THE GREATEST STORY NEVER TOLD

WHITEPAPER FROM "TAKE LEAD",
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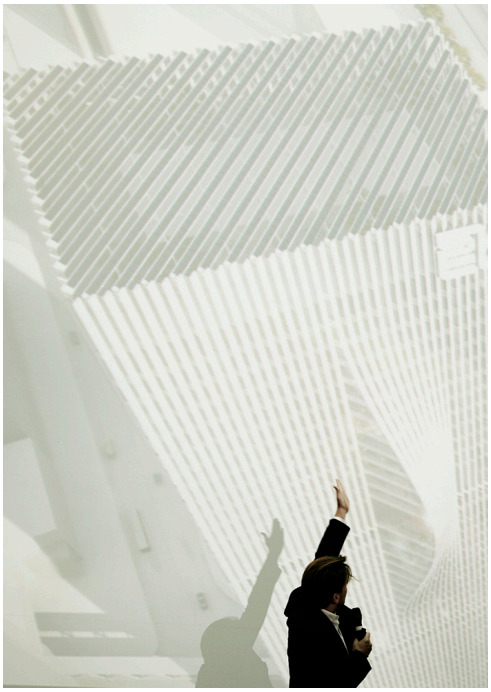
GREEN GROWTH LEADERS









Content

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Founding Partners

Mondaymorning DONG energy Realdania Climate Capital Copenhagen

Strategic Partners

VELUX Vestas Managing Risk DNV

Introduction

Mapping the potential of the green economy

On October 12th and 13th, 2011, 576 sustainability experts and leaders from more than 20 countries embarked on a journey into unknown territory.

Convened in Copenhagen by the Green Growth Leaders, they spent two days in workshops and at roundtables, working together to understand and describe how a new and more sustainable economic model can improve our lives and societies.

Simple as it may sound, this was in many ways a pioneering effort.

Our understanding of the term "sustainable growth" – i.e. how can improving the environment help grow the economy – is still in its infancy, as documented in the reports prepared for the event[1].

Mapping the potentials of a green economy is even harder, but nevertheless necessary if we want to create the enthusiasm and ownership needed to accelerate the transition. So this was what we tried to do.

The following pages capture this effort. They represent only part of the picture, but they are an important first step along the way – and the collective knowledge of a large and important multi stakeholder expert group, from architects, economists, anthropologists, technologists, policy makers, designers, urban planners to NGO's, diplomats, ministers and communicators from many regions around the world, participating on behalf of a far reaching network of organizations, institutions and corporations . Most of the delegates were experts in a variety of sectors and functions, many of them also leaders and decision makers.

The purpose of the excercise was to qualify the global discussion on green growth and sustainability and share insights and best practice.

The whitepaper is formally handed over to the OECD, the EU Commission for Climate Action, the C40, Eurocities, the Danish Government and the UN Global Compact in preparation for the Rio+20 Summit, but it is our hope that it will also inspire colleagues around the world, sharing our mission.

We would like to take this opportunity to thank our partners and all delegates who contributed to the success of Take Lead and the collaborative wisdom that we share in this whitepaper.

In coming years, the Green Growth Leaders will build on this platform – and we invite you to do the same.

[1] The following reports were issued prior to Take Lead:

- "Shaping the green growth economy" (April 2011). A desk study into the evidence behind green growth (prepared by The Pathways Project at UC Berkeley)
- "From Religion to Reality" (August-September 2011). A number of case studies on green growth economies (prepared by The Pathways Project at UC Berkeley)
- "Beyond Green: The socioeconomic benefits of being a green city" (October 2011). A study on green growth projects in Copenhagen (prepared by Damvad)
- "Guidebook to Sustainia" (October 2011). A scenario report on the sustainable future in 2020 (prepared by Monday Morning).

Green Growth Leaders

"Take Lead" was convened by Green Growth Leaders, a multi stakeholder international high level partnership, established in 2010, consisting of:

Alice Madden, Wirth Chair, University of Colorado

Anders Eldrup, CEO, DONG Energy

Lord Anthony Giddens, Professor, London School of Economics

Bjarke Ingels, Founding Partner, B.I.G.

Bjørn Kj. Haugland, COO, Sustainability and Innovation, DNV

Ditlev Engel, Chief Executive Officer, Vestas Wind Systems

Erik Rasmussen, CEO and Editor-in-Chief, Monday Morning

Flemming Borreskov, CEO, Realdania

Frank Jensen, Lord Mayor, Copenhagen

Dr. Jacqueline McGlade, Professor and Executive Director, European Environment Agency

Dr. James L. Sweeney, Professor at Stanford Institute for Economic Policy

Jeffrey Heller, President and Founder, Heller Manus Architects

Dr. John Zysman, Professor of Political Science and Co-Director of BRIE, University of California, Berkeley

Dr. Katherine Richardson, Chairman, Danish Commission on Climate Change Policy & Professor and Vice Dean, Copenhagen University.

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Dr. Plutarchos Sakellaris, Vice President, European Investment Bank

Ranbir Saran Das, Founder & Managing Director, Fairwood Group of Companies – India & Singapore

Ray Pinto, Government Affairs Director for Environment, Microsoft Europe, the Middle East and Africa

Dr. Sean Randolph, President, Bay Area Council Economic Institute in California

Dr. Soogil Young, Chairman, The Presidential Committee on Green Growth

Yvo de Boer, Special Global Advisor, Climate Change and Sustainability, KPMG

The greatest story never told[2]

Executive summary

Today we are seeing the dawn of the sustainable economy. It is emerging in dynamic cities, competitive companies and vibrant economies all over the world. It is improving quality of life for citizens. It is making our communities more livable. It is creating prosperity and new business opportunities – and hope.

It is *the greatest story never told*.

While we have struggled to understand and address the complexity of the global crises, a multitude of encouraging examples of sustainable practices have been successfully implemented around us. On a daily basis they are demonstrating that economic prosperity, social welfare and environmental responsibility can go hand in hand. That sustainability is about people, society and everyday life.

In coming years, we must follow their lead. We must learn, share, replicate, inspire – and be inspired. We must work together to discover, discuss and understand the nature of the sustainable economy - and how we collectively can unleash its potential for society as a whole.

We, 576 leaders and experts from 21 countries, have met in Copenhagen, Denmark, to take this leadership forward. Over the course of two days, we have examined the evidence behind "green growth", based on research by leading scholars, and we have scrutinized pathways and solutions.

Evidence: The potential awaiting us

We have seen a large body of evidence that businesses, civic society, cities and countries are making a positive difference and creating real growth, e.g. how

- buildings, where we spend 90% of our time, have huge potential for both lowering environmental impact and improving our quality of life. Sustainable buildings with healthy indoor climate, whether retrofitted or new build, can increase learning ability amongst youngsters by 20%, enhance productivity in our workplaces and improve livability in our homes.
- green cities are healthier and more livable, efficient and innovative. Green projects in a city like Copenhagen create economic and social benefits in addition to environmental, e.g. bicycling that annually saves 43 million USD due to less congestion and fewer accidents. For every kilometer traveled by bike instead of a car the city saves approx. 7 USD cents.
- wind energy creates predictability and economic benefits such as stable prices, secure energy supplies, and significant new spin off businesses. Wind energy is an abundant and therefore increasingly competitive energy source that can fuel society's growth.

[2] This text was developed and adopted in Copenhagen on 13th of October 2011 as the overriding message from "Take Lead" under the headline "The Copenhagen Manifesto on Sustainable Growth". It was presented to the EU Commission for Climate Action, the OECD, the Danish Government, the C40, Eurocities and the UN Global Compact in preparation for the World Summit on Sustainability, Rio+20.

- intelligent energy networks benefit society through optimization of energy use and avoided costs of overproduction, and at the same time enable new and additional markets and business models. The potential for smart grid equipment alone is estimated to reach between 15 and 31 billion USD in 2014.
- bio technology can turn waste and biomass into high value products such sustainable chemicals, energy and materials that have hitherto been based on oil.
- there is an emerging understanding of the positive synergies between solutions within welfare and sustainability. In the healthcare sector digital solutions can e.g. improve the treatment and safety for patients and reduce transportation.

These are a few of the examples that form an image of a sustainable society in the near future, that is more efficient, more innovative, more collaborative, healthier, cleaner, safer - and at the same time wealthier. This is the future we can choose. To start with, we can multiply these examples of best practice.

We have come to see that creating the sustainable economy is a historic systems transformation akin to those of the railroad and the internet and that the benefits will go far beyond the cleantech and energy sectors themselves. True value creation comes not only from replacing “brown” with “green”, but in the new markets, jobs, products and services that more efficient integrated transport systems, intelligent energy systems, houses and cars will foster.

In a time of economic crisis, this is a promising way to grow the global economy and increase prosperity for all.

