

2473-49

Joint ICTP-IAEA School on Nuclear Energy Management

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Nuclear Sociology

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**“Or do we know what we know about
nuclear issues and the world we are living
in?”**



NUCLEAR SOCIOLOGY

YANKO YANEV

The Universe was created 12 -15 billion years ago.

Life on Earth began nearly 4 billion years ago.

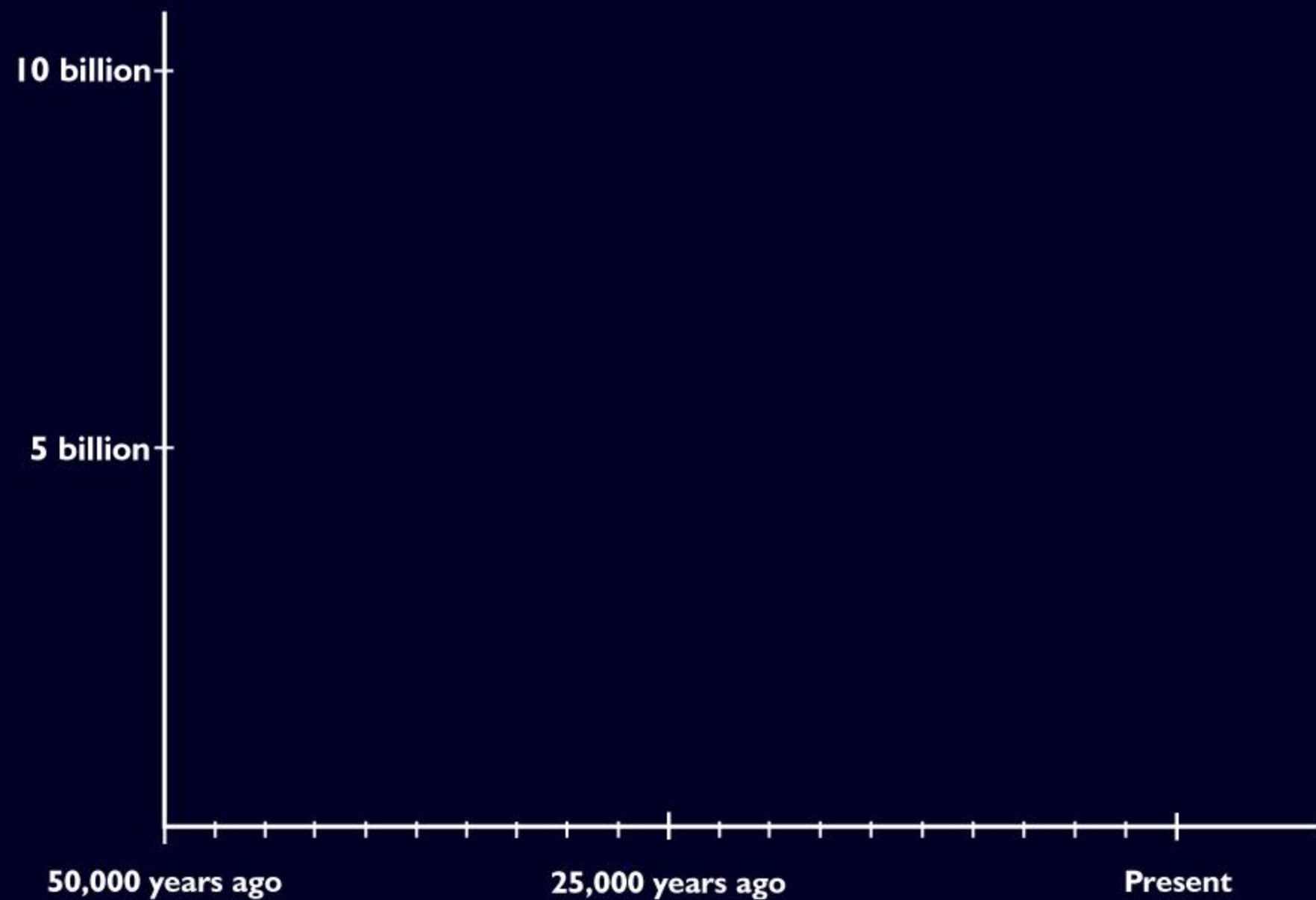
Hominids appeared 7 million years ago.

Homo erectus mastered fire 400,000 years ago.

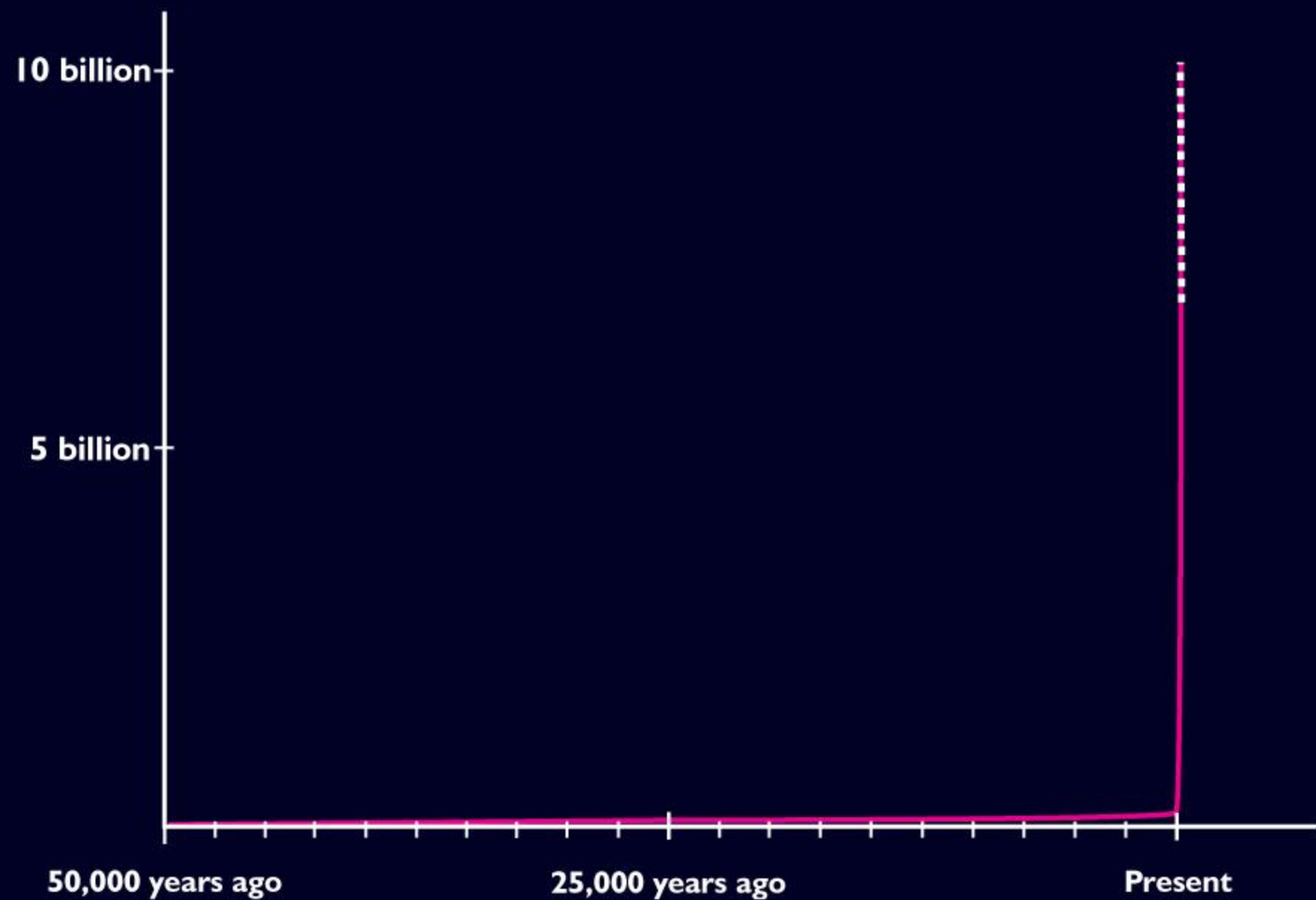
Homo sapiens developed 50,000-100,000 years ago.

All told, some 60-100 billion people have lived on Earth.

