

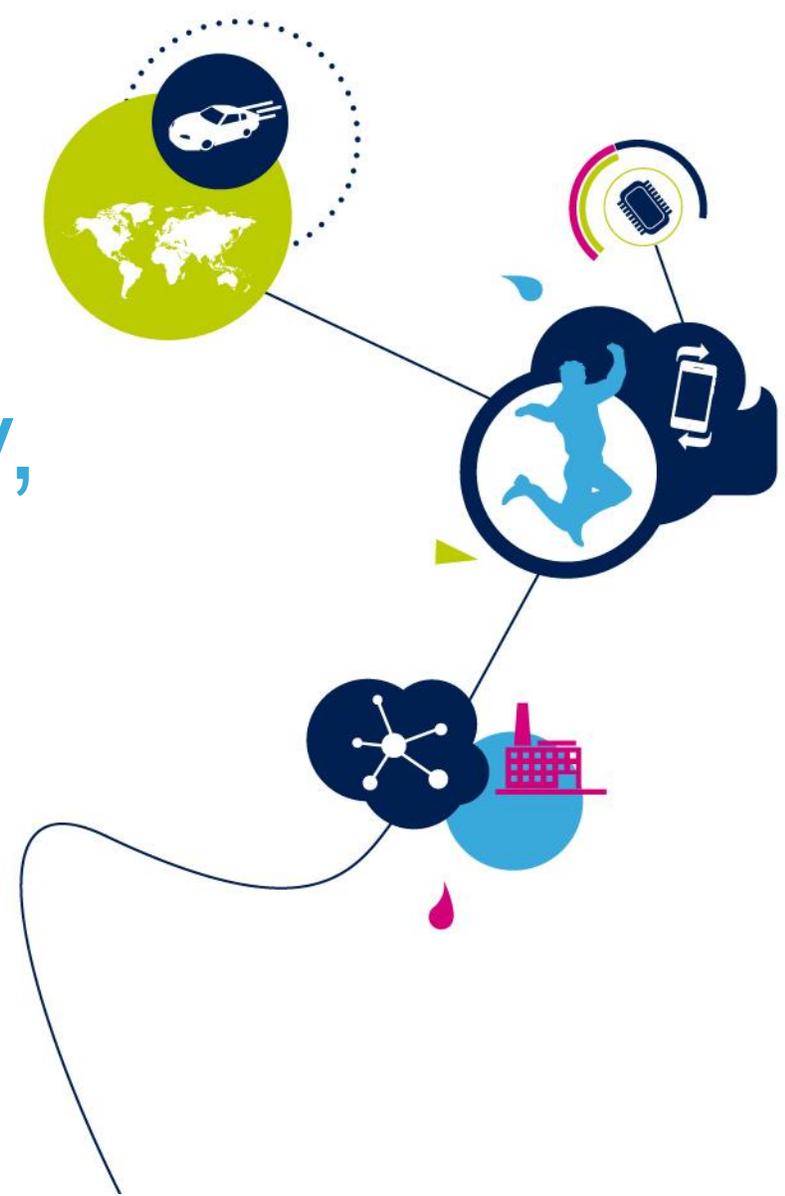
STMicroelectronics Energy Relevance in Industry, Commercial, Automotive

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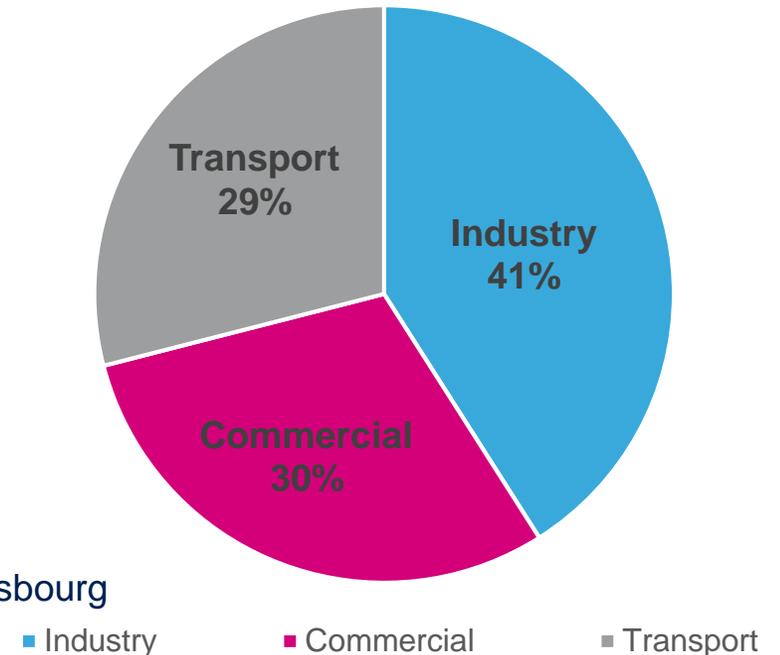
**EF ECS 2019
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Moving to a low carbon economy

I want Europe to become the first climate-neutral continent in the world by 2050.

