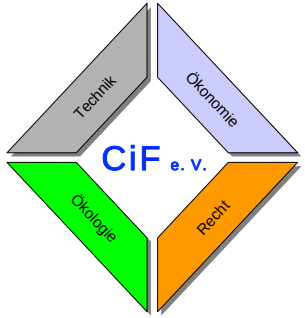
Landuse - Brownfield Redevelopment
- reuse - ecological aspects - new urbanity -

Herbert Klapperich, Claudia Werner
TU Bergakademie Freiberg & CiF e. V., Germany
TU Dortmund & CiF e. V., Germany

"New Urbanity" ... Urban Services - regional soil protection - regional planning & real estate & renewable energies



CiF e. V.

INTERDISCIPLINARY CENTER OF EXCELLENCE FOR BROWNFIELDS & RENEWABLES

site & renewable energy

RESEARCH & DEVELOPMENT

CONSULTING & SERVICES

with concentrated competence

for the management of contaminated sites

Sites & Real Estate into the Business Cycle!

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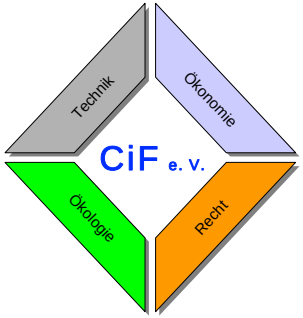
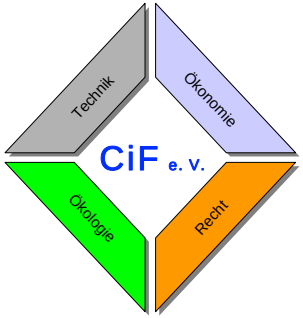


TECHNOLOGY

ECONOMICS

Reports – Expert Reports – Design – Project Management

- Geotechnology in Construction and Mining
- Waste, industrial wasteland, reinstatement of mining sites, site conversions
  - investigation
  - remediation
  - stabilisation
- Remediation and stabilisation technologies *methods/techniques, development*
  - soil and groundwater protection
  - historic buildings (conservation)
  - site reinstatement
  - re-cultivation
- Project specific site pre-development
- Total site remediation
  - involving total spectrum of four central disciplines
  - interdisciplinary actions
  - synergetic design
- Project Management *design – contract award – completion*
- Planning laws – reinstatement of mining sites – town planning analysis and sustainable town development
- Commercialisation
  - site/real estate in the business cycle
  - area development policies of local authorities
- Risk appraisal and management
- Project development
  - business case
  - economic appraisal
  - financing
  - subsidies and taxation issues
  - market research
  - marketing
- Public Private Partnerships
  - concept
  - project management
  - mediation
- Risk management/controlling
  - budgeting/cost estimating
  - risk identification
  - risk appraisal
  - risk management
  - portfolio methods
  - due diligence
- Property and real estate management



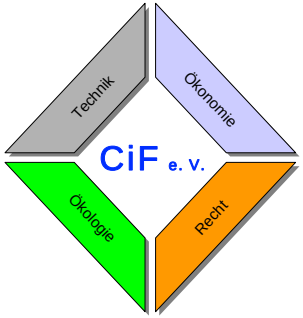
ECOLOGY

- Site appraisal
  - geology/hydrogeology/hydrology
    - potential of contamination
    - transport of substances
    - threat to ground water
  - ecology
    - soil and water protection
    - bio-availability of substances
    - requirement of protection
    - threat to bio-topes
- Protectable commodities
  - ground water
  - surface water
  - soil characteristics/soil consciousness
  - soil protection
    - containment of soil degradation
    - building spread/land cover
    - biodiversity
    - soil and soil contamination
    - ingress of hazardous substances, waste
    - land and water management
    - re-degradation/soil formation
    - preventative measures "hazardous substances"
- Action paths in the cycle of substances soil/water/fauna/flora → human
- Re-cultivation
  - environmental protection
  - ecological balance
- Land management
  - minimising usage of greenfields
  - rehabilitation

LAW

- Planning and building regulations
- Soil protection and remediation laws
- Anti-pollution laws and water rights
- Law of environmental impact analysis and compatibility
- Environmental conservation laws
- Recycling law
- Commercial law
- Reform/privatisation of public administration

- Soil protection by planning standards
  - building regulations
  - regional planning laws
  - state planning laws
  - requirement of co-ordinated regulations



CHINA

FINANCIAL TIMES **SPECIAL REPORT** | Thursday October 1 2009

Inside
Today's big army parade is domestic show – but not entirely, says **Kathrin Hille**
Page 3

Early arrival at new world party

But there are formidable obstacles in way of China becoming a legitimate superpower, says Geoff Dyer

To mark the 60th anniversary of the founding of the People's Republic of China, the capital will put on a highly-organised show of strength today with a military parade displaying the country's gleaming new weapons systems, accompanied by floats and a marching band of more than 1,000 people.

And to inject a bit of the razzmatazz from last year's Olympics, Zhang Yimou, the film director who put on the opening ceremony at the Games, has been brought in to organise a firework display.

As they stand on a special podium to watch the display pass along Beijing's main avenue and Tiananmen Square, China's leaders might be forgiven for feeling quite pleased with themselves.

Only a few months ago, some pundits were predicting that China's one-party state could end up as the biggest victim of the global financial crisis as factories along the country's south and east coasts were forced to close down, sending millions of migrant workers back to their rural home towns.

Yet a year after the collapse of Lehman Brothers, China appears to be

Inside this

The economy A st… has been built on a… loans, writes **Geoff D…**

The environment R… run-up to the Copen… change negotiations … in Beijing's thriving …

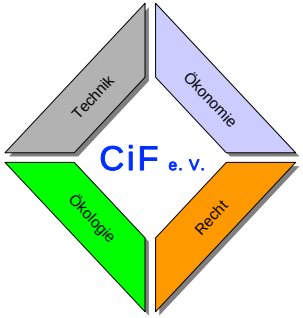
Cars Automobile sa… 90 per cent last yea… the US off the top s… Patti Waldmeir **Page**