Leading by example

Leaders can and should lead by example. Leaders should re-think business models to create value in a sustainable economy. Leaders can accelerate the transition by experimenting and encouraging the entrepreneurial spirit, by setting up public-private partnerships, by sharing information, by enabling people to make sustainable choices. By greening urbanization, by committing to clear and ambitious goals. Governments must enable cities to become platforms for innovative systemic solutions that unleash the green growth potential to the benefit of society as a whole.

Together, we have produced a set of guidelines for leaders and a comprehensive catalogue of examples (see below) on how to shape a sustainable economy in order to underpin this manifesto. Together, we dare to lead.

The new narrative

First and foremost, we have assessed the potential and the benefits of the transition for society as a whole, because we strongly believe that in order to accelerate it, we need to put people first. What promotes change is a vision of where to go; presenting consumers, the electorate and the media with a tangible, compelling image of what the world would look like if we unleashed the potential. The green economy, however, is not a goal in itself. It is a means to achieve a better tomorrow and higher quality of life for people all over the world.

With effective and qualified communication we will succeed. Therefore we have developed a set of Principles for Succesful Communication (see below) – and we have worked to create a green communication role model, an example of a new narrative, that can move hearts and minds; Sustainia[3], a fact-based scenario of how our world could look in 2020 if we implemented the green solutions at hand.

We met in Copenhagen to give this vision form and shape - but work has only just begun. We invite you to contribute with your expertise and lessons learned and to share our positive spirit in this endeavor.

We call upon you to work with us, act – and take lead. Accelerating the emerging sustainable economy is a challenge we can only meet in common.

We pledge to make our significant contribution. We are already changing our business models and strategies as organizations and institutions to accelerate the transition, and as profitable businesses, vibrant cities and competitive economies we testify to the fact that there is no contradiction between sustainability and prosperity.

The sustainable economy is emerging around us. It is our choice if we want to embrace it – and turn it into *the greatest story ever told*.

[3]http://greengrowthleaders.org/uncategorized/guide-to-sustainia/

Communicating green growth and sustainability[4]

Our efforts to get the message across have so far failed – and we are all facing the same communication challenges. At "Take Lead", experts developed 9 principles that will improve the storytelling and identified the common barriers for communicating green growth and sustainability successfully.

Without inspiring and clear communication we will never have green growth. Transparency, dialogue, information and storytelling are important tools for change, but until now communication efforts have largely failed to motivate consumers and citizens to embrace the green growth economy.

What is needed is not more communication, but better communication. By following the below principles, stakeholders – whether policy, business, science or civil society – can create a much stronger and efficient storytelling.

9 Principles for successful communication

1. **Paint a positive picture/vision:** Be clear about where you want to take people. Communicate the desirable target – the benefit of chosen your product and/or solution. VELUX does not sell windows – they sell improved indoor climate; Philips Lighting does not sell light bulbs – they sell improved atmosphere at home and improved felling of safety in cities. Sell the dream by communicating the inspiring, desirable and positive vision.
2. **Use new words that inspire to action:** Do not use the term sustainability, carbon friendly or clean tech if you can avoid it. To many people they don't mean anything. Instead stress the benefits, the unique selling points or use other words like better quality, responsibility, accountability, improved quality of life, healthier etc. Use words that are inspiring – minimize the use of dates, percentages and figures when selling a desirable product. People want desirable things[5]. **Make it relevant and achievable:** A vision without a plan is just a dream. Make sure you provide your customer or your employee with very clear actions and/or goals they can then carry out – make it relevant, understandable, important and achievable. Keep it simple and possible to overcome. Demonstrate by example[6].
3. **Know the people you are talking to and talk TO them – not AT them:** People do not like to be told what to do or talked down to. Never preach. Inform and engage in dialogue. Be sure you know who

[4] Findings from expert's workshop on October 12th at Danish Architecture Center, moderated by Lucy Shea, Futerra, and Laura Storm, Monday Morning. Participants were 49 experts in communication, journalism and media. The workshop was prepared in collaboration with the members of Project Green Light; http://greengrowthleaders.org/project-green-light/

[5] This principle is also founded on qualitative research carried out by Futerra Sustainability Communication ("Words that sell" and "Sell the Sizzle") that stresses how people cannot comprehend dates, figures and numbers and that the average global consumer do not understand the words used to communicate climate change and sustainability issues.

[6] This is based on discussion in the workshop, however, a lot of the literature on sustainability management stresses how a key criteria for success when transforming you business to a more sustainable one is to make it very concrete to employees what their role is and how they can overcome the new challenges (see Esty & Winston (2006) Green to Gold or Werback (2009) Strategy for Sustainability)

you're talking to and target your communication towards them. Know their desires and needs, concerns and skepticism.

4. **Be honest, open and transparent:** Never tell half the story. Be honest about your products, your strategy, your situation. Be transparent and never hide important information. People can understand that we are not perfect YET in all areas – they understand it is a transformative process. Be honest about that and admit areas where you can improve. This will make people listen and trust what you're saying and claiming[7].
5. **Stress the business case:** Stress the benefits, advantages and the savings. Many customers believe that cheap products cannot include environmental considerations, and that products will be more expensive if they become environmentally friendly. Push your messages on the business case.
6. **Put your money where your mouth is:** People are generally skeptic towards "green strategies". Never over claim and make sure that you, throughout your value chain, are doing what you say you are doing. Simply, practice what you preach.
7. **Prioritize storytelling and your relations to media:** Tell stories! Use the rule of thumb: If you can't translate it into a bedtime story for your children then the media probably won't buy it[8]. Abstract nouns are not stories that will sell. A good story often has a dark side or a potential negative consequence. If the story you are selling is too positive – be sure that the journalist will look extra hard to find the negative story. Might as well be honest and present it yourself as it allows you to better control it.
8. **Make sustainability fun and desirable:** Many falsely believe that sustainable products are of lower quality and ugly to look at. Remember you are marketers selling a desirable and attractive lifestyle – you are not selling moral obligation or bad conscience. Make it fun and attractive – not boring and complicated. You are selling an improved quality of life[9].

Common barriers for successful communication

Communication and sustainability managers in all organizations are facing a number of common challenges that prevent successful communication of sustainability messaging. Understanding the barriers and obstacles is often a step towards overcoming them.

The below barriers was identified by communication managers, journalists and experts on communication:

- **It is not a priority in organizations:** Despite its importance, communication of sustainability issues is not a priority in many organizations. They may have a communications department; however, the understanding of the importance to be proactive on this issue and communicate internally and externally is rarely there. Furthermore, the sustainability department is often not funded properly

[7] This principle was discussed in great detail and came up after a presentation by British journalist Isabel Hilton that encouraged companies to tell everything as it would come back and hit them hard if journalists started digging. Journalist's become skeptic if the stories the companies are trying to tell are too rose-painted. Honesty creates respect.

[8] This principle was proposed by Journalist Isabel Hilton who has previously worked for the Guardian, BBC and The Financial Times. If they couldn't immediately see a great story in the press release they wouldn't bother.

[9] The discussion used examples such as BIG's "Hedonistic Sustainability"

and therefore the sustainability managers don't have the possibility of communicating extensively about their activities and strategies. [10]

- **Hard to differentiate external communication strategy from other companies/organizations:** Many companies found it challenging to find their niche in this – what was their unique approach to tackling sustainability or in what regard were their sustainability strategy different from others. How could they make people care for their approach – and how could they stand out if most companies suddenly had a sustainability strategy, an annual sustainability report etc..
- **Many see this as a complex and boring topic:** The topic of sustainability, climate change and green technologies are very complex to understand and many companies find it difficult to translate the complicated language into clear and inspiring language. It is not perceived as an urgent problem and is difficult to relate. Furthermore, many people are suffering from climate change fatigue – they are tired of hearing about it and do not find the technologies and/or data interesting enough to hear/read about.
- **Lack of knowledge about key stakeholders: H**ow do you differentiate your sustainability communication to cater to all levels of understanding and needs? Global companies also have the challenge of tailoring their communication to different cultural groups. Many participants at the workshop believed that solid data on consumer's attitude towards these issues were heavily lacking.[11]
- **Mistrust and skepticism among consumers:** Due to many cases of green washing many consumers have become skeptic towards companies trying to sell them green products. There has been a lot of misinformation and for the individual consumer it is easy to be misled[12].
- **Resistance towards change:** As is often the case in change and transformation processes the employees is a key player when making the change happen. Many companies and organizations have experienced initial resistance internally to the new sustainability strategy. Scientifically proven, people aren't too keen on new organizational changes[13]. Motivating employees to go the extra mile and change their routines are often one of the main reasons why strategy initiatives fail. On top of that neither employees nor consumers are motivated through fear and doomsday scenarios as has been an often used tool when marketing green products.
- **Where's the business case?** Many pointed towards the lack of clear financial arguments for choosing sustainable products or deciding to incorporate a sustainability strategy. They need clear

[10] The lack of C-level commitment is the most common barrier in many organizations and many of the experts in the workshop could draw on their own experience and examples of the sudden change that could happen when a CEO became engaged in the agenda.

