



How is the projected growth of renewable and decentralized energy to be financed? Now that the potential of the sectors is beyond question, it is time to consider how investors can be persuaded to move into sustainable energy. **Kirsty Hamilton** has been taking soundings.

A challenge of scale

Financing for renewables and decentralized energy

The challenge of financing a significant scale-up of renewable energy was central to discussions at the Bonn International Conference for Renewable Energies in June 2004. The first conference of its kind, it attracted 3600 participants representing 154 governments, businesses and civil service departments, alongside a forum of finance professionals. While the governmental focus was concentrated on renewable energy, many of the issues raised regarding finance are also relevant to decentralized energy (DE).

The Bonn conference illustrated clearly that the vast market potential of sustainable energy is now unquestionable. The challenge now is how to scale-up commercial operations; investment, of course, is a critical element. There was political consensus for a commitment to a 'substantial increase' in the share of renewables in the total energy supply, and also a commitment to various policies and regulations, including the removal of barriers to allow fair competition, and the need for international financial institutions to 'significantly expand' investment in renewable energy and energy efficiency.

Serious business engagement is also beyond doubt. In the past couple of years, for example, GE has acquired Enron's wind business, solar power product manufacturer Astropower, and Austrian company Jenbacher, manufacturer of equipment for on-site generation, including cogeneration and gas/biogas engines. GE Wind's Chief Executive Officer, Steve Zwolinski, told a recent renewables conference for Wall Street financiers that, in this period of 'rapid change' in energy markets, the message is simple - invest. For instance, the Renewable Portfolio Standard (RPS) targets for 2010 in the US alone will require multibillion dollar investment. Whatever the core drivers are - environment, poverty alleviation, megacity

infrastructure requirements, energy security or rising natural gas prices - the fundamentals of the market are starting to change.

However, although there is emerging interest from financiers and investors for renewable and 'new' energy technologies in the Organization for Economic Co-operation and Development (OECD) markets, caution is still advisable. According to Virginia Sonntag-O'Brien - one of the authors of the financing paper at the Bonn conference and organizer of

The fundamentals of the market are starting to change

the financiers' forum, held alongside the main event - the mainstream financial community still lacks the knowledge necessary to assess the risks and opportunities associated with investing in these technologies. 'Until private capital is mobilized to any significant extent,' she says, 'the public sector must come in and hedge or share some of the risk'.

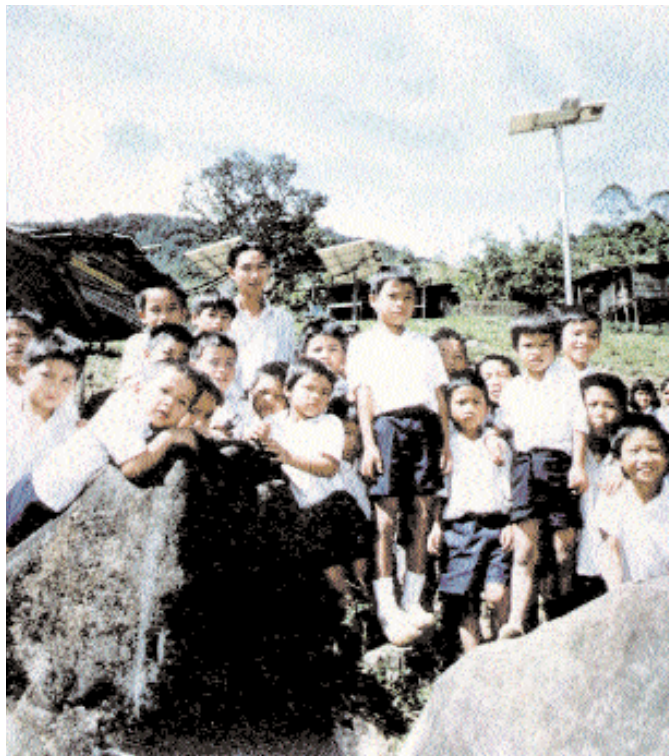
FINANCING CHALLENGES

In a preparatory paper for Bonn,¹ Sonntag-O'Brien, and co-author Eric Usher, a finance expert with the UN Environment Programme (UNEP), highlighted the challenges in financing this sector:

- barriers and disincentives exist within deregulated markets



Assembly work on a wind turbine: fitting together financing for renewables is by no means as straightforward! DEWIND



ABOVE Malaysia's Ministry of Rural Development (MORD) has funded 2.2 MWp of PV in Peninsular and the East Malaysia States of Sabah and Sarawak since 1996 BP SOLAR
BELOW Cash in palm: this mill in Indonesia produces palm oil for power generation
 BRONZEOK **FACING PAGE** Rural solar demonstration, Hatareskotuwa, Sri Lanka COLIN WHYMAN/SHELL

- the conventional calculation of risk and return does not resolve in favour of these energy technologies for the most part
- there are key gaps in what is called the 'financing continuum' – the supply chain of finance needed to get from project development to commercial reality.

