



# Power Electronics The Enabler for Energy Efficiency

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electronics enabling efficient energy usage

## Services & Customers

RTD Strategy	RTD Management	RTD Policy
Strategy planning Target group analysis Technology trends Programme design	Managing projects and programmes Impact analysis Project planning	Public policy Media cooperation Public relations Studies




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## Overview

1. The ICT context
2. ICT potential
3. Success stories
4. The future

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## Cause...and effect



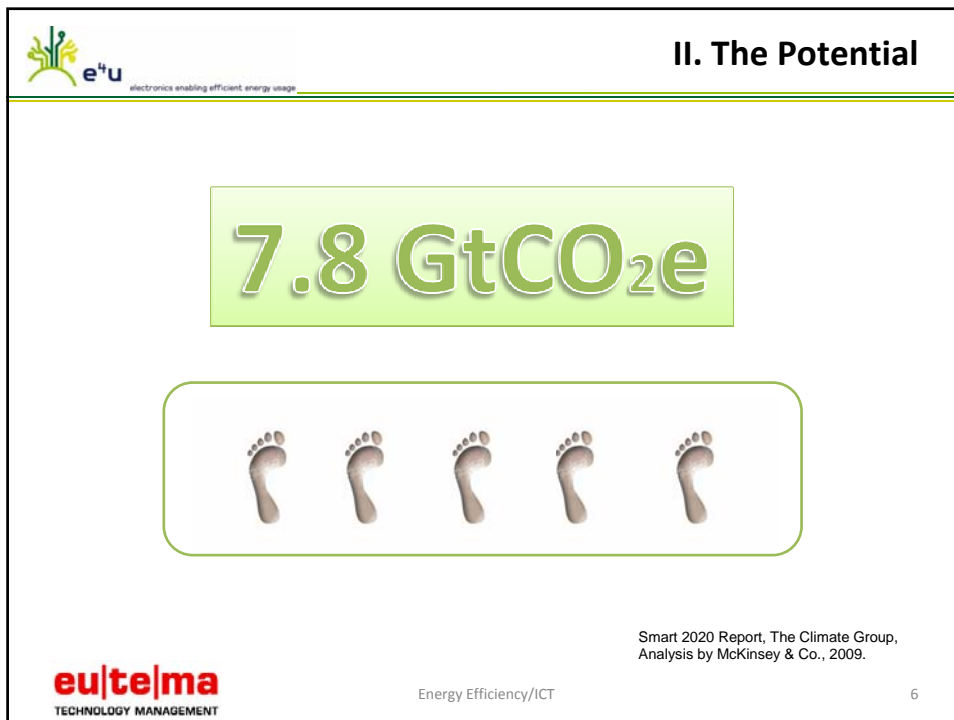
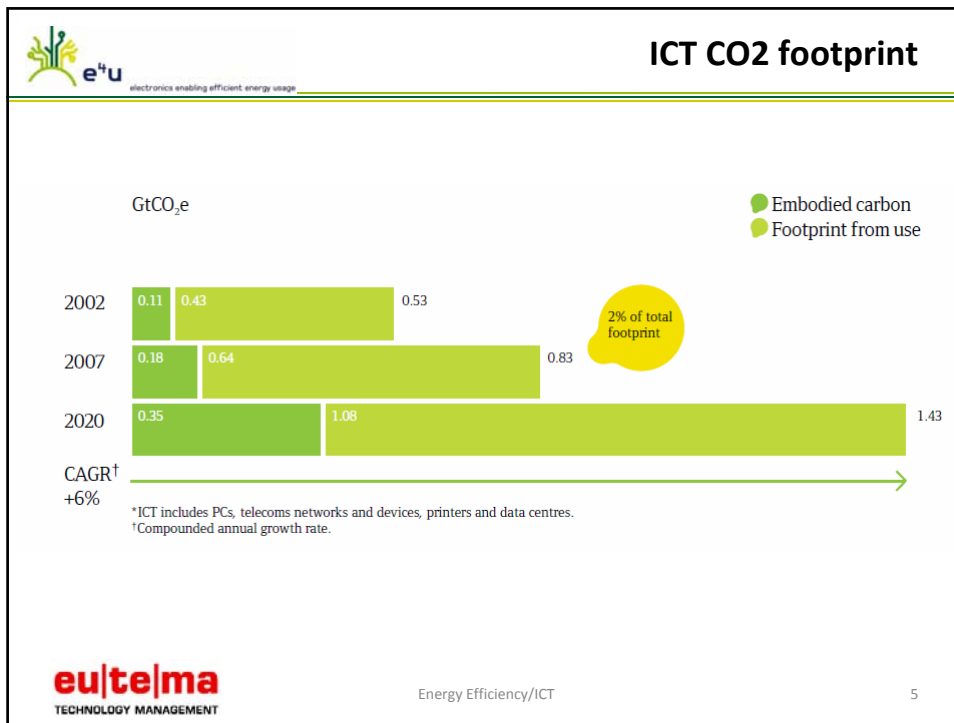
- Information
- Monitoring
- Control
- Optimization
- Innovation
- Transformation

