

Sustainable Development

Pınar Deniz

Outline

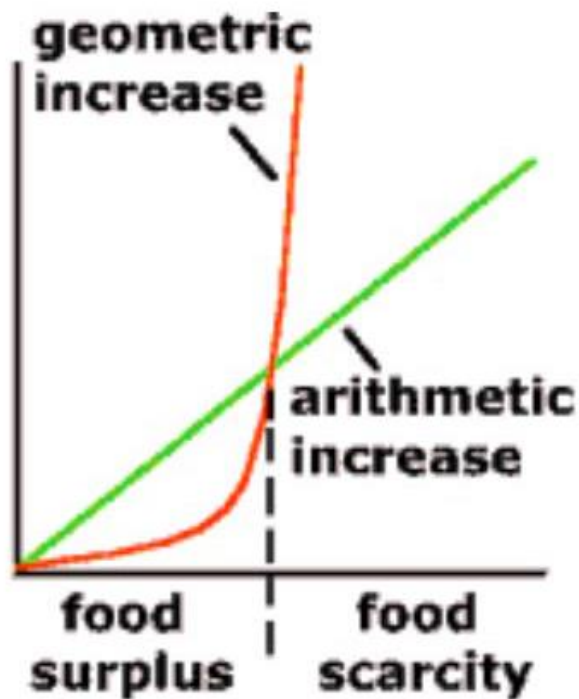
- Sustainable Development
- Importance of Adjusted Net Saving in Sustainable Development
- An Ecological Perspective in Sustainable Development: Ecological Footprint
-
- Environmental Kuznets Curve
- An indicator for Development: Human Development Index

Sustainable Development

- The term “Sustainable Development” has become popular since the UN Conference on Environment and Development held in Rio de Janeiro in 1992.
- "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."
- The starting point of theory formation is the ethical idea of sustainability. It is based on obligations toward future generations and presupposes intergenerational equity.
- Concerning specific resources and services (e.g. fresh water, the atmosphere as a carbon sink, the wide variety of ecosystems), it is evident that continuing growth at these utilization rates is unsustainable.

- Problems on earth are diverse: underdevelopment, poverty, drought and famine, environmental depletion, wastage, waste of resources etc.
- The aim of Sustainable Development is to solve these problems and create a situation that is of long-term durability for all present and future generations, known as intra- and intergenerational equity.

- Sustainable Development contains within it two key concepts:
 - the concept of **needs**, in particular the essential needs of the world's poor, to which overriding priority should be given,
 - the idea of **limitations** imposed by the state of technology and social organization on the ability of the environment to meet present and future needs.



In his essay, Malthus argued that the geometrical power of increase in human numbers (world population), and an arithmetical growth in agricultural production, would regularly combine to produce famine, increased mortality, and longer hours of work.

According to Malthus, population growth would reach such a level that the land would no longer be able to support it, and widespread starvation would occur.

- Sustainable Development concept has three main pillars: social, economic and ***ecological*** aspects.

Adjusted net saving (ANS)

- Adjusted net saving (ANS) measures the true rate of saving in an economy after taking into account investments in human capital, depletion of natural resources and damages caused by pollution.
- Adjusted net saving, known informally as *genuine saving*, is an indicator that aims to assess an economy's sustainability based on the concepts of extended national accounts.

- Positive savings allow wealth to grow over time thus ensuring that future generations enjoy at least as many opportunities as current generations.
 - In this sense, adjusted net saving seeks to offer policymakers who have committed their countries to a “sustainable” development pathway, an indicator to track their progress in this endeavor.
- Adjusted net saving is derived from the standard national accounting measure of gross saving by making four adjustments:
 - (i) consumption of fixed capital is deducted to obtain net national saving
 - (ii) current public expenditure on education is added to account for investment in human capital
 - (iii) estimates of the depletion of a variety of natural resources are deducted to reflect the decline in asset values associated with extraction and depletion
 - (iv) deductions are made for damages from carbon dioxide and particulate emissions.

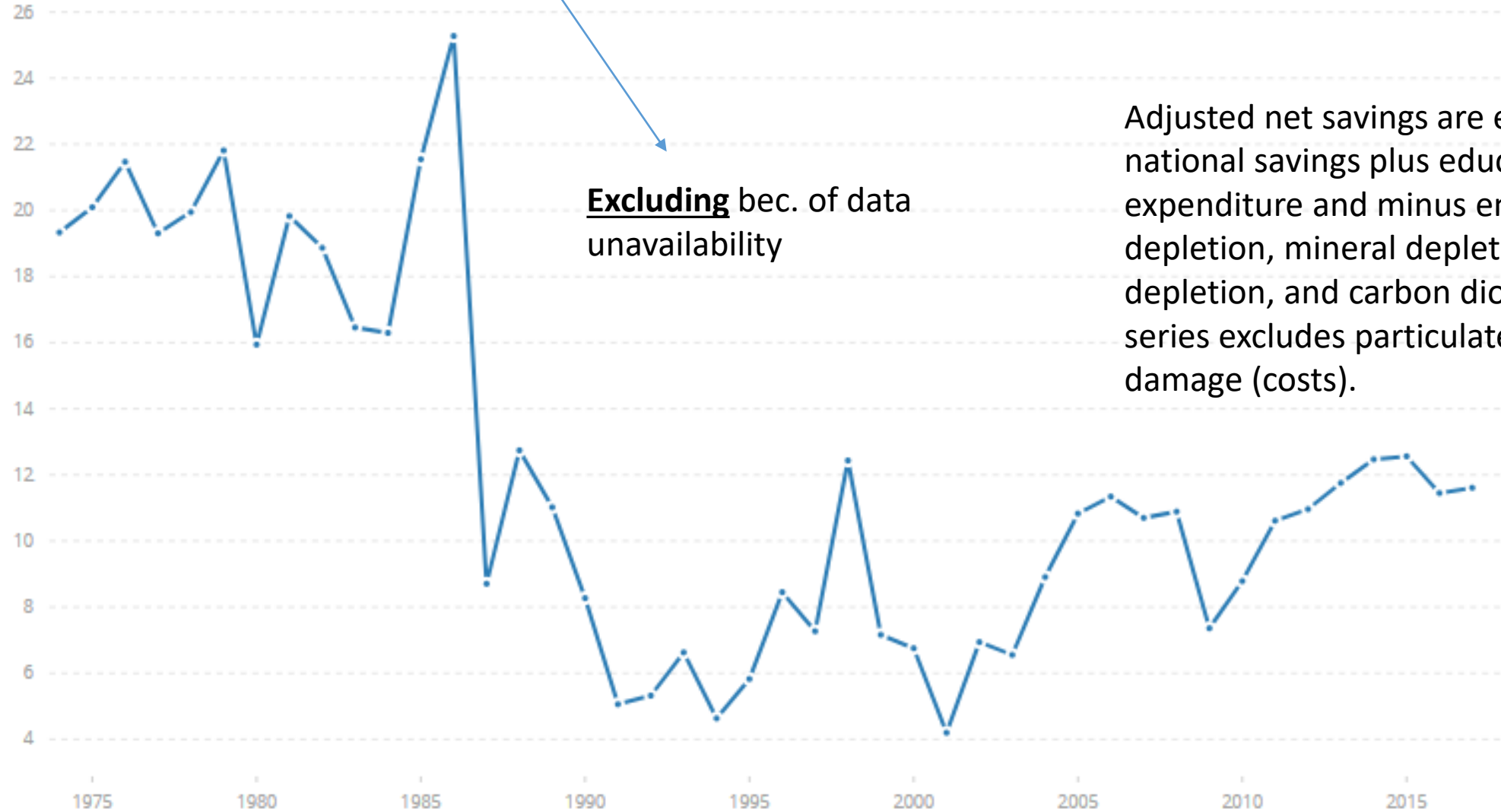
How to calculate Adjusted Net Saving

- Gross national saving – Consumption of fixed capital = Net National Saving
 - ***Consumption of fixed capital*** is the decline, during the course of the accounting period, in the current value of the stock of fixed assets owned and used by a producer as a result of physical deterioration, normal obsolescence or normal accidental damage.
- Net National Saving + Education Expenditure – Energy depletion – Mineral depletion – Net forest depletion – Damage from carbon dioxide emissions – Damage from particulate emissions = Adjusted Net Saving
 - The indicator is measured in percentage by dividing ANS by Gross National Income (GNI)

