



Financing the Transformation to a Low-Carbon Economy

11th International Sustainability Leadership Symposium 2010
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Swiss Re Centre for Global Dialogue, Rüslikon / Switzerland

Preface



Zeno Staub

Dear reader

Once again, we were able to host an inspiring event at the Swiss Re Centre for Global Dialogue and we wish to thank their Head Annabelle Hett for the overwhelming hospitality. In my welcome address, I outlined the main aim of The Sustainability Forum Zurich, which is to be the financial sector's leading sustainability discussion platform, ensuring an international reach while addressing sustainability from a Swiss angle.

My understanding of financial markets is that they operate by assessing future outcomes and matching the price of contracts with the risk appetite of capital allocators. For the theme of our Symposium, "Financing the Transformation to a Low-Carbon Economy", this means trying to match uncertain future profits with known present costs – and the uncertainty is all the greater since COP-15 in Copenhagen failed to produce a political roadmap and market-based incentives for emission reductions. It is now up to the market to do better than the politicians in pushing decarbonisation forward.

I think this Symposium has confirmed that the technology is available and that it puts a low-carbon future within our grasp. In the course of the programme, we submitted the technical feasibility of the vision to the "reality check" of financial market viability – embodied at the event by the capital owners, the capital deployers of the real economy and the capital allocators. They described some of the opportunities they see in the low-carbon space. Furthermore, the programme addressed three different sectors in which low-carbon economic activity is already unfolding: the energy, building and transportation sectors showcased their solutions. Finally, we addressed the political and regulatory frameworks and realised that the transition to a low-carbon economy is not only a financial issue – we need to convince all stakeholders to achieve a social consensus.

Zeno Staub, President
The Sustainability Forum Zürich (TSF)

Imprint

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Summary and conclusions “A Wishlist”

by Thomas Streiff, CEO, The Sustainability Forum Zürich



Thomas Streiff

When we boil it down to the essentials, what do we need to facilitate the transformation to a low-carbon economy? This Symposium yielded concrete suggestions that can best be summarised in a “wish list”:

- We need robust and meaningful data on environmental factors; the property companies in particular are called on to provide these as the basis on which investors can make their decisions.
- Considering the huge improvement potential for energy efficiency (EE) in real estate and the low implementation status, we must encourage private individuals and corporates to step up their demand for energy efficient buildings.
- We would like to see more pre-financing solutions for EE technologies with comparably high up-front costs (Siemens is one of the pioneers in this with its energy savings contracting solutions).
- Co-financing of private sector R&D in EE applications is needed; governments could step in here.
- Orchestrated lobbying for transparent regulations is needed urgently, in particular from the energy-intensive industries and the very diversified clean tech sector.
- Regulators should play a more decisive role in establishing and promoting mechanisms to unlock investment capital for climate change mitigation from pension funds and insurance capital.
- Diversified investments in early-stage EE and renewable energy (RE) solutions need to be encouraged – the private equity market should make a major contribution here.
- Active ownership by investors is crucial. The real economy should show leadership in this respect, and the institutional investors like the pension funds are called on in particular.
- We would like to see more strategic and operational partnerships, like those between start-ups and big corporates, and also public-private partnerships.
- We should move away from product dependency to system applications.

Symposium Programme

Tuesday, 28 September 2010

Time	Speakers	Topic
09:00	Annabelle Hett , Head, Swiss Re Centre for Global Dialogue	Welcome by the host
	Zeno Staub , President, The Sustainability Forum Zürich (TSF)	Symposium opening and presentation of conference theses
09:15	Norbert Ender , Leader, Smarter Cities, IBM Switzerland & Jan-Olaf Willums , Chairman and founder, InSpire Invest interviewed by: Thomas Streiff , CEO, The Sustainability Forum Zürich (TSF)	The vision
09:45	Ramón Baeza , Managing Director, BCG Spain & worldwide BCG topic leader "CO ₂ and emissions"	Setting the scene: Are we on track for a prosperous low-carbon world?
11:00	Panel Discussion Christopher Flensburg , Global Coordinator for Green Bonds, Skandinaviska Enskilda Banken (SEB) Alexander Schindler , Member of the Board, Union Asset Management Holding AG Simon Thomas , CEO, Trucost Sander Paul van Tongeren , Senior Sustainability Specialist Global Real Estate, APG Asset Management John K.S. Wilson , Director, Corporate Governance, TIAA-CREF Moderator: Ivo Knöpfel , founder and Managing Director, onValues	Asset owners' investment strategies: Consideration of climate risks and opportunities
13:30	Parallel Workshops Markus Koschenz , Implenia Real Estate Erika Meins , University of Zurich Andreas Schläpfer , schlaepfer:associates Stefan Seitz , Siemens AG Facilitator: Markus Nöthiger , PricewaterhouseCoopers (PwC) Remo Estermann , TEXX AG Swiss Battery Management Systems & TEXX Energy AG Daniel Hofer , Migrol AG Facilitator: Thomas Streiff , The Sustainability Forum Zürich (TSF)	Financing decarbonisation of buildings and building materials Financing decarbonisation of mobility and transportation

Time	Speakers	Topic
	<p>Brice Koch, ABB Ltd.</p> <p>David N. Bresch, Swiss Re</p> <p>Facilitator: Sabine Döbeli, Bank Vontobel</p>	<p>Financing decarbonisation of energy supply</p>
15:00	<p>Panel Discussion</p> <p>David N. Bresch, Director, Head Sustainability & Emerging Risk Management, Swiss Re</p> <p>Gina Domanig, Managing Partner, Emerald Technology Ventures</p> <p>René Eichenberger, Managing Director, ClearSky Power & Technology Fund</p> <p>Dustin Neuneyer, Group Development, Sustainability Management, WestLB AG</p> <p>Roland Pfeuti, Head, SAM Private Equity Team Switzerland</p> <p>Moderator: L. Warren Pimm, Director, Investment Banking, Sustainable Development Capital LLP</p>	<p>Financing models for renewables and energy efficiency</p>
16:45	<p>Closing Panel Discussion</p> <p>Patrice Robineau, Senior Advisor to the Executive Secretary, replacing Ján Kubiš, Executive Secretary, Economic Commission for Europe (UN ECE)</p> <p>Peter Maurer, State Secretary, Swiss Department of Foreign Affairs</p> <p>Lord Colin Moynihan, former UK Minister for Energy, Chairman, Pelamis Wave Power Ltd</p> <p>Nico Stehr, Professor, Zeppelin University Friedrichshafen; co-author of the Hartwell Paper</p> <p>Ian Zhu, Principal, Tsing Capital (China)</p> <p>Moderator: Alexander Barkawi, former Managing Director, SAM Indexes</p>	<p>Policies for a low-carbon economy: Objectives, strategies and leadership</p>
17:45	<p>Thomas Streiff, CEO, The Sustainability Forum Zürich (TSF)</p>	<p>Symposium summary</p>



Thomas Streiff, Norbert Ender, Jan-Olaf Willums



Norbert Ender



Jan-Olaf Willums

Norbert Ender, Leader, Smarter Cities, IBM Switzerland
Jan-Olaf Willums, Chairman and founder, InSpire Invest

The vision

Invited to play the role of “professional visionaries”, the first two speakers described how they envisaged a technologically savvy, energy-efficient, low-carbon future.

IBM’s Norbert Ender presented a vision of low-carbon cities where interconnected technology is key. In IBM’s view, future cities will be

- instrumented: omnipresence and availability of sensors
- interconnected: even more avid internet use in the future, smart-phones will connect to cars and houses and inform us about their energy consumption
- intelligent: not only information but also analyses of it in real time will be accessible.

This is already reality in systems which forecast and manage traffic congestion, a vast source of pollution.

Similarly, smart meters can reduce household electricity consumption by 10% according to the US Energy Department.

Considering that Europe alone wastes an estimated 170 bn kWh of energy each year – equivalent to the entire power consumption of Germany – because devices are not switched off after use, these technologies can make a huge difference. But the cities need to act urgently. Success depends on mastery of new skills, willingness to adapt, and economic feasibility. In this context, Ender was the first of many symposium participants to see the growing need for public-private partnerships.

Jan-Olaf Willums evoked an enticing picture of low-carbon transport in a not too distant future. He sees a need not only for innovative technologies but also for new business models for the automotive sector, moving from products to services based on new financing solutions along the lines of “Pay As You Drive.” Coming generations will anyway no longer regard cars as prestige items but simply as means of mobility. Willums thinks that efficient linkage of electric vehicles and the grid will come faster than expected and could enable us to “shave” peaks of energy consumption. He considers that tapping unused energy-efficiency potentials can be a self-financing means of climate mitigation. Closing the energy gap can be financed through investments paid back by energy cost savings, and such investment will yield very attractive returns, turning energy efficiency into “the next goldmine.” Mobilising investment and risk capital will be easier if carbon efficiency is made measurable and tradable.



