

BEHIND
ENERGY

Energy@School

Energy test

Secondary school - Key stage 3

QUESTIONS

Around the world

1. **The energy we use every day – to cook our pasta, to move our cars and for many other reasons – comes mainly from oil. But from other sources as well. What is the second most used energy source in the world after oil?**
 - a. Solar
 - b. Nuclear
 - c. Coal
 - d. Natural gas
 2. **The main source of electricity globally – which we use to run our TVs and dishwashers at home – coal. Why?**
 - a. Coal is easily available in all continents
 - b. It's cheaper than other sources
 - c. It's cleaner for the environment than other sources
 - d. It's considered a safe technology
 3. **According to experts, what source of energy will grow the most in coming years?**
 - a. Solar, given the technological advances we're making and the abundance of sunshine available
 - b. Coal, because it's the cheapest
 - c. Oil, thanks to more advanced technologies available to extract it
 - d. Wind, because it's available in many places around the world
 4. **Which part of the world consumes most coal?**
 - a. North America
 - b. Asia Pacific
 - c. Africa
 - d. Europe and Eurasia
 5. **Which country is the biggest oil producer?**
 - a. China
 - b. USA
 - c. Russia
 - d. Saudi Arabia
 6. **Which country is the main oil consumer?**
 - a. India
 - b. USA
 - c. China
 - d. Russia
 7. **What will be the main source of electricity generation worldwide in 2040?**
 - a. Renewables
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- b. Coal
 - c. Oil
 - d. Nuclear

Energy impacts

- 8. Fossil fuels powered growth in the 20th Century, but they also had some negative social and environmental impacts (externalities) on the entire human race. Today the main externality related to the usage of energy is:**
 - a. Traffic jams
 - b. Climate change
 - c. Pollution of the oceans
 - d. Deforestation

- 9. Who pays the bill for the energy related externalities?**
 - a. Today's citizens and future generations
 - b. Taxpayers
 - c. Governments
 - d. Countries that produce fossil fuels

- 10. In order to avoid irreversible impacts on the Earth, what is the maximum amount global temperature can rise compared with pre-industrial times?**
 - a. 0.5°C
 - b. 2°C
 - c. 3°C
 - d. 4.5°C

- 11. Since the 1970s, energy sources have caused many wars and conflict around the world. What percentage of wars have been fought mainly over control of energy sources?**
 - a. 10%
 - b. 30%
 - c. 60%
 - d. 80%

Opportunities & Trends

12. What will be the most price competitive technology in 2040?

- a. Nuclear
- b. Fossil fuels
- c. Renewables

13. Energy efficiency is considered to be “the greenest fuel” in the world, because:

- a. It's cheap
- b. It's available to everybody
- c. It allows us to maintain the same lifestyle but with lower energy consumption
- d. It's a technology with low greenhouse gas emissions

14. Jobs in the renewable sector reached 7.7 million in 2014. What is the source which created most jobs, mainly for younger workers?

- a. Hydroelectric
- b. Geothermal
- c. Photovoltaic solar
- d. Biofuels

15. There are more than 1 billion cars on the road around the world, and only 0.1% of them are electric. The technology is advancing rapidly and in the 2040 the number of electric cars will be far greater than today as they replace vehicles running on petrol or diesel. In 2040, how many electric cars will we have as a percentage of all automobiles sold?

- a. 15%
- b. 35%
- c. 55%
- d. 70%

ANSWERS

Around the world

1. **The energy we use every day – to cook our pasta, to move our cars and for many other reasons – comes mainly from oil. But from other sources as well. What is the second most used energy source in the world after oil?**
After oil, the most used energy source is coal, followed by natural gas, hydro, nuclear and renewables. (Source: BP statistical review of world energy 2016)
2. **The main source of electricity globally – which we use to run our TVs and dishwashers at home – coal. Why?**
Producing electricity from coal is the cheapest option (Source: Assocarboni)... if we don't take into consideration the environmental externalities such as air pollution and damage to our health. But already today in some areas of the world – e.g. Chile – solar is cheaper than coal.
3. **According to experts, what source of energy will grow the most in coming years?**
Thanks to technological improvements and energy storage, together with abundant resource availability, solar is expected to enjoy the fastest growth in coming years.
4. **Which part of the world consumes most coal?**
The Asia-Pacific region accounts for 72% of coal consumption worldwide. North America, Europe-Eurasia follow, with Africa and South and Central America closing the table with only 3% and 1% respectively. (Source: BP statistical review of world energy 2016)
5. **Which country is the biggest oil producer?**
USA (12,704,000 barrels per day), followed by Saudi Arabia (12,140,000 b/d) and Russia (10,980,000 b/d) (Source: BP statistical review of world energy 2016)
6. **Which country is the main oil consumer?**
USA, followed by China, India and Russia. (Source: BP statistical review of world energy 2016)
7. **What will be the main source of electricity generation worldwide in 2040?**
In 2040 renewable energy is expected to be the largest source of energy for electricity production, followed by coal, natural gas and nuclear. Oil will decrease also in absolute terms versus today. (Source: IEA Data - International Energy Agency, World Energy Outlook 2015)

