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for every child

A brighter life for every child with sustainable energy

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Cover photo:
Karim (13) in Burkina Faso learns skills in solar energy at a UNICEF-supported training center that gives displaced children the opportunity to learn a profession. After attending training sessions, he said, "My dream is to become an engineer."

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Sustainable energy strengthens social services to improve young lives

UNICEF recognizes the integral connection between equitable access to energy and child rights. Where sustainable energy access is lacking or unreliable, children and young people pay the biggest price as they are one of the single most-affected groups due to lack of energy access. The impacts threaten to undermine decades of progress on every child's ability to survive, grow and thrive (see box).

Clean, sustainable energy is critical for children and young people. It improves the quality, accessibility and reliability of essential services they rely on for education, universal healthcare and safe water and sanitation. Affordable, reliable, sustainable and modern energy can aid in advancing development goals and reducing multidimensional poverty, and reduce emissions that contribute to the climate crisis.

UNICEF's global sustainable energy initiatives focus on reaching the most vulnerable children and young people,[1] including in geographically challenging, remote, off-grid communities and in humanitarian and protracted crises.[2] Here, renewable energy solutions are already transforming vulnerable, energy-poor communities as a key building block for enhancing the quality and reliability of service delivery.

Building on its expertise across multiple sectors — and a large global presence (190 countries and territories, including the 46 least developed countries[3]) — UNICEF deploys sustainable energy solutions across health; water, sanitation and hygiene (WASH); education; and social protection sectors. UNICEF's sustainable energy initiatives range from paradigm-shifting, global activities such as vaccine cold chain, solar water pumping programmes[4] to solar seawater desalination projects[5] to community-level energy access for education and social protection programmes.

This publication highlights UNICEF's sustainable energy efforts around the world within and across multiple sectors — showcasing best practices, lessons learnt and investment cases.

644 million
Children and adolescents under age 18 affected by multidimensional poverty (of 1.3 billion people).[6]

>186 million
Students in primary schools without access to electricity (predominantly in Sub- Saharan Africa, South Asia and Latin America).[7]

274
Number of days more that children living in electrified households spend at school over those without electricity.[8]

~600,000
Children under age 5 who die each year from respiratory infections related to indoor and outdoor air pollution and second-hand smoke resulting from unsustainable energy practices.[9]

UNICEF's sustainable energy priorities

UNICEF is committed to accelerating its efforts to deliver transformative results at scale for children, young people and their families across the following priorities:

Market shaping and assessment

UNICEF has decades of experience in assessing and influencing markets to strengthen the evidence base for and improve access to sustainable, affordable and fit-for-purpose energy products and services. UNICEF aims to expand its ongoing solar market and demand assessments to define the demand and supply landscape and quantify the market size for sustainable energy services in healthcare, education, water and sanitation at national, sub-national and facility levels.

UNICEF Supply Division's longstanding track record in the following areas will serve as a foundation to shape the sustainable energy market in key programme areas:

- → Activating demand and facilitating market access for a diverse range of sustainable energy products and services that are appropriate for different contexts;
- → Engaging with new suppliers and enabling them to enter the market and meet demand;
- → Procuring supplies at sustainable prices where they are needed most; and
- → Incentivising and technically supporting manufacturers and suppliers to innovate and improve solutions and business models.

Cross-sectoral advocacy and policy engagement

Building on the data and evidence generated through market assessments and trusted relationships, UNICEF will accelerate evidence-based advocacy, convene governments and partners to facilitate enabling policy environments, enhance national ownership, and catalyse public and private investments in sustainable energy access across social sectors. UNICEF will continue to advocate for integrating child-sensitive climate, disaster risk reduction (DRR) and renewable energy actions into sectoral plans and policies, as well as the integration of health, education and WASH priorities into national climate, DRR and energy policies.

Rightsized off-grid solutions deployment

Drawing from market assessments and as underpinned in its core development and humanitarian programming, UNICEF will facilitate public and private partnerships to identify the most appropriate sustainable energy solutions, implement proofs of concept, and scale up the most feasible models for wider deployment, benefitting children, young people and communities. UNICEF aims to avoid duplications and create synergies with existing service delivery mechanisms. This will help to optimize return on investments and reinforce existing programmes that target areas and populations with the direst needs and greatest potential.

Green skills and engagement by young people

Sustainable energy transition is an intergenerational issue and young people have a key role to play. UNICEF will continue scaling up its support to young people as agents of change for climate, DRR and energy actions. This includes through strategic partnerships (e.g., with the SDG7 Youth Constituency [SGD7YC][10]), capacity and green skills trainings, and co-creating tools and training resources for children and young people on sustainable energy. Such efforts will contribute to reaching climate and energy goals and help enable a just and equitable transition to a climate-safe future.

