

Discussion Paper



# Financing the Transformation to a Low-Carbon Economy

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# Preface

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On 28 September 2010, The Sustainability Forum Zürich will run its 11<sup>th</sup> International Sustainability Leadership Symposium. This year's theme is "Financing the Transformation to a Low-Carbon Economy". In line with tradition, this discussion paper is intended to provide "food for thought" before and during the event<sup>1</sup>. It seeks to serve as a common reference point to stimulate thinking on questions such as:

- Where are we in terms of science, politics and business regarding the transformation to a low-carbon economy?
- Where do we need to be, considering growing energy demand, diminishing resources and worsening climate prospects?
- What are capital providers and capital seekers doing in the low-carbon space?
- How could and should investors, banks and insurers be involved?
- What are the barriers to getting there and how can these be overcome?

The paper starts with an overview of current financial flows and the financial flows needed to enable business to turn towards low-carbon strategies. The thought leadership interviews that follow demonstrate where some of the major low-carbon capital initiatives have already been launched and what remains to be done. These targeted case studies with top-level industry experts aim to be thought-provoking yet realistic in addressing the pipeline mechanisms for funding a low-carbon economy. To achieve real economic change will involve significant 'joined-up' development, including the specialist sectors that we have chosen to highlight in this paper.

Our sincere thanks go to:

- Christian Feisst, Managing Director Business Development, Cisco Smart Grid Business Unit
- Barbara Kux, Member of the Managing Board of Siemens AG
- Roland Pfeuti, Head Private Equity Team Switzerland, SAM Private Equity AG
- Katharina Tomoff, Vice President, GoGreen Programme & Martin Ziegenbalg, Executive Vice President Investor Relations, Deutsche Post DHL
- Sander Paul van Tongeren, Senior Sustainability Specialist Global Real Estate, Asset Management, APG Asset Management

We hope this paper will inspire insightful thinking and will contribute to a stimulating debate at the Symposium.



**Zeno Staub**, President  
The Sustainability Forum Zürich



**Thomas Streiff**, Chief Executive Officer  
The Sustainability Forum Zürich

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<sup>1</sup> The opinions reflected in this paper represent individual views of the interviewees quoted. The paper is not a statement or declaration either by The Sustainability Forum Zürich or its member institutions.

# Setting the Scene:

## The status quo vs. the “low-carbon economy”

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With growing insight into the potential impact on the real economy, climate change mitigation is increasingly gaining the attention of the financial sector – from both a risk and opportunity point of view. As a result, financial sector players are keeping a close watch on the burgeoning scientific and political debates.

Science, represented principally by the United Nations Framework Convention on Climate Change (UNFCCC), tells us that a tolerable degree of global warming would be about 2°C. This temperature increase corresponds to a concentration of greenhouse gases at around 450 parts per million (ppm) CO<sub>2e</sub> in the atmosphere. The probability of the worst impacts of climate change might – according to Lord Stern and other prominent scientists – be substantially reduced if this level can be stabilised. But the current level is 430 ppm CO<sub>2e</sub>, and rising at more than 2 ppm each year.

Politicians around the world are coming under pressure to align their efforts around the Copenhagen Consensus, which has endorsed the 2°C target. Subsequent concerted climate change mitigation measures and regulations are expected. In combination with resource scarcity and unmet energy demand, this may soon dramatically change the business landscape and pave the way to a “low-carbon economy”.

However, the actual emissions reduction pledges made to date by national governments are insufficient to meet the 2°C target. This means that projected national carbon budgets will continue to be exceeded. Consequently, further down the line, business is still faced with inconsistent legal frameworks and therefore still lacks the planning security it needs. In the meantime, long-term growth potential remains unused and climate risks increase.

Nevertheless, reducing carbon intensity through energy efficiency, renewable energy and mainstreaming of clean tech applications in general already makes sense for business and the overall economy. It increases productivity of energy and other increasingly scarce resources, constitutes an attractive investment opportunity and a vital means of risk mitigation.

### Investment needs on a global scale

Channelling capital into this low-carbon economy poses a significant but manageable challenge to investors, shareholders and their intermediaries. Lord Stern has calculated that the mitigation costs – reducing greenhouse gas emissions to avoid the worst impacts of climate change – will be at around 1% of global GDP each year, if early action is taken<sup>2</sup>. McKinsey confirms this with an estimation of its own: The annual worldwide cost of achieving the 450 ppm scenario could vary between 500 and 1,100 bn Euros – between 0.6 and 1.4% of GDP. But this depends largely on the ability to capture abatement potentials with relatively low costs per tonne of CO<sub>2</sub> reduced<sup>3</sup>. In any case, it is expected that some 85 per cent of the financial resources needed to this end will have to come from private sources.

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<sup>2</sup> Stern Review: The Economics of Climate Change

<sup>3</sup> The McKinsey Quarterly (05/2007): A cost curve for greenhouse gas reduction

The OECD countries are expected to provide 49 % of all necessary emission reductions. The corresponding additional estimated amount of investment and financial flows needed by 2030 to address climate change is large compared with the funding currently available under the UNFCCC and the Kyoto Protocol, but relatively small in relation to estimated global gross domestic product (GDP) (0.3 – 0.5 per cent) and global investment (1.1 – 1.7 per cent) in 2030.

