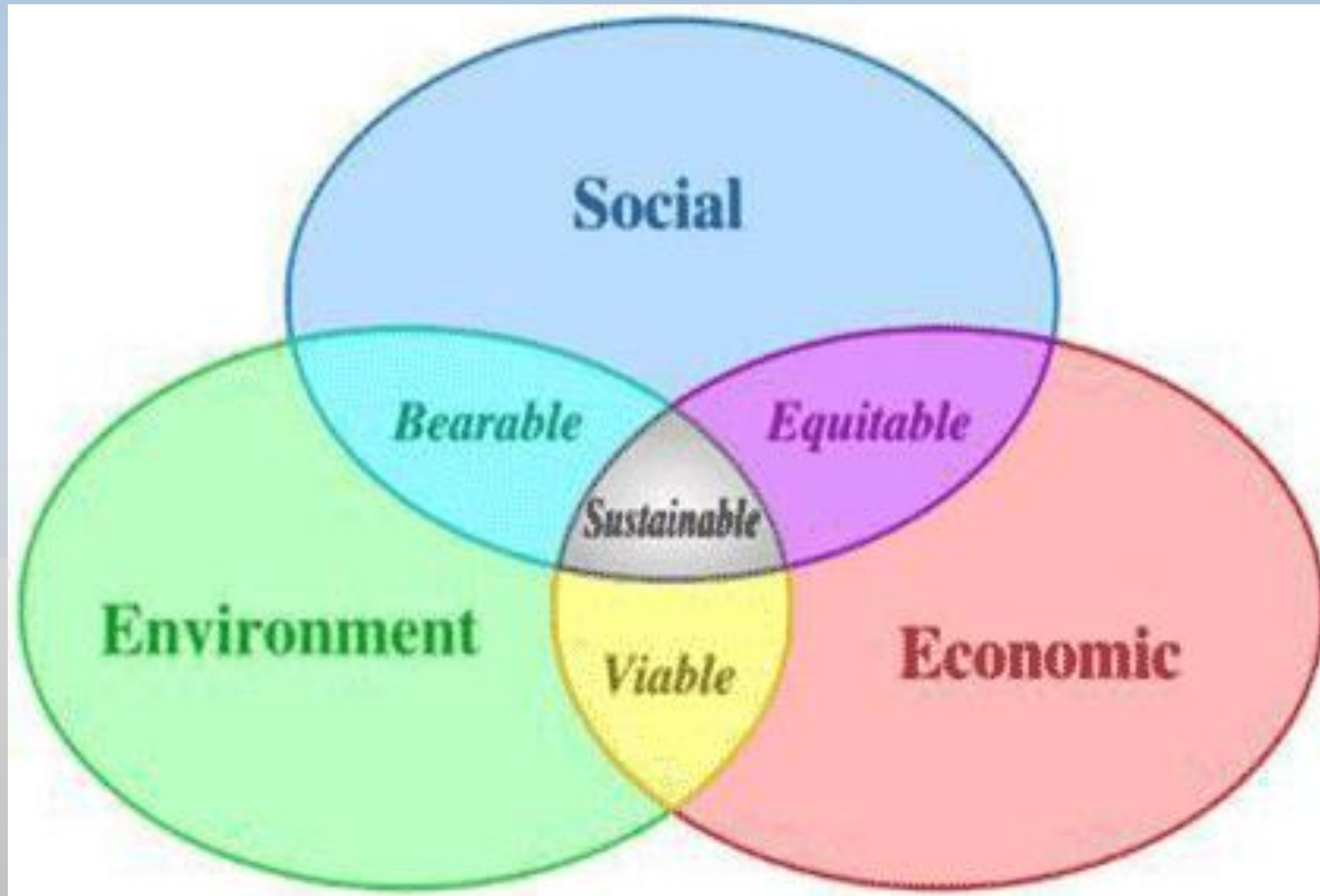




Do we need sustainable development?



