BioLite
energy everywhere

BioLite Environmental Sustainability Report 2017

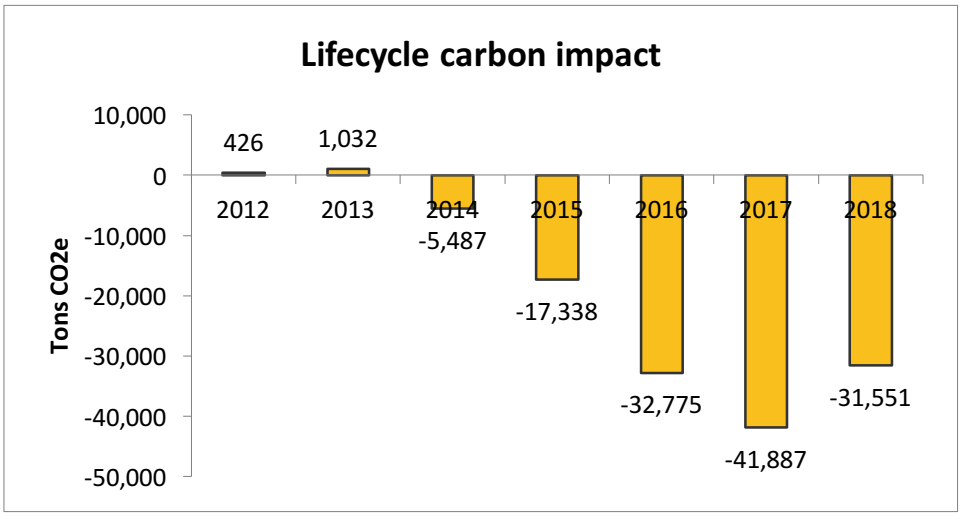
March 2018

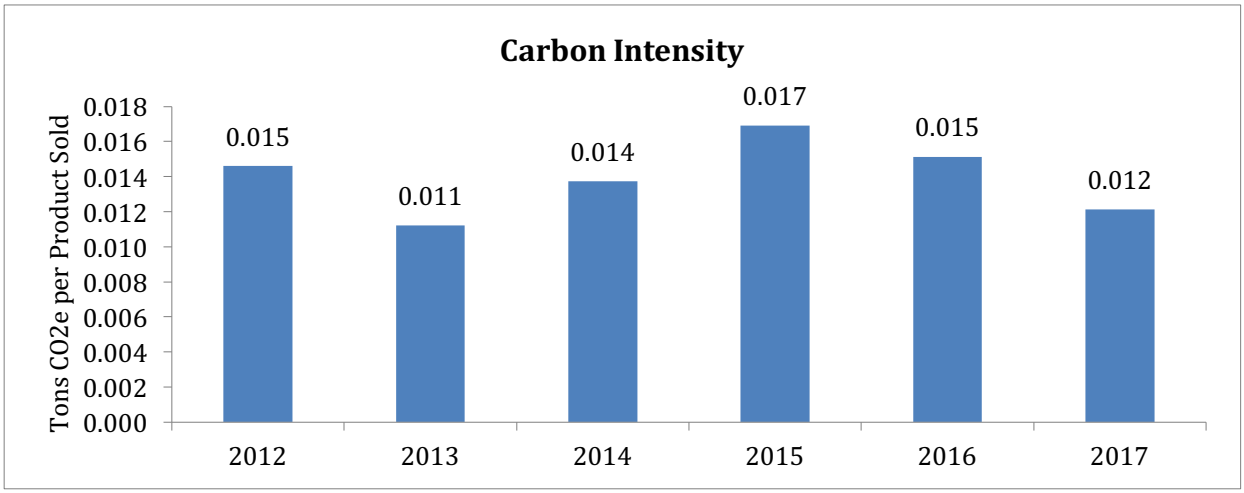
Contents

Executive Summary

BioLite's 2017 carbon footprint analysis reveals some key conclusions and trends. First, BioLite's products result in a significant reduction in greenhouse gas emissions compared to emissions produced from BioLite operations. This fact is evident from the graph below, which is further explained in the "Lifecycle analysis" section.

