



Improving the Database of Electricity Efficiency in Tertiary Buildings by Monitoring and Surveying

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Background and objectives



- Increasing electricity consumption in the tertiary sector: more and new appliances, increasing cooled area, IT infrastructure
- Untapped energy-saving potentials, high level of barriers
- Building managers and politicians need data for decision making



Combination of measured and surveyed data – two examples: EU project EL-TERTIARY and a broad survey in Germany





Project team: 18 institutions from 12 countries

Types of buildings:

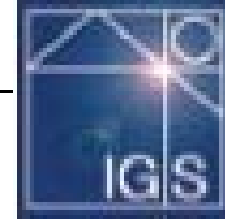
- office buildings
- super markets
- hotels
- hospitals
- schools, universities
- kindergartens
- old people's residences

Electricity use by purpose:

- lighting
- office equipment, ICT
- ventilation
- air conditioning
- cooling & freezing
- hot water
- electric heating



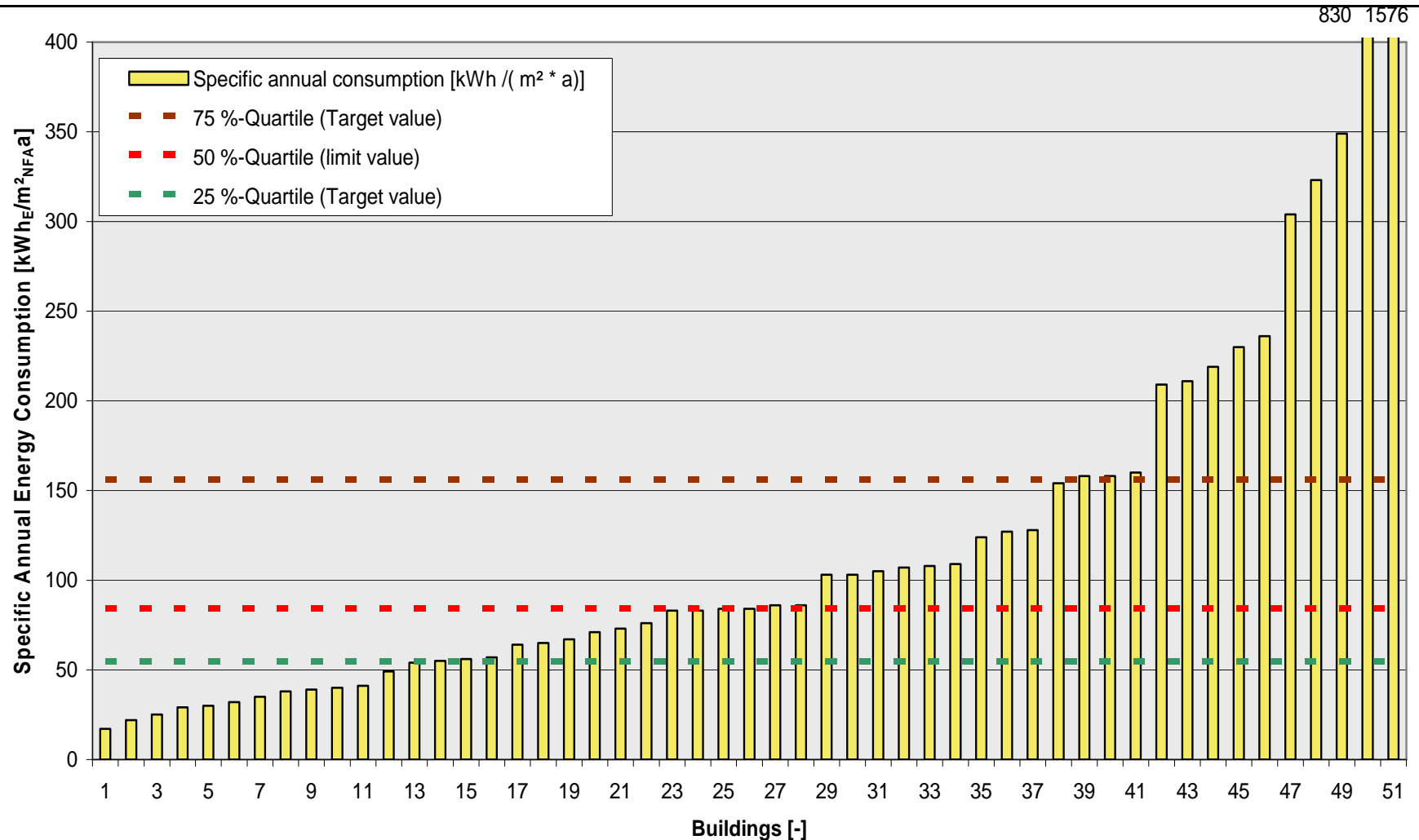
Methodology for electricity audits



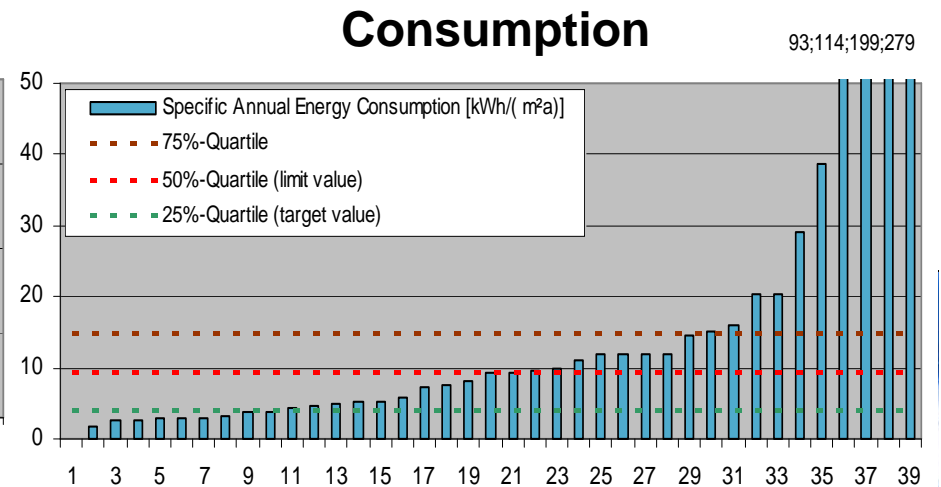
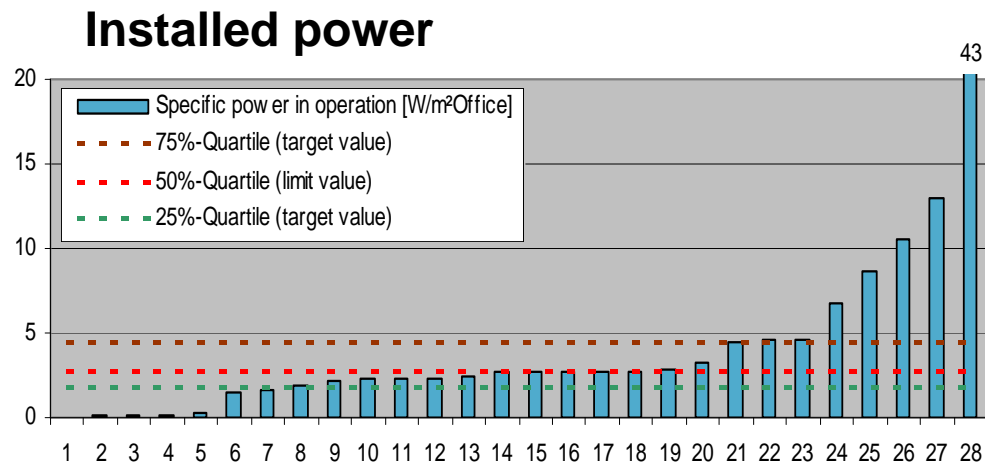
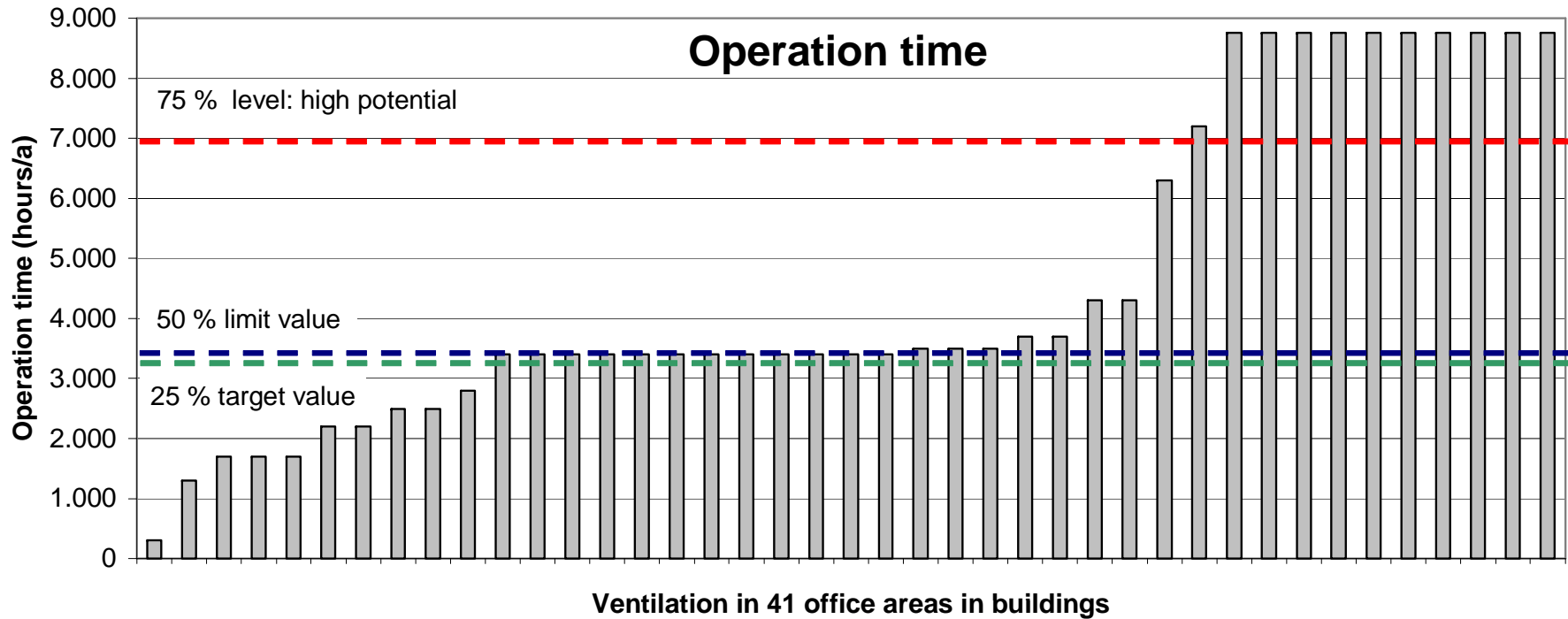
- Developed by
- Internet-based, usable on site
- Easy to handle
- Broadly applicable (different frame conditions, types of buildings and appliances, technical standards, metering equipment)
- Flexible (administration, number of buildings and systems, data, users)
- Results available immediately



