

## CLIMATE 101: WHAT IS SEA-LEVEL RISE?



### THE BASICS

Absolute sea-level rise is the increase in the *average* sea level *across the globe*. And it's a fact: Around the Earth, oceans are climbing higher and higher up our coasts and it's happening faster and faster

So what's to blame? **As humans burn more and more fossil fuels, Earth's climate is changing and the world is getting warmer. The result: glaciers and icebergs are melting. Oceans are expanding – and our seas are rising.**

### QUICK FACTS

- [According to NASA's satellites and buoy data](#), seas around the world have risen an average of nearly 3 inches (7.6 cm) since 1992, with some locations rising more than 9 inches (22.9 cm).
- The longer it takes us to reduce emissions, the higher our seas will become. Scientists at NASA say what we can expect depends on how quickly we cut emissions.
- Researchers at [Cornell University estimate](#) that by the year 2100, 2 billion people – about one-fifth of the world's population – could become climate refugees due to rising ocean levels

### WHAT'S CAUSING SEAS TO RISE?

**The short answer? Sea-level rise is driven by climate change.** [Ever heard of the greenhouse effect?](#) When humans burn fossil fuels for energy, we release carbon dioxide (CO<sub>2</sub>) and other greenhouse gases into the atmosphere. These gases act like a blanket (or a greenhouse) of sorts over our atmosphere, absorbing heat radiation from the sun and preventing a significant amount of it from escaping into space.

Burning fossil fuels means we're putting more greenhouse gases into the atmosphere and trapping more heat than the Earth can safely handle. Which means the Earth (including its atmosphere, surface, and seas) is getting warmer.

## HOW IS ADDED HEAT IS CONTRIBUTING TO SEA-LEVEL RISE?

### 1. MELTING GLACIERS AND ICE SHEETS AT THE POLES

It's simple physics: heat melts ice. When air and ocean temperatures rise, glaciers and ice sheets melt. The melted ice becomes water that flows into the ocean, either directly or running over land first. All that extra water then causes sea levels to rise.

### 2. THERMAL EXPANSION

Water expands as it warms. Imagine a pot of water heating on the stove. The volume of that water in the pot expands as it heats up. Now imagine the entire ocean doing that. [Scientists estimate that](#) "about half of the past century's rise in sea level is attributable to warmer oceans simply occupying more space."

### 3. GREENLAND, WEST ANTARCTICA, AND BEYOND ARE LOSING ICE, TOO

Not only is global warming melting the ice at our poles, but our warming planet is also causing the massive ice sheets that cover Greenland and West Antarctica, and land ice elsewhere in the world to weaken, break off, and melt. The bottom line: more water flowing into the oceans.

## WHY IS DOES THIS MATTER?

[According to 2010 data](#), almost 40 percent of the US population lives near a coast. **And eight of the world's 10 largest cities are located near a shoreline.** As global sea levels rise, millions of people around the world are affected by increased episodes of coastal flooding, coastal erosion, and higher storm surges that are moving further inland.

We're not talking about something happening in 10 years. We're talking about something happening right now – and unless we act, the danger will only grow.

Witness: in places like Miami and New York, residents are already experiencing what has come to be known as "sunny day flooding," – or flooding not linked to heavy rainfall or storms. While variations in high and low tides are natural, flooding like this shows that sea levels are already higher than they used to be. Scientists [have found that sunny day floods have already increased by at least 300 percent](#) in the US since the 1960s.

**It's important to remember that our oceans *do not* work like a bathtub or sink:** when you fill up a tub with water, the water level rises at a consistent level. But research has shown that seas actually rise unevenly – putting some communities even more at risk than others. Relative sea levels are different because local factors are at play, like land subsidence (or sinking) and wind and ocean circulations.

For example, [NASA's findings show](#) that sea levels on the US east coast are rising two or three times faster than the global average. In Scandinavia, by contrast, sea levels are falling. It all adds up to a planet transformed, much of it the result of burning fossil fuels and rising seas.

**Our seas are rising, but so are climate activists around the world.**

*Burning fossil fuels caused this problem. Shifting to clean, renewable energy will help us solve it. We can still act and avert the worst of a changing climate. But it starts with leaving fossil fuels behind.*