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The Entry of New Technologies for the Modernization and Increase of Energy Efficiency in Small and Medium-sized Business

Efficientia 98

Rio de Janeiro, 20. October 98

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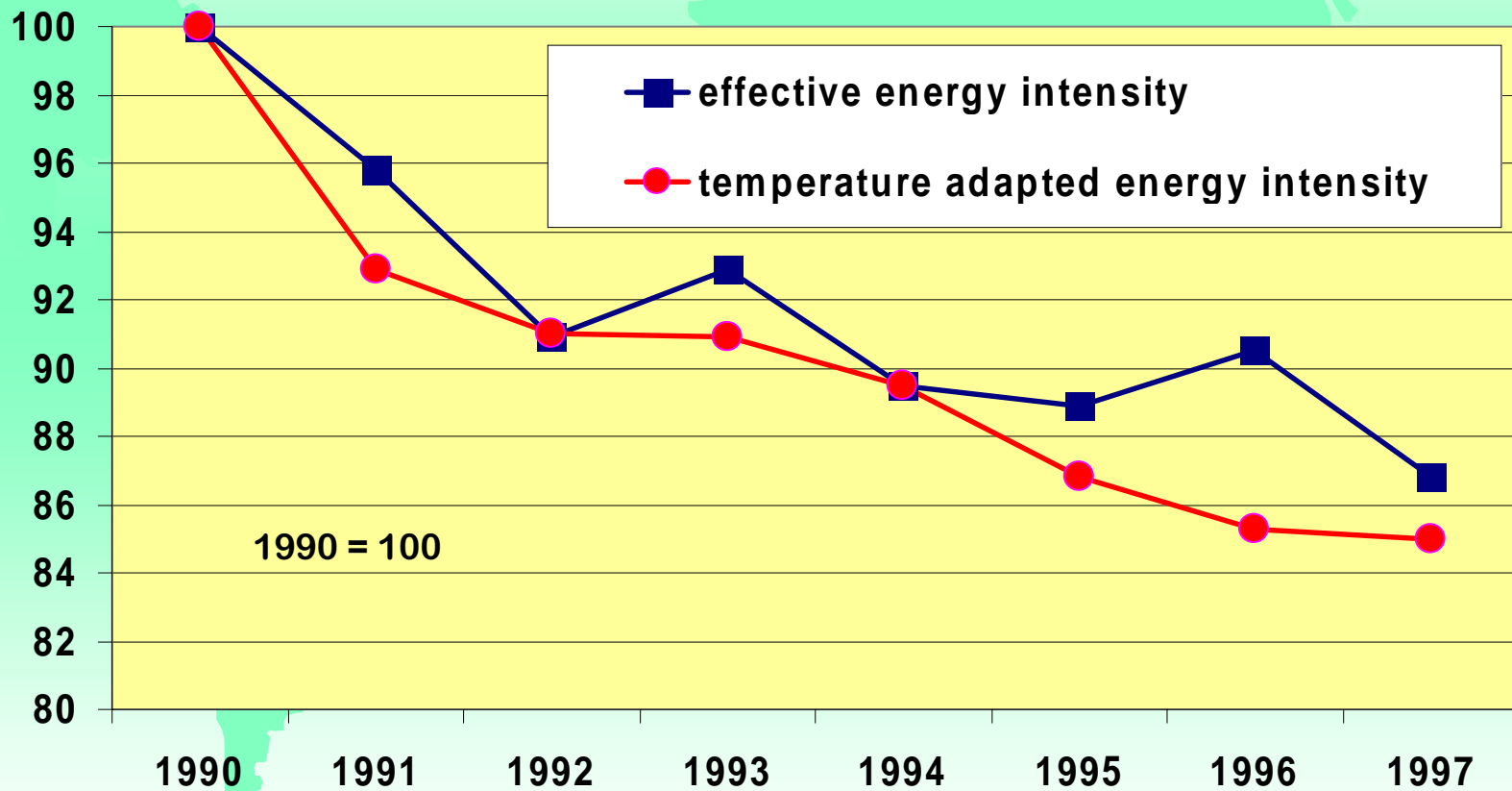