Ramón Baeza

Ramón Baeza, Managing Director, The Boston Consulting Group (BCG)
Spain & Worldwide BCG Topic Leader “CO₂ and Emissions”

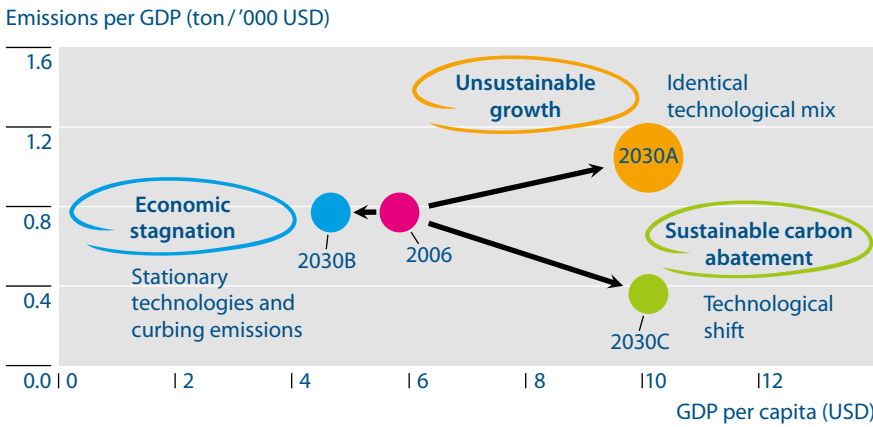
Are we on track for a prosperous low-carbon world?

Following the first two speakers’ upbeat vision of a low-carbon future, Ramon Baeza’s view of the current situation was sobering. He thinks the world is a long way off track and that the situation is extremely challenging, despite technological innovation and the high awareness of politicians and CEOs to climate change. In fact, we are currently losing the momentum needed to achieve our targets of 40 to 60% emission reductions in the next 20 to 40 years. As increases in emissions are not slowing down sufficiently, our distance from the calculated reduction baseline scenario is increasing.

Also, most macro-economic indicators drive further growth in total worldwide carbon emissions: population growth, increase of GDP and a growing carbon intensity of the total primary energy supply (TPES). Only the energy intensity of GDP has been going down (TPES/GDP). Why is this so? Five important principles are crucial for any effective carbon abatement measure – and they have not been followed to a large degree so far:

- **Materiality:** Measures must aim for visible abatement potentials. In contrast, current binding reduction commitments cover only a small share of global emissions at a geographical and sector level.
- **Efficiency:** Priority must be given to the cheapest available solutions, at a regional level. But low-cost abatement levers are not being fully activated. There are also obstacles in consumer awareness and these are not always aligned with the political or economic development agenda.
- **Feasibility:** Measures must overcome technical, social and political deterrents. In fact, efficiency and carbon intensity reduction initiatives are not achieving their full expected potential because of consumer inertia.
- **Catalytic potential:** Measures must contribute to economic development. This has partially been the case. Incentives for renewable energy – e.g. in the EU have effectively promoted local industry and employment.
- **Fairness:** Measures must be neutral vs. the current economic balance. Reduction targets are not assigned according to abatement potentials – e.g. the assignments in the first phase of the EU Emissions Trading System. Carbon pricing at EUR 40 – 50 per ton is unimaginable for economies like India’s or China’s. Baeza revealed a range of market imperfections that are responsible for the above violations of the five principles. Among these imperfections are:
 - incorrect incentives such as agency problems e.g. in the building sector comprising issues such as the project developer is not the end user, high upfront investment costs with long payback periods, time lags between building and purchasing;
 - consumer behaviour;
 - administration costs;
 - market fragmentation.

Fig. 1: Sustainable abatement can only be achieved through a major technological shift

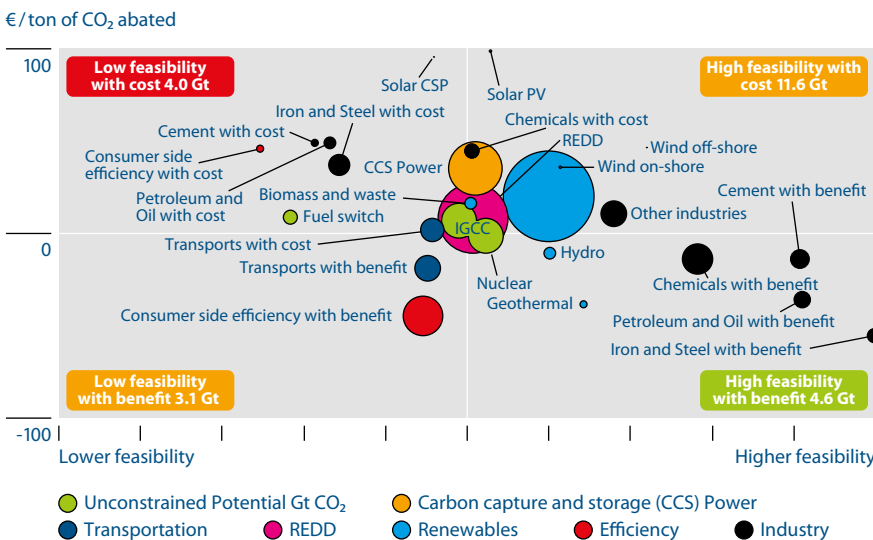


Source: The Boston Consulting Group

Carbon abatement measures, according to Baeza, can only be sustainable if they allow for economic growth and development. Pointing out three scenarios for the year 2030, he clearly showed that the current technological mix will be unsustainable as it makes emissions grow along with economic growth (scenario 2030A in graph 1). Alternatives could be to either reduce emissions by halting economic growth (scenario “stagnation” 2030B) or through a major technological shift (compare scenario 2030C in the following graph) – the latter preferably accompanied by mandatory regulations that help to overcome the market imperfections. Only the technological shift can help us to reconcile the sometimes conflicting priorities of increasing wealth (as expressed in GDP) and reducing emissions per unit of GDP at a time.

Fig. 2: Both high and low feasibility abatement levers required to keep global warming below 2 degrees by reducing 22 Gigatonnes of CO₂

Feasibility vs. cost of CO₂ abated by abatement lever (2030)



REDD stands for Reducing Emissions from Deforestation and Degradation

Source: The Boston Consulting Group

What can we do? Many different technological CO₂ abatement measures (“levers”) could be implemented (see graph below)– but they differ in cost per tonne abated and they are not uniformly feasible. In total, all global measures achievable by 2030 would yield an estimated 23 Gt of CO₂-e – which even exceeds the abatement target of 22 GT (according to IPCC and as compared with the baseline scenario). The aim is to halt global warming at no more than 2 degrees). But many of these abatement levers have been double counted. And reaching the target would entail pushing all the levers at the same time. In addition, we have to be realistic about the measures: on a regional level, priorities can be very different. Therefore, Baeza strongly recommended to carefully distinguish on a regional level. He also gave the corresponding examples: In Asia, the challenge is power generation, he said, in South America it is avoiding deforestation and degradation, in the U.S. the issue is how to achieve energy efficiency.

Panel Discussion

Asset owners' investment strategies: consideration of climate risks and opportunities



Ivo Knoepfel

When it comes to “financing the transformation to a low-carbon economy,” it is clear that much is expected of the capital owners, who can allocate capital as they wish and change their way of assessing risk and the potential of investments. At all events, a big proportion of the capital needed for mitigating climate change must come from the private sector.

How will capital owners deal with the challenges related to climate change? Will they calculate the associated risks – whether regulatory, reputational or physical – differently? Or will they focus more on carbon-related opportunities – such as new infrastructure, clean technologies, etc.? Or will they do both?

At the beginning of the session, moderator Ivo Knoepfel acknowledged that some large funds and large asset owners have already expressed their commitment to clean technologies and climate solution investments – mostly within the context of the United Nations' Principles for Responsible Investment (UN PRI) or the P8 initiative launched by Prince Charles – , and they have allocated capital accordingly. Although tax incentives for carbon are still relatively weak, their motivation is probably their extremely long-term investment horizon.



Simon Thomas

The panel was made up of specialists in important asset classes, representing the top allocation priorities of pension funds such as fixed income and bonds, listed equities, real estates and private equity.

At the beginning, two investment advisors gave their insights into environmental issues that are important to capital owners.

First, Simon Thomas, co-founder and CEO of Trucost Plc, showed that carbon risks in institutional portfolios can be measured and managed. He described different risk profiles in investments and explained how to reduce carbon risk – which does not figure in conventional risk management – in mainstream equity portfolios.

Cap and trade schemes and other carbon pricing methods are becoming increasingly established across the globe, creating winners and losers. Thomas quoted Goldman Sachs: “Whether a company is a winner or a loser depends on how carbon efficient it is compared to its peers,” and from the same source: “At a carbon cost of USD 60, up to 10% of total cash flow of listed companies may be transferred from companies with below average carbon efficiency to those with above average efficiency.” Therefore, data on companies' carbon efficiency will increasingly provide investment advantage.

