

National energy access planning from the bottom up



Key messages

Challenging the status quo

We are risking a catastrophic failure to deliver on globally agreed promises made to the world's poorest and most vulnerable populations. If universal energy access targets are to be achieved, a radical and swift shift in approaches to national energy access planning is needed. Those living in energy poverty should be brought to the heart of the agenda, driving planning and policy.

In this edition of the *PPEO* we take a bottom-up approach to energy planning. Applying our Total Energy Access framework, we worked in 12 representative communities in Kenya, Bangladesh and Togo, comparing the resulting plans with existing national plans.

Our recommendations are that national energy plans which respond to the experiences, needs and demands of those living in energy poverty must:

- Embrace decentralized technologies which are smaller, faster, and require different financing models to the traditional grid;
- Prioritize cooking as on par with electricity access, recognizing its essential role in achieving broader development aims;
- Recognize the differentiated energy access requirements of women and men, and mainstream women's priorities in energy access plans at the national level; and
- Measure energy access using a multi-tier framework and in terms of longer term development goals, rather than simply by counting numbers of connections and megawatts generated.

New solutions to old problems

Ending the scourge of global energy poverty has rightly become an international priority – but governments and the international community still lack the tools and approaches necessary to deliver on this important objective. One major reason for this is that current approaches do not meaningfully consider or understand the realities of energy-poor people or the technologies most suited to addressing their needs.

Despite this, recent years have seen incredible progress in our collective understanding of the centrality of energy services to achieving broader development objectives. This has resulted in energy access being a central pillar of the UN Sustainable Development Goals, where the global community has committed to universalizing energy access by 2030.

Previous editions of the *PPEO (Poor People's Energy Outlook)* have shown how the needs of people living in energy poverty, who mostly reside in rural areas, are quite different from what conventional energy systems are set up to deliver. Despite this progress in global prioritization and empirical understanding, and the recent radical technical evolution of renewables and systems management, energy planning and policies have evolved very little to date. In most countries, they remain the same as those that have left over two billion people without adequate, safe, reliable, or affordable access to energy services, and over three billion people cooking on dirty and deadly open fires.

It has repeatedly been shown that energy poverty in dozens of countries around the world is actually set to increase, not decrease, as we move towards 2030; and that in many other countries energy poverty will only be marginally reduced. Much current national energy planning and international donor support is disjointed and focuses disproportionately on large infrastructure that, as evidenced in the *PPEO 2016*, is not aligned with the global 2030 timeline, does not make economic sense in most energy-poor contexts, and is out of touch with the needs of the energy-poor.

Putting people at the centre of energy planning

Energy planning often takes place far from those without energy access, leaving them unseen, unheard and under-represented. The community-driven energy access plans we created in Bangladesh, Kenya and Togo use the UN Sustainable Energy for All (SEforALL) initiative's Multi-Tier Framework to measure existing

and required levels of energy access. This Total Energy Access (TEA) approach encompasses:

- all spheres of energy access: households, productive uses and community facilities, differentiated by gender;
- all forms of energy access: electricity, cooking, heating and mechanical power; and
- all feasible and appropriate means of energy provision: grid-connected, mini-grid, and stand-alone.

We used this approach to identify the combination of energy access technologies which provide the best means of economically meeting all of people's energy access needs on the tight 2030 timeline.

Findings and implications for national planning

The countries and communities we selected illustrate a range of geographic, socioeconomic, and political contexts, as well as existing energy access levels. Insights gathered across 12 communities provide detailed and tangible recommendations for rapidly achieving universal energy access at the national scale. The top-line messages and findings are:

- The process we use – putting energy-poor people at the heart of rural energy planning – **fundamentally changes the balance of national energy plans** in terms of technologies (smaller), timelines (faster), and economics (different financial support, more rural economic opportunity, more energy-sector jobs).
- Based on the energy services people said they needed, and the applications they prioritized, (of the five tier SEforAll Multi-Tier Framework) **Tier 3 electricity was found to be the level at which households should be considered as having 'access'** in national plans. Energy for productive uses and community facilities often needs higher Tiers of access. Tier 4 cooking energy should be the minimum level for 'access', recognizing transitional targets for Tier 2 may also be needed. Progress should be measured across all the tiers.
- **Prioritizing cooking is essential to achieving broader development aims.** Cooking with dirty biomass kills millions of people, mostly women and children, and collecting and processing it drains millions of hours per year. Cleaning up cooking will free up time, massively reduce women's burdens, save billions of dollars in health care and millions of hectares of forests, while costing dramatically less than universalizing electricity.

The scale of the challenge



The scale of the challenge is large. In 8 of the 12 communities, less than 30% of households had any form of electricity.



Those who had electricity were, at most, in Tier 1, which was insufficient for their needs. Over 92% in every case wanted energy services requiring at least Tier 2: often more for SMEs.



People continue to rely on biomass fuels (mostly wood) and on very basic stoves. In Bangladesh and Togo in particular we found very few examples of manufactured stoves (just 1/253 in Bangladesh and 8/243 in Togo).

