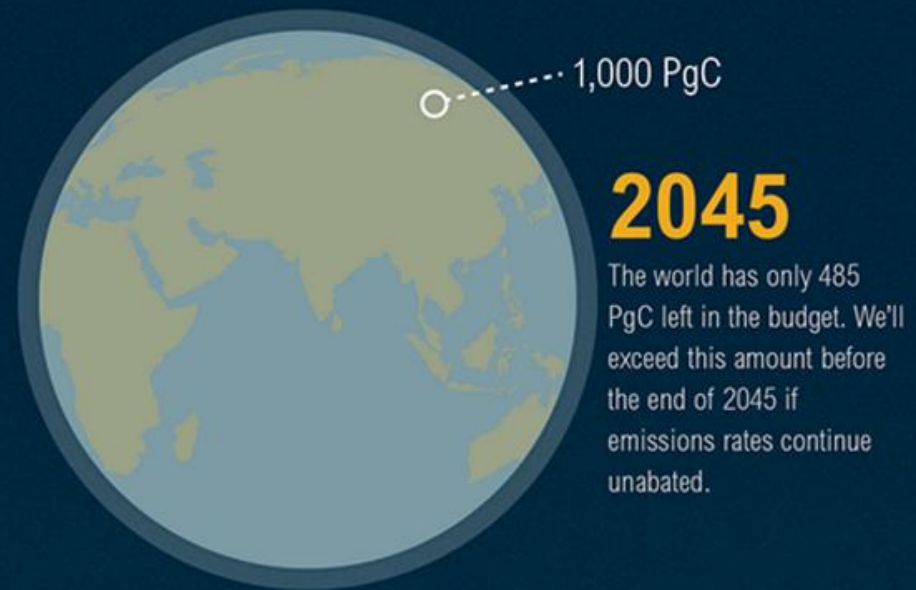


Climate change and fossil fuels

Filip Černoch
cernoch@mail.muni.cz

IPCC's Carbon Budget

- The amount of carbon dioxide that can be emitted if we are to have a likely chance of averting the most dangerous of climate change impacts.
- The world is to spend the remainder of it in just three decades.

