

Energy Storage Technologies

The key to the energy transition in Brazil

Context

The Brazilian electricity market is one of the largest in the world. In 2019, hydroelectric power accounted for 64.4 per cent of all electricity generated, making it the main source of power generation. Against the backdrop of economic and demographic growth and the associated increase in demand for energy, Brazil needs to further expand its generation capacity. The Brazilian Energy Research Office (EPE) anticipates an average annual growth rate of 3.5 per cent in the demand for energy over the next 10 years.

Renewable energy is therefore becoming increasingly important in Brazil, especially under the national plan to tackle climate change, which is currently being implemented. The supply of renewable energy, in particular solar and wind power, is not consistent, so relying on it causes fluctuations in the country's electricity supply. Renewable energy now accounts for more than 39 per cent of the Brazilian power mix, and this proportion is growing, leading to greater fluctuations in electricity supply.

To counteract these fluctuations, the country needs storage technologies that improve grid stability and the security of supply. The successful use of energy storage technologies therefore plays a key role in achieving energy and climate policy objectives. However, these technologies are not sufficiently in use in Brazil, and crucial prerequisites have not yet been met.

Energy storage technologies also make it possible to network different areas of the energy sector and industry. The focus here is on electricity, heating, transport and industry, which are being considered and optimised in a joint approach. 'Power-to-X' technology (P2X for short) plays a key part in this. P2X embraces a range of processes and technologies for storing excess electricity generated from renewable energy sources.

P2X makes it possible to create a flexible energy system in which excess electricity is stored and can be used across a range of areas.

Programme title	DKTI – Brazilian-German Technology Partnership for Energy Storage (DKTI – Parceria Brasil-Alemanha - Tecnologias de Armazenamento Energético)
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Country	Brazil
Political partners	Ministério de Minas e Energia (Ministry of Mines and Energy)
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Budget	€ 5.000.000

All P2X technologies begin by producing hydrogen from water using excess electricity from renewable energy sources. The 'green hydrogen' this produces can then be used to generate climate-neutral fuels, combustion gases and fertilisers, making it a key element in a successful energy transition.

The German Federal Government is also aware of the importance of green hydrogen, and in 2020, it therefore approved a National Hydrogen Strategy. The German National Hydrogen Strategy aims to promote the international market launch of hydrogen technologies, strengthen German companies in the area of hydrogen and ensure a national supply of green hydrogen. The German Government is therefore keen to recruit international partners from whom it can import green hydrogen in the future.

Brazil is well placed to become a major exporter of green hydrogen to Germany. It is not only the largest producer for German industry outside Germany but is also ideally positioned, thanks to its climatic conditions, its logistics infrastructure and its strong trade relations with Germany.



Left: Wind farm in desert region for energy generation.

Right: Installation of photovoltaic systems on roofs of houses.

Objective

The Brazilian Government implements energy storage technologies on a broad scale.

Approach

The project advises political decision-makers, regulators, power utilities and grid operators on assessing technical usage possibilities and energy storage options and creating the necessary framework conditions. It also advises independent power utilities and grid operators in northern Brazil on planning and integrating energy storage in isolated power grids. Moreover, it supports governmental and private research institutions in Brazil in establishing cooperation arrangements and networks with international companies and conducting application-oriented research, with a special emphasis on partners from Germany.

The capacity development strategy entails broadening HR, organisational and social competences. To deliver HR development, the project organises training courses and provides technical and policy advice to support the broad-scale use of energy storage technologies in Brazil. The organisational development measures improve tendering procedures, boost project funds and support the development of new service provision, such as business and funding models. They also create interdisciplinary working structures, for instance in the context of public-private research and development projects, to network experts and promote the sharing of experience. At societal level, finally, the project is working on developing networks such as cooperation arrangements between associations to intensify the international exchange of experience and initiate research and development projects on the issue of energy storage.

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