



Leave no one behind

Money is Power

Tracking finance flows for
decentralised energy access
in Tanzania

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Eco Associates (T) Ltd (EATL) is a multidisciplinary independent consultancy firm based in Dar es Salaam, Tanzania, providing specialized interdisciplinary research, policy and technical advisory services in the areas of natural resources assessment and management, mining, climate change, gender, energy and development. The EATL works with government, private sector, training, research and academic institutions.

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The Shaping Sustainable Markets group works to make sure that local and global markets are fair and can help poor people and nature to thrive. Our research focuses on the mechanisms, structures and policies that lead to sustainable and inclusive economies. Our strength is in finding locally appropriate solutions to complex global and national problems.

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Investment in Tanzania's energy sector is growing, but how much attention is being given to decentralised energy solutions for people who still lack energy for their basic needs: to light their homes and power their farms and businesses? This study maps the available data on finance for decentralised energy access in Tanzania, and compares this to funding needs. It finds that the vast majority of public energy finance is flowing to large grid-connected projects and only a small proportion supports decentralised energy access. To encourage investment in the sector and ensure that no one is left behind, stakeholders need to implement a range of policy, finance and capacity building interventions.

Contents

Summary	4	4 Barriers and interventions	29
		4.1 Barriers	29
		4.2 Potential interventions	30
1 Introduction	9	5 Conclusions and recommendations	32
1.1 Background	9	5.1 Conclusions	32
1.2 Research purpose and scope	12	5.2 Recommendations	33
1.3 Target stakeholders	13		
1.4 Data collection methods and tools	14	References	34
1.5 Limitations of the study	14		
1.6 Methodological note	14	Annexes	36
2 Mapping funding needs, flows and mechanisms	15	Annex 1. List of consulted stakeholders	36
2.1 Priority funding needs	15	Annex 2. Government funding for grid and decentralised energy 2009/10 – 2016/17	37
2.2 Priority funding mechanisms	17	Annex 3. Bilateral and multilateral development partners financing for grid and decentralised energy in Tanzania	38
2.3 Main sources for financing decentralised energy	18	Annex 4. Finance received for decentralised energy access in Tanzania, as reported by recipients	39
2.4 Mechanisms for financing grid and decentralised energy access by development partners	21		
3 Who is being left behind?	24	Abbreviations and acronyms	40
3.1 The concept of 'leave no one behind'	24		
3.2 Which geographies and populations are served?	24		
3.3 Affordability of services by tiers of access	26		

Summary

The UN's Sustainable Development Goal 7 commits countries "to ensure access to affordable, reliable, sustainable and modern energy for all" by 2030. To meet this challenge, there is growing investment in Tanzania's energy sector. But how much attention is being given to decentralised energy solutions¹ targeting people living in poverty, who need energy to light their homes and power their farms and businesses?

The vast majority of Tanzanians still lack access to clean and affordable energy. In 2012, only 20.7 per cent of Tanzania's population had access to electricity² and almost 95 per cent of the population still used biomass fuel for cooking – particularly charcoal and firewood (URT, 2015a). Over the next two decades, the government of Tanzania has ambitious plans to increase energy access and boost power generation. This includes a target of 75 per cent for national electrification by 2033, with interim targets of 30 per cent by 2016 and 50 per cent by 2020. To achieve this, the government's main strategy is to increase large-scale power generation and grid extension. Although this approach is important, decentralised solutions – such as solar home systems and clean cooking facilities – are often cheaper and quicker to deploy than large centralised infrastructure, which requires much greater investment costs and regulatory approvals.

This study examines data on funding commitments for decentralised energy made by the government of Tanzania and its development partners,³ and compares this to overall finance needs in the sector. It provides a baseline analysis of the energy-financing scenario in Tanzania⁴ this decade.⁵ The study identifies some of the key barriers that stakeholders in Tanzania have identified as preventing progress, along with potential solutions they propose to increase the flow of finance to this sector. We also examine which sections of the population and 'tiers' of access are being prioritised

by non-governmental organisations (NGOs), social enterprises and the small-scale private sector working in the off-grid energy sector.⁶

This report and its findings are based on a review of key documents and interviews with key players engaged in on- and off-grid energy access. In addition, consultation meetings were conducted with a Research Reference Group set up to guide this work. The group comprised energy financing specialists from main state institutions: the Ministry of Finance and Planning, Ministry of Energy and Minerals, the Division of Environment in the Vice President's Office, the Rural Energy Agency (REA) and Policy Research for Development (REPOA).

Key findings

Flows of government and development finance to decentralised energy access

- The vast majority of funding for energy projects from both international funders and domestic budgets goes to large on-grid energy projects such as grid expansion, operation and maintenance (URT, 2016; EDPG, 2016).
- Between 2008 and 2021, development partners provided or committed to provide around US\$1.6 billion for both on-grid and off-grid energy, of which nearly 11 per cent is for decentralised energy (see Figure 1).
- The UK's Department for International Development (DfID), the European Union (EU) and the French Development Agency (AFD) are currently the major funders of decentralised energy access in Tanzania (EDPG, 2016). Most decentralised energy funding is directed at solar and small hydro technologies in the form of mini-grids.

¹ Decentralised energy refers to a system where energy production occurs at or near the point of use, irrespective of size, technology or fuel used. It encompasses mini-grids and micro-grids supplying electricity into a small distribution network and standalone systems providing mechanical, thermal or electrical power, such as diesel generators or solar home systems.

² This uses a definition of access based on actual household connections and draws on 2012 data produced by Tanzania's National Bureau of Statistics (NBS, 2013).

³ Development partners are bilateral and multilateral donor organisations.

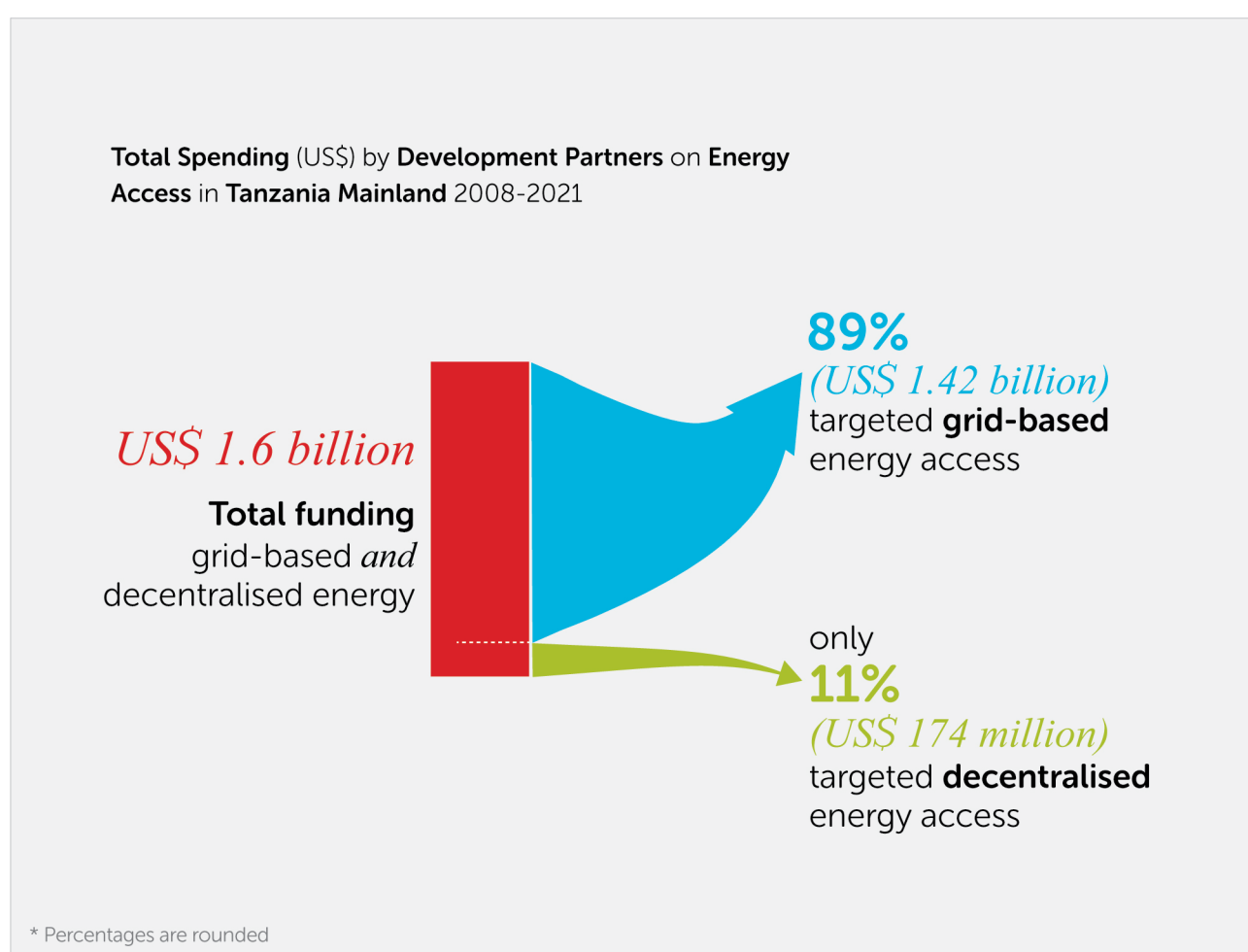
⁴ The study focuses on mainland Tanzania and does not include Zanzibar. Data on energy in Zanzibar is managed by its local authorities.

⁵ The exact timeframe varies by funder. The government data covers fiscal years 2009/10–2016/2017, while for the 12 development partners reviewed in this study, their reported energy spending ranges from 6 to 10-year commitments over the 2008–2021 period.

⁶ The multi-tier energy access framework developed by the World Bank and supported by the UN initiative Sustainable Energy for All has 5 levels, ranging from very low-capacity supply technologies such as solar lanterns, to high-capacity technologies such as the central grid.

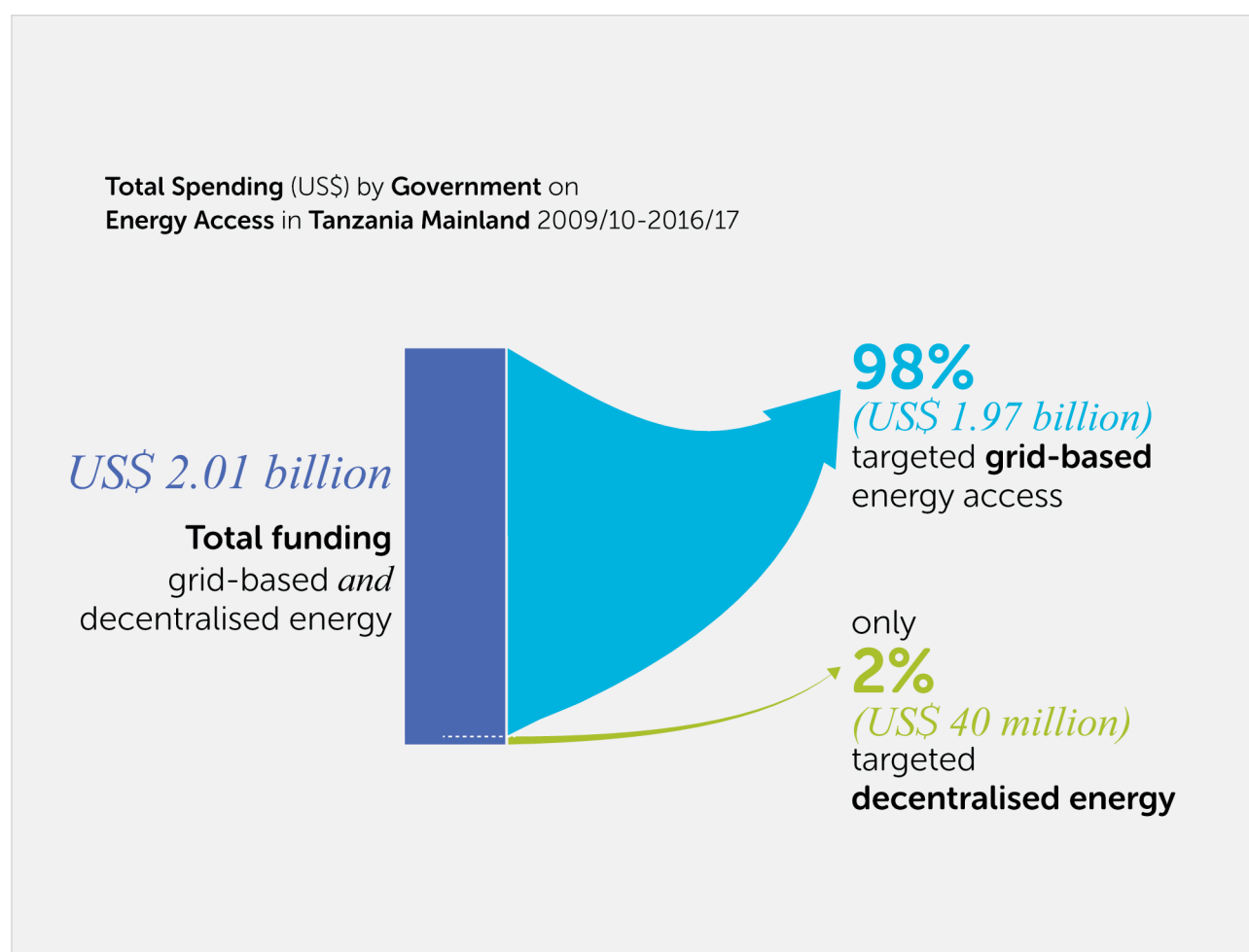
- Between 2009/10 and 2016/17 the government of Tanzania allocated nearly US\$2 billion to energy access, of which US\$40 million – or 2 per cent – was targeted to off-grid energy projects (see Figure 2).
- Energy for cooking receives less funding than other decentralised energy sources. Development partners' funding data indicates that over the 2008–2021 period, energy for cooking received around US\$11.6 million – or 0.7 per cent of their total energy funding. Within this budget, the funding priority is clean cook stoves, improved charcoal technologies, biogas and liquefied petroleum gas.
- Among the 20 recipients of development financing for decentralised energy access highlighted in this research, 13 are Tanzanian NGOs, social enterprises or domestic companies, and 7 are international NGOs or small and medium-sized enterprises (SMEs) (see Annex 1 for a list of all stakeholders consulted). International entities generally receive the largest amounts of funding, followed by a few Tanzanian NGOs or energy SMEs. As a rule, domestic energy companies receive the least funding from development partners, although a handful have been successful in securing multi-million dollar grants.
- The size of grants/loans received partly relates to the type of systems that are being invested in, with mini-grids receiving much higher up-front capital investments than, for example, solar home systems.

