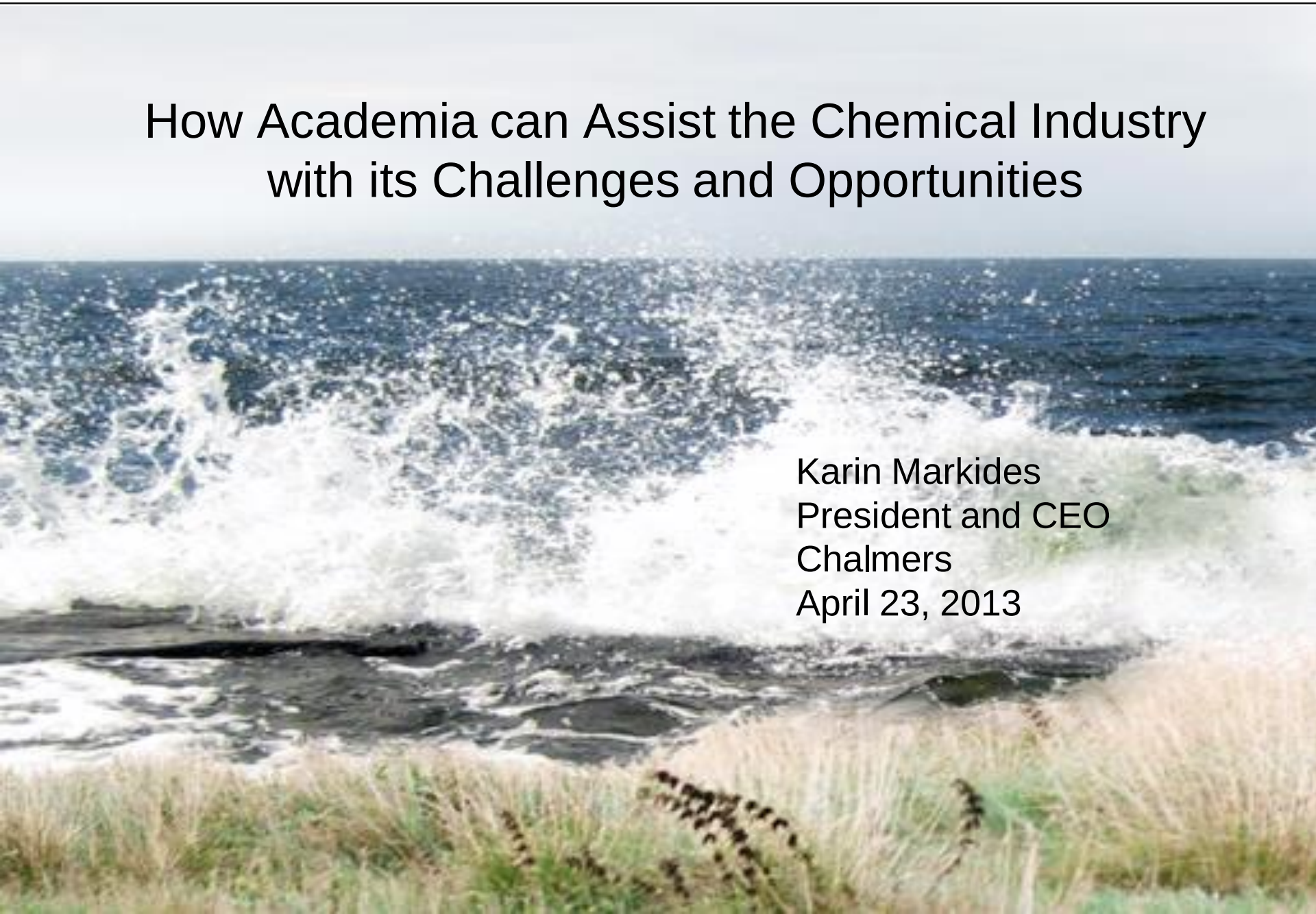
CHALMERS
UNIVERSITY OF TECHNOLOGY

How Academia can Assist the Chemical Industry with its Challenges and Opportunities



Karin Markides
President and CEO
Chalmers
April 23, 2013

Chemical Industry Challenges and Needs

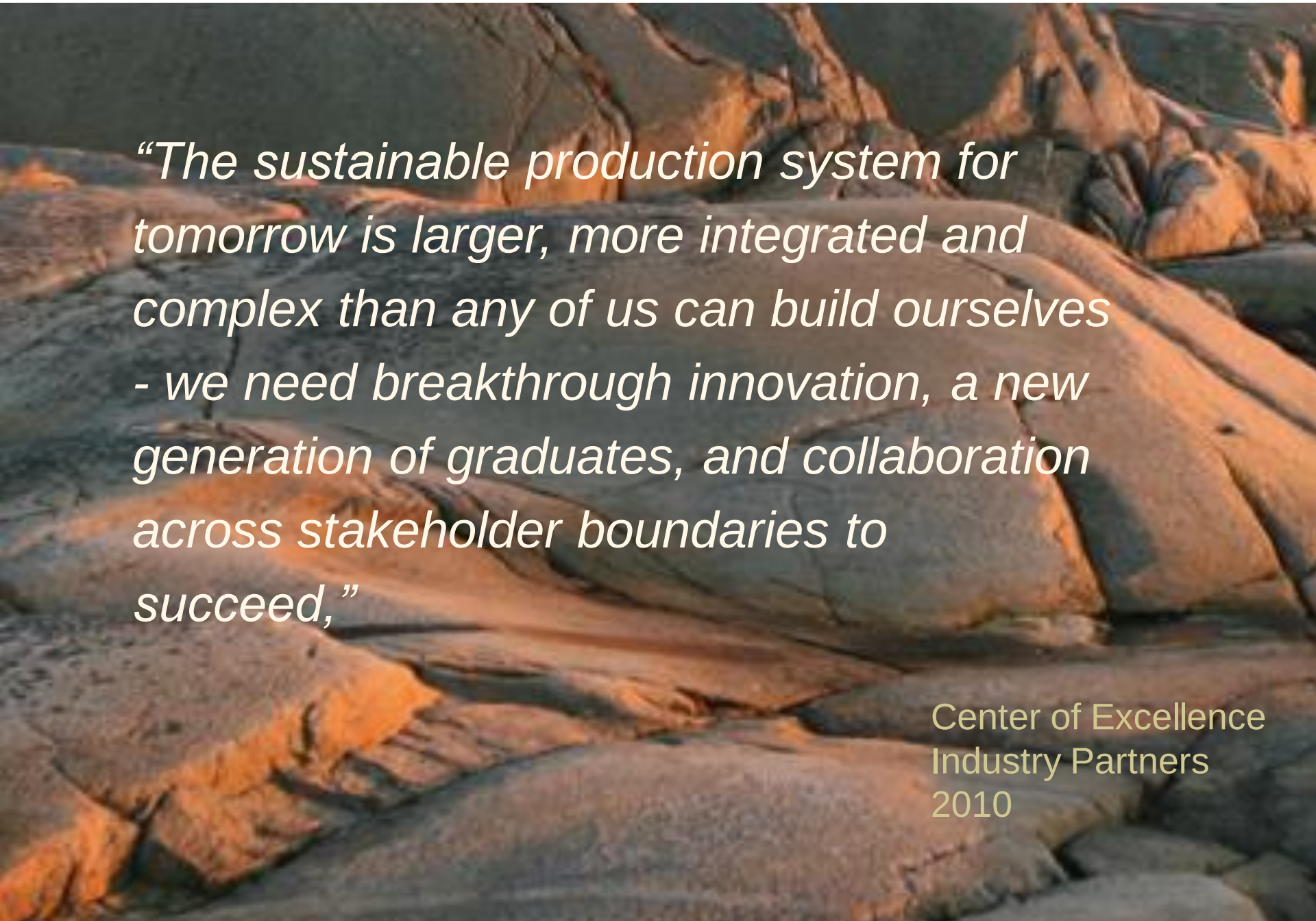
Public-private-university partners joint action list 2012