Amina, 24, learns how to install solar panels at a UNICEF-supported Youth Empowerment Centre in Somalia. The Centre provided training in construction, engineering and plumbing to more than 500 displaced youth.

Investment will improve essential services for children and young people

Global investment in renewable energy is increasing, with a two percent growth in 2020 to $303.5 billion. However, only 20 percent of those funds are reaching the least-developed countries.[11]

$303.5 billion

2020 global investment in renewable energy

Only 20 percent of those funds are reaching the least-developed countries

With dramatically decreased costs and emerging delivery models, decentralised, off-grid renewable energy solutions — such as solar — are becoming increasingly feasible for improving energy access in remote, underserved schools; healthcare facilities; and communities. Investing in the scale up of solar solutions provides opportunities to engage and empower the most vulnerable young people and women as valuable consumers and, most important, crucial players for renewable energy.

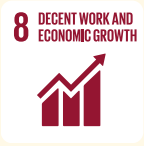
Shifting renewable energy investment to countries most in need is not only critical to keep families out of poverty,[12] targeted investment can mitigate the growing threats to children's health from environmental pollution, disasters and climate impacts. Child-sensitive[13] renewable energy solutions can also accelerate achieving the Sustainable Development Goals (SDGs) for children and young people by 2030.[14]

SDG 7 **Affordable and Clean Energy**[15]

Sustainable energy solutions can help achieve better health, education, safe water and sanitation, and social policy outcomes in development and humanitarian situations for the most vulnerable children and young people.

SDG 5 **Gender Equality**[16]

Sustainable energy solutions can engage and empower girls and young women by increasing school attendance and the ability for home study. It can also save them time and effort from having to travel far to collect water and fuelwood, provide safety at night, and boost technical skills-building and livelihood opportunities.



SDG 8 **Decent Work and Economic Growth**[17]

Sustainable energy solutions can increase opportunities for full and productive employment and decent work for young people, especially in technical skill training as the renewable energy market grows.

SDG 13 **Climate Action**[18]

Sustainable energy solutions in child-centric social sectors can contribute to reducing greenhouse gas (GHG) emissions and air pollution, promote climate-resilient development and disaster recovery, and increase green job opportunities.

SDG3
Good Health and Well-Being[19]

In the Syrian Arab Republic, a child receives vaccines at a UNICEF-supported clinic during a national immunization campaign. More than 700 health workers participated in 60 fixed health centres and with 83 mobile health teams. UNICEF provided all vaccines and cold chain equipment (including solar-powered equipment) to ensure vaccine safety.

Decentralised and reliable energy at healthcare facilities can power vital life-saving medical equipment 24/7 (e.g., vaccine refrigerators, diagnostic equipment, ventilators, emergency and operating rooms); ensure access to maternity treatments, safe births any time of day, postnatal care and reproductive health; and improve facility operations and staff retention. Electricity provides lighting, heating, cooling, digital connectivity and clean and safe water.

In more than 80 countries, UNICEF has supported the solarization and off-grid energy solutions for vaccine cold chain, electrification, heating and cooling at health facilities and medical warehouses. This includes providing technical assessments to define and quantify vaccine storage and relevant energy needs at healthcare facilities, market assessments and shaping, supply, procurement and deployment support to governments, evidence-based policy support on the interlinkages of health and renewable energy, and engaging local entrepreneurs and young people.

From 2016-2021, UNICEF procured and delivered more than $333 million worth of solar-powered vaccine cold chain equipment. Since 2017, more than 88,000 solar cold-chain vaccine fridges have been installed across healthcare facilities, mostly in Africa.[20]

Off-grid energy solutions

UNICEF supports the solarization and off-grid energy solutions for vaccine cold chain equipment, electrification, heating and cooling at health facilities and medical warehouses.

Syria

Solar-powered health systems advance quality of care for children and young people

Between 2016-2021, UNICEF Syria solarized 70 rural healthcare facilities. It also procured vaccines and cold chain equipment under the 2017-2019 Humanitarian Response Plan for Syria supported by Gavi, the Vaccine Alliance. Additional funding during the Covid-19 response allowed UNICEF to accelerate these efforts, which contributed to improving the quality of care for children through more equitable vaccine and healthcare access.

For instance, the 2021 UNICEF installation of 180 solar refrigerators and 16 cold rooms ensured vaccine access and effectiveness for COVID-19 and other routine and campaign vaccines for children and their families. To improve long-term care, UNICEF built technical and managerial capacities of more than 700 health workers (400 women) to maintain the cold chain systems. The trainings equipped them with the skills needed to better respond to current and future health emergencies.

- **70 rural healthcare facilities** solarized.
- **~1.7 million children and women** reached through solarized healthcare facilities in Syria, including more than 2 million free paediatric and maternal health consultations.
- **$15 million USD** investment for solar equipment.