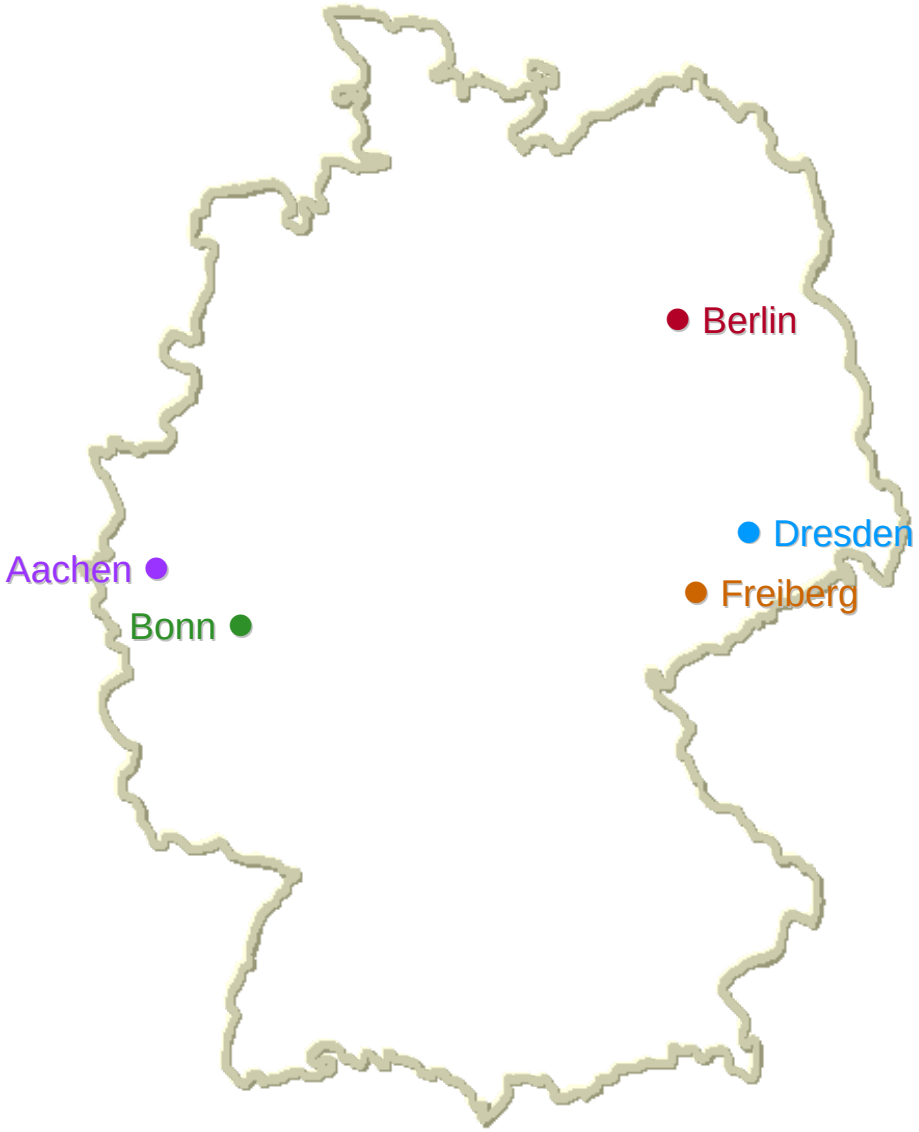
Outward investmen… enterprises via for… China pushes its glo… expansion. Jamil Ano… **Page 4**

to be a strong source… needs a much broa… tem that will offer … of funding, includi… bond and equity mar… Fang Xinghai, d… the Shanghai gover…

Summary

New technologies in remote sensing, geographic information systems (GIS), modelling and visualisation enable an accurate assessment of environmental potentials and planning options. This covers the derivation of detailed and reliable information on natural capabilities as well as on socio-economic factors and economic calculations. The instruments of spatial information management and modelling allow an integrated holistic evaluation of land use potentials and options. The derivation of future land use proposals is an important support for the decision making process and can also be applied for sustainable brownfield management. Moreover interactive data representation and internet applications stimulate the involvement and the communication of all stakeholders.

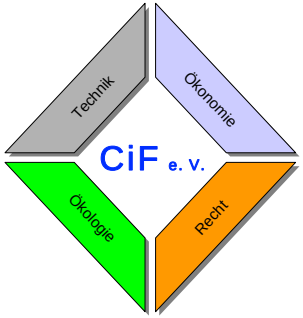



Berlin
Dresden
Freiberg
Aachen
Bonn

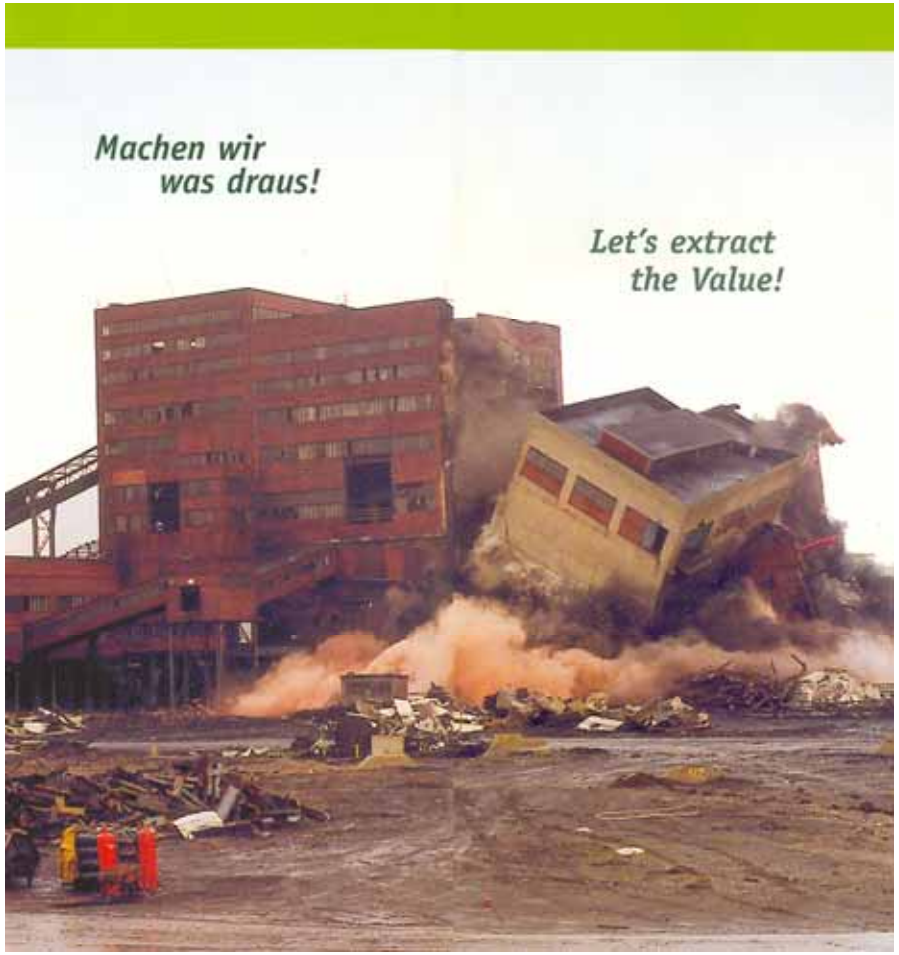
Keywords:

The interaction between land use and water management is the **prominent overall issue in megacities**. Land-cover and land-use leads to the subject of brownfields which play an important role in water management. The **sustainable redevelopment of brownfields** may ensure and/ or improve water quality and quantity essentially.

