



ACCELERATING SDG 7 ACHIEVEMENT

POLICY BRIEF 24

ENERGY SECTOR TRANSFORMATION:
DECENTRALIZED RENEWABLE ENERGY
FOR UNIVERSAL ENERGY ACCESS

7 AFFORDABLE AND
CLEAN ENERGY



POLICY BRIEF #24

ENERGY SECTOR TRANSFORMATION: DECENTRALIZED RENEWABLE ENERGY FOR UNIVERSAL ENERGY ACCESS

Developed by

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In collaboration with

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Key Messages

Status of the energy sector transformation and progress towards achieving SDG 7.1.1

- The deployment of decentralized renewable energy is fuelling a disruptive transformation of the energy sector. The rapid growth of decentralized renewable energy technologies changes the structure of the energy sector towards a multi-actor set-up in which large utilities interact with self-producing consumers and mini-utilities.
- Accelerating the deployment of decentralized renewable energy will drive energy solutions that are more in line with people's needs, in particular those who prioritize energy services with major development co-benefits. The focus of energy access is therefore not just wires and poles, but quality supply that supports local economic activities.
- Renewable energy distributed through the grid (27 per cent) as well as through mini-grids and off-grid installations (3 per cent) have provided power to 30 per cent of the people who have gained access since 2000. To achieve universal energy access by 2030, this share will need to increase significantly. For over 70 per cent of those who gain access in rural areas, decentralized systems based on renewable energy will be the most cost-effective solution (IEA, 2017).
- This, in turn, will drive a deeper systematic transformation of the energy sector. Business as usual governance of the energy sector will not be able to mobilize the full potential of renewable energy for electricity access. Comprehensive regulatory, legal and financial frameworks will need to enable a decentralized and proactive citizen-oriented organization of the energy sector with high shares of renewable energy.

Priority actions over the next four years and toward 2030

- Countries with a large energy access deficit will need to introduce mini-grid and off-grid renewables in national electrification plans, in addition to on-grid capacity, to enable a decentralized organization of the energy sector with clear energy access development targets. It is also important for these countries to recognize and address existing shortcomings in the regulatory, financial and administrative frameworks for renewables, in particular for mini-grid and off-grid renewables, based on reliable data regarding energy services.
- The financial landscape needs to shift towards unlocking local and community-driven financing available from the private sector to generate, distribute and sell decentralized renewable energy, especially in remote areas. For governments, this translates into a changing role from a direct provider of energy access to a facilitator of energy access, and introducing clear investment frameworks tailored to different renewable solutions, cost-reflective tariff settings, and dedicated funding facilities.
- The focus of energy planning and monitoring should move from least-cost energy supply, to value maximization approach, where energy services address people's needs and unlock the co-benefits in areas related to other SDGs, such as education, food security and socioeconomic development. Only with inclusive planning and monitoring processes, as well as high quality data and adequate legal and financial frameworks, will countries set the right path for a deeper transformation towards low carbon development pathways. The international community will thus need to refine the instruments for multi-stakeholder participatory planning and monitoring of SDG 7.
- Without the proper human resources, it will be impossible to achieve a long-lasting, equitable transformative change in energy access. Going forward, it will be critical to strengthen the role of people throughout the entire energy supply chain—from producers to users. Capacity-building and training will become essential components of any successful project aimed at enhancing energy access through decentralized renewable energy.

Preface

We acknowledge the inputs done in Policy Brief 1 on ensuring universal access to electricity. This policy brief discusses universal access to electricity in the context of the disruptive transformation of the energy sector fuelled by the deployment of decentralized renewable energy. The brief focuses on the regulatory framework necessary for the wider roll out of decentralized renewable energy. Although we recognize other energy forms such as transport, clean cooking, heating and cooling, this policy brief's primary focus is on the electricity sector, as we see this sector as the key for an energy sector transformation within the framework of the Paris Agreement and the NDCs. In this policy brief decentralized renewable energy is recognized as renewable energy (solar, wind, small hydro) distributed both through the grid and through mini-grids and off-grid installations.

Current Status of Energy Sector Transformation

The energy sector is evolving rapidly and undergoing a disruptive transformation fuelled by decentralized renewable electricity generation. Since 2012, new generating capacity driven by renewables has exceeded that of non-renewables by a widening margin (IRENA, 2017a). Similarly, renewable energies have had a positive impact on the provision of electricity access. Out of the people who have gained access since 2000, 27 per cent have been reached through on-grid renewables, and 3 per cent through mini-grid and off-grid renewables (IEA, 2017).