The Need for Adjusted Net Saving

- Saving is a core aspect of development. Without the creation of a surplus for investment, there is no way for countries to escape a state of low-level subsistence.
- Resource dependence complicates the measurement of the saving effort because depletion of natural resources is not visible in standard national accounts. The same is true for pollution damages to existing assets.
- Adjusted net saving overcomes this problem by measuring the change in value of a specified set of assets, excluding capital gains.
- If a country's net saving is positive and the accounting includes a sufficiently broad range of assets, economic theory suggests that the present value of wellbeing is increasing. Conversely, persistently negative adjusted net saving indicates that an economy is on an unsustainable path.

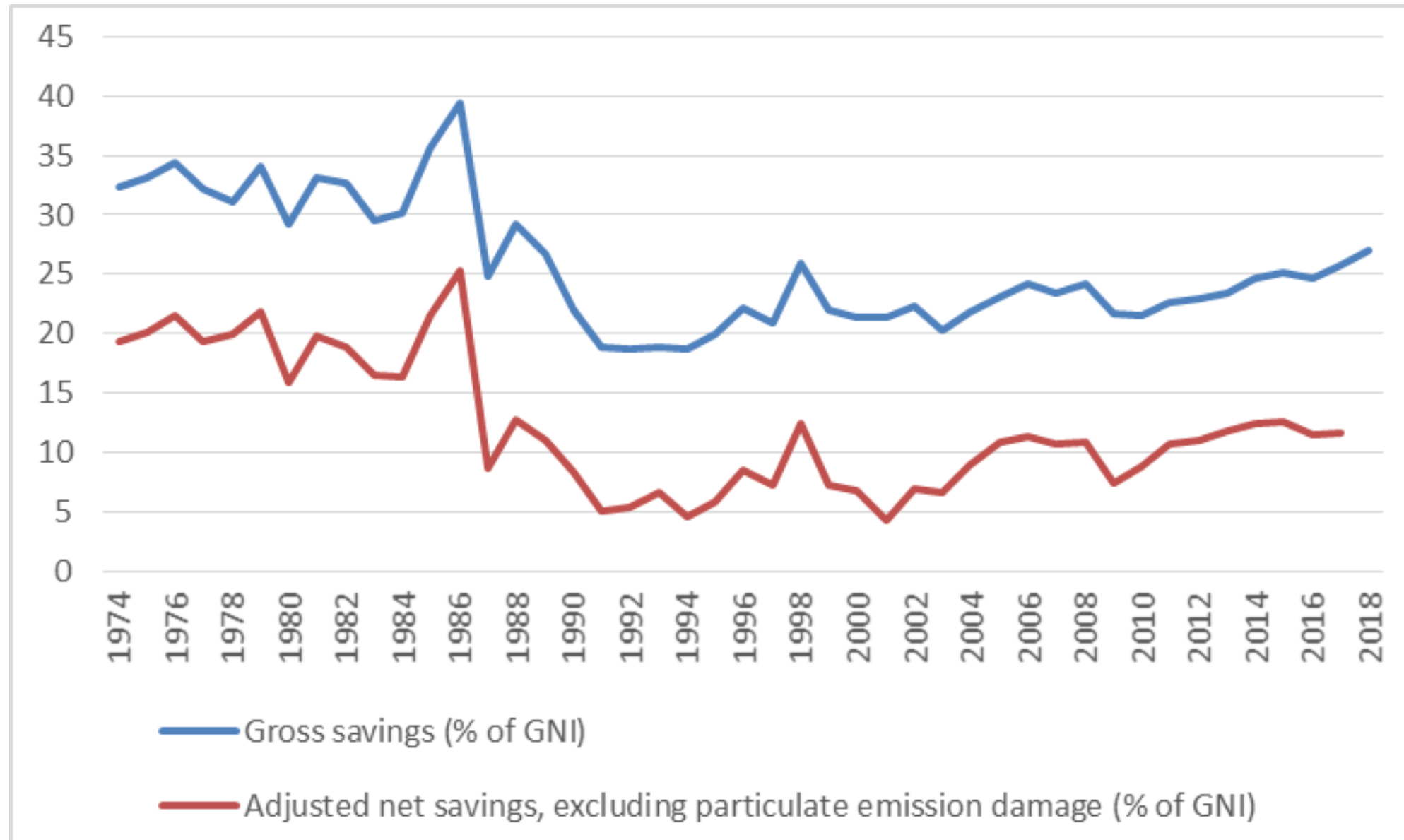
Adjusted net savings, excluding particulate emission damage (% of GNI) – Turkey - 1974 - 2016



Excluding bec. of data
unavailability

Adjusted net savings are equal to net national savings plus education expenditure and minus energy depletion, mineral depletion, net forest depletion, and carbon dioxide. This series excludes particulate emissions damage (costs).

Adjusted net savings, excluding particulate emission damage (% of GNI) and Gross Savings – Turkey - 1974 - 2018



IPCC (Intergovernmental Panel on Climate Change)

- 6 October 2018, IPCC published a [report](#) about the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.
- You can follow climate issues from NASA in this [link](#).

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Climate change

We have 12 years to limit climate change catastrophe, warns UN

Urgent changes needed to cut risk of extreme heat, drought, floods and poverty, says IPCC

● [Overwhelmed by climate change? Here's what you can do](#)

Jonathan Watts *Global
environment editor*



Advertisement

Source: The Guardian (2018)

<https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report>

CHAPTER 3 of IPCC special report on the impacts of global warming of 1.5 °C

- Risks of local species losses and, consequently, risks of extinction
 - The risks of declining ocean productivity, shifts of species to higher latitudes, damage to ecosystems (e.g., coral reefs, and mangroves, seagrass and other wetland ecosystems), loss of fisheries productivity (at low latitudes), and changes to ocean chemistry (e.g., acidification, hypoxia and dead zones) are projected to be substantially lower when global warming is limited to 1.5°C
- The projected frequency and magnitude of floods and droughts in some regions are smaller under 1.5°C than under 2°C of warming
- Risks of water scarcity are projected to be greater at 2°C than at 1.5°C of global warming in some regions
- Limiting global warming to 1.5°C, compared with 2°C, is projected to result in smaller net reductions in yields of maize, rice, wheat, and potentially other cereal crops. And so on...

Source: https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Chapter3_High_Res.pdf

Bad news is..

- We have already surpassed the temperature rise limit of 1.5 °C for many regions in the World.

Good news is...

- Most emitting country leaders started to accept the urgency of the issue and decided to act together.
- Technological advance may somehow help us find a way to deal with the temperature rise compared to the case that we leave it to the nature.

World leaders outline climate commitments at COP26 summit

Chloe Taylor


The coverage on this live blog is now over.

