

What is the potential for innovation in the consumer electronics and communications industry - how can European product policy help realise this

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EEAC Conference, Evora, October 12th 2007



Never stop thinking

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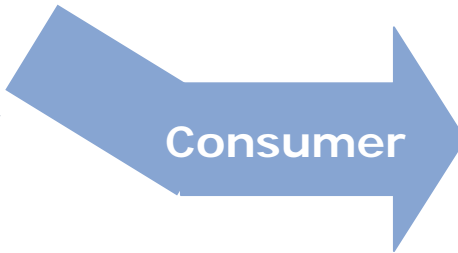
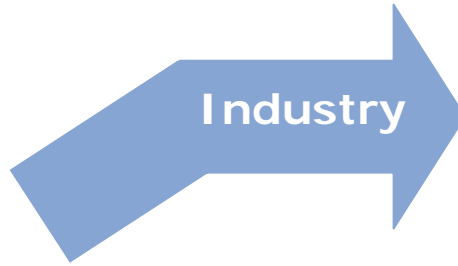
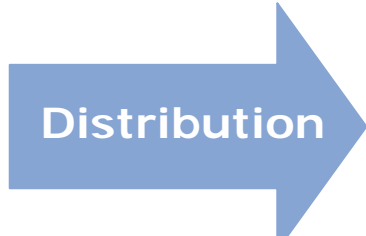
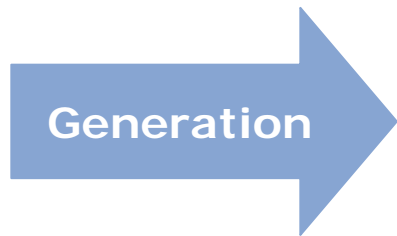
■ Current Programs of Energy Savings

■ Infineon's Contribution to Energy Efficiency

The "New" Infineon at a Glance

- More than EUR 4 bn in revenues in the fiscal year 2006,
- Approx. 30.000 employees (incl. 6,000 R&D staff) as of June 30, 2007
- Strong technology portfolio with about 22,900 patents and applications; more than 30 major R&D locations worldwide
- Focus on Energy Efficiency, Communications & Security
- Majority holding of Qimonda

Infineon Products Enable Efficient Power Supply Chain



Consumption

- Solar power
- Wind power
- Fuel cells

- FACTS & SVC
- HVDC Transmission

Potential savings everywhere

- Traction (trains)
- Speed controlled motors
- Pumps
- Computer & server power supply
- Lighting
- TV, DVD, etc. supply & stand-by
- Inductive cooking
- Automotive



FACTS = Flexible AC Transmission Systems; SVC = Static Var Compensation ; HVDC = High Voltage Direct Current

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Saving Potential by Using Power Electronics

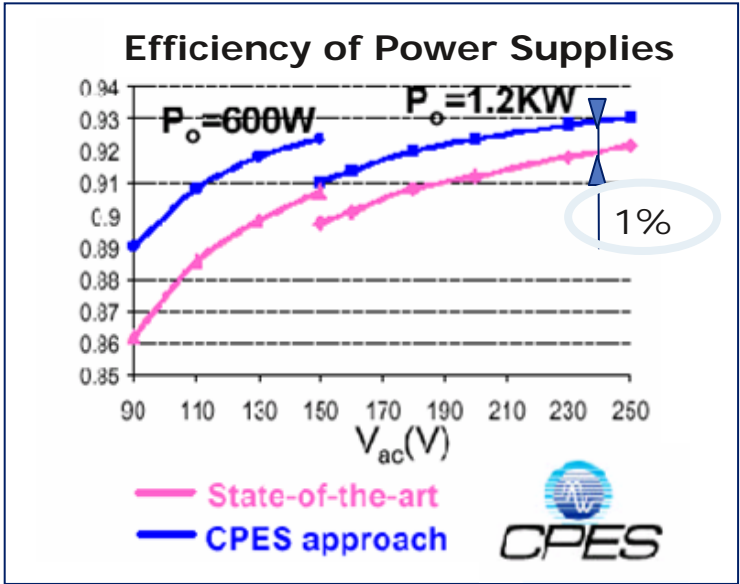
<p>POWER SUPPLY</p> <p>1% Saving potential</p>	<p>LIGHTING</p> <p>25% Saving potential</p> <p>(by Electronic ballast)</p>	<p>INDUCTIVE COOKING</p> <p>25% Saving potential</p> <p>(using induction instead of electric ovens)</p>	<p>TRACTION DRIVES</p> <p>20-30% Saving potential</p> <p>(using power semiconductors e.g. recuperation of braking energy)</p>	<p>MOTOR CONTROL</p> <p>30-40% Saving potential</p> <p>(using inverters)</p>	<p>AIR CONDITIONER</p> <p>30-40% Saving potential</p> <p>(using Intelligent Compressor Control)</p>	<p>STAND-BY POWER (TV)</p> <p>90% Saving potential</p>