Second, as BioLite grows, the company's carbon intensity, as defined as by emissions per product manufactured, is gradually reducing, though variability in this trend exists over time, as pictured below:





These key findings result from the exhaustive analysis of BioLite's operations, which is outlined in detail in the following report.

Introduction

BioLite is dedicated to creating positive environmental, health, and social impact through the development and distribution of safe, affordable, and desirable clean energy technologies for households living in energy poverty in the developing world.

We at BioLite seek to minimize our resource consumption and create products that have a net benefit to humanity and to the planet. Monitoring our carbon footprint is the first step in understanding whether we are achieving this goal. To that end, we have been measuring our carbon footprint since 2012 and will be offsetting the entire footprint during this period. This process has been particularly important recently since BioLite has been experiencing significant growth, which we aim to achieve in both a financially and environmentally sustainable way. This report covers BioLite's carbon footprint during the calendar year 2017, while also citing results from previous years in order to identify trends over time.

We serve two distinct markets: 1) "emerging market" families living in energy poverty, and 2) outdoor recreation users seeking fuel-independent cooking, charging, and lighting. Through a process of "parallel innovation,"[i] BioLite incubates core technologies for both markets; BioLite reinvests near-term revenue from our outdoor recreation business to support the emerging markets businesses in India and East Africa until they are commercially self-sufficient.

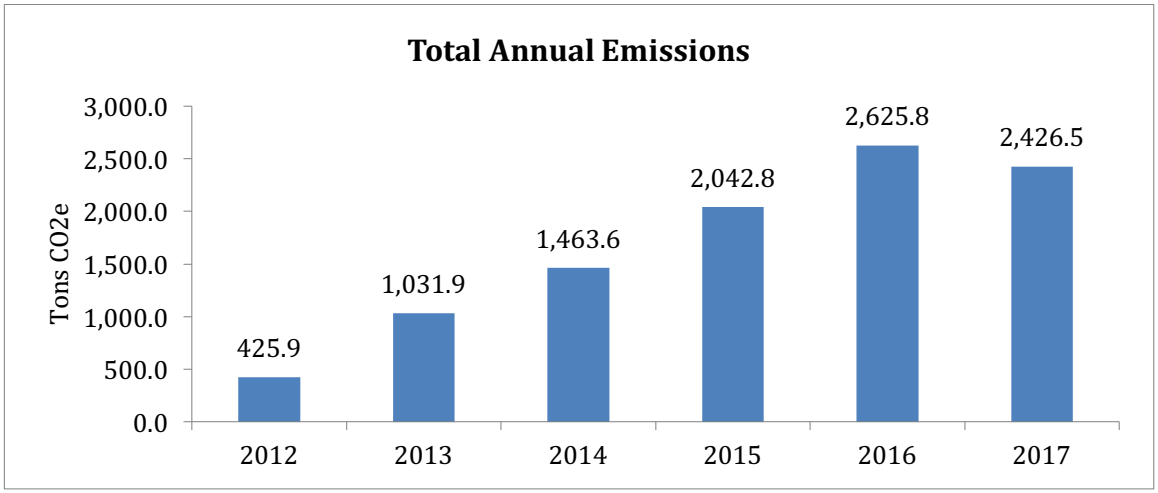
BioLite generates a carbon credit for every metric ton of greenhouse gas (measured in carbon dioxide equivalent) reduced through the use of its products in emerging markets. For instance, when a household in Uganda cooks on the BioLite HomeStove, they emit fewer greenhouse gases compared to the smoky, open fire which they would otherwise use. These savings are independently verified by Gold Standard Foundation, the leading carbon accreditation body.[ii] We either retire these credits to offset our corporate footprint or we sell them in the open market. We reinvest this revenue into our emerging markets business, to enable poorer and more remote households to purchase BioLite clean energy products. BioLite's footprint from 2012-2016 will be offset entirely by BioLite carbon credits.

