



# CE Obriefing

A document of the UNEP FI Climate Change Working Group • June 2004

## Renewable Energy



Purpose

This study is the third by the Climate Change Working Group of the UNEP Finance Initiative. The first was a so setting paper on the risk of climate change, in 2002. It called for more leadership from policy-makers, and action by financial institutions on valuation methodologies. The second paper (2003) confirmed the sector's support for emissions trading as a key financial tool. This third paper presents the business case for financing renewable energy. It presents concrete examples and makes strong policy recommendations for further action.

#### Summary of Policymaker Recommendations

- Adopt tough targets and schedules for the adoption of renewable energy, on a rolling 15 year programme, and within a framework for the stabilisation of global GHG emission concentrations;
- Refocus energy policy: adopt full-pricing for non-renewables in a progressive schedule; provide a tapered support programme for renewables, gradually eliminating subsidies; and simplify and clarify the regime for renewable energy projects and carbon finance;
- Align other policies, particularly transport, development, education with climate change policy;
- Keep key financial institution decisionmakers well-informed about climate change and renewable energy technologies;
- Ensure multilateral and national public sector financial institutions support the transfer to renewable technologies adequately.

Renewable energy has to supply a greater share of the world's energy requirements. Renewables confer a number of major benefits compared to other energy pathways - energy security, a stable climate, cleaner air, and new employment opportunities - and the resources are truly vast.

It is estimated that the market for clean energy technologies could be worth \$1.9 trillion by 2020. The financial sector has a key role to play in developing and promoting this market. Renewable energy is both a solution and a business opportunity. However, there are still some significant barriers to capturing this promise. The most important thing that policymakers can do is create confidence in the long-term future of the renewables market by policies that make "the deal on the table" attractive financially.

#### Summary of Finance Sector Recommendations

- Engage with policymakers to help develop the renewable energy sector;
- Develop an effective approach for smallscale renewables, such as "bundling" small projects, fast-track process for small business, and support for start-ups;
- Research and develop new products and services for renewable energy financing;
- Refine assessment methodologies to cope with climate change issues;
- Raise awareness in key stakeholder groups externally;
- Re-organise internally to provide a focus on renewables;
- Improve awareness on renewable energy prospects and developments, particularly within the financial institutions themselves.

## The case for renewable energy

The world needs more energy to enable economic development, but conventional fuels are a finite resource, contribute to climate change, and are creating other problems and risks such as smog, extended supply lines, and vulnerable power grids. A switch to renewables would help avoid these problems, create new job opportunities, and reduce the drain on hard currency for poorer countries. Since conventional fuels received long-term subsidies in the past (and still do in many cases), government support in the form of financial incentives for the development of renewable energy is necessary in order to create a level playing field.

It is estimated that the market for clean energy technologies could be worth \$1.9 trillion by 2020 (see CEO Briefing on Climate Change, 2002) and financial institutions need to take advantage of this business opportunity. The availability of renewable energy varies around the world, but almost every country has significant resources in some form. Currently, renewables supply just 2% of the primary energy for power generation globally. Our goal should be 100% by 2100, and the debate merely how we get there. In addition, improved energy efficiency is an important complementary policy to renewables, particularly in OECD countries with high per capita energy use.

Admittedly, renewable energy technologies face a number of barriers. These barriers can be financial and economic, such as higher upfront costs, political and regulatory (generally policies do not favour renewable technologies), environmental and social (e.g planning objections), technical (e.g. intermittent nature of renewable technologies), or related to the scale of the projects, mainly higher transaction costs.

There are alternative technology pathways like nuclear power, unconventional oil (oil sands and shale), or "clean coal" (where additional processes are introduced to prevent the release of exhaust gases). However, these all entail major risks and costs, and do not deliver as many social or economic side-benefits as renewable energy technologies. More importantly, these types of technologies are unsustainable and damaging to the environment. To create a level playing field for renewable technologies, all the barriers mentioned above need to be addressed, but the crucial starting point is a supportive and stable policy and regulatory framework. This will encourage greater investment on the part of financial institutions, as demonstrated by the case studies in this briefing.