Results: Electricity consumption in office buildings

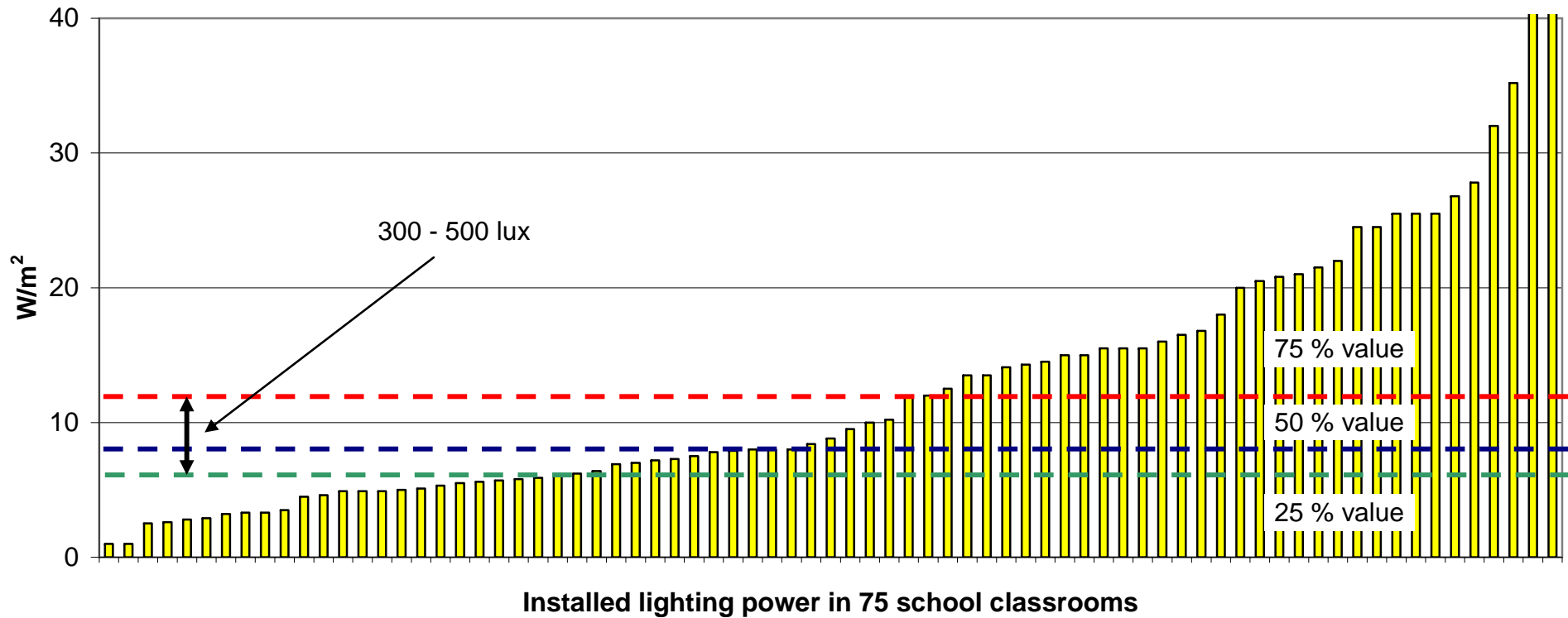


„Systems“ approach: Ventilation in offices



Lighting: more than 500 systems evaluated

Example: classrooms, installed power



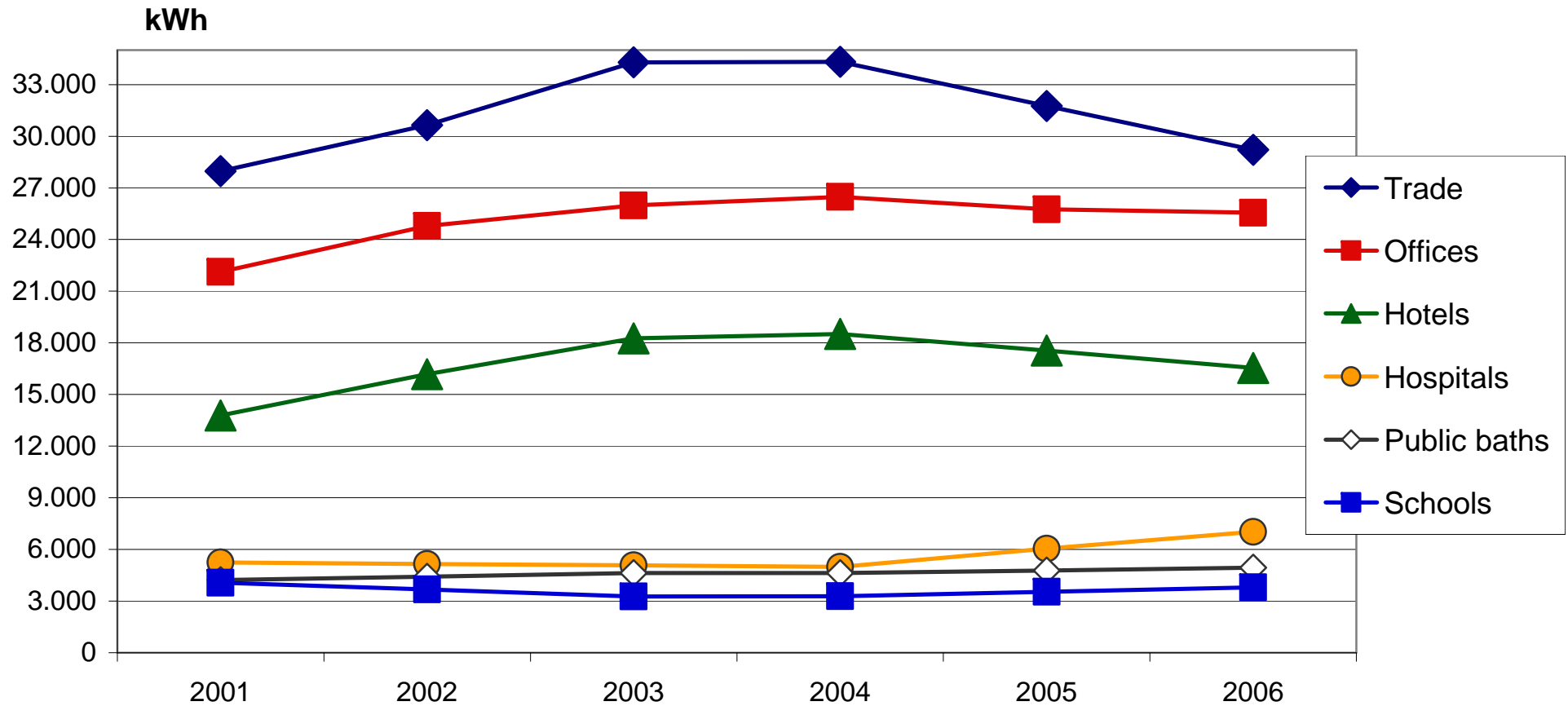


Energy consumption of the tertiary sector (trade, commerce and services): surveys since 1996 in Germany

