



# ENERGY

V I E W P O I N T P A P E R

*Benefits and Costs of the Energy Targets  
for the Post-2015 Development Agenda*

Innovation: Africa

# Benefits and Costs of the Energy Targets for the Post-2015 Development Agenda

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Post-2015-Consensus

Innovation Africa

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## **Introduction**

Writing this paper in August of 2014, we as a global community have just entered the final 500 days of the Millennium Development Goals. We will not reach the 8 goals set out for humanity by 2015, but since 1990, extreme poverty has been cut in half, 17,000 fewer children die each day, maternal mortality fell by 47% and 2.3 billion people gained access to clean drinking water.

This is an important lesson for those of us engaged in the Decade of Sustainable Energy for All (DSEA).

I commend the authors of this paper on their exploration of social, environmental and financial issues in working towards DSEA's ambitious goals, but as a practitioner working on off-grid energy access for the past 6 years, I'd like to suggest an alternate conclusion.

## **Viewpoint**

The final thesis of the paper is that universal energy access is an aspirational goal, and states that this target is "the least positive as providing access to the last percentiles will exhibit increasing marginal costs with constant marginal benefits."

First, let's look at this argument from the authors' own financial perspective.

In assessing the value of human life from an economic standpoint (mainly by looking at GDP per capita), the authors demonstrate that the benefit of achieving universal energy access will lead to financial gains totaling between US \$205.2 billion and \$314.8 billion annually. With the cost of universal access ranging from US \$48 billion to \$182 billion a year, this amounts to a solid return on investment.

But apparently not solid enough to merit a status higher than aspirational goal. So let us transition from the financial discussion to a social one, looking at the "marginal benefits" of universal energy access.

Fifty percent of students in the developing world go to schools without electricity, according to the Sustainable Energy for All Initiative. Most don't have electric light at home either. They can't read, do homework or study for national exams without the use of expensive candles and kerosene lamps that come with the risk of smoke inhalation, eye-strain and fire. The same is true for their teachers, many of whom turn down rural teaching positions because of this reality.

According to Practical Action's Poor People's Energy Outlook 2013, 30% of medical clinics in sub-Saharan Africa do not have electricity. These facilities are nearly invisible at night to those who need them. Midwives can barely see the women who come in for maternity services; clinic staff struggle to diagnose and treat patients needing urgent care. These clinics often can't even store vaccines to serve their communities, as the same report

mentioned above also states that nearly half of all vaccines delivered to the developing world spoil due to lack of refrigeration. And lastly, the same staffing issues apply here as do to schools. Medical professionals would rather work in clinics with electricity than those without.

According to the International Energy Agency, there are 1.3 billion people today without access to electricity, and 599 million of them are in sub-Saharan Africa. Without electricity, not only do they struggle with the challenges above, but they are unable to pump clean water from below ground. At best, they use hand pumps that frequently break down, and often have to walk for long distances and wait in line just to bring water home to their families. At worst, they have no water. Women spend their days searching for dirty water to bring home—water that they know could make them sick, but they have no other choice. They have little to drink, and even less to irrigate, leading to hunger, malnutrition, and an unending cycle of poverty.

And then there's indoor air pollution, which according to the World Health Organization accounts for 3.5 million deaths a year.

For those working on sustainable energy development, we know energy is not a goal in and of itself. It is a means to an end—a tool to improve the caliber of rural healthcare and education, to provide rural people with clean water, clean air, food security and economic growth.

Let's imagine for a moment that every one of the 1.3 billion people currently lacking access to electricity had the following:

1. Clean water either pumped from below ground or purified from other sources
2. Light for urgent care and maternity services at night
3. Properly stored medicines and vaccines
4. Light for evening study—for both children and adults
5. Cooking without indoor air pollution
6. An internet connection (whether by phone or computer, in the home or communally) to learn, to share ideas, to buy and sell products and more

If we were able to do just this by 2030, we would essentially eradicate water borne disease, we'd reach nearly universal immunization of all children, we'd decrease maternal mortality, end indoor air pollution, drastically improve education, create food security and economic opportunity, and provide 1.3 billion people with access to information and ideas from around the world.