## Practical lessons from finance sector experience with renewables

To identify the key issues for the finance sector in developing the renewable energy industry, we decided to examine a number of typical real-life cases so that the message for policymakers and finance sector CEOs would be more credible, not just based on economic theory. We selected three to present in more detail, a solar-power manufacturer in Australia, and two lenders to windfarms, one in the US, and one in Europe. Throughout this brief, however, we have stayed close to the ground.

#### Case Study 1

### Solar Energy Systems (SES)

SES was set up in 1998 in Australia, with a mission statement to "take water to the world in the cleanest possible way", based upon the work of one inventor. The company was floated in Australia in December 2000, raising some A\$5m. The largest shareholder was Unilever, holding 20% of the stock, with a further 700 green-minded investors taking up the remainder. The company specialises in solar photovoltaic (PV) technology and has a range of products that convert solar energy to electricity that is in turn used to pump and purify water. The market initially was remote farm locations in the Australian outback.

The Australian government actually helps start-up companies such as SES through a system of grants and rebates for renewable energy technologies from the Australian Greenhouse Office that are applicable to small companies in the early stages of commercialising renewable energy products. Other programmes are aimed at the end-user; a Photovoltaic Rebate Programme for residents was particularly relevant to SES's Grid Feed Solar System.

SES markets its products within Australia under a dealership arrangement with Shell Australia, under the Shell brand name. Further markets were created overseas in the Maldives and East Timor through aid-related programmes. The company finally achieved profitability after several years of expensive product development and high rates of cash-burn. Awards for the fastest growing technology company in Australia by Deloitte Touche led to a listing on the Berlin stock exchange and grants for R&D of A\$300,000. The latest development at SES has been a deal struck with Sino West Assets Group (SWAG) that gives access to the People's Republic of China. This could be the turning point for SES.

#### **LESSONS**

- Institutions, even SRI funds, are not interested in small companies with heavy start-up costs prior to them returning profits;
- The up-front costs of solar deter end-users, despite the superior lifecycle economics;
- Incentives at regional and local level can help entrepreneurs to get started;
- For end-user products, distribution is a critical aspect;
- It takes time (seven years) to achieve profitability.

#### Case Study 2

## Hypovereinsbank's (HVB) renewables experience

HVB is a major European bank, with nearly 10 million customers. It is a member of UNEP FI, and has signed up to the Equator Principles on sustainable financing. HVB has been involved in financing renewable energy projects since 1989. HVB won the Renewable Energy Deal of the Year Award in 2002 from Project Finance Magazine for the 201 megawatt (MW) EuroVento wind farm portfolio financing, for which HVB arranged and fully underwrote a EUR220m project finance facility as a sole arranger. The deal was a complicated one involving six fully cross-collateralized Spanish wind farms with the project loans replacing construction financing upon completion of each wind farm. The sector is subsidised, but the Spanish tariff involves a certain degree of market risk. The renewable energy tariff is set as a percentage of the annual average end-user price of electricity. It was the complex due diligence process that made this transaction particularly challenging.

In order to finance these types of projects a stable regulatory regime is an absolute must, as a predictable regulatory regime simplifies the process. HVB has also financed other renewable technologies like biomass and hydro, but wind has by far achieved the biggest volumes. None of the wind projects they have engaged in have defaulted and they are a good source of continued income. Structuring the finance of renewable energy projects can be difficult, (apart from windpower) due to the "the funding gap" between the capital the bank is willing to lend under the perceived risks, and the limited amount of equity that the sponsor or developer can provide.

In terms of enhancing wind markets, there is often a lack of long-term wind data for correlation with onsite measurements. In terms of developing less mature technologies such as geothermal or even solar, there needs to be significant support from government (e.g. a tariff regime, subsidies). As to the development of new technologies using renewable energy sources, such as tidal power stations, there needs to be a strong drive from financially strong private industry - companies need to provide the financial capacity for developments in these markets.