Speakers:

Christopher Flensburg, Global Coordinator for Green Bonds, Skandinaviaska Enskilda Banken (SEB);

Alexander Schindler, Member of the Board, Union Asset Management Holding AG;

Simon Thomas, CEO, Trucost;

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

John K.S. Wilson, Director, Corporate Governance, TIAA-CREF

Moderation:

Ivo Knoepfel, Founder and Managing Director, onValues

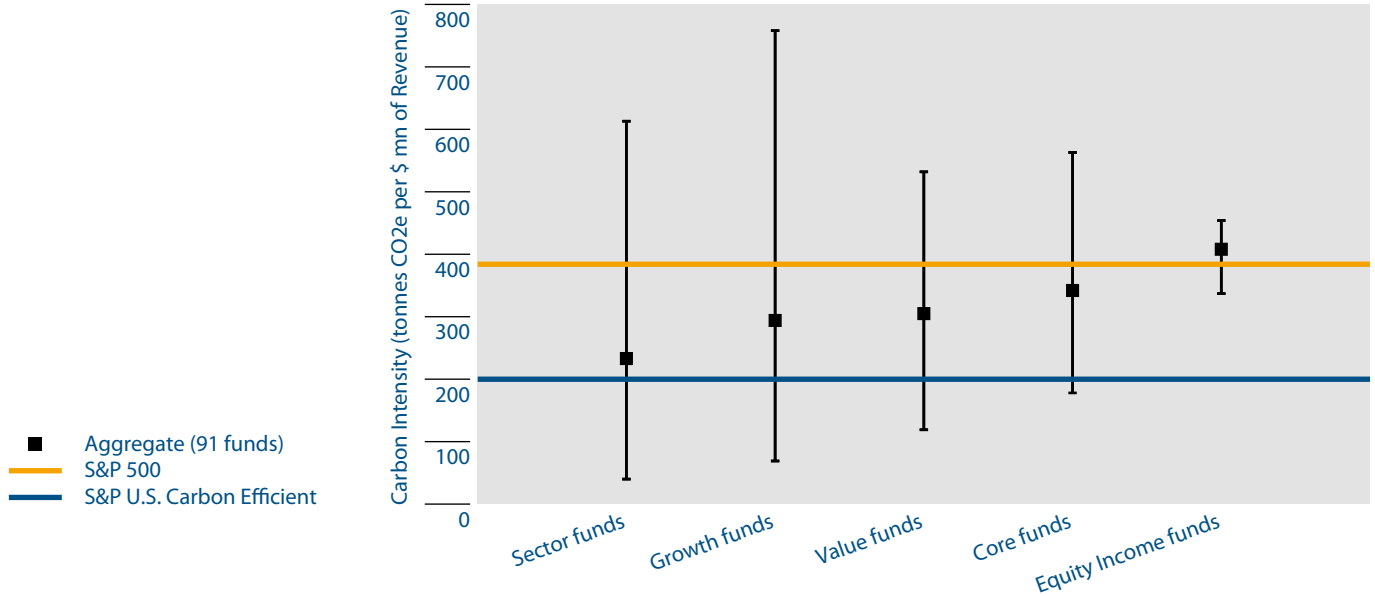
“At a carbon cost of USD 60, up to 10% of total cash flow of listed companies may be transferred from companies with below average carbon efficiency to those with above average efficiency.”

Simon Thomas



Alexander Schindler

Fig. 3: Carbon intensity in tonnes of CO₂e per USD mn of revenue



“Climate change, for us, becomes a question of corporate governance and whether the right incentives are set in our investee companies.”

John Wilson

He explained how an analysis of carbon intensity for funds in the S&P 500 and funds in the S&P US Carbon Efficient Indices showed the carbon output of the latter to be 48% below those of the former, with equal returns. When carbon pricing is introduced in the USA, the US Carbon Efficient Index will outperform spectacularly.

The second investment advisor, Alexander Schindler of Union Asset Management Holding AG presented a sustainability criteria survey of German investors (cf. figure 4). The survey of more than 240 large-scale German investors, with a combined investment volume of EUR 920 bn, was conducted in March and April of 2010 and it showed that 68% of institutional investors consider sustainability in their investment decisions, with the highest awareness among the pension funds and the banks, followed by the insurance companies. The awareness was lowest among corporates

and churches. About 56% of the respondents claimed they invested in climate-neutral values. Diversification was considered a means of lowering risk.

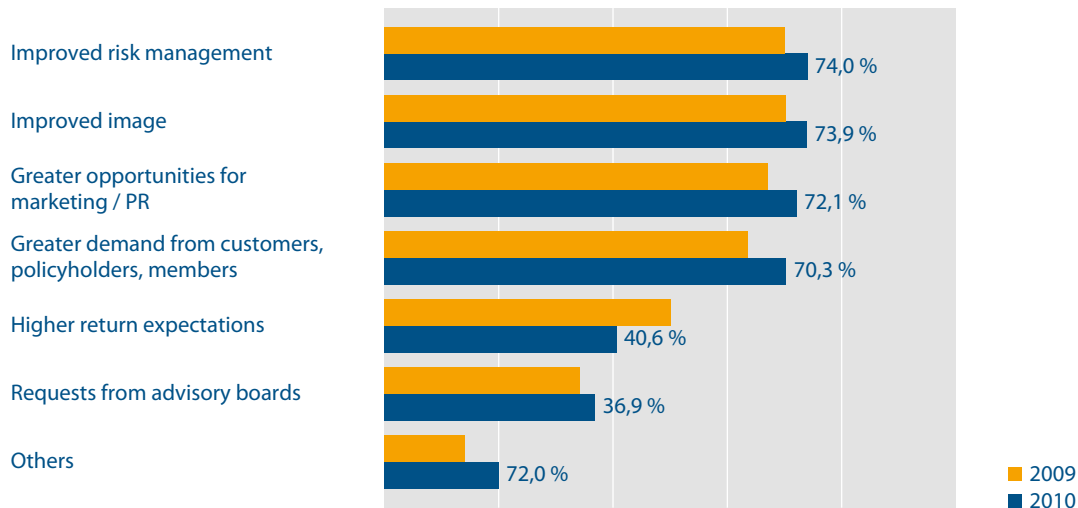
Knoepfel summarized that there is an awareness of risk and reputational factors among institutional investors, while the financial materiality does not yet seem to be so strong – but pension funds are most aware of these issues.

John Wilson is Director of Corporate Governance of TIAA-CREF, the biggest private pension organisation in the USA, managing assets of over USD 400 bn and insuring 3.7 Mio teachers in the U.S. TIAA-CREF addresses climate change on several levels, among them a dedicated real estate programme and a small allocation to venture capital in energy efficiency technologies. Furthermore, in its mainstream real estate portfolio, TIAA-CREF has the declared aim of improving the energy efficiency and



John Wilson

Fig. 4: Which motives are important for the consideration of sustainability criteria?



Source: Nachhaltiges Vermögensmanagement institutioneller Anleger 2010. Eine Studie der Schleus Marktforschung (Hannover) im Auftrag von Union Investment (Frankfurt am Main) Hannover/ Frankfurt am Main, 20. Mai 2010 Schleus Marktforschung, Union Investment, 2010

thereby the performance of their investments. The most important component of the organisation is their public equities: TIAA-CREF “owns basically the entire market” with USD 150 bn and 7000 companies in the portfolio. The pension fund tries to take climate risk into consideration but, as a universal owner, is exposed to systemic risk of climate change. Therefore, TIAA-CREF takes an active ownership approach to climate change, attempting to sensitize portfolio companies to the long-term implications of climate change and convince them to invest accordingly.

The moderator asked John Wilson whether his organisation would consider excluding industries from the portfolios on the grounds of high carbon risk. Wilson said that – at a universal owner – no sector can be excluded, though certain industries can be underweighted. TIAA-CREF tries to

ensure that companies are managed in accordance with the long-term interests of its pension fund participants. For Simon Thomas, that approach is inadequate. He was critical of the supposed “universal owner dilemma,” asserting that externalised costs are to the detriment of other companies, and therefore ultimately also to the detriment of the entire portfolio of TIAA-CREF. The prospect of negative screening would be a more effective lever than active owner admonitions. Organisations with large assets to invest can do an enormous amount of good without financial disadvantage.

John Wilson pointed out that when companies are mispriced due to environmental risks, like BP, this often only becomes obvious ex-post. This is why TIAA-CREF is struggling with a market that does not reward forward-looking investors pricing-in environmental risks early on.

“It is still difficult to integrate climate change in asset management because it is unclear on what timescale the risk will occur.”

John Wilson

“Only being an active owner without doing negative screening is like going into the boxing ring with one arm tied behind your back.”

Simon Thomas



Sander Paul van Tongeren

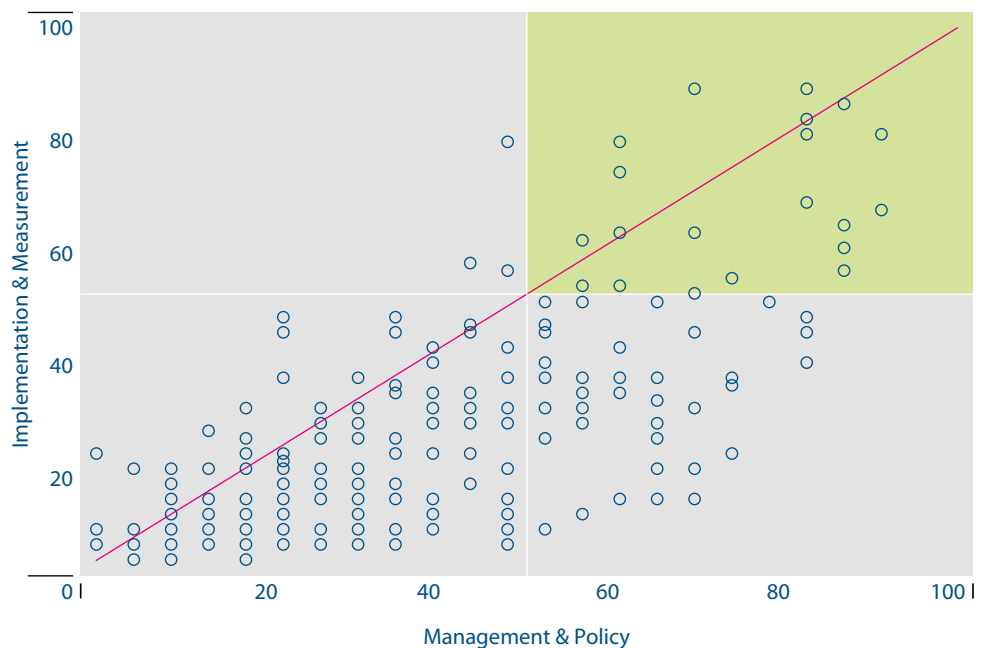
As a specialist in real estate investment portfolios, Sander Paul van Tongeren, Senior Sustainability Specialist with APG Asset Management explained how APG expanded its ESG investment philosophy to its EUR 17bn real estate portfolio of listed and non-listed property funds. APG found that it was almost impossible to judge the degree of sustainability of the portfolio. Therefore, they conducted their own global survey on integration of environmental practices (cf. figure 5). This was one of the first – and in addition open source – real estate sustainability benchmarks, and he invited more investors to join. The survey was designed to examine the environmental and energy policy of the real estate funds and its implementation. About two thirds of the companies and funds were “environmental laggards”, scoring low on both policy and implementation. Only about 10% were “green stars”, expressing environmental commitment

and acting on it. There was a positive correlation between sustainability thinking expressed in high environmental standards and financial performance.

