



NORDREGIO
Nordic Centre for Spatial Development

Smart, Sustainable and Inclusive Growth

How Renewable Energy and Clean Tech can
contribute to the Europe 2020 Strategy

Ole Damsgaard and Aslı Tepecik Diş

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to the Europe 2020 Strategy

Main messages from the Mid Sweden
Conference 14 – 15 June 2011

Ole Damsgaard and Asli Tepecik Diş

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Nordic co-operation

Nordic co-operation

takes place among the countries of Denmark, Finland, Iceland, Norway and Sweden, as well as the autonomous territories of the Faroe Islands, Greenland and Åland.

The Nordic Council

is a forum for co-operation between the Nordic parliaments and governments. The Council consists of 87 parliamentarians from the Nordic countries. The Nordic Council takes policy initiatives and monitors Nordic co-operation. Founded in 1952.

The Nordic Council of Ministers

is a forum of co-operation between the Nordic governments. The Nordic Council of Ministers implements Nordic co-operation. The prime ministers have the overall responsibility. Its activities are co-ordinated by the Nordic ministers for co-operation, the Nordic Committee for co-operation and portfolio ministers. Founded in 1971.

Nordregio – Nordic Centre for Spatial Development

works in the field of spatial development, which includes physical planning and regional policies, in particular with a Nordic and European comparative perspective. Nordregio is active in research, education and knowledge dissemination and provides policy-relevant data. Nordregio was established in 1997 by the Nordic Council of Ministers. The centre is owned by the five Nordic countries and builds upon more than 30 years of Nordic cooperation in its field.

Stockholm, Sweden, 2011

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Preface

Europe 2020 is the European Union (EU)'s growth strategy that encompasses the ambitious goals of turning Europe into an 'Innovation Union' by the end of the decade. The Europe 2020 strategy puts forward three mutually reinforcing priorities:

- Smart growth: developing an economy based on knowledge and innovation.
- Sustainable growth: promoting a more resource efficient, greener and more competitive economy.
- Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.

The county administrative boards and county councils of Jämtland and Västernorrland in Sweden organised the second Regional Development Conference aimed at addressing the objectives of the EU 2020 in the context of renewable energy and clean tech. The conference was held in Östersund on the 14th and 15th of June, 2011; with participants from different levels of governmental units, public and private sector, academia and NGOs in Europe as well as Canada.

Ms. Britt Bohlin, County governor of Jämtland, stated in her welcoming speech that the main aim of the conference is to foster synergies between the clean technology and energy sectors and discuss the methods to turn those efforts into regional development strategies that promote the Europe 2020 strategy; *smart, sustainable and inclusive Europe*.

Ms. Bohlin stated that the conference is timely because the debate on EU policy decisions not only deals with cohesion and regional policy but also on how regional growth is to be sustained for the next 10 years. The debate will include the EU's financial framework for the next programming period and the legislative package for the implementation of the European Cohesion Policy; *“Our findings in this conference must influence that debate!”*

Following Ms. Bohlin's speech, Ms AnnSofie Andersson, mayor of Östersund, mentioned that Östersund adopted a growth program in 2009 and accordingly, the city has built its growth strategy on Europe 2020: *“By working together, we can develop regions, companies and public authorities.”*

Subsequently, key note speeches and presentations offered exemplary cases concerning how smart, sustainable and inclusive growth can be fostered in a regional context under the EU 2020 framework. Attention was drawn to the crucial role of green innovations in developing green economies and thus sustainable regional development strategies. It was also highlighted that in order to realize the full potential of each and every region, continuous co-operation between different sectors and administrative levels is essential. The role of designing the right policies was emphasized, as it would set the right political foundations for public and private enterprises, which would then lead to more innovative and competitive nations in a global society.

The conference included representatives from Polish Presidency of the EU Ms. Anna Gmyrek and Mr. Daniel Balinski, Incoming member of the European Parliament Mr. Jens Nilsson, State Secretary Mrs. Marita Ljung, Mr. Raffaele Trapasso, OECD, International Energy Agency Mr. Bo Diczfalusy and County Council Commissioner Mr. Robert Uitto. Speakers from European eco-regions and representatives from SMEs also contributed to the conference. The conference was moderated by Mr. Tomas Kåberger and Director General of The Swedish Energy Agency and Mr. Bo Källstrand, Governor Västernorrland. A declaration was developed during the conference and is added as an annex to this conference report.

This conference report brings together some of the main messages from the presentations made in the context of the meeting and the discussions that followed. The conference report was drafted and commended by Ole Damsgaard and Asli Tepecik Dis at Nordregio.

Main Messages

Smart specialization and clever integration are essential for achieving sustainable regional development

The economic and environmental challenges that are being faced globally, nationally and regionally were at the heart of the discussions during the conference. One key component of regional development was addressed in the concept of smart specialization, which aims to encourage regions to capture their high value added activities. In this context the Communication from the Commission on 'Regional Policy contributing to smart growth in Europe 2020' should be mentioned. This Communication and the Innovation Union Flagship recommend that both national and regional governments design 'smart specialisation strategies'. Smart specialization and clever integration are necessary to make use of the regional and local conditions and to find innovative methods for integrating and utilizing local strengths and possibilities.

Smart specialisation; the strategic way of prioritising

The idea is to understand smart specialization as an instrument to concentrate resources on strategic priorities and comparative advantages. This would help design the right mix of policies to enable smart and inclusive growth by strengthening the potentials and competitiveness of the firms in the region. Thus, smart specialization should be a bottom up approach; based on regional knowledge. Smart specialization should also ensure a more effective use of public funds, helping to leverage private investment, stimulate the cooperation between regions and thus maximize the overall research and innovation potential of the Union.

Comments:

There might be a risky tendency to use this approach as a way of prioritizing sectors in a top down manner to direct investment which could restrain regional innovation. Another consideration is that if innovation is channelled towards the limitations of certain sectors, it

might create rigid structures. Therefore, the concept has to be used creatively to help regions develop programmes and standards as well as to give them the possibility of testing their ideas and potentials.

However, there are also success stories on smart specialisation. The regional initiative in Northern part of Scotland demonstrates a good example of how smart specialization can utilize a region's strengths (e.g. see the best practice example on p.35).

Recommendations:

The regions have to consider how they can utilize their specific regional profiles and potentials in good cooperation with national and local levels. Two themes were addressed at the conference that can be of relevance:

-Using local networks is essential, especially for SMEs to advertise their products. In this regard, the regional government and local authorities can cooperate with SMEs and support these local innovations by consuming their innovated products.

-It is crucial to provide the right competence with the right training facilities in areas where SMEs are situated as they need multi skilled personnel to be able to cope with changes and new techniques.

The role of regional and local cooperation in creating innovation

In line with Europe 2020, a broad interpretation of innovation is used in the regional strategies presented in the conference. Innovation is mainly described as meeting needs, challenges and demands through new and better targeted solutions. These may include new products, services, business models and new ways of working.

Accomplishing innovation is not easy; it requires new combinations of knowledge around financing and clean technology. It also requires green consumers who are willing to make

changes on the demand side and contribute to the innovation process. In this regard, innovation is generated by mutually supported interaction between supply and demand.

In return, innovation brings new jobs and stronger competitiveness while making the future greener. Although investments can improve the future of the regions, the main actors are considered to be the Member States (MS) and the EU itself, both to make investments and also to steer the discussions. To reach the ambitious objectives set in the EU 2020 strategy, it is essential to have a bottom up approach, while the objectives, strategies and measures need to be deeply rooted in strong communication among the local, regional and national levels.

Comments:

There is a strong need for regional cooperation in order to foster new ideas and also utilize new knowledge together with existing knowledge at different levels. However this should not only take place among policy makers but also between policy makers and all other stakeholders, particularly those with a stake in manufacturing industries. The more efficiently we convert knowledge into innovation, the more new products, services, processes, organizations and solutions will come to life.

Another main feature of the conference was to bring the private sector and public authorities together to discuss what needs to be done, specifically in the cases of small and medium sized enterprises (SMEs) and micro businesses. Funding and capital are the engines of the SMEs. As is stated in the conference declaration, there is an increasing need for (risk) capital and the adaptation of state aid rules to be able to obtain tangible results from entrepreneurial efforts. Further, the step from “the good idea to commercialization” needs attention.

Politicians and policy makers often find that access to risk capital is the key factor when it comes to innovation and entrepreneurship. However, other types of public support and facilitation are often more crucial and needed.

In terms of green innovation, the private sector is essential. To a large extent, it is SMEs that develop, produce, promote and sell all the products and services that are based on the good

ideas and innovations related to the renewable energy and clean tech sectors, thus creating regional growth. On the other hand, at various levels, the public sector has the responsibility to support, to make use of green procurement possibilities, and adapt regulations and legal frameworks. In short, local and regional authorities have specific roles to fulfill in creating a basis for the development of SMEs.

Here, the Green Highway project can be mentioned as a good example of a smart growth strategy (e.g. see the best practice example on p.37). The project runs in close cooperation with three cities that are located in the Northern part of Scandinavia; Sundsvall and Östersund in Sweden and Trondheim in Norway. The project operates under the EU Interreg initiative and works on a green corridor for people to drive their eco-friendly vehicles without having to depend on any type of fossil fuel. This fossil free green transportation corridor is a good example of how a region can grow through close cooperation with other regional stakeholders. The Green Highway will not only contribute to generation of business opportunities and sustainable growth but also reduce the climate impact and increase the attractiveness of the region.

Recommendations:

-Regions have a specific and important role as facilitators for cooperation across borders and for linking the public and private sectors. The regional level authorities also have an important role in grasping opportunities in terms of funding and in making SMEs aware of the possibilities to develop green businesses (i.e. Structural Funds).