#### **LESSONS**

- Banks need greater regulatory certainty to make long-term financial commitments;
- Facilities for financing the "funding gap" would speed up the process considerably;
- Less mature technologies need a combination of government assistance and strong industrial partners' support with a strategic interest to "kick-start" the markets;
- The entry of large-scale industrial companies is essential to deliver volume quickly.

#### Case Study 3

### ANZ and US windpower

ANZ is one of Australia's leading banking and financial services group. It is a member of UNEP FI, and a signatory to the federal Australian "Greenhouse Challenge". ANZ Investment Bank, a division of the ANZ Banking Group, is a leader in advisory, lead arranging and underwriting finance solutions for the renewable energy sector in Europe, North America and Australasia. While primary focus has been on wind, ANZ finance projects across a broad range of technologies including landfill gas, geothermal and run of the river hydro. ANZ's dedicated renewable energy team was ranked first in 2003 according to the number of projects financed by Dealogic.

In 2003, ANZ was a lead arranger in financing the Colorado Green project, a 162MW wind farm located in southeastern Colorado, USA. The project sponsors are PPM Energy (a subsidiary of Scottish Power), and Shell WindEnergy (a subsidiary of Shell Oil). The project was built by GE Wind Energy, who also supplied the 108 1.5MW turbines and is providing operation and maintenance services. Power is being sold pursuant to a 15-year off-take contract. Colorado Green was the largest windpower deal in the US in 2003. The plant is located in a poor region: local benefits include 10-15 full-time jobs and more than \$2 million a year in property tax.

In arranging the financing a key issue was ensuring the project qualified for the federal production tax credit (PTC), an incentive to produce renewable energy, which expired at year-end 2003. The project was required to be commissioned by then, and therefore, created a very tight construction schedule. The deadline was successfully met through an efficient financing process led by ANZ and the collective strengths and experience of leading sponsors, PPM Energy and Shell WindEnergy.

Subsequently, the construction of new windfarms in the US has ceased, disrupting the manufacturing and project development sector, as the industry waits to see whether the PTCs will be extended beyond end-2003.

#### **LESSONS**

- A stable regulatory regime is essential to enable domestic renewable technologies to operate effectively;
- Projects with experienced stakeholders can be delivered very efficiently;
- Renewable energy has considerable potential to assist regional development.



"Our principal finding is that renewable energy resources can now sharply reduce local, regional, and global environmental impacts as well as energy security risks."

G8 Renewables Task Force, 2001

#### Threats and Opportunities for the Financial Services Industry

Financial Sector	Threat	Opportunity
All	Reputation risk due to passive position Negative image due to local siting problems	Positive image on mitigation issues
	Financial losses due to unforeseen problems with new RETs	New products/services for RE sector
Capital finance	Defaults due to technology problems/inexperienced management	Finance for clean energy
	Unplanned GHG costs to projects/borrowers	■ Enhanced project returns from GHG credits
Institutional Investors	Decline in value of carbon-intensive sectors	Growth of RE sector
	Loss of value in old property stock	■ Incorporate RE into new build property
		Innovative climate-themed funds
		■ Mezzanine finance for RE
		■ Engaging corporates on RE to improve their performance
Insurance	Underwriting losses on new technologies	Insure mitigation projects
	Missing the market by being overcautious	Innovative risk transfer for carbon markets
		Recognition of carbon as insurable item
Public Sector	Stranded infrastructure assets	■ New domestic industries increase wealth
	Changes in GDP due to revaluing energy resources	Changes in GDP due to revaluing RE
	Wasted resources from misaligned policies	Supportive mechanisms for new sectors and developing countries
Other finance	Compounded carbon risks for diversified funds	Innovative services for GHG credits (brokerage, certificates, trading etc)
	Professional indemnity risk	■ Weather derivatives, microfinance, consultancy

## The finance sector and renewables: current and future products

For the sake of this briefing we have divided the finance sector into capital/structured finance, insurance, and institutional investment. At present attention is focussed on attracting sufficient capital finance to renewable energy projects. However, capital will only become available if there are stringent risk controls in place, a key one of which is insurance. In the future when renewable energy is a mature, but still dynamic industry, the bulk of the activity will be within large corporates. Already BP has a major solar power company, while GE has a large windpower component supplier, and has just entered the PV field by acquisition. At that stage, ultimate control is with institutional investors. Finally, the public finance sector also actively participates in some areas.

