

出國報告（出國類別：其他：移地教學）

歐洲產業發展趨勢

服務機關：國立政治大學商管專業學院碩士學位學程(AMBA)

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派赴國家：丹麥、挪威、瑞典

出國期間：2013/04/05-2013/04/17

報告日期：2013/06/17

摘要

北歐各國為眾所公認的永續發展領頭羊，在全球暖化加劇、氣候快速變遷、天然資源逐漸受限的趨勢下，綠色經濟時代已然來臨。面對相關議題，政大企業管理研究所黃秉德副教授特別與安侯永續發展顧問股份有限公司總經理黃正忠副教授(時任中華民國企業永續發展協會秘書長)合作開授「歐洲產業發展趨勢」課程，帶領學生前往丹麥、挪威、瑞典，參訪綠色企業與低碳城市，透過行前拋出多項關注主題，做足準備；和參訪中不斷的交流、反饋與討論，深入探討永續未來趨勢。對北歐產業有了深入的觀察後，反思臺灣，期許這個世代廣泛應用所學，保護臺灣的環境，開拓藍海商機，力行永續信念。

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一、目的

在全球綠色經濟的發展趨勢中，最綠、最貴、最永續、也最具競爭力的北歐企業，如何在追求獲利的同時，兼顧永續發展；在企業發展策略轉型時，又如何將企業社會責任、低碳與綠色創新等概念內化到商業模式中。歐洲商業競爭相當聚焦在低碳、綠能、高資源效率、創新材質等，成為城市開發及國家續航的實力之爭。北歐有創新的商業模式以及不拘泥或滿足現狀的企圖心，造就了多項驚人成效，值得臺灣借鏡。

本課程著眼於此，特別重視引導小組合作與討論，希望學生思維更全面深入：

- 每組均須解析與觀察歐洲產業發展總體與個體的趨勢面
- 每組均有總體焦點議題、產業、及城市發展議題
- 每項主題均訓練負責學生，整合小組合作至發表會結束為止

經過不斷的演練與準備，至各大企業與引領永續型商業模式發展的組織及城市實地參訪時，我們展現出台灣新一代青年，也就是未來領袖的積極精神，深獲企業好評。

二、過程

政治大學 AMBA 連續四年舉辦國內唯一之 MBA 永續創業競賽，每年獎勵補助前三名之來自全國隊伍，另外結合低碳產業及歐洲產業趨勢等課程招募具永續概念的修課學生，成團赴歐洲考察學習永續政策及企業營運。

我們深知要創造美好永續的未來，人類社群須要思索新的商業模式，不論在產品、服務，甚至政策、財務面向，都有追求進步的空間。期望學生透過行前三次課程密集而內容豐富的學習，認識北歐現今產業趨勢。

針對不同產業或公司背景探討，瞭解業界如何實務執行企業永續與社會責任，經過實際參訪，並同時與企業管理階層溝通交流，增加國際視野與實務管理知識。回國後，可延伸分享國外所學之企業永續知識給予同儕，耕耘散播更多種子人才。

(一)行前上課

3/2 (六)下午 13:30-17:30

- 課程背景說明
- 參訪行程簡介
- 決定個人負責參訪單位資料蒐集與分析：
解析與觀察歐洲產業發展總體與個體的趨勢面
總體焦點議題、產業、及城市發展議題

3/16 (六)下午 13:30-17:30

- 進行參訪單位個人簡報
- 個人簡報修訂方向之討論
- 期末報告撰述之說明

3/30 (六)下午 13:30-17:30

- 歐洲低碳與產業永續說明
- 個人簡報及繳交參訪時的提問問題

(二)北歐企業實地參訪

- 每晚全體進行參訪後心得討論及隔日行程預習一至二小時
- 成果發表之個案簡報及期末報告討論半小時

4/8

Novozymes 諾維信酵素生技

是引領生物科技創新的世界先導，開發面向未來的工業生物解決方案，促進客戶業務發展，改進地球資源的使用方式。其 700 多種產品遍及全球 130 個國家和地區，而主訴求生物創新為未來市場需求提供卓越和可持續解決方案，提高工業效率，保護地球資源。

Kalundborg Symbiosis 葛倫堡工業園區

4/9

ATP 丹麥退休基金

Copenhagen Cleantech Cluster 哥本哈根清境技術聚落

4/10

Center for Design, innovation and Sustainable Transition (DIST)永續創新設計中心

4/11

Cities of the Future (Norway) 挪威未來城市專案

Norsk Hydro 鋁業能源創新再造

4/12

Confederation of Norwegian Enterprise (NHO)挪威企業商會

Storebrand 壽險財務規劃

Statoil 整合石油與天然氣

4/15

Ericsson 愛立信

為世界級領導供應商，為全球行動及固網營運商提供全方位通訊設備與相關服務。超過 180 個國家的 1,000 多個網路，使用其網路設備；全球 40%的行動呼叫，透過其系統承載。愛立信是全球少數能為所有主流行動通訊標準，提供端到端（end-to-end）解決方案的廠商之一。

Ethical Council 政府退休金投資規劃

4/16

Sandvik 山特維克重工業：採礦、金屬、不銹鋼等重型機具研發製造商，是高科技工程集團，在相關業務領域居全球領先地位。

Electrolux 伊萊克斯家電，為家用設備和專業用設備的世界領導品牌之一。

(三)回國後課程：4/28 (日)下午 13:30-17:30

– 學生簡報參訪企業資料及修訂

(四)成果發表會：5/10(五)下午 13:30-18:30

– 繳交期末簡報及期末報告書，邀請環保署葉欣誠副署長、中研院楊致行資深督導及台北市環保局吳盛忠局長擔任評論人；並廣邀永續競賽及北歐相關企業總部經理人如臺灣伊萊克斯總經理、摩根史丹利臺灣區執行長趙辛哲蒞臨指導。除分享此行豐碩成果，更透過心得發表與群體互動討論，帶動社會各階層深入自省，包括政府部門、科技及金融等產業，倡議新創思考的無限可能。



2013 北歐產業永續創新趨勢
2013 Seminar on Sustainability of Scandinavian Leading Organizations 研習成果發表會

議程 時間：2013年5月10日（五）13:30~18:00
地點：政治大學商院1F國際會議廳

| 時間 | 主題 |
|-------------|--------------------------------------|
| 13:00~13:30 | 來賓報到 |
| 13:30~13:40 | 開幕致詞 |
| 13:40~14:20 | 未來總體經濟發展的宏觀趨勢 |
| 14:20~15:00 | 北歐永續型投資標竿分享 (Responsible Investment) |
| 15:00~15:15 | 中場休息 |
| 15:15~16:55 | 北歐永續型企業標竿分享 (Clean Tech) |
| 16:55~17:55 | 北歐綠色與低碳城市 (Smart City) |
| 17:55~18:05 | 台灣未來領袖的期許 |
| 18:05~18:10 | 發表會圓滿結束 |

主辦單位：AMBA 執行單位：AMBA 合作單位：企業永續發展教育 TCBF 贊助單位：HSBC 渣打銀行 Dow

合作贊助單位：ASUS 華碩電腦 EPSON 愛普生 宏碁 3M PHILIPS 飛利浦 SONY

三、心得及建議

「歐洲產業發展趨勢」課程至今已邁入第五年，歷年到歐洲參訪都有更深入的感受。尤其明顯的是，北歐企業在永續議題上已轉型往互利互惠，共生共榮的生命共同體信念中。本次參訪包括油氣業、礦業、生技業、保險與資產管理業，順利解構這些全球領先之永續型企業的商業模式，及環保新知與社會創新範例。

舉例來說，北歐各大企業的遠見，是臺灣值得學習的精神；如葛倫堡生態工業園區則結合了社區居民和大型廢棄物工業廠區，找到自然生態與廢棄物互換商機的平衡點，致力於增進物業價值鏈中每一個環節的永續性，爲了兼具環保與獲利，將核心能力結合永續概念的做法，非常值得效法。

在金融產業方面，我們看到各國紛紛成立共同退休基金，根據國際評則，協助退休後的理財投資觀念，有效將其核心能力發揮在社會責任之上，剖析未來經濟大趨勢(Mega trends)、解析企業永續報告書，及建立責任型投資模式。聚焦在分析國際資本市場與評等機構如何解析將永續整合到財務評估、投資決策、及績效揭露的商業實務中。

更重要的是，越來越多企業不僅成立單一的永續部門執行單向的計畫，而是由上而下將永續的概念貫徹施行到每一個部門，根據不同部門特性推行不同的永續策略；對其全球分公司，也竭盡所能地隨時溝通理念，以期推動朝向長遠永續的方向邁進，這在所有參訪企業中，都是無形的共同目標，卻能從他們的發展策略，見識其由小而大，全力推廣執行永續信念的決心。

歷經 14 個參訪點後，更明顯的觀察到東西方政府與企業經營理念與管理思維的迥異；北歐注重人權與企業責任，強調永續與經濟效益並重，新舊世代總是針對問題反覆發想，不斷試圖找出更好的解決方案。諸如綠建築集中雨水及日照、交通工具採用生質燃料、回收台能辨識瓶身正確分類、智能機具使人力成本減至最低等等公共措施，足見永續信念深植在北歐人的 DNA 中。

也因此斯德哥爾摩、奧斯陸及哥本哈根堪稱歐洲最綠色的三個城市，尤其是瑞典將於 2020 年成爲無石油國家，丹麥哥本哈根將於 2025 年成爲全球第一個碳

中和首都。北歐城市永續除了人民覺醒、企業共同努力外，還有政府政策的配合。引領環境保護、能源效益、公司治理、退休基金等發展政策朝更好的方向邁進，用更深更廣的角度衡量人的議題。

許多數據顯示，現實環境的仍然持續惡化，此刻全球正面臨的氣候變遷、資源短缺問題，並未因為意識覺醒而趨緩。我們仍需付出更多的心力來改變現況，當歐洲社會和企業已經跑在前端之時，許多開發中國家仍在經濟困境中掙扎，我們的島國家園，歷經多次風災和震災，更應時時省思，正視自然界發出的警訊。

國內社會的公民成熟度，或政府的組織治理能力皆有大幅成長空間，要追趕上北歐社會的腳步，教育是一大利器，也是最基本的工具。當前商學院的菁英學生，就是將來的企業領袖，在年輕時灌輸永續發展的理念，讓他們親身接觸歐洲企業的永續理念，或許能拓展其視野；期待這樣一門課，能影響下一代未來做決策時，把遠光放得更遠，運用創新創業精神，成就全人類社群最高福祉。

在全球綠色趨勢策略下，本課程既然訴求學生具備國際觀，並植入永續思維新苗，據此行北歐參訪後心得，提供具體建議如下：

每年透過歐洲產業發展趨勢課程，可以發現語言溝通能力的重要性，尤其是英語已為全球共通語言，若因語言辭不達意，將錯失許多深入探討跨文化的寶貴交流機會，也無法達成成功的國民外交。

總括參訪全程，學生的表現很精采，只可惜時間過於緊湊，無法給每個人對等的機會展現學習成果；而在成果發表會中，學生往往著分享自己觀察到產業現況及城市文化，但提供臺灣反思建議則不夠具體。建議未來可以在行前預備課程同時要求尋找與歐洲當地相對應的臺灣企業做比較，回程後的研討課程，著重於針對臺灣產業的應用與反省，進而歸納為對提升國內產業發展有益的建言。

此外，永續議題是全球公民的共同課題，除了學校教育學生，政府也應更主動對民眾及業界透過各式管道加強宣導；永續不只是環保，任何機關行號、個人與團體都須認知自己所處的險峻情勢，才能為下一代營造基本的生存環境，尋求未來進步發展。

附錄一 參訪照片及成果發表會簡報

4/8 Novozymes 諾維信生技



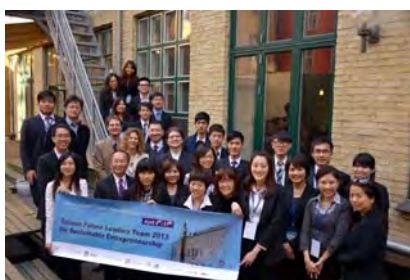
Kalundborg Symbiosis 葛倫堡生態工業園區



4/9 ATP 丹麥退休基金



Copenhagen Cleantech Cluster 哥本哈根清境技術聚落



4/10 Center for Design, innovation and Sustainable Transition (DIST) 永續創新設計中心



4/11 Cities of the Future (Norway) 挪威環保署未來城市專案



Norsk Hydro 鋁業能源創新再造



4/12 Confederation of Norwegian Enterprise (NHO) 挪威企業商會



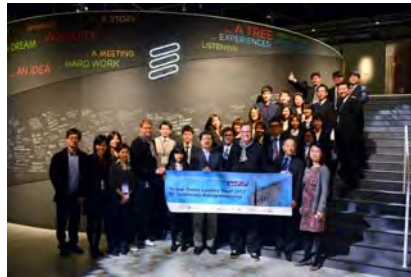
Storebrand 壽險財務規劃



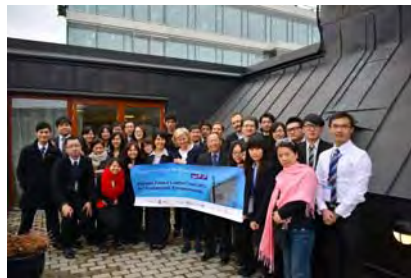
Statoil 整合石油與天然氣



4/15 Ericsson 愛立信



Ethical Council 政府退休金投資規劃



4/16 Sandvik 山特維克重工業



Electrolux 伊萊克斯家電



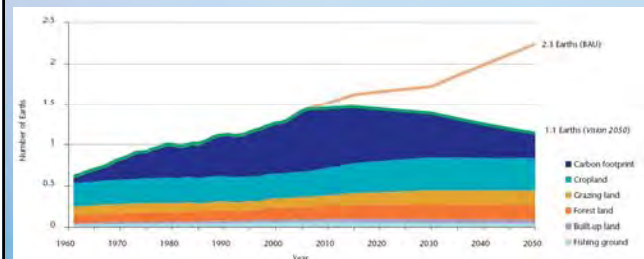
Three Key Questions

- What does a sustainable world look like?
- How can we realize it?
- What are the roles business can play in ensuring more rapid progress toward that world?

