How Beneficial is Aiding Solar?: An Evaluation of "SolarAid"

Last Updated: November 2013

Giving What We Can has started to investigate the cost-effectiveness of climate change organizations. One of the organizations investigated is SolarAid, which sells pico-solar lights in rural Africa. Overall, we estimate that SolarAid will reduce a tonne of CO_2 for about less than $15, thereby averting a DALY for less than $75K, though this figure contains a high degree of uncertainty and does not include the significant benefits from health and economic development. A more in-depth review that takes these benefits into account is warranted before conclusions are drawn about SolarAid's impact.

Summary

- SolarAid's goal is to phase out the kerosene lamp commonly used in the developing world in favor of solar lamps.

- The benefit of this is reduced pollution, but also has health benefits (averting complications from kerosene lamp smoke), economic benefits (no longer having to continuously buy kerosene), and educational benefits (children at able to study after dark with safe, reliable light).

- Climate change poses significant risks. The World Health Organization states that increased climate change will eventually result in more exposure to thermal extremes and weather disasters, which will increase the incidence of malaria, diarrhoea, and malnutrition and The Stern Review, conducted by the UK Treasury, estimates that there is a substantial economic cost to climate change, potentially reducing global GDP by 5% and up to 20% with more pessimistic assumptions.

- SolarAid's case for impact is that a donation of £6 ($9.36) will pay for the delivery of a solar light, a solar light will last 3-5 years and will avert 200kg of CO_2 per year, and replacing a kerosene light with a solar light also has economic, education, and health benefits.

- In each of the programs run so far, the average number of kerosene lamps replaced by a solar lamp has been at least one. Given that one kerosene lamp produces 200kg of CO_2 emissions per year and the solar lamps do not produce any emissions, providing a solar lamp will avert 200kg of CO_2 per year for the life of the lamp.

- Therefore, SolarAid can avert a DALY for about $75K. Though this estimate is highly uncertain and does not take into account the additional health, education, and economic benefits

of SolarAid.

- This is good, but not as good as our top recommended charity, the Against Malaria Foundation, which could avert a DALY for $32.07 to $71.20, and therefore is potentially more than 1000x more cost-effective, though this doesn't fully take into account all the potential benefits of SolarAid.

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Introduction

What is SolarAid?

Currently, many people in the developing world use kerosene for energy and lighting. SolarAid's goal is to phase out the kerosene lamp in favor of solar lamps. The benefit of this is reduced pollution, but also has health benefits (averting complications from kerosene lamp smoke), economic benefits (no longer having to continuously buy kerosene), and education benefits (children can study after dark with safe, reliable light).

The Case in Favour of the Project

Who We Spoke With

Kat Harrison, SolarAid Social Impact & Research Manager

SolarAid's Plan

SolarAid is a charity that set up SunnyMoney, which is a socially-minded non-profit business (social enterprise), with the overall intent of mixing business models to provide affordable solar energy to rural Africa. SunnyMoney sells the solar light and then re-invests any revenue into being able to sell more solar lights.

SunnyMoney also aims to get local entrepreneurs to begin selling solar lights, creating a sustainable market for the technology. SolarAid also tries to work with local communities to secure more awareness and buy-in for solar lighting.

SolarAid and SunnyMoney are currently operating in Kenya, Malawi, Tanzania, and Zambia.

SolarAid's Case for Impact

SolarAid's argument for impact is that:

- a donation of £6 ($9.36) will pay for the delivery of a solar light.
- a solar light will last 3-5 years and will avert 200kg of CO_2 per year.
- replacing a kerosene light with a solar light also has economic, education and health benefits.

Analysis

Does climate change prevent us with a legitimate concern worth taking action on?

- The World Health Organization states that increased climate change will eventually result in more exposure to thermal extremes and weather disasters, which will increase the incidence of malaria, diarrhoea, and malnutrition.

- The Stern Review, conducted by the UK Treasury, estimates that there is a substantial economic cost to climate change, potentially reducing global GDP by 5% and up to 20% with more pessimistic assumptions.

- These methods of assessing the impact of climate change do not take into account additional negative side-effects, including but not limited to damage to culture, forced migration, and biodiversity loss.

Does SolarAid have a credible case that their lamps each avert 200kg of CO_2 per year?

- In each of the programs run so far, the average number of kerosene lamps replaced by a solar lamp has been at least one. A solar lamp replaced one kerosene lamp on average in Tanzania and Malawi and two kerosene lamps on average in the program in Kenya.

- We expect the rate of replacement to be similar in the future as it has been in the past.

- One kerosene lamp produces up to 200kg of CO_2 emissions per year.

- The solar lamps do not produce any emissions.

- Therefore, providing a solar lamp will displace at least one kerosene lamp and replace 200kg per year of CO_2 with no emissions, averting 200kg of CO_2 per year for the life of the lamp.

Does SolarAid have a credible case for additional health and economic benefits?

- A survey conducted among the target population shows that 20% of people's incomes is spent on kerosene. Many of these costs would be freed up upon buying the lamp, making the lamp pay for itself in just a few months and then provide net income afterward.

- Indoor smoke from kerosene causes many health problems, such as pneumonia (Source: World Health Organization Report).

- Some users claim education benefits from being able to study at night for longer.

- It's difficult to fully verify and quantify these benefits because they involve fairly complicated social effects in areas that Giving What We Can has less experience with. We unfortunately lack the time to continue to work to analyse these benefits at no fault of SolarAid, but hope to do so in the future.

Where does SolarAid rank compare to currently recommended charities?

- The World Health Organization estimates that averting about 5,000 tonnes of CO_2 would avert about 1 DALY, though this is a highly uncertain estimate.

- Assuming that a solar lamp lasts for three years, it will avert 0.6 tonnes of CO_2. This is a rate of one tonne of CO_2 averted per $15.

- If we take all these claims at face value, SolarAid can avert a DALY for about $75K.

- Our top recommended charity, the Against Malaria Foundation, could avert a DALY for $32.07 to $71.20, which is 1000x to 2300x more cost-effective (Source: GiveWell), though this does not take into account all of the potential benefits of SolarAid.

- These estimates and comparisons do not take into account the additional health, education, and economic benefit of the lamps, however.

What do we wish we knew, but don't?

In order to evaluate SolarAid further, we would need to gather the following information:

- More information about the costs of the SolarAid lamp.
- The real size of the economic benefit to very poor people.
- Evidence that the lamps last as long as SolarAid claims.
- Additional evidence for the emission rate of kerosene lamps.
- Details on SolarAid's room for more funding.

It's important to note that not having this information is no fault of SolarAid. SolarAid has been impressively transparent and claims they can provide us with this information. Unfortunately, we just currently do not have the capacity to follow up with SolarAid at the moment, but hope to potentially do so in the future.