Challenges:

- Fossil dependence
- Knowledge in Chemistry
- Development of new materials
- Complex challenges as drivers
- Materials and Energy in harmony

Needs:

- Meeting places
- Innovative education–research-innovation climate
- Knowledge and information outreach
- Interaction between branches
- Less border restrictions



“The sustainable production system for tomorrow is larger, more integrated and complex than any of us can build ourselves - we need breakthrough innovation, a new generation of graduates, and collaboration across stakeholder boundaries to succeed,”

Center of Excellence
Industry Partners
2010

CHALMERS
UNIVERSITY OF TECHNOLOGY

Case ”Göteborg”

PUBLIC

- 500.000 (900 000) inhabitants in ”Göteborg”
- 1.200.000 inhabitants in Region ”Western Sweden”

PRIVATE

Industry: Volvo, Astra Zeneca, Ericsson, SKF, Stena, SCA, Nobel Biocare, Preem, Perstorp, AkzoNobel, Borealis, Ineos, Eka Chemicals, Göteborg Energi, Södra, Renova……..

INSTITUTES

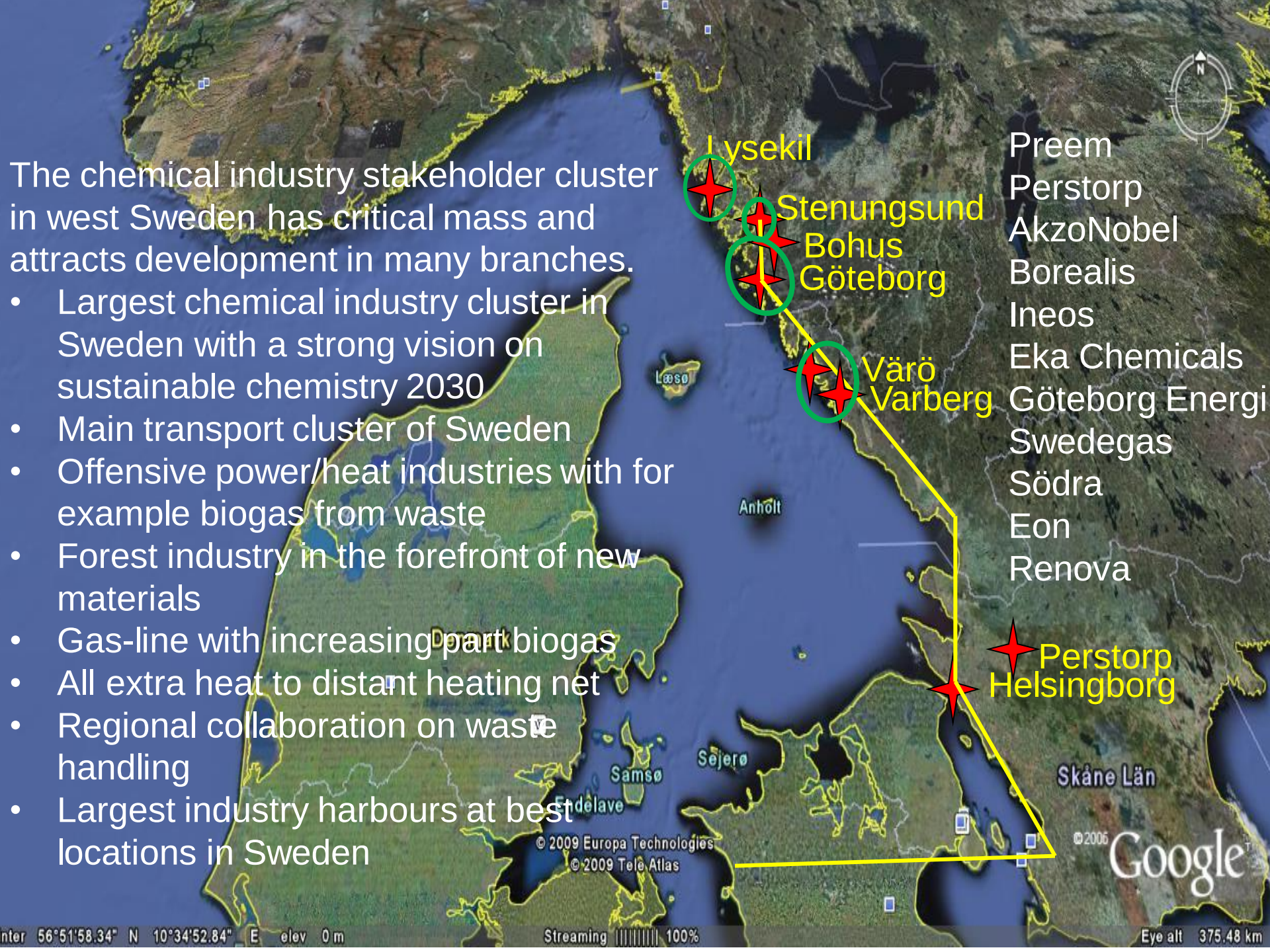
Industrial Research Institutes: Imego, IVF, SIK, IVL, IFP, SP…., RISE (nation), CIT(Chalmers)….

