ACCELERATING SDG 7 ACHIEVEMENT

POLICY BRIEF 08

INTERLINKAGES AMONG ENERGY, POVERTY AND INEQUALITIES

7 AFFORDABLE AND CLEAN ENERGY

ACCELERATING SDG 7 ACHIEVEMENT

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POLICY BRIEF #8

INTERLINKAGES AMONG ENERGY, POVERTY AND INEQUALITIES

Developed by

United Nations Development Programme (UNDP) and University of Bergen

In collaboration with

UNESCAP and Federal Ministry for Economic Cooperation and Development (BMZ), Germany*

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KEY MESSAGES

Status of energy/poverty/inequality linkages and progress towards achievement of SDG 7

- SDG 7 is a condition for economic development, poverty alleviation (SDG 1) and reducing inequalities (SDG 10). Progress on SDG 7 can be seen as a means towards achieving other SDGs and the principle "Leave no one behind".
- Unequal access to energy and low human development are highly correlated. The concept of "energy poverty" includes "fuel poverty" in the developed world, but is most often used in the context of lack of access in the developing world to electricity, and/or clean cooking fuels or technologies. About 1.2 billion people still lack access to electricity and nearly 40 per cent of the people in the world lack access to clean cooking fuels.
- In situations where people do have access to energy, the poorest often end up paying disproportionate shares of income for energy, in part because of the higher upfront costs for energy-efficient equipment. The cost impacts of public clean energy incentive schemes may also disproportionately burden poorer taxpayers, and public money tends to favour national grid infrastructure over smaller-scale off-grid development.
- Private sector financing will be necessary to complement public sector finance in realizing universal energy access in conjunction with renewable energy uptake. This is often prevented by high financing costs as a result of a range of technical, regulatory, financial and informational barriers and their associated investment risks. Public-private partnerships may be able to make private-sector energy solutions affordable for low-income households.

Priority actions

- Policy targets need to take into account the quality of energy access. The Multi-tier Matrix for Measuring Access to Household Electricity Supply outlines six different levels of energy access from 0 to 5. It is only at Tier 3 and above that there are new opportunities for productive uses that lead to poverty reduction and reduced inequality. Policy targets formulated for energy access should transcend a binary approach (access or not) and institute timelines and milestones for percentages of population that can graduate to Tier 5 (full) access to energy, while also acknowledging "fuel poverty" and supporting energy efficiency investments by low-income households.
- For private sector financing to contribute to clean energy access, policymakers should analyse the investment risks contributing to high financing costs and address the risks in a systemic and integrated manner. Policy de-risking instruments geared towards renewable energy uptake should be prioritized, as these offer the most cost-effective future solutions. Market transformation will usually require combining these with financial de-risking instruments, supplemented by direct financial incentives as required.
- Policymakers can address the interlinkages between energy, poverty and inequality by combining Tier 5 ("full") energy access with the promotion of productive energy use, while acknowledging "fuel poverty" and supporting energy efficiency investments by low-income households. The distribution and quality of energy access is determined by several sociotechnical and political economic drivers which operate differently across scales. As cities, regions and countries undertake energy transitions, they must "democratize" the energy sector so it is responsive to a range of stakeholders and held accountable for provision of clean energy in an equitable and inclusive manner.

Interlinkages among energy, poverty and inequalities

Energy is an "intermediate" commodity. It is valued not so much for its own sake as for the services it enables. It powers appliances, equipment, and machinery, and also has lighting and thermal applications. In relation to the SDGs, one might say that SDG 7 is primarily useful in that it helps to achieve other SDGs. Thus, the success of SDG 7 is a precondition for the success of all other SDGs. However, for several SDGs such as SDG 1 (No Poverty) and SDG 10 (Reduced Inequality) there is especially a strong link with SDG 7. Due to its instrumental value for improving the living conditions and capabilities of households, access to energy is also a means to achieve the principle "Leave no one behind".

