



Powerful solutions to poverty



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Imagine living in the dark, unable to keep warm, turn on a light or boil a kettle.

Imagine being forced to rely on burning poor grade wood, dung or crop waste to cook – suffering the effects of the potentially choking fatal toxic fumes given off by this fuel.

Imagine being taken desperately ill and being turned away from a clinic because it has no electricity and can't offer even the simplest treatment.

Imagine your child living under the shadow of life-threatening disease because there's no vital vaccine, due to a lack of refrigeration.

Imagine if you or your partner were pregnant and went into labour at night and had no light, no pain relief and no way of saving you or the baby if there were complications.

This is the stark reality for billions of people living in poverty.

THE FACTS

- 2.5 billion people - almost half the world's population - have no access to decent fuels for cooking.
- 1.5 billion people have no access to electricity, that's nearly a third of the world's population.
- In Africa 85% of the population don't have electricity.
- 60% of energy is consumed by just 20% of the world's population

This is a massive problem, one that destroys lives and stops poor people escaping the clutches of poverty.

And it is not just a lack of energy for heat and light. Women are forced to rely on burning biomass - wood, dung and crop residue – so they can provide their families with a meal.

Women and children are forced to walk long distances to search for and carry firewood, sometimes up to 40kg, that's the weight of an eleven year old child.

And the devastating legacy of burning these fuels is the overpowering and toxic fumes which hang in the air, slowly poisoning families.

Life without energy

Without energy, people's ability to get a decent education is severely affected.

Education is acknowledged as a crucial factor in helping people escape poverty. In communities without energy children are often forced out of school to help collect fuel, carry maize for grinding, or to help bring in an income for the family.

Time spent on education is severely reduced as children have to help search for and collect fuel. And when children do go to school – often following a long gruelling walk - it has to be in daylight – as no electricity means time available in the classroom is restricted.

When they arrive home needing to do their schoolwork, they have no light to study and all that greets them is darkness and thick smoke from the open fire. Or they have to rely on kerosene to provide precious light, which is both expensive and dangerous; if a lamp is knocked over it can cause serious burns.



Women and children spend much of their time gathering firewood for cooking

Computers, radio or TV lessons are important tools for modern education. A lack of electricity restricts the opportunity for children to further their education and can leave youngsters feeling isolated from the rest of the world. And teachers don't want to work in communities where there are no lights, little equipment, no TVs, computers or life after dark.

Without energy, people's ability to earn a living is also severely affected.

As with education, life without modern energy is also denying people knowledge. Without electricity there is no access to radios, computers or the internet, so there is no access to vital information such as radio programmes about farming techniques, flood warnings or local news.

Lack of energy means people struggle to start a simple business like; sewing, welding, or battery recharging which could be their way permanently out of poverty.

Without clean, modern energy people's health can be severely affected.

One of the greatest energy needs across the world is for cooking, something which we take for granted. Without a decent energy supply, people are forced to rely on wood and dung for cooking.

Women and children can spend hours every day searching for increasingly scarce resources. They are at risk from wild animals and in some countries, rape. But it doesn't end there, once they start burning biomass, the thick acrid smoke causes serious lung disease and turns kitchens into death traps. Children and their mothers are most at risk, choking, retching and gasping to get air to their lungs which are being attacked and destroyed by smoke.

More people die from smoke inhalation than malaria. According to the World Health Organisation's 'World Health Report', diseases associated with indoor air pollution claim 1.6 million lives every year - that's one person every 20 seconds.

Strong evidence links indoor air pollution to respiratory diseases such as pneumonia, bronchitis and lung cancer. Women and children who spend long periods every day around traditional open fires inhale the equivalent of two packets of cigarettes a day.

Three times more women than men die from diseases related to indoor air pollution every year.

Yet Practical Action is working on more fuel efficient cooking stoves which can reduce smoke levels by up to 80%, improving health and also reducing drudgery for women as they spend less time collecting



Pupils at Nyafaru school, Zimbabwe, using electric light to continue their studying in the evening

firewood and have more time for other money making activities. We know improving energy for cooking leads to better education, it empowers women, saves the lives of children and their mothers while benefiting forests and our climate.

Grace Aduogo, Kisumu, Kenya: "I spent many long hours cooking in my kitchen. I was told that smoke levels were 100 times more than they should have been. Every time I cooked my children would be coughing and their eyes red and painful. All I wanted to do was make sure they had food in their mouths yet we all suffered."

A solution to poverty?

Practical Action – one of the world’s leading authorities on energy for development – has been working with the world’s poorest

communities for more than four decades.

We believe renewable energy can – and does – act as a catalyst for change. If people have access to appropriate energy they can escape from poverty for ever. Energy is a powerful solution to poverty.