[11] Global scientific research on target groups within sustainability and climate change is lacking, however, Yale Project on Climate Communication have identified 6 key "audiences" in the US with regards to climate messages: The dismissive, the alarmed, the concerned, the cautious, the disengaged and the doubtful. Knowing each of these target groups values and concerns in detail will improve your messaging and the responsiveness. Yale Project on Climate Communication are tracking the developments in this segmentation to analyze whether there is an increase in the public of people who believe climate change is a hoax (e.g. the group the "Dismissive" – who believe global warming is not happening and probably a hoax – has more than doubled in size since 2008 to 16 percent of the American public (Yale Project on Climate Communication "Global Warming's Six America's 2010).

[12] It was discussed that one way to avoid this is transparent and credible labeling of products. Labels like Windmade, FSC and the Flower were mentioned as one approach to make it trustworthy to the individual consumer. They generally don't believein products sold as "green", "great for nature" etc.

[13]Kotter, John (1996) "Leading change – why transformation efforts fail, Harvard Business Review

data underlining the business case that they could then communicate to both consumers and key internal stakeholders – management for example. A communication strategy without stressing "what's in it for me" is seen as "too fluffy" and "not effective". The companies present in the workshop believed that a catalogue of business arguments for sustainability had to be developed with clear and concrete references to case examples.

Unleashing the potential: Guidelines for leaders[14]

The systems transformation – from fossil fuels to renewable – will create growth. But the new and additional economic activity will often take place outside the cleantech and energy sector.

Spearheading the transition is the role of leaders within policy, business and civil society - but equally important is their ability to reframe and revitalize the way we address the challenges.

Efforts so far have been inadequate to meet the challenges in time and at scale. We have to revisit the principles, the governance structures, the roles and guidelines – and translate this into action.

The sustainable growth agenda offers great opportunities for this because it reframes our understanding over the transition, as documented in the studies made by UC Berkeley[15]. They show that the arguments for green growth go beyond climate, the environment, cleantech and the energy sector. To fully understand and seize the benefits, we must discover how the decarbonization of today's energy system opens a wide range of new opportunities for the economy as a whole. Ahead of us lie entirely new ways of generating and sustaining prosperity, employment and quality of life.

What we are facing is a systems transformation. The green growth economy will not just look "like the fossil fuel economy but with a load of wind power", as Green Growth Leaders Councilor, Lord Anthony Giddens, put it. Instead, it will require a technological and economic transformation akin to those of the emergence of steam, rail, or information technology.

Each of these technologies had implications that went beyond their "natural habitat". Railroads transformed time and space and made the Industrial Revolution possible. The emergence of the Internet created effects transcending the entire economy, leading to e.g. Google and Facebook - ventures we weren't able to imagine just two decades ago.

In the same way, additional green economic activity will not come from just the new products or investments in a replacement for today's energy systems. They will come from enabling the broader economy to discover and express the presently unknown—and often unknowable—opportunities that such a new system may create in terms of new businesses, new services, new products, new cities.

Sustainable cities hold great potential. Green ambitions can drive growth in cities. Green ambitions lead to higher quality of life in cities. Sustainability must therefore be seen in a broader perspective than strictly environmental.

However, political leadership is crucial if the potential is to be released. Cities need the audacity to lead by committing to clear and ambitious goals. Governments must enable cities to become platforms for solutions that unleash the green growth potential to the benefit of society as a whole. Furthermore, increased awareness of the benefits of sustainability is needed.

[14] Findings from leaders roundtables on October 13th at Copenhagen City Hall, chaired by Yvo De Boer, Chief Global Advisor, KPMG, and Richard Bevan,Executive Director, Eurocities and moderated by professor John Zysman, UC Berkeley, and Wirth Chair, Alice Madden,University of Colorado. Participants were 60 leaders from the public and private sector, NGO's, and academia, divided into two groups, one focused on the role of cities, and one focused on the role of business.

[15] http://greengrowthleaders.org/uncategorized/uc-berkeley-green-can-drive-growth/

At this point in time we know very little of the butterfly effect of green growth. What we do know is, however, that the transformation needs to happen as quickly as possible in order to confront environmental challenges for nations, cities and people worldwide.

It is essential to mobilize leaders in all sectors and all regions, but to do this we need to create a common understanding of the change we are going through – and what can be done to accelerate it.

During ”Take Lead”, leaders from all sectors pledged that they and their peers should:

- recognize that green growth should be seen as a systems transformation
- empower change makers. Governments must enable cities to become platforms for solutions.
- focus on benefits - instead of focusing on cost. Ensure vision, inspiration and motivation for change.
- Share best practice. Great solutions have already been developed and implemented in cities and businesses around the world – and need to be communicated and shared.
- set up models that tap into institutional investors, who represent a major, relatively untapped financial source. Governments, the private sector and other financial actors need to explore new models for partnerships that involve e.g. pension funds. The case of Anholt Off Shore Wind Farm in Denmark[16] is a best practice example of this, enganging DONG Energy, Siemens and and two pensions funds, PKA and PensionDanmark, and with the Danish government offering long term stable tariffs.
- provide transparency, so that it becomes clear to the consumer and society what ressources companies use in their entire supply chain. Transparency can motivate change. A best practice example is CREX, Corporate Renewable Energy Index, where companies report on their energy sources[17].
- make clear that financing is available and that the challenge is to direct finances to sustainable projects. They should also encourage financial innovation, based on public-private partnerships, that can handle risks and balance short term investments with long term savings and profits.
- play a frontrunner role in communicating and visualizing the vision to a broader audience, including e.g. children. This is a way to create a bottom-up market pull. A best practice example is to “sell the sizzle” – i.e. focus not on the product itself (the steak), but the sensation (the sizzle)[18].
- create communicative collaborations where companies pledge to use a certain percentage of their investment in communication activities
- Have the audacity to lead. Act as role models and showcase that the change is not only about money, but also a matter of ethics and moral.
- take action towards providing service rather than products, which is a way of optimizing the quality and life cycle aspects of investments, rather than selling the cheapest product. A best practice example is the ESCO-model[19] – Energy Service Companies, that guarantee customers to lower their energy bill and are paid by parts of the savings.

[16] http://www.dongenergy.com/anholt/EN/News/anholt_nyheder/News/Pages/PensionDanmarkandPKAtobecomeco-ownersofDenmark'slargestoffshorewindfarm.aspx
[17] http://www.vestas.com/transparency
[18] http://www.futerra.co.uk/downloads/Sellthesizzle.pdf
[19] http://communityinnovation.berkeley.edu/publications/ige_chuck-goldman_lbnl.pdf

- discourage monopolies and support standards and frameworks that foster open source innovation in relation to energy infrastructure like smart grids – take inspiration from the way internet and telecommunication encourage the development of apps.
- form clusters and partnerships, recognizing that no single actor can fix the problem on their own. This includes using collaborative concepts like e.g. smart city[20]

[20] http://setis.ec.europa.eu/about-setis/technology-roadmap/european-initiative-on-smart-cities

Best practice catalogue:

Solutions for Sustainable Cities[21]

Our cities can become platforms for green innovation and growth – and in the process we will increase livability.

Since 2007 the majority of the world has been living in cities which continue to concentrate people and activities. By concentrating people – and thus facilitating face-to-face interaction - cities accelerate innovation, attract talent, encourage entrepreneur ship and sharpen companies. The economic driving force of cities is well documented.

In addition, there is emerging evidence, that cities offer a series of environmental, social and economic co-benefits.

Investing in cycling lanes not only cuts CO2 emissions and improves citizens' health and quality of life, but improves the bottom line of the city. Cleaning the water in the harbor not only improves the environment, but increases real estate values, local business life and tourism. Investing in an integrated public transport system not only reduces traffic congestion, but saves billions of dollars and keeps the city efficient and competitive. Homegrown energy not only produces electricity, but allows local businesses to become strong and competitive.

Green must, therefore, be seen in a broader perspective than strictly environmental. It is not only about reducing CO2 emissions. It is also about improving quality of life and creating jobs and business opportunities throughout the entire economy – not just in the clean-tech sector.

Mapping the potential

The benefits for society and people as a whole within sustainable cities can be split into three categories:

- Environmental
- Social
- Economic

Environmental: Cities holds great environmental potential. Urban density allows for efficiency within transportation, water, heating and other activities in need of energy.[22]

Concentrating people and activities grant citizens the benefit of e.g. short travel distances and thus less dependence of personal motorized transport.

