MicroEnergy Credits Response to the BeZero Rating of the Microfinance for Clean Energy Product Lines – Mongolia Carbon Project

Contents

Executive Summary

In 2008 as I was founding MicroEnergy Credits, my team helped a Mongolian microfinance institution, XacBank, to begin to think about how microfinance could help the low-income households it served. After doing initial market research in Ulaanbaatar, we discovered some incredible facts:

- Some households were spending 90% of their income buying coal to keep warm in -40˚C temperatures.
- Households would have coal delivered to their home in truckloads as the beginning of the winter season.
- The smoke from burning coal had created the highest global levels of lung disease, heart disease and birth defects.
- Ulaanbaatar was the most polluted city in the world during the winter.
- The carbon emissions exceeded 1.2 million tCO_2e per year per 100,000 households/ Gers[1].

Our team worked with XacBank to identify two products which could address the needs of these communities. One was an efficient furnace that would burn cleanly, eliminating smoke in the home and reducing coal use by 50%. The second was an efficient home insulation, called a ger blanket which could reduce fuel consumption by an additional 50%. Neither of these products were commercially available in Ulaanbaatar at the time. Rather, some prototypes had been developed by universities and development research institutions including GIZ (then GTZ).

There were many challenges to overcome to introduce these products. This included developing local supply chains to produce the products which did not exist in the local economy, development of distribution networks, development of financing products, marketing and education in local communities, development of capacity within XacBank beyond traditional banking activities to work in green banking among many others.

To our great delight, the program found initial success, which led to further challenges, including finding ways to scale. The positive response from our initial pilot led to attention from local government, including an audience with the President of Mongolia. This led to new partnerships with the local government and aid agencies such as the World Bank, FMO, and the MCC.

Ultimately the program was so successful that over 90% of the gers in Ulaanbaatar adopted one or both technologies. This resulted in over 657,276 tCO_2e of emission reductions over 15 years. Additionally, it changed the lives of hundreds of thousands of people. I remember meeting with a tearful resident, who thanked me and said “We always wanted a clean environment, we always wanted to have clean air for our children, we just never had a choice. Thank you for finally giving us the chance to buy these products for our family”.

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[1] Calculated based on: the MCC project reported 13.5 kg of coal consumption daily by traditional stoves in Ulaanbataar in 2010. Annual coal consumption = 4.93 tonnes (13.5 kg x 365 days). Bituminous coal emission factor as per GHG Protocol is 2.44 tCO_2e per tonne of coal. Therefore, annual CO2 emission per household is 12 tCO_2e. For 100,000 households/ Gers, annual emission is 1.2 million tCO_2e.

The program has been scrutinized and studied over the past decades by experts in climate and international development. In addition to the the World Bank, FMO, the MCC, the IFC led study tours, XacBank presented the program at Microfinance Conferences, MEC was a finalist for an Ashden Award and the Swedish Energy Agency conducted extensive due diligence before becoming the offtaker of the carbon credits.

As a project developer that sought to connect microfinance institutions to the carbon markets when they lent for clean energy, MEC was careful to ensure that the project met the major principles of the carbon markets. These included additionality, proper quantification of volume of carbon emission reductions, leakage, and permanence.

Given this experience, I was surprised to read the BeZero report that said the program had a low likelihood of reducing carbon emissions. Thankfully, BeZero invited us to review the assumptions and methodologies of the BeZero analysis to understand how they came to their conclusion, and to provide clarifications.

The first flaw in the BeZero analysis is that it has misinterpreted a report that was a 2012 Impact Assessment of the MCC project in Mongolia. BeZero incorrectly assumed this was a precursor project to the MEC project, when in fact the MCC had added on to the original MEC program. So it is more accurate to say that the MCC program is a portion of the MEC project and it came after the start of the MEC project. BeZero thought that the MCC program shows that the MEC program was not additional. However, there were no efficient stoves commercially available in Mongolia prior to the MEC program.

A further misinterpretation by BeZero of the MCC report is that the efficient stoves did not reduce emissions :

- The evaluation brief of the MCC project that BeZero mentions actually does report significant emissions reduction (65% reduction in PM2.5, 16% reduction in CO) and decreased air pollution (30% reduction of ambient air pollution from residential heating stoves) (Social Impact, 2017), however the key issue was low compliance with instructions on correct usage of the improved stoves, and preference for using traditional stoves;
- However, the MCC project report only spans a two-year period (2011-2013) and non-compliance on correct, regular use of improved stoves was a well-known issue at the time. Even so, a World Bank strategy document from April 2014 titled “Mongolia – National Clean Stove Strategy” concludes that “This strategy, and the December 2013 stocktaking report, finds that a higher share of the urban population needs to have access to cleaner stoves to sustain and increase their contributions to air quality improvements in Ulaanbaatar” and “providing access to cleaner heating or cooking solutions presents a win-win opportunity for a broad range of society – it helps the poor by reducing fuel bills with more efficient stoves using cleaner technologies and it helps everyone with lower health risks from better air quality” (The World Bank Group, 2014);
- In response to non-compliance on proper use of stoves, awareness-raising campaigns advocating regular use of improved stoves were disseminated through media outlets. Moreover, our carbon project promoted compliance among households by providing training on usage during sales, ensuring suppliers correctly install the stoves, replacing and dismantling traditional stoves previously used by the households and

conducting regular phone and on-site monitoring of stove conditions and usage, which are compiled by MEC;

- The results of the initial MCC project spans a short timeframe (two winter seasons from 2011-2013) however, clean stove distribution activities continued afterwards until 2015 reaching total sales of 142,434 stoves (85,161 stoves were distributed through the MCC project from 2010-2012), which covered more than 90% of ger area households at the time, and since 80% of air pollution was emitted from ger area stoves, the sharp reduction in PM2.5 concentration from 2010-2015 as shown in the graph below is attributable to the clean stoves:

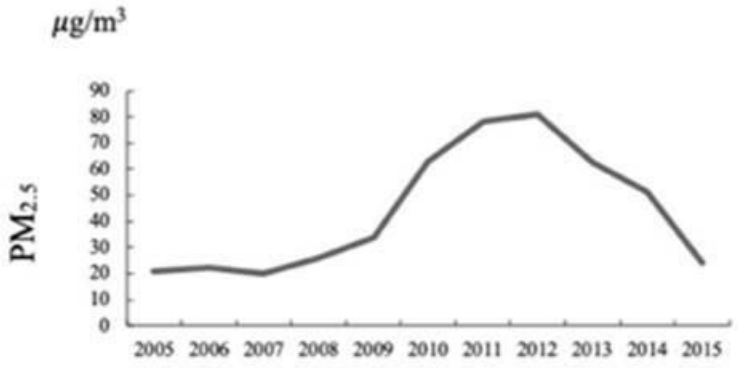


Figure 1: Drop in air pollutant concentrations in Ulaanbaatar City, 2015 onwards (Mongolia Statistical Information Service, National Statistics Office) (Enkhbat, et al., 2020).

Therefore, the conclusion of the ratings agency that the project would not effectively reduce air pollution is unfounded.

Further, one of the reasons I was confident that the program did achieve emission reductions was that we had commissioned our own studies-on an annual basis over several years. These studies showed that the emissions reductions were achieved. The MEC program is a carbon project certified by both the CDM and the Gold Standard. Part of the process of certification is verification that the carbon emission reductions did in fact take place. These monitoring studies were carried out annually. Verification studies were done annually by licensed DOEs and following strict methodologies. The results of these studies are available on the CDM and Gold Standard websites. It seems like an omission that the BeZero rating did not reference the monitoring and verification reports that are a publicly available results of studies for the precise purpose of identifying whether the project reduced emissions.

One of the strengths of a carbon project compared to traditional aid projects is that the requirement for annual verification creates a business case for continual improvement of the projects. If you were to only read the MCC report, you would get the impression of a development aid project that wasted money and resulted in zero impact. In fact, this was a carbon project where the stoves were successfully disseminated, and ran into an obstacle with user errors, but caught the problem with regular monitoring and corrected the issue allowing a dramatic impact to be achieved. Indeed, some of the initial monitoring done as part of the program also found improper stove usage consistent with the MCC report. However, the program did not just throw up its hands. The program was able to use carbon funding for enhanced user training and media campaigns. Subsequent monitoring showed

that this training was effective, as the graph showing the drop in pollution in Ulaanbaatar because of MEC projects.

How the MEC Mongolia Project can be rated using BeZero's Methodology:

We understand that BeZero has a different methodology from the standards that MEC has traditionally worked with. We have reviewed the BeZero methodology training and contributed facts, data and context that support the Project Assessment using our understanding of the the BeZero approach.

Additionality: Very Low risk

BeZero considers four categories of analysis when establishing additionality. These are:

- Financial barriers
- Common practice
- Target market
- National trends.

Common Practice

The clearest evidence of this projects strong additionality is in the Common Practice category.

This project introduced efficient furnaces and efficient home insulation as new products that were commercialized for the first time in Mongolia by the project developers in 2008.