Presentation

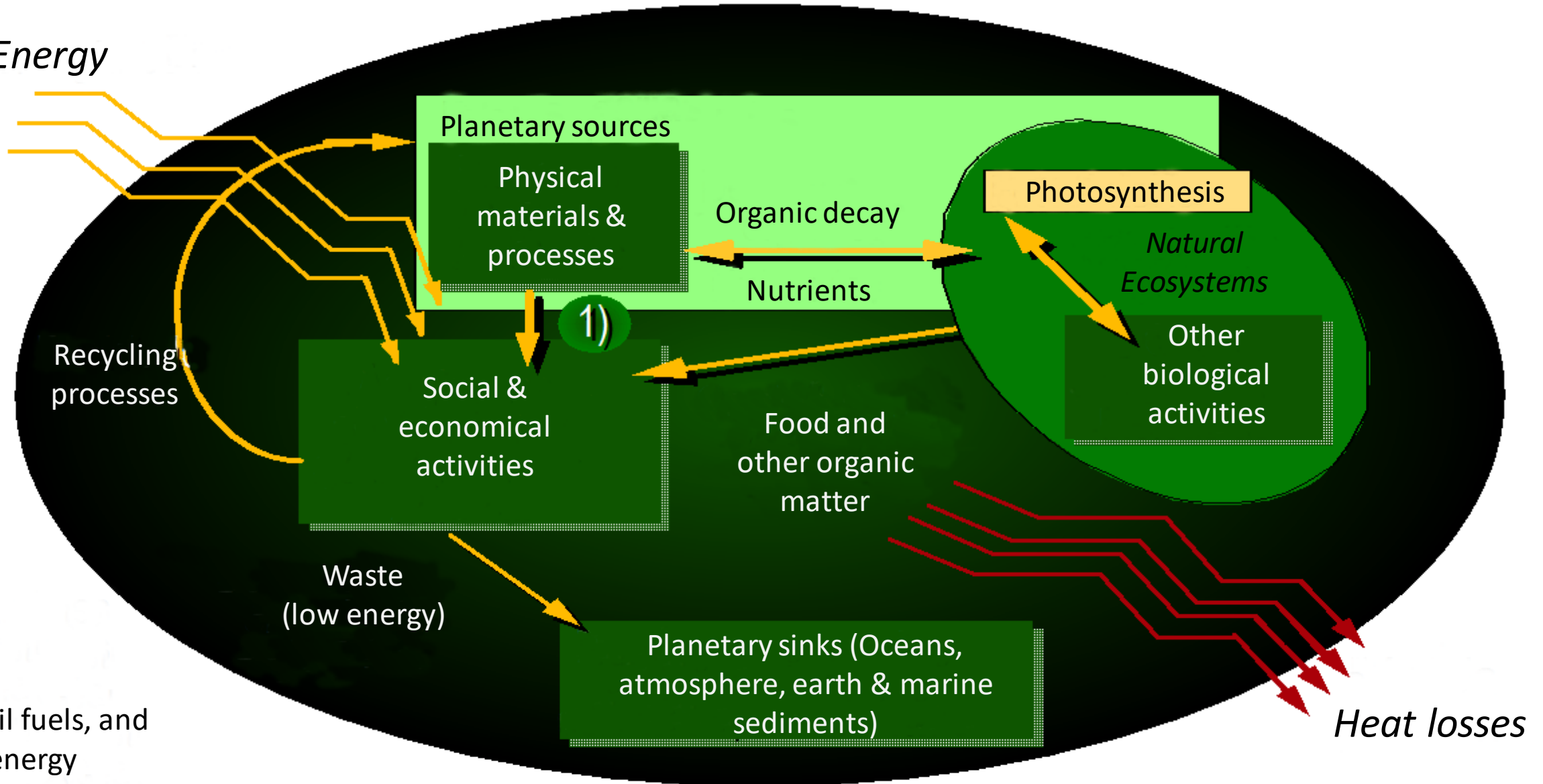
In 2007, the Secretary General of the United Nations declared: "The future is in our hands, **together**, we must ensure that our grandchildren will not have to ask us **why we failed** to do the right thing by letting them suffer the consequences."

Sustainable development seeks to find answers to this statement.

This course presents to students the concept of SD in its three main bases, the individual and social responsibility that we all have to achieve this goal; as well as the role that technology plays in the search for sustainability within **a holistic approach of peace and cooperation**.

