

Can microchips make electronic devices more energy efficient?

In the ongoing quest to make electronic devices ever smaller and more energy efficient, researchers want to bring energy storage directly onto microchips, reducing the losses incurred when power is transported between various device components.

How effective is on-chip energy storage?

To be effective, on-chip energy storage must be able to store a large amount of energy in a very small space and deliver it quickly when needed - requirements that can't be met with existing technologies.

Could a new microelectronics technology be the future of energy storage?

The findings, published in the journal Nature, pave the way for advanced on-chip energy storage and power delivery in next-generation electronics. This research is part of broader efforts at Berkeley Lab to develop new materials and techniques for smaller, faster, and more energy-efficient microelectronics.

Could on-Microchip energy storage change the world?

Their findings, reported this month in Nature, have the potential to change the paradigm for on-microchip energy storage solutions and pave the way for sustainable, autonomous electronic microsystems.

What are the different types of energy storage technologies?

Other similar technologies include the use of excess energy to compress and store air, then release it to turn generator turbines. Alternatively, there are electrochemical technologies, such as vanadium flow batteries.

What is AI-generated illustration of ultrafast energy storage & power delivery?

AI-generated illustration of ultrafast energy storage and power delivery via electrostatic microcapacitors directly integrated on-chip for next-generation microelectronics. (Image courtesy of Suraj Cheema)

Europe and China are leading the installation of new pumped storage capacity - fuelled by the motion of water. Batteries are now being built at grid-scale in countries including ...

The use of fossil fuels has contributed to climate change and global warming, which has led to a growing need for renewable and ecologically friendly alternatives to these. It is accepted that renewable energy sources are ...

The tariffs largely target key clean energy technologies and critical minerals. By Justine Calma, a senior science reporter covering energy and the environment with more than ...

The basic idea is simple: unlike previous chips, where only calculations were carried out on transistors, they

are now the location of data storage as well. That saves time and energy. "As a result, the performance of ...

A surprisingly simple new energy storage system is built on blocks that store thermal energy like melted chocolate chips in a muffin. The team says they're efficient, ...

Berkeley Lab scientists have achieved record-high energy and power densities in microcapacitors made with engineered thin films, using materials and fabrication techniques already widespread in chip ...

energy and power densities in microcapacitors made with engineered thin films of hafnium oxide and zirconium oxide, using materials and fabrication techniques already widespread in chip ...

"For the first time, we've shown that electrostatic energy storage capacitors are approaching the areal energy densities of electrochemical supercapacitors -- and even commercial lithium-ion microbatteries," said ...

The race to make smaller chips and components is all about power and convenience. With smaller processors, you can make more compact computers and phones. But shrinking down chips also decreases their energy ...

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