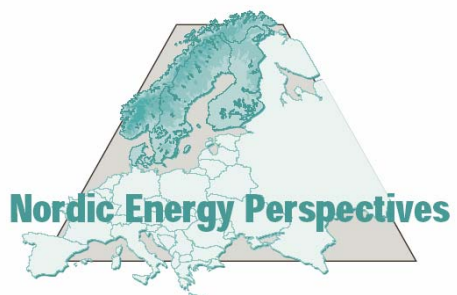




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Challenges and opportunities within the biomass sector, sustainability driven business models

Anders Sandoff



norden

Nordic Energy Research

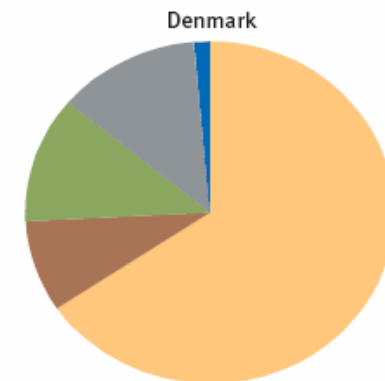
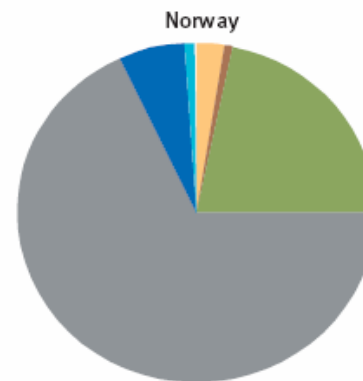
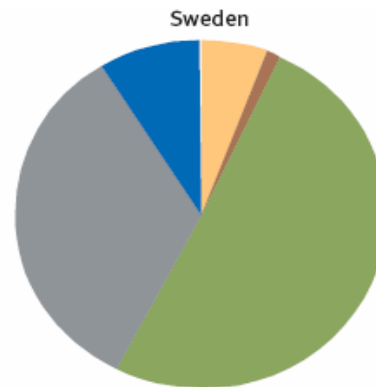




There is a good argument for choosing the biomass sector..

Land use in the Nordic countries

-  Arable land and gardens
-  Permanent meadows and pastures
-  Forests
-  Other land area
-  Lakes





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Great expectations on Biomass sector

CleanTech has attracted a lot of interest for its environmental impact, but maybe more for its potential to drive economic development, increase employment and export

Biomass advocates: National, regional and local governments,
Swedish Environmental Technology Council (SWENTEC),
Swedish Energy Authority,
Royal Swedish Academy of Engineering Sciences
Swedish Environmental Protection Agency
Swedefund, Mistra, Vinnova, Nordic Energy Research
Incubators and Industry associations

Biomass energy production based on system solutions are seen as a Swedish stronghold.



Development in co-operation with manufacturers, customers, universities and governmental facilitators



Challenges and opportunities within the biomass sector

A lot of official reports and research concludes that Sweden not as successful at export as peers

Purpose of the research is to identify:

Mechanisms explaining export activities in small and mature companies

Leading indicators for successful export-promoting policies

Manufacturers of industrial combustion plants and equipment for solid biofuels (1-50 MW)

Sample includes six Swedish companies with their own technologies



Characteristics of Biomass Combustion Equipment Industry

- Sells 'one off' turnkey heat and CHP plants for dry and moist biomass
- Offers also individual components and service
(fuel management, burners, flue gas cleaning, ash management and control systems)
- Customers in energy sector, pulp and paper, sawmills, service and industry
- Manufacturing in own facilities, subsidiaries and subcontracting
- Competitive edge in engineering rather than product attributes
- Nordic market with different characteristics
- No radical change in the industry foreseen



Economic characteristics

	Sales (MSEK) 2007	Employees 2007	Average ROA (%) 2007-2004	Average ROE (%) 2007-2004	Equity ratio (%) 2007	Ownership/ Owner type/ Year of foundation
Petrokraft AB	82	44	1,3	1,6	55	Priv./family/1958
Järforsen Energi System AB	91	16	0,2	-0,7	9	Priv./family/1985
HOTAB Eldningsteknik AB	74	50	5,3	9,7	14	Priv./family/1979
Saxlund International AB	66	16	2,5	3,9	52	Priv./family/1960
TPS Termiska Processer AB	105	60	-8,3	4,6	29	Priv./Priv. Equ./1970
KMW Energi AB	300	41	-1,0	-25,5	9	Priv./Priv. Equ./1958
Total/Average	718	227	0,0	-1,1	28	



