CCS Legislation Development in Europe and in the Baltic Sea Region Countries: Progress and Problems

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INTRODUCTION

- Directive on the geological storage of carbon dioxide was officially published by European Parliament and the Council of the European Union on **23rd April 2009** and entered into force on the 20th day following its publication.
- This directive established a legal framework for the environmentally safe geological storage of carbon dioxide (CO2) to contribute to the fight against climate change.
- In the article 39 „Transposition and transitional measures“ it is stated that „Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by **25 June 2011**“,
- that they „shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this Directive“
- and they „shall ensure“ that the storage sites „are operated in accordance with the requirements of this Directive by **25 June 2012**“.

INTRODUCTION

- Recent developments in the Emissions Trading Scheme (ETS) rules bring about two important changes: CO_2 captured and reliably stored can now be considered as not emitted and, after 2013, stronger economic incentives will exist for industrial operators to prefer low-emission technologies.

- The EU Emissions Trading Directive and the CCS Directive both provide a strong legal backbone to facilitate the development of CCS, allowing both private and public money to be invested in order to build large-scale projects that will prove the viability of the technology. These laws will help (i) boost research and innovation, (ii) accelerate the deployment of technology and (iii) define clear targets in order to achieve a coming together of political and commercial objectives.

- The CCS Directive in particular addresses the risk management associated with this technology, such as the removal of barriers to CCS in existing national legislation, the regulation of the long-term liability for CCS storage sites, the inclusion of CCS in the Emissions Trading Scheme, and the improvement of communication about CCS to the public and stakeholders.

- **Source of information:**
  http://www.zeroemissionsplatform.eu/policy-and-regulation.html

INTRODUCTION

- ***The Directorate-General for Climate Action has established an Information Exchange Group in order to organise an exchange of information between the competent authorities of the Member States and promote a coherent implementation of the CCS Directive throughout the European Union. It has also prepared a set of guidance documents to assist stakeholders.***
- *The DG Climate Action of the European Commission has issued four guidance documents to support coherent implementation of Directive 2009/31/EC on the geological storage of carbon dioxide ("CCS Directive") across EU Member States.*
- *The four guidance documents, mainly addressed to competent authorities and relevant stakeholders, elaborate on key provisions of the CCS Directive:*
- *Guidance document 1. CO2 Storage Life Cycle Risk Management Framework*
- *Guidance document 2 Characterisation of the Storage Complex, CO2 Stream Composition, Monitoring and Corrective Measures*
- *Guidance Document 3 Criteria for Transfer of Responsibility to the Competent Authority*
- *Guidance Document 4 Financial Security (Art. 19) and Financial Mechanism (Art. 20)*

- *These documents have been discussed with experts from Member States and key stakeholders, including industry, research community and NGOs.*

INTRODUCTION

- At the present time situation with transposition of the CCS Directive is very different in European Countries, often complicated by different
  - ✓ political
  - ✓ national
  - ✓ economical problems
  - ✓ different geological conditions
  - ✓ and absent public awareness and acceptance of CCS

INTRODUCTION

- Data shown in this presentation were collected in the frame of WP4.2 of CGS Europe project during preparation for
- CGS Europe knowledge-sharing workshop

  "**Legal and regulatory issues for the implementation of the EU Directive on the geological storage of carbon dioxide"**

  which will take place on 11th May during **CO2GeoNet 6th Open Forum**

  9-11 May 2011, Venice, San Servolo Island

Data (situation by end January 2011) were collected using Questionnaire compiled by the Workshop Scientific Committee.

- Alla Shogenova (TTU GI, Estonia)
- Kris Piessens (RBINS-GSB, Belgium)
- Hubert Fabriol (BRGM, France)
- Adam Wojcicki (PGI-NRI, Poland)
- Isabel Suarez Diaz (IGME, Spain)
- George Hatziyannis (IGME, Greece)
- Sergio Persoglia (OGS, Italy)

