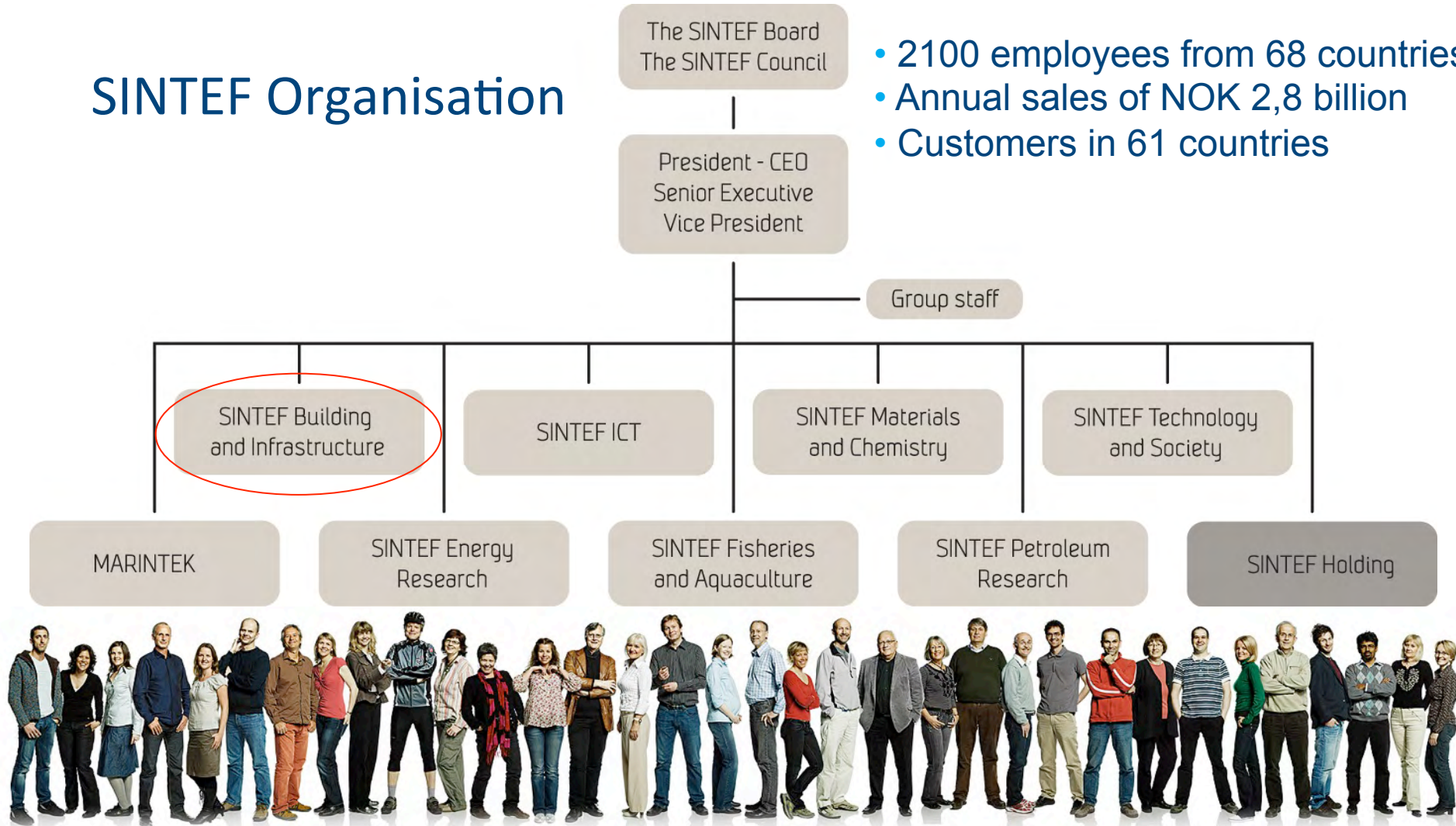


Who are we and what we do?