#### **CAPITAL/STRUCTURED FINANCE**

For all financial institutions, the main motivation for investment is the expected profit. Renewable energy is no different. In considering a project, a financier will identify all the individual risks and then carry out the expensive process of due diligence to assess each individual risk and how to mitigate its potential impact on the project through sensitivity analysis. Each proposal is vetted by the bank's Credit

Committee for an acceptable risk/reward profile, encapsulated in the DSCR (debt service cover ratio). Because renewables is a new sector there is less experience of how loans perform, and so the DSCR is usually set more stringently, risks are emphasised and a conservative view is taken on revenue.

From a financial institution's perspective, the renewable energy industry is affected by risks in technology (will it work?), market (will it compete?), reputation (will people like it?) and regulation (will the rules change?). The higher the risks, the higher the credit risk (i.e. risk of default) for the financier. This credit risk is directly reflected in the cost of capital of the renewable energy technology. Risk mitigation is essential to ensure access to affordable financing, and financiers actively assist their customers here (see diagram page 5).

There are various ways in which the finance can be structured, from participation as shareholders, to granting credit or offering project finance. Small, novel renewable energy projects need to provide between 25% and 50% of the capital in the form of shareholders equity, because as the risk associated with a renewable energy project increases, lenders require a larger equity component before they

finance it (to improve the DSCR). This can strain a developer's capital resources since the cost of equity capital is higher than debt. How to fill the "funding gap" between the equity and debt available to a project is a key question.

#### **INSTITUTIONAL INVESTORS**

Institutional investors are very large in financial terms (e.g. the 90 members of the Carbon Disclosure Project (CDP) control \$10 trillion in assets). However, because they invest money on behalf of beneficiaries, often for long periods, the principles they follow are security of capital and reliability of return on capital. Indeed there is a subset of socially responsible investors (SRI). However, this is still a "niche" part of the market, around 1-2 % of funds.

These institutional investors are so large, that effectively they cannot follow narrow segments of the economy. They are "universal investors", committed across the full spectrum of industries. This gives them a unique role in that they can take a broad view of future trends, since they will be able to offset declining industries and technologies against growth ones, like renewable energy. They are already making their weight felt through initiatives like the CDP, UNEP FI, the Institutional Investors Group on Climate Change (IIGCC) and the Investor Network on Climate Risk (INCR). Universal investors can be a counterbalance to industrial or political lobbies that resist change, but they have generally been reluctant to take up this role.

Their role concerning renewable energy is to promote its adoption by large corporates, firstly through R&D, then by acquisition and organic growth. The institutions do not generally have the skills to intervene in renewable energy directly by project finance. There is some potential to support small-scale renewables through mezzanine finance and themed climate or technology funds, but these will always remain a small part of the funds. In fact these approaches have been tried and have generally under-performed.

#### INSURANCE

Insurance lowers a project's cost of capital and improves liquidity by reducing the potential financial impact of "events" (e.g. fires, or natural disasters) that might delay the project or interrupt production. However, an insurer must have sufficient information to estimate the cost of the insured events. Although there is now considerable operational data for wind projects, most renewable energy projects do not have the requisite statistics. When sufficient data is unavailable, underwriters must employ narrower clauses, tighter restrictions and risk loading factors. Even though in some cases the technology is said to be mature (e.g. onshore wind parks), the losses incurred thus far require premium levels that must seem high to renewable energy project developers and operators. Underwriters remember the early "serial losses" where a systematic defect in one component caused a large number of claims at different locations.

