SIA SEMICONDUCTOR INDUSTRY ASSOCIATION

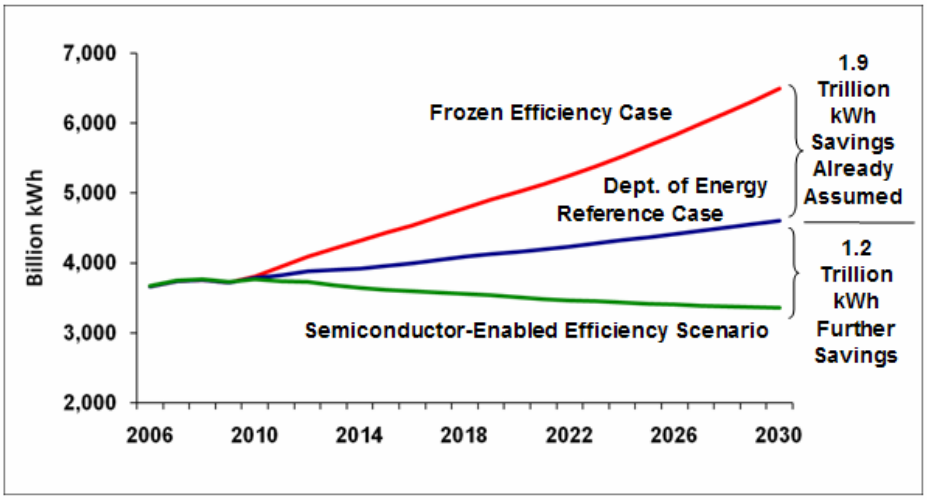
THE HEARTBEAT OF AMERICAN INNOVATION

SEMICONDUCTORS CAN ENABLE 1.2 TRILLION KWH SAVINGS BY 2030

Semiconductors Make U.S. More Productive with Less Energy

By 2030, the U.S. could decrease the amount of electricity used annually by accelerating the adoption of semiconductor enabled technologies, according to a study by the Washington DC-based American Council for an Energy-Efficient Economy (ACEEE) commissioned by SIA.[1]

The study reviewed semiconductor enabled technologies and concluded that if new policies accelerated adoption of these technologies by just one percentage point per year, electricity demand in 2030 could be 1.2 trillion kilowatt-hours (kWh) lower than the Department of Energy's *reference case*, a scenario that had already assumed substantial savings from implementation of *semiconductor enabled efficiency* applications compared to *"frozen efficiency" case* that posited continued reliance on today's technologies.



What does 1.2 trillion KWh savings in 2030 mean?

- 27% less electricity consumed than the reference case, and 11% less than today, even though the economy will be about 70% larger.
- 733 million metric tons less CO_2 emitted in 2030
  - Even more if semiconductor enabled renewable energy (solar, wind) sources are included.
- 296 plants (600 megawatt) that will not be built by 2030
- $1.3 trillion in cumulative savings from 2010-2030

DID YOU KNOW?

- A computer's energy efficiency improvement, has improved by 2,857,000 percent since 1978, while miles per gallon for automobiles have only improved by 40 percent .[2]
- Data centers can reduce energy demand by 56 percent using semiconductor enabled technologies such as efficient uninterruptible power supplies, variable speed fans and pumps, and server virtualization.[3]
- The electricity of 47 power plants flows through power supplies each year, charging our phones and powering our computers. Semiconductors can greatly improve the efficiency of power supplies.
- Semiconductors enable telecommuting and video conferencing. About 3.9 million households in 2006 had at least one telecommuter, and their actions reduced U.S. annual gasoline consumption by about 840 million gallons.[4]
- More than half of all U.S. electricity flows through motors.[5] By 2030, motor related electricity savings largely enabled by semiconductors are likely to exceed 100 billion kilowatt hours.

Policies to accelerate semiconductor enabled technologies

The study highlights that smart public policies and incentives will play a key role in enabling the potential energy, emissions, and cost benefits associated with semiconductor enabled efficiency scenario. Consistent with the report conclusions, the SIA supports a variety of incentives to accelerate the adoption of semiconductor technologies, including:

- a federal investment of $150 billion over 10 years to accelerate the commercialization of plug-in hybrids and renewable energy, encourage energy efficiency and develop a smart grid;
- federal grants and tax incentives for manufacturers of energy efficient and renewable energy components, products and/or technologies;
- regular updates of efficiency standards, zero emissions for all new federal buildings by 2025, accelerated depreciation on energy conservation expenses, decoupling utility profits from increased electricity usage, and tax credits and other incentives for reductions in data center power consumption in order to meet a goal of reducing electricity demand 15 percent from DOE's projected levels by 2020;
- increased tax credits for alternative energy investments that will allow for 10 percent of the nation's electricity to derive from renewable sources by 2012;
- doubling federal science and research funding for clean energy projects; and
- ensuring that climate change legislation supports rather than hinders the domestic production of products such as semiconductors that enable a net energy savings.

- Light-emitting-diodes (LEDs) pass electric current through semiconductors to produce light. Replacing incandescent and fluorescent bulbs with LEDs can potentially reduce electricity use for lighting by 43% by 2030.
- Semiconductors enable solar panels to harvest up to 57% of power normally lost to real-world conditions due to clouds, dirt, and bird droppings.[6]
- Advanced smart grid technologies can allow consumers to program their water heater and climate control systems reduce their electricity bills 10 percent on average.[7]
- Semiconductors enable plug-in hybrid electric vehicles, cars that will feed excess power back into the grid when electricity is in high demand and thereby reduce the need to build new power plants to service peak demand periods.

1. ACEEE, "*Semiconductor Technologies: The Potential to Revolutionize U.S. Energy Productivity*," May 2009. The study also found that, compared to the technologies available in 1976, the entire family of semiconductor-enabled technologies has generated a net savings of about 775 billion kilowatt-hours (kWh) of electricity in the year 2006 alone, and but for these technologies, we might have had to build another 184 large electric power plants to satisfy the demand for goods and services. http://aceee.org/pubs/e094.htm
2. Technology CEO Council, "A Smarter Shade of Green", February 6, 2008. –computer efficiency in instructions per second/watt.
3. U.S. EPA, 2007, "Report to Congress on Server and Data Center Energy Efficiency Public Law 109-431," Washington, DC.
4. Consumer Electronics Association , 2007. "*The Energy and Greenhouse Gas Emissions Impact of Telecommuting and e-Commerce*" July 2007.
5. Nadel, Steven R., et al; 2002. *Energy-Efficient Motor Systems: A Handbook on Technology, Program, and Policy Opportunities, Second Edition*. Washington D.C.: American Council for an Energy-Efficient Economy.
6. Muenster, Ralph J.2009. "Shade Happens", *Renewable Energy World*, February 2, 2009.
7. Lohr, Steve. 2008. "Digital Tools Help Users Save Energy, Study Finds". *New York Times*, Jan. 10, 2008.