Trade and Climate Change

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- Challenges of climate change and burden-sharing: What is the appropriate balance of rights and obligations in our diverse world?
- Where does trade fit in?

Preliminaries

- The great *global* externality -- CΔ
- Inter-temporal problem: short-term actions against long-term consequences (costs now, benefits later), and the delayed consequences of inaction
- Climate justice
  - who is responsible and who gets hit the hardest?
  - Capacity to pay and to cope (mitigation and adaptation)
- Non-linearity, cannot do period by period analysis over time
- Uncertainty and risk (scientific and socio-economic)
- Public policy inertia in the face of uncertainty about the gravity and time-specificity of adverse effects
- Technology to the rescue – what we don't know now will save us later

Preliminaries: Uncertainty and Risk Preferences

- Should those who doubt the veracity of mainstream climate science nevertheless advocate inaction on climate change?
- What are the different social attitudes towards risk?
  - Risk-seeking preferences: taking higher risks to achieve above average returns
  - Risk-averse preferences: A guarantee has more weight than any other outcome
  - Risk-neutral preference: Risk insensitivity
- Behavioural studies show that societies collectively tend to be risk-averse
- If this is so, why not behave as if man-made, avoidable climate change is a real and potentially fatal threat?

Overview

- Climate Change and its Consequences
- Vulnerabilities
- Sources of Greenhouse Gas Emissions (GHGs)
- Policy and Climate Change
  - Subsidy Rules
  - Border Tax Adjustments
  - Pubic Policy
- Kyoto Protocol
- Paris (COP21)

Climate Change and its Consequences

Determinants of earth's climate

- Climate: average values of atmospheric conditions (atmosphere, land surface, snow, ice, oceans, rivers, lakes, living oganisms)
- Climatic balance requires that heat exchange between the sun and earth is in equilibrium
- The sun radiates heat to the earth and some is reflected back
- And some radiation gets though and warms the earth
- The earth re-radiates heat back to the sun but some is trapped on the way up by greenhouse gases (GHGs) in the atmosphere (CO_2, methane, nitrous oxide, CFCs, ozone, water vapour)
- As GHGs become more concentrated, the earth heats up so that energy is generated to maintain heat exchange equilibrium.

Determinants of earth's climate: Summary

- Three fundamental ways to change earth's radiation balance with the sun:
  - We have seen how radiation back from the earth can be affected by GHG concentrations
  - Second, changing the fraction of solar radiation that is reflected ("albedo" effect)
  - Third, changing incoming solar radiation (orbital change or changes in the sun – sun spots)

Vulnerabilities

Potential climate change impacts

- Importance of the **non-linearity** arguments and risks of sudden change (e.g. methane release)
- Melting glaciers, flood risk
- Rising sea levels affecting low-lying areas and coastal cities worldwide
- Drought, water shortages
- Declining crop yields, especially in tropical zones, leading to food crises
- Ocean acidification from rising CO^2 levels

Potential climate change impacts (cont.)

