



**Friends of
the Earth
International**

ENERGY: ACCESS AND SUFFICIENCY

Enough is enough: understanding 'energy sufficiency' as an integral part of delivering energy access

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Energy access and energy poverty

Our energy system is fuelling human-made climate change and environmental and social injustices across the globe. Industrial countries, corporations and the global elite need to reduce their energy consumption to lessen their impact, while, overall, developing countries need to increase consumption to ensure their basic well-being and allow them to lead lives with dignity.

According to the International Energy Agency (IEA), nearly one in five of the world's population does not have access to electricity, and many more suffer from inconsistent or poor quality access. Close to two in five people globally do not have access to clean cooking facilities. The vast majority of those without electricity or clean cooking fuel access live in Africa and developing Asia (IEA, 2016).

Furthermore, while the problem of energy exclusion is primarily concentrated in the global South, many people in the North also struggle to afford sufficient energy to meet their basic needs. Here, the problem is one of capacity to pay rather than energy availability. Definitions of fuel poverty vary, but the most widely used states that a household is fuel poor if it needs to spend ten per cent or more of its income on domestic fuel, including that needed to heat the home adequately. For example, in December 2011, one quarter of households in England and Wales were officially defined as fuel poor, and figures for all fuel poor across Europe are estimated at 50 to 125 million people (EPRS, 2016).

Global inequalities in energy use

Alongside the issues of energy exclusion and energy poverty there are massive inequalities in energy consumption. Global energy consumption is highly skewed towards the global North, despite the existence of severe fuel poverty, and is grossly unequal. Energy consumption per head of population in the US

and Canada is still roughly twice that in Europe or Japan, nearly four times that in China, nearly 20 times that in India, and about 30 times as high as in the poorest African countries (World Bank, 2013).

Energy sufficiency

Somewhere between the extremes of excessive energy use and energy poverty lies 'energy sufficiency'. We would argue that sufficient energy is "a human right and must be affordable for poor people." (CSE *et al*, 2015) Yet without further elaboration about how energy sufficiency is to be understood and insights into what it might look like in practice, energy sufficiency is nothing more than a moral stance (CSE *et al*, 2015).

In this briefing we endeavour to explain what the concept of energy sufficiency might mean in practice, specifically with respect to delivering energy access, with examples from Palestine, Cameroon, and Scotland. While these examples are by no means exhaustive, they provide a starting point for integrating the concept of energy sufficiency into thinking around delivering sustainable energy for all.

Confronting paradigms

Energy sufficiency is about using enough—not more, and not less. It goes beyond energy efficiency, which is focused on being able 'to do more with less' without defining or capping what that 'more' should be: "An increase in resource efficiency alone leads to nothing, unless it goes hand in hand with an intelligent restraint of growth." (Sachs W, 1999). This in turn implies that energy sufficiency must incorporate 'restraints on growth', which makes it incompatible with 'orthodox economic growth' (which focuses on maximising growth) (Barry J, 2012; Barry J, 2015), and rather different from techno-centric efficiency solutions that are aimed at getting the most out of limited natural resources.

Here, an important related criticism is that energy efficiency can actually lead to an increase in overall consumption, a phenomenon known as the 'Jevons paradox' or 'rebound effect'. (Polimeni JM *et al*, 2008). This may occur when efficiency leads to more affordable equipment or operations, which in turn leads to an increase in demand and consumption (the relatively rapid spread of refrigerators to keep food cold is a good example (New Yorker, 2010)). A "positive 'rebound effect'" may occur where energy efficiency measures such as insulation lead to an increase in levels of energy consumption for a previously fuel poor household, moving them towards energy sufficiency and a better quality of life (Jenkins D *et al*, 2011).

Energy sufficiency is not simply about providing light bulbs (so children in poor families can study at night, for example). Of course, access to modern energy services in the context of education and health care are important. However, energy sufficiency needs to challenge romantic, Northern notions that all people in developing countries like to live off the land with no desire to consume more. Many indigenous communities do live comfortably and sustainably without access to energy services. Yet for very large numbers of people around the world, lack of energy to meet their needs is a central problem, and one which directly correlates with the major elements of poverty, including inadequate health care, low education levels and limited employment opportunities.

The degree to which access to modern energy services such as electricity is essential for basic well-being and living with dignity varies considerably between different communities, regions and nations. It depends on a range of factors including culture, lifestyle, climate, and access to locally-available energy resources. It has been noted that, in the Indian context at least, "even the most successful experiments are built on limited opportunity models - such as the lantern or the solar panel with a few light-bulbs, which works when people are poor. It does not meet needs or aspirations as people become richer or have more energy needs. In this way, existing solar energy systems have been designed only for the poor and only when they are poor." (Bhushan C & Kumar J, 2012) Denying the realities of these people when delivering energy access may well lead to energy system failures further down the line.

Gaza: plugging the electricity gap in Palestine

The Israeli siege on Gaza, and consequent restrictions on fuel and spare parts, means that the productivity of Gaza's power plants declined to just a quarter of previous capacity after bombardment by Israeli fighter jets in 2006. More than 1.7 million Palestinians in Gaza now suffer from daily electricity shortages, which usually last for at least ten hours (Pengon, 2016). Some communities receive only three to four hours of grid electricity to their houses each day (FoE, 2015).

In order to 'plug the gap', the population has turned to gasoline generators. There are tens of thousands of generators in Gaza, emitting health-endangering pollutants and exceeding safe limits for noise pollution. The imported generators are often unsafe, leading to fires, electric shocks and carbon monoxide leaks (Pengon, 2016).