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Business As Usual or Unusual?

-How many Earths do we use?



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Business domains for the next decade – Opportunities and overlaps



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Responsible Investment

AMBA Johnny Lee



What is “Responsible Investment”

- Responsible investment is an approach to investment that explicitly acknowledges the relevance to the investor of **environmental, social and governance (ESG)** factors, and the **long-term health and stability of the market** as a whole.

---By UN PRI

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History of responsible investment



1990
MCSI KLD 400
Social Index

1928
US Pioneer Fund

17th
Quaker Movement

1999
Dow Jones
Sustainability Indexes



2006
UN PRI



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UN PRI 6 Principles

1 We will incorporate ESG issues into investment analysis and decision-making processes.

2 We will be active owners and incorporate ESG issues into our ownership policies and practices.

3 We will seek appropriate disclosure on ESG issues by the entities in which we invest.

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Scandinavian Leading Organizations

UN PRI 6 Principles

4 We will promote acceptance and implementation of the Principles within the investment industry.

5 We will work together to enhance our effectiveness in implementing the Principles.

6 We will each report on our activities and progress towards implementing the Principles.

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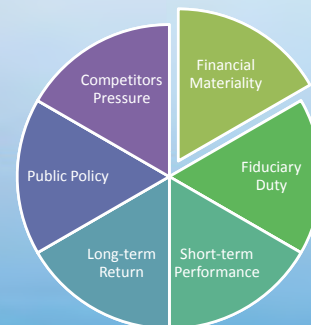
Growth of the PRI Initiative



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Source: UN PRI

Drivers for Responsible Investment



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Responsible Investment Supply Chain

Fund
Managers

Analysts

Consultants

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Related Responsible Investment



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Scandinavian Leading Organizations

Investing Strategies



Business domains for the next decade – Opportunities and overlaps



Reference

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- The forum for sustainable and responsible investment
<http://ussif.org>
- European Sustainable Investment Forum
<http://www.eurosif.org/>
- Denmark Sustainable Investment Forum
<http://www.dansif.dk/>
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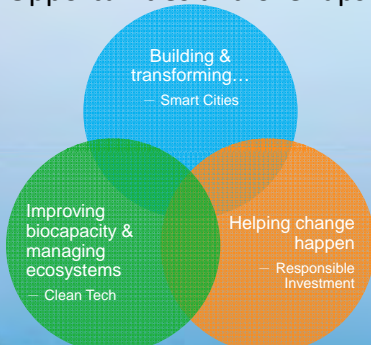
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CLEAN TECH



Business domains for the next decade – Opportunities and overlaps

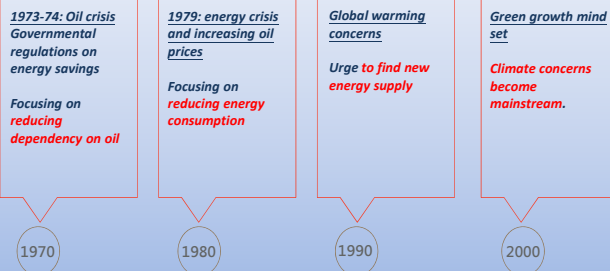


Agenda

- Evolution of Clean Tech
- Market size
- Clean tech in the future
- Opportunities of Taiwan

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Evolution of Clean Tech



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What is Clean Tech?

RI



ESG

Megatrend

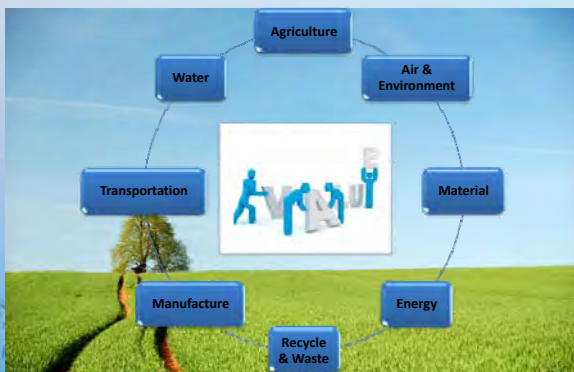


- **What**
To create value activity, with a **smaller environmental footprint** and **minimize pollution**.
- **Description:**
Any product or services that improves **operational performance, productivity, and efficiency** while reducing costs, inputs, energy consumption, waste, or environmental pollution.
- **Business:**
Clean tech is often associated with **venture capital funds** and land use organizations.

How?

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What involves in Clean Tech for consideration?



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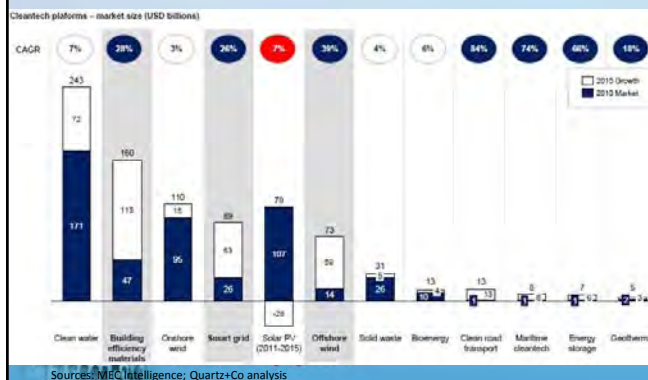
What Impacts Clean Tech on evolution?

- Technology Improvement
- Needs of Energy
- Energy Supply
- Footprint Reduction
- Enterprise Responsibility
- Market & Regulation



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Market size



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Clean Tech in the Future



Source: MIT Intelligence analysis; Quartz+Co analysis

Opportunities of Taiwan

- Taiwan has potential and strength to be a Clean Tech leader in Asia:
 - Leading ICT industry. e.g. Acer, ASUS, HTC.
 - Components provider in High-Tech (e.g. LED, Solar, controllers). e.g. Delta Electronics.
 - Near biggest market: China

Solution Provider

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Smart City

MBA 張世婷



Why is there a need for Smart City?

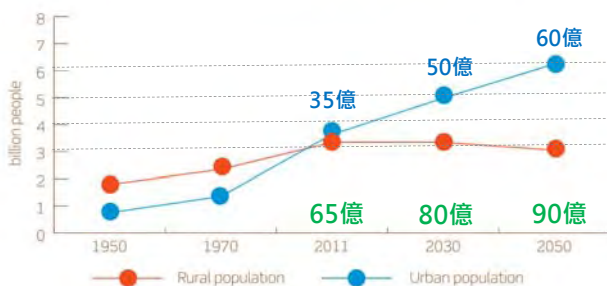


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1. Rapid Urbanization

Figure 1. World urbanization prospects

Source: United Nations: World Urbanization Prospects: The 2011 Revision



2. Polarized economic growth

- By 2025, the **600 biggest cities** in the world are projected to account for **60% of global GDP**.
- The **30 largest cities** alone are projected to drive **20% of global GDP** growth from 2010 to 2020.
- The cities are home to concentrated and diverse pools of knowledge, which spur new economic development.





3. Greenhouse gas emissions

- Around **70% of global CO₂ emissions** derive from cities.
- Cities consume around **80% of total global energy production.**



Think whole,
think healthy



Cities of the Future Challenges

Increasing
Population

Public Diverse
Demand



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What is a Smart City ?



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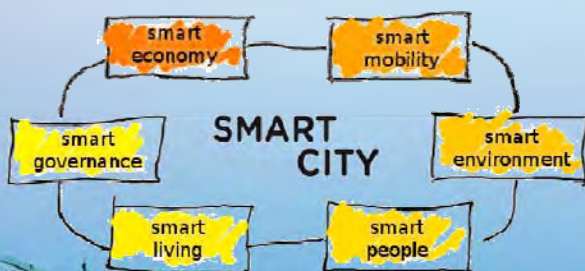


Smart City

*"Smart cities use **information and communication technologies (ICT)** to be more intelligent and efficient in the use of resources, resulting in cost and energy savings, improved service delivery and quality of life, and reduced environmental footprint—all supporting innovation and the low-carbo*



6 dimensions



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6 dimensions



Smart Economy

- Innovation & Competitiveness



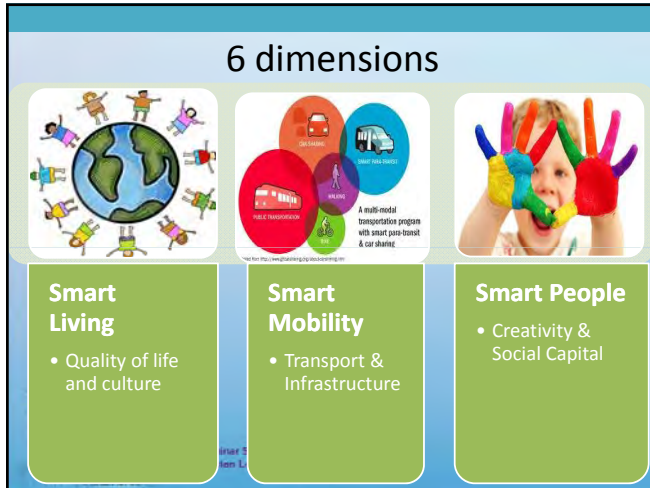
Smart Environment

- Sustainability & Resources



Smart Government

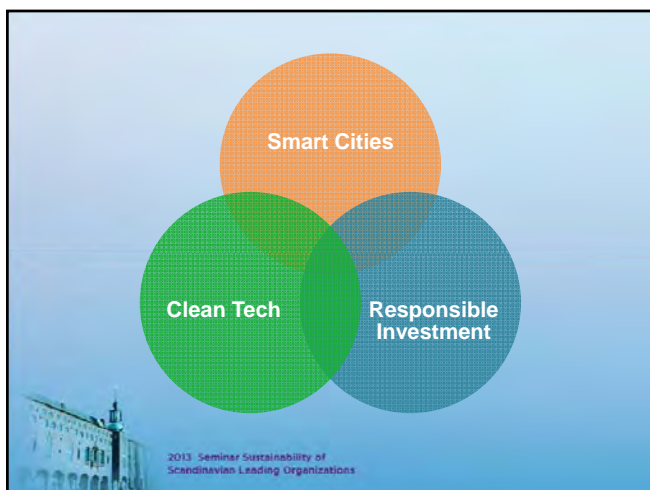
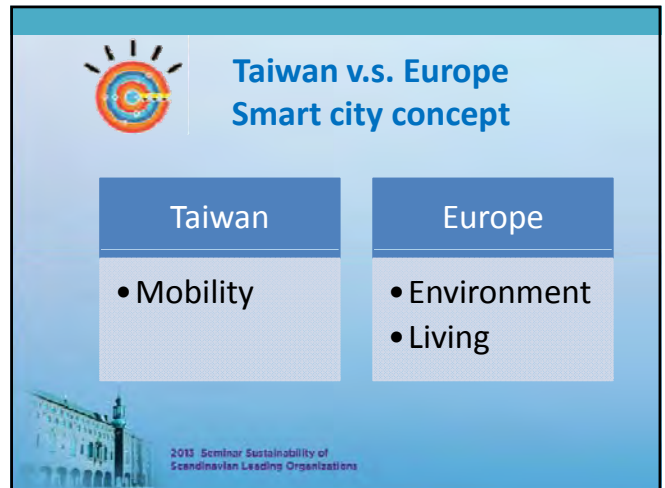
- Empowerment & Participation