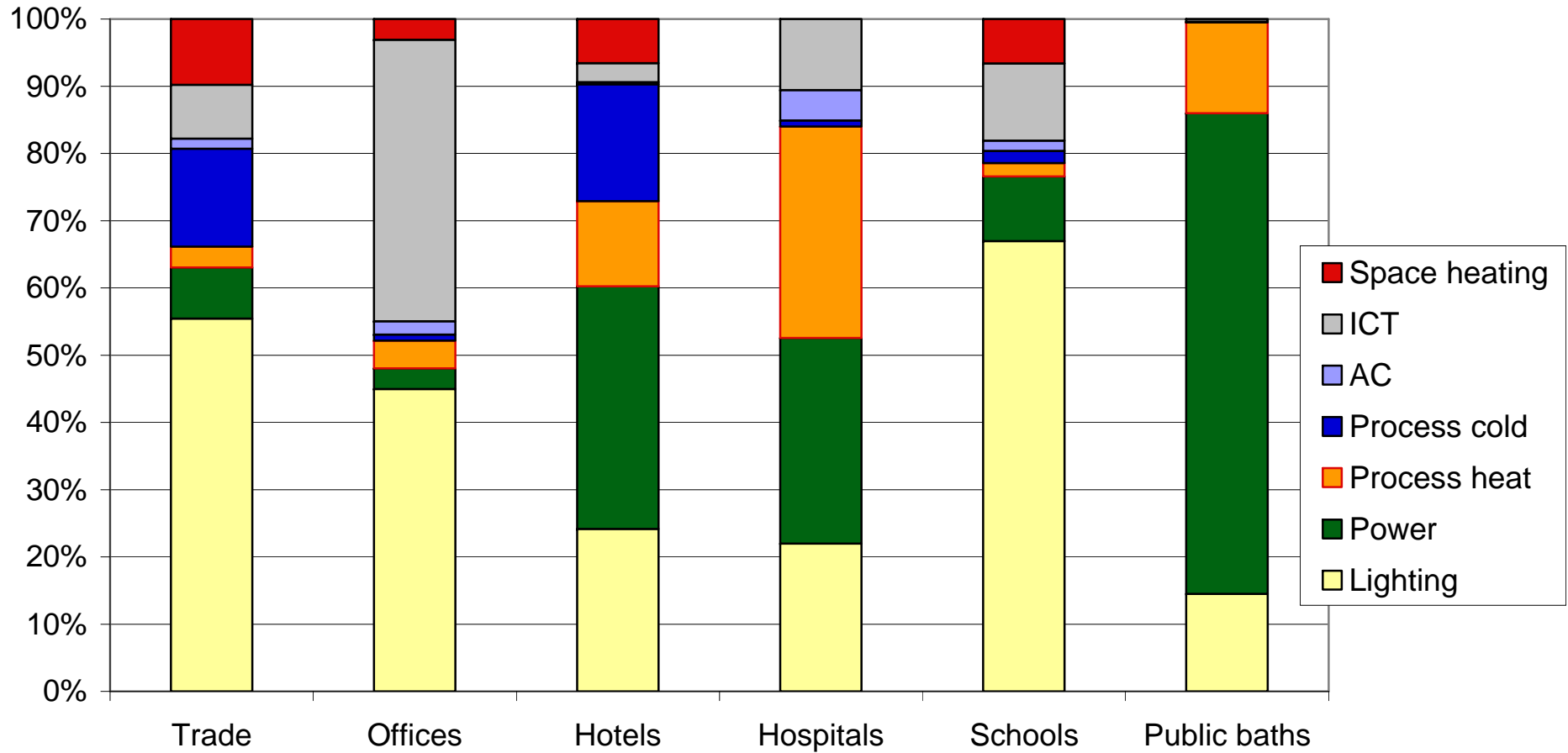
- More than 2,000 companies surveyed
- 23 relatively homogenous splits
- All company sizes
- Energy consumption in detail
- Energy-consuming installations, influence factors
- Extrapolation for consumption and type of use