Funding support from Gavi, the Vaccine Alliance.

Zimbabwe

Sustainable energy solutions enable progress on quality of care and healthy environments

To achieve a higher quality of care for families in rural areas with no or unreliable energy access — especially for children, adolescent girls and women — UNICEF Zimbabwe and the Ministry of Health and Child Care (MoHCC) implemented the Sustainable Energy for Health Facilities and Surrounding Communities programme. The programme included three components:

- Solarizing 30 healthcare facilities across four districts between 2018-2022;
- Developing a sustainability framework to guide operation and maintenance of the solar systems; and
- Promoting the use and household adoption of fuel-efficient cookstoves.

The solar systems enabled 24/7 access to healthcare for more than half a million people.[21] Through consistent energy supply, the solar systems enabled improved access to medical services and procedures that contributed to reduced child mortality and death. The solarized staff quarters and health facility water points improved conditions of care, water quality and supply at the facilities and surrounding communities, and staff motivation and retention.

Fuel-efficient cookstoves were also introduced in two districts across 26 communities surrounding the newly solarized healthcare facilities. Households which adopted the cookstove model reported a reduced reliance on fossil fuels and wood, reduced child respiratory infections from improved air quality and greater incomes for women who built and sold the cookstoves as a microbusiness.[22]

Within the communities:

- **5,473 households adopted** the cookstove model.
- **7,470 women** trained in cookstove construction.
- **1,000 women trained** in small business operations.
- **95,768 mothers and their female neighbors** trained in infant and young child feeding, including cooking demonstrations using the cookstoves.
- **>$3 million USD** investment.

Primary funding support from the Government of Sweden through the Zimbabwe Health Development Fund, with additional funding from the United Kingdom, Ireland, European Union and Gavi, the Vaccine Alliance.

Gogo (granny) Imbayago, 71, says she can cook healthier food faster on her fuel-efficient 'Tsotso' cookstove, a specially designed open clay pot she and others in her community learned to make and use.

India

Hybrid solar systems improve tribal healthcare for children, adolescents and women[23]

For decades UNICEF India has been working with the Ministry of Health and Family Welfare (MoHFW) in its mission to improve equitable access to health services, especially for children and mothers in tribal areas. Starting in 2008, in Maharashtra, UNICEF conducted electricity needs analyses at tribal Primary Health Centres (PHCs) to design and install 58 solar hybrid photo-voltaic (PV) systems in 2009. The technical knowledge gained and benefits for children and women led to UNICEF and the MoHFW scaling up to 407 systems by 2015 in 29 districts of the state. The hybrid systems were gradually refined to take the critical load off entire PHCs with in-built real-time monitoring systems.

The solar systems created a more accessible, efficient environment for healthcare staff to handle emergencies 24/7, such as for trauma, poisonings, deliveries, newborn resuscitation, emergency minor surgery, etc. This resulted in heightened medical devices use; expanded cold chain points beyond the block (*taluka*) level; increased health-seeking behaviours, safety and security for patients and staff, especially for females during night hours; improved laboratory services, especially those requiring light microscope work like malaria and tuberculosis; and enhanced reporting and management information system functionality. The 24/7 electricity provided a conducive environment to achieve the following results:[24]

- **12.2 million** people have access to reliable diagnostic facilities for malaria, tuberculosis and essential pathology services
- **240,000 children** born each year benefit from essential newborn care facilities and access to vaccinations.
- **912% increase** in indoor admissions (from 5,051 to 51,106), with some increases due to students using the electrified buildings as a place for evening study and patient attendants accessing safe water supplied through solarized water purifiers and mobile charging facilities.
- **128% increase** in lifesaving interventions (from 856 to 1,956).
- **71% improvement** in newborn care services.
- **22% improvement** in Operational Theatre (OT) services.
- **~$4.7 million USD** on solar systems.

Funding support from KfW Development Bank.

Jhilimoni Tulo, a female health worker and acting cold chain handler working in rural India, checks the temperature of a Solar Direct Drive (SDD) vaccine refrigerator supplied by UNICEF. The installation allowed the Primary Health Centre (PHC) to become a cold chain point, which helps bring more effective, efficient and timely vaccine deliveries to the community.

SDG4
Quality Education[25]

About 20 Rohingya girls are learning to install and repair solar panels in a refugee camp in Bangladesh. Nur, 16, (in yellow) said, "I'm learning this so that I can do repairs myself in my house. The boys can come here, so why not the girls?"

Modern, reliable and affordable electricity at schools, learning centres and homes is required for lighting, cooking, heating, cooling, water supply and purification, and emergency and medical services. It can increase student school attendance; allow for longer operating hours; improve educational outcomes and students' quality of learning; and support remote learning and studying outside of daylight hours. Electricity has also been associated with higher teacher retention.