The interlinkages between energy, poverty and inequality have been acknowledged widely, but are interpreted using different concepts. "Energy poverty" is a concept used in interpretations varying from "fuel poverty" in developed countries to "lack of energy access" in the developing world.[1] In energy and development studies scholarship, energy poverty is commonly defined as (a) lack of access to electricity networks or (b) dependence on burning solid biomass, such as wood, straw, and dung, in inefficient and polluting stoves to meet household energy needs (Laldjebaev et al., 2016). In this policy brief, our discussion focuses on the interlinkages between energy, poverty and inequality from the latter, developing world perspective, with the interpretation of "energy poverty" mainly relating to the lack of energy access and the factors driving it.

Despite the important role that sustainable energy plays in poverty reduction, about 1.2 billion people still lack access to electricity and nearly 40 per cent of world's population still rely on solid fuels for cooking and heating (UNDP, 2017). Poor people also pay a high price—in cash or in labour—for the energy they use. Moreover, they spend a much greater share of their household income on energy than do wealthy people, not only because their incomes are so much smaller, but also because the fuels and equipment they use are so much less efficient than modern fuels and equipment. No country has managed to substantially reduce poverty without greatly increasing the use of energy.

In the first edition of the Poor People's Energy Outlook in 2010, Practical Action framed lack of access to energy services as a form, an outcome and a cause of poverty. It is a form of poverty because it restricts human capabilities to meet their needs and realize their full potential. It is an outcome of poverty because low-income individuals are limited in their financial abilities to afford goods and services that their better-off fellow citizens enjoy, even if those goods and services are ultimately unsuitable or unsustainable. And it is a cause of poverty because it "reinforces constraints in income generation potential, because many product and service-based enterprises and public services either rely on energy or are substantially improved in their productivity, profitability, or efficiency by the introduction of improved forms of energy access." Taken together, a "vicious circle" is created whereby "a lack of energy access leads to limited income-earning capability, which reduces purchasing power, which in turn limits the access to energy that could improve incomes" (Practical Action, 2010).

Box 8.1

Clean cooking and poverty alleviation[2]

- Clean energy access is critical for women's health, education and productive activities and is strongly related to reducing poverty and inequality for women since in many parts of the world women spend more time than men cooking and collecting water and fuel.
- Improving energy access would reduce the drudgery of women's unpaid labour and care work, enabling them to access education and employment options and enhance their livelihoods.
- According to a recent study by the McKinsey Global Institute, empowering women to participate in the global economy on an equal basis with men would add US$ 12 trillion worldwide by 2025 (McKinsey Global Institute, 2015). Women invest 90 per cent of their income back into their families and their welfare, which has a positive knock-on effect, with lasting effects for generations to come.

Reducing the global disparity in energy is key to reducing income inequalities, gender inequalities and inequalities in other dimensions such as rural/urban income disparities. A lack of adequate, reliable and affordable supplies of modern energy disproportionally impacts women and children. It is also more severe in rural communities and it limits their productive opportunities, enterprise growth and employment, exacerbating income inequality and persistent poverty. The use of alternative and unsafe energy sources often has severe consequences on health, which in return impacts poverty levels. In addition, some regions with the lowest energy consumption and greenhouse gas emissions, for example, countries in sub-Saharan Africa and South Asia, are the most vulnerable to climate change impacts and will suffer the most. Sustainable energy can help build resilience of these communities against climate change impacts and reduce inequality between and among nations.

Less often discussed but equally important is the relation between public expenditures on clean energy development and the

[1] A COST Action on European Energy Poverty is seeking to bridge this gap: http://www.cost.eu/COST_Actions/ca/CA16232.