[21] Findings from expert's workshop at Copenhagen City Hall, October 12, chaired by Flemming Borreskov, CEO of Realdania, moderated by Kent Martinussen, CEO, Danish Architecture Center. Participants were 62 experts – architects, urban planners, policy makers and technoogy providers - from e.g. Masdar, Singapore, Tokyo, Berlin, Copenhagen, Aarhus and London. The workshop was prepared in collaboration with Anne-Mette Feldby Madsen and Claus Bjørn Billehøj, City of Copenhagen and the chair and moderator.

[22] Edward Glaeser, The Triumph of the City, 2011 & Richard Florida, The Great Reset, 2011.

Therefore, cities remain below their respective countries with regard to CO2 emissions – despite having a higher GDP.[23]

Broadly speaking certain city structures can facilitate

- greater transport energy efficiency due to reduced distances and greater shares of green transport modes
- greater heat/cooling energy efficiency in buildings due to lower surface-to-volume ratios of more compact building typologies and urban vegetation
- more efficient use of grid-based energy systems such as combined heat and power
- lower embedded energy demand for urban infrastructure due to greater utilisation
- greater energy efficiency in operating a range of utilities. E.g. electricity, water and sewer lines.
- more sustainable lifestyles by shifting the focus from material consumption to less energy intensive activities[24]

However, in order to reap the environmental benefits of concentrating people, cities must demonstrate political leadership and courage. A best practice example of this is the congestion charge in London.

Despite lack of public support the congestion charge in London was installed. Once implemented the number of cars was instantly down by a third. Varying from year to year, it has been reported[25] that congestion is down by a quarter. All traffic entering the zone is down by a fifth. Buses are up by nearly 50 pct. and CO2 down by a fifth.

The net revenue generated from the charge created a surplus of 100+ million pounds, which was used on buses on, improving cycling etc. The effects on businesses (restaturants, theatres, etc.) has been broadly neutral. The amount of "loosers" is marginal – mainly shops that rely on passing traffic.

None of the major parties in London want to roll back the decision of the congestion charge in central London which now holds popular support.

Social: Perhaps the most inspiring advantage of sustainable cities is the link between sustainability and livability.

Green city investments and ambitions result in benefits far beyond environmental. Building up is the evidence base of how sustainable life can be more fun, more profitable, and healthier, than ordinary life. [26]

Investing in cycling lanes cuts CO2 emissions AND improves citizens' health and quality of life. Cleaning the water in the harbor improves the environment AND increases real estate values, local business life and tourism. [27]

[23] Philipp Rode, LSE Cities / Urban Age Programme - London School of Economics and Political Science

[24] Philipp Rode, LSE Cities / Urban Age Programme - London School of Economics and Political Science

[25] Transport for London: Central London Congestion Charging - Impacts monitoring. Fifth and sixth annual reports, 2007 and 2008.

[26] Green Growth Leaders, Copenhagen – Beyond Green. The socioeconomic benefits of being a green city. http://greengrowthleaders.org/wp-content/uploads/2011/10/CPH-Beyond-Green.pdf

Subsequently, cities in the top of “Eco-city” rankings and “Quality of living” rankings overlap[28]. It is no coincidence that among the cities competing to be the most livable cities in the world, most of them are also among the most sustainable cities. Besides Copenhagen, cities such as Berlin, Vienna and Stockholm fall into this category.

Where urban density is needed for sustainable city life, new types of urban structure, design, nature and greenery can improve the essential quality of life in cities.

We must look beyond the environmental benefits in order to understand the full value of greening our cities. Sustainable solutions for cities must be considered also on their ability to create co-benefits in health, quality of life etc.

It may be difficult to quantify quality of life, and the benefits of fresh air, green environments that are visually stimulating, traffic that is safer. At the same time all of them have direct outcomes in healthier individuals, higher productivity or fewer accidents.

Nevertheless it's important to be able to document and communicate the benefits of these.

Economic: Green ambitions can drive growth in cities. Demand for and implementation of new technology and solutions, create jobs, growth and enhance city image and attractiveness towards talent and tourists.

Evidence shows that because of green ambitions and green leadership, the green sector in Copenhagen has been transformed into a local tiger economy. Over the course of five years, the green sector in Copenhagen experiences a 55 percent increase in turnover, 12 percent annual growth rates in exports, and an increase in productivity four times higher than the average of the region. [29]

Being an early adopter of solutions will catalyze new markets and cities should focus procurement and investment strategies on key solutions, and thereby ensuring clear goals with long term policies, clear conditions and regulatory frameworks as uncertainty burdens businesses.

Furthermore, when implementing sustainable solutions in cities, city planners should keep attention to how to supply value for all stakeholders. It is therefore also vital that cities enter into partnerships. In public-private partnerships, cities and businesses can reach a common goal and have a strong business case.

Whereas the cost of green investments is known – less is of the value of the benefits. City planners should also focus on both sides of the equation. Also externalized costs such as ecological footprint should be added to the accounting so that the market can include this as incentives for green tech.

Unleashing the potential

To harvest the benefits and potentials listed above, a wide range of instruments are well known. The most important ones identified include:

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[27] Arup: Copenhagen – Solutions for Sustainable Cities, 2011.
http://www.kk.dk/Nyheder/2011/Maj/SustainableCph.aspx
[28] http://www.mercer.com/qualityofliving
[29] Leaders, Copenhagen – Beyond Green. The socioeconomic benefits of being a green city.
http://greengrowthleaders.org/wp-content/uploads/2011/10/CPH-Beyond-Green.pdf

- Demonstrate political leadership: Have the audacity to lead. Engage people in the change. Expect resistance in the beginning. Walk the talk.
- Tell the good stories: Communicate the benefits of sustainability. Bring the good examples into the spotlight.
- Empower the cities: Governments must enable cities to become platforms for solutions.
- Calculate the other side of the equation: Focus on output - instead of focusing on cost.
- Deal with context: Make the solutions and the goal relevant and desirable for the local context.
- Unite: Get united in clusters. What is needed is not technologies but collective solutions.

Best practice catalogue:

Power of Wind[30]

The economic benefits of wind should be found not in "green jobs", but in the fact that it gives us cheap, sustainable, stable and secure resources to society.

Renewable energy offers stable, clean and plentiful resources to society, and is essential to meet environmental goals. According to a new, comprehensive study by IPCC, 77% of the world's total energy consumption could come from renewable sources in less than 40 years. 20% of consumption could be generated from wind resources[31].

In 2008 alone wind power saved 158 million tons of C02 globally which is 16% of the Kyoto target for 2008. In 2020 wind power is predicted to save 10 billion tons by 2020[32]. Increasing the share of wind power helps mitigate climate change as wind energy does not pollute the air like other sources of energy thus reducing the overall health risk of air pollution and puts less strain on the earth's resources.

In terms of growth, however, the question is what economic and social benefits wind power gives us. The argument that wind power should be implemented because it creates green jobs should be handled with care. It is true for export-led growth in countries like Denmark with a big share of the global market. Studies also show that compared to e.g. oil, gas and coal, one unit of energy produced from wind generates more jobs – but this trend will probably disappear as the technology is matured. The real economic benefit is that wind energy is clean and green. It is putting fewer strains on the environment, increasing energy security by stable and foreseeable prices of energy worldwide, which in turn creates less political turmoil.

Furthermore, technological advances are expected to create spillover effects and new types of activities in the economy.

Mapping the potential

The benefits for society and people as a whole within wind energy can be split into two categories.

- Business opportunities
- Societal benefits

Business opportunities: The global market for wind power is expected to continue its significant growth rates in coming decades.

[30] Findings from the expert's workshop on October 12th at Danish Wind Energy Association, chaired by Jakob Lau Holst, COO, Danish Wind Industry Association, moderated by Thomas Færgeman, Director, CONCITO. Participants were 23 experts in wind power, including economists. Power of Wind: Prepared in collaboration with Michael Zarin, Jakob Askou Bøss, Filip Engel, Jan Hylleberg and Jakob Lau Holst from Vestas, DONG Energy and Danish Wind Industry Association.

[31] http://cms.srren.ipcc-wg3.de/press/content/potential-of-renewable-energy-outlined-report-by-the-intergovernmental-panel-on-climate-change

[32] *"Wind Power Works"* Global Wind Energy Council http://www.gwec.net/index.php?id=164

A new long-term projection model from Bloomberg New Energy Finance[33], the world's leading independent expert on renewable energy and carbon markets, shows that annual global expenditure on renewable energy projects will increase from $90 billion in 2009 to $150 billion in 2020. The model shows that this will further increase to $200 billion by 2030 given current policy targets.

Wind energy will continue to be the leading recipient of large-scale asset financing through 2020, reflecting its status as a relatively mature and cost-competitive, large scale clean energy technology, according to a comprehensive study made by Pew Charitable Trust (2010)[34].Under current policies, asset financing in wind technologies will rise to $110 billion in 2020, an increase of 86 percent over 10 years. Under the Copenhagen policies scenario (implementation of The Copenhagen Accord), wind energy investments in 2020 are estimated to be $12 billion higher than under the current policies level. In contrast, under the enhanced clean energy scenario, asset financing in wind is projected to be $190 billion — an increase of 222 percent over 10 years.