UNIVERSITIES

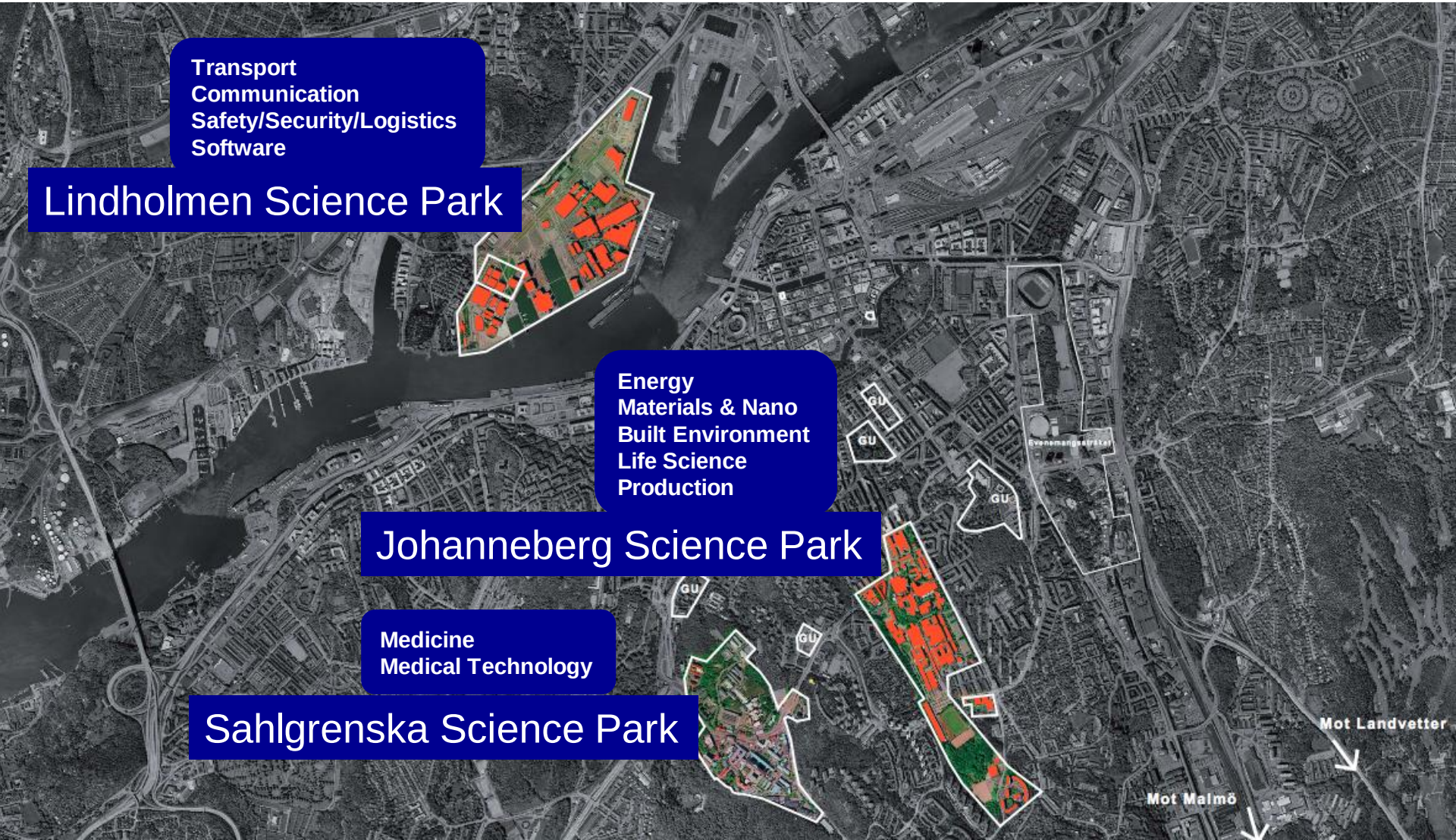
- **Chalmers**
  11000 students, 2700 employees, 250 PhD per year
- **University of Gothenburg**
  55000 students , 5500 employees, 250 PhD per year

MEETING PLACES

- 3 Science Parks
- Research Infrastructures
- Science Centers


The chemical industry stakeholder cluster in west Sweden has critical mass and attracts development in many branches.
• Largest chemical industry cluster in Sweden with a strong vision on sustainable chemistry 2030
• Main transport cluster of Sweden
• Offensive power/heat industries with for example biogas from waste
• Forest industry in the forefront of new materials
• Gas-line with increasing part biogas
• All extra heat to distant heating net
• Regional collaboration on waste handling
• Largest industry harbours at best locations in Sweden
Lysekil
Stenungsund
Bohus
Göteborg
Värö
Varberg
Perstorp
Helsingborg
Preem
Perstorp
AkzoNobel
Borealis
Ineos
Eka Chemicals
Göteborg Energi
Swedegas
Södra
Eon
Renova
Læsø
Anholt
Sejerø
Samsø
Skåne Län
© 2009 Europa Technologies
© 2009 Tele Atlas
©2006 Google

Science Parks in Gothenburg



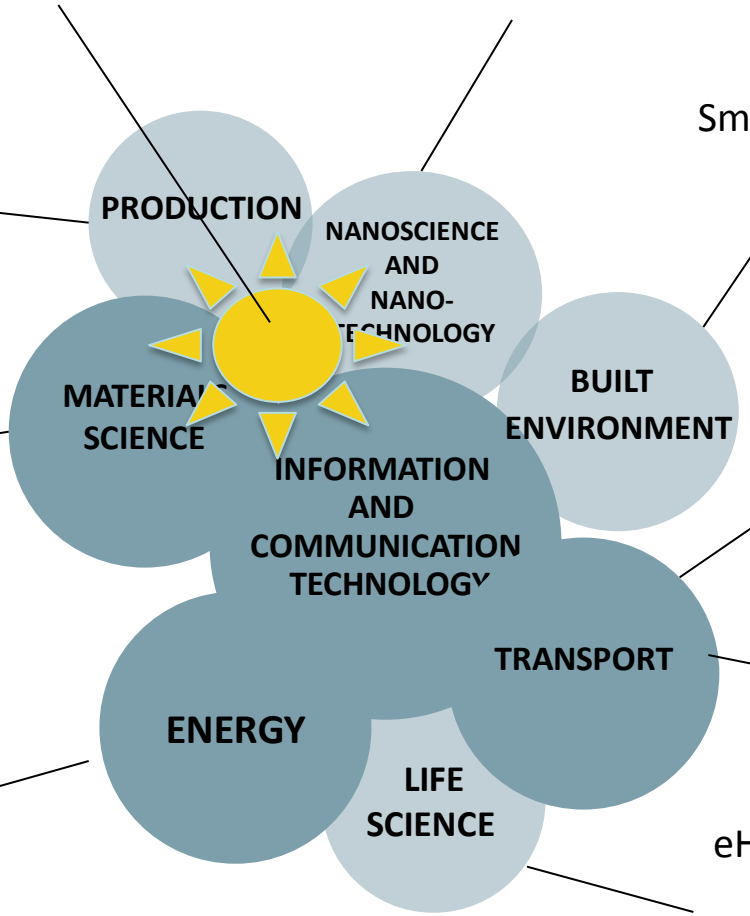
CHALMERS
UNIVERSITY OF TECHNOLOGY

Chalmers Areas of Advance for visibility and focus

Brings together research, education and innovation across 17 departmental boundaries and > 40 Centers-of-Excellence, and to co-operate with bodies and organizations outside Chalmers

