Energy storage

Our activities in support of energy storage and electrification

BACKGROUND

Energy generation accounts for two thirds of total greenhouse gas (GHG) emissions and for 80 per cent of carbon dioxide emissions. It is thus the main driver of climate change. This means that the energy sector plays a key role for global climate change mitigation. Population growth and growing demand for energy in the Global South will lead to increased GHG emissions if the additional demand is met partly through fossil energy.

Energy storage is an important technology for the expansion of solar and wind power, as such power is not generated continuously but on a variable basis depending on the weather and the time of day. By using such variable renewable energy sources in combination with energy efficiency and energy storage solutions, a large proportion of the energy sector emission reductions needed to reach the targets of the Paris Agreement can be realised by 2050. Simultaneously, increased use of renewable energy facilitates more economic growth and development.

THE ROLE OF ENERGY STORAGE

Energy storage plays a key role for achieving universal access to energy (SDG 7). And in combination with the expansion of renewable energy generation, storage solutions accelerate the transition to sustainable and reliable energy systems and pave the way for the complete decarbonisation of economies.

The variability of generation from renewable sources limits their contribution to the reduction of carbon emissions and to the achievement of universal access to energy. Energy storage is essential, along with other flexibility mechanisms, for increasing the share of variable renewable energy sources. This applies especially to weak, unstable power networks and to off-grid sites. Decentralised solutions on the basis of renewable energy, such as micro-grids with solar hybrid systems, could provide power for 490 million people in off-grid regions by 2030 and make energy systems more resilient to disasters and extreme weather events.

BATTERY STORAGE

Battery storage is an energy storage technology that has unique advantages. It is a modular system and can be put into operation quickly, flexibly and universally.

Battery storage can foster economic development, as it facilitates the use of machinery and equipment for farming and crafts and trades in off-grid regions. Battery storage can also contribute substantially to the introduction of clean, electrical cooking solutions. There are still 2.7 billion people worldwide who have no access to clean cookstoves. 83 per cent of them live in sub-Saharan Africa. Annually, this is causing four million premature deaths worldwide from air pollution (mainly from cooking smoke) and one gigatonne of carbon dioxide emissions from wood-based fuels.
As prices are falling rapidly (having dropped by 70 per cent in seven years), battery storage is increasingly becoming economically viable. However, the market for stationary batteries is only just emerging. At present, total capacity worldwide is only 19 gigawatt hours (only one third of which is in developing countries), compared with 400 gigawatt hours for batteries for electric vehicles. A mere five per cent of the world’s 19,000 microgrids have battery storage. Moreover, the special conditions in developing countries (extreme temperatures, special challenges with regard to operation and maintenance, remote sites) require special solutions.

**THE BMZ’S KEY INTERVENTIONS AND INITIATIVES**

Energy storage already plays an important role in Germany’s development cooperation:

- **Through KfW, the German Development Ministry (BMZ) provides funding on a large scale for renewable energy installations and for programmes to expand climate-friendly energy networks**, and it supports the integration of renewable energy. Storage systems (battery-based) will increasingly complement these programmes in order to enhance system stability.

- **The Global Energy Transformation Programme (GET.pro) is working with partner countries on the long-term planning of energy systems. Energy storage plays a key role in that effort.**

- **The Green people’s energy for Africa** initiative supports communities that set up their own decentralised renewable energy supply, which is often combined with storage solutions.

- **The EnDev (Energising Development) programme and GET.pro support solar home systems and micro-grid solutions with integrated battery storage.**

- **Germany’s bilateral development cooperation programmes provide technical support with regard to grid and system integration** for variable renewable energy. This also involves exploring storage options.

**MULTILATERAL ACTIVITIES**

Fostering synergies between existing programmes and fostering the exchange of experience in multilateral fora is a key element of Germany’s work on energy storage.

On that basis, battery storage will be able to make an even stronger contribution towards implementing the Paris Agreement and the 2030 Agenda. The World Bank’s Energy Storage Partnership (ESP) and its battery storage investment programme are important pillars in that regard. Germany supports both programmes. The purpose of these endeavours is cooperation between international organisations, research institutions and industry federations on the development of tailor-made storage solutions for developing countries, and also financial support for the installation of batteries in order to foster renewable energy generation and grid stability in developing countries.