The global market for wind power is expected to grow from approx. 30 billion Euros to 219 billion Euros in 2030[35] and this development will inevitably create new business opportunities in technology development as well as new companies especially in the off shore wind field including: supply and maintenance of transmission lines, installation, transport of parts, control and monitoring, maintenance of the turbines themselves and corrosion protection.

Another aspect of the economic opportunity of wind power is displayed in the Global Consumer Wind Study 2011 which shows that 50% of consumers worldwide are willing to pay more for products based on renewable energy and furthermore that 65% of consumers worldwide would prefer buying brands produced using wind energy[36].

Societal benefits: Technical advances have brought down costs of energy from wind power by roughly 40% every decade since 1970. This trend is expected to continue and will – over time -give society and consumers the benefit of clean and inexpensive energy from unlimited resources.

From 2010 until 2015, a technology learning rate of 10% is assumed (European Wind Energy Assoctiation)[37], implying that each time the total installed capacity doubles, the costs per kWh of wind generated power decreases by 10%.

Wind is a non controversial source of energy compared to fossil fuels and is not sensitive, or related to, political conflict and unrest. The future price of wind is thus foreseeable and stable, providing energy security and stable prices, while fossil fuel prices are expected to continue rising as resources become scarce and demand increases. An important risk factor in the global economy is thus removed gradually by the shift to more renewable resources.

[33] http://bnef.com/PressReleases/view/113
[34] http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Global_warming/G20-Report-LowRes.pdf
[35] http://www.business.dk/energi-miljoe/siemens-aabner-3-vindfabrikker
[36] http://www.vestas.com/en/about-vestas/sustainability/transparency.aspx
[37] http://www.wind-energy-the-facts.org/fr/part-3-economics-of-wind-power/chapter-1-cost-of-on-land-wind-power/future-evolution-of-the-costs-of-wind-generated-power.html

Unleashing the potential:

- In the current financial crisis, growth and employment are real concerns politicians must address. Re-affirming or even accelerating the commitment by governments towards a more sustainable and greener energy supply could help spur growth.
- Removing fossil fuel subsidies will make it cheaper to introduce new technology. At present no green field power plants – wind energy or other technologies – is able to compete against existing power plants that are fully depreciated and/or established with subsidies. The International Energy Agency's *World Energy Outlook 2011* reports that fossil-fuel consumers worldwide received about six times more government subsidies than were given to renewable energy. State spending on gasoline, coal, and natural gas rose 36 percent to $409 billion, whereas support for biofuels, wind power, and solar energy rose 10 percent to $66 billion. The IEA further notes that fossil fuel subsidies are "creating market distortions that encourage wasteful consumption."
- An integrated, cross border and intelligent grid will ensure energy security for consumers and make it easier to exploit the benefits of wind energy, selling across borders and transporting wind energy over longer distances[38]. A smart grid will also make it possible to expand into other things- making use of wind power when charging Electric Vehicles and so on.

[38] http://www.climatechangecorp.com/content.asp?ContentID=5309

Best practice catalogue:

Smart Grid –Smart Growth[39]

Intelligence in the networks allows the economy to discover new opportunities and new business.

Development and implementation of intelligent networks for distribution of energy will be the key to a successful transformation to a green growth economy. The potential, however, lies not in the grid itself as a physical structure, but in the intelligence and opportunities for new business models that the system can potentially nurture. In this way, smart grids are a perfect example of how the transformation can create additional, sustainable economic activity.

The capacity, quality and outreach of the grid will to a certain degree define the scale and speed of the transition, according to the UC Berkeley studies. Decisions on standards, access and regulation of the grid will be critical. With the right design, however, smart grids could foster a range of new products, services and businesses.

Studies by McKinsey & Company[40] says that the potential for smart grid equipment manufacturers and service/solutions providers is – already today - considerable, and could range between 15 and 31 billion USD annually in 2014. Growth will happen in different regions, but will most probably be highest in regions where the energy infrastructure is still developing, e.g. in China.

Mapping the potential

The benefits for society and people as a whole within the smart grid can be split into three categories:

- customer applications
- grid applications
- integration.

Customer applications: The benefits of customer applications are both to an advantage of the consumer and the energy producer. Deployment of the smart grid technology from U.S. utility control centers and power networks to the consumers' homes could cost between $338 billion and $476 billion over the next 20 years, but in turn it will deliver $1.3 trillion to $2 trillion in benefits over that period[41].

Customer applications offer price flexibility to motivate the customer and customers will have the possibility to oversee their energy use, manage their consumption, especially relevant during peak hours, and furthermore have the opportunity to sell excess energy back to the grid. With customer applications,

[39] Findings from expert workshop October 12th, at DONG Energy, chaired by Jens Jakobsson, Vice President, Distribution Assets, DONG Energy, moderated by Henrik Bindslev, Vice Dean, Faculty of Science and technology, University of Aarhus. Participants were 46 experts in grids and networks, including academia, organizations and business. The workshop was prepared in collaboration with Filip Engel and Christian Eika Frøkiær, DONG Energy

[40] The global market for smart grid solution providers. McKinsey & Company, 2010

[41] Electric Power Institute *"Estimating the Cost and Benefits of the Smart Grid" 2011* http://my.epri.com/portal/server.pt?space=CommunityPage&cached=true&parentname=ObjMgr&parentid=2&control=SetCommunity&CommunityID=404&RaiseDocID=000000000001022519&RaiseDocType=Abstract_id

the emphasis should be on solutions that do not require large up-front payments. In China it is already possible to get a Smart Home as part of your mortgage[42]. The financial potential of customer applications, which constitutes pricing packages, in-home displays, smart appliances and information portals, represent an opportunity of $59 billion in the U.S alone[43].

Grid applications: The smart grid is basically a new flow of information and power. The fundamental change is from a few large power plants to hundreds of thousands of end users, to hundreds of thousands suppliers. This means that distribution of energy also needs to get smarter.

80% of the world's energy is consumed in cities which is why there is a great need and opportunity for companies to help cities reach their energy efficiency targets. Grid applications can provide an annual value to society of $63 billion dollars in the U.S. alone by 2019[44].

A smart energy system will enhance the use and the integration of Electric Vehicles (EV's) into the market and thus reduce major emissions from motor vehicles, which is now 900 million metric tons of CO2 each year[45]. The system would provide the EV owners with the flexibility to charge when price is low, and should in the future allow the consumer to sell excess energy back from the battery to the grid during peak hours[46].

Integration: 80% of energy is lost from extraction to consumption so there is a huge business potential for new ways to conduct energy efficiency. The smart grid could balance the capacity, through storage of energy, which results in less overproduction of energy. It can also incorporate renewable sources of energy, such as wind and solar, more efficiently into the grid and would ideally allow the energy to 'travel' the distance i.e. solar power from Spain to Denmark[47].

Unleashing the potential

- The smart grid industry needs to focus on how to engage the consumers in using the benefits and opportunities that are available. There is lot of potential and consumers need to experience the incentive. Furthermore, the industry needs to understand the consumers better and should engage them by letting a lot of the value flow directly to the consumer. The consumers are very fragmented both domestically and industrially and behavior matters a lot. As people react to pain and convenience social acceptance and norms matter. They may even matter more than saving money. Avoiding waste is a goal for many consumers and the smart grid offers customers to help avoid wasting energy. This kind of "social incentive" should be explored in greater depth as an enabler for smart energy consumers
- We need to consider the "wife factor", which means a greater focus on comfort, architecture and especially esthetics.
- There is a need for application models that have price flexibility and a utility that communicates the daily benefits. This is better achieved if the customer has a single point of contact in the energy

[42] Presentation at workshop by Mr. Martin Manniche, Chairman and CTO, Green Wave Reality
[43] U.S. smart grid value at stake: The $130 billion question. McKinsey & Company, 2010
[44] *U.S. smart grid value at stake: The $130 billion question.* McKinsey & Company, 2010
[45] http://www.wri.org/publication/content/8468

[47] http://www.abb.co.za/cawp/seitp326/377dbeff7a3a6aedc12577c20033dbf5.aspx

market – rather than having to interact with various different actors as is the case in many markets today. Less complexity will make savings and thus value, more visible to the consumer. The devices need to communicate with the user, and make the changes in the consumer's everyday life visible. The key is to make smart grid utilities easy and understandable. The focus should be on different kinds of values and not only focus on energy savings but the quality of life, and the value for the grid, as a whole.

