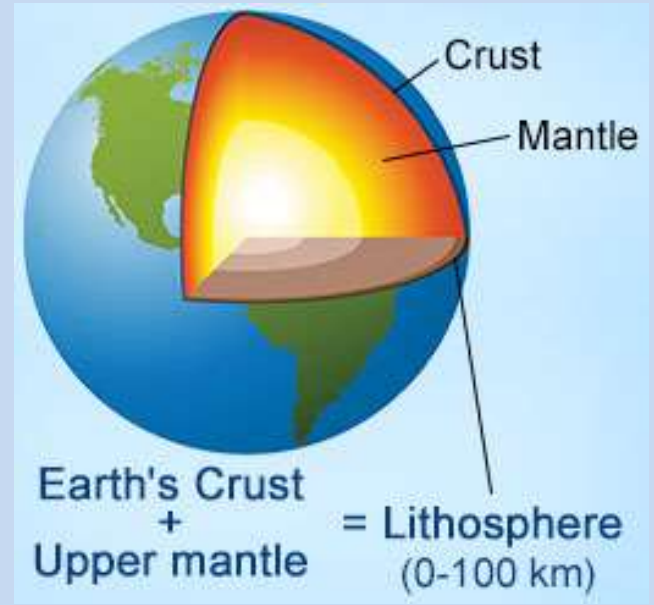
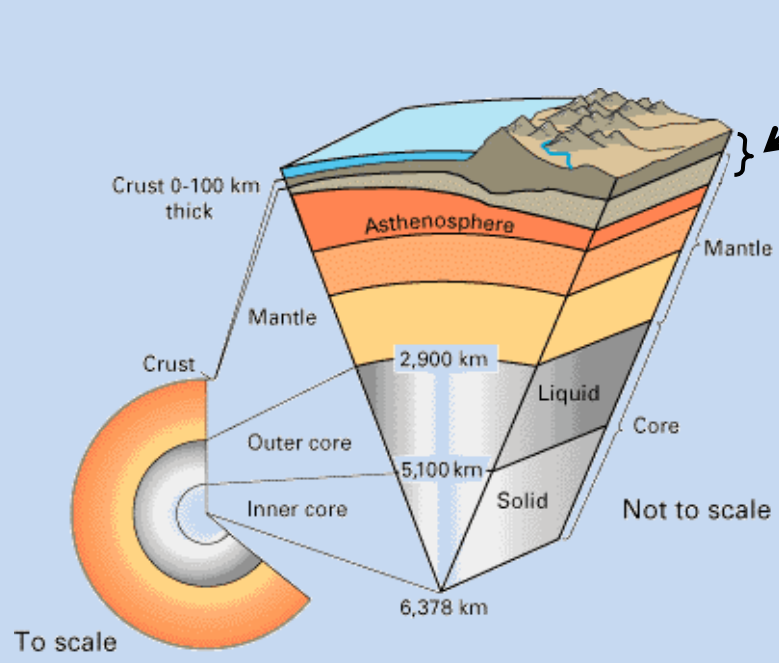


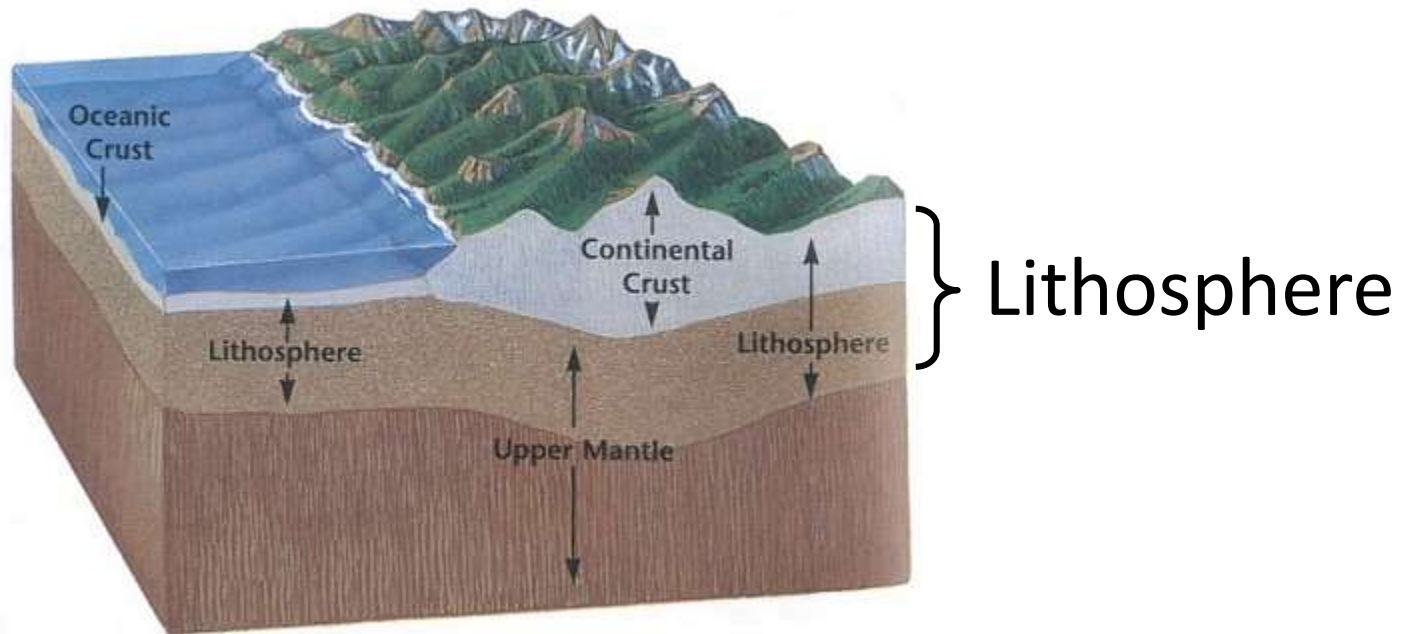
Lithosphere

Lithosphere



Lithosphere:
(Rocky Sphere)

- Solid, rocky, outer layer of the Earth.
- Includes the crust and part of the upper mantle.



Minerals: Solid, inorganic substances that have a clearly defined composition and properties.



Rocks: Heterogeneous solids composed of minerals





Mining in Quebec

● Nickel

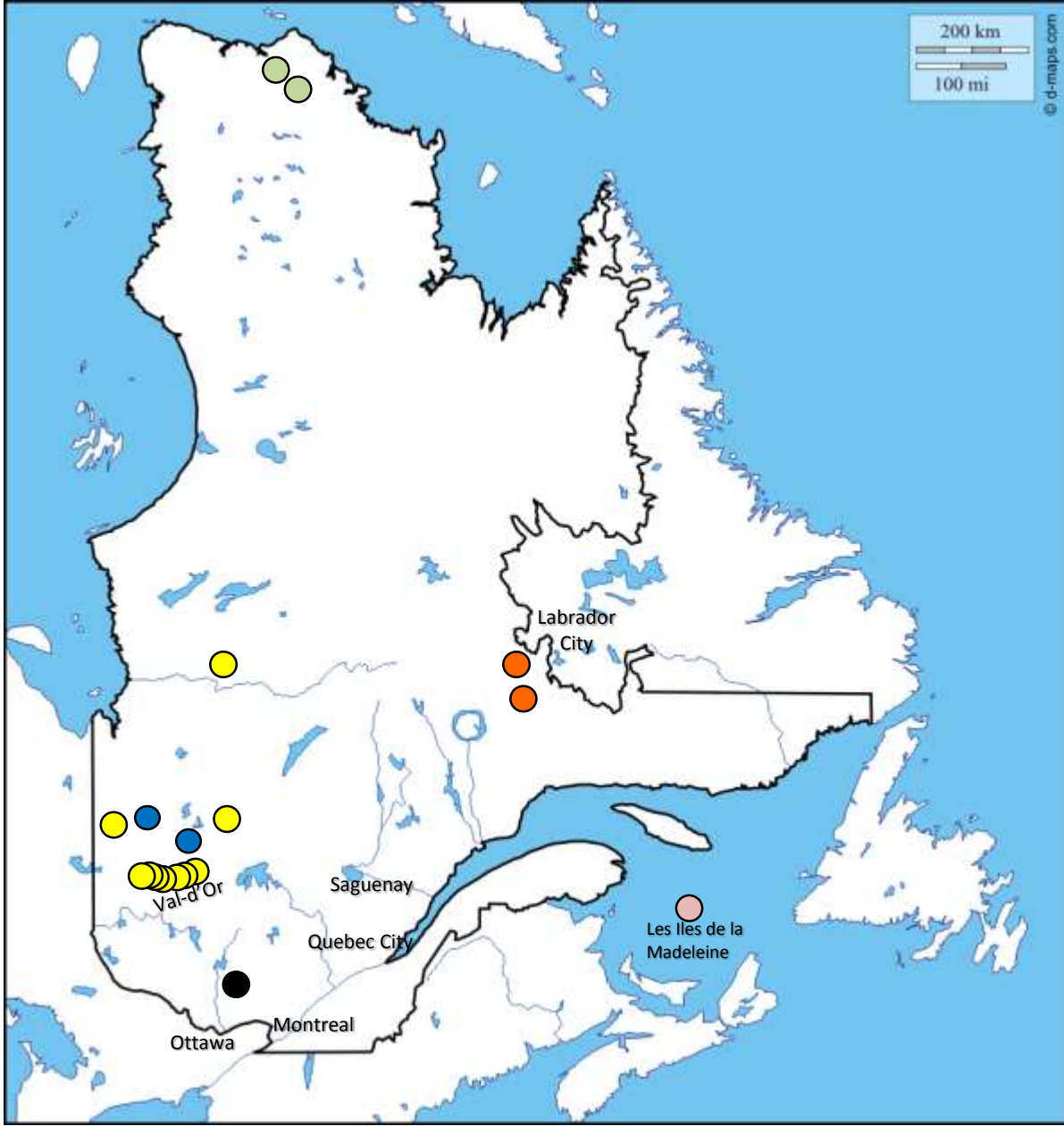
● Gold
Silver
Copper

● Zinc

● Graphite

● Iron

● Salt



Permafrost



Permafrost

Ground that is at a temperature of 0°C or below for more than 2 years.

