



ACCELERATING SDG 7 ACHIEVEMENT

POLICY BRIEF 11

EDUCATION AND ENERGY

7 AFFORDABLE AND
CLEAN ENERGY



ACCELERATING SDG 7 ACHIEVEMENT

POLICY BRIEFS IN SUPPORT OF THE FIRST SDG 7 REVIEW AT THE UN HIGH-LEVEL POLITICAL FORUM 2018

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- IRENA: International Renewable Energy Agency
- Global Energy Interconnection Development and Cooperation Organization
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POLICY BRIEF #11

EDUCATION AND ENERGY

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Key Messages

Status of education and energy and progress towards achieving the SDGs

- Globally over 291 million children go to primary schools without any electricity, 188 million in sub-Saharan Africa, South Asia and Latin America.
- Educational facilities require energy for lighting, cooking, heating, cooling, water delivery and purification, as well as information and communication technology (ICT), including for disaster and medical emergencies. Efforts towards achieving the SDG 7 target of universal access to affordable, reliable, modern energy services also contribute to the sustainable development goal of ensuring inclusive and quality education for all (SDG 4).
- About 57 million children still do not go to school, half of them in sub-Saharan Africa. Although education levels have increased over the years, globally about 103 million young people still lack basic literacy skills, almost 60 per cent of them female (UN, 2017) and youth literacy levels tend to be lower in countries with electrification rates below 80 per cent.
- School attendance and performance levels have been shown to increase with increased electrification rates—especially for lighting and equipment (including ICT). Electrification allows schools to stay open for a better learning environment, extended operating hours of study, and teacher preparation and training after hours.
- Schools with better access to sustainable energy can also be used as a place for addressing other community services, such as clean water, hygienic sanitation, health and emergency services.
- Efforts to electrify schools have lagged behind, leaving millions of children without access to electricity—more prominently in disadvantaged and rural communities.

Priority actions

- Increase efforts and coordination among different stakeholders to gather quantitative and qualitative data and information on access to energy in educational facilities to drive evidence-based decision-making.
- Adopt enabling policies that incentivize and prioritize investment in energy access in the education sector.
- Reinforce policies that facilitate a more coordinated approach in the public sector for collaboration in the provision of energy and education infrastructure and services.
- Build support for these policies through stakeholder engagement, public advocacy and outreach to influence decision makers.

- Enhance public awareness and education to adults and children about sustainable energy in order to facilitate necessary behavioural changes, build a technical skill base and encourage youth innovation to advance sustainable energy solutions.

Energy in Education in the context of the Sustainable Development Goals

Access to modern, reliable and affordable energy is critical for development and contributes directly to achieving positive educational outcomes. Education facilities require energy for lighting, cooking, heating, cooling, water delivery and purification, and information and communication technology (ICT), including for emergency and medical emergencies. Lack of access to sustainable energy forces schools, dormitories, kitchens and staff facilities to rely on unsustainable sources such as biomass, charcoal or kerosene for lighting and cooking purposes. This exposes students and staff to indoor air pollution, creating health risks ranging from headaches to respiratory diseases, which compromises their health and learning abilities.

There is a positive correlation between access to electrification, particularly for lighting, and improved education. For instance, research in Bhutan showed that children in electrified households experienced a total of 274 more days of schooling than those living in households without access to electricity. Similarly, research in rural villages in Madagascar demonstrated that the electrification of households affects children's ability to keep up with school and helps reduce gender inequalities by providing girls, who are traditionally more engaged in housework than boys, opportunities to study after sunset. (UNICEF, 2015)

Access to reliable and sustainable energy in educational facilities allows them to extend their operating hours and improve the quality of education by providing a place for teachers to prepare lessons or receive training, contributing to teacher retention by improving their quality of life. For example, in rural areas of Kenya, 75 per cent of head teachers reported that recruiting and retaining teachers was a problem, but 60 per cent said better lighting would encourage teachers to work in remote regions. Over a third of teachers said that they use a solar light for marking, lesson planning and extra classes (Smart Villages, 2017).

Overall, efforts in achieving SDG 7 target of universal access to affordable, reliable, modern energy services also contribute to the sustainable development goal of ensuring inclusive and quality education for all (SDG 4).

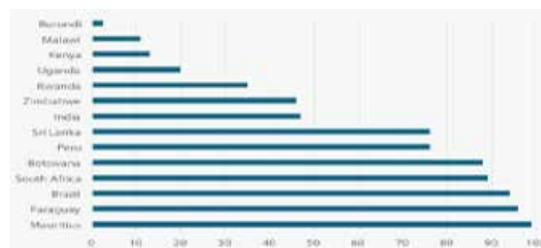
Current Status

Up-to-date energy access data in the education sector is scarce, but available research shows clear trends and correlations between electrification and education.

