

*Key* 5-

## Geography Test Energy Resources, Name: Cyrill Zürcher

1. Define following words in one sentence each: (2p)

Secondary Energy:

Secondary Energy is converted Primary energy.  
For example Windpower; kinetic energy is transferred  
primary into electric power ✓

Reserves:

Reserves are oil masses which are discovered and  
can be exploited at an economical rate / price.  
not only ✓

Conversion losses:

During conversion between primary and secondary  
energy losses are generated:  
Heat losses, sound losses, kinetic losses.  
→ car, phone ✓

Statistical life of reserves:

Statistical life of reserves determines how long  
the reserves will last depending on the  
production and demand. However it doesn't  
include the consumption increase like the  
dynamic life of reserves. ✓

2. Answer with yes or no: to oil: (1p)

- The global oil industry is less profitable per barrel than it used to be 20 years ago Yes
- Petroleum is gaining importance compared to Biodiesel No
- The theory of peak oil was claimed by a scientist in the last century No ↗
- Peak oil is the time when costs for oil extraction start to increase No ↗

3. And again: (1p)

- If the crude oil price rises, oil reserves change to oil resources No
- If the technology of oil production improves, the oil price will therefore fall yes
- The amount of useful energy is bigger than the amount of end energy No
- The advanced technology in oil production will enlarge the total oil reserves Yes

4. Currently the oil price has started to rise again. Explain the reasons with following key words:  
(1.5p)

Speculation

The speculations about how high the oil prices should  
be are too high → overspeculation. ✓

Price agreement of OPEC-States

OPEC-States are trying to hold the oil price high on  
purpose to keep the market under their control. ✓

New US-President

Many investors believe that Donald Trump is a threat  
to the oil industry and could bring the economy to a collapse. ? ↗

Decreases investment in  
renewable sources ↗

5. Why do you think the energy consumption is rising faster (in %) in Africa than in Europe. (Two reasons) (1p)

1 Development → Industry is increasing → higher demand for energy.

2 Europe is going towards being more economic which means that the consumption rises more slowly.

6. What are the risks of the future arctic oil exploitation? Explain two of them. (2p)

- If there was a blowout the water would be completely dark which would prevent further mining. → and destroy marine life.
- It is very expensive to exploit oil in the arctic → cold temperature could damage machinery, borehole freezing, transportation to oil rigs difficult.

7. What is meant by the carbon flux? (1p)

The carbon flux is the rate of exchange of CO<sub>2</sub> between lithosphere and atmosphere. → Carbon-cycle  
→ CO<sub>2</sub>-cycle  
CO<sub>2</sub> is released into the atmosphere

8. Draw an anticline oil trap and name the important layers. Mark with colours the area where water, gas and oil can be found. (2p)



9. What is a blow out preventer? Why is it needed? (1p)

It is a valve on top of a drilling hole which can regulate the pressure. If there was no blowout preventer oil would gush out due to lower pressure on the surface.

Answer with "Yes" or "No" to your presentations.

10. OTEC and Wind Power: (1p)

- Open cycle OTECs produce as side products salt and water Yes
- Ammonia is used in some OTECS as a fluid to convey the heat flow Yes
- In Switzerland only around 19% of the total energy is produced by wind power No
- Horizontal-axis wind turbines have the higher efficiency than vertical axis turbines No Yes

11. Waves and tidal energy / geothermal energy (1p)

- There are only experimental tidal energy power plants at present Yes
- Estuaries are good places to install tidal barrages Yes
- The best places for geothermal energy use in Switzerland are in the northern parts Yes
- A major problem of geothermal energy is the fact that it cools down the inner of the earth No

12. Desertec/Nuclear fusion (1p)

- A Solar power plant would be a typical Part of Desertec Yes
- Desertec planned to produce more energy for local consumption than for use in Europe Yes
- At a nuclear fusion helium cores change to deuterium and tritium No
- The first nuclear fusion power plant was installed in 1951 No

13. Solar Power Plants und updraft Towers/Net energy gain and EROEI (1p)

- The energy of a solar updraft tower is produced by steam pressure Yes D
- CSP stand for concentrated solar power No D
- The EROEI is desired to be as high as possible Yes
- If the EROEI of fossil fuel reaches 1, oil will no longer be produced for energy use Yes

Explain the strategy of the federal council concerning nuclear power. (2p)

The Government has decided that no new nuclear power stations are going to be built and that old power stations will slowly be shut down until 2030. By 2050 Switzerland should be run ~~only~~ only on renewable energy.

Why could the exploration of oil below sea ground damage the environment? Explain. (1.5p)

During the exploration shockwaves seismic waves <sup>oil</sup> are used to locate oil. These shockwaves either produced by shot guns or by explosions can damage the fish hearing / orientation and explosions could damage sea life / coral reefs.

Whbs ~

Bonus Question: (1p)

What is the reason magnetometers are used in oil exploration?

Flowing oil could change the magnetic field locally. By measuring the magnetic field flowing oil can be discovered.

Bonus Point from homework \_\_\_\_\_