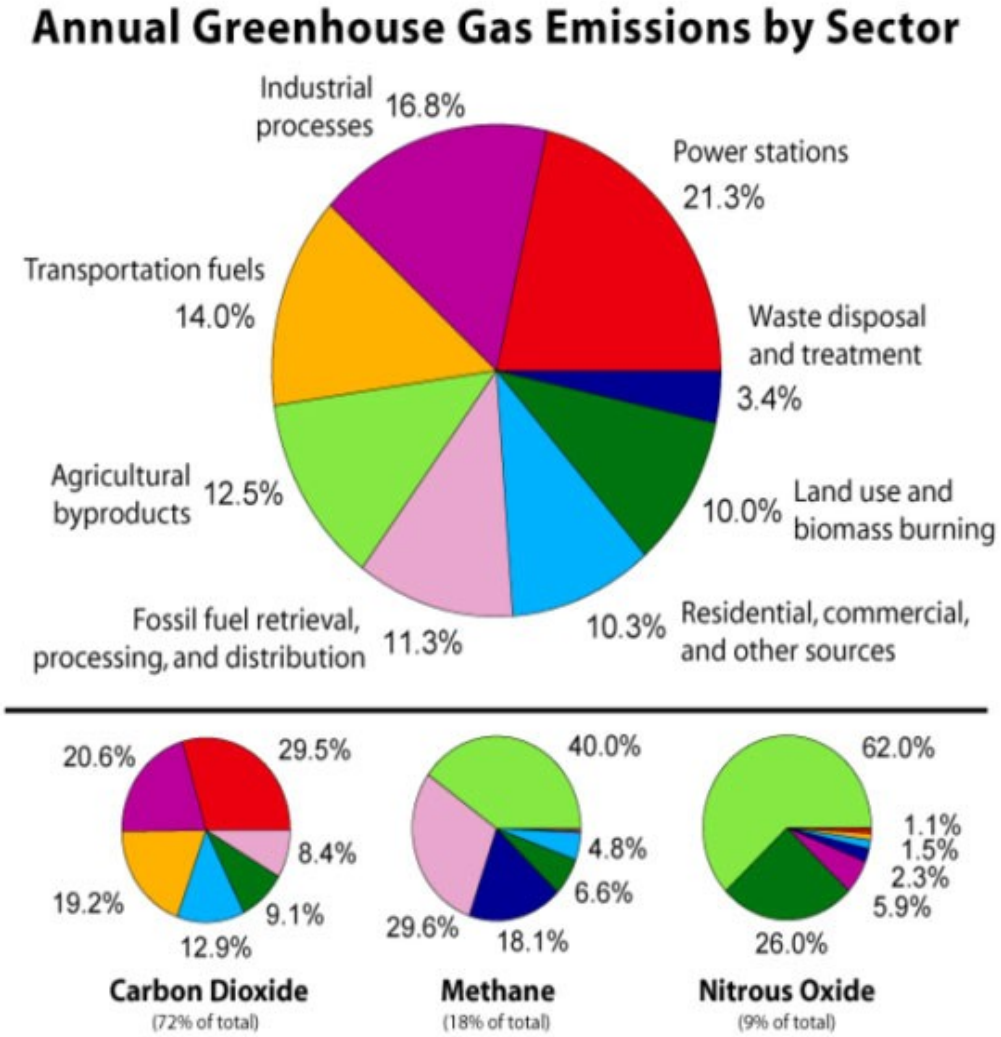
- Destruction of the Amazon, forest fires
- Malnutrition and heat stress
- Spread of vector-borne disease (malaria, dengue fever)
- Physical displacement of populations and risks of mass migrations
- Damage to ecosystems and species extinction
- Sudden shifts in weather patterns (monsoons, El Niño, La Niña)

Countries Most Affected by Climate-Related Threats (IBRD 2009)

Droughts	Floods	Storms	Sea levels	Agriculture
Malawi	Bangladesh	Philippines	Low-lying islands	Sudan
Ethiopia	China	Bangladesh	Vietnam	Senegal
Zimbabwe	India	Madagascar	Egypt	Zimbabwe
India	Cambodia	Vietnam	Tunisia	Mali
Mozambique	Mozambique	Moldova	Indonesia	Zambia
Niger	Laos	Mongolia	Mauritania	Morocco
Mauritania	Pakistan	Haiti	China	Niger
Eritrea	Sri Lanka	Samoa	Mexico	India
Sudan	Thailand	Tonga	Myanmar	Malawi
Chad	Vietnam	China	Bangladesh	Algeria
Kenya	Benin	Honduras	Senegal	Ethiopia
Iran	Rwanda	Fiji	Libya	Pakistan

