Service indicators and related data

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Training session on EE indicators in Mediterranean countries with MED OBSERV'EEER
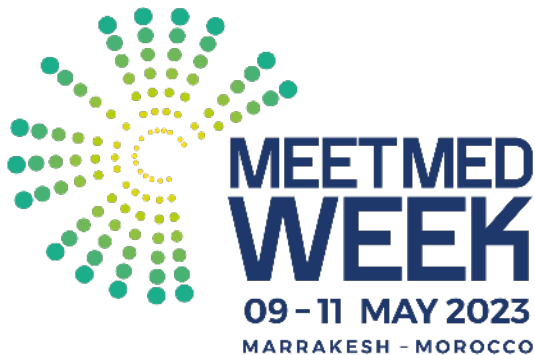
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Morocco, Marrakech

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Energy demand uses and determinants

- In the tertiary sector, energy is more a factor of working conditions than a factor of production.
- Employment and floor space are the real drivers of energy demand.
- Energy needs :
  - Air conditioning, heating, cooking, hot water, lighting, ICT, etc.
- Great heterogeneity of energy issues within the tertiary sector:
  - large differences in m2/job by activity
  - strong differences in usage structures according to activities
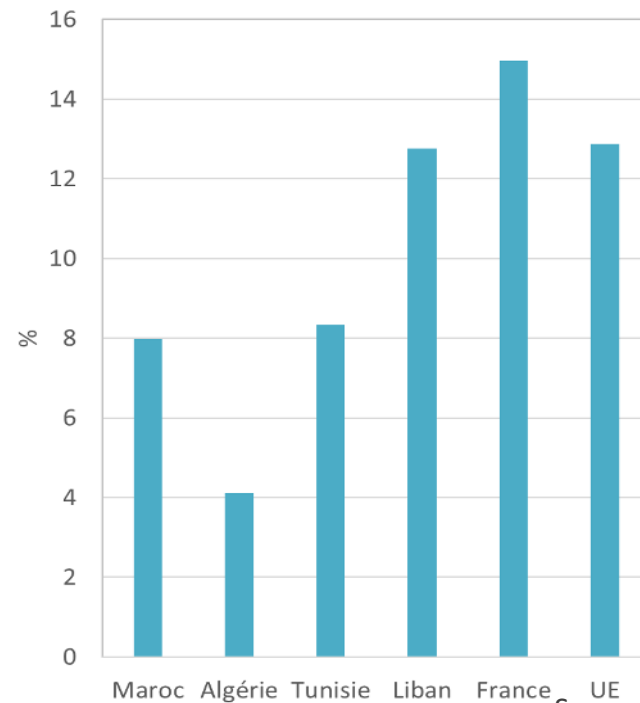 - high dispersion of m2/establishment within the same activity

The place of the tertiary sector

The tertiary sector: a central role in the economy but a low weight in final energy consumption

Share of tertiary sector in GDP in 2017
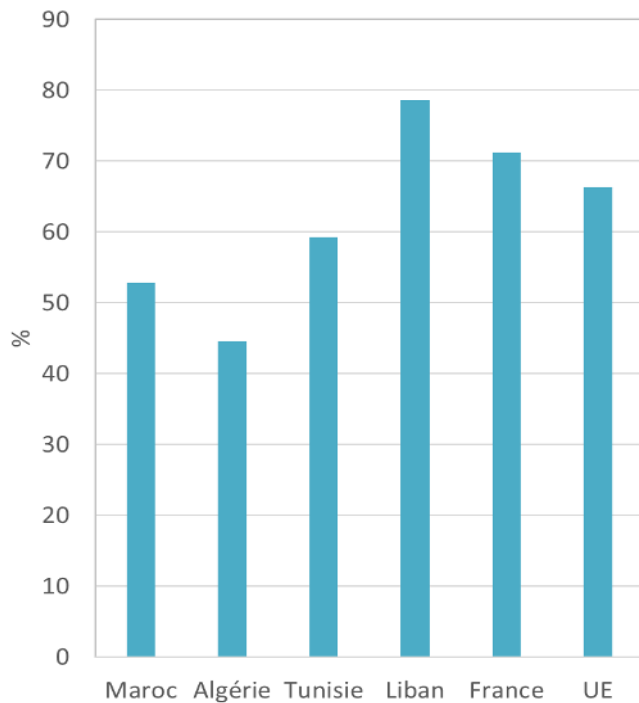
Share of tertiary sector in final energy consumption in 2017