The investment decisions that are taken today will affect the world’s emission profile in the future. Investments in new physical assets are projected to triple between 2000 and 2030. Given that in many industries the lifetime of capital stock can be thirty years or more, this constitutes a special new window of opportunity to direct funds into significantly more climate friendly and resilient facilities<sup>4</sup>.

The UNFCCC has published sector estimates of global additional investment and financial flows necessary in 2030 to return global greenhouse gas emissions to current levels. In the following table we have extracted four of the sectors looked at by UNFCCC.

<b>Sector</b>	<b>Investment and financial flows<sup>5</sup></b>
Energy supply	Investment in energy efficiency and biofuels of about USD 158 bn is expected. It is predicted that about USD 148 bn out of USD 432 bn of projected annual investment in the power sector will be shifted to renewables, carbon dioxide (CO <sub>2</sub> ) capture and storage (CCS), nuclear energy and hydropower. Investment in fossil fuel supply is expected to continue to grow, but at a reduced rate. Currently most of the power sector investment is made by government-owned or private, usually regulated, electric utilities, and is made domestically in most regions.
Industry	Additional investment and financial flows are estimated at about USD 36 bn. More than half of the additional investment is for energy efficiency, one third for installation of CCS and the rest for reduction of non-CO <sub>2</sub> gases, such as N <sub>2</sub> O and other GHG high global warming potential.
Buildings	Additional investment and financial flows amount to about USD 51 bn. Currently commercial and residential energy-efficiency investment comes from building owners and is financed domestically.
Transportation	Additional investment and financial flows amount to about USD 88 bn. Efficiency improvements for vehicles and increased use of biofuels are likely to require government policies, but the investment would come mostly from the private sector.

Another McKinsey study says that annual investments of USD 170 billion are needed for the next 13 years to capture energy productivity opportunities among end users.

<sup>4</sup> UNFCCC United Nations Framework Convention on Climate Change (2007): Investment and Financial Flows to Address Climate Change

<sup>5</sup> Ibid.

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## Significantly, closing the energy-efficiency gap remains a serious financing issue

The International Energy Agency (IEA) projects that half of the carbon emissions that can be avoided by 2030 should come from energy efficiency (EE) alone. Tapping unused EE potentials is largely considered as “self-financing” climate change mitigation over time. This energy efficiency gap could be closed by making investments that are paid back by energy cost savings. McKinsey estimates that large parts of such investments will have very attractive rates of return, up to 17%<sup>6</sup>. Therefore, there is talk about EE being “the next goldmine”.

Undoubtedly, the potential of EE is not being harnessed sufficiently. Often it is also hard to identify EE investments because they are folded into more general borrowing for activities such as building refurbishments<sup>7</sup>. So they are happening, but not on the necessary scale and not significantly directed towards climate impact. To properly account for energy savings in the usage phase, and to contrast these savings with the initial investment cost, life-cycle costing is crucial. But it is not yet being used as an appropriate tool to support investment decisions. So we have a major barrier here.

There is also a lack of clarity around the instruments that can be used to finance EE. There are several reasons for this:

- Banks have been historically uncomfortable with EE projects as they do not fit neatly into their conventional financing structures organized around “sectors” or “products” (the long-held view that a cost saving is not a real revenue is another source of reticence).
- EE has an ‘asset’ problem – i.e. there is no conventional asset involved against which a bank will lend. Cash flow from energy savings is not the form of revenue or collateral that investors are familiar with.
- There is a lack of EE project developers such as energy services companies (ESCOs)<sup>8</sup>.
- There is a dearth of loan products for initiatives such as energy-efficient houses.

Several groups in different sectors are in need of specific financing solutions for EE: Conventional utilities, building owners, large fleet operators. Conversely, it is not yet quite clear who steps forward as a financier.

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6 McKinsey Global Institute, 2008: The Case for Investing in Energy Productivity

7 UNEP Finance Initiative Climate Change Working Group, 2009: Energy Efficiency and the Finance Sector – A survey on lending activities and policy issues

8 Economic Commission for Europe, 2010: Financing Global Climate Change Mitigation – Sources of Financing Energy Efficiency and Renewable Energy

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## However, investable clean tech equities successfully attract capital

Companies providing solutions for energy efficiency (EE) and renewable energy (RE) are an attractive investment market. They successfully attract investors as can be observed through several sources:

- In the NEX Wilderhill Index<sup>9</sup> and other indices for RE we observe that RE and EE investment in listed companies is on the rise and market capitalisation is growing. But this and similar indexes are still highly volatile and often connected to political incentives (feed-in tariffs).
- SAM Sustainable Asset Management reports that clean tech private equity already accounts for nine per cent of global private equity investments and is expected to grow further.
- IPOs, private-equity secondaries and convertibles of renewables are growing again after a break in 2009.
- The Guardian newspaper in the UK recently reported that in 2009 clean technologies had attracted USD 140bn in financing already, and had “overtaken investments into gas and coal for electrical power generation.”