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Innovation

- No general or acute need of innovation
- Innovation through customer demands, carried out in real projects
- Sometimes done together with subsidiaries, partners
- Specific issues analyzed in collaboration with universities and prior customers
- Standardization of developed solutions and processes



Export

- Growth potential primarily through export but no active marketing abroad
 - Lot of experience of export
 - Nordic market problematic
 - Standardized plant-configuration in continental Europe
 - Few initiatives by governmental facilitators instrumental for success
- Important prerequisites for export outside the Nordic market:
 - Local presence through licensing, local partner or subsidiary
 - Flexible production (sub contract or co-operation)
 - Not a general need for funds but long term endurance and stable capital base
 - Isolated export organization



Co-operation

- Many possibilities for co-operation
- To many actors – needs to be coordinated and structured
- Very little co-operation in sale activities
- Co-operation needs to be business-driven and goal oriented
- Industries are preferred customers in domestic market



Mechanisms explaining export activities in small and mature companies

- The entrepreneurial drive to growth is limited.
- Low risk strategies prominent for a reason
- Isolated deals
- Capital is rarely a limiting factor
- Difficult to establish local presence
- Facilitators of limited use



Leading indicators for successful export-promoting policies for small and mature companies

- Pragmatic, deal oriented attitude
- Capabilities to handle company specific needs
- Capabilities to foster corporate culture and entrepreneurial orientation
- One stop shop facilitators with detailed knowledge of every company
- Establishing co-operation and trust building mechanisms
- Capabilities of promoting sustainability as an overall governing framework for conducting business

Demands new ways of working paired with extraordinary commitment and resources



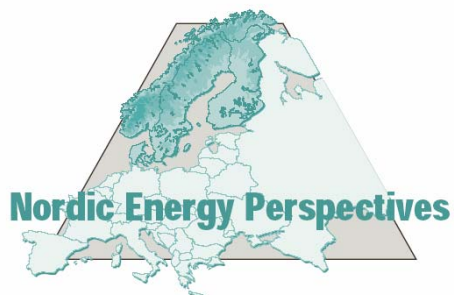
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Governance and funding of clean technologies within the energy sector, models and practices

Anders Sandoff

Framework for closing the gap

Existing synergies
Coordinated action
Important stakeholders



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The Nordic CleanTech Industry

Large and growing

Two main problems:

“Shortage of money”

“The lack of efficient and natural meeting place”



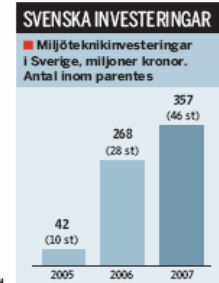
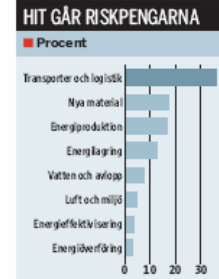
Sverige på efterkälken

Investeringsarna i svenska miljöteknikbolag har ökat med över 800 procent de senaste två åren. Trots det ligger Sverige fortfarande efter i satsningen på grön teknik. Norge drar till sig överlägset mest pengar i Norden, även om antalet investeringar är färre än i Sverige.



Källa: Cleantech Scandinavia och Svenska Riskkapitalförningen

GRAFIK: HELENA FAHLESON



Norge tar ledartröjan i jakten på riskpengar

Fjolåret blev ett rekord år för investeringar i miljöteknik i Norden. Totalt investerades nära 1,8 miljarder kronor.

Flest investeringar gjordes i Sverige men den största delen av kapitalet landade i Norge, enligt en färsk sammanställning.

I Norge investerades totalt 1,1 miljarder kronor, tre gånger så mycket som tvåan Sverige, som lockade 357 miljoner kronor.

Antalet investeringar var dock högst i Sverige, 46 stycken jämfört med Norges 17.

Svenskar sprider pengar
Danmark har också investerat starkt i miljötekniken och har redan många stora etablerade miljöföretag, framför allt i vindkraft.