List of Participants

No	Name	Short name	Country
1	BUREAU DE RECHERCHES GEOLOGIQUES ET MINIERES	BRGM	France
2	CO2GEONET - RESEAU D'EXCELLENCE EUROPEEN SUR LE STOCKAGE GEOLOGIQUE DE CO2	CO2GeoNet	France
3	BUNDESANSTALT FUR GEOWISSENSCHAFTENUND ROHSTOFFE	BGR	Germany
4	GEOLOGISCHE BUNDESANSTALT	GBA	Austria
5	INSTITUT ROYAL DES SCIENCES NATURELLES DE BELGIQUE	RBINS-GSB	Belgium
6	SOFIISKI UNIVERSITET SVETI KLIMENT OHRIDSKI	SU	Bulgaria
7	CESKA GEOLOGICKA SLUZBA	CzGS	Czech Republic
8	TALLINNA TEHNIKAULIKOOL	TTUGI	Estonia
9	GEOLOGIAN TUTKIMUSKESKUS	GTK	Finland
10	INSTITUTO GEOLOGIKON KAI METALLEYTIKON EREYNON	G-IGME	Greece
11	MAGYAR ALLAMI EOTVOS LORAND GEOFIZIKAI INTEZET	ELGI	Hungary
12	Department of Communications, Energy and Natural resources	GSI	Ireland
13	LATVIJAS VIDES, GEOLOGIJAS UN METEOROLOGIJAS CENTRS SIA	LEGMC	Latvia
14	Gamtos tyrimų centras	GTC	Lithuania
15	PANSTWOWY INSTYTUT GEOLOGICZNY - PANSTWOWY INSTYTUT BADAWCZY	PGI-NRI	Poland
16	Laboratorio Nacional de Energia e Geologia I.P.	LNEG	Portugal
17	INSTITUTUL NATIONAL DE CERCETARE-DEZVOLTARE PENTRU GEOLOGIE SI GEOECOLOGIE MARINA-GEOECOMAR	GEOECOMAR	Romania
18	STATNY GEOLOGICKY USTAV DIONYZA STURA	SGUDS	Slovakia
19	GEOINZENIRING DRUZBA ZA GEOLOSKI INZENIRING DOO	GEO-INZ	Slovenia
20	INSTITUTO GEOLÓGICO Y MINERO DE ESPAÑA	S-IGME	Spain
21	SVERIGES GEOLOGISKA UNDERSOKNING	SGU	Sweden
22	University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering	UNIZG-RGNF	Croatia
23	MIDDLE EAST TECHNICAL UNIVERSITY	METU-PAL	Turkey
24	FACULTY OF ECOLOGY AND ENVIRONMENTAL SCIENCES	UB	Serbia

30 European Countries Involved

- 31 institutions from 28 European countries participating in CGS Europe project took part in the research. Information for additional two countries Switzerland and Iceland was taken from published sources. Altogether 30 European countries are covered.

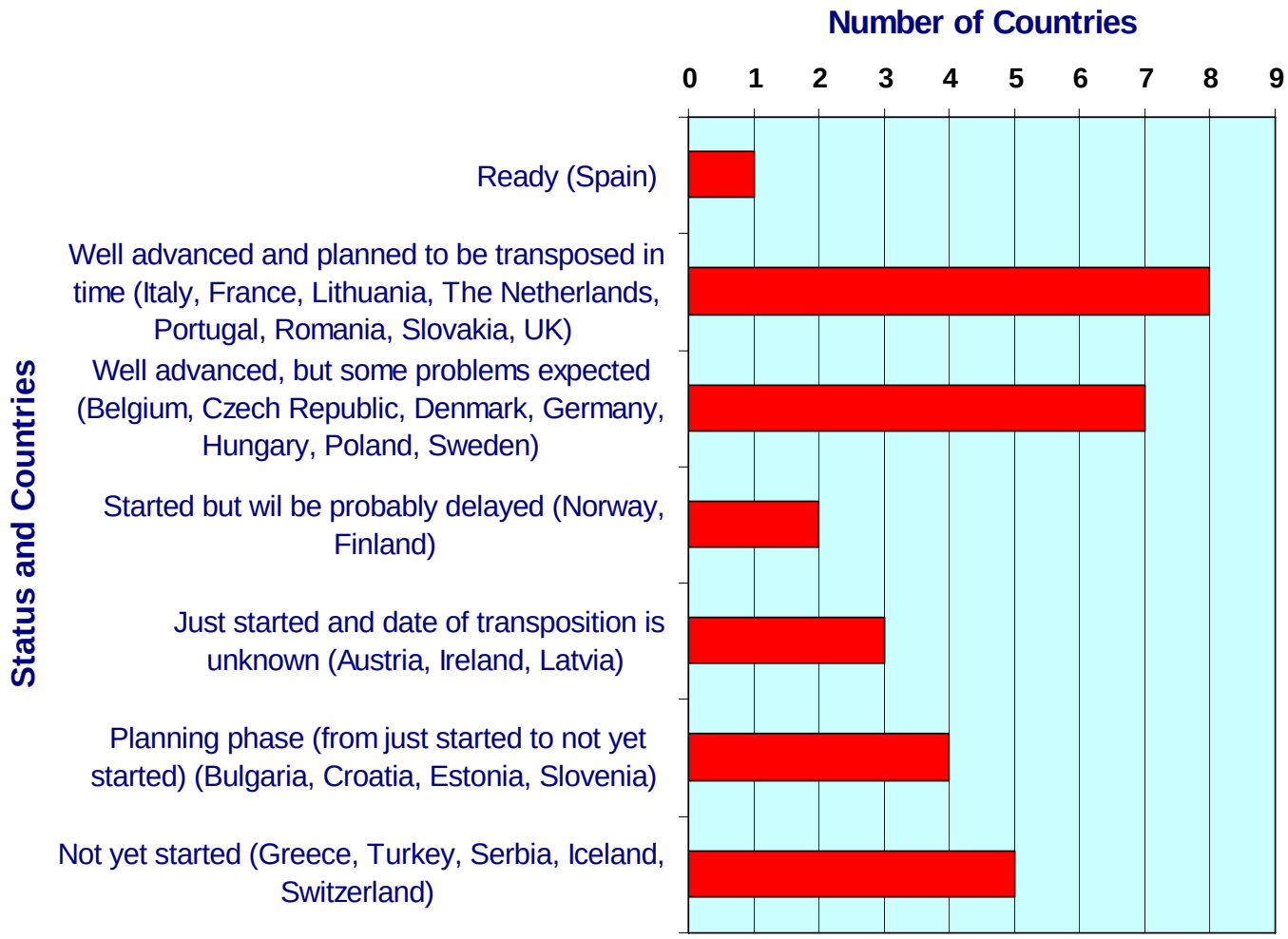
Other Information Sources

- Data for Switzerland is taken from
  IEA Report (October 2010)
  Carbon Capture and Storage
  Legal and Regulatory Review (Edition 1)