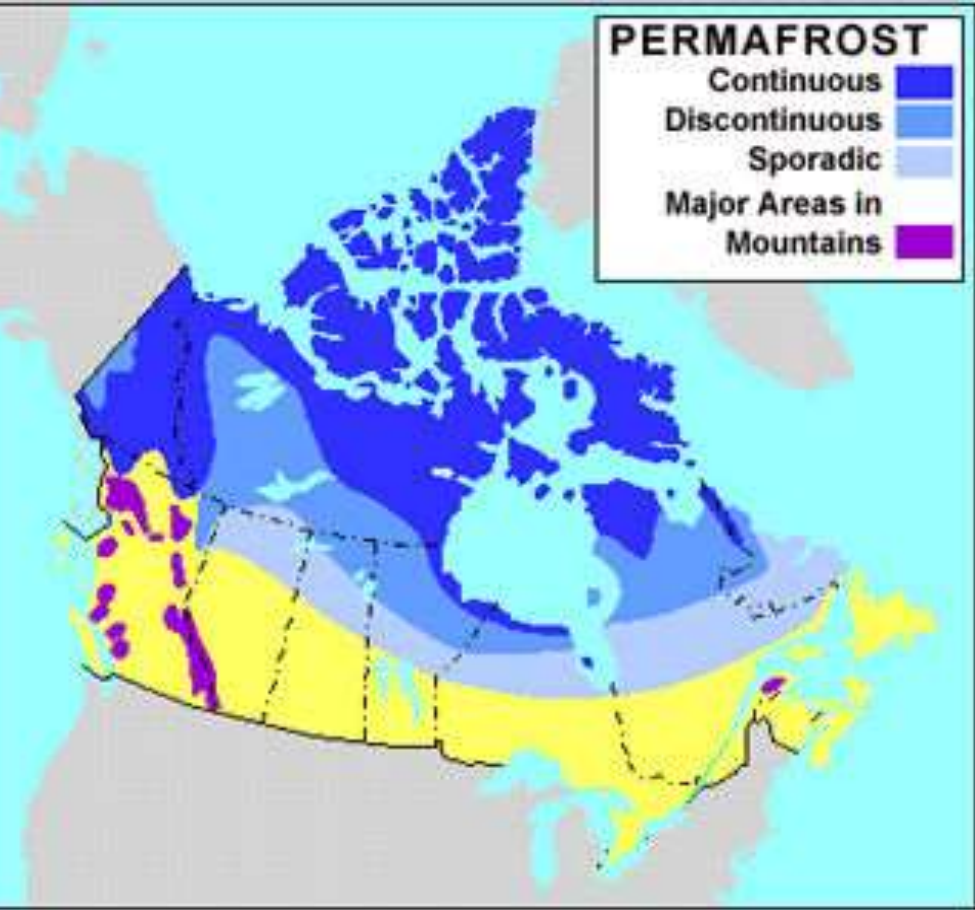


Permafrost

Ground that is at a temperature of 0°C or below for more than 2 years.