Source: Enerdata

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Services/tertiary: NACE classification

- Retail trade (Section G)
- Transport and storage (H)
- Hotels and restaurants (Section I)
- Information and communication (J)
- Finance and Insurance (K)
- Real estate (L)
- Professional, scientific and technical activities (M)
- Administration and support services (N)
- Public administration and defence (Section O)
- Education (Section P)
- Health and Social (Section Q)
- Arts, entertainment and recreation (Section R)

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Aggregate indicators for the tertiary sector

- Two types of indicators at the aggregate sector level:
  - ✓ Energy or electricity intensity (consumption per unit of value added)

  - ✓ Specific energy or electricity consumption per employee (ratio between consumption and total number of employees in the sector)

- These two indicators allow the overall energy efficiency of the sector to be assessed from an economic rather than a political or technical point of view.

Aggregate indicators for the tertiary sector

Indicator	Comment
Energy intensity	Highly aggregated; includes variations in equipment rates
Specific consumption per employee	More interesting indicator because a large part of energy consumption is directly linked to the number of jobs (case of information technologies) or to the surface area of buildings (heating, air conditioning, lighting), and therefore to a certain extent to the number of jobs, as the m2 /job ratio varies slowly.
Specific consumption per m2	Requires data on total building area

Electricity consumption per employee and per unit of value added in the tertiary sector

Electricity consumption per employee is increasing faster than electricity intensity (per unit of value added). The difference is due to the increase in labour productivity, i.e. the value added produced per employee (€ per employee).