Ursula von der Leyen, Candidate for President of the European Commission
Opening Statement in the European Parliament Plenary Session July 16, 2019, Strasbourg

Primary energy use in world (2017)



Energy Relevance in Industrial Sector

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Industrial sector represents 41% of energy use worldwide (2017)



Industry 4.0's potential is based on the combination of novel technologies:

- Cyber-Physical Systems (CPS)
- Internet of Things (IoT)
- Artificial Intelligence (AI)

Higher power efficiency at all levels is an enabler for Smart Industry:

- Power conversion & energy harvesting
- Power Management
- Power storage & Motor Control

Energy Relevance in Commercial Sector

Commercial sector represents 30% of energy use worldwide (2017)



Energy efficiency is achieved using sensors, actuators, drives, controls and innovative components where the loss of energy can be reduced by **innovative or even disruptive approaches**.

Increase monitoring in adaptive and controlled systems to reduce energy losses.

For example, Smart Buildings can **guarantee minimal energy use** for heating and lighting (also providing safety and security).

Energy Relevance in Automotive Sector

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Transportation sector represents 29% of energy use worldwide (2017)



Transportation is one of the primary energy uses in Europe.

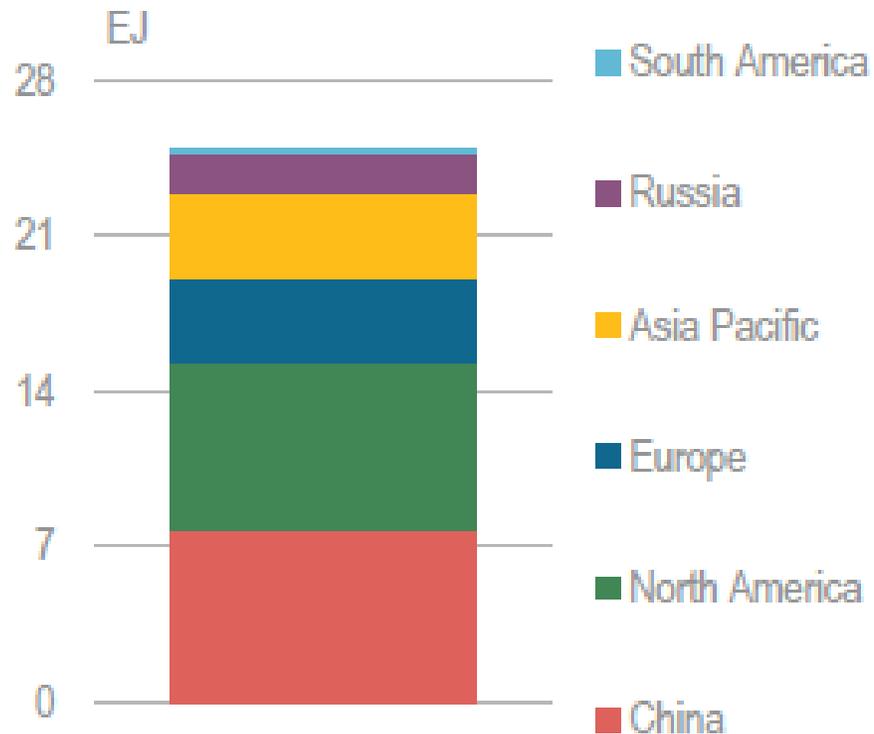
Electrical cars are critical to move energy consumption in transportation away from fossil fuels.

The electronics for power conversion and traction in electrical cars require high temperature and high voltage devices.

Industrial Energy Efficiency

Trends and Outlook

Regional contribution to observed efficiency savings in IEA countries



Without improvements in **energy efficiency** since 2000, an additional 25 EJ (20%) of energy use would have been required in the industry and service sectors.

This equivalent to the total final energy use of India and would have resulted in additional greenhouse gas (GHG) emissions of 2.4 gigatonnes of carbon dioxide (CO₂) equivalent (Gt CO₂-eq).

Industrial Energy Efficiency

Trends and Outlook

Today's efforts have offset by more than half the impact of increased activity in the industry and service sectors.

A near doubling in activity, driven overwhelmingly by China and India, continues to push up energy use. The movement away from energy-intensive industrial sectors towards less energy-intensive manufacturing and the service sectors has offset around just over a quarter of the impact from rising activity.

Such structural change is now very evident in emerging economies. **China was responsible for over 40% of the energy savings** resulting from structural change, with non-OECD economies accounting for two-thirds.

Commercial Energy Efficiency

Trends and Outlook

In 2017, buildings and appliances were responsible for **around 30% of global final energy use**.

Building energy use increased 0.8% from 2016 and rose 20% between 2000 and 2017.

Growing populations and changing economic conditions result in more floor area, buildings and appliances.

Since 2000, global energy consumption in buildings has decoupled from the growth in floor space and economic output.

Energy use per floor area has improved each year since 2000 at an average annual rate of 1.6%, while floor area increased by 3% per year.