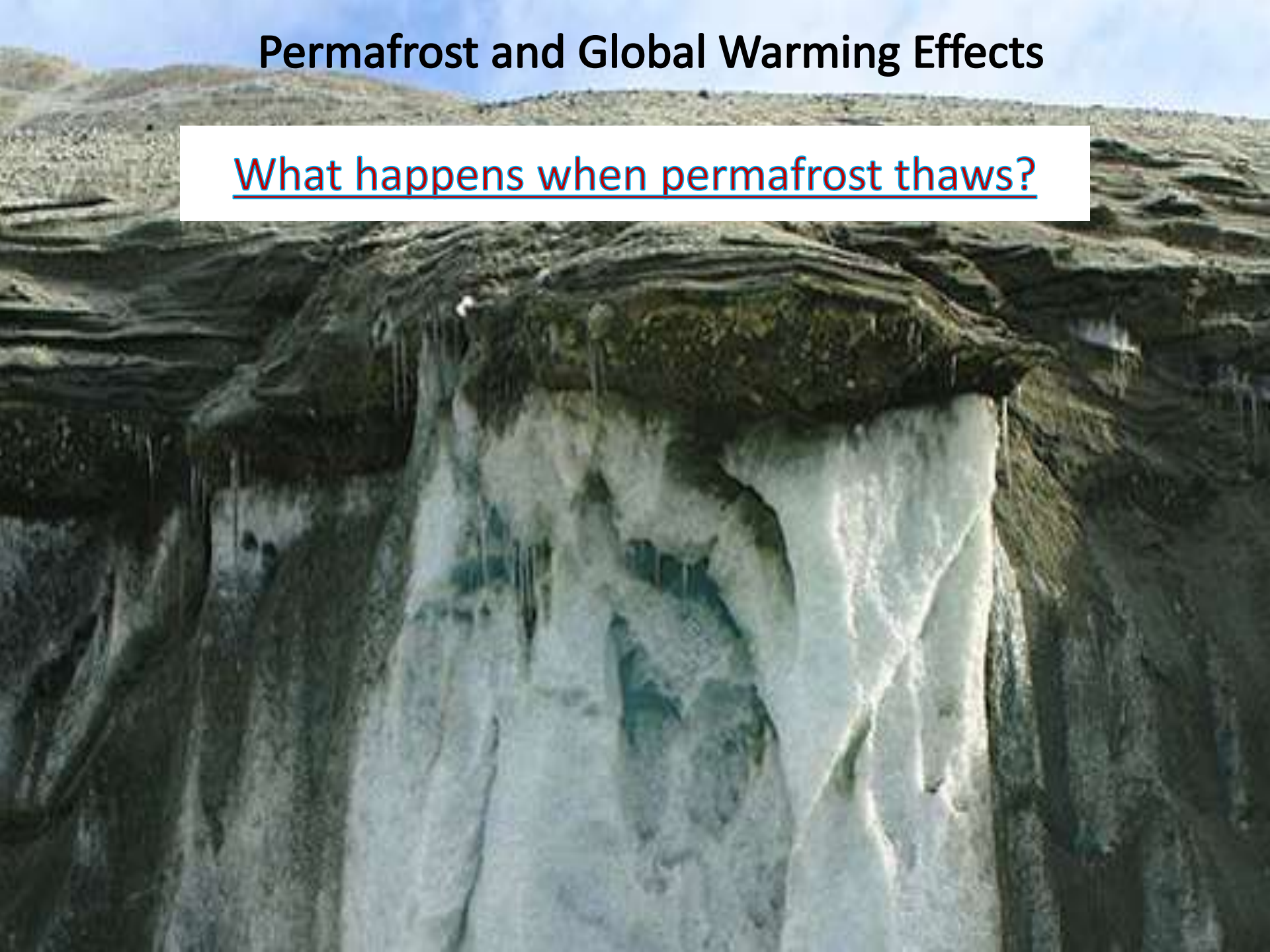


Permafrost Regions

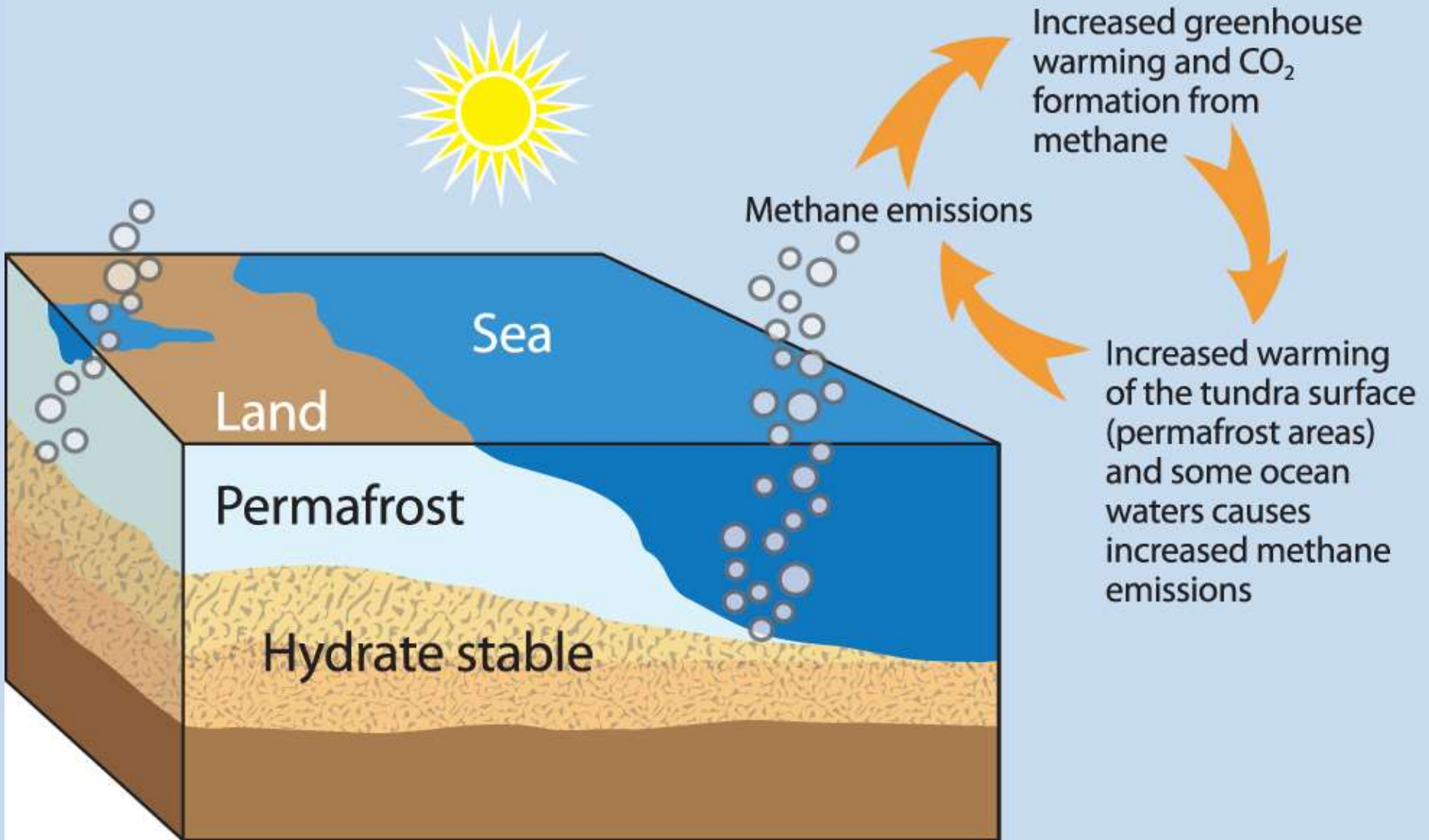


Permafrost and Global Warming Effects

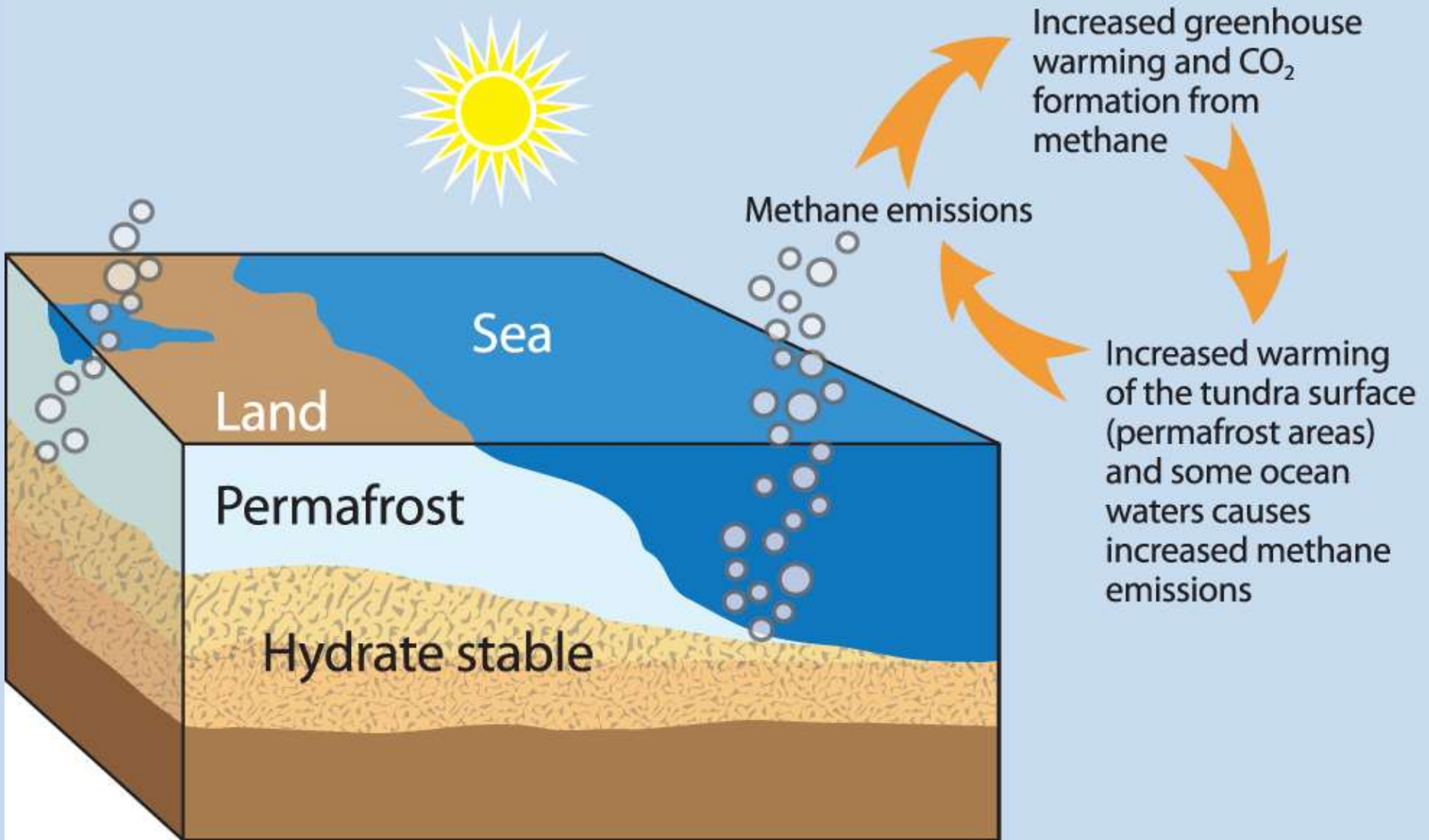
What happens when permafrost thaws?



- Permafrost contains massive amounts of frozen organic material.

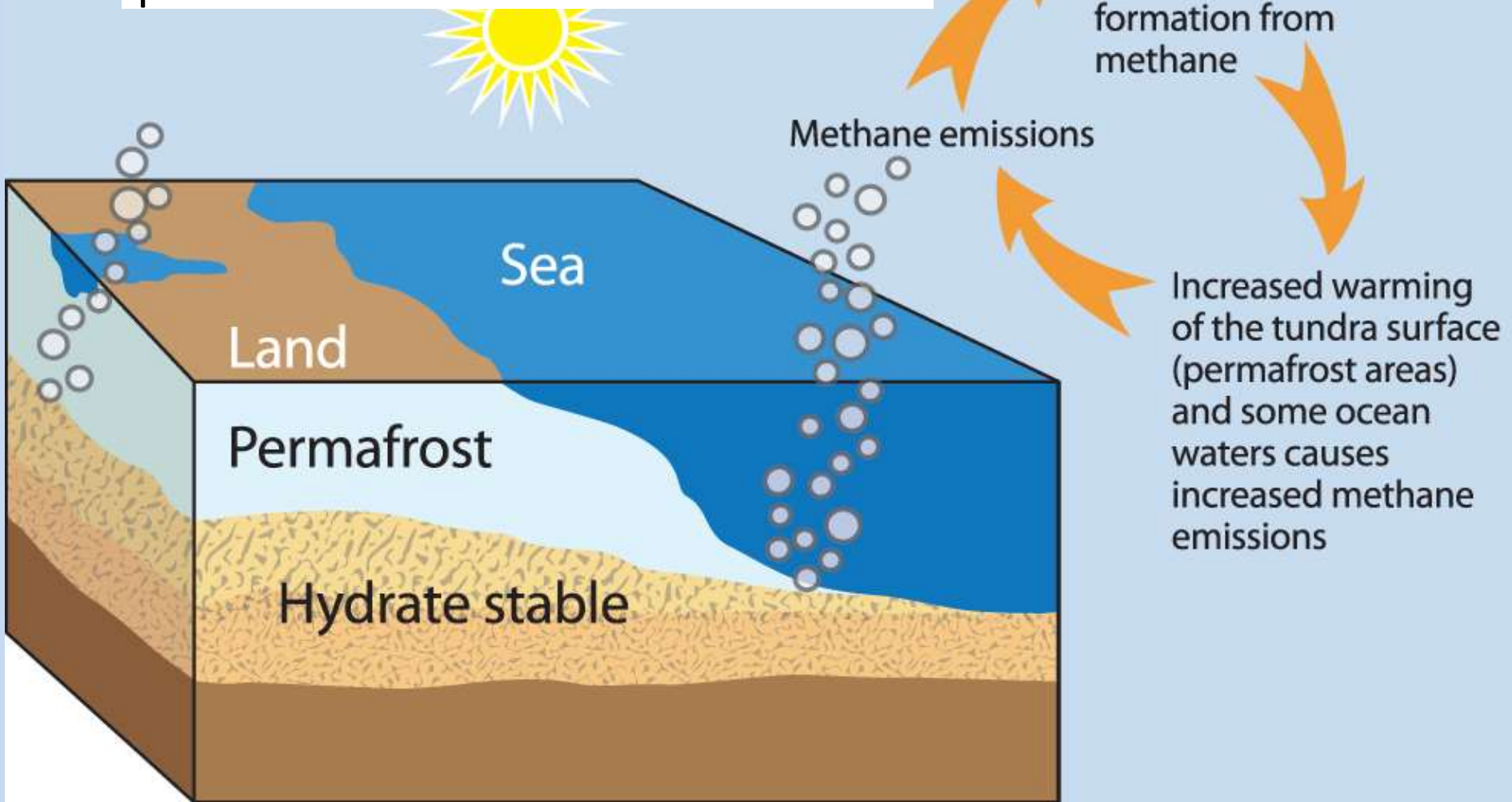


As permafrost thaws, large amounts of carbon/methane are released into the atmosphere.



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This contributes to global warming, which will subsequently increase permafrost thaw.



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- Permafrost stabilizes the ground in many mountain regions.



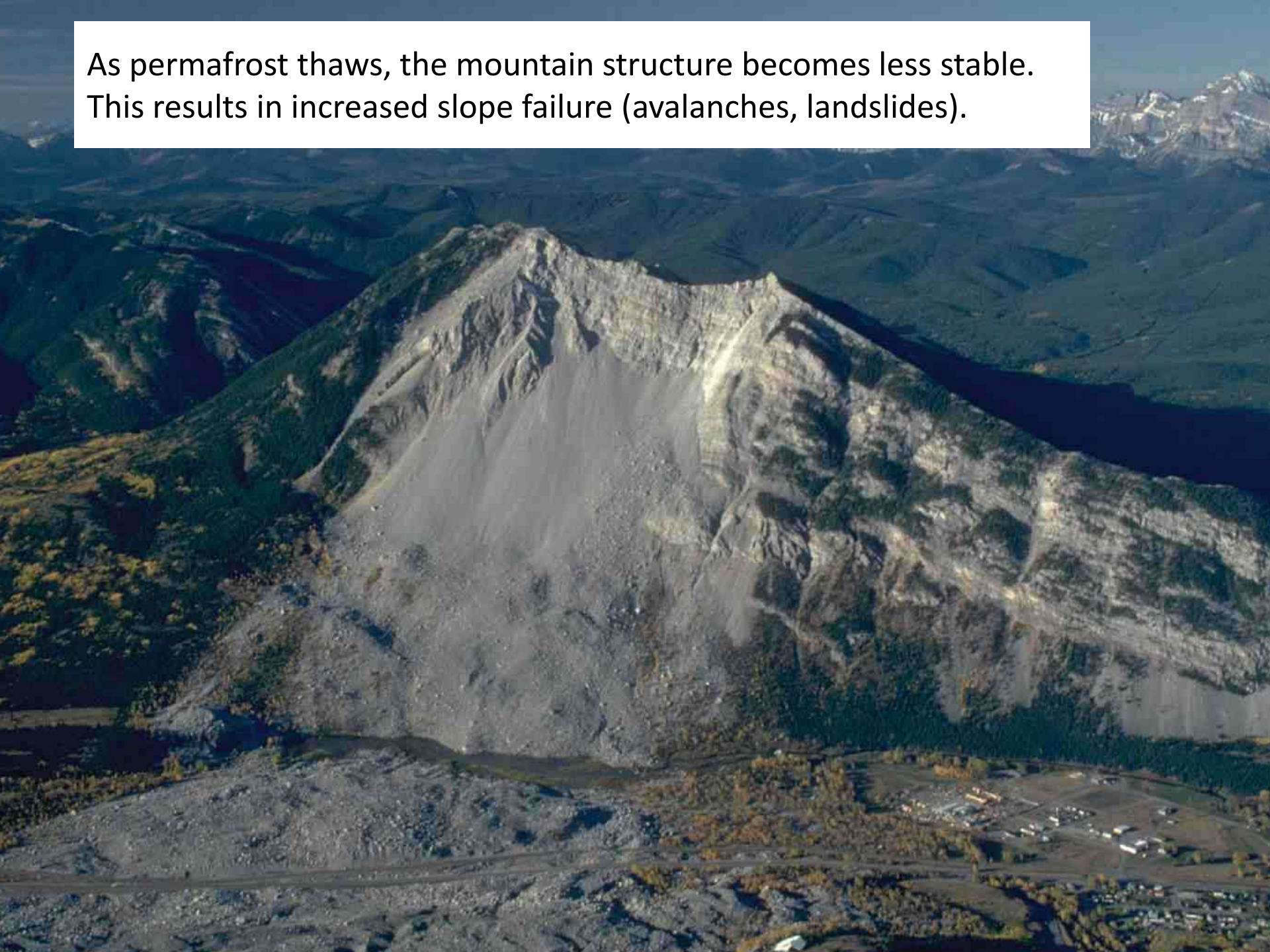
As permafrost thaws, the mountain structure becomes less stable. This results in increased slope failure (avalanches, landslides).



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- Permafrost stabilizes the ground under many man-made structures.