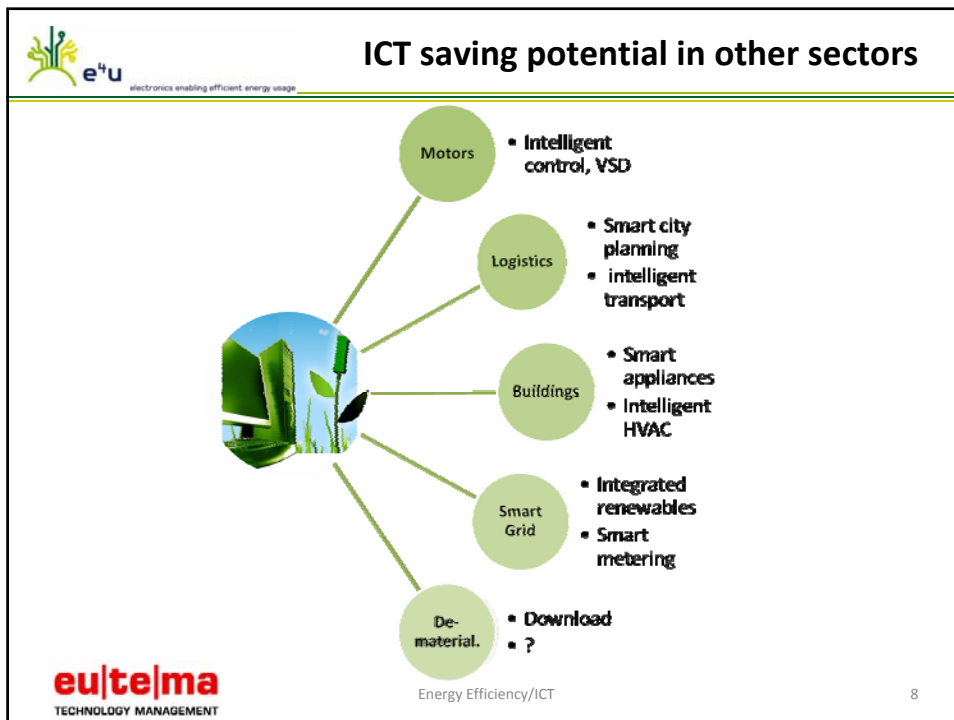
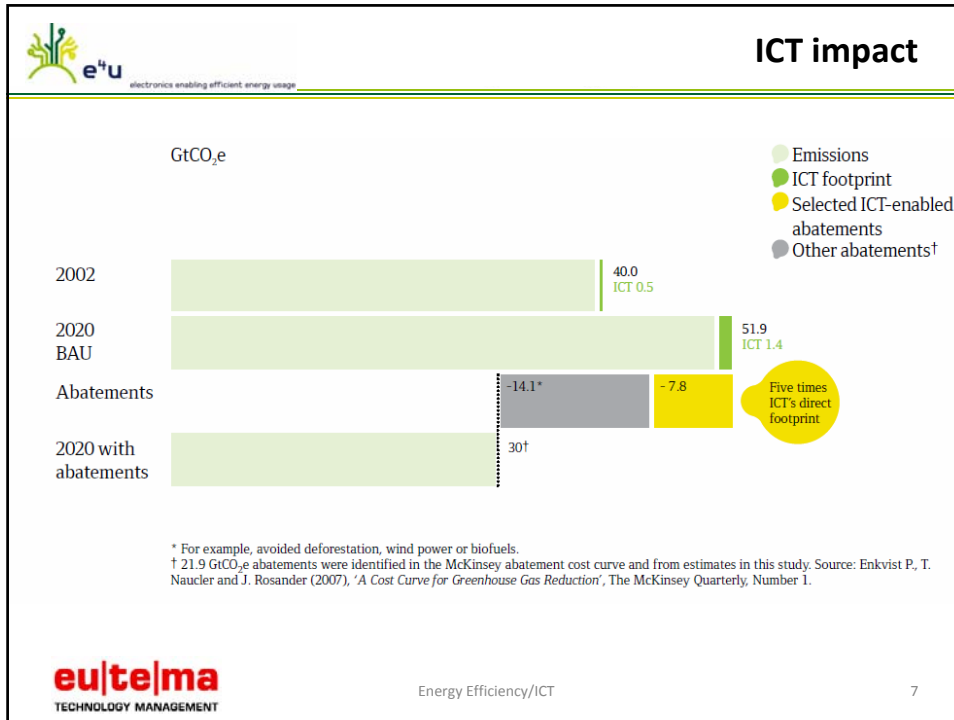