Source: eupec GmbH; BVG- Berlin; Siemens / ECPE, 10/2005

Energy Saving in Server Power Supplies

Higher efficiency factor in power supply units through CoolMOS®

Amount of server ww in 2006*	~ 9.5Mio
Amount of server (additionally) until 2011	~ 30Mio
Ø Electric power consumption of one server	~ 1200W
Total electric power consumption server ww	36.000MW



- 1% savings is equivalent to a hydroelectric power plant (360MW)
- You can also save on cooling power

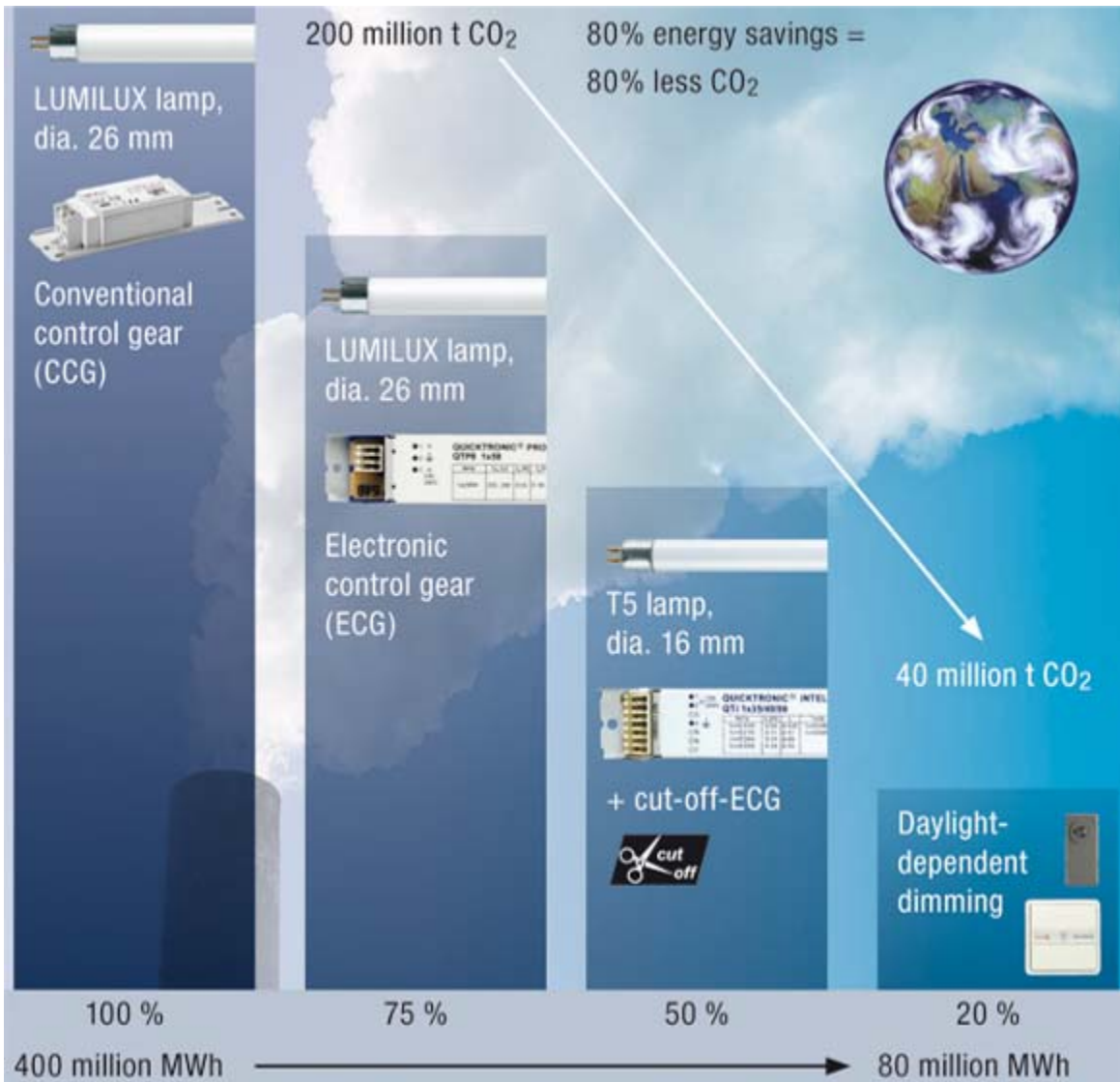
Saving Potential by Using Power Electronics

