

Solar cooking for a sustainable planet

160

Aspenia | 89-90 | 2020

The environmental and health costs of cooking with solid fuels are significant. The potential savings of switching to solar cooking – in some countries reaching billions of dollars annually – are dramatic. Harnessing the power of the sun to cook is a powerful solution to problems faced by many of the world’s more vulnerable communities; it is also a valid response to our climate crisis.

On another typically sunny morning at Kakuma Refugee Camp in northern Kenya, a woman stepped outside of her home, with walls made of plastered mud and a roof made of a tarp provided by the United Nations Refugee Agency. She put a pot of ugali, a pot of collard greens, and a few chicken eggs into her solar cooker – an insulated box with a glass window and a top flap reflector that seemed to reach up to catch sun rays – to take advantage

of the already rising temperatures within. She went back inside to nurse her child and study for the

Alan Bigelow is the science director, Caitlyn Hughes is the executive director and Mindy Fox is special projects manager of the NGO Solar Cookers International.

course she was taking at the vocational school, knowing that in about an hour, her food would be ready to eat.

She is grateful to have her solar cooker and she says it has transformed her life. She no longer needs to crouch next to a burning fire, breathe in smoke, and risk her own health and that of her baby's. She has also reduced her visits to a makeshift cooking-fuel market in the camp to purchase firewood and charcoal brought in from outside her deforested region. The camp administration is not able to provide enough firewood to meet all the refugees' cooking-fuel needs, so many are left either to use part of their precious food rations to barter for cooking fuel or to scavenge for firewood, which is a time-consuming and potentially dangerous activity (especially for women and young girls who risk sexual assault). But now, with a solar cooker, the refugee woman can benefit from the abundant solar resource that is freely available in northern Kenya, greatly reducing her challenges in cooking and more easily feeding her family.

161

MAKING COOKING SAFE FOR HUMANS. The woman described above is not alone in the challenges she faces: about 40% of our planet's population struggles to access basic cooking fuel. According to the World Health Organization, approximately 3 billion of the world's poorest people are cooking over open fires, and over 3.8 million people a year die prematurely from illness attributed to the household air pollution caused by cooking fires. Of these deaths, 27% (over 1 million people) die prematurely from pneumonia each year from cooking fire smoke. Especially in the midst of the current global health crisis, reducing the risks of respiratory infections is incredibly important.

Beyond the negative impacts that cooking over open fires has on human health, cooking practices that use fossil fuel and other combustible fuels are

not sustainable and contribute to damaging our planet's environment. The 2018 Intergovernmental Panel on Climate Change special report on the impacts of global warming of 1.5°C above pre-industrial levels emphasized the need to reduce emissions of the greenhouse gas carbon dioxide (CO₂) and black carbon (soot – a short-lived climate pollutant) to help meet the goals of the Paris Agreement and to help keep our planet from excessive warming. Both CO₂ and black carbon are associated with polluting emissions from cooking practices.

Solar Cookers International (SCI)¹ has been improving human and environmental health by supporting the expansion of effective carbon-free solar cooking around the world since 1987. Solar thermal cooking technology is an effective solution to a multitude of global challenges. It allows people to breathe cleaner air and drink safer water; it protects biodiversity and habitats; it increases safety and opportunities for women and children; it increases energy independence (particularly essential during global health crises); and it reduces greenhouse-gas emissions from cooking.

Solar cookers use free solar energy accessible worldwide for cooking and water pasteurization. Solar cooking is a cross-cutting solution that has a positive impact on all 17 Sustainable Development Goals (SDGs) of the United Nations Agenda 2030. It offers a solution to the frequent and difficult choices many families make every day – whether to buy fuel or to buy food, for example. The sun's free energy makes solar cooking an effective, clean, and sustainable cooking solution for everyone who lives where the sun shines.

In 2018, SCI began its most recent initiative – in collaboration with a Kenyan foundation, Ecomandate – to provide Kenyan-produced solar cookers and training at Kakuma Refugee Camp. This has benefitted at least 700 people like the woman above, who now have access to the cleanest cooking technologies. Kenya is particularly ripe for solar cooking investment: only

6% of rural Kenyans in 2017 had access to clean fuels and technologies for cooking, according to a 2019 report tracking the United Nations Sustainable Development Goal for affordable and clean energy (SDG7). Furthermore, the Kenyan government has declared a ban on logging, increasing the need for alternative cooking fuels.