- Data for Iceland: Teir S. Et al. 2010. Potential for Carbon capture and storage (CCS) in the Nordic Region. VIT publication, 223 pp.

- Altogether 30 European counries are covered in this presentation!

Status of CCS Directive transposition in 30 European Countries (status on January 2011)



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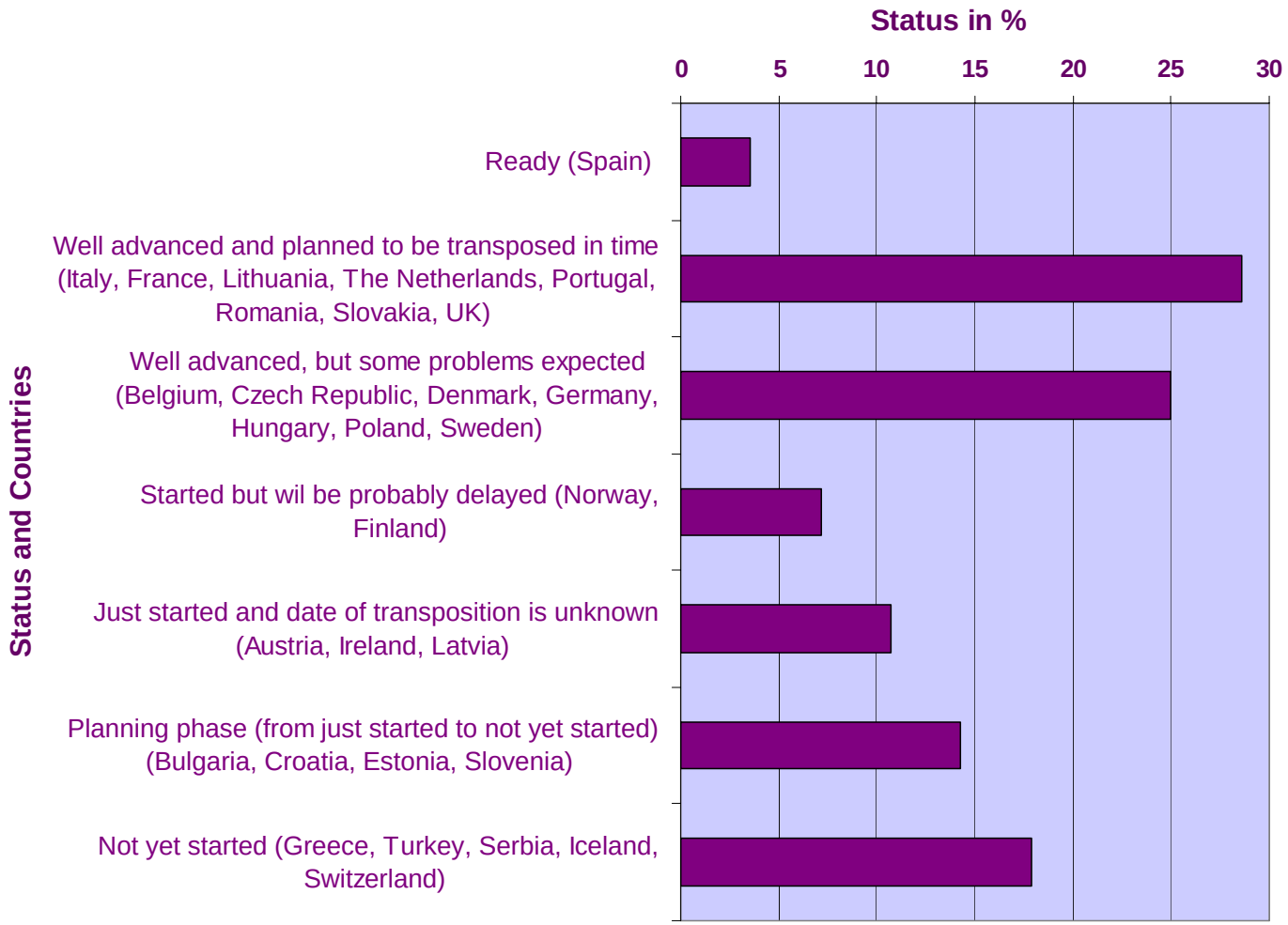
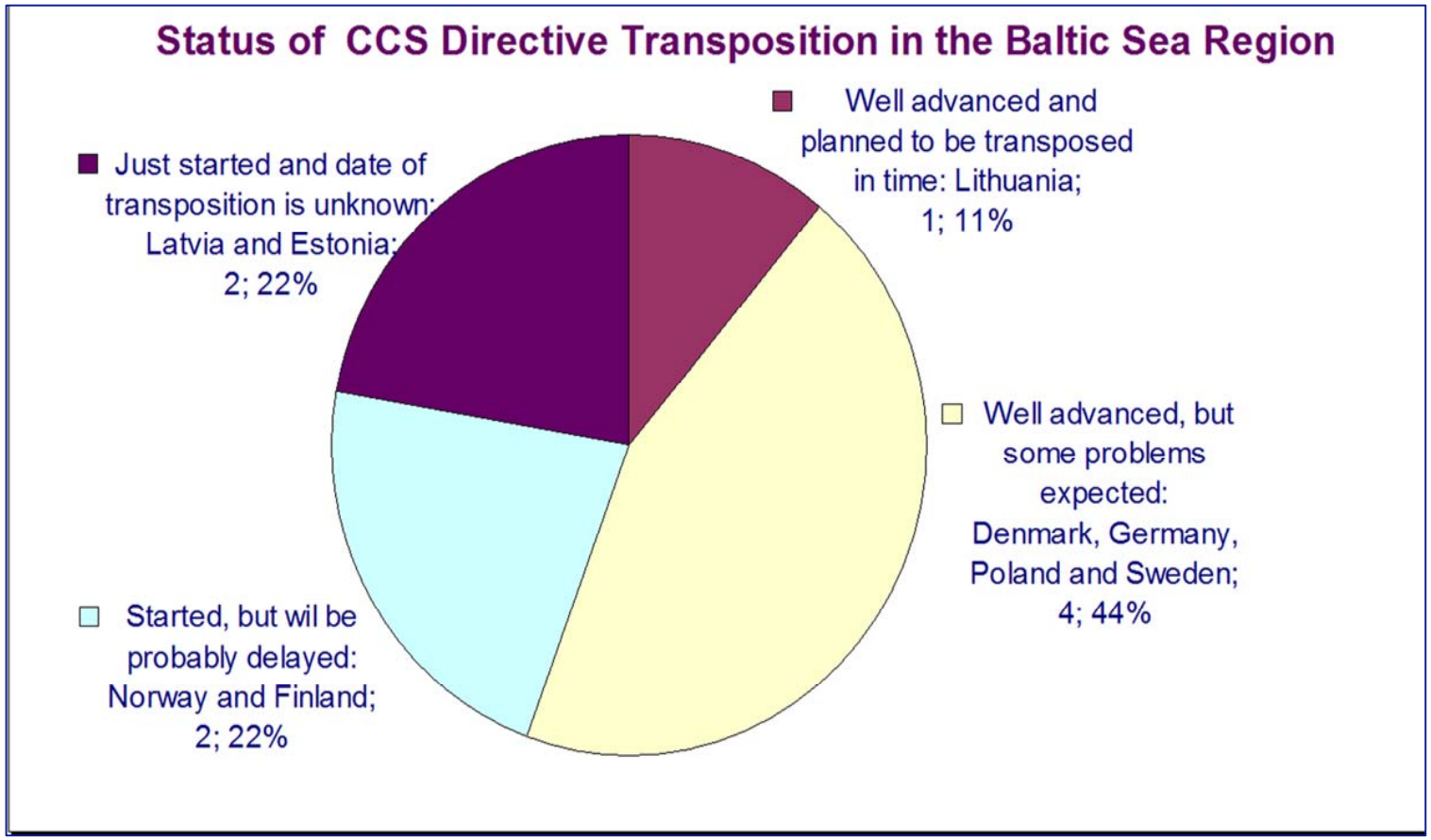