Biosphere, an almost closed system

Solar Energy




1) Fossil fuels, and other energy sources

The environmental crisis of current development policies

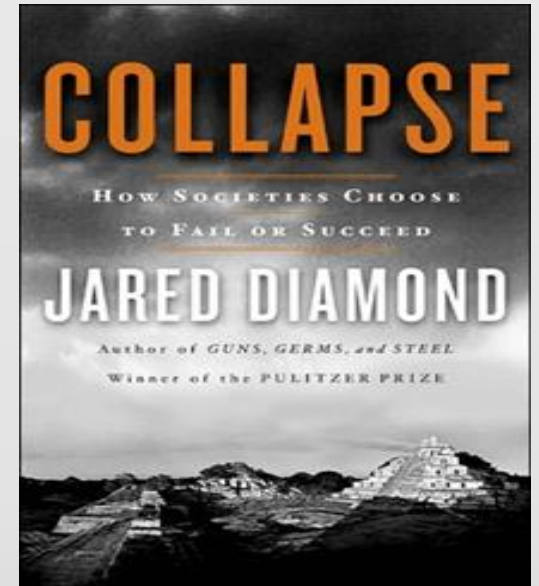
- Global
 - Unequal
 - Transgenerational
 - Uncertainty
 - Complex
 - Exponential
 - Mutually reinforced
 - Systemic
 - Serious consequences
 - Urgent
- (in scale)
 - (in distribution)
 - (in its effects)
 - (in prediction)
 - (dynamic systems)
 - (growth rates)
 - (in its structure)
 - (in its causes)
 - (survival of the human specie)
 - (urgent to correct)

What we have learn...

- Jared Diamond (1937-) work points out that:
 - Our history is full of examples of over-exploitation and destruction of unrestored habitats that have resulted in the collapse of societies, societies that have not operated sustainably.
- 
- A portrait of Jared Diamond, a man with a grey beard and mustache, wearing a dark suit, white shirt, and red tie. He is looking slightly to the right.
- 1st approximation to the problem:
 - Biological resources
 - Social behavior towards development (archaeology & history)
 - Analysis of the collapse of ancient civilizations to understand our current situation
 - Looks to the future with an analysis of the implications that past lessons have left us

Framework

- Main causes of societal collapse:
 - Environmental degradation
 - Climate change
 - Unfriendly neighbors
 - Commercial exchange and
 - The response of society to environmental, social and economic problems



Eastern Island: deforestation

- Isolation
- Geographic position (latitude)
- Low rainfall



- Video de David Attengorrough (7'13'') The Lost Gods of Easter Island
- <http://www.youtube.com/watch?v=-hO-vCPuuQQ>

Anasazi, Mesa Verde, Colorado, EUA.

- Deforestation
- Desvío del arroyo
- Abatimiento de mantos freáticos
- Cambio climático
- Comercio interno



Montana: Bitterroot, Montana

- Mining
- Deforestation
- Erosion and soil degradation
- Reduction of water sources and water quality degradation



Diamond's: 11 environmental problems

- 1) Natural habitats destruction (mainly thru deforestation)
- 2) Lost of natural & native food sources (fishes, plant diversity)
- 3) Lost of biodiversity
- 4) Soil erosion
- 5) Natural resources depletion
- 6) Water contamination
- 7) Appropriation of natural photosynthesis
- 8) Introduction of toxic substances -new molecules-
- 9) Exotic species
- 10) Global climate change, induced by human activities
- 11) Overpopulation and its impact

Why societies make wrong decisions?

- Fail to anticipate problems
- We fail to perceive that the problem has arisen - we do not recognize it
- Misbehavior - conflicts of interest between the elites and the masses
- Disastrous social values: Religion
- Irrational failures
- Non-practical solutions
- Leadership almost null or null