World leaders met in Glasgow, U.K., on Monday for the first day of the highly anticipated COP26 climate summit.

Delegates were asked to accelerate action on climate change and commit to more ambitious cuts in their countries' emissions, all in an effort to limit global temperature rises.

Here are some of the biggest developments Monday:

- [COP26 a 'minute to midnight moment,' U.K.'s Johnson says](#)



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World leaders open COP26 climate talks with sombre warnings: 'We are digging our own graves'

British Prime Minister Boris Johnson opened the COP26 UN climate conference in Glasgow on a sombre note on Monday by warning that the world...

1 gün önce



... BBC

COP26: Leaders agree global plan to boost green technology

The announcement will be made at the climate summit COP26 in Glasgow on Tuesday. Five high-carbon sectors will be targeted at first, including...

35 dk. önce



... BBC

COP26: Act now for our children, Queen urges climate summit

The Queen has urged world leaders at the COP26 climate summit to "achieve true statesmanship" and create a "safer, stabler future" for the...

16 saat önce



Global Agreements for Climate Issues

- The **United Nations Conference on Environment and Development** (UNCED), also known as the **Rio Summit, Rio Conference, Earth Summit** was a major United Nations conference held in Rio de Janeiro in 1992.
- The issues addressed included:
 - systematic scrutiny of patterns of production — particularly the production of toxic components, such as lead in gasoline, or poisonous waste including radioactive chemicals
 - alternative sources of energy to replace the use of fossil fuels which are linked to global climate change
 - new reliance on public transportation systems in order to reduce vehicle emissions, congestion in cities and the health problems caused by polluted air and smog
 - the growing scarcity of water

Kyoto Protocol

- 1992 Earth Summit results in the United Nations Framework Convention on Climate Change (UNFCCC)
- Parties to the UNFCCC agreed on reducing greenhouse gas emissions, based on the premise that (i) global warming exists and (ii) human-made CO₂ emissions have caused it.
- They signed The Kyoto Protocol, an international treaty adopted in Kyoto, Japan, on 11 December 1997 and the Protocol entered into force on 16 February 2005.
- There are currently 192 parties to the Protocol.
 - Excluding the US, Andorra, South Sudan and Canada, which withdrew effective December 2012.

Paris Agreement

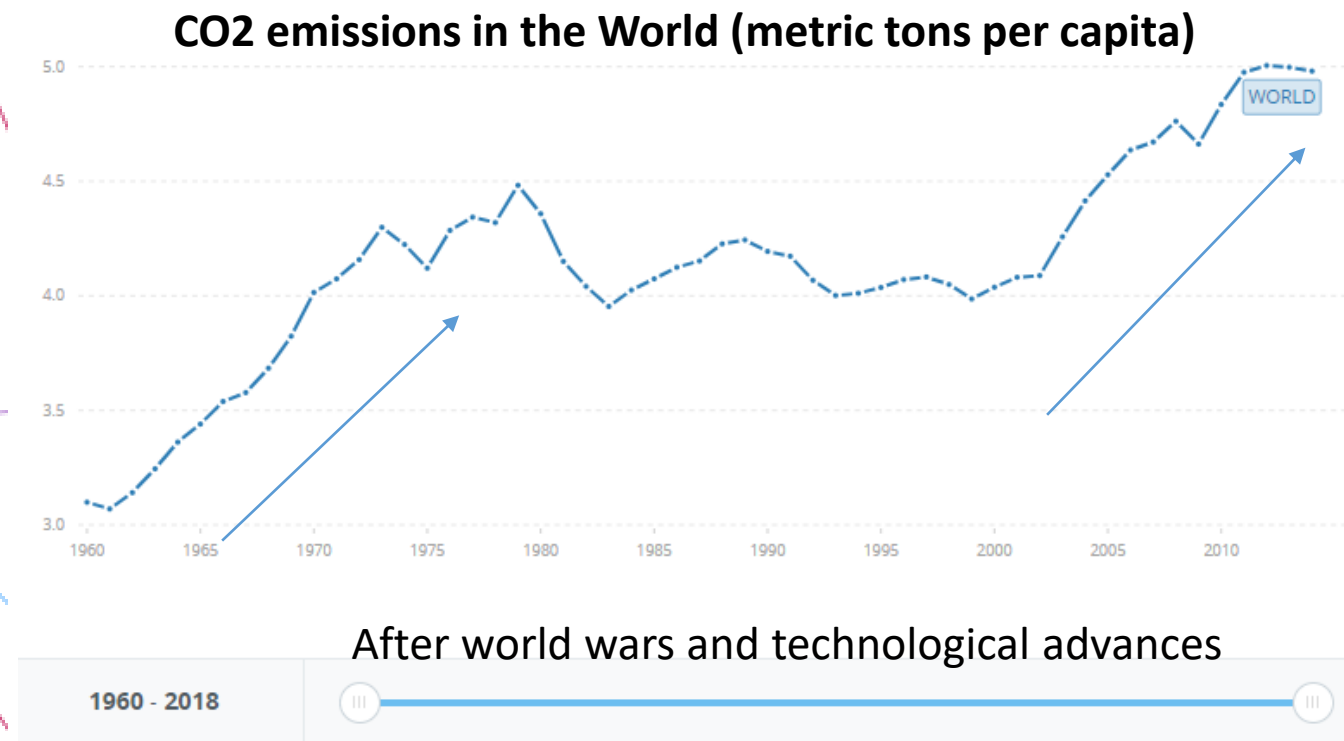
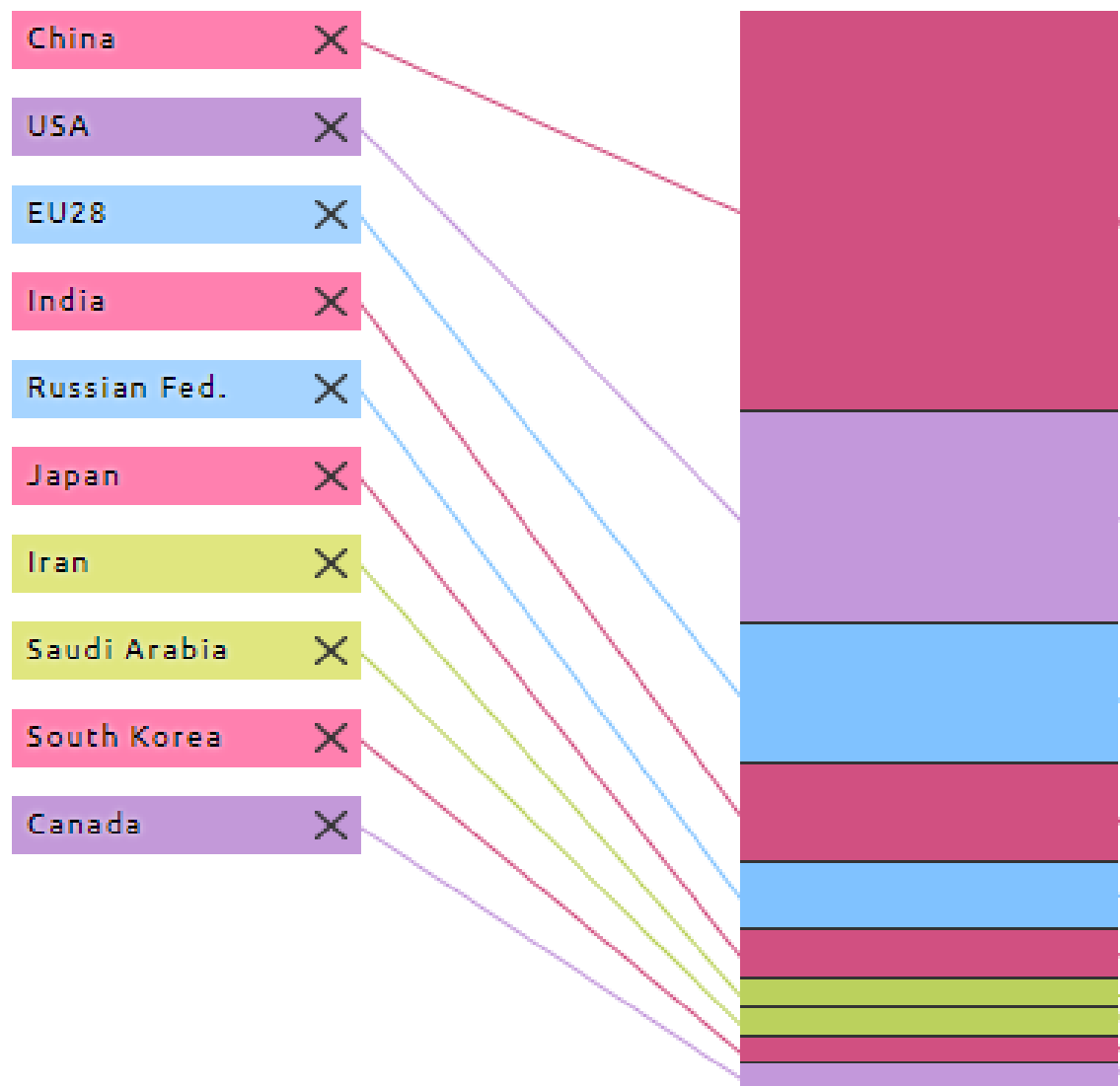
- The Paris Agreement central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.
- 196 countries came together under the Paris Agreement to transform their development trajectories so that they set the world on a course towards sustainable development.
- The Paris Agreement entered into force on 4 November 2016.
- **192 Parties** out of 197 Parties to the Convention are Parties to the Paris Agreement.
- Then President of the United States (Donald Trump) in June 2017 announced that his administration has decided to withdraw from the Paris Climate Change Agreement.
 - On 20 January 2021, the current Government of the United States of America (Joe Biden's presidency) finally deposited its instrument of acceptance of the Agreement.