The positive contribution of renewables to electricity access reflects a change in the energy sector. Public programmes and community level initiatives have traditionally been the key actors in this sector. More recently, private sector actors have emerged to provide electricity access by associating renewables with end-user services, ranging from solar irrigation pumps to stand-alone home systems. More than 100 international companies are now providing stand-alone solar lanterns and solar home system kits targeted at those without modern electricity access.

Governments have been instrumental in the engagement of the private sector by implementing dedicated policy and regulatory frameworks to support renewable energies. Recently, governments have been attempting to mobilize market-based mechanisms (such as result based financing and auctions) to improve the effectiveness of financial support, address market failures, leverage capital, and support market development in the long term. Sierra Leone, for example, has recently announced auctions for mini-grid projects and electrification of health centres.

The international community has been similarly instrumental in putting renewables on the international agenda, including through the dedicated focus on renewable energy within SDG 7. Instruments

for monitoring SDG 7 have been refined to allow for the tracking of renewable sources for electricity access. For example, the Multi-Tier Framework (MTF) redefines the measurement of access to energy, acknowledging the incremental energy access benefits provided by both the grid and off-grid energy technologies (Bhatia, Angelou, 2015, see Policy Brief #8 on energy-poverty-inequalities interlinkages).

Energy sector transformation—what role can decentralized renewables play for universal energy access?

Business as usual governance of the energy sector will not be able to achieve universal energy access, in particular with regard to renewable energy. Since large scale on-grid energy production can be less cost effective for providing access in rural areas, mini-grid and off-grid renewable energy systems are essential to achieving universal access by 2030 in the most cost- and time-efficient manner. Since most of the people who will gain access live in rural areas, the share of mini-grid and off-grid renewable energy (38 per cent) for energy access needs to be higher than the on-grid renewables share (23 per cent) (IEA, 2017). In addition, timely access to energy would mitigate the opportunity costs associated with better livelihoods and economic prosperity, which are fundamental aspects to achieve other SDGs (see Box 1).

Barriers to a deeper and systematic energy sector transformation

The move towards a decentralized organization of the energy supply with a high share of renewables challenges the structure of the existing energy sector. A range of policy, regulatory and financial barriers are still in place that impede a deeper and systematic energy sector transformation in line with universal energy access by 2030 and the long-term objectives of the Paris Agreement.

Regulatory Indicators for Sustainable Energy (RISE) show that all energy access deficit countries have developed regulatory provisions for renewables. Taking a closer look at regulations, however, it seems as if these countries are still some steps away from a coherent and integrated energy access development scenario through renewables. For example, very few of these countries have regulations that clarify interconnection procedures for the main electricity grid reaching a mini-grid, which is a very important investment consideration for mini-grids (RISE—World Bank 2017). Only 40 per cent of countries have a grid code that includes variability of RE, 36 per cent of countries have transmission pricing rules for RE, 14 per cent of countries have plant forecast rules for RE generation, and only 8 per cent of countries have power exchange rules for balancing areas, which is an important consideration for feasibility of grid-connected RE projects (RISE—World Bank, 2017).

In addition, out of the ten highest access deficit countries, only

Box 24.1:

Interlinkages with other SDGs

Although governments have stressed the integrated, indivisible and interlinked nature of the SDGs, important interactions and interdependencies are generally not explicit in the description of the goals or their associated targets. Implementation of Agenda 2030 and the SDGs requires comprehensive national sustainable development strategies that factor in all the SDGs and their interlinkages. The range of relevant interlinkages with SDG 7 includes: Energy, Poverty and Inequalities (SDGs 1, 10); Food, Water and Energy (SDGs 2, 6, and Nexus-Approaches), Good Health (SDG 3), Gender Equality (SDG 5), Decent work and economic growth (SDG 8), Industry, innovation and infrastructure (SDG9), Energy and Education (SDG 4), Life on land (SDG15) and Sustainable cities (SDG 11). Some recommendations include integrated planning and programming, breaking down silos and interdisciplinary research (Lay and Prediger 2016, Mc Collum et al., 2017) as well as specific policy options for interlinkages between SDG 7 and SDGs 1, 2, 3, 6, 8, 13 (Nilsson et al., 2016)

Poverty reduction (SDG 1)

No country has gone from poverty to prosperity without providing energy in line with people's needs. Sustainable energy available in the right amount, at the right time, and at the right place, and affordable for all segments of society, can offer major social and economic benefits. Renewables have the potential to supply electricity directly in line with end-user demand, ranging from solar irrigation pumps to off-grid renewable energy solutions for healthcare facilities. With the development of local skills, the deployment of decentralized energy can create employment in assembling, distributing, installing and maintaining equipment. Electricity is also essential for economic sectors—agriculture, tourism, commerce, and industry—to thrive and create income-generating opportunities. (IRENA, 2017a).