There was only 2.1% penetration of improved efficient cookstoves in Mongolia in 2007. (ASTARE, The World Bank, 2009).

In 2008 the Project Developer, MicroEnergy Credits, and its field partner, the Microfinance Insitution, XacBank conducted original research to determine a viable alternative for low income households to heat their homes without burning the high levels of coal that were the standard practice. After conducting market research and engaging with local technology developers, they established that efficient coal furnaces and efficient home insulation would be two products that would be affordable on a lifecycle basis, and could reduce pollution, expenses and carbon emissions by over 50%. (Source: Internal project documents shared with MicroEnergy Credits, XacBank, and project funder, FMO. Subsequent conference presentations: including SOCAP 2010, MicroCredit Summit, 2010, Ashden Awards 2011)

There were many barriers to overcome. By using microfinance it was possible to overcome the high upfront cost to end users of purchasing the new stove or home insulation. XacBank was willing to offer this financing even though it required many changes to their existing microfinance offerings. However, catalyzing the commercialization and market acceptance of a completely new technology required substantial costs including, but not limited to the establishment of a network of demonstration and marketing centers where end users could see the new products, place orders, have them installed in their homes and have their old stoves removed.

After the MEC program's initial pilot in 2009 showed a high degree of success in meeting the needs of low income household and reducing pollution, additional agencies including the World Bank, the Millenium Challenge Corporation and the Government of Mongolia joined hands to support the project. With their support the project was able to import stoves from Turkey radically shortening the timeframe to develop the local supply chain. With this increased availability of stoves, the project was able to scale up more quickly. (Note: The MCC has published reports about the MCC clean stoves project in Mongolia. The activities assessed in that report are a component of the same MEC carbon program.)

According to a report by UNDP, ICS penetration increased to 54% by 2016 (UNDP, 2020). This can be attributed to the interventions by MEC's carbon program. Clean stove distribution activities reached total sales of 142,434 stoves by 2015 which covered more than 90% of ger area households at the time.

Between 2010-2015 PM2.5 concentration sharply reduced from over 80 mg/m3 to less than 25 mg/m3. This is a 69% reduction in air pollution in Ulaanbaatar. Since 80% of air pollution was emitted from ger area stoves, the sharp reduction in from 2010-2015 is attributable to the clean stoves. This is shown in the graph below (Enkhbat, et al., 2020):

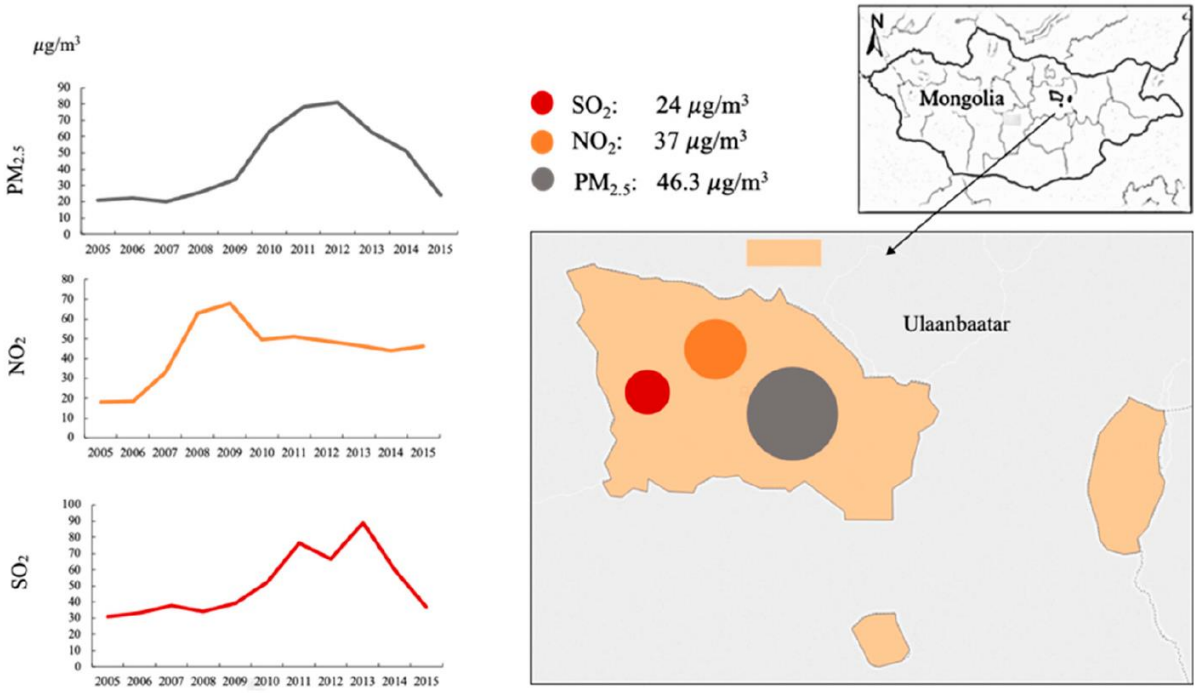


Figure 1: Air pollutant concentrations in Ulaanbaatar City in 2015 (Mongolia Statistical Information Service, National Statistics Office) (Enkhbat, et al., 2020).

Target Market:

Although Common Practice shows the most definitive evidence of additionality, it is also insightful that BeZero takes into consideration '*target market barriers to clean energy*' for proof of additionality.

BeZero considers the target market to understand if a project is additional. As a guideline it considers rural markets more additional than urban market. The MEC Mongolia project

focuses on low income households living in the Ger District of Ulaanbaatar. The ger district is similar to the slum area of other cities. Low income households that cannot afford a permanent house have mounted gers (yurts) which are mobile dwellings in the yards or unofficial areas surrounding the city. These dwellings do not benefit from municipal heating network and often don't even have electricity or plumbing. The inhabitants of the ger district are often pensioners with a very low fixed income. Although this is not a rural area, it experiences greater barriers than the middle class households of Ulaanbaatar. For them, daily payments are a struggle and the option of investing in clean energy is a luxury they cannot afford.

Barriers to clean Energy:

MEC's PoA-DD lists out the following the barriers to clean energy that existed during the initial implementation of the projects due to economic barriers and market inefficiencies including:

- Lack of access to upfront finance
- Lack of awareness of clean energy products and their value proposition
- Lack of supply of products in the local marketplace
- Lack of aftersales service and maintenance
- Inability to afford the clean energy product

MicroEnergy Credits addresses these barriers by working with microfinance institutions to market affordable, reliable clean energy products right to doorstep of the low-income households. Microfinance institutions are well positioned to provide clean energy to their clients because they offer:

- Awareness: Microfinance institutions (MFIs) offer education in addition to finance with frequent touch points
- Finance: Ability to finance upfront costs
- Local knowledge: MFIs are typically local organizations that understand local energy resources and needs.
- Longevity: Most microfinance clients remain bank clients for many years or decades

Historically a very small percentage of microfinance institutions have offered microfinance for low-carbon technologies due to economic barriers. MicroEnergy Credits has developed a program that enables Microfinance institutions to overcome these barriers. Obstacles that have prevented Microfinance institutions from starting clean energy product lines include:

- High cost of hiring additional staff
- Expense of marketing and awareness building
- Steep learning curve to understand products and technologies.
- Lack of partnerships with local suppliers and distributors.
- Reputational risk
- Scarcity of on-lending funds
- Difficulty developing financial products for consumptive loans.

MicroEnergy Credits uses carbon finance to overcome all these obstacles, enabling low-income households and individuals to invest in clean energy products. First, MicroEnergy Credits works with the microfinance institution to develop an attractive clean energy product offering to its microfinance client base, addressing each of the barriers such as education, price, finance, and supply and aftersales service. Second, MicroEnergy Credits trains the microfinance institution to implement the clean energy lending program. This includes business planning, capacity building, and implementation of marketing, education and supply chain processes. Third, MicroEnergy Credits implements a robust and transparent carbon credit monitoring and tracking system to quantify and record the volume of carbon emission reductions created through the clean energy program. Finally, the carbon finance is used to expand and sustain the clean energy program through:

1. Client education and marketing
2. Internal training and capacity building
3. On-lending funds to local SMEs producing the clean energy systems.
4. Aftersales service and maintenance
5. Lowering the interest or principal cost to the client.

Such robust and transparent use of the carbon funding has ensured that the project is self-sustainable. This is the primary reason that the cookstoves distributed through MEC's project are still in use after a decade of distribution. This is among the few projects globally that has successfully achieved such a milestone.

Financial Analysis

BeZero, as part of its additionality method evaluates a financial analysis to ascertain if the project would have happened anyway due to existing market forces, or if the carbon funding played a critical role in catalyzing the project. This financial analysis was done by the project developer in 2008, with the conclusion that carbon finance was required to change a decades old practice.

As mentioned above, there were many barriers to overcome. By using microfinance it was possible to overcome the high upfront cost to end users of purchasing the new stove or home insulation. XacBank was willing to offer this financing even though it required many changes to their existing microfinance offerings. However, catalyzing the commercialization and market acceptance of a completely new technology required substantial costs including, but not limited to the establishment of a network of demonstration and marketing centers where end users could see the new products, place orders, have them installed in their homes and have their old stoves removed.