To improve education outcomes for students and promote climate-resilient schools, UNICEF is connecting schools and learning centres to renewable energy. UNICEF simultaneously supports educational, community and government partners to ensure systems are long-term and sustainable. Energy access is a critical component in ensuring quality education through digital learning. Equitable technology access is a cornerstone for providing children and young people with the skills they need to improve their prospects and safeguard their well-being.[26]

Equitable technology access

Energy access is a critical component in ensuring quality education through digital learning. Equitable technology access is a cornerstone for providing children and young people with the skills to improve their prospects and safeguard their well-being.

Bangladesh

Solar energy solutions support safer learning environments in refugee camps

In Cox's Bazaar, Bangladesh, more than 351,000 Rohingya children and young people living in refugee camps are studying at 2,800 learning centres (LCs) and 150 multi-purpose centres (MPCs) supported by UNICEF. This includes at 150 of the centres UNICEF built with renewable energy systems that power lights, fans and other equipment.

UNICEF and its partners are also facilitating solar repair and maintenance training for adolescents and youth in the refugee camps. Young people learn to fix and maintain learning centre solar panels and provide technical skills to the wider community, such as at shelters and for street solar lights. Reliable energy access has been shown to increase student attendance and retention at the LCs and MPCs. It assures necessary power supply within the community at shelters and on the streets, which is critical for child protection, safety and well-being.

- **2,937 Rohingya adolescents** aged 15-18 graduated with solar repair and maintenance skills in 2021.
- **78 multi-purpose centres** offering solar repair and maintenance in Cox's Bazaar as a trade.
- **~$8.7 million USD** investment.

  Funding support for the vocational skills training rollout from KfW Development Bank as the largest donor, building on multiple other donor funds.

Jordan

Electrification supports safe spaces for children and young people

Since 2016, more than 140 Makani ('My Space' in Arabic) centres[27] have provided safe spaces for vulnerable children and young people up to age 24 years to learn, build skills, improve their well-being and reach their full potential. The centres support those from refugee camps, informal-tented settlements and host communities (regardless of nationality).

By 2022, UNICEF Jordan installed solar PV systems in 52 out of 69 Makani Centres in host communities, which improves their long-term sustainability by lowering carbon footprints and energy bills. The cost savings from solar power are redirected to improved, affordable services for children and young people.

UNICEF Makani Centres also incorporate environment-friendly programming to stimulate young people's civic and economic engagement. In 2021, UNICEF and the Royal Health Awareness Society (RHAS) introduced youth environmental clubs into 22 Makani Centres, with plans to scale the activity into other centres. Young people in the clubs learned about and created projects on the environment, renewable energy, waste management, climate change and climate-resilient WASH.

- **60,000 children and young people** reached per year in Makani Centres powered by solar systems.
- **~$175,000 USD** in energy cost savings per year at the 52 Makani Centres.
- **$475,000 USD** investment to install the solar systems.

Funding support from KfW Development Bank/German Federal Ministry for Economic Cooperation and Development (BMZ) & the European Union.

With the savings from the solar PV installations, Makani Centres have been able to reduce operational costs; and some centres have been able to add additional staff members to support integrated learning, child protection and child and youth services.

Sudan

School and home solarization heightens educational outcomes

Given that 65 percent of the Sudanese population is younger than age 25, ensuring children and adolescents have a strong educational foundation is critical to Sudan's social and economic future. With a significant proportion of Sudan's population living in off-grid communities, solarization in schools and homes is providing opportunities to increase students' access to education, digital connectivity and enhance learning, such as being able to do homework at night.[28]

Since 2018, UNICEF has installed solar PV systems in 114 schools in 8 states and in 300 households with solar lighting, provided more than 2,400 solar-charged tablets for young people to use and supported 78 solar-powered e-learning centres in 3 states to meet online educational needs. The solar systems distribution to households included a technical orientation, educational materials and installation support. The school solar units have helped to improve overall school environments, teacher and student motivation, learning outcomes and safety and security during evening hours.

- **750 rural women** received training since 2019 in solar system installation and maintenance, business management and income-generating activities (including 450 who received intensive on-job training in revolving fund management and bookkeeping).
- **62,100 children and adolescents** are benefiting from solar power in schools and households.
- **$427,500 USD** investment.

Funding support for the e-learning centres & schools from UNICEF Netherlands, the Government of The Netherlands and The Government of Germany.

Girls attend an e-learning class in rural Sudan as part of an initiative offering out-of-school children aged 7-9 years access to quality education on solar-powered tablets.

SDG6*
Safe Water and Sanitation[29]

In some Colombian areas, girls and women walk more than 8 hours to find water. Improved access to water services — coupled with key WASH messaging — can enable and empower community members to use their time and resources more productively, such as for study and pursuing livelihood opportunities.