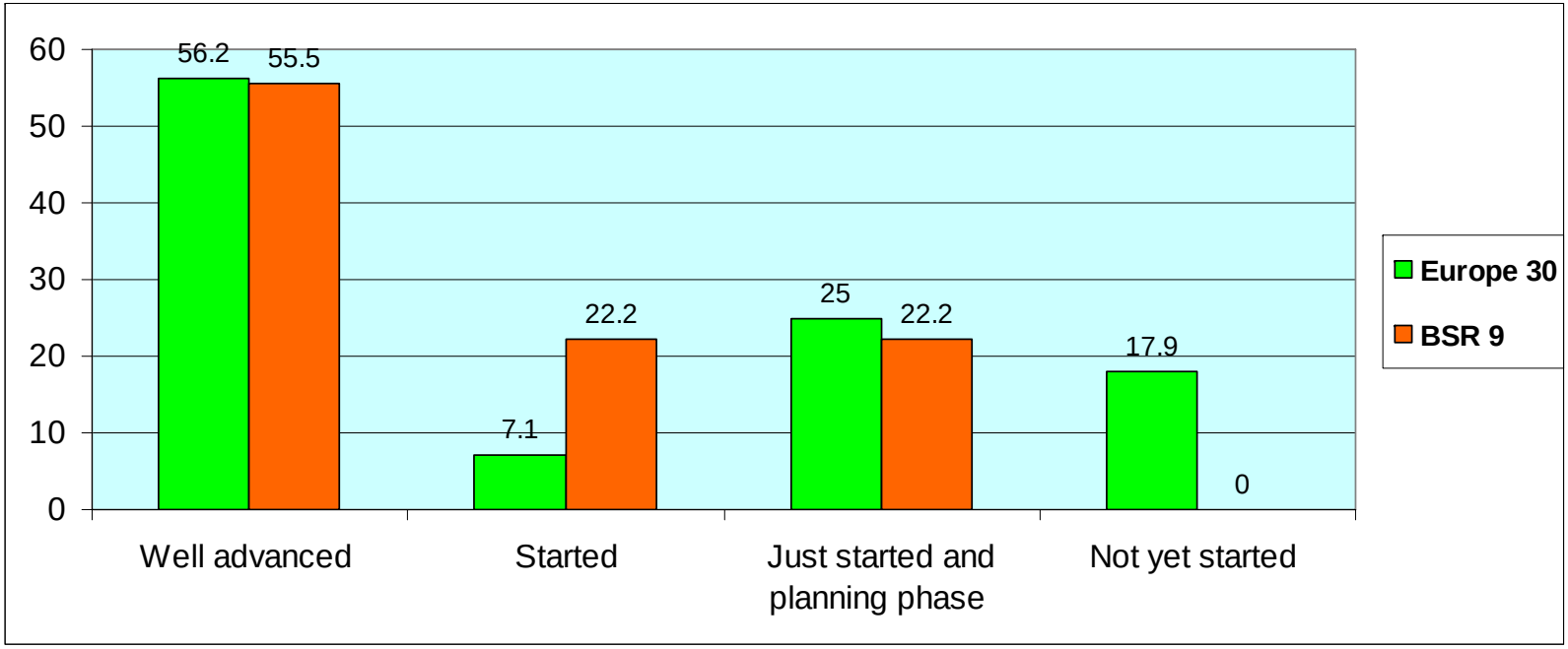
Evaluation of transposition process

- **Successful (10)**
  - Italy
  - Spain (The law has been already published by the Official State Bulletin on December 29th 2010)
  - Denmark
  - UK
  - Lithuania
  - Portugal
  - Romania
  - Slovakia
  - The Netherlands
  - Belgium (sucessful only in Flanders, others regions– rather problematic)
  - **Fare (5)**
  - France (relevant laws approved, the decrees specifying how the laws should be enforced are well advanced)
  - Sweden (Law proposal is in the late stage of preparation)
  - Hungary (The amendment of the Mining Act is being discussed by the Parliament, a specific Government Decree has been also prepared)
  - Norway
  - Finland
  - **Problematic (6)**
  - **a) already problematic**
  - Germany ("final steps for bringing the national CO2 Storage Act into force have been postponed several times due to negotiations between federal government and the states")
  - Czech Republic
  - Three Regions of Belgium
  - Poland (fare or problematic)
  - **b) Expected to be problematic**
  - Estonia
  - Latvia
  - Slovenia