To cover the budget for these activities which were completely outside the scope of operations of a typical microfinance institution, an additional funding source was needed.

The parties conducted an internal financial analysis and established that the project was not viable without carbon finance (IRR negative), but was able to achieve a viable IRR of approximately 8% with the projected value of carbon finance. These analyses were required in order to achieve buy in from the management team at XacBank to begin the project.

Although it would have been possible in 2008 to hire an independent consultant to verify or recreate this financial analysis, the project developers did not do this because it was explicitly not required by either the CDM or Gold Standard because it was deemed an unnecessary additional expense for small scale projects which had met additionality criteria by other methods. It was important to the project developers to use carbon funds to support the project rather than redundant use of consultants, so this verification of this analysis was not commissioned.

BeZero in its analysis asks the question if a conventional business could have carried out the project without carbon finance. Given the tremendous barriers and significant business risks entailed in starting the clean cooking program including an extremely low income target market, an untested and brand new improved cookstove and ger insulation technology, the need to establish an entirely new supply chain and distribution mechanism it is clear that this was not a business that could have been easily carried out by any single business entity within Mongolia.

BeZero includes in its methodology the insight that free or heavily subsidized products are often not used by end users as they do not value them. The MEC program was developed with this insight as a core principle. At the start of the program, the products were distributed at market value with microfinance used to make the monthly cost less than the baseline stove. After the initial pilot, additional agencies including the government of Mongolia joined and offered a deeper discount on the stoves. Although this went contrary to the original principle, in this case, the benefit of being able to distribute stoves more quickly outweighed the risk. Indeed, as of the latest verification audit over 75% of the project stoves are still functioning, many over 7-8 years after installation. (Source: MEC 2023 audited verification report). It is a testament to the carbon credit business model, that carbon funding provides an annual incentive to the project participants to keep the products functioning. Each year as the projects monitoring program identifies households that have broken stoves or users that are incorrectly using the stove, the project is able to provide aftersales technical service or customer training.

Summary:

The project establishes strong proofs of additionality to across all the factors of financial barriers, rural target population, common practice and market penetration and reducing reliance on polluting fuels. Therefore, the project poses very low risk.

Over-crediting: Very low risk

BeZero considers whether a project has a risk of overcrediting.

This project has a very low risk of overcrediting, and a much higher likelihood of undercrediting due to several conservative factors that were used in its calculations.

The following conservative factors lead towards undercrediting:

- The project carried out sampling and monitoring at the VPA level rather than the option to use cross-VPA monitoring. This means it monitored a higher sample size than required by the methodology.

- The project uses a 90/10 confidence/precision which is higher than 90/30 allowed by some cookstove methodologies.
- The project monitors usage at district level thereby taking into full consideration the heterogeneity in usage rates across different heating districts.
- Stove stacking is simply not possible because –
    - The baseline stoves are systematically taken and scrapped.
    - There are no non-coal based technologies available in the project boundary even to date.
- One factor that can be questioned in some projects is fNRB. This factor is not applicable as there is no biomass use involved.
- Although the project probably reduces the use of a small amount of biomass which is sometimes used to start the baseline stoves, the project conservatively did not attempt to credit this.
- The fuel savings were measured using advanced regression model accounting not only for project fuel usage, but also external factors like temperature and wind speed prevailing during the winter months in Mongolia. The approach used for calculating fuel savings is specific for individual districts/regions, different seasons (Autumn, Winter & Spring) and for different dwelling types, which increases the accuracy of ER calculations. This model was specifically requested by the CDM board during the project validation, and is far more precise and advanced than other cookstove modeling methods.
- The project has conservatively not credited the four warmest months of the year, even though the stove is also used in those months.
- Stove efficiency is not a parameter used for ER calculations. For transparency, the project reports a stove efficiency which is from lab tests. However the actual ER calculations use an even more robust method. Fuel is weighed in kitchen performance tests. This is then combined with the external factors including temperature and windspeed and is specific for individual districts, and for each season.
- While it is certain that homes that used both the Stove and the Blanket experienced lower emissions than homes that only had a stove, in order to ensure conservativeness of Emission reduction accounting where both Stoves & Blankets are in place, the PP has not claimed addition ER for such GERs. PP has accounted only for ER assuming only stove in place. This was done for a pragmatic reason. The methodology required by the CDM was too complex to account for multiple products in the same household with the same baseline. After extensive deliberation, the best minds could not find a way to credibly measure it with the high standard of care required to be approved. Therefore, the project opted to be conservative and only account for the stove.
- GS2435's emission reduction calculations rely on outdated default figures. In particular, the project uses outdated Intergovernmental Panel on Climate Change (IPCC) global warming potential figures for CH_4 and N_2O. The CH_4 figure that is used is

lower than the more up-to-date IPCC figures which creates a small possibility of under-crediting.

- GS2435 conservatively does not account for emission reductions related to the reduced use of wood as a starter fuel, however, they do not monitor some of the necessary parameters, such as the fraction of non-renewable biomass or baseline wood usage, required to claim credits for these reductions. In our view, this presents a small likelihood of under-crediting.
- Although issues with user errors using the stoves were identified early on, (MCC 2012) The project implementer has carried out extensive user training to ensure the proper usage and handling of stoves by the Households. Annually MEC has surveyed hundreds of households and carried out assessment of fuel usage in the project scenario, which has clearly established the fuel reduction.

Other factors: End User Compliance

- Although issues with user errors using the stoves were identified early on, (MCC 2012) the project implementer has carried out extensive user training to ensure the proper usage and handling of stoves by the Households. Annual audited verification reports confirm that MEC has surveyed hundreds of households each year and carried out KPT assessment of fuel usage in the project scenario, which has clearly established the fuel reduction. This is supported by measured reductions in airpollution in Ulaanbaatar.

Stove efficiency assumptions:

The Project conservatively does not rely on stove efficiency assumptions. Rather it uses kitchen tests which are the most accurate assessments and are only one input into MEC's even more robust methodology. Laboratory testing of stove efficiency, which BeZero considers a less reliable indicator, is reported in the project documents for transparency but is not used in the calculation of the Emission Reductions.

Seasonal effects –

The project exceeds other cookstove projects in measuring seasonal effects. It carries out fuel saving calculation efforts for each of the 3 seasons during the heating season including autumn, winter, and spring. The regression analysis takes into consideration the air temperature and wind speed to estimate the baseline fuel consumption. This approach is more robust than carrying out KPTs once a year or biennially, as required by most cookstove methodologies.

Monitoring –

Sampling methodology:

The project exceeds the CDM guidelines on sampling and carries out sampling and monitoring at VPA level although the option was there to carry out a cross-VPA monitoring, which would have resulted in a lower sample size. The 90/10 confidence/precision is

considered a very robust method in carbon markets and is higher than the 90/30 allowed by some cookstove methodologies.

Usage Rates:

The project monitors usage at district level thereby taking into full consideration the heterogeneity in usage rates across different heating districts.

Stove stacking:

Stove stacking is not a risk for this project because:

- The baseline stoves are systematically taken and scrapped.
- There are no non-coal based technologies available in the project boundary even to date.

Confidence in reported figures:

The parameters of interest usage rates, fuel savings etc. are monitored using kitchen performance tests on a sampling basis and are DOE audited before undergoing another level of review at GS.

Calculation methodology:

Baseline setting:

The project has been able to unequivocally establish the baseline. Space heating is different from cooking and in Mongolia, the use of traditional stoves using coal is prevalent.

Use of default figures:

The project follows the default figures provided by the IPCC, as required by the methodology. The figures used by MEC are conservative compared to the most recent default values.

The value of fNRB is not an issue for this project as there is no biomass use involved.

Leakage: Very low risk

This project has a very low risk of leakage.

The project took measures to ensure leakage did not happen.

- The project implementer collected and scrapped the old stoves upon installation of the new heating technologies. This ensured that the baseline stoves did not move outside the project boundary or get used as an alternative option to the project stoves within the project boundary.
- Leakage is only possible when the traditional stoves are transferred outside the boundary and used in place of a more efficient technology. This is not possible as the project has established that outside of the project boundary, space heating is also done by inefficient stoves.

BeZero questioned whether 100% of the baseline stoves were indeed scrapped. The audited reports indicated 98% of the sample were scrapped. The stove scrapping policy was an integral part of the project distribution process. Records of the stove scrapping are with the Project Developer.

However even if the stoves were not scrapped, it is not possible that a baseline stove replaced a more efficient stove because there were no efficient stoves in place outside the project boundary.

Monitoring and Discount factor:

Since the baseline stoves are scrapped at time of distribution of project stoves, there is no risk of leakage.

Loss of space heating and/or insect repellant:

Since the baseline stoves are collected and scrapped, there is no risk of space heating loss. Insect repellant is not relevant to this project type.

Wood-fuel supply and demand: N/A.