#### **Credit Risk** Renewable **Energy Project** Market Risks Technology Risks **Financial** Reputational Risks Institutions Risk of Change of Legislation Influence on: ■ High Costs of Lending ■ Corporate Rating ■ Market Capitalization/ ■ Costs of Capital Shareholder Value **Creditworthiness**

There are challenges for (re)insurers wishing to enter the renewable energy market. In general, the insurance industry needs a large geographically diffuse pool in order to spread risk. In the starting phase this will not be possible. The sector favours long-term business relationships to "equalise" bad years with good ones, and compensate for pricing cycles. A prerequisite for this is politically and economically stable energy markets, which makes risk assessment much simpler.

Since renewable energy projects cut across the classical mould of property/ marine/ engineering/ etc underwriting classes, and also involve new risks like carbon credits, there is considerable interest in exploring Alternative Risk Transfer arrangements (e.g. captives, catastrophe bonds, and weather derivatives) which offer potential to extend the limits of insurability. It may be possible to create special purpose underwriting vehicles to ensure that the risk transfer meets legal, fiscal and accounting requirements. As renewable energy projects have long lead-times, finite insurance may be a useful option, whereby premiums are paid into an account over a period of years and any balance after meeting claim payments is shared on a proforma basis. Most renewables depend on the weather as a resource, so weather derivatives are particularly appropriate as a risk tool. Initially they were limited to temperature, but an increasing range of indices is available. One advantage is that claims are easy to identify and quicker to process.

The boundaries of insurability are being pushed in other directions as well. Recently, the private sector has started to provide political risk insurance (PRI), which can improve the credit rating of projects, particularly in emerging markets, where the rules of the game can change drastically and suddenly. The advent of the flexible mechanisms under the Kyoto Protocol has also led insurers to research how some of the risks attached to carbon finance, like delivery and/or value of tradable green certificates and emission reduction credits could be covered (see companion CEO Briefing on Emissions Trading, 2003). Even when a risk is deemed uninsurable, there is still the possibility of providing risk assessment services, which can help to improve the credit rating.

#### **PUBLIC SECTOR**

Often business risks that face the corporate sector are deemed to be unacceptable by the private finance

Source: Dresdner Bank 2004



"Lending should concentrate on promoting the transition to renewable energy."

World Bank 2004, Extractive Industries Review sector (e.g. development costs, product marketability, expropriation by foreign governments, war, terrorism, currency convertibility etc). At the national level Export Credit Agencies (ECAs) and other public bodies provide critical support by supplying cover for many of these risks. However, ECAs have provided little support to renewable energy because their rules of operation are unfavourable (e.g. renewable energy projects have a lengthy payback period, which is not admissible currently). A prime example is when the British Government allocated £50m in finance for renewable energy at the Johannesburg Summit on Sustainable Development, and yet uptake has been very slow. A number of changes are currently under discussion by the OECD, including the adoption of "carbon

intensity" as one of the metrics for environmental acceptability of projects.

Similarly, at the international level, multilateral finance institutions (MFIs) like development banks could help to bear risks to renewable energy projects that are not commercially acceptable (e.g. long-term maturity loans, or contractual obligations). To date, MFIs have been passive and slow to support the market in this way. The World Bank Extractive Industries Review has proposed that energy investments should be devoted to projects that "delink energy use from greenhouse gas emissions", but this is facing some resistance. There remains some hesitancy at the highest level to prioritise renewables (e.g. the G8 Task Force on Renewables Report (2001) was not adopted).

The Carbon Disclosure Project reveals that only one-third of major banks see renewables as a market opportunity. This proportion remained static between 2002 and 2003, although actual participation in renewables did rise from 13% to 31%. For further information visit:

## What policymakers need to do to mobilise the finance sector

Financial institutions have limited resources, and need to apply them to make a satisfactory return within a set period. Currently, financial institutions are deterred from involvement in renewables for a number of reasons. Firstly, there is a general retrenchment. This lack of appetite for adventure is reinforced by the collapse of the new dot.com sector, and the losses which pioneering financial institutions suffered in their early involvements with renewables – whether on the venture capital funding side or insurance underwriting.