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Energy Intensity in Germany

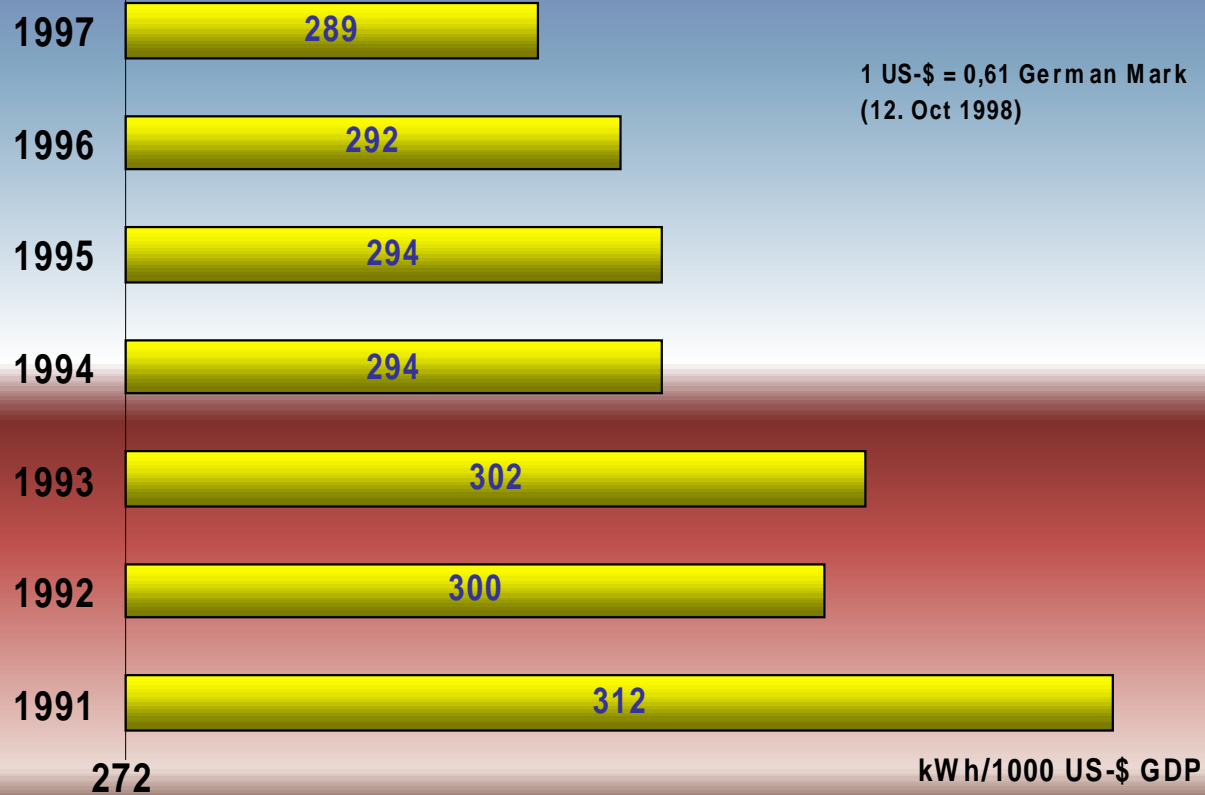
(Primary Energy Consumption / GDP)