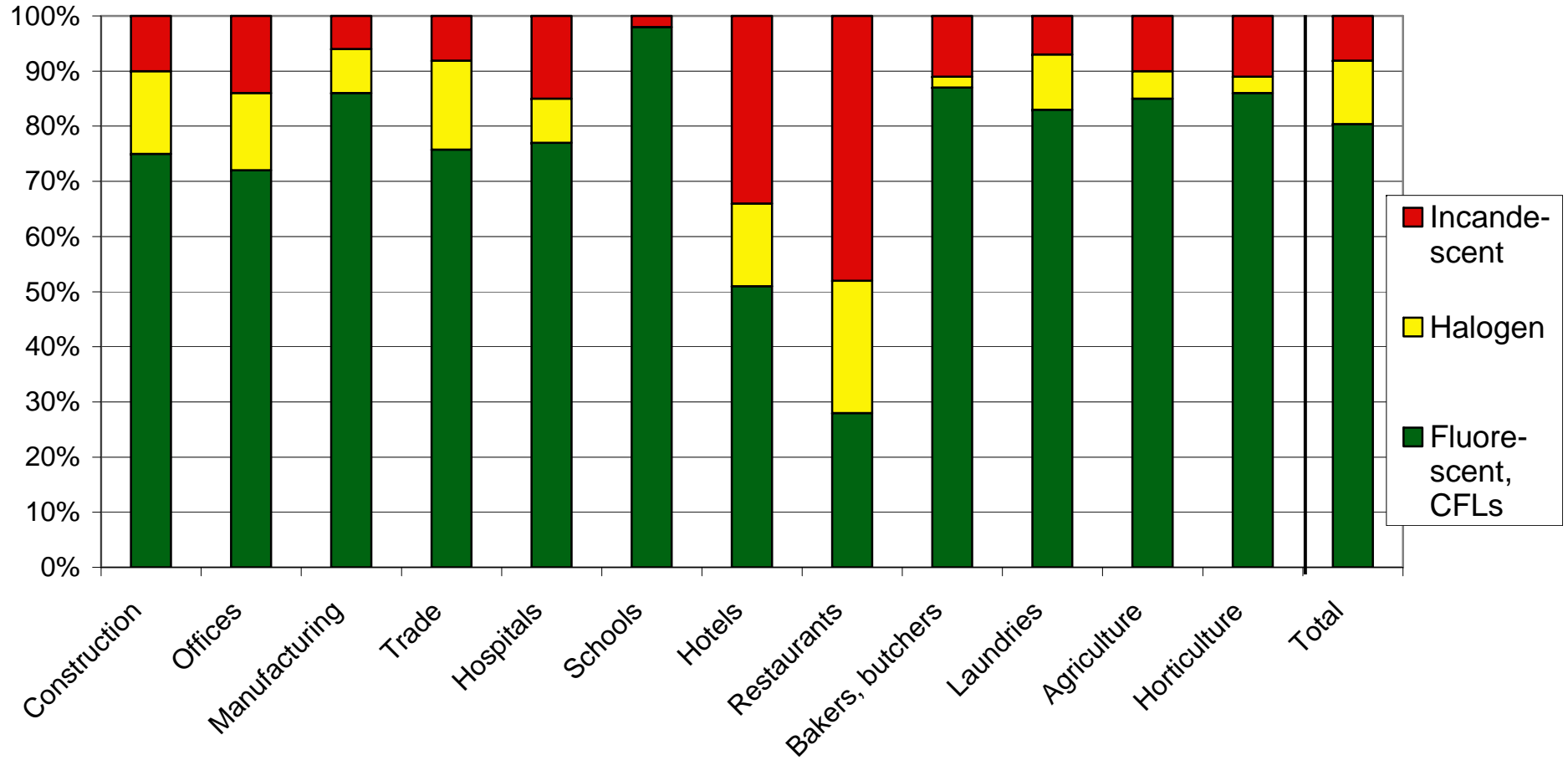
Results of the surveys: development of electricity consumption