One example

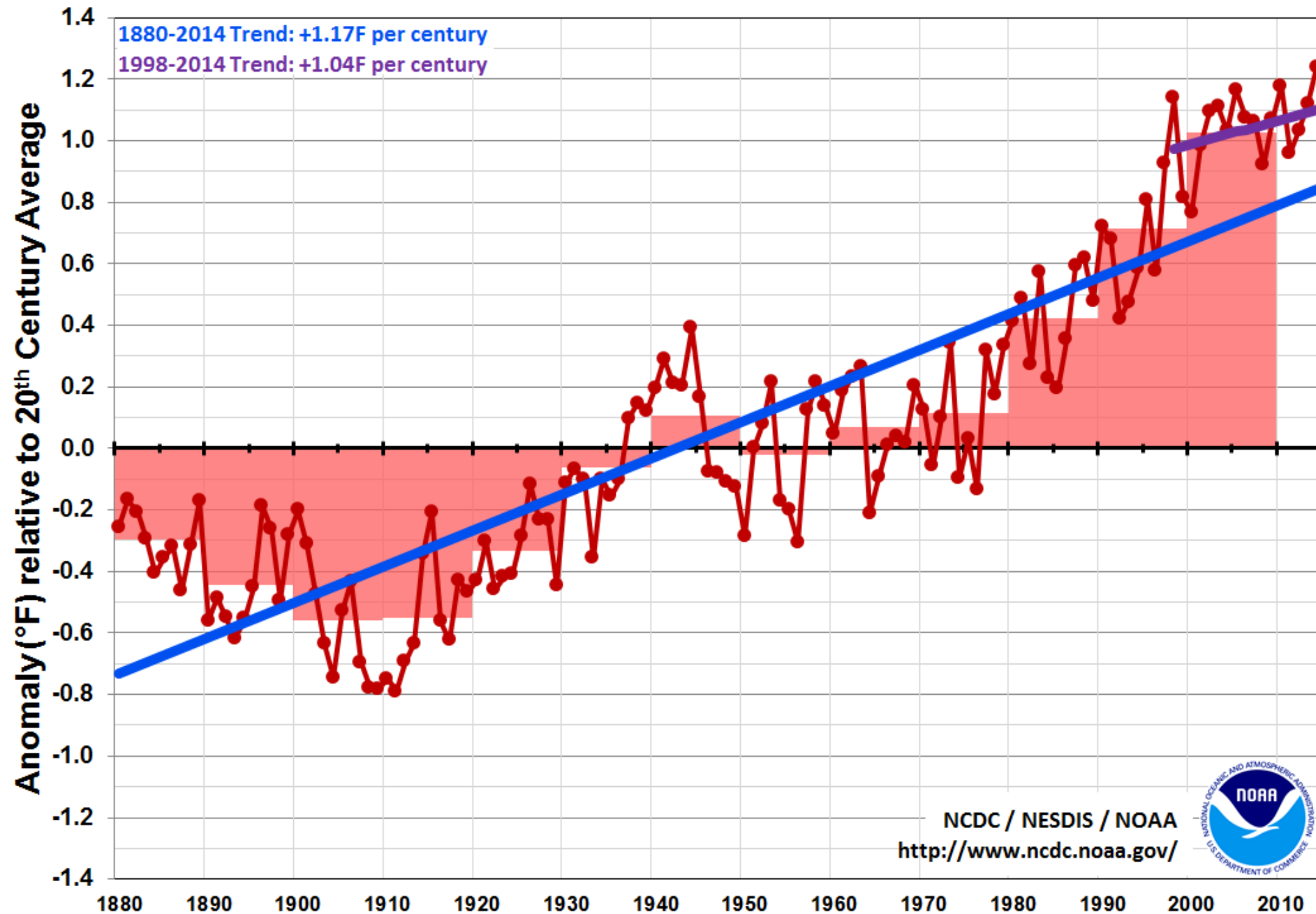
Many scientist, policy makers and citizens argue that the climate of the planet will change due to human activities that alter the chemical composition of the atmosphere.

"Greenhouse gases have increased, altering the chemical composition