

Demanding supply

Putting ordinary citizens at the heart of future energy systems

Sarah Best

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Hivos is an international organisation that seeks new solutions to persistent global issues. With smart projects in the right places, Hivos opposes discrimination, inequality, abuse of power and the unsustainable use of our planet's resources. Counterbalance alone, however, is not enough. Hivos's primary focus is achieving structural change. This is why Hivos cooperates with innovative businesses, citizens and their organisations – sharing a dream with those organisations of sustainable economies and inclusive societies.

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Photo caption: Futurepump has developed a solar powered irrigation pump called the Sunflower, which is being piloted with smallholder farmers in Rusinga Island, Lake Victoria, Kenya. Oluoch Omwoma (pictured) is one of Futurepump's first customers and a member of the Rusinga Island Organic Farmers Association.

Photo credit: Sarah Best

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What role will ordinary people play in energy systems of the future? IIED and Hivos asked leading energy thinkers for their views. Opinions vary: some want to see a future where citizens produce, control or profit more from local energy resources; for others, companies and governments are likely to remain in the driving seat, with people acting as passive consumers. A point of convergence is that energy solutions, however delivered, need to be more ‘people-centred’: they need to create jobs, incentivise users to be efficient, be accountable to customers, and promote off-grid and ‘bottom-up’ service design for poor communities. Accelerating change will require tried and tested tools such as price signals, and newer approaches focused on transforming the energy sector’s culture, education and leadership, strengthening civil society advocacy, and creating new spaces for cross-sector innovation.

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Executive summary

“They call them not consumers, but ‘prosumers’. It’s a future where decentralised energy makes every consumer – or most consumers, in very rich countries – an energy producer.”

“I don’t think people really care about whether they are producers of energy or not...what they want is to access energy as and when they need it, in the right quantity and right quality.”

Our energy systems are in transition. What role will ordinary people play in energy systems of the future?

Will a shift to renewables and energy efficiency go hand in hand with a radical democratisation, where people are generating and trading energy from their own homes and businesses? Or will the future look similar to today, with large companies and governments in the driving seat while people act as consumers, focused on utility and price alone? What are the ingredients of a ‘people-centred’ energy system anyway? What might it look like across developing and developed countries, rural and urban areas?

The opening quotes, from two African energy experts interviewed for this paper, hint at the diverse scenarios that could unfold.

The term ‘energy transition’ has been used to refer to the shift from one energy source to another,¹ such as from wood to coal. However, many commentators today have a broader understanding of transition as the shift toward an energy system that is economically, socially and environmentally sustainable.² How can countries secure energy supplies to provide access for everyone, while shifting away from fossil fuels and promoting efficiency to avoid dangerous climate change?

Whether using the broad or narrow concept of energy transitions, mainstream debates on energy futures tend to have a common blindspot: ordinary people. These debates rarely start with, or centre attention on, the ‘people’ aspect of transition. The focus is instead on energy sources, market regulation, security, demand, price and the environment.

These are undoubtedly fundamental elements in the global energy transition. However, the International Institute of Environment and Development (IIED) and Hivos find that energy agencies, government ministries and investors tend to consider people in narrow and utilitarian ways, depicting them for instance as sources of ‘unmet demand’ or in terms of ‘consumer behaviour’. This lack of in-depth focus on the role of ordinary citizens is surprising, given the highly political nature of energy and the profound effect of previous energy shifts on human societies.

This research explores what the ‘people factor’ in energy transitions means, by asking leading energy thinkers and practitioners around the world what they think. Our core focus is on the transition towards more people *accessing* energy in developing countries, though we also give considerable attention to the shift to green energy globally. The interviews are part of background scoping work by IIED and Hivos in 2014 on the potential for an ‘energy change lab’ in Tanzania, a platform where diverse stakeholders would come together to learn, experiment and co-create innovations that accelerate the shift to an inclusive and sustainable energy system. Innovations might relate to government policy, institutions, human capacity or business models.

This paper presents the diverse views that global experts shared with us. By presenting these scoping results we have two goals in mind. First, to raise awareness of the issue and stimulate discussion among others working on energy transitions globally, across the public, private, NGO and academic sectors, by asking: Is the ‘people factor’ under-represented in debates on energy transitions? What does it mean? How do we address it? Second, this paper aims to inform thinking, in our organisations and others, about energy in Tanzania, where IIED and Hivos want to work with others on practical solutions to accelerate energy shifts that meet the aspirations of Tanzanian citizens.

Our interviewees included heads of investment funds, a former oil executive, the leader of UN’s Sustainable Energy for All (SE4ALL) initiative and directors of NGOs and social enterprises SELCO³, IBEKA⁴ and the Kumasi Institute for Technology and Environment (KITE)⁵, who have pioneered energy access solutions for poor communities in Africa and Asia. (see Box 3)

We asked questions covering three broad areas:

1. What's your vision of energy systems in 30 or 50 years' time, and how will ordinary citizens be involved? (Chapter 2)
2. What are the barriers to achieving a greener, more people-centred energy system? (Chapter 3)
3. What kind of niches and solutions are emerging? What is needed to support a transition to a people-centred energy system? (Chapter 4)

"It's a really big cultural shift, mental model shift, to move from the 'old boys' club' of the US electric sector to one that is much more – I guess you could say – democratic and customer-centric."

Using participatory methods to analyse the interview transcripts, our team drew the conclusions outlined below.

Role of people in future energy systems

- The energy sector today, particularly its large-scale power providers, is failing to meet many people's expectations or serve their interests.
- Experts are optimistic that the shift to renewable energy will accelerate and this trend has *potential* to be more people-centric, principally through off-grid technologies that allow people to produce energy themselves.
- Respondents have different outlooks on how 'deep' democratisation of energy can or should go. This seems to depend on whether they believe that inequality and environmental damage can be solved within a better regulated market economy or requires a paradigm shift in our economic system.

We found four main ideas about people's role in future energy systems:

Figure 1: Role of people in future energy systems



Barriers to change

Many of the barriers to scaling up decentralised and green energy are well known and relate to political, policy and finance issues. Our interviewees uncovered other blocks related to the culture of the energy sector – in terms of mindsets, skills, incentives, overly technical or top-down ways of working – and the lack of active engagement by citizens and consumers in personal or public energy choices.

“[The energy sector] has not changed really in 100 years and that creates a culture and a set of mental models that are very difficult to shift and turn.”

Niches and solutions

We distilled from our interviewees seven recommendations for a people-oriented energy transition. These combine four specific *priorities* and three promising *approaches* that could be used to overcome barriers and address those priorities.

Key priorities for people-centred energy transition:

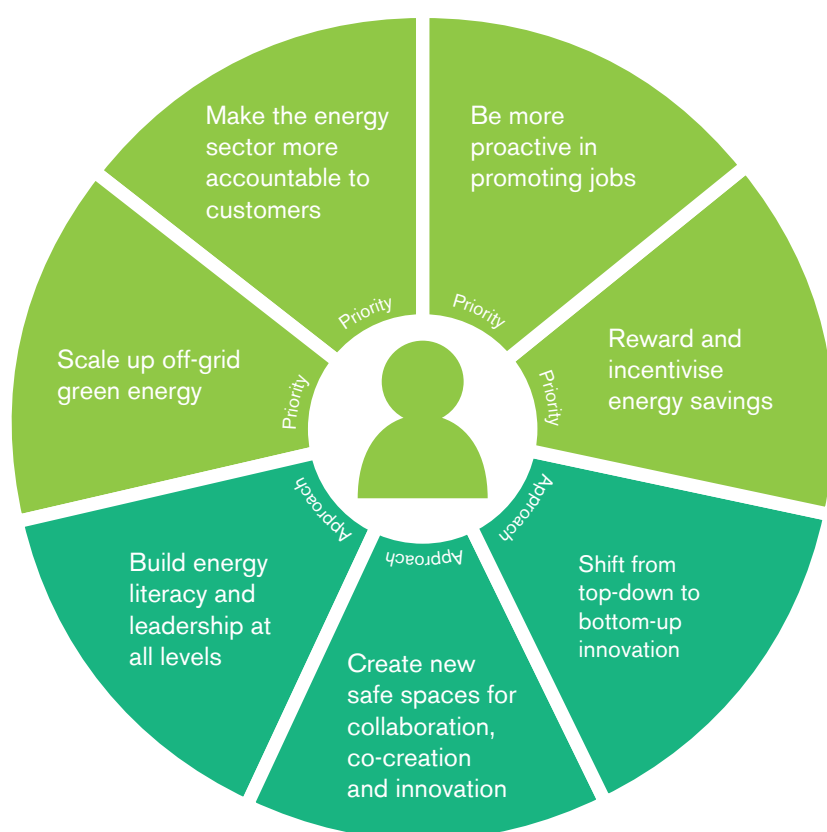
- **Scale up off-grid green energy** by accelerating existing approaches and exploiting new opportunities, particularly at the sub-national level in developing countries.

