“Challenges for COP 21 and beyond”

MIDI MINATEC
Grenoble Ecole de Management

Joachim Schleich, GEM
4 December 2015
CO₂ levels hit record high for 30th year in a row –WMO (PR Headline 9-11-2015)

"Every year we say that time is running out. We have to act NOW to slash greenhouse gas emissions if we are to have a chance to keep the increase in temperatures to manageable levels."

Michel Jarraud
WMO Secretary-General
Climate change is already happening

Observed change in surface temperature 1901-2012

Source: IPCC WG 1 (2013)
What are the causes?...comprehensive picture

Source: Climate Change Starter’s Guidebook UNDP (2010).
Which regions are responsible for climate change and which are affected the most?

Current world emissions:

- ¼ G7 countries
- ¼ China
- ¼ Rest of G20
- ¼ Rest of World

#Facts4Paris

Source: Malte Meinshausen, Joeri Rogelj, Louise Jefferey, Farhana Yamin, Special Climate and Energy College Seminar at COP21, 1 December 2015,
Climate Policy Target at UN Level

• To avoid dangerous climate change, objective is to limit the average global surface temperature increase to 2°C compared to the pre-industrial average (COP 15)

• “2°C target” requires global reduction of 50-85% of 1990 GHG emission levels by 2050 (and peak before 2020) (IPCC 2007)
IEA (2013) Emission scenario: Need for action

Figure 3.15 World energy-related CO₂ emissions abatement in a “delayed” 450 Scenario relative to the New Policies Scenario

Need to dramatically reduce greenhouse gas emissions, while demand for energy is surging (in particular in Asia)

IEA (2013): World Energy Outlook, Special Report
What does 2°target imply?

- Global greenhouse gas emissions now about 50 GtCO$_2$/year
- Global emissions by 2050: < 20 GtCO$_2$/year
- Population in 2050: around 9 billion
- Hence an average person can emit 2 tCO$_2$/year in 2050
- At current modes of production, 2 t CO$_2$/year means:
  - one flight to Australia per year
  - 20–40 km in a car each day
  - 2 meals each day
  - “or” not “and” ! ! ! ! !
Costs of inaction

**Earlier** studies:
Climate impacts are between **5-20% of GDP** in 2050 Stern Report (2006)

**More recent** findings:
“........unmitigated warming is expected to reshape the global economy by reducing average global incomes roughly 23% by 2100 and widening global income inequality...”

Costs of Action (Mitigation)

- IPCC (2014): mitigation efforts to achieve 2°C target cost about 3.4% of global consumption levels compared to “business as usual” scenario in 2050
- So the benefits of action likely exceed the costs of action!
Climate policy (UN level) – From Rio via Kyoto to Paris

- **Earth Summit in Rio** in 1992: 154 states signed the United Nations Framework Convention on Climate Change (UNFCCC) and pledged to take action against global warming.

  - Industrialized countries committed themselves originally to:
    - on average ~5% Emissions reduction of 6 GHG ($\text{CO}_2$, $\text{CH}_4$, $\text{N}_2\text{O}$, HFCs, PFCs, and $\text{SF}_6$) in 2008-2012 compared to 1990/95 levels.
  - Targets vary by region / country
  - No targets for other countries
  - US and Canada, among others, later “defected”
Why is there so little progress in international climate policy?

1) Tragedy of the commons (social dilemma, free riding)
2) Disagreement over burden – sharing (“effort sharing“)

• Guiding principle (CBDR)
  
  “The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof” (UNFCCC 1992).

• Little agreement on how to implement in practice
Typical normative fairness criteria

- Accountability (Polluter pays)
- Ability to pay
- Per-capita emissions
- Sovereignty

Normative fairness criteria
Applying common normative criteria to allocate remaining emissions

Different criteria lead to very different distributional effects

World Bank (2010)
Which fairness criteria should be applied?

Negotiator’s perspective

Accountability (Polluter pays)

Sovereignty

Per-capita emissions

Ability to pay

Self-serving bias

Normative fairness criteria
Citizens’ perspective

Representative household survey in China, US & Germany

“How strongly should the following rules be considered when allocating costs in order to reduce global greenhouse gas emissions?”

- **Accountability** (polluter pays): Every country has to bear costs according to emissions it causes (hence countries causing higher emissions have higher share of costs)
- **Capability** (ability to pay): Every country has to bear costs according to economic strength (hence richer countries have higher share of costs)
- **Egalitarian**: Every country is allowed to produce same amount of emissions per capita (hence countries with currently high emissions per capita have higher costs)
- **Sovereignty**: Every country is allowed to produce same share of global emissions as in past (hence proportional reduction of emissions is same for every country)
Which fairness criteria should be applied?

- Accountability (Polluter pays)
- Normative fairness criteria
- Per-capita emissions
- Ability to pay
- Sovereignty
- No self-serving bias

"Citizens' perspective"
COP 21: Paris

• Objectives
  • Legally binding agreement on post 2020 climate action, succeeding the Kyoto Protocol
  • So far: Intended Nationally Determined Contributions (INDCs) – „Bottom-up“ Approach
$\text{CO}_2\text{eq}$ in Megatons, 2020 - 2030 (INDCs)

Source: Malte Meinshausen, climatecollege.unimelb.edu.au
How effective are INDCs (if implemented!)?

The INDCs have the capability of limiting the forecast temperature rise to around 2.7 degrees Celsius by 2100, by no means enough but a lot lower than the estimated four, five, or more degrees of warming projected by many prior to the INDCs.” (Christina Figueres, UNFCCC Executive Secretary)

Source: SYNTHESIS REPORT ON THE AGGREGATE EFFECT OF INTENDED NATIONALLY DETERMINED CONTRIBUTIONS (INDCs), UNFCCC, Bonn, Nov. 2015
COP 21: Paris

- Objectives
  - Legally binding agreement on post 2020 climate action, succeeding the Kyoto Protocol
  - So far: Intended Nationally Determined Contributions (INDCs) not very ambitious; need to agree on review process leading to more ambitious commitments in the future (criteria?) – “Bottom-up” Approach
  - Commitments regarding adaptation to climate change, financing of mitigation and adaptation in developing countries
  - Technology development and transfer
  - Capacity building
  - (Transparency)
Will Paris Climate Summit be successful?

1> Will the Paris Climate Summit lead to a mandatory international agreement on climate?

GEM/ZEW Energy Market Barometer 2015
Thank you!

Questions?

Comments?

GEM Energy Team:
http://research.grenoble-em.com/energy-0