

# Four Futures

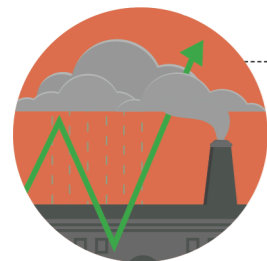
STORY BY  
Mara Grunbaum

How the choices we make today will change the world

**H**ow many people could live on Earth? Many scientists have tried to calculate that number, with widely divergent results. Seventeenth-century biologist Antonie van Leeuwenhoek put the upper limit at 13.4 billion; in 1967, biochemist C.T. De Wit said one trillion. Population modelers now say there is no single answer. The population that Earth can ultimately carry, and the quality of life that those people will have, depends on political and environmental choices. The Tellus Institute, a nonprofit sustainability-research organization in Boston, has made some of the most sophisticated predictions yet of how those decisions will play

out. PoleStar, the computer simulation that Tellus developed, starts with projections of population and economic growth from United Nations and World Bank data and then analyzes the effect of different trajectories on hundreds of parameters, including energy consumption, land use and pollution. The simulation's outcomes show that how we shape policy now will determine whether the next century's population lives in a pleasant world or one of degradation and scarcity. It's not too late to choose one of the brighter paths, says Richard Rosen, the executive vice president of Tellus, "but you'd have to get going immediately. There's no leisurely way."

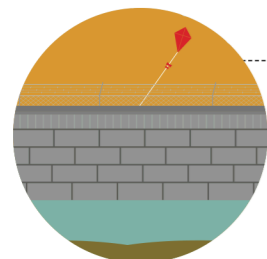
## Possible Scenarios



**Market Forces**  
Business as usual—the economy grows, technology advances. Poorer regions build up industries, and environmental problems become more serious.



**Policy Reform**  
Governments take rapid action to meet U.N. climate targets and other sustainability goals, but economic growth remains the strongest factor in developing new policies.



**Fortress World**  
Environmental, economic and social problems overwhelm current systems, and governments become authoritarian. The wealthy retreat to protected enclaves, leaving poor masses in a degraded wasteland.



**Great Transition**  
Society's values change radically to prioritize environmental preservation, social equality and cooperation.

## Population (in billions)

Policies that make family planning available to all social strata will help control population growth. Without such measures, the global population could top 10 billion.

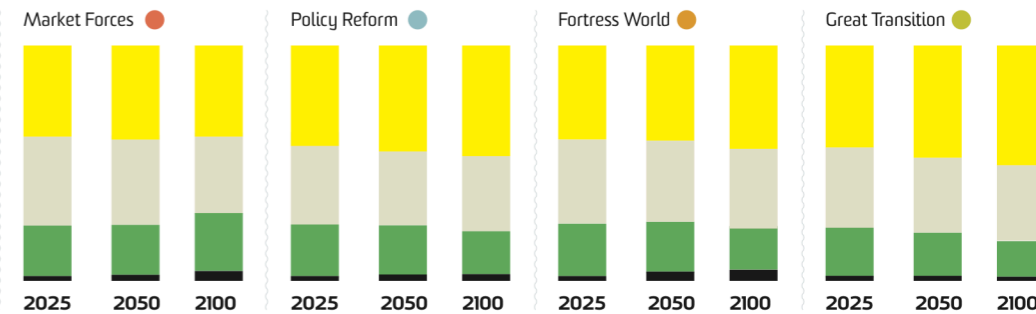
In 2011, the global population reached **7 BILLION.**

	2025	2050	2100
<b>Market Forces</b>	7.9	9.1	9.3
<b>Policy Reform</b>	7.8	8.7	8.4
<b>Fortress World</b>	8.1	9.5	10.2
<b>Great Transition</b>	7.6	8.1	7.3

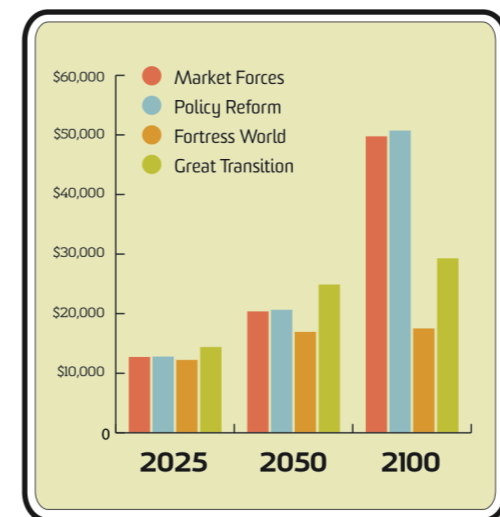
## Land Use

2005

- Forest 30%
- Grazing 26%
- Cropland 12%
- Built-up 2%



## Purchasing Power (per capita)

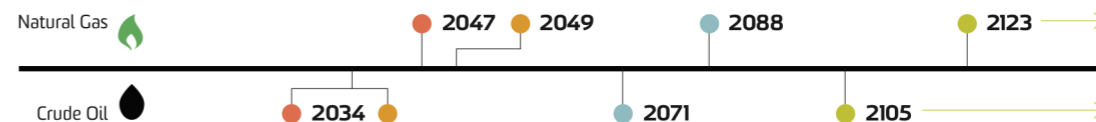


## Income Disparity

In 2005, the poorest 20 percent of society made 12 cents for every dollar the richest 20 percent made. How will policy decisions affect wages?

	2025	2050	2100
<b>Market Forces</b>	9¢	7¢	5¢
<b>Policy Reform</b>	12¢	12¢	11¢
<b>Fortress World</b>	8¢	4¢	2¢
<b>Great Transition</b>	14¢	21¢	36¢

## Year When Natural Resources Will Run Out



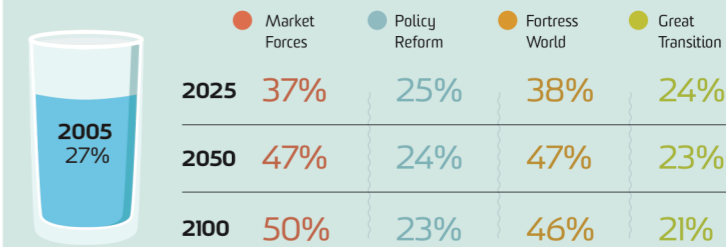
**282 billion**

The maximum number of people that could ultimately be packed onto the planet, with all other land used solely to grow food, according to geophysicists at the Potsdam Institute for Climate Impact Research in Germany.



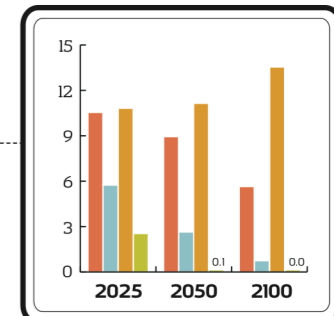
## Water Shortage

Up to 50 percent of the population will struggle with "water stress" by 2100.



## Hunger Incidence

In 2005, 14 percent of the population went hungry. Depending on how resources are allocated, this number could shrink to zero by 2100.



## Environmental Impact

