

DECADAL PLAN FOR SEMICONDUCTORS AND NANOTECHNOLOGY

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Abstract

Information and Communication Technologies (ICT) is the social-economic growth engine of modern world. This electronic processing and transmission of information includes the explosion of sensing for real-world applications in many market segments, such as automotive, industrial manufacturing and automation, robotics, health, environmental, etc.

The use of ICT continues to grow without bounds dominated by the exponential creation of data that must be moved, stored, computed, communicated, secured and converted to end user information. Ever-rising energy demands for the information and communication technologies versus global energy production are creating new risk, therefore new paradigms need to be discovered that would result in dramatically improved energy efficiency of ICT.

How to get 10^6 more semiconductor energy efficiency? Inventing the next hardware/software ICT paradigm is a tall order, to be sure. However, it is achievable if the right questions are asked and right resources are put in place. These steps are outlined in the Decadal Plan for Semiconductors (<https://www.src.org/about/decadal-plan/>), which emphasize the need for radical new solutions for future ICT with major innovations using unexplored physical principles, from materials and devices to circuits and system-level functions.