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Lighting Applications – High Energy Saving Potential

Electronic Control of Lighting and Switching Reduces Energy



15% of worldwide electrical energy is used by lighting

Source: Osram GmbH; evg-spot 1/2007

Saving Potential by Using Power Electronics

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Inductive Cooking Increases Efficiency by 25% Compared to Conventional Electric Ranges



German households using electrical cooktop

35.8 million

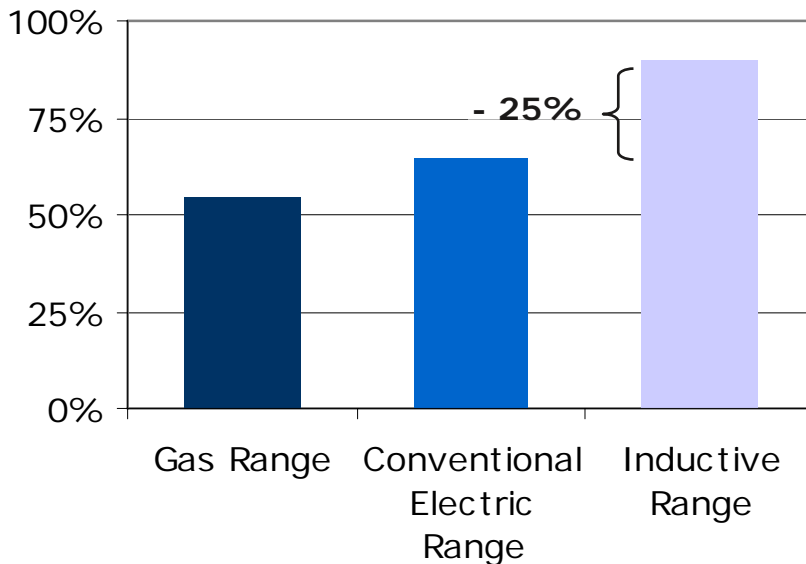
Energy consumption for electric cooking per household (Ø)

300 kWh/y

Energy consumption for electric cooking in Germany (Ø)

10.7 bill. kWh/y

Efficiency



■ **Energy consumption of electrical cooktop**
10.7 bill. kWh/y

■ **Higher efficiency from inductive cooking***
25%

■ **Energy savings from inductive cooking**
 $25\% * 10.7 \text{ bill. kWh/y} \sim 2.7 \text{ bill. kWh/y}$

■ **Cost savings**
 $2.7 \text{ bill. kWh/y} * 0,155\text{€/kWh} \sim \text{€ } 419 \text{ mill./y}$

Energy savings: approx. half a power plant per year
When compared to power plants (700MW/pp) $\sim 0.46/y$

* Source: <http://theinductionsite.com/> [15.08.2007]