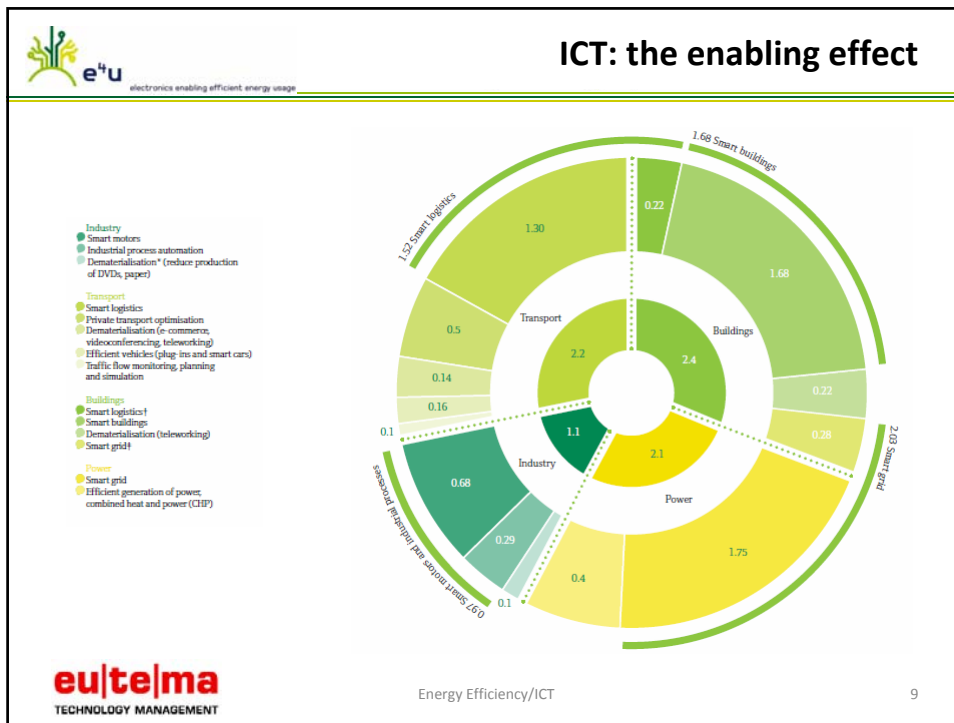
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### III. Success Stories

- Transport** • 60% of world oil consumption
- Motors** • 65% of industrial electricity
- Buildings** • 40% of energy use in developed countries
- Telecom** • 90% of 3G network power costs due to base stations

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## Transport: opportunity & challenge


**e-Mobility**

- 60% of world oil consumed in transport
- Electric drive much more efficient than combustion engine
- Cost of electricity/km 3-4 times lower than petrol/km


**Technological Challenge**

- Battery technology
- Charging






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## Electronics in electric vehicles

**Solution: NRGspot – a Public Ultra-Fast Charging Infrastructure**

- Based on Lithium-ion batteries and advanced power electronics
- Charging systems provided by Epyon (spin-off of TU Delft)
- Charge points located at strategic places (near shopping centres), supply 100% green electricity
- Access open to subscribers via intelligent interface
- Ultra-fast charging within 5-60 min.