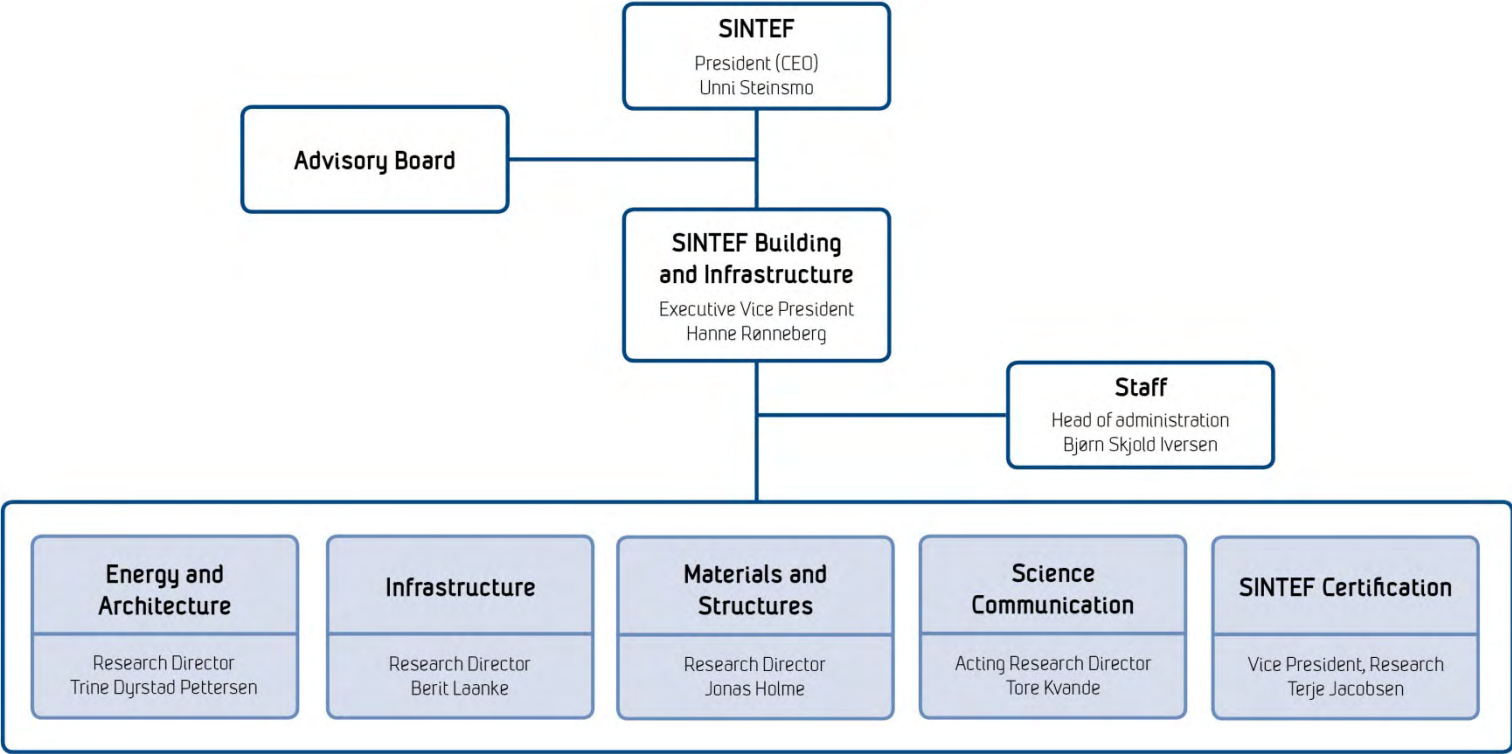
Serina Ng
Research Scientist

SINTEF Organisation

- 2100 employees from 68 countries
- Annual sales of NOK 2,8 billion
- Customers in 61 countries



SINTEF Building and Infrastructure | Organization



SINTEF Building and Infrastructure



- Our main objective: SINTEF Building and Infrastructure shall be an internationally leading research institution for sustainable development
- We create value both for our clients and society as a whole by means of
 - Research and development
 - Research-based consultancy
 - Research design guides
 - Certification
 - Knowledge dissemination