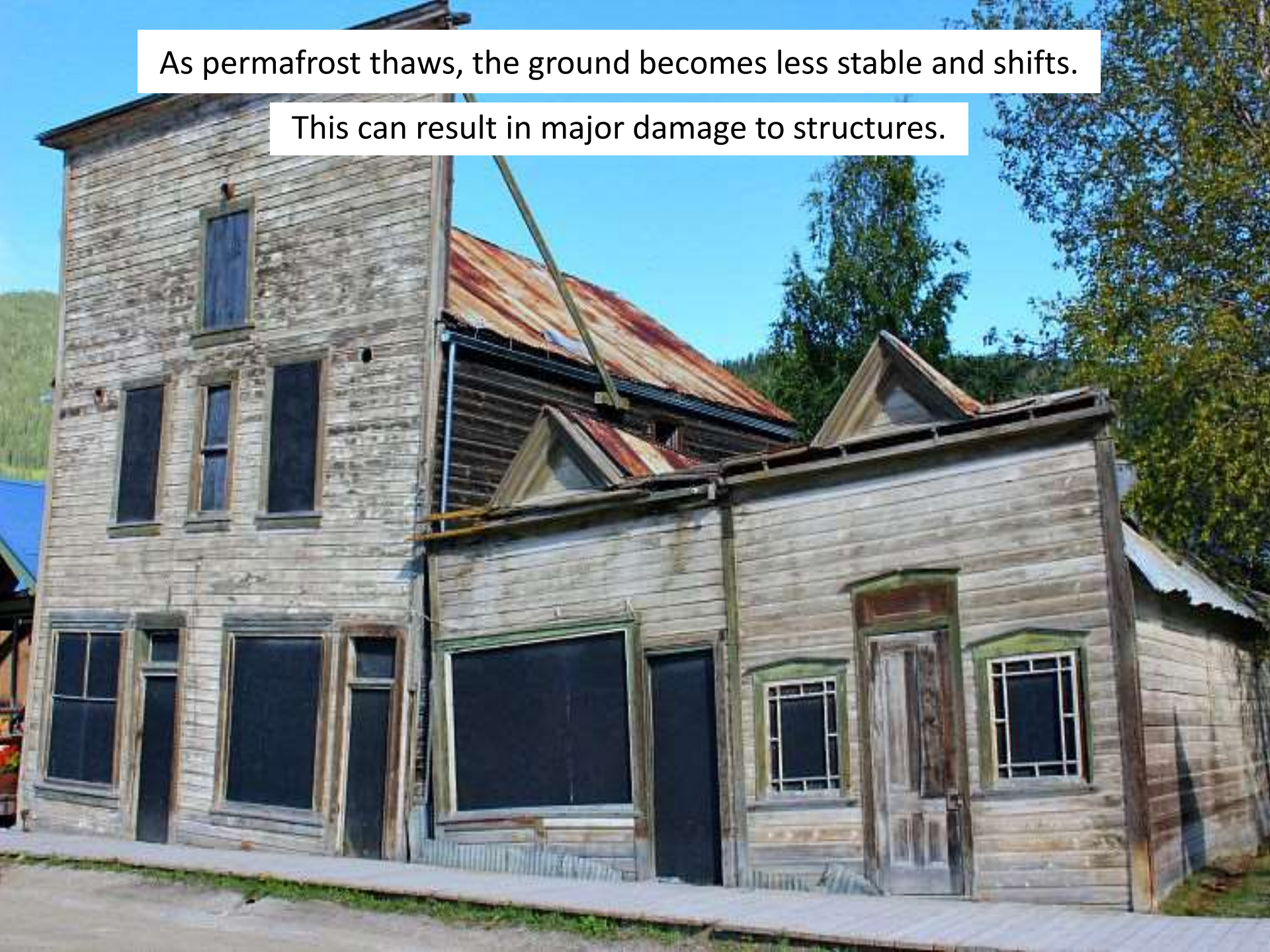
As permafrost thaws, the ground becomes less stable and shifts.

This can result in major damage to structures.



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Energy Resources in the Lithosphere

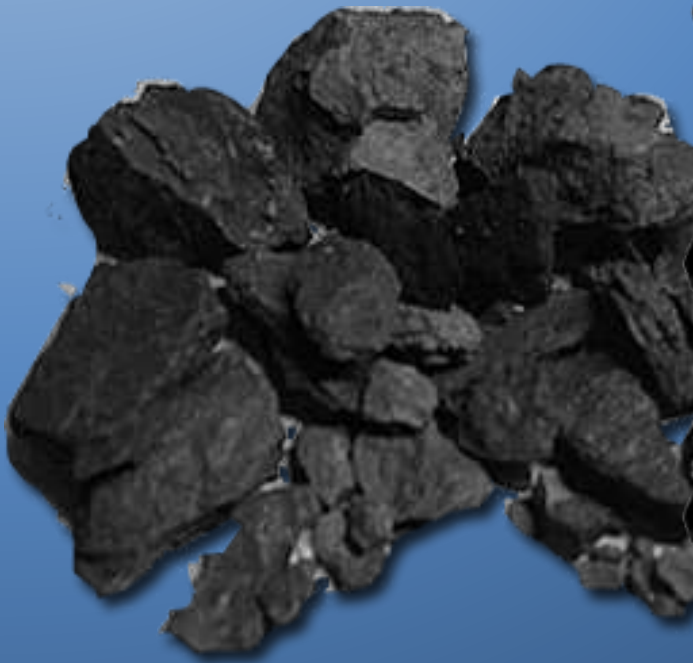
- Fuel that results from the decay of plants and animals in the ground.