-Regional and local authorities play a crucial role concerning public procurement and the administration of public funding. Public funding sometimes excludes other sources of funding and vice versa. Collaboration between public funding and private risk capital is essential in order to stimulate small companies and make use of resources more efficiently.

-Traditional and industrial companies have to be able to compete in global markets. To do so, they have to work more systematically on innovation, which requires strong collaboration between national and regional level authorities.

Such authorities can help to mobilize stakeholders at all levels and thus steer the development of small companies towards a more innovative direction.

-There has been a much greater focus on the supply side of financing R&D; however there are challenges in the legislation on public procurement and state aid rules. Flexibility is needed.

- SMEs need brave customers, and the role of national and regional stakeholders is integral to the development and success of the SMEs. Regional and local authorities have the responsibility, possibility and resources to consume new green technologies. Public authorities should also be encouraged to be the early adopters by investing early on and in purchasing innovative products.

-Consumer behavior is also crucial to determine the future of green development at the regional level. It is not only a question for individuals but also a question for public and private stakeholders at regional and local levels to steer the green choices.

-The overall perspective on the production of new types of green technologies should also consider the embedded CO₂ capacity; their carbon footprint.

Smart growth in cities

There is a strong trend towards urbanization around the world which brings cities into focus, especially when it comes to climate mitigation strategies. Residential areas are the drivers of emissions, but if the smart growth strategies can be implemented, they can be converted into sites of a converged 'platform' of services. This way, economy and ecology can go hand in hand.

Comments:

Smart growth as an urban planning concept refers to concentrating growth in compact walkable urban centers to avoid sprawl and helps using existing information for the control of technologies to make it possible for consumers and customers to act in a sustainable way. This would both save money and resources as well as increase competitiveness by making the

communities more competitive for new businesses.

Recommendations:

-Cities play an important role in terms of their contribution to green house gas emissions. In this connection, some sectors will be on the forefront for investment; energy efficient buildings, eco system services, eco innovations, and renewable energy development are to name a few.

-Similarly, energy efficient homes (Home Energy Management) will play a key role in delivering energy efficiency targets. Smart homes will also be the site where new sources of power generation and new services like electric vehicles will intersect.

-Regional and local authorities can play an important role in planning and by helping the citizens to modify their consumer behaviour in a more energy efficient direction.

Eco-efficient economy through renewables- an opportunity for rural areas

An eco-efficient economy brings competitiveness and environmental responsibility together. It is about exploiting the growing demand for environmentally friendly products and services. It became evident from the presentations that wind power in particular is a high priority in many regional development programmes within the framework of regional growth policies. It is considered to be an efficient way of producing renewable energy and is also seen as an opportunity to support and develop a new manufacturing industry. The goal for wind power centres is to create long-lasting businesses.

Comments:

Renewable energy has to be produced where the resources are located. Most rural areas are rich in natural resources and raw materials that can be used for energy. Renewable energy creates opportunities for increased entrepreneurship and enterprise. Thus, rural areas will have the power and resources to make an important contribution to the economy. It is the regions themselves that should make the actual choices and necessary decisions to create sustainable regional growth. The role of the government should be to provide the regions

with the tools they need throughout the process. European Regional Development Fund (ERDF) is important resource for achieving the objectives in regional strategic plans. Local and regional actors in the regions should use the full potential of the workforce by getting involved in green business development in close dialogue with other actors such as SMEs and their products.

Recommendations:

-The use of local and regional renewable energy resources is an important theme for regional strategic planning in all types of regions. Local and regional authorities need to see renewable energy sources as strategic investments for securing employment and regional development within this framework.

-Smart grid, smart transportation systems and industrial automation can also be considered as key areas of opportunity for eco-efficient economies and thus for smart and sustainable growth.

The overall Policy Framework

State Secretary of Sweden Ms. Marita Ljung, EU-commissioner Mrs. Charlina Vitcheva, Polish Presidency of the EU Ms. Anna Gmyrek and Mr. Daniel Balinski and Swedish member of the European Parliament Mr. Jens Nilsson

The synergies between energy, clean tech and regional development shall contribute to the success of the Europe 2020 Strategy

The challenges that society and the environment face as a result of climate change have become central to the European Union's agenda. Decreasing natural resources and increasing global demand on goods and services have led to greater awareness of the need to move towards a sustainable, low carbon economy. On the other hand, many possibilities have emerged for a new industry to develop, namely; Clean Tech. The development of the Clean Tech sector requires secure, sustainable and competitive energy resources. The role of regions is central for meeting these challenges and utilizing the possibilities in the energy sector. During the conference, policy makers reflected upon how best to respond to the multi-dimensional challenge of energy with policy instruments at the EU's disposal. In this context, Europe 2020 sets the overall framework for action.

Regions are the key actors

During the conference, a clear description of what role regions can play for successful and sustainable regional development was established.

In her welcome speech, Ms. Marita Ljung, State Secretary of Sweden, provided examples from Swedish regions and reflected upon the Swedish government's view on the role of regions in accomplishing innovation. For instance; in Sweden, all 21 counties develop individual regional climate and energy strategies. These strategies are used to identify, plan and implement regional initiatives and measures to reduce environmental impacts as well as to increase the share of renewable energy and to maximize energy conservation. Their work is closely connected to regional development programmes in each county and is carried out in

close collaboration with other local and regional stakeholders.

An example was given from a company in Habo, a locality in south Sweden. The company, *Portsystem 2000*, manufactures gates and portals for logistics centers with embedded intelligence systems. The intelligent portals can read information from the goods coming in and out through RFID (Radio-frequency identification) technology. This will eventually transform the company from a portal manufacturer to a systems company working with logistics. This new solution was developed in close collaboration with research institutions and large companies such as Swedish postal office, Schenker and DHL. This collaboration changed the business model of this small company and resulted in smart growth by generating new jobs in the small town of Habo.

Accordingly, the Swedish national strategy will be based on a broad dialogue with stakeholders in business, academia and the public sector at both national and regional levels by providing a framework for innovation policy towards 2020. This strategy will be presented in 2012 and shall bring new ideas for developing Swedish Regional Growth policy. This undertaking will be in line with the next planning period of the structural funds.

Regions can often manage trade-offs with local communities better than the national level

Ms. Charlina Vitcheva, Director of DG Regio, identified regions as the key actors in developing technology clusters as well as R&D and innovation, which can be suited to the energy needs of the respective regions.

There has been a great deal of experience gained from working with regions in the field of innovation strategies. While improving the Regional Policy, this experience has also made it

possible to identify examples of strategies that have already proven their potential to create smart and sustainable growth.

The role of local and regional authorities in specific was developed further in Ms. Charlina Vitcheva's presentation. In particular, regions are essential to achieve the ambitious goals in the energy sector. Three of the Europe 2020 headline targets are related to sustainable energy; Greenhouse Gas emission reduction, increased use of renewable energy, and improved energy efficiency.

Energy investments are vital for regional development and regions are increasingly in charge of the governance of energy systems.

Being close to energy actors, suppliers and consumers; regions and municipalities are well placed to translate policy decisions into practice and to encourage investment in new technologies.

Together with other actors and stakeholders, regions and cities can work to find locally tailored solutions. In fact, regions can often manage trade-offs with local communities better than the national level.

The role of Cohesion Policy as a place based policy

In this context, Cohesion Policy operations can indeed make a difference. Cohesion Policy is a "place-based" policy which offers a unique opportunity to integrate key EU policies and to contribute to sustainable growth in the regions.

The implementation involves mobilising stakeholders at all levels and across all boundaries, working together towards European objectives. It offers a system of multi-level governance and partnership, which values and exploits local, regional and national knowledge and combines it with strategic directions for the EU.

Regional Policy contributing to sustainable growth in Europe 2020

With the active engagement of local and regional stakeholders, Cohesion Policy can already deliver much more for sustainable growth. Ms. Charlina Vitcheva further remarked that there is a need for further investment in the green economy.

This is one of the two core messages of the Commission Communication on Regional Policy contributing to sustainable growth in Europe 2020.

The second core message of this Communication is to invest better, which implies that public authorities need to ensure;

1. The mainstreaming of sustainable development principles in all investments
2. Climate and resource proofing of investment projects
3. Improved governance, as we can only succeed if all local/regional actors including civil society and NGOs are involved and have their say

Investing more in Green Economy

Going back to the first core message, increased energy efficiency in buildings plays a key role in achieving the Europe 2020 target of reducing energy consumption by 20%. In particular, Cohesion Policy can now further promote investments in energy efficiency and renewable energy in residential buildings throughout the EU 27. This has multiple benefits in terms of local jobs and growth while also tackling energy poverty and enhancing energy security. The Member States need to quickly tap into this strategic opportunity for sustainable regional development.

Achieving the EU target of 20% renewable energies (RES) in total energy consumption by 2020 could also provide a large number of additional jobs, many of them close to where these investments are made. Furthermore, the deployment of RES can be an especially important driver of local economic development, particularly in rural areas as well as in peripheral regions or on islands, where it is possible to tap into their marine energy potential.

To reap the full benefits of the local RES potential, the Communication invites local and regional authorities to address RES in a full life-cycle approach to develop an integrated regional supply chain on renewables, based on the local potentials. It will have cross-sectoral benefits at the local and regional levels, from agriculture

and forestry (biomass for energy) to SMEs, industry or construction sectors.

Managing authorities should also support investments in the local 'smart grids', as part of the wider TEN-E network, to effectively enable the exploitation of the decentralised RES potential.

Act now!

