

STRATEGY

THE ENERGY CHANGE LAB

Building a sustainable and
people-centred energy system

The Energy Change Lab works with pioneers and changemakers to build an energy system that is sustainable and people-centred. We do this by developing leaders, incubating prototypes for sector change, building evidence, connecting people and sharing ideas.

Jointly initiated by Hivos and IIED, and working with local partners, the lab started in Tanzania in 2015. In Tanzania, we are focusing on three priority areas: accountability in the energy sector, job creation, and improved coverage of decentralised energy solutions. We work with partners to run learning and leadership programmes for young people, aspiring entrepreneurs and energy professionals. As we grow, we share our approach and results globally.

1. THE TANZANIAN ENERGY LANDSCAPE

Tanzania's energy sector is in transition. There are promising developments in energy financing, policy, and entrepreneurship. But change is often slow and fragmented. Investments in the grid and in fossil fuels dwarf efforts to provide energy in remote areas and scale-up decentralised models. A greener, people-centred energy system is a possibility, if the need for skilled leaders, new ideas, and progressive partnerships between people and sectors are met.

The time for change is now. Energy demands are surging in Tanzania as its economy and population grows, and industries develop. The task is significant: in 2012, about 20 per cent of Tanzania's population had access to electricity and almost 95 per cent still used biomass-based fuel for cooking.¹ The government has big ambitions: it wants to achieve 75 per cent electrification by 2033. Tanzania has a range of assets to help reach this ambitious goal: a dynamic Rural Energy Agency, policy reforms to encourage mini-grid developers, a wealth of renewable energy sources and political commitment at the top.

But the country also faces challenges common to many low-income countries: an ageing power infrastructure, financial losses in the state utility, strained public budgets, power outages, and political pressures that often counter efforts to improve performance (such as rent-seeking or pressure for unsustainably low prices). As the grid expands, expectations

for an accessible and reliable connection will increase, but the electricity sector faces many challenges in terms of delivering a good, reliable service to customers. Moreover, like many countries in sub-Saharan Africa, Tanzania is grappling with an influx of poor quality and counterfeit off-grid energy products, such as solar lanterns and solar home systems.

Large-scale gas finds and investments in coal risk locking-in fossil fuel dependency and crowding out opportunities for green growth. Large hydro resources are vulnerable to climate change impacts and put a strain on local environments. Moreover, with concerns about climate change and in the spirit of a long-term vision to avoid future emission reduction commitments, Tanzania is strategically placed to leapfrog dependency on polluting fossil fuels and build an alternative energy sector.

¹ This uses a definition of access based on household connections, rather than proximity to a distribution line, and the most recent survey data produced by Tanzania's National Bureau of Statistics in 2012 (Source: United Republic of Tanzania, 2015. SE4ALL Action Agenda).

2. OUR VISION

Our vision is an energy system that is sustainable and that serves all citizens. In Tanzania, the Energy Change Lab works with pioneers and changemakers to achieve this goal.

A sustainable energy system

A sustainable energy system ensures access for everyone, is economically viable, shifts away from fossil fuels, and promotes efficiency to avoid negative environmental impacts. At the Lab, we are particularly focused on promoting renewable energy and decentralised solutions. Renewable energy sources can help solve Tanzania's energy deficit, expand access to energy, and create new opportunities for green growth and development. It also has huge potential to be people-centred, principally through off-grid technologies that allow people and communities to produce energy locally. We support innovations in local capacity, practice, and policy, which spread renewable energy services for both rural and urban citizens.

A people-centred energy system

Mainstream debates on energy futures tend to have a common blind spot: ordinary people. Terminology used by energy agencies, ministries, and investors focuses instead on energy sources, supply, market regulation, security, demand, price, and the environment.

'People' are often referred to in narrow and utilitarian ways, depicted as sources of 'unmet demand' or in terms of 'consumer behaviour'. At the Energy Change Lab, we believe the political nature of energy and the profound effect of previous energy shifts on human societies requires a much stronger focus on people - both in the process and goal of energy transitions.