Energy Resources in the Lithosphere

Fossil Fuels

- Includes coal, oil and natural gas.
(a solid) *(a liquid)* *(a gas)*



Energy Resources in the Lithosphere

Fossil Fuels

Heat

Motion

Electricity

Chemical
Energy

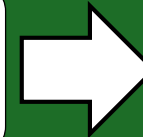


Burning

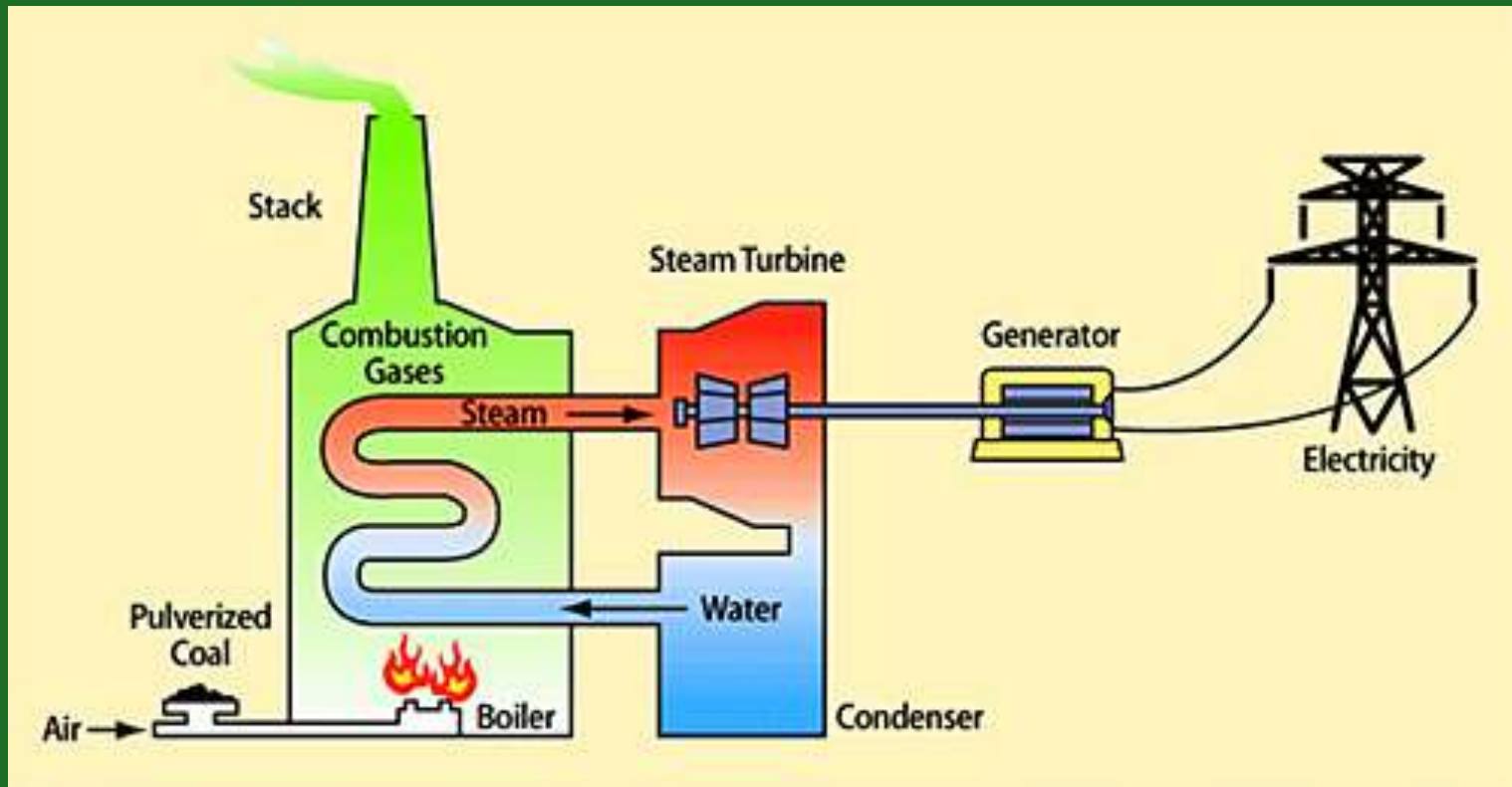
Thermal
Energy



Kinetic
Energy

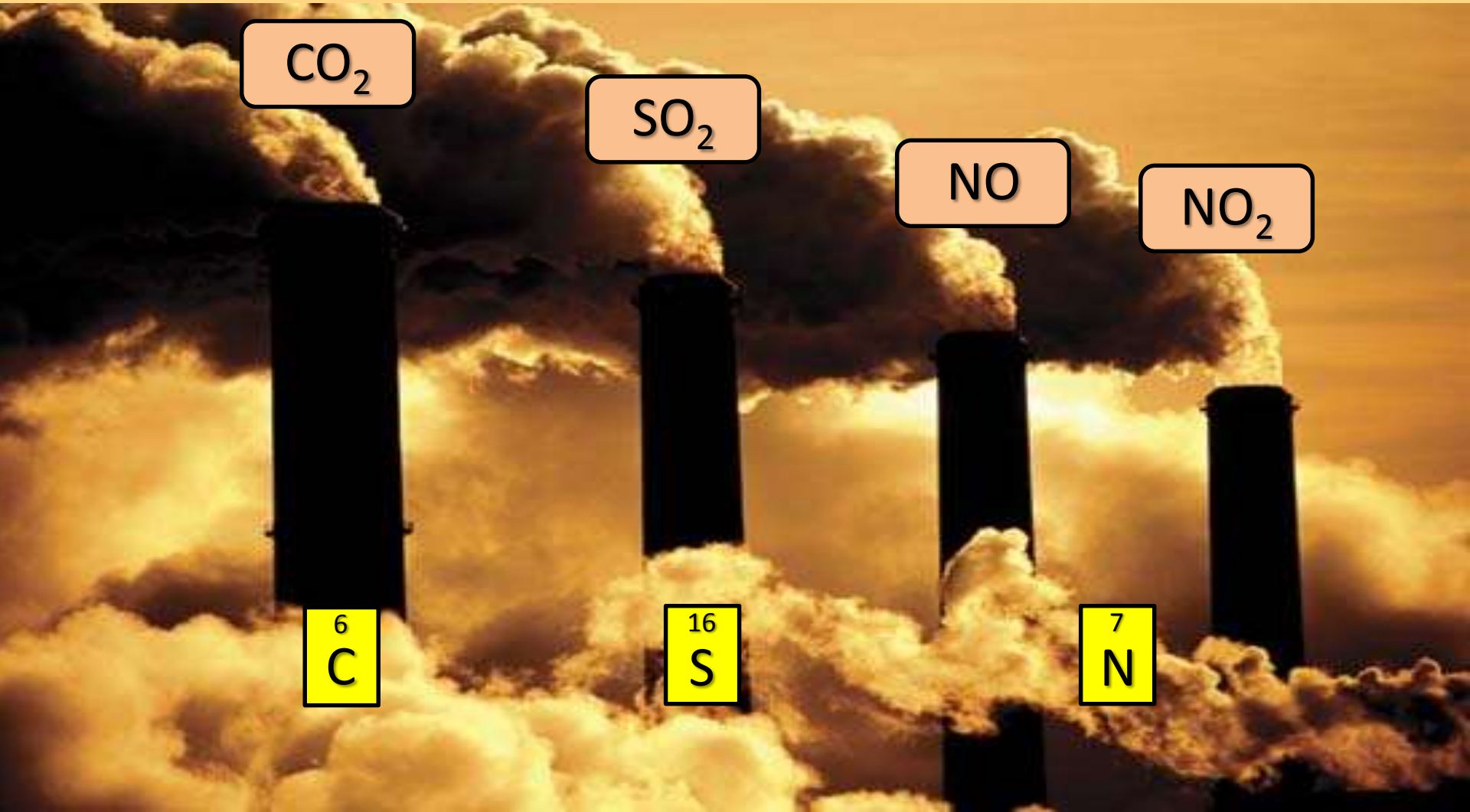


Electrical
Energy



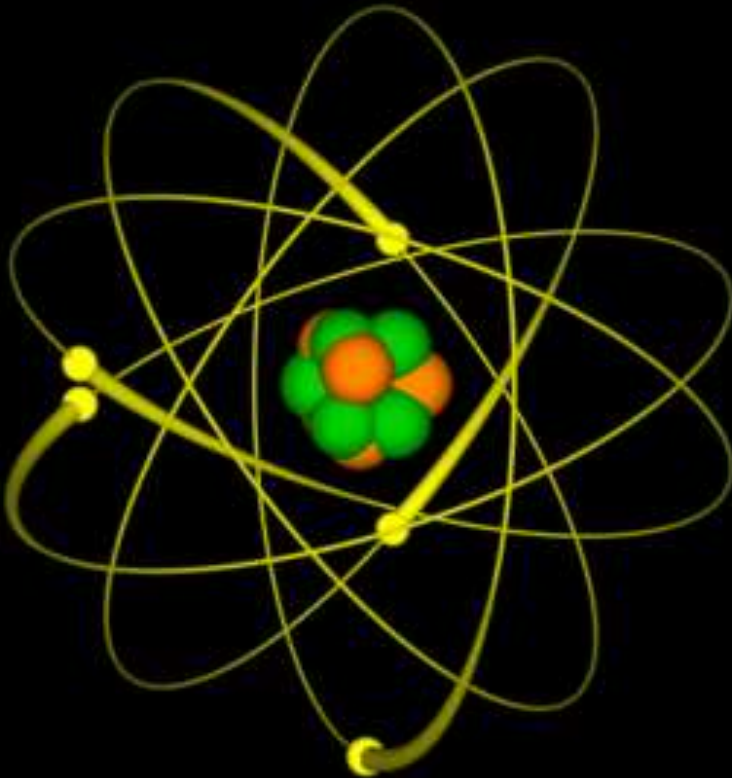
Gases released into the atmosphere by burning fossil fuels:

- Carbon dioxide, CO_2 ; major greenhouse gas.
- Sulphur dioxide, SO_2 and nitrogen oxides, NO_x ; cause acid rain.



Nuclear

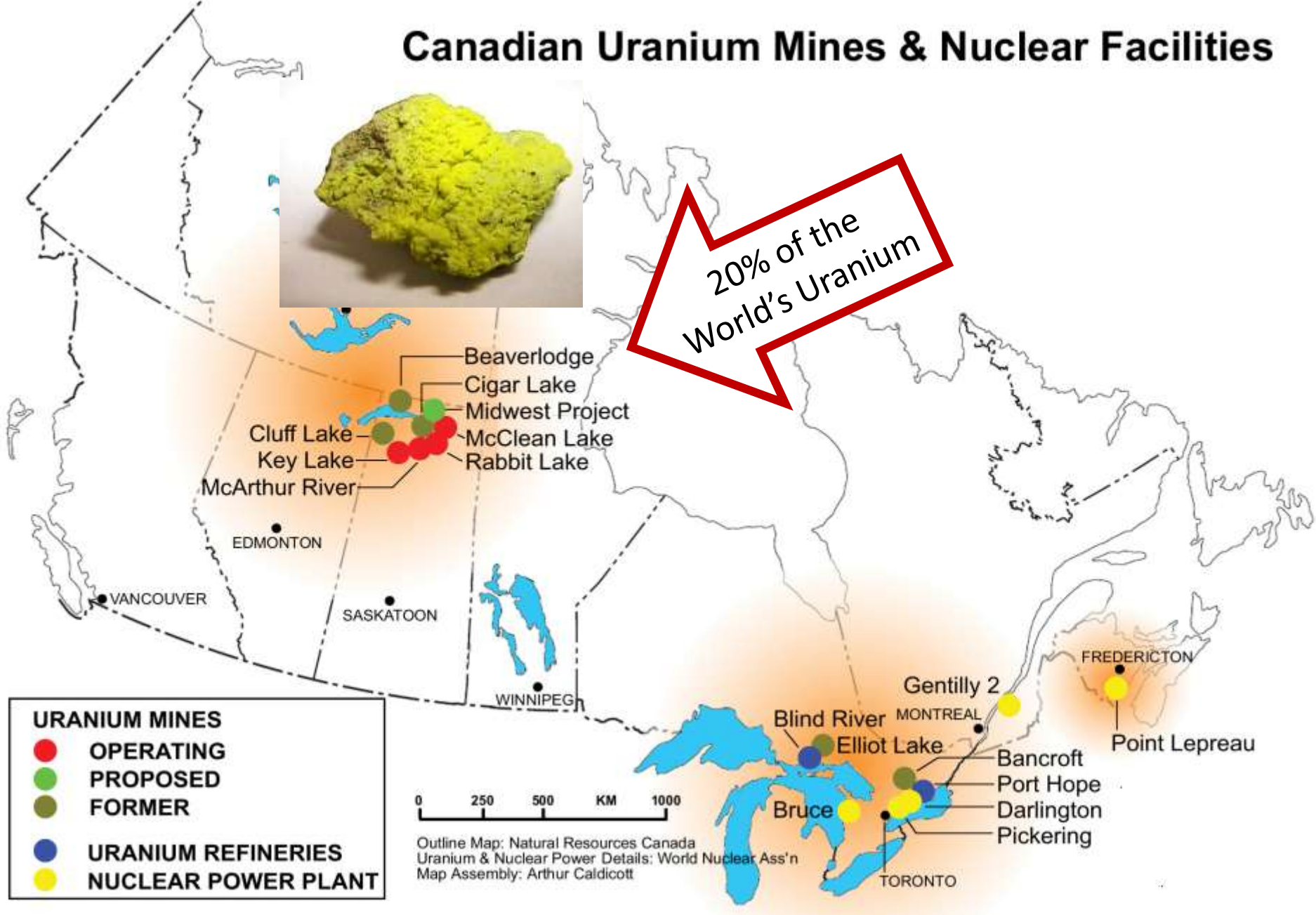
- Uranium, U, is a radioactive element that occurs naturally in the Earth's crust.



Canadian Uranium Mines & Nuclear Facilities



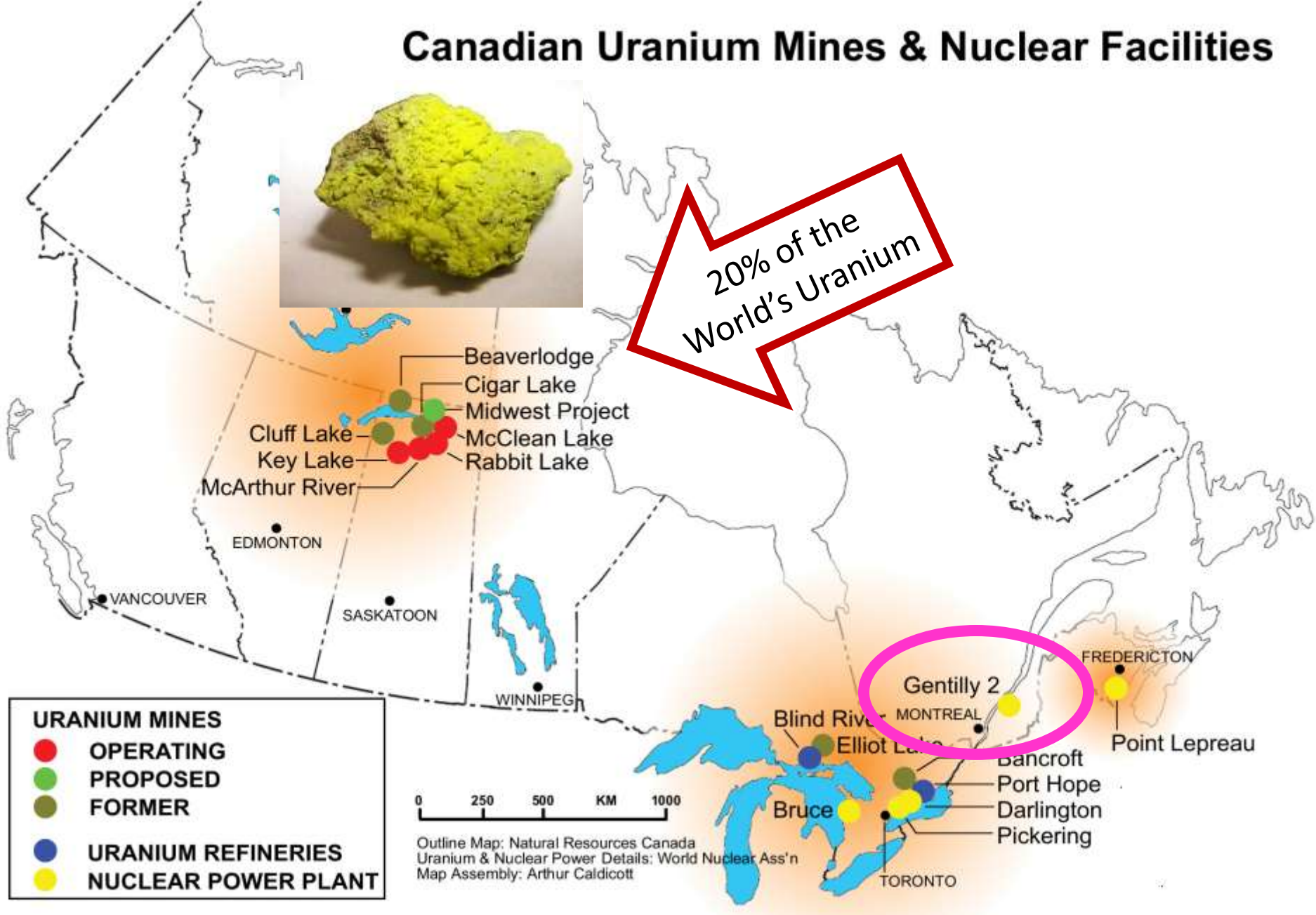
20% of the World's Uranium



Canadian Uranium Mines & Nuclear Facilities



20% of the World's Uranium



Beaverlodge
Cigar Lake
Midwest Project
Cluff Lake
Key Lake
McArthur River
McClean Lake
Rabbit Lake

