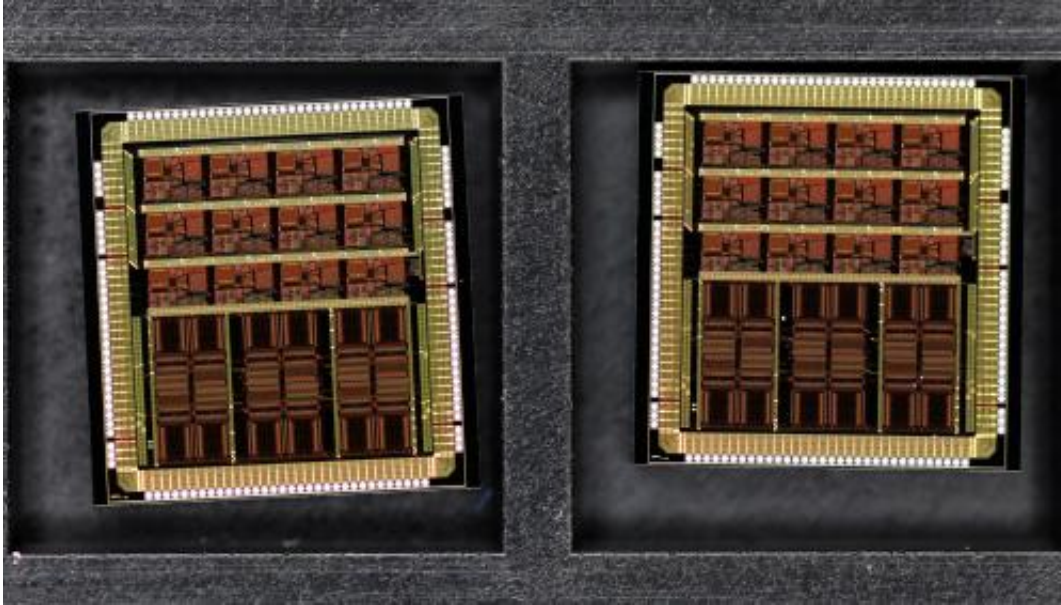


# A power grid on a chip

June 9 2011, By Cecilia Carron

---



© Alain Herzog 2011 EPFL

Presented during the EPFL Middle East research days, a device only 4mm thick can manage an urban power grid a thousand times faster than currently possible.

Is it really possible to manage the [power grid](#) of a whole town on single chip? The future of [energy production](#) will surely be a combination of several power sources, and Maher Kayal's team from EPFL's Electronics Laboratory (ELab) are developing a dedicated hardware that manages the network a thousand times faster than current software running on a conventional computer. The first unit of this integrated circuit has just

been developed and could be deployed on the scale of a town five years from now.

Defective power lines, problems with generators, or risks of power cuts will be handled by the chip a thousand times faster than at present. This will allow their management in close to real time, and at a lower cost than existing installations. “The problem with power grids has always been that ‘fatal moment’ when there is a sudden power failure”, emphasizes Kayal. This chip will enable the anticipation of breakdowns that could occur when the network is stretched to the limit in much greater security, efficiency and speed than software coupled with hardware not developed specifically for this purpose. This increased speed will allow for modeling of thousands of possible scenarios and anticipate failures and calculate their best solutions before they even happen.

## **Smart Grids**

“Apart from the increased speed, a further advantage will be an easier use of renewable [energy](#) sources that depend on climatic conditions, and therefore are non-programmable, in comparison with nuclear energy power stations, which require advance planning”, he adds.

This way of managing the network is in line with the concept of the “smart grid”: that is, the use of electronic technologies to optimize the production and distribution of electricity and thereby match demand and supply, ultimately reducing economical and ecological impact without even limiting energy consumption. However, Maher Kayal prefers not to put a figure on the financial savings: “Everything depends on the education, the intelligence and the psychology of the users of the network.” These factors will probably take longest to address and resolve.

Once in production, the [chip](#) should only cost a few Swiss francs, and will have the significant advantage of being both reconfigurable and programmable according to the town, the district, or any other scale of network. The company ABB, which is financing part of the research work, has now filed a patent. This new concept of the intelligent management of energy will be unveiled on June 22 and 23, during the EPFL Middle East research days, which will bring together Swiss- and Emirates-based scientists to focus on the future of energy and sustainable development.

Provided by Ecole Polytechnique Federale de Lausanne

Citation: A power grid on a chip (2011, June 9) retrieved 25 April 2024 from <https://phys.org/news/2011-06-power-grid-chip.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.