Advanced laboratories for building and infrastructure



Laboratories

General laboratories

- Materials laboratory
- Large testing hall (NTNU)
- Structural tests (NTNU)

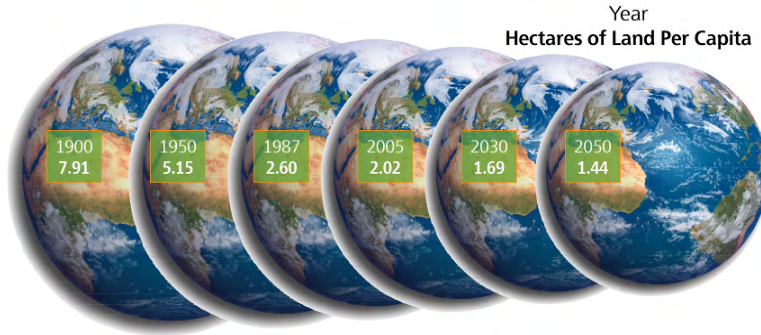
Special laboratories

- Chloride analyses
- (wet) chemistry
- Corrosion of steel/rebars
- DTA/TG
- Petrography (aggregates)
- Shrinkage and crack rigs
- Physical cement testing
- Rheology from paste to concrete
- Calorimetry



Global trends

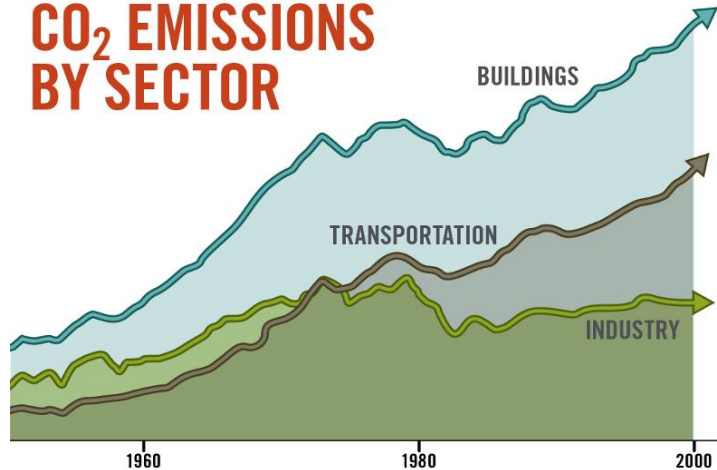
Population - Our Shrinking Earth



Urbanization



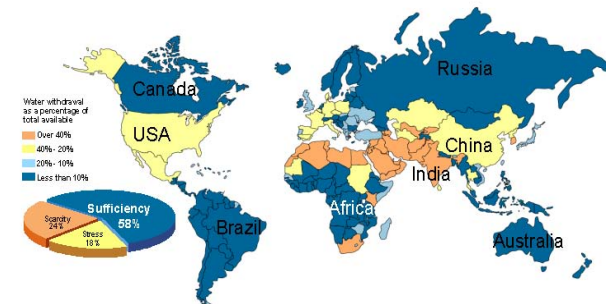
CO₂ EMISSIONS BY SECTOR



Energy Information Administration (2006). *Emissions of Greenhouse Gases in the United States*.

Water

By 2030, over 2.1 billion people will live in areas with acute water scarcity



GE Healthcare

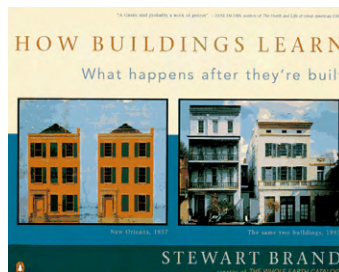
12_23-sep-2009

Source: Global Infrastructure Outlook 2009, GEO, UNEP, Eurasia, London, 1999

VOLVO

FME-ZEB: Zero Emission Buildings

- National Centre of Environment friendly Energy Research
- Develop competitive products and solutions for existing and new buildings
- Market penetration of buildings with zero greenhouse gas emissions related to their production, operation, and demolition
- Experts within material science, building technology, energy technology, architecture, and social science
- Strong industry involvement
- Encompasses the whole value chain within the Norwegian construction sector
- Duration: 2009 – 2017
- Budget: approximately 40 mill Euro (300 mill NOK)