Source: AG Energiebilanzen



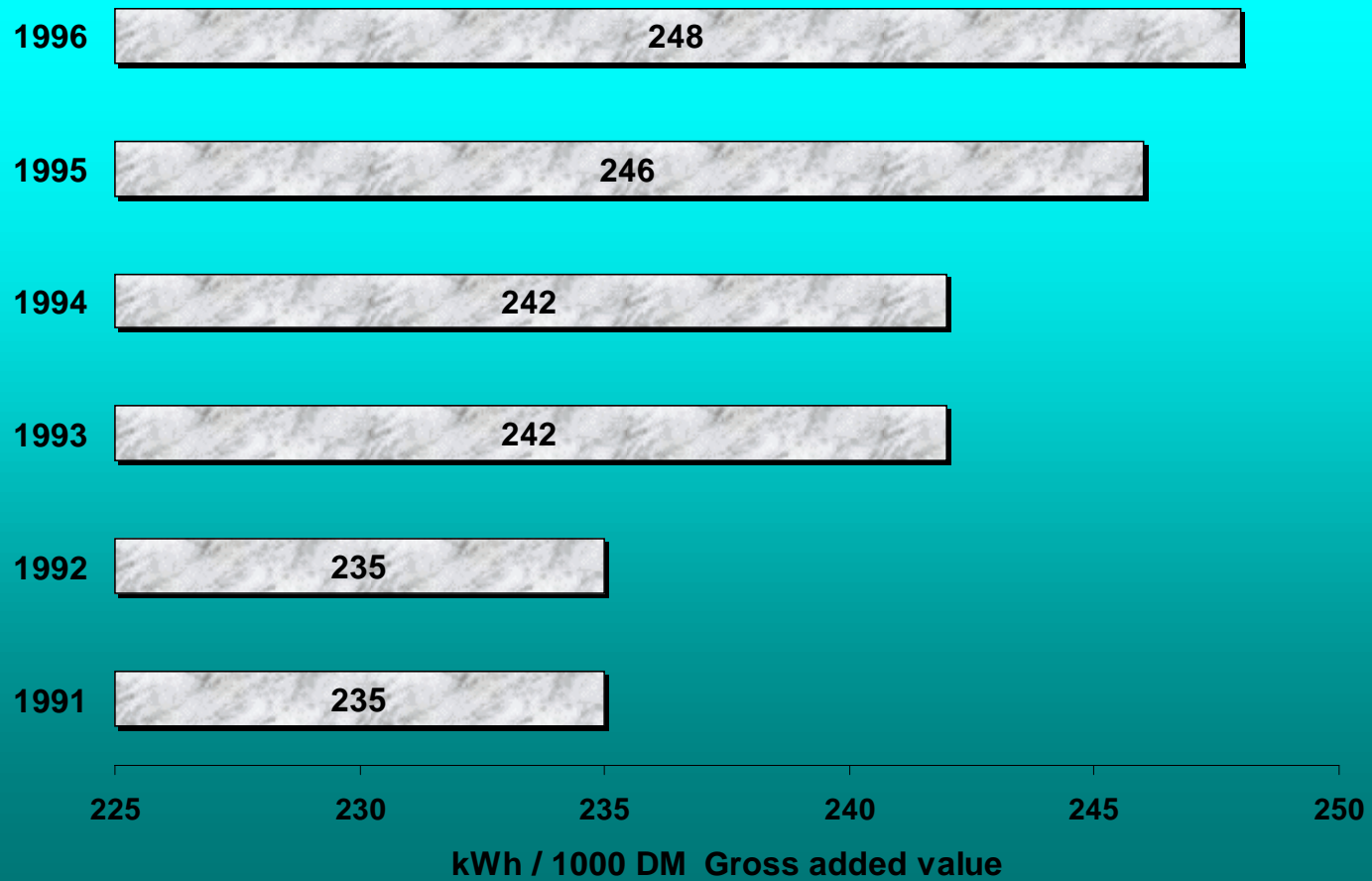
Specific Electricity Consumption in Germany