We see that technology is available and also performing well. An indication of this is the continuous increase in successful start-up companies in this field. But finance for ubiquitous deployment of many technologies is still lacking.

Who are the investors for those cleantech companies? Are pension funds and other institutional investors among them? On the pension fund side, this is a varied landscape. Few such institutional investments are made in Switzerland, for example. However, broader investor groups such as CERES in the US and the Prince Charles P8 group of pension funds have pledged money to climate change solutions. Public pension funds in many countries are also committed to finance clean tech companies.

Other financial mechanisms, asset classes or solutions need to be looked at of course, but they have not been further investigated in this paper. They include project finance, infrastructure finance, venture capital, index insurance products (e.g. for wind and solar to provide risk capital in case a certain quantity of wind or sun is not forthcoming in a defined time period), hedge funds, bonds, etc. The carbon markets also provide much needed capital. But the relevance of carbon markets and the associated opportunities and limitations are not covered in this paper because of their complexity. They actually require a symposium of their own, as this is a highly political subject.

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<sup>9</sup> The NEX Wilderhill New Energy Global Innovation Index is comprised of companies worldwide whose innovative technologies and services focus on generation and use of cleaner energy, conservation and efficiency, and advancing renewable energy generally. Included are companies whose lower-carbon approaches are relevant to climate change, and whose technologies help reduce emissions relative to traditional fossil fuel use. Other indices: Cleantech Index, DB NASDAQ OMX Clean Tech Index

# The interview-based case studies

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Achieving real economic change will involve significant development of the specialist sectors that we have chosen to highlight in this paper. We believe they set the scene for serious debate.

Firstly, **Sander Paul van Tongeren** from one of the world's largest pension fund managers, **APG Asset Management**, examines how the role of institutional investors – one of the largest potential sources of crucial long-term capital for low carbon financing – is developing and where they are focusing their investments.

One of the other vital pipelines for low-carbon investments is, of course, the corporate sector. **Barbara Kux** of **Siemens**, one of the few companies worldwide with the in-house experience, know-how, products and solutions covering the entire energy value chain, explains how it drives up the demand for low-energy solutions by taking on certain up-front investments for clients on a contracting or energy service company (ESCO) basis.

Corporates are, of course, high energy users and are confronted with the upsides and downsides of energy scarcity and carbon regulation. In our third thought piece, **Katharina Tomoff** and **Martin Ziegenbalg** of **Deutsche Post DHL**, explain how they balance an ambitious energy reduction programme with an enlightened attempt to raise capital from sustainability-oriented investors.

Low-energy production is nothing without the proper grid infrastructure to control it. **Christian Feisst** at **Cisco Systems** is pioneering the development of smart grids that could change the way people consume power. Investing in these systems presents its own challenges, which the company discusses in our fourth case study.

Finally, on the financing side, **Roland Pfeuti** of **SAM** talks about how private-equity investors are refining their strategies for the successful financing of early-stage investments in low-carbon businesses.

# An institutional investor vision of the low-carbon future

## The clear case for energy-efficient property assets

One of the world's largest pension fund managers, APG Asset Management, the solely-owned manager of the giant ABP pension fund, which also runs assets for 20 other client pension plans, giving it total assets of more than 250bn Euros, has taken up sustainability and low carbon into its investment process. This reflects its view of the way the world is developing financially because of major social and political changes. Where it believes sustainability issues are material, APG has integrated them into portfolio investment decisions.

The pensions manager has invested across a huge variety of environmental themes, including a 500 m Euro trading position in the European carbon market in 2007, a 250 m Euro clean tech private equity commitment, and a 100 m Euro investment in a European renewable energy infrastructure fund.

In 2008, APG also created an internal think-tank looking at climate change amongst other strategic energy issues. The pension fund manager is also involved in a climate change strategic asset allocation project organised by Mercer, the investment consultant, which will look at long-term implications for investing in bonds, equities, private equity and infrastructure.

One area where the pension fund manager sees the transition to a low-carbon reality combining clearly with business rationale is that of property investments. Real estate, considered in terms of the construction, use and demolition of property, is estimated to be responsible for around 30–40% of global carbon emissions. The Intergovernmental Panel on Climate Change (IPCC) identified buildings as offering the most significant opportunity for cost-effective emissions reductions worldwide. Real estate is also a key constituent of most institutional investors' portfolios, often as much as 10% of overall assets, giving significant scope for a reduction in greenhouse emissions. APG wants to create a global benchmark for the greenest listed and private property management companies to gee up poor reporting levels in the sector. The benchmark idea came after a survey of property managers revealed a "strikingly low" number able to provide meaningful data on environmental factors. Only 19% of respondents were able to report verified figures for energy consumption of their buildings, while just 16% could do so for water consumption and a mere 14% for carbon emissions.