AREAS OF ADVANCE

Graphene Flagship – Coordinated Action



Bottom-up nanoelectronics

Smart buildings with ICT

Packaging and production for electronics & photonics

Sensors, communications, and signal processing for vehicles and transportation

New materials for electronics and photonics

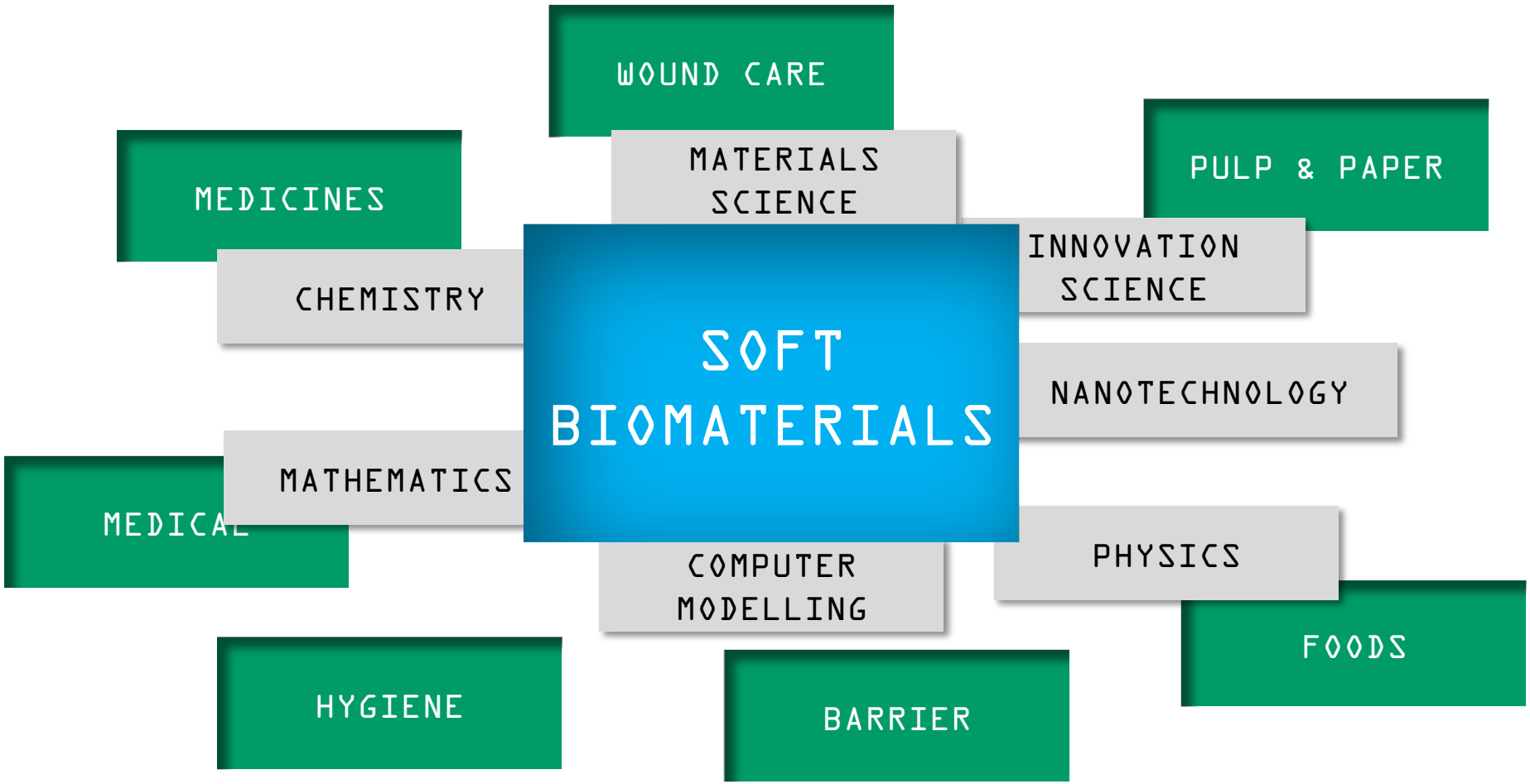
Safety critical automotive software

Smart grid
Green wireless
Energy-efficient computing infrastructures
Low-power electronic components and design