”Svenska investerare sprider pengarna lite överallt i mindre bolag medan norrmännen går in tyngre i stör-

re bolag som har kommit längre i utvecklingen”, säger Anders Ydstedt, delägare i Cleantech Scandinavia och vd för Riskkapitalförningen. USA, som är ledande, ligger långt före de nordiska länderna. Enligt siffror från Riskkapitalförningen investerar USA 27 procent mer i förhållande till BNP om man jämför med till exempel Sverige.

Ett av problemen som Anders Ydstedt ser är att det inte finns någon effektiv och naturlig mötesplats mellan investerare och miljöteknikföretag.

”Vi ser oss själva som en



Anders Ydstedt, delägare i Cleantech Scandinavia

Di FAKTA

De drog in mest

Land	Mkr
■ Think global, e-bil	
Norge	550
■ Sway, flytande vindkraftverk (No)	176
■ Revolt, uppdragsbaserade batterier till mobiltelefoner, (No)	141
■ Noxstel, energisnåla halvledare, Sverige	94
■ TRD, bränsleceller, Danmark	94

del i den lösningen. Vi bygger en bro mellan investerare och miljöteknikbolag. Men vi skulle vilja att det fanns fler aktörer som knyter den här sortens kontakter”, säger Anders Ydstedt.

Jakt på pengar
Jakten på pengar är en återkommande fråga. Tom Berggren, vd på Svenska riskkapitalförningen, anser att det finns för lite offentliga pengar att hämta för svenska bolag i startfasen.

”Sverige ligger lågt om man jämför med andra när det gäller att stötta kommersialisering av forskning. Det är ofta mindre företag som kommer med nya innovationer och de är beroende av riskkapital i början av sin verksamhet”, säger Tom Berggren.

Anders Brännström, vd för Volvo Technology Transfer, håller delvis med och säger att miljöhaussen har lett till

en skev bild av värdet på miljöteknikbolag.

”Många värderingar byggs bara på förväntningar och har inte riktigt med verkligheten att göra”, säger han.

Göran Linder är vd på Midroc New Technologies, som är en av de aktörer som ritat sig mycket mot clean-tech-bolag.

Inga överinvesteringar
Även han ser ett ökat intresse men drar inga paralleller mellan miljöteknik och it-bubblan som sprack 2001.

”Tittar man på den här branschen är det inte så mycket pengar som investeras. Intresset för miljöteknik har levererat många rubriker och det kommer väldigt många nya företag i det här segmentet men det överinvesteras inte som under it-boomen”, säger Göran Linder.

KIM LIEDHOLM
kim.liedholm@di.se
08-7593 653 24



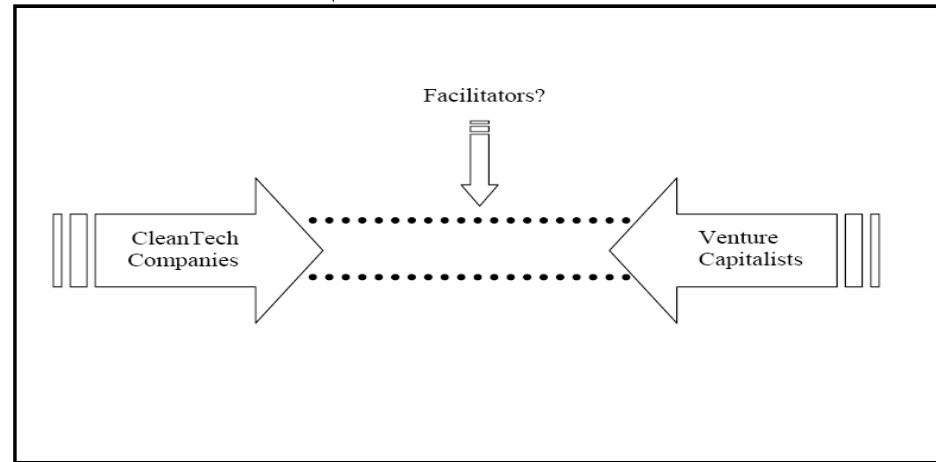
CleanTech and its 11 investment segments

- **Energy Generation** (wind, solar, hydro/marine, biofuels, geothermal)
- **Energy Storage** (fuels cells, advanced batteries, hybrid systems)
- **Energy Infrastructure** (management, transmission)
- **Energy Efficiency** (lighting, buildings, glass)
- **Air & Environment** (emissions monitoring and offset, trading)

- **Recycling & Waste** (recycling, waste treatment)
- **Transportation** (vehicles, logistics, structures, fuels)
- **Materials** (nano, bio, chemicals)
- **Agriculture** (natural pesticides, land management, aquaculture)
- **Water & Wastewater** (water and wastewater treatment, water conservation)
- **Manufacturing/Industrial** (advanced packaging, smart production)



Closing the gap



Who are the facilitators?