- **Energy access planning needs to mainstream gender concerns** and be used as a tool to empower women. Women's energy access needs and priorities differ from men's, reflecting their different responsibilities and the extent to which their lives are made more challenging and less productive as a result of a lack of energy access. In our case studies, women often prioritized lighting at home for security over street lighting and, beyond the domestic sphere, they have particular energy needs for agricultural processing and accessing clean water.
- Despite the conservative nature of our cost modelling, **decentralized solutions were found to be cost-competitive or cheaper than grid extension** in 11 out of 12 communities. In 5 communities, mini-grids were the cheapest. In 3 they were cost-competitive with grid extension; in particular if hybrid systems are considered, and if additional costs of grid reinforcement are factored in. In 3 communities, all or the majority would be served by stand-alone solutions.
- Overly focusing on traditional grids is wasting both time and money in most cases. Decentralized systems would provide more reliable power than the national grids currently do, and would be deployable in a fraction of the time, swinging the balance even further in their favour. Global and national energy planning, technical assistance, energy literacy and financing efforts must be urgently re-balanced to reflect this.
- There is demand and willingness to pay for energy services in rural areas that is often above what is

charged for national grid electricity. By perversely incentivizing grids (via sustained subsidies) while often requiring decentralized solutions to function without much or any public financial support, energy planners and donors are actively constraining the technologies and approaches best suited to fulfill global agreements on universalizing energy access.

- **People's priorities for energy access go beyond household energy**, including energy for community services (schools are particularly poorly served), street lighting, and water pumping. They can see the potential for energy to improve livelihoods, and many SMEs would like to use energy services requiring Tier 3–4 electricity. Linkages with agricultural value chains are also important, including for irrigation and for post-harvest processing and storage - emphasizing the need for far greater co-ordination between ministries in tackling energy poverty.

Priorities and solutions



Household energy for lighting, cooking and phone charging was the top priority in 11 of 12 communities. The second priority in 10 of 12 communities was for community services including energy for schools, street lighting and health centres.



In 11 of 12 communities, mini-grids or stand-alone solutions were cost-competitive or cheaper than grid extension.



Tier 2 or 3 cooking solutions are cheaper than current solutions in all cases, once fuel costs are included. There is enthusiasm for clean fuel solutions; chosen as the preferred solution by >50% in 7 out of 12 communities.



The real cost of electricity from grid extension is estimated at between 6 to 9 times more than the amounts grid users are being charged in Bangladesh, and 2 to 6 times more in Kenya. At the same time, there is an affordability gap between least-cost solutions and current willingness to pay.

Major obstacles, simple solutions

Our case studies and review of national planning systems highlighted three overarching obstacles to, and simple solutions for, realizing global energy access objectives – all of which can be implemented immediately, are inexpensive, and would have incredible impact.

Obstacle: Amongst many global and national decision-makers, there is a fundamental lack of understanding and acceptance of the technologies and approaches we evidence as best suited to achieving universal energy access.

Solution: A broad and robust effort must be made to educate staff to be well-versed in both decentralized energy technologies and the service-focused approach required to deliver modern energy services across all relevant sectors (energy, health, water, agriculture, and education).

Obstacle: Meaningful efforts to include the energy-poor in discussions on energy poverty are lacking, despite that it is only by knowing one's customer that a service provider can ensure its product is relevant. The results of this *PPEO* illustrate how different energy plans and policies would look if voices of the energy-poor were adequately included.

Solution: Significant effort must be made to encourage participation of the energy-poor and their representatives in energy planning, from the project level up through programmatic efforts and national policy-making.

Obstacle: Counting megawatts and connections is misleading. Most new megawatts go to other mega needs, such as factories and mines, which only provide jobs for a select few and whose outputs are often exported rather than benefiting those at home. Counting household connections masks how rural connections are loss-making for most utilities, and that the quality of these connections is also often inadequate.

Solution: Outputs and outcomes of energy projects should assess the energy services delivered, and go beyond that to consider the numbers of jobs created, agricultural productivity increased, children educated, patients served per megawatt, and so on. These are the development objectives of the global community, and we should measure our progress accordingly.

Future editions

This briefing report on the *Poor people's energy outlook 2016*, is the first volume of a three-part guide for re-writing how the world needs to think about, and act on, energy service delivery if we are to eradicate energy poverty by 2030 in line with global goals. This edition focuses on robust energy planning and policy making for universal access; the 2017 edition will focus on financing national energy access plans; and the 2018 edition will show how to deliver universal access in practice.

The *PPEO* series draws on Practical Action's 35 years of experience working with communities in Africa, Asia and Latin America to improve their access to energy. It highlights what it means to live in energy poverty, the expressed needs and priorities of the energy-poor, and how the global community can make energy access more affordable, appropriate and sustainable. Practical Action has documented its experience in numerous publications and technical advice, through our Consulting, Publishing and Practical Answers enquiries service.

For more information on the *PPEO 2016* visit: policy.practicalaction.org/ppeo2016

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