Non-permanence: Very low risk

Non-permanence refers to the risk that emission removals by afforestation or reforestation carbon offset projects are reversed because forests are cut down or destroyed by natural disaster. As per World Bank's views presented at SBSTA 39: "The carbon sequestered in land use activities in terrestrial ecosystems is subject to the risk of non-permanence due to disturbances that cause the stored carbon to be emitted back into the atmosphere. Such reversal of carbon sequestered in terrestrial pools can nullify emissions reduction benefit and undermine the permanence of mitigation actions."

Non-permanence is not applicable for MEC's carbon program for two key reasons:

- All the carbon credits generated are *ex post* . The emission reductions have already happened before a credit is issued. So it is a permanent reduction.
- There is no biomass involved in this project.

Transparency of data

The MEC project data which cannot be found in online sources is available by reaching out to the project developer. This projects transparency is strengthened by the fact that the project developer is a going concern and happy to respond to questions about the project, including providing . There are many data fields which BeZero examines but which naturally are not posted in public settings. This includes investment analysis which was carried out in board rooms, and project data which was not required and therefore not proper to include in the official documents submitted to the standards. Examples of project data which is easily available by reaching out to the project developer include:

- Records of the stoves that were scrapped
- Discussion of the Investment analysis carried out by project proponents
- The detailed use of the carbon funds for activities including
    - End user awareness and marketing
    - Stove distribution networks
    - Aftersales service

- Institutional capacity building
- End user financing
- Carbon monitoring

Policy: Very low risk

The MEC project has a very low policy risk for the following reasons:

- The government supported the MEC program after the initial pilot including adding financial support, meeting with the President of the country, and presentation at the Mongolian Economic Forum. (MEF 2011)
- The efficient stoves disseminated by the MEC program have achieved over 90% penetration in the Ulaanbaatar ger districts.
- The carbon program has supported the Government's NDC, by helping its end users shift from raw bituminous coal to refined coal briquettes which are a cleaner burning form of coal, and which is the cleanest available option within Ulaanbaatar. The RCBs first became available in Mongolia in 2019, and research into them was one of the uses of the carbon funding. All of the households now use RCBs rather than raw coal.
- The efficient furnaces promoted by MEC have achieved over 90% penetration within Ulaanbaatar, and the PM air pollution in Ulaanbaatar has reduced over 65%.
- While Mongolia's policies represent a shift away from coal, the cleanest heating option for low income households in the ger district is still the project's clean stoves using the RCB briquettes. The project does allocate part of its funding to ongoing R&D in order to transition the household to electric heating using heatpumps or other fuel source when those technologies become viable for that segment. Until a replacement technology becomes viable, it is a vital need to keep the efficient stoves in place, and prevent any backsliding in how the stoves operate and loss of the valuable source of emission reductions.

Initiatives:

- Benefits include health and environmental benefits.
- This carbon program predated, catalyzed, and then co-financed the government initiatives.
- Efficient furnaces are not in the Mongolia NDC.

Effectiveness:

- Governmental policies are not a risk to carbon efficacy.
- Prior to the project in 2009, the government had not considered efficient stoves as a solution and had no policy to support them. There were some development aid projects that were exploring these options on an R&D basis by GTZ and some universities.
- In 2008, the MEC carbon program worked with XacBank to create a viable program. Carbon funding was essential to the activation of these private sector partners to engage and bring their significant capabilities to introduce the technologies.
    - Reference: 2008 MEC Ecosecurities Announcement
    - Reference: 2009 MEC SOCAP presentation

    - Reference: 2009 MEC Microfinance Summit presentation
    - Reference: 2010 MEC Ashden Award Application
    - Reference: 2008 MEC -XacBank Management meeting presentations
    - Reference 2013: Citi group ERPA announcement
- The initial pilot was very successful in attracting attention from the government, the World Bank and donors including MCC, who then took efforts to accelerate the scale up, and support the program in the policy framework.
    - Reference: MEC presentation at Mongolia Economic Forurm
    - Reference: MCC project initiation documents
- As those players supported the program, care was taken to separate which financing was supported by carbon and which by donors. In this way the investment analysis used in the carbon program was not damaged.
    - Reference: XacBank, MEC, World Bank, MCC internal documents from 2010
- As a result of these collaborations the scale up was nearly complete. This is where we saw the strong adoption of the stoves and tremendous drop in pollution.
    - Reference over 90% adoption of stoves.
    - Reference: Drop in pollution 2012-15 (Enkhbat, et al., 2020).
- Further these efforts created near universal support by policy makers for this approach.
    - Reference: 2013 IFC Study tour of Mongolia
    - Reference: 2013 WB document supporting efficient furnaces as a key strategy for Mongolia
    - Reference: 2013 MEC audience with President of Mongolia
- After some time end users started to not use the stoves properly. This was noted by project proponents during carbon pre-monitoring. This was also noticed in the MCC impact assessment of 2012, which noted that all the stoves were disseminated, and that users experienced benefits in level of smoke and heating capability, but that some users were toploading the stoves.
- Luckily the continued carbon funding created funds to reeductate users through training campaigns and media campaigns and make sure the usage was proper.
- After some time the donor projects ended and the government changed hands. Similarly the new government came up with different policies, such as at one point temporarily “banning coal” in the ger districts or proposing a shift to electric heating.
- These policies were well intentioned but did not create any viable alternative for ger district dwellers, who are the poorest members of Mongolian society and who did not have any viable alternative to survive in winter temperatures.
- When that happened, the carbon project proponents used carbon funding to do its own R&D on any alternative heating options for the ger district that did not use coal. The result of this research was that electric heating alternatives such as resistance heaters or heatpumps were not yet viable for such cold temperatures. Instead the

program was able to shift the customers to the RCB briquettes which were cleaner than raw coal.

- Clearly, carbon funding has been an essential form of funding that initially catalyzed government policy, and then later continued to provide viable low carbon options to poor households when the official policies did not fully serve their needs or when donor agencies had moved on.
- This project demonstrates the unique role of carbon finance across the evolution of a market environment and evolving policy environments as well a typical donor behavior.
- The remarkable feat is that over 75% of the households of Ulaanbaatars ger district continue to use the efficient furnaces which were disseminated by the carbon project, in some cases over 10 years ago.
    - Reference: MEC 2023 verification report

Factual Errors in BeZero Analysis

Additionality

MEC's understanding of BeZero's approach and what the conclusion could be using that approach:

MEC understands that the BeZero aims to use a robust methodology to prove additionality for the projects.

Before MEC's carbon program, there was only 2.1% adoption of efficient stoves in Ulaanbaatar between 2003-07 (ASTARE, The World Bank, 2009). Our program helped scale the distribution of cookstoves to 54% of the households in Ulaanbaatar by 2016 (UNDP, 2020).

The proof of all these factors makes the clean energy projects by MEC's Carbon program highly additional. Moreover, the continuous use of these cookstoves by customers even after a decade of distribution proves that there was very low risk to additionality of the projects.

Factual errors in BeZero's analysis:

BeZero states: "Significant risks to additionality due to the project's similarity to common practice."

MEC response: There were nearly zero efficient furnaces or ger blankets when MEC started the program. The MEC program introduced these technologies to the Mongolian market. The project is not common practice. Using the CDM's Tool01: Tool for the demonstration and assessment of additionality –

1. The use of inefficient technologies for space heating was prevalent in the project boundary. There are no other projects or programmes under the CDM, Verra or Gold Standard similar to this project.
2. At the time of implementing this project, there were no laws that required this project to be implemented.

The Gold Standard deems distributed technologies implemented in Land Locked Developing Countries (LLDC) as additional and hence no common practice analysis is even required.

BeZero states: "Our view that credits issued by this project face significant additionality risks is informed by policy support at the national level for clean fuels; the project distributing stoves to house owners; the subsidised price of night-time electricity in Ulaanbaatar which is likely to reduce the need for coal stoves for overnight heating; and from the likelihood that project activities do not exceed common practice. These risks are slightly alleviated by the project's facilitation of micro-finance for consumers, which may help to reduce any potential financial barriers."

MEC response: This analysis fails to address the main deterrents to the widespread adoption of electric heaters currently which are:

- High upfront cost: electric heaters currently cost an average of MNT 5 million, which poses a hefty capital expenditure on the part of low-income households. Moreover, given that the government highly subsidizes coal briquettes, the price of such briquettes has remained constant over the past 5 years while the cost of heaters have risen as a result of high inflation. As a result, stoves are a mainstay for heating purposes in ger area households as they are economically viable and provide a solution for both heating and cooking.
- Weak electricity distribution in ger areas: Although the majority of ger-area households are connected to the central grid, the distribution network is weak and limits the heaters to only 4kW in the ger area, which is not enough to heat a ger. (Source: https://documents1.worldbank.org/curated/en/950841626163487984/pdf/Disclosable-Version-of-the-ISR-Ulaanbaatar-Clean-Air-Project-P122320-Sequence-No-19.pdf).
- Insufficient power capacity in the country: Mongolia faces energy capacity constraints and imports electricity to meet demand that exceeds capacity. In the absence of new (preferably cleaner) installed power capacity, the connection of the ger area to electric heaters may severely overload the current capacity and reduce the reliability of electricity supply (blackouts are common in the country). Moreover, a sudden increase in electricity demand may lead to a sharp increase in the price of electricity and may even lead to the discontinuing of night-time subsidies.