EDMONTON

SASKATOON

WINNIPEG

Gentilly 2

MONTREAL

FREDERICTON

Point Lepreau

Blind River

Elliot Lake

Bancroft

Port Hope

Darlington

Pickering

Bruce

TORONTO



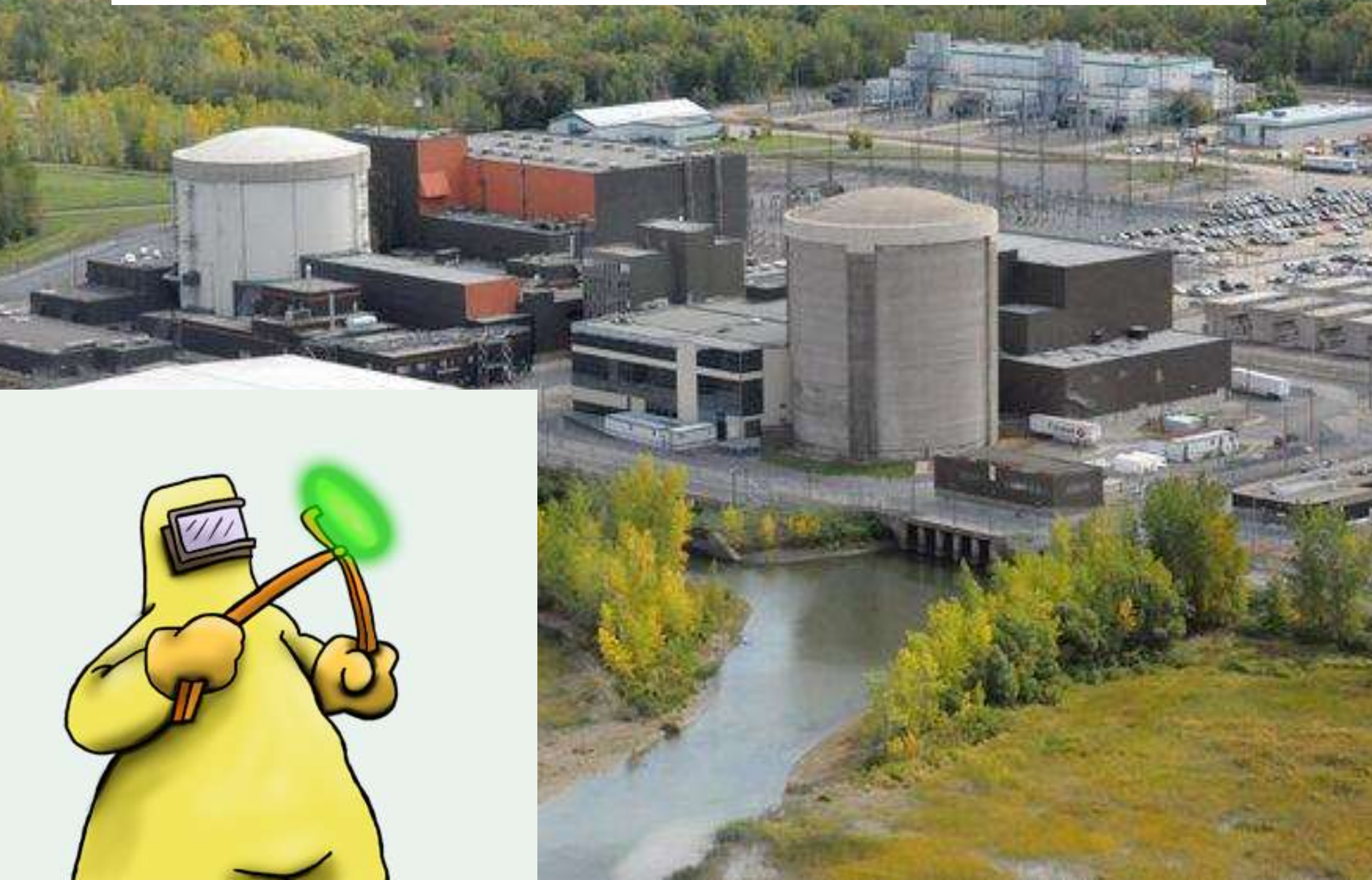
CENTRALE NUCLÉAIRE GENTILLY 2

4900 BOUL. BÉCANCOUR

PROPRIÉTÉ PRIVÉE

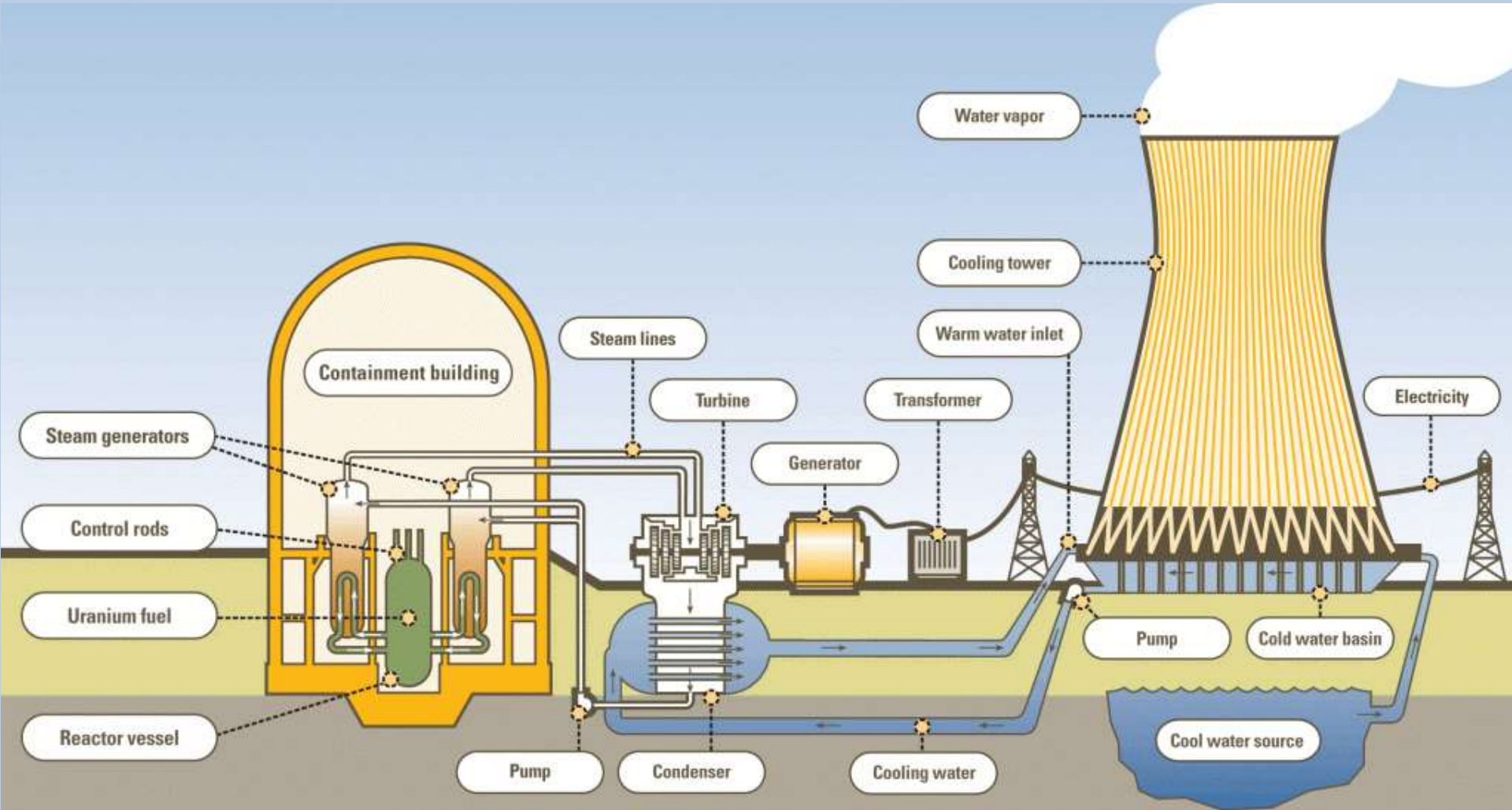
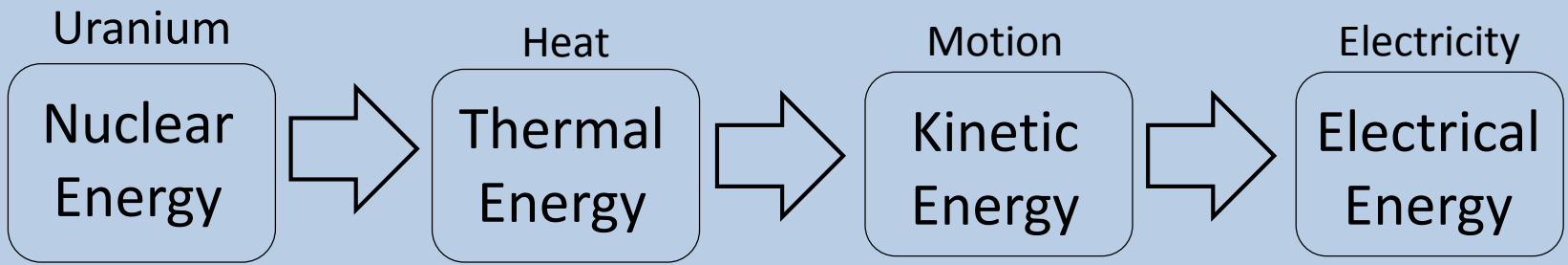
**DÉFENSE D'ENTRER SANS
AUTORISATION**

- Heat emitted during nuclear fission is converted (transformed) into electrical energy.



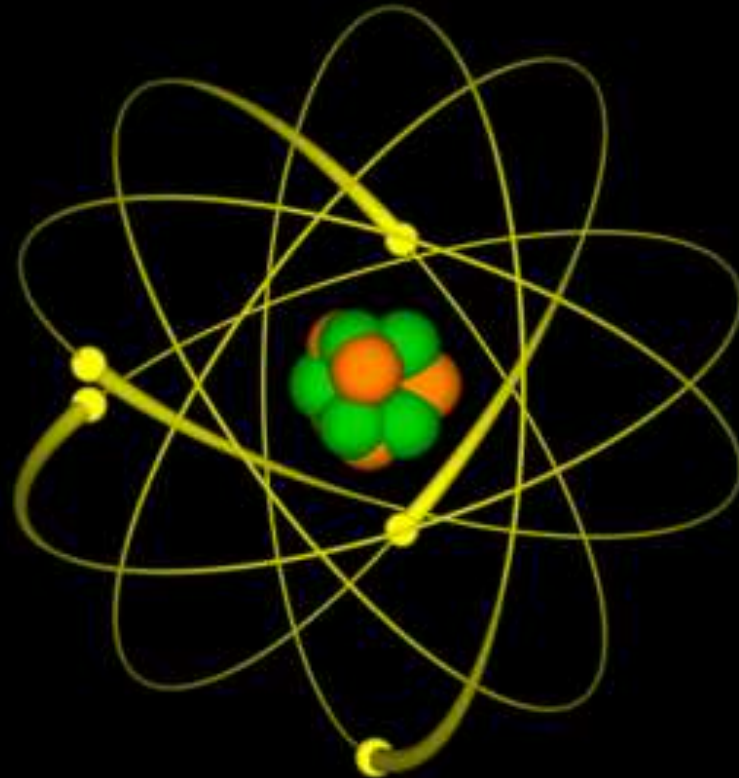
- Heat emitted during nuclear fission is converted (transformed) into electrical energy.