With regard to the property and real estate sector, Knoepfel noted that it is very energy-intensive and greatly lags behind compared with other sectors. Van Tongeren thinks that awareness has substantially risen in the property sector – for very practical reasons: reduction of operational costs, reduced tax expenditures, emission trading schemes like the one in the U.K.

As a representative of the fixed income asset class and especially bonds, Christopher Flensburg, Head of Sustainable Products and Product Development at SEB presented the “Green Bonds” which were developed by SEB in cooperation with the World Bank Green Bond. The underlying idea is to satisfy a specific

Fig. 5: APG’s Four Quadrant Model of Property Funds’ Performance



Upper right: “Green Stars” only 20 respondents (10%)

Lower left: “Green Laggards” 133 respondents (67%)

Source: APG Asset Management



Christopher Flensburg

demand from pension funds asking for dedicated products within the conventional benchmark/mainstream portfolios but with a climate profile. In the World Bank, SEB found a partner who brought on board the know-how and an isolated portfolio of projects within the World Bank structure, with sound environmental criteria to satisfy the investors' demand for environmental responsibility. SEB further contributed the fiduciary duty know-how needed to satisfy pension funds' obligations regarding asset allocation. In short, the due diligence of the green bonds is handled by the World Bank, and SEB focuses on fiduciary obligations. The proceeds of the bonds are earmarked for certain environmentally-friendly projects.

The primary advantage of this financial product is that thanks to the World Bank AAA rating large institutional investors can comply with their standards for credit standing of bonds. It therefore constitutes a kind of public-private partnership (PPP), in which the public side plays the role of the risk insurer and the private side provides the capital. Potentially, this is a scalable format and it is applicable to other asset classes. It could possibly even work with corporate bond issuers, who raise capital for specific environmental solutions (e.g. Siemens for energy contracting). But Flensburg admitted that investors are wary of entering the "grey zone" of corporations that are neither fully green nor fully "dirty".

The moderator wondered whether for investors there was an over-emphasis on climate and carbon, considering that other drivers like energy security and energy supply constraints could come into play much faster. Flensburg agreed but thought this view was counterbalanced by growing awareness of climate change.

John Wilson was wary of involvement by asset owners in public policy making. He favoured strengthening shareholders' rights to increase the effectiveness of active ownership. Van Tongeren advocated more intense dialogue between investors and policy-makers. Simon Thomas agreed that efficiency is key, and said that enhancing it would entail tackling externalisation of costs. The world currently subsidises fossil fuel production and consumption to the tune of USD 557 bn per year. Merely ceasing to subsidise the companies damaging the climate and environment would be a good starting point.

"We had to make a split between what our fiduciary obligation is as a financial intermediary and what thematic climate investment is."

Christopher Flensburg

"There are other investment drivers that will kick-in earlier than climate change: Energy security, constrained energy supplies. Are we focussing too much on climate while these aspects materialise in a much shorter term?"

Ivo Knoepfel

Panel Discussion

Financing models for renewables and energy efficiency –



David N. Bresch



Gina Domanig

“Corporates help clean tech venture capital companies cross the chasm.”

Gina Domanig

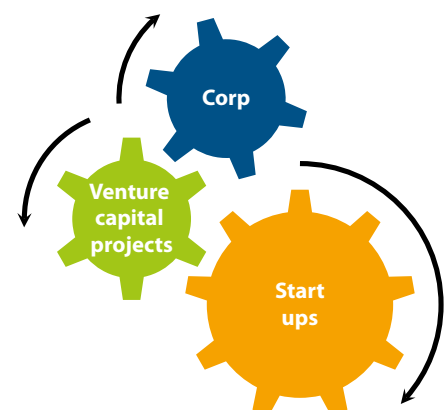
While the morning panel had focussed on the big asset owners’ strategies, the second panel discussed innovations in energy efficiency (EE) and renewable energy (RE) finance. The examples presented were closely aligned with the pre-symposium discussion paper and underpinned the thesis that the real obstacle to climate change mitigation is not so much a lack of projects or innovative ideas on the market but rather capital constraints and barriers to finance. In every case-study presented, finance or insurance was the decisive element in implementing new technology that helps to mitigate climate change. The discussion showed that innovation should not end with the start-up companies’ products, but is also needed throughout the entire value chain including investment (e.g. special forms of venture capital (VC) or new capital aggregators like fund of funds and insurance).

The speakers provided insight into the value chain and put the financing models into a context: development of clean technologies – especially at small start up companies –, cooperation with corporates to refine the new technologies, specific environmental requirements in project or debt finance and attempts to bring the big pension funds into the environmental space. Going beyond the examples in the discussion paper, the panellists described the activities of large companies. This session made it clear that apart from putting up capital, VC and

private equity (PE) can substantially facilitate knowledge transfer between established market players and innovative start-ups.

Gina Domanig, the founder and Managing Partner of Emerald Technology Ventures, showed how venture capital in the clean tech space differs from other VC sectors. In clean tech finance, venture capitalists need to give the newcomers access to the know-how and market distribution channels of the big players. The VC organisation can also introduce the start-ups to the large corporations eager to buy in specific new technologies rather than develop them themselves. The newcomers are usually cash-strapped and need capital to broaden their innovations to other application areas. The large corporates can help them to overcome this challenge (cf. figure 6).

Fig. 6: Cleantech venture capital projects take on a new role...



Source: Emerald Technology Ventures

incentivizing low-carbon investments through private equity, project finance and insurance



René Eichenberger

René Eichenberger fully agreed that partnerships between newcomers and the big established players are crucial. For the new companies this can mean the fast-track to high market credibility, and they can turn out to be excellent investments. For the established companies this might also mean a shift in their attitude towards the newcomers, i.e. not blocking the way of competing innovations but integrating them into their business model.

Some powerful utility companies are wary of buying products from start-ups rather than established firms. Eichenberger's organisation teamed up with Florida Power and Light NextEra Energy Inc. (NEI), to create a new kind of private equity platform called ClearSky Power and Technology Fund. This provides new companies with access to experienced engineers, real life deployment and testing with feedback from end-users, as well as regulatory support and NEI's endorsement. The result is a superior value proposition and in some instances a high return at the time of exit. For example, in the case of Silver Spring Networks, a company producing smart meters, the return was 900%.

Eichenberger used the example of Silver Spring Networks to describe how the ClearSky model works in practice. Initial discussions were held with the company in 2006, when it had "superior technology but no market traction." By 2009,



Roland Pfeuti

Silver Spring had 80% of the smart meter market and had proved to be an excellent investment.

Higher up in the value chain, SAM Private Equity acts as an aggregator of capital through a fund-of-fund platform. Roland Pfeuti, Head of SAM Private Equity Team Switzerland, described the sustainable private equity (PE) market as very interesting for large capital owners. He said that the market was constrained by a lack of capital, rather than a lack of good projects (cf. figure 7 on growth and funding sources). SAM, Robeco and Rabobank have therefore launched a fund of funds platform for sustainable private equity markets in the four vigorous growth sectors of clean tech, forestry, infrastructure and food, agriculture and water, which provide interesting opportunities for large asset owners, especially as many potential projects are held back only by capital constraints. The Robeco SAM Climate Change Fund focuses on emerging markets, excluding BRIC, and leverages public capital (in the form of debt guarantees provided by government agencies) to increase private capital sourcing. For the investors the guarantees are buffers to the perceived risk. On the fixed income side, Rabobank has put together a Renewable Energy Senior Debt Fund, with a 12 to 15 year tenor. High diversification greatly attenuates risk for the asset owners.

Speakers:

David N. Bresch, Director, Head Sustainability & Emerging Risk Management, Swiss Re;

Gina Domanig, Managing Partner, Emerald Technology Ventures;

René Eichenberger, Managing Director, ClearSky Power & Technology Fund;

Dustin Neuneyer, Group Development, Sustainability Management, WestLB AG;

Roland Pfeuti, Head, SAM Private Equity Team Switzerland

Moderation:

L. Warren Pimm, Director, Investment Banking, Sustainable Development Capital LLP

"If you can't beat them, join them."