Summary

Historical Performance

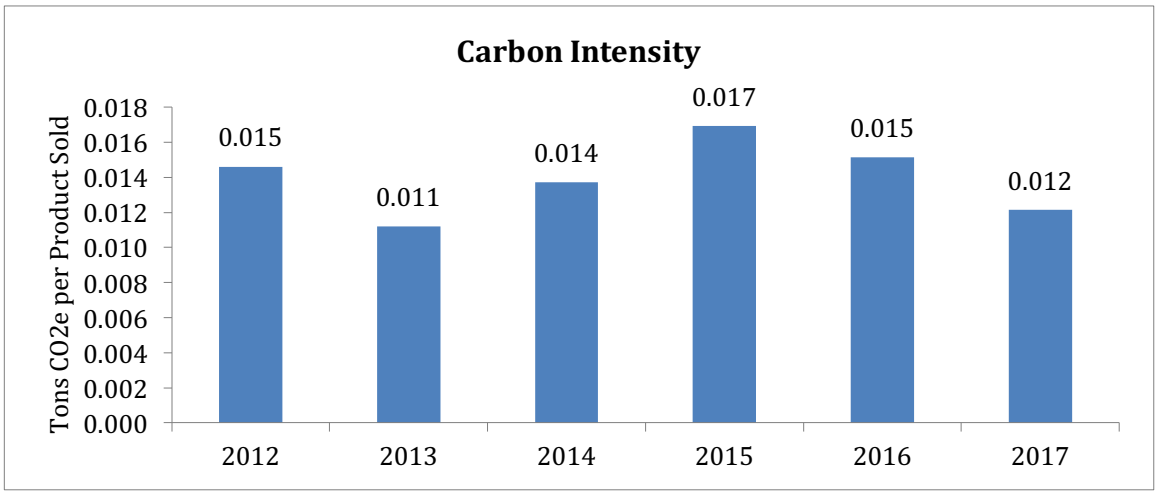
BioLite has cumulatively emitted 10,016.5 metric tons of carbon dioxide equivalent (tCO_2e) since 2012. For the years 2012-2016, the company will offset this carbon footprint by retiring the same number of carbon credits generated from the reduction in emissions from HomeStove usage in India and East Africa. During the six-year period from 2012 to 2017, every ton of CO2e emitted by BioLite has generated a savings of 10.6 tons of CO_2e.

In 2017, BioLite emitted a total of 2,426.5 tCO_2e, and it will continue to offset these emissions through a combination of BioLite carbon credits and third-party-verified credits purchased from trusted partners.

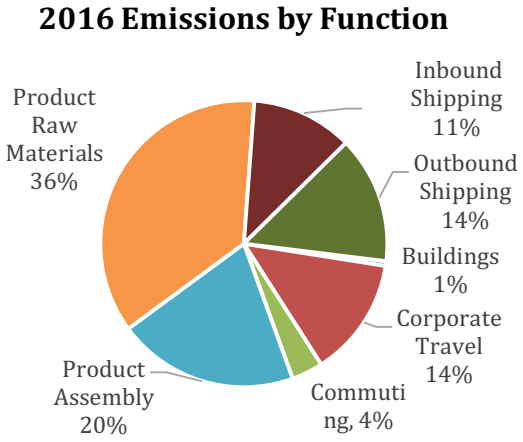


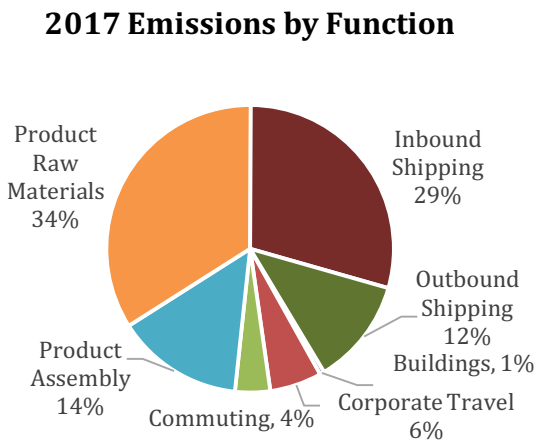
Across the 2012-2017 timeframe, we observe a steady increase in emissions that is roughly proportional to the growth of BioLite's operational scale. This trend continues until 2017, when we observed a slight decrease in carbon footprint, despite an increase in sales. This was due to several factors. First, emissions from raw materials and product assembly declined because a higher proportion of BioLite sales in 2017 were of less carbon-intensive products than previous years. Secondly, a reduction in corporate travel, including a reduction in travel within emerging markets, further reduced the 2017 footprint vs the 2016.