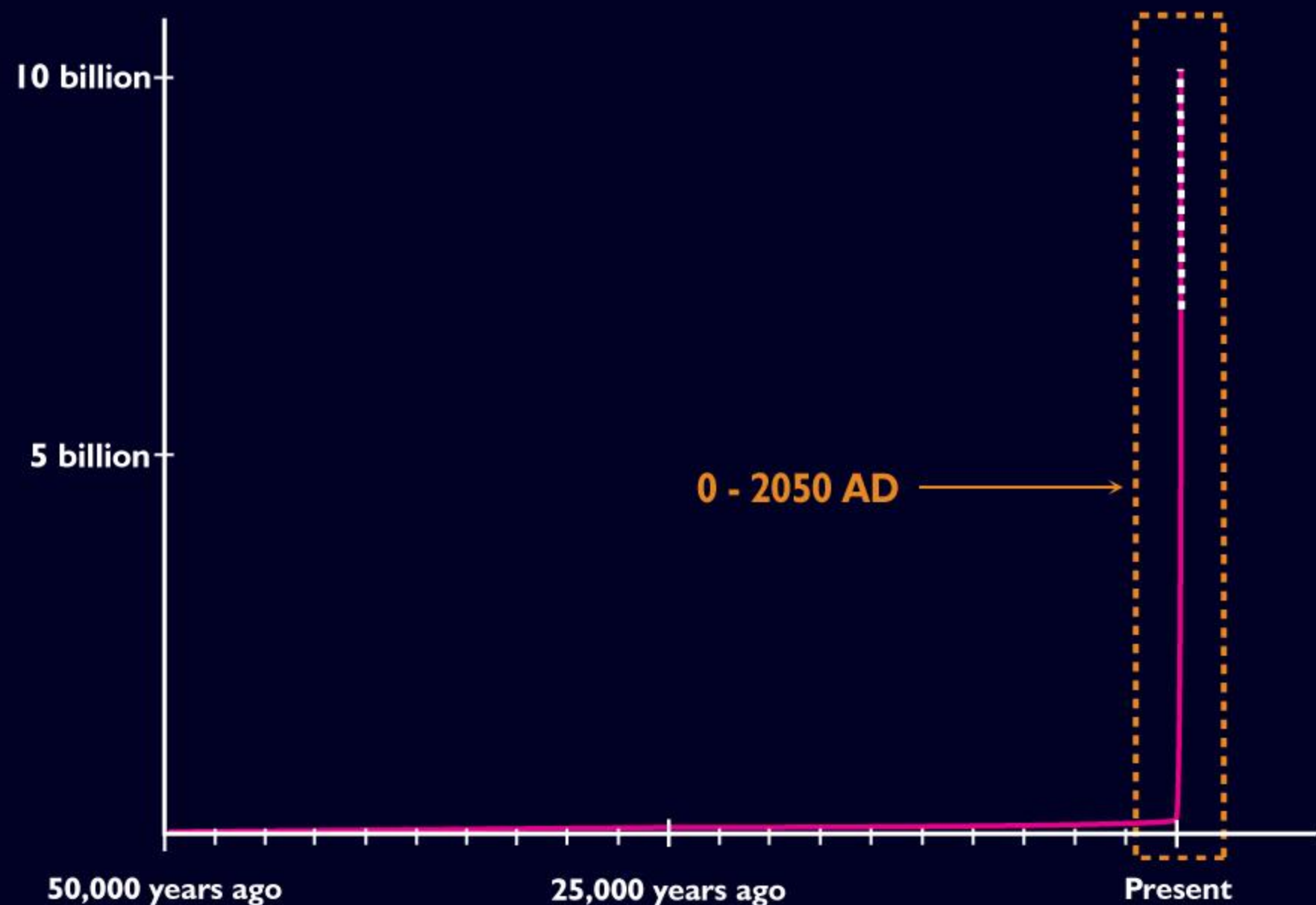




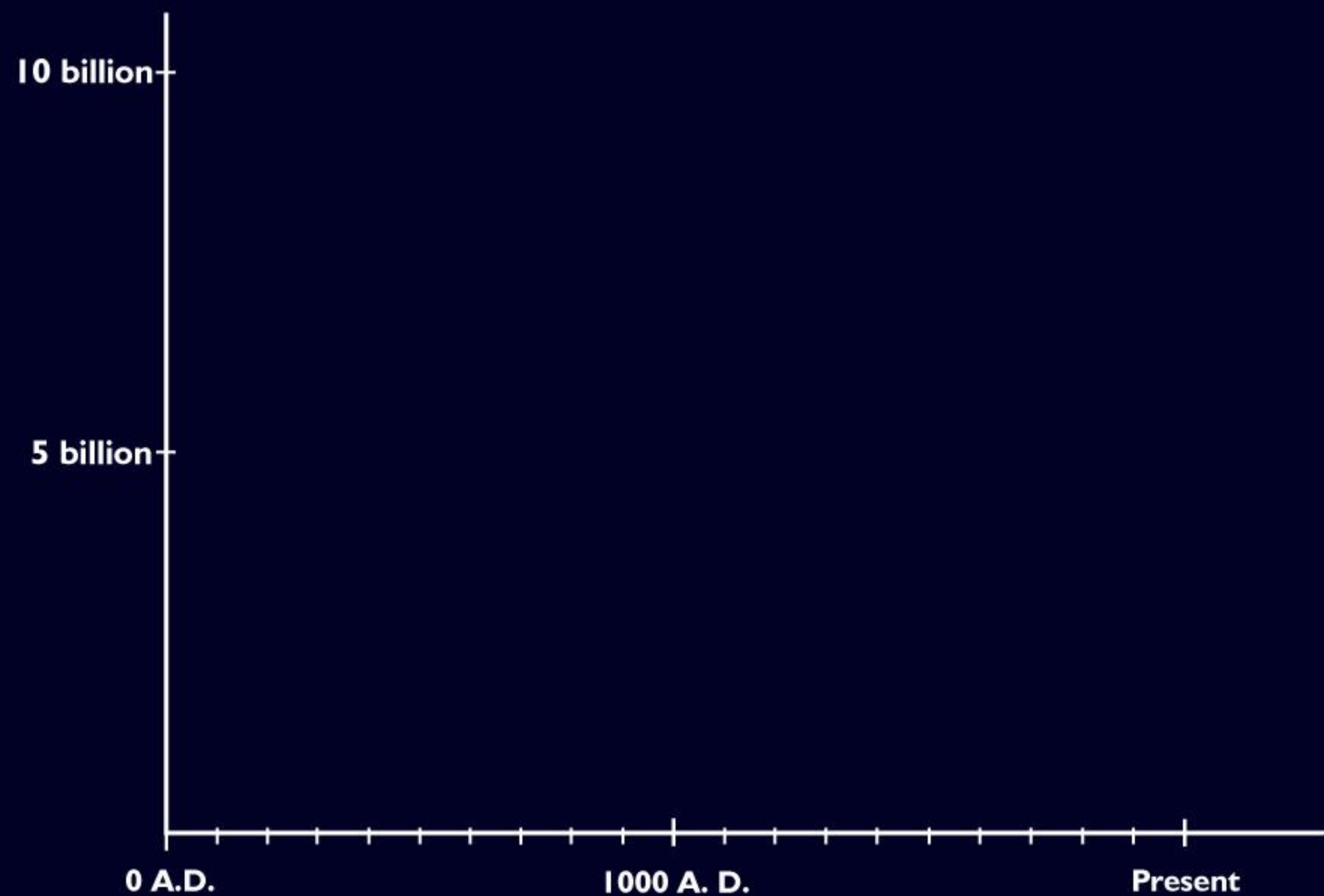
Global Population through 50 Millennia



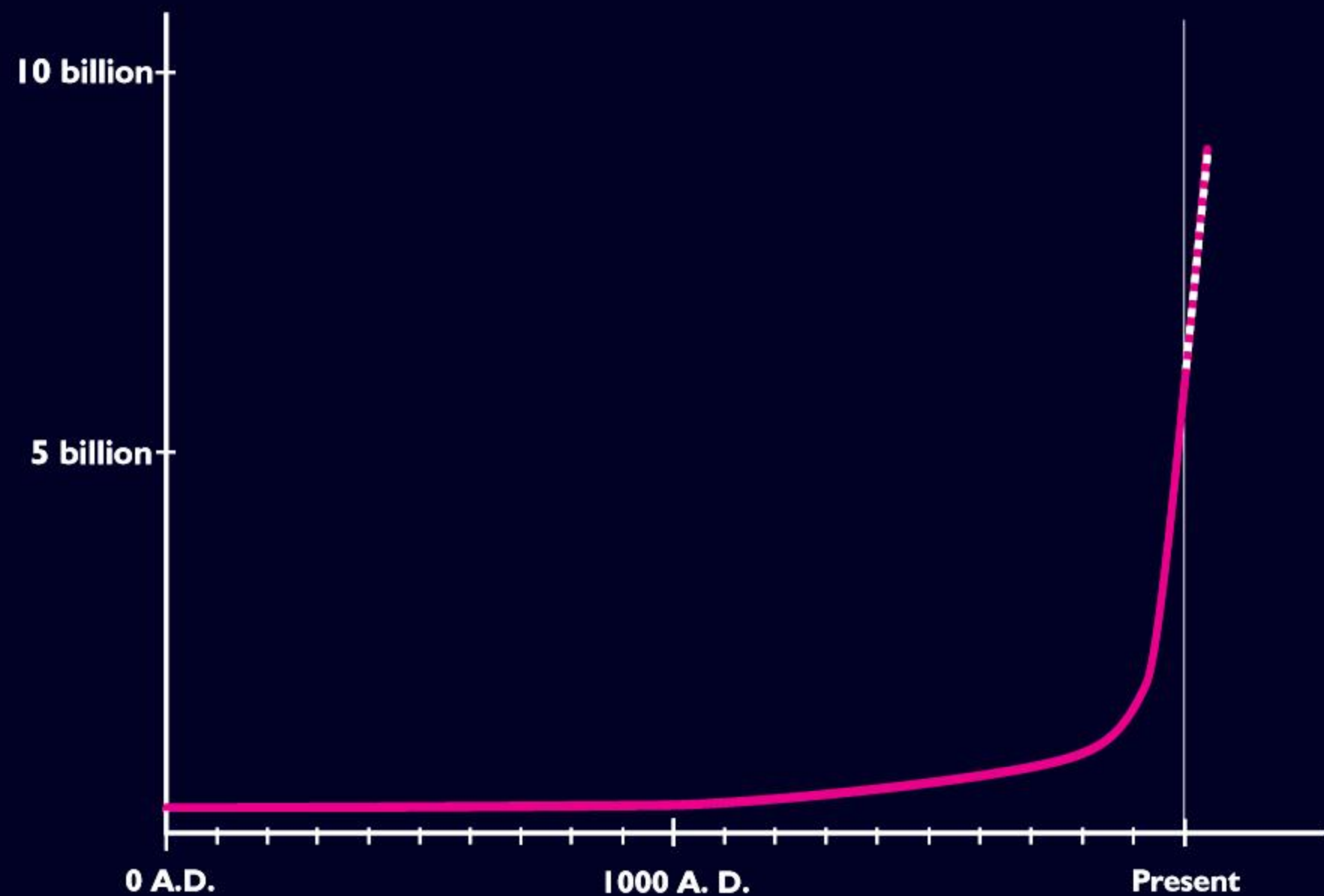
Global Population through 50 Millennia



Global Population through 50 Millennia



Global Population in the Last Two Millennia



Global Population in the Last Two Millennia

10 billion

5 billion

1800

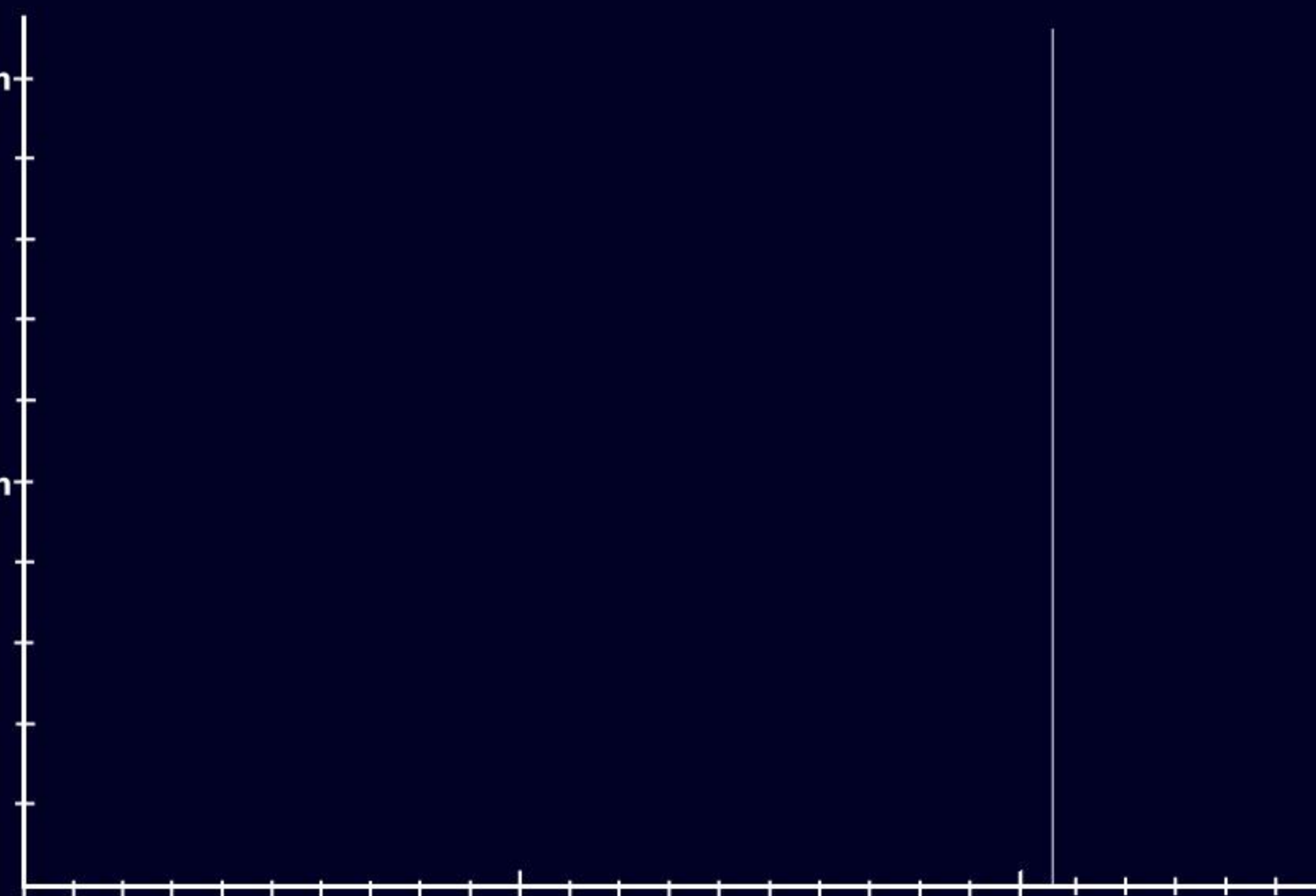
1900

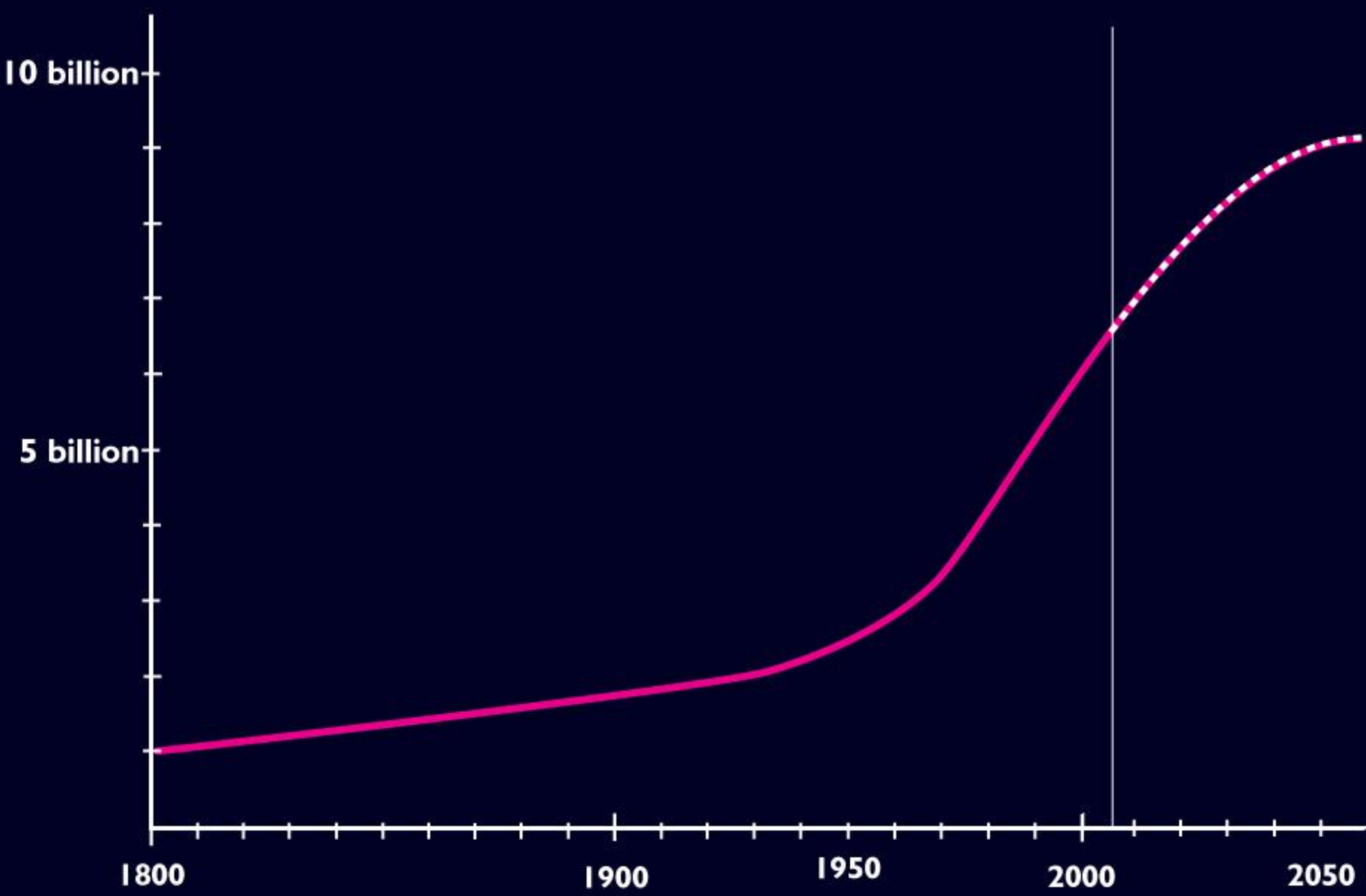
1950

2000