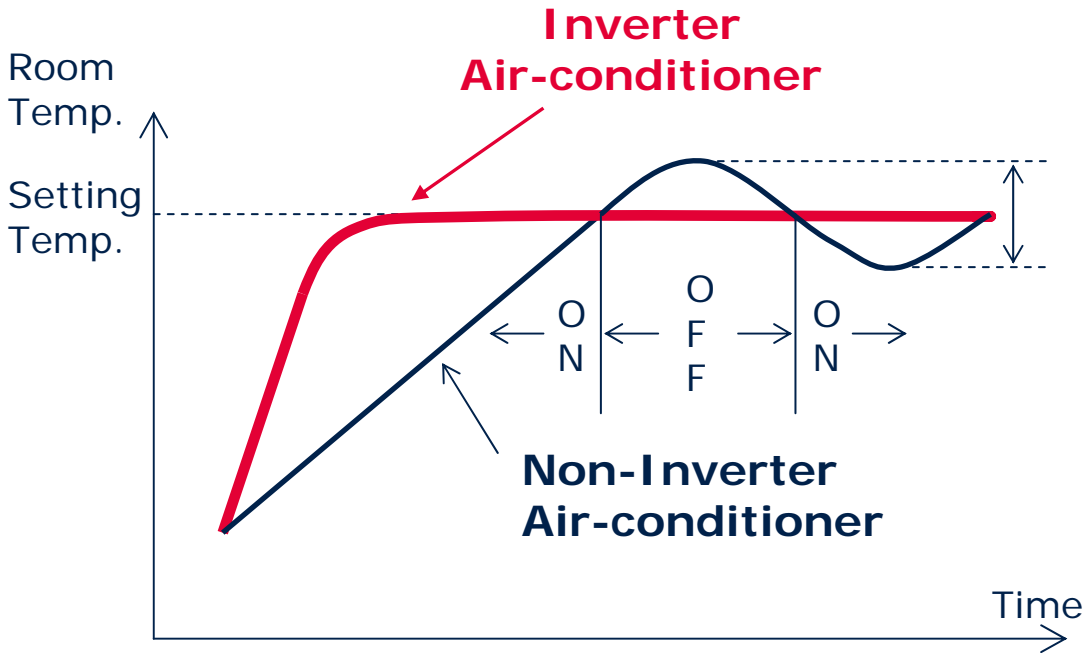
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Source: eupec GmbH; BVG- Berlin; Siemens / ECPE, 10/2005

Infineon Products

Improve Airconditioning Efficiency



The temperature can be easily regulated with Infineon microcontrollers








Using IGBTs improve the efficiency of the air conditioner



- Offers one-third less time to achieve desired temperature
- Energy savings up to 30 – 40%
- Permanent control without disturbing noise and constant draft

Source: eupec GmbH, 2005

Saving Potential by Using Power Electronics

POWER SUPPLY	LIGHTING	INDUCTIVE COOKING	TRACTION DRIVES	MOTOR CONTROL	AIR CONDITIONER	STAND-BY POWER (TV)
1% Saving potential	25% Saving potential	25% Saving potential	20-30% Saving potential	30-40% Saving potential	30-40% Saving potential	90% Saving potential
	(using electronic ballast)	(using induction instead of electric ovens)	(using power semiconductors e.g. recuperation of braking energy)	(using inverters)	(using Intelligent Compressor Control)	
						

Source: eupec GmbH; BVG- Berlin; Siemens / ECPE, 10/2005

Massive Energy Waste During Standby!

Infineon chips allow lowest stand-by power consumption

Europe: ~ **200 million TV sets**
 consuming **2 GW during stand-by** of 20h
 (with about 200Wh/day per set)

IEA
 recommendation:
 Up to **90% savings potential**



European TV stand-by
 power consumption
 p.a.



Rated Output Power	Phase 1 Jan. 2001	Phase 2 Jan. 2003	Phase 3 Jan. 2005
> 0.3W and < 15W	1.0W	0.75W	0.30W
> 15W and < 50W	1.0W	0.75W	0.50W
> 50W and < 75W	1.0W	0.75W	0.75W



Implementation of IEA
 recommendation would
**save the same power as 2
 power plants (à 900 MW)**

Source: International Energy Agency (IEA), Infineon

New AC/DC Power Supplies Offer More Energy Efficiency

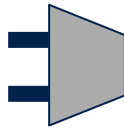


Miniaturization, reduced losses, wide input range

Yesterday



AC 230 V



PC-Power Supply

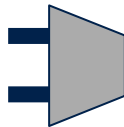
Efficiency ~ 65%



Today



AC 85-240 V



Notebook-Power Supply

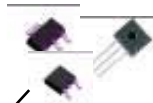
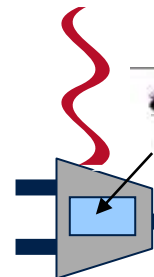
Efficiency ~ 75%



Tomorrow?



