

# Basic Knowledge Energy Efficiency in Building Services Engineering



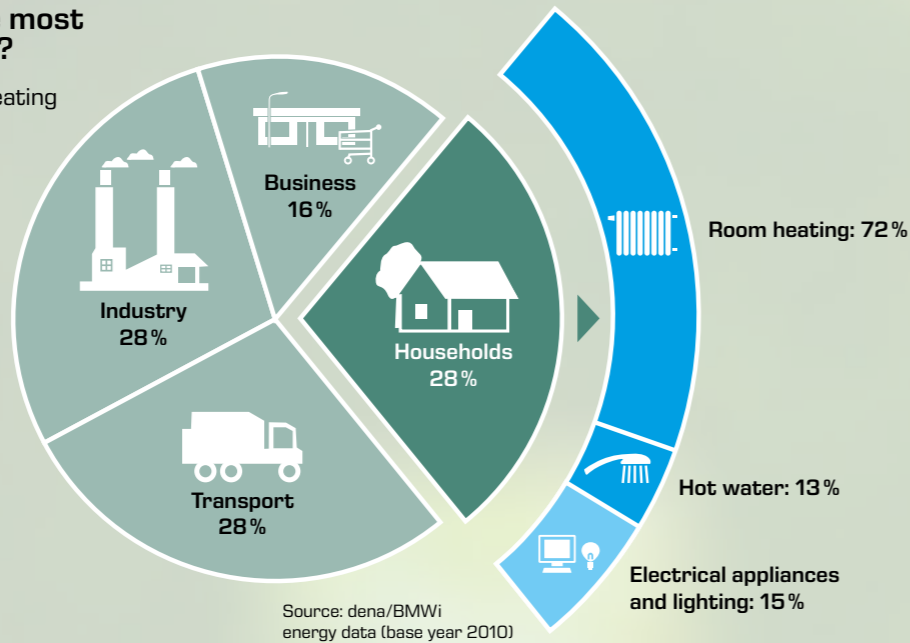
## Climate protection through increased energy efficiency in building services engineering

Efforts to encourage climate protection through the use of renewable energies can only be successful if, at the same time, all measures to increase energy efficiency are consistently used. Since the main proportion of globally-consumed energy relates to the supply of buildings, this area offers enormous potential for delivering a significant contribution in reducing the use of primary energy through energy efficiency increases. Measures

which result in a building using energy more efficiently involve nearly all the areas of modern building services engineering. In addition to consumption by electronic equipment, lighting and water heating, these include in particular consumption by heating, ventilation and air conditioning. As can be seen from the diagram using Germany as an example, the field of heat supply for buildings represents a major energy consumer.

### Who consumes the most energy in Germany?

Energy consumption of heating often underestimated



## Structural and technical techniques for resource conservation

Structural and technical measures are needed in order to reduce the primary energy demand in buildings. Heat insulation and the use of transparent façades, for example, are some of the possible structural measures. This area is becoming increasingly important in the training of architects, urban planners and construction engineers.

Efficient components and systems, controlled by means of modern building services engineering, are at the forefront of technical measures for heating optimisation. Taking modern concepts for combined heat and power, distributed power grids and energy storage into account, it is possible to achieve energy production and distribution which is optimally adapted to demand.

## Standards for energy efficiency in building services engineering

Directives have been passed by the European Parliament on energy efficiency in buildings. Below is an excerpt from Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings:

[...] (3) Buildings account for 40% of total energy consumption in the Union. The sector is expanding, which is bound to increase its energy consumption. Therefore, reduction of energy consumption and the use of energy from renewable sources in the buildings sector constitute important measures needed to reduce the Union's energy dependency and greenhouse gas emissions. Together with an increased use of energy from renewable sources, measures taken to reduce energy consumption in the Union would allow the Union to comply with the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC). [...]

To implement the EU Directive in Germany, the energy efficiency of buildings is categorised in the energy efficiency classes A to G in an energy certificate in accordance with the German Energy Efficiency Act. Buildings are classified according to the specific primary and final energy demand. For highly-efficient passive houses, the annual energy demand is well below 50kWh/m<sup>2</sup>.



Based on our 2E curriculum, we offer you teaching equipment from the following subject areas to allow you to focus on energy efficiency in building services engineering:

Heat supply and air conditioning

Inclusion of renewable energies

Energy efficiency in business and industry

We believe that knowledge in these subject areas is indispensable for engineering students and professionals in the field of building services engineering in order to create sustainable and energy-efficient buildings, and to convert existing buildings to be more energy-efficient.





# Subject Areas

# Energy Efficiency in Business and Industry



## Subject Areas

## 2E0 Products

In business and industry, measures to improve energy efficiency are connected to both the optimisation of building services engineering and to the relevant value creation processes. Close integration of these two areas often results in novel approaches to improving energy efficiency. For example, waste heat from cooling equipment can be used in the food trade for air conditioning in the showrooms. In industrial environments, the use of process engineering waste heat is a good example of a more efficient measure.

On these pages we have compiled only a very small selection of devices on this topic. The basic approach to analysing energy flows in given application environments in order to achieve a reduction of primary energy use can also be demonstrated by many devices from our standard product range, in addition to our 2E devices.

### Energy efficiency in refrigeration technology

**ET 420**  
Ice Stores in Refrigeration

**ET 428**  
Energy Efficiency in Refrigeration Systems

### Outlook: energy efficiency in process engineering

**RT 682**  
Multivariable Control: Stirred Tank

**RT 396**  
Pump and Valves and Fittings Test Stand