This complex mix of factors will apply in slightly varying proportions in the OECD, compared with developing country markets, on- and off-grid markets, and for different technologies.

The rise of electricity sector deregulation and 'competitive' market structures has been a mixed blessing for the renewable energy (RE) and DE markets.² New sources of capital can enter the market, which should mean that overall energy efficiency is improved. However, renewables and other forms of local generation have been expected to compete on an equal footing with conventional, centralized power options, when their basic cost structures are different and a series of additional benefits offered by renewables and local generation are discounted. This does not make them a commercially attractive option.

Indeed, consultations with financiers leading to a 'finance sector' statement,³ which fed into the Bonn policy process, emphasized the critical importance of the strength and stability of government policy frameworks at this stage of market development. If investor confidence is to increase, and the bankability of projects to

be improved, then policies must be 'loud, long and legal' – 'loud' meaning that the incentives are sufficiently strong to make a difference to business plans, 'long' meaning of a sufficient time frame to be relevant to project lifetimes, and 'legal' meaning legally binding, whether targets or mechanisms.

Tom Lord, managing partner of the Distributed Energy Financial Group⁴ – a specialized financial services firm in the US – and an experienced energy market player, makes the basic point that policies must affect cash flow if businesses are expected to respond. If a policy is based on 'aims', then the government is, in effect, asking investors to speculate on political delivery, and that speculation, in financial terms, means high venture capital level returns are expected, due to the risk that policy aims are not backed by political commitment, and the investment environment changes. RE and DE technologies which are in many cases still not yet fully cost competitive, look even less attractive under these circumstances.

This leads on to the risk-return factor. Financiers, of course, want to be sure that if they lend or invest they are going to get their money back with the premium they require. This is part of the equation that defines the bankability of projects. So whatever the energy technology, returns must be commercially attractive, and risks should be clearly understood and minimized through risk management tools, such as insurance.⁵

RISKS AND RETURNS

Jonathan Johns, Partner in Ernst and Young's Renewable Energy Group, presented the company's latest annual 'country attractiveness index' for equity investors at the recent Wall Street conference. Risks that are assessed include:

- electricity market regulatory risk
- planning and grid connection
- access to finance (including the local market)
- existing infrastructure
- planning and grid connection
- perceived risk associated with the technology and the creditworthiness of the off-taker.

Key factors on the 'returns' side are:

- project size
- market growth potential
- the tax climate
- resource quality.

From a banking point of view, these factors are reinforced by Nick Gardiner, who leads a team of six at Fortis Bank, in London. At present, like many investors, Fortis Bank is mainly interested in wind in European markets, but is looking for opportunities in other areas, such as landfill gas and biomass. Speaking at the financing forum in Bonn,⁶ he highlighted a cautious approach to new energy technologies and projects: the interest is there, but there is not enough financing going on. Part of this is the result of a conventional power 'hangover' from the rash of failed Independent Power





Producer investments in many markets in the 1990s, which has left investors particularly risk-averse to the power and utilities sector.

There is also a series of risks that are assessed for any project. The 'new' energy technologies have a higher perceived risk, as investors are still working their way up the learning curve. Risk assessment experience, as well as risk management and insurance tools, should start to reduce this risk, but this will only follow actual investment experience, and commercial track record. A further issue for investors and lenders is project scale – something well known to small and medium-sized project developers. €20 million is the minimum size of project that a bank like Fortis is likely to consider, because of transaction costs.

There is also a set of technical issues that increase uncertainty and perception of risk in the medium term. In the UK, for example, the capacity of the electricity grid and the distribution networks to 'take' a growing contribution from DE, and cope with different voltage characteristics is a case in point. Graham Meeks, director of policy development at Climate Change Capital, a specialist merchant bank concentrating on low and zero carbon technologies, says it is still not clear who is going to pay for any required upgrades or configuration of the grid and network. This adds to concern that there may be future additional costs that could reduce project returns.