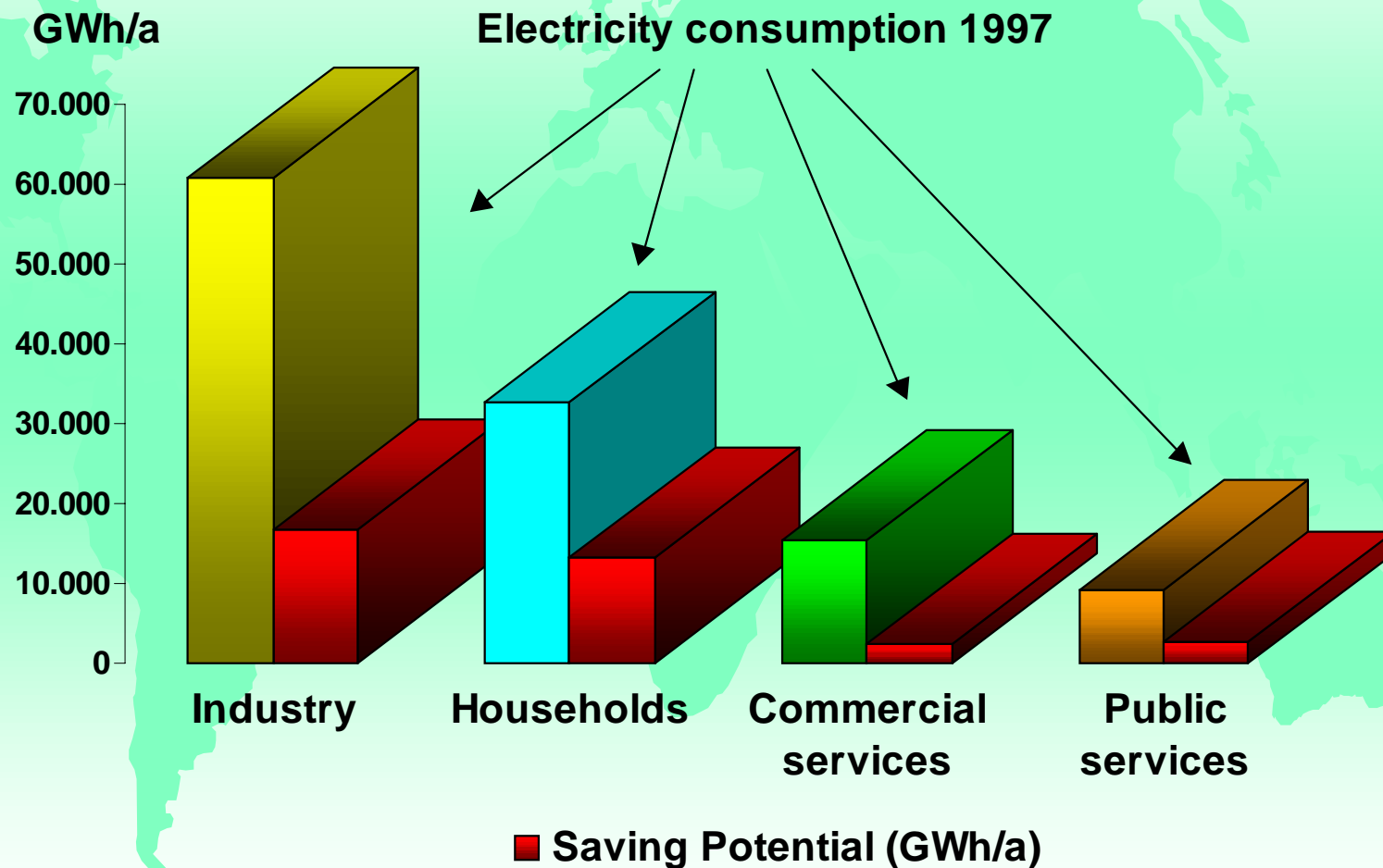
Source: BMWi, Energiedaten 97/98; VDEW



Electricity consumption in German industry



Electricity Saving Potentials in Northrhine-Westfalia /Germany



Energy Costs in Relation to Overall Costs

<i>Branch</i>	<i>Energy Costs</i>
<i>Bakeries</i>	2-5 %
<i>Meat Processing industry</i>	3-9 %
<i>Dairy industry</i>	4 %
<i>Timber and Saw Mill industry</i>	4 %
<i>Laundries and dry-cleaners</i>	9 %
<i>Grain-drying industry</i>	10 %
<i>Foundry industry</i>	10 %
<i>Pulp and Paper industry</i>	13 %
<i>Fish Meal industry</i>	25 %



Source: Institute for Energy Technology, Norway, 1998

Instruments and Measures for the Introduction of Energy-saving Technologies in SME

- ◆ **Energy indicators / Benchmarking**
- ◆ **Labelling**
- ◆ **Branch-specific Energy Concepts / Technology Data Banks**
- ◆ **Integration of Energy and Environmental Management**
- ◆ **Impulse Programmes (Training and Information)**
- ◆ **Regional and local Energy Agencies**
- ◆ **Voluntary Agreements**

