



IPN Develops Lithium-Based Projects to Support the World's Energy Future

- **Edilso Reguera Ruiz, a researcher at CICATA Legaria, notes that Mexico is among the top five countries with the highest solar radiation potential. Its geographic location and climate offer a strategic opportunity.**
- **The current challenge, according to the National System of Researchers Emeritus, is the extraction of lithium with minimal water consumption.**

The Instituto Politécnico Nacional (IPN) is actively developing projects focused on lithium utilization, aiming to capitalize on the fact that Mexico holds some of the largest lithium reserves in the world—a mineral with remarkable energy storage capacity.

For Dr. Edilso Reguera Ruiz, a researcher at the Center for Research in Applied Science and Advanced Technology (CICATA), Legaria Unit, and Emeritus of the National System of Researchers under the Secretariat of Science, Humanities, Technology, and Innovation (SECIHTI), lithium represents a promising path forward for building batteries suited for electromobility. These developments are key to reducing dependence on fossil fuels and enabling the storage of renewable energy.

Aligned with the scientific and technological development policy promoted by Secretary of Public Education Mario Delgado Carrillo, IPN is undertaking lithium-based projects involving natural brines, seawater, and geothermal fields—primary sources of lithium. Global demand for this mineral is rising rapidly, driven by the expansion of electromobility and renewable energy systems.

Dr. Reguera emphasized the need for universities in Mexico to become incubators of technology-based enterprises, ensuring that scientific knowledge leads to innovation and benefits society. "Many of the companies now leading this field abroad started in universities," he noted.

In the global race to locate and exploit deposits of what is often referred to as "the white gold of the future," Mexico ranks among the top countries with the largest reserves.



However, the country now faces the challenge of developing extraction technologies that minimize water usage, a commitment already being addressed by researchers at IPN and across the national scientific community.

Other lithium-rich countries include Bolivia, Chile, and Argentina—the so-called “Lithium Triangle”—as well as the United States, China, Australia, Germany, Canada, and the Democratic Republic of the Congo. One of the world’s largest known lithium deposits is located in northern Mexico, spanning the regions of Sonora and Chihuahua.

As part of IPN’s efforts in this field, Dr. Reguera has developed a high-performance lithium battery aimed at promoting a more sustainable future for Mexico City through electromobility.

The Cuban-born scientist—recipient of the 2023 National Science Award—explained: “We are working on technology for lithium extraction that uses very little water. The areas with the highest concentrations of lithium, like Sonora and Chihuahua, also suffer from water scarcity. We cannot use large amounts of water where communities already face shortages. That’s why we’re developing a technological process that optimizes water usage.”

He further explained that in addition to its lithium reserves, Mexico is among the top five countries with the highest solar radiation potential. Its geographical position and climate conditions provide a strategic opportunity to harness energy through photovoltaic, solar-thermal, and wind technologies.

The challenge for the coming years, he added, lies not only in extracting the mineral but also in building electrochemical energy storage plants powered by lithium and sodium batteries, as well as supercapacitors and other energy storage devices.

Dr. Reguera highlighted that it is feasible to establish industrial-scale plants using Mexican technology and materials to produce such devices. These facilities could be located in strategic regions across the country, creating jobs and helping drive Mexico’s energy transition.

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