- First, the **decontamination of brownfields** is important to prevent pollution of the water resources. Advanced new technologies of geotechnology offer many possibilities for decontamination which can be applied also in built-up areas.
- Second, the choice of appropriate land use considering the functions of the brownfields for water enrichment, storage and protection may improve the drinking water supply.
- Third, the reuse of brownfields is an essential contribution for the **reduction of land consumption** which indirectly influences the pressure on **water resources quality and quantity**, e.g. decreasing the pressure on greenland, which has important functions on water enrichment, storage and protection. Due to the high ecological value of greenland especially for the drinking water supply Germany has formulated the "political goal" for a nationwide reduction of greenland consumption to **30 ha/d in the year 2020** (momentarily about 110 ha/d). The achievement of this goal lies in the responsibility of the local and city governments (see REFINA 2009).



LAND RESOURCES



"old sites
→ new
development

about SUSTAINABILIY ... & CLIMATE CHANGE

Mit Gott!

SYLVICVLTVRA OECONOMICA,

Oder

Haußwirthliche Nachricht und Naturmäßige

Anweisung

Zur

Wilden Baum-Zucht,

Nebst

Gründlicher Darstellung/

Wie zu förderst durch Göttliches Beandeyen dem allenthalben und insgemein einreissenden

Grossen Holtz-Mangel/

Vermittelst Säe- Pflantz- und Versetzung vielerhand Bäume zu prospiciren/

Alles zu nothdürfftiger Versorgung des Hauß- Bau- Brau- Berg- und Schmeltz-Wesens/

Worbey zugleich eine gründliche Nachricht von den in Churfl. Sächs. Landen

Gefundenen Turff

Dessen Natürliche Beschaffenheit/ grossen Nutzen/ Gebrauch und nützlichen Verkohlung.

Aus Liebe zu Beförderung des gemeinen Wesens beschrieben

Von

Hannß Carl von Carlowitz/

Königl. Pohl. und Churfl. Sächs. Cammer-Rath und Ober-Berg-Hauptmann.

LEIPZIG/

verlegts Johann Friedrich Braun 1713.

DGGT IFGT VFG CiF e. V.

– mit Unterstützung des ITVA –

4. Symposium UMWELTGEOTECHNIK &
5. Freiberger GEOTECHNIK-Kolloquium &
FACHAUSSTELLUNG

4. & 5. Juni 2009
Konferenzzentrum "Alte Mensa" · Freiberg

Herausgeber: H. Klapperich · R. Katzenbach · K. J. Witt · D. Grießl

CiF e. V. publication 7 · 2009

Vulnerability and adaptation to climate change in Europe

Significant changes in climate and their impacts are already visible globally, and are expected to become much more pronounced. In Europe, mountain regions, coastal zones, wetland, the Mediterranean and the Arctic region are particularly vulnerable. Although there are some positive effects, many impacts are adverse. Existing adaptive measures are concentrated inflood defence, so there is considerable scope for adaptation planning and implementation in other areas, such as public health, water resources and management of ecosystems.

André Jol, Head of Group Climate Change and Energy, European Environment Agency (EEA), Copenhagen (DK)

ESPACE - Putting adaptation at the heart of spatial planning

However successful we are at reducing emissions, we expect to deal with many decades of climate change due to emissions that we have already put into the climate system. We need to start adapting today to these changing conditions to ensure our social, economic and environmental systems are best-prepared for the unavoidable risks and are able to take advantage of any opportunities. Although spatial planning will playa crucial part in helping communities adapt to climate change, our current planning systems do not sufficiently take climate change into account and are therefore not robust enough to deal with the impacts. This article summarises the work of ESPACE (European Spatial Planning: Adapting to Climate Events) - an Interreg/IIB North West Europe project which aims to tackle this important issue by recommending how adaptation to climate change can be incorporated into the spatial planning system.

Chitra Nadarajah and fill Cook, ESPACE Project, Hampshire County Council (UK)

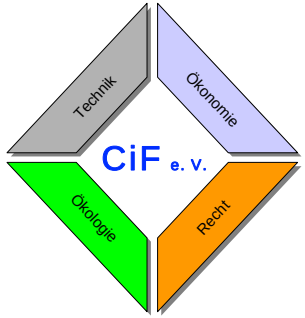
Extract of Climate Change Policy (CC2) in the South East Plan

Mitigation to be addressed through:

- Energy efficiency
- Changing travel patterns and choices
- Carbon sinks
- Renewable energy
- Minimising landfill

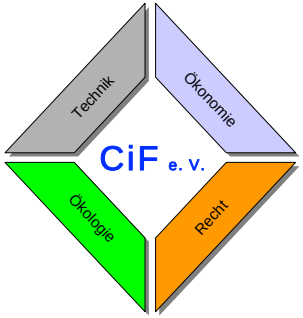
Adaptation to be achieved through:

- new development located away from areas at risk from impacts such as flooding and water shortages;
- resilience of development against impacts including flooding, storms and heat;
- sustainable drainage and water efficiency;
- increased flood storage capacity;
- Re-establishment of habitats.



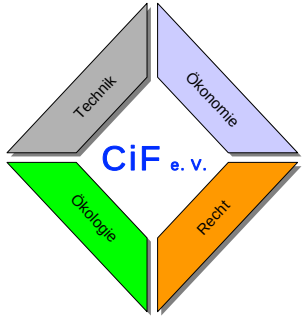
Extract of the Guide for Planners - Seven principles for adaptation

1. ***From the start*** - consider measures for climate change adaptation throughout the planning process.
2. ***Be flexible*** - developments should be resilient to a range of future climate scenarios.
3. ***Maintenance*** - consider the need for ongoing maintenance and appropriate end-use; sustainable urban systems for example must be desilted and monitored.
4. ***Integrated approach*** - there are some instances where adaptation options can help reduce greenhouse gas emissions - for example green roofs.
5. ***Be innovative*** - the case studies demonstrate the benefits of successfully integrated adaptation measures in existing
6. ***Use all available instruments*** - address climate change a range of existing mechanisms, e Environmental Assessment and
7. ***Partnerships*** - working in partners hip can help integrating adaptation into the planning and development process.