*UNICEF aims for 'safe' water as clean water may not be safe (e.g., water that includes arsenic).

Consistent, climate-resilient water supply systems in communities powered by solar or other renewable energy sources can contribute to ensuring access to sustainable, affordable, equitable and safe water services. Keeping water safe and accessible can lessen children's exposure to deadly waterborne diseases.

In 2020-2021, UNICEF's Global Solar Water Pumping Programme — active in 51 countries — installed nearly 3,000 solar-powered water systems (SPWS) in schools, healthcare facilities and communities in rural, urban, disaster-prone and conflict-affected contexts. UNICEF is scaling up multiple use systems (including irrigation points) through mini-water networks, such as tap stands. The programme also trains community members and municipalities in system operations and maintenance.

As an example, in Myanmar, UNICEF partnered with the Department of Rural Development to construct more than 20 SPWS, which allowed 50,000 people living in off-grid communities to gain access to safe water.

Mini-water networks

UNICEF is scaling up multiple use systems to provide water for schools, healthcare facilities and community water points (including irrigation points) through mini-water networks, such as tap stands.

Colombia

Solar-powered water pumping systems reduce drought-risk

The climate of La Guajira, Colombia is arid and very dry with two seasons of sparse rainfall each year and a high threat of extreme and extended drought. In rural areas, fewer than 10 percent of the population has access to safe water and sanitation. To improve the availability, reliability and resilience of water sources in this high drought-risk area, UNICEF, Colombia's Ministries of Foreign Affairs (MoFA) and Public Works, and Oxfam installed or rehabilitated wind- and solar-powered water pumping systems.

As a result of the 2016-2017 programme, 13 communities improved their access to more sustainable and resilient water systems, including through 37 new or rehabilitated solar desalination systems. Solar and wind power allowed systems to operate continuously and to manage scarce water supplies in remote areas. UNICEF and its partners also strengthened capacities at municipalities for officials to support the solar- and wind-powered water pumping systems. The efforts strengthened the relationship and trust between remote communities and public institutions.

- **1,100 people** reached by improved water sources, including more than 400 children and young people.
- **6,000 litre** increase in water availability per day in communities.
- **1-2 hours/day** reduction in time per family in the 13 communities to collect water.
- **$517,000 USD** investment.

Funding support from UNICEF, Colombia's MoFA and Oxfam.

Gaza Strip

Solar-powered desalination plant brings safe water to thousands

Water resources have long been critically scarce in the Gaza Strip, State of Palestine, as 95 percent of the water extracted from the coastal aquifer is considered unfit for human consumption. In 2017, the southern Gaza Strip region was only receiving electricity from the grid 4 hours a day, which limited the supply of safe water access for hospitals, factories, schools, households, etc. In response, UNICEF deployed a solar-powered desalination solution. With funding from the European Union, UNICEF built and continues to manage a Southern Gaza Desalination Plant (see photo).

The solar photovoltaic (PV) systems not only allow uninterrupted operation of the desalination plant but also act as a sustainable independent energy source that would likely not be impacted by any conflict in the region that affected the national power grid. In 2022, the desalination plan is running at full capacity following the completion of a dedicated power line to the plant to receive 24/7 grid power supply. The solar PV system continues to operate as on-grid support source to the national grid.

- **75,000 people (50% children and young people)** benefitting from improved water services. Once the expansion phase of the plant is completed, it will supply water to 250,000 people.
- **6,000 cubic metres** of drinking water provided each day by 2022, up from 2,000m^3 in 2017.
- **€10 million EUR** for phase I (2014-2017).
  €20 million EUR for phase II-III (2017-2022).
  Funding support from the European Union.

In addition to solar field construction, together with Coastal Municipality Water Utility and the Palestinian Water Authority, UNICEF led a public information and communication for development (c4d) campaign to inform community members that they can trust desalinated water. They explained how to safely handle the water and keep it clean in water tanks at home.

Mauritania

Combined manual drilling and solar energy builds drought resilience

Mauritania is in the Sahelian region of West Africa with two-thirds of the country receiving less than 150mm of rainfall per year. Most of Mauritania's villages are small with 80 percent having fewer than 500 people. Many are in off-grid desert areas with terrain that makes it difficult to access deep aquifers with traditional borehole drilling. In rural areas, nearly half of the population lacks access to safe water and many children, young adolescents and women walk several kilometres a day to collect water.

In response, since 2018, UNICEF has supported more than 60,000 people in rural areas to gain access to an improved water supply through boreholes equipped with solar pumps, reservoirs and mini networks. Where feasible, these were connected to local schools and healthcare facilities. To ensure on-going operation and maintenance, UNICEF contributed to conditions for sustainability. This included ensuring management models aligned with Ministry of Water and Sanitation frameworks; promoting autonomous systems; using innovative, friendly low-cost technology; and strengthening local capacities.