And this is only if we meet this population's most basic energy needs.

The authors of this paper rightly point out that there will be other unstated costs in creating energy infrastructure where there is none. This is undoubtedly true. But achieving universal energy access doesn't necessarily mean building costly energy infrastructure in every corner of the globe.

To speak for a moment about the finances of the relatively modest proposition above, I'll use the example of my own organization—Innovation: Africa—which brings Israeli innovation to African villages. We power rural schools, medical clinics and water pumping systems with solar energy. We also use remote monitoring technology to track the energy production and consumption of our projects. We get email and text alerts if something goes wrong, we can predict problems before they start, perform remote diagnostics, optimize our systems and more. And every one of our projects has a built-in income generating mechanism that provides the funds necessary for system maintenance.

In 6 years, we've completed 82 solar installations impacting 678,928 people. That isn't many in terms of the scope of the problem, but we've managed to do this with a total of less than US \$3 million. Which means that we've brought clean water, improved education and proper medical care to nearly 700,000 people at a cost of less than \$5 per person. And this is without factoring in economies of scale.

Ours is one of many models, and we've focused on communal institutions to maximize social impact with minimum investment. But there are countless approaches in reaching those beyond the grid: minigrids, solar lanterns, clean cookstoves and so much more.

We can also take a moment here to briefly explore the finances behind solar home solutions (it's an area we're increasingly familiar with as Innovation: Africa is piloting its first rural energy store next month). According to the 2013 Off-Grid Lighting Assessment for Uganda produced by UNEP and en.lighten, 13.6 million Ugandan households are dependent on kerosene lamps for light at night. These households are spending an average of \$7.83 a month on kerosene, amounting to approximately \$95 annually. For a family earning \$1 a day, this accounts for approximately 30% of their household income.

In Uganda alone these off-grid energy consumers are using 593 million liters of kerosene to light their homes, emitting 1.7 million tons of CO<sub>2</sub> (the equivalent of that produced by 420,200 mid-size cars). And that's just from 13.6 million households.

To date, approximately 50 solar home products have met the Lighting Global Minimum Quality Standards, most of which are priced under \$75. Given that in Uganda kerosene lanterns cost an average of \$8 a month to maintain, a solar lantern costing \$30 that replaces the need for kerosene will save rural Ugandan consumers \$66 in the first year alone.

Similar financial equations exist for people living without electricity around the world.

## **Conclusion**

The bottom line is that the groundwork to reach the goal of universal energy access is already being done. Products and organizations exist to help end energy poverty, and have since before there was a Decade of Sustainable Energy for All. But now that there is a global



focus on this sector and large amounts of capital ready to be invested, now is exactly the time to reach for that ambitious goal, not the time to shy away from it as just aspirational.

As 2015 quickly approaches, the world has much to learn about ambitious global goals. We are not today where we'd hoped we'd be, we haven't and won't meet the Millennium Development Goals. But 15 years later, now is the time to get smarter. It's time to better activate public-private partnerships, time to make funding more accessible to those with proven track records of success, time to leverage tremendous technological advancements to create increased transparency, especially when it comes to infrastructure development.

We have a phenomenal opportunity here that we—and the 1 in 6 people still living without energy—simply cannot afford to miss. I hope that we as a global community can capitalize on this and work together for a brighter future for all.

This paper was written by Innovation Africa, a non-profit organization that brings Israeli innovation to African villages. The project brings together more than 50 top economists, NGOs, international agencies and businesses to identify the goals with the greatest benefit-to-cost ratio for the next set of UN development goals.

For more information visit [post2015consensus.com](http://post2015consensus.com)

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Copenhagen Consensus Center is a think tank that investigates and publishes the best policies and investment opportunities based on how much social good (measured in dollars, but also incorporating e.g. welfare, health and environmental protection) for every dollar spent. The Copenhagen Consensus was conceived to address a fundamental, but overlooked topic in international development: In a world with limited budgets and attention spans, we need to find effective ways to do the most good for the most people. The Copenhagen Consensus works with 100+ of the world's top economists including 7 Nobel Laureates to prioritize solutions to the world's biggest problems, on the basis of data and cost-benefit analysis.