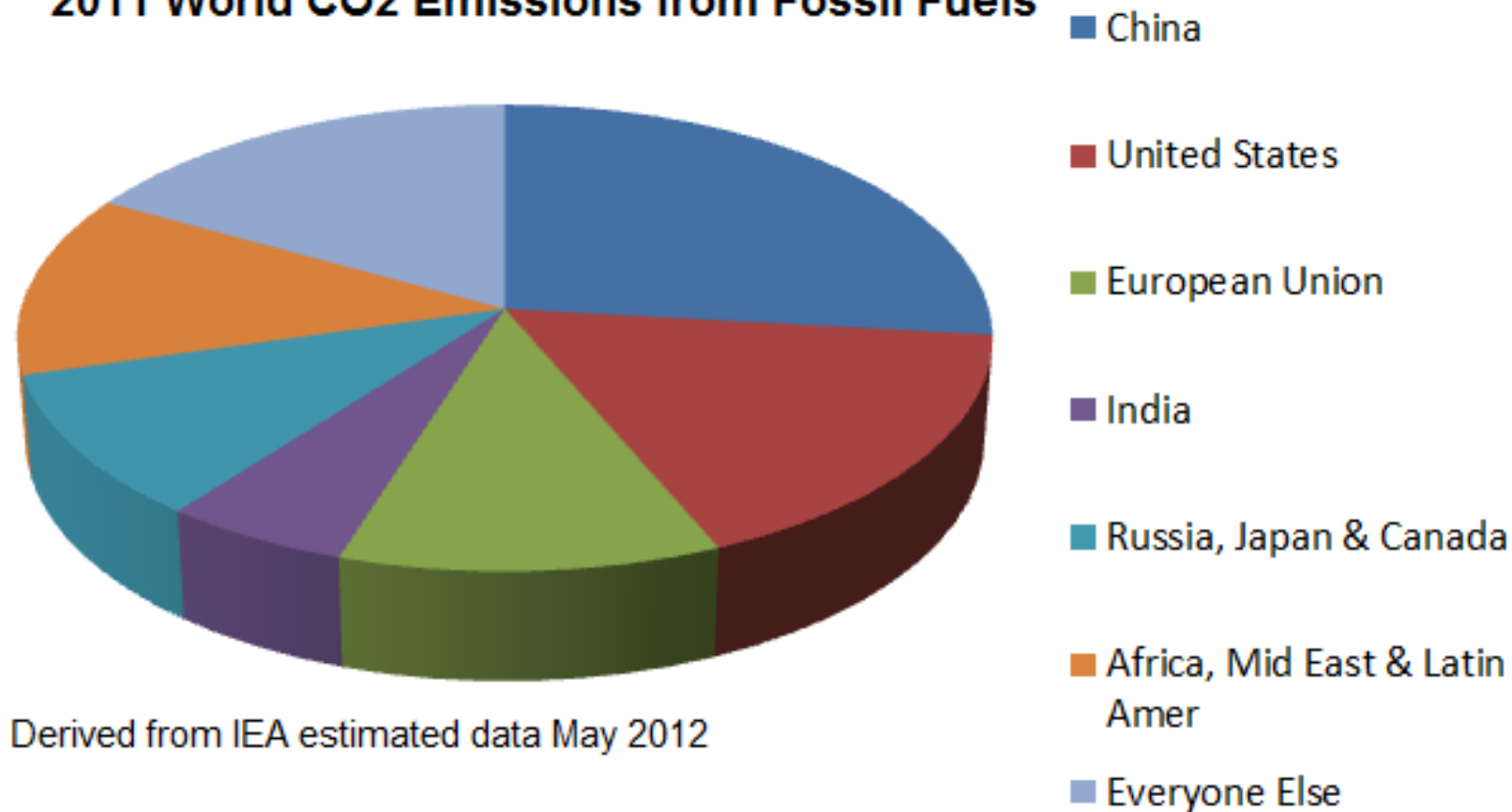


Climate change as a public policy problem

- **Is uniquely global**

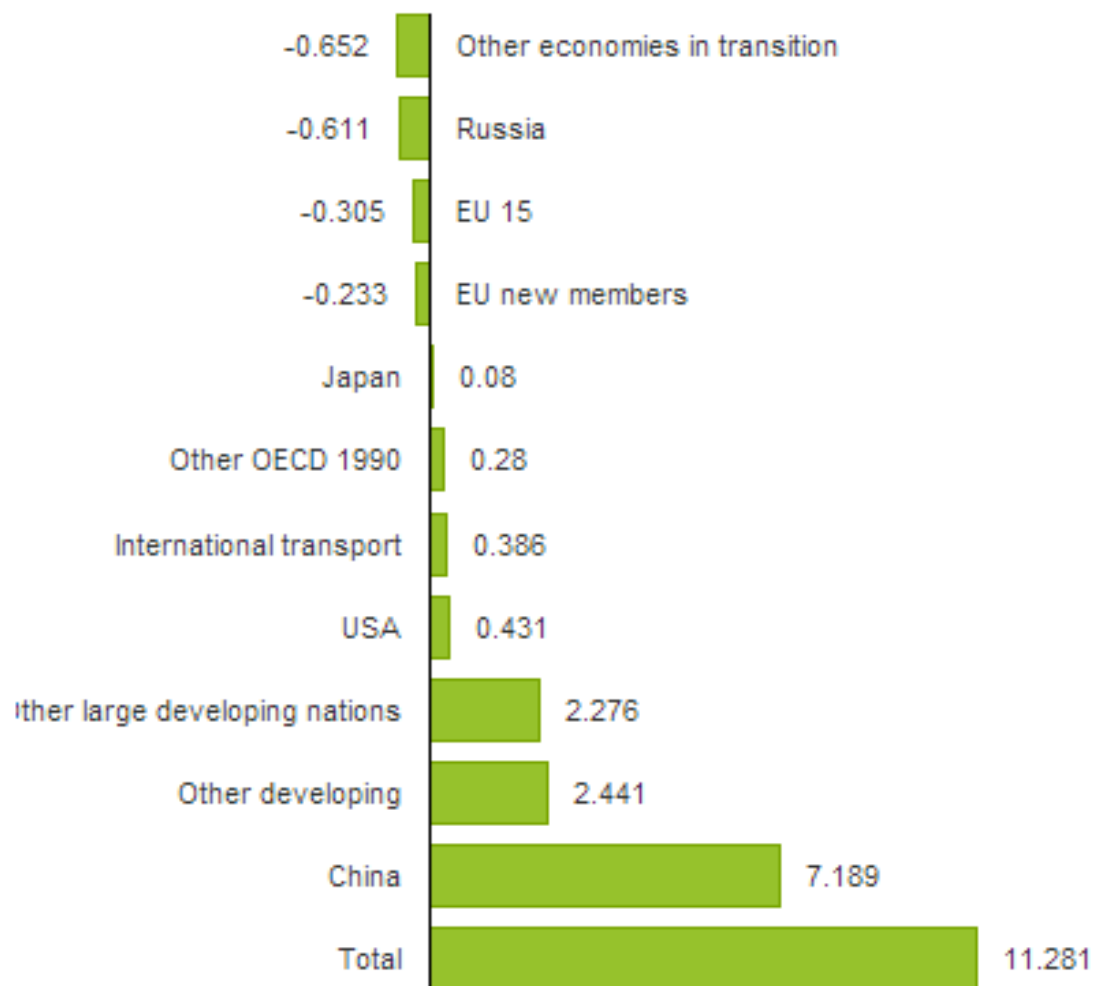
- Environmental problems usually regional (Beijing's smog, waste from EU's industry).
- Climate change - impacts may be regional, but phenomenon is global.
- The global nature of climate change also complicates any sensible climate policy. It is tough to get voters to enact pollution limits on themselves, when those limits benefit them and only them, but it is tougher to get voters to enact pollution limits on themselves if the costs are felt domestically, but the benefits are global = a planetary free riding problem.
- Impact of climate change is not evenly distributed among regions and countries. Different vulnerability.