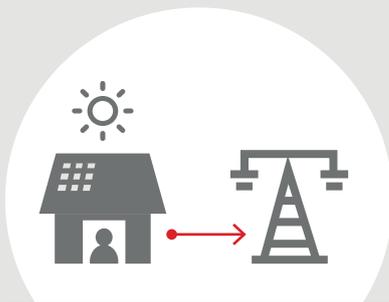
'People-centred' or 'citizen-centered' energy systems

We do not have 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.

We distinguish four main roles for people in Tanzania’s future energy system and use this framework to consciously guide our activities: people as prosumers, consumers, employers, and entrepreneurs as well as active citizens.² Access to energy, tailored to local needs, lies at the heart of our

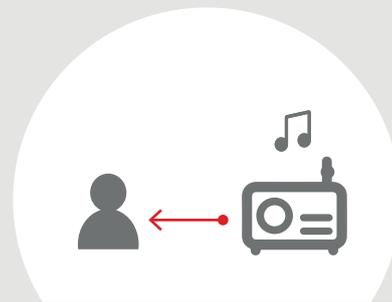
people-centred approach. We support innovations that create opportunities for people to earn money from energy, develop their communities, choose a better service, and hold providers and decision makers to account for service quality.

ROLE OF PEOPLE IN FUTURE ENERGY SYSTEMS



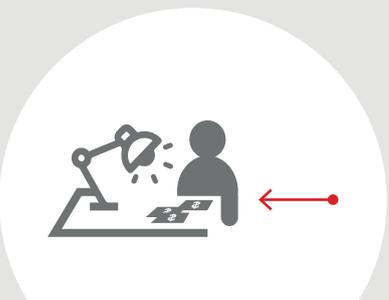
PEOPLE AS PROSUMERS

- a) Energy users who also produce, manage, sell and/or trade energy; and
- b) more active involvement of users in the design of energy services.



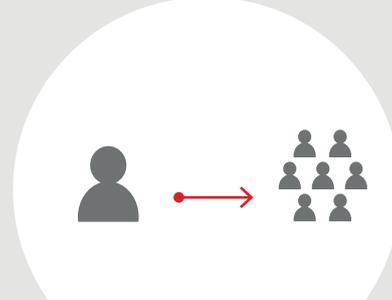
PEOPLE AS CONSUMERS

People acting solely 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.



PEOPLE AS ACTIVE CITIZENS

Individuals and groups engaging energy policymakers and companies to secure or defend their interests (e.g. access to affordable, reliable power).

² In our first research project, we asked leading energy thinkers around the world what role ordinary people would play in energy systems of the future.

See: *Demanding Supply: Putting Ordinary Citizens at the Heart of Future Energy Systems*. Hivos and IIED, 2015. <http://www.energychangelab.org/assets/2015/08/demandingsupply.pdf>.