René Eichenberger on the relation and the cooperation of established utilities and new start ups



Dustin Neuneyer



L. Warren Pimm

“No lack of projects, investment opportunities are there, it is capital constraint!”

Roland Pfeuti

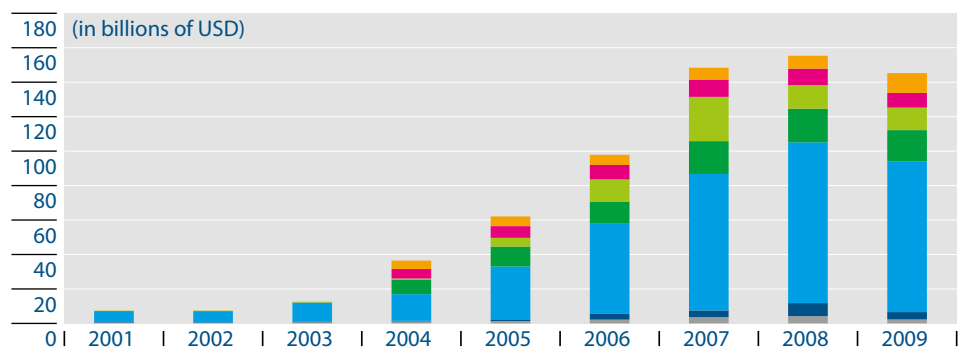
Roland Pfeuti also made a more general comment on environmental, social and governance (ESG) criteria in PE. Apparently, SAM is currently applying its capacities in ESG investment research for equities (questionnaires) also to PE. Thereby, they strive to make the climate impact of PE more transparent. This can be a new motivation for asset owners.

Another aspect in the value chain is debt finance. Dustin Neuneyer, Sustainability Management at WestLB AG continued the theme of financial innovations. As a project financier focussing on energy, infrastructure and metals and mining, WestLB decided that in view of climate impacts as well as political and regulatory changes, it could not continue financing coal-fired power plants as it had hitherto. So they drew up a business policy embodying a minimum standard for financing coal power transactions, which takes into account plant efficiency

and carbon capture and storage (CCS) and rules out significant reputational risk. Putting Mr. Neuneyer’s presentation into the context of financing EE and RE, moderator Warren Pimm stressed the importance of having debt, which much infrastructure investment needs in order to generate the desired equity returns.

The theme of insurance products to foster the greening of the economy was touched on by David Bresch, Head Sustainability & Emerging Risk Management, Swiss Re. With regard to mitigation, he sees enormous opportunities for investors but also some hurdles. Commercial solar parks, for example, have to be financed for 20 to 25 years. To encourage cautious long-term investors to buy in, Swiss Re created a 25-year “bankable” performance warranty, which is unconditional and irrevocable. If the investment fails, the investors still have a guarantee for the money they put in.

Fig. 7: Growth and Funding Sources for Clean Energy
(clean energy markets serve as a proxy for the entire clean tech market)



Funding Source (2001–2009)	Total Percent	USD billions
Government R&D	6.3%	43
Corporate RD&D	7.2%	48
Public markets	10.8%	72
Small Scale Projects	13.2%	89
Asset Finance	56.9%	383
Development Capital	3.1%	21
Venture Capital	2.5%	17
Total		673

Source: SAM Private Equity / Bloomberg New Energy Finance, 2010



Carlos Gascó



Brice Koch

Workshop

Financing the decarbonisation of energy supply

Sabine Döbeli of Vontobel opened the workshop by emphasising that decarbonising our energy system is vital in the fight against climate change. Roughly 25% of global greenhouse gas emissions result from electricity production. Measures to reduce the CO₂ footprint of power generation as well as to reduce transmission losses are therefore key.

Before the financial crisis, roughly USD 100 bn were invested in renewable energy by public and private sources. Morgan Stanley estimated that investments in renewable energy generation will grow by about 12%, thereby slowly eating up the market share of conventional power generation.

“Yet, the power of routine is still strong. We keep investing in old technologies. For example, Switzerland has funded research in nuclear power with CHF 18 mn compared to CHF 1.5 mn that went towards research in wind energy”, stated the moderator in her introduction. Three speakers gave insights about the current situation in the space of low carbon energy provision.

Carlos Gascó of Iberdrola Renovables pointed out that renewable energy can

contribute 17% to the overall reduction in emissions aimed at by 2050 under the 450 ppm scenario. Compared with conventional energy sources, renewables, wind especially, are becoming increasingly competitive and are economic drivers. The gap in generation costs between conventional and renewable energy is small today and even shrinking. Additionally being independent of fossil fuel prices and the gradual internalization of the CO₂ emission costs are further advantages.

A favourable investment climate for renewable energy (RE) depends on social consensus and political support, above all regarding the legal and regulatory framework. This must offer stability, predictability for the life of the asset, and robust incentives like the feed-in tariffs and tax benefits already featuring in some national programmes (cf. figure 8). Regulation should also ensure cost efficiency and customer protection to make renewables sustainable for the system.

Brice Koch, Member of the Group Executive Committee of ABB, Switzerland, strongly advocated investing in energy efficiency (EE) alongside with renewables, but not to simply increase energy produc-

Speakers:

Carlos Gascó, Head of Prospective Dept, Iberdrola Renovables;

Brice Koch, Exec. Vice President, Member of Group Executive Committee, ABB Ltd., Switzerland; Head of Marketing & Customer Solutions;

David N. Bresch, Director, Head Sustainability & Emerging Risk Management, Swiss Re

Moderation:

Sabine Döbeli, Head Sustainability, Head, Sustainability Management ManagementBank Vontobel

“If renewables are perceived as strong, stable and politically supported, the financial sector will provide the money.”

Carlos Gascó

“The power of routine is still strong. We keep investing in old technologies.”

Sabine Döbeli

Fig. 8: Regulatory incentives for renewables: Mechanism choice vs. robustness of incentives

Country	Wind MW	Incentive type
USA	35.064	Tax benefits & Certificates
Germany	25.777	Feed-in-tariff
Spain	19.149	Feed-in-tariff / Premiums
UK	4.051	Green certificates
Denmark	3.465	Feed-in-tariff / Industry

Source: Iberdrola Renovables, EWEA, AWEA, BWEA



David N. Bresch



Sabine Döbeli

“Renewable energy is mostly financed by utilities’ own equity, whereas technology development is financed mainly by venture capital stemming from industry.”

Brice Koch

“What is ironic is that we are extremely transparent with new technology, so all the risks and possible failures immediately jump out at us.”

David N. Bresch

tion for its own sake. He reminded the audience of the International Energy Agency’s 2009 analysis that stated that 75% of the reduction in emissions targeted in the 450 ppm scenario could be achieved by RE and EE alone (cf. figure 9). Also business wise, this makes good sense. At present only 20% of primary energy generates economic value, but technology readily available on the market could double this figure, e.g. by avoiding electricity transmission losses. Replacing the traditional power grids with smart grids could thereby make a major contribution to energy efficiency.

Who will pay for such investments? The most common routes of financing, according to Koch is utilities’ own equity (for RE) and industry providing venture capital for technology development (for both RE and EE).

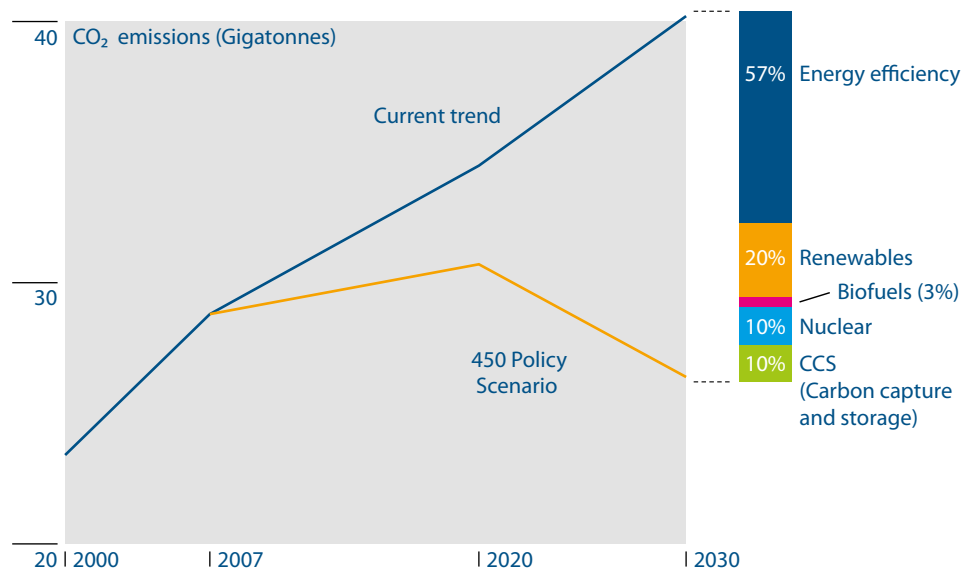
Yet, Koch thinks that many sensible investments are still not being made. Today, 40 – 60% of available electricity is consumed by manufacturing and there

again, machines account for two thirds of industry’s need for electricity. Therefore, investments are needed to replace inefficient machinery. Pay-back on the required investment is – according to Koch – only between six months to three years. So, the obstacle is between capital expenditure (being in the responsibility of purchasing departments) and operational expenditure decisions: A decision based on a technology’s life-cycle cost is not being made as both are governed by separate budgets in most companies.