- There is a need for collaboration between industries to encourage innovation, before real competition can happen. The collaboration can happen between telecom-providers, municipalities, utilities, etc. These actors can form new partnerships and put together new packaged, *smart* value propositions to energy consumers. The industry also needs to collaborate with the surrounding countries and develop intelligent transmission systems and local storage. With regards to grid integration one of the ways to solve the problems and unleash the potential is to increase innovation in the transmission technology field, so it becomes easier to send larger amounts of electricity through cables under the ground.
- More competition: Today competition is hampered by an overly complex, non-transparent energy market and consumers do not stand a chance in understanding the difference between different competitors – e.g. different energy retailers- because the consumer needs to deal with so many different services to get the energy. Furthermore, the consumers' energy bill is made up of various costs and, to make things more complicated, these costs come on different invoices. To unleash the potential there is a need for a more simple market which will give the customer a feeling of empowerment to choose the energy retailer and energy services he/she sees most value in and then get the full energy cost in a single bill from his/her exclusive provider.
- The fastest way of optimizing savings is doing something in peoples home and we can do it now, the technological solutions are available now already. Energy labeling of houses and energy renovation affects the capital value of the house in a positive way, which needs to be communicated.

Best practice catalogue:

Bio Business is Big Business[48]

The Danish case shows that the real potential in bio is not fuel, but new ways of creating bio-based higher value products.

More than 60 of Denmark's leading experts and companies developed this strategy for how Denmark can build a position of strength within biorefining. The strategy consists of a common vision, objectives and over all road map. While the focus for the work and strategy has been Danish, some of the conclusions and potential can be found at a European level and abroad.

Biomass is a renewable resource with a huge potential. Until now focus has primarily been on – apart from food production - converting biomass to bioenergy, but this is no longer enough, as there is also a need to find alternatives to the high value products that we get from oil today.[49]

Via processing of biomass at a biorefining plant biomass can be converted from agriculture into food, chemicals, feed, materials, electricity, heat and biofuel.

This poses a huge potential for green growth. Some of the growth is reflected in what the revenue looks like right now from a global perspective, where the European market with a turnover of 13 billion Euros for biomaterials is the most developed[50]. And other markets are well on the way.

Mapping the potential

A common Danish strategy could create:

- A new multi billion DKK industry
    - Another 10 billion ton biomass from agriculture to more food, biofuel and biomaterial such as acrylic acid which can be used in globally widespread bioplastic, materials such as diapers, hygiene products and paint. Based on price developments in recent years, it could generate a turnover of DKK 50 billion per year. Furthermore, an estimate minimum 10,000 new jobs. Specifically, connect to agricultural production in the peripheral regions.

- New export opportunities via new products and new markets
    - In the coming years the European and global markets' demand for chemicals, energy, materials and fibre based on biomass will grow significantly. Danish companies and research institutes have crucial competences and know how within these areas, and Denmark has a strong position to build up an export of technology and knowhow within biorefining plants, technology licenses and production of new high potential products based on biomass.

[48] Findings from "Biorefining Camp" in Copenhagen on 16-17 August, 2011, chaired Anders Eldrup, CEO, DONG Energy and Per Falholt, Chief Scientific Officer, Novozymes, moderated by Claus Bindslev, Director, Bindslev. Participants were 60 Danish experts.

[49] Mandag Morgen: "Bioenergi – et kapitel i glemmebogen" i Køreplan for Klimarevolutionen, 2011.

[50] PÖYRY INSIGHT*: "The Dynamics of the Advanced Bio-based Materials Business", 2011*

- A fossil-free society via biobased solutions:
    - Biobased solutions based on Danish research, a highly effective agriculture production and Danish biotech industry can play a crucial part in the phasing out of fossil based products.

- Demonstration for the rest of the world via plants and research:
    - With its strong starting point Denmark can become the centre for hatching and demonstrating new agricultural production, biorefining technologies and use of new materials.
- Companies that are the preferred partner via international commercial collaboration:
    - Denmark and Danish companies can be 'preferred partner' for a wide number of companies and research institutes that with other niches are making big stakes the world over.

Unleashing the potential

To harvest these opportunities for growth and creating a biobased – and fossilfree society - a range of actions is needed. The most important ones identified include:

Create awareness of the opportunities for new and biobased products
It is important to also see the opportunities for new products, materials and renewables in a consumer political context, as environmental and climate awareness is a stronger and stronger consumer incentive.

Test each step in the value chain.
Each step in the value chain – from biomass to high value products - must be technically well tested and financially viable. This would include the establishment of a national research program and demonstration facilities.

National cooperation
Connecting and coordinating all the players across the value chain within biobased know how and technology. Support the setting up of public-private partnerships

Ensure a common industrial and political vision
The steps listed above requires a well developed research, educational and development effort which can only be driven by a common and industrial political vision. Preferably a common national 2020 ambition for biorefining.

Best practice catalogue:

Sustainable Living in Buildings[51]

Improving indoor climate in our buildings holds huge potential. It can improve productivity and learning environments dramatically.

Buildings are a great part of the global movement for a sustainable future. In the western world, we spend 90% of our time indoors, in buildings that account for 40% of our total energy consumption, and 30% of those buildings do not provide a healthy indoor climate.

The future of construction and retrofitting of buildings holds a huge potential for businesses, but most importantly for the people who spend their life in buildings. Building professionals carry the key to unleashing the potential of this sector now and in the long run. However, it requires leadership to map the rise of new profitable markets within green and sustainable buildings – whether it is renovation of old buildings or new projects it will not only benefit the bottom line and jump start new businesses, as well as make our lives better. What is needed is thought leadership that can map the benefits of sustainable solutions in buildings and inspire others to follow.

Mapping the potential

The benefits for society and people as a whole within sustainable buildings can be split into three categories:

- Livability
- Cost-benefit
- Innovation

Livability: Health is our most precious resource. However, little attention is paid to how our buildings actually work in the decades following occupancy, even though the collective value of these could overshadow that of energy costs by far.

Dramatically reducing energy consumption in houses – new built as well as existing buildings – holds huge potential for the economy and is basically a matter of what financial frameworks that will encourage owners and buyers to apply best available technology and harvest the fruits. In 2015, we are able to build residential houses that consume almost 50% less energy than today[52]. According the 2009 McKinseys cost (version 2.1)[53] curve, almost all of the technologies (insulation, lighting systems, air conditioning) are cost-effective and will create economic surplus for society towards reaching internationally endorsed CO2-targets (emissions in developed countries to be lowered by 25-40% in 2020 by 1990-levels).

[51] Findings from expert workshop on October 12th, at Osramhuset, chaired by CEO Matt Peterson, Global Green (USA), moderated by director Mark Watts, Arup. Participants were 61 engineers, architects, designers, anthropologists, NGO's, and experts from the building sector.
[52] Strategic Centre for Research for Zero Energy Buildings, Aalborg University
[53] http://www.mckinsey.com/en/Client_Service/Sustainability/Latest_thinking/Costcurves.aspx

Even so, the most important benefits for society most probably lie in e.g. avoided health costs, improved quality of life, improved learning environments and improved productivity through improved indoor climate (light and air).

The evidence is considerable:

A study from California has found that, controlling for all other influences, students with the most day light in their classrooms progressed 20% faster on math tests and 26% on reading tests in one year than those with the least [54]. Likewise, children's learning abilities rise by up to 15 % if they are in a good indoor climate, according to a Danish study [55].

A study on productivity and staff performance from Australia[56] showed a 39% reduction in average sick leave days per employee per month and a 44% reduction in the monthly average cost of sick leave.

By 2020 1.7 million Danes will have contracted allergies, some of which are directly attributable to poor indoor climate. This is a rise by an estimated 796,000 compared to 2005. It is the same tendency all over Europe [57].

Furthermore, increased livability will also be a key to create a consumer/market pull, as it is essential to offer buyers other kinds of motivation than a lower energy bill.

Integrated urban areas with high livability exist around the world, e.g. Malmö Western Harbor which is sustained by 100% renewable energy[58].

Best practice examples based on holistic building concepts, including standards, for increasing livability in sustainable houses exist, e.g. the carbon-neutral demonstration project Soltag[59] from 2005, as well as a number of Active House[60] cases, based on collaboration between urban planners, architects, engineers and researchers. The VELUX Model Home 2020 project consists of 6 European experiments, base on the Active House principles . The key focus of the Active House Alliance, which is formed by planners, researchers and manufacturers is to base future sustainable buildings - new build as well as modernizations - on a holistic approach, where aspects of energy, indoor climate and environment (www.activehouse.info) are balanced and included in the perspectives of planners and policy makers, for the benefit of health and comfort for the building users. A number of Active House cases are currently being tested in real life.

Soft indicators are critical to further underpin the efforts of increasing livability. We need to increase our understanding of what is, as it will otherwise be impossible to “measure and manage”. Our understanding is, though, still in its infancy.