Figure 1. Total spending by Tanzanian development partners on energy access, 2008–21



Source: Study authors/IIED

Figure 2. Total spending by Tanzanian government on energy access, 2009–17



Source: Study authors/IIED

The finance gap for decentralised energy access

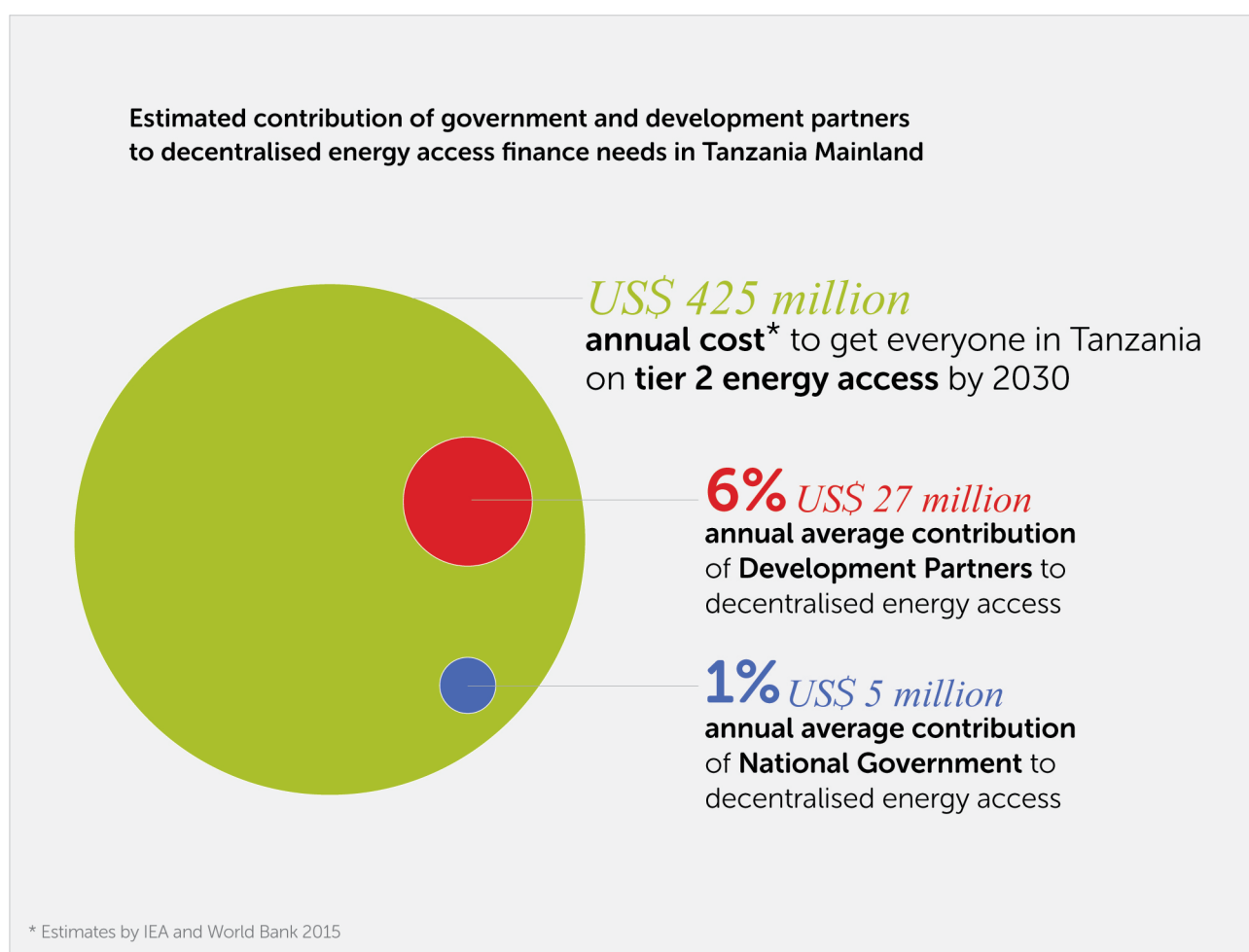
- The finance landscape for the decentralised energy sector in Tanzania involves many actors, needs and sources. The finance needs of energy users differ from energy providers, domestic banks and government, and the sources and instruments that could help fill these gaps will vary.
- Current funding flows from government and development partners do not come close to meeting

the country's needs for decentralised energy access. The World Bank and International Energy Agency (IEA) have estimated that to provide everyone in Tanzania with a minimum of Tier 2 access,⁷ which can only be provided through decentralised energy, around US\$425 million in investment is needed each year (IEA and World Bank, 2015). This means the current average annual funding from development partners represents just 6 per cent of Tier 2 investment needs, while average contributions from the government represent around 1 per cent⁸ of total needs (see Figure 3 below).

⁷ The multi-tier energy access framework developed by the World Bank and supported by the UN initiative, Sustainable Energy for All has 5 levels, ranging from very low-capacity supply technologies such as solar lanterns, to high-capacity technologies such as the central grid (IEA and World Bank, 2015).

⁸ These contributions are potentially an overestimate, since spending commitments recorded here also includes some higher power systems (Tier 3) like isolated mini-grids.

Figure 3. Estimated contribution as a proportion of decentralised energy needs in Tanzania



Source: Study authors/IIED

Financing mechanisms and instruments

- The main financing mechanisms used by funders for energy access include grants, loans, technical assistance and results-based financing (RBF) mechanisms. Most financing by development partners for energy is provided in the form of grants, with the remaining funds delivered as loans or a combination of grants and loans. In terms of funding mechanisms, some development partners are using fund managers, for example PriceWaterhouseCoopers for the UK's Africa Enterprise Challenge Fund (AECF) and the Africa Development Bank for the Sustainable Energy Fund for Africa (SEFA), while others are using financial intermediaries (see below).
- Commercial banks and other lending institutions in Tanzania are not yet engaged in funding for decentralised energy access. Reasons for this include a lack of relevant instruments, such as risk guarantees for lenders, and relevant credit lines. This presents a

critical constraint to the potential future growth of the domestic energy sector.

- Without funding from commercial banks and other financial institutions, intermediary companies such as Sunfunder are playing a role in addressing this gap. These companies mobilise financial resources from development financing institutions (DFIs) and microfinance institutions (MFIs) and make it available to domestic energy companies on relatively affordable terms.

Who is being left behind?

- While the decentralised energy sector in Tanzania is growing, better data is needed on whether remote communities and poor households are being reached.
- Major cities such as Dar es Salaam, the northern zone (eg Arusha and Kilimanjaro regions) and the Lake Zone (eg Mwanza region) are currently being targeted by off-grid solar providers more than remote areas in the western zone (eg Kigoma and Tabora regions) and southern zone (eg Ruvuma, Rukwa and Katavi regions).

- Decentralised energy providers that are receiving public funding target a range of tiers of access: from very low-capacity systems (Tier 1), to medium capacity (Tier 3).⁹ Providers report that customers are increasingly upgrading to Tiers 2 and 3 to access energy for productive uses.
- While this study did not conduct an in-depth analysis, data gathered on prices for high quality Tier 2 solar home systems suggests that the upfront costs and monthly payments are unlikely to be affordable for people living in poverty. Despite the importance of energy for cooking to the health and well-being of poor households in particular, this technology appears to be a lower priority for funders than electricity.

Key barriers to financing decentralised energy access

- **Private sector:** A common problem for domestic companies and NGOs trying to access finance is their lack of technical capacity for designing and preparing business proposals that meet the funders' requirements. There may be limited awareness or interest from domestic commercial banks in financing renewable energy projects, and there are financial risks due to frequent currency fluctuations. Bank interest rates and lending conditions are often unfavourable for small enterprises, who may lack sufficient collateral to take out loans. Funders often require equity that may be as much as 30 per cent of the total budget.
- **Government and development partners:** The policy and enabling environment is not always favourable for investment in decentralised energy. Government regulations and lack of co-ordination between relevant departments can also act as deterrents to investment. The government does not always share grid expansion plans.
- **Community:** Many people living in remote rural areas lack regular or sufficient sources of income to pay for the upfront costs of installing equipment and to make subsequent payments. There is a general lack of awareness of alternative energy solutions among Tanzania's citizens. The low population density and poor infrastructure in these areas make distribution costly.

Recommendations

Decentralised energy access, using a range of renewable energy sources that are abundant in Tanzania, offers a low-cost and strategic approach to the current energy access gap. This will also contribute to national commitments to ensure sustainable energy for all by 2030, in line with the UN's Sustainable Development Goals (SDGs). Clearly, achieving this will require adequate and appropriate financing arrangements that overcome the current barriers for investment in energy access in off-grid areas. Some of the measures recommended by stakeholders consulted in the study, many of which are well recognised, include:

Government: The government should take a lead role in ensuring a conducive policy and regulatory environment for private sector investment in off-grid energy access. This would include publishing the grid expansion plan as part of the Rural Electrification Master Plan, to give the private sector greater confidence to invest in the sector. The government should also ensure effective co-ordination of its ministries, departments and agencies, particularly over taxes and other charges.

Development partners: As champions and catalysts of off-grid energy access, development partners should strengthen their role in financing and providing technical assistance for investments in off-grid areas. Such mechanisms could include grants and results-based financing (RBF) to stimulate innovation and investments in the energy sector, and instruments such as risk guarantees and credit lines, to enable commercial banks and other financial institutions to issue long-term loans to local energy companies.

Private sector: The private sector, including commercial financial institutions and energy service companies, should be encouraged to engage in off-grid energy access. Banks should establish appropriate instruments to provide loans for energy projects on affordable terms. Other instruments may include loan syndication arrangements to allow co-financing for large energy projects; reducing current equity requirements; and considering alternative ways of addressing collateral requirement, for example considering cash flow instead of physical assets. Increasingly, energy companies will need to ensure that the services they provide are reliable and adequate to meet the domestic and productive needs of their communities.

To reach more people in rural communities, all stakeholders need to collaborate to find ways to make energy more affordable. This could include exploring alternative ways for communities to finance energy access, for example through community assets, and expanding access to improved cook stoves.

⁹Tier 1: Very low capacity; Tier 2: Low capacity; Tier 3: Medium capacity; Tier 4: High capacity Tier 5: High capacity.

1

Introduction

1.1 Background

Tanzania is one of the 48 'least developed countries', with an annual per capita income of approximately US\$879 in 2015.¹⁰ With a population of around 45 million, Tanzania's main development challenge is widespread and persistent poverty, with 28.2 per cent of the population living below the poverty line (URT, 2015b). Rural poverty is 33.3 per cent compared to 15.5 per cent in urban areas (ibid). Around a third (35 per cent) of poor people living in rural areas cannot meet their basic needs including energy services.¹¹

Data from 2007 reveals that people on low incomes spend about 35 per cent of their household income on energy, while the better-off spend only 14 per cent (GTZ, 2007). The economy is heavily dependent on agriculture, which in 2015 accounted for one quarter of gross domestic product (GDP), provides 85 per cent of exports and employs about three quarters of the workforce (IFAD, 2017). Lack of access to modern energy services creates a vicious cycle of poverty for rural communities due to continued limited production opportunities and social facilities. This report digs deeper into the energy sector to provide a baseline analysis of the financing situation and the implications for decentralised energy access in Tanzania.¹²

1.1.1 Overview of energy sector and access rates

Tanzania is endowed with diverse and rich energy resources including natural gas, biomass, hydropower, geothermal, coal, solar and wind power. These resources have the potential to boost the socioeconomic development of the country, though much of it remains unexploited. Currently the country depends on petroleum, hydropower and natural gas as its major sources of energy for commercial use. Only 4 per cent of rural people and 46 per cent of urban people have access to electricity, while only 2 per cent of rural people have access to non-solid fuels for cooking compared to 15 per cent of those in urban areas (IEA and World Bank, 2015).

Electricity is supplied through the central grid, which is owned by the state utility Tanzania Electric Supply Company (TANESCO), as well as stand-alone solar photovoltaic systems and isolated mini grids. Local NGOs and faith-based groups often operate the latter. The vast size of the country, coupled with low population density in most regions, makes grid extension enormously challenging and an expensive way to electrify rural areas.

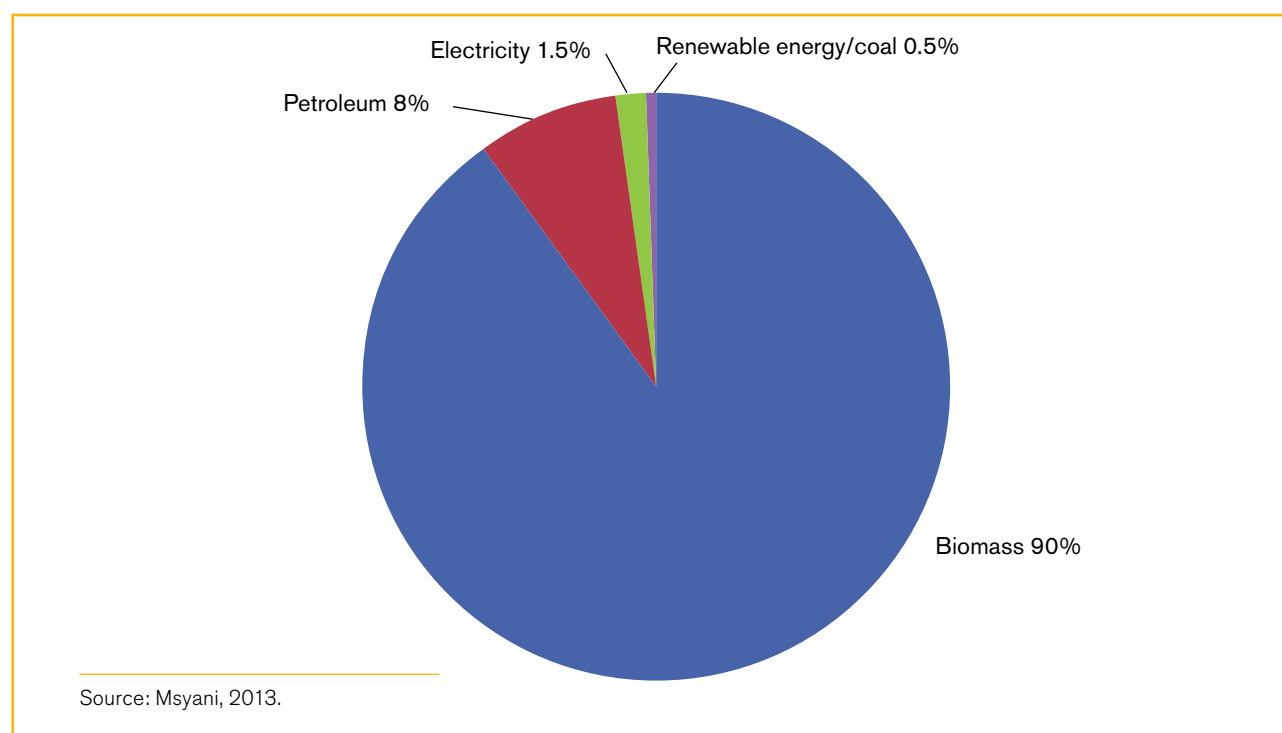
In terms of Tanzania's total primary energy consumption, biomass energy represents 90 per cent of the energy consumed, electricity represents only 1.5 per cent and

¹⁰ GDP per capita measured in current US\$ from World Bank national accounts data, and OECD National Accounts data files. See <http://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=TZ>

¹¹ World Bank development indicator – see <http://wdi.worldbank.org>

¹² The study focuses on mainland Tanzania and does not include Zanzibar because data on energy in Zanzibar is managed by the Zanzibar authorities.