- **Reward and incentivise energy savings**, but with a new focus on poor people who are already skilled at managing energy consumption.
- **Be more proactive in promoting jobs** by reforming energy education, investing in youth, incubating small and medium-sized energy enterprises and fostering cross-sector collaboration.
- **Make the energy sector more accountable to customers**, for instance in the electricity sector for power outages and grid connections.

Key approaches for change:

- **Shift from top-down to bottom-up innovation** in energy service design, in a way that puts poor people at the heart of the process.
- **Build energy literacy and leadership at all levels** – from government ministers to faith leaders, and from energy professionals to health workers.
- **Create new safe spaces for collaboration, co-creation and innovation among** actors currently stuck in ‘silos’ or facing competing incentives.

Figure 2: Priorities and approaches for a people-centred energy transition



Introduction

1

Energy is about people. We depend on energy to cook our food and power our machines; our tastes can determine which technologies flourish or founder – yet energy debates rarely put ordinary people centre stage. However, there are signs that this is changing. Energy poverty is on the political agenda and industry watchers predict changing consumer habits will shake up the power sector. What role will people play in future energy systems? Hivos and IIED conducted research to find out what the experts think.

Large-scale shifts in the energy system can fundamentally transform human societies in terms of what people do, how we live and work, our social lives and our prospects for betterment. The introduction of steam-powered technology to the print industry enabled huge growth in newspapers, magazines and books, encouraging mass literacy in 19th century America and Europe.⁶ And today, the spread of electricity for lighting, phone charging, radio and television is transforming opportunities for poor rural families in Africa and Asia to learn, communicate, and do business.

Energy reform efforts can trigger huge popular resistance. In 2012–2013, attempts to reduce budget-draining fuel subsidies led to violent street protests in Sudan, Nigeria and Indonesia – and subsequent U-turns by the governments in power. In developed countries, plans for new wind power or fracking operations regularly spark opposition from local communities and environmental groups. Attempts to introduce new energy products or crack new markets have always required a good understanding of local people's tastes and practices (see Box 1).

Energy is a social and political issue

Yet despite this crucial social aspect to energy, mainstream debates on energy transitions are principally concerned with energy sources (fossil or renewable), technology, price and financial flows. The language tends to be technical, geared toward engineering and economics rather than human development. The people side of transition – such as how people might be involved in using, producing or trading energy – is neglected.

Where people are discussed, this can be in narrow and utilitarian ways. They may be considered as sources of 'unmet demand' or in terms of 'consumer behaviour'. The flagship 2014 IEA/OECD report, *Africa Energy Outlook*,⁷ provides an in-depth review of energy development in sub-Saharan Africa toward 2040. Access to affordable and reliable energy for development is a central focus, but the anticipated role of ordinary people in the energy system does not appear to be much more than commodity consumers. This is in a continent where the main fuel suppliers to poor people are not billion-dollar companies but women and girls collecting firewood. Figure 3 contrasts the way energy transitions are often presented in the expert sphere and what energy actually means to people in their daily lives.

At the same time, some institutions are beginning to suggest that energy transitions underway now will be driven by, and lead to, a changing role for consumers and providers alike. In 2014 the *Guardian* newspaper reported that UBS, the world's largest private bank, sent a briefing paper to its clients predicting that large-scale centralised power stations will become obsolete due to their size and inflexibility. Instead it will be cheaper and more efficient for households and businesses to generate their own energy. According to the report authors, "Power is no longer something that is exclusively produced by huge, centralised units owned by large utilities. By 2025, everybody will be able to produce and store power. And it will be green and cost competitive."¹⁰ The latest in Shell's 'energy scenarios' suggest that civil society could have an influential role in energy reform processes globally, depending on how wider political developments unfold (see Box 2).



When petrol prices rose in 2012, protestors in Lagos, Nigeria, carried placards depicting President Goodluck Jonathan with devil horns pumping fuel at a petrol station. Credit: AP/PA images

BOX 1. KNOW YOUR CUSTOMER: TIN BIRDCAGES AND 19TH CENTURY OIL MARKETS

Daniel Yergin's history of oil, *The Prize*, offers an intriguing snippet on how the 'people factor' played into the struggle for control of world oil markets at the end of 19th century. A big headache for the Russian producers was how to get their kerosene from its production site in Baku in modern day Azerbaijan to the hundreds of millions of potential customers in Asia. The main barriers included high overland distribution costs and the threat of price undercuts by Rockefeller's Standard Oil, which was already operating in Asian markets.

Enter stage left: a merchant from London's East End, one Marcus Samuel – later founder of Shell Transport and Trading company. Samuel and his Rothschild backers cracked the conundrum by commissioning larger, more advanced tankers; negotiating access through the Suez Canal; building storage tanks in local markets and lining up Eastern trading houses. Their first tanker reached Singapore in 1892, but the kerosene initially went unsold. Why? Samuel had assumed they could deliver the kerosene in bulk and that his new customers would bring their old Standard

Oil tin cans to fill them up. What he had not reckoned with was the social context:

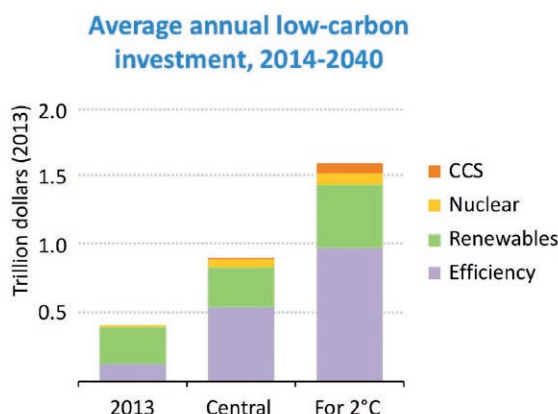
Throughout the Far East, Standard's blue oil tins had become the prized mainstay of local economies, used to construct everything from roofing to birdcages to opium cups, hibachis, tea strainers, and egg beaters. They were not about to give up such a valuable product (Yergin, 2008; p.52).

Marcus Samuel did overcome the crisis, instructing local partners to begin manufacturing tin cans – red ones in this case. And within a few years the trade was flourishing so that by 1902, 90 per cent of all oil to pass through Suez belonged to Samuel and his group. The tin birdcages are a tiny footnote in this tale of oil, money and politics, but underline the essential role of responding to customer preferences in effecting any large-scale change in energy systems.

Source: Yergin D (2008) *The Prize: The Epic Quest for Oil, Money and Power*. Free Press, New York.

Figure 3. The gap between the theory and reality of energy transitions

HOW EXPERTS TALK ABOUT ENERGY...



Financial flows for a green future are a key focus of energy debates. In this chart the International Energy Agency estimates that to stay within a limit of 2°C average warming, investment in in carbon capture and storage, nuclear, renewable and energy efficiency needs to increase four times beyond current levels.

Source: Presentation by Fatih Birol, 14 January 2015, Brussels © OECD/IEA 2014 *World Energy Outlook*, IEA Publishing⁸.

HOW PEOPLE ACTUALLY EXPERIENCE ENERGY IN THEIR LIVES



A Wakesi woman carries firewood home, Nyanza Province, Kenya. Credit: Robin Wyatt⁹

BOX 2: SHELL'S NEW LENS SCENARIOS: CIVIL SOCIETY IN A VOLATILE ENERGY TRANSITION

Shell has been developing 'energy scenarios' since the early 1970s. Shell's latest report, the New Lens Scenarios, outlines two future worlds: *Mountains* and *Oceans*.¹¹

In *Mountains*, existing powerful institutions have control of the energy landscape, delivering stability but dampening economic dynamism and social mobility. In this scenario, there is not much of a role for civil society or citizen activism.

In *Oceans*, power is devolved, civil society is more empowered, and varied social and political interests press for and block policy reform, ultimately

slowing the transition from fossil fuels. Information technology is used by diverse civil societies who generate new ideas and challenge governments, but also promulgate narrow and intolerant views. Under *Oceans* distributed solar energy grows rapidly in part due to public pressure. Other renewable energy sectors that need popular consent – such as large-scale wind farms and geothermal – face continuing opposition. Increasing stresses around inequality, food, water and energy creates social and political instability.

Access to modern energy services for poor people has also climbed the political agenda in recent years, as demonstrated by the UN Secretary General's Sustainable Energy for All (SE4ALL) initiative and the likely agreement of a new sustainable development goal on energy. It seems intuitive that achieving the SE4ALL goals for energy access, efficiency and renewable energy should involve a shift of focus onto people.

But even if a 'people focus' is desirable, what does the future hold? Will we see energy systems evolve to be more people-centric? And what would that look like? Will people continue to be passive consumers of energy or will they be proactive producers and political agitators?

IIED and Hivos has started exploring this complex topic by asking leading energy thinkers and practitioners for their views.

Methodology

We interviewed 15 global experts and practitioners with a mixture of backgrounds, including investors, NGOs, policymakers, aid donors, international organisations and activists (see Box 3). They are all working to change energy systems either by increasing energy access in developing countries or by promoting renewable energy. We supplemented our interviews through discussions with practitioners in Tanzania and Kenya, as part of wider scoping work by IIED and Hivos to establish an 'energy change lab' in Tanzania.