AC 85-240 V



Efficiency > 90%



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1. Meeting of the EU-Heads of Government (08.03.2007)

Targets till 2020

- 20% reduction of primary energy consumption
- Development of the share of renewable energies to 20%
- 20% reduction of CO₂ emission under the status of 1990

2. Actionplan E eff of the EU-Commission (19.10.2006)

- 20% reduction of primary energy consumption in comparison to the Trend

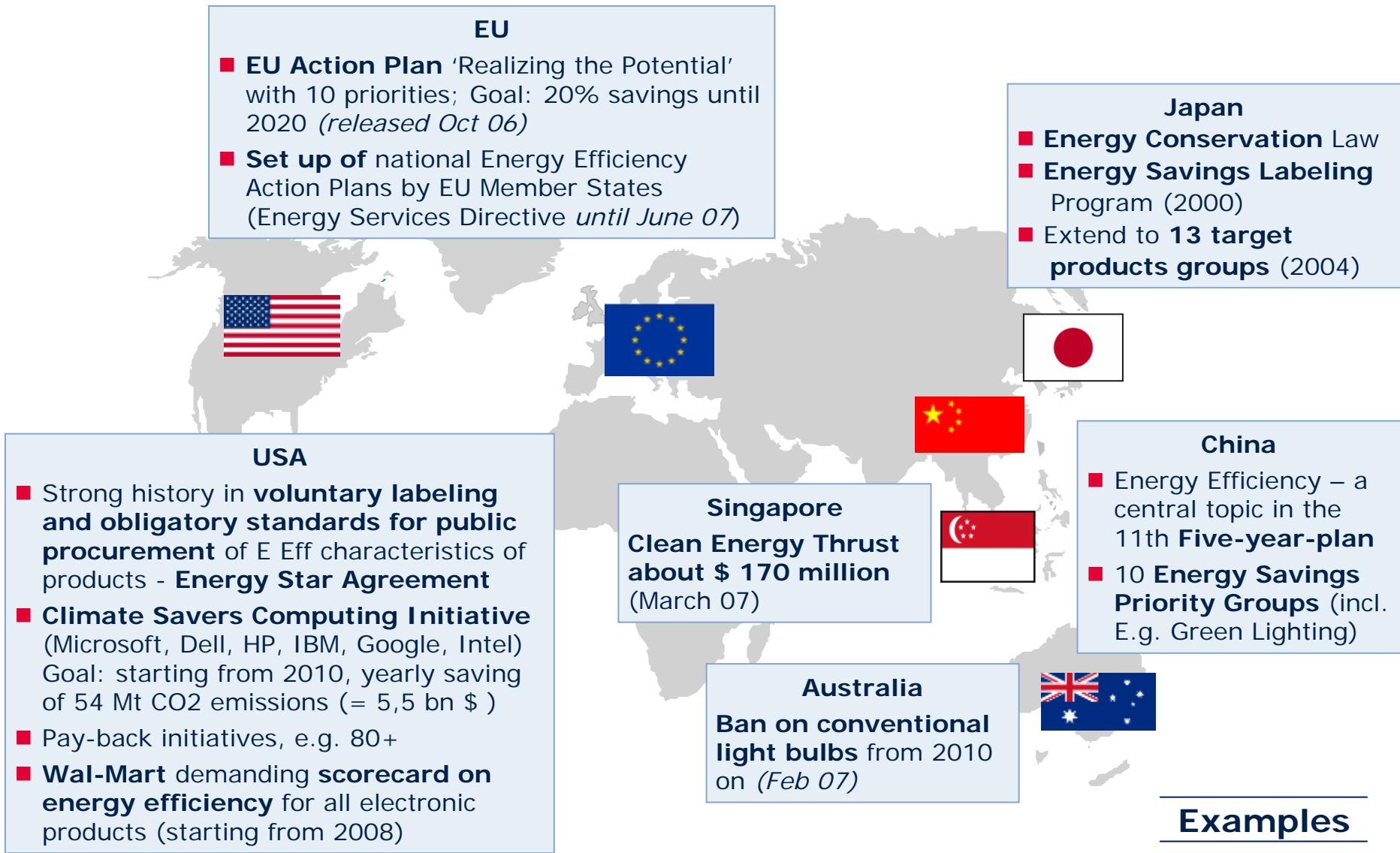
3. EU energy-guideline (05.04.2006)

- Till 2016 detection of final energy savings about 9% independent from the development of the economy and the energy consumption

4. Coalition contract between CDU, CSU and SPD (11.11.2005)

- doubling of energy productivity (economy power a fossil energy unit each) in Germany from 1990 till 2020

Energy Efficiency – not just a new buzzword, but a global challenge



Source: press articles

How Much Money Can a European Household Save?