Electricity consumption per employee and per unit of value added
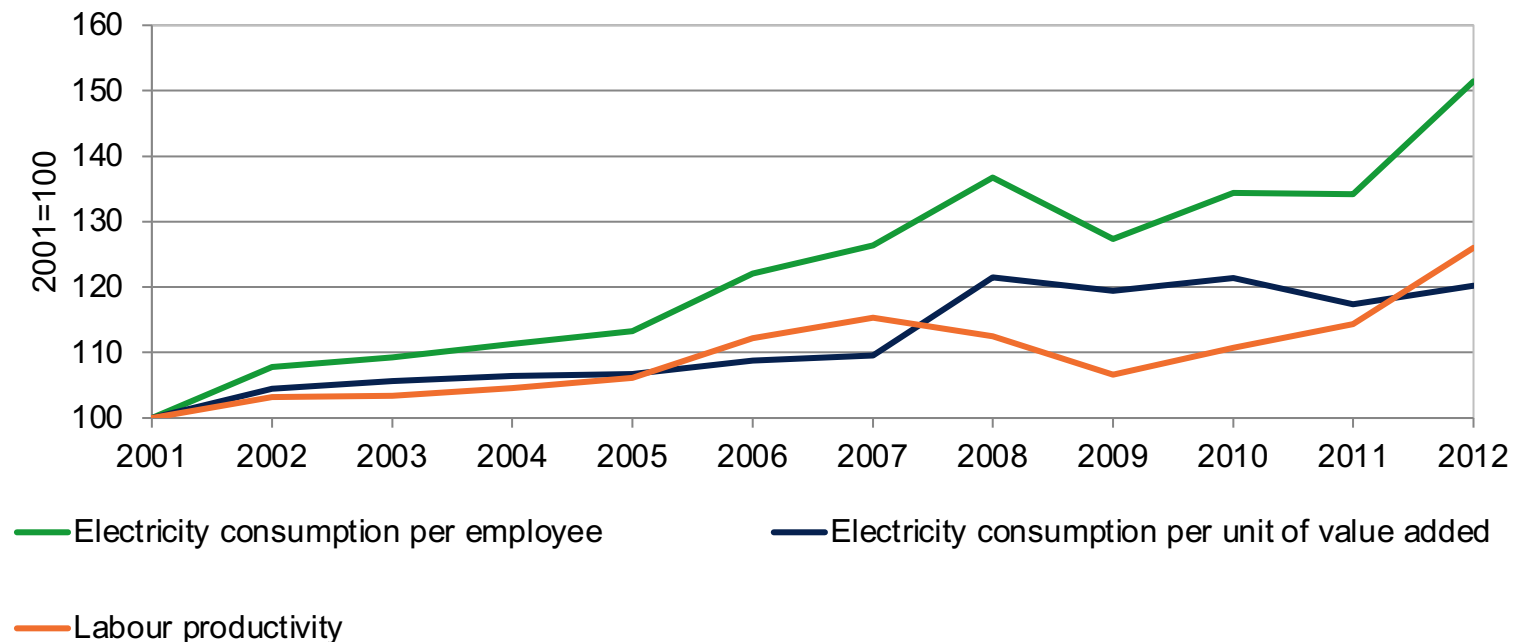
— Electricity consumption per employee   — Electricity consumption per unit of value added
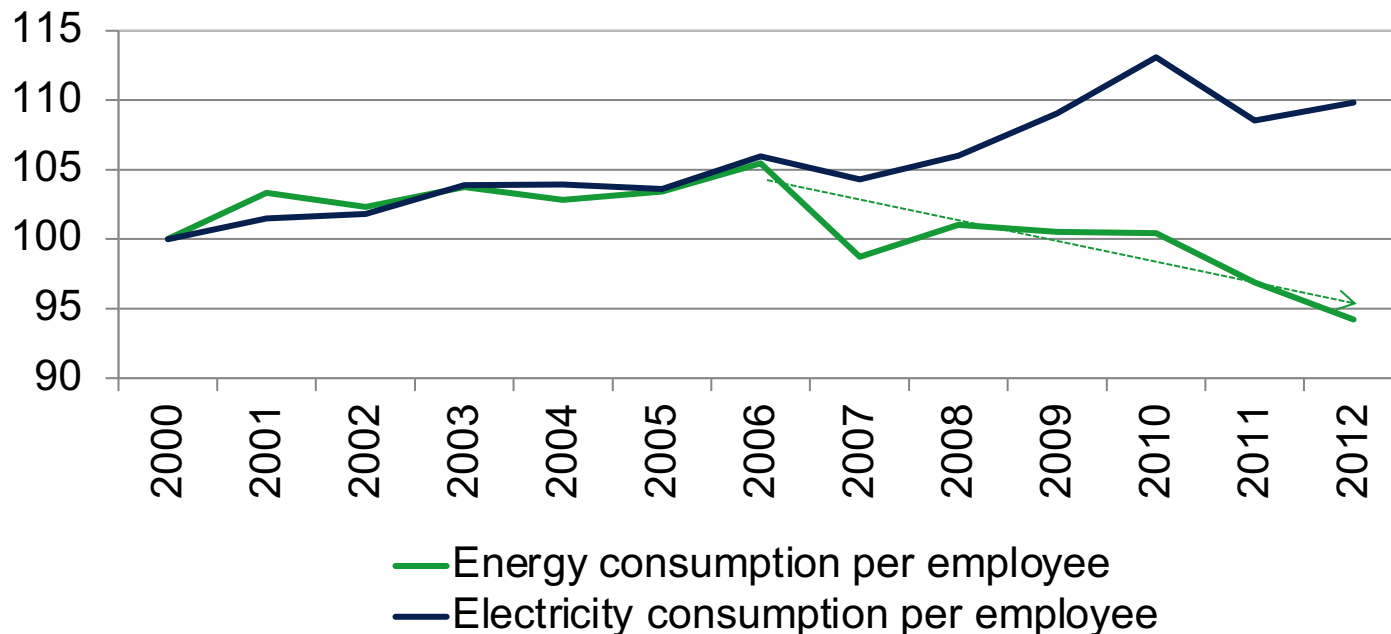
— Labour productivity

Energy consumption per employee in the tertiary sector

In the EU, energy consumption per employee started to decrease from 2007 onwards, while electricity consumption per employee continues to increase.