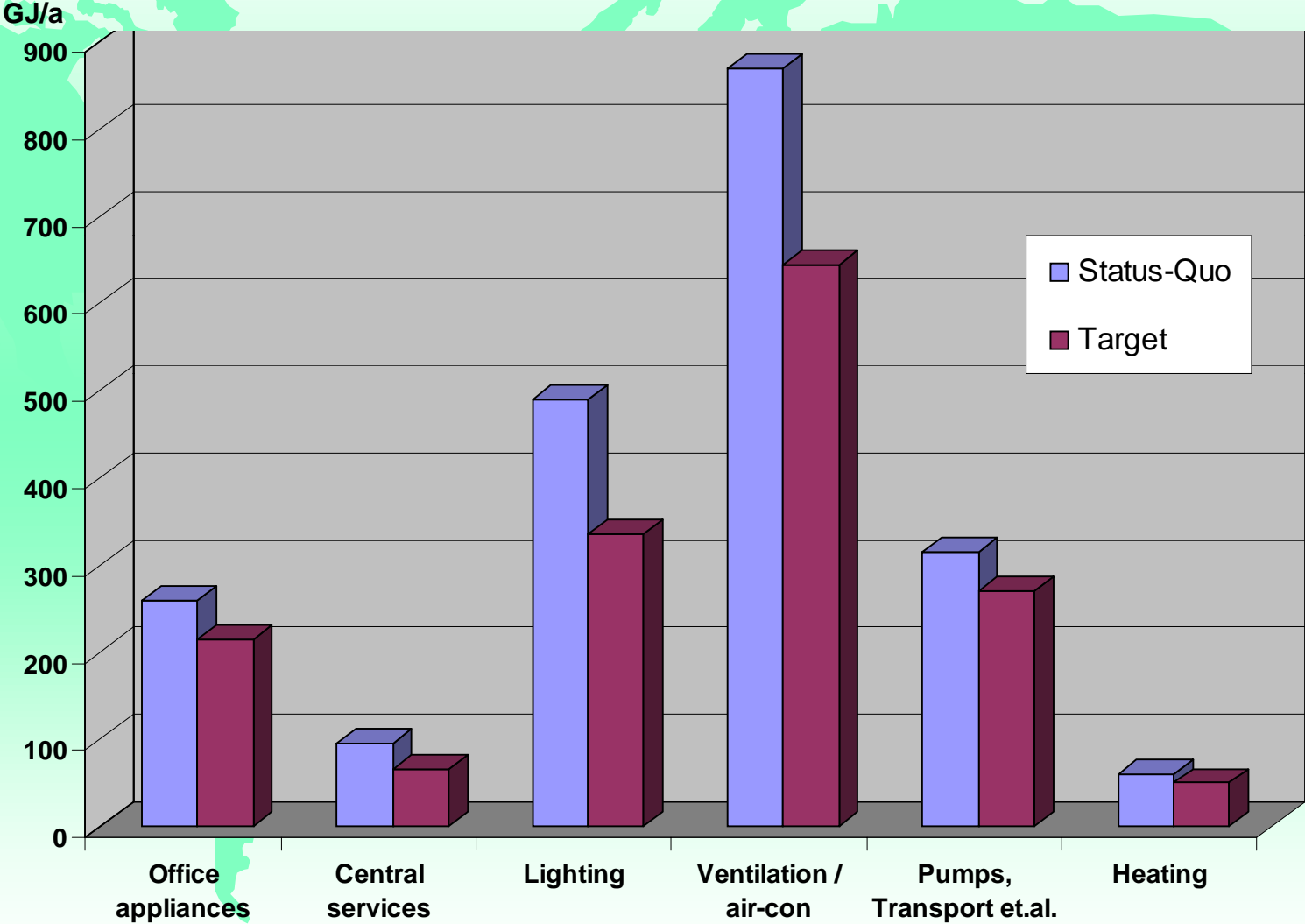


Average Heat and Electricity Consumption for different paper and cartonage products