Nuclear Energy

Advantage: Large amount of energy from a small amount of matter.



Nuclear Energy

Concerns: Radioactive waste and consequences of an accident.



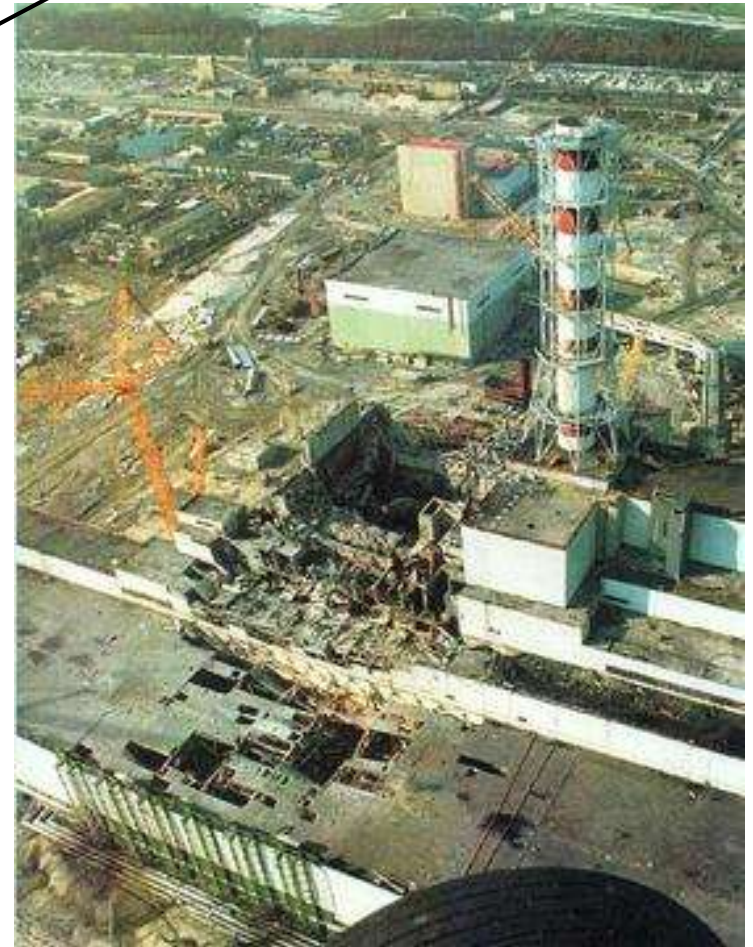
Pripyat, Ukraine (before 1986)

Chernobyl Nuclear Power Plant





What used to be Reactor #4
(Chernobyl Power Plant)



Where was affected?

While much of the nuclear fallout fell close to Chernobyl – mainly Russia, Ukraine and Belarus – after the disaster traces of radioactive deposits were found in most countries in the Northern Hemisphere. Fluctuating winds meant some areas were affected worse than others.

Dose = multiples of normal rate

10⁻²-1

1-5

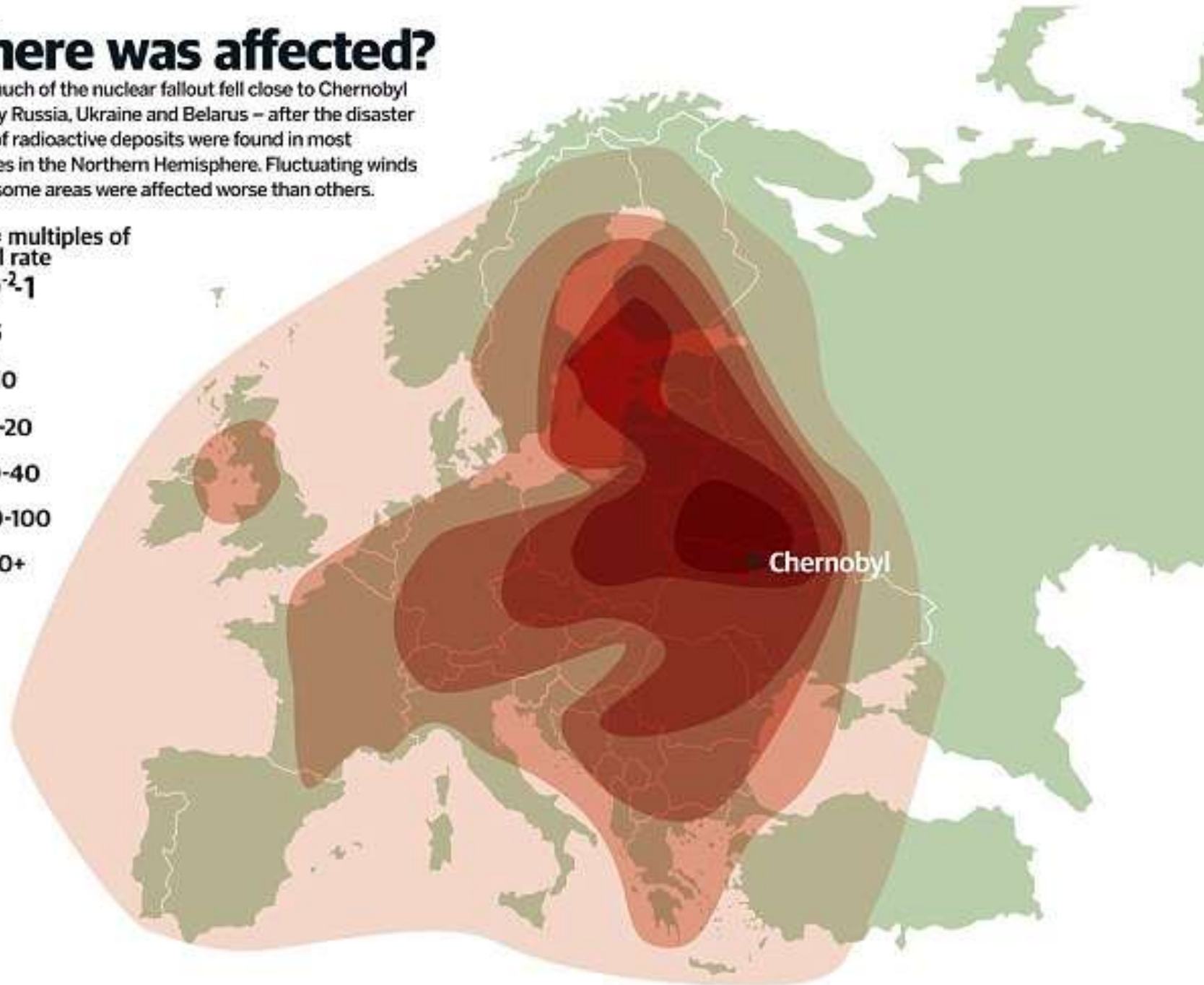
5-10

10-20

20-40

40-100

100+



Abandoned city of Pripyat, Ukraine (After 1986)

Chernobyl Nuclear Power Plant





March 2011

Earthquake
causes a
Tsunami

A green directional sign with a white border, mounted on a wooden post. The sign features the word "FUKUSHIMA" in large, white, sans-serif capital letters. The sign is set against a background of a blue sky with scattered white clouds and a green landscape with a road in the distance.

FUKUSHIMA





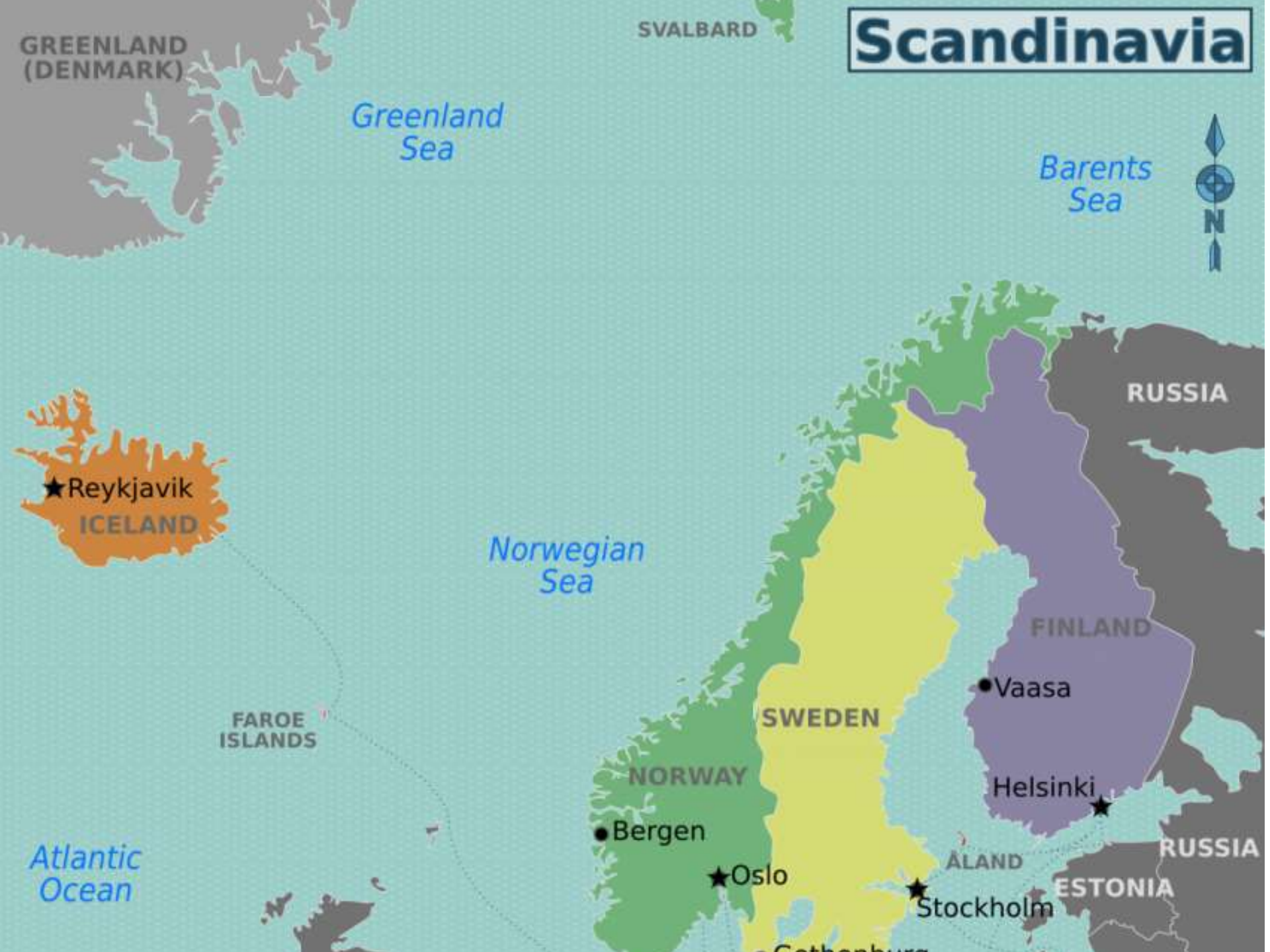




NUCLEAR FALLOUT MAP



Scandinavia



Geothermal

Energy obtained from the internal heat of the Earth.