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**Electronics in hybrid electric vehicles**

Source: S. Kihne, 'Der Volkswagen Bora Hybrid', Symposium Hybridfahrzeuge-Energiemanagement, Braunschweig, 2004

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**ICT in industry**

**Electric Drives**

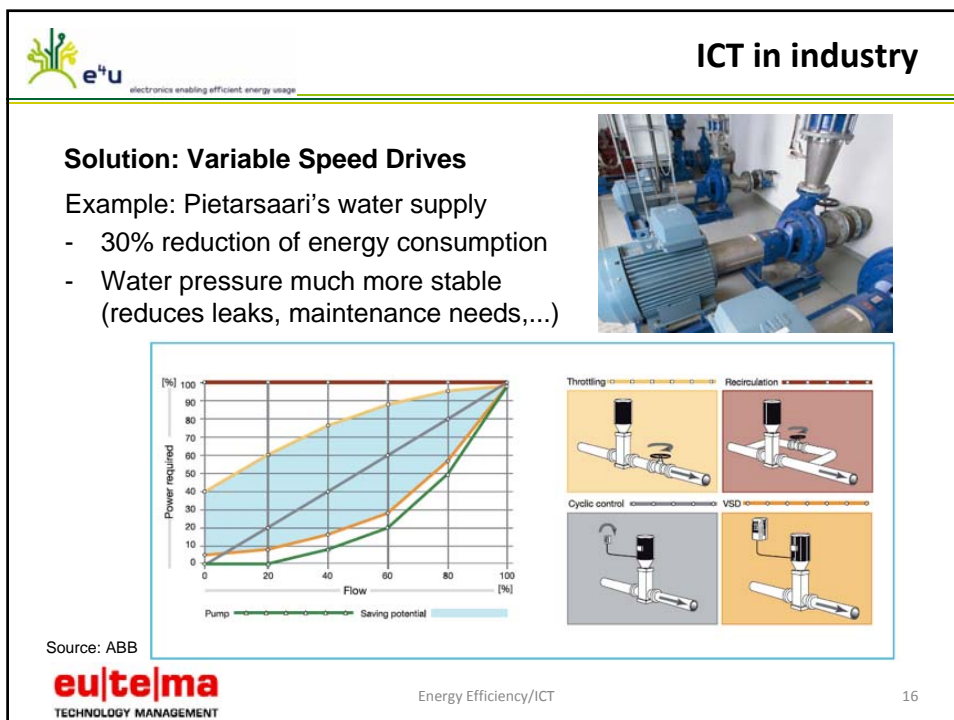
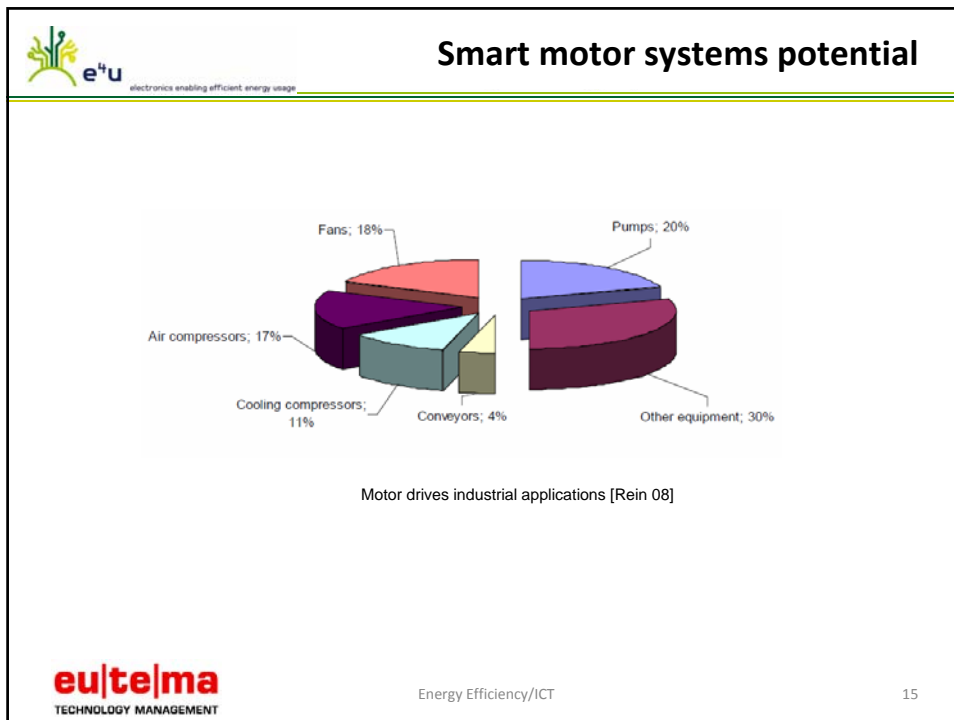
- Electric drives account for 65% of industrial electricity consumption
- Converting to variable speed drives permits almost 50% reduction
- Most important area of application: pumps and fans