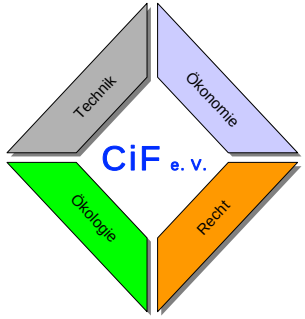
Spatial information management

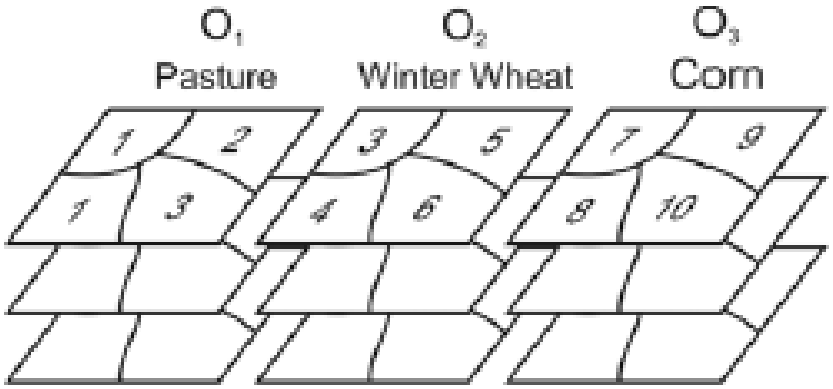
If the principles of sustainability will be considered seriously the reuse of brownfields is an essential contribution for the reduction of land consumption. The protection of environment and conservation of nature, economic growth and the improvement of life quality and conditions have to be regarded altogether to select the appropriate kind of use. Moreover the reuse of brownfields has to be integrated in the whole spatial planning context on local up to at least regional level.



Elements of a spatial planning decision support tool

Spatial planning process	Spatial information management and modelling instruments
1. Assessment of the situation	➲ Achievement of reliable information on the site condition and actual land use with remote sensing and GIS
2. Derivation of future land use potentials	➲ Combination of remote sensing and GIS spatial analysis tools
3. Integrated analysis of land use options and interests	➲ GIS based models for the multiobjective Optimisation (Pareo optimality)
4. Economic analysis of environmental functions	➲ Implementation of quantitative and qualitative data for the cost-benefit analysis
5. Decision support: proposals of land use options	➲ Interactive GIS tools for simulation and visualisation creating virtual realities

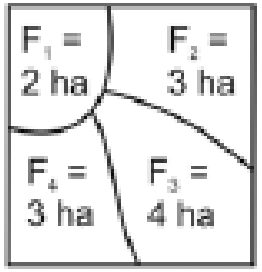




C_1 Soil Erosion

C_2 Compaction

C_3 Groundwater Recharge



Objective Functions

$$z_1 = \min x^1_1 + 2x^1_2 + 3x^1_3 + x^1_4 + 3x^2_1 + 5x^2_2 + \ldots$$

$$\vdots$$

$$z_3 = \max c^{31}{}_1 x^1_1 + c^{31}{}_2 x^1_2 + c^{31}{}_3 x^1_3 + c^{31}{}_4 x^1_4 + c^{32}{}_1 x^2_1 + c^{32}{}_2 x^2_2 + \ldots$$

Constraints

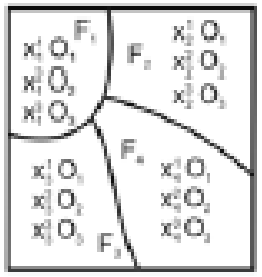
$x^1_1 + x^1_2 + x^1_3 + x^1_4 \geq 3$ Explicit Areal Constraint

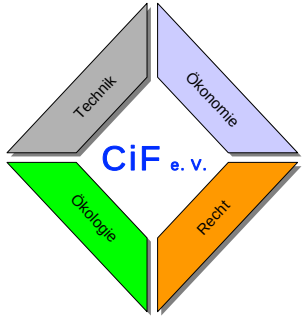
$\vdots$

$x^1_1 + x^2_1 + x^3_1 = F_1$ Implicit Areal Constraint

$\vdots$

Result





GMES Urban Service, as a contribution to regional soil protection for the Region of Freiberg-Chemnitz