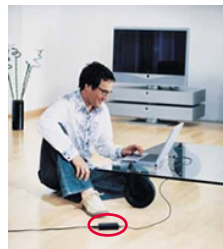
Average European Household



Energy efficiency
due to
innovative technology

+

Energy Savings
due to
energy-saving behavior



Average energy saving potential
up to 1000€ p.a. *

*Source: BMU, Energie effizient nutzen , 2006

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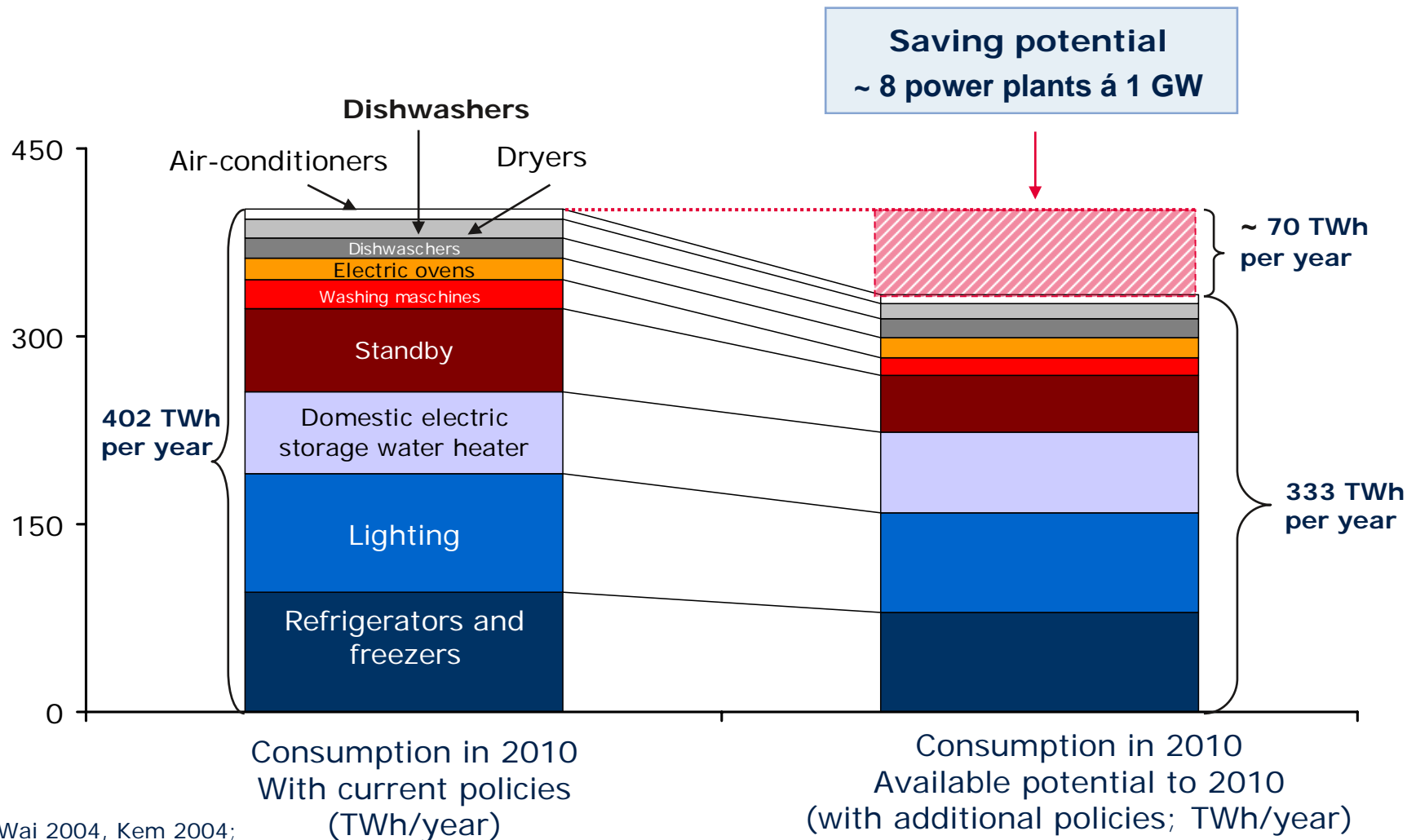
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■ **Infineon's Contribution to Energy Efficiency**

Enormous savings potential in households: White goods, Standby Operation & Lighting

Power consumption in European households in TWh/year (Forecast 2010)



Sources: Wai 2004, Kem 2004; Joint Research Centre IES

How Much Money Can an Inverter Driven Heating Pump Save?