We asked the interviewees about their vision of future energy systems and the role of people in them, as well as the barriers to and solutions for a more people-centric system. Annex 1 provides details of the interview questions and process. We refer to 'people' and 'citizens' throughout this paper; what we mean by a 'people-centred' energy system is open-ended at this stage (see Box 4).

By 'future' energy systems we mean in 30 to 50 years' time. In asking experts and practitioners about their vision, we were interested both in what they predict *will* happen and what they believe *should* happen. At IIED and Hivos, we want to see an energy future that is both 'greener', avoiding dangerous climate change and other environmental impacts, and 'fairer', providing affordable, reliable energy to everyone. We therefore also asked interviewees what they thought the role of people might be in a hypothetical 'green and fair' system. We were interested, for example, in whether renewable and decentralised energy, and expanded energy access, are inherently more people-centric.

Our research is focused on energy transitions in developing countries. We also interviewed those working in developed countries in order to bring a global perspective and draw lessons from those practitioners' experiences of trying to effect change in large-scale energy.

BOX 3. INTERVIEWEES

Roberto Bocca, Convenor on Energy, World Economic Forum

John Browne, Partner, Riverstone Holdings LLC, UK

Alain de Cat, Partner, Powerdale, Belgium

Ishmael Edjekumhene, Director, Kumasi Institute for Technology and Environment (KITE), Ghana

Jeremy Grantham, Co-Founder and Board Member, GMO LLC, United States

Harish Hande, Managing Director, SELCO-India

Lena Hansen, Principal, Rocky Mountain Institute's Electricity Innovation Lab (eLab), United States

Srinivas Krishnaswamy, Chief Executive Officer, Vasudha Foundation, India

Matthew J. Matimbwi, Executive Secretary, Tanzania Renewable Energy Association (TAREA), Tanzania

Grace Mukasa, Regional Director, Practical Action East Africa, Kenya

Tri Mumpuni, Executive Director, People Centred Economic and Business Institute (IBEKA), Indonesia

Anjali Saini, Adviser, Renewable Energy and Adaptation to Climate Technologies Funding Window at Africa Enterprise Challenge Fund (AECF), Kenya

Youba Sokona, Special Advisor, the South Centre, Switzerland; Co-Chair of Working Group III, Intergovernmental Panel on Climate Change

Steve Thorne, Director, Energy Transformations cc, South Africa

Kandeh Yumkella, Chief Executive Officer of the Sustainable Energy for All Initiative (SE4ALL), United Nations Under-Secretary-General and Chairman of UN-Energy, Austria

The interviews were carried out by a team of IIED and Hivos staff from Kenya, the Netherlands and the United Kingdom, supported by the consultancy Natural Innovation. We held a workshop with Hivos, IIED, Natural Innovation¹² and the UK's Finance Innovation Lab¹³ in which we jointly analysed the interview transcripts to build a shared analysis of our findings (see Annex 1).

BOX 4. 'PEOPLE-CENTRED' OR 'CITIZEN-CENTRED' ENERGY SYSTEMS

We do not have a precise definition of our terms, but rather we want to convey the idea that individuals interact with energy systems in diverse ways, not simply as consumers. 'People' encompasses the diverse identities of individuals or groups as energy users, customers, community members, employees, small business owners, students, and so on. We understand 'citizen' more narrowly to denote a person or group's engagement on energy issues on a more political level – for instance, meeting a regulator or protesting against price rises.

Visions of the future – what role for people in energy systems?

Our interviewees are confident that energy futures will be greener, but are less certain if they will be more 'people-centred'. There are synergies between 'green' and 'people' as renewable energy creates opportunities for energy self-sufficiency and jobs. At least four potential roles for people emerged: prosumer, consumer, employee and citizen.



There is a strong sense that the energy sector today is failing to meet many people's expectations or serve their interests.

A veteran of the oil industry highlighted the gap between the 'big capital, big tech' of modern energy production and the local communities living around project sites. Reflecting on a past experience, the interviewee noted:

"We started one of our projects saying, 'We really want to engage with our local community'. And we built ourselves a fortress in which we lived, just in case we got attacked."

This gap may widen further with the drive to exploit more unconventional fossil fuels that require ever more sophisticated expensive technologies and skill sets that are increasingly removed from local people's expectations and realities.

The power sector was criticised by experts from developed and developing countries alike. They described problems variously of rent-seeking, inefficiency, corruption and politicisation, with jobs at the gift of the minister, not according to merit. One person described it as an "old boys' club" with old school ideas about how power is delivered (must be grid, must be fossil fuels).

These failings are leading to poor quality services for people. One Tanzanian community leader explained how it took him five years – and monthly telephone calls to the Rural Electrification Authority – to get a power line built to his village located just two hours outside Dar es Salaam. Another interviewee observed that power providers in Tanzania, despite being 'formal sector', are less reliable than the informal biomass sector, which provides 28,000 bags of charcoal to Dar es Salaam every day.¹⁴

Looking to the future, our interviewees were optimistic that the shift to renewable energy will continue to accelerate, aided by the falling costs of solar power and innovations in battery technology. What remains uncertain is how long that transition might take, and the most appropriate role for fossil fuels in the meantime (see Box 4).

BOX 4. ECONOMIC HURDLES TO 'GREEN LEAPFROGGING'

The drive for economic growth and profits means fossil fuels remain attractive to governments and investors alike. One investor noted that while clean energy funds are doing well,

"it's nothing like as good as investing in conventional energy."

Similarly, an African energy expert pointed to new oil and gas finds and commented:

"There is no way, if you are interested in growth, you would cut straight to renewables."

"When you have a distributed system that by definition means that customers have to be more involved than they were before."

Many respondents suggested that green energy has the *potential* to be more people-centric in the sense that renewables are better suited to off-grid and decentralised (or 'distributed') modes of energy production than fossil fuels. Advances in technologies like rooftop solar power and smart grids¹⁵ allow individuals or groups of people to produce energy themselves and sell surpluses to the grid.

But we heard mixed views on how *important or desirable* it is for future greener energy systems to be accompanied by a different role for people, compared with today.

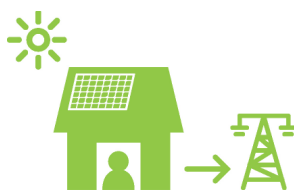
In general, interviewees working on access to energy were interested in the people dimension, particularly in terms of local management of energy resources. Business respondents were more interested in how policy, regulation and financial incentives could support green energy, rather than any radical reshaping in the way people are involved in energy provisioning. One respondent commented:

"The most important thing about all energy is to keep reducing its cost. And to keep changing its relative cost along with its relative carbon intensity. In the ideal you want almost free electricity that has no carbon content."

When pushed to articulate what role people *could* play in a future energy system, our respondents offered four main ideas:

- **People as ‘prosumers’:** meaning both a) energy users who also produce, manage, sell and/or trade energy; b) more active involvement of users in the design of energy services.
- **People as consumers:** people acting principally as energy buyers, potentially making greener choices and changing consumption patterns, but not involved in ownership and management.
- **People as employees/entrepreneurs:** people profiting from new opportunities to earn money; both through job creation in the energy sector, and through productive activities made possible by increased access to energy in poor communities.
- **People as active citizens:** individuals and groups engaging with energy policymakers and companies to secure or defend their interests, such as access to power.

People as ‘prosumers’



The idea that there will be increased self-provisioning of energy came up repeatedly. ‘Prosumer’ was one term used to describe this blurring of roles in which individuals produce as well as consume energy (see Box 5). The drivers and types of prosumer vary by context.

In low-income countries a long-standing failure of public and private energy investment to provide access to reliable power drives people to find their own solutions. Typically, this means buying diesel generators, but now renewable energy offers new possibilities – as seen in the growth of solar home systems across East Africa or community-run micro-hydro power in countries like Indonesia and Nepal.

Many grassroots practitioners underlined the need to involve poor communities extensively in designing and managing energy solutions to ensure these are tailored to their needs (one type of cookstove will not work in all places) and avoid systems failing through disuse (for instance where households do not replace batteries).

“I see a future where it will be very natural in a village to have an energy committee.”

BOX 5. WHAT IS AN ENERGY PROSUMER?

The term ‘prosumer’ was coined by futurologist Alvin Toffler in 1980. Loosely meaning ‘proactive consumer’, prosumers were consumers who would personally help to improve or design goods and services. Faced with markets saturated with mass-produced goods, Toffler predicted businesses would involve consumers in production processes to create highly customised products.¹⁶

Prosumer has also been used to denote the idea of a *non-corporate* producer/consumer; a form of self-help or local production designed to circumvent large companies. A variant on this is digitally enabled

peer-to-peer collaboration, where individuals produce, share and co-create content such as music, videos and news.¹⁴

People are starting to apply the term to energy, though there is no agreed definition.^{6,17} In this paper, we use the term principally in the sense of a ‘producing consumer’ – an individual or group of individuals who generate energy for their own use and possibly to sell or share. We also include the idea of poor consumers being involved in the design of energy technologies and services, so these are tailored to their needs.

One African energy leader, a strong believer in the role of the private sector, envisaged more community-level management as a practical solution for remote rural areas.

