



electronics enabling efficient energy usage

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Power Electronics

Realizing its Potential for Energy Efficiency

Today 40% of all energy consumption is in electrical energy, but this will grow to 60% by 2040. Much of this energy is wasted by inefficient technologies. Power electronics is the key technology to control the flow of electrical energy from the source to the load precisely according to the requirements of the load.

Power Electronics is a cross functional technology covering high Giga Watt (GW) power e.g. in energy transmission lines down to very low milli Watt (mW) power needed to operate a mobile phone. It is responsible for the reliability and stability of the whole power supply infrastructure in Europe from the sources, the transmission and distribution up to the huge variety of applications in industry, transportation systems and the home.

European Policies

Energy efficiency is high on the agenda of European policy makers – at the EU and national level. If Europe wants to harvest the enormous potential of new technologies for energy efficiency, it must streamline and focus its research and technology development efforts.

In its Communication on ICT for Energy Efficiency, the EC suggests to

- Foster research into novel ICT-based solutions and strengthen their take-up
- Strengthen efforts to reduce the energy needed by ICT itself
- Encourage structural changes to realize the full ICT potential for energy efficiency

The EC action plan target is to reduce the total energy consumption by 20% by 2020. Since ~40% of the total energy consumption is electrical energy, power electronics as a single technology can achieve half of this target. Policies helping to boost power electronics for energy efficiency include research, standardization, and education.

E4U is an European initiative to study and improve EU and member states' policies in these areas.



Strategies for Power Electronics Research

Europe's research community in power electronics is internationally competitive, but its resources are limited. The electronics industry is in need of orientation to plan long-term investments.

This is why we need a streamlined strategy for mainstreaming R&D, clear strategic options and recommendations based on facts and scenarios.

The E4U initiative aims at developing a strategic research agenda for power electronics – including best-practices and show case results.



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Research Strategy

E4U aims at fostering world-leadership in ICT enabled energy efficiency in the EU through accelerating research and development for energy-efficient ICT systems.



E4U has created a strategic roadmap for power electronics research. It defines technology gaps and research priorities in the areas of buildings & lighting, power supplies, smart electricity grids, and industrial drives.

The roadmap is based on EU strengths such as the European electronics industry and our high-quality research groups. It also acknowledges the improvements to be made in software tools, device costs, and wide band gap materials. Europe should foster a coherent research landscape.



Designing the strategy

Europe needs more explicit actions targeting electronics research for energy efficiency. While many results are available today and stricter standards will help realising some of the existing potential, much more can be achieved based on new research in power electronics and ICT for energy efficiency.

Europe needs to focus on key industrial and technical research challenges such as reducing the cost of components and systems, improving reliability, pushing efficiency even further and fostering modularity and standardization.

Europe needs more visibility for this kind of research through large-scale demonstration and improved coordination of research activities. This will help to overcome fragmentation and also attract more young researchers to the field.



Policies

Several countries in Europe have recognized the enormous potential of research into electronics for energy efficiency for their economies. They have started power electronics research programmes or initiatives to foster the take-up of technologies for electric vehicles. These are best-practice examples for boosting both energy efficiency and competitiveness in this area.



It is important that electronics for energy efficiency features more prominently on the public programme agendas and that research and development are both adequately addressed.

Apart from research initiatives, it is the standards, legal minimum requirements, labelling framework etc. that drive research into electronics and ICT for energy efficiency. The E4U project has analysed these framework conditions and developed recommendations how they can further boost research in the field.



Get involved!

Contact us or go to:

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E4U initiative project partners

eutema Technology Management GmbH, Austria

eutema is a strategic research and technology consultancy based in Vienna, Austria. eutema designs and implements research strategies for EU member states and manages RTD projects and programs. Its customers and partners include the European Commission, Austrian ministries, research councils, funding agencies, universities as well as global industry players, small companies and private research organisations.



European Center for Power Electronics e.V., Germany

Leading power electronics industries have founded the European Center for Power Electronics (ECPE) in 2003 in order to promote research, education and technology transfer in this field. ECPE aims at promoting the importance of power electronics to the public. For an efficient realisation two legal bodies have been founded, the registered association ECPE e.V. and the limited company ECPE GmbH.



Universidad Politécnica de Madrid, Spain

Universidad Politécnica de Madrid is the oldest and largest of the Spanish Technical Universities. The Centro de Electrónica Industrial (UPM-CEI) is mainly devoted to power conversion systems, Embedded systems design, and power quality. All these research lines have horizontal activities in common, such as design and integration of electronic systems and advanced techniques for modelling and simulation.



University College Cork (Tyndall Institute), Ireland

The Tyndall National Institute was created in 2004 at the initiative of the Department of Enterprise Trade and Employment and University College. The strengths of the institute at the present time lie in the area of photonics, electronics, materials and nanotechnologies and their applications for life sciences, communications, power electronics and other industries.



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