Energy consumption per employee in the tertiary sector in the EU

— Energy consumption per employee
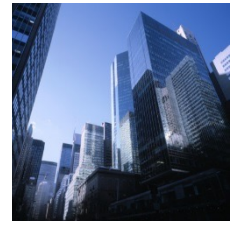— Electricity consumption per employee

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Indicators by branch

- Four types of indicators per branch:
  1. **Energy or electrical intensity** ;
  2. Specific energy or electricity consumption in **kWh per employee ;**
  3. Specific energy or electricity consumption **per unit of activity**, specific to each sector (number of beds or overnight stays in hotels, number of beds in hospitals, etc.);
  4. Specific energy or electricity consumption **per ^{2}** metre for certain types of buildings.

- Indicators 1 and 2 can be produced for the main branches (2 digits), as they are based on macro-economic statistics:
  - Trade,
  - Hotels and restaurants,
  - Health, etc.

- Indicators 3 and 4 can be produced for more detailed industries (e.g. hospitals, hotels) depending on data availability.
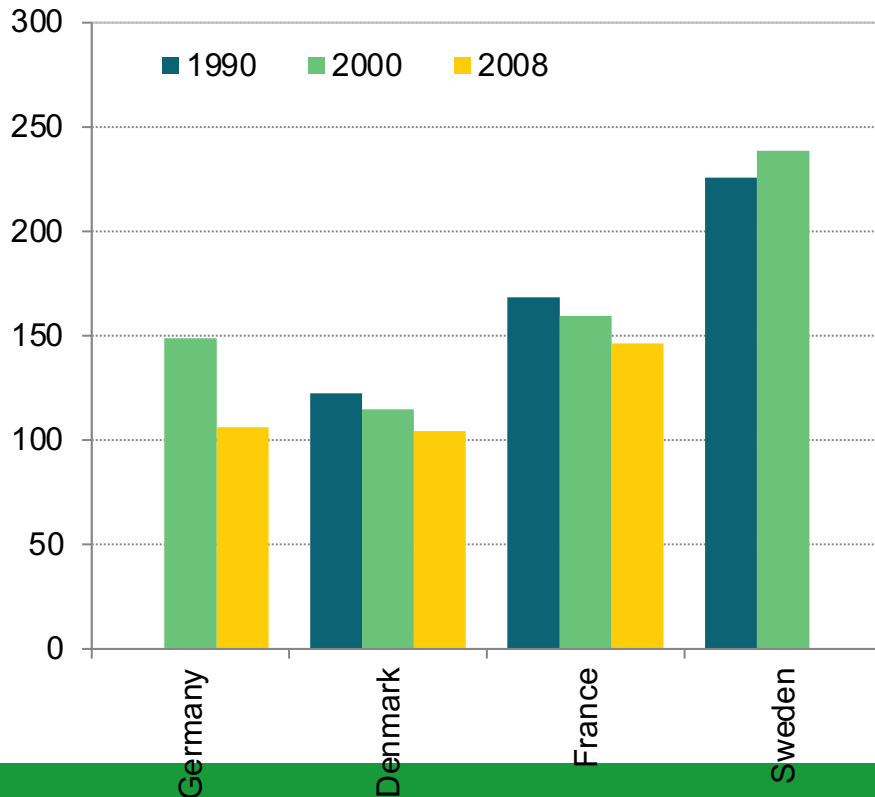
Indicators by branch

|	kWh/employee	kWh/m2	kWh/unit of activity (bed, overnight stay, etc.)
Assets	•Provides information on the efficiency of energy use by employees: relevant indicator for most electrical uses related to working conditions depending on the number of employees (ICT, lighting) •Indicator that can be produced for the main branches (2 digits)	•Good indicator for lighting, heating and air-conditioning whose consumption is related to the surface area of the buildings •Less relevant for other uses	•Specific to each branch
Limits		•Requires area data by branch •May be available by building type rather than by industry	