Energy impacts

- 8. Fossil fuels powered growth in the 20th Century, but they also had some negative social and environmental impacts (externalities) on the entire human race. Today the main externality related to the usage of energy is:**

Climate change is the most important externality related to the production and consumption of energy. The data considered by scientists and presented in the 5th evaluation report of the International Panel for Climate Change (IPCC) confirm that climate change is a real phenomenon beyond any doubt. Based on the four scenarios considered, the increase in the average temperature will be between 2 and 5 degrees Celsius before the end of the century. The effects are already visible worldwide, with huge impacts on society, human health and the environment.

- 9. Who pays the bill for the energy related externalities?**

Today citizens and future generations are paying and will pay for current energy related externalities. The bill is in terms of premature deaths, environmental disasters, wars and economic inequality. The World Health Organization estimated that 7 million people died prematurely in 2012 due to air pollution. *(Source: WHO)*

In Italy alone, 84,000 premature deaths a year are attributed to air pollution. *(Source: European Environmental Agency)*

- 10. In order to avoid irreversible impacts on the Earth, what is the maximum amount global temperature can rise compared with pre-industrial times?**

The temperature increase has to be lower than 2 degrees Celsius in order to avoid irreversible changes. The 21st Conference on Climate held in Paris during December 2015 approved the “Paris Agreement” – signed by 175 countries – to keep the temperature rises below 2 degrees, and ideally to keep them at no more than 1.5 degrees. To meet the targets, CO₂ emissions will have to start decreasing by 2020.

- 11. Since the 1970s, energy sources have caused many wars and conflict around the world. What is the percentage of wars fought mainly over control of energy sources?**

Since the 1970s, 25-50% of all wars have been triggered by conflicts over control of energy sources: Iraq, Syria, Kuwait, Nigeria, South Sudan, Ukraine... *(Source: Belfer Center for Science and International Affairs at Harvard Kennedy School)*

Opportunities & trends

12. What will be the most price competitive technology in 2040?

Renewables, mainly thanks to decrease the in the technology costs of solar (-60%) and wind (-41%). At these levels, solar and wind will be the cheapest source in numerous countries in the world by 2020 and almost everywhere in 2030. *(Source: Bloomberg New Energy Finance - New Energy Outlook 2016)*

13. Energy efficiency is considered to be “the greenest fuel” in the world, because:

It allows us to maintain our current lifestyles consuming less energy. In the last 10 years, the main reason for reductions in consumption is energy efficiency. Thanks to the energy efficiency, Italy alone saved 7.55 million tons of oil equivalent (Mtep) per year. This allowed Italy to avoid importing €2 billion of oil and natural gas and emitting 18 million tons CO₂. *(Source: Enea – 4th Report on Energy Efficiency)*

14. Jobs in the renewable sector reached 7.7 million in 2014. What is the source which created most jobs, mainly for younger workers?

Photovoltaic solar with 2.5 million new jobs, followed by biofuels (1.8 million) and wind (1 million). *(Source: Irena – International Renewable Energy Agency)*

15. There are more than 1 billion cars on the road around the world, and only 0.1% of them are electric. The technology is advancing rapidly and in the 2040 the number of electric cars will be far greater than today as they replace vehicles running on petrol or diesel. In 2040, how many electric cars will we have as a percentage of all automobiles sold?

By 2040, 41 million electric cars are expected to be sold yearly, equal to 35% of total new cars sold. *(Source: Bloomberg New Energy Finance)*