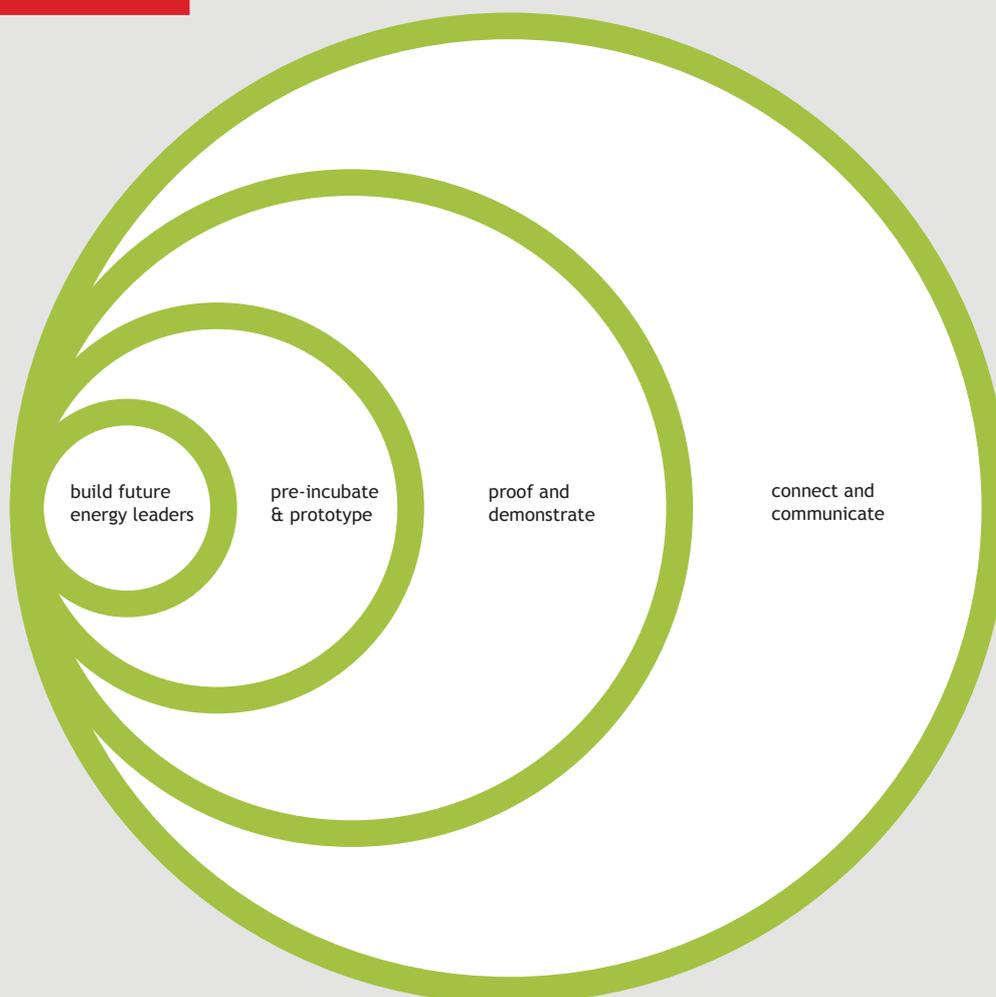
3. STRATEGIC APPROACHES

The Energy Change Lab team is based in Tanzania and Europe. Our interventions are on the ground in urban and rural areas in Tanzania. We share our learning and ideas from Tanzania in regional and international forums, and use our international experience to enrich what we do at the country level.

We apply four strategies:

- 1 Building future energy leaders.** The Lab runs a programme to build future leaders in the energy domain. The programme works with starting professionals in the energy sector - or related sectors, like agriculture or water - who may go on to work in more influential positions in government or industry, and with young people with high potential to change the system from outside-in, for example by starting an innovative energy business, by means of activism or community work, etc. We provide experiential learning experiences and run a mentorship programme to build individual knowledge as well as challenge and ground-check their ideas.
- 2. Prototyping and pre-incubation.** The Lab addresses sector-wide energy problems in Tanzania by bringing together relevant stakeholders from in and outside the energy sector to foster joint problem-solving and creative thinking around new approaches and business models. We facilitate prototyping processes that operationalise new ideas and enable actors to move beyond dialogue, demonstrating potential solutions.
- 3. Evidence building and targeted research.** We conduct targeted research to support our prototyping work and to build the evidence based on sustainable, people-centred energy transitions. In doing this, we work with a range of partners (researchers, labs, civil society organisations, private sector, government) in Tanzania and globally.
- 4. Communication and knowledge sharing.** We enable sector-wide learning and stimulate dialogue by sharing findings from our own research and on-the-ground prototyping - as well as innovations led by others - with a wider audience. We share our learning and promising prototypes with governments and other stakeholders at national and global level.

STRATEGIES, STAKEHOLDERS, SERVICES



BUILD FUTURE ENERGY LEADERS

WHO

- Graduates in energy-related field
- Young entrepreneurs in energy-related field

WE OFFER

- Mentorship
- Immersion learning trajectories
- Regular community convening
- Pre-incubation of ideas

PRE-INCUBATE & PROTOTYPE

WHO

- Pioneers inside institutions
- Local stakeholders in energy (or related) sector
- Young energy changemakers

WE OFFER

- Immersion learning
- Support in analysis and problem solving (tools, guidance, new ideas)
- Connections and sharing spaces with relevant actors
- Focused prototypes or research on system issues

PROOF AND DEMONSTRATE

WHO

- National and international researchers
- Stakeholders in energy (or related) sector

