Carbon Capture and Storage (CCS)

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Rechtsanwälte

Agenda

- **Technical Background**
  - Contribution of CCS to fighting climate change
  - Technical process of capturing, transporting and storing carbon
- **Current Legal Basis for CCS**
  - CCS and Waste Law
  - CCS and Mining Law
  - CCS and Water Law
- **Future Legal Framework for CCS**
  - Draft European Directive on Carbon Storage
  - Implementation of the CCS-Directive in national law

Background

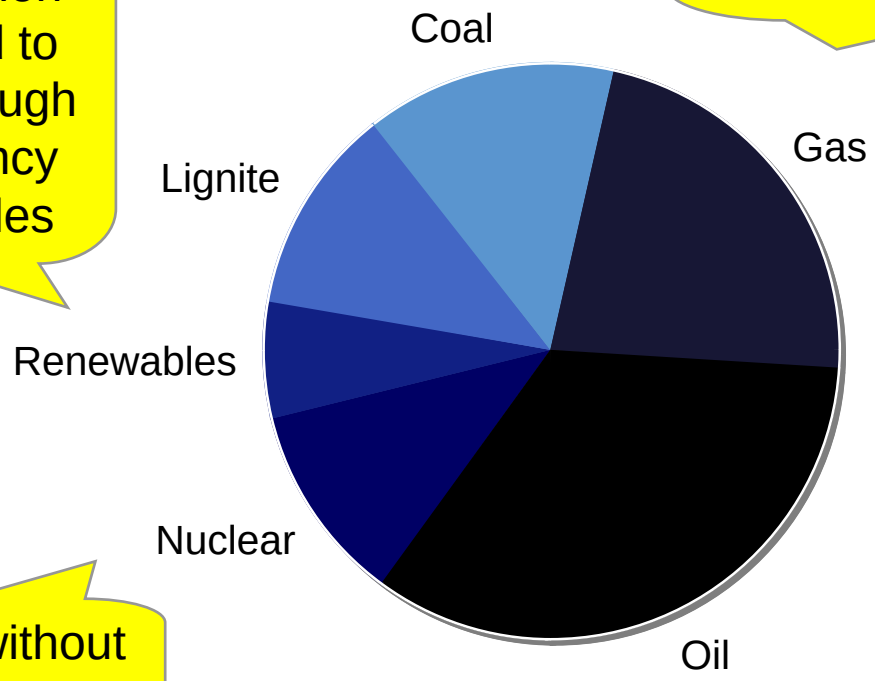
Background
Policy goals

- **Climate change objectives for 2020**
  - 20% reduction of greenhouse gas emissions compared to 1990 levels
  - 30% in case of an international agreement
  - limit global warming to a maximum of 2° Celsius
  - half way through? not yet: until 2005 only 6% reduction reached
- **Strategy to reach these ambitious goals**
  - Germany: Integrated Energy and Climate Programme, December 2007
  - EU level: Climate Action and Renewable Energy Package, January 2008

Background: Why CCS?

Carbon reduction goals are hard to reach only through energy efficiency and renewables

Moreover, countries with large fossil energy resources will not abstain from using these



Particularly, without nuclear power

CCS is an option to reduce carbon emissions and to reach the ambitious climate change goals

CCS is important as fossil energy recourses will continue to play an important role in the international energy mix

Background
CCS-Technology

- **Carbon Capture**
  - Oxyfuel (Vattenfall)
  - Pre-Combustion (RWE)
  - Post-Combustion
- **Discussion**
  - „Clean Coal“ and „emission-free“
  - Efficiency reduction of power plants
  - Capture Readiness
- **Legal framework**
  - IPPC (Integrated Pollution Prevention and Control) regime applies as carbon capture is usually an integrated part of an IPPC facility

Background
Carbon transport

- **Ways of transport**
  - Pipelines, ship, train or road
  - Pipelines preferable from an ecologic point of view
  - routes of existing pipeline networks may be used
- **Legal framework**
  - Planning procedure under the German Environmental Impact Assessment Act
  - in case of potential hazards to water, a water license is needed
  - for transport via ship, train or road dangerous goods law might become relevant

Background
Carbon storage

- **Potential storage sites**
  - Deep saline formations/aquifers: underground layer of water-bearing permeable rock (depth of 800-1.000 m)
  - Oil and gas storage sites/fields: fully extracted or still extractable (Enhanced Oil/Gas Recovery)
- **Further possibilities**
  - Ocean storage (in the water column)
  - Non-mineable coal seams

Current Legal Basis for CCS

Current Legal Basis for CCS
CCS and Waste Law

- **Is carbon waste?**
  - as CCS aims at capturing carbon (current) waste law should apply
  - common sense at least for carbon in supercritical state
- **Is CCS an "recycling" process?**
  - the use of carbon for EOR/EGR to further exploit dwindling springs (e.g. in the Altmark) may be considered as recycling in the sense of waste law
  - if so carbon has to be injected in a proper and non-pollutant way and in line with waste law provisions; however, no licensing requirement applies
- **What provisions apply if CCS is classified as "waste disposal"?**
  - carbon storage apart from EOR/EGR constitutes waste disposal and is only allowed at approved waste disposal sites (thus, demanding a planning permit including an environmental impact assessment)
  - however, according to the landfill regulation underground storage of "liquid waste" including carbon in a supercritical state is prohibited