In her conclusion, Ms. Charlina Vitcheva underlined that to make the case for a meaningful budget for the future, it is central to demonstrate the best possible take up of the current funds.

As attention is now geared towards the future Cohesion Policy and given the long lead time and complexity in planning for investments in sustainability at local and regional level, it is crucial that the steps taken towards the Europe 2020 objectives will make future programmes and projects easier to deploy.

In this context, the two Communications can be seen as a call to action as well as an early preparation for the next financial period. It is now up to the stakeholders at different levels to build on the central messages of the Communications and to design regional specific sustainable and smart growth path.

A more result-oriented and integrated approach to territorial development in a Europe that benefit from openness

On behalf of the incoming Polish EU Presidency, Ms. Anna Gmyrek, Ministry of Regional Development, introduced the Polish Presidency Programme on Cohesion Policy.

In general the Polish Presidency aims at European integration as a source of economic growth and a secure Europe concerning food, energy and defence. Besides that, the Polish Presidency aims at a Europe benefitting from openness, which implies further cooperation and partnership with third countries such as Russia and those in the Arab peninsula.

A very important issue for the presidency will be to ensure the efficient progress of negotiations for the Cohesion policy after 2013.

The Polish Presidency will be working on the advancement of strategic programming and

thematic concentration during the negotiation of the new EU regulations on the future cohesion policy. The aim is to highlight three specific features of the cohesion policy. First, cohesion policy should promote an integrated development approach and second, cohesion policy should have a strong territorial dimension. A third aim is to strengthen the political visibility and weight of the Cohesion policy.

With the intention of highlighting the importance of cohesion policy, a number of high level meetings for the Member States, addressing themes like regional and cohesion policy as well as territorial and urban development will be arranged. The ambition is to not only gather ministers responsible for regional policy but also ministers responsible for territorial development and urban planning to demonstrate that an integrated approach to development is essential.

Ms. Anna Gmyrek ended her presentation with a reference to the Europe 2020 Flagship Initiative on Resource Efficient and Innovation Europe, which will be one of the priorities during the Polish presidency. This initiative will be developed in September.

Rural areas and cities must work together in their region

Mr. Jens Nilsson, an incoming Swedish member of the European Parliament, welcomed the presentations of the Commission and the Polish Presidency by stating that "We have extremely important six months ahead of us."

Mr. Nilsson made the observation that a shift is under way in the attitudes to climate change from only seeing the threats to also being able to see the opportunities for innovation, new jobs and economic growth.

Concerning Cohesion policy, it is important that we do not destroy what has been built up during the previous programme periods, with strong regions and strong involvement of the local and regional level in the implementation process.

It will be detrimental if the new programme gathers all the money and resources at national level in national programmes, as some MS have proposed. The regional programmes are needed

because it is only at the local and regional levels that one can see the progress. It has also been proposed that big cities should have a stronger role in the new programme; however even big

cities are a part of their region. Therefore, rural areas and cities have to work together within their respective regions. The same situation applies to renewable energy as well.

Renewable energy, Global prospects and Regional opportunities

Mr. Bo Diczfalusy, Director, Directorate of Sustainable Energy Policy and Technology; IEA

Mr. Diczfalusy reflected upon the renewable energy sector and possible opportunities for regional development. He provided figures revealing that global energy consumption has doubled in the last 25 years. While the global share of renewables remained constant, oil has been superseded to natural gas and to some extent nuclear, while the share of coal has doubled. While the EU is making a screening of all the reactors, some countries have publicly announced that they will pursue nuclear programs. Taking these figures as the basis for discussion, Diczfalusy stated that a revolution in renewable energy is needed and that the possibility lies in the design of new policies.

He further discussed the world's primary energy demand in three different scenarios from the World Energy Outlook report in a timeframe from today to 2035. If all global energy policies such as emissions trading systems, energy efficiency and renewable energy policies are kept as they are (current policies scenario); the energy consumption would be 50% higher in 2035 than today. If the 450 ppm scenario (CO₂-equivalent concentration stabilization levels) is developed, by designing strong policies in the field of energy, there would be considerably lower energy consumption than in the status quo scenario. Thus, he emphasized that energy and related policies could play a decisive role in shaping the future demand.

Diczfalusy stated that sustainable growth is happening outside the OECD countries as well. China and the rest of the world are beginning to see strong growth in many kinds of energy. On the other hand, in developed countries the share of renewable energy is significant and shares of coal and oil are going down very rapidly due to conscious energy policies.

Wind, hydropower, photo-voltaic (PV) and biomass hold the 4 biggest shares in terms of renewable energy types in the short term perspective, during the next 20 years or so. The new policies scenario for 2035 indicates very strong growth not only in Europe, North America or China but in all regions. Certainly, this change will not happen spontaneously.

China, where a vast growth is expected, will serve as a very important market in this manner. One out of five solar PV installations between now and 2035 could come from China, in addition to wind power plants, electric vehicles as well as nuclear energy. If the right conditions are in place, there will be substantial technological development opportunities there.

Having noted that there is a transition to a global energy economy, he suggested that the next question would be, 'how far have we gotten in moving towards a low-emission society?' The recent Energy Technology Perspectives report reflects on the next 50 years of energy technology development, while including different types of policy scenarios. Again, if the current policies are kept as they are (the business as usual scenario), CO₂ emissions would be doubled, which would probably have catastrophic consequences, such as 5-6 degrees of rise in the temperature.

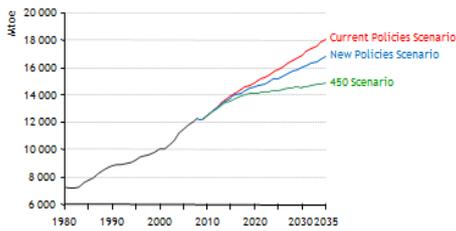
The figures at the international level show that renewable energy and energy efficiency technologies are entering the market vigorously. However, in the last 10 years, half of the increase that happened in total energy comes from coal. This is disappointing for many of us that think we are heading in the right direction for the future. Diczfalusy emphasized that we need strong policies with the right regulations and clear goals. Fruitful cooperation between policy makers and industry is a must in order to develop environmentally friendly technologies.

Diczfalusy illustrated the uneven spread of wind and solar energy potentials using European and global maps. In many cases, the energy resources are not located near the energy consumption centers. There has to be a lot of trade and interaction between the regions, as different countries will have different needs. The goals vary for different countries, which mean that there is considerable room to enhance cooperation for trade and for the building of grids. Thus, the building of infrastructure will be an important part of this development. In addition to environmental benefits, renewable energy holds great potential for job creation and economic growth.

Since the European renewable energy commitment is part of the Europe 2020 strategy; there is a strong need for smarter grids, smarter regulation and smarter cooperation.

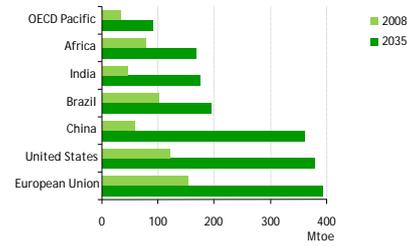
Diczfalusy noted that fossil fuel will still be the back bone of global energy supply for many years ahead. Even though the renewables are entering the mainstream, they would need sustained policies which will play a decisive role in promoting renewable energy in the context of regional development. Accordingly, he concluded his presentation by stating that there is ample room for regional cooperation not only between policy makers but between policy makers and all other stakeholders, the manufacturing industry in particular.

World primary energy demand by scenario



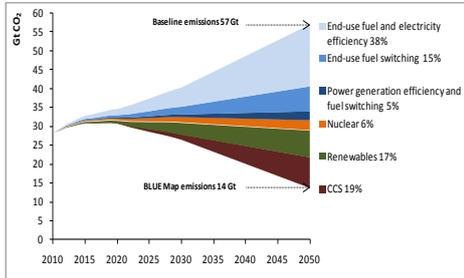
In 2035, energy demand is 8% higher than in the Current Policies Scenario and 11% lower in the 450 Scenario than in the New Policies Scenario

Renewable primary energy demand in the New Policies Scenario



The use of renewable energy triples between 2008 and 2035, driven by the power sector where their share in electricity supply rises from 19% in 2008 to 32% in 2035

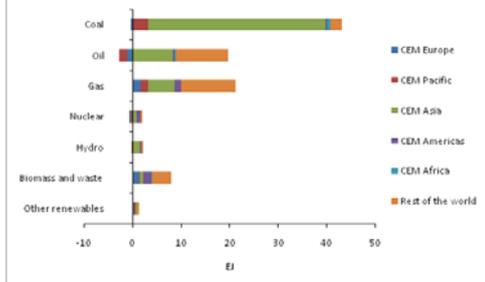
Key technologies for reducing global CO₂ emissions



A wide range of technologies will be necessary to reduce energy-related CO₂ emissions substantially.

Coal continues to dominate globally

Incremental total primary energy supply (2000-08)



2010 saw a strong reduction in CCS funding announcements ... and still no large-scale CCS on a coal-fired power plant

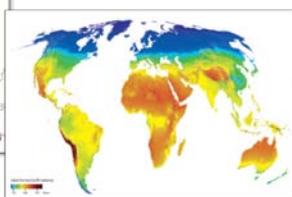
The role of regions and renewables

Resources are unevenly spread – regional specialization necessary

European wind atlas



Global solar resource atlas



New challenges for all stakeholders

- Electric renewables will require new and better grid infrastructures – smarter grids and smarter regulation
- From an industrial perspective, more specialization at regional level

Part of the European electric grid



US wind power manufacturing sites



A Global and Corporate Perspective

The Home of Modern Energy Technology Mr. Kai Johan Jiang, State Power Group

Mr. Kai Johan Jiang was a former Volvo executive and is currently working for one of the largest biomass power businesses in China. He founded *State Power Group (formerly known as Dragon Power Group Company Limited)* in 2004. The company imported technology from Denmark to use leftover straw and the like to produce energy. Through the experts from Bioener in Denmark, State Power Group obtained a license for biomass boiler technology.