Product	Electricity Demand kWh / t	Heat Demand kWh / t
Cartonage	500	1260 - 1880
Wrapping paper	300 - 640	900 - 2330
Cellulosis	300 - 640	1750 - 3520
Graphical Paper	700	1440 - 1760
Photographic Paper	840	3000
Hygenic paper	1100	1100 - 1920
Special Paper	1760	3240
Fine Paper	1000 - 1200	4170 - 5200
Condensator Paper	-	2780 - 4030
Transparent Drawing Paper	-	1800 - 3400
Printing Paper (Newspaper quality)	200	820 - 1210



Target values for the electricity consumption: Case Study: Banks / Insurance Companies



Quelle: IC Consult, Modellvorhaben zur Energieeinsparung im Tertiären Sektor Berlins, 1996

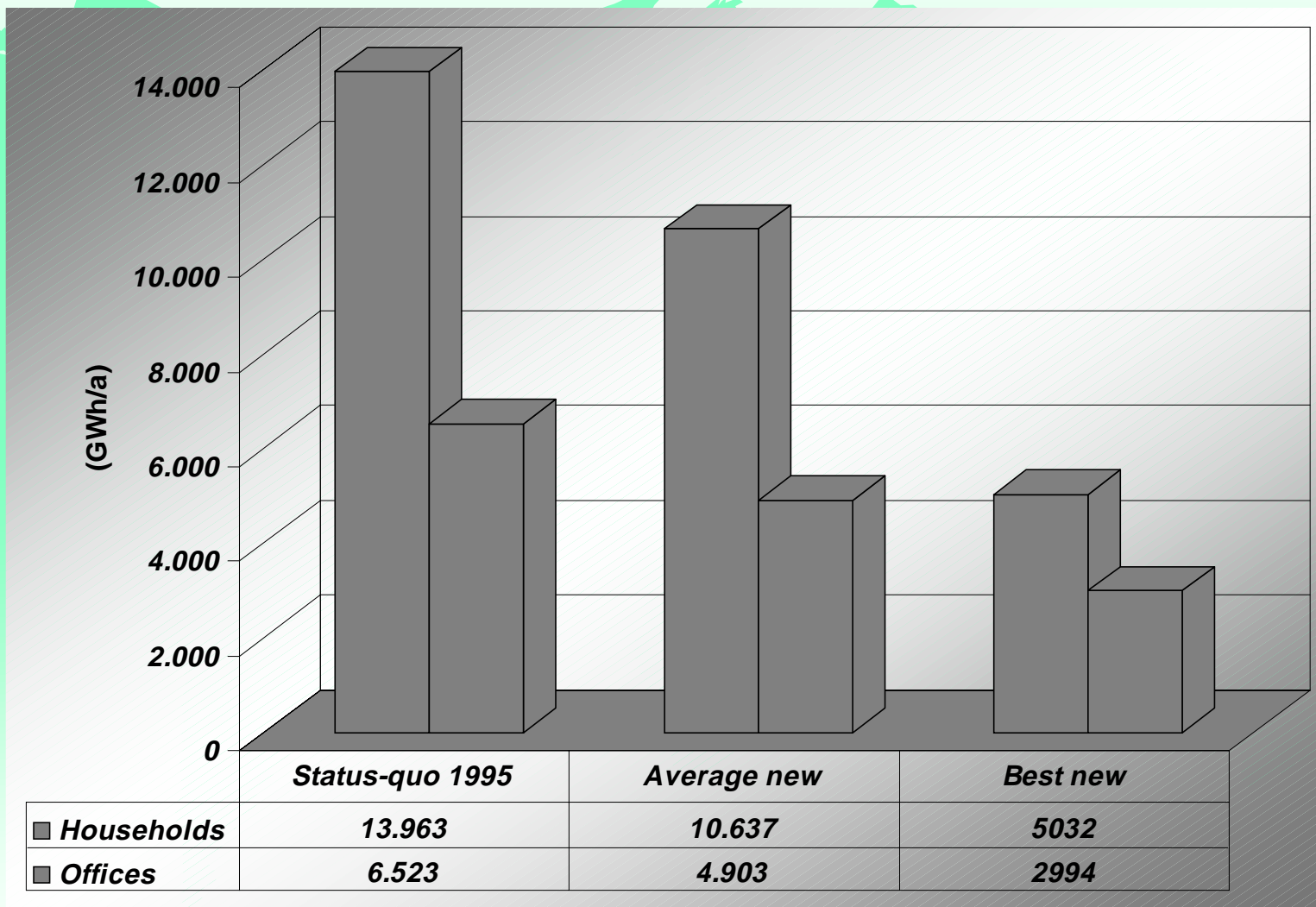


SIA 380/4 - Threshold and target values for specific energy requirements: Lighting (selection)