2012 Europe Smart City Rankings

| Final | Smart City | Smart Economy | Smart Environment | Smart Governance | Smart Living | Smart Mobility | Smart People |
|-------|------------|---------------|-------------------|------------------|--------------|----------------|--------------|
| 1 | Copenhagen | 7 | 1 | 8 | 4 | 3 | 1 |
| 2 | Stockholm | 2 | 2 | 5 | 7 | 5 | 4 |
| 3 | Amsterdam | 6 | 3 | 7 | 5 | 1 | 5 |
| 4 | Vienna | 10 | 8 | 1 | 1 | 2 | 7 |
| 5 | Paris | 4 | 5 | 4 | 8 | 7 | 2 |
| 6 | Berlin | 1 | 4 | 6 | 6 | 6 | 9 |
| 7 | London | 5 | 6 | 3 | 9 | 10 | 3 |
| 8 | Barcelona | 8 | 7 | 2 | 10 | 4 | 6 |
| 9 | Munich | 3 | 9 | 9 | 2 | 8 | 10 |
| 10 | Frankfurt | 8 | 10 | 10 | 3 | 9 | 8 |

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Business areas

- Life and pension
- Insurance
- Asset management
- Banking
- **Sustainable investments**
= Socially **responsible** investment

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Sustainable Investment Strategies

- **Positive screening** / "Best in Class"
- **Negative Screening** / Exclusion
- Engagement

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Charity

Compliance

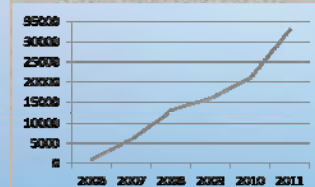
CSR

Sustainability

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PRI

UN PRI – launched in Paris 2005



- 1100 asset managers and \$30,000 bn under management
- Equivalent to 16% of total global assets

Signatory of:

PRI Principles for Responsible Investment



PRI Principles for Sustainable Insurance

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Practice system

1. We will **embed** in our decision-making environmental, social and governance issues relevant to our insurance business.
2. We will work together with our clients and business partners to **raise awareness** of environmental, social and governance issues, manage risk and develop solutions.
3. We will work together with governments, regulators and other key stakeholders to **promote widespread action** across society on environmental, social and governance issues.
4. We will demonstrate **accountability and transparency** in regularly disclosing publicly our progress in implementing the Principles.



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Sustainable Investments

Sustainability Rating

Sector Analysis of all companies with evaluation of positioning, efficient operations, and financial robustness.

Minimum Standard

Excludes companies based on the themes of human rights, corruption, environment, controversial weapons and tobacco. In addition, companies, ETFs and government bonds with low sustainability rating are excluded.

Active Ownership

Companies are contacted with questions about their practice and their performance related to sustainability, and are challenged to have a clear understanding of the relevant issues.

Dedicated team of 8 ESG analysts within Front Office

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Sustainability rating

- Efficient operations – ESG issues
- Financial robustness
- Well positioned for the future
- Storebrand Trippel Smart (Norway)
- SPP Global Topp 100 (Sweden)

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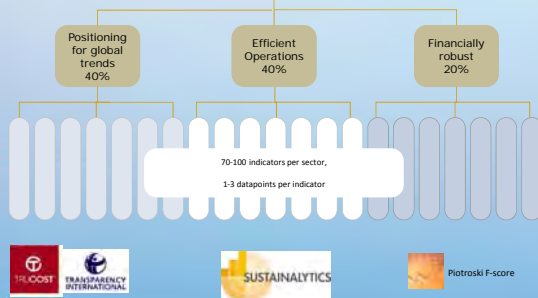
Minimum standard

- Human rights and international law
- Corruption and financial crime
- Environment and climate
- Controversial weapons
- Tobacco
- Total sustainability risk
- Government bonds



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Sustainability Rating



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Follow-up



- nearly **4000** companies that are **monitored continually**
- **customized internet search engine**: searches through **120,000** sources, for a combination of **company names** and **thematic search words**. It is this process that allows us to identify news articles on possible company breaches of our criteria.
- sustainable investment committee makes the final decision

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Supply Chain

- **Environmental requirements: Report & commitment** on reducing waste, packaging, energy, emissions and transport, etc.
- reputation & integrity
- certified to:
 - >> ISO14001
 - >> EMAS
 - >> Miljøfyrtårn
 - >> Svanen
 - >> Grønt punkt
- internal guidelines: **SA8000**



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Embedment

- All funds under management are invested in a sustainable manner.
- Storebrand has **redefined** the relationship of **trust** between the manager and the customer in asset management."

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Questions

- In terms of sustainability issues, how much money are devoted each year? What are its percentage to total expense, revenue, and net income? Will the devotion increase in the future?
- In terms of sustainability issues, how many human resources are devoted? In what fields they are professionals, respectively? How is the work divided? Which specialized fields will be fortified in the future?
- What is the composition of the dedicated team of 8 analysts?
- Will there be additional business regarding sustainability in the future?

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Engagement

- Shareholder → pressure → improve **environmental, social and governance (ESG)** performance
- Daily contact
- Cooperation with other investors

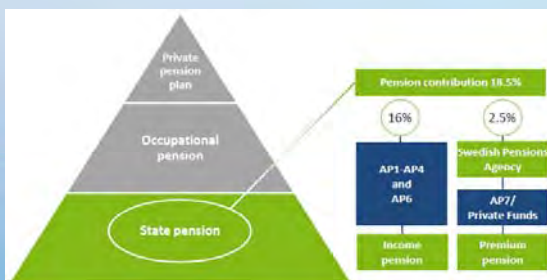


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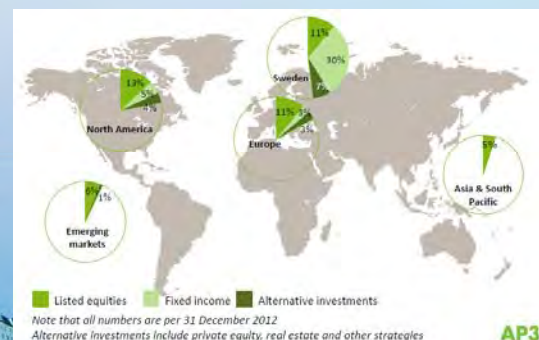


Sweden Pension Fund



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The AP funds have global diversified portfolios - below is an example of AP3's portfolio-



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Background of the Ethical Council

- Since 2007, AP1, AP2, AP3 and AP4 have been coordinating through the Ethical Council
- Ethical Consideration and a high return
- Positive change in companies



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Joint Ethical council since 2007

- Benefits
 - 1 general secretary
 - 1-2/members per fund
 - Collaboration regarding E&S engagement with listed foreign
- Procedure
 - Screening
 - From reactive approach to proactive approach
 - Main tools: Engagement through dialogue and collaboration with other investors
- Each fund engages on their own with Swedish companies as well as with their holdings in real estate, private equity, agricultural land, timberland, bonds.

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Issues



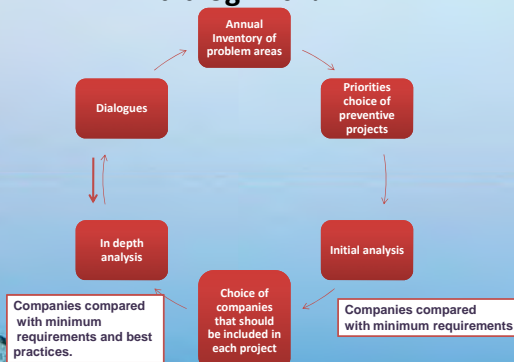
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A two fold strategy



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How ethical council select the company to dialog with?



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Reactive dialogues


- 10-15 official dialogues annually
- Current examples



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Proactive projects Mining industry

- 30 companies
- Co-operation with other investors



The 10 principles

01. Implement and maintain ethical business practices and sound systems of corporate governance.
02. Integrate sustainable development considerations within the corporate decision-making process.
03. Uphold fundamental human rights and respect cultures, customs and values in dealings with employees and others who are affected by our activities.
04. Implement risk management strategies based on valid data and sound science.
05. Seek continual improvement of our health and safety performance.
06. Seek continual improvement of our environmental performance.
07. Contribute to conservation of biodiversity and integrated approaches to land use planning.
08. Facilitate and encourage responsible product design, use, re-use, recycling and disposal of our products.
09. Contribute to the social, economic and institutional development of the communities in which we operate.
10. Implement effective and transparent engagement, communication and independently verified reporting arrangements with our stakeholders.

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Keep an eye on the companies

Create awareness

On-Site Inspection

Follow up
Follow up with the company to evaluate if they managed the issue at investors request.

Power from third party
Measures have been taken according to action plan which target company provide with, and most of them have been verified by a third party.

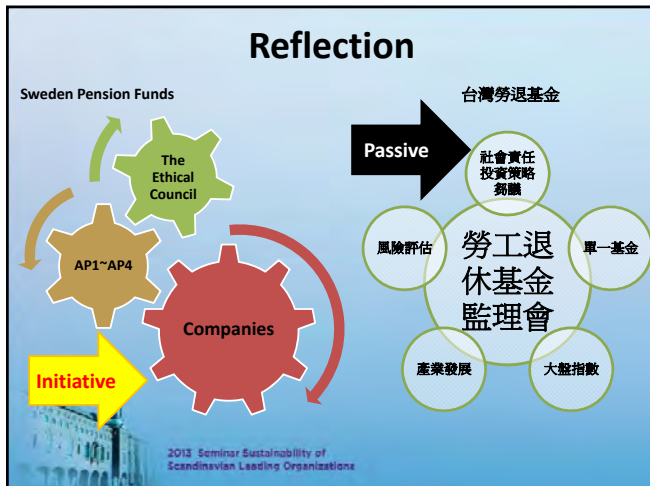
Street Smart







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Thank you.



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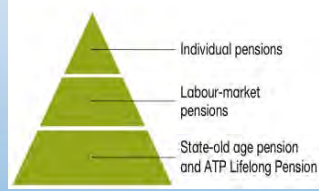
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atp=



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Denmark Pension System



Individual pensions

Labour-market pensions

State-old age pension and ATP Lifelong Pension

ATP ensures that the vast majority of Danes have a bit more to live on when they retire.

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ATP's objective

Main the purchasing power of future pensions

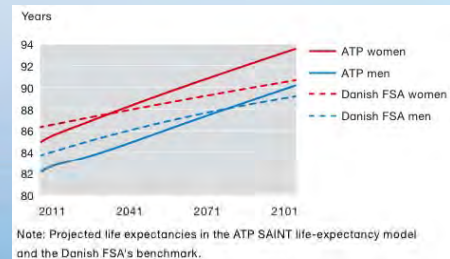
Guarantee a life- long nominal annuity

Maximize the real value of future pensions: 6M
Euribor + inflation + 1%

Risk tolerance: no more than 1% risk

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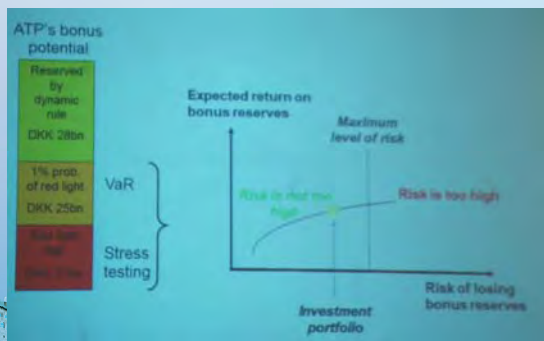
Expected future increases in life expectancy



**Ageing + Traffic light system
= higher returns with less risks (Dilemma!)**

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Investment risk: never too much, never too little



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4 approach to investments

Avoid uncompensated risks

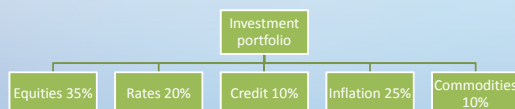
Appropriate risk level

Diversify aggressively

Have "Black Swan" events and
other tail risks in mind

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Effective diversification

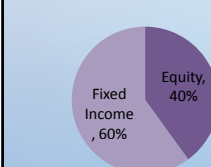


- Allocate RISK- not cash!
- Equities don't dominate- each of the risk classes contributes substantially
- Portfolio expected to do well in a fluctuating economic environment
- Mitigates the risk of large losses
- Higher risk- adjusted return than more concentrated portfolios

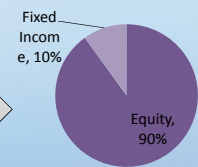
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Cash allocation vs. risk distribution- an example

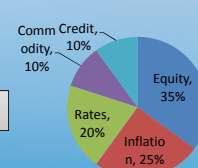
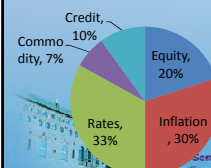
• Cash allocation



• Risk distribution



Classical 60/40 allocation



ATP's long turn application

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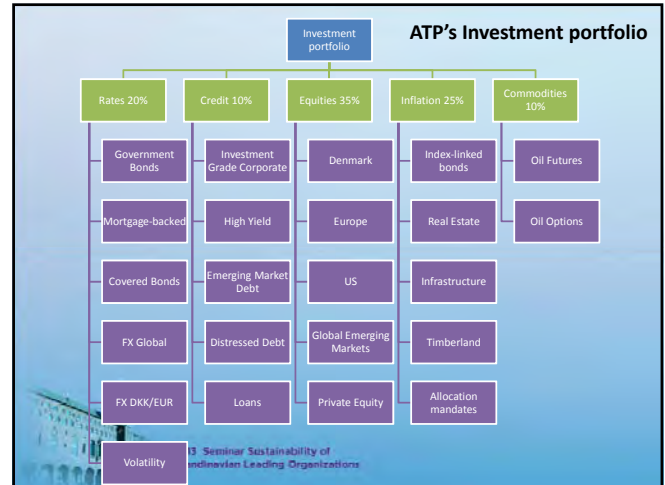
Poor implementation can ruin good allocations

ATP doesn't use benchmark.