[2] The topic of access to clean cooking is mentioned here because of its importance for alleviating poverty and reducing inequality. Detailed discussion of clean cooking can be found in Policy Brief 2 and detailed discussion on gender inequality is addressed in Policy Brief 12.

translation of these costs to the taxpayer. While the costs of clean energy incentive schemes are usually borne by all taxpayers, these programmes can disproportionally affect the poor if the policies are not sufficiently designed to cushion vulnerable households with social safety nets. Another crucial consideration for equal distribution of public expenditures is the far stronger focus on national grid infrastructure; small scale off-grid development is often neglected and not eligible for similar public funds allocation as compared to national infrastructure.

Status of Implementation

Quality of energy access

Access to electricity used to be defined as whether or not a household had access to electricity. This, however, does not account for different levels of access to electricity provided to end users. Electricity is only useful if it allows the desired energy services to be run adequately. Different energy services require different levels of electricity supply in terms of quantity, time of day, supply duration, quality and affordability.

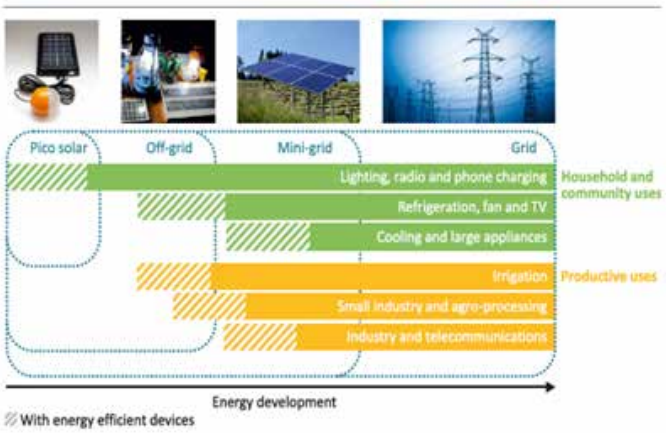


Figure 8.1

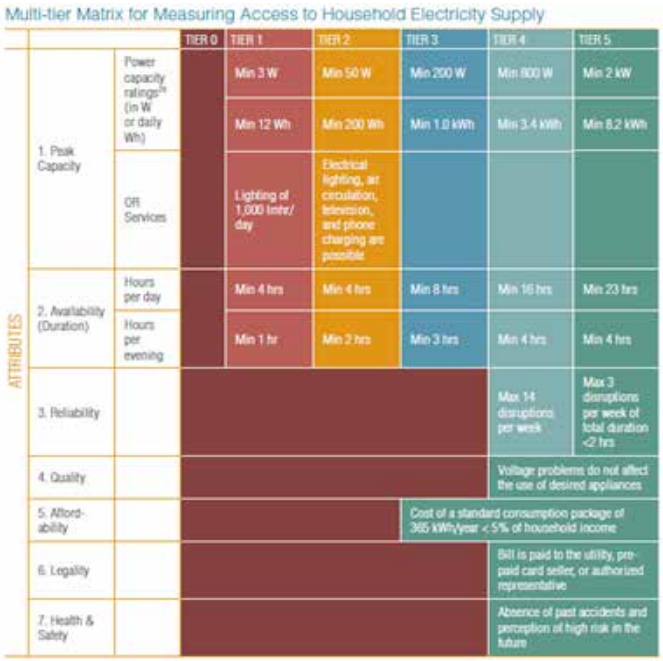
Electricity access and illustrative technology options (IEA, 2017)

Figure 8.1 illustrates how investments in various energy systems (ranging from the most basic pico solar system, to off-grid and local mini-grids, to the most advanced system with access to an integrated electricity grid) result in incremental levels of access to electricity, and the possibility for end users to utilize more advanced end-use technologies with increasing access levels.

More recently, a comprehensive framework was developed to measure levels of access to electricity provided to end-users, where successive thresholds of supply allow for increased use of end-use equipment (appliances) (ESMAP, 2015). This framework defines 6 levels for electricity access. Tier 0 represents the baseline situation with no access to electricity and consequently no access to energy services. Subsequently, Tier 1 represents the most basic level, Tier 2 a more advanced level and ultimately Tier 5 the most advanced level (see figure 8.2).