Another practitioner said that the nature of self-provisioning would vary according to the amount of power needed. Many low-energy requirements like home lighting, television and mobile phone charging would be produced at the household level, while livelihood applications like rice mills and sewing machines would need to be run at a community level. Interestingly this interviewee also pointed out that incentives for communal management might be higher in urban slums as opposed to rural contexts, where people's ownership of their land and homes favours energy production at the level of individual households. The interviewee explained:

"In urban areas [the] sense of insecurity and vulnerability is much higher. You are not trying to invest on your own, you are trying to share it because you don't know what is going to happen tomorrow."

In high-income countries access to energy is not such a problem. But interviewees anticipated that increased local control is still likely, given the opportunities afforded by technical innovation. In the same way that the Internet has transformed the music, publication and communications industries, advances in smart grid, digital technology, batteries and renewable energy have provided individuals, groups of people and businesses the means to produce, share and trade their own energy. One respondent remarked:

"They call them not consumers but 'prosumers'. It's a future where decentralised energy makes every consumer – or most consumers, in very rich countries – energy producers."

The interviewee linked the rise of a prosumer model to customers' rejection of conventional utilities. This view chimes with Germany's experiences in energy transition (*energiewende*).¹⁸ Shifting policy incentives mean that large-scale centralised utilities have been challenged by the rise of smaller firms and community-run facilities. A future where people increasingly sell their energy back to the grid was also envisaged by interviewees from the United States, Europe, India, Indonesia and South Africa.

People as consumers



A different perspective to the prosumer idea is the view that the real social change in energy will

not be in production or trading, but in how people consume energy; shifting from petrol to electric cars or to car sharing, for example. A couple of 'big energy' representatives were sceptical about whether lots of small-scale local-level energy production could meet the scale of demand and capital investment costs – particularly as some energy resources become more expensive to extract, like offshore gas.

"I think the single biggest difference will be how we use energy, not how we produce energy... that is things like off-peak use of electricity by automatic control, autonomous vehicles that know when to stop and start, and not use all this gasoline that we use today."

Others suggested that the average person just wants a good array of energy choices at the right price. They suggested that in the future people would be passive consumers in a role little changed from today. One African practitioner told us:

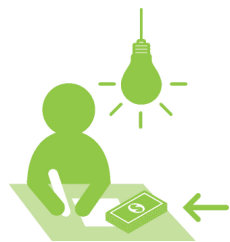
"I don't think people really care about whether they are producers of energy or not... what they want is to access energy as and when they need it, in the right quantity and right quality."

Even if opportunities for home production do expand, people may prefer to outsource the management to an intermediary. As another respondent reflected:

"You could really continue to not be all that involved except having made a decision to let some company or some aggregator come put stuff in your house that operates behind the scenes to manage your energy more efficiently."

There was strong consensus that transforming consumer awareness and behaviour to encourage energy efficiency *should* be a priority everywhere. A couple of people emphasised the growing divide in habits between rural and urban areas in developing countries: in the former, people's poverty mean they really understand the value of energy, while in the latter consumption is rising rapidly.

People as employees/entrepreneurs



Several interviewees flagged the job creation potential of new green industries and expanding energy supply. In developed countries the debate is mainly about new jobs in renewable energy or energy efficiency businesses. In developing

countries it's also about new opportunities to earn money by getting access to reliable, affordable energy – whether it's for irrigating crops, powering an electric sewing machine or manufacturing bricks.

“Well it's nice to light up the village. But can we talk about energy for productive use? As a friend of mine says, ‘You're shining the light on poverty, [but] they still remain poor.’”

One issue that came across as having great urgency was the need to create jobs for young people in developing countries, where unemployment is high and the youth population is growing fast.

The jobs agenda in energy encompasses all parts of the sector, not just modern renewables. For instance, people we spoke to in Tanzania highlighted the huge number of people involved in the biomass energy sector, such as charcoal and wood supply. Some social enterprises and non-governmental organisations (NGOs) there are piloting efforts to train poor, low-skilled people in sustainable production techniques that would enable them to earn a living. There was also acknowledgement that large-scale energy investments – like a large wind farm or shale gas development – also need to create jobs in order to gain public acceptance for their operations.

Figure 4: Job creation is key to energy transitions

LARGE-SCALE ENERGY TENDS TO BE TECH-HEAVY AND JOB-LIGHT



Oil platform P-51 off the Brazilian coast is the first 100% Brazilian-owned oil platform. Credit: © Divulgação Petrobras (ABR)/ Agência Brasil/CC BY 3.0BR

BUT LOCAL PEOPLE WANT TO ENERGY PROJECTS TO CREATE JOBS AND REDUCE POVERTY



Locals drill for oil by hand in Myanmar. Artisanal oil production is informal and dangerous but can be a good money-earner. Credit: © REUTERS/Damir Sagolj

People as active citizens



A final area picked by some interviewees is the role people have in shaping energy futures via their

political attitudes and participation.

People's future participation in energy policy could be indirect, in that decision makers would have to respond to public opinion when making high-level choices about a country's energy future. One respondent working at the global level described how governments face extremely challenging choices on how to balance demands of energy security, access, environment and cost. Public opinion could help decision-makers work out which to prioritise: are we willing to meet energy demand by using coal reserves, despite the effects on the environment? Should we invest in renewables even if the short-term cost is higher?

A couple of interviewees with NGO backgrounds had more of a campaigning perspective. Irrespective of what might happen, they felt there *should* be more activity by civil society organisations (CSOs) to bring 'technical' energy issues into the political sphere. By contrast, fewer of the business or policy representatives suggested that energy transitions required increased CSO activism, either as part of the process or as an outcome.

To summarise, there is not yet a clear narrative on the role of ordinary people in energy systems of the future. This is in contrast to the green agenda, where the lines of debate are well understood.

The interviewees were agreed that the spread of renewable, decentralised energy offers opportunities for more local generation, and that increasing energy efficiency requires a closer engagement by energy providers with users. However, they disagreed on how likely or desirable any large-scale shift in energy systems would be, from individuals acting primarily as consumers (albeit better informed ones) to more active 'prosumers'. Some interviewees wanted to see a stronger focus on people in terms of job creation and CSO engagement in energy debates.

What's stopping us? Barriers to a people-centred energy system

Familiar barriers to green energy and energy access include policy, politics and finance. Our interviews uncovered two additional barriers that deserve more attention: the culture of the energy sector and unengaged consumers.



"We all want to save the Africans, the poor Africans in villages, but we're all showing them 50 different models. Everybody has their own favourite thing they want to test and it's always an African laboratory that everybody looks for."

"The way this [US electricity] sector has evolved has not changed really in 100 years and that creates a culture and a set of mental models that are very difficult to shift and turn."

In discussing the barriers to energy transition, our interviewees were mainly thinking about obstacles to the shift to 'green' and 'decentralised'. Many of these barriers will be familiar reading to people working in the energy sector. To some extent they are also indirectly barriers to a 'people-centred' system – since, for instance, decentralised energy can also expand access to power for poor people.

One problem is policy that can be insufficient, capricious or even malign. For instance, renewable energy developers cannot compete with generous subsidy regimes and 'free electricity' for their fossil-fuel counterparts, while feed-in tariffs are not always attractive.

Power and politics skew the landscape further.

The fossil fuel lobby holds sway over decision making and "[doesn't] want their business being disturbed", as one leader commented. Governments need to lead transitions, but can be part of the problem – for instance promising grid connections as voting bait or mismanaging state-run utilities.

The challenge of directing financial flows toward pro-poor energy investments was mentioned by many. Renewable energy firms serving low-income markets, particularly small and medium-sized businesses in developing countries, struggle to get finance; mainstream providers do not understand the sector and fail to offer competitive rates or sufficiently long-term loans.

In addition to these, two blocking points stood out for us as being particularly relevant to a 'people-centred' shift in energy.

Block 1: Energy sector culture

The first insight drawn from the interviews focused on the prevailing culture of the energy sector and covered a spectrum of ideas about mindsets, skills, incentives and ways of working.

"Today you're all having a very much top-down approach of delivering services to the poor."

Many of our interviewees argued that the energy sector is overly focused on technology and does not reflect the realities of people's lives. It ignores people's essential issues – their needs, habits, attitudes and preferences – that actually determine whether a new energy service or practice is successfully adopted.

They suggested that in part the problem is that energy initiatives are parachuted in from the top – from governments, companies and international organisations – and fail to grasp local demands and realities. This is particularly relevant to energy access in developing countries. The power dynamics of 'energy aid' are wrong, with outside experts brought in to prescribe solutions for a problem they have little understanding of.

Commenting on initiatives such as Power Africa and SE4ALL, one African interviewee lamented:

"A problem is that those initiatives are heavily supply-oriented, technology-driven and heavily finance-driven. They are not emanating from the people. They are naïve because they think if you are technical, you can solve the problem."

Linked to this, what also emerged from the interviews was a lack of joined-up, holistic approaches. Large-scale, systems-wide change is needed in all countries, yet few energy professionals have the capacity to take that approach. Different reasons were given for this: complexity is inherently hard to grasp; people are comfortable in their particular specialisms, whether solar or coal; the culture and incentives discourage risk-taking; or in some cases, staff are just not competent. One US expert reflected how governance frameworks can stifle innovation among employees:

"We have regulated to focus the electricity sector almost entirely on reliability, and that is the antithesis of being willing to take risks and being creative and trying new things."