2050

Global Population in the Industrial Age





Global Population in the Industrial Age

2,000 years ago



10 million

1,000 years ago



300 million

1800



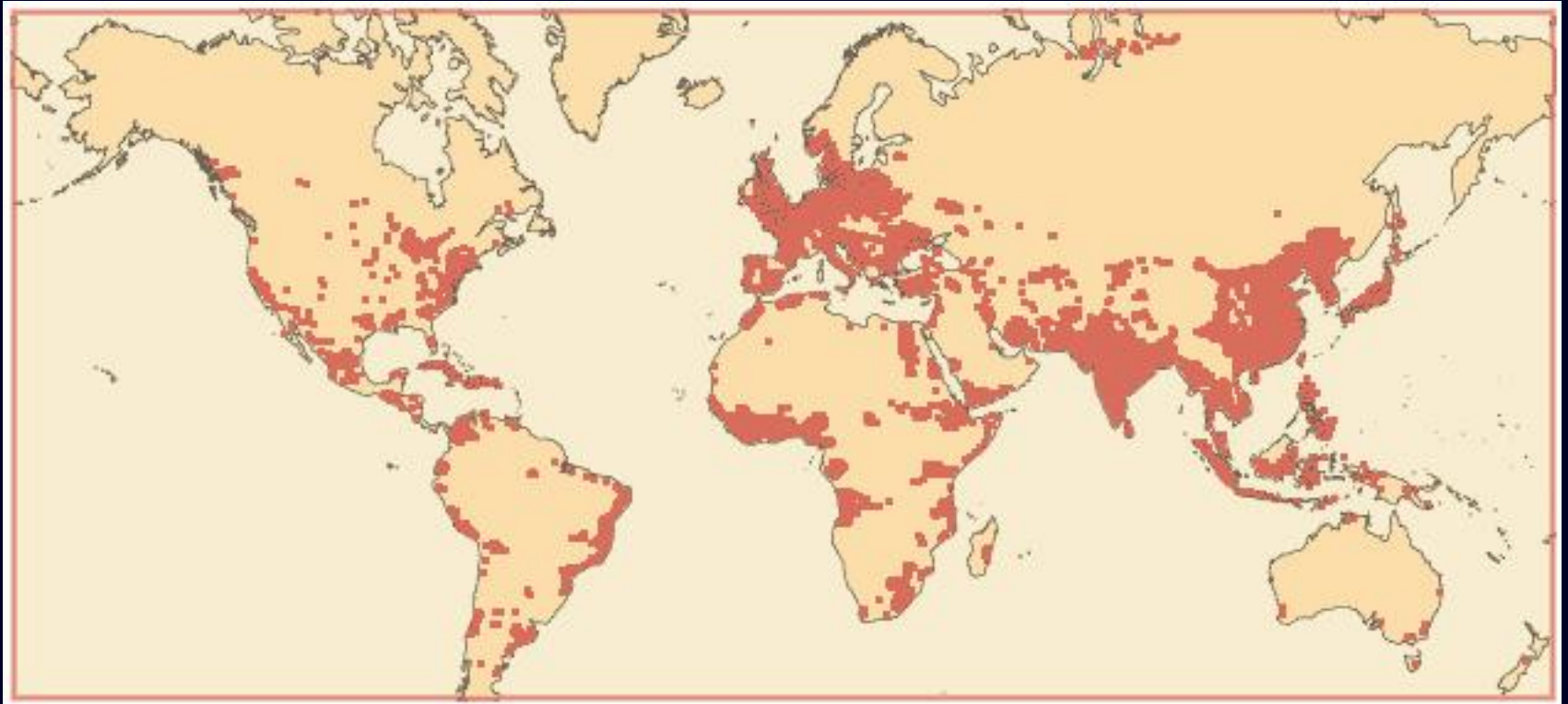
1 billion

1927



2 billion

1960



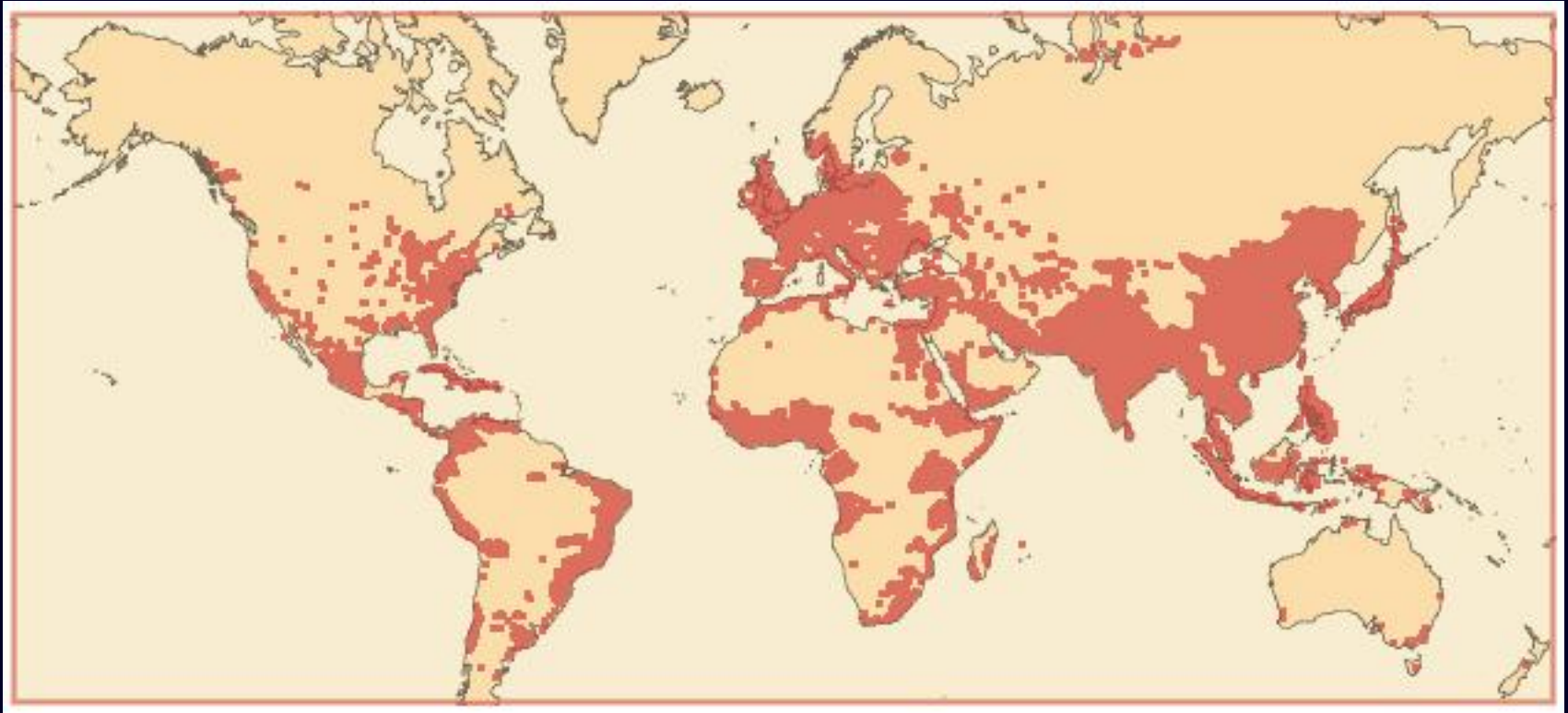
3 billion

1974



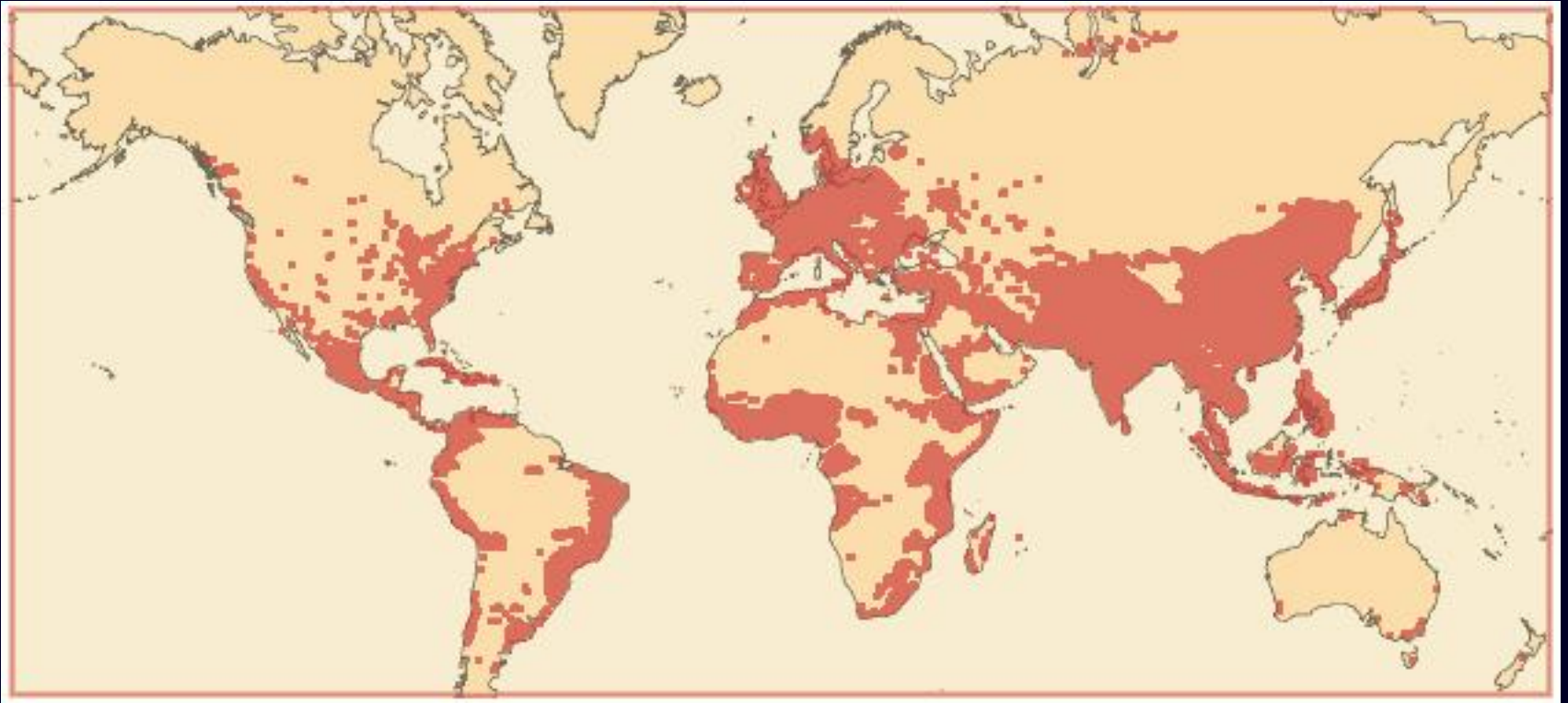
4 billion

1987



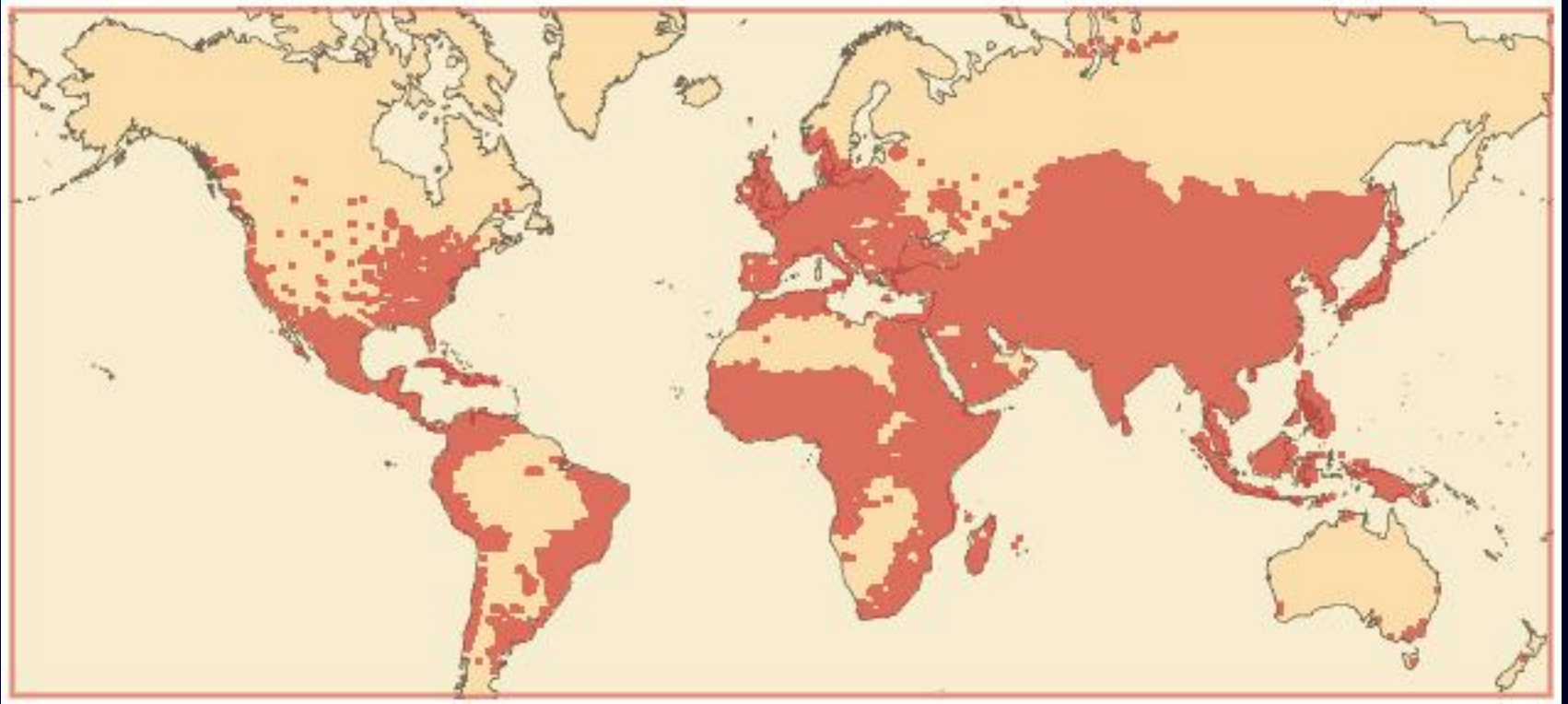
5 billion

1999



6 billion

2050

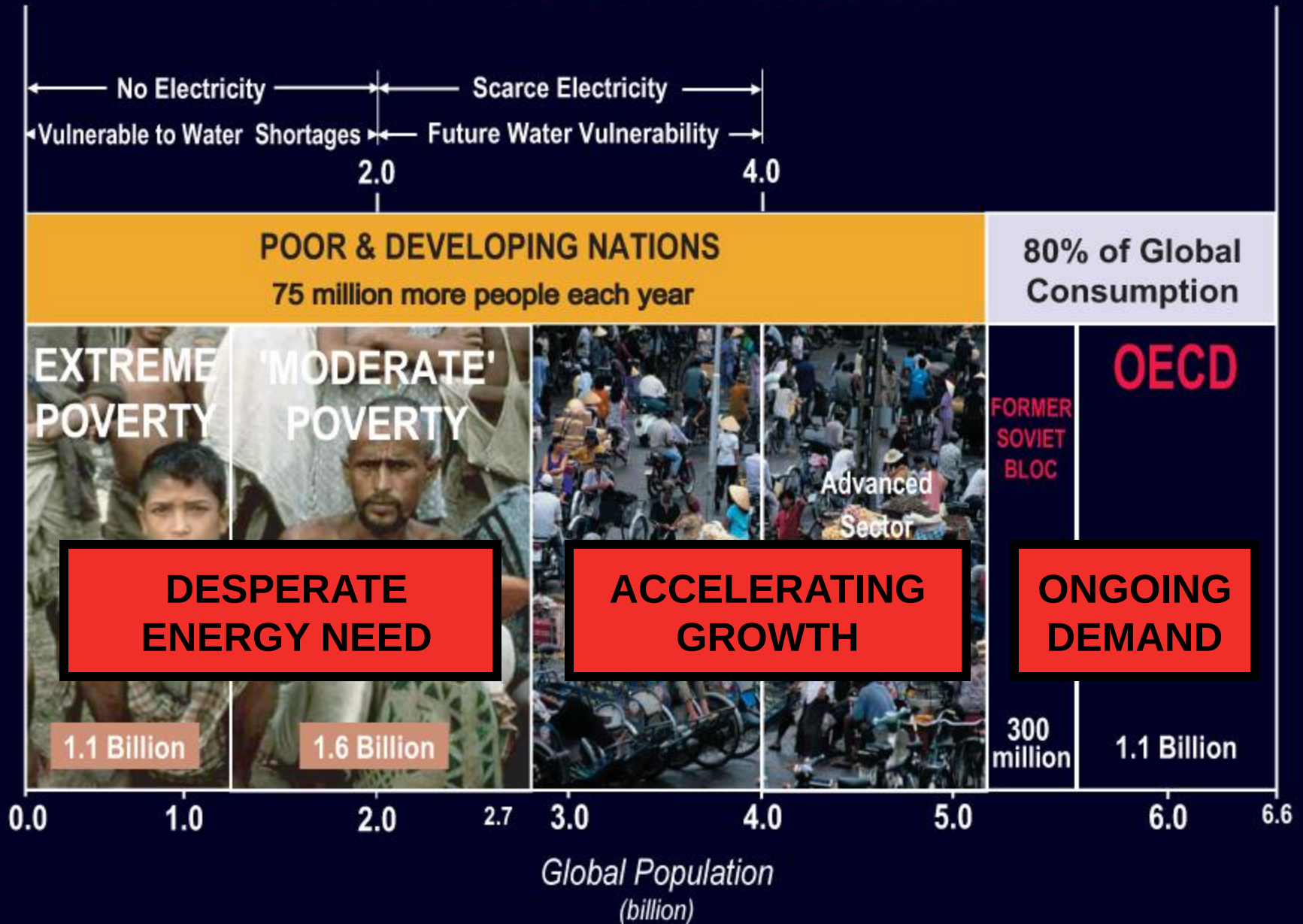