In 2006, the company opened a straw biomass-powered plant, the first plant of its kind in China and also the first national project in biomass energy operating in Shandong province. Today, The State Power Group has become a world leader in advanced energy technologies such as biomass power generation, wind power and energy storage technology. Further, State Power group is the only company in the world to incorporate the entire biomass energy production chain; from equipment manufacturing to power plant operation to providing a wide range of technologies.

In China, most of the farmers burn straw and wood as unwanted waste. However, the caloric value of the amount of straw burned each year is the equivalent of 500 million tons of standard coal. Initially, the company started a biomass power plant in China with farmers, with 95% directly recruited locally. 26 power plants

have been running over the last 7 years, with a capacity of 618MW. Today, State Power Group supplies almost 60% of the country's biomass electricity and has benefited millions of Chinese farmers. Jiang stated that the company delivered 9.5 TWh of green electricity, which reduced CO2 emissions by almost 7 million tonnes, created the 65.000 jobs in the agricultural sector and generated additional revenue of 3.5 billion RMB for farmers.

He underlined the fact that wind is nature's richness and the most important source for the development of clean energies. Storing electricity with high efficiency is the most important technology for the development of clean energy, and an intelligent power network. However, there have been some problems with noisy turbines. Jiang noted that there is a new version of wind turbines that his company has been developing. This new version makes almost no noise and the company took the patent for this technology worldwide.

State Power Group successfully supplied developed products to important clients such as the National Lab of Riso in Denmark, Air Base of South Carolina of USA, PacificCorp of Utah of USA and Tomamae VRB-ESS of Japan.

Jiang concluded his presentation by highlighting that teamwork and a spirit of innovation are the key elements for the development of a country as well as an enterprise.



Innovation förändrar livet

Med sju år ansträngningar, har State Power Group blivit världens ledande företag i modern energiteknik

- Biomassa kraftproduktion
- Vindkrafts teknik
- Energilagringsteknik
- Clean energi panna för kraftproduktion



Vind är naturens rikedom. Utnyttja vind är den mest betydelsefull för utvecklingen av clean energi. Den nya vindkraft teknik kommer att bli mycket mer effektivt.

NWE utvecklat den 1MW vertikala axeln vindkraft system har tagits i kommersiell produktion.

Lagra el med hög verkningsgrad är viktigast teknik för veveckling av clean energi och och intelligenta kraft nät.

Staten Power Group är Världens ledande inom el lagringsteknik område !

Prudent Energy Group , världsledande Vanadin Redox Batteri system (VRB) utveckling och tillverknings företag, med säte i Kina, i USA och i Kanada.

Med fokus på VRB forskning och teknisk utveckling sedan 2006 , och nu har satt i kommersiell produktion.

Under 2010 har State Power Group köpt Prudent Energy Group och äger hela patenterade VRB teknik.

Företaget har idag två produktionslinjer för kw-klass och m w-klass. Vi är ett av de få företag som kan tillverka m w-klass energi lagringssystem

> Successfully supplied developed product to important clients in the world.

National Lab of Riso in Denmark
 Air Base of South Carolina of USA
 Pacific Corp of Utah of USA
 Tomonae VRB-ESS of Japan



"Panna" är viktig Plattform för clean energi produktion. år 2007, Staten Power köpte framgångsrikt Jinan Boiler Group (JBG), den största pannan tillverkare av Kina. Efter 4 år har JBG blivit det största bio bränslepannan tillverkare i världen.

The three pillars of the Europe 2020 Strategy

Growth is, as defined by the Europe 2020, classified under three main themes; smart, sustainable and inclusive growth. The following key note speakers reflected upon each theme from their organizational and research point of view.

Smart growth

Mr. Alejandro Obregón, Director Climate Group European Programmes, Brussels, Belgium

Mr. Alejandro Obregón represented the Climate Group (TCG); the world's first international Non-Governmental Organization (NGO) focused solely on a clean energy future and low carbon economy while raising awareness and proving concepts. TCG has partnerships with multinational companies, cities, regions and states to support leadership on climate policy and technology. The organization is operating with 90 staff at different offices around the world; including San Francisco, Chicago, NY, Toronto, Shanghai and Beijing, to name a few.

The private sector constitutes the main pillar of TCG and the key objective of their work is to foster awareness among government members, states and regions and engage them in TCGs projects in order to build partnerships to accelerate the deployment of low carbon solutions. This would lead to projects that employ new technologies and ideas into the market as well as a substantial mitigation potential at the commercial scale.

One of TCG's projects involves the proliferation of LED lighting. Light Emitting Diode (LED) lamps are combined with smart controls that can cut CO₂ emissions by roughly 50-70% by 2020. To see the success rate of these products, TCG has selected 10 different cities as test grounds with different conditions, including Toronto, New York, Calcutta, London, Tianjin and Guiyang. TCG disseminates information by giving publicity to their partners. They work with a network on fast-start deployment by setting standards and developing and disseminating templates to finance the implementation of the technology at a larger scale. Mr. Obregón also

gave examples from their corporate partners such as ALSTOM, Dow, TESCO, PHILIPS, EDF Energy, Peugeot UK and Citroen UK.

It was noted in his presentation that "cities are where we need to focus" as half of the world's population now lives in cities and because they contribute more than 70% of global emissions. For instance; in London, buildings are the source of 40% of the city's emissions. Accordingly, there are key areas of opportunity when it comes to smart buildings, smart grid, smart transportation systems and industrial automation. He further gave examples from ICT, emphasizing its key role in helping model more efficient buildings and energy models which would reduce up to 15% of emissions in building use through building management systems and upgrades. Therefore, TCG wants cities to move towards greater energy efficiency, pursue related efforts and try to act as an objective partner in their respective initiatives.

The presentation also addressed the flagship initiatives of the EU concerning smart growth. Based on the communication of the Commission, the three pillars of smart growth are highlighted, as innovation, education and digital society. TCG thinks that these pillars should be based on security, competitiveness and employment, as these issues are quite relevant and important to any type of government, particularly due to the high cost of fossil fuel economies. Energy self-sufficiency is also underlined as one of the reasons to foster new technologies, as any political entity that wants to achieve energy independence needs clean resources. This would ensure that they would not need to purchase energy from other countries, while also providing employment opportunities as well. Mr. Obregón detailed the argument with examples from Europe and Germany in particular. For instance, renewables accounted for 60% of newly installed power capacity in Europe in 2009. The German government, an early mover, has 278,000 workers employed in renewable energy sector; more than the number employed in

conventional energy. By 2020, this number is estimated to be between 353,500 and 400,000.

By taking these facts and figures in to account, TCG launched an initiative called “the states and regions climate alliance” based on the commitments made by sub-national governments in the Montreal Declaration in 2005. Mr. Obregón provided detailed examples of regional government actions on green initiatives from Scotland, Catalonia, the North

Rhine-Westphalia, Basque country, Bavaria, Vitoria, London, Wales, Amsterdam, Brittany and Upper Austria.

The presentation was concluded by a business call for 30% reduction in greenhouse gas emissions which would have numerous economic and social benefits in terms of fostering innovation, investment and thus millions of new jobs in a low carbon economy.

Sustainable Growth (Renewables 4 Rural)

Mr. Raffaele Trapasso, OECD, Paris, France

Mr. Raffaele Trapasso, representing the Regional Development Policy Division of the OECD, delivered a presentation on the OECD's new sustainable growth strategy which was renewed during the last decade in view of the enlargement of its membership. Three pillars are mentioned in the vision of the strategy. They are similar to those of the EU Commission. The strategy emphasizes continuous interaction between members for a stronger, fairer and clearer economy. In the past, these relationships were rather clear in the sense that competitiveness and redistribution took account of the social aspect of the economy. However, these pillars have changed since both the OECD and member countries have been looking for better integration of these two targets. Additionally, there has been a strong need to develop a cleaner and greener economy. In this context, mainstreaming sustainability should be a consideration which involves intergenerational fairness.

With this in mind, Mr. Trapasso highlighted the importance of building diversified public groups and cross-sectoral solutions. Here, the example of a climate change strategy was given as a way of producing a route for the benefit of future generations. Mr. Trapasso referred to the environmental dimension of sustainability and centred his presentation on green growth. In view of this, moving from trade-offs to complementarities is the greatest challenge, as Member States are consulting the OECD on how to make both growth and sustainability possible, while designing and implementing their policies, especially after the crisis. The OECD's vision, as it was stressed by the EU Commission, is that the interaction between the three dimensions of sustainability would become more evident at the regional level.

The Regional Development Policy Division of the OECD is engaged in a research project "The Production of Renewable Energy as a Regional Development Policy for Rural Areas (Renewables for Rural)". The title is self-evident in the sense that the OECD aims to investigate

whether the production of renewable energies can trigger regional development in rural areas. Understanding this question is considered to be crucial because despite the deep economic crisis, investment in renewable energy has been skyrocketing in recent years and a large part of this investment is taking place where it's possible to install the facilities at sites with low population density, namely rural areas. The OECD defines rural areas according to population density and emphasizes that it is crucial to take rural dynamics into account due to this large investment.