And in 2004, the United Nations Development Programme warned that “none of the Millennium Development Goals – which aim to reduce poverty by half – can be met without major improvements in the quality of energy services in developing countries”.

Access to energy is the key to unlocking people’s potential to help themselves. It can be the spark which fires real poverty reduction. We’ve been successfully helping communities for over 40 years, working with them to provide solutions to poverty.

Efficient energy gives people more time to spend with their families and strengthens community life, whether fuel efficient stoves in the home or larger wind power and micro-hydro schemes for entire villages.

We know it improves health and education. Practical Action’s energy work provides people with a lever out of poverty; not only is it making life better, it is helping people find new ways to earn money and empowers people to do more.

Life changing energy

“Light has changed our lives completely” said Kara Bahadur Chepang. He lives in a remote village high on a Nepalese hillside where Practical Action has been working with the community to build a prototype ‘energy village’. Now the villagers have access to a

variety of locally resourced energy options – from micro-hydro, to solar and wind power. The micro-hydro system is providing light to three villages, delighting the women in particular.

“We have never known such a change. Dark has turned to light, and we have more time to spend with our children and families. We no longer breathe in the smoke that used to hurt our lungs, or walk so far for wood” said Fulmaya Chepang. Now she is not spending so much of her income on kerosene for lamps she is saving money, which she has invested in growing crops to earn extra income. Last year the village sold 10 tonnes of vegetables, now it manages to sell 30 tonnes.

Not enough is being done

Practical Action’s work is hugely successful. We know what works, we advise the EU and World Bank among others and have won awards for our work. What we do is small scale and tailored for individual communities because there are a variety of solutions rather than one big one.

We want to increase the scale of our work so that as many people as possible across the world living without energy can climb out of poverty. However, governments of developing countries have large and competing demands such as paying off national debt and balancing trade. While energy may be discussed by our world leaders, energy for poverty reduction is rarely taken into account. This must change if communities living in some of the most remote areas in the world are to access off grid, renewable energy.

Providing energy is expensive on a large scale. In remote rural areas the costs of reaching people with grid electricity is prohibitively

“Without energy, poverty is like a dog chasing its tail. Searching for firewood means longer journeys, leading to less education and less time for processing and production, meaning less money. Without investment into energy, communities are becoming more and more steeped in poverty, struggling to claw their way out.”

Tinashe Nhete, Practical Action, Zimbabwe



Electricity has come to the Campo Alegre community in the highlands of Peru, through a hybrid wind power - photovoltaic system. It has given them the means to communicate with others, to share and hear information, and has given them more hours in the day to be productive, healthy and happy.

expensive. Private companies are unlikely to make the necessary investment – especially when the recipients may be too poor to pay for it.

But it can be done

Isolated communities in developing countries should not be denied the right to energy. That's why our solution is small scale renewable energy. Our projects, using natural resources such as water, wind, sun and waste, work in even the smallest or most remote communities. We know this because we are working with thousands of people across the world that previously had no energy options and are now benefiting every day.

We want to do more and see it scaled up across the world.

Yet there is no 'one size fits all' solution, which is why Practical Action puts people – not technology - first. What kind of energy do people need? Do communities have the knowledge to maintain it and is it sustainable?

Renewable energy can be 'owned' by a local community and designed to meet their specific needs. In almost all our work the costs of building the power generation are met, at least in part, by the local community. They can fix any problems, make new parts and earn money from it as people start up their own businesses such as battery

"I strongly believe access to energy can have major benefits; people can earn a living, medicines can be refrigerated, children have time to study and most importantly, it lifts people out of the vicious poverty cycle."

Teo Sanchez, Practical Action's Energy Specialist



Practical Action/Karen Robinson

Ester from Kenya is able to run a hairdressing business using power supplied by micro-hydro. As a result she has an income and her children can go to school.

charging and welding. Our work helps the community build the most appropriate and sustainable energy systems for their needs. Some of our micro-hydro schemes in Peru were built over 20 years ago and are still successfully providing electricity to communities who no longer need our support.

We have seen how improved stoves, making better use of biomass for cooking, has had major benefits on people's lives. People are now enjoying better health and having more time to spend with their families, while freeing up time to explore new money making opportunities.



Bio-digester from a plant in Sri Lanka

Energy is a powerful solution to poverty

Generating biogas from cow manure

Sri Lankan Sakuntha Kathirav and her four children rely on selling cows' milk. She and her daughters would spend several hours each day collecting wood leaving them little time for the milk business.