of the atmosphere (mainly carbon dioxide, methane and nitrate oxides).

These gases have the ability to trap heat. It is not known exactly how this phenomenon will be reflected in the global climate.

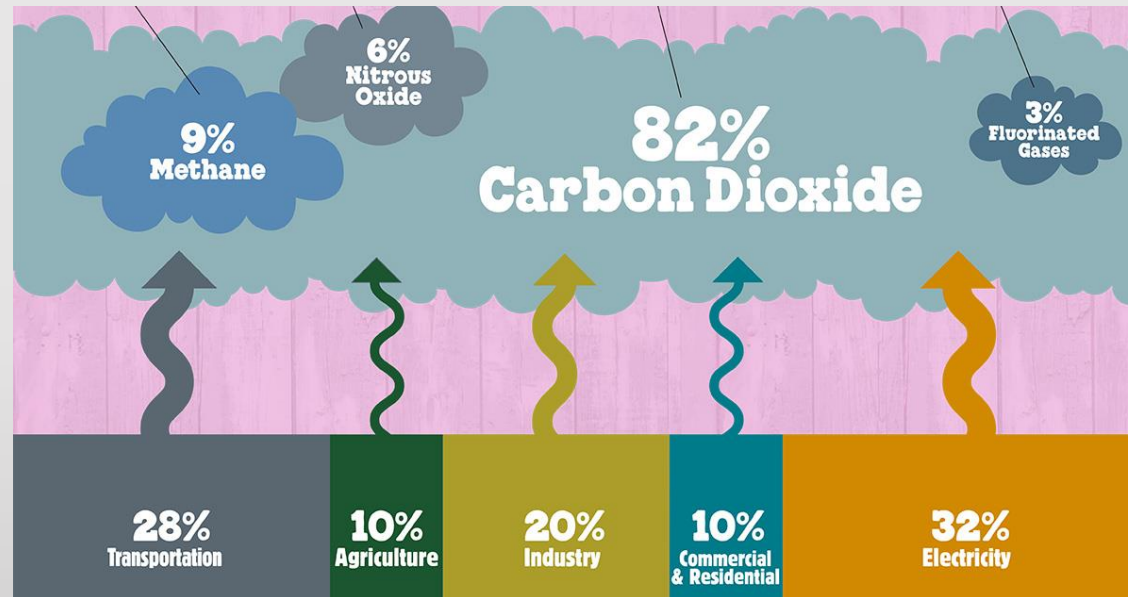
The temperature of the planet has increased.