Sources of GHGs

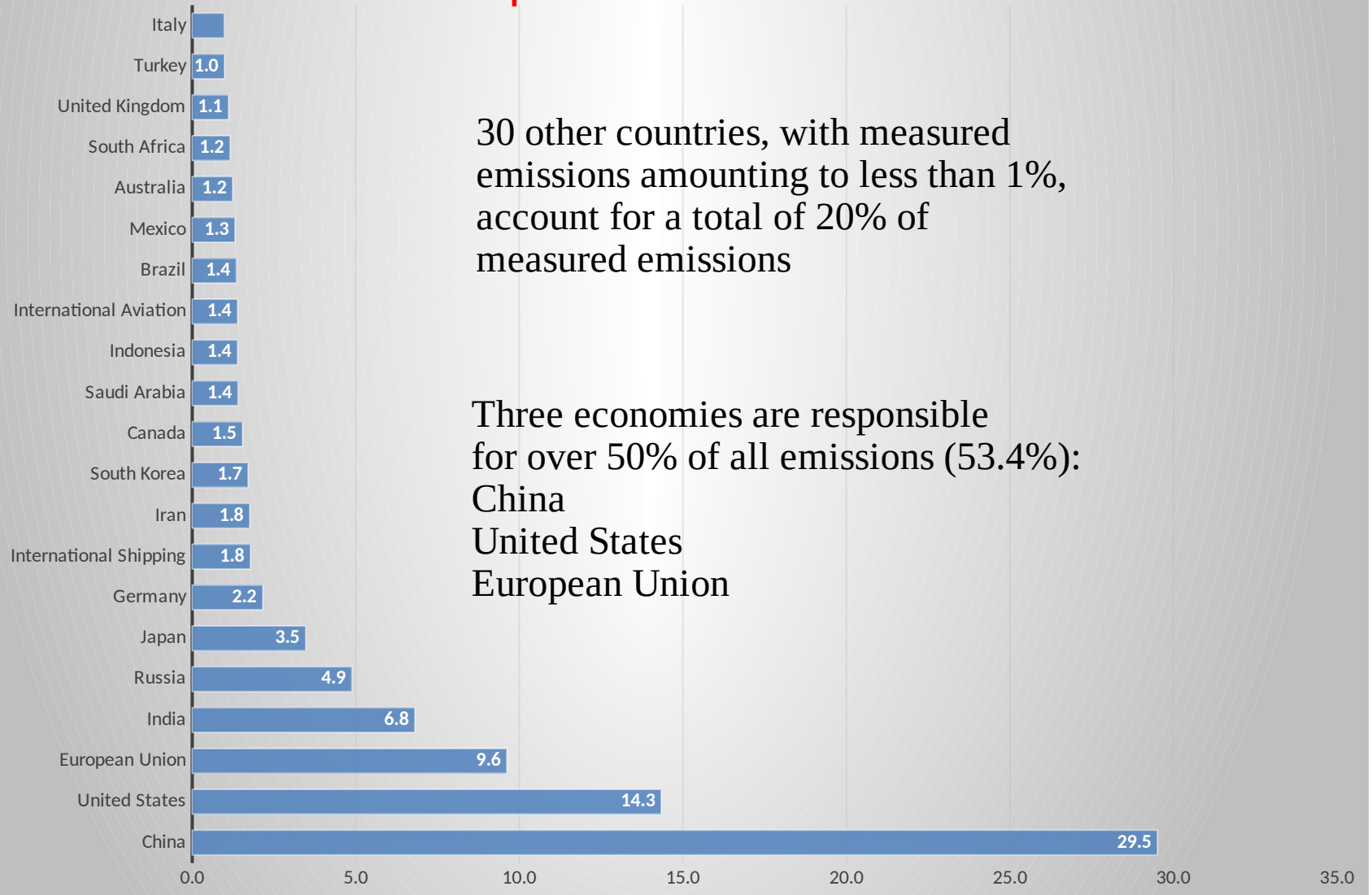
The sources GHGs by sector



GHGs and human activity

-- Burning fossil fuels (oil, natural gas, coal);
-- Extracting, processing, transporting and distributing fossil fuels;
-- Deforestation:
--Lime (calcium oxide) to make cement;
-- Methane from domesticated animals, rice cultivation and disposal of garbage and human waste;
-- Fertilizer use (nitrous oxide);
--CFCs have been stabilized, but replaced by HCFCs, which are a potent GHG, even if better for the ozone layer