Secondly, financial institutions do not feel that investing effort in developing products and markets for renewables will be rewarded soon. There is a general impression that policymakers do not see climate change as a top priority due to the lack of progress on the Kyoto Protocol, and little if any signs of what is to follow in 2013. On renewables specifically, the failure by the G8 to adopt its own 'Task Force on Renewables' recommendations sent a negative signal. Thirdly, engaging with the climate change markets is not easy. Defining the flexible mechanisms under the Kyoto Protocol was tedious, and the rules seem complicated and over-rigid in their definitions of project admissibility.

The most important thing that policymakers can do is create confidence in the long-term future of the renewables market. This requires measures that appeal to the various types of financial institutions. Those providing primary services on a large scale (e.g. credit, project finance, insurance) respond to policies that make "the deal on the table" attractive financially. This can be done by supporting the renewables supplier or purchaser.

There are two basic support options for on-grid renewable electricity: guaranteed price, or mandatory quotas. From a financial institution's viewpoint, the former is preferable, because of the greater certainty on revenues, which allows a more relaxed DSCR. The ultimate goal should be to do without them, by ensuring that renewables are the cheapest option.

In "start-up" situations, which are inherently high-risk due to both the entrepreneurial and technology risk, incentives aimed at the primary financial services provider itself can mobilise private "patient capital" and SRI funds. For secondary investors, such as pension funds, what matters is to ensure that their fund managers and advisers are well briefed on climate change, and pay attention to the effect that the growth of renewables will have on goods and services provided by the companies they are investing in.

Regional and local governments significantly influence energy demand and use, and are significant end-consumers. Because of their smaller scale and the great number of these polities, this is a good level for experimentation with new forms of support measures.

The risks for projects in developing countries are even greater, due to their less mature institutions and weaker economies. The public sector can build capacity, set up financing support programmes, and enable the private sector to function by taking on uninsurable risks (e.g. through improved ECA terms, partial credit guarantees, local currency guarantees, and contingent finance).

#### RECOMMENDATIONS FOR POLICYMAKERS

- Adopt tough targets and schedules for the adoption of renewable energy, on a rolling 15 year programme, and within a framework for the stabilisation of global GHG emission concentrations:
- Align other policies, particularly transport, development, and education with climate change policy:
- Create a legal and regulatory framework that enables renewable energy to compete with conventional sources of energy;
- Adopt full-pricing for non-renewables in a progressive schedule;
- Provide a tapered support programme for renewables, gradually eliminating subsidies thereby reducing the risks associated with dependence on subsidies;
- Simplify and clarify the regime for renewable projects and carbon finance;
- Improve support for renewable energy start-ups;
- Keep key financial institution decision-makers well-informed about climate change and renewable energy technologies and markets;
- Ensure multilateral and national public sector financial institutions support the transfer to renewable technologies adequately;
- Delegate powers to promote renewable energy to regional and local polities.

#### RECOMMENDATIONS FOR FINANCIAL INSTITUTIONS

#### **Overarching strategy**

- Engage with policymakers to help develop the renewable energy sector;
- Commit resources to research and development of products/services for renewables;
- Develop an effective approach for small-scale renewables (e.g. "bundling" small projects, fast-track process for small business, and support for start-ups);
- Improve awareness on renewable energy prospects and developments, particularly within the financial institutions themselves.

#### **Lenders**

- Develop more holistic valuation methodologies for renewable energy projects as suggested by the CCwg in its 2002 CEO Briefing on Climate Change;
- Identify and help to develop better credit enhancement instruments;
- Provide information to customers and clients on the opportunities to invest in renewable energy;
- Adopt carbon intensity as one of the metrics for environmental acceptability of projects;
- Structure finance plans for end-user renewable energy to reflect the life-cycle benefit;
- Identify sources of finance for the "funding gap".

