

## 2007

More of the world's population now lives in cities than in rural areas, changing patterns of land use. **The world population surpasses 6.6 billion.** (Peter Crane, Royal Botanic Gardens, UK, Science; UN World Urbanization Prospectus: The 2003 Revision; U.S. Census Bureau)

## 2008

Global oil production will peak sometime between 2008 and 2018, according to a model by one Swedish physicist. Others say this turning point, known as "Hubbert's Peak," won't occur until after 2020. Once Hubbert's Peak is reached, global oil production will begin an irreversible decline, possibly triggering a global recession, food shortages and conflict between nations over dwindling oil supplies. (Doctoral dissertation of Frederik Robelius, University of Uppsala, Sweden; report by Robert Hirsch of the Science Applications International Corporation)

## 2020

- Flash floods will very likely increase across all parts of Europe. (IPCC)
- Less rainfall could reduce agriculture yields by up to 50 percent in some parts of the world. (IPCC)
- **World population will reach 7.6 billion people.** (U.S. Census Bureau)

## 2030

- Diarrhea-related diseases will likely increase by up to 5 percent in low-income parts of the world. (IPCC)
- Up to 18 percent of the world's coral reefs will likely be lost as a result of climate change and other environmental stresses. In Asian coastal waters, the coral loss could reach 30 percent. (IPCC)
- **World population will reach 8.3 billion people.** (U.S. Census Bureau)
- Warming temperatures will cause temperate glaciers on equatorial mountains in Africa to disappear. (Richard Taylor, University College London, Geophysical Research Letters)
- In developing countries, the urban population will more than double to about 4 billion people, packing more people onto a given city's land area. The urban populations of developed countries may also increase by as much as 20 percent. (World Bank: The Dynamics of Global Urban Expansion)

## 2040

The Arctic Sea could be ice-free in the summer, and winter ice depth may shrink drastically. Other scientists say the region will still have summer ice up to 2060 and 2105. (Marika Holland, NCAR, Geophysical Research Letters)

## 2050

- Small alpine glaciers will very likely disappear completely, and large glaciers will shrink by 30 to 70 percent. Austrian scientist Roland Psenner of the University of Innsbruck says this is a conservative estimate, and the small alpine glaciers could be gone as soon as 2037. (IPCC)
- In Australia, there will likely be an additional 3,200 to 5,200 heat-related deaths per year. The hardest hit will be people over the age of 65. An extra 500 to 1,000 people will die of heat-related deaths in New York City per year. In the United Kingdom, the opposite will occur, and cold-related deaths will outpace heat-related ones. (IPCC)
- **World population reaches 9.4 billion people.** (U.S. Census Bureau)
- Crop yields could increase by up to 20 percent in East and Southeast Asia, while decreasing by up to 30 percent in Central and South Asia. Similar shifts in crop yields could occur on other continents. (IPCC)
- As biodiversity hotspots are more threatened, a quarter of the world's plant and vertebrate animal species could face extinction. (Jay Malcolm, University of Toronto, Conservation Biology)

## 2070

- As glaciers disappear and areas affected by drought increase, electricity production for the world's existing hydropower stations will decrease. Hardest hit will be Europe, where hydropower potential is expected to decline on average by 6 percent; around the Mediterranean, the decrease could be up to 50 percent. (IPCC)
- Warmer, drier conditions will lead to more frequent and longer droughts, as well as longer fire-seasons, increased fire risks, and more frequent heat waves, especially in Mediterranean regions. (IPCC)

## 2080

- While some parts of the world dry out, others will be inundated. Scientists predict up to 20 percent of the world's populations live in river basins likely to be affected by increased flood hazards. Up to 100 million people could experience coastal flooding each year. Most at risk are densely populated and low-lying areas that are less able to adapt to rising sea levels and areas which already face other challenges such as tropical storms. (IPCC)
- Coastal population could balloon to 5 billion people, up from 1.2 billion in 1990. (IPCC)
- Between 1.1 and 3.2 billion people will experience water shortages and up to 600 million will go hungry. (IPCC)
- Sea levels could rise around New York City by more than three feet, potentially flooding the Rockaways, Coney Island, much of southern Brooklyn and Queens, portions of Long Island City, Astoria, Flushing Meadows-Corona Park, Queens, lower Manhattan and eastern Staten Island from Great Kills Harbor north to the Verrazano-Narrows Bridge. (NASA GISS)

## 2085

The risk of dengue fever from climate change is estimated to increase to 3.5 billion people. (IPCC)

## 2100

- A combination of global warming and other factors will push many ecosystems to the limit, forcing them to exceed their natural ability to adapt to climate change. (IPCC)
- Atmospheric carbon dioxide levels will be much higher than anytime during the past 650,000 years. (IPCC)
- Ocean pH levels will very likely decrease by as much as 0.5 pH units, the lowest it's been in the last 20 million years. The ability of marine organisms such as corals, crabs and oysters to form shells or exoskeletons could be impaired. (IPCC)
- Thawing permafrost and other factors will make Earth's land a net source of carbon emissions, meaning it will emit more carbon dioxide into the atmosphere than it absorbs. (IPCC)
- Roughly 20 to 30 percent of species assessed as of 2007 could be extinct by 2100 if global mean temperatures exceed 2 to 3 degrees of pre-industrial levels. (IPCC)
- New climate zones appear on up to 39 percent of the world's land surface, radically transforming the planet. (Jack Williams, University of Wisconsin-Madison, Proceedings of the National Academy of Sciences)
- A quarter of all species of plants and land animals—more than a million total—could be driven to extinction. The IPCC reports warn that current “conservation practices are generally ill-prepared for climate change and effective adaptation responses are likely to be costly to implement.” (IPCC)
- Increased droughts could significantly reduce moisture levels in the American Southwest, northern Mexico and possibly parts of Europe, Africa and the Middle East, effectively recreating the “Dust Bowl” environments of the 1930s in the United States. (Richard Seager, Lamont Doherty Earth Observatory, Science)

## 2200

An Earth day will be 0.12 milliseconds shorter, as rising temperatures cause oceans to expand away from the equator and toward the poles, one model predicts. One reason water will be shifted toward the poles is most of the expansion will take place in the North Atlantic Ocean, near the North Pole. The poles are closer to the Earth's axis of rotation, so having more mass there should speed up the planet's rotation. (Felix Landerer, Max Planck Institute for Meteorology, Geophysical Research Letters)