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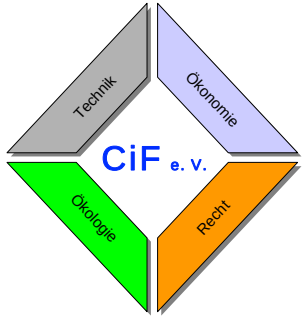
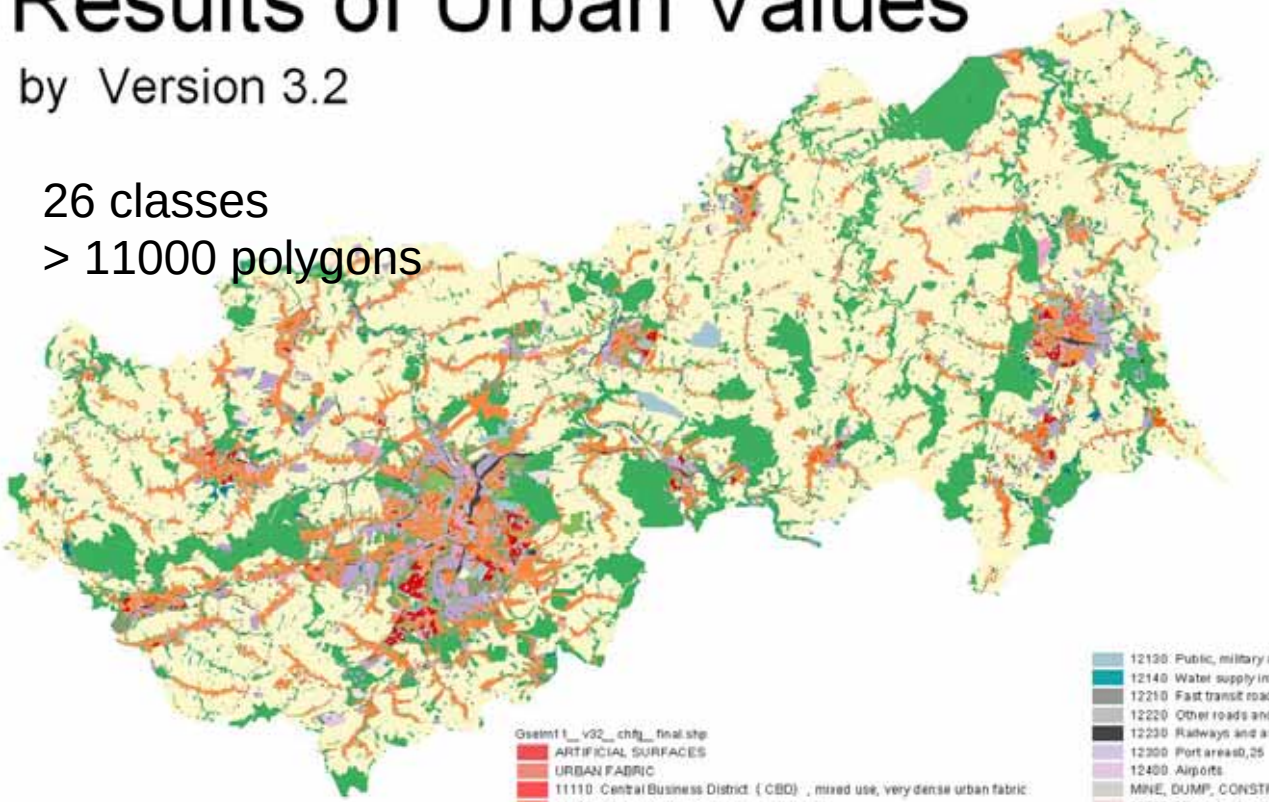
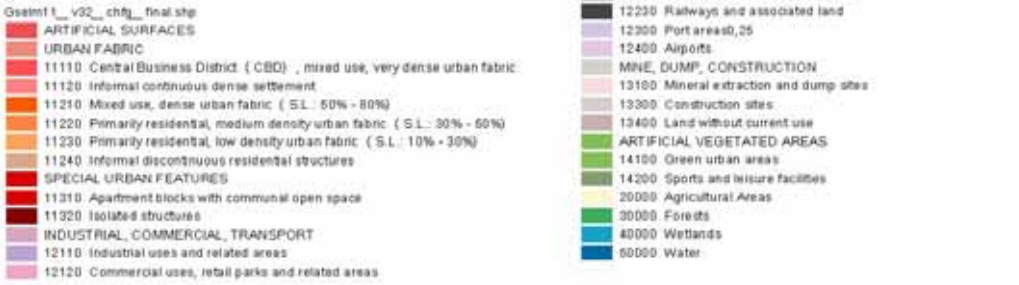


Results of Urban Values

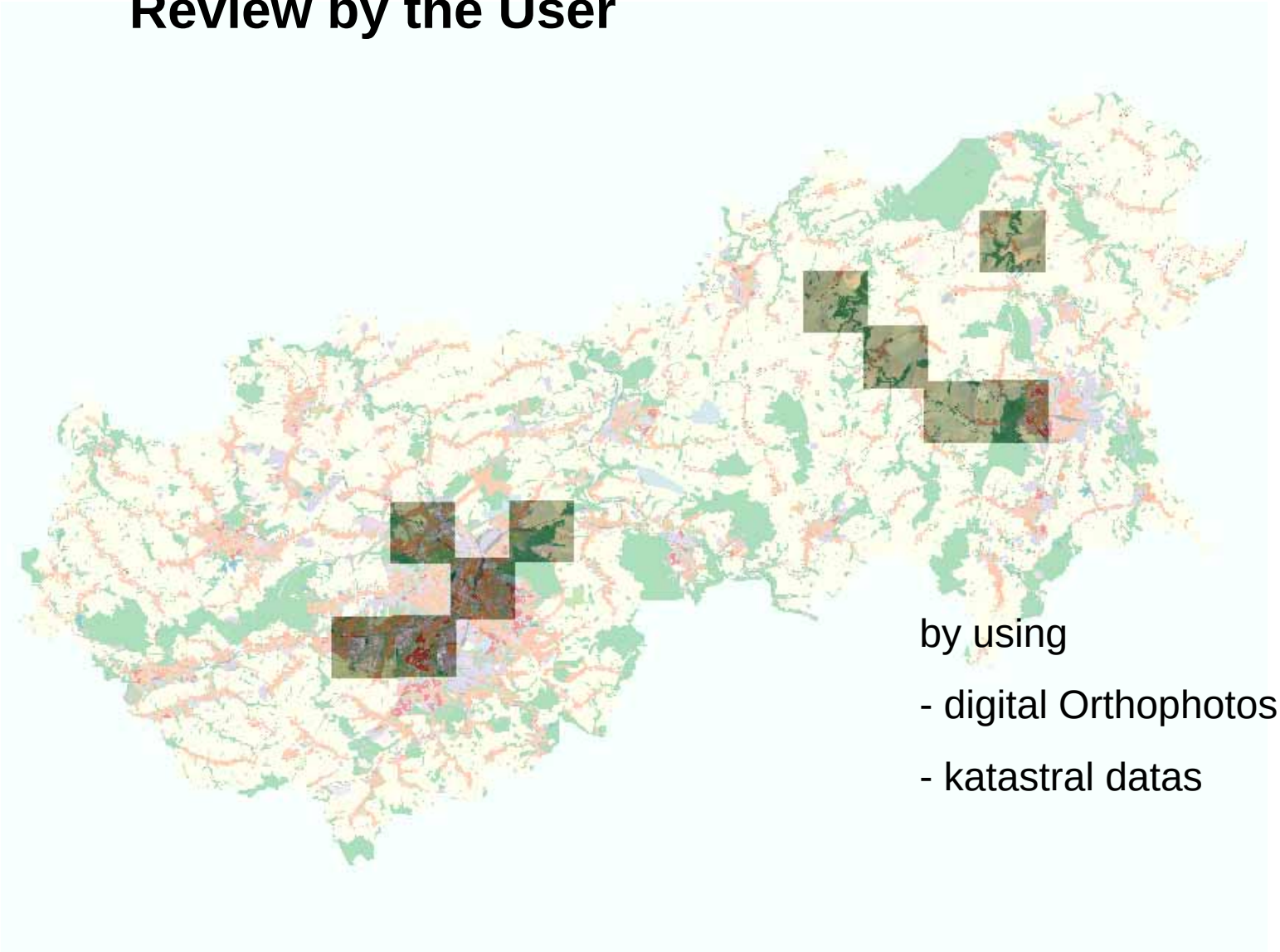
by Version 3.2

26 classes
> 11000 polygons





Review by the User



by using

- digital Orthophotos
- katastral datas

Results of the comparison

- very good classification results of the urban area
- a detailed coverage of the urban density
  - for example the urban land use in big cities (Chemnitz) with many informations of different land use and land consumption
  - for example the urban land use in rural regions with elongated structures and cutting effects and land consumption
- a homogeneous record in the whole area
- all information in vector format: a user can change the land use information if it is necessary