Figure 4. Main composition of energy mix in Tanzania



petroleum products (oil and gas) represent 8 per cent (Msyani, 2013). Renewable energies (solar, wind) and coal represent around 0.5 per cent of the total energy consumed in Tanzania (ibid) (Figure 4).

1.1.2 Electricity grid connection

TANESCO generates, transmits and distributes electricity across the country. The company is wholly government-owned and responsible for 98 per cent of the country's electricity supply (URT, 2015). In December 2015, Tanzania's installed electricity generation capacity was 1,550 megawatts of which 1,466MW was available on the grid. Installed capacity consists of 553MW of large hydro-power, 501MW of thermal generation with natural gas, 456MW with oil, 27MW with biomass, and 13MW of small hydro-power (URT, 2015b).

In 2012, only 20.7 per cent of Tanzania's population had access to electricity¹³ and almost 95 per cent used biomass-based fuel for cooking – particularly charcoal and firewood (URT, 2015a). The government has ambitious plans to increase energy access and boost

power generation. This includes a target of 75 per cent for national electrification by 2033, with an interim target of 50 per cent by 2020 (URT, 2015a).

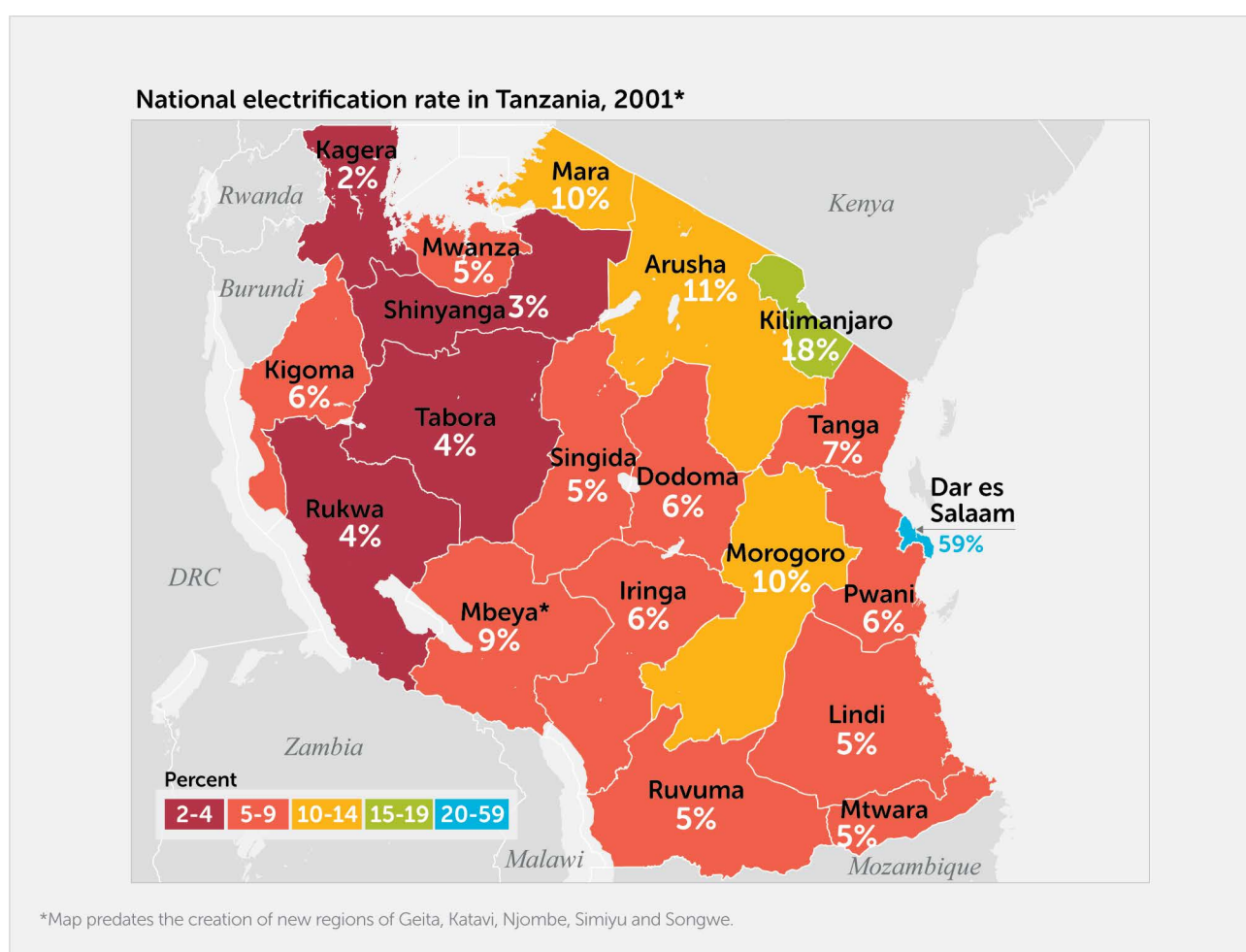
Electrification varies across different regions of Tanzania. Some regions (central, west and north western as well as the southern region) have the lowest rates of grid-based electrification. Conversely, the northern and eastern parts of the country have the highest rates of connections. Using data from 2001 (URT, 2002)¹⁴ the map in Figure 5 illustrates the historic regional differences in electrification rates in Tanzania.

While TANESCO's focus is primarily on grid access, the Rural Energy Agency (REA) is the main government driver for the deployment of off-grid electrification projects (ranging from 1 to 10 megawatts). Solar home systems (SHS) and mini-grids are key technologies funded by the Rural Energy Fund, which REA manages. There are, however, other decentralised energy initiatives that are not co-ordinated by REA; these include NGOs such as faith-based organisations and private sector initiatives, covering solar, hydropower and mini-grids.

¹³ The Government of Tanzania uses two definitions of electricity access: (1) at household level: one connection implies one household connected to electricity; and (2) at community level: access is implied for any person within 600 metres of the low voltage distribution line(s). The 20.7% figure is based on the first definition, that access equals connections, and is the definition used by the government to set the country's goals on Sustainable Energy for All (URT, 2015a)

¹⁴ Though national electrification rates have increased since 2001 and been tracked in subsequent household budget surveys conducted in 2007 and 2011, information on the regional breakdown for these later surveys was not available at the time of this research (see National Bureau of Statistics at www.nbs.go.tz). This map was presented by Justine Uisso of the Rural Energy Agency at a World Bank ESMAP workshop, March 2011, Washington DC. See https://www.esmap.org/sites/esmap.org/files/4b.%20TANZANIA_Innovation%20in%20Delivery%20of%20Services.pdf

Figure 5. National electrification rate in Tanzania



Source: Based on Uisso, 2016.

1.1.3 Financing for decentralised energy access in Tanzania

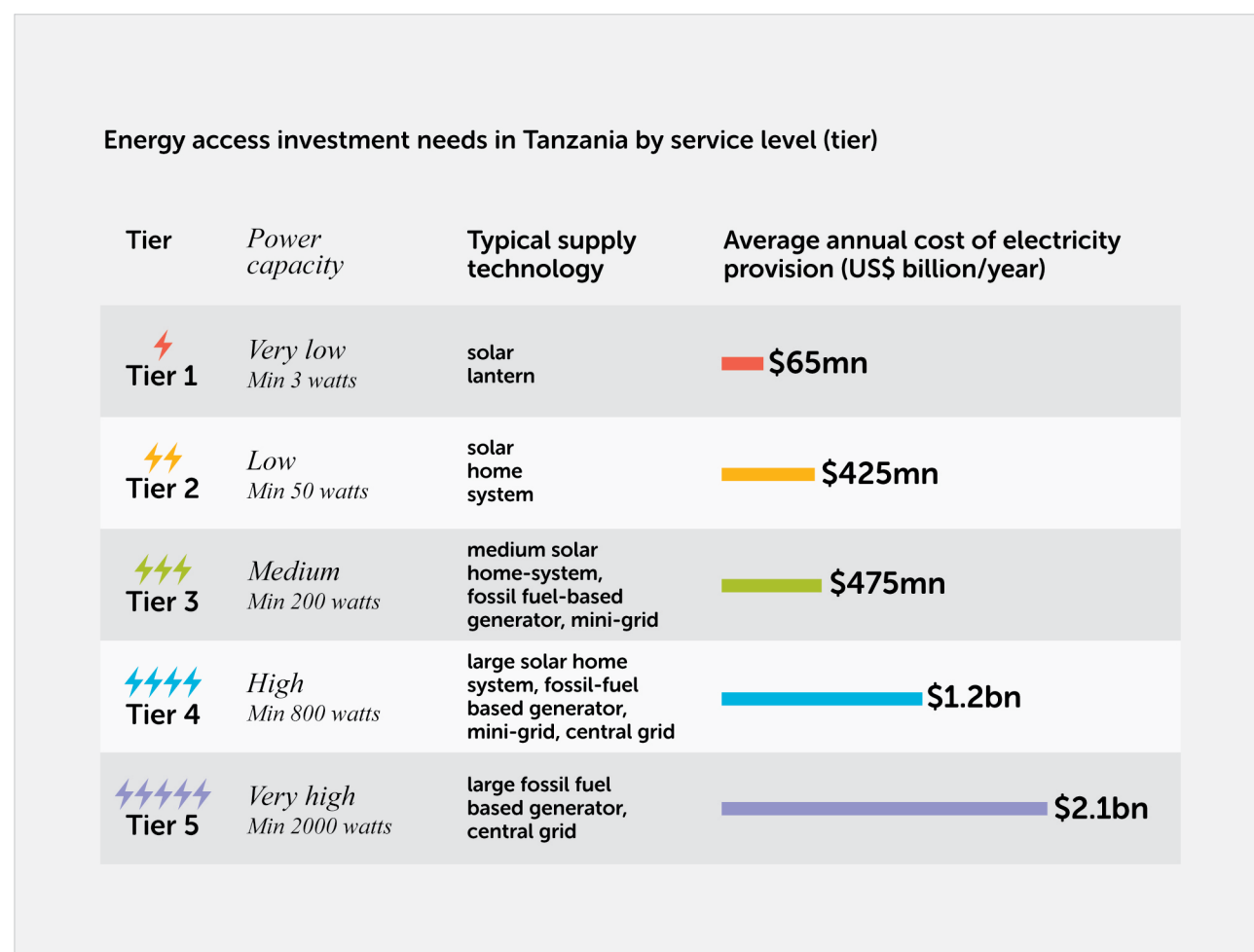
Achieving the UN's Sustainable Development Goal of universal access to energy will require increasing funding and improving Tanzania's enabling environment. First, this will mean better policy, regulation, institutions and energy provider capacity. Second, it will mean developing decentralised energy markets for low-income households to power homes, public services and small businesses. Given that it is too costly to extend the grid to Tanzania's remotest areas, increasing investment in decentralised energy must be a priority.

Many global estimates of energy access investment needs do not specify the allocation required for decentralised versus centralised energy systems, nor for specific technologies. They also fail to compare decentralised finance needs with the actual funding flows from different public and private sources.

Similarly, for Tanzania, we could not find an assessment of energy financing needs that specifies the share required for decentralised energy. However, modelling by the International Energy Agency (IEA) and the World Bank is available via their ACCESS Investment Model, which assesses the investments needed to reach different levels (or 'tiers') of energy access (IEA and World Bank, 2015). Taking electricity alone, the IEA and World Bank estimated Tanzania's annual average electricity access investment needs to be US\$65 million to US\$2.1 billion, depending on the level of energy service provided. The service levels are tracked along 5 tiers, with Tier 1 representing very low-capacity equipment such as solar lanterns, and Tier 5 equivalent to a high-power grid connection.

Figure 6 below sets out the estimated costs of providing electricity access along different tiers.¹⁵ To provide everyone with a minimum of Tier 2, the level of power needed for basic domestic energy needs such as

Figure 6. Energy access investment needs in Tanzania by service level (tier)



Source: IEA and World Bank, 2015.

lighting the home and charging mobile phones, an estimated US\$425 million is needed each year. This increases to US\$475 million per year for Tier 3, which is the minimum amount of power for many productive activities such as food processing or irrigation. Tier 3 service levels include both decentralised and centralised supply technologies, with urban customers in particular served by grid connections (IEA and World Bank, 2015).

Thus Tanzania's decentralised energy finance needs can be estimated at US\$425–475 million per year based on Tiers 2 and 3. For the purposes of this report, we use the conservative estimate of US\$425 million per year (Tier 2), which we explain further in the methodological note below.

1.2 Research purpose and scope

This report was commissioned and edited by the International Institute for Environment and Development (IIED). It follows a recent study by IIED and Hivos (Rai *et al.*, 2016) which provides a global analysis of how much international public finance for climate change is going to decentralised energy access for the poor. The study found that while the energy sector is a major recipient of climate finance, just 3.5 per cent has been earmarked specifically for decentralised energy. Low-income countries such as Tanzania are losing out the most: just 5 per cent of the total of US\$5.6 billion targeting energy sector projects and programmes in 2006–2015 is going to low-income countries.

¹⁵ 'Tier' and 'multi-tier approach' refer to the system of measuring energy access as proposed in the SE4ALL global tracking framework of 2013.

This study of Tanzania is part of an effort to provide better national-level analysis on finance needs and flows for the decentralised energy sector, to help identify the gaps and lessons learned, and to help prioritise where public money can be best spent. It aims to provide a baseline analysis of the **international and national public finance flows for supplying decentralised energy access** in Tanzania. Other specific objectives of the study are to:

- Provide an **initial overview of private sector investment** in decentralised energy access in Tanzania, mapping out key actors and size of known funds received or investments made
- Begin to gauge the extent to which the poor are being **'left behind'** by examining which tiers of access, geographies and population segments different types of funders/investors are targeting
- **Identify barriers to managing and accessing finance** experienced by the government (which disburses funds) and decentralised energy providers
- Identify key **priorities for improving public and private finance arrangements** from the perspective of different stakeholder groups.