The MEC program works with a microfinance program to specifically people living in the low income ger districts surrounding Ulaanbaatar. Those people live in gers (yurts) which are informal housing not connected to the city-wide district heating.

At the time the program was started, the Mongolian government was impressed by the performance of the MEC pilot and highlighted it for government support. Subsequent governments implemented clean energy policies banning the use of coal in the ger districts. However, these policies did not create any alternative for the ger dwellers to heat their homes.

Extensive research was carried out by local universities and development agencies including GTZ, and in conjunction with FMO, which was reviewed by MEC to look for the cleanest possible heating technology for the ger dwellers. Unfortunately, passive solar or electric options such as resistance heat or heat pumps were not close to being economically viable given the extreme temperatures. Periodically during the life of the project MEC with its partner XacBank, used a portion of the carbon funding to carry out further research, to see if technological advances in heat pumps had made them a viable option, however they had still not reached viability.

The Mongolian subsidized electricity policy of 2017 “grants free of charge monthly electricity use up to 1,500 kilowatt-hour per customer during night time (between 9:00 pm–6:00 am) in winter season” (Asian Development Bank, 2018). In the Mongolian climate, heating is needed during the day, not only at night. Even given this subsidized electricity price, none of the Gers have switched to electric heating because of this policy. There is no practice of households in Ulaanbaatar’s ger district switching to electric heating.

Even after many years the dominant process are households using the stoves disseminated by the project, which have maintained a long-term success rate as a result of continued maintenance support by the project proponents. As per ADB Institute’s report and recommendation to the President of Mongolia coal “is the dominant energy resource in

Mongolia which accounts for 60% of primary energy and 95% of secondary energy, and it is the sole resource available at affordable cost in the country" (Asian Development Bank, 2018).

There were nearly zero efficient furnaces or ger blankets when MEC started the program. The MEC program introduced these technologies to the Mongolian market. The program achieved initial success in the pilot phase, and then greater success in the scale up phase, resulting in a high penetration of usage of the products. All these products were part of the carbon program.

BeZero states: "GS2435 demonstrates its additionality by compliance with the CDM positive list for small-scale projects. However, our analysis indicates that the positive list alone may not be sufficient to support additionality claims as it does not consider other important factors such as national policies, common practice and barrier analysis."

MEC Response: BeZero is basing this claim on the project documentation that MEC submitted for validation under the Gold Standard. Naturally, MEC followed the Gold Standard guidelines for additionality in its Gold Standard documentation because otherwise it would not have been approved through that standard. The Gold Standard required the CDM positive list which is what MEC supplied. Using an alternative analysis would have been an improper application of Gold Standard rules.

The project is clearly additional when other analyses such as national policies, common practice and barrier analysis are carried out, as demonstrated elsewhere in this response. The Gold Standard validation submission was not the proper place to look for those other analyses.

In the PoA-DD of MEC's Carbon Program GS2434, we have highlighted the barriers to clean energy access that the people in Ulaanbataar faced as well as the obstacles that hindered XacBank from starting a clean energy program without support of the carbon funding received through MEC channel.

BeZero states: "In aggregate, this program of activities (PoA) exceeds the 60 ktCO2e emission reductions per year limit of small-scale projects".

MEC Response: This project qualifies for and is compliant with Type-II as per CDM-SSC-PDD and the efficiency improvements of the project is within "equivalent of 60 GWh per year every year throughout the crediting period".

BeZero states: "If this project were not small-scale it would be required to conduct more robust additionality tests, such as investment analysis, barrier analysis and common practice analysis. GS2435 targets sales towards the peri-urban population in Ulaanbaatar. However, the penetration rate of clean cooking using gas fuels, ethanol, electricity, and renewables is high in urban areas and throughout the entire population of Mongolia (54.5% and 38.6% urban and total population penetration in 2012 respectively)".

MEC Response: We would like to request for the reference used to state that there is high penetration of clean fuels in Mongolia, especially for heating purposes in the low income ger districts of Ulaanbaatar. Our field teams and field partners are unable to identify any alternative heating fuel for these populations other than coal. The International Energy

Agency shows that coal continues to be the most used fuel in Mongolia till date. As per IEA's country data key statistics 2020, in 2020, coal still accounts for 67% of energy use in Mongolia (IEA, 2023). ADB Institute's report and recommendation to the President of Mongolia also states that coal "is the dominant energy resource in Mongolia which accounts for 60% of primary energy and 95% of secondary energy, and it is the sole resource available at affordable cost in the country" (Asian Development Bank, 2018).

Reference to cooking fuels in not relevant as the project involves replacement of space heating stoves.

BeZero states: "Furthermore, this project was not the first of its kind in Ulaanbaatar as it was preceded by similar cookstove distribution projects by the U.S. Millennium Challenge Corporation (MCC) and the Mongolian Government alongside the World Bank. These prior projects had limited success in increasing the long-term penetration of ICS because benefits were not observed by homeowners due to low compliance with usage instructions. Both of these points suggest that cookstove adoption in Mongolia may already be common practice and may not be reliant on projects such as GS2684."

MEC response: There were nearly zero efficient furnaces or ger blankets when MEC started the program. The MEC program introduced these technologies to the Mongolian market. The MEC project received support from government agencies, the World Bank and the MCC, to help it scale up after the successful pilot. Each of these agencies gave their support a project name. However, they were all part of the same project.

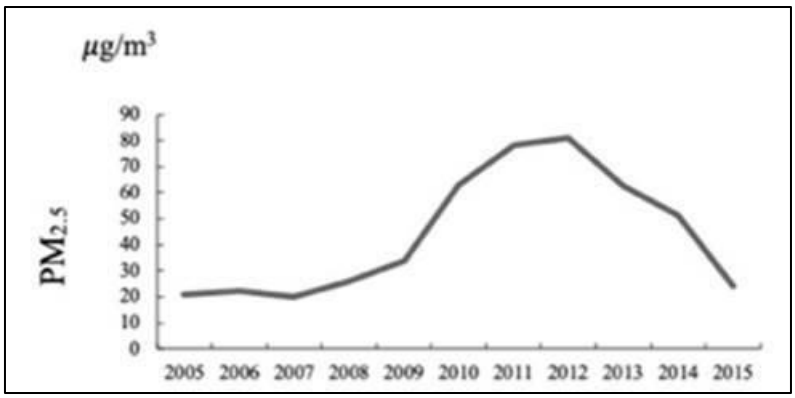
BeZero states: "One of these previous projects in Ulaanbaatar highlighted that emission reductions were not successfully achieved due to only 4% of households using their ICS as directed by the manufacturer. This suggests that one of the barriers to ICS adoption is education on the proper usage of stoves. This project addresses this barrier through training on usage during sales. However, even that practice may not improve use. Some previous projects in the same area that employed additional awareness campaigns still observed limited success."

MEC response: The MCC project that BeZero is referencing does report significant emissions reduction (65% reduction in PM2.5, 16% reduction in CO) and decreased air pollution (30% reduction of ambient air pollution from residential heating stoves) (Social Impact, 2017), however the key issue was low compliance with instructions on correct usage of the improved stoves, and preference for using traditional stoves.

In response to non-compliance on proper use of stoves, the project implemented awareness-raising campaigns advocating regular use of improved stoves disseminated through media outlets. Moreover, our carbon project promoted compliance among households by providing training on usage during sales, ensuring suppliers correctly install the stoves, replacing and dismantling traditional stoves previously used by the households and conducting regular phone and on-site monitoring of stove conditions and usage, which are compiled by MEC.

The results of the initial MCC project spans a short timeframe (two winter seasons from 2011-2013) however, clean stove distribution activities continued afterwards until 2015 reaching total sales of 142,434 stoves (85,161 stoves were distributed through the MCC project from 2010-2012), which covered more than 90% of ger area households at the time, and since 80% of air pollution was emitted from ger area stoves, the sharp reduction in PM2.5 concentration

from 2010-2015 as shown in the graph below is attributable to the clean stoves (Enkhbat, et al., 2020):



Therefore, the conclusion of the ratings agency that the project would not effectively reduce air pollution is unfounded.

BeZero states: “The aggregated PoA has distributed 88,715 stoves, of which 33,369 went to people living in houses and 55,346 were distributed to people in gers. However, those living in houses are likely to realise less benefit from ICS adoption due to their greater access to public amenities such as electricity and water, and the higher likelihood that they already own relatively efficient baseline stoves. Therefore, this suggests to us lower barriers to ICS adoption and therefore weaker additionality when stoves are distributed to people living in houses rather than Gers”.

MEC response: As stated above, the primary technology used in the heating districts of Ulaanbaatar was inefficient stoves. There were no efficient baseline stoves commercially available in Mongolia prior to the MEC program. The only stoves were the inefficient coal furnaces. Electric stoves are not economical regardless of low electricity cost due to low temperatures in Mongolia. The only economical option aside from the MEC efficient stoves is connection to district heating which only middle-income homes can access.