PENGON / Friends of the Earth Palestine is supporting the poorest and most marginalised communities who do not have access to fuel for generators. PENGON, in cooperation with its members, first assesses the needs of communities, and then designs the most suitable solar photovoltaic (PV) units to provide these communities with the energy they need. Some projects are implemented at a household level, so that families can meet their basic electricity needs (lighting, for example), but also so that they may run fans and power laptops. Other projects are implemented at a community level to produce energy that is needed to operate generators for small wastewater treatment plants or water pumps.

Mouanko, Bikogo and Biagnimi: powering and empowering rural communities in Cameroon

Nearly 100% of Cameroon's energy comes from dirty sources—the majority from mega-dams, which account for over 70% of installed electricity capacity (CIA, 2016). While the country must, overall, increase energy consumption to meet the needs of the population, the government favours mega-dams and big fossil fuel-burning plants, which feed energy into a centralised grid structure, which only reaches a fraction of the population. As a consequence, the system fails to serve more than 74% of rural and poorer communities, and leaves environmental and social devastation in its wake (Cameroon, 2015).

Renewable and sustainable energy sources are hardly considered. Their contribution is currently far less than 1% of national energy production, despite the enormous potential for renewable energy in Cameroon. Over the past five years, Centre pour l'Environnement et le Developpement (CED) / Friends of the Earth Cameroon has introduced community renewable energy initiatives to improve access to a basic, modern energy service through solar energy models. In the villages of Mouanko, Bikogo and Biagnimi, where energy access is very limited or even non-existent, CED has supported people to introduce a community model for solar lighting.

Aside from the clear social, economic and educational benefits of introducing solar lighting technology to the villages, the initiative has done much to raise awareness among the rural population about the possibilities of an alternative system—one that responds to the needs of people and does not exist solely to make profit. A holistic and systemic transformation is needed, though even small-scale community solar initiatives can empower communities to claim their right to energy and can contribute to a real social and cultural shift.

There is still a long way to go to ensure that the community as a whole has sufficient energy access. Remaining barriers include unfavourable government policies, including a lack of adequate national and/or local public resources for community energy initiatives, and a continued habitual focus on 'traditional' dirty energy.

The Isle of Eigg: energy sufficiency in practice in Scotland

Until 2008, people on the Isle of Eigg in Scotland did not have access to grid electricity. Instead they largely relied on diesel generators that would produce electricity for a limited number of hours per day. This reliance on fossil fuels was expensive and the process of transporting it from the mainland to the island and then onwards to individual buildings was cumbersome. Eventually, the island community managed to secure funding in the region of US\$2 million to install a stand-alone mini-grid and local generation capacity. A combination of small wind, small hydro and solar photovoltaics now produce about 90% of the electricity needed on the island, with a diesel generator as back-up (Schiffer A, 2014).

In order to keep the capital cost to a minimum and to avoid spikes in consumption in this closed system, the community decided to implement a 5kW consumption cap for households and a 10kW cap for local businesses. If a household breaches this cap by running too many power-consuming devices simultaneously, it is automatically disconnected from the grid (Eigg Electric, 2009). An engineer then has to physically come out and reconnect the household.

Every household and business on Eigg is provided with a small display unit that indicates current power consumption and so helps people to manage their usage in line with the 5kW/10kW cap. However, conversations with local people and observations suggest that many have become so used to the set-up that they no longer require the aid of display units and intuitively know when they are close to the consumption limit

Instead of moving from under-consumption to over-consumption, people have adapted their behaviour to live comfortably with a sufficient amount of power.

Friends of the Earth Scotland campaigns for people's ownership of renewable energy, in order to ensure that the transition to a fossil free future is socially as well as environmentally just. A collection of community power case studies from across Scotland can be found here: <http://www.communitypower.scot/case-studies/>

Discussion

This introduction to energy sufficiency and energy access offers a step towards moving discussion about the concept of energy sufficiency from a moral standpoint to a debate about something that happens in practice.

e have focused on electricity, a focus which is also evident in schemes such as the Africa Renewable Energy Initiative and discussions on global finance for renewable energy transitions. Yet energy sufficiency and energy access need to be viewed much more holistically. For example, transport infrastructure is another modern energy service that has huge implications for local energy cultures, and for land use, which in turn affects our ability to grow food (Girardet H, 2008).

We need to integrate our thinking about how electricity, heating/cooling, transport and food production interrelate (CAT, 2013; EnergyPLAN, 2016). This has clear technological, political and spatial dimensions. Importantly an integrated approach to energy also needs to consider social dimensions that relate to who actually has access at the local level: Who benefits and who is excluded? How does change impact on local energy cultures and behaviour? What role is there for communities to create locally appropriate energy futures?

What is clear is that delivering energy access without considering energy sufficiency is likely to lead to changes in energy culture that promote excessive consumption. Stakeholders need to play an active role in defining levels of sufficient energy and determining the mechanisms with which cultures of sufficiency are implemented and sustained. The role of communities, including defining their capacity needs, should therefore be reflected in policy frameworks and mechanisms designed to deliver sufficient energy access.

Conclusions

Friends of the Earth International envisions a world where peoples everywhere live in sustainable societies, in harmony with nature, and keeping within Earth's ecological limits. In addition, rich, industrialised countries must provide their fair share of public finance to better enable developing countries to turn away from a dirty energy development pathway and to follow a just transition.

People have a right to energy, but we must address overconsumption and challenge the paradigm of the consumer society. We also need to challenge wealth and resource concentration between countries and within countries, and transform our energy system from a dirty, planet-destroying system that seeks to accumulate profit, to one that is gentle on our environment and responds to the needs of people.

We are working together towards a life of dignity for all, where everyone has access to Earth's resources in a way that is sustainable and just.

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