2011 World CO2 Emissions from Fossil Fuels



Derived from IEA estimated data May 2012

Change in CO2 emissions (GT), 1990 to 2011



Climate change as a public policy problem

- **Is uniquely long-term**

- The past decade was the warmest in human history. The one before was the second-warmest. The one before was the third-warmest.
- Changes are evident. Arctic sea ice has lost half of its mass, three-quarters of this volume in only the past thirty years.
- But the worst consequences of climate change are still remote, often caged in global, long-term averages. The worst effects are still far off – but avoiding these predictions would entail acting now.

Climate change as a public policy problem

- **Is uniquely irreversible**

- Stopping emitting carbon now we still would have decades of warming and centuries of sea-level rise locked in. Full melting of large West Antarctic ice sheets may be unstoppable.
- Over 2/3 of the excess CO₂ in the atmosphere that wasn't there when humans started burning fossil fuels will still be present a hundred years from now. Over 1/3 will be there in 1000 years.

Climate change as a public policy problem

- **Is uniquely uncertain.**
- Last time concentration of carbon dioxide were as high as they are today, at 400 ppm, at Pliocene. That was over three million years ago, when average temperatures were around 1-2,5°C warmer than today, sea levels were up to 20 meters higher, and camels lived in Canada.
- We wouldn't expect any of these dramatic changes today. The greenhouse effect needs decades to centuries to come into full force, ice sheets need decades to centuries to melt, global sea levels take decades to centuries to adjust accordingly. CO₂ concentrations may have been at 400 ppm 3 million years ago, whereas rising sea levels lagged decades or centuries behind.

Costs of climate change

- Around current climates massive investments and industrial infrastructures is build, that makes temperature increases costly.
- The current models estimates that warming of 1°C will cost 0,5% of global GDP, 2°C around 1% GDP, 4°C around 4% GDP.
- We could think about damages as a percentage of output in any given year. At a 3 percent annual growth rate, global economic output will increase almost twenty-fold in a hundred years
- Or lets assume that damages affect output growth rates faster than output levels. Climate change clearly affects labor productivity, esp. in already hot countries. Then the cumulative effects of damages could be much worse over time.

Summary

- Climate change is unlike any other public policy problem. It's almost uniquely global, long-term, irreversible, uncertain. These factors are what make climate change so difficult to solve.

International regimes to fight climate change

- Who is responsible?
- Who is affected?
- Who should act?
- What is to be done?

International regime to fight climate change

- Who is responsible? (population growth + increasing consumption).
- Who is affected (common but differentiated vulnerabilities).
- Who should act? (divergence between the countries most responsible and countries most affected).
- What is to be done?

International regime to fight climate change

- Intergovernmental Panel on Climate Change – 1988.
 - Rio Summit on Earth – 1992 (UN conference on environment and development) → UNFCCC.
 - Kyoto Protocol.
 - 1997, in force 2005.
- = Existence of a generally accepted consensus on the climate change as well as the contribution of human activities to this change.