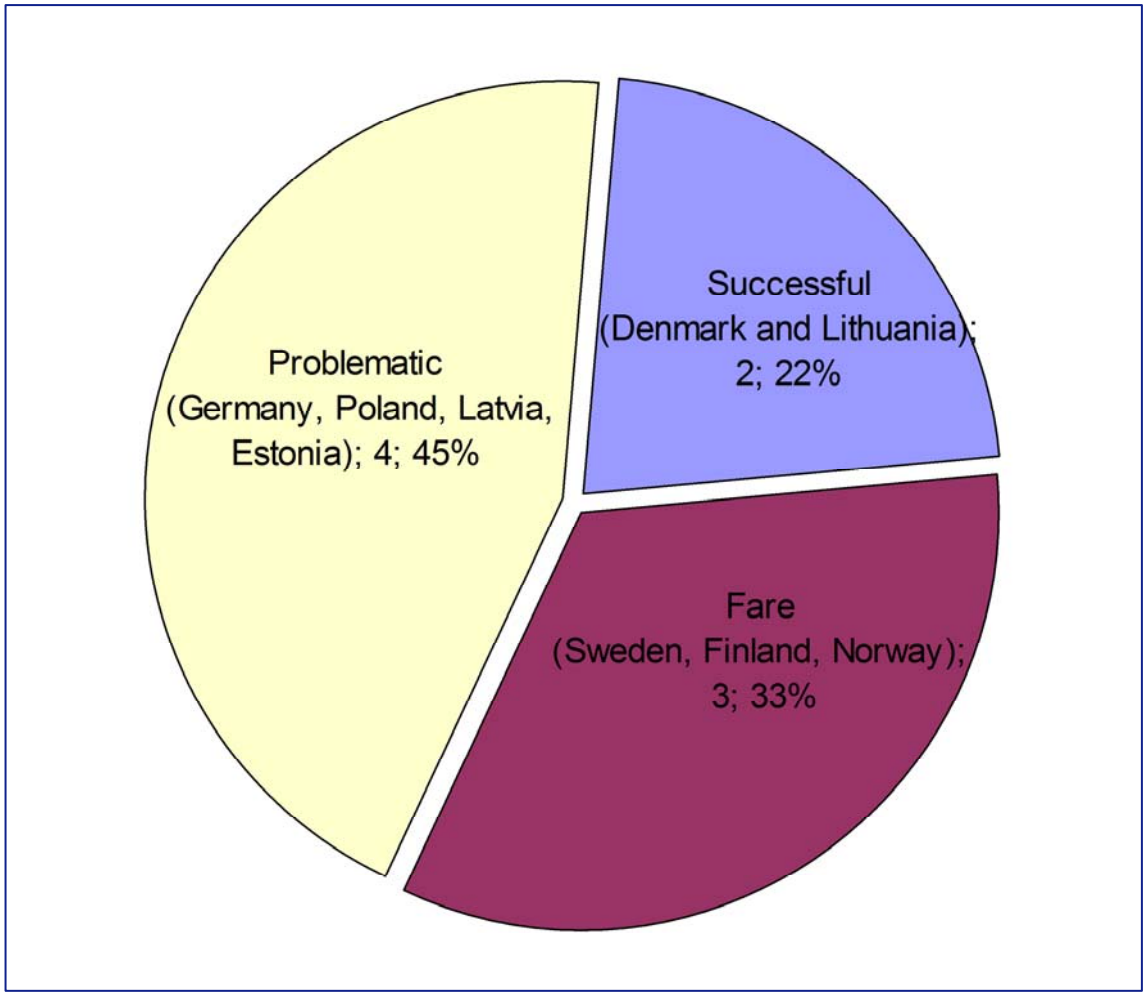
Status of CCS directive transposition



Status of CCS directive transposition:
compared situation in Europe (30 countries – green) and in the Baltic Sea Region (BSR: 9 countries, orange)



Evaluation of transposition process in the Baltic Sea Region



Guidelines writing and decrees

- **Only 6 European countries reported the ongoing or planned process of guidelines writing**
- France (Guidlines draft is prepared now by BRGM, IFP and other public institutions and will be finished by September 2011)
  - Germany (Recommendations and guidelines have been proposed for discussion by BGR)
  - Hungary (specific Government Decree has been also prepared)
  - Norway (Climate and Pollution Agency and the Norwegian Petroleum Directorate are working on guidelines)
  - Poland (Law proposal included guidelines for the application of the relevant law. Polish Platform of Clean Coal Technologies provided own guidelines as well).
  - Spain (rules for the published law application are still in the writing process)
  - Denmark (Guide is expected as anologue to Guide to hydrocarbon licences)
- **and 2 countries reported decrees in addition to laws**
  - Czech Republic
  - Hungary

- **Some countries reported about prepared or planned national reports before legislation**
  - Austria (national report before legislation)
  - Estonia (Report on legislation and regional storage capacity was prepared by TTUGI for national company Eesti Energia in 2009. Results were presented by requiest to Ministry of Environment of Estonia in January 2011).
  - Finland (report to authorities is planned)

National Problems Reported

- CCS is not a part of the official national policy:
  - Denmark, Slovenia, Sweden
  - and some other coutries
- Ongoing public and political debates
  - Germany, Poland, Czech Republic
- Probable insufficient storage capacity (Czech Republic),
  or absent storage capacity (Estonia, Finland, Belgium)
- Financial matters
  - Czech Republic, Latvia, Estonia
- Cross border storage and transport and mineral carbonation are not described in CCS Directive, not in guidances
  - Estonia, Finland
- Russian Territory in the Baltic Sea next to the Swedish territory in connection to potential storage complex
  - Sweden
- Change of ministerial structure after elections
  - Hungary
- Absent public acceptance (perception)
  - Denmark,
  - Germany, Poland, Sweden
  - Belgium and some other countries
  - Complexity in competent authorities because of the complexity of the country, or different situation in the different regions.
  - Spain, Belgium

Switzerland (IEA published data 2010)

- The Federal Office for the Environment (FOEN) and the Swiss Federal Office for Energy (SFOE) have a shared competence in dealing with CCS
- Due to the domestic energy supply being mainly based on hydro and nuclear power, the potential for CCS in Switzerland currently is low.
- Approximately 5 percent of power is generated in fossil power plants, whereas 75 percent of all CO2 is being emitted by non-point sources such as transport, commercial and residential heating.
- This results in relatively low CO2 per capita emissions (5.8 t CO2 in 2008).
- Except for a few cement production and waste incineration sites, there are no large point sources in Switzerland.
- Furthermore the geological storage potential of CO2 is yet unknown.
- In August 2009, the Federal Council announced in its proposal for the amendment of the Swiss legislation on the reduction of CO2 that guidelines concerning CCS will be provided when necessary.
- National funded Swiss research project Carbon Management in Power Generation (CARMA, 2009-2011) is ongoing with participation of six Swiss research institutions
- CARMA aims to explore the potential and feasibility of CCS systems deployment in Switzerland, taking into account the future energy scenarios.
- It also aims to exploit available expertise and to develop new CCS technologies and know-how that might be applied in Switzerland.
- The Project consists of six subprojects, one of which focuses on the public perception and the legal aspects of CCS.
- There are no ongoing legal or regulatory developments concerning CCS so far.