There is a related problem of duplication, particularly in the area of energy access. Entrepreneurs or donors are so focused on their own model, there is little pooling of efforts or working collaboratively toward a collective goal.

We also heard that the energy sector's obsession with technology is rooted in education systems and the curricula for engineering students. One interviewee bemoaned the lack of 'energy anthropologists' and felt that education is generally too academic and not practical enough:

"It's the two billion people who have it [energy] assuming they know what the four billion need or want. That goes deeply into the education systems. You're talking about the Oxfords or Cambridges, the Indian Institute of Technology or management schools in India."

"What we need in all of this are more anthropologists who are able to look at the society in a more holistic fashion. For me that's the biggest challenge and barrier."

Block 2: Are people energy agnostic?

"People in the US spend seven minutes a year thinking about their electric utility."²⁰

A second new insight that emerged was the lack of proactive interest or engagement on the part of people themselves. This relates to people in their capacity as consumers finding solutions to their own energy needs; and as citizens with a stake in decisions about the country's energy future.

Generally there was a sense that energy does not really rally people. For people with decent incomes in developed countries, the savings you make from more efficient energy use are seen as "too small to be interesting", one person suggested. Another respondent cited consumer research by Accenture conducted across nineteen (mainly developed) countries which found that people spent an average of nine minutes a year interacting with their electricity provider – in the United States, it was just seven minutes. This presents quite a challenge given that many trends like smart metering and energy conservation require greater levels of consumer interaction.²⁰ Subsequent Accenture research highlights a growing minority of 'energy literate' consumers, who are knowledgeable and opinionated about the source, mix and environmental impact of different energy options.²¹

In developing countries people's daily priorities lie elsewhere, but for different reasons. Simply putting food on the table or paying school fees might typically be people's main concern. Even when the local energy supply is patchy, people can find alternatives like a diesel generator or kerosene lamp.

It was felt that this apparent agnosticism or disengagement of many consumers with energy could be partly caused by the technical bias of the language used to discuss it, as mentioned earlier. The language of engineering and economics is pretty impenetrable to the average person. In poor communities, people find it hard to run their own system or press the regulator for a connection if they are unsure how to use, maintain or pay for energy. One of our interviewees suggested that utilities use technical jargon to insulate themselves from upward pressure to change.

"I think the energy suppliers encourage an under-understanding, an under-engagement with the information, which relates to energy literacy"

The causes of disengagement go deeper than knowledge gaps, particularly when it comes to people's involvement in the political sphere. The wider social and political context can stifle dialogue, protest and political organising by citizens and civil society organisations.

We heard one example from Tanzania, where – apart from violent protests against gas pipeline construction in Mtwara in 2013 – civil society engagement on energy tends to be limited.²² There are no NGOs with an active interest in electricity, and the handful that are working on gas tread cautiously. We were told that people associate the new gas finds with corruption, elite interests and election politicking, making public opposition and media reporting risky.

To sum up, many barriers to green and fair transitions are well known, but our interviewees uncovered other blocks that deserve to be explored further. They are the culture of the energy sector and lack of interest or engagement on the part of people themselves in personal or public energy choices. The reasons behind this apparent agnosticism need to be explored further, though lack of knowledge about energy issues and the technical bias of the sector could play a role.

In the final section, we look at what types of niches and solutions could be deployed to address these barriers and accelerate the transition toward a more people-centred energy system.

Sparkling off a people-centred energy system: seven ideas

Our research identified several promising ideas on how energy systems could become more people centred which merit further exploration. These include job creation, energy efficiency incentives for poor people and power sector accountability as priority goals; and promoting 'bottom-up' energy service design, cross-sector collaboration and energy literacy – including among CSOs – as promising methods to support people-centred innovation.



There is already an enormous amount of innovation in the energy sector designed to promote green energy and expand access. Several people highlighted the growth of new business models that are making energy affordable for poor people, such as those using mobile phones and pay-as-you-go technology.

Perhaps because of the breadth and newness of our topic, it was hard to distil a coherent set of recommendations for change targeted at specific actors. To some extent, encouraging 'people-centred' transitions may partly be about implementing existing policy tools that we are already familiar with, like carbon price signals²³ and enterprise support for small and medium-sized enterprises (SMEs) targeting low-income energy markets.

From our interviews, we identified four *goals* or priorities for a people-centred transition, and three promising *approaches* that could help address the types of barriers identified earlier and achieve those goals.

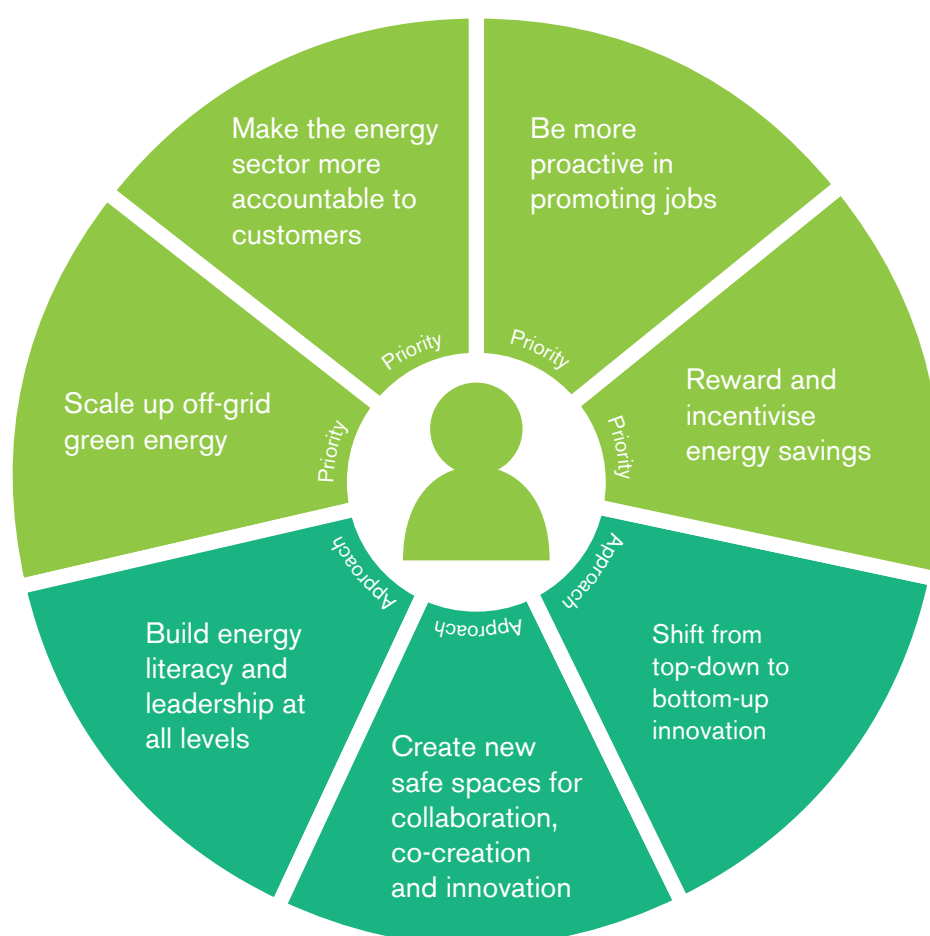
Key priorities

1. Scale up off-grid green energy by accelerating existing approaches and exploiting new opportunities, particularly at the sub-national level in developing countries.

The obvious way to increase opportunities for people to produce and trade energy is for governments to incentivise off-grid and renewable energy through an effective and stable policy framework.

The types of interventions proposed by our interviews are not new. For instance, investors proposed carbon taxes, purchase guarantees and research and development for technological innovation to make the cost-risk equation more favourable.

However, Kenyan respondents reported that there are new opportunities to promote off-grid renewables. In Kenya political decentralisation processes have provided county governments with new decision-making and budgetary powers for energy. At this sub-national level, the greater proximity to citizens and smaller number of players could make it easier to implement the type of cross-sector and bottom-up approaches to energy planning that our interviewees argue are important.



2. Reward and incentivise energy savings with a new focus on poor people who are already skilled at managing energy consumption

Energy efficiency came through as a priority focus; reducing energy use requires significant change in user behaviour. Two concrete ideas put forward by our experts sounded promising. One is **metering**: there is a huge opportunity to introduce this in Africa and other parts of the developing world where energy consumption is picking up.

The other is finding innovative ways to **reward energy savers financially**, and particularly target these incentives at people on a low income. One respondent remarked:

"I'd love to see a payment for a verified saving in energy be as high or higher than what you would pay for [consuming] that same amount of energy."

The rationale is that poor people are extremely good at managing their energy within the constraints of fuels and appliances they have access to, but this is often undermined once modern energy services arrive and when energy suddenly seems abundant (particularly if it is subsidised). The interviewee suggested this could go hand in hand with rewards for utilities for saving energy, either through their own interventions or by supporting job creation opportunities in energy demand services that achieve the same goal.