Current Legal Basis for CCS

CCS and Mining Law

- **Does mining law cover CCS?**
  - exploiting oil and gas is a traditional mining activity so that the use of carbon in the EOR/EGR process is covered by mining law
  - thus, the use of carbon in the EOR/EGR process (e.g. in the Altmark) has to be approved under mining law in the recovery permitting procedure
  - this includes the requirement for a special closing plan upon termination
  - moreover, the post-closure obligations resulting from the mining law apply
- **Mining law and carbon storage beyond EOR/EGR**
  - Mining law also covers gas storage, however, only temporary storage
  - the injection of carbon in saline aquifers is no such gas storage because CCS aims at permanent instead of temporary storage
  - nevertheless, these provisions where used for licensing the research project CO2SINK in Ketzin (arguing that the carbon can be retrieved)

Current Legal Basis for CCS
CCS and Water Law

- **Carbon storage in aquifers**
  - constitutes a “discharge of substances into the groundwater” and thus a genuine water use which needs a water law permit
  - problematic if the carbon injected pushes saline groundwater into upper beds suitable for ground water or the carbon reacts with the deep groundwater
  - permission can only be granted if these risks can be excluded
- **Carbon storage in oil and gas storage sites/fields**
  - is not necessarily connected with a groundwater contact
  - nevertheless, a water law permit might be needed if there is risk of groundwater quality being affected in the case of a leakage
  - permission requires that negative effects are impossible or excluded

Current Legal Basis for CCS
Conclusion

	Storage in saline aquifers	Storage in depleted oil and gas fields	Storage in the EOR/EGR process
Waste Law	is waste disposal and needs a planning permit; however, storage in liquid state is prohibited		is a recycling process and thus allowed
Mining Law	Not applicable as mining law covers temporary storage only but not permanent storage		Applicable; permit requirement as part of the recovery process
Water Law	Water allowance needed	Water allowance needed	Water allowance needed
Conclusion	**Not permissible**	**Not permissible**	**Permissible**

Future Legal Framework for CCS

Future Legal Framework for CCS

Draft European Directive on Carbon Storage

- **Purpose of the Directive**
  - establish a legal framework to manage environmental risks, i.e. site selection criteria and requirement of a storage permit
  - remove existing legal barriers (in Waste and Water Framework Directives)
  - prohibit ocean storage in the water column
  - regulating fair and open access to carbon storage networks and storage sites as this might become a precondition for entry into the power and heating market
- **Focus on carbon storage**
  - as carbon capture is already regulated in the IPPC- and EIA-Directives and carbon transport in the EIA-Directive (see above)
  - however, requirement of a capture readiness, demanding that (i) new large combustion plants must have suitable space for capture equipment and (ii) must have assessed availability and feasibility of CCS-retrofitting

Future Legal Framework for CCS
Draft European Directive on Carbon Storage

- **General Provisions**
  - Requirements for permanent storage and site selection
  - Exploration permit
- **Permission process and operation duties**
  - No storage without storage permit
  - Acceptance of carbon streams
  - Monitoring, Reporting, Inspection
  - Corrective Measures
  - Closure, post-closure obligations and transfer of responsibility
  - Financial Security

Future Legal Framework for C
Draft European Directive on Car

Art. 4.2: no significant risk of leakage and no significant negative environmental or health impacts

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- **Permi nd operation du**
  - orage permit
  - streams
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Discussion: Priority right for subsequent storage permit?

Art. 4.3: criteria for the characterisation and (a four step) assessment of storage sites (specified in Annex I)

Future Legal Framework for CCS

Draft European Directive on Carbon Storage

- **General Provisions**
  - ➢ site selection
  - ➢
- **Permission process and o… duties**
  - ➢ No storage without storage permit
  - ➢ Acceptance of carbon streams
  - ➢ Monitoring, Reporting, Inspection

- Detailed provisions on application, conditions and contents
- Commission Review (non-binding)

- Consist overwhelmingly of carbon
- No waste added
- Discussion: 90% purity threshold

- Operator has to regularly monitor storage site to assess behaviour of the carbon injected and to detect leakages
- Monitoring plan has to be established pursuant to Annex II
- Regular reporting and inspection (ex officio) duties apply

Future Legal Framework for CCS

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  - ➢ No st… storage permit
  - ➢ Accepta… carbon stre…
  - ➢ Monitoring, Reporting, I…
  - ➢ Corrective Measures
  - ➢ Closure, post-closure o…
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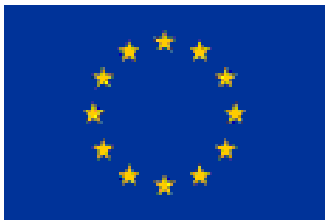
- Operator must immediately notify the authority and take corrective measures in case of leakage
- Authority may take corrective measures itself and recover the costs incurred
- Environmental Liability Directive applies for „local“ damage and Emissions Trading Directive for „global“ climate change effects

- Operator remains responsible for the safety of the storage site also after its closure
- Responsibility may be transferred to the authority when closure plan has been fulfilled and all evidence indicates complete containment of the carbon injected

Covering, in particular, leakage risks and closure obligations

Future Legal Framework for CCS

Implementation in national law



Draft Directive

Co-decision procedure

Enactment of the Directive

Implementation deadline

2008

2009

2010

National law for pilot projects
eg. Schwarze Pumpe/Altmark,
research projects as CO2SINK in Ketzin,
and already ongoing exploration of storage sites

Implementation of the Directive

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Rechtsanwälte

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