eHealth

Antennas for medical diagnostics and treatment

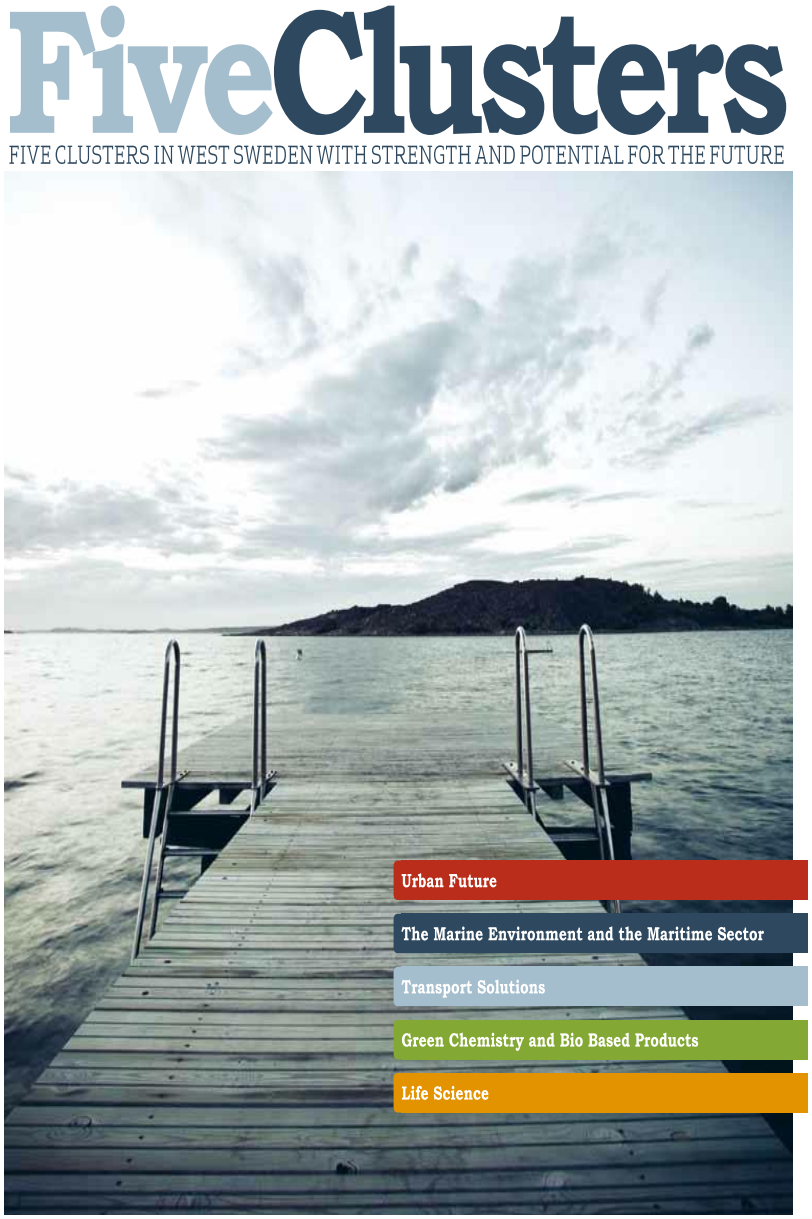
Center of Excellence



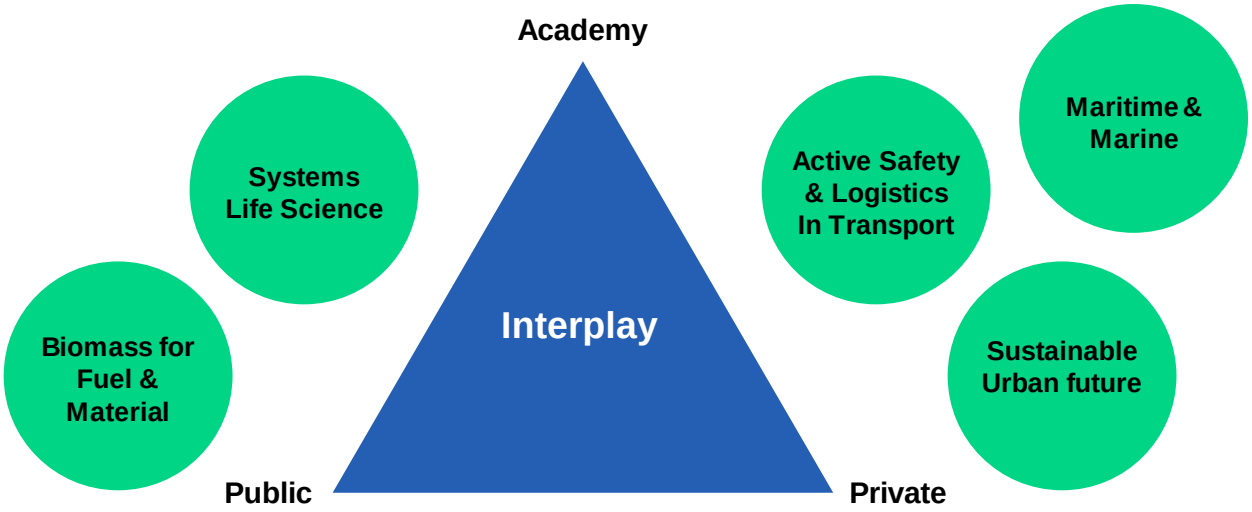
Public-Private-University Regional Partnership

THE INTENTION IS for these clusters to develop cross-boundary collaborations, something Gothenburg and West Sweden have always done over the years. The region is characterized by openness to the surrounding world, both nationally and internationally. It is also known for the closeness between the academia and the public and private sectors, not to mention the openness among people in general.

However, in order to be successful we also have to be brave enough to try new approaches. In addition to our renowned cooperative spirit, we must reinforce the sense of trust that effective cooperation is built upon. Then Gothenburg and West Sweden will clearly have what it takes to become even more attractive, both nationally and globally.



Attraction, competitiveness and growth from glocal knowledge clusters



Offer:

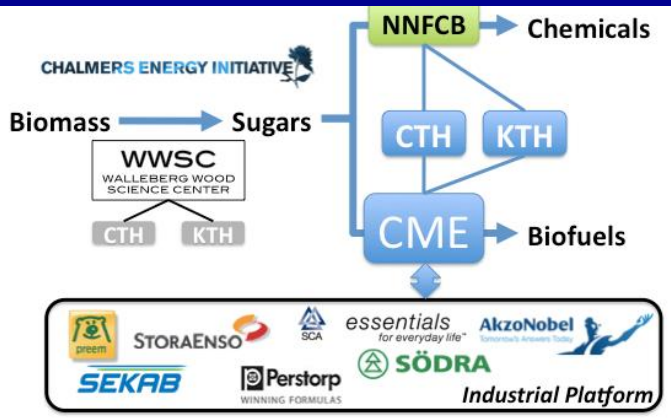
- Partnership towards common goals
- Identification of each stakeholders strength, abilities and roles
- Coordinated innovation system
- Attraction of competence, investment and meetings for growth