REUSE – renewable energies

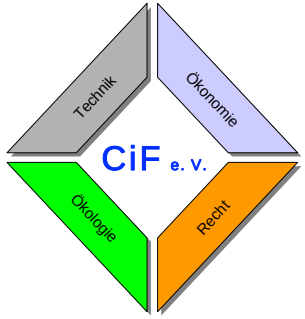
Megacities: Interactions between landuse and water management • Guangzhou PR CHINA 2009

Herbert Klapperich • CiF e. V.

REUSE – renewable energies

Sustainable and renewable energy resources

such as mining heat or cold from the subsurface will increase energy options, reduce vulnerability to disruptions, increase energy market flexibility and stability, and most importantly decrease atmospheric greenhouse gas concentrations. Shallow and deep explorations and exploitations of the subsurface for space heating and cooling such as ground source heat pump (GSHP) systems, heat storages such as aquifer thermal energy storage (ATES) systems, and electricity generation from enhanced geothermal systems (EGS) provide significant opportunities to address these issues.

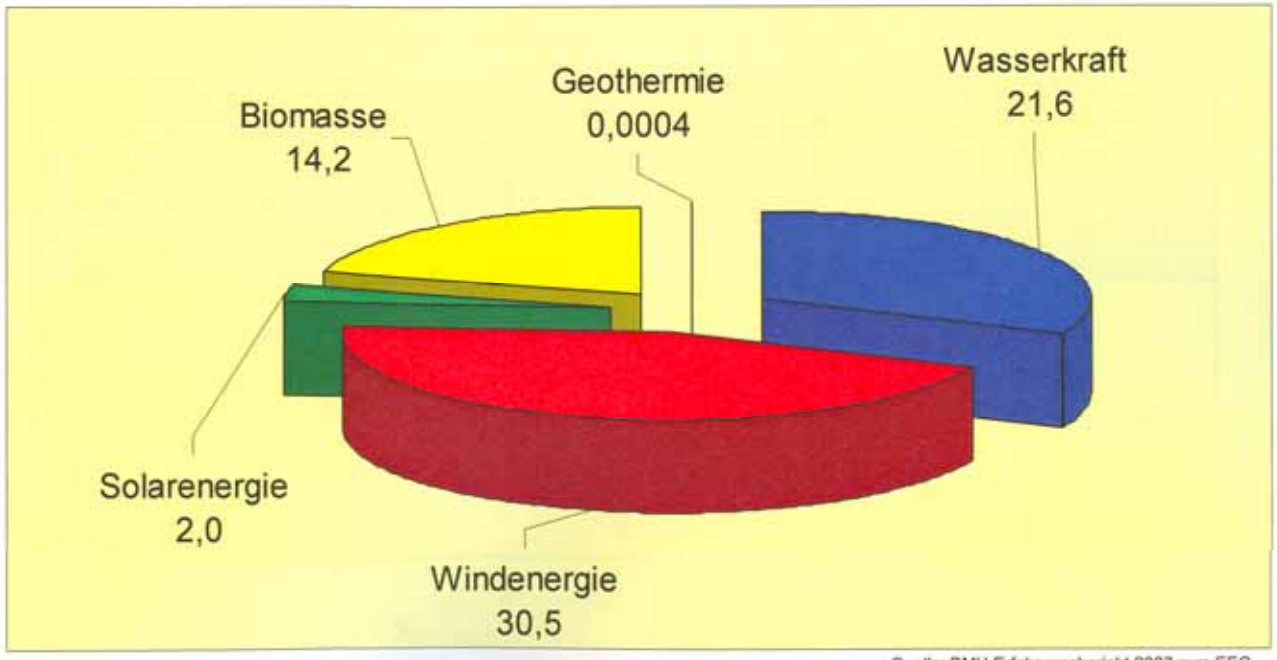


GEOTHERMIEKOMPETENZ.DE

SONNTAG & PARTNER

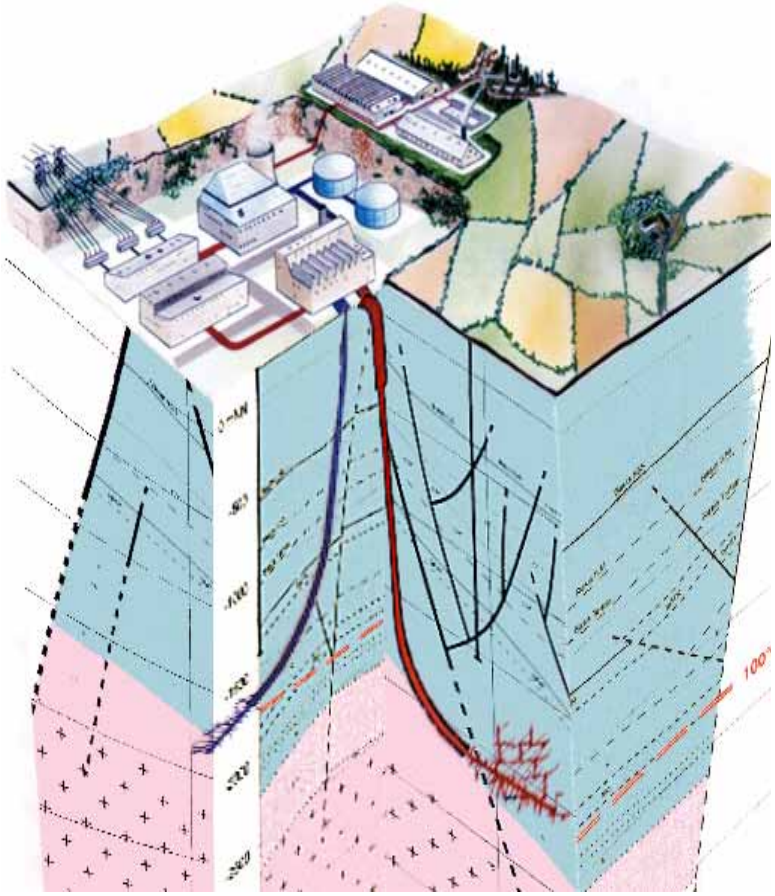
BERGAKADEMIE FREIBERG · TECHNISCHE UNIVERSITÄT