Eriksson & Ho, 2007

Innovation systems

(e.g. CleanTech incubators, science parks, authorities/organizations)

Clusters

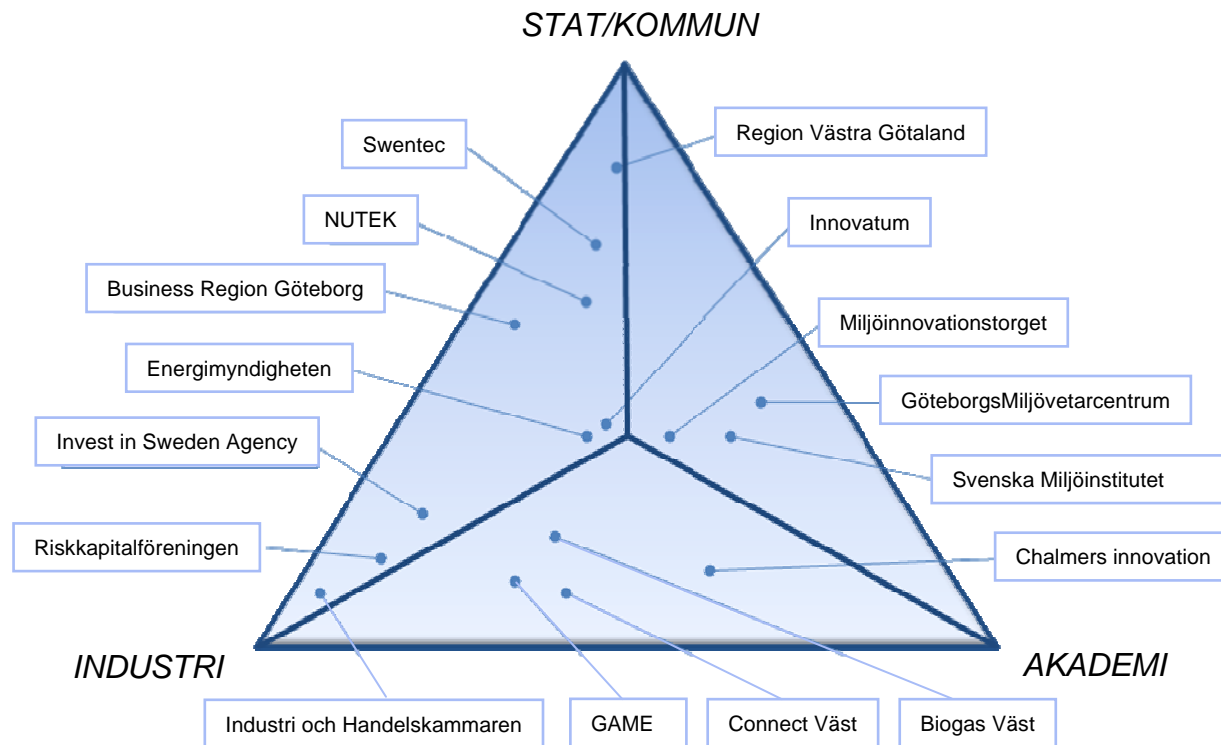
(local and regional co-operation)

Triple Helix

Active co-operation between research, politics and business



CleanTech Swedish West Coast networks from a Triple Helix perspective





Stages of funding and typical investors

Early stages (1-3)