**Technological Challenge:**

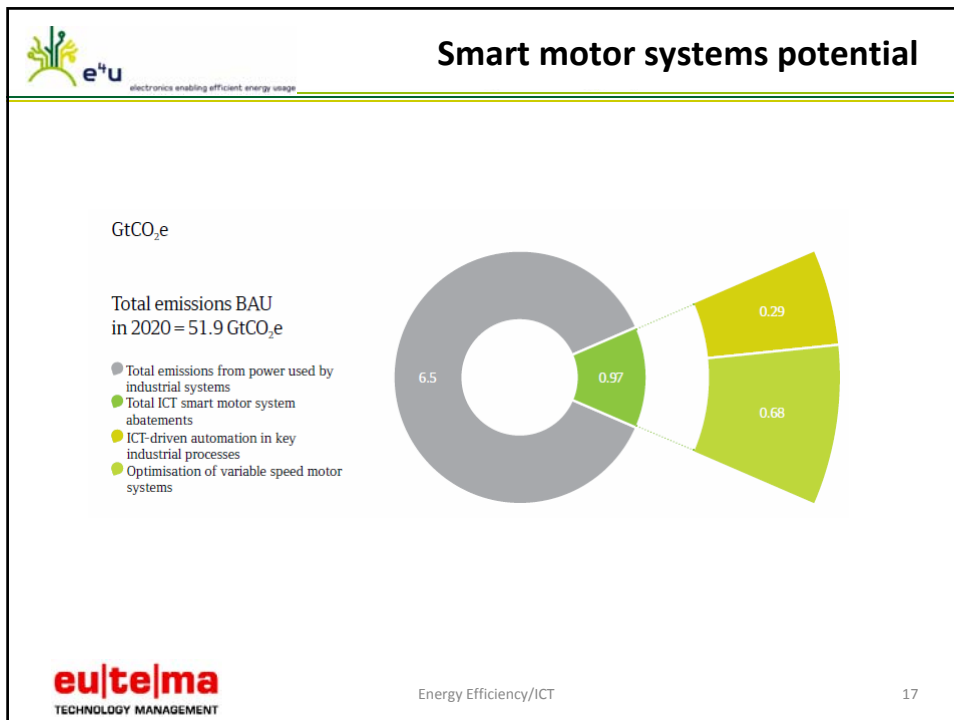
- Flow / pressure control

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**IV. Research into the Future**