WE OFFER

- Data and analyses on relevant topics
- Networking and connections
- Ideas and inspiration

CONNECT AND COMMUNICATE

WHO

- National and international governments
- National and global energy community/sector

WE OFFER

- Workshops and learning events
- Sharing spaces
- Data analysis on relevant topics
- Ideas and inspiration

4. ENERGY

PRIORITIES

Following extensive scoping globally and in Tanzania, we identified three priority areas for action to accelerate a transition towards a people-centred, sustainable energy future in Tanzania and beyond:



Accountable Energy

The Lab is exploring ways to improve information and feedback mechanisms between consumers, government, and energy providers. Putting end-user perspectives centre stage, the aim is to build informed dialogue and understanding between users and providers, and improve customer perceptions on quality of service.

There are few organisations involved in grass-roots awareness raising or campaigning on energy issues. We are seeking ways to make energy information more accessible to citizens and resonate with their daily lives. By increasing awareness and the knowledge of citizens, combined with effective engagement, we can increase responsiveness from government, regulators, and energy providers.



Energy and Jobs

The renewable energy and energy access sectors in Tanzania are showing significant growth, particularly with the emergence of new small and medium enterprises (SMEs) serving low-income communities. However, while there are Tanzanian-owned companies, many of the more established players attracting large investments are foreign-owned SMEs and non-governmental organisations (NGOs). The Lab focuses on identifying new ways of creating energy jobs nationally: beyond access to finance, what is needed to foster local micro and small-scale businesses in the renewable energy access space? How can we create sustainable job opportunities? And what is required to supply energy for productive activities in communities where people on a low-incomes live and work?



Decentralised Energy

Providing energy for all Tanzanians will depend significantly on distributed energy, such as mini-grids and stand-alone systems, often using renewable or hybrid sources. Mini-grid operators are increasingly attracted by Tanzania's policy environment. This has created a window of opportunity, but many projects remain at the pilot stage. Both mini-grid and off-grid providers need to develop pilots into successful businesses and continue to innovate in the design of services. The Lab aims to better understand the decentralised Tanzanian energy landscape. We explore key questions, such as how off-grid green energy services can be better designed so they result in significant uptake and are driven by end-user demand. We explore the enabling environment, including the supporting policy and financial structures already in place but possibly under-utilised, and examine what new design approaches, policy tools, and financial models need to be created.

5. ACHIEVEMENTS AND PLANS

In our three focus areas, we run several successful programmes that relate to our energy priorities. We invite other players to think and act with us to build a people-centred, sustainable energy system.



Accountable Energy: Exploring feedback mechanisms

What we have done

In collaboration with Tanzanian partner Twaweza, we conducted a survey of 2,000 households, to assess citizens' perceptions of electricity services. The findings suggest that grid-connected customers are unhappy with repeated service disruptions - 66 per cent say they think outages are longer than planned and 73 per cent say they lack sufficient information on power cuts. The survey also found that energy customers have little understanding about off-grid products, such as portable lights and solar home systems, and they often buy cheaper, lower quality imitations of well-known brands, or think they have bought a good quality panel, but, in fact, it is a fake.

The Energy Change Lab has started working on these issues by convening a diverse range of stakeholders to discuss the findings and collectively brainstorm pathways towards building trust between customers and energy providers as well as enhancing service quality.³

What we are doing now

Throughout 2017, the Energy Change Lab is piloting an Energy Supply Monitoring Initiative (ESMI) in Tanzania, in collaboration with the World Resources Institute (WRI) and Prayas Energy Group (PEG). By placing monitoring devices in selected households and small businesses across different neighbourhoods in Dar es Salaam, ESMI measures the quality of electricity supply. The data is aggregated and published live on a website, tapping into the need for reliable publicly available data on electricity quality in Tanzania.⁴ It serves customers, who can use these data to hold service providers accountable and, more generally, it serves citizen awareness and enables active citizenship. In addition to a website with 'real life' data, findings will be shared with practitioners and policymakers through a range of blogs and stakeholder meetings.