Look for investment vehicles that provide the best risk/return characteristics in absolute terms.

Before implementing an investment idea, we investigate which investment vehicle- a manager, a total return swap, etc.- provides the best absolute return prospects.

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Regulation and the ATP Board's Policy

ATP Act

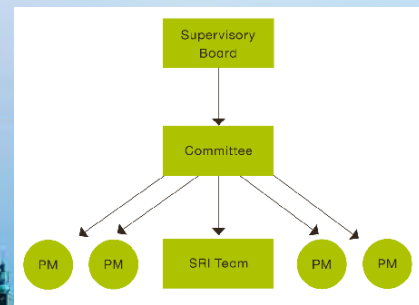
- Invest the funds in an expedient manner, for the benefit of the member
- Preserve the real value of the funds

The ATP Board's Policy

- CSR is usually the precondition for long-term, healthy earnings

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ATP's management model for responsibility in investments



ATP's Policy of Social Responsibility in investment

Main principles

- ATP does not purchase equities in companies that deliberately and repeatedly violate the rules laid down by the national authorities in the markets in which the company operates or by international organizations endorsed by Denmark.
- Nor does ATP purchase equities in companies located in countries being subjected to a trade embargo imposed by the UN or the EU and endorsed by Denmark.

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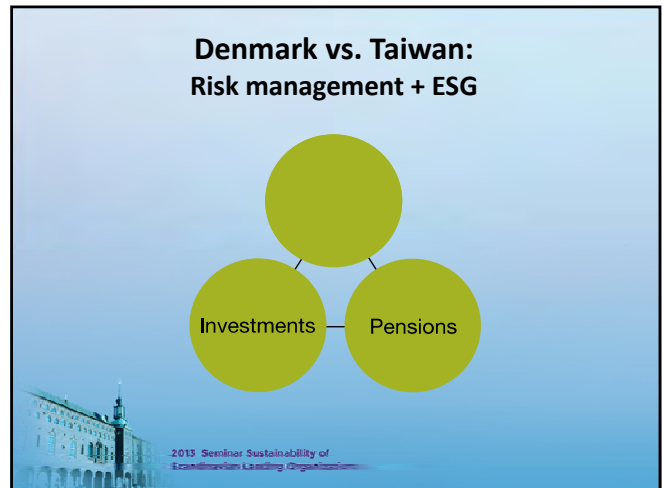
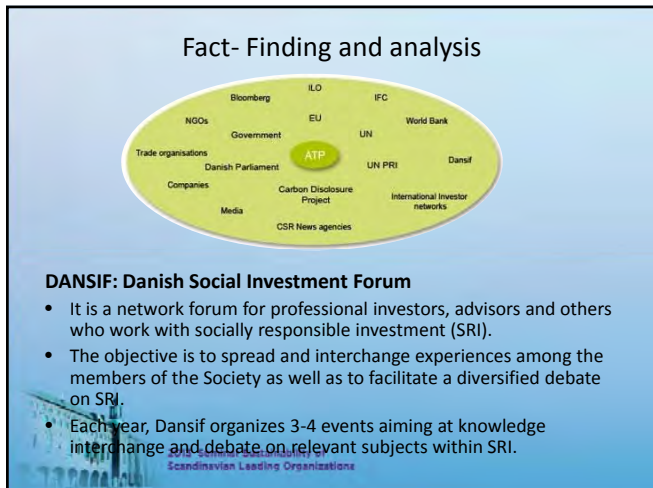
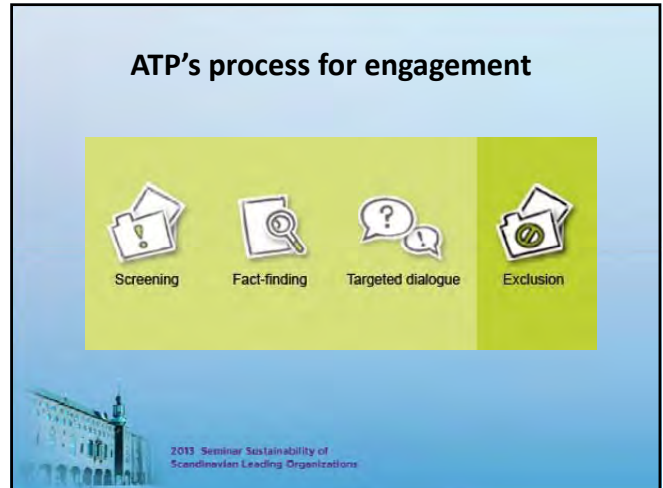
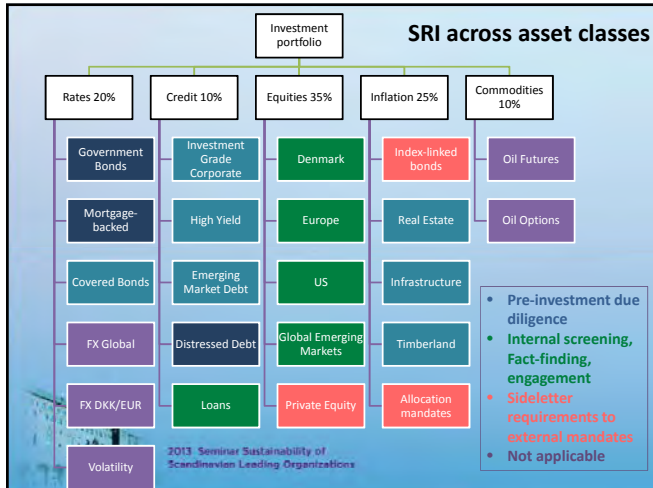
ATP is a signatory to the UN Principles for Responsible Investment(PRI)

In 2006 ATP was the first Danish investor to sign up to the UN's Principles for Responsible Investment, UN PRI.

UN PRI's six principles have gradually evolved into a globally recognized framework for the SRI activities of investors.

Among other things, UN PRI functions as a global network for the exchange of information and experiences on responsible investment within a large number of sectors and asset classes.

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報告人：AMBA 101 呂昆達

AMBA 101 呂昆達

ASUS 華碩, 中華郵政特准掛號, TCSF, HSBC 匯豐, Dow, EPSON, 愛普生, 3M, PHILIPS, SONY

About Novozymes

novozymes®
Rethink Tomorrow.
World leader in bio innovation

- 6 t employees
- 2 bill USD in sales
- 15 % of sales re-invested in R&D
- 25 % operating profit margin

United Nations Global Compact

Walmart, P&G, Nestle, SB20, World's Most Ethical Companies, Dow Jones Sustainability Indexes

WWF for a living planet

Diversified Group



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Sustainability, the Novozymes' DNA

Our statutes:

- "The company strives to do business in a sustainable and responsible way with regard to the economic, environmental and social aspects of our activities."

Our vision:

- "We imagine a future where our biological solutions create the necessary balance between better business, cleaner environment and better lives."

Our ambition:

- "To change the world together with our customers through insights and solutions"
- "To drive the world towards sustainability"
 - Become a voice on the world stage
 - Sustainable solutions drive new business
 - Build sustainability capabilities



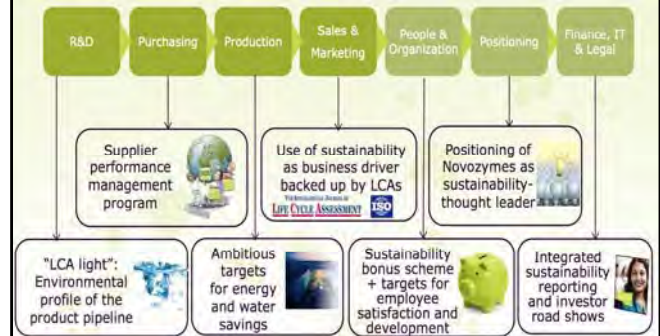
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Organization



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Sustainable Development



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Three Keys to Success with Sustainability in Business and a few cases



Know the product life cycle

– and make it better together with business partners !



Raw materials



Production



Use



Discharge

Life Cycle Assessments (LCA)

–key to understand what matters most

Risk's and opportunities

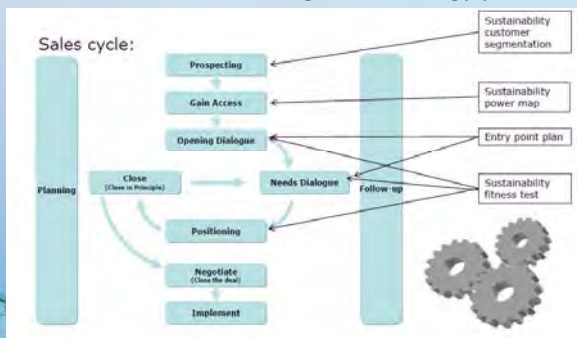
–wide spread throughout the product life cycle chain!

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LCA Case: Enzymes have Transformed the Baking Supply Chain



Make sustainability an integrated part of the common sales, marketing, and strategy process



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Stakeholder Insights



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Concluding Remarks

- The global sustainability agenda is robust, is strong, and will significantly influence all companies.
- Sustainability is a great opportunity for business providing solutions.
- Key to success with sustainability as business driver:
 - Product lifecycle insights and engagements
 - Employee engagements and integration with core business
 - Stakeholders touch and engagements

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Thank You
Q & A



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HYDRO

企碩一
李宜達 Lida Lee



Agenda

- Introduction of Hydro
- About Aluminum
- About Report

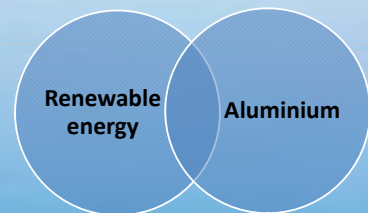


HYDRO

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Introduction of Hydro

- Nation : Norwegian
- Ownership Structure : 43.8% by Norwegian state
- Business :



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Renewable energy

- Solar power
- Hydro Energy

99%



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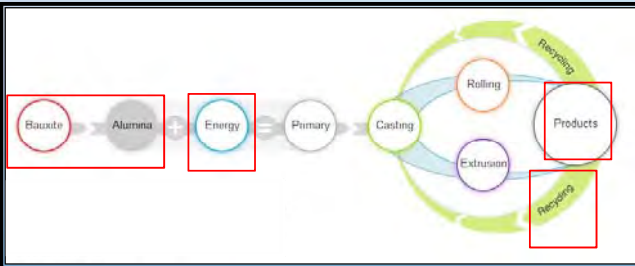
Aluminum

- 4th supplier in the world
- Vertical integration



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Product Life Cycle

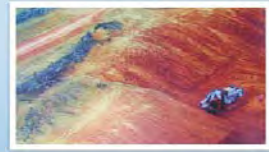


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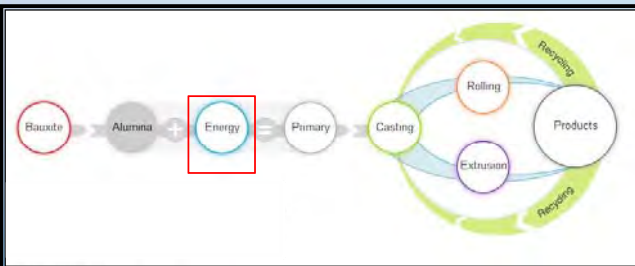
Mining

- Around equator
- Responsible mining
- Reforestation



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Product Life Cycle



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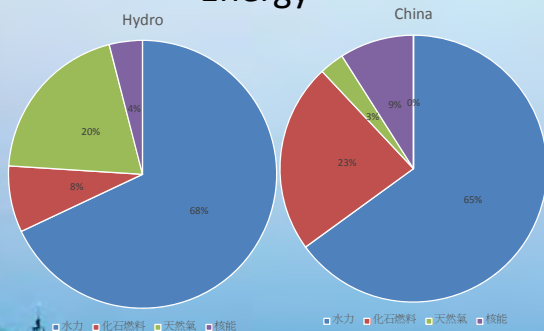
Energy