The research questions aim to address job creation, investment and human capital and last but not least the empowerment of local communities:

- Is renewable energy going to create valuable jobs in rural areas?
- Is renewable energy going to enhance the availability of skills in rural areas?
- Is renewable energy going to help the empowerment of local communities? This is a multi-dimensional question and is particularly important to understand the difficulty for local communities to manage a new project; the deployment of renewable energy in the rural areas they inhabit.

Mr. Trapasso noted that this research project is part of a voluntary contribution of the regions and countries involved. There are 15 case studies (i.e. Mid Sweden is a case study region) and 9 institutional partners including supranational (i.e. Nordic Council of Ministers), national (i.e. USDA; Ministry of Agriculture of the United States), and regional levels (i.e. Scotland, Quebec and so forth). The OECD is working in an interactive process through peer reviewing which suggests that if Sweden participates in the assessment of a certain policy in Italy, Sweden can give Italy a suggestion to improve that specific policy so the regions have the possibility to exchange information with

local hosts and improve their knowledge of the host where possible.

The presentation also reflected on the preliminary remarks, stating that renewable energy is indeed a development opportunity for rural areas as energy is almost always produced in locations which have the competence, skill set, resources and the capacity to realize the opportunities. Renewable energy is a multi-sectoral policy and should be considered in regards to its three dimensions; energy, environment and economy. It can be challenging to make this shift however. Therefore, there is a need for a new energy paradigm that respects the environment.

In terms of economies, there should be a consideration of the social acceptance and the concept of ownership. The local community has to be brought in to the discussions of the potential project to share in the real advantages and the benefits.

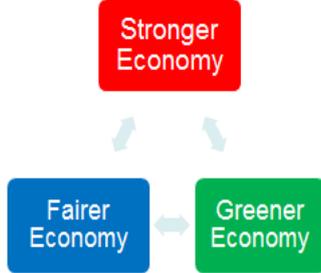
Mr. Trapasso ended his presentation by raising some key issues for further discussion in terms of green growth, where he mentioned the need of a strong law for green revolution that would not force the economic burden of this transition only on a small portion of the community, dispelling the possibility of any real agreement.

Secondly, green growth requires collective action but may also require high transaction costs. This can be especially true at the small scale, where there is a strong potential for biomass production.

Lastly, green growth requires clear policy targets with clear information and strong involvement. It's crucial to inform inhabitants about the projects and take them on board at the preliminary phase of designing the targets.

Better policies for better life...

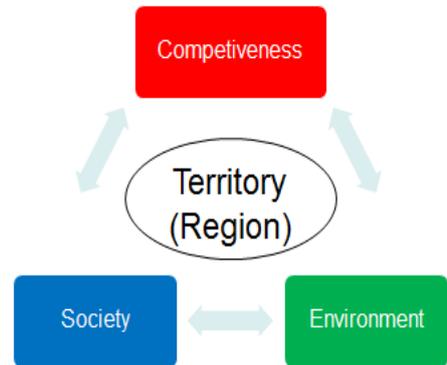
- The OECD's strategy is based on three pillars (similar to EU's 2020)



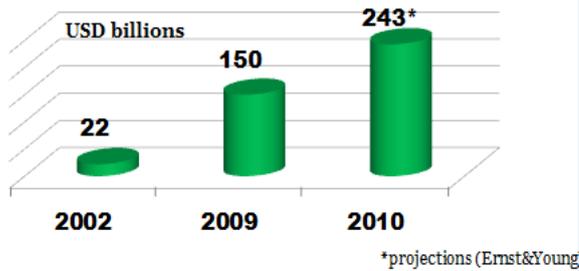
These imply: intergenerational fairness (need to tackle ageing of population) and green growth, among others.



From trade-offs to complementarities



Global Investment is Skyrocketing

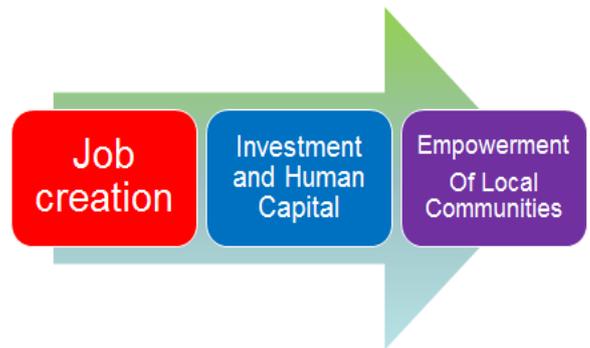


Investment is concentrated in low-density areas (Rural Areas) where installations are located



An opportunity to Rural Development ?

Research Questions



The International Network



9 partners (supra-national, national, and regional levels involved)

15 case studies
Peer reviewing at its best

Partners are directly involved in our research activities.

Feedbacks for "Sustainable Growth"

Issues for discussion (green growth)

- First: strong law – do not affect people's wallet!
- Second: requires collective action (high transaction costs)
- Third: it requires clear policy targets (information and involvement)



Inclusive Growth

Ms Mari Ratinen, Aalto University, Finland

Ms. Mari Ratinen, a researcher from Aalto University in Finland, had a slightly different perspective on what constitutes growth. She gave an example of electricity markets for reflections upon inclusion and exclusion. During her presentation, she challenged the whole idea of business as a subjective construction; whether it is profitable or not.

According to Ms. Ratinen, business is never universally profitable or not profitable; it solely depends on the authority that defines 'profitable'. For instance, these new energy technologies open immense doors for new businesses and it becomes a question of whether the technologies are allowed to be exploited or not.

These basic terms (inclusion and exclusion) are often marginalized in research and in general discussions. The terms of inclusion and exclusion deal with questions such as; who is included in working groups? Who is invited to meetings where policies are designed? Who is called as an expert? How is expertise defined and by who?

Ms. Ratinen specifically elaborated on electricity markets and highlighted the question of who produces and generates heat. Electricity and the necessary utilities are mainly controlled by governments and people are used to having electricity produced through this monopoly. Energy policies are based on preferences and the technologies used.

In practice, this could suggest that instead of having one centralized power station, there could be many different technologies, generators and businesses present.

Ms. Ratinen detailed the on-going research at Aalto University on film-like solar cells that can be applied on facades, construction materials and even on clothing. More traditionally, photovoltaic dyke cells can also be applied on rooftops and different kinds of wind

technologies which can lead to a fundamental shift in business paradigms in this respect. On the other hand, very little change is happening in the electricity market and those changes have been very small in terms of the technologies used.

Further, she raised another question concerning how markets are liberalized and who is included in policy making processes and policy outcomes. Here, the change is analysed in 2 dimensions; first, who makes the policies and second, who gains from them? The presentation was followed by a typology based on these 2 dimensions. The typology has 2 scales (Inclusion in policy outcomes) and (Inclusion in policy processes). These scales were illustrated with some examples from the Nordic countries (Finland and Sweden) and the EU. Ms. Ratinen emphasised the fact that these typologies are quite representative of the changes in general because most countries fall in the categories of private monopolies and ostensible liberalization which implies that even though there would be high inclusion in policy processes, the outcomes are still very exclusive; mainly focusing on centralised electricity generation and large utilities.

In the Swedish example, citizens are included in the policy processes since most of the energy policies are determined during parliamentary elections, but some of the policy solutions are negotiated within governments and governmental working groups. Sweden is in the "low inclusion in the policy outcomes" based on the fact that centralized electricity generation in Sweden is mainly supported and sustained by governmental policies.

Ms. Ratinen concluded her presentation by addressing the problem with inclusion and exclusion issues, saying that no one is totally against inclusion. However, including actors that are from extremely small companies, and then placing them in negotiations against large companies can be very hard in providing them with the kind of representation they should receive.

Inclusion and Exclusion

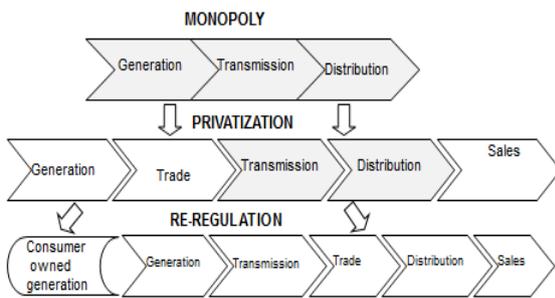


Growth



A? Aalto-yliopisto

Liberalization of electricity markets



A? Aalto-yliopisto

How markets are liberalized: Who are included?

- In policy making processes?
- In policy outcomes?

A? Aalto-yliopisto

Modes of liberalization

Inclusion in policy processes	High	Ostensible liberalization	Re-regulation
	Low	Private monopolies	Distinctive liberalization
		Low	High
		Inclusion in policy outcomes	

Inclusion in policy processes	High	Ostensible liberalization SWEDEN	Re-regulation DENMARK
	Low	Private monopolies FINLAND	Distinctive liberalization
		Low	High
		Inclusion in policy outcomes	

Triventus®



air  star



LOWERGY



Regional Development Conference 2011

Exhibitors

Small & Medium-Sized Enterprises

Triventus: A consulting company working with investment and economics in building renewable energy capability; wind farms, hydro power plants and biogas. The company also provides service and maintenance for different types of renewable energy techniques.

<http://www.triventus.com>

El Farm: After working with electric drive systems for wheel chairs for many years, El Farm determined a need to use steering devices as a sensitive attendant control. The system used in a steering handle may provide a control function and can be re-designed for any kind of goods. The result is a servo-controlled carriage "who knows where the driver wants to go." A smart card ready for new applications, new businesses and opportunities!