Iceland (VIT report and other publications, 2010)

- In 2007 in Iceland were only three industrial facilities with CO2 emissions exceedin 0.1 Mt: two alluminium plants and one ferroaly plant, in total emitting 1.08 Mt CO2 (The total CO2 emissions were 3,29 Mt (UNFCCC, 2010)
- Iceland has no deep porous sedimentary rocks, but has several deep and shalow basaltic lava flows, which are much more reactive than other silicates and may store CO2.
- This option is studied by CarbFix pilot project. The target formation at a depth of 400-800 m consists of basaltic lava flows and hyaloclasite. The total CO2 storage potential of basalts is not yet estimated.
- At Hellisheidi pilot storage site storage capacity is estimeted as 12 Mln t CO2, that is enough for 200 years for the nearest geothermal Power Plant, emitting annualy 60000 t CO2 (Gislason et al, 2010).
- Any information about CCS legislation is absent, and most probably has not yet started.

The most problematic issues which have common interest to discuss

- Conflicts of interests/interaction with other underground use interest – groundwater protection, hard coal deposits, natural gas storages, geothermal (Italy, Czech Republic, Denmark)
- Financial security (Czech Republic, Hungary)
- Corrective measures (Norway)
- Well abandoment procedure (The Netherlands)
- Criteria for qualification and responsibility transfer to the authorities in the post closure phase, verification and transfer of liability from the operator to public (The Netherlands, France, Croatia, Bulgaria)
- Licensing phase (Croatia, Bulgaria)
- Aspects connected with the practical application (Italy, Latvia)
- Technical concepts that must be included in legislation (Turkey)

The most problematic issues which have common interest to discuss

- Regulations and guidelines for implementation of CO2 storage
  (Germany)
- Public and political debates
  (Germany, Denmark)
- Competent Authority: how to guarantee a sufficient level of expertise and objectiveness, are they ready to evaluate applications
  (Belgium, Spain)
- Cross-border transport and storage
  (Belgium, Estonia, Finland, Spain, Lithuania)
- Site characterization and assesment of storage capacity: organization and standartization, information to public
  (France, Italy, Slovenia, The Netherlands)
- Monitoring issues, possibility of leakage
  (Italy, Norway, France, Hungary, Croatia, Greece, Slovenia, Bulgaria)
- Translation issues (Spain)

The most problematic issues, not covered in CCS Directive, which have common interest to discuss

- Public awareness on CCS technology and geological structures (France, Italy)
- Public acceptance (Poland)
- Cross-border issues (Estonia, Finland, Belgium),
- Storage complexes extending to the countries not covered by directive (Sweden),
- Legislation of the full chain of CCS (Poland)
- Transformation of natural CO2 deposits into underground reservoir of methane (Slovakia)
- EOR (Denmark)
- Link with other EU Direcive (Water, Wastes, Hydrocarbon wells safety, etc.) (France, Hungary)

To store, or not to store: that is the question:

- Estonia and Latvia are planning to take laws prohibbiting CO2 storage at their teritories

Why:

- Estonia: explained by absent geological conditions for CO2 storage (shallow sedimentary basin, no structures, potable water everywhere in aquifers.

- Latvia: Why:
- Latvia: “The largest Latvian CO2 emissions are too small for CO2 storage, the costs are very high for the relatively small and geologically poorly investigated structures."

- Denmark: 31.03.2011 Climate and Energy Minister of Denmark decided to postpone onshore CO2 storage until 2020, but to start with EOR (Enhanced Oil recovery) offshore, in the North Sea.
- Why: absence of public perception

- Belgium : Walloon Region: there is a draft of Decree aiming to prohibit CO2 storage in Walloon underground.
- Why: absent CO2 storage capacity

(Also problematic in other regions, except for successful legislation in Flanders).

To store, or not to store: that is the question: Fortum scraps CCS project in Finland Projects / Policy, Nov 04 2010 (Carbon Capture Journal)

- *Finnish energy company Fortum Oyj discontinued the Finncap carbon capture and storage (CCS) project, due to the technological and financial risks.* The decision is also based on the company's updated strategy.
- For the past couple of years, Fortum and Teollisuuden Voima (TVO) have collaborated on the Finncap project, the aim of which has been to build a large-scale demonstration plant for carbon capture and storage (CCS) at the companies' jointly-owned Meri-Pori power plant.
- Based on studies that have been done and on the company's updated strategy, Fortum has now decided to not continue with the project. Consequently, the Finncap project did not apply to be a part of the European Union's CCS demonstration programme. TVO withdrew from the project earlier in autumn 2010.
- Also the technological and financial risks related to the project contributed to Fortum's decision. EU programme covers only a portion of the costs of the approximately EUR 500-million project. In addition to EU funding, the project would have required national funding from Finland and significant investments from the participating companies.