Carbon intensity remains an instructive indicator of whether BioLite is succeeding in its pursuit of environmentally sustainable growth. When the data are normalized for total annual sales to calculate carbon intensity per product, we see that on a per-product basis, emissions range from about 0.011 to 0.017 tCO_2e.



Although our products are becoming increasingly larger and more complex, and subsequently more carbon-intensive, our product mix in 2017 was relatively less carbon intensive than in previous years; the smaller products were some of the best sellers. Since raw materials account for approximately a third of BioLite's carbon footprint (see chart below), this has a significant impact on the carbon intensity per product.





Note: Some 2016 emissions were recategorized to match the 2017 categories.

Breakdown of Emissions by Function

In 2017, the majority of BioLite's carbon emissions can be attributed to product raw materials (34%) and inbound shipping (29%). Differences between 2016 and 2017 emissions are discussed in detail in the following section, but two major changes stand out: first, carbon-intensive, outbound shipments directly to customers (as opposed to wholesale shipments to retailers) increased dramatically in 2017; and second, less carbon-intensive products comprised a larger proportion of our sales.

Methods, Approach, and Function-Specific Results

As with previous years in which BioLite quantified its carbon footprint, we applied the World Resources Institute's Greenhouse Gas Protocol,[iii] taking into consideration resource and data constraints and using best efforts to arrive at reasonable and conservative conclusions, i.e. overestimating emissions where uncertainty exists. In this analysis, we quantified all material sources of greenhouse gas emissions throughout our business functions and value chain, as defined in the Greenhouse Gas Protocol.[iv]

This report was compiled by BioLite staff and an intern from December 2017 to March 2018. Due to resource constraints, an external auditor was not engaged to verify the results of this analysis. All of the numbers and claims in this report can be supported by a detailed Microsoft Excel model and references to authoritative third-party documentation for all conversation factors and calculations. However, this model is not publicly available.

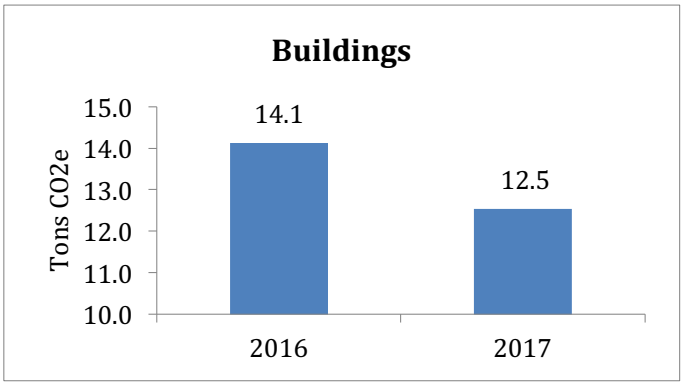
Scope 1 Emissions

Scope 1 emissions are defined as those originating from emissions sources directly controlled and owned by BioLite. Since BioLite uses an external manufacturing facility to fulfill our manufacturing needs, there are no sources of emissions within operations over which we have direct control. For that reason, scope 1 emissions are zero, while all manufacturing emissions are included in scope 3 below.

Scope 2 Emissions

Scope 2 emissions include those from purchased or acquired electricity, steam, heat and cooling.

Building Emissions



Building emissions are typically the smallest source of emissions, as they have never exceeded 15 tCO_2e since 2012. BioLite purchases electricity for three offices and natural gas for heating at only our headquarters office. Our offices in emerging markets are small and work out of shared spaces that are not billed monthly for utilities, thus we have made many assumptions regarding their carbon footprints. Standard conversion factors were applied to calculate total emissions from the consumption of electricity and natural gas to arrive at the final values.