Example in the education sector
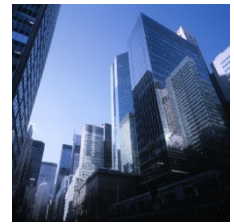
- Energy consumption per m2 is decreasing in Germany, Denmark and France.
- On the contrary, energy consumption per employee tends to increase

Energy consumption per m² in the education sector (kWh/m²)

Energy consumption per employee in the education sector (kWh/emp)
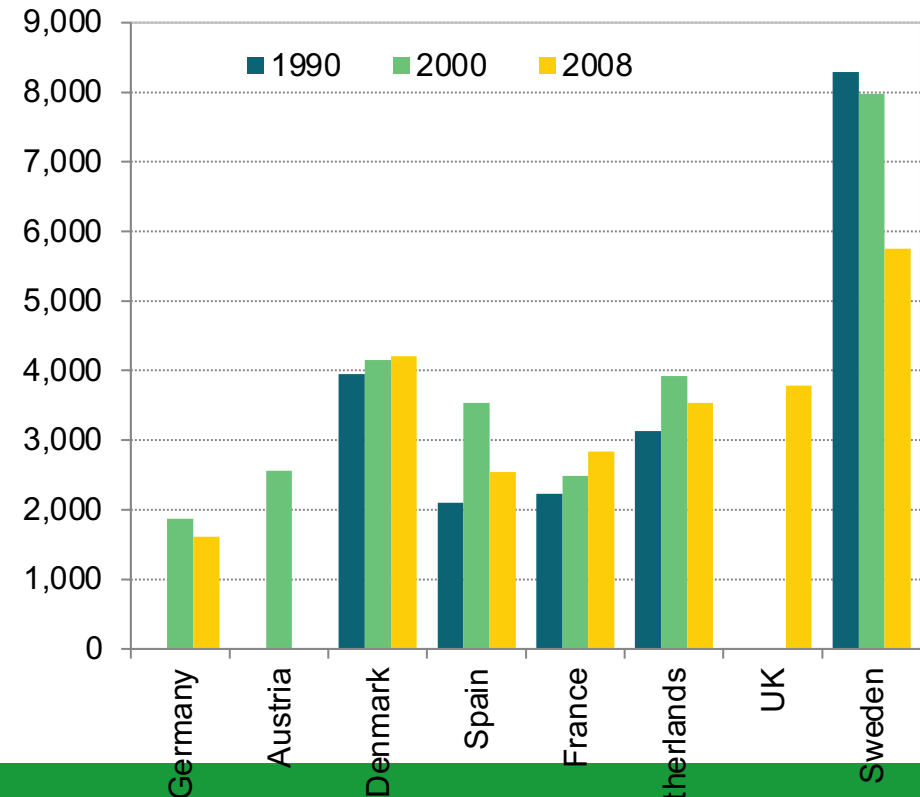
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Service sector data

- Activity data :
  - Value added: total and by branch
  - Employment: total and by branch
  - Service -specific indicators (number of hospital beds, number of hotel nights, etc.)
  - Building area (m2): total and per branch

- Energy and electricity consumption by use and type of equipment in commercial buildings :
  - Heating
  - Air conditioning
  - Lighting
  - Other

- Consumption for public lighting and public water supply

3. Presentation of the sectoral tabs: Tertiary

Tertiary

• Energy consumption of the public, tertiary and commercial sector
•Energy consumption by industry and use
•Surface area of tertiary buildings and annual constructions
• Value added by industry
•Jobs
•Activity data (number of hotel nights, number of hospital beds)
• No. of efficient lamps for public lighting
• area of (thermal) solar collectors