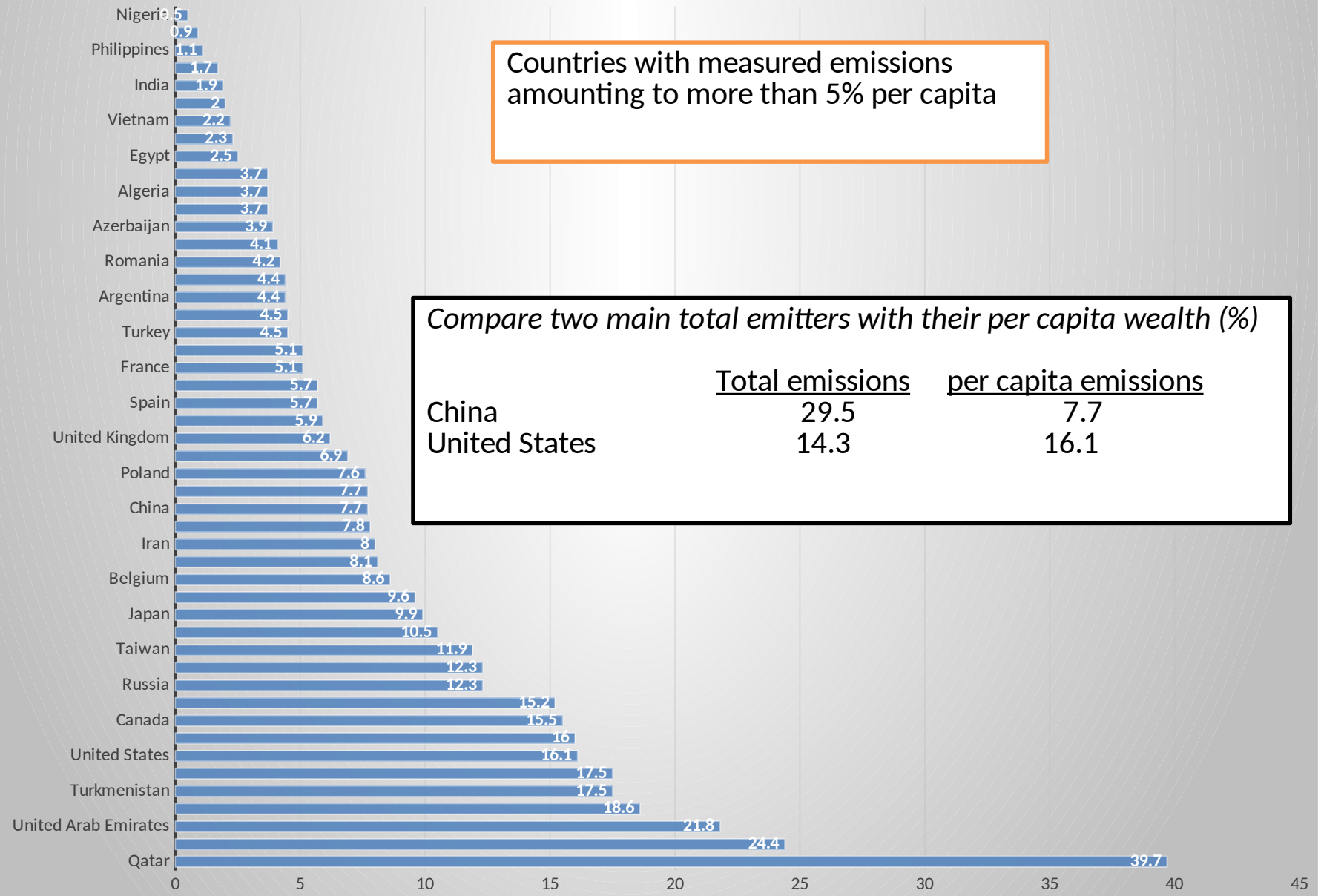
Who was most responsible for emissions in 2017?



