

COMPANY

BioLite, Inc.

LOCATION

Brooklyn, New York, United States

SOFTWARE

Autodesk® Product Design Suite Ultimate**Autodesk® Simulation CFD****Autodesk® Simulation 360**

Not your average stove

BioLite creates electricity-generating biomass stoves with Autodesk software to improve public health

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—**Jonathan Cedar**

Founder, CEO, and Director
BioLite, Inc.



Image courtesy of BioLite, Inc.

Project summary

Co-founded by Alexander Drummond and Jonathan Cedar, BioLite develops and manufactures innovative, low-cost biomass stoves that make cooking with wood as clean, safe, and easy as with modern fuels. Using patent-pending technology, the company's stoves convert heat from burning wood into electricity, a portion of which powers an internal fan that creates airflow and dramatically improves combustion efficiency. Stove owners can use excess electricity to charge cell phones and other devices via a USB port on the stove's exterior power module.

While working full-time, Drummond and Cedar also worked nights and weekends to develop a functional prototype of their initial product offering, the BioLite CampStove™, for recreational markets. Much to their surprise, that prototype won the top prize for lowest emissions at the 2009 ETHOS stove conference, a gathering focused on designing woodstoves for the developing world. "That experience opened our eyes to the larger potential impact of our technology," says Cedar, chief executive officer (CEO) and director of BioLite.

The challenge

"Every day around the world, roughly 3 billion people eat meals prepared over smoky, open fires," says Cedar. Smoke from these fires has disastrous health impacts, causing almost 2 million deaths per year. So serious is the problem that (former) U.S. Secretary of State Hillary Rodham Clinton created a partnership led by the United Nations Foundation to distribute 100 million cleaner and more efficient stoves by 2020.

Some companies have tried to increase combustion efficiency—and therefore reduce harmful emissions and particulates—by adding fans to stoves. But their solutions required electricity from an external source, limiting their usefulness in the developing world where rural electrification rates are quite low. To address these issues, BioLite designed the BioLite HomeStove™. Designed to survive three or more hours of daily, family cooking for up to five years, the HomeStove can generate enough electricity to charge a basic cell phone and LED light, in addition to powering the stove's fan unit.

The BioLite HomeStove consumes 50 percent less wood than traditional cook fires and reduces smoke emissions by 90 percent

The solution

Creating high-performance stoves requires the use of durable materials with high levels of embedded energy. However, when BioLite and the Stanford University Engineering School conducted a lifecycle analysis of one of the company's stoves, they found that its performance benefits far outweighed the energy usage associated with its manufacturing.

To balance performance, durability, and cost, BioLite performed multiple design iterations and initially created only physical prototypes, a process that is both time consuming and expensive. To reduce costs and save time, BioLite used Autodesk® Simulation CFD software—a component of Autodesk® Simulation 360—to digitally simulate heat transfer within the CampStove and, later, the HomeStove. The design team also used Autodesk® 3ds Max® Design visualization software to create photorealistic digital prototypes of the stoves, allowing the team to evaluate stove aesthetics.

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“Autodesk Simulation 360 gives us the ability to run multiple simulation studies in the cloud in the same amount of time that it used to take us to run just one single-variable study,” says Matt Nowicki, senior product engineer at BioLite. “That really

opens up the game for us and helps us understand much more of the system, much faster. It's impressive how easy, valuable, and seamless this capability is for our company.”

BioLite acquired Autodesk Simulation CFD and Autodesk 3ds Max Design at a very low cost through its membership in the Autodesk® Clean Tech Partner Program. In future design cycles, the firm plans to use other Autodesk software, including Autodesk® Product Design Suite Ultimate and various simulation software products.

The result

The BioLite CampStove can be ordered through the company's website. BioLite plans to roll the product out at large-scale retailers throughout the developed world in the near future. “We are investing revenue from our early sales in the recreation market into the development of a commercially viable business plan for the BioLite HomeStove in the developing world,” says Cedar. “We intend to ship 1 million cook stoves over the next five years.”

According to Cedar, each BioLite HomeStove can reduce smoke and particulate emissions by up to 90 percent when compared to cooking over open fires. Before rolling out the HomeStove on a commercial scale, however, BioLite is conducting global pilot programs.

In the Republic of Ghana in West Africa, BioLite is working with the Canadian government and Columbia University on a program funded by the National Institutes of Health that will quantify emissions reductions and attempt to better understand the relationship between smoke and particulate exposure and children's health. BioLite is conducting other pilots in India, Kenya, and Uganda. Eventually, BioLite hopes to expand into other areas, such as communications and refrigeration. “Our ultimate goal is to deliver clean, affordable energy access to people all around the world,” says Cedar.

To learn more about the Autodesk Clean Tech Partner Program, visit autodesk.com/cleantech.

Membership in the Autodesk Clean Tech Partner Program has allowed us to consolidate all of our design tools on a single, well-integrated platform.

— **Jonathan Cedar**
Founder, CEO, and Director
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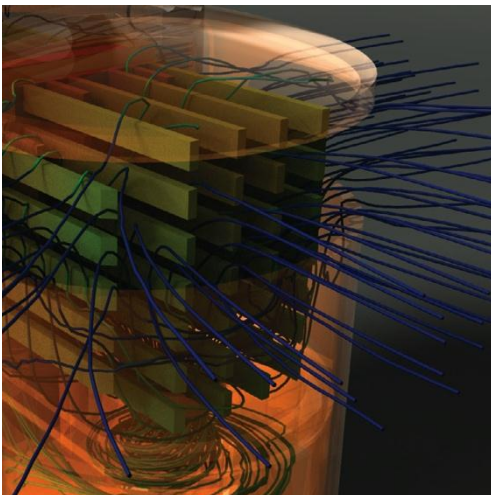


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