Figure 8.2

Multi-tier Matrix for Measuring Access to Household Electricity Supply (ESMAP, 2015)



Today, the tracking of progress on energy access is mainly based on a binary perception of access to energy. However, it is clear that lower-tier levels of energy access may not contribute much to poverty alleviation, if at all. It is only from Tier 3 onwards that we may see growth in home businesses and new enterprises. For energy access to lead to poverty reduction and reduced inequality we therefore need to aim at Tier 5 or "full" energy access for all.

Barriers to energy access improvement and their associated investment risks

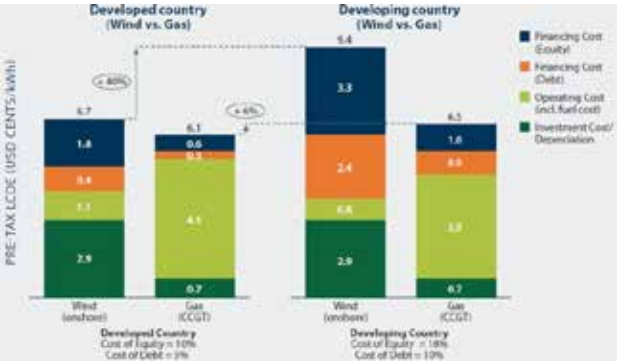
SDG 7 provides opportunities to drive a transition towards clean energy access for all. However, sustainable energy in developing countries often faces technical, informational, financial and regulatory barriers that create associated investment risks, both real and perceived.

In pre-market conditions, as in many of the poorest countries and communities, these barriers to sustainable energy can act as immediate "show-stoppers". For example, investment is often impeded by a lack of access to affordable financing and capital scarcity due to lack of legal frameworks, underdeveloped economies and weak financial sectors. This presents a challenge for scaling up sustainable energy solutions, as higher returns are needed to compensate for the greater investment risks found in early-stage markets. Under these conditions, sustainable energy

interventions become very sensitive to financing costs, making them less attractive and less cost-competitive than conventional solutions, as illustrated in figure 8.3.

Figure 8.3

The impact of financing costs on wind and gas power generation costs (UNDP, 2013)



In those cases, a market transformation approach is needed that assists governments in implementing combinations of public instruments that systematically target these barriers and investment risks, with the aim of cost-effectively achieving risk-return profiles that attract investment in sustainable energy at scale. An investment's risk-return profile can be improved through reducing risk, transferring risk or compensating for risk. Measures that reduce or transfer risk result in lower financing costs. Any residual risk may then be addressed by measures that compensate for risk. All public interventions to promote sustainable energy act in one or more of these three ways.

The public sector should be aware that there may be cases where private sector engagement can lead to increased consumer prices or where energy infrastructure is solely built in areas where returns are highest. In these cases, public-private partnerships may be able to contribute to solutions that avoid this risk.

Sociotechnical and political economic drivers of equity and quality of energy access across scales

The nature of energy access is determined by a variety of processes at multiple scales. These are characterized not only by techno-economic factors, but also by path dependence, incumbency, inertia and resistance to change. At the global scale, the geopolitics of infrastructure (oil and gas trade links, multinational treaties) modulates energy transition pathways. At the national scale, energy remains a sensitive political issue, with public perceptions driving the commitments of governments, along with economic and technical concerns. At the subnational regional scales, population demographics and intersecting factors such as class and ethnic factors matter. At the local scale, norms along religious and gendered lines determine access within communities and households.