- 1/3 of total cost
- Cheap & Stable
- And



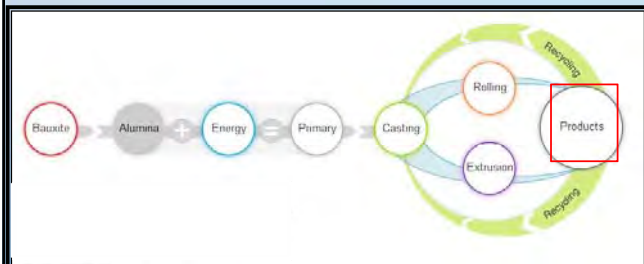
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Energy



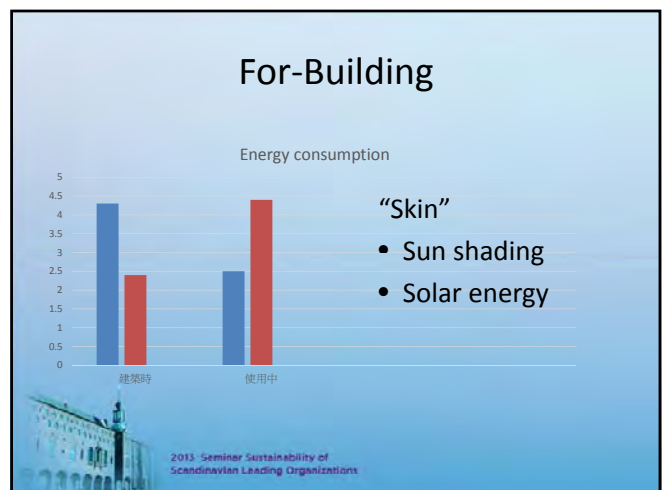
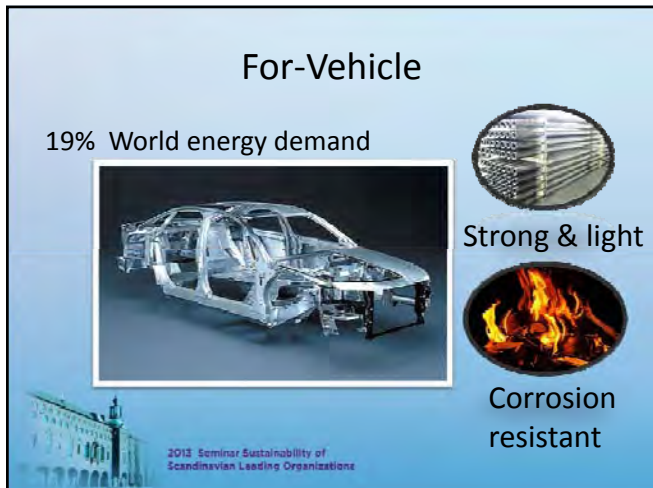
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Product Life Cycle

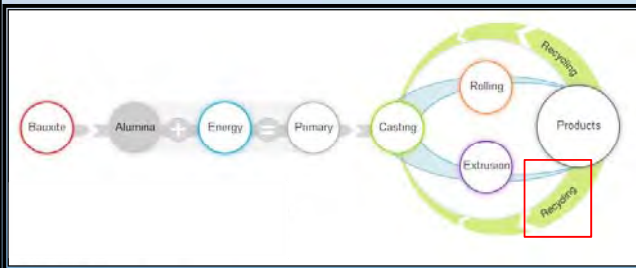


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Product Life Cycle



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Recycling

- Easily & Endlessly
- 5% for re-melting
- Aluminum Bank



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Example

- 1Kr 1 can
- donation



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Aluminum's Future

- Growing Demand in aluminum
- Recycling, a big trend
- Our expertise in remelting is a good basis for future expansion.



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About report



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Why report?



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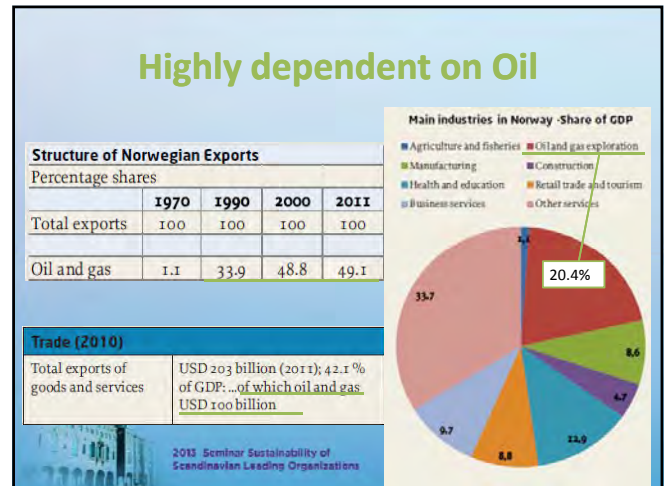
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企碩一 陳亞都

Norwegian State Oil Company, Statoil

- Established in 1972
- Business—oil & gas
- Position
 - The second-largest gas exporter to Europe
 - A world leader in carbon capture storage and carbon efficiency in oil and gas production.
- Sustainability Raking

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Highly dependent on OIL

After the Oil crisis...

2030 World energy consumption 50%↑

**Without oil,
Can we still survive?**

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Long-term business success = ability to operate sustainably

Sustainability as a Strategy

- opportunities for innovation
- Differentiator
- Shaping the future

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Transfer of core competences

Energy



Clean Energy

Oil & Gas

- New
 - Low-carbon technologies
 - Renewable energy
- Oil & Gas
 - Choosing energy-efficient processes

Being part of solution

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Hywind Use expert offshore oil

low-carbon

Being Part of Solution Diversification , Risk↓

Reduce 70% CO2
Reduce nitrogen oxides

CO2 solution

Challenges

Frontier regions with complex and sensitive political, social and environmental contexts

Increased onshore exposure (resettlement, indigenous people, human right)

Global operatorship and Statoil under increased scrutiny

Reactions

operate with zero harm to people, society and the environment

Policies and guidelines engaged in sustainability activities

Expect partners and suppliers to have standards consistent with Statoil.

Zero Harm

Health and safety

Climate and environment

People and the group

Society

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用閃電！拼經濟！

反火力！台電2004年提出計畫在彰濱工業區興建火力發電廠，遭到地方民衆抗議，引發民衆與酪農產業界不安。當時彰縣府宣示，不贊成興建火力發電廠。

a package of measures ?

風力發電噪音擾民 組自救會抗議

抗議風力廠 扶老攜幼一起嗶聲！

台灣風力能推動現況

| 縣市 | 商轉 (籌設) | 台數 | 裝置容量 MW | 縣市 | 商轉 (籌設) | 台數 | 裝置容量 MW |
|----|---------|----|---------|-------------------|---------|----|---------|
| 新北 | 2 | 9 | 9.96 | 雲林 | 4(1) | 41 | 76.64 |
| 苗栗 | 3(7) | 28 | 66.7 | 屏東 | 1(1) | 3 | 4.3 |
| 臺中 | 4(3) | 42 | 88 | 金門 | 1 | 2 | 4 |
| 彰化 | 5(1) | 83 | 181.6 | 合計279台 | | | |
| | | | | 總裝置容量 8 643.675MW | | | |

工研院綠能所彙整，統計至2012/11/6

資料來源：工業技術研究院《再生能源彙編》

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日照與風力條件都優於德國

台灣發展綠能，還怕沒潛力？

全國平均日照時數

national development strategy?

台灣多20%

台灣2400小時/年
德國2000小時/年

資料來源：BMU、氣象局、風力發電廠商

Conclusion

Energy is about **Competitiveness & National safety**

Green Race is on !

EU

market leader today

China

About to become the leader

Japan

Leader on energy efficient solutions

How about Taiwan ?

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SANDVIK

Wade Ho



Heritage

Founded 1862 in Sandviken, Sweden

Göran Fredrik Göransson redesigned the Bessemer furnace to mass-produce steel

A breakthrough and an innovation started the company 150 years ago



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Sandvik Group

900B SEK/year



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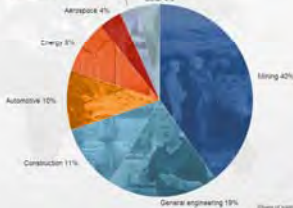
Global Presence

Markets and customer segments

Sales 2012, share of Group total



Customer segments



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Special

➤ EHS culture

- >25 employees (essential)
- Safety first
- Affect BONUS (20%)



➤ Gender Balance

- female employees → mining 27%
- female managers → 12%~17%



➤ Employee development plans

- Focus on health & welfare
- 2015: 90% employees join & >50% satisfy

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Environmental Policy

➤ Conservation

2015:

- energy consumption -2%
- water consumption -10%
- CO2 production -4%

➤ Recycling

- Global buyback program. (discount when buyback)
- over 85% production from steel scrap. (50% internal recycle)
- target 75% internal recycle before 2015.



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What is the missing pieces
to success?



Omission

- Just have EHS department below HR/VP.
 - New CSR manager just on board for weeks.
- Only pay attentions to internal governance.
 - Lack of environment and social equity
- Still focus on current generation business.
 - Business as usual

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Thank You



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 **Electrolux**

科管所 朱思年



Background

Thinking of you
 **Electrolux**

- Founded in 1919
- Trade—OMX & NASDAQ
- Industry—Household appliances
- HQ—Stockholm, Sweden
- Employees—59,478 (2012)
- Finance(2012)
 - Net Sales—SEK 109,994 m
 - EPS—SEK 8.26



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Product

烤麵包機
早晨的第一道香味，給您滿滿的活力!
[圖文介紹]

果汁機
炎夏的廚房必備品，給您每日健康活潑的香甜滋味!
[圖文介紹]

Cosima直立式攪拌棒
-生機活力系列-廚房DIY的全方位好幫手
[圖文介紹]

完美管家2in1第二代
2008年上市的首席管家，以其卓越設計外型、實用二合一功能，而獲眾多媒體與消費者好評。
[圖文介紹]

完美管家2in1第一代
Ergonomix 人體工學設計，輕鬆、省力、輕鬆。
[圖文介紹]

多功能烤箱
生活中的點滴樂趣，就對最大的幸福!
[圖文介紹]

完美管家2in1第三代
Ergonomix 人體工學設計，輕鬆、省力、輕鬆。
[圖文介紹]

Rapido手持吸塵器
134114 輕鬆輕鬆的外觀，及令人驚嘆的功能，讓您愛不釋手。
[圖文介紹]

Rapido車充吸塵器
28-412C 輕鬆輕鬆的外觀，及令人驚嘆的功能，讓您愛不釋手。
[圖文介紹]

完美管家2in1第三代新系列毛髮剋星
[圖文介紹]

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Awards and Recognition

Dow Jones Sustainability Indexes
Member 2012-13
Dow Jones Sustainability World Index: Since 2006, Electrolux is its sector leader in the prestigious index for long-term economic, environmental and social performance.
Corporate Knight's Global 100: Included in the list of most sustainable companies.
Ethisphere: Among the list of World's Most Ethical Companies 2012.

ROBECOSAM Sustainability Award
Gold Class 2013
RobecoSAM Sustainability Yearbook 2013: Gold Class member and sector leader.

CDP
DRIVING SUSTAINABLE ECONOMIES
Carbon Disclosure Project: Nordic Leadership Index member.

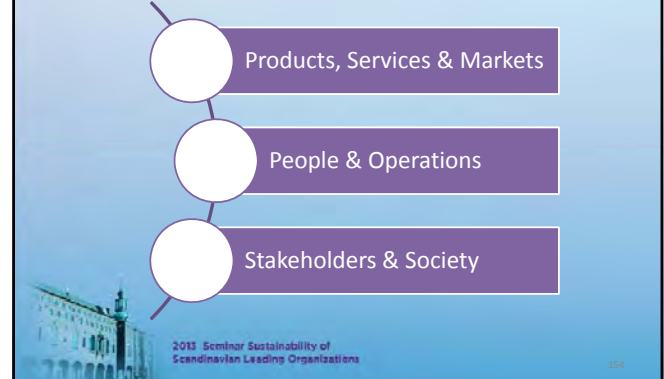
ClimateCounts.org
Climate Counts: 2012-2013 sector leader.
CNN and Fortune Magazine: Electrolux is included in the 2012 edition of the annual World's Most Admired Companies list.

