CESI

Shaping a Better Energy Future

INTERCONNECTING THE WORLD

The importance of interconnections for cleaner energy

According to most part of the scientific environment, climate change is mainly a result of human activity and since the mid-20th century it is proceeding at a very fast rate. But human beings are also capable of changing direction, and the development of innovative energy projects can help the planet shift towards environmental sustainability.

In this respect, electricity interconnections are a key example. Strong interconnections are one of the most concrete ways to foster an increased penetration of renewable energy into the power system, bringing clean energy from production to consumption areas and sharing it across neighboring countries. As the share of variable renewable energy increases, interconnections can handle their volatility transferring excess power from areas with a surplus of clean energy production (for example solar, wind, or hydropower) toward areas in need of clean power. In addition to increasing the exploitation of renewable power, interconnections heavily contribute to increasing security of power supply and to decreasing the price of electricity to the final consumer thus making corporate and domestic bills lighter.

One example: Tajikistan and the Kyrgyz Republic have excess power supply during the summer, which cannot be utilized locally, while Pakistan has an increasing demand for electricity due to its growing economy and population. The CASA-1000 project aims at solving the problem, enabling the transmission of electricity from hydro generation plants in the Kyrgyz Republic and Tajikistan to final consumers in Pakistan, via Afghanistan, thanks to an electricity interconnection. CESI is supporting the realization of this enormous project, valued at $1.2 billion, supervising the construction of an HVDC power connection and overseeing the implementation of environmental plans, the project implementation and carrying on capacity building activities.

Furthermore, CESI (together with the Saudi Electricity Company) helped develop the first HVDC power transmission interconnector between Riyadh and Mecca, covering the central and western regions in the Kingdom of Saudi Arabia. The project brings several benefits for the areas involved, because the 800 km HDVC line objective is not only increasing the power generation capacity of local networks, but also providing a reliable back-up energy supply in emergency situations. In addition, it allows multiple users to benefit from the newly created capacity of 3,000MW. It will result in increased energy reserve margins to fulfill high energy demands with greater reliability and allow growing interregional power transfers following the deployment of variable renewable generation, notably PV and wind.

But Asia is not the only area to be involved. In Africa, energy access levels are very low: 6 hundred million people have no access to modern forms of energy. To overcome the problem, several energy projects are underway. For example, since 2013 CESI has been working on an electricity highway, a transmission corridor to transport significant amounts of clean energy from Ethiopia to Kenya. Let's consider that 60% of the hydroelectric potential of the sub-Saharan area is located in Ethiopia and the Democratic Republic of the Congo. This corridor extends for 1,068 km and boasts 2,000 MW capacity, destined to supply demand with clean energy in 1.4 million homes by 2022. CESI is on the front lines, being in charged of oversight and controls during the engineering phase and construction of the infrastructure. CESI is also responsible for verifying the technical adequacy of

these infrastructures, making sure they are in line with international standards. The company is handling design review, support for utilities, technical and quality certifications for the principal components of the line, and even training local resources.

As for America, and in particular to Ecuador, a specific interconnection project made it possible to enable higher capacity power flows in the region. There, CELEC, the national Electrical Corporation, decided to introduce the 500kV level within their power system. To understand the feasibility of this initiative, CESI carried on a specific Master Plan, completing a preliminary engineering and socio-economic analysis of a complex transmission network expansion. Thanks to this project, the energy availability of the country will be tripled over the next ten years.

Energy interconnections, especially when they are based on clean energy sources, help create economic, social and, finally, environmental benefits to countries and regions involved.

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