Annual Global Temperature (Combined Land & Ocean)



Other Greenhouse Gasses

- Besides CO₂, there are other gasses that have an important impact on the ability of earth's atmosphere to trap heat.



Each gas has different heat absorption capacities, HFC and PFC are those that absorb less heat, while methane traps 21 times more heat than CO₂ and nitrous oxides absorb 270 times more heat than CO₂.

Since the beginning of the industrial revolution the concentration of GHG has increased:

CO2 has increased by 30% approx.

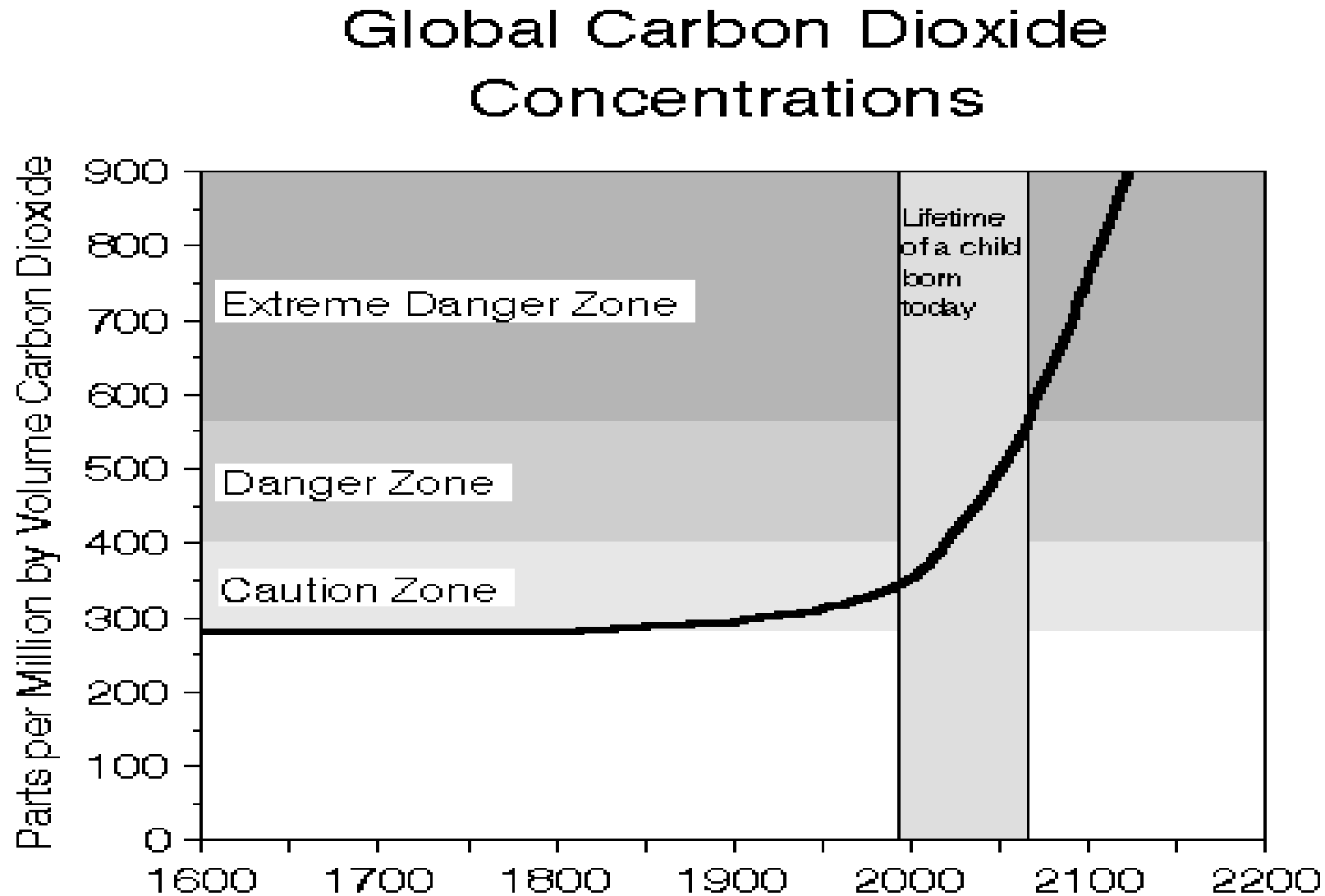
Methane has doubled

Nitrous oxides have increased 15%

Increasing the capacity of the atmosphere to trap heat !!!

Sulfate aerosols are a pollutant that cools the atmosphere (they reflect light), but they are short-lived.