IEA releases first Clean Energy Progress Report (Apr.06. 2011)

- In order to achieve a 50% reduction in energy-related CO2 emissions by 2050, IEA research shows that around 100 large-scale CCS projects will be needed by 2020, and over 3,000 by 2050. “This represents a significant scale-up from the five large-scale CCS projects that are in operation today.”

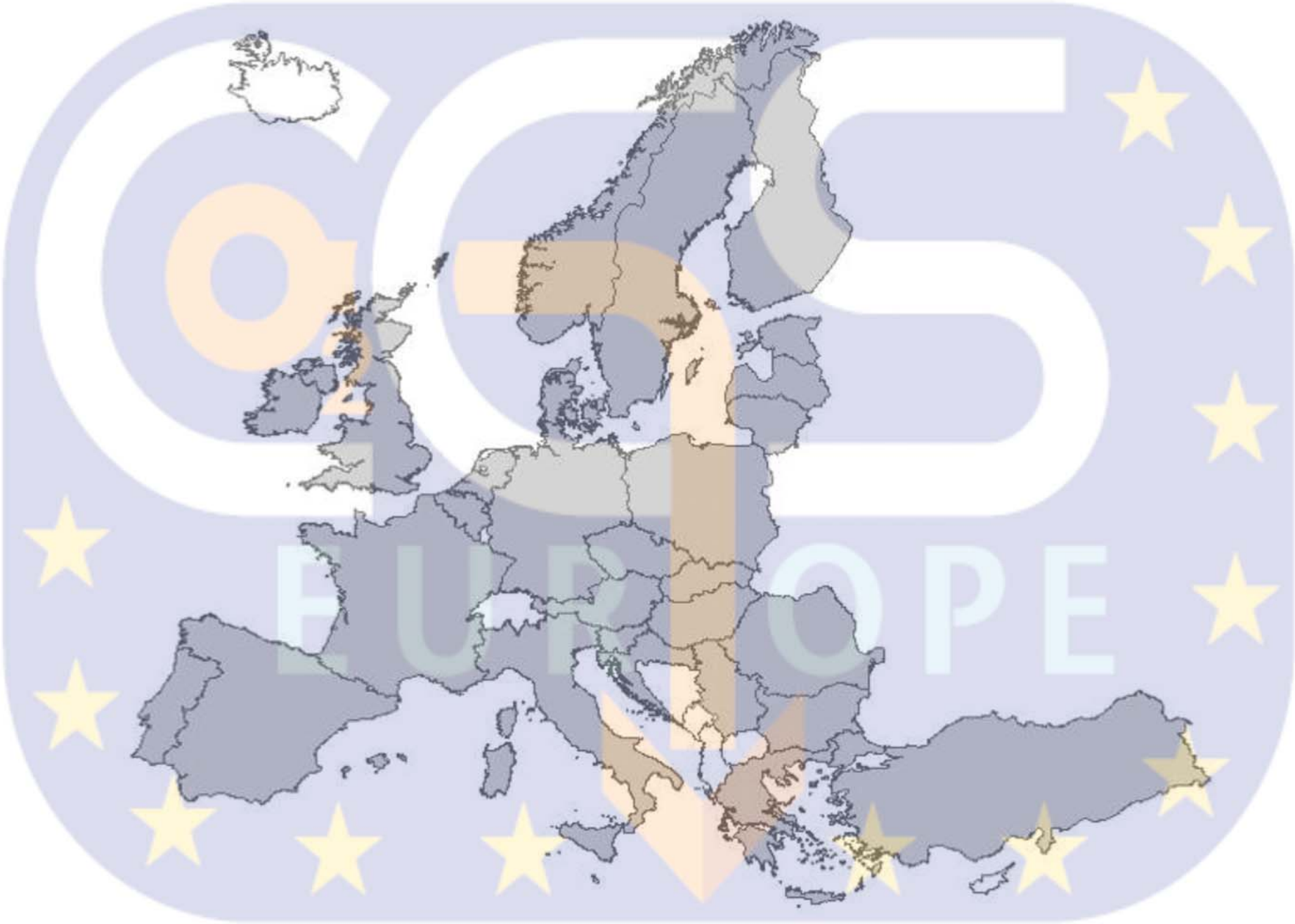
- While there are over 70 CCS projects currently planned, the report says it is uncertain how many will be realised because of recent delays in allocating public funding.

CONCLUSIONS

- Among 30 European countries about 56% are well advanced in CCS regulation.
- Among 20 countries, 14 (70%) reported the transposition process as successful and fare.
- All countries with ongoing and planned CCS demo and industial projects reported the transposition process as successful and fare.
- Only 18% of 30 countries have not yet started the process.
- There are a lot of work need to be done in all the countries by regulators, stakeholders and researchers.
- In most of the countries the guidelines to laws in CCS are still to be written or prepared, as only 4 countries have reported already proposed guidelines.
- Statistically situation with CCS regulations in the Baltic Sea Region countries is looking to be better than in the whole European Area.

- I wish you all successful implementation of CCS technology in your countries and fruitful international cooperation!

- Thank you for attention!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