9 billion



**“WE OFTEN THINK OF 'PROGRESS'
AND 'ECONOMIC GROWTH' AS
NATURAL DEVELOPMENTS THAT
BENEFIT ALL MEMBERS OF
SOCIETY”**

A World of Extremes





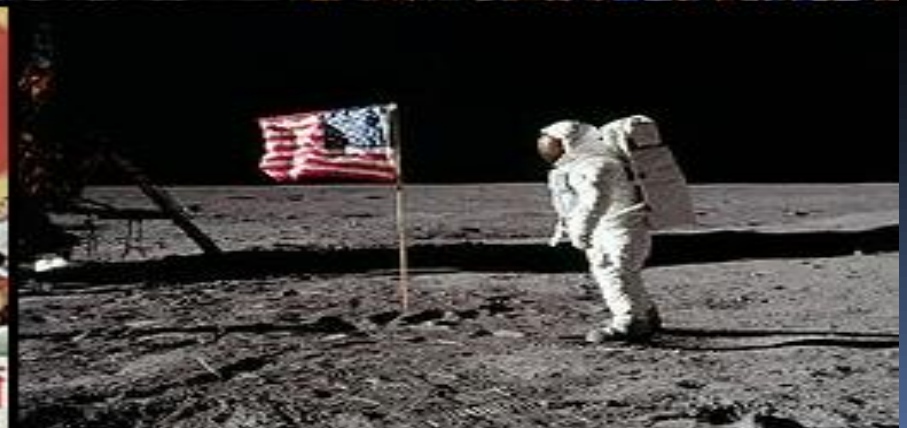
G E N E R A T I O N S



AND ATTITUDES

The postwar generation

“Baby boomers” and after?



Can you guess what is this?



- The picture was taken in 1956...

It is a 5 MB Hard Disk Drive for the IBM 305 RAMAC, the first IBM 'SUPER' computer released in September 1956.