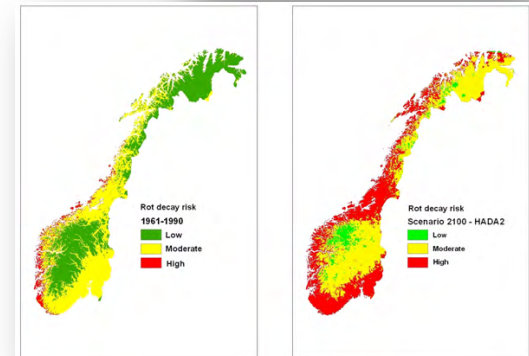


B I V U A C

Buildings and Infrastructure –

Vulnerability and Adaptive Capacity to Climate Change

- Funding: The Research Council of Norway;
- Researcher project in NORKLIMA;
- Partnership with Vestlandsforskning;
- Cooperation with NTNU, Loughborough University UK, and National Water Research Institute - Environment Canada;
- Main objectives:
 - Identify the gap between actual and requisite capacity to climate strain in buildings and infrastructure;
 - Develop knowledge about climate robustness in built environment and water/sewage infrastructure;
 - Provide input to the development of planning and building legislation;





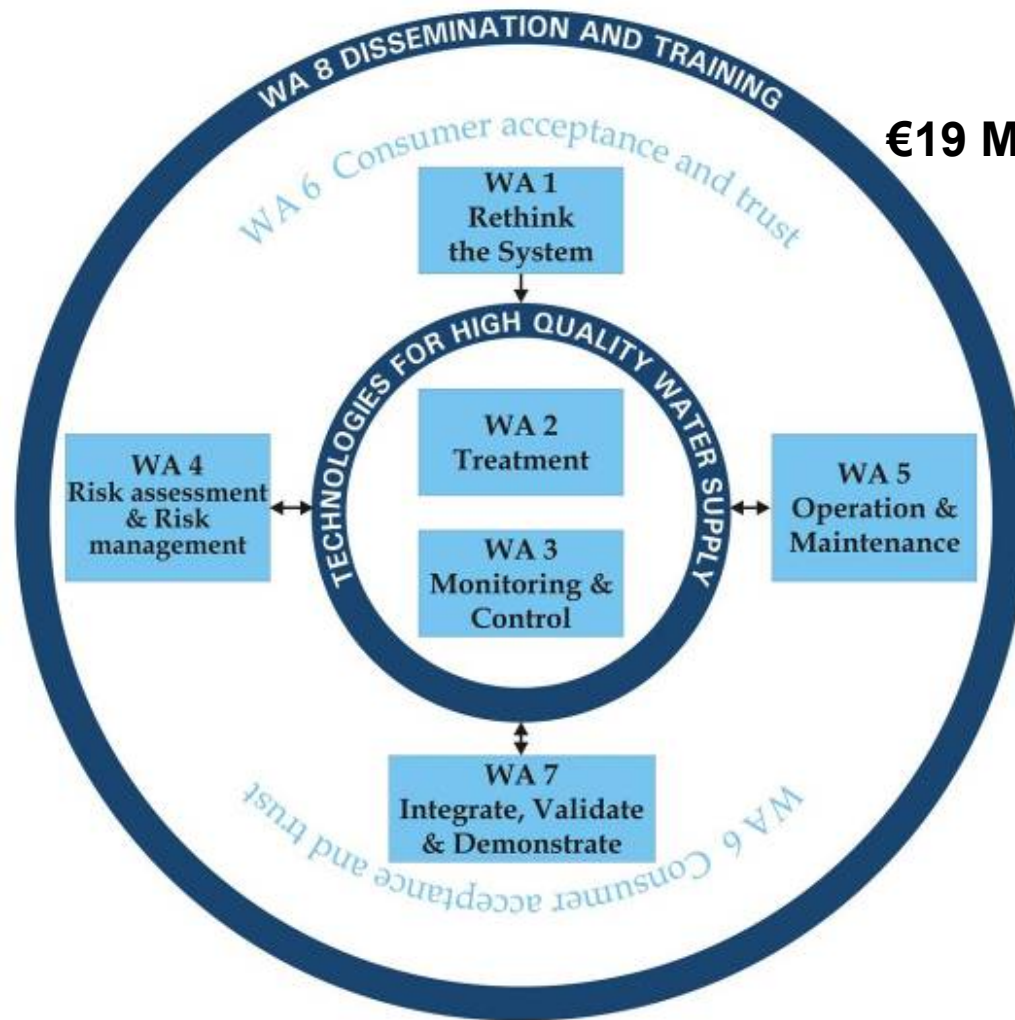
SAMCoT - Vision

SAMCoT shall be a leading national and international centre for the development of robust technology needed by the industry for sustainable exploration and exploitation of the valuable and vulnerable Arctic region.

SAMCoT will meet the challenges due to ice, permafrost and changing climate for the benefit of the energy sector and society.

- Duration : 8 years
- Main research partners: NTNU (host), SINTEF, UNIS, Industrial Partners, Oil Companies, Engineering consulting companies

TECHNEAU: Rethink current water supply systems, provide improved technologies and practices



€19 Mil., 2006 -2011

Use of Underground Space in Singapore and Hong Kong

The ultimate goal; to use underground space for various purposes in Singapore:

- Stage 1: Master Plan for Development of Underground (completed 2008)
- Stage 2: Underground Rock Cavern Usage Feasibility Study (URC) – STM (completed 2009)