Van Tongeren said: "We believe that most new construction buildings from 2019 on will be close to carbon neutral. We asked most real estate companies whether they measured their carbon exposure. About 14% said they did, but mostly limited to UK, Swedish, Dutch and Australian property companies. Conversely, there was very little measurement in Asia."

Van Tongeren says APG sees its endeavours in greening its real estate investments as a classic double bottom-line win where financial savings lead to greater sustainability: "When buildings are made energy efficient the tenant benefits from lower energy costs and the owner from potentially better rent and overall building value. Legislation is the main driver of change, but there is also demand from corporate tenants."



**Sander Paul van Tongeren**  
Senior Sustainability Specialist  
Global Real Estate, APG Asset  
Management

*"We believe that most new buildings from 2019 on will be close to carbon neutral."*

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The Dutch government, for example, has committed to a private sector target of a 25% increase in energy conservation by 2011 and 50% by 2015 in new shops, homes and offices. Its ultimate target is to achieve energy-neutral construction across the board by 2020.

## Leaders and laggards

“The UK’s mandatory carbon emissions scheme, the CRC Energy Efficiency Scheme, started on April 1, 2010. It requires companies liable under the CRC to pay GBP 12 per tonne of CO<sub>2</sub> emissions with the intention that laggards will be shown up in a league table. Building codes are becoming tougher in each country based on carbon emissions,” he notes.

*“We will monitor the progress investments make year-on-year.”*

“We’re conducting more surveys and looking at making real web-based progress in such a way that you are able to monitor the progress investments make year-on-year. New real estate investors (listed and non-listed) will be able to complete the survey online. Participating investors will be able to use the automatic report generated as part of their sustainability due diligence process, as they will see the relative environmental performance of the potential investment against that of a peer group. It is a topic on the mind of all CEOs and CFOs in property companies and is increasingly presented as a pure financial business case. What we are now seeing is that some of the things we requested in the first survey coming through in the sustainability reporting of the likes of property companies like Hammerson and Unibail-Rodamco. We’ve had a lot of engagement success, and it’s interesting to note that this straddles both the listed and unlisted sector.”

# How to develop and finance low-energy strategies

“With our innovative technologies, we can now sustainably reduce CO<sub>2</sub> emissions, the primary cause of climate change. We achieve this by improving energy efficiency and by substituting fossil fuels with renewable energy sources,” says Barbara Kux, Member of the Managing Board of Siemens. She is also Siemens’ Head of Supply Chain Management and Chief Sustainability Officer and has a proven track-record in sustainability management.

Her company, Siemens, belongs to the leading companies worldwide with the in-house experience, know-how, products and solutions that cover everything in the energy chain – from the energy-efficient production and transport of oil and gas, to all forms of power generation, the efficient transmission and distribution of power, and efficient energy consumption in all areas of life.

“Optimizing the energy chain,” says Kux, “is the key to a sustainable future.” For example, the utilization of energy-efficient technologies has a simple economic logic: investment costs can be recouped in a short time through the savings they generate. Consequently, green technologies will be a strong growth driver for Siemens in the future. “Our customers will also benefit from significant CO<sub>2</sub> reductions and cost savings, and – what is particularly important to us – we’ll be making a valuable contribution to protecting the climate and the environment.”

“As energy consumption soars, particularly in emerging countries, we face the challenge of meeting this demand as efficiently and cleanly as possible.” Kux knows that many decades will pass before the world can be served with renewable energy sources alone. Until then, the primary energy loads will depend on the traditional fossil fuels coal and gas. Siemens’ highly efficient gas turbines already achieve CO<sub>2</sub> emission levels that have the potential to help to meet the 2-degree target. With coal-fired plants, Siemens has reached efficiency degrees of nearly 47 percent. Consequently, Kux sees great potential for climate-friendly power generation in retrofitting existing plants with the latest technologies. And this upgrading will pay off, since efficiency in fossil-fueled power plants primarily means saving fuels. “In the face of steadily rising prices, the advantage is obvious,” she says.

The other end of the energy value chain marks an energy source of its own: energy efficiency. In nearly every area of public, private and commercial life, major amounts of energy can be saved without having to sacrifice supply security, comfort, flexibility or performance. Kux points out the example of real estate. Siemens’ experience is that, on average, the energy costs of buildings can be reduced by up to 40 percent by converting to them into modern energy management, heating and climate systems.



**Barbara Kux**  
Chief Sustainability Officer,  
Member of the Managing Board of  
Siemens AG

*“The energy costs of buildings can be reduced by up to 40 percent.”*

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## Contracting can help to overcome financing hurdles

“Investments in energy efficiency have the advantage that their returns are certain and can be precisely scheduled,” assures Kux. Yet many energy-efficiency projects never have a chance, primarily due to financing hurdles. For companies, however, investments in energy efficiency are not paid from projected increases in sales, but in fact pay for themselves completely and automatically from savings in operating costs. In addition to lower lifecycle costs, energy efficient devices also have longer maintenance intervals which save additional servicing costs.