- This HDD weighed over a ton and stored an 'astonishing' (@ the time) 5 MB of data.
Do you appreciate being able to reach into your pocket & pull out your 8 GB memory stick now - or perhaps even your 4GS iPhone with 64 GB of memory?!?
- Something to think about, eh?

Did you know?



- Radio needed 38 years to reach 50 million users



- TV – 13 years



- Internet – 4 years

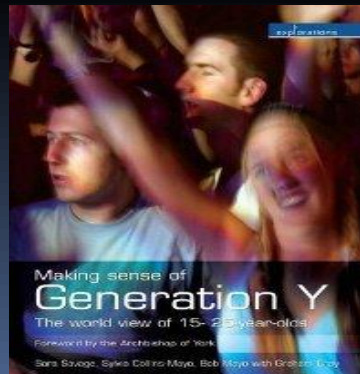
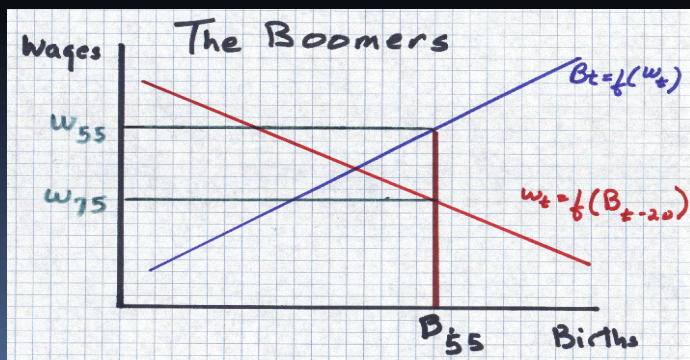