1.3 Target stakeholders

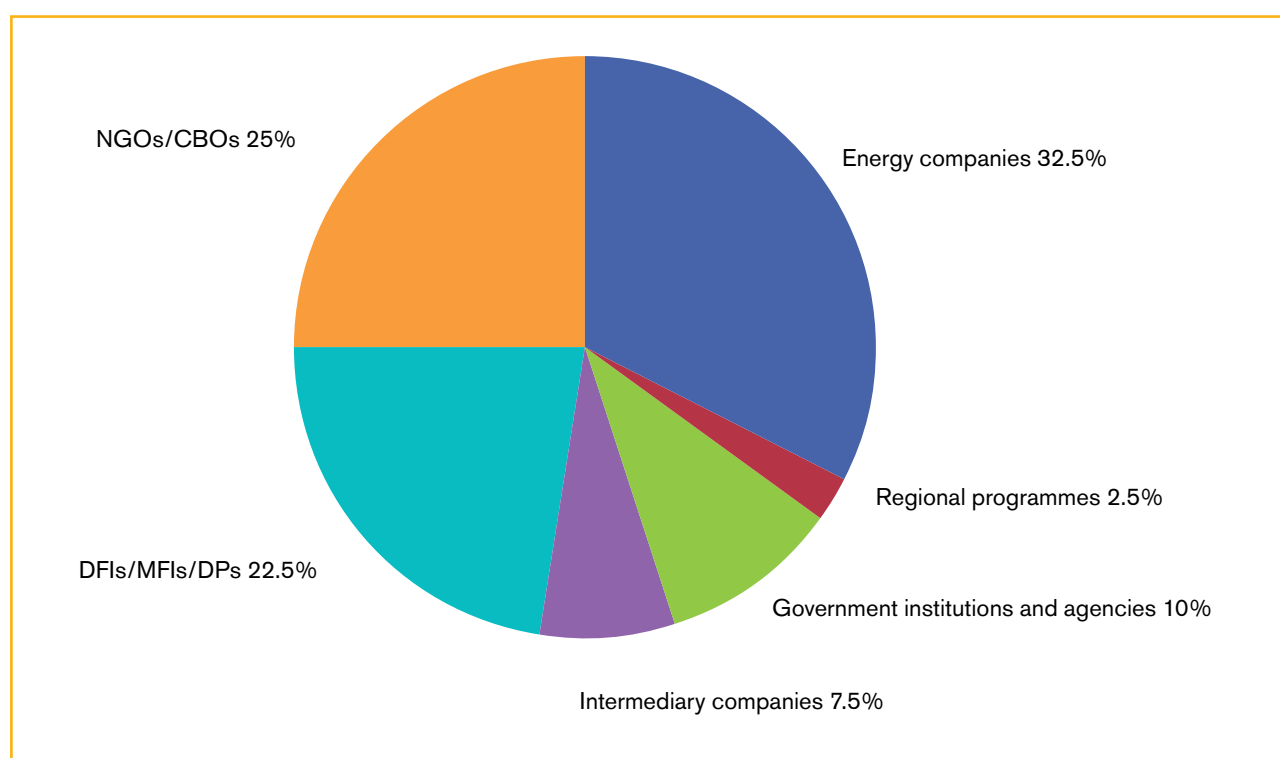
The study conducted data collection and consultation between July and October 2016. Information was gathered from key players in the energy sector including several government agencies (Ministry of Energy and Minerals, Ministry of Finance and Planning, REA and TANESCO), development partners, multilateral agencies, financial institutions, intermediary companies, regional programmes, NGOs and private sector energy project developers.

The study team invited key Tanzanian stakeholders to participate in the study, based on these criteria:

- Institutions that participate actively in implementing projects related to the decentralised energy sector
- Institutions that financially support projects for decentralised energy
- Organisations with significant experience and knowledge of decentralised energy services.

Forty institutions were consulted (Figure 7). A full list of stakeholders is provided in Annex 1.

Figure 7. Categories of stakeholders consulted



1.4 Data collection methods and tools

The main method for data collection was document review and consultation with stakeholders through either face-to-face interviews, email or telephone. The documents reviewed are listed in the references.

1.5 Limitations of the study

The main limitations to the study were the gaps in publicly available data, the sensitivity of some private sector investment data and the short time period for data collection. Because of this, the study principally focused on first mapping public funding commitments, and second capturing stakeholders' views on key finance needs, barriers and solutions for the decentralised energy sector. It was not possible to conduct in-depth mapping of private sector investment flows nor to reach firm conclusions on how far the current investment trajectory by energy providers will meet the aspirations of the UN's Sustainable Development Goals (SDGs) to 'leave no one behind'.

The study design initially targeted 80 stakeholders for data collection, of which half participated in the study.

It was particularly difficult to engage commercial financial institutions, especially banks, due to concerns over proprietary information. Some private companies were concerned about jeopardising their competitiveness if they shared their financial information. This meant that several stakeholders responded more positively to face-to-face consultation, although budgetary constraints prevented stakeholders in some areas from being consulted. The study also excluded Zanzibar since their authorities collect energy data independently.

Additional challenges related to the lack of publicly available data, or in-country offices or contacts for regional programmes that provide significant funding for energy access in Tanzania. Regarding international public finance, it was extremely difficult to accurately differentiate between finances from regional/global/headquarters and those from local funding. This posed a risk of double counting.

1.6 Methodological note

The report compares funding commitments by the government and development partners to overall financing needs in the decentralised energy sector in Tanzania. Here we use the IEA/World Bank figures for Tanzania's energy access investment costs estimated as US\$425 million per year, equivalent to a 'Tier 2' scenario.

We chose this figure because the IEA and World Bank (2015) assume that, at Tier 2, all rural and urban electricity provision would be through decentralised solutions whereas at Tier 3, a mix of centralised and decentralised energy is assumed.¹⁶ There are limitations to our comparison because:

- Total decentralised energy investment needs in Tanzania are higher than US\$425 million per year, since this figure **excludes** key decentralised technologies such as larger solar home systems and isolated mini-grids (Tier 3), as well as non-electricity such as cook stoves
- The recorded spending commitments from government and the development partners reviewed for this report do **include** Tier 3 projects, specifically mini-grids.

The result is that our data may overestimate the current contribution of development partners and the government to overall decentralised energy finance needs.

¹⁶ 75 per cent of rural electricity provision will need to be through off-grid or mini-grid solutions (and 25 per cent through the grid), and 100 per cent of urban electricity provision is through the grid. See Table A2.1 in IEA and World Bank (2015, p.74).

2

Mapping funding needs, flows and mechanisms

This section examines the different funding needs of stakeholder groups in the sector, the recorded funding flows from government and development partners, and the main financial mechanisms used to disburse funds.

2.1 Priority funding needs

Table 1 summarises the funding priorities articulated by the stakeholders consulted.

Table 1. Financing needs of stakeholders

STAKEHOLDER	FINANCING NEEDS	SOURCE OR INSTRUMENT	NEEDED BY
Energy user	• Paying for fuel, maintenance and repairs • Alternative means (non-cash) of financing energy access • Paying for electrical equipment (eg fridges, TV, power tools) • Paying for upgrading and new energy products or services (eg grid connection, monthly tariffs) • Start-up capital for business resulting from access to energy (ie productive use)	• Personal savings • Local savings group • Retailer finance scheme eg pay-as-you-go, rent-to-own • Loan (eg from microfinance institution) • Use of assets	• Households • Small and medium enterprises (SMEs)/ entrepreneurs • Social services providers (dispensaries, schools, local markets)
Energy providers	• Working capital • Technical feasibility studies (eg EIA, business/financial plans) • Seed capital for early stage research and enterprise development eg concept design, feasibility analysis, piloting • Investment capital • Trainers (eg solar technicians) • Solutions to address customer affordability gap • Piloting and demonstrating models of service delivery • Improve technology to meet customer needs (eg upgrading systems and packages to meet customer requirements and collect payments) • Address infrastructure barriers (eg transport and connection to remote places)	• Grants • Concessional loans • Equity • Credit guarantees • Credit lines • Risk mitigation instruments (eg political risk insurance) • Results-based financing • Mobile payment platforms (pay-as-you-go and rent-to-own models)	• Financial aggregators (eg Sunfunder) • Energy service providers and pay-as-you-go companies (NGOs, faith-based and for-profit organisations, eg Mobisol/off-grid electric)
Financial institutions	• Concessional finance for energy providers and users • Risk guarantees and risk mitigation instruments (eg protect against currency fluctuations) • Capacity development • Technical advisory services including legal arrangements	• Grants • Concessional loans • Line of credit line • Risk guarantees • Syndication for large projects • Shareholding • Refinancing • Technical support • Transaction advisory	• MFIs (eg AfDB, IFC, AFD) • DFIs (UNDP/GEF)
National government	• Capacity building and training (eg energy ministry officials, regulators, universities) • Market development (eg resource mapping, feasibility studies, business) development services • Policy and regulatory development: identifying and reforming policy, laws and regulations needed to attract investment (eg feed-in tariffs, product standards) • Incentives (eg matching grants, performance grants and credit line) • Technical assistance (eg transaction advisors)	• Grants • Loans from DFIs • Domestic taxes	• Ministry of Energy, Ministry of Finance and Ministry of Environment, • Government agencies such as REA • University, research and academic institutions including vocational education training

Note: AfDB: African Development; DFI: development financing institution; EIA: environmental impact assessment; GEF: Global Environmental Facility; IFC: International Finance Corporation; MFI: microfinance institution; REA: Rural Energy Agency; UNDP: United Nations Development Programme.

2.2 Priority funding mechanisms

Funders use a range of mechanisms to finance off-grid energy access. The most common instruments

reported include results-based financing (RBF), grants (eg matching and performance grants), loans, lines of credits, risk guarantees, syndication, shareholding and technical assistance including transactional advice. Table 2 provides details of each funding mechanism.

Table 2. Funding mechanisms for decentralised energy access in Tanzania

FUNDING MECHANISMS	DESCRIPTION	EXAMPLES
Results-based financing (RBF)	RBF offers incentive payments, based on the results achieved, to intermediaries who deliver pre-specified outputs within the energy access sector.	Development financing institution SNV's RBF project for Pico Solar in the Lake Zone (SNV, undated). ¹⁷
Matching grants (pre-investment financing)	Foundation, philanthropist or government contributes funds that 'match' a financial contribution made by the beneficiary.	Under TEDAP, the World Bank provided matching grants to over 35 projects including small hydro, biomass and SHS. Matching grants provided finances of up to 80% of the costs of pre-investment activities, predominantly for feasibility studies and environmental and social impact assessments. The awarded matching grants finance on average 52% of the costs of pre-investment activity (World Bank, undated). ¹⁸
Performance grants	Funds to reward good performance and promote best practice in implementing development activities.	
Lines of credits	Refers to a long-term (15 year) source of funds to financial institutions that lend to eligible rural or renewable energy projects, eg programmes administered by Tanzania Investment Bank on behalf of the Ministry of Finance under the direction of REA and the Bank of Tanzania.	Through TEDAP, the World Bank established a US\$23 million credit line to support grid energy projects. Of this, US\$7.3 million was used by 3 companies – Mwenga (3.5MW), Andoya (1MW) and Ngombeni (World Bank, undated). Similarly, AFD through the Bank of Africa has established a US\$12million credit line facility for RE and EE for the period 2016–2020. This credit line will provide US\$2,000–4,000 per project primarily to finance costs of feasibility studies and prepare project documents and risk assessments.
Risk guarantees	Risk guarantees cover private lenders, or investors through shareholder loans, against the risk of a government (or government-owned entity) failing to perform its contractual obligations with respect to a private project.	The World Bank Group's Multilateral Investment Guarantee Agency is the largest public provider of political risk insurance in terms of volume.
Loan syndication	DFIs can co-lend senior debt with commercial banks and distribute the risks among a broader group of lenders, thereby limiting risk-taking. This applies especially to larger and riskier projects such as offshore wind power.	IFC and FMO provide syndicated financing to XacBank in Mongolia that will significantly increase access to finance for local SMEs and especially for women entrepreneurs and other energy project developers (FMO, 2016). ¹⁹

Notes: AFD: French Development Agency; DFI: development financing institution; FMO: Entrepreneurial Development Bank; IFC: International Finance Corporation; REA: Rural Energy Agency; SHS: solar home system; SNV: Netherlands development organisation; TEDAP: Tanzania Energy Development Access Programme.

¹⁷ See www.snv.org/project/results-based-financing-grid-lighting-sector

¹⁸ See <https://www.esmap.org/sites/esmap.org/files/TEDAP%20SPPs%2011-18.pdf>

¹⁹ See <https://www.fmo.nl/k/n1771/news/view/29468/20819/ifc-and-fmo-provide-xacbank-with-syndicated-loan-to-support-msme-borrowers.html>

2.3 Main sources for financing decentralised energy

Financing for off-grid decentralised energy access in Tanzania comes mainly from the national government budget, international public finance and private sector investors. The points below outline the level and nature of financing provided by each of these sources.

2.3.1 Government public finance

We analysed the national government budget from 2009/10 – 2016/17 to determine the level of funding and priority allocated to both grid and decentralised energy projects. It indicates that the government has provided or committed to provide a total of around US\$2 billion (US\$2,012,258,374) for decentralised and off-grid energy access combined (URT, 2016). Of this, only US\$40 million (US\$40,147,460) or 2 per cent

of government funding for the energy sector was for off-grid services.

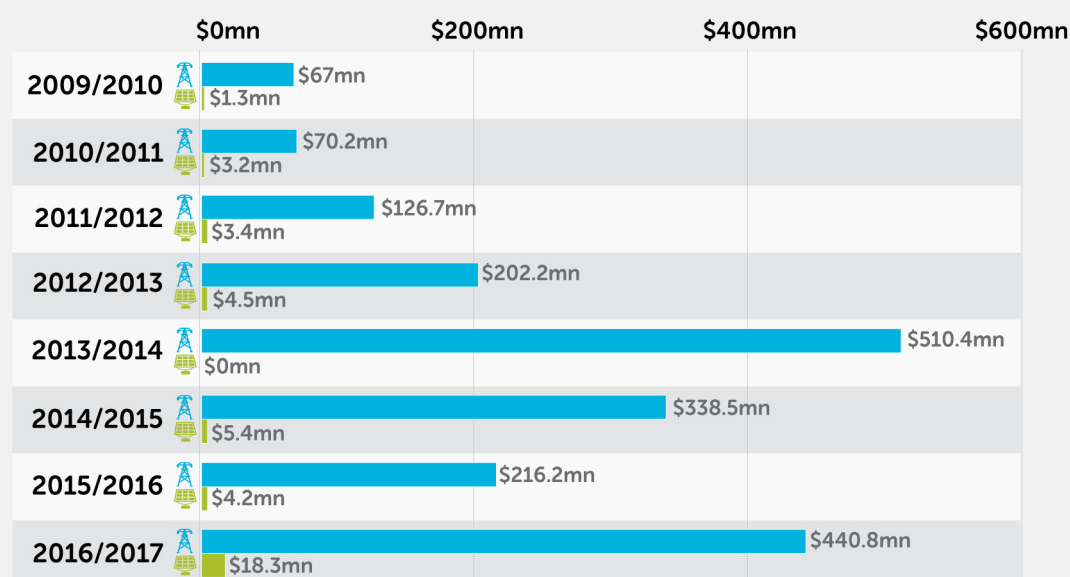
Over the eight financial years examined, the highest annual funding for off-grid energy was in 2010/11 (4.3 per cent of total spend that year) and 2016/17 (4.0 per cent of total spend that year). Table 3 presents the proportions of annual and overall national funding for grid and decentralised energy services from 2009/10 to 2016/17 (URT, 2016).