Between 2020 and 2021, UNICEF supported five manual drilling stations equipped with solar pumping systems and trained local operators. The knowledge gained led to a regional scaling up of more than 100 manual drilling boreholes supported by companies under municipality supervision. It also prompted the addition of manual drilling as an option for water supply in government programming planning, with a specific focus in northern Mauritania where the technology is particularly well adapted to increase the resilience of the communities during the dry season and periods of climate shocks.

- **60,000 people** in rural areas gained access to an improved water supply.
- **$6.4 million USD** investment.

Funding support primarily from the Netherlands Ministry of Foreign Affairs for International Cooperation (DGIS); the German Federal Ministry of Economic Cooperation and Development (BMZ); the Japanese Government and the Office of U.S. Foreign Disaster Assistance (OFDA).

In a drought-prone area of Mauritania, as part of a UNICEF programme in partnership with local authorities, a women's cooperative uses solar energy to operate a borehole that supplies water to their market garden. This provides regular income from their crops for the women, and a rich variety of fruits and vegetables for their children.

SDG1
No Poverty[30]
— Social Protection

In Mongolia, Khandarmaa Dashdorj and her family participated in the CHIP (cooking, heating and insulation products) sustainable energy programme in 2019, supported by UNICEF. With CHIP, they found they no longer needed to make a fire for heating or cooking in their home and they put away their stove. They did not need to buy coal and had very little dust inside after cooking.

Access to clean, reliable energy can strengthen delivery of social services for children and young people, reduce multidimensional poverty, build child and community resilience and sustain development gains — especially in areas subject to shocks and chronic stress. Clean energy access for cooking helps in preparing healthy, nutritious meals for children and young people while reducing indoor air pollution.

UNICEF has been working with governments to link sustainable energy solutions and social protection investments, such as the use of cash transfers and building shock-responsive strategies.[31] Through efforts to embed energy access into national social protection programmes for systemic change, UNICEF and its partners aim to raise families out of poverty. That is, through sustainable energy solutions that can boost child education outcomes through greater access to digital learning and light for night-time study, improve income-generation opportunities, and lead to better family health and well-being.

Building skills for green energy jobs can also help to graduate people from receiving social assistance to contributing to social insurance part of social protection.

Raise families out of poverty

Through efforts to embed energy access into national social protection programmes for systemic change, UNICEF and its partners aim to raise families out of poverty.

Mongolia

Families breathe easier with energy-efficient products and services

In Bayankhongor city,[32] Mongolia, outdoor air quality levels can reach 600 µg/m3 during winter (which is 24 times higher than World Health Organization acceptable levels). Indoor air pollution is also high due to widespread coal fired stove use, provoking serious health effects in children and pregnant women. In response, UNICEF Mongolia is supporting the CHIP (cooking, heating and insulation products, and energy advisory services) programme.

In 2018, UNICEF and the local government set an ambitious goal to transform Bayankhongor into the first Smog Free City in Mongolia by 2022. As part of this programme, in 2020 CHIP financially and technically supported 529 vulnerable households[33] in 3 provinces and Bayanzurkh district of Ulaanbaatar to shift away from cooking and heating with coal in their *gers*.[34] In 2021, the programme was scaled up, which led to the following results:

- **420 children** aged 0-5 in **724 households** who benefited in the *gers* from a clean and safer environment (fewer stove injuries), better health (fewer cases of pneumonia), enhanced sleep quality and more.
- **41 minutes** is the estimated time saved per day for families (4% of the day), particularly for girls and women who are usually responsible for the warmth in a *ger.*
- **~$800,000 USD** investment.

Funding support from UNICEF, Swiss Agency for Development and Cooperation, local governments, The Government of the Netherlands and in-kind partner contributions (The Mongolian University of Science and Technology, People in Need INGO, Mongolian Sustainable Finance Association and the University of Pennsylvania).

Kenya

Cash transfers provide home energy to school-age students and their families

UNICEF, in collaboration with the Sweden Embassy in Nairobi (Swedish International Development Agency, SIDA), is supporting the Government of Kenya to implement an Energy Cash Plus Initiative (*Energy for the Poor or Mwangaza Mashinani*). This initiative is the first of its kind in Kenya to link the social protection and energy sectors for people living in poverty. UNICEF has also partnered with Energy4Impact[35] and Dlight[36] for the implementation of the programme.

The social protection initiative allows off-grid households with children who live in poverty and are vulnerable to shocks to access solar lanterns and Solar Home Systems (SHS). This innovative initiative provides a bi-monthly cash top-up to the Kenyan government's National Safety Net Programme (NSNP or *Inua Jamii*) beneficiaries, which allows them to pay for the solar systems.