But there was a readily available solution to their problem – they could use biogas made from cow manure, free and available all year. The manure is mixed with water and placed into a bio-digester or fermentation pit where it is broken down to release methane. The gas is collected and stored in a tank and then piped on demand to the farmer's house to be used for cooking, laundry and lighting. The residue is also a valuable fertiliser.

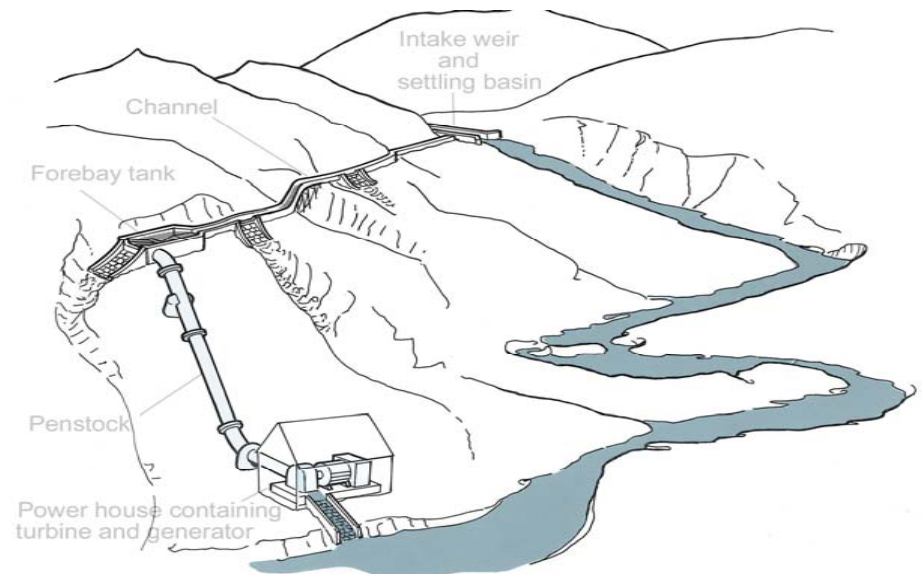
Instead of being dependent on wood to cook a hot meal for the family

or heat water, Sakuntha now has a new biogas stove. It has freed up so much of her time that she now has an extra two and a half days a week to spend on producing and selling milk.

With both fertiliser and fuel wood becoming increasingly expensive in the country biogas has a potentially important future. Practical Action has introduced 60 new biogas schemes, meeting 75% of household cooking needs, and is now working with the government on setting standards for biogas systems in Sri Lanka.

The power of water

For Alfredo Sarango the arrival of electricity to his isolated village of Pampa Verde in Peru has not only changed his life, but has affected the whole community. For five million Peruvians access to electricity is a dream – living in remote rural areas grid electricity is never likely to reach them.



By channelling part of a river's flow through a pipe and down a slope to a turbine electricity can be produced

Practical Action has installed 50 micro-hydro schemes – harnessing the power of local rivers – to bring clean, renewable energy to 30,000 people.

This helps to boost local industry as the turbines are manufactured locally, and the local community has also taken control of the maintenance of the equipment. As a result of the new power, the community has benefitted from improvements to the medical centre, a new internet café which brings a much needed communication lifeline with the outside world and an increasing number of businesses.

Improved clay stoves in Darfur

Shortage of fuel for cooking is one of the many problems faced by people in Darfur, Sudan. Gathering fuel is generally women’s work but can be dangerous - they have been attacked, raped or even killed during their search for firewood. We are still working with families at

risk, in Darfur, showing women like Sulaffa in the village of Shagra how to make a new kind of stove.

It is better insulated than her current stove, meaning that it needs half as much firewood to cook the food her family needs. This halves the number of trips Sulaffa and her children need to make into the baking sub-Saharan desert to search for wood. Over the space of a year, that means Sulaffa and her family will be able to spend more than an extra month together in the safety of their village - all thanks to the stove.

According to Sulaffa: “The stove will mean my children and I can stay at home together and talk. I miss being with them and being able to learn about their day – I am sorry I have had to bring them to this life. I do not want to take them to dangerous places but I cannot leave them on their own.”

We have trained thousands of women across Darfur so they can show others how to make the stoves. The result? More families benefiting from being healthier, safer and enjoying more time together.

Lighting up a village – using wind power

In Nepal, where only 27% of the population has electricity - the mountainous landscape makes it difficult to extend the electricity grid. Practical Action has worked with communities to develop low cost wind energy systems. In Phakhel, a wind system was connected to a child day care centre, benefiting more than 50 local children. After this successful demonstration, the local community demanded more such plants in the villages. Now two more turbines generating a total of 300 watts of power have been installed in the same community. These provide energy to the local villagers for different applications including lighting, listening to radio, watching television,



Practical Action/Margaret Gardner

A women’s group involved in training for stove making



The community work together to erect a wind turbine in Phakhel village, Nepal

recharging LED lamps and mobile phones for communications.