Example: Heating Pump

Pump Type and Heating System Type	Energy consumption (5500 h/year)	Energy costs (0,18 €/kWh)	Energy costs during lifetime (20 years)	Difference of costs	Time for amortization (only pump)
<ul style="list-style-type: none"> - Uncontrolled pump - Uncontrolled heating system - Investment => 85€ 	500 kWh p.a.	90 € p.a.	1.800 €	Reference	Reference
<ul style="list-style-type: none"> - Modern inverter driven pump - Optimized heating system - Investment => 140€ 	180 kWh p.a.	32 € p.a.	640 €	-64% 58 € p.a.	1-2 years
<ul style="list-style-type: none"> - High efficiency pump - Optimized heating system - Investment => 200€ 	90 kWh p.a.	16 € p.a.	320 €	-82% 74 € p.a.	2-3 years

- All heating systems only switched on during the heating period.
- Values vary depending on heating and pump size.



Lamp Ballast

High efficiency – low costs



Common lamp		Energy saving lamp		Benefit
Performance	Cost of electricity over 10 years	Performance	Cost of electricity over 10 years	Reduction of costs for 10 energy saving lamp over 10 years**
25 W	45 €	6 W	11 €	290 €
40 W	72 €	8 W	14 €	530 €
60 W	108 €	11 W	20 €	830 €
75 W	135 €	15 W	27 €	1.030 €
100 W	180 €	23 W	41 €	1.340 €

General acceptance:

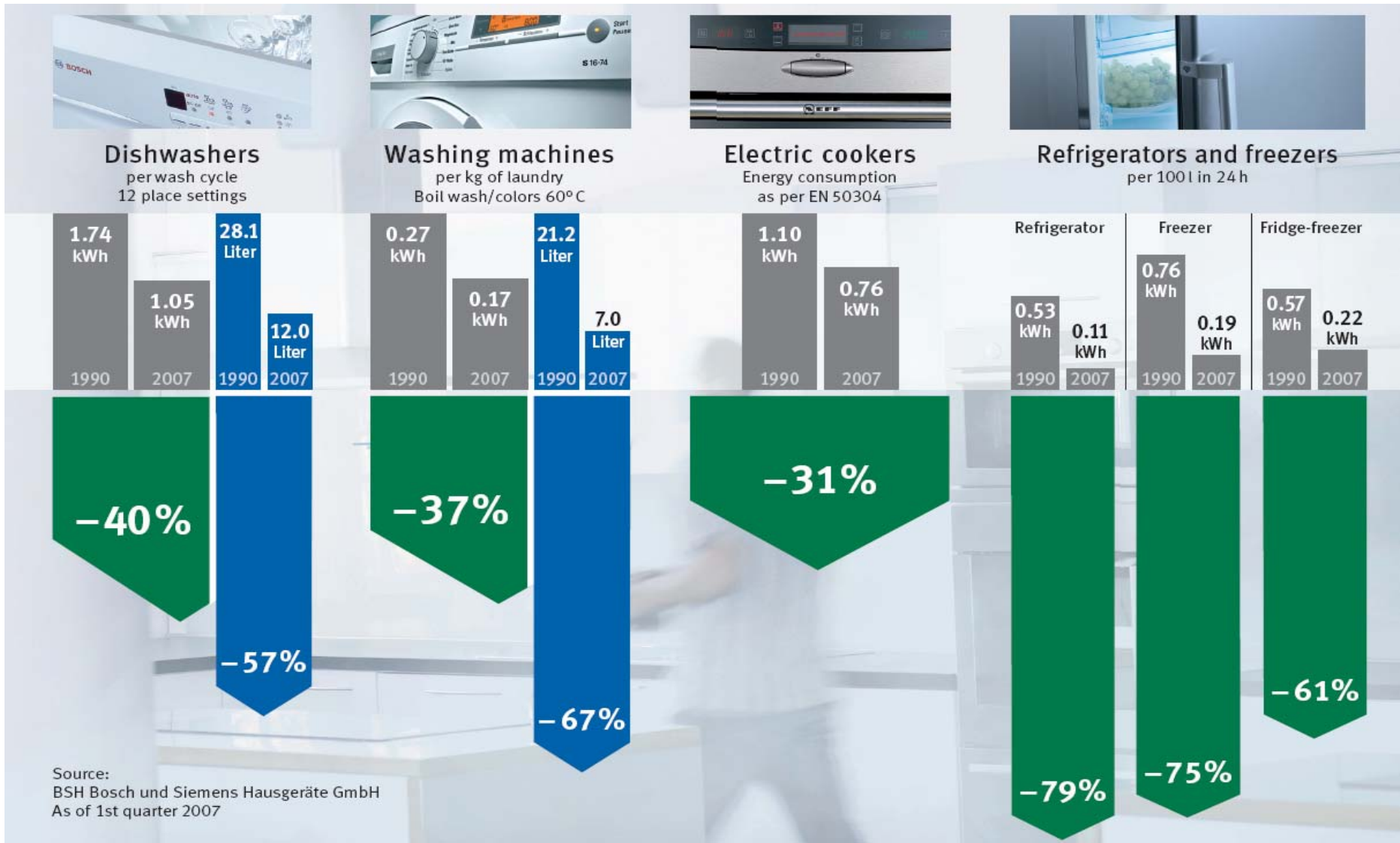
1.000h burning time per year, costs of power consumption €18 cent/kWh