[54] California Board for Energy Efficiency, 1999. http://www.coe.uga.edu/sdpl/research/daylightingstudy.pdf)
[55] International Centre for Indoor Environment and Energy, Technical University of Denmark.
[56] http://www.businessoutlook.com.au/08/archives/500%20Collins%20Employee%20Productivity%20Study.pdf
[57] Statens Institut for Folkesundhed - Folkesundhedsrapporten Danmark 2007
[58] http://www.malmo.se/sustainablecity
[59] http://www.soltag.net/
[60] http://activehouse.info

From a user perspective, anthropologists talk about "homeliness"[61] or "ontological security" (Anthony Giddens). Our home is our castle, it is where you "take off your shoes". It is where things are available, in stock and you feel sustainable (without necessarily being it). At the other end of the spectrum we have "unhomeliness", which is the zone where we are threatened on our existence and solutions are not available. This is where challenges like climate change appear, and our efforts should aim at providing e.g. a house owner with as many sustainable tools as possible within the homeliness zone.

Cost /Benefit: Traditional business cases for construction of sustainable buildings represent an economic and mental barrier for innovation and focus on whole life costing; aspects of quality are sacrificed on a short-term return-of-investment altar, which is out of proportion with a service life of a sustainable building.

To capture the full benefits, instruments like LCC (Life Cycle Cost) and LCA (Life Cycle Assesment) are helpful to define a solution with the right cost, value and yield, but they cannot stand alone. The fundamental challenge is to define the real value of a given building for a given consumer, and to create a meaningful price that reflects the costs and the benefits over time.

A role model is the holistic German DGNB standard for buildings that includes environmental, economic and social factors throughout the total life cycle[62].

New financial products and models are critical. A best practice model is puplic-private-partnerships, e.g. used in Frederikshavn City School (Denmark)[63], where the entrepreneur not only delivered a building, but became part of a collaboration that included management over a period of 25 years. Since higher quality (and price) constructions over a certain period of time will mean lower operation costs, the model works out well for both parties, and the cost/benefit issue is handled.

This PPP-model secures the use of best available technologies, which means that the total costs over a lifetime are considerably lower than when using less costly materials to lower the entry price. The model thus has the potential to become a driver for innovation when more widespread and brought to scale.

Case studies by MT Højgaard Schultz show that going to a higher energy standard, e.g. from BR08 to BFR15, prolongs simple payback time, but has very limited extra total cost.

Energy performance contracts is another way of securing optimal efficiency and this could include not just energy, but also indoor climate parameters.

Innovation: As much as 99% of the building stock of 2050 in the EU is estimated to be built already. This means we must address the existing stock with innovative approaches, system solutions and process design. It will demand an innovative approach in a building sector anæmic of knowledge and practice of how to "green" existing buildings.

Innovative architecture has historically pushed what is possible - and is doing so again.

[61] Mark Vacher: http://boligforskning.dk/sites/default/files/bk063031[1].pdf
[62] http://www.dgnb.de/_en/
[63] Højgaard & Schultz: http://mth.dk/Om-Os/Aktuelt/Presse/Pressemeddelelser-2011/Byskole-frederikshavn-ops.aspx

An important approach is taking inspiration from nature in new construction materials. We are seeing more and more research into new materials, based on recycling and cradle-to-cradle-principles, and inspired by natures own materials and resource flows. One best practice example: Newly developed materials and constructions used in projects like The Cube in Berlin (Germany)[64] that has self-cleaning facades and concrete that cools or heat the building when needed. All in all, measures that reduces the carbon footprint of the building with 25 %.

Another approach is using digital tools. The potentials that we are seeing right now are immense and we are talking about individualized, customized solutions, e.g. intuitive user interfaces for occupants.

Using the most advanced computer mathematical modeling tools, we are able to evaluate extremely precisely the energy and resource flow in buildings before they are constructed – and thereby also the total costs.

An innovative model by Microsoft makes it possible to take the design (from the architect), run through thousands of possibilities, evaluate them and finally create the knowledge to improve the quality. In this way, computer scientists can and should play a key role in increasing the efficiency and effectiveness of the way we manage natural resources in sustainable buildings.

Best practice examples include the city of Totnes (UK), where biodiversity has been integrated in the ”transition town” project, meaning that the outside areas of buildings are used to improve biodiversity and 60% of food is now grown locally. In Zimbabwe[65], The Eastgate Center in Harare, is an example of biomimicry, designed to cool the building using inspiration from termite mounds.

An innovative approach to usage of buildings is also a potential pathway. Buildings use up to 40% of energy outside occupancy hours, which means that multiple purpose buildings is a way of increasing resource efficiency and lower the need for new buildings and land use.

Unleashing the potential

To harvest the benefits and potentials listed above, a wide range of instruments are well known. The most important ones identified include:

- Increased research in indoor climate factors in relation to health
- Development of indicators for livability (soft indicators)
- Service companies; New business models that provides services rather than products
- Legally binding building standards and codes (e.g. DGNB, LEED, BREAM, LCC and LCA)
- Public-private partnerships in relation to building contracts, including e.g. lifelong servicing contracts
- Development of new financial products and models that take life cycle costs into account
- Sustainable standards in tenders

[64] http://www.3xn.dk/en/76637_cube_berlin/
[65] http://inhabitat.com/building-modelled-on-termites-eastgate-centre-in-zimbabwe/

Best practice catalogue:

Welfare and Green Growth in the Nordic Countries[66]

A new frontier is emerging: Innovation in welfare and sustainability can go hand in hand and confront both challenges

Strategic use of innovation policies is gaining momentum throughout the world. Governments are increasingly aware of how solutions to key societal challenges should be sought through innovation[67]. From Japan[68] through South Korea[69] to Germany[70], the Netherlands[71], and major international organizations such as the OECD[72] and the EU[73], calls for innovation on challenges regarding sustainable development are heard. This particularly encompasses the issues of welfare and green growth. The latter responding to a challenge stemming from climatic changes and resource dependency/shortage, but with an emphasis on continued growth. Innovation in welfare responds to challenges of ageing, health care, and diseases related to life style. It is worth noting that welfare related challenges aren't restricted to developed countries in Europe, North America and Japan, today developing economies around the globe face similar problems.

The Nordic Countries of Denmark, Finland, Iceland, Norway, and Sweden have the preconditions to play a vital part in providing solutions to the wicked problems relating to welfare and green growth. E.g. on welfare, the Nordic Countries are already experiencing the consequences of an ageing population with booming expenses on health care and medical treatment, which has worked as a push towards new solutions in the health and care sector of the large welfare states. Furthermore, longstanding efforts on environmental issues, dating back to the Brundtland Commission developing the notion sustainability, have put the Nordic Countries on the forefront in developing green growth solutions.

But future Nordic leadership within welfare and green growth is far from guaranteed. A number of other actors are already moving in record speed and all talk of a blue ocean strategy should be forgotten. One way forward is to develop ways to couple solutions on green growth and welfare – thereby providing holistic solutions that aim to solve both welfare and environmental challenges. From the Nordic experience, joint innovative solutions within welfare and green growth are/can be achieved in at least five areas:

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[66] Findings from work stream facilitated by Meik Wiking, Esben Alslund-Lanthén and Magnus P. Hansen, Monday Morning, commissioned by Nordic Innovation, lead represented by Melita Ringvold Hasle, Communications Manager, Nordic Innovation, and Sigridur Thormodsdottir, Senior Innovation adviser, Nordic Innovation

[67] OECD: *The OECD Innovation Strategy – Getting a Head Start on Tomorrow*. http://www.oecd.org/document/15/0,3746,en_2649_34273_45154895_1_1_1_1,00.html

[68] Council for Science and Technology Policy: *Japan's 4th Science and Technology Basic Policy Report*. December 24, 2010: http://www8.cao.go.jp/cstp/english/basic/4th-BasicPolicy.pdf

[69] Ministry of Education, Science, and Technology. *Becoming a S&T Power Nation through the 577 Initiative, Science and Technology Basic Plan of the Lee Myung Bak Administration*: http://www.mest.go.kr/file/577initiative.PDF

[70] Federal Ministry of Education and Research. *Ideas. Innovation. Prosperity. High-Tech Strategy 2020 for Germany*: http://www.bmbf.de/pub/hts_2020_en.pdf

[71] Ministry of Economic Affairs, Agriculture and Innovation. *Towards an agenda for sustainable growth in productivity*: http://www.rijksoverheid.nl/bestanden/documenten-en-publicaties/notas/2008/09/26/long-term-strategy-towards-an-agenda-for-sustainable-growth-in-productivity/lts-eng.pdf

[72] OECD: *The OECD Innovation Strategy – Getting a Head Start on Tomorrow*. http://www.oecd.org/document/15/0,3746,en_2649_34273_45154895_1_1_1_1,00.html

[73] European Commission: *Europe 2020 - A European strategy for smart, sustainable and inclusive growth*. http://europa.eu/press_room/pdf/complet_en_barroso___007_-_europe_2020_-_en_version.pdf

Mapping the potential

Governments shopping sustainability: Smart public procurement creates incentives for markets to develop solutions to key societal challenges. For governments it's a tool that, if used correctly, stimulates innovation activity towards goals of welfare and green growth. All Nordic Countries are working towards utilizing public procurement as a driver of innovation in sustainable products that enhance social services and reduce environmental costs. And the benefits of buying green is substantial, e.g. if all public authorities across the EU demanded green electricity, this would save 60 million tonnes of CO2, which is equivalent to 18 % of the EU's greenhouse gas reduction commitment under the Kyoto Protocol[74].