During the development stage, Practical Action supported two local businesses with manufacturing and installation training. This has been rolled out to other manufacturers, engineers and students across the country; and we are supporting policy development on wind technologies development and promotion in Nepal.

"Before, we used to light kerosene lamps in our rooms at night. We had black smoke under our noses and our eyes itched due to kerosene smoke. Wind powered lamps installed by Practical Action have helped my newborn grow up in a smoke free environment," says, Ranju Pakharin, mother of a seven month child, Phakhel.

Energy poverty and climate change

Communities in developing countries now face a new enemy, climate change. Despite contributing least to the problem, the world's poorest people are hit hardest as droughts and floods hit more often, giving people less time to recover. Now, more than ever there is an urgent need to tackle poverty and give people the option to adapt to changing climate.

But wouldn't increasing energy access increase carbon emissions?

Giving poor communities access to energy would increase global carbon emissions by less than 2%. And if renewable energies were used this figure would be even lower, meaning poor countries would leapfrog the carbon technologies which industrialised countries are so reliant upon.

Practical Action strongly believes that developing countries have a right to increase their energy use – even if this means marginally increasing emissions in the medium term.

As developing countries struggle to cope with the effects climate change is already having, poor men and women are spiralling deeper into poverty. For them energy access and the opportunities it can provide are becoming more important than ever.

As HRH Prince Charles said when he opened the Nobel Laureates' Symposium on Climate Change in May 2009: "We know about energy efficiency, renewable energy, and how to reduce deforestation, to name but a few, but we seem strangely reluctant to apply them. I fear that this hesitation will have catastrophic consequences."

Rich countries, which have historically produced the greatest emissions, have a moral responsibility to make cuts, to allow poorer countries to develop further. This is about justice – while we need to see emissions reduce overall, we cannot stop poor countries developing and hold people back.

Lighting the way for a brighter future?

Energy is a powerful solution to poverty. Practical Action has a very clear message: using renewable energy technologies will help millions of people escape poverty. Simple and easy schemes can – and already do – give people a way out of poverty for ever.

Through our successful work, people are no longer condemned to a life of poverty. Communities are becoming healthier, discovering new ways to earn a living and to improve the education of their children. We have proved just how easy it can be to provide people with renewable and sustainable energy, giving people a brighter future.

But we need to increase the scale and reach of this work. We can't do this alone. We already work with other development organisations, governments and funders, to provide technical expertise and inspire them to make energy a higher priority.

Now we need your help too.

As Fritz Schumacher, author of *Small is Beautiful* and Practical Action's founder said: "There is no substitute for energy. The whole edifice of modern life is built upon it. Although energy can be bought and sold like any other commodity, it is not just another commodity, but the precondition of all commodities, a basic factor equally with air, water and earth."



How you can help

Providing energy is one of the most effective ways of building a future free of poverty.

Help us spread the word so that we can scale up our work and give people the catalyst they need to leave poverty behind by doing one of three things today:

Step 1: Visit www.practicalaction.org.uk/energyaccess to find out more about our work and tell other people

Step 2: Get involved in the debate about energy on our social networks and blogs

Visit [facebook](#) [twitter](#) [YouTube](#)

www.practicalaction.org.uk/blogs

Step 3: Give a gift and help Practical Action reach out to remote communities. Visit www.practicalaction.org.uk/supportus



A small business charging mobile phones in Kenya, powered by micro hydro

Practical Action/Karen Robinson



Computers powered by wind energy improve educational opportunities in Peru

Practical Action/Ana Castañeda

Practical Action is the brain child of economist and author of Small is Beautiful - Fritz Schumacher. It makes a huge difference to hundreds of thousands of people's lives across the world every year. Practical Action passionately believes that small scale and low cost appropriate ideas can provide people with the tools to fight their way out of poverty.

The right idea, however small, can change lives, improve health and livelihoods, create jobs and ultimately help people to lift themselves out of poverty.

By working with people and identifying technologies which are suitable and appropriate to their needs, these solutions to poverty mean people start to see a change in their lives. As well as technologies Practical Action shares knowledge. The combination of innovative ideas and technology make a huge difference to individuals, families and their communities.

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Front cover : Women carrying materials up a hillside to build a wind turbine in Nepal.
Practical Action/Rakesh Shrestha

Opposite: Electricity from micro-hydro enables remote communities in Cajamarca, Peru to view television via satellite. Practical Action/Steve Fisher

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