- Facebook added 100 million users in less than 9 months



Find us on
Facebook

The new generation (Millennials or GenY)

- In 2010 Gen Y outnumbered baby boomers – currently 2 billions
- Optimistic, tech-savvy, multicultural and collaborative
- What do they know about Nuclear issues and from where?
- How accurate, complete and reliable is the Information they get from portals, forums, blogs, social media?
- What to do?

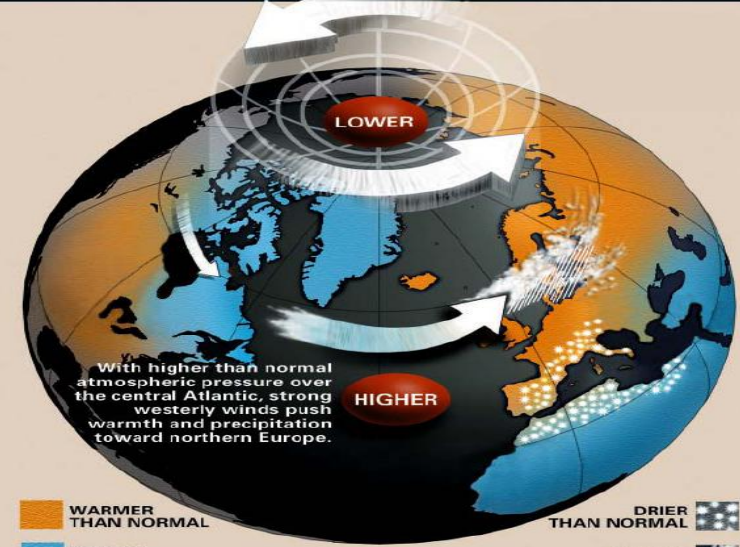


The ongoing energy debate.