³ Reflect and Act: Pushing for Better Power in Tanzania. Hivos and IIED, 2016. www.energychangelab.org/assets/2015/08/Pushing-for-better-power-in-Tanzania.pdf; Event Report: Better Power in Tanzania's Energy Sector. Hivos and IIED, 2016. www.energychangelab.org/assets/2016/11/Better-Power-in-Tanzania-electricity-sector-event-report.pdf

⁴ See: <http://www.betterpower-tanzania.org/>

“The Energy Safari helped me learn a lot about the energy sector. I found the problem-solving techniques used in the programme absolutely fascinating and helpful in reshaping my business idea. The Safari also presented great networking opportunities; I got a chance to meet with people from various backgrounds, different age groups, government organisations and international development organisations.”

DIANA MBOGO, ENERGY SAFARI PARTICIPANT 2015 AND CEO OF MILLENNIUM ENGINEERS ENTERPRISES LTD.



Energy and Jobs: Productive Use of Energy

What we have done

In Tanzania, there are huge needs and opportunities to direct ambitious energy access investments to increase rural productivity. Catalysing productive uses of energy (PUE) often requires special design measures to overcome barriers such as gaps in local people’s skills or financial resources, for example by supporting local enterprise development or facilitating access to finance for end-users.

The Energy Change Lab has done research⁵ with mini-grid developers in Tanzania, who are testing ways to combine energy access provision with wider rural development processes. These include private sector mini-grid developers, such as JUMEME Rural Power Supply Ltd (solar hybrid), and mini hydro projects initiated by non-governmental organisations. In a well-attended PUE workshop hosted by the Energy Change Lab at the Rural Energy Agency in Dar es Salaam, stakeholders from the private sector, government and civil society discussed the research and identified several measures that could support PUE.⁶ This included better information and guidance, and new platforms for collaboration.

What we are doing now

The Energy Change Lab is running a multi-stakeholder process focused around ‘live’ projects, which will enable pioneers in and outside the energy sector to design, test, and learn about interventions that promote PUE. This covers aspects such as conducting PUE assessments, refining the delivery model, introducing support measures to stimulate demand among promising local sub-sectors (e.g. agriculture, forestry, fishing or retail), and the measuring of impacts. We work at two levels: the local level, by providing expert advice and prototyping interventions to improve 2-3 specific energy services; and at the sector level, through a multi-stakeholder process of problem-solving and dialogue, which helps inform the prototypes and spread learning.

⁵ Remote but Productive: Using energy access investments to catalyse enterprises and income in Tanzania’s rural communities. IIED and Hivos, 2016 www.energychangelab.org/assets/2017/01/Remote-but-productive.pdf; Making mini-grids work: productive uses of electricity in Tanzania. IIED and Hivos, 2016. http://www.energychangelab.org/assets/2017/03/Making_mini-grids_work_IIED-Hivos.pdf

⁶ Blog by Sarah Best: Four Challenges to Powering Local Economies. <http://www.energychangelab.org/four-challenges-powering-local-economies/>



Energy and Jobs: Building future energy leaders

What we have done

The Energy Change Lab supports future energy changemakers, and develops initiatives that foster domestic job creation within the Tanzanian renewable energy sector. The culture in large parts of Tanzania's energy sector and training institutions is highly technocratic, and the focus on centralized, top-down grid energy provision is deeply entrenched. Young local entrepreneurs and pioneers sometimes struggle to turn their ideas into viable business propositions, or to get seed funding and advice. Together with Buni Hub, the Lab organised an Energy Safari, a five-day experiential learning programme, where groups of talented, interdisciplinary youth worked on energy issues in their city.⁷ Participants followed a facilitated process, moving from problem definition and exploration to developing ideas, prototyping, seeking and sharing feedback, and drafting of a follow-up plan. A core principle of the Safari involves sending participants into the field during all stages of the process, allowing people to immerse themselves in the world of the 'end-user', instead of relying on information from written sources or experts. The Safari received extremely positive feedback from participants as a learning experience. Some participants have moved on to start up their own enterprise or initiative - and there is an alumni community that stays in touch.