3. Be more proactive in promoting jobs – by reforming energy education, investing in youth, incubating energy SMEs and fostering cross-sector collaboration.

Crafting energy transitions so they create jobs and income-generating opportunities is a compelling idea. It has been around for several years and was the centrepiece of economic arguments in favour of climate action during the economic downturn. Germany's experience of creating 370,000 or so jobs in renewable energy is frequently quoted in publications and speeches.²⁴

The challenge is: *how?*

Based on these interviews, one method could be to address university curricula so that tomorrow's engineers have the practical, business understanding of social and cultural contexts that our experts say are currently lacking. Another is to link training to an actual opportunity, with appropriate support. One social enterprise we spoke to in Tanzania found that local graduates often lacked basic workplace skills such as using a spreadsheet; another pointed out that a person may learn how to sell a solar light, but without access to capital to buy stock, it's hard to convert that into a business opportunity.

Skills development must go much wider than university students and young people, we were told. One African energy leader highlighted pioneering initiatives like Barefoot College in India, where hundreds of illiterate women – particularly grandmothers – have been trained to install, repair and maintain solar lighting units as part of electrification efforts in their villages.²⁵ Grameen Shakti in Bangladesh has adopted a similar approach in targeting women to train as solar technicians. They have set up 45 Grameen Technology Centers to promote local production, repair and sales of solar home systems.



A woman technician installing charge controllers, Bangladesh. Credit: Grameen Shakti

A few NGOs and small firms in the Tanzanian energy sector are trying to create jobs in their own supply chains. But the research team questioned whether these enterprise-level initiatives that depend on unpredictable donor funding reach any scale? Perhaps the energy sector as a whole needs to collaborate more. Cross-sector collaborations will also be needed to capitalise on new investments in mini-grid and off-grid electrification. Energy providers typically stop at the point of supply; other actors (micro-finance, enterprise support, banks, agriculture extension) will be needed to convert that access to energy into a money-making opportunity for customers.

An NGO working in West Africa wanted to see the flowering of more intermediaries in the energy sector who – like them – would support the development of energy SMEs. These should work at every stage of enterprise support, from the incubation of new ideas to demonstration and commercialisation, and combine enterprise coaching skills with direct funding and market facilitation, as well as training for technicians.

4. Make the energy sector more accountable to customers, such as for power outages and grid connections in the electricity sector

Transparency and accountability has become a hot topic in parts of the energy sector, particularly in upstream production of large-scale oil, gas, coal and hydropower. Many initiatives have been developed to address these challenges, such as the Extractives Industry Transparency Initiative and the spread of corporate environmental and social impact reporting.²⁶ However, the drive for accountability is not reaching all parts of the energy sector, and our interviewees in Tanzania reported that gaps in trust and accountability appear to exist – notably in downstream segments of electricity distribution, supplying people's homes and businesses.

In Tanzania we heard repeatedly that TANESCO (the state-run electricity utility) is providing a sub-standard service, yet few initiatives or tools exist to allow customers to put collective upward pressure on the provider. Regular power outages and heavy transmission losses are endemic in Tanzania and across many African countries. Other customer-related problems mentioned include unexpected tariff rises and the slow rate of new electricity connections.²⁷ Besides the huge inconvenience for households, the unreliability of energy supply stifles the development of public services, industry and SMEs. While there are formal channels for complaint, including to the Energy and Water Utilities Regulatory Authority, our interviewees explained customers have such low expectations that they do not see it as worth their while.

There are also emerging accountability gaps in the off-grid renewable energy sector. For instance, in Tanzania, off-grid solar markets are taking off. Civil society organisations and SMEs we spoke to fear that the entrance of very low-cost competitors, selling poor quality products without maintenance and warranty arrangements, could choke off market demand as consumers lose faith in solar when their product fails. There is little in the way of product certification, and consumers lack the knowledge to make informed spending choices and are unfamiliar with the concept of customer service. Another example we heard is in Kenya, where micro-grid operators are supplying electricity to poor communities in remote places not served by the grid. Pricing is a regulatory grey area. Micro-grid operators charge higher rates than the national tariff to cover the higher costs of supplying

remote areas, but there is not yet a policy permitting differential pricing. This regulatory gap could weaken protection for both the consumer and operator alike.

There are no civil society or consumer organisations in Tanzania (and undoubtedly none in other countries) working on the electricity sector from a transparency and accountability perspective. This seems to be an under-explored yet critical aspect of a people-centred energy future. There are many lessons to be learned from other parts of the energy sector, as well as areas like health and education, on the types of transparency and accountability interventions that might work in particular contexts. This could include the use of digital platforms to make data publicly available (on blackouts and grid connection plans, for instance), making complaint systems more effective, strengthening CSO organising and their knowledge of the issues, involving communities in local planning decisions around energy, developing product standards and generating media and public debate.

Key change levers and processes

1. Shift from top-down to bottom-up innovation in energy service design, in a way that puts poor people at the heart of the process

If a key barrier is the energy sector's 'top-down' approach then, as some interviewees proposed, the solution partly lies in switching to design and innovation processes that start with people at the local level. For energy poverty, that means putting poor people at the heart of the process as partners, not beneficiaries.

A bottom-up approach is already hard-wired into the philosophy of many NGOs and some social enterprises working on energy poverty.²⁸ The innovation lies in incorporating it into the policies and investment practices of governments, utilities and donors. This will require changes in mindsets and incentive structures. There is usually pressure to deliver results at scale in a short period and to minimise transaction costs.²⁹ This tends to favour large-scale energy investments over lots of small, decentralised options, even though scaling up decentralized energy is critical for achieving universal energy access.³⁰ Our interviewees did give examples of innovations that had successfully put users at the heart of the process, including in big business (see Box 6).

BOX 6. BIG ENERGY GOES BOTTOM-UP: BP COOKSTOVE INVESTMENT IN INDIA

BP adopted a local-level design approach when developing new cookstove and biomass pellet fuel products in India during the 2000s. In the early design phase, BP had a team of people who lived for six months in rural villages in India. Their job was to understand how things worked, what people's needs were, their willingness to pay and to figure out the 'ecosystem' that could be leveraged for local sourcing and production. The person formerly in charge reflected:

"[With] the 'democratisation of energy', there is a part that is [to] make sure there is a clear understanding of what underserved people's needs are. It's a simple marketing concept really."

When a new CEO joined BP with a different set of strategic priorities, the initiative became independent and it is now an Indian-owned company, First Energy, with 100 employees. (See www.firstenergy.in/#up)

A more radical view on the 'bottom-up' approach proposed by one of the African energy policy experts was to dispense with outside donor funding all together:

"Funding for energy in Africa should primarily come from within the continent in order to be driven by the continent-set agenda. We would invest time and effort provided a large amount of the money comes from the continent; donor money should not be the main source of funding."

2. Build energy literacy and leadership at all levels – from government ministers to civil society leaders, energy professionals to health workers

Building capacity goes beyond training people for jobs. Citizens, NGOs and local decision makers need to become more literate in energy issues to manage their supply and press for more reliable services.

"There is a need for energy literacy at all levels."

One practitioner from India pointed out that executive training programmes are geared toward 35-year-olds with an MBA:

"Why are we not looking at the 18-year-olds who are going to be decision-makers for the 2030 problem?"

If awareness is raised among other local influencers, they might spearhead local reform efforts. These could include school teachers, postal service operators, doctors, banks, parents groups, shelter groups and popular sports teams.

One interviewee felt there needed to be a particular effort to strengthen the capacity of civil society organisations.

"I think the building of civil society organisations to be able to critically engage with policy and policy implementation would be a very useful investment in the future and engage the public more fully on the energy sector."

At the same time, we heard that energy professionals and leaders need to build their 'soft knowledge'. One concrete suggestion of how to achieve this was by training more 'energy anthropologists' and creating more in-depth immersion processes to help professionals understand the realities of rural energy needs.

3. Create new safe spaces for collaboration, co-creation and innovation, particularly among actors working in isolation or facing competing incentives

Finally, one emerging approach is to create multi-stakeholder forums for energy, where experts and practitioners can come together and test out different solutions. This approach has potential to overcome the type of cultural barriers in the energy sector that we heard stifle progress, such as technical jargon and a lack of joined-up approaches.

One promising example we heard about in our interviews is the Rocky Mountain Institute's eLab, a forum for experts and policy makers which seeks to promote the shift toward distributed power in the US electricity sector (see Box 7). This type of 'social innovation lab' is growing in popularity as a way to bring together pioneers and incumbents in a safe space to address highly complex societal challenges.³¹ Labs in other contexts, such as the Finance Innovation Lab in the UK (focused on financial system reform) or InSTEDD in South East Asia (focused on communication technology for health, safety and development) have worked to promote innovations in technology design, public policy, business models, campaigning strategies or framing of cultural values and behaviour change. They use tools such as social enterprise incubators, leadership programmes, seed

BOX 7. THE ELAB: DRIVING TRANSITION IN DISTRIBUTED ENERGY IN THE US

The eLab (Electricity Innovation Lab) describes itself as “an assembly of thought leaders and decision makers from across the U.S. electricity sector”. The group focuses on collaborative innovation to address critical institutional, regulatory, business, economic, and technical barriers to the economic deployment of distributed energy.