Digital solutions in Medical Treatment: Cheaper and better medical treatment – with less CO2 emissions. In Norway and Denmark digital solutions in health care have proven a success for patients with chronic diseases and patients living in isolated areas far from a hospital. Service is optimized for less money and CO2 emissions from transportation are reduced drastically. An Ericsson Research study on home-based care of elderly patients with chronic leg and foot ulcers in Sweden shows that if telemedicine was introduced nationwide, it would reduce total CO2 emissions by 2100 metric tons per year equivalent to 84,000 hours of driving[75].

Private Public Partnerships: A high level of confidence between businesses and the public administration in the Nordic Countries has spurred successful partnerships on green growth and welfare issues. If used correctly private public partnerships (PPPs) can ensure that long-term and life-cycle perspectives are implemented in the building process, thereby enhancing sustainability. Therefore PPPs could be a tool for coupling innovation within green growth and welfare. A promising case is a PPP to develop, build, operate, maintain, and finance the New Karolinska Solna University Hospital in Stockholm. The vision of the hospital is to provide high quality health services that focus on the patient's perspective and experience. This vision goes together with an ambitious goal of becoming "the world's most environmentally friendly University hospital"[76]. The Karolinska Hospital highlights how PPP's can be utilized as a means to provide innovative solutions on welfare and environmental challenges. .

Biking, the Healthy and Green Alternative: "Cars run on money and makes you fat, bikes run on fat and saves you money", is the message of a New York street art campaign. Improving conditions for bicycles allow for transportation which is environment friendly and has substantial positive welfare effects: noise free, low cost, reduces congestions, improves health and quality of life. According to a 2009 study by COWI, in Denmark biking contributes to the overall societal economy by DKK 1.22 per driven kilometre whereas a car costs society DKK 0.69 per kilometre. In Copenhagen alone the health impact of biking was estimated to be worth DKK 2 billion per year[77].

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[74] European Communities: Buying *Green! A handbook on environmental public procurement*: http://ec.europa.eu/environment/gpp/pdf/buying_green_handbook_en.pdf

[75] Ericsson Research. *The potential CO2 emissions reduction from a mobile telemedicine system*: http://www.medetel.eu/download/2009/parallel_sessions/presentation/day2/the_potential_co2_emission_reduction_from_mobile_telemedicine.pdf

[76] Stockholm County Council. We are Building a World Class University Hospital: http://www.nyakarolinskasolna.se/PageFiles/124/NKS_Broschyr110913_ENG.pdf

[77] COWI and City of Copenhagen, Samfundsøkonomisk analyse af cykletiltag, 2009

Team up! Cluster Thinking: Throughout the Nordic Countries cluster-thinking has flourished and enhanced cooperation within networks of companies, research institutions and public organisations. Cluster thinking creates a cooperative environment that induces innovation, which can be utilized on green growth and welfare issues. The Finnish Cleantech Cluster – recently ranked third best in the world – promotes environmental technology with the aim of increasing Finnish environmental business and creating new jobs. The activities of the cluster cover about 60% of Finland's environmental business and 80% of the sector's research. Its network covers more than 300 Finnish clean tech companies and in the 2010 the cluster estimated to have created more than 500 jobs[78]. In the Southern Part of Denmark a publicly funded welfare cluster called 'Welfare Tech Region' has proved successful in creating innovative solutions within the care and health sector.

[78] Finnish Cleantech Cluster – OSKE Program: http://www.cleantechcluster.fi/en/cleantech_cluster/?id=166

Best practice catalogue:

Measuring the Potential of Green Growth[1]

The continued focus on the green economy and the emergence of clean-tech as a sector add pressure in the OECD countries to greening the activities of their economies.

Nevertheless, there is yet little information on how local regions can successfully monitor or document their transition to a greener economy. Nor is there any common understanding of how to define green jobs, green companies or green initiatives[2]. A major theme arising from the workshop were measurement limitations arising from the Eurostat definition of the green economy. Right now the contributions of "non green" industries utilizing green solutions to generate green efficiency dividends and productivity increases are not captured. The workshop discussed practices and experiences with regards to indicators needed to analyze how local economies, companies, clean-tech clusters and regions adjust to the green economy and its potential.

The workshop was organized within the framework of the OECD project on 'Measuring the Potential of the Green Growth Economy'[3] which focus on identifying measurable indicators at regional/local level that can inform over time of transition to low-carbon economic and industrial activities addressing the two aspects of the green growth economy: (1) fostering job creation and economic development in new areas of growth; and (2) sustainable development. The workshop was particularly focused on Greater Copenhagen and Copenhagen Cleantech Cluster hosted by Copenhagen Capacity.

The workshop discussions provided inputs for a framework of sound indicators that can be measured in different context and socio-economic settings and providing pathways for measuring progress to the green economy by looking into the following issues (see Box 1).

Box 1: The OECD-CC workshop on measuring the potential of green growth

- How can indicators help improve the foundation for policy making, green strategies and programs?;
- What are the indicators needed to analyze how local economies, firms, clusters and regional ecosystems adjust to low-carbon activities?
- How do local labor markets make the transition?
- How do firms re-structure their organization and production processes?
- How do skills, education and training systems adapt to the development of new areas of growth?
- What are the indicators of greening human capital and its management?

Source: OECD-CC workshop 12-14 October 2011

[1] Findings from the workshop of OECD LEED Program and Copenhagen Capacity at Hotel Mariott Oct. 13th. The workshop was co-organized back-to-back with the Green Growth Leaders conference, Take Lead. Participants at the workshop were 50 people from international organizations.

[2] OECD http://www.uncsd2012.org/rio20/content/documents/towards%20green%20growth%20full%20report.pdf

[3] OECD http://www.oecd.org/document/25/0,3746,en_2649_34417_46891033_1_1_1_1,00.html

Although not discussed separately, one of the primary issues arising from the workshop was the need to pass the test of relevance. Indicators need to be relevant in a way that they could be used to communicate the green story to business, political leaders and the broader community. This in particular was one of the key issues identified by the Take Lead high level roundtable meetings that had participants from large companies and business leaders present.

The results of the discussion point out to four areas that need to be considered for developing indicators at the local level (see box 2).

Box 2: Areas of consideration for measuring green growth in Copenhagen Cleantech Cluster

- *Measuring and understand the potential of green growth and the dynamics of Copenhagen Cleantech Cluster (CCC)*: CCC is characterized by radical innovation, with disruptive market potential across a broad range of industries. Its companies are highly collaborative with strong links to research and test labs and knowledge infrastructure. It is important that green growth indicators capture these aspects and structures in order to measure the full potential. In 2010, 13 % of the clean-tech companies were established as spin-off companies in the Copenhagen Cleantech Cluster[1].
- *Investment attraction and promotion*: Understanding the role of local agents and talent is critical to the overall measuring and analytical architecture. Cities are in a great extent the drivers of growth and trade, investment flows and migration exist between city to city - while companies undertake business to business. At the same time, talent is a key prerequisite for a vibrant and competitive clean-tech sector.
- *Local and regional dimensions*: putting governance to work: There are real tensions – political, economic and definitional – of balancing the development of local measures and targets with EU and national ones[1]. It is essential to find the right balance to ensure political ownership and participation at the local level, but the same time ensuring the integrity of national and EU policy settings and targets, and measurement tools. Governance issues are particularly important in the determination of policy predictability and transparency.
- *Revised green growth indicators*: At the workshop the following indicators were up for discussion: Foreign Direct Investment and Regional Attractiveness, Creation of Green Jobs, Cluster Perspective, Competiveness and Intellectual Property and Job Types and Skills. The revision of indicators will continue during 2012 while the Copenhagen report is in preparation.

Source: OECD-CC workshop 12-14 October 2011

Output of the OECD LEED workshop and Copenhagen report[4]:

The Copenhagen discussions provide inputs for the report now in preparation. A dashboard of indicators of transition to low-carbon economy for Copenhagen will be prepared as part of the study. The dashboard will provide local authorities and agencies a tool available for monitoring their transition overtime and identify areas of attention for policy and strategic development purposes. The final report will include "Guidelines for local transition to a low carbon economy" and its justification.

[4] For more information contact Mr Klaus Rovsing Kristiansen of Copenhagen Capacity or Ms Elisa Campestrin of the OECD LEED Programme.