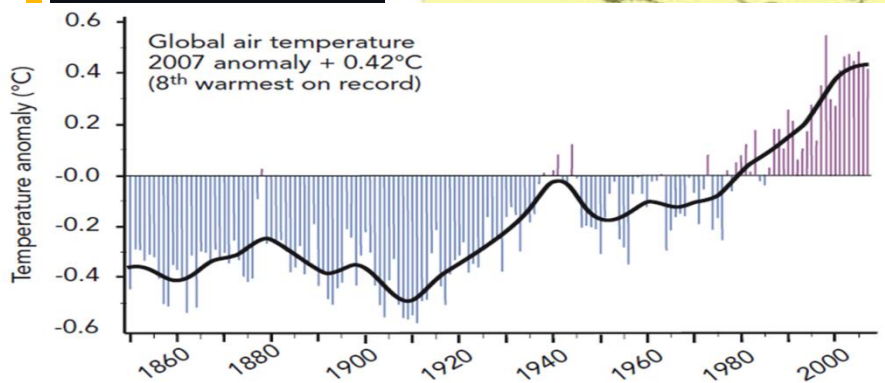
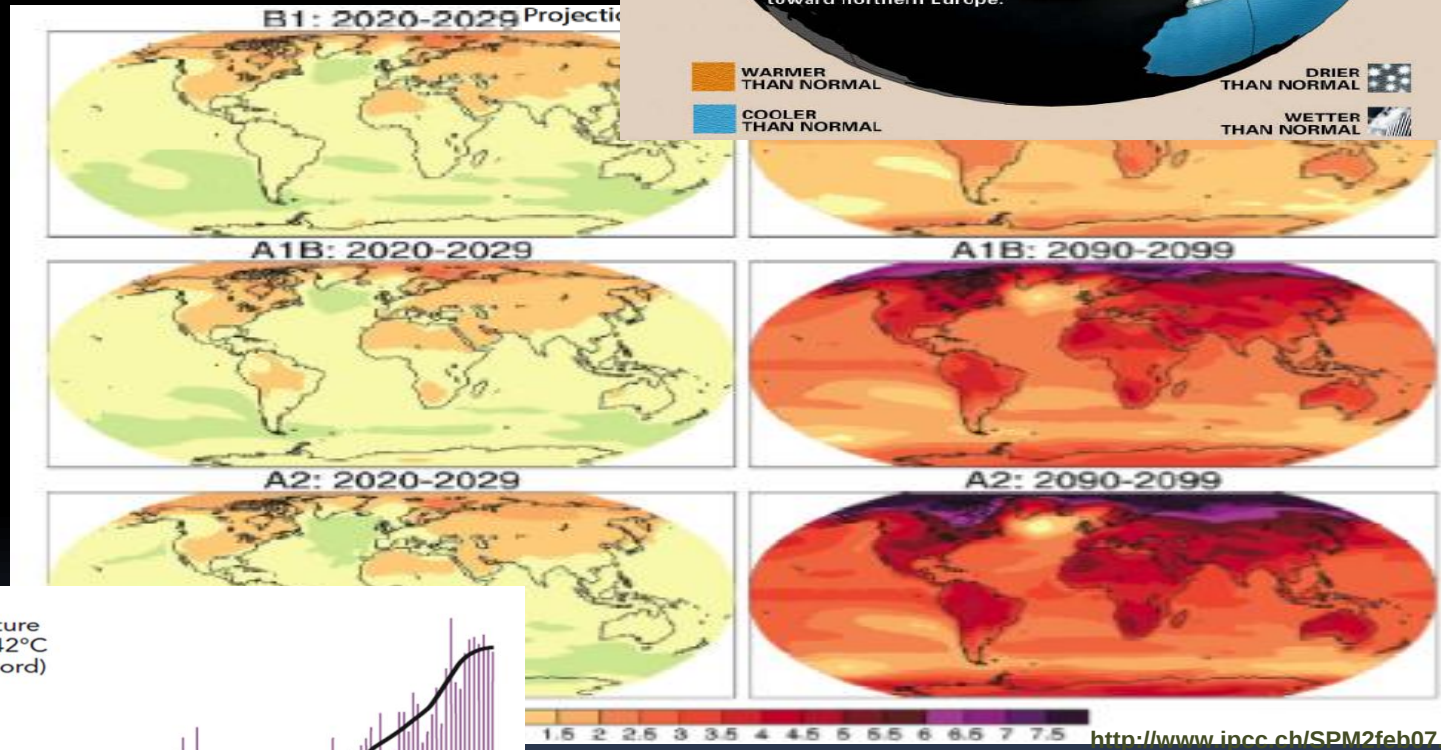
The discussion about energy supply is not consistent. What are the facts and the arguments:

- Every source of energy is accompanied by certain risks and the nuclear risks are not the greatest.
- Climate disruption, and environmental pollution present tremendous risk to society which we refuse to accept just because they are not quantified.
- For nuclear everything is well known and assessed.
- Nuclear causes pessimistic discussion while all the rest and especially renewables are discussed optimistically.

Climate crisis



■ WARMER THAN NORMAL
■ COOLER THAN NORMAL
■ DRIER THAN NORMAL
■ WETTER THAN NORMAL

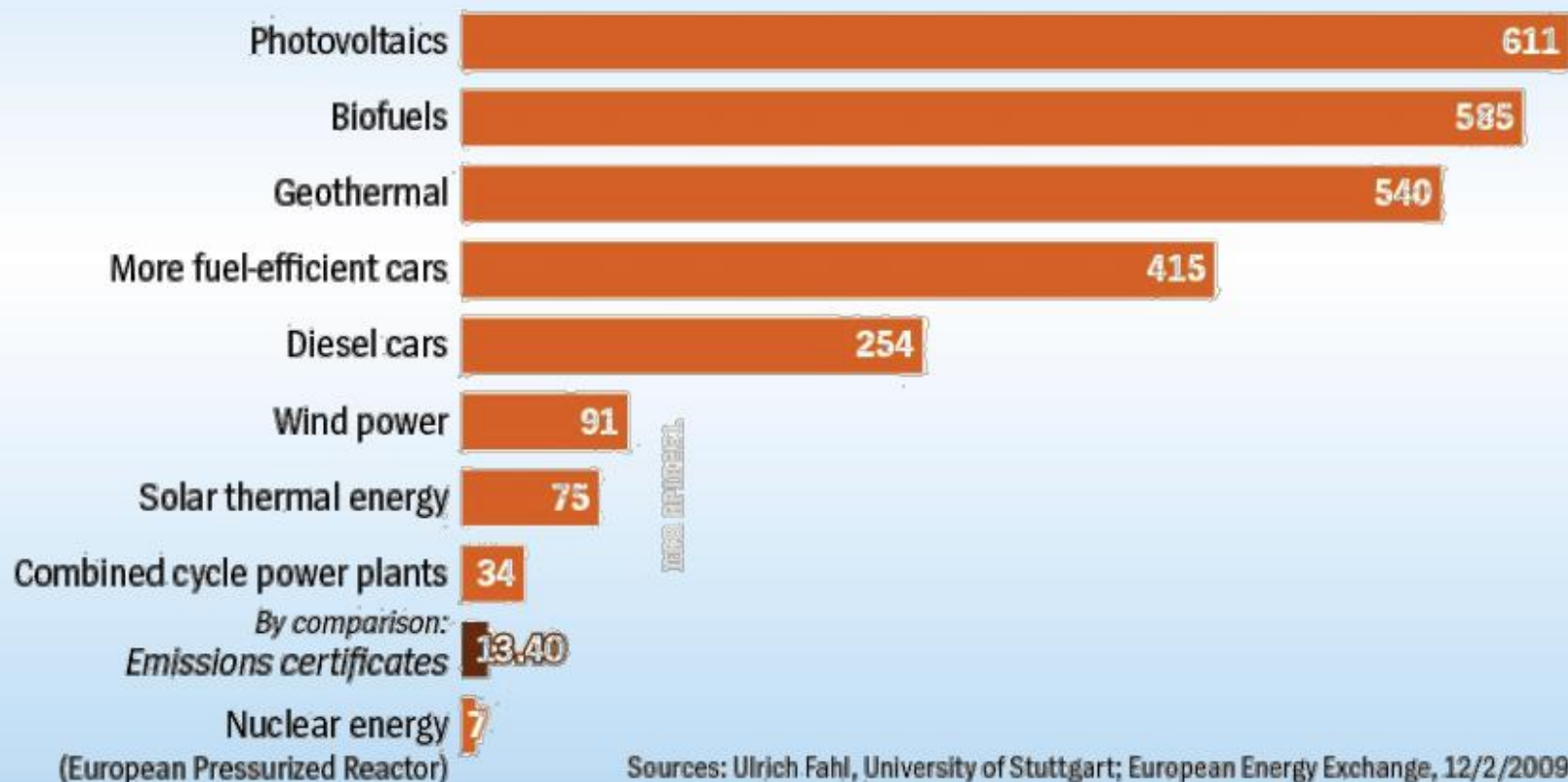


Source: Jones (2008).

<http://www.ipcc.ch/SPM2feb07.pdf>

The Cost of Cleaner Energy

The maximum costs of diverse measures to prevent one ton of CO₂ emissions, in euros



Sources: Ulrich Fahl, University of Stuttgart; European Energy Exchange, 12/2/2009



Lessons Learned from the past

- It is simply that the countries with later industrialization have learned from the countries with earlier industrialization that energy is an important constituent of everyday life and that it has to be used efficiently.





Lessons Learned from the past

- We should also keep in mind that coal was the fundamental energy source for the world industrial development and will continue to be important in the future as well.





Lessons Learned from the past

SMART ENERGY USE???

- The energy intensity follows a trend of rationalization long before the “greens” and other modern energy consultants came into existence.
- 



**SHOULD NUCLEAR POWER
PARTICIPATE IN A SOLUTION
TO THE ENERGY AND
ENVIRONMENTAL CRISIS?**

After 55 years Nuclear Power Electricity is currently being used by
more than 4 billion people world-wide!





Science says “yes”.

Society has no uniform opinion.



Can we solve a global problem without global approach?



HOW SOCIETY DEVELOPS AN ATTITUDE TOWARDS NUCLEAR ISSUES?



Why the word “nuclear”
produces fear and sponsors
negativism?