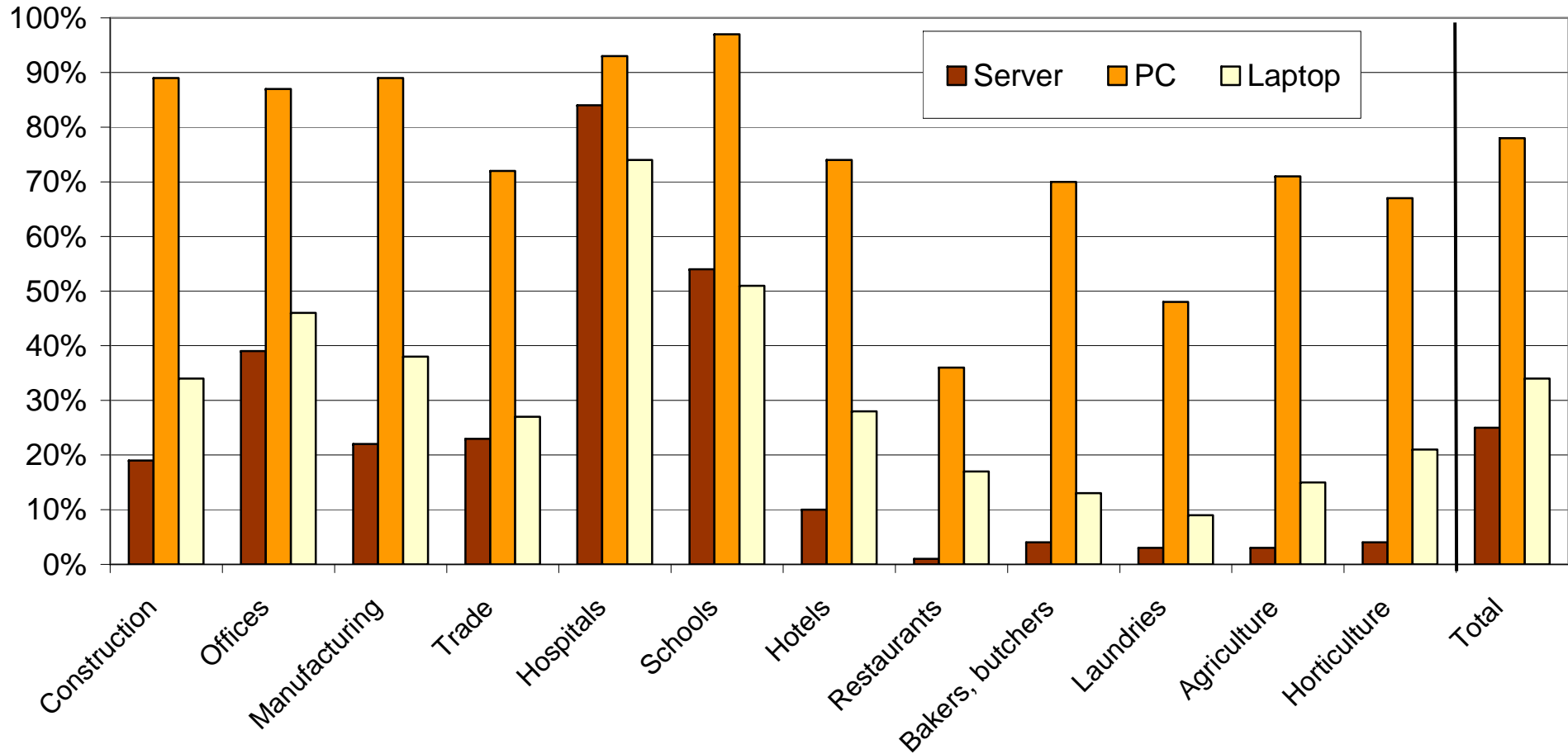
Results of the survey 2008: type of electricity use