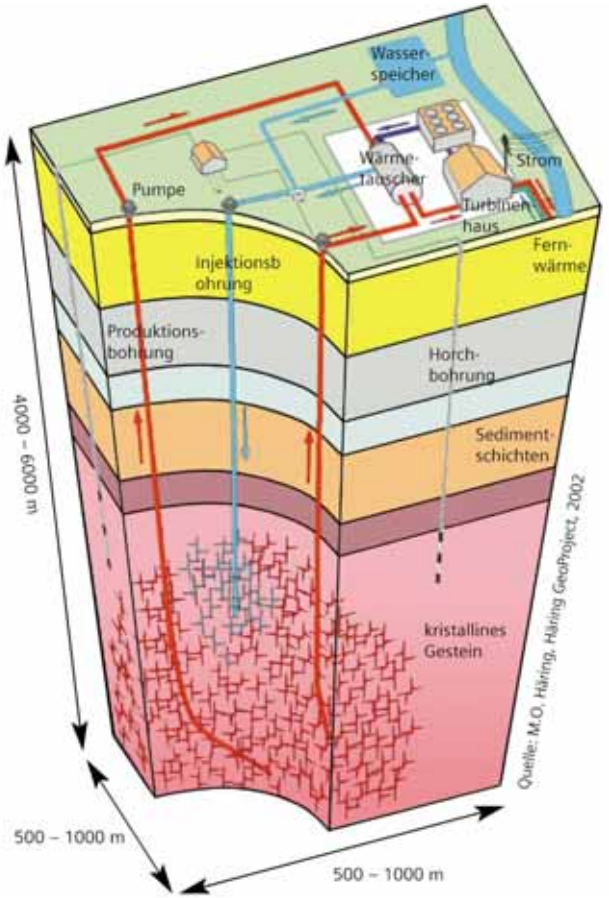
c) Stromerzeugung aus erneuerbaren Energien in Mrd. kWh



Quelle: BMU Erfahrungsbericht 2007 zum EEG

Technik Ökonomie Ökologie Recht CiF e. V.




Wasser-
speicher
Wärme-
Tauscher
Strom
Pumpe
Turbinen-
haus
Fern-
wärme
Injektionsb
ohrung
Produktions-
bohrung
Horch-
bohrung
Sediment-
schichten
4000 – 6000 m
kristallines
Gestein
Quelle: M.O. Häring, Häring GeoProject, 2002
500 – 1000 m
500 – 1000 m

CHINA sets ambitious goals on renewable energy

- Already, China has made rapid gains in building up its domestic renewable-energy industries.

  - wind generation
  - solar
    Last month, it opened the world's largest solar research facility - in China.

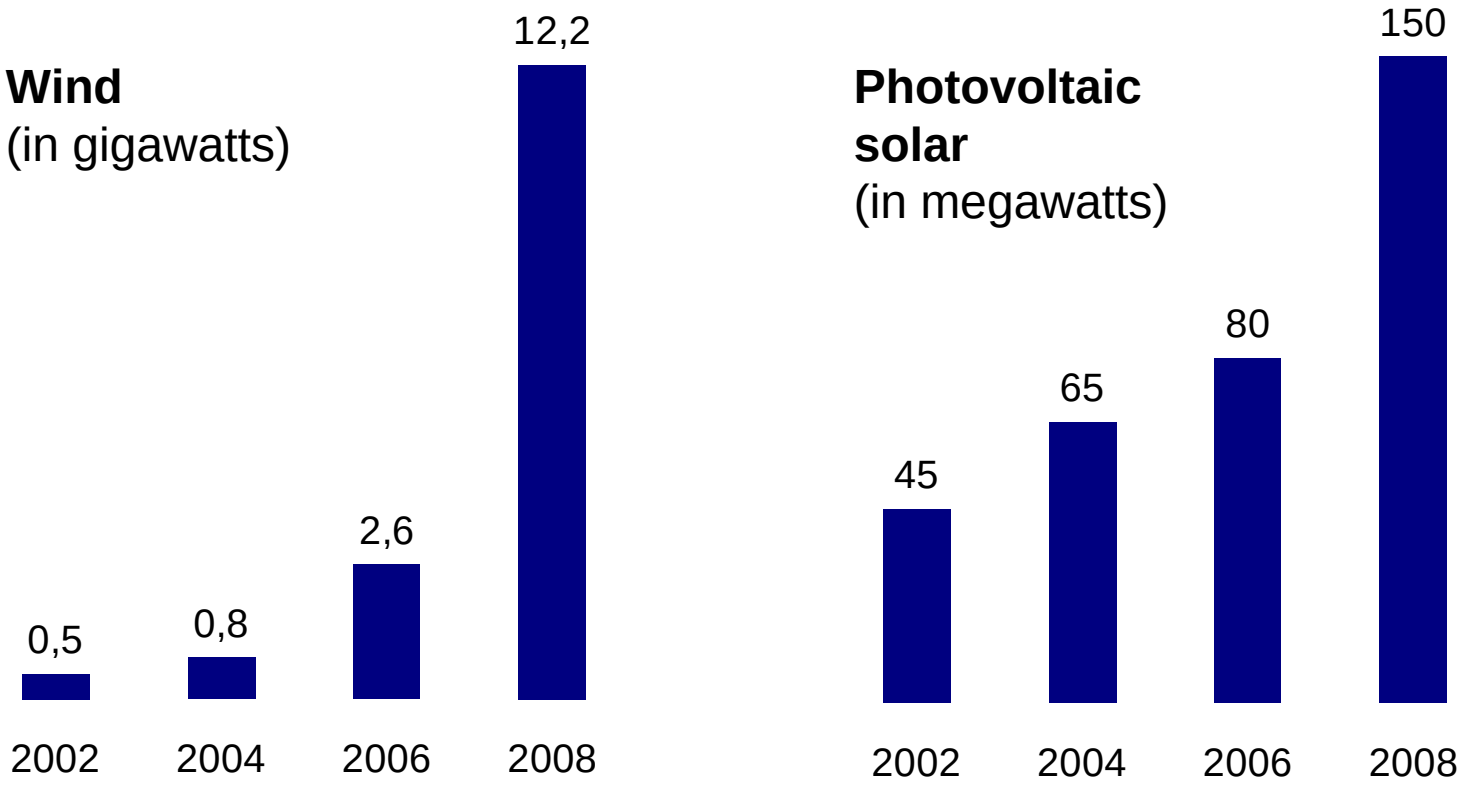
  in corporation:

  - U. S. power company Duke Energy with two Chinese energy firms to co-develop energy technologies, including solar and coal-fired plants to capture and store carbon emissions.
  - German companies
  - background:
    more than 70 % of its energy comes from coal, which produces more carbon than other fuels.

- Urgent needs - new urbanity
  By 2025, 350 million Chinese - almost the population of the USA - will migrate from rural areas to cities not yet built. They'll need electricity.

Chinas's renewable energy push

China is quickly ramping up wind and solar power. Installed capacity for:



Source: China Greentech Report, 2009 (by Karl Gelles, USA TODAY)

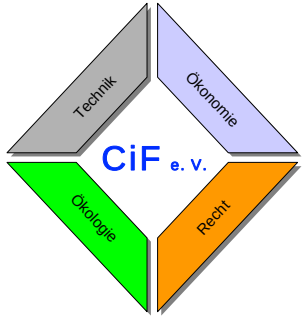
CHINA sets targets for greenhouse emissions

- Wen Jiabao to go to Copenhagen
- Beijing faces calls for further action
- Per unit of economic output by 40 - 45 per cent by 2020
- The carbon intensity target means reducing the amount of carbon produced per unit of gross domestic product, and is not the same as cutting emissions.

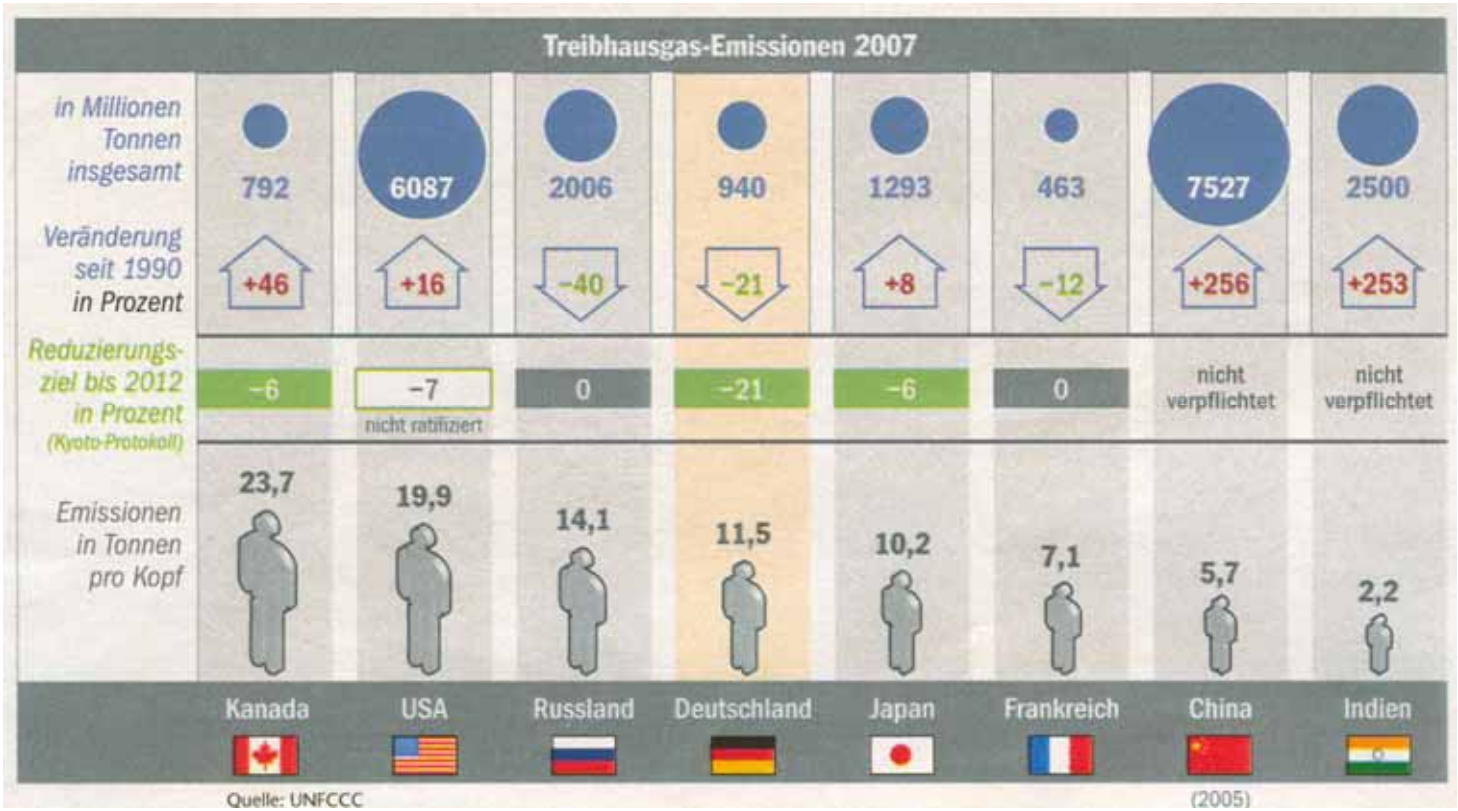
CLIMATE CHANGE

Kyoto protocol → Copenhagen meeting December 2009

- overall goal: LOW CARBON ECONOMY
- German situation
  CO_2-goal/based on Kyoto protocol for 2012/achieved already today
  * emission reduction to base line 1990: 21 % reduction
- CO_2-trading
  * companies competition
  * motivation in energy-efficiency
- ECI-conference, Castle Pillnitz, Dresden, 2010
  "Sustainability in property"
  = green building =
  U. S. EPA - UBA, Germany - CiF e. V.
- international scene - expectations on Copenhagen
  * conviencement
  * there is no sort of sanctions



CO_2 - CHINA & USA a head



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