Complementing the perspective of the technology providers, David Bresch of Swiss Re explained how insurance can encourage investment in EE and RE by transferring the risks. Insurance coverage based on performance can make new technologies more viable and more amenable to long-term investment. He pointed out that most energy issues are interrelated and that is where the risks emerge. He therefore advocates a systemic approach to managing the energy supply chain.

Fig. 9: Energy efficiency and renewables can deliver three-quarters of emissions reductions

World energy-related CO₂ savings by policy measure under 450 Policy Scenario relative to Reference Scenario



Source: ABB; IEA, World Energy Outlook 2009



Markus Koschenz



Erika Meins

Workshop

Financing decarbonisation of buildings and building materials

As one of the major contributors to the world’s CO₂ emissions, buildings have a large savings potential but also imply a CO₂ lock-in effect. What we build today will impact our energy consumption over the next 30 to 80 years. Markus Nöthiger of PricewaterhouseCoopers looked at the building sector from different perspectives, emphasising practical factors and asking key questions about the status quo and the future.

Markus Koschenz of Reuss Engineering and Implenla Real Estate described five phases in the lifetime of a building when opportunities for lowering carbon emissions arise (cf. figure 10). Challenges lie primarily in taking the right decisions rather than in the availability of appropriate technology. For instance, choosing a site well connected to sustainable modes of transport will result in lower CO₂ emissions.

Achieving a low-carbon society is currently hindered by the absence of common understanding of the benefits of low-carbon buildings, a lack of transparent requirements for the construction companies and of performance indicators for each construction phase. A key problem arises between three groups of people involved in the decision to construct a building. “Institutional investors say they would invest if construction companies offered low-carbon buildings. Construction companies say they would design and build if investors asked for low-carbon buildings, and manufacturers claim they would develop low-carbon components if construction companies asked for them.”

Speakers:

- Markus Koschenz**, CEO, Reuss Engineering AG; Member of the Board, Implenla Real Estate;
- Erika Meins**, Senior Researcher, Center for Corporate Responsibility and Sustainability (CCRS), University of Zurich;
- Andreas Schläpfer**, Founder, schlaepfer:associates;
- Stefan Seitz**, Director, Energy & Environmental Solutions, Siemens AG

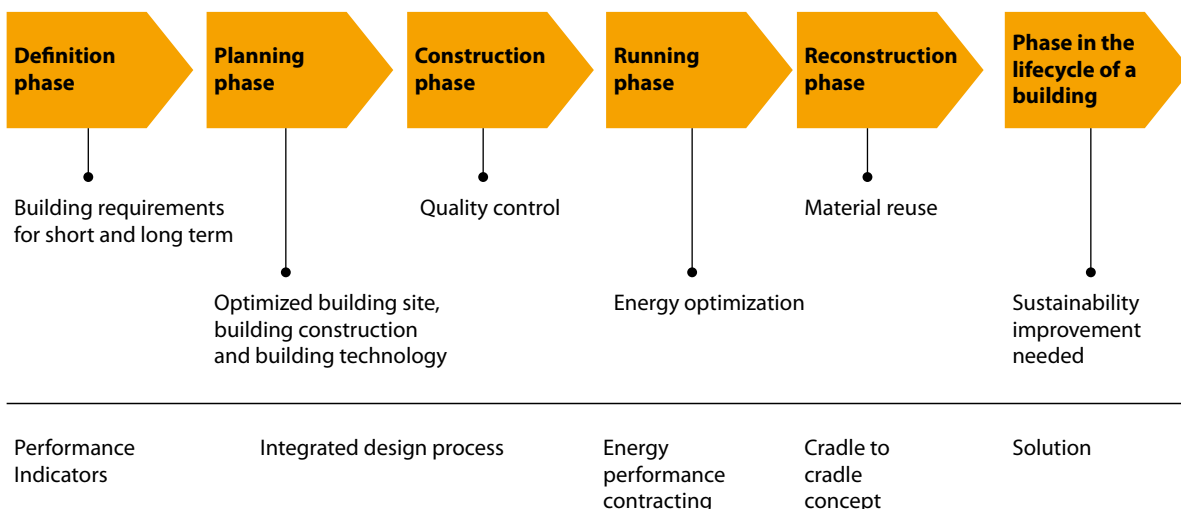
Moderation:

- Markus Nöthiger**, Partner, PricewaterhouseCoopers (PwC)

“We need a common understanding about the benefits of sustainable and low-carbon buildings. Will the market pay more in the future?”

Markus Koschenz

Fig. 10: Opportunities for low carbon buildings



Source: Reuss Engineering



Andreas Schläpfer



Stefan Seitz

“From an investors’ perspective a property is sustainable if it reduces the risk of losing value in the future due to the long term developments.”

Erika Meins

“We need to acknowledge that buildings have a material value at the end of their lifetime.”

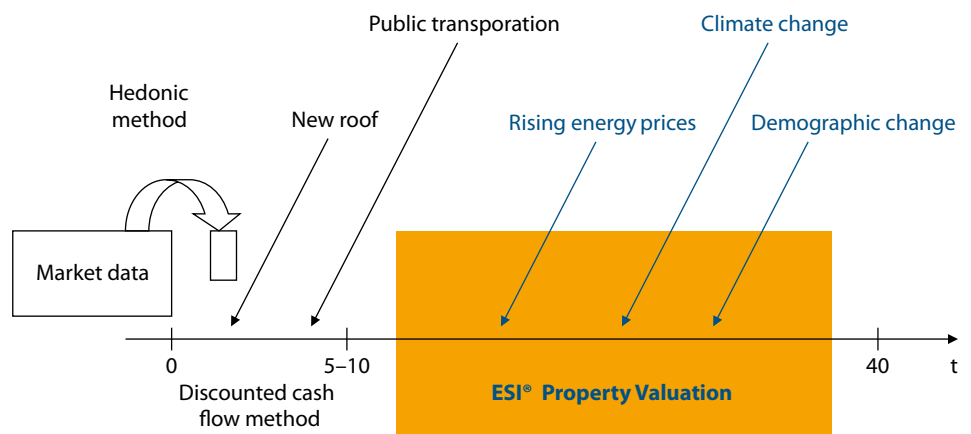
Andreas Schläpfer

Erika Meins, Senior Researcher at the Centre for Corporate Responsibility and Sustainability in Zurich, outlined major decarbonisation challenges from a real-estate investment perspective. A sustainable property is one that can endure long-term consequences of challenges like climate change and is therefore less at risk of losing value in the future. This new understanding needs to be integrated into the investment perspective, as shown in the tool “ESI Property Valuation” (cf. figure 11). Although owners and tenants of property are willing to pay for high-energy standards (like “Minergie” in Switzerland), the current property valuation system implies a short-term trap, ignoring long-term consequences in the model cash flow. Sustainable construction requires higher initial investments that may be compensated for over time with lower operating costs and higher yields. So the problem is that

sustainability can lead to lower returns in the short term, even though it may yield higher returns in the long-term.

In the cradle-to-cradle design concept introduced by Andreas Schläpfer, CEO schlaepfer:associates, the main focus is on continuous use of safe, healthy and low-carbon building materials as “nutrients” within the biological or technical circle. According to Schläpfer, today’s building industry has a vast amount of knowledge on energy efficiency but fails to think long term, including with regard to building materials. There is little awareness of the value of the raw materials at the end of a building’s lifetime. A take-back system is lacking that could incentivise to reuse materials. Therefore, new business-to-business models need to be established, e.g. with recycling companies, to keep the valuable materials within the value creation chain. The financial sector

Fig. 11: Property Valuation and the Short-term Trap



Source: Centre for Corporate Responsibility and Sustainability (CCRS)



Markus Nöthiger

could play a role when it comes to leasing schemes or special mortgages. Thereby, both the building industry and the investors could ultimately move from a linear to a circular economy. Finally, cradle-to-cradle companies also offer lower risk profiles – which should be rewarded with higher returns.

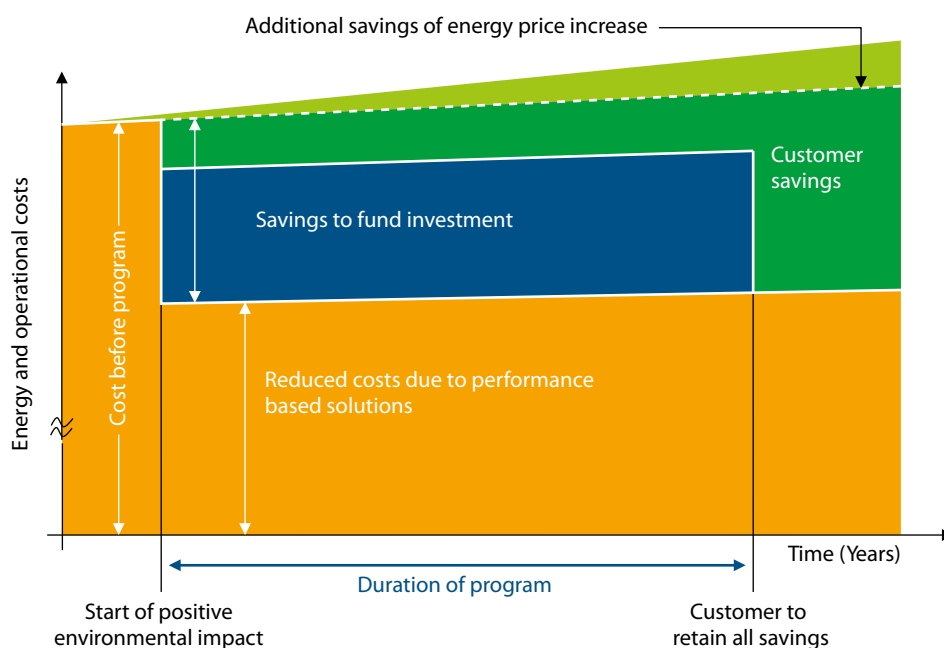
Finding practical means of making buildings more energy efficient in every phase of the lifecycle is Stefan Seitz's of Siemens goal. He presented ways of reducing energy consumption during the phase of usage by means of building automation, which can potentially achieve a 15 – 30% reduction. Many measures could even reduce CO₂ emissions profitably, e.g. by having energy consumed only where it is in fact used. In the Energy Saving Performance Contracting model, investments are paid for by energy savings. Seitz showed that savings increase over time

due to rising energy prices (cf. figure 12). After the initial investment has been paid back, the contracting customer retains all savings. But to trigger a larger-scale change, Seitz argues, regulations from the public authorities may be necessary.