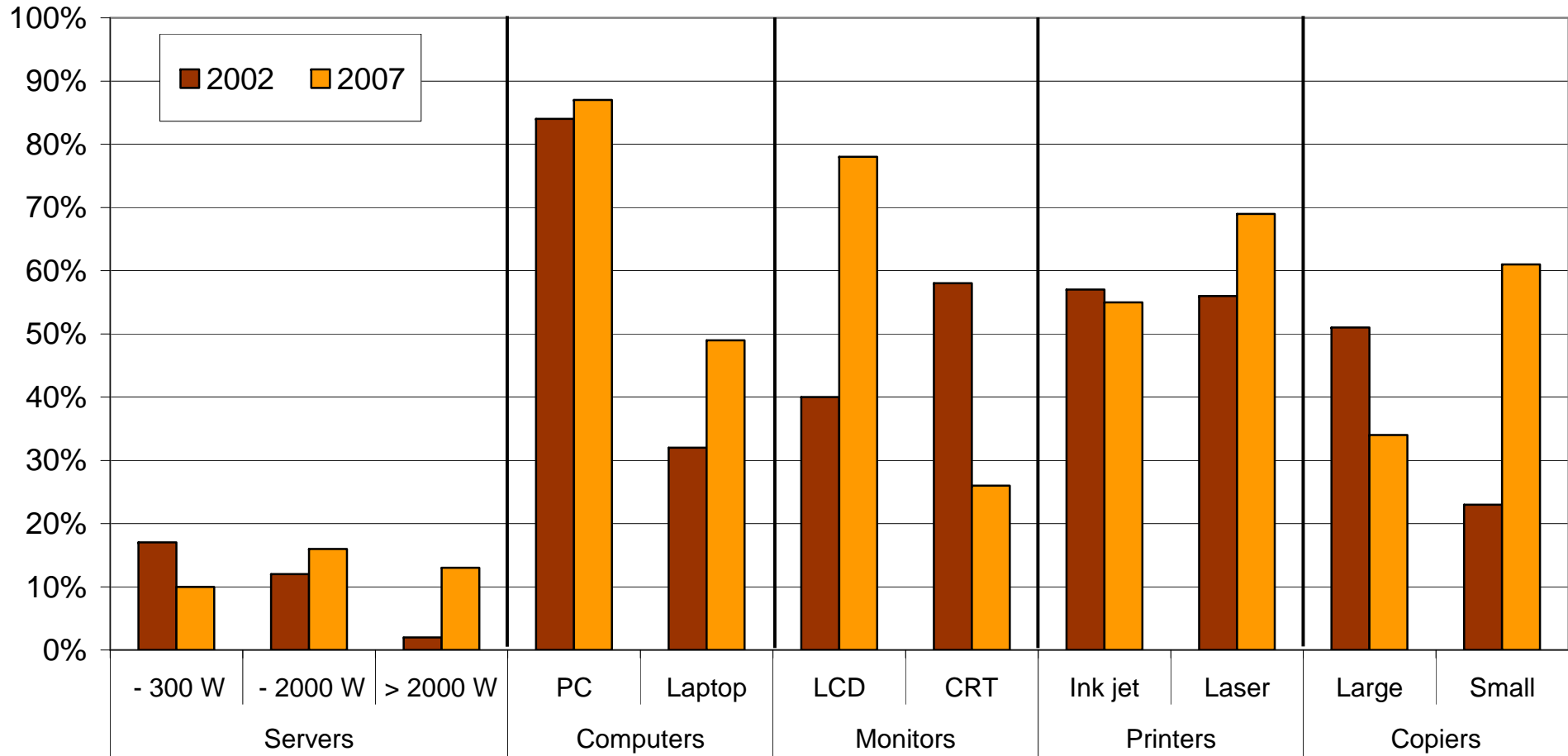
Evaluation of sector-specific data: lighting