CHALMERS
UNIVERSITY OF TECHNOLOGY

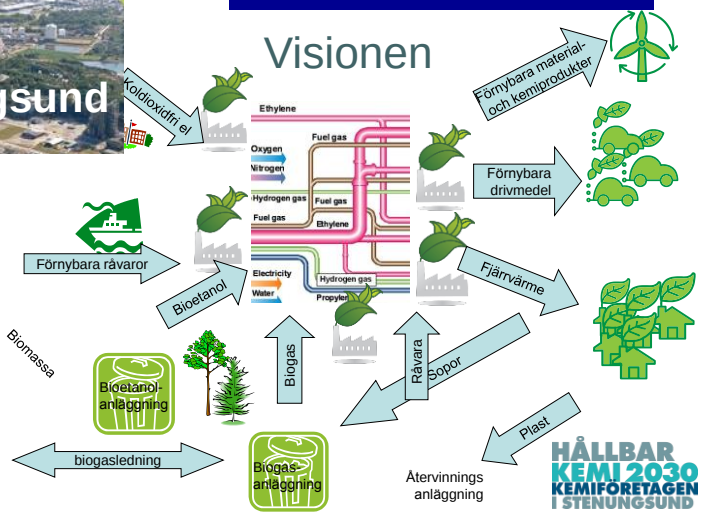
Bio based products/Green chemistry

A Cluster in West Sweden

Public-private-university partnership



Large Industries



PRIVATE

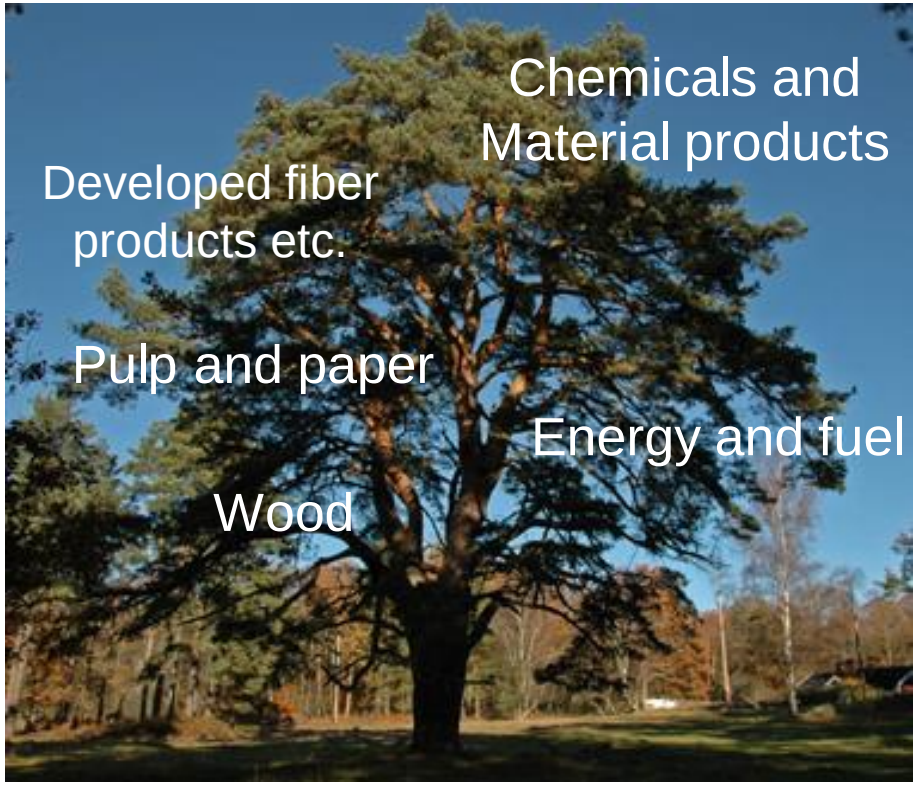
PUBLIC

ACADEMY

Large scale infrastructures

SME

Strong synergies between forest and chemical industry



AkzoNobel
Tomorrow's Answers Today

A Member of The Linde Group | AGA

INEOS ChlorVinyls

BOREALIS

Perstorp
WINNING FORMULAS

Domsjö

processum

SCA c/o Life

SÖDRA

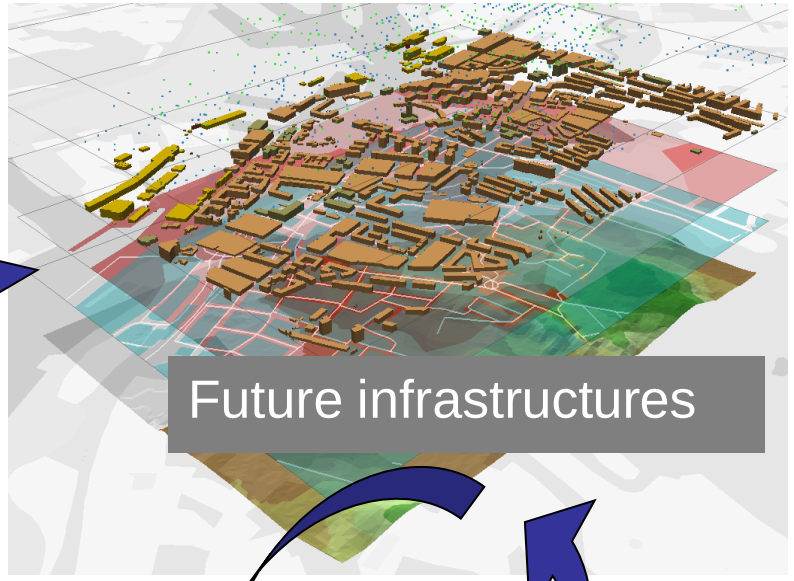
HOLMEN SKOG

M.fl…

Sustainable Urban Futures

Cities are social constructions which support human activities and well-being

Smart transport systems

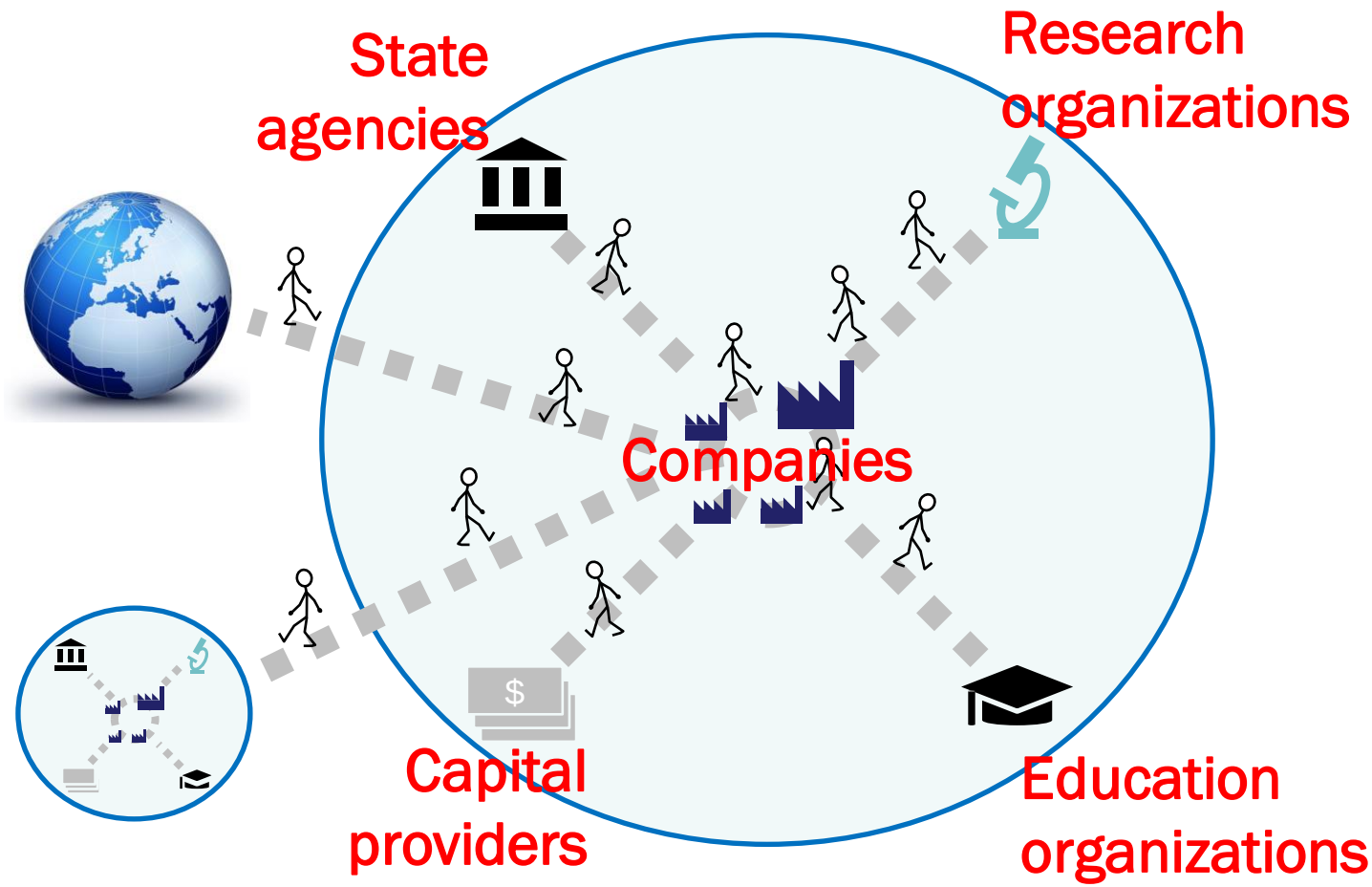


Future infrastructures

Efficient buildings

New technology

The Dream of Dynamic Clusters



Building entrepreneurial ecosystems

- Regions around the world are building up their innovative capabilities
  - Response to increasingly globalised and complex world

- Universities are often seen as the hub for these *”entrepreneurial ecosystems”*
  - Primary source of knowledge development and diffusion

“It was the ecosystem of large corporations, universities and start-up companies on the U.S. west coast that broke Nokia”

Jorma Ollila, chairman

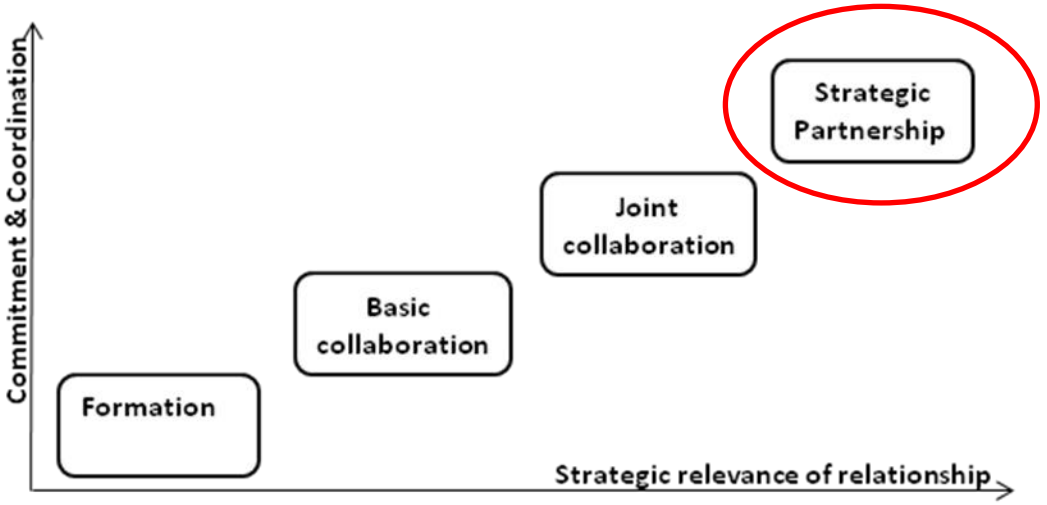
Seven key factors

when building entrepreneurial ecosystems

1. Senior leadership at the university
2. Team of entrepreneurial champions
3. Sustained commitment over decades
4. Substantial financial resources
5. Continuing innovation
6. Organizational infrastructure
7. Local, national and global partnerships