Recognition of the multi-scalar and intersectional nature of drivers of energy poverty is finally gaining ground. But it must be translated into affirmative action, adoption of transparency measures, and substantive public participation in decision-making on energy services. This is necessary in order to systematically reduce inequalities in energy access and address energy poverty. Such action requires policy measures that are responsive to the political economic and sociotechnical realities of energy within multi-scalar administrative contexts (Sareen, 2017). Otherwise we run the risk of actors with entrenched interests pushing for regressive courses of action in the energy sector at great public cost.[3]

Energy and poverty alleviation in light of fuel poverty and energy efficiency

The links between energy and poverty alleviation, as well as reducing inequalities, may be seen most obviously in the context of access to clean energy, but there are also cases of energy poverty related to "fuel poverty". In situations where people have access to energy, it is often the poorest that end up paying disproportionate shares of their income to energy, in part because the higher upfront costs of investments in energy efficient equipment are more difficult to bear for low-income households (Simcock et al. 2017). Energy poverty widens this discussion to encompass factors related to the built environment, including reliable, safe and comfortable access.

Fuel poverty is mainly associated with developed countries where low-income households have difficulty keeping their homes warm at a reasonable cost. However, it also relates to low-income households in developing countries, since especially for people in the poorest countries, the most inelastic segment of demand is energy for cooking and heating to ensure basic survival. Enhancing access to modern and cleaner forms of household energy is important for this group owing to its potential for increasing income levels. Just as important, however, is the need to reduce their expenditures on energy services. Previous analysis has shown that in most countries poor people spend a higher share of their income on energy than the non-poor, both for electricity as well as fuels (IISA, 2012).

Access to energy will not alleviate poverty if it is not affordable for the lowest-income households. In some cases, tariff systems with progressive fee structures (cross-subsidies) have been introduced as solutions to this challenge. However, such solutions may also create counterproductive signals to clean energy development for low-income households. It may lead to clean energy such as solar systems being of most interest to households with higher utility fees, thereby creating distortions in the business model of the utility, which may lose its higher-paying customers. Careful consideration of energy price policies is needed while alternative policies to cushion vulnerable households with social safety nets

[3] See the Mapping Power project for a comparative study of 15 Indian states along these lines: http://www.cprindia.org/projects/mapping-power.

are preferred.

Electricity access and clean cooking are therefore only part of the desired policy objectives to reduce poverty. Equally important is access to energy efficient and low-cost end-use options and devices used by the poor in agro-processing, small scale value-addition processes, water pumping, housing and transportation.

Policy recommendations

Quality of energy access

The policy discussion on energy access must move from a binary to a qualitative understanding of access to energy. The five-tier framework of energy access can provide a graded picture to attune action to the context and emphasize the relation between quality of energy access and poverty and inequality (ESMAP, 2015). Policy targets formulated for energy access should move beyond the binary concept and set timelines and milestones for percentages of population with Tier 5 ("full") access to energy.

Barriers to energy access improvement and their associated investment risks

In order to allow private sector financing to contribute to access to energy, thereby reducing poverty and inequality, policymakers should analyse the investment risks contributing to high financing costs and address the risks in a systemic and integrated manner. Policy de-risking instruments geared towards renewable energy uptake should be the first choice for action as these offer the most cost-effective and sustainable future solutions, while market transformation will usually require a mix of policy and financial de-risking instruments, supplemented by direct financial incentives as required.

Sociotechnical and political economic drivers of equity and quality of energy access across scales

Policymakers must act on the emerging consensus that energy poverty and inequitable access persist (a) due to political economic factors that can be dealt with through more participatory decision-making and transparency measures in the energy sector; and (b) due to the misrecognition of sociotechnical factors that modulate energy access at different scales and must be taken into account in national and regional energy policies. As cities, regions and countries undertake energy transitions, we must utilize the opportunity to democratize this sector into one that is responsive to public interest. Regulators, administrators, and utilities alike must be held accountable for provision of quality access to clean energy in an equitable, inclusive manner.

Energy and poverty alleviation in light of fuel poverty and energy efficiency

The interlinkages between energy, poverty and inequality can be addressed by policymakers in combining Tier 5 ("full") energy access with promotion of productive use of energy, but also by acknowledging the concept of "fuel poverty" and support for energy-efficiency investments by low-income households.

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