What we are doing now

We are developing a comprehensive Energy Leadership programme. This is geared to: i) starting professionals working in the energy sector (or in related sectors, like agriculture or water), who may go on to work in more influential positions in government or industry; ii) young people with potential currently working outside formal institutions. The programme offers a range of experiential learning opportunities, mentoring, and a community of practice. The main outcome of the programme is a cadre of individuals equipped with new skills, ideas, advice, and networks to lead, collaborate, and innovate in the energy sector.

The programme includes the following elements:

- Energy Safaris: learning and career inductions for young people from mixed disciplines.
- Energy Academy: learning and career development for starting professionals working in energy or related sector.
- Renewable Energy Trainings: applied trainings to bridge university education with practical and social skills.
- Mentoring: professional coaching to support individuals at early stages of a business idea/initiative - 'pre-incubation'.
- Energy Conversations: monthly dialogues to discuss new ideas and to network.

⁷ A visual impression of the Energy Safari, August 2015:
<http://www.energychangelab.org/energy-safari-2015/>



Decentralised Energy: Prototyping a crowdgrid

What we have done

Unconnected Tanzanian citizens can wait years for the national grid or a mini-grid investment to arrive in their area. Consequently, people in rural Tanzania are buying solar panels, often with the help of non-profit organisations or companies with pay-as-you-go and micro-finance schemes. These solar panels bring light to remote villages, which is a great achievement, but the capacity of these individual systems is often low, not allowing for higher power equipment like fridges, milling machines, or irrigation.

The Energy Change Lab has explored alternative electrification strategies that allow people to progressively upgrade their local energy supply, and to become 'prosumers', by selling the excess energy they produce to their neighbours. Energy capacity in villages with solar home systems (SHS's) can increase if independent SHS's start connecting to and building on each other, becoming an intertwined system. This is sometimes called 'swarm electricity'; we call it a crowdgrid. The potential advantages of this type of bottom-up approach include that it is cheap, environmentally friendly, it gives citizens control over their energy costs (and potential revenue) and, importantly, provides energy for productive use with possibilities for income generation.

What we are doing now

Scoping for crowdgrid options in urban and rural Tanzania has led us to conclude that, due to legal restrictions in grid-powered areas, rural, unconnected areas that meet local demand for SHS's will be our focus area for the prototyping of a crowdgrid. We are currently exploring possible rural locations where we will identify, together with a Tanzanian solar company and village community members, demand for a crowdgrid and then co-develop the prototype. The technical specifications, delivery model, management structure, and financing scheme will be developed through an inclusive bottom-up process. This process will provide rich learning in terms of technical outcomes and community-level needs and engagement. If successful, the idea has great potential to add more individual and community value to existing isolated SHS's, while simultaneously strengthening 'prosumer' opportunities, radically shifting our conception of energy systems, from top-down to bottom-up.

6. WHY A CHANGE LAB APPROACH?

The causes of the challenges faced by Tanzania's energy sector are complex, interrelated, and wide-ranging. A profound shift in thinking that embraces sustainable energy as a win-win, ensures energy access for all and recognises the role of citizens in the energy transition. A system shift of this scale must involve all key actors, who are willing to use new and diverse policy and finance levers to deliver change.