- Stage 3: Study on Co-location of Underground Utilities (SCUU) (Tendered)
- Client: Jurong Town Corporation (JTC) + Ministry of National Development



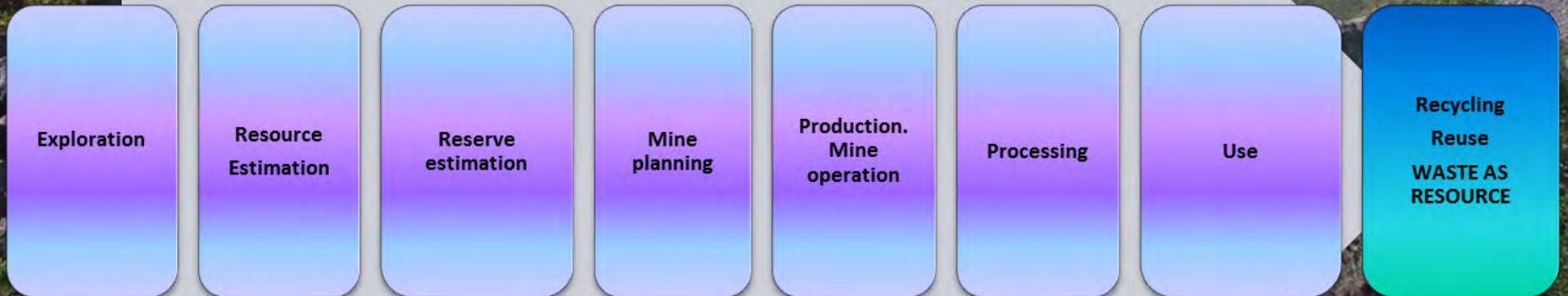
And in Hong Kong:

- Relocation of Sha Tin Sewage Treatment Works to Caverns – A feasibility study
- Releases 28-hectares land for housing development or other initiatives
- Provide world-class sewage treatment works
- Safe, economic and efficient housed in a stable rock cavern
- Client: Drainage Service Department



Mineral resources

for the future



COIN - Concrete Innovation Centre

- The building industry "won" one of 14 Centres for Research-based Innovation (CRI) - The Research Council of Norway's tool to stimulate the industry to further innovation by forging close alliances between research-intensive enterprises and prominent research groups
- SINTEF leads this 8 year centre (2007 – 2014) with a total budget of 220 mill NOK, and NTNU and 9 industrial partners and their subcontractors represent the whole value chain



Focus areas



Environmentally friendly concrete

1. Binders with low carbon footprint
2. Insulating and energy preserving concrete



Competitive constructions

1. Robust highly flowable concrete – Surface specifications
2. Ductile high tensile strength concrete (15 MPa) – Fibre
3. High quality manufactured sand



Technical performance

1. Crackfree concrete structures
2. Service life
3. Structural performance

Lignosulfonate for Future Concrete

Lignosulphonate act as a dispersant for cement in concrete leading to a lower water demand.