Turkey?

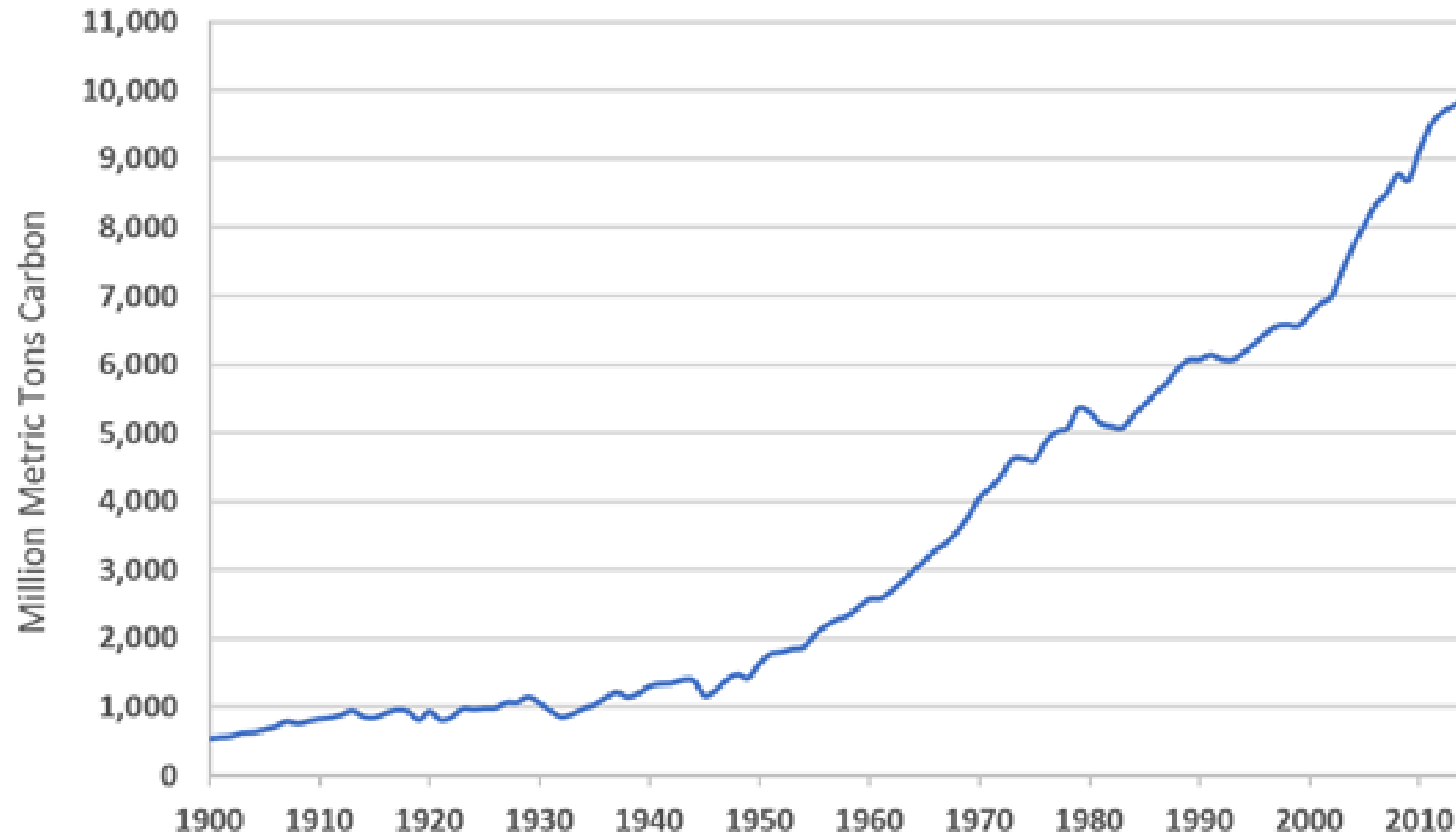
- Turkey was the only country that signed but not ratified the agreement until finally ratifying by 11 Oct 2021.
- The reason was Turkey's insist on being acknowledged as a Non-Annex 1 country as Annex 1 countries are greatest contributors to the Accord financially and physically.
- After ratification, it is announced that Turkey will receive more than 3 billion euros of loans from World Bank, France and Germany for its goals set out in the Paris Agreement.
- For some, Turkey sees this funding as a financial opportunity rather than being committed to the fight with climate change.

The major pollutants?