#### Insurers (including reinsurers and brokers)

- Promote dialogue within and beyond the insurance industry to other key stakeholders, including policy-makers and politicians;
- Establish insurance product groups and in-house networks to handle renewable energy business;
- Develop new underwriting methodologies;
- Develop and promote new risk transfer markets through alternative risk transfer.

#### Institutional investors

- Encourage industry, including utilities, to plan for a shift from fossil fuels to renewables, and to move at the appropriate time;
- Provide information to clients on the opportunities to invest in renewables;
- Increase analyst and stakeholder awareness of climate change and sustainability;
- Provide finance for acceptable "funding gap" propositions.

#### IN DEVELOPING COUNTRIES

- Factor sustainable development into finance decisions;
- Collaborate with the public sector (ECAs, development banks) to develop new markets.

The good news is that wellstructured policies can growth in renewables. Worldwide growth in windpower has reached 25% annually in installed capacity, and even more in favourable regimes like Denmark, **Germany and** Spain.

#### JNEP FI

The United Nations Environment Programme Finance Initiative (UNEP FI) is a unique global partnership between UNEP, financial institutions, insurance and re-insurance companies and fund managers. Based in Geneva, Switzerland, UNEP FI has over 230 member institutions worldwide. UNEP is headquartered in Nairobi, Kenya. UNEP has eight divisions through which it carries out its activities, including the Division of Technology Industry and Economics (DTIE) based in Paris, France. The Economics and Trade Branch (ETB), based in Geneva, Switzerland, is a branch of DTIE. The Finance Initiative is a unit of the ETB.

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#### **Study Editor and Advisor**

#### **Dr. Andrew Dlugolecki**

Andlug Consulting Perth, Scotland Tel +44 1738 626 351 andlug@btopenworld.com

#### **UNEP FI Climate Change Working Group member**

#### **Iris Gold**

**Ethics Director** Citigroup New York, USA Tel +1 212 559 1227 goldi@citigroup.com

#### Dirk P. Kohler

Managing Director GSDP Global Sustainable Development Project Marseilles, France Tel +33 4 96 11 68 21 gsdp@gsdp.fr

#### **Thomas Loster**

Head, Weather/Climate Risks Research Munich Reinsurance Company Munich, Germany Tel +49 89/3891 5287 tloster@munichre.com

#### **Dr. Armin Sandhövel**

**Head Corporate Sustainability** Corporate Risk Office Dresdner Bank AG Frankfurt, Germany Tel.: +49 (0) 69 263 55193 armin.sandhoevel@dresdner-bank.com

Kirsty Hamilton Policy Consultant London, UK Tel +44 7986 355 561 kirsty\_hamilton@hotmail.com

#### **Dr. Sascha Lafeld**

Managing Director 3C climate change consulting GmbH 60386 Frankfurt, Germany Tel +49 69 420 88 98 11 sascha.lafeld@3c-company.com

#### **Julian Salt**

Climate Solutions Consultancy Canterbury, UK Tel +44 1227 379 880 jesalt@tiscali.co.uk

#### Other contributors from **UNEP FI (Non-CCwg**

#### Shane Bush

Director & Head Renewable Energy Global Structured Finance **ANZ Investment Bank** London, UK +44 20 7378 2813 bushs@anz.com

#### **Vinay Mistry**

Risk and Exposure Analyst Group Reinsurance Aviva plc +44 20 7662 7516 vinay.mistry@aviva.com

#### Michaela Pulkert

Head of Power & Environment Global Project Finance **HVB AG** Munich, Germany +49 89 378 25859 michaela.pulkert@HVB.de

#### **Paul Clements-Hunt**

Head UNEP Finance Initiative Geneva, Switzerland Tel +41 22 917 8116 pch@unep.ch

#### **Lisa Petrovic**

Consultant **UNEP Finance Initiative** Geneva, Switzerland Tel +41 22 917 8686 lisa.petrovic@unep.ch

www.unepfi.net