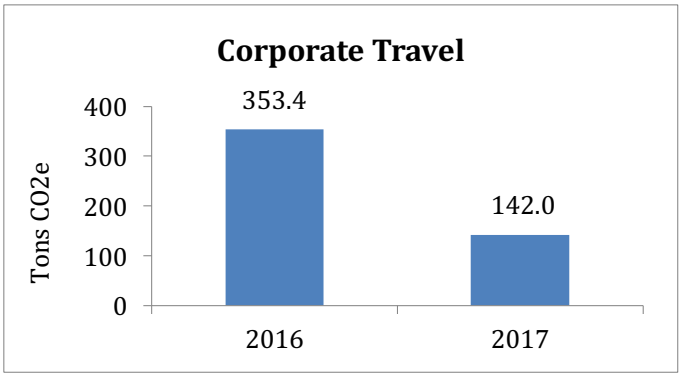
Scope 3 Emissions

Scope 3 emissions include indirect emissions throughout our value chain, such as corporate travel, employee commuting, purchased goods and services, and transportation and distribution. Similar to most businesses, the overwhelming majority of our emissions are included under scope 3.

Corporate Travel

The majority of miles traveled and greenhouse gas emissions originated from commercial aircraft. Corporate travel accounted for the largest decrease in emissions from 2016 to 2017. This decline is due to two primary reasons: changes in our methodology compared to 2016, and fewer employees traveling to emerging markets due to the growth of our local staff.[1]

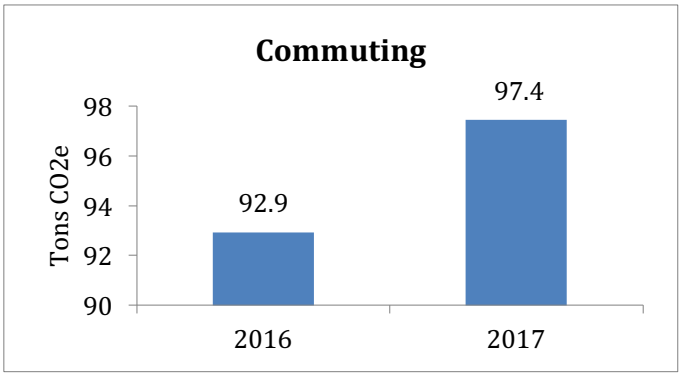
Corporate travel emissions were quantified by examining records of all company travel for the periods in question and calculating the distance traveled for each trip. These distances were then multiplied by industry standard conversion factors based on the type of transport. Where imperfect travel records existed, we compared travel records with accounting records (which are maintained much more closely) and added a commensurate amount of travel to ensure that no underreporting took place. Corporate travel includes travel within emerging markets, which decreased in 2017 vs 2016.



Commuting

Company employees completed a survey in late 2016 in which they self-reported their commuting patterns, revealing the frequency with which employees commute via public

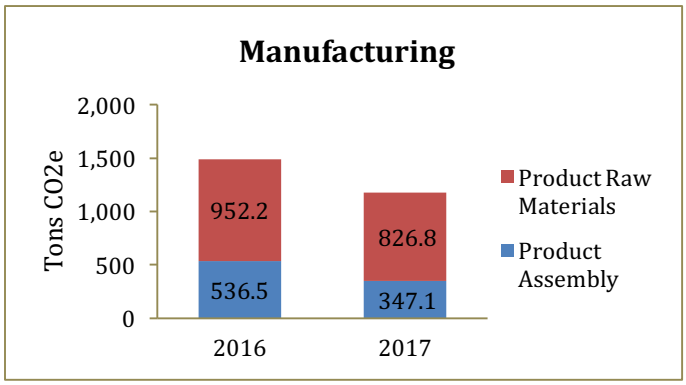
[1] Emissions from field travel by employees in our Emerging Markets offices, also known as "burners," were recategorized from 'commuting' to 'corporate travel' in 2017. This same change was made in the 2016 data presented in this report for the sake of consistency. The total number of emissions did not change as a result.



transportation, bicycle, car or by walking. The results of this survey were then adjusted to correspond with the average number of BioLite employees in 2017. Approximately 60% of BioLite employees that work in its Brooklyn headquarters either walk, bike or work from home the majority of the week. Less than 10% of BioLite employees at HQ drive at least some of the time, with the balance taking some form of public transportation. Total emissions from employees commuting to Brooklyn did not exceeded 10 tCO_2e for either of the two years. The majority of carbon emissions from commuting is made up of BioLite's Emerging Markets team because staff members have to travel a substantial distance to reach customers in rural areas.