Climate Action (SDG 13)

The framework conditions for delivering universal access to energy are defined by the Paris Agreement, which seeks to promote low-emission, resilient development pathways that limit the temperature rise to well below 2°C, ideally at 1.5°C. To achieve the temperature targets outlined in the Paris Agreement, all countries need to decarbonize their energy systems through an up-scaling of renewables and energy efficiency. Renewable energy systems contribute to climate change mitigation by replacing or avoiding fossil fuel based energy services. About 70 per cent of Nationally Determined Contributions (NDCs) to the Paris Agreement therefore mention the need to expand or strengthen renewables in their country's energy mix time (Stephan et al., 2016; REN21, 2016). The energy sector also needs to increase its resilience and adapt to the effects of climate change; and in addition can be an important contributor to climate change adaptation.

Peace and justice, strong institutions (SDG 16)

To "ensure universal access to affordable, reliable and modern energy services" (SDG 7.1) through the promotion of renewable energies, requires conducive political and legal framework conditions for the energy sector, including effective, accountable and transparent institutions at all levels (SDG 16.6), rule of law and access to justice (SDG 16.3) and responsive, inclusive and participatory decision-making (SDG 16.7).

three countries (Bangladesh, India and Tanzania) have developed comprehensive frameworks for mini-grids. 41 out of 55 RISE access deficit countries, mainly in Sub-Saharan Africa, are lagging behind in the provision of enabling policies for off-grid solutions: they neither provide confidence for private investors, nor champion public sector solar uptake. Only 23 access deficit countries have financing facilities available for mini-grid and/or stand alone home systems.

Over the last years, finance commitments for small-scale electricity projects have still been minimal compared to large-scale investments. Between 2013 and 2014, finance commitments for electricity in the 20 countries representing 80 per cent of the global energy access deficit were at least US\$ 19.4 billion a year on average. Almost all finance commitments were dedicated to large-scale solutions including two-thirds from renewables and one-third based on fossil fuels (SEforALL, 2017). This implies a continuing bias toward funding large-scale infrastructure projects and a need for more targeted and refined strategies to address structural issues related to the organization of the energy sector.

Policy Implications/Recommendations

Energy access deficit countries—Integrated and holistic planning for a deep transformation

Countries with a high energy access deficit will need to focus on enabling a deep transformation of the energy sector to scale up decentralized renewables for universal energy access. As a first step, this would mean to introduce next to on-grid capacity, mini-grid and off-grid renewables into their national electrification plans. Energy access development scenarios should focus on satisfying the current and future needs of various population groups, especially women, youth, and the poor, and establish pathways for increasing consumption and demand over time. This requires dynamic energy access planning that allows for the co-existence and integration of different technologies and system-sizes over time (Sareen, 2017). The planning should be the result of cross-sectoral consultation with various stakeholders, including the local private sector and civil society organizations, as well as relevant ministries (health, education, water and agriculture) and subnational governments. Planning needs to be bottom-up and gender-sensitive. Such holistic electrification planning will provide guidance to the public and private sector, as well as development banks and donors, to collaborate, mobilize and work to direct resources towards off-grid and grid-based electrification options (IRENA, 2017b). This approach will avoid duplication of efforts (from off-grid and on-grid sectors) and will also mitigate the risk of stranded assets of off-grid systems (if and when the grid arrives).

Tailoring regulatory frameworks to accelerate deployment

Equally important, countries with high energy access deficits will need to address outstanding shortcomings in the policy