<http://www.elfarm.se/>

Mittel: The company operates in the district energy sector, working with the maintenance of the pipe network by improving the technology used in both the new production and repair of leaking joints in the existing district energy pipes. Their business is based on two main systems; one is the TSC System (Two Step Casing) for case welding on pre-insulated pipes and the other is for leak detection and maintenance planning.

<http://www.mittel.se>

JP Vind: JP Vind focuses on wind-energy development in Mid-Sweden and provides services for finding suitable locations for wind energy while carrying out feasibility studies that are necessary to receive permission for development. The company is currently working with 3 big projects; Moskogen with around 50 wind turbines (Åre), Borgvattnet with 30 wind turbines (Ragunda) and Skyttmon with 65 wind turbines (Ragunda/Strömsund).

<http://www.jpvind.se/>

Lowergy: The company uses an old, cheap renewable energy technology in a new way. It

specializes in the supply and installation of the latest renewable energy heating systems from air to air heat pumps, reducing CO2 emissions by 50% and energy bills by 63 % while purifying the indoor air as well.

<http://www.lowergy.com/>

AirstarAB: Airstar has developed new ventilation systems that are easy to install and have low maintenance. The company produces a fresh indoor climate through a filter that renews the air indoors every second hour. Controlling room temperature and air exchange is conducive to a healthy life.

<http://airstar.se/>

Invekta: A biotech industrial and institutional cleaning company, Invekta has the mission to reduce customers' environmental loads by offering intelligent cleaning solutions based on *Bio Gen Active*. The company's vision is based on a smart way to clean without using rough chemicals. They have been investing in natural ingredients that are not harmful to the environment.

<http://www.invekta.se/>

Iso Timber: The company has developed the concept of using prefabricated building blocks based on the natural properties of wood and air for constructing buildings. These blocks contain air pockets that act as insulation and provide good indoor climate, while reducing heating costs. This is an environmentally friendly material which is important from a life cycle perspective and introduces further ease of use due to its flexible structure.

<http://www.isotimber.se>

Absolicon: Having won the "Oscar of the Solar Energy Industry" at the world's largest solar energy exhibition, **Intersolar** in Munich in 2011; Absolicon produces solar concentrators by focusing the light from the sun into a thin line that can obtain very high energy density. The company's specialty is that it is able to utilize this concentration to produce both heat and electricity simultaneously.

Big Companies' Perspective

A New Era for the Forest Industry

Mr. Ola Hildingsson, CEO, Domsjö, Sweden

Mr. Ola represented Domsjö Fabriker, a leading biorefinery company in the Swedish environmental technology industry. The company refines raw forest material into specialty cellulose, lignin and bio-ethanol. In connection with smart and sustainable growth, Hildingsson emphasized the use of alternative and sustainable products while providing examples from Domsjö and also from their product development processes. Since 2000, Domsjö has transformed their pulp mill into a bio-refinery with a slogan "We make more from the tree!"

Cellulose, which is one of the main products of Domsjö, is intended to be used in the viscose textile business as an alternative to cotton. Lignosulfonate is another material produced; it is used in the construction business as a dispersing agent while reducing CO₂ emissions. Domsjö is also working on a demonstration plant for the production of bio-methanol and other biofuels from pulp mill residue material. If successful, these second-generation biofuels will replace traditional fuel in the transport sector, especially for heavy trucks. The EU has approved the Swedish Energy Agency's 500 Million SEK research and development grant to build this large-scale demonstration plant for biofuels at Domsjö Fabriker. Hildingsson highlighted that there would be less consumption of natural resources if we make a shift to alternative and sustainable product development. Accordingly, he gave examples regarding the consequences of the over consumption of water and its impacts by stating the fact that big rivers and lakes such as the Indus Colorado River and Aral Lake dried up due to massive irrigation for food and cotton production. The process of producing cotton is not sustainable and additionally, there will not be sufficient amounts of cotton in the future where we are approaching peak cotton.

Significant amounts of chemicals and pesticides are used on cotton fields where the concentration of the chemicals creates problems.

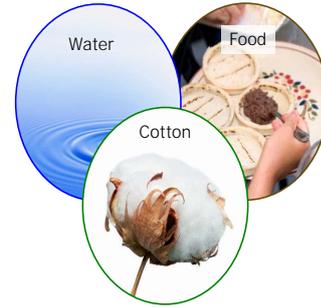
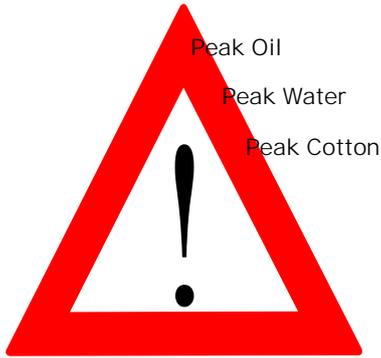
Domsjö's partners in the textile industry in Borås carried out forecast analysis which indicated that currently, the textile fiber market consists of 80 million tons of fibers which can be related to paper and cotton board as major products but eventually there will be a fiber gap. Hildingsson emphasized the role of Swedish forests as part of the solution for textiles with the slogan "*more comfortable than cotton and more beautiful than silk.*" As cotton production is not keeping pace with the demand, increased product development or further development of its properties; viscose is the natural choice. He stated that the potential market is large and product assets are significant; it is renewable, non-toxic and sustainable.

Hildingsson further emphasized that forests can replace cotton fields; in principle, the same product can be produced with the same concept. Even though it can be complicated and expensive; whatever can be made of oil, can also be made of wood. To stimulate this development, there must be incentives, either in the form of tax or some form of premiums. Otherwise, it will be difficult to fill the gap with various products in the future.

For instance, tires can be made of cellulose, which is a better material than steel because of the heat generation in the tires. Cellulose is also a source of thickener in both foods and paints. In brief, cellulose offers great variety of possibilities.

Hildingsson made a remark concerning biofuel's current regulation, noting that it is uncertain in terms of its implementation, time frame and levels. Therefore, the regulation can't support financing of new projects. Hildingsson underlined that Domsjö Fabriker's work is in the format of Triple Helix but he further stated that EU and Swedish government should provide clear rules, since companies' tasks are to handle market and technical risks but large investments can't carry excessive political risk. Tax regulation is a political risk from the company's point of view. Therefore, the company believes that authorities should be aware that companies cannot make such investments unless they have more clear rules.

Competition of Natural Resources



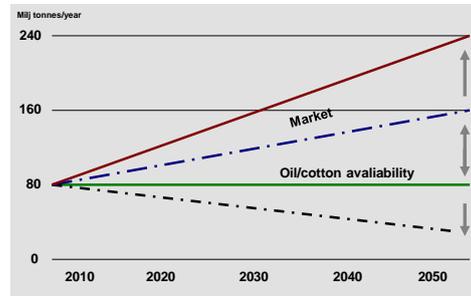
How shall we dress ourselves in the future?

Cotton production consumes over 11% of all chemicals used worldwide for agriculture and 25% of world's pesticides..

It also requires high water consumption in dry areas...



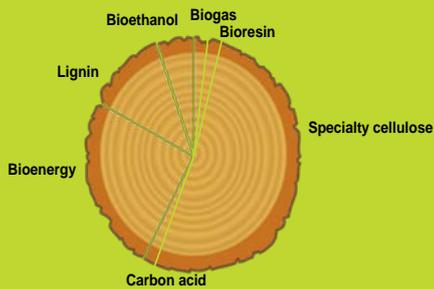
The Fibre Gap



Source: The Swedish school of textiles



Our products



Another contribution to the environment



- 1 kg lignin reduces CO₂ emissions by 20 kg
- The first step in our lignin production (50 KT) reduces CO₂ emissions by >1 million tons
- 1 million tons CO₂ corresponds to ~300 000 Volvo V70 @ 15,000 km/y



Sustainability from the perspective of a large truck maker

Mr. Rolf Willkrans, Director Environmental Affairs, Volvo Group Headquarters

Mr. Willkrans started his presentation by stating the fact that our lifestyle is heavily depended on transportation and the transportation of goods, which creates numerous challenges such as global warming, the depletion of resources and increasing greenhouse gas emissions. When it comes to the depletion of resources, oil is central.

Volvo has invested substantial resources on improving their engines while decreasing their carbon footprint. For instance, NOX emissions (mono-nitrogen oxides NO and NO₂) are 95 % lower than they were 15 years ago.

Willkrans emphasized that the most important strategy for emissions reductions were energy efficiency and alternative fuels. Energy efficiency has been on Volvo's agenda for many years as there has been constant pressure from customers to bring low fuel consumption vehicles onto the market. Volvo has been able to reduce the fuel consumption by 1 to 1.5% per year for the last 30 years. Willkrans stated that Volvo has the aim to reduce the fuel consumption by 10% in the next 10 years as well.

Volvo has been selling hybrid buses for the last 2 years and is planning to sell hybrid trucks in the near future as well. For city buses, there has been a substantial improvement in fuel consumption which corresponds to a 30 - 35 % decrease. The next step for the buses will be plug-in hybrids; meaning they can be charged at the bus station, further lowering the fuel consumption.

Willkrans mentioned that on the truck production side, it is not possible to achieve a high reduction in terms of fuel consumption, but that a reduction of 15-20 % is realistic.

Volvo has been testing longer trucks for energy efficiency as well. A truck that is 30

meters long can carry 65 tons of goods with a total weight of 90 tons. This approach would reduce CO₂ emissions by 20 %. He stated that no single alternative fuel can supply the total need since the resources are limited. Furthermore, many countries promote a secure fuel supply by using their local fuels.