Product Manufacturing

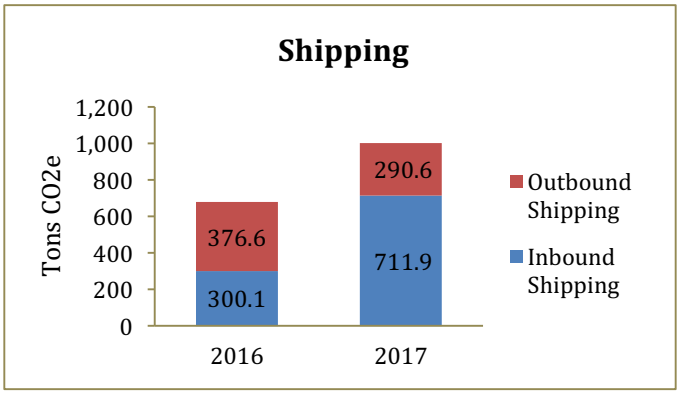
Despite an increase in sales between 2016 and 2017, emissions from raw materials and product assembly declined because a higher proportion of our sales in 2017 were of less carbon-intensive products. For example, a significant portion of our sales came from the SiteLight family of products which have the fewest embodied emissions and are also the lightest of our products in terms of weight, which results in fewer emissions during product assembly.



Each BioLite product was catalogued by its component parts, their material type and respective masses. Widely accepted embodied energy conversion factors for each material were then applied to calculate a per-unit embodied energy value for each product.[v] This was then multiplied by the total number of products sold in 2017 to arrive at a total figure for raw materials.

In calculating emissions from product assembly, BioLite was unable to attain direct energy consumption data from our third-party factory in China. Instead, we used publicly available benchmarks from the automotive industry and made minor adjustments to be more applicable to BioLite's products. We accounted for all processes involved in manufacturing each BioLite product to arrive at the values in the graph above.

Shipping

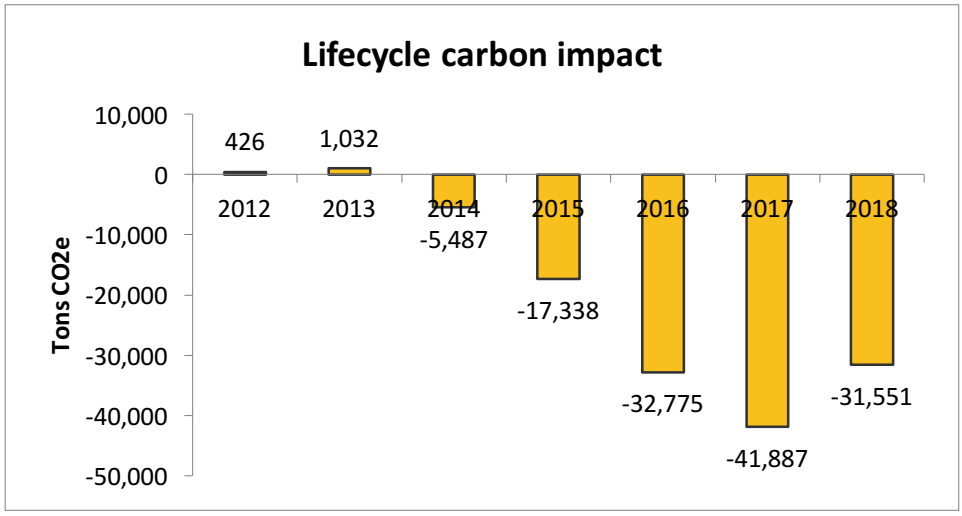


Shipping emissions within BioLite are broken into two categories: inbound and outbound. "Inbound" shipments are from BioLite's manufacturing facility in China to one of several BioLite warehouse and distribution hubs throughout the world by sea or air. Conversely, "outbound" shipments consist of wholesale shipments to resellers by sea or air, or e-commerce shipments directly to customers by sea, air, or ground freight.