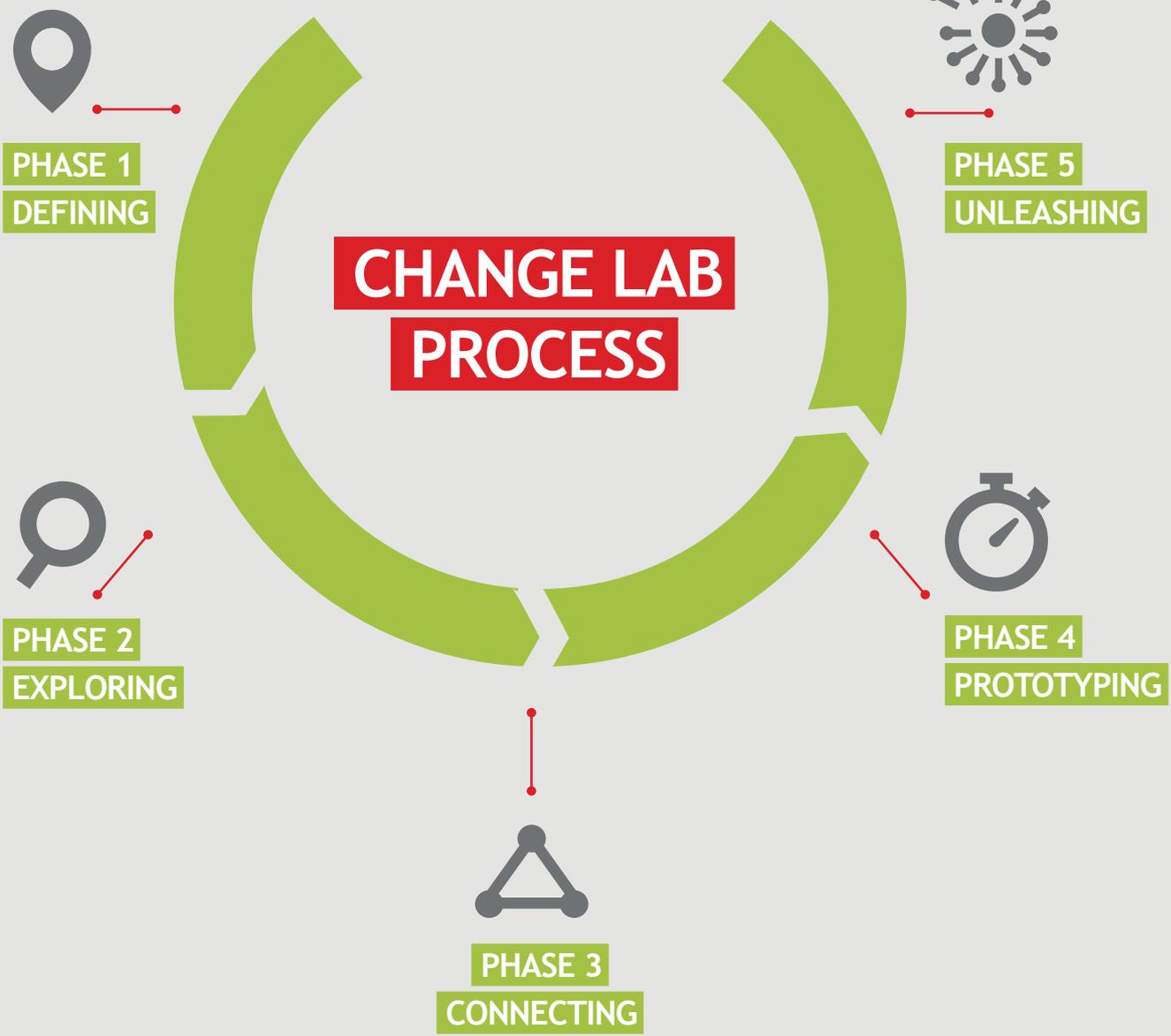
The Hivos - IIED Change Lab approach uses a phased multi-stakeholder process that moves from problem analysis to idea development and prototyping of solutions. In this social innovation process, stakeholders work together to address and solve complex challenges in a sustainable and equitable way. Beyond technology, these innovations can take the shape of public policy, new business models, (re)framing cultural values and, ultimately, behaviour change.

Our Energy Change Lab works on multiple levels, using mechanisms that not only focus on fostering tangible, imminent results ('physical capital', i.e. a new service, product, or infrastructure), but also a minimum of three other outputs: 'human capital' (new capacities and skills), 'social capital' (increased trust and collaboration) and 'intellectual capital' (new knowledge and learning). These types of outcomes have potential to scale up ideas or practices, by building capacity in people and networks that go on to create solutions that have impact beyond the Lab.

In our programmes, we employ an inclusive Change Lab process to tackle the following underlying barriers to change faced by the global and Tanzanian energy sector:

- Top-down culture. Across the world, the energy sector is essentially 'top-down'. Initiatives often fail to grasp local realities and decision makers tend to believe that grid expansion and fossil fuels are the best and only route to quick development.
- Silo ways of working. The sector lacks joined-up thinking and action. Holistic approaches that bridge sectors (energy, water, agriculture, ICT, gender, design and health) are urgently required.
- Capacity gaps. Training for young people is overly technical and fails to explore important (social/cultural) dimensions of energy provision. In Tanzania, local entrepreneurs lack the skills or resources of foreign counterparts.
- Limited consumer engagement. People struggle to resolve their own energy needs and there is little interest in engaging in energy debates. Policy-making happens behind closed doors and consumers lack ways to hold their service providers to account.