Spending commitments for decentralised energy increased considerably in 2016/17. However, over the whole eight-year period, the government's average annual contribution to decentralised energy has been relatively modest – about US\$5 million per year. This represents just 1 per cent of the US\$425 million the World Bank and IEA estimated is needed annually to provide everyone with a Tier 2 energy service.

Further details on annual spend by the government is available in Annex 2.

Table 3. Annual government spending on energy access in Tanzania

Annual Spending (US\$) by the Tanzanian Government on Energy Access
in **Tanzania Mainland** 2009/10-2016/17 by *grid-based*  and *decentralised energy* 



Source: URT, 2016.

Note: the exchange rate was US\$1=2,190 Tanzanian shillings according to www.xe.com/currencyconverter, October 2016.

BOX 1. ROLE OF LOCAL GOVERNMENT IN FINANCING ENERGY ACCESS

There are no dedicated desk officers responsible for energy policy and implementation at local government level, nor does energy have a specific budget code. Energy-related matters are incorporated into other departments, particularly environment and natural resource departments. Project implementers, both public and private sectors, tend to work directly with energy users at the community level rather than going via the local government authorities. LGA staff may be brought into the project implementation process as one of several local stakeholders.

In some limited cases, LGAs receive funding directly for implementation and/or promotion of access to cleaner energy services, such as improved cook stoves. In these situations LGAs become managers of funds and civil society organisations work directly with them as partners.

Regarding grid connection, LGAs have a different role. TANESCO, which owns and manages the national grid, has offices in each of the local government authorities. This arrangement facilitates the co-ordination and promotion of grid energy access throughout the LGAs.

Local government authorities (LGAs) have very limited involvement in managing and disbursing funds for decentralised energy access in Tanzania (see Box 1).

2.3.2 International public finance

International public finance for energy comes from bilateral and multilateral development partners as well as regional programmes, such as Power Africa from the US Agency for International Development (USAID). Due to the lack of a local presence in Tanzania, it was difficult to access and verify information from regional

programmes. Table 4 presents the data that was available on investments in decentralised energy access through regional programmes.²⁰

2.3.3 Development partner finance

Development partners are playing a key role in financing energy in Tanzania. The study identified nearly US\$1.6 billion (US\$1,593,920,693) in spending commitments for the energy sector over the 2008–21 period. The length and timeframe of spending commitments vary by partner, though a typical timeframe is 6–10 years.

Table 4. Finances of regional programmes for decentralised energy in Tanzania

REGIONAL PROGRAMMES	AMOUNT (US\$)	% FOR OFF-GRID FUNDING	REFERENCES
SREP (2016–20)	70,000,000	60.5	AfDB (2015) ^a
USAID-Power Africa (2011–16)	22,200,000	19.2	EDPG (2016) ^b
US-ACEF (2012–18)	13,850,292	12.0	Morton (2015) ^c
ACEF (from 2011)	9,159,191	7.9	ACEF (undated) ^d
SEFA (2014)	420,000	0.4	AfDB (2016) ^e
Total	115,629,483	100.0	

Notes: ACEF: Africa Enterprise Development Fund; SEFA: Sustainable Energy Fund for Africa; SREP: Scaling-up Renewable Energy Programme; US-ACEF: United States - Africa Clean Energy Finance Initiative; USAID: United States Agency for International Development.

^a African Development Bank (2015) <https://www.afdb.org/en/news-and-events/article/tanzanias-untapped-renewable-energy-resources-ripe-for-investment-states-report-14439/>

^b EDPG, 2016

^c Morton, J. (2015) <https://www.opic.gov/blog/renewables/u-s-africa-clean-energy-finance-initiative-supporting-renewable-energy-to-power-africa>

^d ACEF Africa <http://www.aecfafrica.org/portfolio/projects>

^e Personal communication; AfDB TZ Field office, August 29th 2016

²⁰ The study team has a full list of projects financed by the Energy and Environment Partnership regional programme in Tanzania's mainland, but no financial information.

The level of contributions and type of energy project funded differs considerably. The World Bank is the largest donor, accounting for around a third of all funding commitments, combining grid and off-grid energy.

Taking the total of all development partners' contributions for this 13-year period, the largest share of funding is channelled to support on-grid energy access. Out of the US\$1.6 billion, about 11 per cent – US\$174 million – was earmarked for decentralised energy and 89 per cent for grid energy.

Table 5 shows the average annual spend by development partner, differentiated by grid and decentralised energy spending.

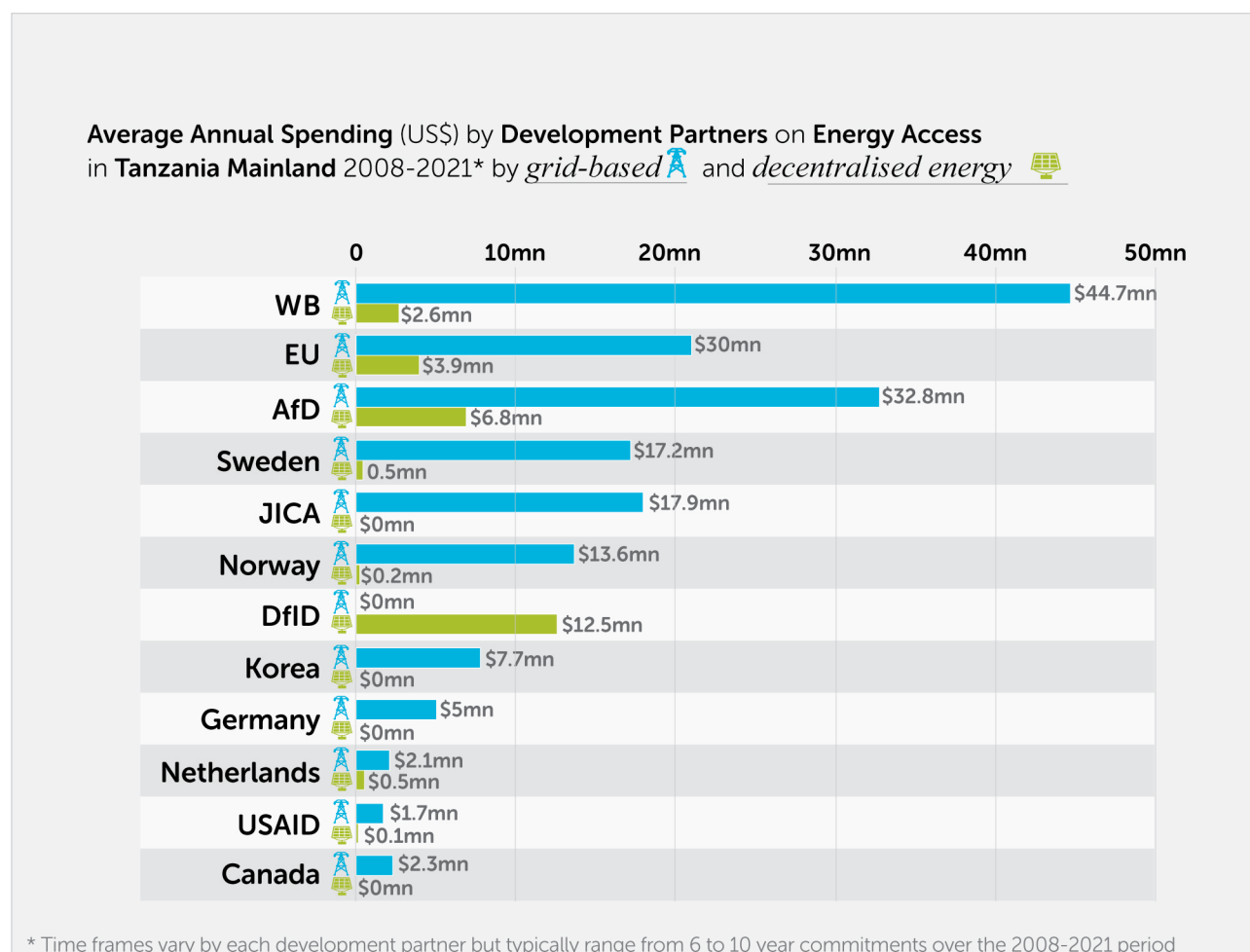
Current average annual funding for energy from all development partners is around US\$26.8 million

per year. This represents approximately 6 per cent of the US\$425 million that the World Bank and IEA estimated is needed each year to provide Tanzania with Tier 2 access.

More detail on the total spend by development partners, and the division between on and off-grid financing, is provided in Annex 3.

The major donors in financing decentralised energy were the UK's Department for International Development (DfID), the EU and the French Development Agency (AFD). Solar and hydropower were the technologies that received the largest proportion of funds from development partners. Almost all development partners provided technical assistance (TA) as part of their support in financing (Table 6).

Table 5. Development partner average annual spending on energy access in Tanzania



Source: EPDG, 2016.

Notes: AFD: French Development Agency; African Development Bank; DfID: UK Department for International Development; EU: European Union; JICA: Japan International Cooperation Agency; USAID: United States Agency for International Development.

Table 6. Finance from development partners for decentralised energy in Tanzania

DEVELOPMENT PARTNER	DECENTRALISED FINANCING		
	AMOUNT (US\$)	OFF-GRID AS % OF TOTAL SPEND	ACTIVITY/ TECHNOLOGY
DfID (2014–19)	62,708,000	35.9	TA, solar and geothermal
EU (2008–18)	39,092,544	22.4	TA, hydro and solar
AFD (2016–21)	34,100,000	19.5	TA, RE and EE
World Bank (2009–20)	28,660,000	16.4	TA and solar
Sweden (2010–21)	4,400,000	2.5	TA on biofuel and solar
Netherlands (2011–17)	2,826,997	1.6	TA and biogas
Norway (2011–19)	1,845,760	1.1	TA and biogas
USAID (2013–21)	800,000	0.5	Renewable energy
Total	174,433,301		

Source: EDPG, 2016.

Note: TA: technical assistance.

Exchange rates: ₤ = US\$1.10; SEK1 = US\$0.11; £1 = US\$1.22; C\$1 = US\$0.76; NOK1 = US\$0.12; 1US\$ = TZS2,190; US\$1 = ¥103.48, according to www.xe.com/currencyconverter, October 2016.

2.4 Mechanisms for financing grid and decentralised energy access by development partners

As noted earlier, development partners channel financing for grid and decentralised energy access through different mechanisms. These include grants, loans/credit or a combination of both grants and loans. The study shows that nearly three-quarters (72.9 per cent) of financing by development partners was channeled as grants, with the remainder distributed as credits/loans (18.3 per cent) or as a combination of both grants and loan (8.8 per cent). Table 7 shows the mechanism for financing decentralised energy for each development partner in Tanzania.

2.4.1 Commercial banks

Commercial banks are currently not engaged in financing energy access but could become a promising source of finance in the future. Discussion with stakeholders revealed a number of reasons why energy developers are reluctant to take loans from commercial banks. These include: 1) a lack of finance for long-term projects (eg 5–12 years); 2) high interest rates of up to 15 per cent and 25 per cent of the loan; 3) the demand for collateral from borrowers; and 4) the requirement for equity of up to 30 per cent of the loan (Nchwali,

2011). The high cost of borrowing discourages many small-scale companies, particularly when considering borrowing for long-term projects. In contrast, and because of short-term deposit funds, commercial banks in Tanzania prefer a short lending tenure of one year, which is usually impractical for energy projects. Apart from the short tenure lending challenges, commercial banks are also very sensitive to currency fluctuations. To safeguard themselves from loss due to recurrent currency fluctuations, commercial banks set interest rates high, deterring many small companies from taking out loans.

2.4.2 Main finance recipients for decentralised energy access

A wide range of organisations are receiving finance for off-grid energy access in Tanzania. Primary recipients are international NGOs and companies, followed by local NGOs and private companies. Government agencies also receive finance, particularly for grid energy access. This includes the Ministry of Energy and Minerals, TANESCO and the REA.

Table 8 illustrates the amount of public funding received by different stakeholders operating in the decentralised energy space. It covers a mix of project developers, distributors of standalone products, and organisations providing various support services to the sector (advice, project development support, financial intermediaries, pilot exercises).

Table 7. Financing mechanisms for grid and decentralised energy access in Tanzania

DEVELOPMENT PARTNERS	TOTAL FUNDING (US\$)	% OF TOTAL FUNDING	FUNDING MECHANISM	% OF TOTAL GRANT, LOAN, OR COMBINATION
World Bank (2009–20)	520,120,000	32.6	Grant	73
EU (2008–18)	248,882,544	15.6	Grant	
Sweden (2010–21)	193,490,000	12.1	Grant	
Norway (2011–19)	110,809,705	7.0	Grant	
DfID (2014–19)	62,708,000	3.9	Grant	
Netherlands (2011–17)	15,430,093	1.0	Grant	
Canada (2013–18)	11,400,000	0.7	Grant	
JICA (2010–17)	125,336,751	7.9	53.3% grant 46.7% loan	9
USAID (2013–21)	14,150,000	0.9	89.4% grant 10.6% loan	
AFD (2016–21)	198,000,000	12.4	Loan	18
Korea (2010–17)	53,900,000	3.4	Loan	
Germany (2010–18)	39,693,600	2.5	Loan	
Total	1,593,920,693	100		100

Source: EDPG, 2016.

Table 8 covers approximately US\$65 million worth of funding provided by a range of funders, from development partners like the EU and USAID, to NGOs or financial intermediaries (a full version of this table is given in Annex 4, which lists the funding institutions). The table identifies funding amounts per stakeholder, but also the maximum tier of electricity access (from 1 to 4) that they serve. Entities engaged in energy for cooking were not tracked using the multi-tier framework, so they are identified as biomass.

The data covers funding as reported by stakeholders to the researchers. It provides an initial mapping rather than a comprehensive account of where development partners are directing finance. See Annex 4 for details.

Compared to domestic companies, on the whole international companies and NGOs are receiving higher levels of funds. The NGOs ACRA Foundation and the European Committee for Agricultural Training (CEFA), and the business Off-Grid Electric (Ashden,

2014)²¹ have accessed the most funding. This is mainly because they focus on larger systems at Tiers 3 and 4, such as mini-grids. A few domestic players have been successful in raising significant amounts of funds, notably the local NGO Tanzania Traditional Energy Development Organisation (TATEDO), and company Ensol. Funding for the NGO Tanzania Forest Conservation Group (TFCG) is also of interest since it is for cooking energy, with a focus on energy efficiency through improved charcoal production.