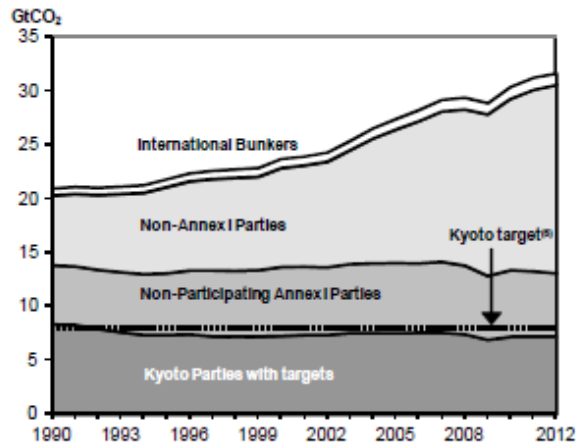
Kyoto Protocol (KP)

- 4 GHG (carbon dioxide, methane, nitrous oxide, sulphur hexafluoride) + hydrofluorocarbons and perfluorocarbons.
- Annex I. countries (37 industrialized countries + EU15), Non-annex I. parties.
- Reducing of GHG emissions by 5,2 % for the first commitment period of 2008-2012. (4,2 % after USA left). Base year 1990.
- Reduction of emissions from fossil fuel combustion; reduction emission in other sectors (land-use or direct industrial emissions); flexible mechanisms – Emission trading, CDM, JI.
- Common but differentiated responsibility.

Kyoto Protocol (KP) results

- In 2012, CO₂ emissions from fuel combustion across all Parties with KP targets were 14% below 1990 levels.
- Emissions in the EU-15 were 8% below 1990 levels.
- Some industrialised countries have seen significant increases (Australia +48%), New Zealand (+44%), Spain (+30%).
- Despite extensive participation of 192 countries the KP is limited in its potential – U.S. remains outside, developing countries do not have emission targets.
- The KP implies action on less than one-quarter of global CO₂ emissions.
- Through its flexibility mechanisms the KP has made CO₂ a tradable commodity, and has been a driver for the development of national emission trading schemes.

	1990 MtCO ₂	2012 MtCO ₂	% change 90-12	Kyoto Target		1990 MtCO ₂	2012 MtCO ₂	% change 90-12	Kyoto Target
KYOTO PARTIES WITH TARGETS ⁽¹⁾	8,339.6	7,157.0	-14.2%	-4.6% ⁽²⁾	OTHER COUNTRIES	12,014.7	23,497.4	95.6%	
<i>Europe</i>	3,154.5	2,906.4	-7.9%		<i>Non-participating</i>				
Austria	56.4	64.7	14.8%	-13%	<i>Annex I Parties</i>	5,550.9	5,983.9	7.8%	
Belgium	107.9	104.8	-3.1%	-7.5%	Belarus	124.8	71.1	-43.0%	-8%
Denmark	50.6	37.1	-26.7%	-21%	Canada ⁽¹⁾	428.2	533.7	24.6%	-8%
Finland	54.4	49.4	-9.1%	0%	Malta	2.3	2.5	10.4%	none
France ⁽³⁾	352.8	333.9	-5.4%	0%	Turkey	126.9	302.4	138.3%	none
Germany	949.7	755.3	-20.5%	-21%	United States	4,868.7	5,074.1	4.2%	-7%
Greece	70.1	77.5	10.5%	+25%					
Iceland	1.9	1.8	-2.5%	+10%	<i>Other Regions</i>	6,352.7	17,334.0	172.9%	none
Ireland	30.6	35.5	16.3%	+13%	Africa	545.0	1,032.4	89.4%	none
Italy	397.4	374.8	-5.7%	-8.5%	Middle East	549.9	1,847.1	199.5%	none
Luxembourg	10.4	10.2	-1.3%	-28%	N-OECD Eur. & Eurasia ⁽⁴⁾	630.0	528.8	-16.1%	none
Netherlands	155.8	173.8	11.5%	-8%	Latin America ⁽⁴⁾	842.5	1,583.3	87.9%	none
Norway	28.3	36.2	27.9%	+1%	Asia (excl. China) ⁽⁴⁾	1,507.5	4,291.4	184.7%	none
Portugal	39.4	45.9	16.4%	+27%	China	2,277.7	8,250.8	262.2%	none
Spain	205.2	266.6	29.9%	+15%					
Sweden	52.8	40.4	-23.4%	+4%	INTL. MARINE BUNKERS	363.2	602.2	65.8%	
Switzerland	41.6	41.3	-0.8%	-8%	INTL. AVIATION BUNKERS	256.3	477.8	86.4%	
United Kingdom	549.3	457.5	-16.7%	-12.5%					
European Union - 15	3,082.7	2,827.1	-8.3%	-8%	WORLD	20,973.9	31,734.3	51.3%	
<i>Asia Oceania</i>	1,339.5	1,641.7	22.6%						
Australia	260.5	386.3	48.3%	+8%					
Japan	1,056.7	1,223.3	15.8%	-6%					
New Zealand	22.3	32.1	44.0%	0%					
<i>Economies in Transition</i>	3,845.6	2,608.8	-32.2%						
Bulgaria	74.9	44.3	-40.9%	-8%					
Croatia	21.5	17.2	-20.1%	-5%					
Czech Republic	148.8	107.8	-27.6%	-8%					
Estonia	35.8	16.3	-54.3%	-8%					
Hungary	66.4	43.6	-34.4%	-8%					
Latvia	18.6	7.0	-62.4%	-8%					
Lithuania	33.1	13.3	-59.8%	-8%					
Poland	342.1	293.8	-14.1%	-8%					
Romania	167.5	79.0	-52.9%	-8%					
Russian Federation	2,178.8	1,659.0	-23.0%	0%					
Slovak Republic	56.7	31.9	-43.8%	-8%					
Slovenia	13.3	14.6	9.6%	-8%					
Ukraine	687.9	281.1	-59.1%	0%					