In terms of primary school access to electricity, sub-Saharan Africa has the lowest rate with 35 per cent, followed by South Asia with 48 per cent and Latin America with 93 per cent. Globally over 291 million children go to primary schools without access to any electricity, and 188 million of these pupils live in the in the regions mentioned above. It is worth noting that not only does sub-Saharan Africa have the lowest levels of electricity, it is also the region with the lowest levels of learning (UNDESA, 2014).

Figure 11.1

Percentage of primary schools with access to electricity in selected countries



Source: Practical Action, 2013

A quality education is instrumental in improving people's lives. Throughout the years, there has been a tremendous progress towards increasing access to education and enrolment rates in schools. Enrolment in primary education in developing countries is at 91 per cent, yet about 57 million children still do not go to school. And over half of those children live in sub-Saharan Africa.

Access to sustainable energy can help advance the education sector in numerous ways. Electrification at schools is associated with a better experience and opportunities for children as lighting significantly allows for better learning environment, extended operating school hours used for studying, teacher preparations and the facilitation of training for community members. School attendance also increases with lighting, especially in regions which face poor sunlight penetration. Qualitative research in Bangladesh demonstrated that teachers consider it almost impossible to teach under conditions of low light (Practical Action, 2013). In the Philippines, teachers have reported cancelling schools in rainy weather when classrooms are not adequately lit for teachers and students (Valerio, 2014). They have also reported cases during school days where they have to travel as long as an hour to get to the nearest city, to be able to print teaching materials and test papers. Facilitating the use of ICT—possible only through access to electrification—therefore enhances more effective use of time and resources for teachers and students, heightens the quality of education, combats the widening digital divide, and builds essential skills for the modern economy. For example, in Ethiopia children in middle school using laptops scored significantly higher in finding analogies and categories than those without (Hansen et.al., 2012).

Electrification of educational facilities can bring overall benefits to the community too, as schools can be used as integrated service platforms for children, where clean water, nutritious meals and primary health services can be provided in a safe environment. For instance, electricity can energize water delivery and purification systems, emergency radio or disaster warning alarms, and refrigeration of both food and vaccines.

Furthermore, sustainable energy improvements, including energy efficiency, in kindergartens, schools, dormitories, kitchen and staff quarters, provide clear benefits in meeting basic energy needs and enhancing the well-being of students and staff alike. Reliable and affordable energy is a prerequisite for accessing clean water and sanitation. Renewable energy for lighting and hot water systems; energy-efficient building designs, space heating and appliances; and cleaner cooking fuels in schools, dormitories and kitchens, all go a long way in ensuring a hospitable, comfortable and safer environment for students and teachers to study, stay healthy and productive. What is more, evidence suggests schools can save on energy expenses by up to 25 per cent through simple behavioural and operational measures alone. The savings can then be utilized in other priority areas in schools (US EPA, 2011).

Simultaneously, sustainable energy measures also provide considerable benefits in reducing indoor air pollution and related health risks, particularly for children. Indoor air pollution, largely caused by the use of solid fuels, contributes to over half a million child deaths under 5 (UNICEF, 2015). Countries currently suffering from critical air pollution levels such as China, India and Mongolia are gradually making efforts towards adoption of sustainable energy solutions in public service facilities, including in the education sector, to reduce and mitigate children's exposure to air pollution. Incidentally, adoption of energy-efficient building designs in kindergartens in Mongolia have resulted in improved indoor air quality, warmer classroom environment and better health outcomes for children and staff, with a nearly 30 per cent reduction in absenteeism due to illness (GIZ, 2016). Essentially, by transitioning towards a more sustainable energy pathway, educational facilities can simultaneously achieve multiple benefits, including improved learning environments, better health, energy savings and positive environmental and economic conditions.

How are we faring—Are we on track?

Under the current rate of progress, the 2017 Global Tracking Framework report shows that we are not on track to achieve the SDG 7 energy targets globally. On closing the energy access gap, 1.06 billion people still live without electricity. Efforts to electrify schools have lagged behind even more, leaving millions of children without access to electricity, more so in disadvantaged and rural communities. In India for example, only 27 per cent of village schools have electricity compared with 76 per cent of schools

in towns and cities. In Peru, fewer than half of rural schools are equipped with electricity, a library or toilets for boys and girls. In Sri Lanka, roughly one in five schools lack access to electricity and in South Africa half or more of the public primary schools lack access to electricity (UNDESA, 2014). It is worthy of note that South Africa also has one of the highest grid connection rates on the continent (UNDESA, 2014).