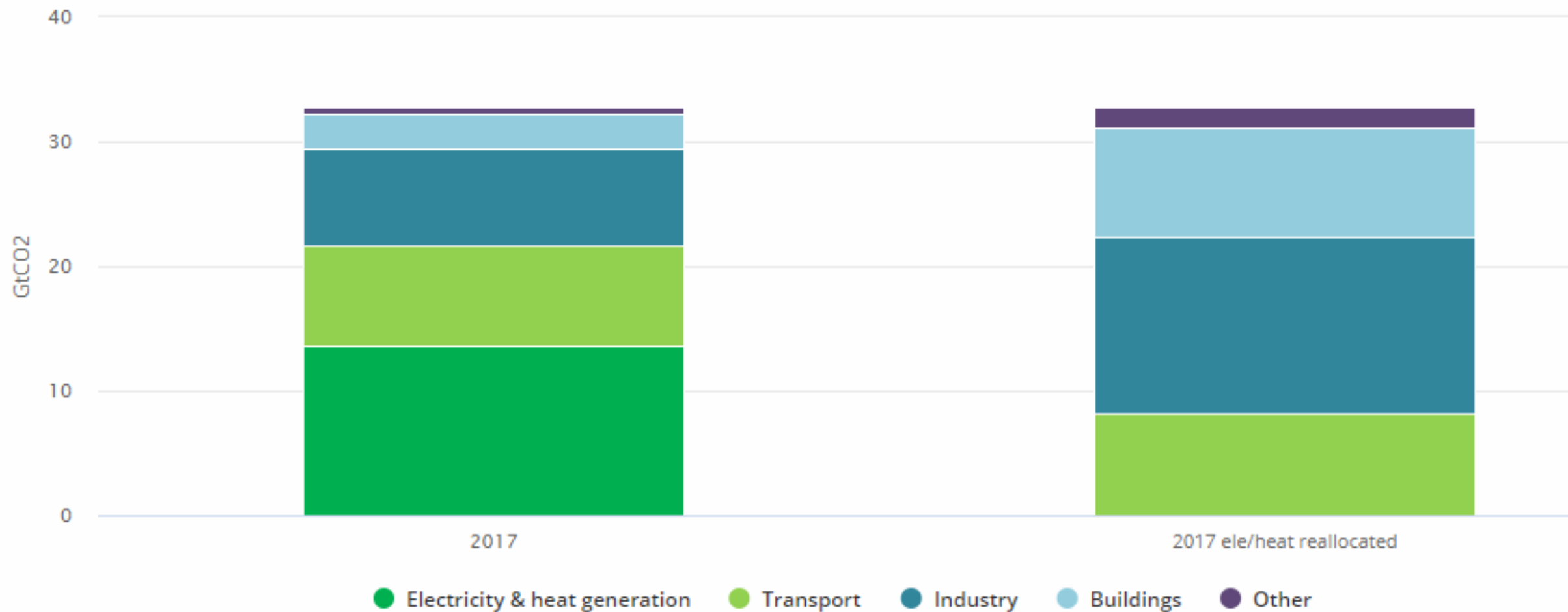
(Ranking in Metric tons of carbon dioxide equivalent)



Global Carbon Emissions from Fossil Fuels, 1900-2014



Global CO2 emissions by sector, 2017

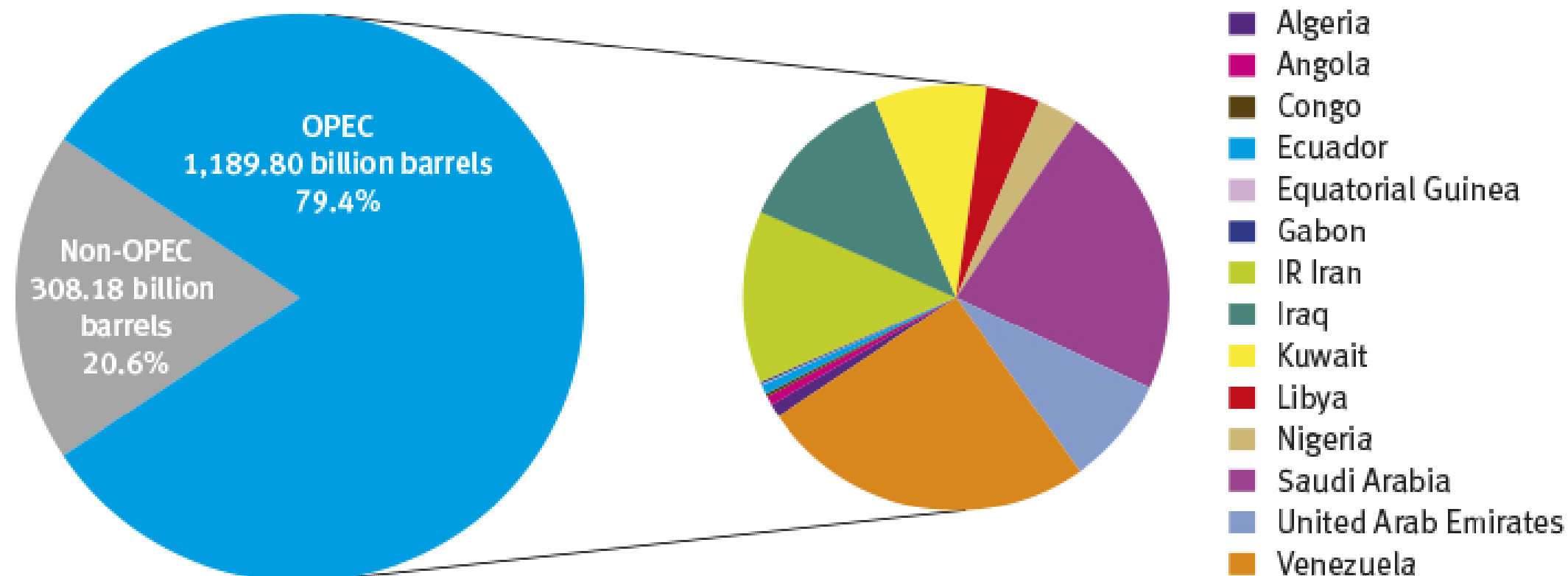


Source: <https://www.iea.org/statistics/co2emissions/>

Dependence on Oil

- Oil is a valuable resource without which modern life would not be possible.
 - What is oil mostly used for?
 - Energy!
- Oil is one of the major global energy sources, and is used both as a fuel and to generate electricity. Currently nearly 40% of the EU's energy supply comes from oil.