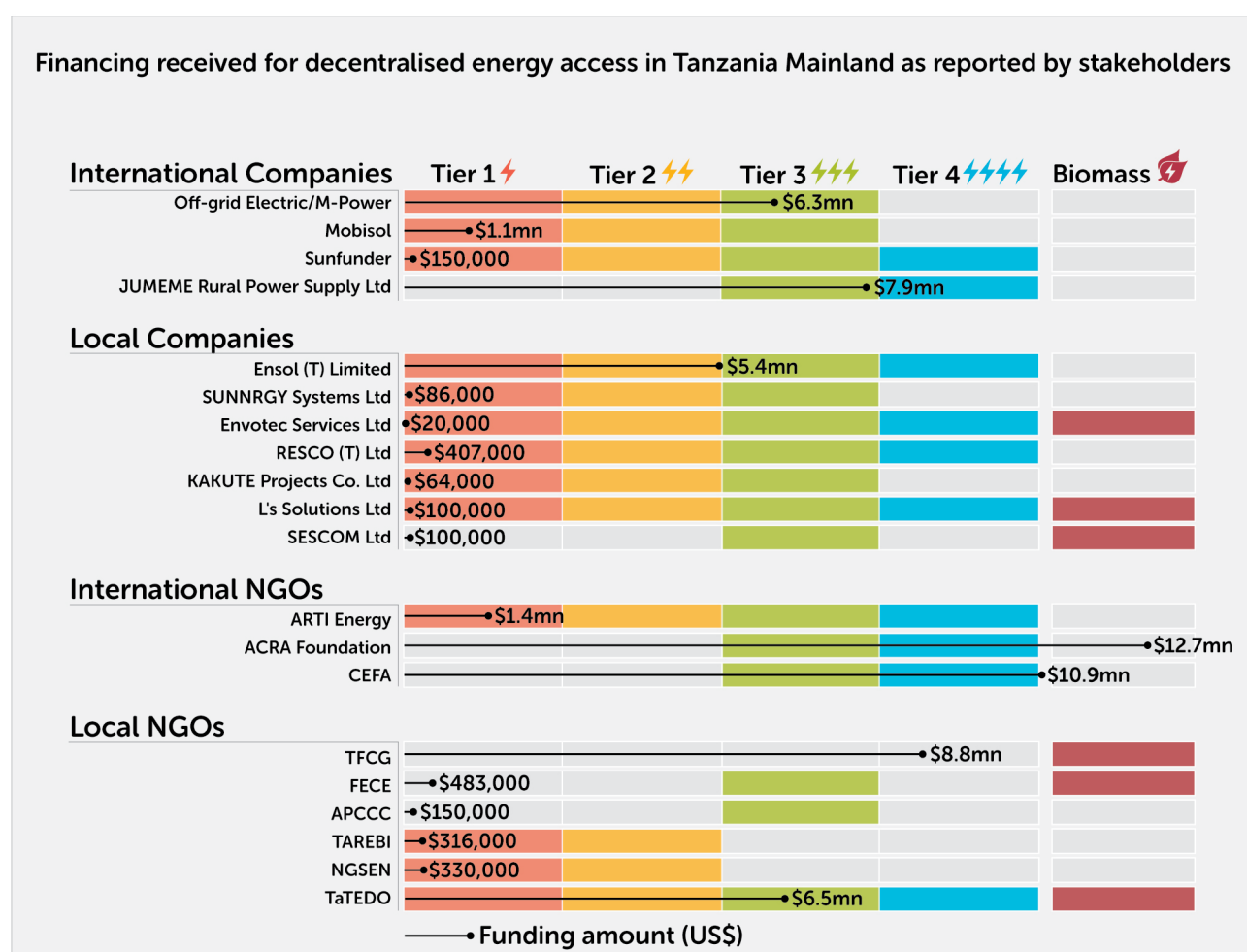
Many of the entities listed are receiving significant funding from other sources. The financial intermediary Sunfunder has raised US\$50 million through the Beyond the Grid Solar Fund involving the Overseas Private Investment Corporation, MCE Social Capital and The Rockefeller Foundation.²² The company Off-grid Electric has raised US\$118 million in debt and equity financing from a range of investors and development financing institutions.²³

²¹ Off-Grid Electric's Tanzanian-registered business manages sales of solar services from its headquarters in Arusha, and its Seychelles-registered business manages investment, hardware and software development. See https://www.ashden.org/files/case_studies/OFF_GRID_FULL_0.pdf

²² See <http://blog.sunfunder.com/post/151718833366/sunfunder-reaches-first-close-of-the-50m-beyond>

²³ See <https://www.crunchbase.com/organization/off-grid-electric#/entity>

Table 8. Finance received for decentralised energy access in Tanzania



Source: Study authors/IIED

3

Who is being left behind?

There is strong rhetoric in the development sector that the achievement of the UN SDGs – including SDG 7 on sustainable energy access – must be equitable, to ensure that all citizens reap the benefits and vulnerable populations are not 'left behind'. As a result, businesses and NGOs in Tanzania are receiving increasing government and development financing for expanding access to decentralised energy. A key question emerging is, what exactly does 'leave no one behind' mean for the energy access sector in Tanzania? Are current investments on the right track? This section summarises initial insights from the research and discussions with stakeholders.

3.1 The concept of 'leave no one behind'

While the commitment to 'leave no one behind' has featured prominently in the discussions on the SDGs, what it means in practice is less clear. There is no accepted definition of what 'leave no-one behind' means in the context of the energy access sector. This paper does not attempt a definition, but below are some key markers that could be used to assess how inclusive energy access is:

- a) Which geographies are served – are some parts of the country better served than others? What is the urban/rural divide?
- b) Which populations or customer groups are targeted – by income level, gender or vulnerability measures (for example female-headed households, people with disabilities or HIV/AIDS)?

- c) How affordable are products for people living below the poverty line?
- d) Which tier of service is provided and for whom – will energy services only enable people to meet basic domestic needs or also use energy for productive activities?

The discussion below looks at some of these dimensions.

3.2 Which geographies and populations are served?

Populations that do not have access to modern energy services (both grid-based and decentralised) are typically communities characterised by the following:

- Low population density
- Low demand/market for energy services largely due to low awareness, knowledge and interest
- Poor infrastructure and inaccessibility due to poor roads and transport
- Lack of supporting services such as banking and telecommunication services
- Lack of private sector such as energy entrepreneurs
- Lack of assets as sources of income or collateral.

Based on the literature and data collected, the researchers identified that unserved populations in Tanzania are typically found in the central areas of Tanzania (including Singida, Manyara and Dodoma); some western areas (including Tabora and Kigoma);

southern areas (including Ruvuma and Lindi); and some parts of the Lake Zone in the northern region (including Geita, Simiyu and Mara).

In contrast, areas with better-served populations are those with characteristics opposite to the ones described above. These include eastern and coastal areas (Dar es Salaam, Morogoro and coastal regions), northern areas (Arusha and Kilimanjaro regions), southern highlands (Mbeya, Iringa and Njombe regions) and some parts of the Lake Zone (Mwanza, Kagera and Shinyanga regions).

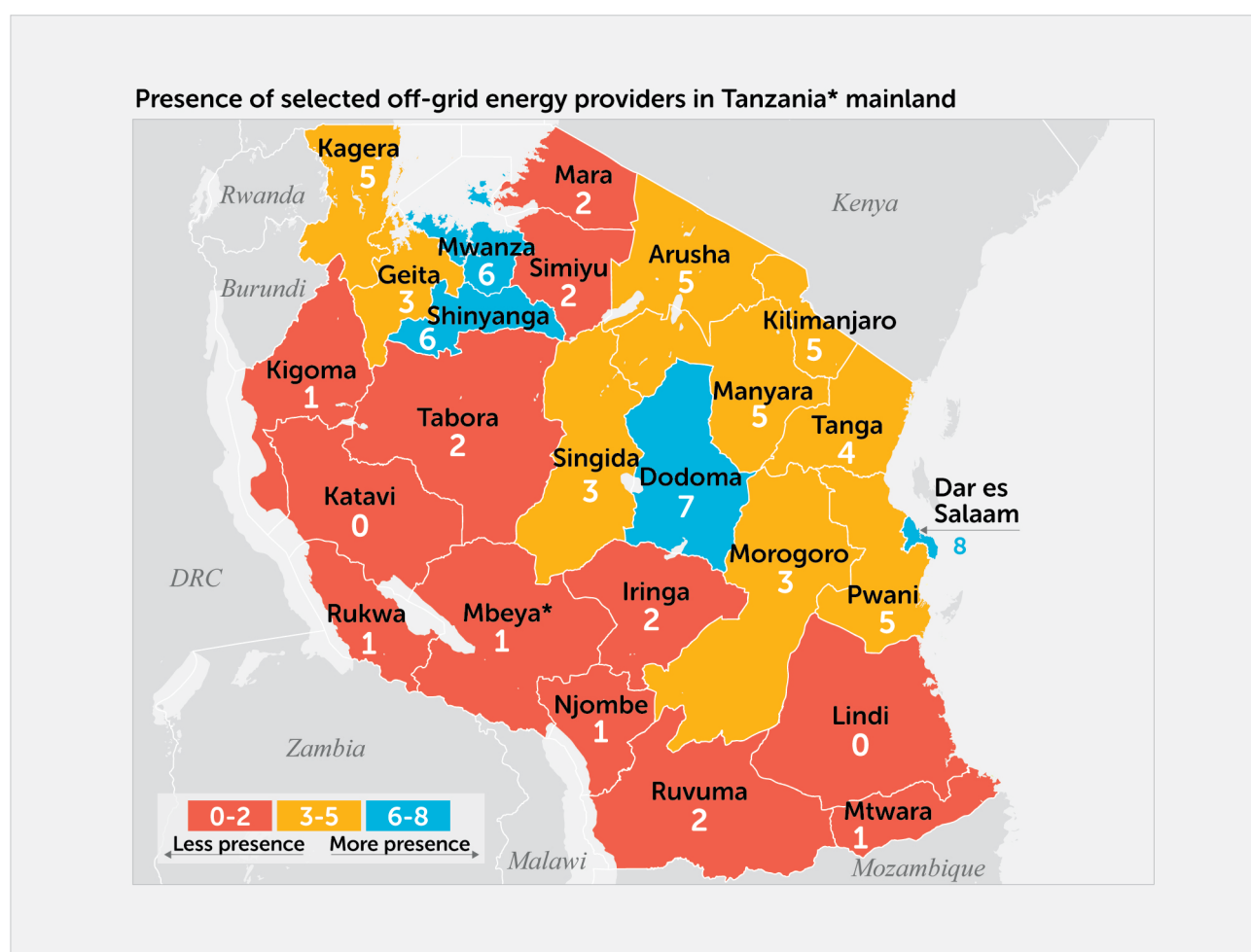
Figure 8 shows 14 off-grid solar organisations interviewed for this research. It identifies where in Tanzania solar companies are selling their products and services. It includes NGOs and companies distributing solar products, and an intermediary organisation providing technical advice to the solar sector.²⁴ The map indicates the number of organisations present in each

region, ranging from zero to a maximum of eight. While far from a comprehensive mapping of the off-grid sector, it does suggest that western and southern parts of the country receive less attention than eastern, northern and some central parts of the country.

Figure 9 shows the distribution of GDP per capita across the regions. Comparing the two maps, there is some relationship between the areas served by the off-grid providers in this study and regional income levels, although the off-grid solar sector does not always target better-off areas. For instance, some regions in southern Tanzania have higher GDP/per capita, but low presence of the selected off-grid solar providers.

This data needs more in-depth analysis to understand what drives companies' investment decisions and distribution strategies, and what this could mean for which populations and regions in Tanzania will benefit or lose out through the growth of decentralised energy

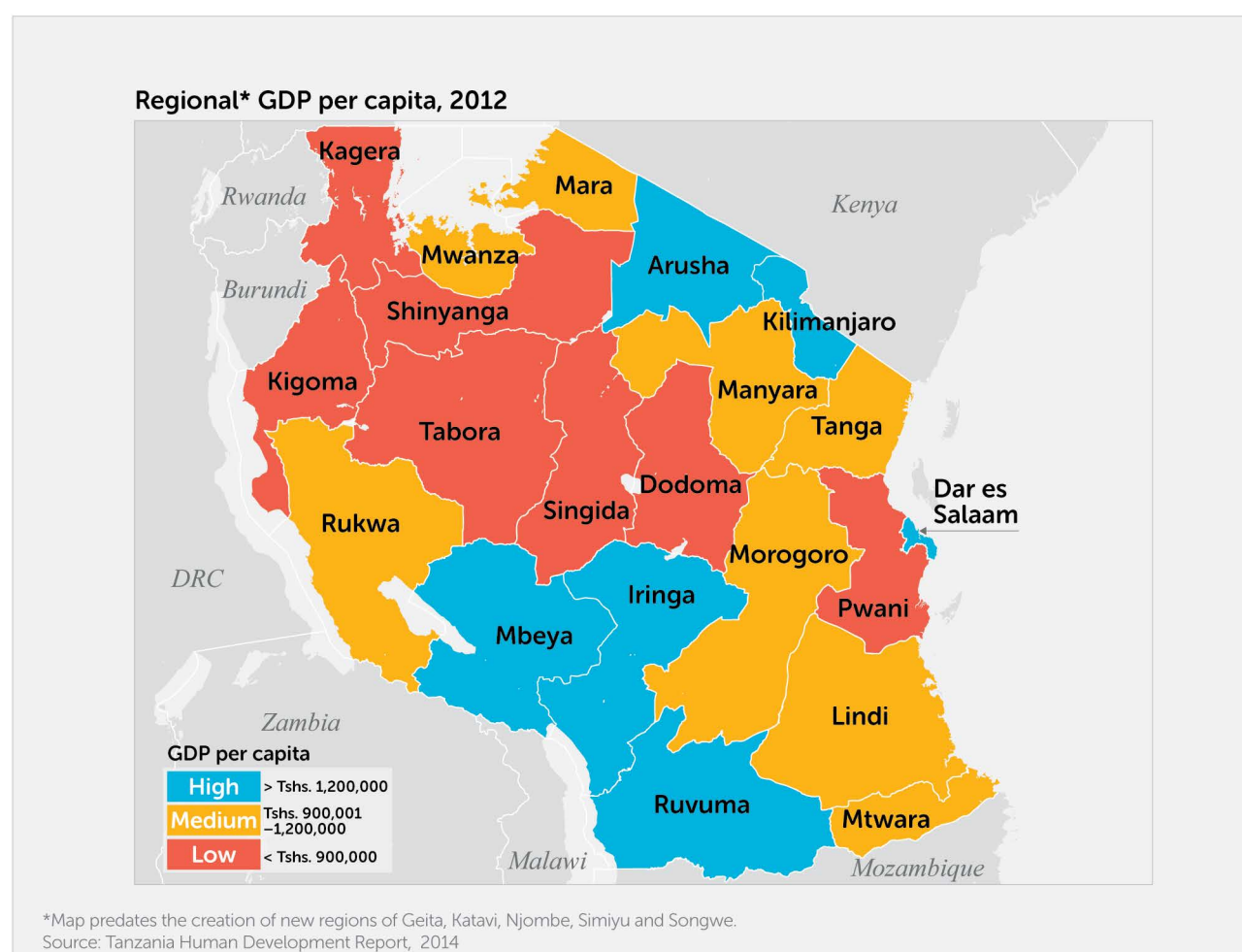
Figure 8. Presence of selected off-grid energy providers, Tanzania mainland



Source: Study authors/IIED

²⁴ The organisations/companies included are: SNV International, Mobisol, Off-grid Electric, TATEDO, L's Solutions Ltd, KAKUTE Projects Co. Ltd, Energy 4 Impact, Greenovate Ltd, Ensol Tanzania Ltd, Envotec Ltd, ARTI Energy, Voltzon Ltd, SUNNRYG Systems Ltd, RESCO (T) Ltd.

