

Insurance for electrical networks



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**Researchers at UPB design
a method that will benefit
the present and future
of electric power systems.**

The inhabitants of the Inca civilization believed that when Ilyapa, god of lightning, walked or moved, he fired lightning from his white dress, while the thunder was produced by the discharge of his slingshot, which he carried in one of his hands. (Torres-Sánchez, 2010). In our world, lightning or atmospheric discharges are natural phenomena that, when impacted on the earth, can lead to human losses, environmental disasters and structural damage.

When power grids are struck by lightning or grazed by tree branches, short circuits can occur in the electrical system which, if not controlled in time, end in fires and



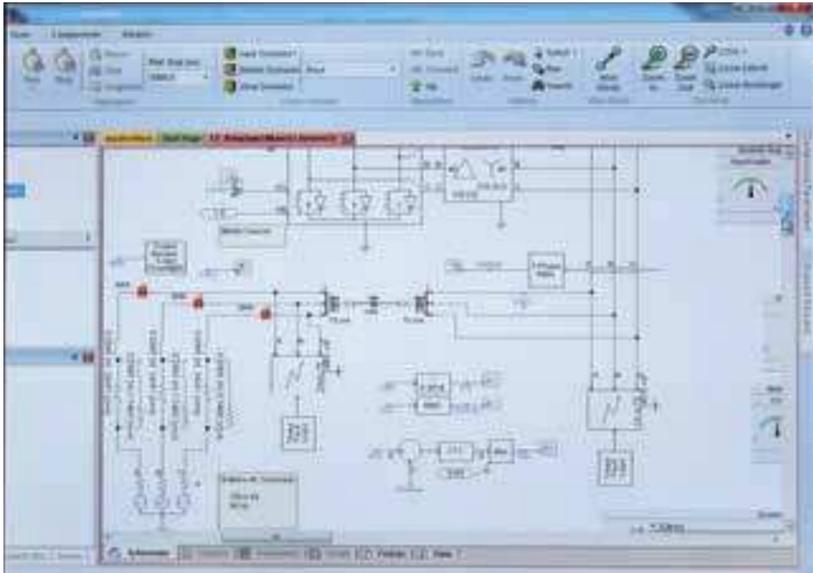
large blackouts with incalculable consequences and, sometimes, disastrous. This was the case of what was called the Italian Blackout which, in 2003, left the whole country without energy for more than three hours when a tree fell on the electrical grids.

Nowadays, some of these electrical system failures are not as noticeable for detection equipment in the world. Faced with this situation, members of the Research Group on Transmission and Distribution of Electric Energy of the UPB, saw the possibility of developing a solution that would identify the faults difficult to detect in transmission lines that carry energy.

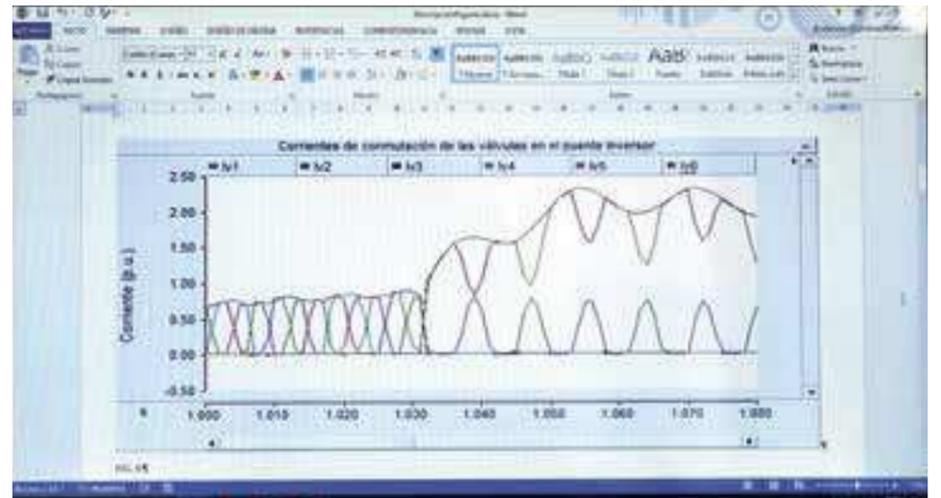
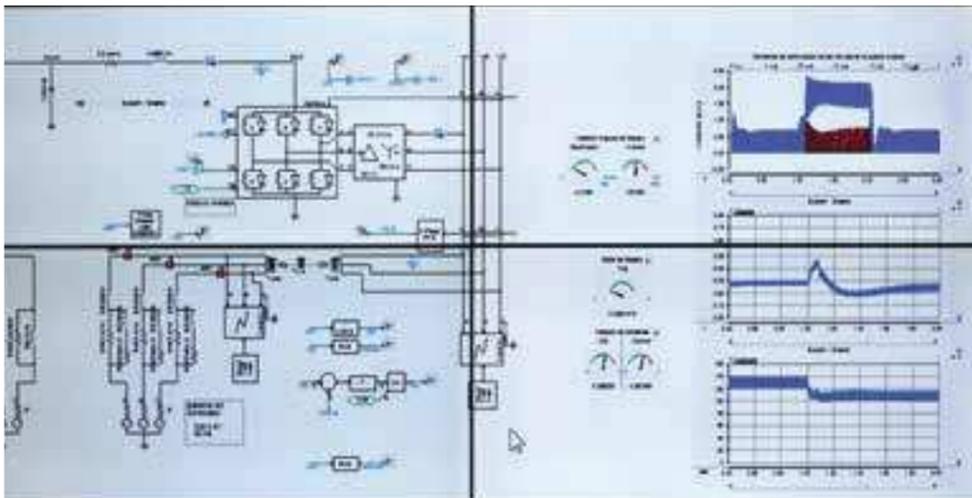
Cities as wooded as Medellin are more likely to have branches twisting the tension lines when their electrical system is external.

From a failure an idea arises

This project comes from the commutation failure situation. When there is a breakdown an abnormality occurs that prevents the commutation is successful. Commuting is a process that resembles a relay race. One component of the electronics delivers the conduction of



For the potential of this technology, the University requested its patent protection to the Superintendence of Industry and Commerce last June 2016.



power to another, but when there is an anomaly there is a failure of switching. It is here when the researchers' solution acts as a witness to the situation and reports on it, explains Jorge Wilson González Sánchez, a member of the team of experts.

"It is a method of detection that exerts control or protection actions," comment the experts. Thus, when a tree brushes the electric transmission lines or a lightning strikes them, a breakdown voltage occurs. Around the impacted cable is generated a flare, arc of light, which indicates the existence of a fault. If the power cable is not de-energized, the



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short will prevail over the rest of the network, causing greater damage and endangering human lives. But when the solution made by the University is installed in the electrical substations, its response time is less than 100 milliseconds (ms): it disconnects the electric fluid from the affected line, produces a detailed report of how much the current was measured, what was the voltage, how long the fault lasted, allows to locate the area in which it was generated and according to the criticality of the event, resets the energy again. That is, it shows relevant information to take appropriate and immediate actions, the researchers explain to Universitas Científica.

In addition to detecting imperceptible faults, protecting lives and avoiding blackouts, this technology avoids the purchase of high-value electronic equipment. A development with a UPB seal that is in line with our institutional commitment: a teaching university with an emphasis on research and innovation.

This technology may interest energy companies that generate, transmit and distribute energy. Companies like EPM, Codensa, ISA and manufacturers like Siemens, ABB and SEL.

Data sheet

Project name: Detection of failures in transmission systems by the principle of commutation failure

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