During the first phase (2018-2020) of the pilot in Garissa and Kilifi counties, *Mwangaza Mashinani* Cash Plus enabled 1,700 participants to acquire solar solutions, with a 70 percent repayment rate. The second phase then expanded to more than 2,400 households for 2020-2022,[37] with positive outcomes:

- Children in solarized households were able to continue learning during COVID-19 pandemic school closures;
- Families improved their social well-being with greater opportunities to socialize and increased security; and
- Private sector suppliers created viable markets in very poor and hard-to-reach areas.

This initiative has attracted the interest of various partners in Kenya. For instance, the Kenyan Ministry of Energy (MoE) and Ministry of Labor and Social Protection both endorsed *Mwangaza Mashinani*. They, and others, recognize the initiative as providing valuable knowledge for how to leverage *Inua Jamii* as a tool for reaching the Kenya National Electrification Strategy (KNES)[38] goal to electrify 2.18 million households.

- **1.7 million households** in *Inua Jamii*, the National Safety Net Programme, reached with cash transfers in 2020 in Kenya,[39] including with Energy Cash Plus.
- **4,200 households** reached with cash transfers in 2020 in Kenya.[40]
- Approximately **$76,026 USD in total savings** in 2021 for households that procured solar devices.
- **3.4 hours more energy** per day for beneficiaries; and 400/KSH per month ($3.5/USD) savings on lighting and mobile phone charging.
- **Nearly 2,300,000 USD** investment. Unit cost per beneficiary of $296 USD.

Funding support from the Sweden Embassy in Nairobi (SIDA). This excludes the costs for an external independent evaluation and costs associated with UNICEF technical assistance and quality assurance activities.

A girl studies by the light powered by a solar home system (SHS), as part of *Mwangaza Mashinani* Cash Plus. The social protection initiative enhanced energy access to the most vulnerable segment of the Kenyan population with a goal to improve the wellbeing of beneficiary households. One key aim, for instance, was to improve children's educational outcomes through increased study hours, particularly after dark.

Cross-sectoral programming

Malawi

Climate-resilient sustainable solar-powered systems contribute to children's good health and well-being[41]

To reduce health issues facing children in hard-to-reach, rural communities, UNICEF Malawi and its partners have developed child-centred, renewable energy solutions that adapt to existing social structures for improving essential services. Attention on social structures means to first prioritize reaching the most vulnerable communities who are not being serviced by traditional energy solutions (e.g., the national power grid).

Second, it means to ensure energy solutions match the local context and needs, as provided through community collaboration for and with children and young people. Especially for drought-prone districts where hydroelectric production is limited or absent, decentralized solar energy solutions can be effective.

By the end of 2021, UNICEF Malawi installed 429 solar vaccine cold chain, conducted energy demand assessments at more than 50 healthcare facilities and installed 20 health facilities with solar PV systems (with 5 being built in 2022). From 2017 to mid-2021, nearly 284,000 children and community members were reached through solar-powered water systems at schools, healthcare facilities and in nearby communities.

- **1 million mothers, children and young people** estimated to be positively impacted by solar refrigerators through improved essential health services.
- **>300,000 mothers, children and young people** to be positively impacted by solar system installations in 25 healthcare facilities with no electricity grid connection or inconsistent power.
- **~$13 million USD** in climate-resilient sustainable solar-powered systems from 2017-2021.

Funding support for WASH, Health and Education initiatives that include solar-powered systems from UNICEF; the European Union; Government of United Kingdom Foreign, Commonwealth & Development Office (FCDO); and Gavi, the Vaccine Alliance.

The solar water system at Mchoka health facility in Malawi has enabled more patients and health workers to avoid waterborne diseases with safe water access.

UNICEF 2018-2021
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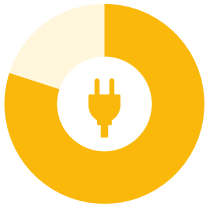
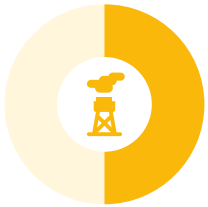
***See as country list on page 30**. Map data gathered from 2018-2021 UNICEF internal reporting on programming activities. The map highlights health, education and WASH as areas of expertise on renewable energy scale up, and social protection as a growth area. Note that the boundaries, names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

UNICEF is reducing its worldwide carbon and environmental footprint



Source 80 percent of electricity from renewable energy by 2030



Reduce UNICEF facility carbon emissions by 50 percent by 2030

In its 2022-2025 Strategic Plan,[42] and aligned with UN reduction targets set in 2019, UNICEF commits to reducing its environmental impact — including by cutting greenhouse gas (GHG) emissions by 25 percent by 2025 and 45 percent by 2030. It aims to source 40 percent of its electricity from renewable energy by 2025 and 80 percent by 2030. UNICEF is also developing an innovative financing model that will support at-scale solarization of UNICEF offices and reduce facility carbon emissions by 50 percent by 2030.