Zone Utilisation hours	Utilisation conditions	Examples	EI: MJ/m ² a Lighting	
			Threshold	Target
Offices 2750 h/a	300 lux, mainly daylight	Single office	35	12
	500 lux, partly with daylight	Offices with higher lighting req.	70	40
	300 lux, no daylight	computer & conference rooms	90	60
Sales areas 3600 h/a	300 lux, no daylight	corner shops	120	70
	400 lux, deco 3W/m ² , no daylight	food or non-food shops	180	120
	300 lux, deco 6 W/m ² , no daylight	fashion/dept. stores	190	130
	50 lux, no daylight	corridors, stairwells, cloakrooms, medical rooms	30	20



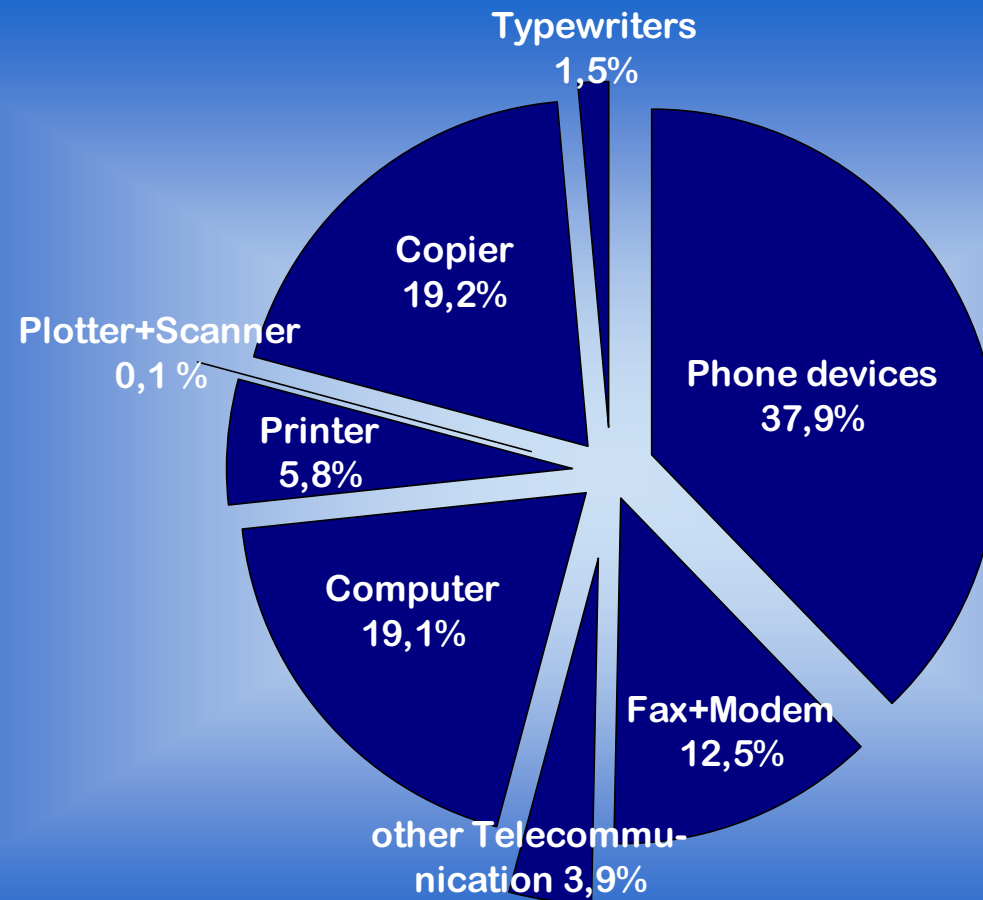
Model calculation for stand-by onsumption