Data

• Energy intensities
• Unit consumption
• Productivity

Indicators

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Sources of activity data

- Value added (total and by branch) :
  - Usually collected by national statistical institutes
  - The branches covered follow standard classifications
  - Must be measured at constant price
  - Published by national statistical institutes often at current prices, sometimes also at constant prices
  - If constant prices are not available, data can be published as a price and/or volume index by industry can be used to calculate value added values at constant prices

- Employment (total and by branch) :
  - Usually collected by national statistical offices

Sources of activity data

- Building area (total and per branch)
  - Based on specific surveys
  - or modelled from long-term construction statistics
  - or a combination to interpolate between surveys.

- Service-specific indicators: number of hospital beds, hotel nights, pupils in education, etc.)
  - Usually collected by national statistical offices

Energy consumption by branch and end-use

- **Survey**: the most common approach (e.g. France, Sweden, Germany) but cannot alone provide detailed data by end use.

- **Modelling**: combined with surveys to obtain data by use (e.g. France) or to interpolate between survey years (e.g. Germany).

- **Administrative sources**: companies are obliged to provide information (e.g. electricity and gas): implies a similar law and classification between companies; works well if small number of companies.

- **Audits/measurements/counting:**
  - Can be used to estimate or model data by use (e.g. Sweden)
  - Problem of representativeness (can only be used to estimate or model data by use if the sample is representative)
  - Very expensive measure
  - Example: EL-TERTIARY project in the EU

Source of final consumption data by branch and use for the tertiary sector

Relative weight of the methods used

- Enquetes
- Administratives
- Modelisation
- Mesures
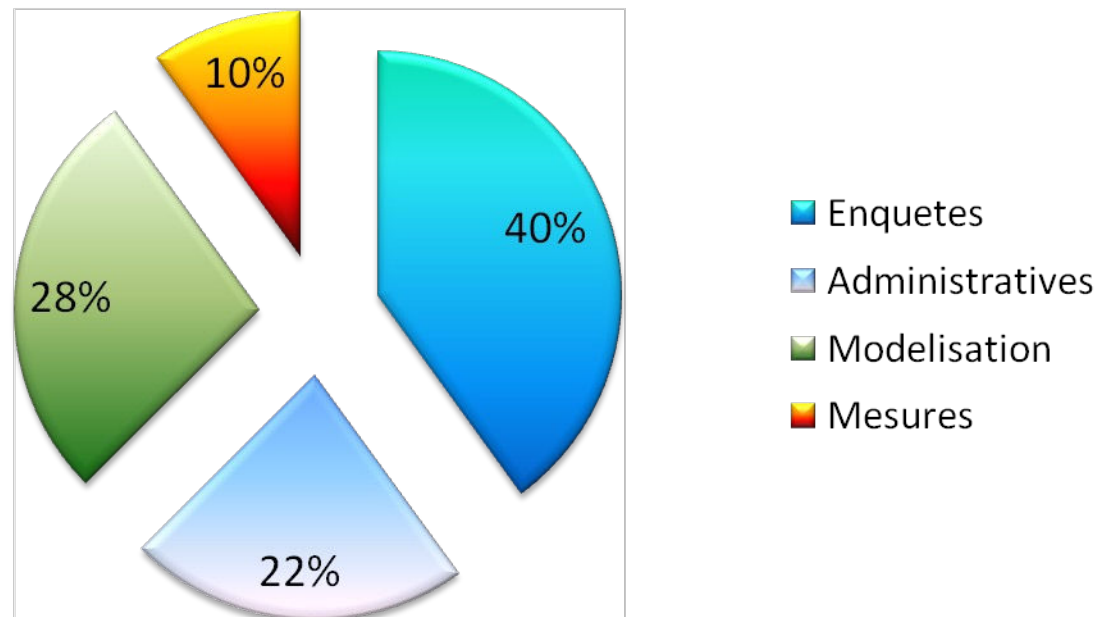
Source: IEA 2011 survey (March 2012), based on 40 data sources

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