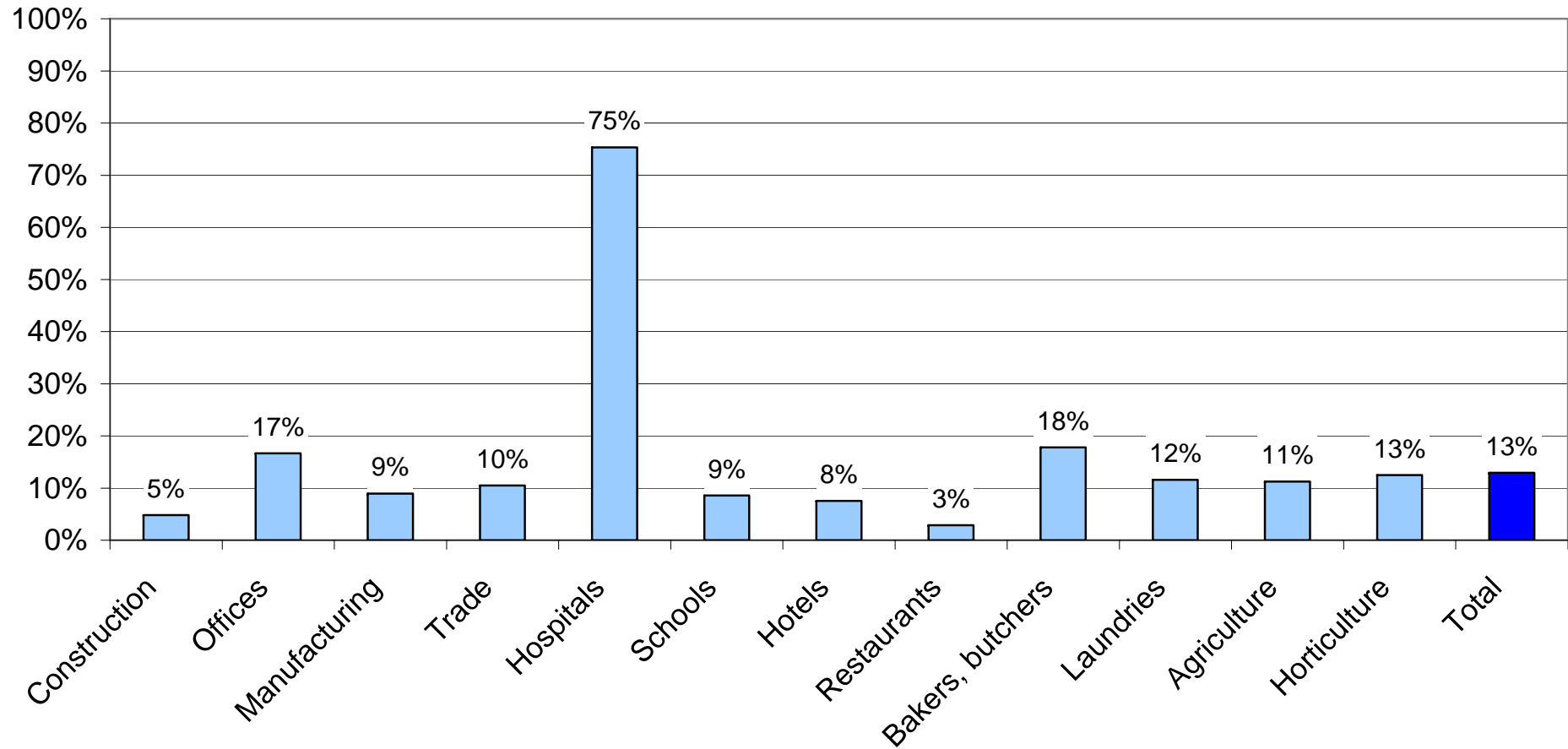
Evaluation of sector-specific data: office equipment



Evaluation of sector-specific data: office equipment 2002–2007



Evaluation of sector-specific data: air conditioning



Conclusions

- EL-TERTIARY database as a starting point
- Improvement of the statistical basis by introduction of "systems"
- Energy saving potentials found which can easily be implemented
- Surveys are complementary to metering to obtain a representative picture
- Detailed sector-specific results and additional questions concerning energy management → conclusions for policies, e.g.
 - Consultation
 - Information campaigns
 - Training
 - Energy efficiency networks





**Thank you very much
for your attention!**

www.eu.fhg.de/el-tertiary

**Fraunhofer ISI energy research:
www.isi.fraunhofer.de/e/**