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**Society megatrends**

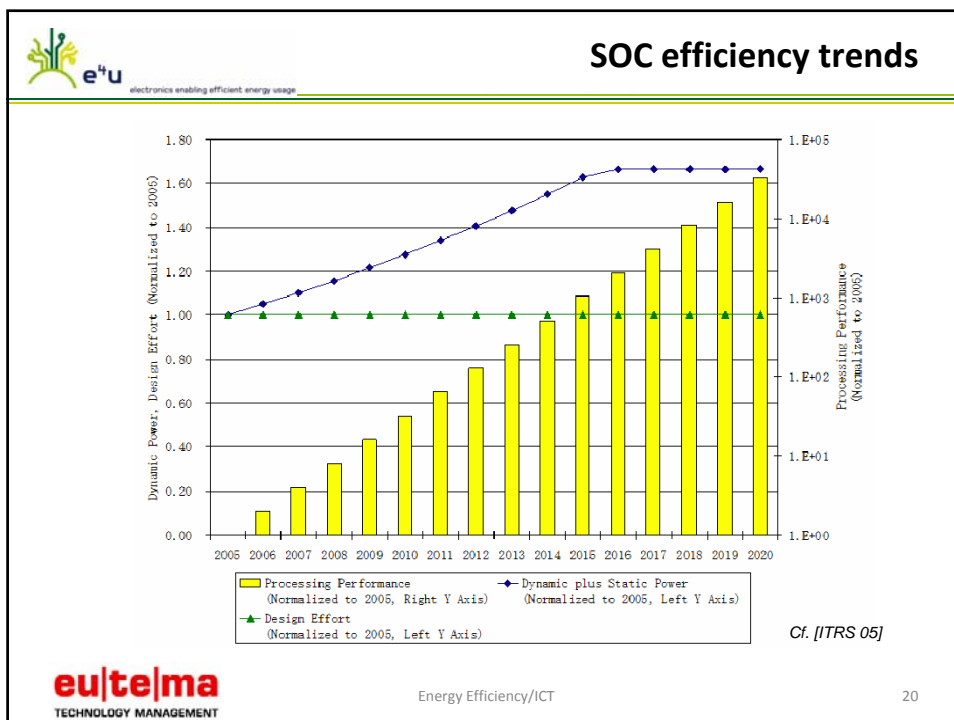
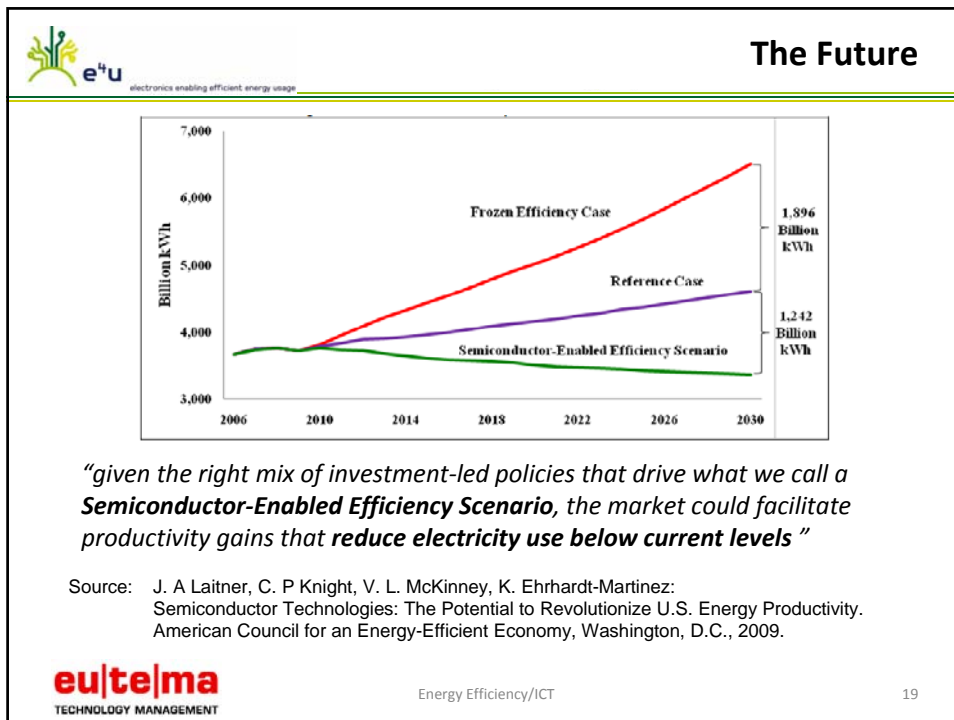
Megatrends:	Consequences for Power Electronics
<b>Mobility</b>	E-car, hybrid car, fuel cell car urban transport, trains, more electric aircraft/ship
<b>Information &amp; communication society</b>	PC, internet, server farm, digital control and system communication body area network (mobile human, mobile miniaturized system)
<b>Energy saving; security, availability and reliability of energy supply; clean environment</b>	Energy efficiency, power quality, electrification, system reliability, intelligent power management, digital control
<b>Comfort; elder society</b>	Electrification, self-learning systems
<b>Urbanisation; basic infrastructure; transport</b>	Electrification
<b>Globalisation</b>	Standardisation