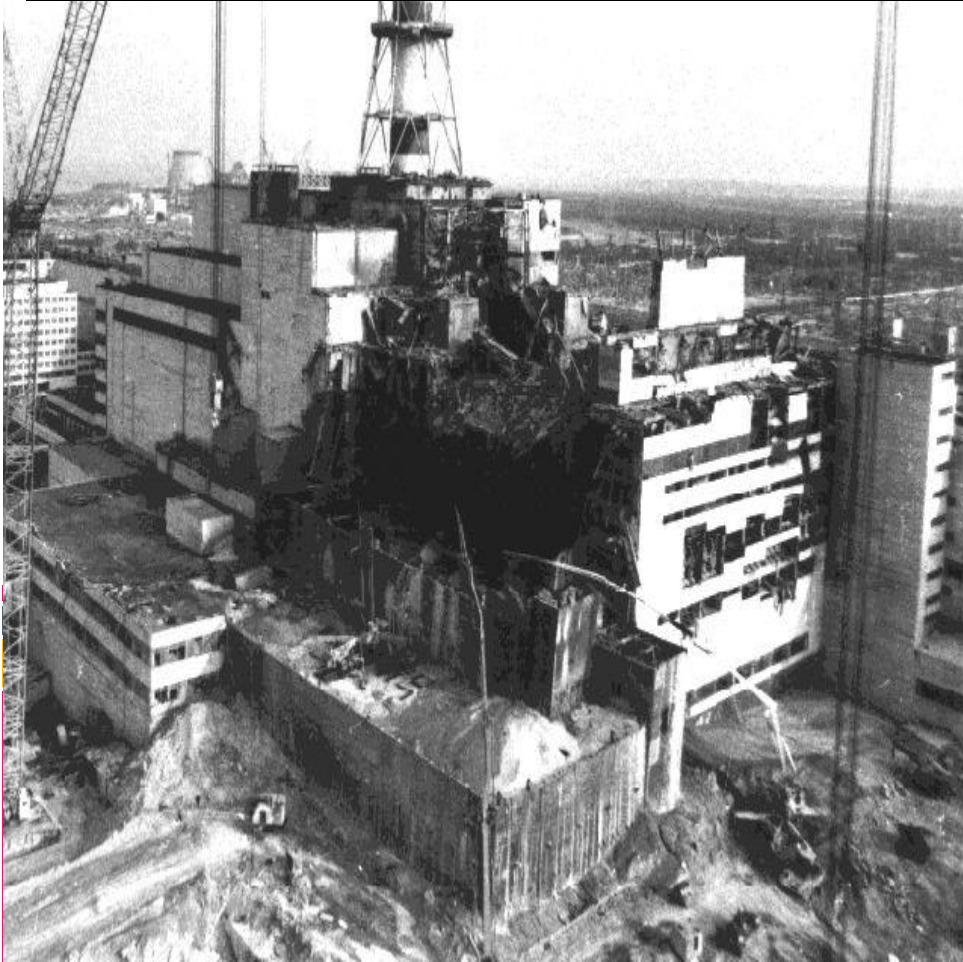
IS IT THE BOMB?

Several sociologists in the late 1940s and early 1950s forecast that atomic energy would produce economic abundance. Vincent Whitney's cautions were an exception to these naive projections. But no sociologist foresaw how the technical and social processes of nuclear power development would compromise its public acceptance and give rise to an antinuclear movement, currently led by environmentalists. Their struggle with the atomic establishment for the mind of the public is registered in recent survey results, analysis of which responds in some measure to Blumer's challenge to polling. Despite a lapse of about two decades in their interest in problems of energy and society, sociologists now have an opportunity to supply the growing demand for social science inputs to the nuclear energy decision-making process.

1000000



Millions of people dead from Chernobyl accident?



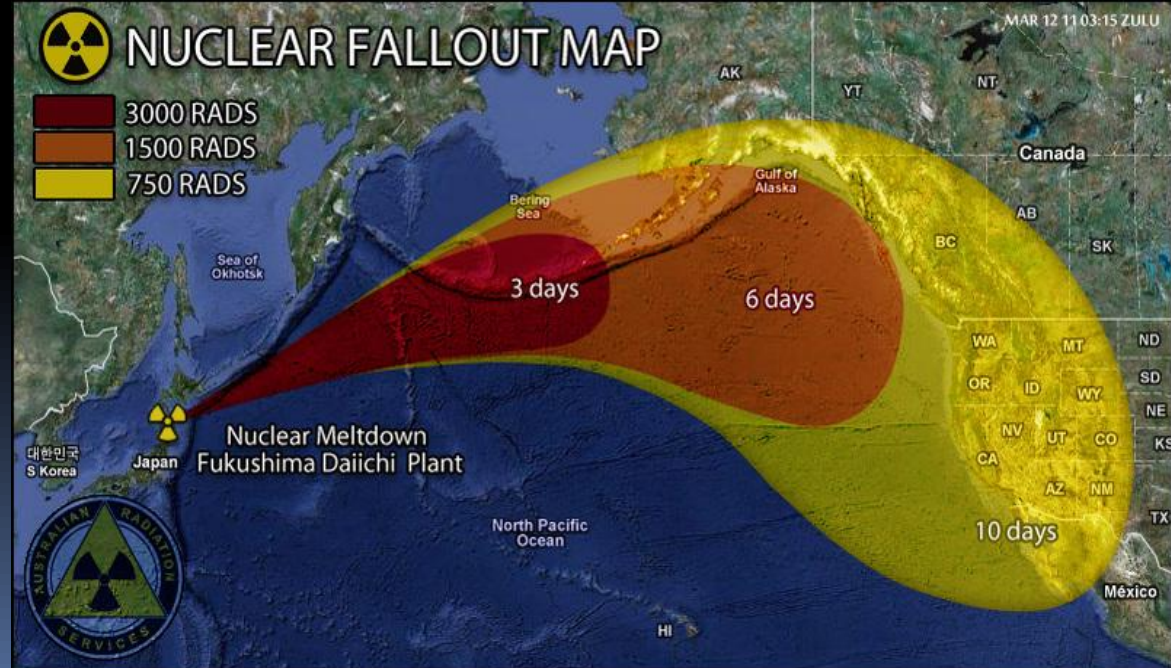
- Official human life losses :
- 30 Liquidators,
- 16 deaths from thyroid cancer
- 4500 according the "collective dose" hypothesis???
- With uncertainties may be up to 10 000??

FUKUSHIMA



More than 20 000 dead
or missing from
TSUNAMI.

NOBODY dead from
radiation!





The Role for Nuclear Power

- Nuclear power is an advanced and highly technological source of energy based on all the scientific achievements of human civilization.
 - Nuclear power is the most scalable cost competitive source of non carbon electricity.
 - Nuclear power alone will not solve all the problems but we will not make serious progress without nuclear power.
- 

Nuclear Energy Basic Principles

(How society may understand it?)

Beneficial use

- Benefits
- Transparency

Responsible use

- Protection of the people and environment
- Security
- Non-proliferation
- Long term commitment

Sustainable use

- Resource efficiency
- Continuous improvement



Peaceful Use of Nuclear Energy

“Six strategic elements for success”

- Energy, Economics and Environmental analysis,
 - Public outreach and confidence building
 - Political commitment to peaceful use of nuclear technology,
 - Resource mobilization,
 - Competence building
 - Program development and Implementation
- 



Sociology

- Sociology is the scientific study of human social behavior.
 - As it studies humans in their collective aspect, sociology is concerned with all group activities: economic, social, political, and religious.
- 



Sociology cont.

- Sociologists study such areas as bureaucracy, community, deviant behavior, family, public opinion, social change, social mobility, social stratification, and such specific problems as crime, divorce, child abuse, substance addiction etc.
 - Sociology tries to determine the laws governing human behavior in social contexts.
- 



Nuclear Sociology

- Addresses the most important social problem in the nuclear energy utilization in the world.
 - Identify the social and systemic problems concerning nuclear energy utilization and work towards solutions.
- 



Nuclear sociology elements

- **The ethics** of using nuclear energy.
 - The **harmony** of nuclear technology with society.
 - **The coexistence** of nuclear nonproliferation and the peaceful use of nuclear energy.
 - **The social perception of the legal environment** for using nuclear technology.
- 

Energy and Ethics

- **Saving of resources seems to general public beneficial** but Pu is not recognized as resource but rather as evil and obviously this is connected with the nuclear weapons.
- **Nuclear weapons are prepared from water as well** (respectively tritium - the heavy isotope of hydrogen) but nobody considers water as evil.



Questions of ethics and tolerability.

Society is ready to tolerate high risks which it understands **(OR BELIEVES TO UNDERSTAND!)**



and is not prepared to tolerate low risks because it does not understand them.

Thinking about the Future?

- If we are thinking about the future as **traders** (i.e. our horizon is 5- 10 years) it will be difficult to consider nuclear energy as viable energy source. It requires serious POLITICAL COMMITMENT, INVESTMENT and the FINANCIAL RISK may be substantial.



Thinking about the Future

- If we are looking about the future as **investors** than we have to take a serious decision about nuclear energy, because it is a real source, one that does not destroys the climate of the planet and carries less risk than e of a of the other energy technologies.
- The long life of a NPP makes it as attractive and as secure as a **governmental bond**.



Thinking about the Future

- Finally if are looking ahead as **philosophers** we should ask the question, how long is the human race going to exist?
 - How much of us are going to survive through the millennia and which will be the energy source that they are going to use.
- 



Thinking about the Future

- Obviously, in the distant future , if the human race is still existing, they will not use the resources that we consider now. In this context Nuclear energy appears to be without any competition untill we find the way to use other energy from space but keep in mind that nuclear energy powers the sun, the stars and the universe.
- 



Thank you very much for paying attention .



THE END