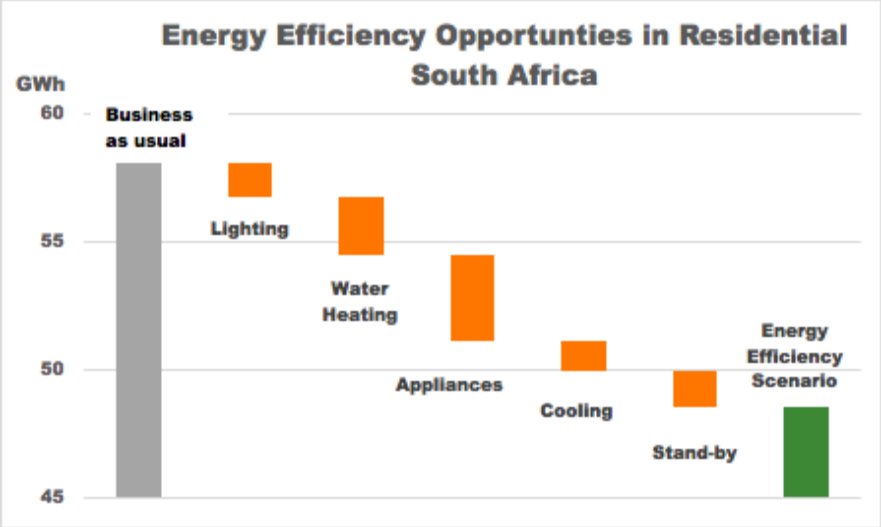
Demand Resources Energy Analysis Model (DREAM)

Energy efficiency is known as the least-cost clean energy resource but it is often overlooked due to its dispersed nature. DREAM models assess energy savings opportunities across many end-uses and aggregate results to help bring energy efficiency as a priority in national planning.

Energy Demand Planning Tool

Energy demand modeling is essential for a comprehensive vision of an economy's future energy pathways, as well as to map alternative sustainable development scenarios. While many energy models exist, most focus on supply resources and are based on the observed status quo energy demand pattern without considering potential improvements in demand technologies.



Energy demand BAU vs. energy efficiency scenario. Units: Gigawatt-Hours

Berkeley Lab's Demand Resources Energy Analysis Model (DREAM) takes a bottom-up approach based on technology details to assess the energy, economic and environmental impacts of demand-side solutions. Energy efficiency improvements and smart equipment can help reduce peak and base-load electricity demand significantly. Future energy pathways are therefore developed according to technology assumptions and behavior changes, to show the benefits of demand-side programs. EE4D works with policy-makers and local experts to develop country-tailored models that inform policymakers of the likely trajectory of business-as-usual energy demand, and reveal the best options for high impact peak load and energy demand reduction, as well as decarbonization strategies.

Applications:

- **Integrate energy efficiency as a resource**: DREAM contributes to the development of integrated resource plans (IRPs) that consider the value of demand-side solutions .
- **Prioritize high-impact areas:** DREAM helps to identify the highest impact energy demand reduction and load shifting opportunities, to inform energy policy actions and contribute to better integration of variable renewable energy.

- **Assess multi-benefits**: DREAM can help users assess energy efficiency program benefits such as emission reductions, air quality improvements, water savings and poverty reduction through consumers' electricity bill savings.
- **Long-term energy transition planning**: DREAM can help countries build a long-term energy outlook that meets national goals, including their nationally determined contribution (NDC) of reducing emissions intensity and sustainable development goals.

In-country Solutions

South Africa: Avoiding a 500 megawatt (MW) coal plant

Though the USAID EE4D program, Berkeley Lab worked with the Department of Mineral Resource and Energy (DMRE) to build a country-specific modelling tool to inform their decisions on setting minimum energy performance standards (MEPS). The tool helped DMRE revise the MEPS levels by showing the program's impact, which is equivalent to avoiding the construction of a 500 MW coal plant and 1.8 megatons of CO2 emissions reduction. It also showed that the government's cost of saving 1 kilowatt-hour (kWh) is 50 times less than the cost of supplying 1 kWh of electricity.

Indonesia: Peak Load Analysis

DREAM helped the Indonesian government estimate a peak electricity demand growth of 77 gigawatts (GW) in 2030, a 200% increase compared to 2010, mostly driven by a soaring penetration of energy guzzling air conditioners. Berkeley Lab identified a potential demand reduction of 23 GW by 2030 by accelerating energy-efficient equipment adoption. To achieve their objective of 10 GW savings in generation capacity, the Indonesia Coordinating Ministry and Berkeley Lab jointly developed a Roadmap. [2]

Uganda: Energy Efficiency Roadmap

The Energy Efficiency Roadmap for Uganda is a response to the important role that electrical energy efficiency can play in meeting the country energy goals. The Roadmap contributed to informing the government revision of its energy policy strategy. More than 20 stakeholders helped to prioritize recommendations for maximizing benefits and improving energy access. [3]

REFERENCES

[1] *South Africa's Appliance Energy Efficiency Standards and Labeling Program*. LBNL. 2020.

[2] "Forecasting Indonesia's electricity load through 2030 and peak demand reductions from appliance efficiency." LBNL. 2019.

[3] *Energy Efficiency Roadmap for Uganda, Making Energy Efficiency Count*. LBNL. 2017.

Energy Efficiency for Development (EE4D) provides technical assistance to energy system planners, regulators, and utility managers to overcome challenges associated with implementing energy efficiency programs.

FOR MORE INFORMATION.

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