Figure 9. Regional GDP per capita in Tanzania, 2012



Source: UNDP, 2014.

markets. This initial mapping indicates that a wide range of factors, other than income levels, make particular regions or consumer segments more or less attractive to off-grid energy providers.

Some energy service companies reported that funders' own preferences play a role in decisions made on technologies selected and regions targeted. The RBF programme implemented by SNV is one example, in which initially only energy companies operating in the lake and central zones were eligible for the programme.

Some funders have also deployed grants precisely to target poorer communities in rural areas, using these to catalyse private sector interest and reduce the risks of serving poorer social groups. An example of this is the grant received by Ensol (T) Ltd from the Energy and Environment Partnership (EEP) for supply of SHS on credit to rural horticulture farmers in the Tanga region.

Finally, it is important to note that beyond inter-regional differences there are significant differences in poverty levels within regions. Even in wealthier regions there are households that cannot afford to pay even for the

smallest SHS. Some energy companies consulted suggested that these households typically involve the most vulnerable members of society. They might be headed by women or widows and include children, the elderly and disabled community members.

3.3 Affordability of services by tiers of access

Another measure of inclusivity is how affordable energy services are for different groups of users. Affordability covers both initial payments (for a grid-line connection or a down payment on a standalone product), and ongoing fees (such as monthly charges or tariffs).

Decentralised energy service providers have different charges based on the mechanism of payment, system size and services provided. While this research does not provide detailed analysis, the initial findings suggest there are challenges in making products affordable to very low-income populations, particularly for Tier 2 level services and above.

BOX 2. PAYMENT METHODS FOR DECENTRALISED ENERGY SERVICES

Two common ways that customers pay for decentralised energy services such as solar home systems are rent-to-own and pay-as-you-go.

Rent-to-own: a contract under which a customer leases the energy service after an initial down payment followed by agreed weekly or monthly payments. Once the customer has completed the contractual payments, they have permanent ownership of the system. Customers are free to pay off the lease early if they are able and choose to do so, and there are financial penalties for late payment. The system is fitted with a subscriber identity module (SIM) card

connected to a mobile payment system operated by a telecommunications company. The system enables service providers to monitor usage of the systems as well as manage it.

Pay-as-you-go: no fixed monthly or weekly payments but instead the customer pays at regular intervals without ever owning the system. While payments come in the service provider guarantees system maintenance and operation, but if customers fail to pay they are disconnected and the system is taken back by the provider.

The typical payment models pursued by the decentralised energy sector in Tanzania are rent-to-own and pay-as-you-go (see Box 2). By allowing customers to buy products through regular small payments, and using mobile-enabled technology to arrange payments, the providers aim to make the service more affordable for customers and achieve efficiency in their own operations.

Table 9 summarises the payment schemes for two reputable international companies selling solar home systems in Tanzania, across Tiers 1–3. Company A sells more powerful, higher-priced systems than Company B. Company A offers both pay-as-you-go and rent-to-own systems, while Company B offers only pay-as-you-go. The table provides detailed information on the system size and related pricing for each system.

Table 9. Payment schemes for energy services

	TIER OF SERVICE	UPFRONT SINGLE PAYMENT (US\$) ²⁵	PAYMENT BY INSTALLMENTS (US\$)		
			INITIAL PAYMENT	MONTHLY PAYMENT	TOTAL PAYMENT IN 3 YEARS
COMPANY A					
80W panel, battery, 3 lanterns	2	416.95	46.02	14.16	555.94
200W panel, battery, 4 lanterns, 32" TV, torch, radio, charger	3	1,315.94	96.69	46.07	1,740.62
COMPANY B					
12W panel, battery, 3 lanterns, radio, charger	1	176.65	13.95	6.97	209.21
50W panel, battery, 5 lanterns, 19" TV, torch, radio, charger	2	567.14	46.49	18.59	669.42

Source: Study authors, 2016

²⁵ Exchange rate: US\$1 = TZS2,151 according to <https://www.oanda.com/currency/converter> calculated as an average from July 2016 – October 2016. According to the 2011/12 Household Budget Survey the basic needs poverty line was 36,482 Tanzanian shillings per adult equivalent per month; more than a quarter of the Tanzanian population fell below the line (NBS, 2013).

In relation to income levels in Tanzania, most of the systems offered by both companies are likely to be unaffordable for many citizens. In poor regions such as Kigoma and Geita, basic needs poverty – measured as expenditure below around US\$17.00 per month²⁶ – accounts for 48.9 per cent and 43.7 per cent of their populations respectively (NBS, 2013; Kamndaya, 2016). Monthly payments for the smallest systems would be between around 41 per cent (12-watt system/ Company B) and 84 per cent (80W system/Company A) of the poorest people's monthly expenditure.

However other products exist, such as solar lanterns, which are relatively affordable compared to services offered by these companies. Such products can be better than existing alternatives, such as kerosene lamps. Providers often suggest these represent an entry-level product whereby people might, over time, progress 'up the energy ladder' to a product which is higher capacity. The data shows that there are significant challenges in making Tier 2 and Tier 3 products available and affordable to many citizens.

²⁶ Exchange rate: US\$1 = TZS2,151 according to <https://www.oanda.com/currency/converter/> calculated as an average from July 2016 – October 2016

4

Barriers and interventions

This section presents findings on key barriers faced by stakeholders in accessing and managing funds for decentralised energy access as well as interventions put forward by stakeholders.

4.1 Barriers

According to stakeholders there are many barriers to financing and expanding decentralised energy access. These apply to different services or technologies to different degrees. The mini-grid sector is a far more regulated and capital-intensive sector compared to small-scale off-grid solar. Therefore issues such as bureaucracy, regulatory burdens or unplanned grid extension pose higher costs and risks to mini-grid developers. Below is a summary of the barriers described by stakeholders.

4.1.1 Funders

Funders of decentralised energy projects reported a range of barriers relating to policy, the regulatory framework and organisational capacity to meet funding requirements, including:

- 1. Low technical capacity of local project developers/companies.** There are relatively few applications made by domestic companies or project developers, and the quality of submitted proposals is generally low. Some funders reported a low response rate to calls for proposals from local businesses compared to foreign companies. They also reported that many proposals submitted by local companies do not meet the donors' technical requirements. As a result, funders are often forced to disburse fewer funds and to allocate their funds to foreign companies rather than local ones.
- 2. Small size of decentralised energy projects.** Many proposals submitted by project developers are for small-scale schemes – typically less than 1 megawatt – because they are easier to develop, given the government regulatory requirements. However, they are less attractive to funders because they present higher administrative costs than single, large projects. In addition, small projects have proportionately low impacts at the user level in terms of the number of people served or the level of power provided.
- 3. Government policy directives.** Funders find that political directives or statements from government relating to specific renewable energy technologies or locations tend to constrain their funding priorities and deter funding commitments.
- 4. Limited government funding.** Stakeholders from energy-related government agencies expressed concerns over the lack of central government budget allocations for financing off-grid energy access. They stated that this forces government departments and agencies to focus resources on grid electrification, particularly for urban and peri-urban areas.

4.1.2 Project developers/energy providers

In general, energy providers see the barriers to financing as intricately tied to the policy and regulatory environment. There are number of gaps in the enabling environment that currently deter investment.

- 1. Implementing the Rural Electrification Master Plan.**²⁷ The private sector, particularly energy service companies, aired significant concerns about the lack of information on the forthcoming Rural Electrification Master Plan, particularly the on-going grid expansion programme by REA. Their concern is that the unexpected arrival of grid electricity in an area significantly reduces the customer base of existing decentralised energy providers, as many customers switch over to grid electrification. There are also concerns mounting over the planned Turnkey Phase III scheme administered by the Rural Energy Agency, which will see greater grid densification.²⁸ As with earlier programmes such as Turnkey Phase II, stakeholders are concerned that they may not receive a clear indication of when different areas will be connected to the grid. Private sector stakeholders say this lack of planning and communication presents serious risks and uncertainty for their businesses.
- 2. Currency exchange.** Unstable exchange rates are a major barrier to investment in off-grid energy access. Fluctuating exchange rates lead to high interest rates that deter small companies from borrowing finance. Intermediary companies such as Sunfunder, who borrow money in foreign currencies and lend to local companies in Tanzanian shillings, are concerned about the risk of losses.
- 3. Government restrictions over funding.** Project developers, especially local energy companies, raised concerns over government requirements for the withholding of 10 per cent of the funding they provide to projects. Under this scheme, the government retains at least 10 per cent of the project cost for one year after project completion, as a guarantee against the quality of the installed plant. This presents a challenge to many local developers that have limited working capital.
- 4. Regulatory procedures.** Many regulatory processes require time and resources, for example securing land/water rights and permits from relevant authorities; acquiring environmental impact assessments (EIAs) from the National Environment Management Council; and receiving other permits from various government departments.

- 5. Rural non-cash economy:** The lack of income to pay for energy services in rural areas is a problem for off-grid energy service companies. Some stakeholders pointed out that these communities do have valuable assets that could potentially help them pay for energy access – though this requires the development of an innovative payment mechanism (see Box 3).
- 6. Counterfeit products.** Energy companies report growing volumes of counterfeit and low-quality products, particularly SHS. Being fakes or low grade, these products are sold at relatively low prices, distorting the market. Because so many Tanzanians live on low incomes, the cheaper products are attracting sales, even though they underperform and do not last.
- 7. Lack of loans.** Commercial banks in Tanzania are not actively involved in financing off-grid energy access, because of their perceived high risks; lack of relevant credit facility; lack of fixed deposits by energy companies to serve as collateral for borrowers; and the long-term nature of energy projects. This means that project developers find it difficult to acquire loans for their decentralised energy projects.

4.2 Potential interventions

Stakeholders identified various measures that could encourage financing of off-grid energy. These are outlined below under the different stakeholder group, and summarised in the recommendations in Section 5.

4.2.1 Government

- 1. Policy and regulatory environment.** Implementing the Rural Electrification Master Plan will bring electrification to more off-grid areas and guide Tanzania's grid expansion programmes. This will allow the private sector to make appropriate calculations and prioritise their investment based on potential returns. There is a need for better co-ordination of key government agencies responsible for the energy sector, namely TANESCO, REA and the Energy and Water Utilities Regulatory Authority. Such co-ordination would bring greater efficiency and facilitate private sector investment.

²⁷ The government is preparing a detailed Rural Electrification Master Plan, which is intended to provide comprehensive annual investment plans and connection numbers.

²⁸ Under the Turnkey scheme, administered by the Rural Energy Agency, contractors build medium voltage grids and low voltage distribution grids, and connect customers. Assets are transferred to the utility TANESCO at the end of the contract.

2. Cooking energy. Energy for cooking currently receives the smallest portion of energy sector funding. Considering the socioeconomic and environmental consequences of continued reliance on traditional biomass energy for cooking, Tanzania needs to make a radical shift to clean technologies in line with the Sustainable Energy for All (SE4ALL) initiative. Interventions could include the introduction of consumer subsidies for improved cooking stoves to poor rural populations to make them more affordable. Other measures should include policy review and implementation of the Biomass Energy Strategy for Tanzania (BEST) (EUEI-PDF, 2014) to promote the adaptation of energy efficiency measures including switching to more efficient cook stoves.

4.2.2 Project developers/energy providers

3. Tariff schedule. Current tariff setting for grid-based electricity provided by the state utility, TANESCO, does not reflect real costs. Decentralised providers have raised concerns that this distorts the market for off-grid energy access. They are particularly concerned about the D1 customer category;²⁹ it is heavily subsidised, resulting in energy being sold below the going market rate and making off-grid energy projects less competitive. Stakeholders have encouraged the government to review all tariff rates, including the D1 tariff, and sell electricity at rates that more closely reflect actual costs. This would help create a level playing field between TANESCO and private energy developers.

4. Affordability of services. Working with others, such as development partners, energy service companies should explore options that would enable people with very low incomes to access energy services using their endowed assets. See Box 3.

4.2.3 Commercial banks

5. Bank financing. To encourage commercial banks to become more engaged in the decentralised energy sector, some DFIs could introduce mechanisms such as concessional loans for on-lending, for example through public-private partnerships. Such mechanisms could also include a bank guarantee scheme, credit lines, syndication and other lending arrangements that have friendly terms for energy companies, particularly domestic energy companies. As an alternative to collateral, banks could also consider company cash flow when deciding on eligibility for loans and other lines of credit.

4.2.4 Funders/development partners

6. Grants: Grants from donors and other philanthropic institutions represent an important source of financing for off-grid energy access, particularly for feasibility studies and risk assessments. Donors should be encouraged to extend grants to small project developers for matching grants and performance grants, particularly in remote regions.

BOX 3. ASSET OWNERSHIP TO OVERCOME AFFORDABILITY BARRIERS

To address the lack of a cash economy in rural areas, some stakeholders put forward the possibility of using non-cash assets for energy access in rural areas.

A study by Sanyal and Deka (2015) has shown that asset ownership is an important measure of household ability to pay for energy access. Regions with high ownership of assets such as radios, mobile phones, land and livestock may be able to pay for energy services using these assets, potentially opening up new markets for energy service providers. In Tanzania in 2012, 63.4 per cent of households had

mobile phones, 65.1 per cent had corrugated iron roofs, 39.8 per cent had bicycles while 61.4 per cent had radios.

The study recommends that off-grid energy service companies should prioritise areas with high asset ownership rates. This approach would require the government to develop appropriate infrastructure to enable payment of energy services using assets as capital. The study suggests that DFIs/MFIs would provide support for the necessary infrastructure.

²⁹ Low-usage tariff for domestic customers who on average consume less than 75 kilowatt hours per month. Any unit exceeding 75kWh is charged a higher rate of TZS350 per kilowatt hour. Under this category, power is supplied at a low voltage, single phase (230V).

5

Conclusions and recommendations

5.1 Conclusions

Most of Tanzania's population still lack access to modern and reliable energy services. Given the enormous challenges to achieving grid connection in rural areas, decentralised energy access using renewable energy sources that are abundant across Tanzania offers a cost-effective approach to achieving equitable and sustainable energy access to all. Renewable energy has the potential to reach all socioeconomic groups by powering homes, businesses and public services, creating jobs and generating higher incomes. It also offers the prospect of reducing environmental threats caused by biomass and fossil fuel use, and mitigating climate change.