30 other countries, with measured emissions amounting to less than 1%, account for a total of 20% of measured emissions

Three economies are responsible for over 50% of all emissions (53.4%):
China
United States
European Union

National emissions per capita (%)



Countries with measured emissions amounting to more than 5% per capita

Compare two main total emitters with their per capita wealth (%)

	Total emissions	per capita emissions
China	29.5	7.7
United States	14.3	16.1

Measurement Challenges

The “Ethical” Variables

- What should we do about climate changes and how quickly?
- “Societal” preferences are key, both through time and in terms distribution:
  - How do we value the future in relation to the present (discount rates)?
  - Should the interests of the unborn be valued the same as the rest of us?
  - Should poor people today assume the burden on behalf of tomorrow’s rich?
- This is about the interplay of inter-generational and intra-generational interests
- Can the market tell us anything, at least about the discount rate?

Integrated Assessment Models

- Once we have sorted out the ethical variables, we can try to estimate the optimal policy path to address climate change
- IAMs are cost-benefit analyses on steroids
- They seek to encapsulate multiple dimensions of economic interactions and climate change effects in a single, multiple equation estimation system:
  - Factors affecting economic growth
  - GHG emissions
  - The carbon cycle (incorporation of carbon dioxide into living tissue by photosynthesis and its return to the atmosphere through respiration, the decay of dead organisms, and the burning of fossil fuels).
  - Climate change (warming and cooling influences)
  - Climate damages (environmental degradation)
  - Climate change policies

Policy and Climate Change

Issues Relating to WTO Rules and Climate Change

- Subsidy rules
- Border tax adjustments
- General Exceptions

These and other policy issues often turn on the challenge of managing trade relations while taking care of the climate

Border Tax Adjustments

Climate Change Policy and Competitiveness and Carbon Leakage

- In the absence of uniform carbon emission policies internationally, the more stringent a national policy
  - The greater the potential for carbon leakage (emission reductions in one country offset by increases in another)
  - That means a greater the likely effect on competitiveness and the clamour for countervailing policy action
  - But what action?

Border tax adjustments to "level" trade playing field

- Indirect taxes generally eligible for adjustments
- Direct taxes generally ineligible
- For a border charge to be a tax adjustment and not a customs duty it must be equivalent to a tax on a "like" domestic product – that is, equivalent to a tax imposed domestically (Art. II.2(a)).

More on policy frames that would obviate the Carbon Leakage problem

- A uniform carbon tax would do the trick, which could be tax-burden neutral, and rendered equitable (nationally and internationally) through transfer mechanisms
- A destination principle approach to taking responsibility for emissions would do the trick
- Life-cycle analysis – food miles, buy local, potatoes, shampoo

Article XX (Public Policy) Exceptions

Article XX: exceptions

- Article XX can override Articles I,II,III, XI
- It is an exhaustive list of public policy exceptions, with a head-note that speaks of non-discrimination where comparable conditions prevail and least trade restrictive
- For climate change, health and natural resources
- Problem of attributing motive: have to go to “design, architecture and revealing structure”

Article XX (cont.)

- Two-tier test:
  - Is the measure justified in public policy terms?
  - Is the objective being met in the most appropriate manner (no longer a question of legitimacy of the objective)
- Tendency to yield more to public policy objective than in the past:
  - Burden of proof (alternatives, difficulty of implementing)
  - Interpretation of head-note (same conditions prevailing)
  - Importance of value at stake and effectiveness of measure in relation to trade objective

International Cooperation

- Kyoto Protocol
- Committee of the Parties Sessions:
  - Copenhagen (2009)
  - Cancun (2010)
  - Durban (2011)
  - Doha (2012)
  - Warsaw (2013)
  - Lima (2014)
  - Paris (2015)
  - Marrakesh (2016)
  - Bonn (2017)
  - Katowice (2018)

Kyoto Protocol

UNFCCC and Kyoto Protocol

1992 Rio, establishment of UN Framework Convention on Climate Change:

- **Stabilize atmospheric GHGs, annual reporting of GHG inventories, review progress on abatement, technical assistance to vulnerable countries, and participation in COP meetings**
- **41 Annex I countries are recommended to reduce emissions, developing countries exempted from immediate emission cuts, though may participate voluntarily**
- **All parties agree to mitigate climate change by, e.g. promoting climate-friendly technologies**