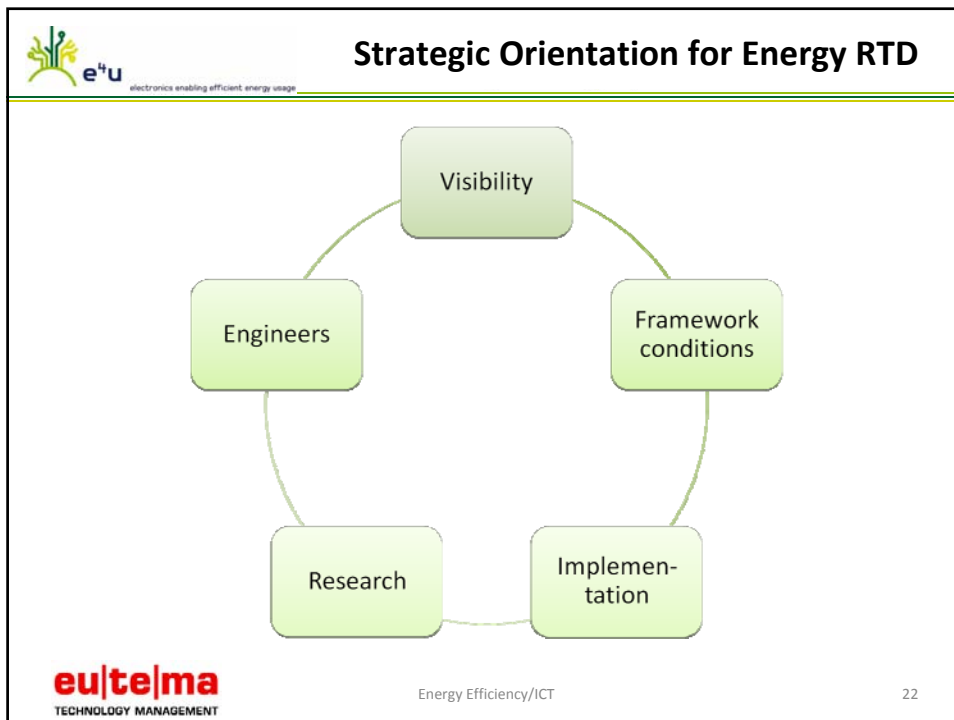
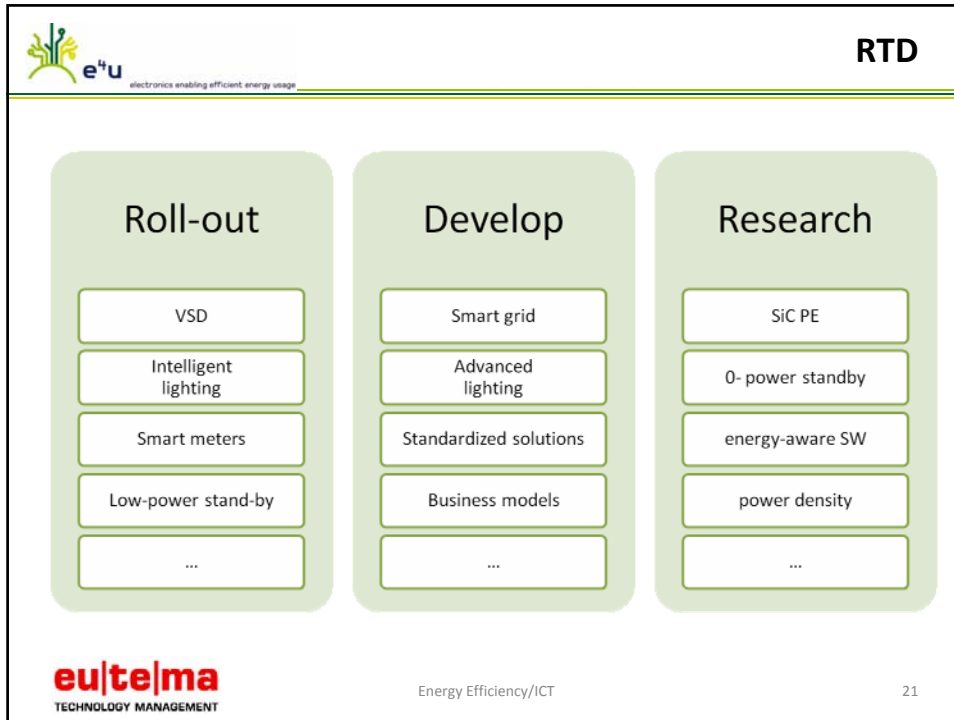
Society megatrends with impact on (power) electronics





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	e4u - Mid-Term Review <span style="float: right;">23</span>