Fetters, Greene, Rice, Butler, 2010

University – Industry Collaboration

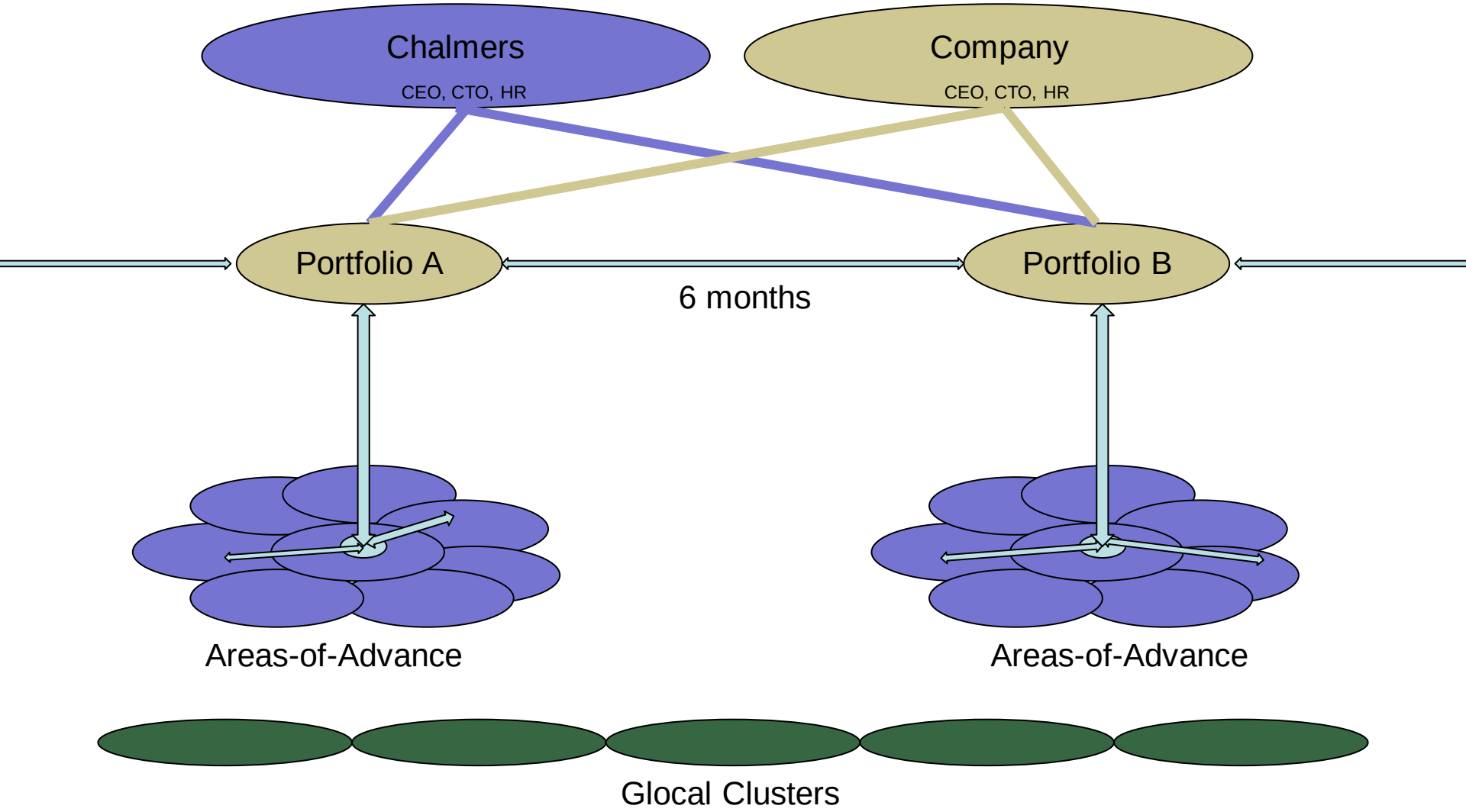


Number / regularity of contacts	Initial contact	One or several projects / irregular	One or several joint activities / regular	One or several joint activities / regular
Time orientation of collaboration	Initiation of short term activities	Short / medium term	Medium / long term	Long term
Number of people involved	Few	Few	Multiple	Multiple
Management level	Individual (Professor)	Individual (Professor)	Faculty (Dean)	Organisational (Univ. Mgmt)