Recent trends in the education sector indicate that basic literacy skills have improved tremendously over the years, but more efforts are needed to achieve universal education goals, as 103 million youth worldwide still lack basic literacy skills, of which 60 per cent are young women (UN, 2017). Secondary education also remains a huge challenge, and according to projections, by 2035 only 63 per cent of the world's 20 to 24 year olds will have completed upper secondary school (Smart Villages, 2017). Dropouts are a continuing issue, mostly in sub-Saharan Africa, where at least 20 per cent of the children enrolled are not expected to reach the last grade (Smart Villages, 2017).

Youth literacy rates tend to be lower in countries with electrification rates below 80 per cent. School performance has also been shown to increase in correlation to electrification rates, with primary school completion rates enhanced with greater electrification (UNDESA, 2014). Advancing access to energy can therefore play a crucial role by complementing other educational investments in improving schooling and educational attainment.

Key challenges and recommendations

Barriers to limited access to sustainable energy in educational facilities pertain broadly to (a) weak policy complementarities and coordination across energy and education sectors to meaningfully facilitate access; (b) issues of affordability and high upfront capital costs; (c) technical barriers, including reliability of power supply, maintenance and after-sales services; and (d) information and awareness on the multiple benefits of energy and implications on educational outcomes.

Although energy access has gradually advanced over the years, the number of students globally still without access highlights the need for carefully targeted measures to address the challenges.

First, sufficient quantitative and qualitative information is required to clearly reflect the magnitude of the challenge and to drive evidence-based decision-making. As it stands, data is often a key difficulty and challenges mount when trying to obtain data on energy access in the education sector. Challenges pertaining to limited data then translate into limited information, which in turn undermines evidence-based decision-making. Therefore, increased efforts at data generation and analysis are needed for better insights and sound decision-making.

Second, enabling policies that incentivize and prioritize energy access in the education sector should be put in place and enforced. Limited quantitative data makes it challenging to authoritatively estimate the financing needs to electrify the education sector. The IEA estimates that US\$1 trillion investment is needed to achieve universal access to energy by 2030; this offers a broad signal of the magnitude of investment required to adequately reach out to the education sector (IEA, 2017).

Leveraging private sector finance is critical. A policy environment that incentivizes private sector financing is needed to promote innovative business and service delivery models for provision of quality energy services—particularly in underserved areas. A suite of Public Private Partnership (PPP) models have been successfully demonstrated for infrastructure and service provision in the education sector. This can be extended to investments in school electrification programmes, too. Several case studies exist where PPP models have been successfully employed in school electrification programmes, including in Argentina, South Africa and the Philippines.

It is also imperative to reinforce policies that facilitate a more coordinated approach among public agencies for collaborating in the provision of energy and education infrastructure and services. In terms of ensuring reliability of energy access, technical problems of connections and equipment can be offset through the use of strong regulatory frameworks, national standards, quality assurance and certification systems. In fact, these have been shown to facilitate more reliable local manufacturing and maintenance activities, reduce costs and improve quality of service.

Furthermore, policy advocacy, stakeholder engagement, public awareness and education are vital not only in influencing decision makers, but also in facilitating necessary knowledge, attitude and behavioural changes among children and adults on the benefits of sustainable energy. Separately, the incorporation of energy education in curricula has been demonstrated to build a necessary technical skill base from early on, creating a youth generation that can act as change agents, while simultaneously allowing greater youth innovation to advance sustainable energy solutions.

Interlinkages with other Sustainable Development Goals

Energy access, energy efficiency and renewable energy for educational facilities also affects other SDGs besides SDG 4, including good health and well-being (SDG 3), clean water and sanitation (SDG 6), and gender equality (SDG 5) among others. Other than providing lighting, electricity in schools can have a multiplier effect on community services when it is used to access, deliver and purify water for drinking and sanitation, circulate air to provide a comfortable indoor climate, heat the space during winter and refrigerate food and medical supplies.

Solar PV systems and solar pumps have been successfully used in educational facilities to provide better access to safe water and hygienic sanitation. UNICEF's Global Solar Water Pumping Programme, for instance, deploys renewable energy across 35 countries to access, treat and supply safely managed water to children, their families and communities, prioritizing public service facilities such as health facilities, schools and community centres. In Kenya, before electrification schools would tend not to clean their toilets due to lack of water, and water-borne diseases such as skin infections, typhoid and cholera were common, leading to “rampant absenteeism of students and teachers”; electrification was successfully used to rectify these issues. (UNDESA, 2014).

With regard to gender empowerment, energy access has been found to directly contribute to time and labour benefits for women and girls. This, in turn, enhances their ability to attend school and educational activities. In Mali for instance, electrification has increased levels of girls' school attendance, improved performance, and drastically improved girl-to-boy ratios. Similarly, a study conducted in 52 developing countries showed that numerous countries with lower electricity access have lower girl-to-boy ratios in schools. Nepal, for instance, showed an increase in girl student enrolment by 23.3 per cent across a sample of villages that had received school electrification (UNDESA, 2014).

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