The eLab's work involves convening regularly to share lessons and best practices among members, and specific research and collaborative projects, such as on pricing and rate design for distributed energy, innovation bootcamps and new business models. Our interviewee from the eLab explained the value of creating a safe and neutral space:

We have 35–40 organisation members who come from all these different sectors. We like to say we are bringing together the ‘incumbents’ and ‘insurgents’ in the electricity sector. That includes the utilities, regulators, solar companies, smart-grid companies. By bringing those people together, giving them an equal footing and creating a space where they can actually talk to each other – and not just spit out their normal talking points they say in public – that in itself is fairly transformative.

For more information see www.rmi.org/elab.

funds, open-innovation competitions, scenario planning and co-working spaces.³²

Another respondent described the value of collaboration within a particular stakeholder group. There can be an incentive to collaborate within the private sector, for instance when there are significant threats or risks that all operators face, and solutions can be advanced more rapidly through joint working rather than competition. An example we heard from the fossil fuel sector is COSIA, a Canadian group of 13 or 14 oil companies working on technology solutions for controversial oil sands projects. Our interviewee explained that the initiative requires that any technology developed by one participating company that improves environmental impacts must be shared among the others; those who do not develop such a technology within a specific timeframe have to provide financial resources instead.³³

Drivers for change in the energy sector will be varied, ranging from shocks and crises (like volatile oil prices), to technology development, political pressure and enlightened leadership. Multi-stakeholder collaboration can sound ‘soft’ as a lever for change. But in practice, the problems facing the energy sector are so challenging and complex, there does seem to be a need for new and dynamic spaces where diverse players – who may be isolated, competing or otherwise distrustful of each other – can combine their skills and experience to find shared solutions. The types of issues raised by our interviewees are suited to a lab-style approach because they require ‘out-of-the-silo’ thinking and cross-sector collaboration: for instance on skills development and income generation, bottom-up energy service design, quality standards and consumer knowledge or behaviour change.

Looking forward

5

Early on in this research collaboration, Hivos and IIED developed this hypothesis:

- Energy transitions should be fair as well as green.
- A fair energy system is orientated around the needs, rights and aspirations of all people – women and men, young and old – and redresses power imbalances between citizen, state and companies.
- Mainstream debates and interventions have not properly considered what a people-centred future energy system could look like.

At Hivos and IIED we were conscious of our own biases and knowledge gaps, and wanted to test these by consulting people who are immersed in different parts of the energy sector. For instance, how does the investment and business sector view proposals for the 'local control' model of energy provision often espoused by civil society organisations?

Some people may challenge our hypothesis that people are 'missing' from energy transition debates. In development circles, the current mantra is 'sustainable energy for all', which arguably directly relates to people in terms of access (for the billions without modern energy), efficiency (which requires changing people's behaviour) and renewable energy (which helps ensure a stable climate and thus human survival).

And yet, are people really at the heart of these high-level discussions? How many discussions at the International Energy Agency, OPEC, UN climate negotiations, green investment conferences, meetings of aid donors or rural electrification authorities think about some of the ideas posed by our interviewees? They could be asking:

- What's the best model for financing an energy system based on the rapid expansion of 'prosumers'?
- How can we get civil servants and engineers to spend six months in slums and villages to work with local people to design services around their needs?
- How do we create energy committees in every unserved village to manage supplies where the market will not reach, and what will help women have a voice in those?
- What will it take to demystify energy for citizens and CSOs and catalyse the types of civic engagement needed to support energy reforms that are green and fair?

Our interviewees did have different views on how important the people factor is relative to other pieces of the transition puzzle. Those working on access to energy or from an NGO perspective were interested in bottom-up energy planning and demystifying highly technical energy debates. Those from an investment or business perspective were more interested in issues such as technology and price.

But all of our respondents seemed to agree that in our current system, large energy companies, whether state- or privately-run, are failing to connect with customers and citizens. Our experts see off-grid, green energy as providing potential for change in that relationship, either in small ways – providing choices for consumers to go green – or big ones, with prosumers displacing centralised power utilities. The culture of the energy sector, and lack of engagement by many citizens and civil society in energy decisions and debates, stood out as two blocks to a green and fair transition that merit more attention.

Next steps

The next steps for Hivos and IIED are to pursue the suggestions we heard about the goals of a people-centred energy system and how to get there (outlined in Chapter 4). We're working at two levels:

1. Explore: global-level debates

We want to invite others to discuss, scrutinise, challenge and add to what is laid out here. We would like to engage with the usual – and unusual – suspects. This could bring together the 'incumbents' of today – regulators, utilities and donors – with the 'insurgents' and future leaders, likely to challenge our collective thinking, from people working on 'systems change' to engineering students, crowdfunders or community-run energy schemes.³⁴ IIED and Hivos are keen to hear views on whether there is a case for making debates and planning around energy transitions more people-centred. What would that look like? What promising innovations and niches are missing? What do we know about 'how change happens' – in energy or other sectors – that this paper overlooks?

The details of our dialogue interview questionnaire and the group process we used to make sense of the results are in Appendix 1. We encourage others to review, adopt and adapt these in their own research – and to tell us about their findings.

2. Exchange and experiment: local-level action.

IIED and Hivos are hoping to develop an energy change lab in Tanzania. The country could be on the verge of significant changes in its energy system – from the huge off-shore gas finds to power sector reform processes, the expansion of the grid, massive energy access gaps and emerging business/donor interest in green mini-grids. The aim is to work with and support change makers and pioneers to spur pro-poor innovations in the energy sector that positively impact on the lives of Tanzanian citizens.

Based on our discussions so far in Tanzania, three areas are coming up as potential priorities: accountable energy; energy, economic development and jobs; and decentralised green energy. We see our role as one of facilitating and accelerating, offering a platform for exploration, exchange, scenario building and experimentation for multiple parties. Some immediate next steps as we continue to explore demand and design for the lab could include work on:

- **Accountability.** Seeding new feedback mechanisms from consumers toward utilities and government as a means to sharpen up service delivery. This may involve working with the youth tech community to create prototypes of new digital platforms. We are also looking at ways to make visible citizens' broader experience of energy services, drawing on successful polling methods used by Tanzanian accountability activists in public services.
- **Economic development.** Engaging with the micro and small-scale business community to find solutions for failing energy services.
- **Decentralised green energy.** We will undertake research and engagement activities to explore how new investments in off-grid, green energy could be better designed so they create jobs and income-generating opportunities in rural areas.
- **Building knowledge, leadership and collaboration.** We are exploring options to pilot a Social Innovation Safari on energy. This would target young Tanzanian leaders, innovators, employees and entrepreneurs from across disciplines and sectors to take part in an immersive learning programme, developing solutions to real-life energy challenges.

Appendix 1

Interview questions guide

Background for interviewees

IIED and Hivos, with the support of Natural Innovation, are conducting a series of interviews to better understand the views of a range of leading energy thinkers and specialists on future energy systems. We are particularly interested in the role citizens may play in future energy systems that are greener and fairer.

We are using these interviews to scope the idea of a 'social innovation lab' on energy in East or Southern Africa. Such a lab would be a permanent platform to bring together pioneers and stakeholders in the energy field and support their projects and initiatives. Through our interviews we hope to understand how we can best support and accelerate innovation and change in the field of citizen engagement and bottom-up energy service delivery. The overall key questions that we're looking for guidance on through these interviews as part of our 'lab scoping' are:

1. How should citizens be involved in energy systems of the future?
2. How can we support a transition to a more sustainable, fairer and citizen-centred energy system?

Guidance questions to structure dialogue interview

Personal background

1. To start with, can you share a bit more about yourself? What is your role? How did you arrive at your current work of...? What or who inspired you to start working in this field? Why is it important to you?

Vision

2. What's your vision for the future? In 30 years' time, what should energy systems look like? What needs to be different from today?
3. How do you think 'ordinary' people can be involved in the energy systems of the future? (e.g. producer, consumer, advocate)? Why? How is that different from today?

Transition

4. What problems, challenges or obstacles do you see in moving towards a more citizen-centred energy system? What's not working? Why do you think it's not working? (Try to get people to tell stories behind challenges, and get a sense of causal connections.)
5. What are interesting and important innovations being tried and who are the innovators: What's working? Why? Who is leading?
6. Who are the important stakeholders in the transition? i.e. who are the individuals or institutions who would have to be involved in order to change the situation? Who has influence over this situation?
7. What previous efforts do you know of to engage citizens more in energy services, particularly in developing countries? What lessons have you learnt from these efforts? What external forces affect the success?
8. What would you love to see happen and why?