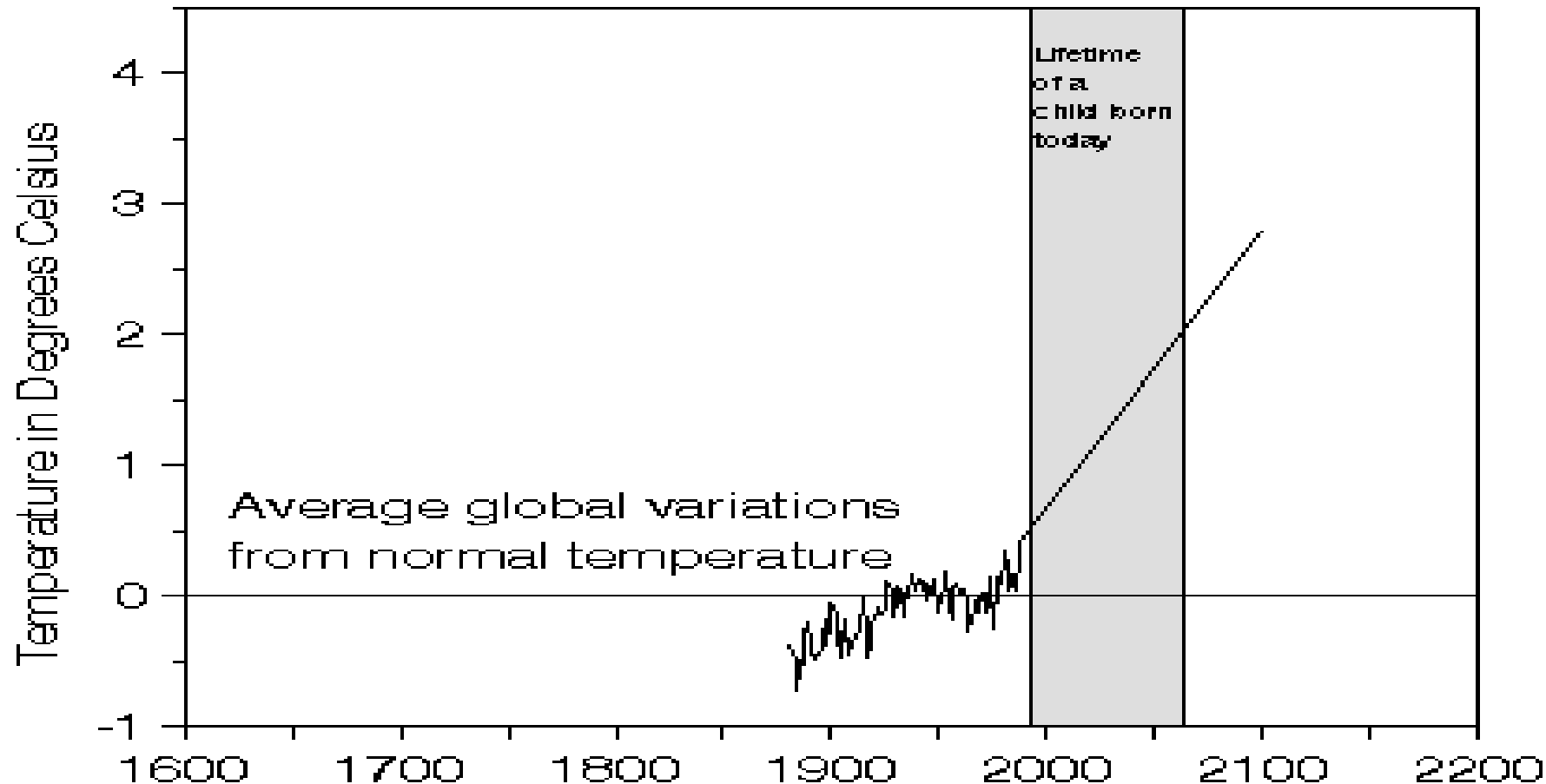
Indicators



IPCC Working Group I.
June 1990.
Policymakers Summary of
the Scientific
Assessment on Climate Change.
"Business-as-usual" scenario.
Nairobi: U.N. Environment
Programme. pp. 7-9.

Indicators

Average Global Variations from Normal Temperature



Projections are from Scenario IS92a as presented in Intergovernmental Panel on Climate Change. 1992. 1992 IPCC Supplement. Nairobi: U.N. Environment Programme. p. 25. The historical data are from Hanson, J. E. 1988. As reported in Shabecoff, P. "Global Warming Has Begun, Expert Tells Senate." The New York Times. 24 June 1988. p. A1.

Divergent points of view



Sustainable Development

Definition

Gro Harlem Brundtland

Norwegian PM and chair the World Commission on Environment and Development (WCED), widely referred to as the Brundtland Commission defines

SUSTAINABLE DEVELOPMENT as

" Development that meets the needs of the present without compromising the ability of future generations to meet their own "

Key concepts on Sustainable Development

Basic needs of the population must be covered with:

- Dignity
- Security

There are no absolute limits; the potential for development is a function of the current state of technology and its impact on the environment.

Sustainable Development

In 1990, the European Economic Commission indicated that:

- To achieve sustainable development, the political line should be based on the precautionary principle.

Principle of Caution

The precautionary principle indicates that environmental measures must:

- Anticipate, avoid and attack the causes of environmental deterioration.

Where there are threats or serious irreversible damage:

- The lack of scientific certainty should not be used as a pretext to postpone measures aimed at preventing the deterioration of the environment.
- As stated by Robert Constanza “ is better to be approximately right, than precisely wrong”.

Sustainability



«Human health and
environment health are
inseparable»

Rachel Carson

The role of technology

In the 70's, Paul Ehrlich proposed the following equation to estimate the human impact on the planet (I).