- Study the mechanism governing LS-cement interaction
- Create novel value added LS with higher plasticizing and less retarding effects
- Future concretes includes usage of blended cements or geopolymers

Project partners: **Borregaard AS, NTNU, Chalmers, Uni Sheffield, Ecole de Mines d' Alés, Uni Melbourne**

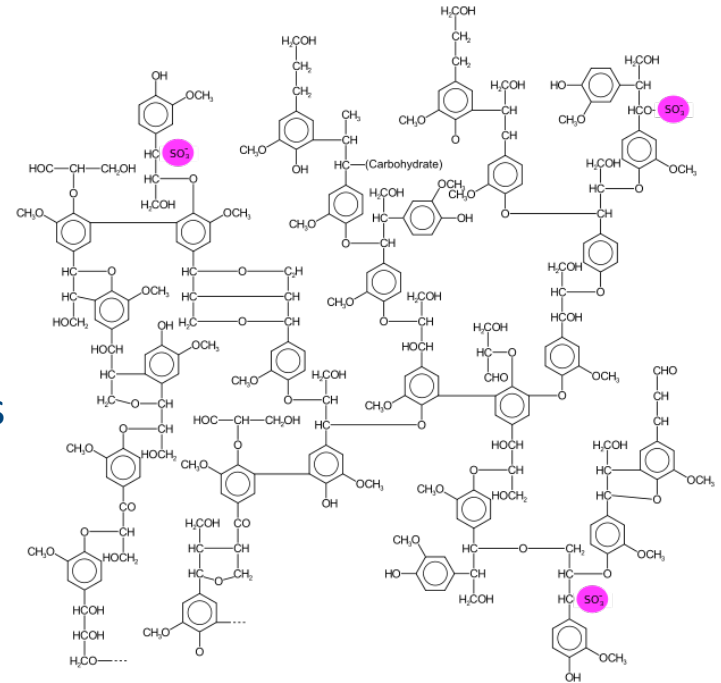
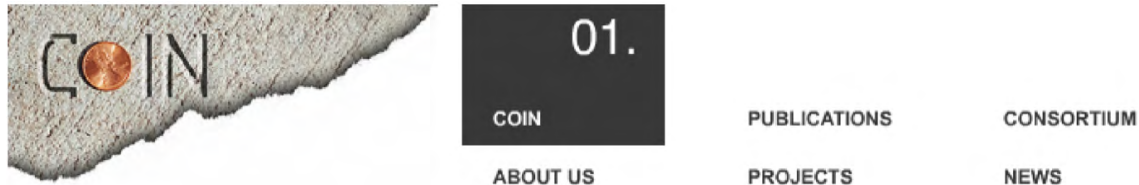


Illustration of a lignosulfonate structure

<http://de.wikipedia.org/wiki/Ligninsulfonat>

www.Sintef.no

Free reports from www.coinweb.no



Concrete Innovation Centre

– a centre for research based innovation



COIN - a Display Window for Concrete Research in Europe

COIN works to create more attractive concrete buildings and constructions. Attractiveness implies aesthetics, functionality, sustainability, energy efficiency, indoor climate, industrialised construction, improved work environment, and cost efficiency during the whole service life.

The Primary Goal

We want to fulfil our vision by bringing the development a major leap forward by more fundamental understanding of the mechanisms in order to develop:

- Advanced materials
- New and sustainable design concepts
- Efficient construction techniques
- More environmentally friendly material production

Established by the Research Council of Norway