Volvo has different fuels on different markets. For instance, 4 years ago, the company revealed 7 trucks running on 7 different types of renewable fuels to demonstrate their research agenda. This demonstration has started a debate both internally and also with Volvo customers. The outcome has been that one of the alternatives; the combination of biogas + biodiesel is a commercial product today. Other alternatives include Volvo FM MethaneDiesel and Volvo Bio-DME truck.

Willkrans explained the process behind these alternatives starting with MethaneDiesel, which is burned with the same energy efficiency that is present in a regular diesel truck. Volvo liquefies the biogas or natural gas, which guarantees a good driving range. Accordingly, Volvo reaches a completely new customer set and long haul applications (long vehicles). This product is sold in Sweden and in the UK.

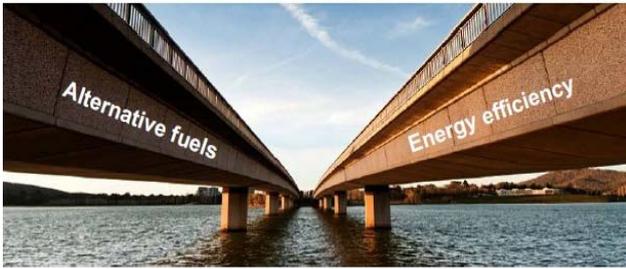
One problem with liquefied fuel/gas is that there is not any infrastructure in place as of today. While there is one filling station in Gothenburg at the moment, this number will climb up to 4 within a year nationwide.

The other alternative fuel is Volvo Bio-DME which is completely new and has one of the best prosperities, as stated by Willkrans. It is energy efficient to produce and it is a diesel-type of fuel which doesn't give any soot emissions. It was noted that this product is currently being tested together with Volvo's customers for a period of two years. The decision will be made about the future of this product based on the outcome of the tests.

He underlined that small and big companies need to cooperate during new fuel tests to support the use of alternative fuels in the transport industry. Biomass has the possibility to play a big role for fuel in the transport industry

and as such, any region that has biomass should invest in it. Willkrans concluded his presentation by stating that energy efficiency is the most important issue in the whole chain of production of the fuels and the utilization of vehicles.

Volvo Trucks' strategy



Volvo Trucks
Environmental Affairs
4 2011-06-07



Hybrids - a Volvo Group approach

- Revolutionary fuel savings
- Reducing CO₂ emissions
- Profitable for operators
- Favorable for drivers
- Suitable for all vehicles in the Volvo Group
- Leading in the development of future technology



Volvo Trucks
Environmental Affairs
5 2011-06-07



Long vehicles (e.g. One more pile)

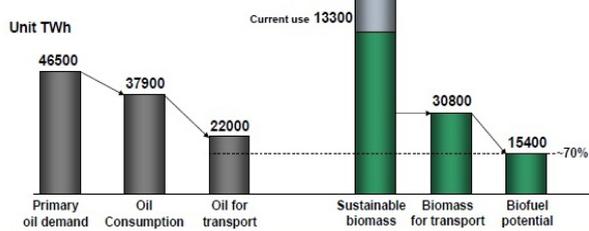


Volvo Trucks
Environmental Affairs
6 2011-06-07



Long term biofuel potential on World basis

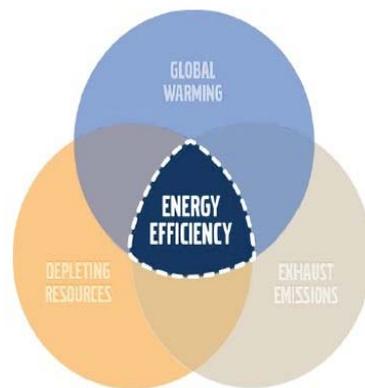
- If 50% of the sustainable biomass potential is used to produce biofuels, roughly 70% of current demand would be replaced.



Volvo Trucks
Environmental Affairs
12 2011-06-07



Energy efficiency in focus



Volvo Trucks
Environmental Affairs
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Promoting Growth-Regional best practice examples in Europe

Highland & Island, Scotland, UK

The Scottish government has a national economic policy for six key sectors, among which energy is one of the most crucial. Renewable energy is considered to be imperative, especially in rural part of Scotland. Therefore, at the heart of the Scottish government policy lies the re-industrialization of Scotland through energy, which is perceived as the biggest opportunity for Scotland to become a serious global industrial player.

In the Highlands and Island, renewable energy is based on what inhabitants used to perceive as problems of the rural area; strong wind, lots of waves and a lack of trees due to the strong winds.

The north western part of Scotland has been a classic Northern European problem region for the past 50 years; suffering from chronic depopulation and focusing mainly on primary industries; fishing, farming, forestry and some extractive industries. During this period, two important developments took place. Just after the Second World War, a strong political decision was taken to use the energy, particularly hydroelectricity, as a catalyst to provide the infrastructure for the region. The state body worked hard on this issue and eventually the population in the region was stabilized. Around 1970, when oil was discovered in the North Sea, the next economic and energy boom started to take over, allowing the Scottish Highlands to become a large fabrication and manufacturing hub. Subsequently, large rings of oil platforms were constructed where the oil was pumped to shore. This industry was halted in 2000 and the fabrication industry primarily went overseas to China. However, this transformation left behind oil and gas infrastructure, along with very large brownfield industrial sites, which had been used to build other oil platforms. Subsequently, the hydro industry took off again and starting in 2000, as in many parts of Europe, on-shore wind

gained importance, moving the Highlands into a renewables revolution.

Crucially, Scotland now faces a new major energy revolution that has two parts; as on shore wind becomes more difficult, the Highlands is moving off-shore. The problems of this rural region once resulted from the wind that complicated other activities, but in recent years, this problem has turned into an opportunity, with the off-shore exploitation of wind as energy. Scotland has focused on installing about 8 gigawatts of off-shore wind capacity, a considerable amount when considering that Scotland's peak energy demand is 6,6 gigawatts. This means that through off-shore wind, Scotland is able to produce, more energy than the country actually consumes.

The Scottish government aims to have 100% of the national energy demand met by renewable energy by 2020. Wave and tidal energy constitute a brand new industry, which can drive Scottish regional economic policy forward. The objective is to produce twice the amount of electricity the country actually consumes and sell the rest to England, Denmark and Germany. Potentially, Scotland can host 10% of Europe's wind regime as well as 25 % of all Europe's tidal capacity.

Currently, government policy in Scotland is based on cluster activity around a range of ports, harbours and industrial sites which are considered to be good options for re-industrializing the North of Scotland through energy. From a regional development aspect, this is an opportunity to capture the operations and maintenance activity associated with these renewable energy sources and to foster self-sustaining rural and peripheral areas in Scotland. Another goal is to make Scotland an international test centre for wind turbines and to support the companies working on wind tech financially as well. Currently, there are 15 devices being tested on Scottish waters. The plan is to

have 1.6GW by 2020 while creating employment and intellectual assets as well.

Flevoland, The Netherlands

Created 25 years ago, Flevoland is the youngest province of the Netherlands. Home to 390 000 people, the Flevoland territory was reclaimed from the sea from the 1940s to the 1960s. Covering 2253 km², the area is 5 meters below sea level and surrounded by dykes. The land is rich in wind and water.

Currently, Flevoland is in a period of transition in terms of wind energy. Smaller wind turbines are being replaced by fewer larger ones located on wind farms. This is a complicated process as the small turbines are owned by farmers. The plan is to turn these infrastructures into a shareholders construction.

As a small region, Flevoland works intensively to cooperate with other regions in Europe. The region has been leading a sustainable energy project called MORE4NRG for the last 2.5 years in which VesterNorrland and Norrbotten from Sweden also participate. The project consists of two pillars; peer reviews and the exchange of good practices. It aims to help the partners in improving sustainable energy policies. During peer reviews or so called the 'mentoring phase', energy sectors from different regions visit the host region and assess the energy situation, identifying its strengths and weaknesses. After this review, they come up with recommendations on how to establish or improve sustainable energy policies. For instance, this process has led to the integration of a section on sustainable energy in the regional development plan in Gabrovo, Bulgaria, which did not have any plan on sustainable energy before. The second pillar is built on exchanging good practices where different types of sustainable projects are discussed from various regions.

Flevoland has applied for a new INTERREG IVC project called *REGIONS4GREENGROWTH*, with an extended partnership (14 partners). The aim is to stimulate investments in renewable energy and energy efficiency since finances often act as bottlenecks for these kinds of developments.

Flevoland will bring in *DE-On* as a good practice from Flevoland; a Dutch acronym for a sustainable energy development company established in Flevoland. The company is a public-private partnership that includes regional and local governments and aims to boost investments for renewable energy and energy efficiency. The public side is represented by a housing corporation and an energy transportation company, while the private side is represented by a waste processing company. Banks tend to avoid financing for individual projects since they often assume that the projects are not profitable enough or too risky to invest in. To avoid this dilemma, DE-ON has proposed a portfolio of projects; where the more profitable projects can compensate for the less profitable ones and a low return of investment would not be a problem. Flevoland has high expectations for this new instrument and aims to achieve 400M € of investment in the next 10 years while creating 4000 jobs. This project will not only highlight the environmental aspect of energy but will also give an economic opportunity to invest in *renewable energy and energy efficiency for creating employment*.

Flevoland also promotes three of its green innovation products; clothes made from the stinging nettle and several eco product facilities made from algae. The final example is from the regional government regarding their commitments in engaging in green practices.

The use of Algae

The company *AquaPhyto* uses advanced biotechnological method to ecologically balanced cultivation of algae which are used at eco cleansing facilities. While some of the algae is used for food, animal feed, personal care products and cosmetics, the rest is used at the Schiphol airport where it provides a solution for the water used for de-icing the planes. Schiphol airport is not allowed to dump the water into the channels anymore due to the chemicals in it. They have discovered that the algae can decompose the de-icing water, leaving a purified and oxygen rich water.