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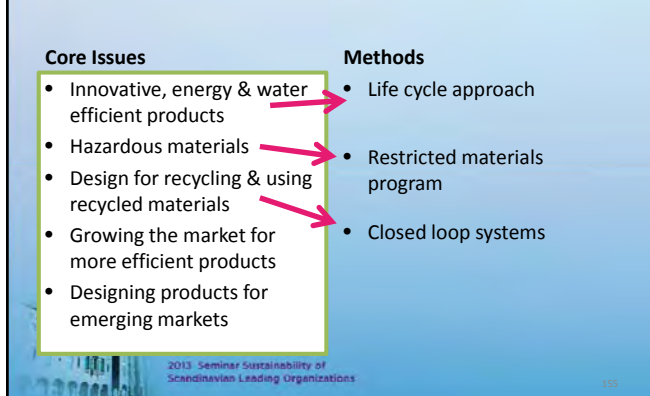
2012 Value Chain Sustainability Highlights



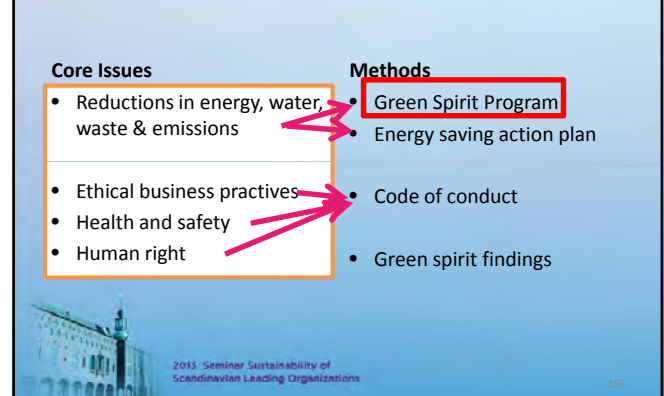
Sustainability Strategy



Products, Services & Markets



People & Operations



Green Spirit Program

■ Start

Electrolux used 1.85TWh energy in the operations in 2005

- 575,000 tons of CO₂ emissions from 250,000 cars
- Total cost of energy € 80 million
- Factories are responsible for 95% of direct CO₂ emissions

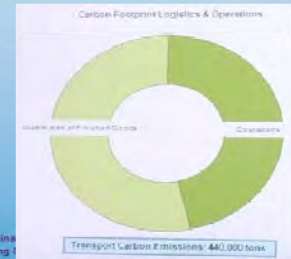
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Green Spirit Program

■ Goal: operational efficiency

Transport: 15% emission reduction by 2014, base 2010



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Green Spirit Program

■ Governance

- Lead : Group Sustainability Affairs
 - Responsible to set global strategy & report
 - Progress to group management

| POLICY | POLICY HOLDER* | POLICY APPROVER |
|---|----------------------------------|----------------------------------|
| Code of Ethics | VP, Group Sustainability Affairs | Board of Directors |
| Workplace Code of Conduct | VP, Group Sustainability Affairs | SVP, Communications and Branding |
| Policy on Countering Bribery and Corruption | Senior Associate General Counsel | SVP, Legal Affairs |
| Environmental Policy | VP, Group Sustainability Affairs | SVP, Communications and Branding |

Green Spirit Strategy

- Energy Management System
- Integrate Green Spirit within the Lean program
- Employee engagement
- Investing in energy-lean technologies

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ENERGY ACTION PLAN

| ACTION | EXPECTED SAVING (MWh) | EXPECTED COST (€ ex. Capex) | EXPECTED PAYBACK | RESPONSIBLE | DEADLINE | STATUS |
|--------|-----------------------|-----------------------------|------------------|-------------|----------|--------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Energy Savings in %
#DIV/0!
Target 15% by 2012

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Green Spirit Program

■ Difficulties

- Investment priority
- Longer payback
- Convince factories
- Lack of ideas
- maintenance

■ Lessons to Success

- Clearly defined and short term targets
- Follow up KPI
- Include into business
- Regular report
- Communication

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Stakeholders & Society

Core Issues

- Responsible sourcing
- Restructuring
- Strategic partnerships
- Dialog
- Transparency and accountability

Methods

- Responsible sourcing program
- Audit thinking and follow up

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Though your beginning was
Start from your network
insignificant, Yet your end will
increase greatly.

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Thank You



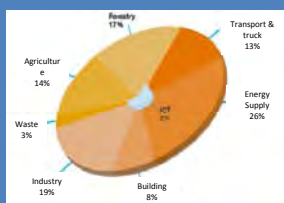
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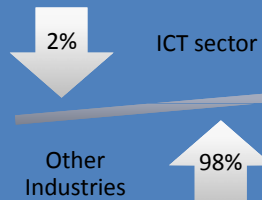
AMBA Tiffany Lin



ICT Leading The Transition to A Low Carbon Economy



Carbon Emissions



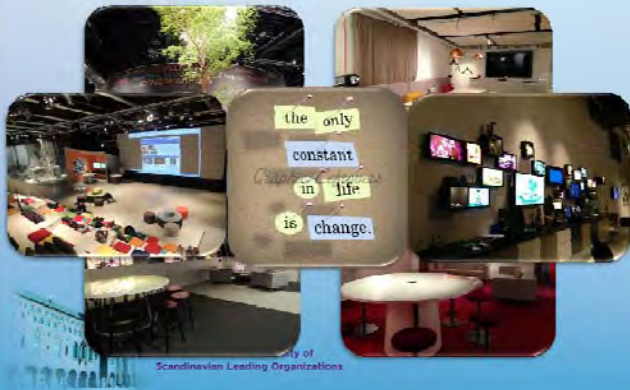
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What part does Ericsson play?



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How does Ericsson accomplish it?



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Sustainability & Corporate Responsibility – What does it mean?

Sustainability : Triple bottom line



Social equity
communication is a human need and
should be available to everyone



Environmental performance
minimizing environmental impact and
creating a more carbon lean society



Economic prosperity
contributions to social and
economic development

Corporate responsibility :

Maintaining the necessary controls to minimize risks to the
business and our brand being a good corporate citizen.

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Shaping Sustainable Cities in the Networked Society



The Goals of Stockholm Royal Seaport :

- ✓ By 2030, free of fossil fuels and climate+
- ✓ Adapted to climate change
- ✓ High ecological, social and economical goals

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Millennium Development Goals



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Positive Impacts of Connectivity



- Central free emergency numbers and phone based support to rural health workers improves the quality and saves lives.
- Integrated mobile health outreach service in Dertu helps immunizing 1000 malaria cases each month.
- The number of girls attending school raised from 2 to 50 in the first month when mobile communications was introduced in Dertu.
- School enrollment in Dertu increased by 3 times, drop out decreased by 85%, partly due to mobile school.
- With mobile coverage, the remote village of Dertu saw a 60-70% increase in travellers choosing that route.
- Internet kiosks in Rwanda generated USD 100/month of income, 3 months after installation.

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Ericsson Response in Belief

DISASTER RELIEF SUPPORT FOR AID AGENCIES



Reflection

- ICT leading the transition to a low Carbon economy.
- Technology is just a ticket.
- The only constant is change.
- What about business in Taiwan ? Exp. If hTC doesn't sell mobile phones, where is the next step?



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Thanks for listening !!

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挪威工商總會
Confederation of
Norwegian
Enterprise (NHO)



Functions

- Member services
- Policy lobbying
- Radar: scan opportunities and risks

Sustainability issues

- Corporate responsibility
- Climate policy
- Energy policy

Twins

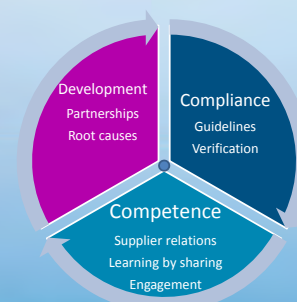
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Corporate Responsibility

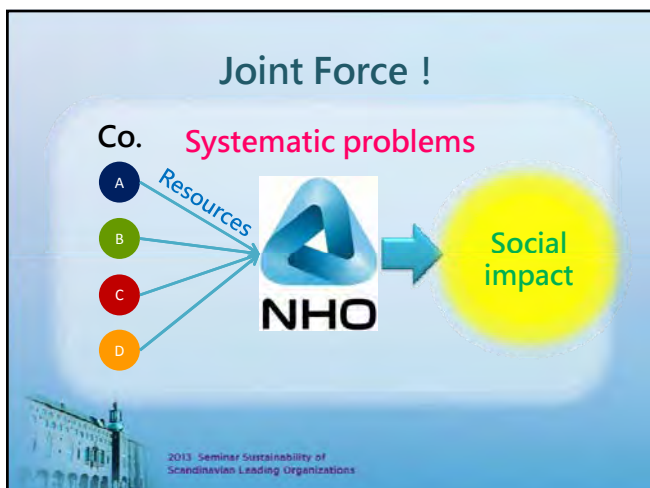
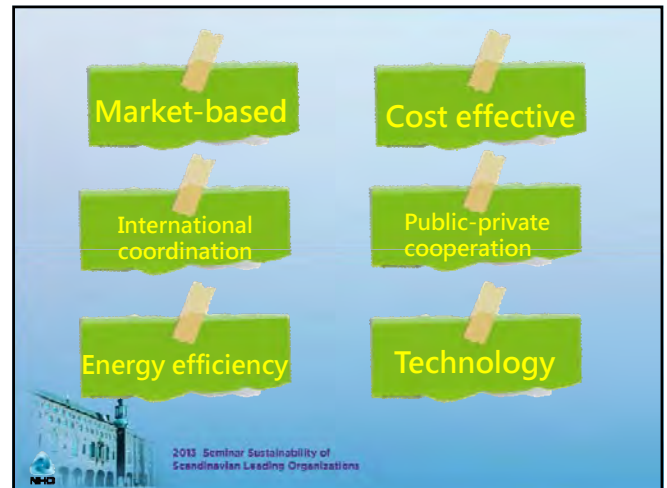
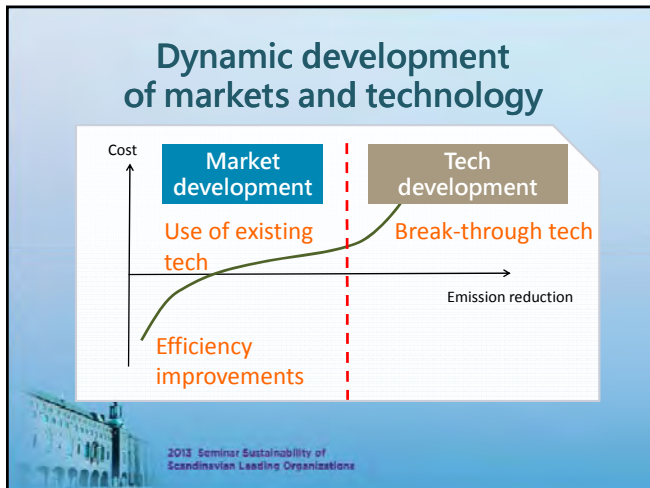
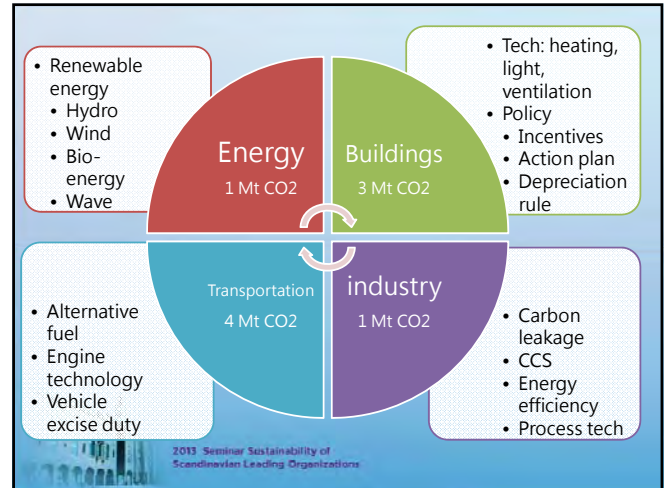
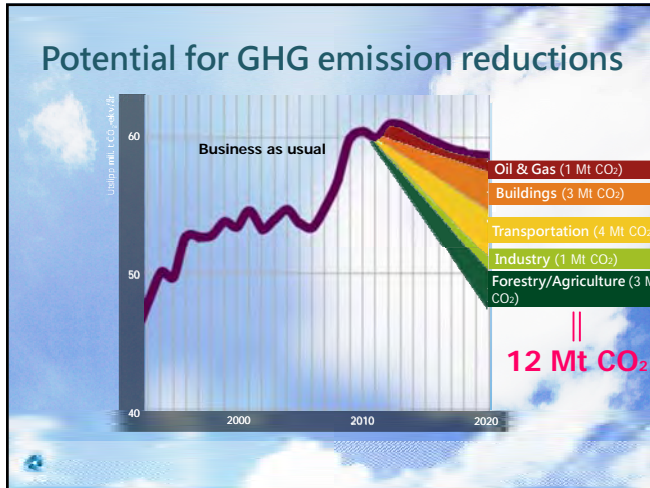
Companies produce goods and services in a **profitable**, **decent** and **sustainable** manner, integrated in **strategy** and **daily operations**.