OPEC share of world crude oil reserves, 2018

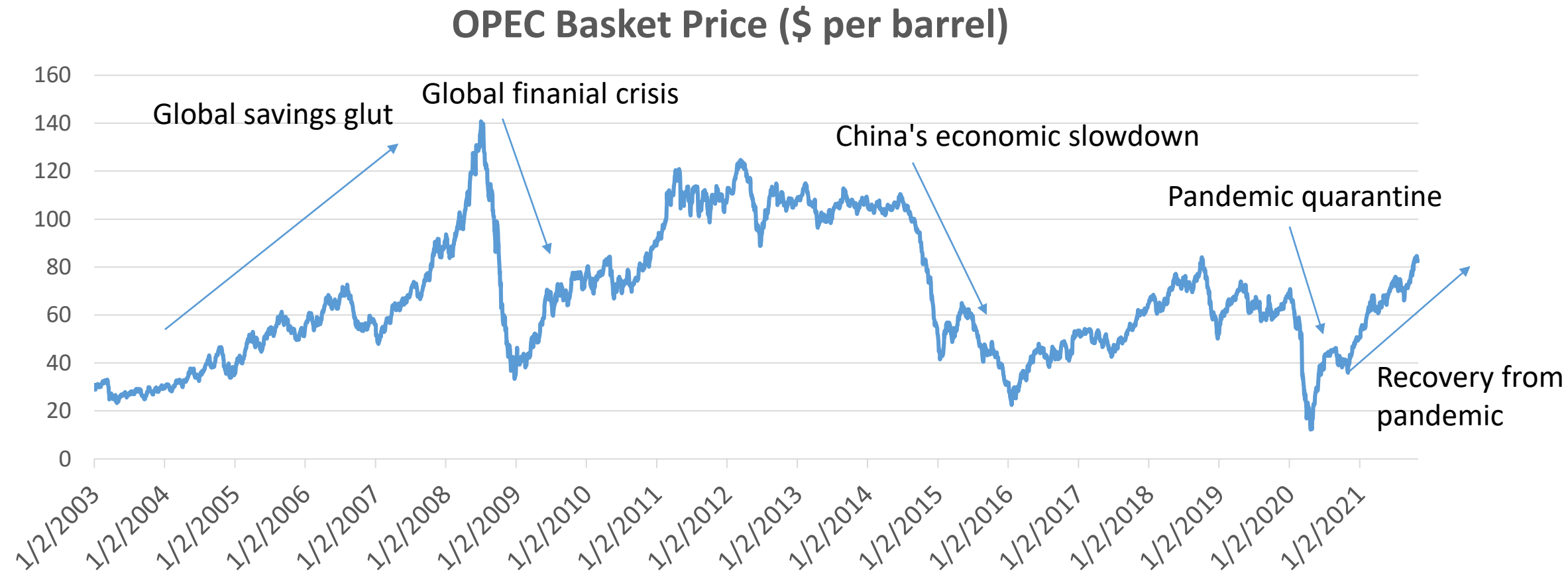


OPEC proven crude oil reserves, at end 2018 (billion barrels, OPEC share)

Venezuela	302.81	25.5%	Kuwait	101.50	8.5%	Algeria	12.20	1.0%	Gabon	2.00	0.2%
Saudi Arabia	267.03	22.4%	UAE	97.80	8.2%	Ecuador	8.27	0.7%	Equatorial Guinea	1.10	0.1%
IR Iran	155.60	13.1%	Libya	48.36	4.1%	Angola	8.16	0.7%			
Iraq	145.02	12.2%	Nigeria	36.97	3.1%	Congo	2.98	0.3%			

Source: OPEC Annual Statistical Bulletin 2019.

OPEC Basket Price

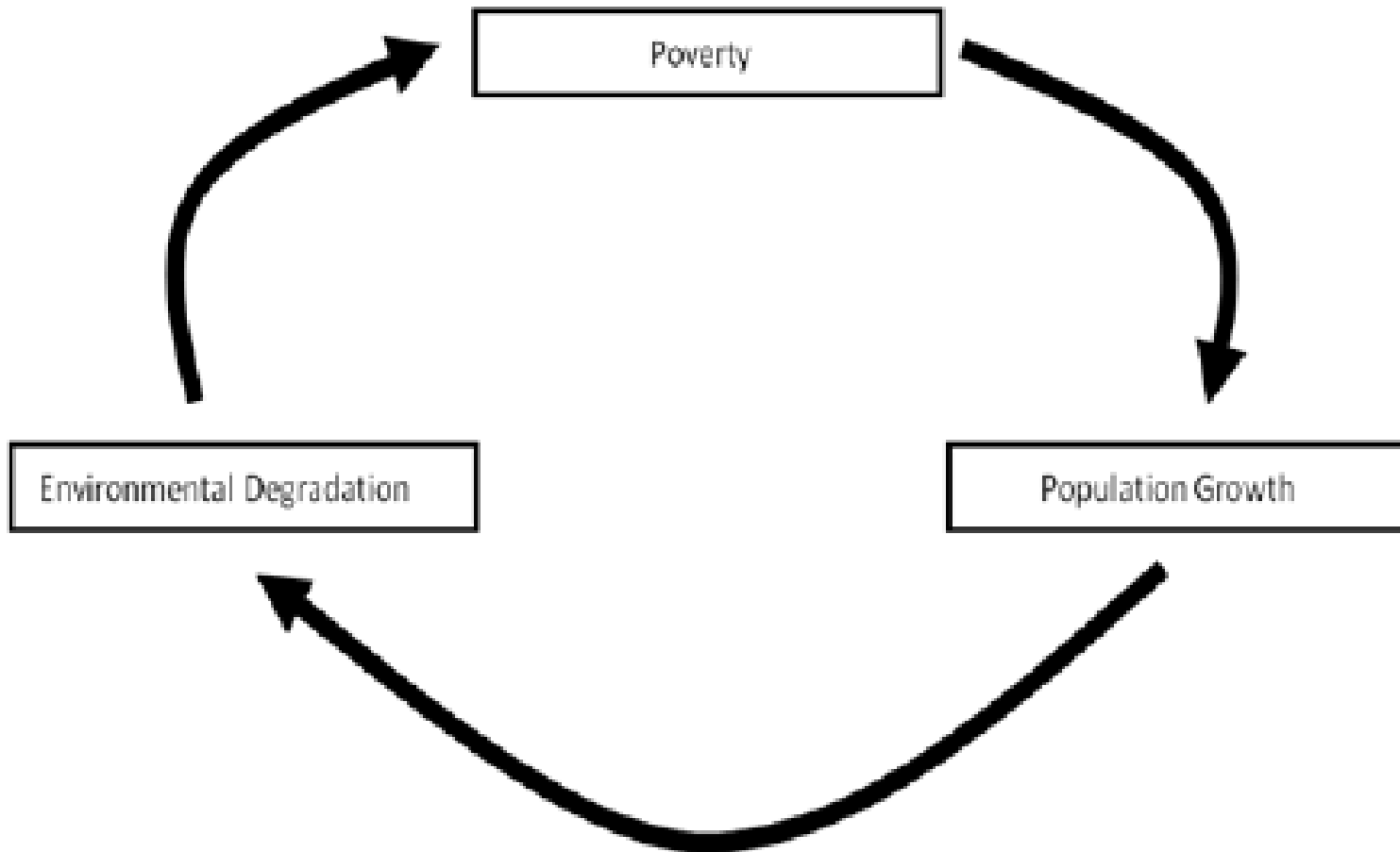


Source: OPEC (2021) http://www.opec.org/opec_web/en/data_graphs/40.htm

How to secure energy after depletion of resources?