(1) On 15 December 2011, Canada withdrew from the Kyoto Protocol. This action became effective for Canada on 15 December 2012.

(2) The actual country targets apply to a basket of six greenhouse gases and allow sinks and international credits to be used for compliance. The overall "Kyoto target" is estimated for this publication by applying the country targets to IEA data for CO₂ emissions from fuel combustion, and is only shown as an indication. The overall target for the combined EU-15 under the Protocol is -8%, but the member countries have agreed on a burden-sharing arrangement as listed.

(3) Emissions from Monaco are included with France.

(4) Composition of regions differs from elsewhere in this publication to take into account countries that are not Kyoto Parties.

(5) The Kyoto target is calculated as percentage of the 1990 CO₂ emissions from fuel combustion only, therefore it does not represent the total target for the six-gas basket. This assumes that the reduction targets are spread equally across all gases.

Post-Kyoto system

- Second commitment period of KP for 2013--2020 concluded in 2012 (COP 18 in Doha). Belarus, Canada, Japan, New Zealand, Russia, USA and Ukraine missing. Others reduction commitments covering 13% of global GHG emissions at 2010 levels.
- To limit global temperature increase to less than 2°C above pre-industrial level, countries are negotiating a new climate agreement (partially finalised at COP21 in Paris 2015).
- It builds on the voluntary emission reduction goals for 2020 that were made at COP15 in Copenhagen.
- Developed and developing countries with these aims account for over 80% of global emissions. (goals nevertheless not sufficient to fulfill 2°C limit).

Paris agreement (COP21)

- Legally binding treaty with reduction commitments from 187 countries starting in 2020. It will enter the force once 55 countries covering 55% of global emissions are in. It:
- Reaffirms the goal of limiting global temperature increase below 2 degrees, while urging efforts to limit the increase to 1.5 degrees.
- Establishes binding commitments by all parties to make “nationally determined contributions” (NDCs), and to pursue domestic measures aimed at achieving them.
- Commits all countries to report regularly on their emissions and “progress made in implementing and achieving” their NDCs, and to undergo international review.
- Commits all countries to submit new NDCs every five years, with the clear expectation that they will “represent a progression” beyond previous ones.