“In all phases of the lifecycle of a building there are different ways to save energy; it is important to analyse in what phase the building is and then to apply the right measures.”

Stefan Seitz

Fig. 12: Energy Saving Performance Contracting allows customers to modernize and optimize buildings, financed through energy savings.



Source: Siemens



Remo Estermann



Daniel Hofer

Speakers:

Remo Estermann, CEO & Co-Founder, TEXX AG Swiss Battery Management Systems & TEXX Energy AG;
Daniel Hofer, CEO, Migrol AG

Moderation:

Thomas Streiff, CEO, The Sustainability Forum Zürich & TFS (TSF)

“The USP of the automotive industry is the combustion engine. If they lose that to electric engines, nothing will be left.”

Remo Estermann

Workshop

Financing Decarbonisation of Mobility and Transportation: E-mobility as a case-study

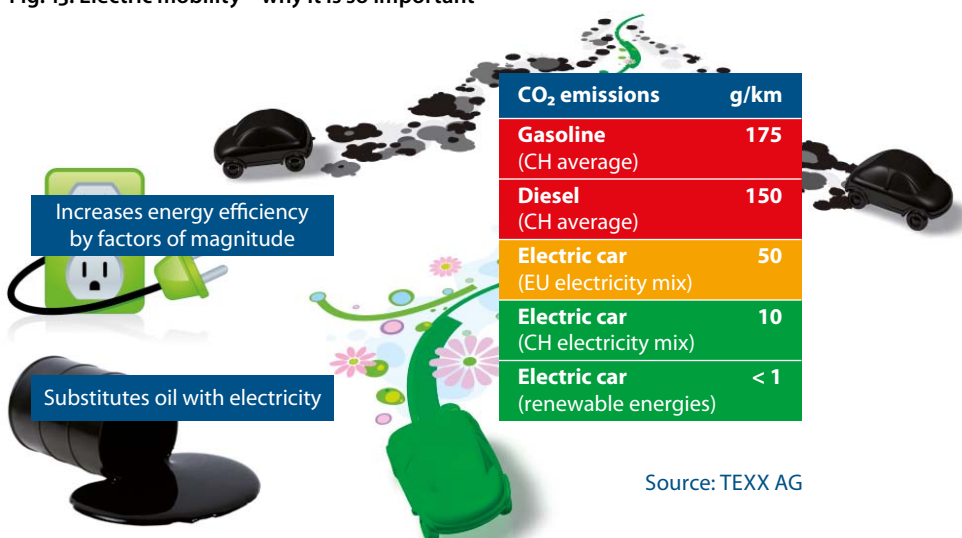
Producers have traditionally sold tangible products like fuel, cars, and tyres, but now there is a shift in attitudes, and the sale of services is gaining traction. Remo Estermann, CEO and Co-Founder of TEXX AG Swiss Battery Management Systems & TEXX Energy AG, runs a company that seeks to provide the service of providing a fully charged battery for cars, available at all times and permitting individual transportation to any location.

Are equity portfolio weightings taking the transition in the transportation sector into account? Estermann was convinced that new players would emerge, challenging the business models of traditional automotive companies. This structural change is likely to influence investors’ equity portfolios and expedite the transformation to low-carbon mobility. At the least, this transition might prompt investors to factor in the higher risk exposure of automotive companies that are not engaged in alternative modes of transportation.

An example of the structural shift is the incursion of electric mobility (e-mobility) into a sector hitherto occupied by car manufacturers and their suppliers. The big car companies typically outsource the development and construction of car parts, their rationale being that keeping the combustion engine technology in-house is sufficient to remain competitive. But if electric engines prevail, they will be left with no USP.

New players are now entering the market. The battery manufacturer BYD, for example, has already developed a car around the battery. Magna, a large supplier of car parts, is also currently developing their own car. For utility companies, e-mobility does not mean simply higher electricity consumption. Through smart grids, utilities will be able to exploit the batteries as reservoirs to feed power back into the grid and save costs by “shaving” several percent off electricity consumption peaks.

Fig. 13: Electric mobility – why it is so important



Source: TEXX AG



Thomas Streiff

As fossil fuel markets in Switzerland shrink, petrol companies are adapting their business models.

Migrol, the budget supplier of gasoline in Switzerland, was represented by its CEO Mr. Daniel Hofer who explained how the company is reinventing itself and expanding its range of offerings beyond the sale of fossil fuel into the provision of individual mobility. The first mobility outlet, M-Way, was opened in Zurich in October 2010, with others scheduled to open throughout Switzerland. In partnership with a network of suppliers, Migrol is offering electric bicycles and electric cars for sale or rent. This venture has brought formerly unrelated sectors together. Hofer is convinced that E-Mobility will bring dynamic development opportunities and new cycles of value creation to his company (cf. figure 14). This nascent mobility market combines the telecom sector, power companies, social media, public institutions, battery producers, financial services, and, if they seize the opportunity, automotive manufacturers.

Niche market? The discussion participants were not all as optimistic as the two speakers. A few of them remained convinced that E-Mobility would remain a niche market. Daniel Hofer countered by describing the excellent electric

bicycles, scooters, and cars already available. Migrol will promote these vigorously as prices fall and the technology continues to improve. The advantage Migrol and TEXX have over their traditional competition is their wide range of services. Their platform will support the development of further business models. The growth potential is enhanced by the fact that young adults care more about being mobile and flexible at all times rather than owning their own car.

While the presentations highlighted the rise of e-mobility options for consumers, there was no time for discussion of the implications for venture capital and private equity or the elaboration of financing options for and insurance questions around electric mobility. For example, the leasing of batteries, which are very expensive, might have been a valuable topic to explore, as would the financing options available to bridge the high initial up-front outlay for an electric vehicle. Insurance companies' perception of e-mobility users would likewise have been an interesting theme. Do insurers consider e-mobility users as a lower-risk category than conventional drivers, and if so, are companies creating specialized offerings/ promotions to attract e-mobility customers?

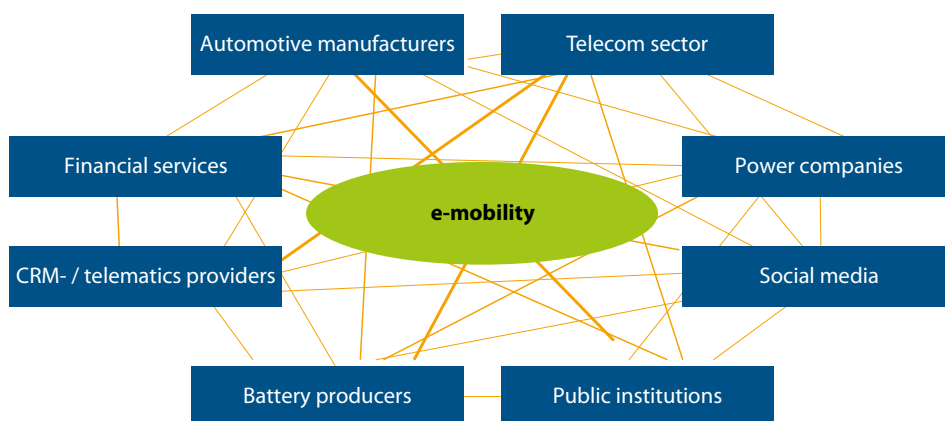
“Electric mobility increases efficiency enormously.”

Remo Estermann

“We don’t sell gasoline anymore ... we sell individual mobility.”

Daniel Hofer

Fig. 14: Electric mobility: dynamic development opportunities & new cycles of value creation



Source: M-Way



Peter Maurer



Lord Colin Moynihan



Patrice Robineau

Speakers:

Peter Maurer, State Secretary for Foreign Affairs, Swiss Department of Foreign Affairs;

Lord Colin Moynihan, Chairman, Pelamis Wave Power Ltd, former UK Minister for Energy;

Patrice Robineau, Senior Advisor to the Executive Secretary, UNECE;

Nico Stehr, Professor, Zeppelin University, Friedrichshafen;

Ian Zhu, Principal, Tsing Capital

Moderation:

Alexander Barkawi, former Managing Director, SAM Indexes

“Investors should require their fund managers to monitor their portfolio performance in terms of social and environmental effects.”