Life cycle of a common lamp: 1.000. Life cycle of a energy saving lamp: 10.000h

**less €5 extra costs for the buy of an energy saving lamp compared to 10 common lamps.

The values are rounded

Potential Savings, Energy and Water Consumption

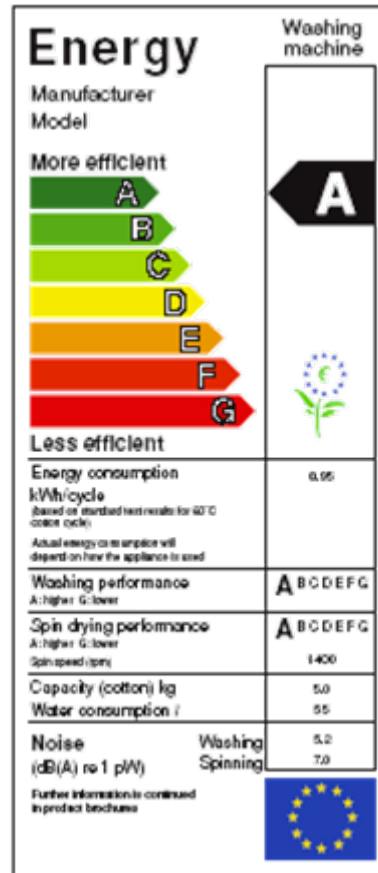


Source:
 BSH Bosch und Siemens Hausgeräte GmbH
 As of 1st quarter 2007

Status Quo in product labelling (EU)

By law, the **European Community Energy Label** must be displayed on all **new household products** of the following types displayed for sale, hire or hire-purchase:

- Refrigerators, freezers and fridge-freezer combinations
- Washing machines
- Electric tumble dryers
- Combined washer-dryers
- Dishwashers
- Lamps
- Electric ovens
- Air conditioners



Energy Efficiency Grade:
From „A“ (most efficient) to
„G“ (least efficient)

Status quo in Energy efficiency labelling (US)



Since Juli 20th 2007 the Energy Star specifications for Computer and Notebooks have higher requirements to energy efficiency as 11 years before. The Energy Star Label is created for energy efficient devices like Desktop-Computer, Notebooks, Workstations and Server with Desktop Components.

Source: <http://www.das-energieportal.de/startseite/nachrichtendetails/datum/2007/07/31/eintrag/energy-star-neues-label-fuer-notebook-und-pc/>

EEAC calls for dynamic efficiency labels and standards for energy using products within the EuP directive. First implementation measures will be discussed in the forthcoming months.

- **How do we assess implementation progress of the directive?**
- **What should be the benchmark for the dynamic standards – is the more pragmatic top-runner model or the less transparent least-life-cycle cost the better benchmark?**
- **Which incentives can be created to speed up consumer goods modernisation – which side effects have to be considered in the design of those measures?**