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## Energy efficiency in buildings, industry and transportation

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## **CORRIGENDUM**

### **Energy efficiency in buildings, industry and transportation**

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At the request of the proceedings editors, and by agreement with AIP, this article (as supplied to AIP for publication) was originally published with authors Milun Babic, Nebojsa Jovicic, and Dusan Gordic missing in the author list. The corrected version is provided and replaces the original published paper (which is attached to this corrigendum).

# Energy Efficiency in Buildings, Industry and Transportation

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**Abstract:** This paper reviews the literature concerning the energy saving and outlines the importance of energy efficiency, particularly in three the most important areas: buildings, industry and transportation. Improving energy efficiency plays a crucial role in minimizing the societal and environmental impacts of economic growth and offers a powerful tool for achieving sustainable development by reducing the need for investment in new infrastructure, by cutting fuel costs, and by increasing competitiveness for businesses and welfare for consumers. It creates environmental benefits through reduced emissions of greenhouse gases and local air pollutants. It can offer social benefits in the form of increased energy security (through reduced dependence on fossil fuels, particularly when imported) and better energy services.

**Keywords:** Efficiency, Buildings, Industry, Transportation

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## 1. Introduction

With energy prices on the rise and energy resources becoming scarce, both prosperity and competitiveness increasingly depend on our ability to use energy as efficiently as possible [1].

Energy consumption has been increasing (Fig. 1) so far (history part) and such trend will continue (projections part of diagram) [2].

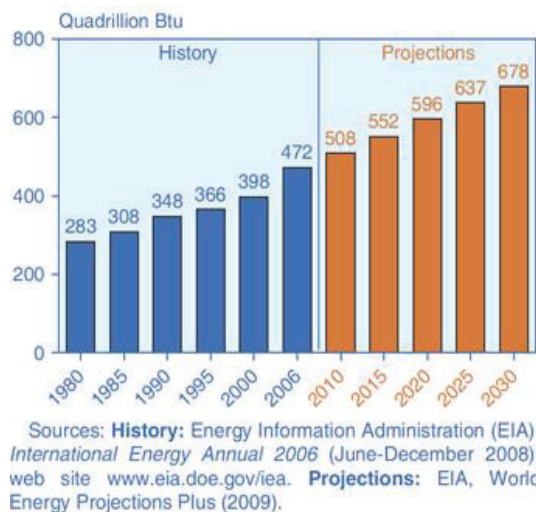
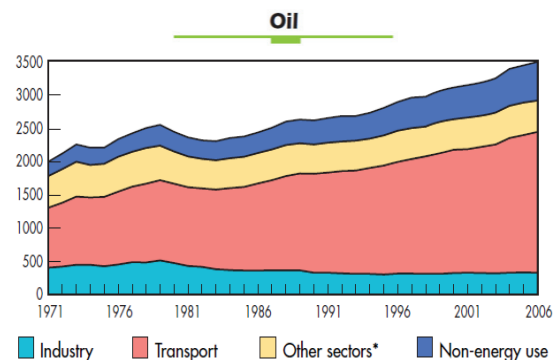
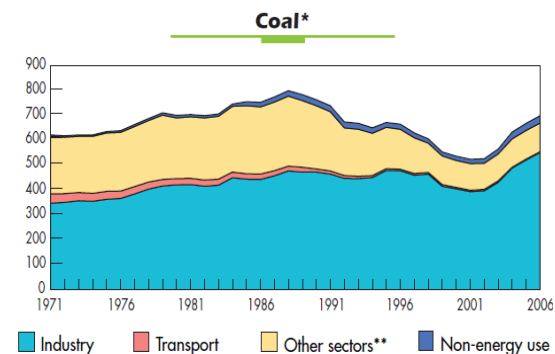


Fig. 1: World marketed energy consumption

Evaluation of world total energy consumptions by sector for different types of energy sources

(coal, oil, electricity, gas) are shown below (Fig. 2-5) [3].