In this context, Siemens offers building owners and operators an interesting model: Siemens modernizes its clients’ buildings and installs most advanced technologies – at Siemens’ own cost. The energy costs saved by state-of-the-art building, heating and climate systems are claimed by Siemens until the investment for the technical conversion is paid back. After that, building owners and operators directly benefit from energy costs that are up to 40 percent lower than before.

Such performance-based solutions leave the client’s funds intact and leverage energy savings to pay for facility, capital, and technology improvements within the client’s existing operational budget. Thereby, operating costs are reduced while realizing the additional value of new, energy-efficient equipment and infrastructure. Siemens guarantees that facility improvements will decrease energy consumption and maintain comfort – all while minimizing environmental impact.

As a certified energy services company (ESCO) in the U.S., Siemens Government Services has offered such services for many years. Siemens thereby provides essential expertise for meeting federal energy goals and optimizing energy management – ranging from energy audits or full program designs, to financing to cover costs while energy savings are realized.

*“It is high time to scale up and multiply contracting schemes.”*

“It’s high time to give serious thought to scaling up and multiplying such schemes,” says Kux. “There are great opportunities here for the financial markets. At the moment, the enormous potential offered by converting society to energy efficiency is still largely untouched. Closer cooperation between banks and companies offering energy-efficient technologies would be a step in the right direction. Everyone would profit from the resource ‘efficiency’: investors, clients and the environment. And each new project would bring us one step closer to a sustainable world.”

# Equities: How to raise capital for ecological innovations?

The transport sector accounts for 13.1% of global greenhouse gas emissions<sup>10</sup>. The total additional investment in transport needed by 2030 under the UNFCCC's mitigation scenario is estimated at USD 88 billion, of which USD 9.2 billion is for bio-fuel production and the balance mainly for more costly hybrid electric vehicles.

Martin Ziegenbalg, Executive Vice President Investor Relations of Deutsche Post DHL (DPDHL) and Katharina Tomoff, Vice President of DPDHL's GoGreen Programme told us about their large pipeline of ecological innovations. They acknowledge that climate-change mitigation poses a challenge to the logistics industry and to their company, but are optimistic they will be able to please both investors and customers. "For us, it is primarily the way we do business and we know that all climate-related activities improve our competitive position. Our aspiration therefore is to become the provider of choice, the employer of choice and the investment of choice." Financing issues do not seem to be a major stumbling block which would hinder their climate-protection-related activities.

Becoming ever more carbon efficient is high on DPDHL's agenda. The company has set itself an ambitious target of a CO<sub>2</sub> efficiency improvement of 30% by 2020, including subcontractors. "A solid measurement is the first step," says Katharina Tomoff. She says this is why the company puts a lot of emphasis on its carbon-accounting scheme. As one of the most recent steps they have integrated consumption data and the respective CO<sub>2</sub> emissions into their financial system. In this way carbon is almost treated as a "currency" – and why not include the amount of carbon generated on the customer's bill?

## Taking the carbon commitment into investment

The company's efficiency targets will be met by fleet optimisation, increased network efficiency, more efficient heating and lighting in buildings, and enhanced employee awareness, which will also help customers to assess and optimise their own footprints. Fossil fuels account for a considerable portion of DPDHL's operational costs. They spend 736 m Euros on fuels and 454 m Euros on kerosene<sup>11</sup>. Bringing down fuel consumption will create savings and increase competitiveness, explains Tomoff.

However, when DPDHL wanted to take its commitment further by engaging in capital-intensive projects like the introduction of electric and hybrid vehicles, it encountered a major bottleneck: many promising technologies are not yet advanced enough for commercial application or available on a marketable level. Hence, DPDHL needed to partner with peers from the vehicle manufacturing industry. It now jointly invests with them in the development of new transportation technologies.

One example is the 18-tonne-hybrid truck, recently introduced as a first-of-its-kind in this vehicle category. DPDHL laments that for this truck, like other projects, a solution in terms of a profitable operation is not yet in sight. Bringing costs down and



**Katharina Tomoff**  
Vice President GoGreen  
Programme, Deutsche Post DHL



**Martin Ziegenbalg**  
Executive Vice President Investor  
Relations, Deutsche Post DHL

*"All climate-related activities improve our competitive position."*

<sup>10</sup> Source: IPCC, Climate Change 2007: Synthesis Report, 2007

<sup>11</sup> [http://www.dp-dhl.com/de/verantwortung-online\\_report\\_2010/wirtschaftliche\\_verantwortung.html](http://www.dp-dhl.com/de/verantwortung-online_report_2010/wirtschaftliche_verantwortung.html)

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*“We are keen to roll out carbon-efficient vehicles, but are not able to develop the transportation hardware on our own.”*

developing such lorries is in the mutual interest of the manufacturer and the shipper. But DPDHL would still like to encourage a stronger commitment from developers and manufacturers by demonstrating substantial demand: “We are very keen to test and roll-out alternative, carbon-efficient vehicles but we are not in a position to develop the transportation hardware on our own – we are a services company, not a car manufacturer.” Tomoff and Ziegenbalg suggest that governments should also give stronger support to R&D activities, and they consider that the subsidies involved would create benefits not only for the technology providers but also indirectly for companies like DPDHL.