Since 2015, the organization has been reducing emissions from vehicles, grid electricity and diesel generators; three out of its four main emissions sources. UNICEF has also claimed carbon neutrality since 2015 through the offset of unavoidable GHG emissions, including through the purchase of carbon credits from the UNFCCC Adaptation Fund.

In 2018-2019, technicians installed a system of 105 KW solar panels on the UNICEF Tanzania rooftop, allowing it to use power from the national grid only sporadically and at night to improve eco-efficiency. This will reduce carbon emissions by approximately 170,000-210,000 kg per year.

Global sustainable energy efforts can transform young lives[43]

Energy can define a child's access to education, healthcare, water, clean air and safety; all of which are threatened by environmental degradation, disasters and a changing climate. The time to scale up sustainable energy solutions around the world is now.

Using sustainable energy to improve child-centred essential services and advance the SDGs requires purposeful, data-informed and appropriate decisions, leadership and investment. For years, UNICEF and its partners have put children and young people at the forefront of solutions in equitable, quality healthcare, education, WASH and social protection. Sustainable energy solutions can accelerate and sustain positive outcomes across these and other sectors.

UNICEF's energy work builds on more than three decades of experience in deploying solar-powered vaccine cold chain and water pumps in geographically challenging and remote areas; access to health and education facilities data; strong relationships with communities and private and public sectors; and critical policy linkages with governments, including sector ministries. Together with our partners, UNICEF is committed to achieving sustainable energy for all — ultimately improving young lives.

Working with UNICEF and the Goodness Tour artists, children who lost their houses during Category-5 Hurricane Dorian in The Bahamas paint a mural showing their houses on a water tank. The mural is part of Abaco Sunny Waters, a UNICEF-supported solarization project in conjunction with Water Mission and the Water and Sewage Corporation of The Bahamas. The project was part of efforts to sustainably bring water back to the island and increase resilience in the system's critical infrastructure.

Working together for a brighter life for every child

To collaborate with and support UNICEF in its sustainable energy work, contact:

UNICEF Headquarters: sustainable-energy@unicef.org
UNICEF National Committees
Regional Offices & Country Offices

→ In 2022, UNICEF launched the **Thematic Trust Fund on Climate, Environment and Disaster Risk Reduction**,[44] which will support UNICEF in strengthening resilience of social services for the 4.2 billion children who will be born over the next 30 years. They face increasingly high challenges to their survival and wellbeing. UNICEF's concrete, sustainable energy solutions are already accelerating such efforts for children and young people around the world.

Please join us in creating a brighter life for every child with sustainable energy.

Nurse Murida Co (34) stands outside the healthcare clinic where she works in the remote village of Dara, Guinea-Bissau. UNICEF worked with partners to install water tanks and solar PV systems at the clinic to ensure it has running water and a sustainable electricity source.

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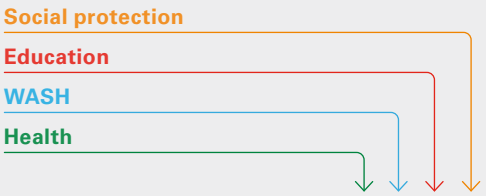
UNICEF 2018-2021
Sustainable Energy Action by Sector



Afghanistan
Albania
Algeria
Angola
Armenia
Bahamas
Bangladesh
Benin
Bhutan
Bolivia
Bosnia and Herzegovina
Botswana
Burkina Faso
Burundi
Cabo Verde
Cambodia
Cameroon
Central African Republic
Chad
Colombia
Comoros
Congo
Cook Islands
Côte d'Ivoire
Cuba
Democratic Republic of Congo
Djibouti
Dominican Republic
DP Republic of Korea
Egypt
El Salvador
Eritrea
Eswatini
Ethiopia
Fiji (Pacific Islands)
Gabon
Gaza Strip, State of Palestine
Gambia
Georgia
Ghana
Guatemala
Guinea
Guinea Bissau
Guyana
Haiti
Honduras
India
Indonesia
Iran
Iraq
Jamaica
Jordan
Kazakhstan
Kenya
Kiribati
Kyrgyzstan
People's Dem Republic of Lao
Lebanon
Lesotho
Liberia
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Somalia
South Sudan
Sri Lanka
Sudan
Suriname
Syria
Tajikistan
Tanzania
Thailand
Timor-Leste
Togo
Tokelau Islands
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Tunisia
Turkmenistan
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Vanuatu
Venezuela
Vietnam
Yemen
Zambia
Zimbabwe

Information gathered from 2018-2021 UNICEF internal reporting on programming activities. The chart highlights health, education and WASH as areas of expertise for expansion, and social protection as a growth area.


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