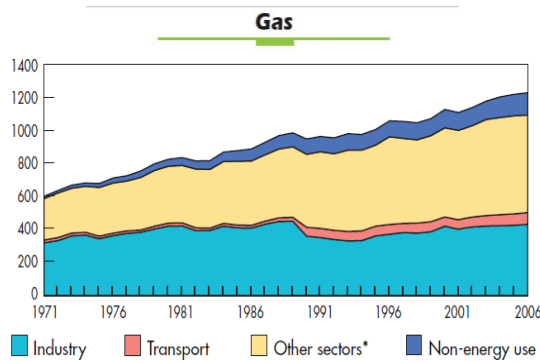


Fig. 4: Total consumption of gas by sectors (Mtoe)

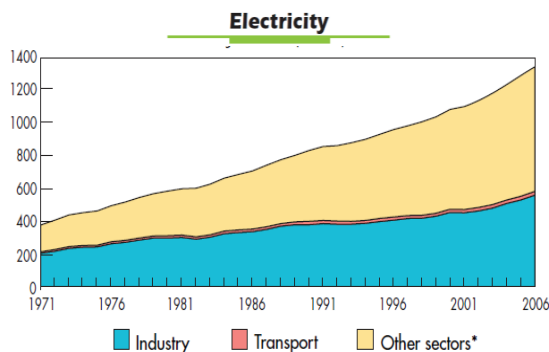


Fig. 5: Total consumption of gas by sectors (Mtoe)

Improving energy efficiency in industry private households and transport sector is the most direct way of increasing the sustainability of the energy system. Energy efficiency stress the positive attributes of energy (the services it provides) and diminishes the negative aspects (the pollution and financial costs) associated with producing and delivering energy.

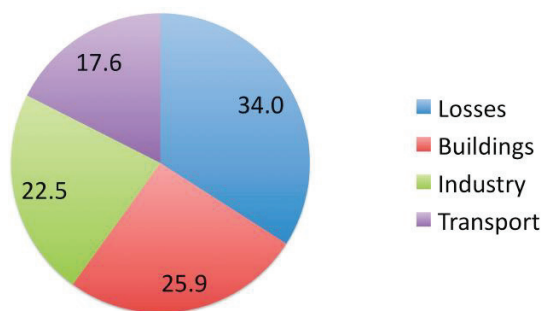


Fig. 6: Global energy end-uses and losses

Most countries in the world have to import most of their energy resources. This is why, for several decades now, more developed part of the world, which use the most of energy, has had a tradition of treating resources with respect and conserving energy, while still ensuring a high standard of living.

### Residential and commercial buildings

account for about one-third of total final energy use in IEA (International Energy Agency) countries. The amount of energy used for space heating varies among countries due to factors such as house size, indoor heating comfort, heating equipment used and insulation. The fastest growing end-use in buildings is electric appliances. This growth is expected to continue and will put pressure on electricity supply. Residential sector energy policies have focused mainly on reducing the intensities of new devices, retrofitting insulation, windows, and other measures in buildings, and replacing burners and other combustion equipment.

Energy use relative to *manufacturing* output has fallen more or less continuously in most IEA countries since the 1950s. This indicates a structural shift away from energy-intensive products and changes in individual energy intensities in each manufacturing subsector. Policy measures to encourage reduction of energy intensities in *manufacturing* have been rather weak. Long-term trends in manufacturing point to greatly increased energy efficiency even though it is difficult to attribute this to specific policies or programmes. Industry works continuously to improve existing processes and products to achieve competitive advantage. Efforts to reduce waste, conserve resources and improve labour productivity promote more effective energy use [4].

Energy policies in *transport* have focused primarily on technology to reduce the nominal fuel use per kilometre in new cars and improved traffic flow to reduce the actual fuel use per kilometre in the existing automobile fleet. Cars, trans, aircrafts and other transport means have become more energy efficient. However, the weight and power of especially cars has increased, so energy use per kilometre driven has not fallen much. There is considerable scope for cost-effective improvements in light-duty vehicle fuel economy, and several policies could be implemented to help maximise the fuel economy benefit of existing technologies.

## 2. Industry

Energy is an essential, economic basis for the industrialised world. Trade and industry can considerably reduce their energy consumption in the coming years without endangering productivity [5].

Generally, in all fields of industry, the potential for improving energy efficiency is significant. The following industrial technologies are widely used: compressed air and pump systems as well as air, refrigeration and conveyor technology. Today, most companies could potentially reduce their consumption of electricity and associated costs for these cross-application technologies by 5 % to 50





