The study investigated finance flows to decentralised energy in Tanzania, and to what extent these finances target the poor. The analysis shows that the vast majority of funding for energy projects from both international and national sources is channelled to large grid and utility-scale energy projects. Between 2009/10 and 2016/17, government funding on energy access was around US\$2 billion, of which 95 per cent went to grid-scale energy access – and just 2 per cent to decentralised energy.

Tanzania is reforming its energy sector and developing new markets for low-cost decentralised energy with ambitious goals for the future. But putting the country on track for meeting the scale of the challenges will require both strong partnerships and a huge effort by government, development partners and the private sector.

The study finds that current financing is inadequate to scale up decentralised energy and achieve the 'energy for all' targets by 2030. Between 2008 and 2021, the total funding provided and committed to energy access from development partners is around US\$1.6 billion; of which only 11 per cent (US\$174 million) is for decentralised energy. To put this in perspective, the World Bank and IEA estimate that providing everyone in Tanzania with a minimum of Tier 2 access – which they assume would be provided through decentralised energy – is estimated to cost around US\$425 million in investment each year. Current funding from development partners therefore represents only 6 per cent of Tier 2 investment needs, while government contributions average around 1 per cent of total needs.

Stakeholders consulted for the study described significant barriers that deter investment – a lack of technical capacity in domestic actors, low levels of engagement by commercial banks in particular, and some weaknesses in the policy and regulatory environment.

Beyond financing, Tanzania needs to develop robust policies and enablers for decentralised energy – clear strategies for grid expansion for example, improved co-ordination of government departments and good communication with stakeholders to facilitate investment planning.

More and better data is needed on who is being left behind to ensure that decentralised energy access is affordable and available to poor and out-of-reach communities. The analysis points to geographic areas

that are being marginalised and the prohibitive costs of some technologies to people living on very low incomes.

The section below outlines approaches proposed by stakeholders to foster greater investment and financing for off-grid energy access.

5.2 Recommendations

The limitations of the study have not allowed a comprehensive review of barriers and enablers; however, some initial recommendations based on the stakeholder consultations are proposed below, some of which support recommendations put forward by institutions working in Tanzania's energy sector. This includes the draft implementation plan for SE4ALL (2017–2020), issued for consultation by the United Nations Development Programme (UNDP) and the Ministry of Energy and Minerals in late 2016. The measures proposed will require sustained collaboration between the government of Tanzania, development partners and the private sector, with each taking the lead on specific areas of actions, as outlined below.

Recommendations for government

Improve co-ordination between energy-related ministries and other governmental departments, particularly for planning procedures and approvals. Private sector stakeholders suggest creating a 'one-stop shop' to create a more enabling environment for investment in off-grid energy in Tanzania.

Reform policy to reduce risks and increase opportunities for decentralised energy providers to expand access to services. Key areas include:

- Publishing grid extension plans and making decentralised energy central to the delivery of the Rural Electrification Master Plan
- Revising the tax exemption for solar equipment to include solar accessories such as solar refrigerators that are currently excluded from tax exemption package
- Exploring options for tariff reform, so there is a more level playing field between TANESCO, which offers subsidised tariffs, and private, decentralised energy providers.

Promote and expand clean energy for cooking through the Biomass Energy Strategy for Tanzania (BEST). Energy policies need to promote cleaner energy for cooking in addition to other renewable energy sources.

Raise public awareness on the benefits of renewable energy, especially for business activities in rural areas, through public campaigns and training programmes

on business skills for energy entrepreneurs. The issue of widespread prevalence of low quality or counterfeit products on the market (eg SHS) also needs to be brought to public attention.

Recommendations for development partners

Strengthen the role of development partners in financing the off-grid energy sector, particularly through grants to stimulate innovation and investment, and instruments such as risk guarantees and credit lines to enable commercial banks and other financial institutions to provide loans to local SMEs. By working with the government and private sector, development partners should consider flexible financial schemes that would help small domestic energy companies to grow. Support to provide access to working capital for start-ups is particularly important, given how difficult it is for them to obtain this from banks and other lending institutions.

Build technical capacity of domestic companies and NGOs to prepare high quality business proposals that meet funders' needs.

Expand finance mechanisms through incentive mechanisms such as RBF. This can support the demand side of the energy equation by helping to make energy affordable and accessible in hard-to-reach areas characterised by low populations and a dearth of markets. Development partners are also encouraged to establish a mechanism to protect private sector investment in off-grid energy access, and help protect against the risks of currency fluctuations.

Recommendations for private sector/commercial banks

Improve banking services. Development partners and commercial banks should collaborate to develop appropriate instruments such as concessional loans, bank guarantee schemes, syndication arrangements and credit lines that would allow funders to issue loans to private developers at lower interest rates and with affordable lending conditions. Banks should consider companies' cash flow in addition to collateral when considering eligibility for credit for energy projects.

Promoting the use of assets as a means to access energy and to address the challenge of limited cash income in most rural communities. Working with others, energy service companies should explore options that would enable people with very low incomes to access energy services using their endowed assets. Development partners could play a role in supporting the development of innovative approaches.

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Annexes

Annex 1. List of consulted stakeholders

	STAKEHOLDER GROUP	CONSULTATION DATE
1	Ministry of Energy and Minerals (MEM)	18/08/2016
2	Vice President's Office – Department of the Environment	18/08/2016
3	Ministry of Finance	18/08/2016
4	Rural Energy Agency (REA)	07/09/2016
5	UK Department for International Development (DfID)	08/09/2016
6	United Nations Development Programme (UNDP)	12/09/2016
7	International Finance Corporation (IFC)	07/09/2016
8	African Development Bank (AfDB)	09/09/2016
9	GLZ (German Society for International Cooperation)	06/09/2016
10	Swedish International Development Cooperation Agency (Sida)	31/08/2016
11	Japan International Cooperation Agency (JICA)	29/08/2016
12	European Union (EU)	29/08/2016
13	French Development Agency (AFD) – French Embassy	01/09/2016
14	Tanzania Forest Conservation Group (TFCG)	20/09/2016
15	Africa Partnership on Climate Change Coalition (APCCC)	07/10/2016
16	ACRA Foundation	06/09/2016
17	SNV (Netherlands Development Organisation)	15/10/2016
18	Foundation for Energy, Climate and Environment (FECE)	05/09/2016
19	World Wide Fund for Nature (WWF), Tanzania	26/08/2016
20	National Gender and Sustainable Energy Network (NGSEN)	24/08/2016
21	Tanzania Traditional Energy Development Organisation (TATEDO)	01/09/2016
22	Tanzania Renewable Energy Business Incubator (TAREBI)	29/08/2016
23	European Committee for Agricultural Training (CEFA)	29/08/2016
24	L's Solutions Ltd	11/10/2016
25	KAKUTE Projects Co. Ltd	13/10/2016
26	Greenovate Ltd	05/09/2016
27	Mobisol Tanzania	13/10/2016
28	Off-grid Electric/M-Power/Zola	12/10/2016
29	Embark Energy	13/10/2016
30	Ensol (T) Limited	24/08/2016
31	Envotec Services Ltd	25/08/2016
32	ARTI Energy	29/08/2016
33	Voltzon Ltd	25/08/2016

	STAKEHOLDER GROUP	CONSULTATION DATE
34	SUNNRGY Systems Ltd	29/08/2016
35	RESCO Ltd	14/09/2016
36	SESCOM Ltd	01/09/2016
37	Interfini (M+ E of REF)=fund manager/trust agent	14/09/2016
38	Sunfunder	26/09/2016
39	GVEP International/ Energy4Impact	31/08/2016
40	Africa Enterprise Challenge Fund (AECF)	26/08/2016

Annex 2. Government funding for grid and decentralised energy 2009/10 – 2016/17

FINANCIAL YEAR	GRID US\$	OFF-GRID US\$	TOTAL US\$	% OFF-GRID IN ANNUAL BUDGETS
2009/10	67,059,196	1,279,717	68,338,913	1.9
2010/11	70,241,781	3,152,067	73,393,848	4.3
2011/12	126,715,037	3,383,713	130,098,750	2.6
2012/13	202,229,160	4,481,279	206,710,439	2.2
2013/14	510,401,253	–	510,401,253	–
2014/15	338,493,151	5,388,128	343,881,279	1.6
2015/16	216,215,779	4,152,055	220,367,834	1.9
2016/17	440,755,557	18,310,502	459,066,059	4.0
Total	1,972,110,915	40,147,460	2,012,258,374	

Source: based on URT, 2016.

Exchange rate: US\$1=TZS2190 according to www.xe.com/currencyconverter, October 2016

Annex 3. Bilateral and multilateral development partners financing for grid and decentralised energy in Tanzania

DEVELOPMENT PARTNERS	GRID FINANCING		DECENTRALISED FINANCING			TOTAL (US\$)	% OF TOTAL FUNDING
	AMOUNT (US\$)	% GRID	AVERAGE ANNUAL FINANCING	AMOUNT (US\$)	% OFF-GRID	AVERAGE ANNUAL FINANCING	
WB (2009–20)	491,460,000	94	44,678,182	28,660,000	6	2,605,455	32.6
EU (2008–18)	209,790,000	84	20,979,000	39,092,544	16	3,909,254	15.6
AFD (2016–21)	163,900,000	83	32,780,000	34,100,000	17	6,820,000	12.4
Sweden (2010–21)	189,090,000	98	17,190,000	4,400,000	2	400,000	12.1
JICA (2010–17)	125,336,751	100	17,905,250	–	–	–	7.9
Norway (2011–19)	108,963,945	98	13,620,493	1,845,760	2	230,720	7.0
DfID (2014–19)	–	–	–	62,708,000	100	12,541,600	3.9
Korea (2010–17)	53,900,000	100	7,700,000	–	–	–	3.4
Germany (2010–18)	39,693,600	100	4,961,700	–	–	–	2.5
Netherlands (2011–17)	12,603,096	82	2,100,516	2,826,997	18	471,166	1.0
USAID (2013–21)	13,350,000	94	1,668,750	800,000	6	100,000	0.9
Canada (2013–18)	11,400,000	100	2,280,000	–	–	–	0.7
Total	1,419,487,392			174,433,301		27,078,195	100.0
% Funding		89.1					

Source: EDPG, 2016.

Exchange rates: ₦=US\$1.10; SEK1=US\$0.11; £1=US\$1.22; C\$=US\$0.76; NOK1=US\$0.12; US\$1=TZS2,190; US\$1=¥103.48 according to www.xe.com/currencyconverter, October 2016

Annex 4. Finance received for decentralised energy access in Tanzania, as reported by recipients

MAIN RECIPIENTS	TYPE	SOURCE	LEVEL OF SERVICE	AMOUNT (US\$)
ACRA Foundation	International NGO	EU, REA, Italian government	Tier 3 and 4	12,650,000
CEFA	International NGO	EU, Trento Province, Italian Cooperation, REA	Tier 3 and 4	10,853,968
TFCG	Local NGO	SDC	Biomass energy	8,821,818
JUMEME Rural Power Supply Ltd	International Company	EU, SEFA (AfDB)	Tier 3 and 4	7,862,000
Off-grid Electric/M-Power	International Company	USAID, AECF, US-ACEF (EEP)	Tier 1 to 3	6,300,000
TATEDO	Local NGO	EEP, EU/HIVOS, WB/REA, Jewish Heart of Africa, Norwegian Government	Tier 1 to 4 and biomass energy	6,249,783
Ensol (T) Limited	Local company	WB/REA, EEP, USAID	Tier 1 to 4	5,367,709
ARTI Energy	International NGO	WB, EEP, Nordic Dev. Fund, SESA, REA, Sunfunder	Tier 1 to 3	1,437,755
Mobisol	International company	AECF (EEP)	Tier 1 to 3	1,100,000
RESCO (T) Ltd	Local company	WB/REA, GoT	Tier 1 to 4	407,384
NGSEN	Local NGO	Hivos	Tier 1 and 2	330,000
TAREBI	Local NGO	NorgesVel	Tier 1 and 2	316,000
FECE	Local NGO	UNDP	Tier 3 and Biomass energy	224,547
APCCC	Local NGO	UNDP	Tier 3	150,000
Sunfunder	International company	US-ACEF	Tier 1 to 4	150,000
L's Solutions Ltd	Local company	REA	Tier 1 to 4	100,000
SESCOM Ltd	Local company	USAID	Tier 3 (Gasification)	100,000
SUNNRGY Systems Ltd	Local company	WB, ARF	Tier 1 to 3	85,890
KAKUTE Projects Co. Ltd	Local company	REA	Tier 1 to 3	63,927
Envotec Services Ltd	Local company	TPSF	Biomass energy	20,091
Total				62,590,872

Source: study authors/IIED and expands on Table 8 in working paper

Abbreviations and acronyms

AECF	Africa Enterprise Challenge Fund
AFD	French Development Agency
AfDB	African Development Bank
APCCC	Africa Partnership on Climate Change Coalition
CEFA	European Committee for Agricultural Training
DfID	Department for International Development (UK)
DFI	development financing institution
EEP	Energy and Environment Partnership
EIA	environmental impact assessment
EU	European Union
FECE	Foundation for Energy, Climate and Environment
GDP	gross domestic product
GEF	Global Environmental Facility
IEA	International Energy Agency
IFC	International Finance Corporation
IIED	International Institute for Environment and Development
JICA	Japan International Cooperation Agency
kWh	kilowatt hour
LGA	local government authority
LRTC	Lighting Rural Tanzania Competition
MFI	multilateral financing institution
MW	megawatt
NGO	non-governmental organisation
NGSEN	National Gender and Sustainable Energy Network
NOK	Norwegian krone
RBF	results-based financing
REA	Rural Energy Agency
REPOA	Policy Research for Development
SDC	Swiss Agency for Development and Cooperation
SDG	Sustainable Development Goal
SE4ALL	Sustainable Energy for All
SEFA	Sustainable Energy Fund for Africa
SEK	Swedish krona
SHS	solar home systems
Sida	Swedish International Development Cooperation Agency
SMEs	small and medium-sized enterprises
SNV	Netherlands Development Organisation

SREP	Scaling-up Renewable Energy Programme
TA	technical assistance
TANESCO	Tanzania Electric Supply Company Ltd
TAREBI	Tanzania Renewable Energy Business Incubator
TATEDO	Tanzania Traditional Energy Development Organisation
TEDAP	Tanzania Energy Development Access Programme
TFCG	Tanzania Forest Conservation Group
TZS	Tanzanian shillings
UNDP	United Nations Development Programme
URT	United Republic of Tanzania
US-ACEF	United States – Africa Clean Energy Finance Initiative
USAID	United States Agency for International Development
WB	World Bank

Investment in Tanzania's energy sector is growing, but how much attention is being given to decentralised energy solutions for people who still lack energy for their basic needs: to light their homes and power their farms and businesses? This study maps the available data on finance for decentralised energy access in Tanzania, and compares this to funding needs. It finds that the vast majority of public energy finance is flowing to large grid-connected projects and only a small proportion supports decentralised energy access. To encourage investment in the sector and ensure that no one is left behind, stakeholders need to implement a range of policy, finance and capacity building interventions.

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