Deutsche Post DHL looks at climate change mitigation as an ongoing process and has not set a fixed budget. As Tomoff explains, “we get the capital for our ‘green’ projects from two sources: internal financing for normal (replacement) investments or from a dedicated ‘GoGreen’ innovation investment pool for newly developed technologies like the 18-tonne-hybrid truck or electric vehicles.”

Monetary returns for GoGreen are mainly expected in terms of cost savings, enhanced customer satisfaction and brand value. B2B and B2C customers equally appreciate steps to a less carbon-intensive service offered by DPDHL. Business clients’ interest is mostly driven by the fact that they increasingly report on their indirect emissions (scope 3 according to the GHG protocol). Conversely, end users are more sensitive today due to the rapid surge of climate change in public awareness.

*“The bar for being an ,investable’ company will be raised.”*

But what contribution can the capital markets make to DPDHL’s programme? There are still few equity investors with an explicit commitment to environmental issues. Ziegenbalg points out that institutional investors with a long-term orientation among the company’s shareholders have not yet proactively subscribed to climate change. Nevertheless, he sees all mainstream investors passively factoring in the cost of carbon as it gains importance, and he says increasing fuel costs and his company’s need to purchase emission rights are getting onto the checklist of every investor. So the bar for being an “investable company” will be raised. In addition, Ziegenbalg expects that carbon and other ESG-related factors will become staple concerns for investors just as corporate governance did some years ago. He says this will happen mainly out of risk considerations. Asked about the recently introduced US Securities and Exchange Commission (SEC) guidelines on emissions reporting<sup>12</sup>, Ziegenbalg strongly advocates a similar reporting requirement for the German stock exchange.

Tomoff is proud that DPDHL’s efforts are mirrored in prominent SRI-Indexes like the Dow Jones Sustainability Index. But she feels that the company’s carbon performance should be more adequately reflected, as rating companies still give more attention to policies and procedures rather than actual achievements. Comparing companies’ carbon performance is still hardly possible. The GHG protocol, they say, is a good start, but industry-driven standards for carbon accounting urgently need to be developed further.

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<sup>12</sup> Media Release: „SEC Issues Interpretive Guidance on Disclosure Related to Business or Legal Developments Regarding Climate Change“ <http://www.sec.gov/news/press/2010/2010-15.htm>

# Creating energy efficiency with the help of smart grids. The challenges of investment and financing

A low-carbon economy – apart from enhancing energy efficiency – is expected to leverage new forms of energy provision and mobility. Renewables like solar, wind and wave power are contributing more and more electricity to the existing grids and electric vehicles are expected to become a major new energy consumer.

Cisco Systems, Inc. is a global leader in networking for the Internet. Cisco's hardware, software, and service offerings are used to create internet solutions that allow individuals, companies, and countries to increase productivity, improve customer satisfaction and strengthen competitive advantage. Christian Feisst, Managing Director Business Development of the Cisco Smart Grid Business Unit, emphasizes that smart grids are a vital prerequisite for accommodating this new energy mix and for electric mobility.

Today's electricity markets are characterized by supply and demand patterns that are drifting apart: supply still largely relies on fossil energy sources that can be switched on and off as demand fluctuates. But this is no longer the case with renewable energy sources. On the demand side, consumers will soon be "prosumers" – e.g. by draining and adding electric power from or to the net through their rooftop solar panels or electric vehicles. Similarly, heat pumps make buildings virtually independent from fossil energies, but increase volume of consumer demand for electricity. Having the ability to better influence consumption and distributed generation are key to managing a future energy system. Consequently, smart grids are essential in handling such unprecedented fluctuations in energy supplies and demand. "In future we will see a paradigm shift: demand will have to follow the supplies and not vice versa as it is today", says Feisst.

Smart grids are a combination of physical net infrastructure with a communication infrastructure on top, enabling all market participants, including consumers, to interact with each other. Smart grids include smart meters and home energy management systems as well as upgrades of the core electrical infrastructure (e.g. transformer stations) and intelligent communication technologies. Such upgrades will enable grid operators to monitor and control areas of their networks that are not currently monitored or managed.

The benefits that smart grids promise to deliver are manifold. Their direct impact will be to reduce transmission and distribution losses, which amount to up to 10% nowadays. They will also help to detect damaged or inefficient electric appliances, identify stand-by losses and alert consumers accordingly, explains Feisst. They will help to better integrate renewables and facilitate the mass-use of electric vehicles. According to Cisco's calculations, smart grids can indirectly reduce 30–40% of CO<sub>2</sub> emissions, compared to a business-as-usual scenario, by using existing energy more efficiently.