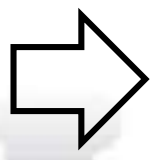


Geothermal

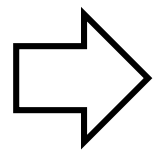
Energy obtained from the internal heat of the Earth.



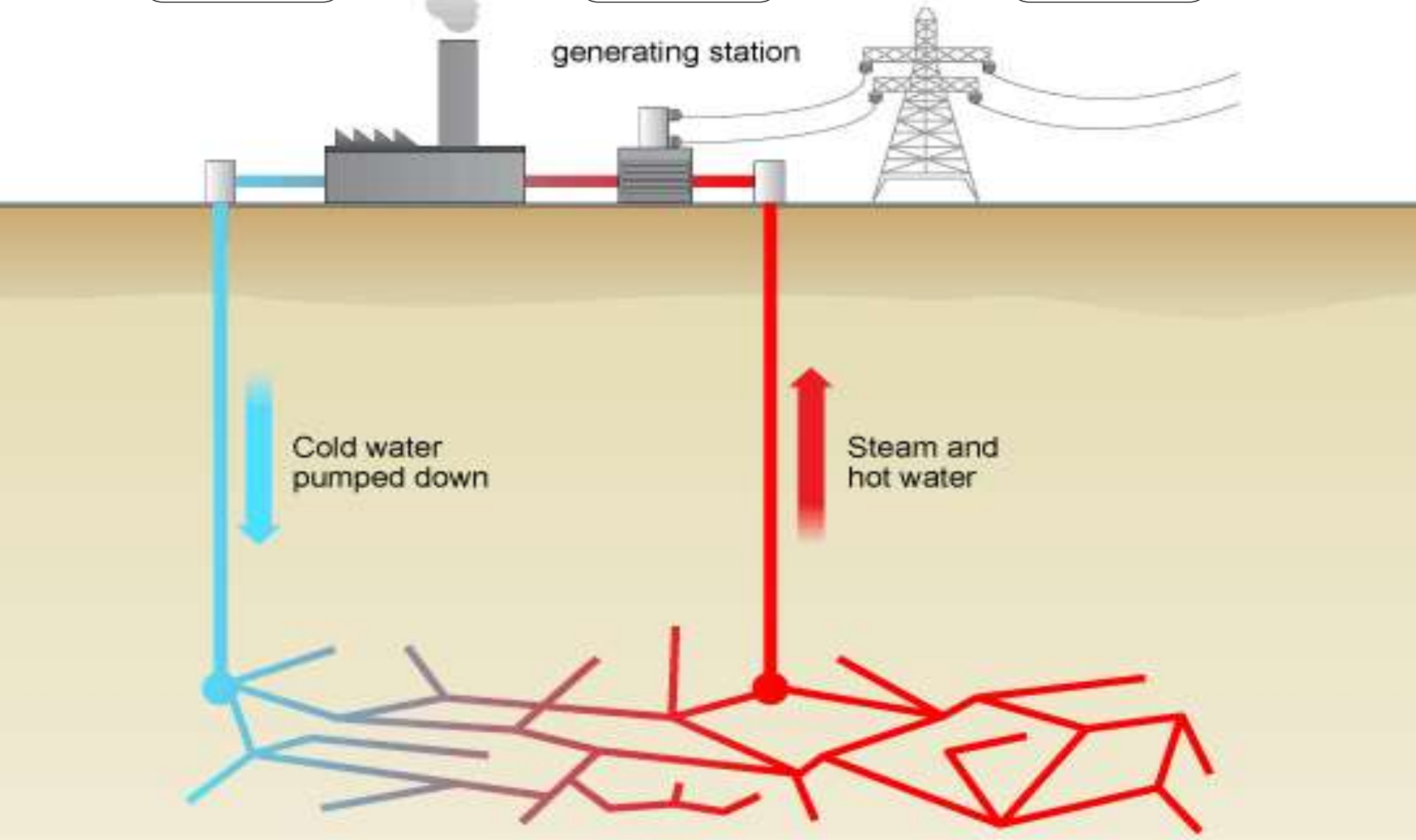
Heat
Thermal
Energy



Motion
Kinetic
Energy



Electricity
Electrical
Energy



Sun

**21% Absorbed by
Water Vapor & Dust**

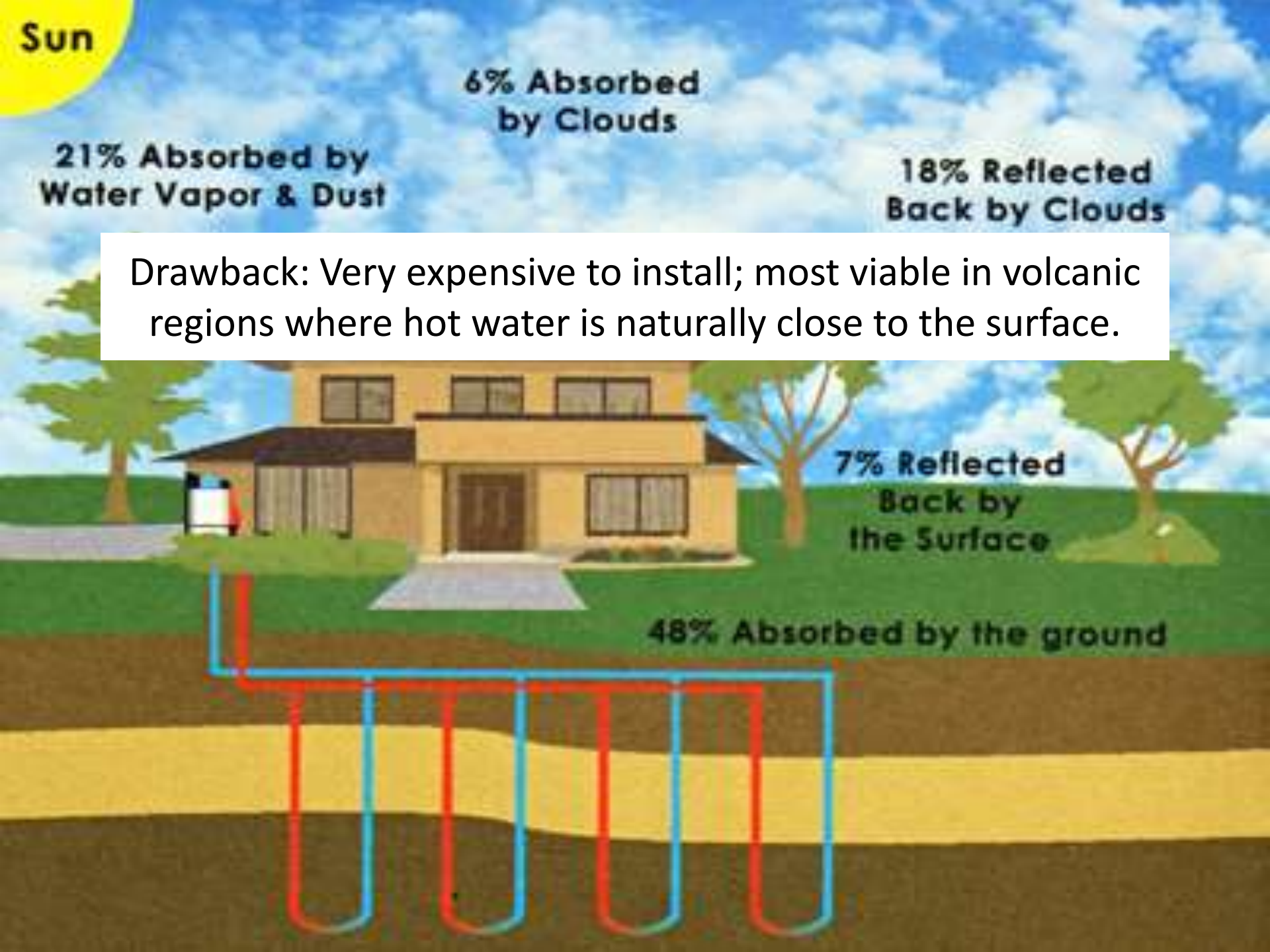
**6% Absorbed
by Clouds**

**18% Reflected
Back by Clouds**

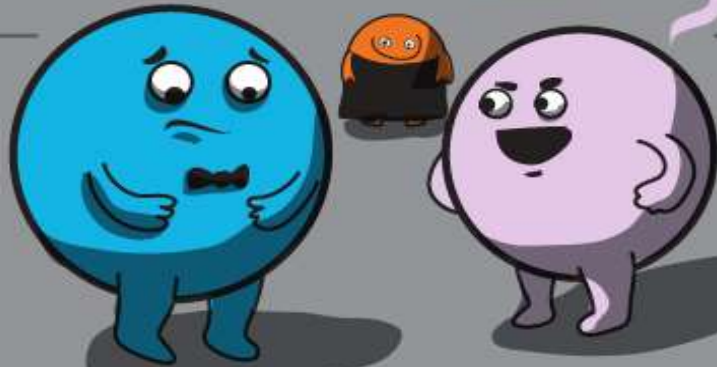
Drawback: Very expensive to install; most viable in volcanic regions where hot water is naturally close to the surface.

**7% Reflected
Back by
the Surface**

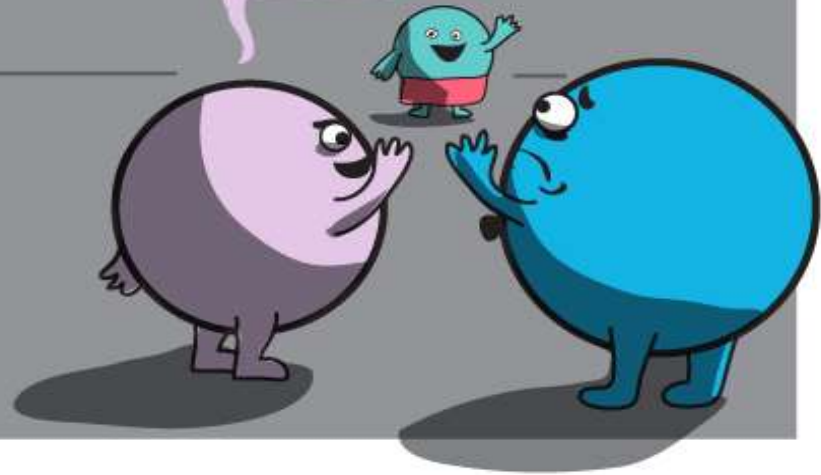
48% Absorbed by the ground



Man, Uranium, you really got yourself in a classic sitcom conundrum: two dates at the same dance.



Good luck getting out of this one!



If only you could split yourself in two, right?