Shipping accounts for the largest increase in emissions between 2016 and 2017. The vast majority of this increase is due to an increase in sales and a product recall, which caused the need for an increased proportion of air freight, a more carbon intensive shipping method, versus sea freight.

BioLite calculated the distance between the distribution hub and the final destination for each product or product lot. Air distances were calculated using an online calculator for the great-circle distances between two airport codes, sea distances were calculated using an online calculator for nautical miles between two port codes and converted into miles, and ground distances were calculated using Google Maps. Every effort was made to be as specific as possible, but the level of detail for the final destination varied. For example, in some cases, the destination zip code was available, but in others, only the state was provided. Distances were multiplied by standard conversion factors for truck, sea, and airfreight as appropriate.

Lifecycle Analysis



Another approach to analyzing BioLite's carbon footprint is to take a lifecycle analysis and compare the total amount of emissions that result from producing BioLite's products vs. the total emissions saved by using these products. In order to do this, we first assume a baseline scenario in which BioLite customers did not purchase BioLite's energy saving devices and continued with business as usual. In calculating the emissions saved by using BioLite products, we include only the usage of the HomeStove in emerging markets, since this is the product that is being used by low-income households on a daily basis, thus saving material quantities of greenhouse gas emissions. We conservatively calculate that each HomeStove saves on average 2.61 tons CO2e per year and that the stoves gradually break due to normal wear and tear. These results are consistent with a series of rigorous efficiency, usage and durability tests we have conducted that comply with Gold Standard requirements to calculate carbon credits. The above chart plots emissions released from all BioLite manufacturing during 2012-2017, combined with emissions savings resulting from the use of HomeStoves during 2014 through 2018 that were sold in 2012-2017. As you can see from this chart, the results are overwhelmingly positive in terms of saving greenhouse gas emissions on a net basis.

Put another way, for each ton of CO_2e released into the atmosphere from BioLite operations during the 2012-2017 period, we have measured an approximately 10.6 tons CO_2e reduction in emissions through 2017 from the use of HomeStoves.

Appendix

Corrections to 2016 Corporate Sustainability Report

In the process of compiling this report, some errors were found in the 2016 report. Emissions from product raw materials were overestimated by 1,015.60 tCO_2e. The original calculation was 1,968 tCO_2e and the revised calculation is 952 tCO_2e. These errors arose as a result of limited or inaccurate product data and human error.

The model was refined to include an additional, more accurate emission factor for e-commerce shipments. Subsequently, e-commerce was overestimated by 46 tCO_2e in 2016. In total, 2016 emissions were overestimated by 1,062.6 tCO_2e compared to the original, 2016 report.

References

[i] Hu, Ray. "BioLite Shares the Case for Parallel Innovation." *Impact Design Hub*. August 5, 2015. https://impactdesignhub.org/2015/08/05/biolite-parallel-innovation/.

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[iii] *Corporate Accounting and Reporting Standard*, Greenhouse Gas Protocol, World Resources Institute and World Business Council for Sustainable Development, March 2004. http://www.ghgprotocol.org/sites/default/files/ghgp/standards/ghg-protocol-revised.pdf.

[iv] *Corporate Value Chain (Scope 3) Accounting and Reporting Standard*, Greenhouse Gas Protocol, World Resources Institute and World Business Council for Sustainable Development, September 2011. http://www.ghgprotocol.org/sites/default/files/ghgp/standards/Corporate-Value-Chain-Accounting-Reporing-Standard_041613_2.pdf.

[v] Inventory of Carbon & Energy by Sustainable Research Team, University of Bath, United Kingdom, 2011. http://www.organicexplorer.co.nz/site/organicexplore/files/ICE%20Version%201.6a.pdf.