$$I = P * A * T$$

where

I = Human impact on the environment

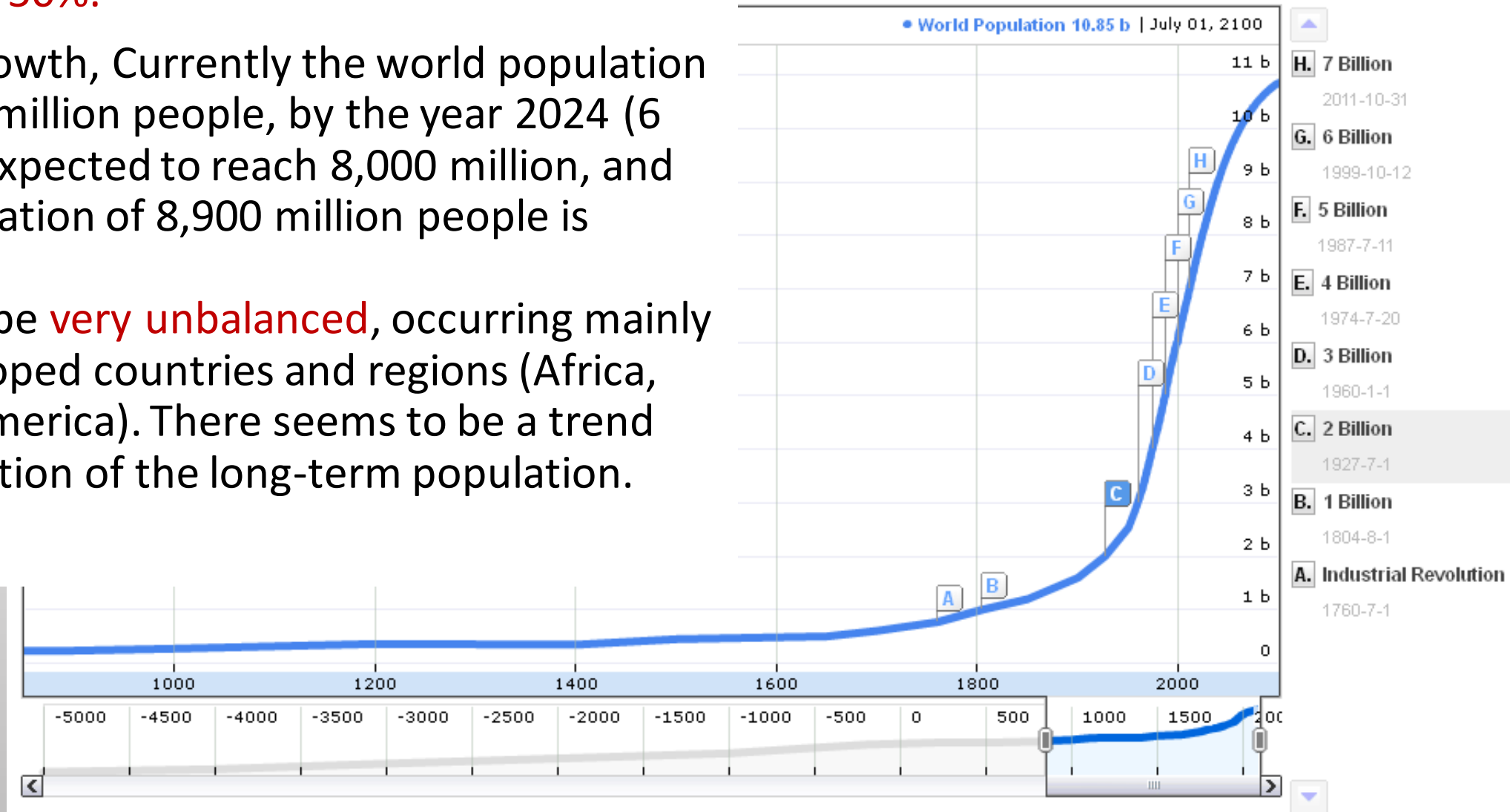
P = Population. Number of humans.

A = Affluence. average consumption of each person in the population, number of products and services consumed per capita (ie PIB).

T = Technology. Represents how resource intensive the production of affluence is.

Implications of the IPAT equation

- I: Environmental Impact, is not sustainable, it should be cut to **around 50%**.
- P: Population Growth, Currently the world population is approx. 7,140 million people, by the year 2024 (6 years ahead) is expected to reach 8,000 million, and by 2050, a population of 8,900 million people is expected.
This growth will be **very unbalanced**, occurring mainly in the less developed countries and regions (Africa, Asia and Latin America). There seems to be a trend towards stabilization of the long-term population.



Implications of the IPAT equation

- A: Affluence, Standard of living -> The richest **20% consume 80%** of the products and services, is this sustainable?
- On average, the rich countries (societies) consume **16 times more** than the poor, with an average growth of the economies of the rich countries of 2%, by the year 2050 it will imply a growth factor of 2.7. If the poor countries want to reach the level of the the rich countries (societies), they will need a growth factor of 43.2 ($16 * 2.7$), which represents an annual **growth of 7.8%**.

Seen from the point of view of consumption, if global consumption is 100, rich countries consume 80 and if growth factor is 2.7, by 2050 consumption will be 216; and they leave the remaining 20 to the poor (currently), with a growth of 43.2, their consumption in 50 years will be 864, resulting in a global consumption of 1,080, **ten times more than the initial one !!!!**

Where to start????

- With the IPAT equation in mind, the first answer is on the population side; but in democratic societies, can we (in the short term) reduce the "P" factor ???
- What about the "A" factor? again in a democratic society, can we reduce the consumption rate and maintain the economic indicators at a sustainable level???
- How can we use the "T" factor???



The famous Earth-rise photographs, taken by Apollo VIII astronauts on December 24, 1968



Image of planet Earth taken by the spacecraft Voyager 1 at a distance of 3.7 billion miles on February 1990, while the spacecraft was leaving the orbit of Neptune

On spaceship Earth, there are no
passenger, everybody is part of the crew.

Marshall McLuhan

Video

Steve Howard. 15 min.

- [Selling sustainability](#)