Transport Energy Efficiency

Trends and Outlook

In 2017, energy use by the transport sector was **~29% of global final energy demand – a 3.3% increase from 2016 and 45% between 2000 and 2017.**

Total final energy use in passenger transport increased by 38% globally between 2000 and 2017, notably in emerging economies such as Brazil, China, India and Indonesia.

One-third of the growth in energy use came from lower vehicle occupancy, a shift away from public transport to cars (inter-mode shift) and an increasing share of larger cars (vehicle type).

Improved energy efficiency since 2000 saved almost 5 EJ of additional energy use by passenger transport in 2017, equivalent to the energy used by nearly 120 million cars.

Energy efficiency would have been greater if not for the growing share of larger cars which accounted for 9% of the increase in energy use between 2000 and 2017.

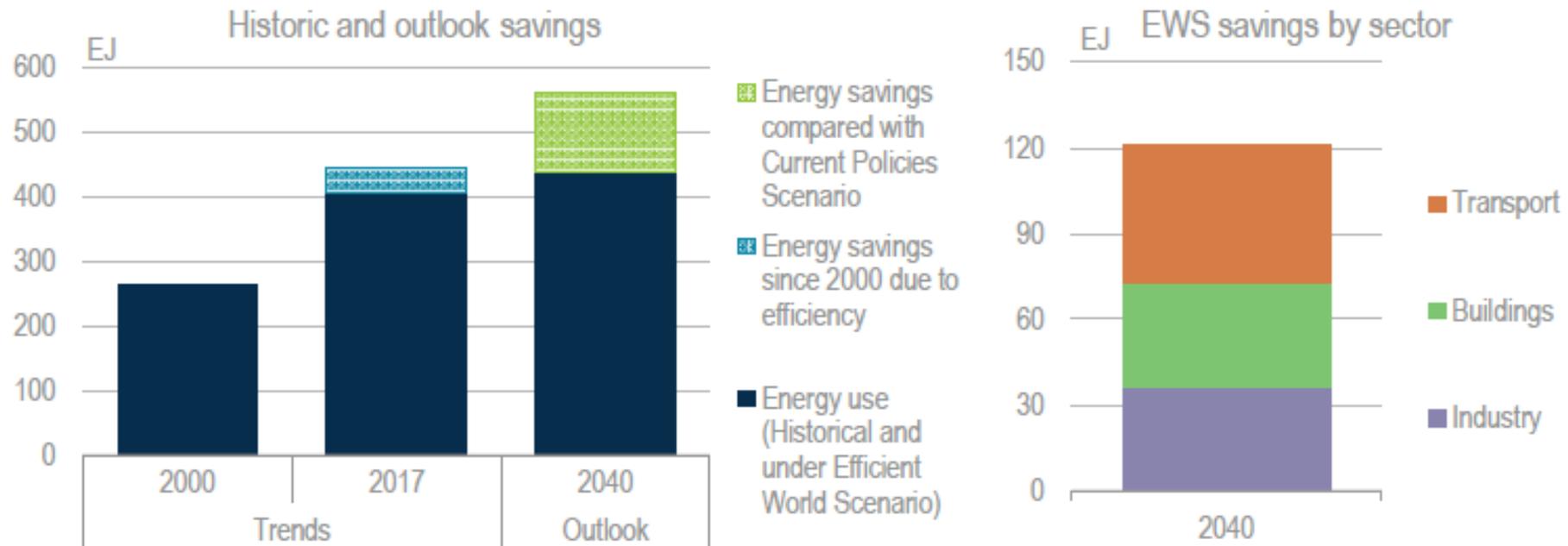
- Global energy demand rose by 1.9% in 2017 – the fastest annual increase since 2010.
- Without energy efficiency progress, increased economic activity would have had a greater impact on the global energy system.
- Efficiency improvements made since 2000 prevented 12% additional energy use in 2017.
- In 2017, 34% of global energy use was covered by mandatory energy efficiency policies, but progress implementing new policies was slow for a second year running.
- Utility obligation programs remained largely unchanged in 2017.

Spending on energy efficiency incentives in 16 major economies was estimated to be around USD 27 billion.

IEA's Efficient World Strategy identifies **how to deliver the available energy efficiency gains:**

- In transport, energy demand **could stay flat** despite doubling activity levels, with key measures that strengthen fuel efficiency and incentivize electrification.
- Total buildings energy use **could also stay flat**, despite 60% more building space, with the help of stronger and broader building codes and appliance standards.
- Industry **could produce nearly twice as much value** for each unit of energy use. Gains in light industry represent 70% of the energy savings, boosted by measures such as standards for industrial equipment and incentives to increase adoption of energy management systems.

Figure 1.9 Global energy use and savings by scenario



Note: One-third of the energy savings in 2040 are the result of current and planned policy settings (New Policies Scenario) and two-thirds from measures contained in the Efficient World Scenario. "Energy use" includes non-energy use (i.e. feedstocks), excludes energy supply.