Climate Change and International Justice: On the Universal Destiny of Created Goods

Conference on Climate Change in Asia: Global Warming and Climate Change and Its Impact on Asia Challenges and the Response of the Church

Bangkok, 19 and 20 October 2011

Prof. Dr. Ottmar Edenhofer
What are the Impacts on Climate?
“Tipping processes of the climate system” show a strong reaction already to small climate changes

Schellnhuber, 1996; Lenton et al., 2008
Prognosis for 2100 (IPCC 2007)

2°C above pre-industrial level

World Map of wealth

Source: Füssel (2007)
World Map of Carbon Debt

Fossil CO2 emissions per person (1950-2003)

Source: Füssel (2007)
Carbon Debt and Wealth

Fitting line: \( \ln P = 0.987 \ln K + c \)

Source: Füssel (2007)
The Preindustrial Earth System – A Sketch

According to Lenton (2011)
From a Solar to a Fossil Stock Economy
The Earth System of the Anthropocene

According to Lenton (2011) and Ostrom (2011)
Fossil Resources Stock – A Lottery Prize!

The Global Economy, 1–2006 AD

Can this really continue???
Facing which Future?

According to Lenton (2011) and Ostrom (2011)
Facing Which future?

According to Lenton (2011) and Ostrom (2011)
GHG emissions resulting from the provision of energy services contribute significantly to the increase in atmospheric GHG concentrations.

SRREN, Edenhofer et al. (2011)
We are not on track – Renaissance of Coal!

SRREN, Edenhofer et al. (2011)
The BAU Scenarios Could Exceed the Level of Greenhouse Gas Concentration of 600ppm (~4°C Temperature Increase)

SRREN, Edenhofer et al. (2011)
Atmosphere as a Global Common

- Atmosphere is a scarce resource – fossil carbon is not
Stewardship refers to a responsibility to take care of something owned by someone else. In that sense, future generations and the Unborn has to be represented within decision making processes.

Universal Destiny of the Goods of Creation: The Global Commons like the atmosphere, the forests, oceans are at risk to be destroyed when common property rights cannot be established due to an extremely unequal distribution of wealth.

Solidarity: Without a vision of a unified humankind, global cooperation remains infeasible; the preferential option for the poor offers a new perspective in evaluating governance and policies.

Subsidiarity is a fundamental principle of good governance: the central authority should perform only those tasks which cannot be performed effectively at a local level. In addition, the central authority should entitle the local level to carry out its own tasks.
The Social Teaching of the Church...

...the church‘s best kept secret
Atmosphere as a Global Common

• Atmosphere is a scarce resource – fossil carbon is not
• Rules for good stewardship:
  – Assigning property rights according to the scarcity of the atmosphere
  – Distributing the emission rights according to principles of fairness and justice
Allocation of Emission Rights

Consumption losses [%]

USA
Japan
Europe
Russia
Middle East
Latin America
Asia (Others)
China
India
Sub-Saharan Africa
Rest of the World
World

Per capita
Per GDP
C&C: Contraction & Convergence
C&C with historical Responsibility
CDC: Common but Differentiated Convergence

Knopf et al. 2010
Universal Destiny of the Goods of Creation

Private Property can be justified if a clear responsibility is assigned to stewards

Emissions Trading is not about the commercialisation of the atmosphere but about
  Protecting the global commons (e.g. reduction of emissions)
  Assigning responsibilities to stewards
  Distributing the emission rights according to fairness
GHG emissions resulting from the provision of energy services contribute significantly to the increase in atmospheric GHG concentrations.

SRREN, Edenhofer et al. (2011)
The Great Transformation

Mitigation technologies: 450ppm  World

Luderer et al. (2011)
The current global energy system is dominated by fossil fuels.

Shares of energy sources in total global primary energy supply in 2008

SRREN, Edenhofer et al. (2011)
RE growth has been increasing rapidly in recent years.

150 GW of new RE power plant capacity was built in 2008-2009.

This equals 50% of all power plants built during that period.
The Technical Potential of Renewable Energies

SRREN, Edenhofer et al. (2011)
The Costs of Renewables Are Often Still Higher Than Those of Non-Renewables But…

SRREN, Edenhofer et al. (2011)
Some RE Technologies Are Already Competitive

- Binary cycle plant
- Domestic pellet heating system
- Palm oil biodiesel

SRREN, Edenhofer et al. (2011)
Renewable Energies Have a Potential to Lower Costs

SRREN, Edenhofer et. al. 2011
RE can contribute to sustainable development

- RE can accelerate access to energy, particularly for the 1.4 billion people without access to electricity and the additional 1.3 billion people using traditional biomass

- RE deployment can reduce vulnerability to supply disruptions and market volatility

- Low risk of severe accidents

- Environmental and health benefits
Global RE Primary Energy Supply from 164 Long-Term Scenarios versus Fossil and Industrial CO₂ Emissions

CO₂ Concentration Levels
- Category I (<400 ppm)
- Category II (400-440 ppm)
- Category III (440-485 ppm)
- Category IV (485-600 ppm)
- Baselines

SRREN, Edenhofer et al. (2011)
Global RE Primary Energy Supply from 164 Long-Term Scenarios versus Fossil and Industrial CO$_2$ Emissions

SRREN SPM, Figure SPM.9

SRREN, Edenhofer et al. (2011)
Potential Role of Renewables

Bioenergy

Direct Solar Energy

Geothermal Energy

Hydropower

Wind Energy

CO₂ Concentration Targets

Primary Energy Supply [EJ/yr]

2030 2050

Maximum 75th Median 25th Minimum

Baselines Cat. III + IV (440 - 660 ppm) Cat. I + II (<440 ppm)

Deployment Level 2008

Bioenergy Supply is Accounted for Prior to Conversion

Primary Energy Supply is Accounted for Based on Secondary Energy Produced

SRREN, Edenhofer et al. (2011)
Macroeconomic Costs

Limited availability of technologies

SRREN, Edenhofer et al. (2011)
Options of Integration

- Demand management
- Network expansion
- Improvement of weather forecast
- Flexible power plants
- Energy storages
New Storage Technologies

Andasol I, Spain
Capture and Storage of CO₂ (CCS)

Atmospheric CO₂

Fossil resources

Combustion

Fossil CCS

BioCCS/ Air capture

Geological CO₂ storage

Carbon Capture and Cycling (CCC)

Atmospheric CO₂

Combustion

BioCCS/ Air capture

CₓHᵧ e.g. methanisation

Biological CO₂ storage

Electricity from RES

X = Cycling, Storage, Utilization
RE-Specific Policies and RE Targets (2011)
http://srren.ipcc-wg3.de/report
GLOBAL ABER GERECHT
Klimawandel bekämpfen, Entwicklung ermöglichen

EIN REPORT
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http://www.klima-und-gerechtigkeit.de/