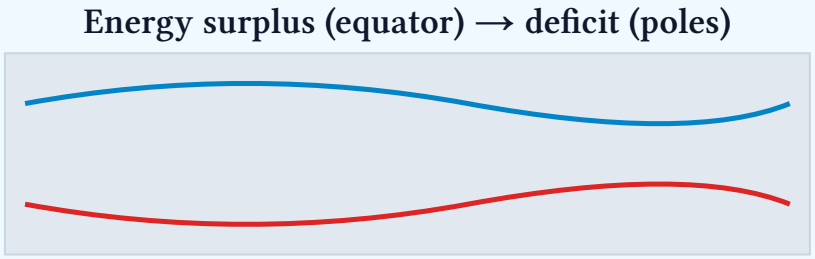
Science 10

## Unit D: Energy flow in global systems

# Global energy transfer and climate zones

# Energy surplus at the equator

- Low latitudes receive more concentrated solar radiation on average than high latitudes.
- Atmospheric circulation and ocean currents move thermal energy toward higher latitudes.




Hadley, Ferrel, and polar cells redistribute heat

# Energy transfer toward the poles

- Without air and ocean currents moving energy, the equator would run hotter and the poles colder.
- Moving air and moving water carry thermal energy toward higher latitudes.
- Show both paths on the diagram. Tomorrow’s local weather comes from a forecast; a climate zone describes the long-term pattern.

# Key terms

**latitude**

Angular distance north or south of the equator.

**atmospheric circulation**

Large-scale movement of air driven by heating differences and Earth's rotation.

**ocean current**

Persistent movement of ocean water that transfers matter and energy.

**energy surplus**

A region or period where absorbed energy exceeds outgoing energy.

# Key terms

**energy deficit**

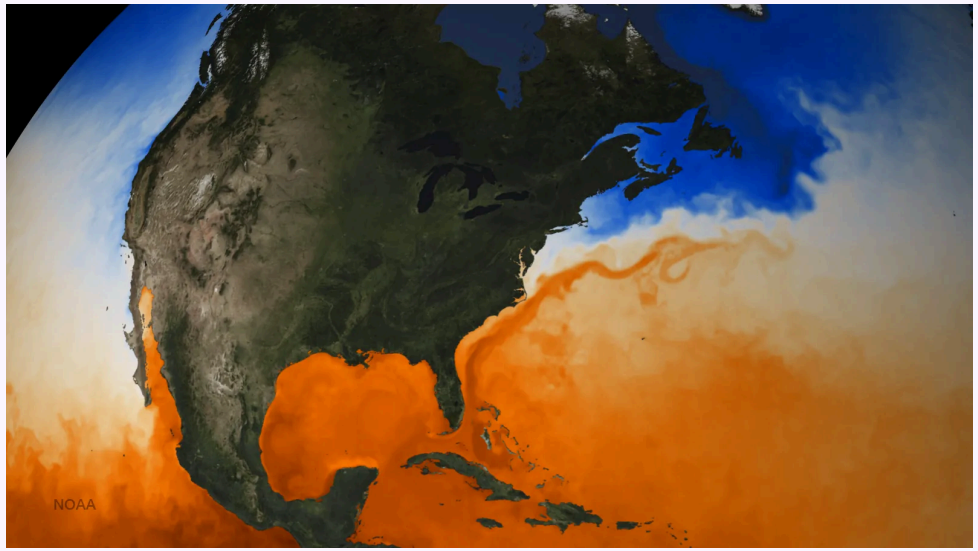
A region or period where outgoing energy exceeds absorbed energy.

## Atmospheric transfer

- Low latitudes gain more solar energy than the poles, so air moves to even that difference out.
- Earth's rotation bends large-scale winds and helps set broad climate bands.
- A jet stream and a local storm are both moving air, at different scales.
- One day's weather can still disagree with the climate zone printed on the map.

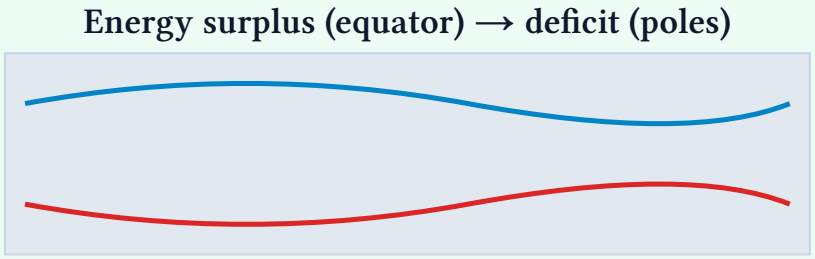
# Ocean and climate

- Surface currents carry warm or cold water along coasts.
- Wind drives much of that surface flow. Temperature and saltiness help drive deeper flow.
- A coast can be milder than inland places at the same latitude.
- Currents move energy. The equator still gets extra energy and the poles still get less.



# Surplus to deficit

- Annotate a world diagram with energy surplus, deficit, and two transport pathways.
- A complete answer shows the latitude pattern and arrows for both air and ocean transport.




Hadley, Ferrel, and polar cells redistribute heat

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