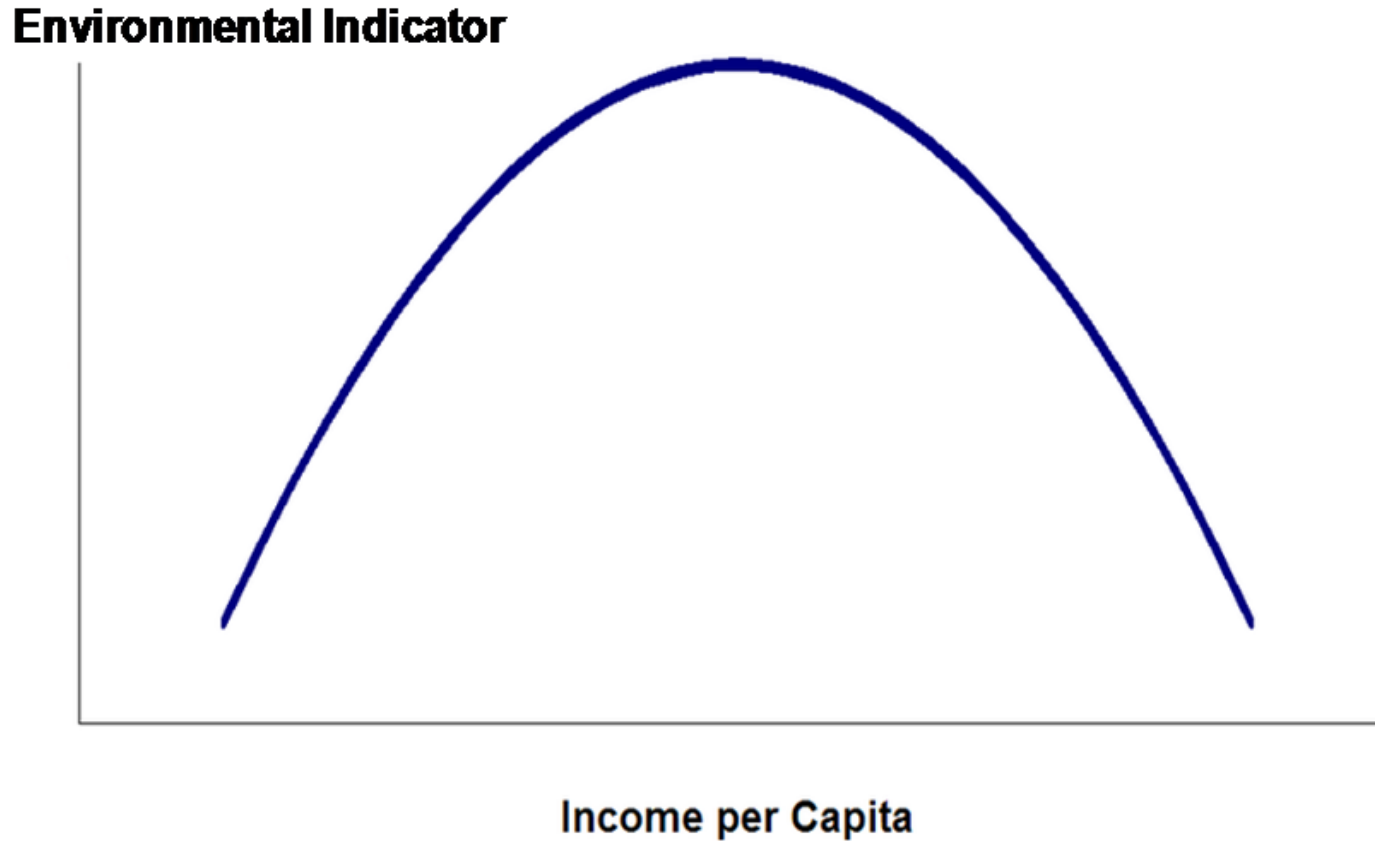
- Renewable energy sources will also be very important in helping us to make the best use possible of our oil supplies. The EU has set a target to have 20% of energy produced from renewable sources by 2020, meaning that governments will be finding ways to increase the use of technologies such as wind, wave and solar power.
- 30% by 2030
- 40% by 2040 at least

Threats to Sustainability: Environmental Degradation



- Poverty leads to Population Growth and is a primary cause of ecological degradation.
- People are forced to overexploit the resources in order to satisfy their own basic needs.

Environmental Kuznets Curve



The relationship between Environmental Degradation and Income per Capita.

Countries with a low per Capita Income has an increasing environmental influence, countries with a high per Capita Income reach a situation with decreasing environmental impact.

The consequence is that only countries with a high per Capita Income can implement environmental precautions effectively.

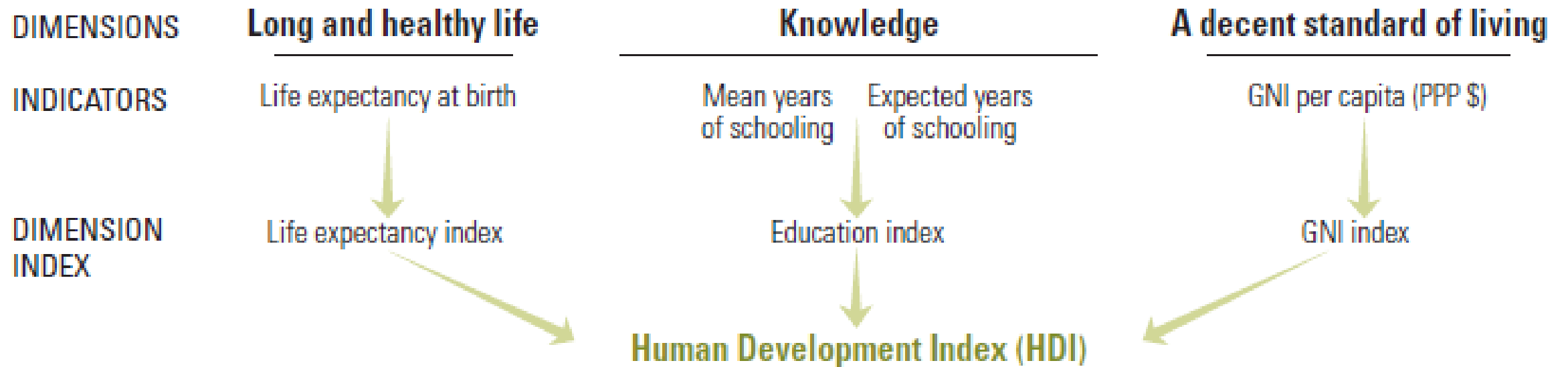
Ecological Footprint

- It is the impact of human activities measured in terms of the area of biologically productive land and water required to produce the goods consumed and to assimilate the wastes generated.
- More simply, it is the amount of the environment necessary to produce the goods and services necessary to support a particular lifestyle.
- People living in richer, more developed countries generally have a higher Footprint than those living in less developed countries.
- <http://footprint.wwf.org.uk/>

Human Development Index (HDI)

- The Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living. The HDI is the geometric mean of normalized indices for each of the three dimensions.
 - The health dimension is assessed by life expectancy at birth
 - The education dimension is measured by mean of years of schooling for adults aged 25 years and more and expected years of schooling for children of school entering age.
 - The standard of living dimension is measured by gross national income per capita. The HDI uses the logarithm of income, to reflect the diminishing importance of income with increasing GNI.

Calculating the human development indices



Step 1. Creating the dimension indices

- Minimum and maximum values (goalposts) are set in order to transform the indicators expressed in different units into indices between 0 and 1. These goalposts act as the ‘natural zeros’ and ‘aspirational goals’.

Dimension	Indicator	Minimum	Maximum
Health	Life expectancy (years)	20	85
Education	Expected years of schooling	0	18
	Mean years of schooling	0	15
Standard of living	Gross national income per capita (2011 PPP \$)	100	75,000

- The justification for placing the natural zero for life expectancy at 20 years is based on historical evidence that no country in the 20th century had a life expectancy of less than 20 years.
- Societies can subsist without formal education, justifying the education minimum of 0 years. The maximum for mean years of schooling, 15, is the projected maximum of this indicator for 2025. The maximum for expected years of schooling, 18, is equivalent to achieving a master's degree in most countries.
- The low minimum value for gross national income (GNI) per capita, \$100, is justified by the considerable amount of unmeasured subsistence and nonmarket production in economies close to the minimum, which is not captured in the official data. The maximum is set at \$75,000 per capita.
 - Kahneman and Deaton (2010) have shown that there is a virtually no gain in human development and well-being from annual income beyond \$75,000. Assuming an annual growth rate of 5 percent, only three countries are projected to exceed the \$75,000 ceiling in the next four years.

$$\text{Dimension index} = \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}}$$

Step 2. Aggregating the dimensional indices to produce HDI

- The HDI is the geometric mean of the three dimensional indices:

$$HDI = (I_{Health} \cdot I_{Education} \cdot I_{Income})^{1/3}$$

HDI data are available at:

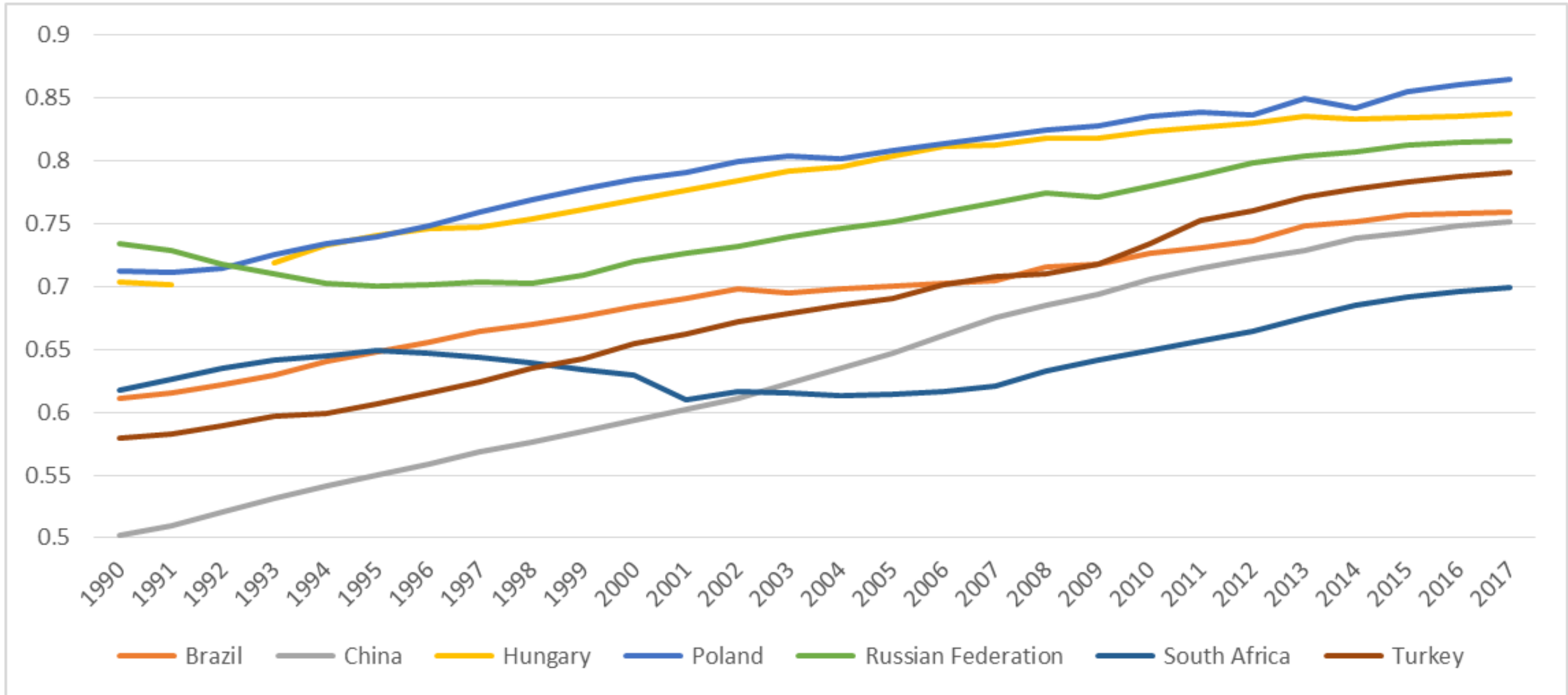
<http://hdr.undp.org/en/composite/HDI>

<http://hdr.undp.org/en/data>

Country groupings

Very high human development	0.800 and above
High human development	0.700–0.799
Medium human development	0.550–0.699
Low human development	Below 0.550

HDI



Human Development Index and its components

HDI RANK	Human Development Index (HDI)	SDG 3	SDG 4.3	SDG 4.4	SDG 8.5	GNI per capita rank minus HDI rank	HDI rank
		Life expectancy at birth	Expected years of schooling	Mean years of schooling	Gross national income (GNI) per capita		
		Value	(years)	(years)	(2017 PPP \$)		
	2019	2019	2019 ^a	2019 ^a	2019	2019	2018
Very high human development							
1 Norway	0.957	82.4	18.1 ^b	12.9	66,494	7	1
2 Ireland	0.955	82.3	18.7 ^b	12.7	68,371	4	3
2 Switzerland	0.955	83.8	16.3	13.4	69,394	3	2
4 Hong Kong, China (SAR)	0.949	84.9	16.9	12.3	62,985	7	4
4 Iceland	0.949	83.0	19.1 ^b	12.8 ^c	54,682	14	4
6 Germany	0.947	81.3	17.0	14.2	55,314	11	4
7 Sweden	0.945	82.8	19.5 ^b	12.5	54,508	12	7
8 Australia	0.944	83.4	22.0 ^b	12.7 ^c	48,085	15	7
8 Netherlands	0.944	82.3	18.5 ^b	12.4	57,707	6	9
10 Denmark	0.940	80.9	18.9 ^b	12.6 ^c	58,662	2	10
11 Finland	0.938	81.9	19.4 ^b	12.8	48,511	11	11
11 Singapore	0.938	83.6	16.4	11.6	88,155 ^d	-8	12
13 United Kingdom	0.932	81.3	17.5	13.2	46,071	13	14
14 Belgium	0.931	81.6	19.8 ^b	12.1 ^e	52,085	6	13
14 New Zealand	0.931	82.3	18.8 ^b	12.8 ^c	40,799	18	14
16 Canada	0.929	82.4	16.2	13.4 ^c	48,527	5	14
17 United States	0.926	78.9	16.3	13.4	63,826	-7	17
18 Austria	0.922	81.5	16.1	12.5 ^c	56,197	-3	18
19 Israel	0.919	83.0	16.2	13.0	40,187	14	21
19 Japan	0.919	84.6	15.2	12.9 ^f	42,932	9	20
19 Liechtenstein	0.919	80.7 ^g	14.9	12.5 ^h	131,032 ^{ei}	-18	19
22 Slovenia	0.917	81.3	17.6	12.7	38,080	15	24
23 Korea (Republic of)	0.916	83.0	16.5	12.2	43,044	4	22

Source: <http://hdr.undp.org/en/composite/HDI>

Turkey ranks 54th as of 2019th HDI (UNDP, 2021)

Some Websites for Sustainable Development and Ecological Issues

- World Bank: www.worldbank.org
- International Monetary Fund: www.imf.org
- United Nations Conference on Trade and Development (UNCTAD): www.unctad.org
- United Nations Development Programme (UNDP): www.undp.org
- Food and Agricultural Organization (FAO): www.fao.org
- World Trade Organization (WTO): www.wto.org
- World Health Organization (WHO): www.who.int
- United Nations Industrial Development Organization (UNIDO): www.unido.org
- International Labour Organization (ILO): www.ilo.org

References

- <http://hdr.undp.org/en/content/human-development-index-hdi>
- <http://data.worldbank.org/data-catalog/sustainable-development-goals>
- http://ec.europa.eu/environment/beyond_gdp/download/factsheets/bgdp-ve-ans.pdf
- <https://stats.oecd.org/glossary/detail.asp?ID=430>
- http://www.opec.org/opec_web/en/data_graphs/40.htm
- http://elearn.uni-sofia.bg/pluginfile.php/84407/mod_resource/content/2/LectureNotes_Barbian-Sofia2014.pdf
- <http://www.futurenergia.org/ww/en/pub/futurenergia2007/resources/sp07.htm>
- <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>
- <https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report>