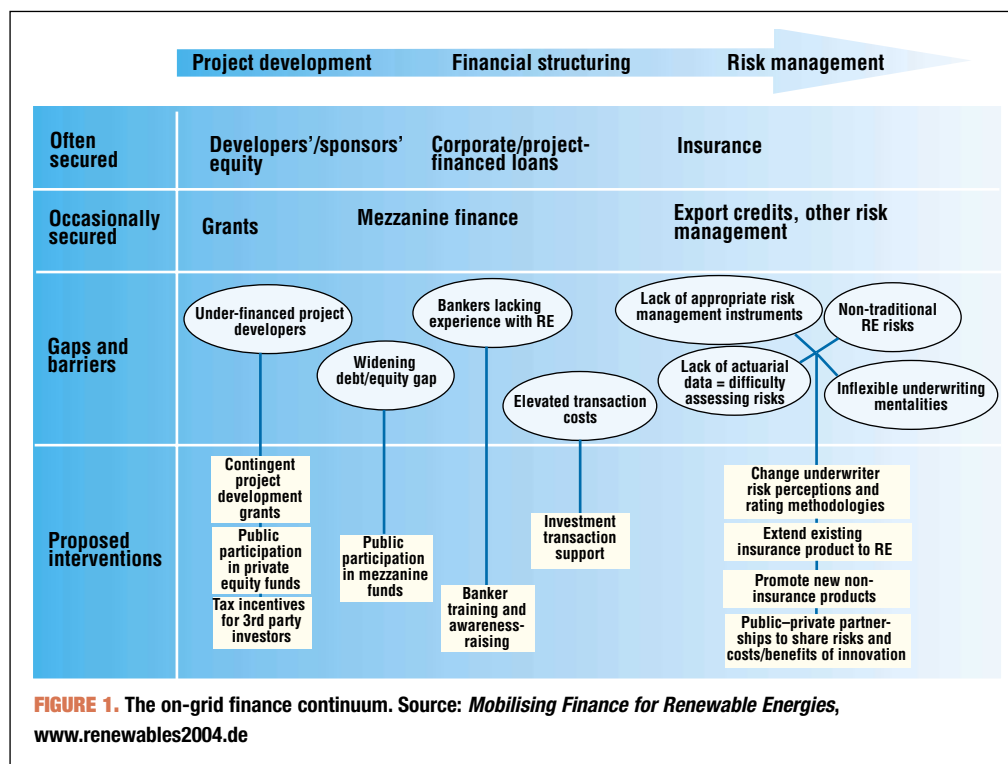
THE FINANCING CONTINUUM

The financing continuum illustrates the more fundamental



challenge of remoulding 'conventional' energy approaches or financing tools for renewables or DE. Sonntag-O'Brien and Usher point out that the very different technologies – in terms of scale, upfront cost and payback times, infrastructure, fuel supply risk (for example, wind data, biomass supply) and so on – require new thinking, new risk management approaches and new forms of capital. Some of these are only now being developed as mainstream financiers and risk managers become engaged.

A diagrammatic summary of the financing gaps helps to illustrate what is required to progress from project idea to commercial reality – referred to as the 'finance continuum' by Sonntag-O'Brien and Usher (Figures 1 and 2). These summarize the full spectrum of financing requirements for the



enterprise-focused finance intermediaries like E&Co,⁹ and commercial banks such as Standard Corporate Merchant Bank.