Strategic Long-term Collaboration Model

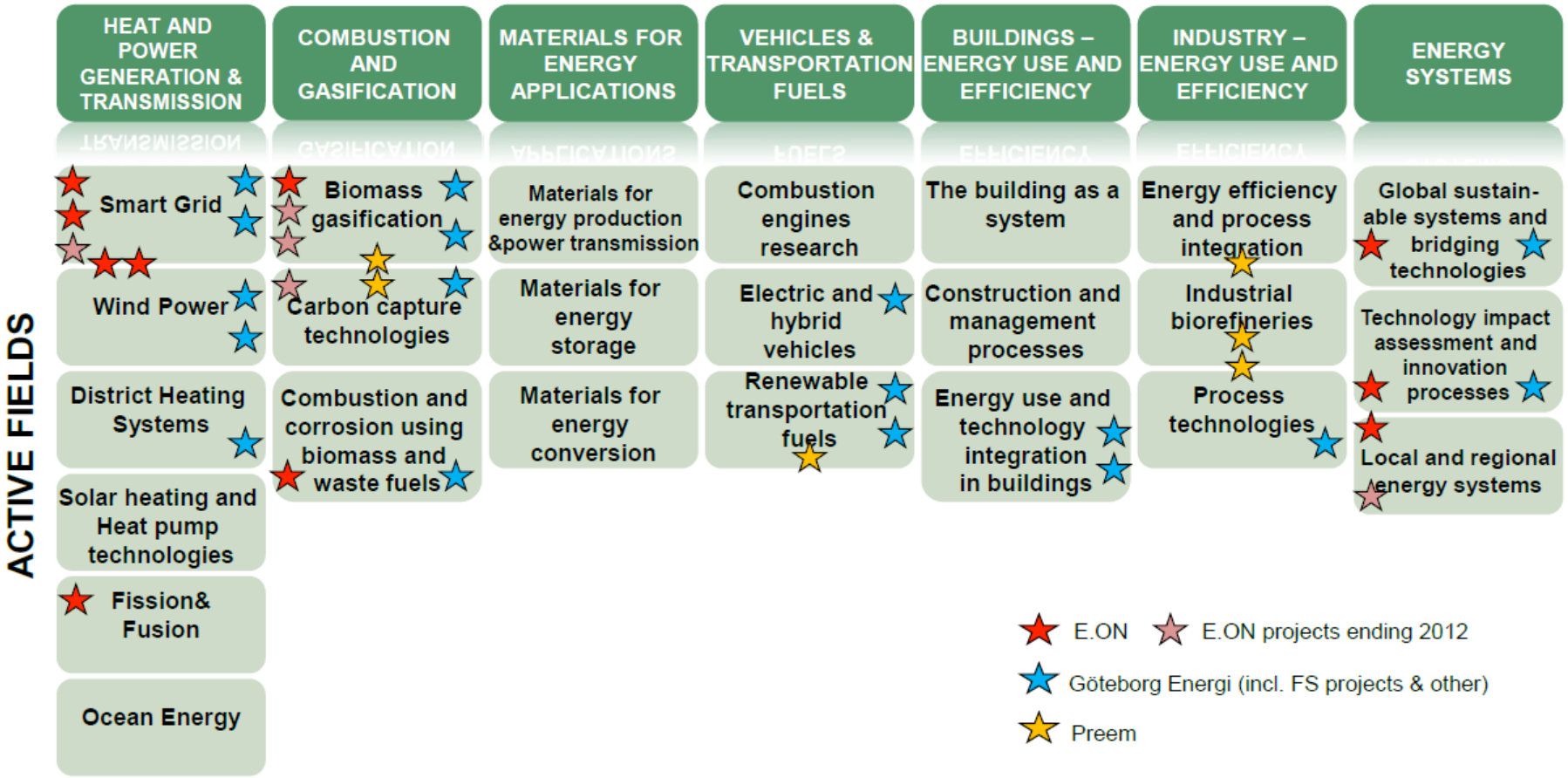
COINS

Chalmers Open Innovation Network System



ENERGY OVERVIEW
EXCELLENCE PROFILES

Research projects industrial collaborations
Chalmers Energy Area of Advance



CHALMERS
UNIVERSITY OF TECHNOLOGY

Entrepreneurship and Innovation

KEMI- OCH BIOTEKNIK
SJÖFART
MASKINTEKNIK, TEKNISK DESIGN, AUTOMATION OCH MEKATRONIK
ELEKTRO, DATA, IT
TEKNISK FYSIK OCH TEKNISK MATEMATIK
ARKITEKTUR OCH SAMHÄLLSBYGGNAD
INDUSTRIELL EKONOMI OCH EKONOMI & PRODUKTIONSTEKNIK

41 MASTER'S PROGRAMMES
Pick your favourite

venture cup

AREAS OF ADVANCE

CHALMERS professional EDUCATION

DRIVHUSET
DÄR STUDENTERS IDÉER VÄXER

Information & Communication Technology

Materials Science

Life Science

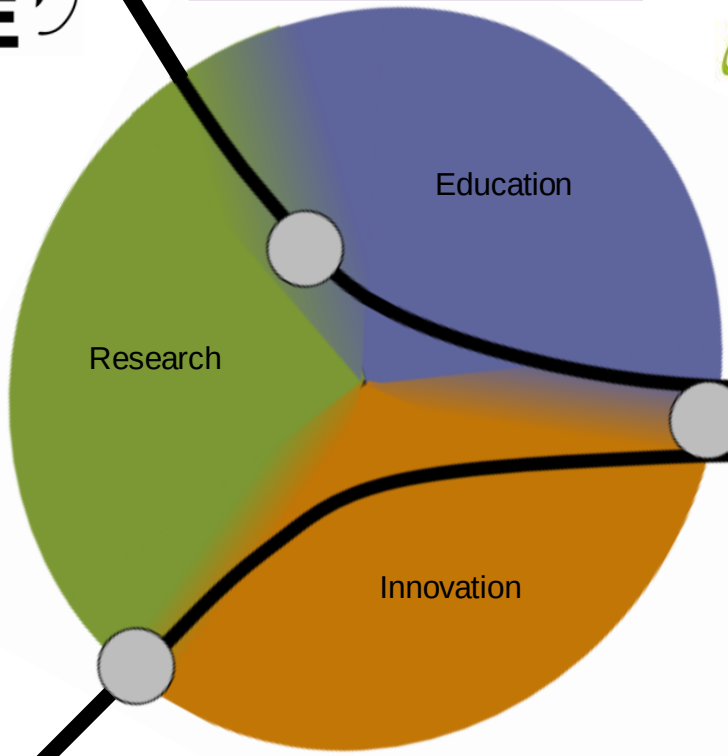
Built Environment

Nanoscience & Nanotechnology

Production

Transport

Energy



CHALMERS SCHOOL OF ENTREPRENEURSHIP

Strong leverage in innovation and entrepreneurs !

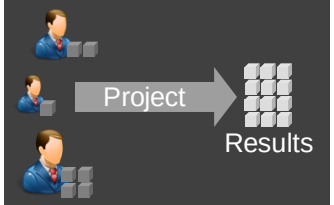
CHALMERS innovation
Business Incubator

INNOVATIONS-KONTOR VÄST

encubator
IDEAS REALISED

CHALMERS
UNIVERSITY OF TECHNOLOGY

Knowledge Management System

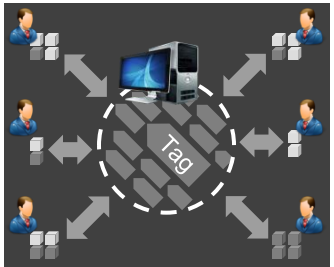


Standardized methods are used to define background and results as objects

1.

Each object is tagged with ownership, access rights, and terms for accessibility

2.

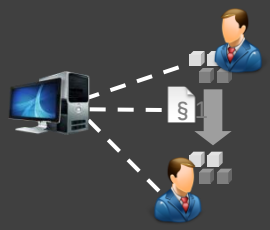


Information is stored and managed centrally through the KMS

3.

Access to the KMS is provided for all partners to browse

4.



Collaboration, licensing and utilization is governed on an object level

5.

The IP model and knowledge management system create an accessible portal for sharing, trading and utilizing IP and knowledge

CHALMERS
UNIVERSITY OF TECHNOLOGY

UNITECH Leadership Program

UNITECH International

A network of extraordinary engineers with unique competence in:

- Technical knowledge
- Business knowledge
- Cultural awareness

Academic partners (AP)

Chalmers
ETH Zürich
RWTH Aachen
TU Delft
INSA de Lyon
UPC Barcelona
Politecnico di Milano
Loughborough University
Trinity Colllege, Dublin

Corporate partners (CP)

CHALMERS
UNIVERSITY OF TECHNOLOGY

System Integrated Student Projects

Focus of yesterday

- Context: Engineering science
- Reduced, “pure” problems (with right and wrong answers)
- Design phase
- Individual effort

Desired focus

- Context: Product & system development
- Systems view; problems across disciplines are complex, ill-defined, and contain societal and business aspects
- Understand the whole cycle: CDIO
- Teamwork, communication

CHALMERS
UNIVERSITY OF TECHNOLOGY

The Chemical Industry
What difference does the university make?

Long term competitiveness