

# ENERGY

## 1. ENERGY

Writer: American Heritage

Toss Up: Short Answer

What is the name for the science of converting the energy harnessed by solar panels into usable electricity?

Bonus Answer: photovoltaics

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Bonus: Short Answer

What law states that the cost of solar panels tends to fall 20% every time cumulative shipping volume doubles?

Bonus Answer: Swanson's Law

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## 2. ENERGY

Writer: American Heritage

Toss Up: Multiple Choice

Which of the following kinds of coal has the highest carbon content?

W) Lignite

X) Bituminous coal

Y) Anthracite

Z) Peat

Toss Up Answer: Y

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Bonus: Short Answer

What is the name of the theoretical limit on the efficiency of a heat engine?

Bonus Answer: Carnot limit

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## 3. ENERGY

Writer: American Heritage

Toss Up: Multiple Choice

What percentage of energy is lost as heat in an incandescent bulb?

W) 70%

X) 80%

Y) 85%

Z) 90%

Toss Up Answer: Z

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Bonus: Short Answer

Which South American country is the largest producer of coal?

Bonus Answer: Colombia

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## 4. ENERGY

Writer: Stuyvesant

Toss Up: Short Answer

Which compound in the atmosphere contributes the most to the greenhouse effect?

Bonus Answer: Water (accept: H<sub>2</sub>O or dihydrogen monoxide)

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Bonus: Short Answer

What is China's largest renewable energy source?

Bonus Answer: Hydropower (accept: Hydro)

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## 5. ENERGY

Writer: Stuyvesant

Toss Up: Multiple Choice

In a conventional light bulb, what is the ratio of light energy to the heat energy produced?

W) 1:9

X) 3:2

Y) 1:1

Z) 7:3

Toss Up Answer: W

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Bonus: Multiple Choice

The arctic is estimated to hold what percent of the worlds what percent of the world's undiscovered oil and natural gas reserves?

W) 7%

X) 13%

Y) 22%

Z) 35%

Bonus Answer: Y

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## 6. ENERGY

Writer: Stuyvesant

Toss Up: Multiple Choice

Which country generates the highest percentage of its energy from nuclear power?

W) Britain

X) China

Y) France

Z) Denmark

Toss Up Answer: Y

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Bonus: Short Answer

By name or number, list the operating temperatures from lowest to highest of these types of fuel cells:

1. MCFC

2. PAFC

3. PEMFC

4. SOFC

Bonus Answer: 3,2,1,4

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## 7. ENERGY

Writer: Centennial

Toss Up: Multiple Choice

Which of the following compounds is not usually a major component of fly ash?

W) Silicon dioxide

X) Aluminum oxide

Y) Magnesium oxide

Z) Calcium oxide

Toss Up Answer: Y

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Bonus: Short Answer

What is the name for the ash that, unlike fly ash, does not escape up the chimney?

**Bonus Answer: Bottom ash**

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## 8. ENERGY

**Writer: Centennial**

**Toss Up: Multiple Choice**

Which of the following is closest to the capacity of the largest offshore wind farm?

W) 60 MW

X) 600 MW

Y) 6000 MW

Z) 60000 MW

**Toss Up Answer: X**

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**Bonus: Short Answer**

In which country is the largest offshore wind farm?

**Bonus Answer: The United Kingdom**

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## 9. ENERGY

**Writer: Centennial**

**Toss Up: Short Answer**

What is the name of the theoretical maximum proportion of energy that can be extracted from an airflow?

**Bonus Answer: Betz's law or the Betz limit**

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**Bonus: Short Answer**

What is the exact value of the Betz limit?

**Bonus Answer: 16/27**

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## 10. ENERGY

**Writer: Granada Hills**

**Toss Up: Short Answer**

In what city was the protocol that phased out the use of chlorofluorocarbons signed?

**Bonus Answer: Montreal (Do not accept Vienna)**

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**Bonus: Multiple Choice**

At what national laboratory was a Shelby Cobra 3D printed in 2015?

W) Oak Ridge National Laboratory

X) Argonne National Laboratory

Y) Lawrence Berkeley National Laboratory

Z) Lawrence Livermore National Laboratory

**Bonus Answer: W**

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## 11. ENERGY

**Writer: Granada Hills**

**Toss Up: Multiple Choice**

What type of geothermal power plant relies on highly pressurized water to generate electricity?

- W) Dry Steam
- X) Binary Cycle
- Y) Subsurface reservoir
- Z) Flash Steam

**Toss Up Answer: Z**

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**Bonus: Short Answer**

What nuclear power plant was formerly located on the Pacific Coast of California in San Diego County and was closed in 2013?

**Bonus Answer: San Onofre**

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**12. ENERGY**

**Writer: Lakeside**

**Toss Up: Multiple Choice**

About how many nuclear power plants are currently in the US?

- W) 57
- X) 104
- Y) 233
- Z) 312

**Toss Up Answer: X**

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**Bonus: Multiple Choice**

What developed country was the first to follow through on the agreements to destroy nuclear weapon stockpiles and cease production of nuclear weapons?

- W) France
- X) USA
- Y) Hungary
- Z) South Africa

**Bonus Answer: Z**

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**13. ENERGY**

**Writer: Lakeside**

**Toss Up: Multiple Choice**

Which US state consumes the most coal annually?

- W) California
- X) Wyoming
- Y) Texas
- Z) New York

**Toss Up Answer: Y**

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**Bonus: Short Answer**

What byproduct of coal combustion is used as filler for tennis rackets, golf balls, and linoleum?

**Bonus Answer: COAL ASH**

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**14. ENERGY**

**Writer: Lakeside**

**Toss Up: Multiple Choice**

About how much solar power does the Earth receive in its upper atmosphere?

- W) 569 Gigawatts
- X) 174 Petawatts
- Y) 298 Exawatts
- Z) 40 Zetawatts

**Toss Up Answer: X**

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**Bonus: Multiple Choice**

In which US state is the world's largest solar power plant found?

- W) California
- X) Arizona
- Y) Texas
- Z) North Carolina

**Bonus Answer: W**

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**15. ENERGY**

**Writer: Oxford**

**Toss Up: Multiple Choice**

To the nearest thousand megawatts, how much geothermal energy does the US have installed?

- W) 1000
- X) 2000
- Y) 3000
- Z) 4000

**Toss Up Answer: Y**

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**Bonus: Multiple Choice**

Which country produces the second most geothermal electricity?

- W) The US
- X) The Phillipeans
- Y) China
- Z) Russia

**Bonus Answer: X**

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**16. ENERGY**

**Writer: Oxford**

**Toss Up: Short Answer**

Which DOE national lab conducted the Manhattan project?

**Bonus Answer: Oak Ridge (Accept: Oak Ridge National Lab)**

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**Bonus: Short Answer**

During the Manhattan project, which two atomic bombs were created?

**Bonus Answer: Thin man and Fat man**

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**17. ENERGY**

**Writer: Oxford**

**Toss Up: Short Answer**

Which branch of the National Energy Technology Laboratory was started the earliest?

**Bonus Answer: Pittsburgh**

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**Bonus: Multiple Choice**

Which DOE national lab was started the earliest?

W) Lawrence Berkley National Lab

X) Thomas Jefferson National Accelerator Facility

Y) Fermi National Lab

Z) SLAC National Lab

**Bonus Answer: W**

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