Furthermore, smart meters are supposed to provide an unprecedented degree of transparency to the end-user. They will enable each and every house owner to monitor his own consumption in real time. But Mr. Feisst points out the true challenge: smarter electricity usage – i.e. using less energy – will only come about when electric appliances can be steered in an automated, pre-defined and thus truly comfortable and intelligent way. And once the consumption of – say – a refrigerator is apparent, end users will be able to make payback calculations for a better, more energy efficient fridge.



**Christian Feisst**  
Managing Director Business  
Development, Cisco Smart Grid  
Business Unit

*“Smart grids will help to integrate renewables and electric vehicles.”*

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## Investment and financing needs

Of course, tremendous future investments are connected to the building up of smart grids. Cisco sees an addressable market potential in 2014 of about 15–20 bn USD – just for the communication side of the system. Additionally, power equipment (like transformers, switch gear, smart meters etc.) needs to be renewed.

As a result, existing and new players expect the smart grid market to explode in the next few years. Utilities can change their business models and start providing many more services to consumers than just electricity. IT companies are also moving into the sector and many start-ups will rapidly grow into bigger companies.

*“Utilities are supposed to make the investments, but they can not capture the entire value yet.”*

Nevertheless, there is a major structural barrier, according to Feisst: “Utilities – not consumers – are supposed to make the majority of the investments, but they can’t capture the entire value yet”. In fact, utilities in the regulated grid business have few incentives to invest in smart grids at present. Why? Regulators’ tariffs approvals often do not factor in smart grid elements, but are based on benchmarks that factor in the installed asset base, not the “intelligence” of the asset base. Only tariffs that allow for such investments can provide the planning security needed for utilities.

In the end, this could lead to a paradigm shift, says Feisst. Once market frameworks are in place, he finally sees utilities shifting to entirely new business models away from generating revenue based on volume sold to a model that offers completely new services. Utilities might go down the same route as the telecom industry some years ago when they started giving away free internet routers or set-top boxes to consumers to enable certain services. This could be a blueprint for deploying smart grid solutions at customer premises. Feisst expects a lot of market potential in such integrated solutions for utilities.

*“Carbon markets currently incentivize emission reductions outside the home economy.”*

Feisst says that what is expected from smart grids is two things. Firstly, a contribution to CO<sub>2</sub> emission targets. Secondly, incentives for smarter consumption. Why not link CO<sub>2</sub> and energy efficiency targets to utilities’ revenues, proposes Feisst. He argues that this could be an incentive for efficiency investments within the EU. Today, power generation assets already need the purchase of CO<sub>2</sub> certificates. But, says Feisst: “the current set up of carbon markets incentivizes emission reductions through the JI or CDM mechanisms outside the home economy rather than within the national electrical systems.”

Smarter consumption means consuming electricity when it’s available cheaply. So finally, it boils down to market frameworks: tariffs need to be more flexible in order to reflect the fluctuations in supply and demand as described above.

# How are successful investments in low-carbon business models being financed?

## The private equity route

One of the most significant financing mechanisms for low carbon environmental companies is the venture capital/private equity route. Roland Pfeuti, Senior Investment Director, Head Private Equity Team Switzerland, at Zurich-based SAM, runs a clean tech fund-of-funds strategy<sup>13</sup>.

SAM runs the clean tech private equity specialist investments of Dutch parent fund manager, Robeco, which were previously labelled under the parent name. Pfeuti says a fund-of-funds is often the first port of call for specialist private equity managers in the low-carbon space seeking to scale up investment: "Six to seven years ago there were maybe 50 clean tech managers and today there are between 250–300, and the first thing those managers do is look around and see who the 4 or 5 big fund-of-funds players are, and we are amongst them. It's one of the first pools of capital to look at and, therefore, a fund-of-funds manager has a tremendous overview of the developments in this emerging industry globally."

Pfeuti says the fund-of-funds approach reflects a need amongst some institutional clients (pension funds/insurers) to invest in the relatively young clean tech sector in partnership with a specialist. "Some institutional investors can go direct, but many need someone to scope the sector and look over the different sub sectors: clean tech, environmental infrastructure, food/agri, forestry etc. They don't have the capacity to research these areas properly and put together a portfolio. We offer that service to them."

Robeco runs about USD 1bn through its master funds, which he summarises as acting as a "quality funnel" providing for a well diversified portfolio which is less risky than individual direct investments. The fund manager has to date raised three clean tech fund-of-funds, and is planning to broaden its offering into other climate-relevant sectors.

Interestingly, Pfeuti says the stage of clean tech investment being looked at by Robeco has shifted from early stage 'venture' into expansion capital. He explains that the venture capital strategy was harder for asset managers to exploit than was expected 7–8 years ago when Robeco began investing in the area: "The reason for this is the lengthy and relatively costly lead-ins to realising investments in products that tend to be either in the utilities or auto sectors, where time-to-market tends to be lengthier than in information technology or biotech." In general, after a bit of a halt last year, the number of managers raising capital is growing again quite significantly. In the first half of this year we have already seen as much deal flow in terms of the amount of fund activity as we did in the whole of 2007."