Scoping the energy lab

9. What interventions could support and accelerate action and innovation around citizen engagement in energy systems? What specifically could a 'social innovation lab' do?
10. Do you know of other organisations or labs that are already engaged in supporting stakeholders and pioneers working toward citizen-centred, greener energy systems?
11. Knowledge and capacity-building is an area we have identified as key. We think we need to build 'energy literacy' at many levels, from policymaker to consumers. What does this term mean to you and is it useful?
12. Out of all this, what do you have energy for? What do you need in order to be more effective in this work?
13. Are there other people you recommend we should talk with – people who are 'dying to change' this situation?
14. Finally, is there something that you would like to share that we haven't asked yet?

Synthesising the interviews: process steps

After the interviews were completed, the IIED and Hivos team held a workshop to analyse the results together. Our process for analysing the interview transcripts involved the following steps:

1. The team selected quotes from the dialogue interviews, and these were printed and displayed on the walls of the meeting room.
2. The team read the quotes and marked the ones most relevant for our project. The unmarked quotes were removed.
3. The team clustered the quotes by affinity, organising the emerging cluster themes under the general four headings of 'external landscape' 'current system', 'niches' and 'innovation and change strategies'.
4. The team worked in pairs to define each cluster of ideas in one sentence and then reflected collectively on the narrative emerging. The themes and highlight quotes have been used to prepare this report.

Notes

- 1 Smil defines an energy transition as “the interval between introduction of a new primary energy source (coal, oil, natural gas, nuclear, solar, wind, geothermal) and its rise to 20-30 per cent of a national or global energy market.” See Smil, V (2010) *Energy Transitions: History, Requirements, Prospects*. Praeger, Santa Barbara.
- 2 See for example Riahi, K, McCollum, D and Krey, V (2012) *The Next Energy Transition: Transformative Pathways, Choices and Opportunities*. IASA, Laxenburg, Austria. The report charts a pathway to an energy system which addresses key challenges of energy security, energy access, climate change, air pollution and health.
- 3 See <http://www.selco-india.com/index.html>
- 4 See <http://ibeka.netsains.net/> In English, IBEKA is known as the People Centred Economic and Business Institute.
- 5 See www.kiteonline.net
- 6 Rifkin J (2011) *The Third Industrial Revolution: How Lateral Power is Transforming Energy, the Economy and the World*. Palgrave Macmillan, New York.
- 7 IEA/OECD (2014) *Africa Energy Outlook 2014*. International Energy Agency and the Organisation for Economic Co-operation and Development.
- 8 For the original presentation see www.slideshare.net/cluster_tweed/world-energy-outlook-2014-dr-fatih-birol. Licence: www.iea.org/t&c/termsandconditions; www.worldenergyoutlook.org/publications/weo-2014
- 9 More information on the photo can be found at <http://www.robinwyatt.org/photography>
- 10 The report itself is not available to the public. This quote from the reports' authors is from Vidal J (27 August 2014) Big power out, solar in. *The Guardian*. www.theguardian.com/environment/2014/aug/27/ubs-investors-renewables-revolution
- 11 Shell International (2013). *New Lens Scenarios*. Shell International BV. www.shell.com/global/future-energy/scenarios/new-lens-scenarios.html
- 12 See www.natural-innovation.net
- 13 See www.thefinancelab.org
- 14 For the original data cited by the interviewee, see World Bank (2009) *Environmental Crisis or Sustainable Development Opportunity? Transforming the Charcoal Sector in Tanzania*. A Policy Note. <http://documents.worldbank.org/curated/en/2009/03/11022403/environmental-crisis-or-sustainable-development-opportunity-transforming-charcoal-sector-tanzania-policy-note>
- 15 A smart grid is a modernised electrical grid that uses analog or digital information and communications technology to gather and act on information – such as information about the behaviours of suppliers and consumers – in an automated fashion to improve the efficiency, reliability, economics, and sustainability of the production and distribution of electricity. http://en.wikipedia.org/wiki/Smart_grid
- 16 Wikipedia (2015), Prosumer. <http://en.wikipedia.org/wiki/Prosumer>
- 17 Accenture (2014) *The New Energy Consumer: Architecting for the Future*. www.accenture.com/us-en/Pages/insight-new-energy-consumer-architecting-future.aspx
- 18 *Energiewende* means energy transition and refers to Germany's plans to shift to an energy portfolio dominated by renewable energy, energy efficiency and sustainable development.
- 19 The Sunflower pump in the photo is produced by Future Pump: <http://www.futurepump.com/>. The farmer is using agro-ecological techniques to grow fruit and vegetables for sale in local markets.
- 20 Accenture (2012) *Actionable Insights for the New Energy Consumer*. Available at: <http://www.accenture.com/sitecollectiondocuments/pdf/accenture-actionable-insights-new-energy-consumer.pdf>
- 21 Accenture (2014) *The New Energy Consumer: Architecting for the Future*. Accenture conducted annual consumer surveys across 5 years in twenty-six high and middle-income countries. The report proposes nine consumer characteristics and corresponding responses that electric utilities need to consider. www.accenture.com/us-en/Pages/insight-new-energy-consumer-architecting-future.aspx

- 22 Media coverage suggests that residents of Mtwara protested at the government's move to pump gas to Dar es Salaam for processing there. Some residents argued that power from the gas should be produced in Mtwara to create more jobs and opportunities for the region. www.theeastafrican.co.ke/news/Tanzania-police-arrest-90-after-Mtwara-gas-pipeline-protest/-/2558/1860394/-/75w1m0/-/index.html
- 23 The 'carbon price' refers to the charge put on carbon dioxide emissions in order to reduce emissions, often by means of a tax or as part of an emissions trading system (which requires emitters to purchase an allowance to emit CO² into the atmosphere). Attaching a charge to CO², which is not priced by any market, conveys information – or a 'signal' – to polluters to reduce their emissions.
- 24 See for example the 2012 Annual Report of Umwelt Bundes Amt (UBA), Germany's Federal Environment Agency. www.umweltbundesamt.de/sites/default/files/medien/publikation/long/4296.pdf
- 25 See www.barefootcollege.org/solutions/solar-solutions
- 26 See more on the Extractive Industries Transparency Initiative at <https://eiti.org>
- 27 Though the country's supply of electricity nearly doubled between 2005 and 2011, only about 15 percent of Tanzanians are on the electrical grid. Banerjee SG, Bhatia M, Azuela GE, Jaques I, Sarkar A, Portale E, Bushueva I, Angelou N and Inon J G (2013) Global Tracking Framework. Data Annex. Sustainable energy for all. The World Bank, p.268. www.se4all.org/wp-content/uploads/2013/09/11-gtf_data_annex.pdf
- 28 Bellanca, R. and Garside, B. (2013), *An Approach to Designing Energy Delivery Models that Work for People Living in Poverty*, IIED, London.
- 29 Wilson (2015) Financing sustainable energy for all – workshop report. Available at <http://pubs.iied.org/G03893.html>
- 30 The International Energy Authority (IEA) says that to reach universal access by 2030, at least 55% of new electricity generation will have to come from decentralised energy sources. IEA (2013) *World Energy Outlook*. Available at <http://www.worldenergyoutlook.org/publications/weo-2013/>
- 31 For more information on Labs, see Hassan, Z. (2014). *The Social Labs Revolution: A New Approach to Solving our Most Complex Challenges*. Berrett-Koehler Publishers, California; MIT's CO-LAB at <http://colab.mit.edu/> ; Labcraft at <http://labcraft.co>
- 32 See InSTEDD (Innovative Support to Emergency Disease and Disasters) at <http://instedd.org>, the Finance Innovation Lab at www.thefinancelab.org
- 33 See more on COSIA (Canada's Oil Sands Innovation Alliance) at www.cosia.ca
- 34 'System change thinkers' is used here loosely to refer to people or organisations working to understand and address significant societal challenges as part of an overall system, rather than dealing with problems in isolation. A system may involve, for example, institutional arrangements, rules of the game, attitudes and practices, all of which relate to each other.

What role will ordinary people play in energy systems of the future? IIED and Hivos asked leading energy thinkers for their views. Opinions vary: some want to see a future where citizens produce, control or profit more from local energy resources; for others, companies and governments are likely to remain in the driving seat, with people acting as passive consumers. A point of convergence is that energy solutions, however delivered, need to be more 'people-centred': they need to create jobs, incentivise users to be efficient, be accountable to customers, and promote off-grid and 'bottom-up' service design for poor communities. Accelerating change will require tried and tested tools such as price signals, and newer approaches focused on transforming the energy sector's culture, education and leadership, strengthening civil society advocacy, and creating new spaces for cross-sector innovation.

IIED is a policy and action research organisation working to promote sustainable development – development that improves livelihoods in ways that protect the environments on which these are built. Based in London and working on five continents, we specialise in linking local priorities to global challenges. In Africa, Asia, Latin America, the Middle East and the Pacific, we work with some of the world's most vulnerable people to ensure they have a say in the decision-making arenas that most directly affect them – from village councils to international conventions.

Hivos is an international organisation that seeks new solutions to persistent global issues. With smart projects in the right places, Hivos opposes discrimination, inequality, abuse of power and the unsustainable use of our planet's resources. Counterbalance alone, however, is not enough. Hivos's primary focus is achieving structural change. This is why Hivos cooperates with innovative businesses, citizens and their organisations – sharing a dream with those organisations of sustainable economies and inclusive societies.



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