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More than 1 solution



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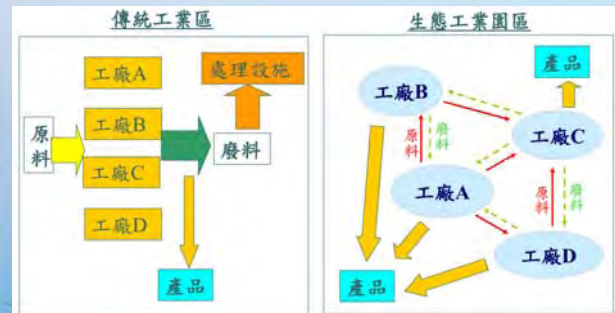


Kalundborg Symbiosis



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What's Eco-Industry Park?



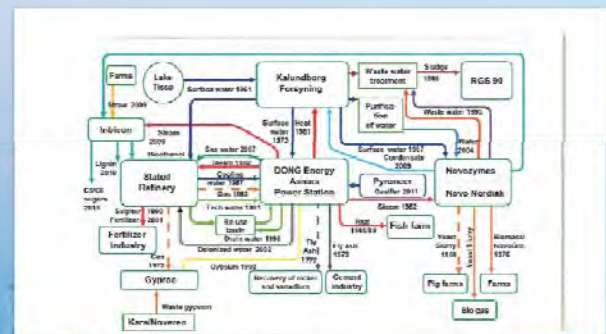
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Introduction

- Located in Kalundborg, Denmark
- Established in 1961
- The World's first working industry symbiosis
- One partner's bi-product is the raw material in another partner's production.
- Today, over 30 waste streams exist between partners.

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Enterprises in Kalundborg 2011



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Example1

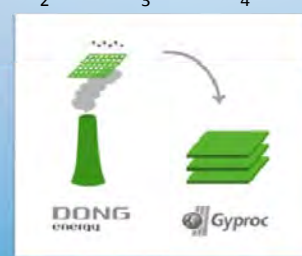
- Organic waste from Novozymes is made into agricultural fertilizer.



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Example2

- Smoke from DONG is made into gypsum at Gyproc. $\text{SO}_2 + \text{CaCO}_3 = \text{CaSO}_4$



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How It Started?

- The Symbiosis was not invented, but developed organically over many decades.
- Kalundborg Symbiosis was a “non-project”, created by a “non-organisation”.

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The Symbiosis Model



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New projects around Kalundborg Symbiosis

- Cooperating initiatives between companies !
- **Biopro**: optimising biochemical production – from tube to full scale production!

Novo Nordisk, Novozymes, CPKelco, DONG Energy, Danish Technical University, Copenhagen University a.o.

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The EIP in Taiwan

台灣的生態工業區-環保科技園區



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The EIP in Taiwan

環保科技園區引進產業範圍



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KSF of Kalundborg Symbiosis

- Municipality supports
- Education
- Cooperates with residents



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COPENHAGEN
CLEANTECH CLUSTER

2013/9/17
簡報人：AMBA 張 韓 (Alan Chang)



AGENDA

1. Cleantech in Denmark
2. About Copenhagen Clean Cluster (CCC)
3. What we learn from CCC



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CLEANTECH IN DENMARK (2012)

- From 99% dependent on imported fossil fuel to self-sufficient in energy
- The world's cleantech centre
 - 1,000+ cleantech companies
 - 60,000+ cleantech employees
 - €12 billion export value
- An ambitious energy policy with the aim of being **100% independent of fossil fuel in 2050**

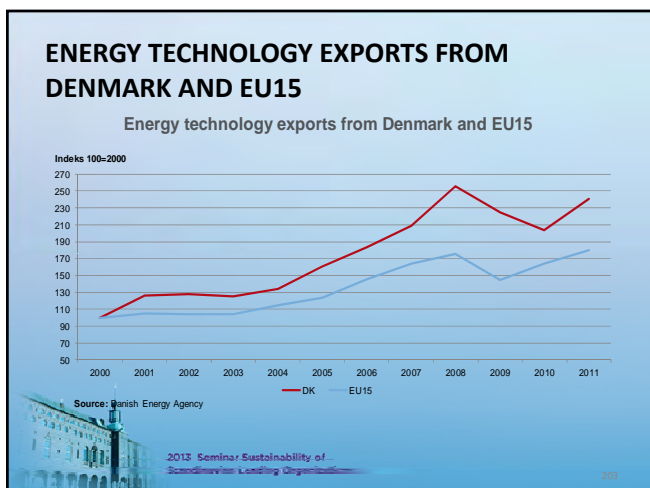
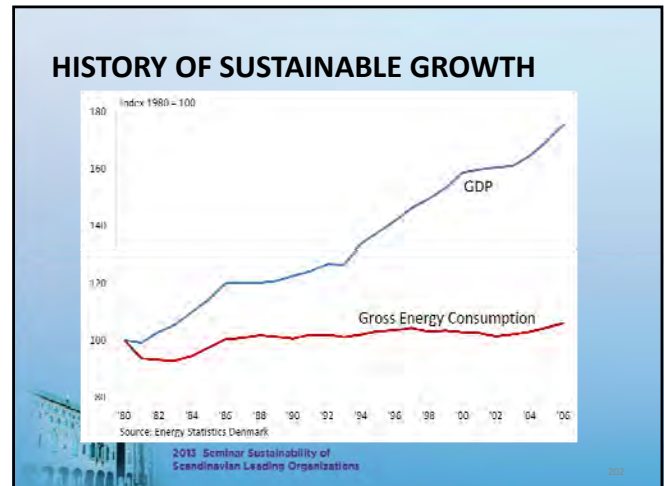
RENEWABLE ENERGY :

19.7%
RE share of total energy consumption

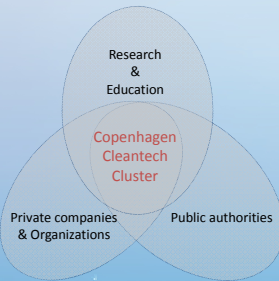
24.4%
RE share of total electrical productions




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COPENHAGEN CLEANTECH CLUSTER - Organization



- Largest cleantech cluster in Europe
- 12 partners covering the entire value chain within cleantech
- 250 members
- 5 focus areas:
 1. Innovation and entrepreneurship
 2. Test & demo (proof of concept)
 3. **Matchmaking**
 4. Facilitation
 5. International Outreach



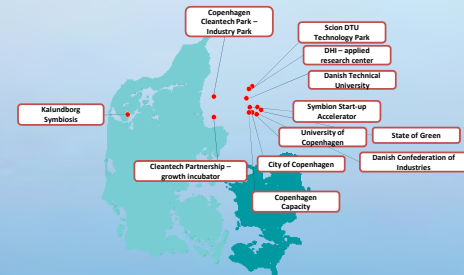
MISSION of the CCC org.

Mission.....

- Create growth for existing companies,
- Support the development of new companies,
- Attract foreign companies, investments and talent.

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Copenhagen cleantech cluster - an overview



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TEST & DEMO



- full scale commercial demonstration plants and new technologies can be displayed and tested

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INTERNATIONAL DELEGATIONS



- High global visibility
- Danish stakeholders becoming partners and members
- CCC partner on increasing number of activities

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MATCHMAKING PLATFORM



- Partnerships, networking, entrepreneurship, and VC

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INTERNATIONAL OUTREACH



- 11 cleantech CLUSTERS (Europe, US, Asia)
- Output:
 - New market opportunities
 - New projects (ie. Regions of Knowledge)
 - Events (Open Smart City 2012, Hamborg and Colorado 2013)

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The Talent Initiative

- **Job opportunities:**
biotech, cleantech, medical tech, Design...
- **Most livable cities**
- **W/L balance**
- **Excellent retention drivers:** Social integration, Danish language skills and children born in Denmark.

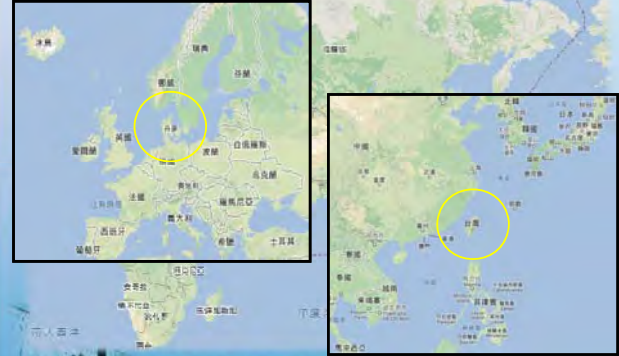


Attracting Welcoming Working & Living Leaving

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Copenhagen is a leader due to a tradition of user focus in innovations and a decade-long dedication to sustainable solutions

What about Taiwan?

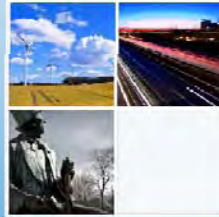


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What about us?

- Strength to be a Cleantech solution provider:
– Education, ICT, Hi-Tech(LED, Solar...etc.)
- Future leader:
 - ✓ Promote Sustainability
 - ✓ Commercialize green idea
 - ✓ Make use of our talents



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THANK YOU



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Copenhagen: Sustainable & smart city



Denmark in brief

- Area: 4.3 Km²
(1.2 Taiwan)
- Population: 5.4 m
(CPH 1/4)
- Average rainfall: 700mm
(TW: 2515mm)
- Geography: plain (▲170m)
- Sectors:
Industry: 20.2%
Service: 77.3%
Agriculture: 2.5%

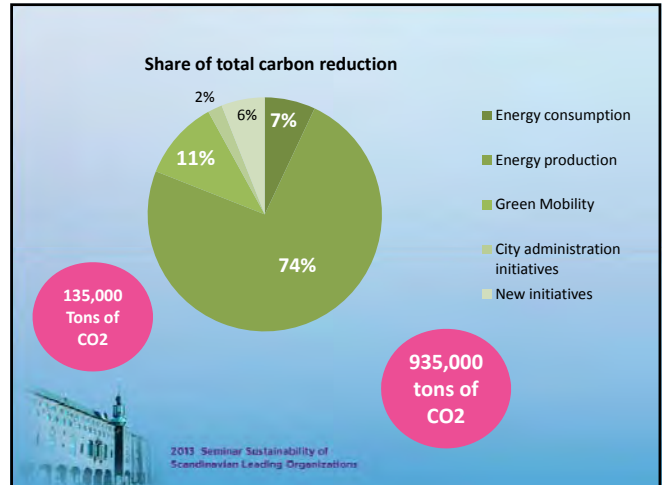


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Copenhagen's vision

- Carbon Neutral by 2025, no using of fossil fuel by 2050.
- Carbon emissions must be reduced by 1.2 million tons.

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- need solutions that
1. do not make it more expensive to be a Copenhagener
 2. yet promote green growth
 3. enhance the quality of life → **Smart city**

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Smart city concept

Wind Turbines
CHP System
Heating System

• Green Building

• Cycling
• Mass transportation



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Mobility

- Cycling
- Integrated Transportation

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Cycling

Time saving

- Transport network
- Green waves

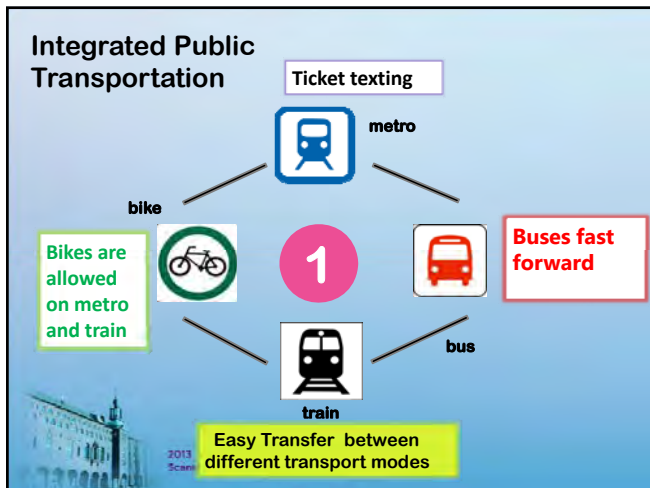
Convenient

- Bicycle Parking
- 43 KM of Greenways
- Cargo Bike

Safe

- Separate lanes

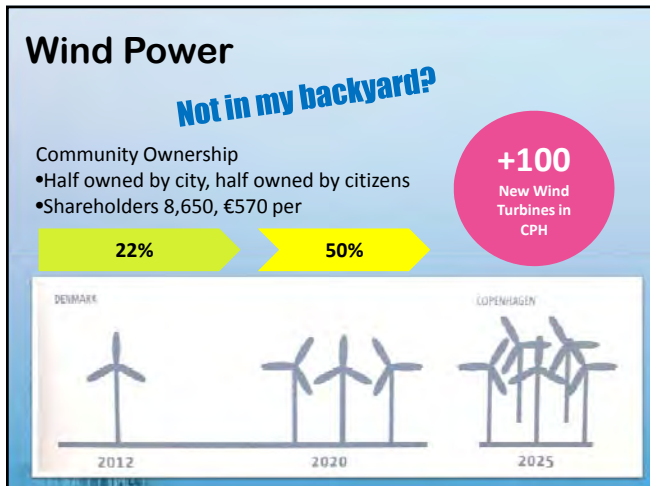




Energy

- Wind Turbines
- CHP System & Heating System
- Green building

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Waste to energy & Heating system--- Renewable CHP

The use of CHP units allows highly efficient use of the energy in the fuels (up to **94%**), and results in lower CO2 emissions.