We believe that innovation and breakthroughs can happen if we enable and connect pioneering people and organisations and stimulate joint problem-solving. Our cyclical lab process is designed to create a conducive environment for trust building and innovation. We move through 5 phases which are fluid and flexible: from defining the problem to unleashing new solutions.



ABOUT THE CONVENING ORGANISATIONS

The Energy Change Lab is an initiative of Hivos and the International Institute for Environment and Development (IIED). In addition to the Energy Change Lab, we are partnering with the Dutch government in the ‘Green & Inclusive Energy’ and the ‘Sustainable Diets for All’ programmes.

Hivos is an international organisation that seeks new solutions to persistent global issues

With smart projects in the right places, we oppose discrimination, inequality, abuse of power and the unsustainable use of our planet’s resources. We have a long history of successfully searching for and joining hands with innovators all over the world. We have experience with various instruments that foster social innovation: supporting co-working spaces, developing different funding mechanisms, and facilitating networks or communities of innovation for change. We have been contributing to the Social Lab field since 2012, bringing together lab practitioners from the Global North and South, supporting the publication of a book called Labcraft and supporting networks like SIX and Afrilabs. More recently, we have started to set up and facilitate labs ourselves on topics including renewable energy, sustainable food and living wages in the agro-food supply chain.

Hivos has a long track record in the field of inclusive and renewable energy. On the Indonesian island of Sumba, we combine implementation with advocacy and a social lab approach. We work with the authorities and private sector on this island to achieve 100% renewable energy as an iconic example that inspires national and international stakeholders. In Tanzania, we have worked closely with Tatedo for more than a decade on energy access programmes, and we are currently running a large biogas programme with SNV and the Tanzania National Biogas Programme. Outside the energy realm, Hivos is one of the founding organisations of the Tanzania Media Fund and Twaweza and we are funding the creative think tanks Culture and Development East Africa (CDEA) and Nafasi Art Space.

Hivos and IIED are partnering with the Dutch government and ENERGIA in the Strategic Partnership Programme Green and Inclusive Energy. This global programme aims to strengthen civil society and develop capacity that enables them to advocate for green and inclusive energy policies and systems. In Tanzania, we work with five organizations in different sectors. For energy advocacy, our key partner is the National Gender and Sustainable Energy Network (NGSEN). Our research partner in this endeavour is the Economic and Social Research Foundation (ESRF). We are also partnering with the Tanzania Consumer Advocacy Society, a consumer organisation working at both the policy and community level to influence the adoption of renewable energy technologies. The Forum for Climate Change (ForumCC) and Tanzania Gender Network Programme will contribute, respectively, their climate and gender expertise to the programme.

IIED is a policy and action research organisation promoting sustainable development and linking local priorities to global challenges

We are based in London and work on five continents with some of the world's most vulnerable people to strengthen their voice in the decision-making arenas that affect them. Our global energy work involves research, dialogue and testing innovative methodologies on the ground, focusing on energy access delivery models, productive end-uses from energy, CSO engagement in policymaking, and financing decentralised renewable energy.

IIED has a long history of working with partners in Tanzania on sustainable development. Two important areas, linked to energy, are climate and water. IIED is currently supporting the President's Office for Regional and Local Government (PO-RALG) to establish devolved-level climate change adaptation funds and secure accreditation as a National Implementing Entity of the Green Climate Fund (UK aid AIM 4 Resilience Programme). We also work with the Government of Zanzibar to strengthen climate resilience in local planning, cooperatives and development finance institutions. In Dar es Salaam, our Connecting Cities to Basin project has brought together the river basin, urban water and sanitation agendas. Working with, among others, Ardhi University, the Centre for Community Initiatives and Tanzanian Urban Poor Federation, we have mapped the complex challenges and scenarios for achieving SDG 6 (water) for low-income settlements, the wider city and the entire river basin.

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