**Roland Pfeuti**  
Head Private Equity Team  
Switzerland, SAM Private Equity AG

*"Institutional investors view clean tech as a maturing sector."*

*"The fund-of-funds approach reflects a need among institutionals."*

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<sup>13</sup> Fund-of-Fund: a master fund invests with a number of primary and secondary specialist private equity managers, which in turn invest into a portfolio of cleantech companies.

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*“Companies like GE are increasingly looking like clean tech companies.”*

Pfeuti said Robeco moved up the value chain into development capital, or into very early-stage venture capital, taking small ideas teams from the drawing board to other incubator investors such as corporates: “Sound expansion capital investment opportunities exist across the various clean tech sectors including renewable energies, where we see consolidation in subsectors such as solar and biomass.” Pfeuti says development capital in the solar sector is a popular investment at the moment, notably amongst what he calls ‘downstream’ investments: companies in sales and installation: “There is a lot of potential M&A activity and consolidation possibilities in this area. ABB, GE and Siemens are still looking for acquisition targets, especially companies with clear 3 – 5-year revenue streams.”

In terms of company flotations, however, Pfeuti says the market for initial public offerings (IPOs) is still “fickle”. September 2009’s float of A123 Systems, the maker of lithium-ion batteries for the electric car market, and June 2010’s USD 226.1 m IPO of Tesla Motors, have been rare signs of life in the market. Says Pfeuti: “You have to be aware that low carbon/clean tech is not the next IT revolution: it is a much broader energy efficiencies investment with a longer play-out.”

“In many ways, the clean tech financing market is not the same as it was 10 years ago. Companies like GE are increasingly looking like largely clean tech companies, and in the auto sector you can see all the big players looking at developing their clean vehicle capacities. At the same time, new building regulations are making parts of the property world akin to clean tech investing.”

Institutional investors, says Pfeuti, are gradually taking a view on clean tech as a maturing sector: “There are many proven managers out there and the sector is de-risking and is certain to attract more capital. There’s also a lot of government money out there in low-carbon infrastructure, because the big picture of climate change adaptation hasn’t changed.”

# Summary & Food for Thought

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The case studies highlighted in this thought paper outline the major topics that will be debated at the 11<sup>th</sup> International Sustainability Leadership Symposium on 28 September. They throw up some of the key questions to be addressed if we are to see meaningful steps taken towards the low-carbon economy so imperatively outlined in the UNFCCC's climate change mitigation targets.

As Sander Paul van Tongeren at APG points out, there is much elemental work to do in convincing companies of the 'self-interest' in turning their operations low carbon. The real estate environment is often held up as the low-hanging fruit of potential carbon emissions reductions. Yet, as he notes, a survey revealed a "strikingly low" number of property companies able to provide meaningful data on environmental factors. That was so despite a plethora of environmental building regulations and taxes in the planning or even implementation stage. But he also mentioned the growing demand from corporate tenants for energy-efficient buildings.

## Encouraging Investment and Financing Solutions

A major point of discussion at the conference should be how to help corporations make short-term investment for long-term gain, both environmentally and financially. Companies are often deterred by high up-front implementation costs despite the substantial savings in operational costs they can expect in the long run. Barbara Kux of Siemens has highlighted energy-saving contracting services as a mechanism to overcome this dilemma. For example, her company provides the pre-financing for energy-efficient technologies for the client and thereby acts as both a technology provider and financial service provider. In so doing, Siemens takes on the investment and leaves the client's funds intact. In our symposium we will explore other possible solutions and discuss banks' and insurers' related roles and services.

The reality of matching savings in operational energy cost with investor's return-on-investment expectations might not always be straight forward. Although, "upgrading will pay off" is being maintained by Kux in this paper, we fear that the energy sector's drive for short-term returns will hinder more sustainable solutions. In addition, we should debate exciting and new technologies, but not forget the importance of phasing out old and inefficient power generation technologies. Even the highly efficient gas turbines mentioned by Barbara Kux can only unfold their potential to help meet the 2-degree target when older turbines are replaced early on.

A debate of similar import is opened up by Katharina Tomoff and Martin Ziegenbalg of Deutsche Post DHL, who point to the funding constraints for capital-intensive projects such as electric and hybrid vehicles, which are not yet commercially viable. Therefore they advocate stronger government support for "integrated" R&D activities to find win-win solutions for green policy, technology developers and corporates alike. A similar issue raised by Christian Feisst at Cisco is the need for smarter tariffs to underpin technological advances in the electrical grid. These points underscore the need for discussion at the conference on how to lobby governments for the right regulatory and incentives framework.

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Deutsche Post's lament that long-term institutional investors have yet to proactively invest in climate-change solutions is also crucial. If the estimated 85 % of the capital required for climate-change mitigation is to come from the private sector, mechanisms to unlock the potential investment stream from pension funds and insurance capital should be discussed. No less important is their assertion that industry-driven standards for carbon accounting also require attention.

Roland Pfeuti of SAM Private Equity claims that diversified investment in essential early-stage climate change solutions can be encouraged through the private equity market. Building the right financing vehicles and partnerships will be key. The above questions and many more are food for thought for the conference.

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