Source: ebök, Tübingen 1995

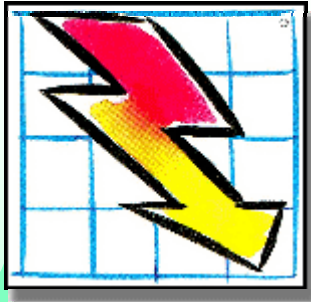


Stand-by consumption in German Offices



Source: ebök, Tübingen, 1995





Labelling for Electronic Office Appliances

Approval criteria for 1998 electricity saving label (Germany and Switzerland)

<i>Appliance</i>		<i>Status</i>	<i>Max. Consumption (W)</i>
<i>Fax machine</i>		stand-by	5
<i>Printer</i>	<i>Laser/LED</i>	switched-off	3
		stand-by	16
	<i>others</i>	switched-off	2
		stand-by	6
<i>Photocopier</i>	switched-off	5	
	stand-by	$Y=27+3,23 \times C$ C=copies/min	
<i>PC</i>	<i>with integrated monitor</i>	switched-off	5
		sleep-mode	30
	<i>without integrated monitor</i>	switched-off	5
		sleep-mode	25
<i>Monitor</i>		sleep-mode	5

Source: Gemeinschaft Energie label Deutschland (GED) and Energie 2000/Switzerland

List of in Germany approved appliances: <http://www.impulsprogramm.de>



German Environmental Label “Blue Angel” (since 1977)

List of Products with criteria on Energy Consumption

- ◆ Special Gas Boilers
- ◆ Water Heaters for use of Gaseous Fuels
- ◆ Combined Burner and Boiler Units
- ◆ Water-saving Flow Restrictors and Valves
- ◆ Solar-Powered Products
- ◆ High-Insulating Window-Glasses
- ◆ Refrigerators / Freezers
- ◆ Workstation Computers
- ◆ Printers
- ◆ Hot-Air Hand Driers
- ◆ TV Sets

Institutions involved:

- Federal Environmental Agency (UBA)
- Environmental Label Jury
- German Institute for Quality Control and Labeling (RAL)



Guidelines for energy concepts in industrial and commercial branches

A. Documentation for Multipliers and Energy Consultants

- ❁ Branch informations
- ❁ Methodology
- ❁ Measures
- ❁ Good-practice examples
- ❁ Contacts

B. Technology Data Bank

C. Information Brochure for SME



Source: NRW - Rationelle Energieverwendung durch gewerbliche Branchenkonzepte, 1997



Eco-Management and Audit Scheme (EMAS)

- ◆ **Environmental Policy**
- ◆ **E. Review**
- ◆ **E. Objectives**
- ◆ **E. Programme**
- ◆ **E. Management System**
- ◆ **E. Audits**
- ◆ **E. Statement**



Impulse Programmes (Switzerland 1990-95)

- RAVEL** - Efficient Use of Electricity
- PACER** - Renewable Energies
- IP Bau** - Maintenance and Retrofitting

Elements:

- Information
- Training
- Further Education



German Industry's Voluntary Energy Efficiency Improvements

- Extract -

Industrial Branch	Reduction of CO ₂ -Emissions and Energy consumption by products	Reduction of CO ₂ -Emissions and Energy consumption by processes	CO ₂ -/Energy-Reduction 1990 - 2005	Monitoring
Cement industry	Optimized products (Composite Cement)	Heat recovery, substitution of old production lines	Specific energy reduction: -20 % (base year 1987)	Every 1-3 years
Brick industry	Light weight bricks	Optimization of oven and drying technologies	Specific energy reduction: -28 %	Yes, additional voluntary energy-audits
Glas industry	Super-insulation glases, mineral wool	Isolation of oven, heat recovery from melting ovens, pre-heating of raw products	Specific energy reduction: -22 % (base year 1987)	Yes

Source: RWI, CO₂-Monitoring der deutschen Industrie, Nov. 1997