and regulatory frameworks for distributed renewable energy. This includes developing comprehensive support frameworks for decentralized renewables and creating an equal playing field by removing key barriers for energy access through renewable energy deployment. Streamlined regulatory requirements can reduce development costs, which will allow a balance between reliability and affordability for the actors participating in the market. Adoption of standards is also critical for distributing high-quality products that do not breach the trust of end-users in off-grid renewable solutions. A common approach to facilitate various regulatory requirements is to establish a single-window clearance facility hosted by a rural electrification agency or similar body (IRENA, 2016c). A tailored approach to tariff regulation has a strong influence on the viability and sustainability of mini-grids, in addition to effective participation of the private sector. This is crucial when countries attempt to move towards market-based mechanisms for renewables support. For many governments this may imply a shift from being a direct financier of energy access (e.g., through state-owned utilities) to being an energy access facilitator, creating incentives and a level playing field for a number of technologies and service providers to co-exist and serve different segments of the grid and off-grid markets. Effective policy and regulatory reforms are also needed to unlock domestic commercial finance, including by raising awareness and capacity-building among local institutions. This, in turn, will require enabling regulatory frameworks from the national to the local level, as well as effective multi-level governance where solutions can be defined, sufficiently funded and implemented.

Flourishing investment in renewables—The key for a deeper sector transformation

The continuing bias towards funding large-scale infrastructure projects will not achieve the necessary financing amounts to contribute to universal energy access. Instead, the focus needs to shift towards attracting funding for small scale low-carbon climate resilient infrastructure projects by the (local) private sector. For this, certainty and clarity within the legal framework and legal enforcement through rule of law are important issues for investors to address. Clear licensing and regulatory guidelines tailored to different renewable solutions should be in place. The traditional approach of uniform national tariffs needs to give way to differentiation between centralized and decentralized grid power to allow for cost recovery. Industrial bulk consumption, self-consumption and the application of distributed storage can yield benefits for both end-users and the power system as a whole. Therefore, regulation should actively promote self-consumption by adopting a cost-reflective design for retail tariffs, and subsidy systems should be reviewed to promote greater equity between grid and non-grid connected households. Finally, governments can also take concrete financing measures by i) cooperating with regional

and global funding facilities to attract early-stage capital, ii) using tools, such as guarantees, to encourage commercial bank lending, iii) developing dedicated funding facilities for specific needs, and iv) creating favourable fiscal regimes (e.g., eliminating custom duty barriers for renewables). Integrating renewable energy and access targets, as concretely as possible, in a country's NDC and in its national energy and economic planning will give policy certainty, enhance the predictability of investors and support a transformation funded by commercial banks, among other investors.

Integrating productive use of electricity in the project life cycle

The inclusion and adequate integration of productive use in project planning and implementation is pivotal for greater economic growth, productivity, and employment. Productive use cannot be an afterthought and should be an integral part of the energy access strategy. Several renewable energy technologies have emerged as economically viable and environmentally friendly options, which if suitably adopted can meet the growing energy needs of industry, and particularly of small and medium-sized enterprises (SMEs).

International community—Guiding the way for a deep transformation

Analysis of the current status of access at the multilateral level, together with identification of gaps, will ensure a more timely and effective process for reaching energy transformation goals. Common methodologies and tools are also needed to assess the energy sector and develop roadmaps for a transformation maximizing the potential of the sector to meet climate and development goals. Similarly, the monitoring of SDG 7 will need to integrate the characteristics of on-grid renewables, as well as mini-grid and off-grid renewable energies, to track the dynamics and integrated nature of energy access development going forward. There is a need for a multilateral supported approach paving the way for an energy sector transformation and maximizing the potential of renewable energy deployment to achieve development goals such as energy access, as well as the Paris Agreement, at the same time. Only with inclusive planning and monitoring processes, high quality data, adequate legal and judicial frameworks, and effective, accountable and transparent institutions countries will set the right course for a deep transformation to meet the “leave no one behind” principle of the agenda 2030.

Effective institutions and administrations at all levels facilitate the development and implementation of policies on renewables and improve citizen-oriented energy supply as part of public service delivery. To increase the availability and the use of data for planning, statistical systems need to be strengthened through training of its members who are in a position to influence, introduce or modify policies that will positively impact national energy access.

Civil society—Voicing the interests of people and communities

To increase the uptake of decentralized renewable energy, including for the last mile, civil society organizations (CSOs) can support national governments and the international community first and foremost by voicing the interests of people and communities, with a focus on household energy consumption as well as productive and community use of energy. Governments need to be proactive in creating these spaces of inclusion and allowing these voices to influence their planning and decision-making. Next, CSOs can support policymakers with concrete suggestions for finance, energy and nexus policies and regulations, making sure policy and implementation is connected to the needs of communities and making sure they are sustainable and operational in the long term. CSOs can increasingly work alongside the private sector as key partners, to support and challenge them to reach the last mile. Finally, CSOs can lead by example, by developing inspiring and daring new solutions, using a multi-stakeholder communication approach.

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