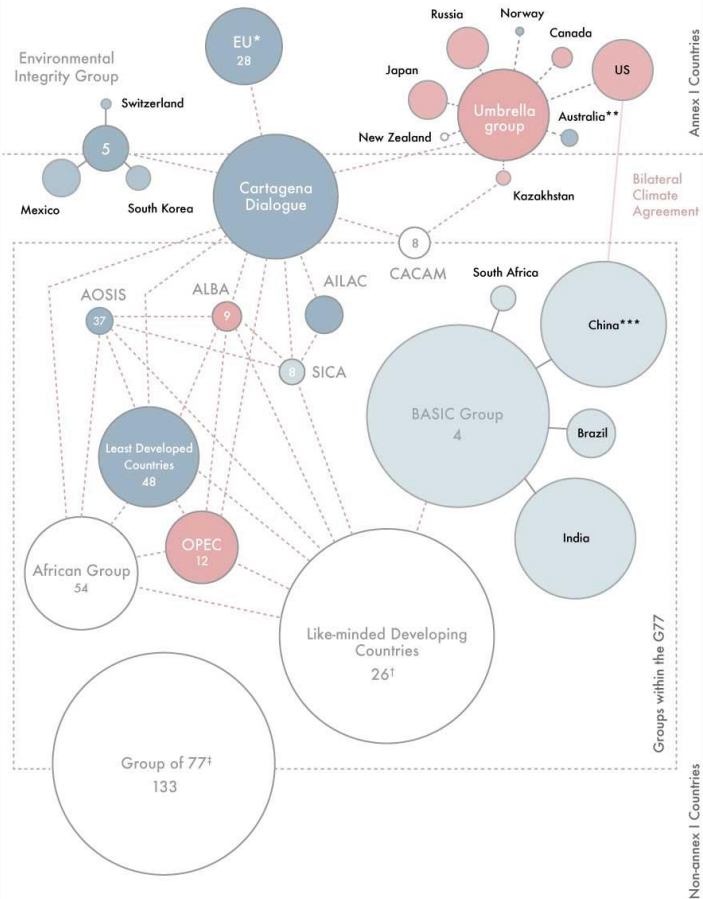
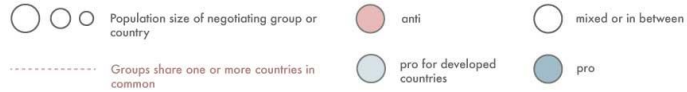
Paris agreement (COP21)

- Reaffirms the binding obligations of developed countries under the UNFCCC to support the efforts of developing countries, while for the first time encouraging voluntary contributions by developing countries too.
- Extends the current goal of mobilizing \$100 billion a year in support by 2020 through 2025, with a new, higher goal to be set for the period after 2025.
- Extends a mechanism to address “loss and damage” resulting from climate change, which explicitly will not “involve or provide a basis for any liability or compensation“.
- Requires parties engaging in international emissions trading to avoid “double counting“.
- Calls for a new mechanism, similar to the Clean Development Mechanism under the Kyoto Protocol, enabling emission reductions in one country to be counted toward another country’s NDC.

Alliances and common concerns at the UNFCCC

The Carbon Brief

Positions regarding legally binding targets for emissions reductions



* some Eastern European countries are anti the EU's position
 ** Australia is hoping this position will prevent the agreement of a successful treaty at all
 *** but has intimated that its position could change in favour of a universal treaty in the future

† membership is changeable
 † now expanded to 133

AILAC - Independent Association of Latin America and the Caribbean
 ALBA - Bolivarian Alliance for the Peoples of Our America
 AOSIS - Association of Small Island States
 BASIC - Brazil, South Africa, India and China
 CACAM - Central Asia, Caucasus and Moldova
 LMDC - Like-Minded Developing Countries
 OPEC - Organisation of the Petroleum Exporting Countries
 SICA - Central American Integration System

Major cleavages

- Should be a global climate agreement legally binding or not?
- Whom it should bind?
- How much aid to provide to help countries adapt to climate change? (Umbrella group vs G77 group).
- Should compensation be given to developing countries for the damage caused by climate change? (loss and damage).

Post-Kyoto system summary

- While obligations are to start from 2020, emissions from the energy sector need to peak by 2020 if there is to be a reasonable chance of limiting temperature rise to below 2°C.
- Complementary initiatives outside the UNFCCC are needed.



CLIMATE SUMMIT

WHAT IF IT'S A BIG HOAX AND WE CREATE A BETTER WORLD FOR NOTHING?

- ENERGY INDEPENDENCE
- PRESERVE RAINFORESTS
- SUSTAINABILITY
- GREEN JOBS
- LIVABLE CITIES
- RENEWABLES
- CLEAN WATER, AIR
- HEALTHY CHILDREN
- ETC. ETC.



JOEL PETT
12/7/19 USATODAY

Author: Joel Pett

Sources

- Wagner, G.; Weitzman, M.L.(2015: Climate Shock: The Economic Consequences of a Hotter Planet
- Figueres, Ch.-Ivanova, H.M.: Climate Change: National Interests or a Global Regime?
- IEA: CO₂ Emission from Fuel Combustion
- Carbon Brief
- Center for Climate and Energy Solutions