BeZero states: “the project distributed 9,752 ger insulation blankets. However, gers where both ger insulation blankets and stoves were distributed reported lower fuel savings than those where only stoves were distributed. In our view, this indicates a risk that the project’s activities are ineffective at reducing emissions, potentially compromising the carbon efficacy and therefore the additionality of the project. This consideration applies especially in relation to the ger insulation blankets, as the aforementioned analysis of fuel savings implies they have a limited link to emission reductions.”

MEC response:

BeZero states: “GS2435 is an improved efficiency project, therefore no fuel switch is required. Notably, Mongolia's nationally determined contributions, published in 2020 (after the project's first crediting period), committed the country to reduce coal usage in the city and switch people to cleaner fuels. This was further supported by the Asian Development Bank's

change of stance from encouraging the uptake of improved efficiency cookstoves to funding cleaner fuel conversion. Overall, this highlights the overarching goal within Mongolia to move towards cleaner fuels and, in our view, further limits this project's common practice additionality".

MEC response: At the time of implementing this Programme, there were no NDCs or policies mandating use of clean technologies in place. This project was implemented and registered during 2012-13 period.

BeZero states: "Furthermore, since 2011, the government of Mongolia has supplied subsidised night-time electricity prices to regions with the highest air pollution. This may further reduce the need for these stoves as these subsidies make electric heating cheaper and may reduce the use of stoves for night-time heating, which could lead to reduced emissions from night-time stove use even in the absence of project activities. The project has previously stated that reduced night-time emissions are one of the main intended benefits of the project".

MEC response: Based on the extensive project surveys carried out for the project, the households were using Coal based heaters, connected to heating wall, which would effectively heat up the households. The electric stove usage for heating was not found in the project regions. Subsequent governments implemented clean energy policies banning the use of coal in the ger districts. However, these policies did not create any alternative for the ger dwellers to heat their homes. So, residents were forced to buy coal illegally. Extensive research was carried out by local universities and development agencies including GTZ, and in conjunction with FMO, which was reviewed by MEC to look for the cleanest possible heating technology for the ger dwellers. Unfortunately, passive solar or electric options such as resistance heat or heat pumps were not close to being economically viable given the extreme temperatures. Periodically during the life of the project MEC with its partner XacBank, used a portion of the carbon funding to carry out further research, to see if technological advances in heat pumps had made them a viable option, however they had still not reached viability.

BeZero states: "While air pollution in Ulaanbaatar is primarily driven by the use of wood and coal for cooking, in our opinion, it is unlikely that this project will effectively reduce air pollution. This view is supported by evidence from a previous MCC project which distributed the same stoves as GS2435 but did not observe a reduction of emissions related to stove use. Reduction of cooking and heating related emissions may be better addressed by the expansion of electrification.".

MEC response: The MCC project is the same project as MEC's program. The issue of imperfect usage of the stoves was caught early on and was corrected through further user awareness campaigns and trainings.

BeZero states: "To date, and in aggregate across the PoA, only about 37% of credits issued by the project have been retired. However, the project has still distributed over 90,000 CEPs and continues to function as of 2022, when it requested to renew its crediting period. This

continued operation despite the project realising only a fraction of the potential revenue represented by issued credits could suggest that carbon finance is not necessary for the project to be financially viable".

MEC response: The report provides outdated information. All VERs from the VPAs have been transacted by the CME. The funding has been received by the CME and percolated to the programme. Whether the VERs have been retired by the end-buyer are not under the control of the CME. The retirement information would only be available once our Buyer has sold this further or retired these credits.

BeZero states: "Overall, we conclude that the additionality of GS2435 is likely to be low due to not exceeding common practice, and the existence of other projects in the same area distributing the same stoves. We also note evidence that the national-level policy favours the adoption of clean-fuel alternatives to coal-based stoves, which may reduce the carbon efficacy of credits issued by this project when compared to a business-as-usual scenario.

MEC response: There were no efficient baseline stoves commercially available in Mongolia prior to the MEC program. The only stoves were the inefficient coal furnaces. Electric stoves are not economical regardless of low electricity cost due to low temperatures in Mongolia. The only economical option aside from the MEC efficient stoves is connection to district heating which only middle-income homes can access.

Over-crediting:

BeZero states: "Significant over-crediting risks as the methodology behind fuel savings calculation is unclear."

MEC response: The project follows the CDM guidelines on sampling and carries out sampling and monitoring at VPA level although the option was there to carry out a cross-VPA monitoring, which would have resulted in a lower sample size. The 90/10 confidence/precision is considered a very robust method in carbon markets and is higher than the 90/30 allowed by some cookstove methodologies.

The project monitors usage at district level thereby taking into full consideration the heterogeneity in usage rates across different heating districts.

We feel that this is a redundant issue and as explained in other sections of the MEC response, stove stacking is simply not possible because –

- The baseline stoves are systematically taken and scrapped.
- There are no non-coal based technologies available in the project boundary even to date.

Confidence in the reported figures – The parameters of interest viz, usage rates, fuel savings etc. are monitored following the requirements of the applied methodology and are third party audited before undergoing another level of review at GS. MEC is confident that each tonne of CO2 avoided is real, measurable, and verifiable.

Baseline setting – The project has been able to unequivocally establish the baseline. Space heating is different from cooking and in Mongolia, the use of traditional stoves using coal is prevalent.

The project follows the default figures provided by the IPCC, as required by the methodology.

fNRB is not applicable as there is no biomass use involved.

BeZero states: "It is our opinion that credits issued by GS2435 face significant over-crediting risk due to the lack of clarity in project documents regarding how fuel savings were measured. This is compounded by a Mongolian study which found that, in practice, fuel savings were limited when using the same improved cookstoves (ICS) distributed by GS2435. Further risks are raised by the use of default figures and initial use of lab-based methods for determining initial stove efficiency."

MEC response: The fuel savings were measured using advanced regression model accounting not only for project fuel usage, but also external factors like temperature and wind speed prevailing during the winter months in Mongolia. In addition, the PP has not credited the four months of the year, as stove is used less in those months. Stove efficiency is not a parameter used for ER calculations or wood savings calculations. Hence this is irrelevant. Further, the approach used for calculating fuel savings is specific for individual districts/regions, different seasons (Autumn, Winter & Spring) and for different dwelling types, which increases the accuracy of ER calculations.

BeZero states: "GS2435 calculates its emission reductions based on the fuel saved in the project scenario compared to the business-as-usual baseline scenario. The methods used for determining the stoves' advertised efficiency and emissions were developed to be regionally specific. However, instead of using the fuel efficiency to calculate credit issuance, the project opted to measure fuel savings in situ. Our ability to fully interrogate the techniques used to calculate emission reductions is hindered by the limited information in the public domain regarding the project's methodology. Our view that this monitoring method likely creates over-crediting risk is supported by a monitoring report for one project within this PoA (GS2685) which notes highly dissimilar emission reductions during its second survey compared to the first (e.g. 0.776 and 4.04 tCO_2e per household per heating season for stoves in gers, during the first and second monitoring reports, respectively)."

MEC response: The detailed ER calculations can be made available for the review. Absence of information in public domain has no linkage with accuracy of calculations itself.

The space heating stoves are quite different as compared for cookstoves. Here, the fuel usage (and savings) depends upon the external factors like ambient Temperature and Wind Speed, which varies year on year. Hence, a robust calculation model was developed which would arrive at a dynamic baseline considering these variations every year. Thus, the number of credits could highly vary year on year based on the climatic conditions.

BeZero states: "A survey conducted by Millennium Challenge Corporation after distributing the same ICS in Mongolia found that fuel use was not reduced in practice due to only 4% of

users complying with given instructions on stove usage. Therefore, without further information regarding fuel reduction experiments, the calculated emissions are subject to over-crediting risk due to the likelihood that stoves are not being operated in a way that will maximise emission reductions."

MEC response: The project implementer has carried out extensive user training to ensure the proper usage and handling of stoves by the Households. Annually PP has surveyed hundreds of households and carried out assessment of fuel usage in project scenario, which has clearly established the fuel reduction.

BeZero states: "Notably, the project's emission reduction calculations indicate that households that purchased ger insulation blankets in addition to ICS did not benefit from any additional emission reductions compared to households that solely purchased ICS. This could indicate that there are limited benefits from ger insulation blankets, or that fuel usage experiments did not effectively capture real life fuel usage."

MEC response: To ensure conservativeness of Emission reduction accounting where both Stoves & Blankets are in place, the PP has not claimed addition ER for such GERs. PP has accounted only for ER assuming only stove in place.

BeZero states: "Emission reductions from cookstoves can only be claimed as long as the ICS are in use, therefore usage monitoring is key to determining emission reduction. GS2435 employed random sampling of 690 properties from the entire PoA (202 houses and 488 gers). However public information on the sampling methods is not available. Furthermore, there is no breakdown of surveyed households by VPA. This monitoring suggests that 91.58% and 96.93% of the project's distributed stoves were still in use at the time of monitoring in house and ger settings, respectively."