Dec 1997: Kyoto Protocol adopted by the UNFCCC (entered into force 16/2/2005):

- **Worldwide reduction of GHG emissions by average 5.2% below 1990 levels in first commitment period 2008-2012, implying a 10% cut relative to 2000 and approximately 20% relative to 2010**
- **Emission credits are tradeable, but mostly ETS only so far**
- **Non-ratifiers include United States**
- **Different targets (see Table)**

Important principle of shared but differentiated responsibilities and respective capabilities

Switzerland, Central and Eastern Europe, EU	-8%
US	-7%
Japan, Hungary, Canada, Poland	-6%
Russia, Ukraine	0%
Norway	+11%
Australia	+8%
Iceland	+10%

Kyoto Protocol: Flexibility Mechanisms

- Bubbles: group of countries pool and re-distribute targets
- Joint Implementation (JI) projects between Annex I countries
- Clean Development Mechanism (CDM) between Annex I and non-Annex I countries, leading to Certified emission Reduction (CERs) units for annex I investor in non-Annex I country; additionality essential
- International Emissions Trading (IET) of assigned amount units, allowing exchange of emission reductions via a cap-and-trade system; ETS scheme in EU is the best example

Paris (COP 21)

Paris (COP 21, 2015)

- Paris is probably the most successful COP ever
- It consolidated two decades of efforts at explicit climate change cooperation, starting with Kyoto in 2007
- The tenor of the outcome, however, follows a post-Kyoto tendency toward voluntarism, domestic demands, and peer pressure
- A common framework that commits all parties to mitigation efforts – all parties to have INDCs (Intended Nationally Determined Contributions)
- Elimination of double counting in assessing INDCs (multiple attributions of emissions reductions through double claiming or issuance)
- Stronger than before on reporting implementation efforts and submitting to review

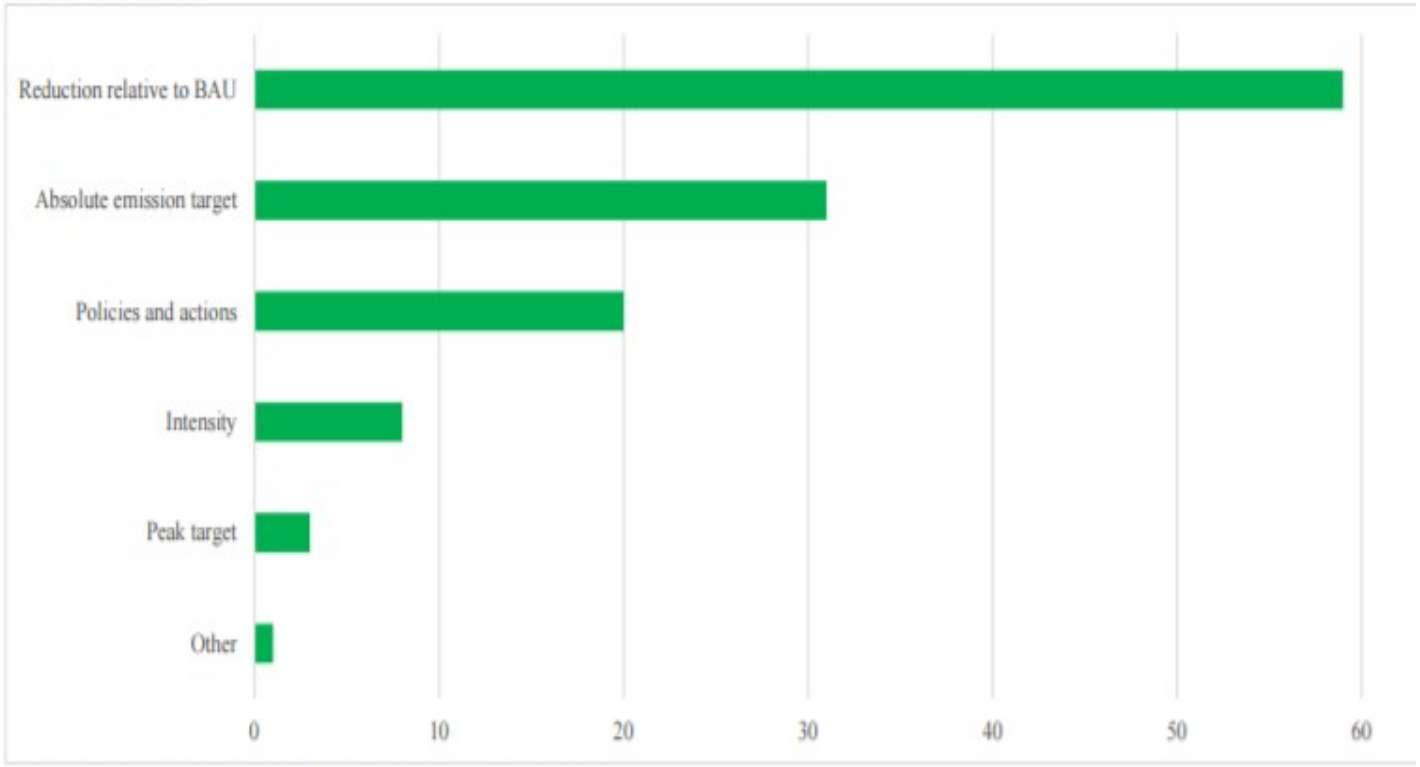
Paris (COP 21, 2015) cont.