Clothes from the stinging nettle

The *stinging nettle* is considered to be a good alternative to ordinary fiber used for producing

clothes and is offering satisfactory results in the Netherlands.

Paperless meetings with Ipad

Flevoland is neither the inventor nor the producer of the Ipad but the government has realized this green innovation potential within their regional platform, where all the parliamentarians have received Ipads and have started paperless meetings. Besides the environmental benefits, 125.000 Euros are saved annually.

Lower Austria, Austria

Austria is centrally located in the heart of Europe. Home to 1.6 million people, Lower Austria is one of the nine federal states in Austria and forms the largest territory in the country. 40% of Lower Austria is covered by forests, 36 % of the land is dominated by agriculture, 11% is grassland and the remaining area is used for industry, roads, building and construction.

There are ambitious goals for the energy supply in lower Austria. As far as consumption is concerned, typical European patterns prevail. Lower Austria consumes 241.762 TJ of energy produced from natural gas, oil and other sources. The interesting point is that %70 of this energy is produced in the country from diverse range of alternative energy sources. The energy goals recently adopted by the provincial government indicate that 100% of electricity and 50% of total energy consumption is to be based on renewable energy in 2015 and 2020, respectively.

Lower Austria is rich in water and for that reason a large portion of its energy requirement is supplied by hydropower, while wind has gained importance in recent years. Besides that, photovoltaics, biogas and biomass are also used for electricity.

The goal of using 50 % renewable energy by 2020 will require a dramatic reduction in fuel consumption. The new plan also includes increasing wind power by upgrading existing wind power plants and developing new habitats. This is due to the fact that it's becoming increasingly difficult to find new sites for wind

power besides inhabitants are concerned about noise pollution and the shadow. Small scale hydropower plants are in the same situation, as there are no new sites available. Here, it is worth mentioning the advantage of PVs, as are they are almost invisible and upgrade the look of roofs as well.

The energy concept in Lower Austria is based on the execution of a comprehensive climate and environment protection plan which emphasises the efficient use of resources, secures the living and economic condition and encourages widespread participation and cooperation. In terms of the concrete implementation of the plan, the promotion of renewable energy has been realized through targeted subsidies and incentive programs. Housing subsidies are used as tools to save energy especially in new buildings, passive houses and restoration projects. Boiler exchange and solar energy programmes were also introduced. Additionally, there are educational programs in schools and targeted trainings for raising awareness in the public sphere.

Green Highway - A fossil fuel free transportation corridor across Scandinavia, promoted by the cities of Sundsvall, Östersund and Trondheim

Along the Green Highway route, the cities of Sundsvall and Östersund in Sweden and Trondheim in Norway aim at providing residents and visitors with electric charging and bio-fuel facilities for their vehicles. The objective is to become a fossil free transportation corridor which will contribute to generation of business opportunities and sustainable growth, reduce the climate impact and increase the attractiveness of the region.

Sundsvall, Östersund and Trondheim have cooperated for many years to enhance collaboration and to increase the region's profile and competitiveness within Scandinavia, as well as EU. In the recent years, the three cities have cooperated within an Interreg project regarding the Green Highway Project.

Knowledge and experience exchange, information and networking are keystones of the project, while more than a hundred various activities have been undertaken. For instance,

Trondheim is renowned for its electro-mobility development, while Sundsvall and Östersund provide know-how in biogas production for vehicles.

Apart from these three cities, there are also a number of companies and organizations involved in the development of a fossil fuel free transportation corridor. The seven energy companies involved in the project have offered great input, and provided electric charging stations along the route.

The Green Highway currently provides a green corridor for people driving their eco-friendly vehicle for 450 kilometres without having to depend on any fuel other than ethanol or electricity. The biogas produced from sewage sludge in Östersund and Sundsvall offers another option for the eco-friendly driver. In Trondheim, there are already more than one hundred charging points, while Östersund has around thirty and Sundsvall is planning for an EV venture.

As the infrastructure for electric-drive vehicles is already located along the corridor, the Green Highway has also become one of the two test routes aimed at facilitating electric-drive traffic between Sweden and Norway. This project was initiated by the countries' infrastructure ministers respectively and is coordinated by their national Energy Agencies. There is also local infrastructure for electric-drive vehicles. The Green Highway has also

spawned a number of spin-offs. For example, Northern Europe's first quick charging station was situated in Östersund. Other quick charging stations are planned all along the Green Highway, in Norway as well as Sweden. The City of Östersund and Jämtkraft have received funding from the Swedish Energy Agency for promoting electric-drive traffic.

The two Biogas producing cities; Sundsvall and Östersund are looking into a joint venture for larger scale production. Should the project be launched, the cities will produce 4 million Nm³ of biogas annually. Trondheim is looking into the prospects of local production of biogas for the city's 170 buses, which are currently running on LNG.

Biogas and electricity are vital to the Green Highway's aim of creating a fossil fuel free transportation corridor. To support the transition, a Master Plan has been developed which includes advice on passenger and freight traffic and on IT, bicycle, pedestrian, air, railway and waterway traffic, as well as on how to organize work, how to communicate and aspects of export and commercialization.

There is also a new project on the way called Green Highway – a green swath of growth. The budget is 26.7 million SEK – 2.9 million Euros and it aims to develop student amenities in urban development and also develop tourism along St Olav's Pilgrimage trail.

Appendix

Declaration from the conference:

Climate change is a fact and requires rapid action. It brings along many questions, many threats and many concerns. So do the global financial crises. Those threats and concerns are interlinked with one another and they do also bring forward opportunities for all regions and companies, not least the small and medium sized businesses, to contribute to a better situation.

In the Europe 2020 Strategy the European Union states that:

- 75 % of the population aged 20-64 should be employed.
- 3 % of the EU's GDP should be invested in R&D.
- The "20/20/20" climate/energy targets should be met and an increase to 30 % of emission reduction is desirable.
- The share of early school leavers should be under 10 % and at least 40 % of the younger generation should have a tertiary degree.
- 20 million less people should be at risk of poverty.

These targets cannot be dealt with one by one; they are interlinked and mutually dependent of each other.

Secure, sustainable and competitive energy supply represents one of society's main challenges. Limited supply, increased global demand and the imperative to cut emissions have led to a new realisation of the need to move towards a low carbon economy based on renewable energy and clean technologies that, at the same time, forms a basis for a new business sector fully in line with the Europe 2020 Strategy – Green Growth in practise!

In Östersund, app. 200 delegates, politicians, officials and businesses, from all over Europe, and beyond, assembled to discuss how renewable energy and clean tech can contribute to the targets set out in the Europe 2020 Strategy and beyond. The following has been

agreed upon as a message from the RDC2011 conference:

RDC2011 reiterates from the first Regional Development Conference in July 2009 that:

(1) It is definitely time to bring renewable energy, clean tech and regional development together in order to both effectively hamper climate change's causes and effects, while at the same time achieve an economic, ecological and social sustainable development. Furthermore, this is essential in order to elaborate new and efficient renewable energy sources and clean technology whilst exploring all potentials for regional growth and public health. It is fundamental that the business and job opportunities that may be revealed from these developments will be utilised to their full potential – and thus, creates an eco-efficient economy.

(2) Cohesion Policy is an important policy for the EU and the Structural Funds are imperative to support efforts in all EU regions – not least in less prosperous regions and in regions with specific geographical and social features.

This policy has to take on an even more demanding responsibility in the field of energy, climate change and jobs in line with the Europe 2020 Strategy, especially when it comes to realizing the potential of developments in SMEs.

(3) Rural and peripheral areas have an advantage in producing renewable energy, developing small-scale technical and social solutions involving local inhabitants in local projects. These advantages for regional and sustainable development can be increased by providing resources and regulations well adapted to local conditions.

(4) Every citizen of the EU should have equal access to these efforts. One objective should be to enhance the labour market participation of

women and to promote women in entrepreneurship, innovation and technology.

(5) Solutions to the issues of climate change and regional development can only be achieved by the involvement of local and regional governments and by the co-operation with SMEs.

In addition, the conference, RDC2011, agreed on the following message:

(6) The concept of Green Growth, i.e. a concept that entails the importance of economic development while avoiding unsustainable pressure on natural assets, must be realised and accepted at all levels. In addition it must be made clear that regions not moving towards a Green Economy are likely to lag behind.

(7) The debate on the next financial perspective of the EU must take into consideration the need to invest in Green Growth in all European regions and that Cohesion Policy has the structures, through the regional structural funds programmes, for an efficient implementation of an adequate policy.

(8) European goals on climate change need to be more ambitious, e.g. a 30 % Green House Gas emission reduction, should be retained for the benefit of the environment and as a pressure on the development of new products and services, within the private and public sectors, benefiting the combat towards climate change.

(9) Green Public Procurement schemes must be made much more effective as a tool for innovative testing of new products and services, for environmentally enhanced and local solutions.

(10) Co-operation between the public and private sectors must be enhanced so as to make use of their unique skills - the public sector in defining societal needs and the private and civil society sectors to come up with efficient and economic viable solutions.

(11) There is an increasing need for (risk) capital and adaptation of state aid rules to be able to obtain tangible results from entrepreneurial efforts. Not least the step from “the good idea to commercialisation” needs attention.

This message will mainly be delivered to decision-makers at EU and national levels. It is imperative for all stakeholders; regions, local authorities, academy, private sector and NGO's, to contribute the achievement of a better situation concerning climate change, energy supply and regional development. The progress should be assessed at the Regional Development Conference 2013.



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