MEC response: The sampling was done in accordance with the prescribed sampling guidelines by standard and methodology. The number of samples are statistically valid as per the required confidence/precision level, and also underwent a third-party Audit.

BeZero states: "GS2435's emission reduction calculations rely on outdated default figures. In particular, the project uses outdated Intergovernmental Panel on Climate Change (IPCC) global warming potential figures for CH_4 and N_2O. The CH_4 figure that is used is lower than the more up-to-date IPCC figures which creates a small possibility of under-crediting."

BeZero states: "GS2435 conservatively does not account for emission reductions related to the reduced use of wood as a starter fuel, however, they do not monitor some of the necessary parameters, such as the fraction of non-renewable biomass or baseline wood usage, required to claim credits for these reductions. In our view, this presents a small likelihood of under-crediting."

MEC response: Both the above statements point to under crediting from the program.

BeZero states: “The project claims credits only for the heating seasons of fall, winter, and spring. This is a conservative approach because our top-down analysis of stove use in Mongolia indicates that even under summer conditions, all gers use coal stoves to some extent.”

MEC response: Points to conservative approach being used in terms of crediting.

Leakage:

BeZero states: “GS2435 does not consider leakage from stove stacking in its calculations. Ger stoves require a chimney to transport smoke outside, and as gers are built with one chimney it is highly unlikely that stove stacking would occur. However, 33,369 out of 88,715 stoves were sold to people living in houses, possibly bypassing this limitation and therefore, in our view, creating some potential leakage risks.”

MEC response: The inefficient stoves are received by XacBank and scrapped for each of the beneficiary House and GER. Therefore, there is no possibility that the inefficient stoves would go outside the project boundary and replace a more efficient technology.

In addition, merely the possibility of construction of one more chimney does not lead to any conclusion of stove stacking.

BeZero states: “The developer’s records indicate that nearly all surveyed traditional stove users (98% of 690 surveyed within the PoA) surrendered their stoves to the project developer after installation of the new stoves. The continued use of remaining traditional stoves in other properties or after the owner sells them is reportedly monitored, but it is not accounted for in the emission reduction calculations. Furthermore, the project’s 690-household sample represents less than 1% of households served by the project, raising concerns over how representative the results are of overall trends.”

MEC response: The sample is representative of the entire population, and sample is taken meeting the required confidence and precision levels.

Non-permanence:

BeZero states: “there is a lack of available information regarding the project’s investment analysis, which contributes to risks of carbon efficacy as it is not clear whether or to what extent carbon finance will contribute to subsidising stoves, improving distribution chains, or disseminating information and education regarding the benefits and correct use of ICSs.”

MEC response: In 2008 MEC worked with XacBank to explore how their clients could access more efficient technologies. During that process there were internal management discussions including and IRR analysis which showed that the significant investment required to commercialize two entirely new technologies in Mongolia would be impossible without a third source of funding. At this point the carbon funding program was established. Detailed information on this investment analysis could be shared through contacting the Project developer directly. Further analysis was done when partners such as the Government of Mongolia, the World Bank and the MCC joined the project. As new sources of capital came

in, care was taken to clarify the role of each funder, including the carbon funding. These details can be made available as needed by the project developer.

BeZero states: “The project does not discuss warranties and maintenance of stoves, which would also help better evaluate the lifecycle of distributed cookstoves.”

MEC response: Maintenance and aftersales service are an important component of the program and a key use of the carbon funding. The latest audited reports show that more than 75% of the stoves are still in proper use even 7-8 years after installation. The Usage Surveys carried out during the annual verification audits which are required by the standard ensure that attrition is duly considered in calculating emission reductions.

BeZero states: “Further information risks arise from the project not providing monitoring figures at the VPA level and relying on the aggregate PoA-level figures instead.”

MEC response: Since the projects are homogenous, we have used identical monitoring and verification report format across the projects GS2435, GS2684, GS2685, GS2686, GS2687 and GS2688. We monitored the samples by categorizing them into the technology and dwelling-type across all VPAs. Therefore, the monitoring figures are available at aggregate-PoA level.

The GS PoA is in line with the GS requirements on debundling. As per Section 4.13.1 of the GS Programme of Activities Requirements, debundling check is not required. The reason for having multiple VPAs is that the implementation happened over a period of time and VPAs were designed to accommodate stove distribution continually as the Programme evolved. The VPAs are not a debundled part of a larger Progamme.

BeZero states: “Additionally, a lack of information regarding the project’s experiment setup for calculating fuel savings contributes to a lack of clarity on how carbon emission reductions are calculated. “

MEC response: The fuel savings calculation is available from the project developer upon request. It is a sophisticated model which was required specifically by the UNCDM Executive Board, and it takes into account kitchen performance tests, actual fuel usage, weather, wind, and seasonality.

BeZero states:

The calculated emission reductions are further brought into question by a report by the Millennium Challenge Corporation which found that a similar project in the same area did not result in any emission reductions.”

MEC response: The MCC project actually does report significant emissions reduction (65% reduction in PM2.5, 16% reduction in CO) and decreased air pollution (30% reduction of ambient air pollution from residential heating stoves). The key issue was low compliance with instructions on correct usage of the improved stoves, and preference for using traditional stoves.

However, the MCC project report only spans a two-year period (2011-2013) and non-compliance on correct, regular use of improved stoves was a well-known issue at the time. Even so, a World Bank strategy document from April 2014 titled “Mongolia – National Clean Stove Strategy” concludes that “This strategy, and the December 2013 stocktaking report, finds that a higher share of the urban population needs to have access to cleaner stoves to sustain and increase their contributions to air quality improvements in Ulaanbaatar” and “providing access to cleaner heating or cooking solutions presents a win-win opportunity for a broad range of society – it helps the poor by reducing fuel bills with more efficient stoves using cleaner technologies and it helps everyone with lower health risks from better air quality” (The World Bank Group, 2014).

Policy:

BeZero states: “while the government has distributed similar stoves in the past and invested in increasing their uptake, the penetration of the type of ICS distributed by this project remains limited.”

MEC response: In fact, the government program added on to the original MEC program. Further the efficient stoves disseminated by the MEC program have achieved over 90% penetration in the Ulaanbaatar ger districts. There is a UNDP report that shows efficient stove penetration of 54% by 2018 (UNDP, 2020). This is including rural areas which use wood, so cannot use the stoves. The only place in Mongolia that did not adopt these stoves are rural areas where wood is used instead of coal, or where distribution has been a challenge due to remoteness, nomadic lifestyle, and low population density.

BeZero states: “The government of Mongolia has attempted to improve cookstove distribution and has multiple laws and policies targeting the improvement of clean technologies. For example, the government distributed 40,000 fuel-efficient stoves within Ulaanbaatar’s ger districts with the assistance of the World Bank between 2011 and 2015, during which time this project was also distributing stoves.”

MEC response: The distribution of 40,000 efficient cookstoves by the government of Mongolia was under the same project as MEC.

BeZero states: “However, the distribution rate of government-provided stoves remains low compared to the number of households in the project area.”

MEC response: The efficient stoves that were disseminated by MEC and the government has reached over 90% penetration of the ger areas as of 2012. Reference: (XacBank Email, Enkh, 2023)

BeZero states: “Based on a World Bank collection of development indicators, the government effectiveness in Mongolia had a percentile rank among all countries of roughly 35 in 2021. Although this figure is not based solely on environmental policy, our view that the country’s environmental policies tend to be ineffective is supported by academic literature, which

highlights the disconnect between the national policy and local perspectives on air pollution, which is closely related to policies such as ICS dissemination."

MEC response: In fact, Ulaanbaatar air pollution PM dropped 60% between 2012-2015. Since 80% of PM air pollution was due to coal burning for heating in the ger districts, this entire achievement was due to the efficient stove program. This program was started by the MEC carbon program and was embraced and adopted by the government. Further the stoves were very popular with the households who adopted them and who continue to use them even more than 10 years later.

Reference: MCC impact assessment – end user is satisfied with stove

Reference: MEC 2023 Verification Audit (To be uploaded in the SustainCERT website in March 2023) — households continue to use stove and achieve benefits including reduced fuel usage, warm homes, and better health.

Reference: Mongolia Statistical Information Service (under National Statistics Office) states that there was a 70% drop in PM 2.5 concentration in Ulaanbataar between 2012-2015 (Enkhbat, et al., 2020).

BeZero states: "Mongolia's Nationally Determined Contribution, which was established after the project's most recent monitoring report, aims to reduce raw coal use in Ulaanbaatar, which may limit the future use of this project's distributed stoves in favour of clean-fuel stoves. "

MEC response: In fact, the carbon program has helped its end users shift from raw bituminous coal to refined coal briquettes which are a cleaner burning form of coal, and which is the cleanest available option within Ulaanbaatar. The RCBs first became available in Mongolia in 2019, and research into them was one of the uses of the carbon funding. All of the households now use RCBs rather than raw coal.