- Reaffirmed goal of max. 2 degrees increase in warming threshold, with 1.5 seen as more desirable
- Mitigation – peak and establish net carbon neutrality as early as possible
- Adaptation commitments still somewhat aspirational, but some support offered and issue stays on the table
- Financial undertaking of $100 billion to go to 2025, with higher post-2025 goal

Paris (COP 21, 2015) cont.

- Loss and damage institutional provisions made permanent but no basis for liability or compensation claims
- New mechanism like Kyoto's CDM

Types of mitigation target communicated in the intended nationally determined contributions



Abbreviation: BAU = 'business as usual'.

Where current INDCs leave us

- 161 countries have articulated 188 INDCs
- Many developing country commitments subject to financial/technical support
- Estimated post-INDC GHG reduction commitments do not fall within least-cost 2°C by 2025 and 2030
- But 2°C target still attainable by 2100, but at much higher GHG reduction levels and cost
- In sum, attaining 2100 2°C scenario depends on:
  - Emissions up to 2030
  - Emissions post-2030
  - Socio-economic parameters
  - Technology

How many of you will be around in 2100, or is this about your children and their children?

Climate Action's ratings of selected INDC commitments

(32 countries, 80% global GHGs, based on Impact, Current Policy and Fair Share)

Inadequate	Medium	Sufficient
Argentina	Brazil	Bhutan
Australia	China	Costa Rica
Canada	EU	Ethiopia
Chile	India	Gambia
Japan	Indonesia	Morocco
New Zealand	Kazakhstan	
Russia	Mexico	
Saudi Arabia	Norway	
Singapore	Peru	
South Africa	Philippines	
South Korea	Switzerland	
Turkey	USA	
UAE		
Ukraine		

What is Kenya’s NDC?

Kenya's INDC has set out a goal to lower greenhouse gas (GHG) emissions by 30% by 2030, despite the fact that **Kenya** contributes a mere 0.1% to the total global emissions.

The **INDC** is **Kenya's** first official communication to the UNFCCC on its contribution to the global mitigation goal.

Increasing Public Awareness – Lagging Political Engagement

Public awareness of climate change realities, is growing but politics lags behind

US: President Trump in 2016: “Climate change is a hoax.” In 2019, “Climate scientists have a very big agenda.”

UK: After the warmest February on record, student strikes/civil disobedience over climate change, and protests by Extinction Rebellion protestors, this was the Attendance level in the UK Parliament for the first debate on climate in two years:

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