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Green Buildings

40% 40% of Denmark's carbon emissions come from buildings


--There is great potential to make existing buildings more energy efficient in CPH, since 70% of buildings were built before the first building regulations were passed.

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Reflecting

- Learn from experience
- Not just a gov but also a biz man
- Social welfare system (enough to hold?)
- Mentally health problem (drug abuse)
- lack young talents (launch pad)
- Nice people? Immigration issue

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Norway



**Geography
/ Climate**



**Natural
Resource**

Industry

- Bordering three ocean; nine-fold the size of Taiwan**
- In the temperate and frigid zone; Fjord**


- Natural Gas**
(3rd largest exporter)
- Petroleum/Oil**
(3rd largest exporter)

- Fishing; Shipbuilding**
- Petroleum and gas**
- R&D in environment protection technology**

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source: cruises.about.com



Norway

Political

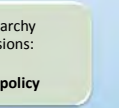
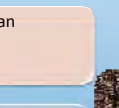
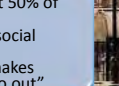
- Constitutional monarchy
- Administrative divisions: 19 counties
- **Open immigration policy**

Culture/ Living

- Religion: Christian
- **Low birth-rate**
- **Aging society**

Economy/ Society

- High taxes; about 50% of income
- Comprehensive social welfare;
- Richman Taxes makes enterprises to "go out"

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**Capital of Norway ;
the largest city
in Norway**

**approx. 600,000
citizens, about
12% of total
population**

**one of the most
expensive cities
in the world**





**Highest per
capita of
green spaces
in Europe**

**Nobel Peace
Prize is
awarded
in Oslo**



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Blue - Green Oslo

- The Ecolabel Nordic Swan
- ISO 14001

Eat Green

Green Oslo

Green Accommodation

Green Transport

Play Green

Oslo Sustainable City

HELLO! WELCOME TO SAVE THE PLANET

Eco-lighthouse

Oslo Bysykkel

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Green Transport

🌐 Oslo Bysykel

🌐 Ruter - local bus, tram, metro

Low noise

Bio-fuel buses

🌐 Electric Car
Think and Buddy
(Norwegian brand)

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Blue Oslo

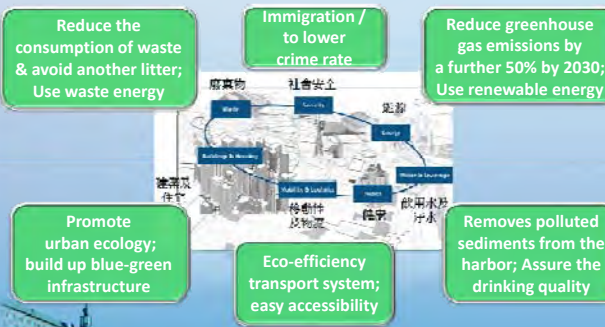
Adaption: abundant water resource can come from the volume of snow!



- Usage of underground water along with pipeline solution.
- Work on water and soil conservation

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Vision



- Reduce the consumption of waste & avoid another litter; Use waste energy
- Immigration / to lower crime rate
- Reduce greenhouse gas emissions by a further 50% by 2030; Use renewable energy
- Promote urban ecology; build up blue-green infrastructure
- Eco-efficiency transport system; easy accessibility
- Removes polluted sediments from the harbor; Assure the drinking quality

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Findings/Issues

- People like to drive car, instead of taking civic transport
- Not clean as expected, even if trash can everywhere
- Comparatively high oil price to avoid over-waste
- Social welfare policy and immigration issues
- Acceptance and assessment of these plans
- Mental influence in citizens and make a win-win situation

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Thank You

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Stockholm

The Green Capital of Sweden

MBA 葛庭好



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Stockholm Overview

- The capital and the biggest city in Sweden.
- Population : around 872,000
- So called Northern Venice
- 90-95% of the city's residents live within 300 meters of green area.
- Average carbon emission per person per year: 4 ton (American: 22 ton)



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Role Model

✧ 2010 European Green Capital Award

- Its cut in carbon dioxide emissions by 25% per capita in ten years; and its decision towards being fossil fuel free by 2050.

✧ 2010 The best city in terms of freedom from pollution (according to the European Cities Monitor)

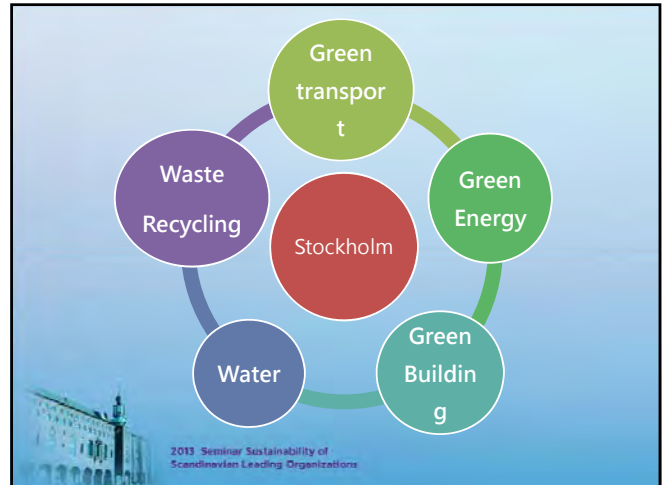
✧ Royal National City Park

- The world's first legally protected "national urban park."



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www.europeangreencapital.eu



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Traffic Problem

Government x IBM

✧ Use technology to reduce congestion.

Congestion charge



- Reduce cars
 - Reduce pollutions
 - Raise funds to build facilities
- Who drives car during peak time will be charged.



30% people go to work by bike.

61% people pass toll station by mass transportation

Traffic Problem

✧ Supporting measures



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well-developed system for waste handling and recycling



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Hammarby Sjöstad (哈姆濱湖城)



Hammarby Sjöstad (哈姆濱湖城)



Before



After

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Hammarby Sjöstad (哈姆濱湖城)



Water

- **Waste water**

Extract methane from waste water as home gas energy.

- **Rain**

Collect by the open drainage system, purify by constructed wetland and flow into lakes.



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Hammarby Sjöstad (哈姆濱湖城)



Garbage to Energy

- Colorful garbage bins
- Unique vacuum system
- **Recoverable garbage**
- **Unrecoverable garbage**
- **Kitchen garbage**



} **heat energy**

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Hammarby Sjöstad (哈姆濱湖城)



Hammarby Sjöstad (哈姆濱湖城)



Green building

- Plant a large number of trees
- Develop non-pollution energy and materials



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Cleantech Companies

- There are highly innovative and specialized technology companies in all urban sectors.
- The cleantech industry consists of nearly 3000 companies and 25000 employees.
- These environmental companies reflect strong turnover and financial results.
- Environmental sectors: renewable energy, water purification, energy efficiency, alternative fuels...

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Vision

- ✧ 2020 reduce average carbon emission per person per year to 1.5 ton
- ✧ 2050 a city free of fossil fuels



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Findings

- Cleaner than the other two countries
- Attract people to do it!
- The REAL waste recycling

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Center for Design, innovation and Sustainable Transition (DIST)

AMBA JERRY LIU



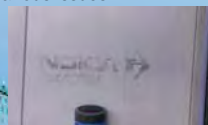
Center in Brief

Aalborg University 奧爾堡大學

- Aalborg
- Copenhagen (DIST)

DIST :

- Humanities, technical and social science
- sustainable development
- coordinated researchers take on various issues



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Strategic Geographic Location

- Benchmarking Copenhagen as city of sustainability.
- University of Copenhagen founded in 1479. (more than 530 years)
- Sustainability programs had been taught in the universities just recently.
- DIST entered the city in 2011, to ensure the future spot.



DIST

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Sustainability fits global mega trend

- design of products, processes into a better sustainable ways.
- research on the sustainability subjects and projects.
- Most Important:
- embedded sustainability into education to the next generation



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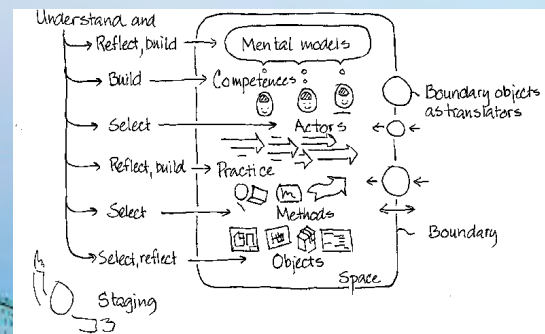
STAGING

- From planning to organizing collaboration events
- From decisionmaking to navigation where criteria may change over project lifetime
- From calculation to translation of uncertain knowledge across boundaries
- Allows involving a mixture of people, concepts and models
- Towards more user oriented perspectives

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STAGING SOCIOTECHNICAL SPACES



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INNOVATION



- Innovative processes have always been highly interactive and collective achievements

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CURRENT RESEARCHES

Carbon20

To strengthen cooperation between city governments and companies about reduction of companies' green house gas emission

CARBON20

iPower

develop intelligent control of power consumption and production tools to manage millions of flexible consumption units, and methods of operation of a distribution with flexible power generation.



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CURRENT PRACTICES ARE CHALLENGED...

- Technology driven concept development leads to 'late kills'
- Speed in decision making in development processes is an issue
- Time to market
- Diverse knowledge to be synthesized from an increasing diversity of domains and forms: variety of users, distributed sourcing, regulative measures
- Societal expectations to the inclusion of a variety of sustainability concerns

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SELF-REFLECTION

what they did ?

- strategic location selection
- Sustainability implemented into education

what can we do ?

- CSR does not equal to sustainability as a whole
- reform educational level with sustainability teaching

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REFERENCES

Website :

DIST : www.cdists.dk

CARBON20 : www.carbon20.dk

iPower : www.cee.dtu.dk

DIST Presentation :

Professor ERIK HAGELSKJÆR LAURIDSEN, P.H.D

Professor Maj-Britt Quitzau, P.H.D

Professor CHRISTIAN CLAUSEN P.H.D

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Cities of the future



- Today, cities are home to half of the world's population. Cities are already the biggest consumer of energy and are responsible for 80% of the world's greenhouse gas emissions.

- Collaboration between the Government and the 13 largest cities in Norway
- Reduce greenhouse gas emissions and make the cities better places to live

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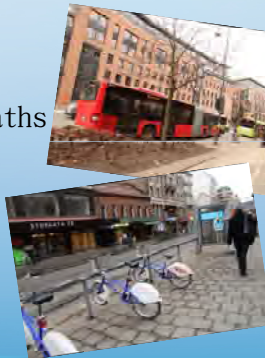
- By including the 13 largest cities in Norway, the Cities of the Future include almost half the country's population.
The 13 cities are: Oslo, Bergen, Brønnøysund, Steinkjer, Trondheim, Porsgrunn, Ålesund, Kristiansund, Sandnessjøen, Steinkjer, Brønnøysund, Steinkjer, Trondheim, Porsgrunn, Ålesund, Kristiansund.
- The goal is to make more use of available resources, and develop effective measures to encourage greener cities.

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Land Use and Transport

- Public Transport
- Land Use
- Footpaths and Cycle Paths
- Parking
- Car Use



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Consumption and Waste

- Waste Treatment and Recycling
- Waste Prevention
- Consumption Pattern
- Procurement
- Green Management



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Energy and Buildings

- Energy Use
- Energy Sources
- Energy Supply
- Information and Competence



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Climate Change Adaptation

- Precipitation
- Flood
- Landslides
- Sea Level
- Wind



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Improved urban environment

- Improved urban environment is a secondary goal in Cities of the Future, which intervenes in all four priority areas, and cooperation between cities and businesses.
- Improved urban environment includes many topics that all relate to the city and sustainable development. It includes social, economic and environmental aspects.

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What about Taiwan?