163

PRAGMATIC SOLUTIONS. A solar cooker is a device that collects and absorbs sunlight and retains heat to cook food or pasteurize water. Solar cookers work on the basic principle that sunlight is fuel. Sunlight energy is converted directly to heat energy, which is retained for solar-thermal cooking. The various sorts of solar cookers can capture, absorb and concentrate sunlight and convert it into heat: some models can heat slowly and evenly, making them particularly suitable for roasting and baking; others can generate intense heat quickly, by focusing rays of sunlight on the bottom of a cooking pot, making it possible to fry food. There are also solar-steam systems, such as those installed by SCI Global Advisor Deepak Gadhia at schools and temple complexes in India, that can cook for up to tens of thousands of people per day. Solar cookers are an appropriate technology for cooking traditional food items favored by communities and cultures that span the globe. From ugali

in East Africa to momos in Nepal, from gai yang in Thailand to quiche in France, consumers are inevitably amazed and satisfied by the quality of solar-cooked food. Solar ovens bake loaves of bread, cakes, cookies, and brownies: enthusiasts worldwide have shown that solar cookers can cook virtually any meal that might otherwise be cooked indoors.

164 POWER FOR FOOD, FOOD FOR POWER. Generally, solar cookers are best used on sunny days and serve as part of a suite of cooking options. A complementary technology to solar cookers is a heat-retaining basket, which is insulated to keep food warm so it can be eaten later (after sunset, for example). The combination of such innovative tools can keep a hot pot of food simmering for several hours with no fuel. Institutional solar cookers outfitted with thermic fluids can also store heat that is useful for cooking after dark. Researchers working with phase-change materials are aiming to bring thermal batteries to market as well, which will further enhance fuel-free food preparation.

Communities adopting solar cooking are experiencing the many benefits derived from no longer cooking over open fires. Women and girls are no longer forced to collect firewood, freeing up time for education and micro-enterprises, and indoor air quality is improving rapidly. Solar cookers even save trees: on average, one solar cooker saves up to one ton of wood per year. (That figure depends, naturally, on the type and size of the solar cooker, and on the frequency of usage.) Families are also saving a great deal of money by switching from cooking with solid fuels to solar cooking. Families in Tanzania, for example, have documented saving up to 35% on their fuel purchases; such savings can have an enormous economic impact for vulnerable people whose energy costs are proportionately higher than for others. Another complementary technology to solar cooking is a water pasteuriza-

tion indicator (WAPI). This basic, binary thermometer is a small transparent tube containing colored wax, which melts at 65°C – the water temperature needed to kill waterborne microbes and make water safe to drink. The combination of a solar cooker and a WAPI can truly be a lifesaver, especially in regions where water quality is uncertain, such as during cholera outbreaks.

PRESENT ACCOMPLISHMENTS, FUTURE GOALS. Solar Cookers International has held special consultative status with the United Nations Economic and Social Council since 1996. SCI uses this status to advocate for solar cooking at various United Nations events, to encourage government and civil society organizations to include solar cooking in their policies (especially relevant to meeting the SDGs) and to improve both environmental and human health across the globe.

165

Some 4 million cookers have been identified worldwide and, by SCI's calculations, they have cooked over 7.5 billion meals: this is having a direct and positive impact on at least 14 million lives. It also means that almost 30 million fewer tons of CO₂ are being released into the atmosphere; according to the United States Environmental Protection Agency's Greenhouse Gas Equivalencies Calculator, this is the equivalent of not driving over 73 billion miles or not burning over 32 billion pounds of coal.

Harnessing the power of the sun to cook is a powerful solution. It is also an easy step for individuals to take in response to our climate crisis. By accessing and harnessing the free power of the sun to improve the quality of life in more vulnerable communities, the global solar cooking movement is working to make our planet more sustainable and healthier.

¹ Based in Sacramento, California, SCI is a non-profit, non-governmental organization that leads through advocacy and research, thereby strengthening the capacity of the global solar cooking movement. To learn more: www.solarcookers.org.