Governmental support
University holding
Incubators
Business Angels

Growth stages

Venture Capital
Pension funds
Public funds

Stage of Funding	Venture Characteristic	Major Goals
1 <i>R&D</i>	Non financial	Basic or applied knowledge
2 <i>Seed</i>	Idea or concept only	Product working prototype
3 <i>Start-up</i>	Business plan and market analysis completed	Get product ready to market
4 <i>Second round</i>	Market receptive, some orders	Achieve market penetration and sales growth
5 <i>Expansion</i>	Significant sales and orders	Achieve sales growth, market share targets
6 <i>Mezzanine (bridging finance)</i>	Break-even or profitable	Establish profitability for IPO (Initial public offering) or LBO (Leverage buy-out) or merger

Adapted from Ruhnka and Young, 1987



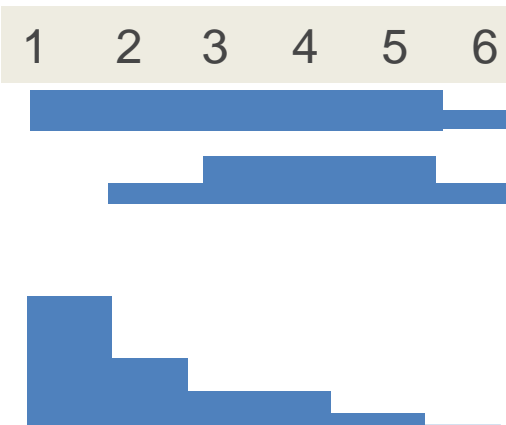
N.B. Risks are easier to identify in later stages



Risks in CleanTech investments and their risk profile

Risk	Description
<i>Financial Risk</i>	Lack of sufficient funds
<i>Market Risk</i>	Future demand for the product
<i>Regulatory Risk</i>	Changes in regulation
<i>Demonstrational Risk</i>	Poor demonstration site
<i>Technological Risk</i>	The technology does not function
<i>Management Risk</i>	Decisions and considerations by management
<i>Exit Risk</i>	The investors potential to exit with a good return

Stage of Funding





Important drivers for sustainability in the energy sector

- Change paradigm
- System thinking and a “Nexus role”
- Innovation and Risk appetite

Risk	Description	Type
<i>Financial Risk</i>	Lack of sufficient funds	External risk for the company
<i>Market Risk</i>	Future demand for the product	External risk for the company
<i>Regulatory Risk</i>	Changes in regulation	External risk for the company
<i>Demonstrational Risk</i>	Poor demonstration site	External risk for the company
<i>Technological Risk</i>	The technology does not function	Internal risk for the company
<i>Management Risk</i>	Decisions and considerations by management	Internal risk for the company
<i>Exit Risk</i>	The investors potential to exit with a good return	Risk for the investor

Energy companies



Syndication



Venture capital



The energy sector as a leverage for growth in CleanTech

- **Energy sector can offer**

- Technical competence
- Long term focus (important in respect to financial risks)
- Strong cash flows
- A large customer base (upstream and downstream) (bundled purchasing power)
- A technically demanding first buyer (standards and quality)
- Non direct competition (location based, open source innovation)
- Established industrial network in a mature industry
- Experience in project management
- Policy measurement competence for non-market strategies

- **Energy sector can gain**

- Faster change over to sustainable energy production
- Higher profitability and/or lower risk
- Technology that fits the needs (pre-commercial procurement)
- Future business areas
- Business intelligence competence
- Innovation competence
- Regional development through Triple Helix co-operation
- Positive public appearance



Coordinated activities

- **Energy Industry Facilitator** (Innovation system, clusters and triple helix)
- **Energy Industry Open Source Innovation Platforms**
- **Pre-Commercial Procurement** (direct purchase or open tender)
- **Energy Industry Venture Capital Funds** (syndication)

- **Integrate Venture Capital and CleanTech issues in:**
 - Business practice (core business)
 - Offers from energy service companies
 - Conferences (general energy and dedicated VC/CT)
 - Industry trade organizations (activities, further- education, press and web content)
 - National, Nordic and European Energy agenda



Important stakeholders for closing the gap between the energy sector and the CleanTech industry

- **Industry trade organizations**

Initiate coordinated actions and build awareness

- **Large industry leading corporations**

Setting industry standards by good examples

- **Owners and owner associations**

Corporate governance and change of attitude

- **All energy companies**

New employments to safe guard existence of sufficient and relevant competence

- **Political and public institutions**

Tax credits, incentive programs, co-financed R&D