Ian Zhu

Closing Panel

Policies for a low-carbon economy: objectives, strategies and leadership

The purpose of the closing panel was to explore how the ground can be prepared politically for more innovative financing solutions. Moderator Alexander Barkawi asked the panel to play the role of a campaign group working towards a policy for a low-carbon economy.

To start with, Professor Nico Stehr summarised the Hartwell Paper, which proposes three overarching decarbonisation objectives: The first objective is to ensure access to energy for all, the second is preserving the ecological balance and the third is to adapt to climate change by ensuring that society can withstand the effects of climate change. In this context, he advocated an EE strategy as a vital first step, the aim being to accelerate development of non-carbon energy supplies. Funding should be provided through a low, dedicated carbon tax.

Barkawi asked whether politicians would introduce such a tax nationally or only within a global deal. Stehr thought that introducing it nationally would be pragmatic.

Ian Zhu, Principal of Tsing Capital, proposes three changes. Firstly, pollution should be made more costly. As an example, he told that China is currently considering taxing the most carbon-intensive industries. Secondly, investors should require their fund managers to monitor their portfolio performance in terms of social and environmental effects. And thirdly, technological innovation and availability are key for tackling the carbon problem.

Patrice Robineau, UNECE, considers the political framework and willingness to be vital. A catalyst for financing is also needed, and the UN has assembled a number of players to provide loans for investment in energy efficiency. Governments should offer guarantees to investors in energy efficiency.



Nico Stehr



Ian Zhu



Alexander Barkawi

Peter Maurer, State Secretary for Foreign Affairs at the Swiss Department of Foreign Affairs, had a five-point approach to the campaign. Firstly, to offer a platform to bring together the stakeholders of the carbon economy. Secondly, to focus on the social groups crucial to the transformation to a low-carbon economy: the rising middle classes of the South and the poor. Thirdly, to draw up real implementation strategies rather than voice vague commitment. In fourth place he wants to explain clearly to people what needs to be done. Instead of a technocratic approach, we need a narrative amenable to the electorate. And finally, he wants to grab the attention of political leaders. Knowing where and when their big meetings are being held, we have to adapt our agendas accordingly.

Considering the campaign at the national level, Lord Colin Moynihan, Chairman of Pelamis Wave power Ltd. and former UK Minister for Energy, made three basic points: “We have to get the narrative right: clear, precise and soundly based on science. We have to back up the campaign with policies. We have to gain public engagement and commitment.”

To convince people that there is a serious problem, the message has to be kept simple. Given clear information, the public in the UK readily bought into government adaptation measures. Legislation is vital and individuals should have a fiscal benefit from buying in.

Moynihan advocates pooling resources in a green investment bank, catalysing private investment through efficient use of public finance to implement a low-carbon infrastructure. A key issue is the need for long-term security and stability for fiscal and regulatory policy. He stressed that moving ahead nationally would be difficult without international action. Peter Maurer agreed but he thinks the action of individual countries should not be conditional on the action of others.

A symposium participant thought that homeland security constitutes a compelling reason for taking action on energy. Ian Zhu agrees that China’s current policies reflect a wish for energy independence, but there are other factors like local pollution issues. He thinks other countries should also move forward, and the USA especially should set an example with domestic policies.

“Basically, we know what to do, but we have to think about governance and resolve differences between nations. The issue is to find a narrative that reconciles the aspirations of the poor and rising middle classes with the economic possibilities offered by a low-carbon economy.”

Peter Maurer

“We have to get the narrative right: clear, precise and soundly based on science.”

Lord Colin Moynihan

Discussion Paper: Setting the Scene

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

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) CO₂e 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 CO₂e, 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 taken¹. McKinsey confirms this with an estimation of its own: The annual worldwide cost of achieving the 450 ppm scenario could vary between 500 and EUR 1,100 bn – 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 CO₂ reduced². 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.

1 Stern Review: The Economics of Climate Change

2 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 facilities³.

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.

Sector	Investment and financial flows⁴
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 ₂) 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 ₂ gases, such as N ₂ 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 bn are needed for the next 13 years to capture energy productivity opportunities among end users.

³ UNFCCC United Nations Framework Convention on Climate Change (2007): Investment and Financial Flows to Address Climate Change

⁴ Ibid.

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%⁵. 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 refurbishments⁶. 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)⁷.
- 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.

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

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

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

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 Index⁸ 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 140 bn 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.

⁸ 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

Discussion Paper: The interview-based case studies

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.

Discussion Paper: 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 EUR 500 mn trading position in the European carbon market in 2007, a EUR 250 mn clean tech private equity commitment, and a EUR 100 mn 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."

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 CO₂ 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.”

Discussion Paper: How to develop and finance low-energy strategies

“With our innovative technologies, we can now sustainably reduce CO₂ 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 CO₂ 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 CO₂ 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.”

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.”

Discussion Paper: Equities

How to raise capital for ecological innovations?

The transport sector accounts for 13.1% of global greenhouse gas emissions⁹. The total additional investment in transport needed by 2030 under the UNFCCC's mitigation scenario is estimated at USD 88 bn, of which USD 9.2 bn 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 CO₂ 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 CO₂ 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 EUR 736 mn on fuels and EUR 454 mn on kerosene¹⁰. 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."

⁹ Source: IPCC, Climate Change 2007: Synthesis Report, 2007

¹⁰ http://www.dp-dhl.com/de/verantwortung-online_report_2010/wirtschaftliche_verantwortung.html

“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 reporting¹¹, 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.

¹¹ 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>

Discussion Paper: 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 CO₂ 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.”

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 USD 15 – 20 bn – 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 CO₂ emission targets. Secondly, incentives for smarter consumption. Why not link CO₂ 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 CO₂ 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.

Discussion Paper: 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 strategy¹².

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 1 bn 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."

¹² 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.

“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 mn 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

The case studies highlighted in this thought paper outline the major topics that were to be debated at the 11th International Sustainability Leadership Symposium on 28 September 2011. 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.

Discussion Paper: Summary & Food for Thought

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.

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.

The Sustainability Forum Zürich

The Sustainability Forum Zürich (TSF) is an independent, non-profit, non-partisan association, founded by leading representatives from business, science and public authorities from Zürich and increasingly joined by financial market players from throughout Europe. It has the purpose of organising and realising the annual International Sustainability Leadership Symposium and other dialogue events as well as connected research and promotion of projects, in particular as pertaining to the sustainability topic relevant to the financial market.

Rapid globalisation produces great economic and public upheaval; it essentially changes the playing field and in some measure the rules of the game for business pursuits. On the one hand, the private sector benefits from a significant expansion of its entrepreneurial scope. On the other hand, new challenges emerge: e.g. demographic change, increasing international mobility, shortage of resources, climate change and pandemics. For business, globalisation therefore means greater opportunities as well as risks, greater freedom as well as extended responsibility.

Because of their service and hinge function between the “real economy”, the capital market and society, the players in the financial market – inde-

pendent of their size and their sphere of influence – deal with these challenges early on. Only in this manner can they maintain their competitive capacity and thereby ensure their existence in the medium to long term.

The following questions are thus posed:

- What are the sustainability issues and related challenges the financial market players will be exposed to in future?
- How does the financial market react to the expected new framework conditions and incentives in order to remain competitive, i.e. to be able to utilise the evolving “sustainability opportunities” and to avoid and manage risks.
- How is entrepreneurial and societal responsibility changing and evolving, in the financial industry in particular and in the private sector in general – and how will the inter-linkages work and where are its limits?

Living up to a transdisciplinary approach is a crucial principle which will be achieved by building up and maintaining strong relations with science and other competent and credible sustainability organisations.

Objectives

TSF provides its members and partners with a dialogue platform that enables the exchange of the most cutting-edge knowledge, experiences and opinions on challenges relevant to the financial market. Companies, experts and scientists, other financial market players, asset owners and capital market regulators are invited to

- “Get fit”: Getting the main players fit through early recognition of financial market relevant, social and geopolitical issues and trends;
- “Challenge mind-sets” of the decision makers in financial sector with respect to their social responsibility, the resulting challenges and of the financial market players with respect to their innovation and communication capacity;
- “Promote options for actions” of the financial market players. The ambition is to improve the efficiency and effectiveness of market practices and instruments and to simultaneously create societal added-value.

TSF’s Symposia to Date:

2000: Sustainability – Driver to Economic Success?

2001: Financial Services – Drivers to Sustainability?

2002: Governance for Sustainability: Making Corporate Responsibility Work

2003: Towards a More Sustainable Retirement System: The Quest for New Governance and Asset Management Strategies for Pension Funds

2004: Business Investment in Development: Experiences and Perspectives

2005: The Market Value of Reputation

2006: From Short- to Long-Term: Who Cares? Institutional Investors, Beneficiaries and Investees in Dialogue

2007: Demographic Change and Financial Services: a Short List of Threats – a Long List of Opportunities?

2008: Capitalising on Natural Resources: New Dynamics in Financial Markets

2009: Restoring Trust in the Financial Markets: Time to Think Sustainably

Vision

TSF seeks to contribute to sustainable business in the dynamics of globalisation by promoting forecast, reflection and action in and through financial markets and its key players.

Mission

TSF aims to take up topics relevant to the future, by way of an action-oriented dialogue with internationally recognised topic leaders and decision makers, enabling the integration of entrepreneurially relevant sustainability principles in the financial market.

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