This is a testament to the benefits of a carbon program rather than a traditional government or development assistance program. Because the program proponents continue to receive carbon funding, the project has maintained a constant communication with end users, resolving the technical difficulties they face with the stoves, ensuring that they continue the proper usage patterns and that they continuously adopt the newest and most environmentally friendly fuels and practices as they become available. Due to the nature of a carbon program, these end users have received continued support starting in 2009, and continuing through present day, 2023 as a vibrant and successful intervention.

Reference: MEC 2023 Verification Audit (To be uploaded in the SustainCERT website in March 2023)

BeZero states: "Nevertheless, there has been limited progress in increasing the adoption of clean-fuel stoves as highlighted by the country's continued high use of biomass as a fuel based on the World Health Organisation's clean cooking data. That data shows that approximately 40% and 33% of the total population of Mongolia relied on biomass as a primary fuel source in 2012 and 2021 respectively."

MEC response: In fact, since before 2009 it was never a common practice in urban areas of Mongolia to use biomass as a primary heating fuel. The common practice was to use coal.

Biomass is only primarily used in some areas of rural Mongolia which are close to forests. During 2008 MEC together with Xacbank conducted market research within Ulaanbaatar to understand the heating needs of the client base and documented that it was entirely coal. A small amount of wood was available for purchase, but it was more expensive for the heating requirement. Supply of biomass in Ulaanbaatar is extremely scarce. The common practice in the ger district of Ulaanbaatar was for households to order coal in units of truckloads at the beginning of the winter season. For example, a typical household would order 2.5 truckloads of coal, for their heating needs.

Since 50% of Mongolia's population lives in Ulaanbaatar compared to 50% who live in the dispersed rural areas, this would explain the WHO report data indicating 33% use of biomass for cooking. which has been misinterpreted by the BeZero team.

BeZero states: "While there is policy in place to increase the uptake of improved cookstoves in Mongolia, it is our view that the success of these programs has been limited."

MEC response: In fact, the efficient furnaces promoted by MEC have achieved over 90% penetration within Ulaanbaatar, and the PM air pollution in Ulaanbaatar has reduced over 65%. This a dramatic success, which is why the MEC was invited for a personal audience with the President of Mongolia in 2013 and was nominated for many awards including Ashden Award where MEC was the 4th place finalist in 2013.

BeZero states: "Policies within the country also support a move away from the use of coal, highlighting a lack of support for coal-based ICS projects. These points support our view that policy support for projects of this type is limited and does not pose a significant risk to the carbon efficacy of credits issued by this project."

MEC response: The takeaway that governmental policies are not a risk to carbon efficacy are correct. However, a clearer narrative is that prior to 2009, the government had not considered efficient stoves as a solution and had no policy to support them. There were some development aid projects that were exploring these options on an R&D basis by GTZ and some universities.

The MEC carbon program worked with XacBank to create a viable program. Carbon funding was essential to the activation of these private sector partners to engage and bring their significant capabilities to introduce the technologies.

The initial pilot was very successful attracting attention from the government and the world bank who then took efforts to accelerate the scale up and support the program in the policy framework.

As those players supported the program, care was taken to separate which financing was supported by carbon and which by donors. In this way the investment analysis used in the carbon program was not damaged.

As a result of these collaborations the scale up was nearly complete. This is where we saw the strong adoption of the stoves and tremendous drop in pollution.

After some time, the donor projects ended, and the government changed hands. This is also when end users started to not use the stoves properly.

Luckily the continued carbon funding created funds to reeducate users, and make sure the usage was proper.

Similarly, the new government came up with different policies, such as at one point temporarily "banning coal" in the ger districts or proposing a shift to electric heating.

When that happened, the carbon project proponents used carbon funding to do our own R&D on any alternative heating options for the ger district that did not use coal. The electric heating was not yet viable for such cold temperatures, but the program was able to shift our customers to the RCB briquettes which were cleaner than raw coal.

Clearly, carbon funding has been an essential form of funding that initially catalyzed government policy, and then later continued to provide viable low carbon options to poor households when the official policies did not fully serve their needs or when donor agencies had moved on.

BeZero states: the government's night-time tariff subsidies "may further reduce the need for these stoves as these subsidies make electric heating cheaper and may reduce the use of stoves for night-time heating".

MEC response: This is not an accurate analysis as there are several deterrents to the widespread adoption of electric heaters currently even at present –

1. High upfront cost: electric heaters currently cost an average of MNT 5 million, which poses a hefty capital expenditure on the part of low-income households. Moreover, given that the government highly subsidizes coal briquettes, the price of such briquettes have remained constant over the past 5 years while the cost of heaters have risen as a result of high inflation. As a result, stoves are a mainstay for heating purposes in ger area households as they are economically viable and provide a solution for both heating and cooking.
2. Weak electricity distribution in ger areas: Although the majority of ger-area households are connected to the central grid, the distribution network is weak and limits the heaters to only 4 kW in the ger area, which is not enough to heat a ger (Source: https://documents1.worldbank.org/curated/en/950841626163487984/pdf/Disclosable-Version-of-the-ISR-Ulaanbaatar-Clean-Air-Project-P122320-Sequence-No-19.pdf).
3. Insufficient power capacity in the country: Mongolia faces energy capacity constraints and imports electricity to meet demand that exceeds capacity. In the absence of new (preferably cleaner) installed power capacity, the connection of the ger area to electric heaters may severely overload the current capacity and reduce the reliability of electricity supply (blackouts are common in the country). Moreover, a sudden increase in electricity demand may lead to a sharp increase in the price of electricity and may even lead to the discontinuing of night-time subsidies.

References

Asian Development Bank. (2018). *Sector Assessment: Energy - Ulaanbaatar Air Quality Improvement Program: Report and Recommendation of the President.* Asian Development Bank Institute. Retrieved from https://www.adb.org/projects/documents/mon-51199-001-rrp

ASTARE, The World Bank. (2009). *Mongolia - Heating in Poor, Peri-urban Ger Areas of Ulaanbaatar.* The World Bank. Retrieved from https://documents1.worldbank.org/curated/en/339891468247270369/pdf/696620ESW0P1010taar0ASTAE0October09.pdf

Enkhbat, E., Geng, Y., Zhang, X., Jiang, H., Liu, J., & Wu, D. (2020, February 09). Driving Forces of Air Pollution in Ulaanbaatar City Between 2005 and 2015: An Index Decomposition Analysis. *Sustainability, 12*(3185). doi:10.3390/su12083185

IEA. (2023, March 16). *IEA - Mongolia - Key energy statistics, 2020*. Retrieved from International Energy Agency: https://www.iea.org/countries/mongolia

Social Impact. (2017, July 07). *MCC MONGOLIA ENERGY & ENVIRONMENT IMPACT EVALUATION*. Retrieved from Social Impact: https://socialimpact.com/portfolio-items/impact-evaluation-mcc-mongolia-energy-environment-project/

The World Bank Group. (2014). *Clean Cookstove Initiative - Mongolia - National Low Emission Stove Strategy.* The World Bank Group. Retrieved from https://documents1.worldbank.org/curated/en/828791468187733003/pdf/98418-WP-P122320-PUBLIC-Box393170B-Mongolia-Emi8ssion-Stove-Startegy-Report.pdf

UNDP. (2020). *AIR POLLUTION IN MONGOLIA: OPPORTUNITIES FOR FURTHER ACTIONS.* AARC Consultancy. Retrieved from https://www.undp.org/sites/g/files/zskgke326/files/migration/mn/Air-Pollution-in-Mongolia.pdf

Additional links –

Gold Standard Optional Requirement- Programme of Activity requirements and procedures v.2.0 – https://globalgoals.goldstandard.org/standards/107_V2.0_PAR_Programme-of-Activity-Requirements.pdf

The World Bank Ulaanbaatar Clean Air Project (P122320) – https://documents1.worldbank.org/curated/en/950841626163487984/pdf/Disclosable-Version-of-the-ISR-Ulaanbaatar-Clean-Air-Project-P122320-Sequence-No-19.pdf

Mongolia Compact - Energy and Environment - Stove subsidy only: Final Evaluation Brief - https://mcc.icpsr.umich.edu/evaluations/index.php/catalog/636/versions/V1.0.1

CDM's Tool01: Tool for the demonstration and assessment of additionality - https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

Documents Available from Project Developer Upon Request

- Ashden Award video
- MCC original project document
- Citigroup erpa announcement: 2012
- Ashden Award Application: 2010
- Motley Fool Announcement 2012
- King County Awards nomination 2012
- MEC-XacBank Contract Signed 2008
- MEC Global Social Business Plan Competition pitch 2008
- MEC Buckminster Fuller Prize Application 2009
- Mongolian Economic Forum: MEC presentation 2/2011
- IFC Study Tour of MEC Mongolia project
- MEC Presentation SOCAP Conference 10/2010
- MEC Presentation Solar Energy 4 All 2010
- MEC-XacBank Contract signed 2009
- MEC -XacBank clean energy business plan management discussion
- XacBank Green Products presentation 2009 “88% of households use traditional stove—note this was after the mec pilot which reached 12% of population.”