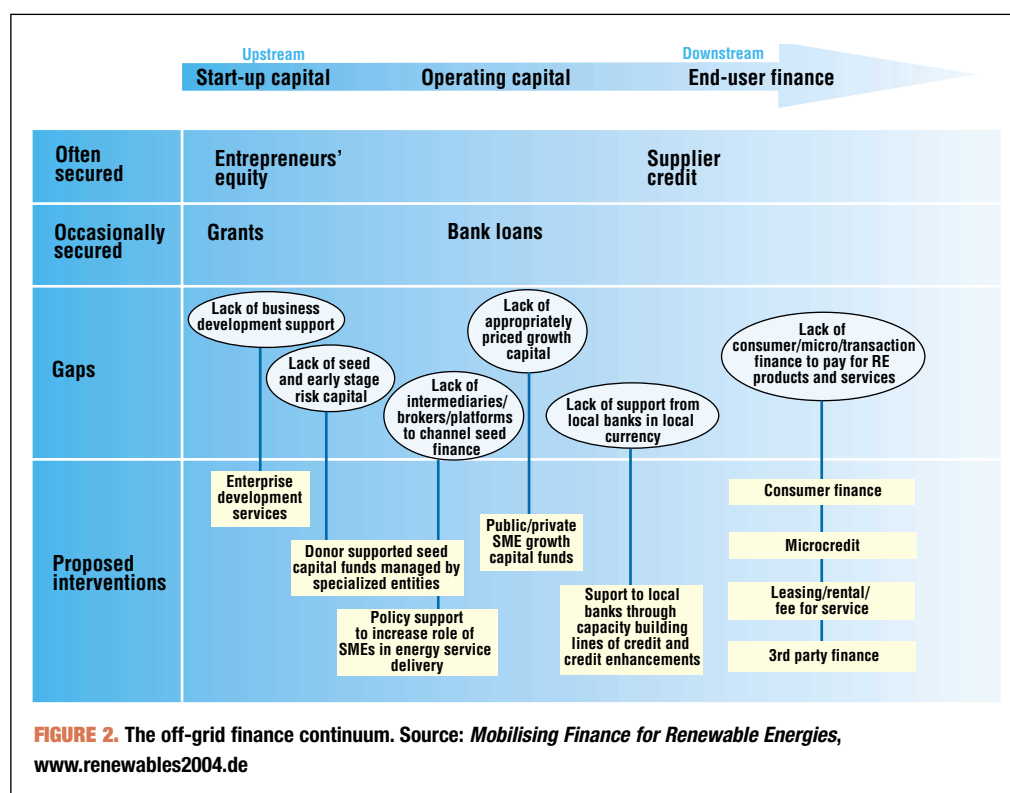
The opportunity of exchange within 'the sector' was seen as valuable, particularly between players already engaged in different stages of financing, or with an interest in investing in sustainable energy. The aim of the energy financiers' network is to increase deal flow, and provide feedback both to project developers working on business plans and looking for the appropriate lenders or investors, and also to policymakers developing the mechanisms for delivering the South African renewables target.

implementation of renewable energy – both for on-grid and off-grid – showing the current gaps and some proposed responses to those.

To take a look at where solutions need to be developed – for instance in developing countries in the off-grid market – project development and 'second-stage' low-return 'seed' capital, together with local small enterprise development and entrepreneur support, are vital but not easily available. This is particularly so as the creditworthiness of entrepreneurs may be difficult to establish since they may not have a commercial record. Consequently, banks may be unwilling to risk capital, and entrepreneurs have to shoulder all the 'pioneering' risk.

One innovative approach to this is seen in South Africa where, under the Renewable Energy and Energy Efficiency Partnership (REEEP),⁷ an initiative to build 'multi-stakeholder' momentum in RE and energy efficiency uptake, a network of sustainable energy financiers has been established. This was on the basis of a meeting in February 2004, organized by RAPS Finance,⁸ of about 25 financiers including public and development finance bodies, small-scale

in developing countries are starting to create new types of funds to fill gaps, using commercial finance experience and tools. For example, Rabobank's Indian Renewable Energy Enterprise and Development Fund (IREEED) is a response to the lack of equity in the renewables sector in India, despite a significant market potential. Established by Rabo India Finance Limited and BTS Investment Advisors, it is using professional investment and management expertise to raise a US\$30 million





private equity fund for the sector. In the remote, off-grid market – for example, the Himalaya Rural Lighting Initiative¹⁰ – finance professionals are developing new approaches that leverage small amounts of investment capital to create credit facilities for farmers' co-operatives to purchase solar lanterns.

INCREASED LENDING FOR RENEWABLES

International financial institutions (IFIs) and Export Credit Agencies (ECAs) play an important, if currently undersized, role in leveraging and underwriting the finance going into sustainable or DE systems. There has been much justified focus on the relative scale of lending going into conventional energy, compared with the 'new energy technologies', but now there are signs of change. During the Bonn conference, the World Bank made a nod in this direction by committing to an increase in its renewables investment of 20% per year for the next five years, amounting to an estimated additional US\$200 million per year by the end of that period. However, it is worth noting that the Bank made a single \$200 million loan to Turkey alone for renewables investment – channelling the money via the Industrial Development Bank of Turkey and the Turkish Development Bank¹¹ – which suggests that different approaches are possible. The World Bank's private-sector lending arm, the International Finance Corporation (IFC), has already stated its interest in cogeneration and DE options in developing countries.¹²



Selling solar PV in China
FREE ENERGY EUROPE

Banks may be unwilling to risk capital and entrepreneurs have to shoulder all the 'pioneering' risk

Also at the Bonn conference, the European Investment Bank (EIB) announced that it would lend up to 50% of its total lending for European electricity generation to renewables by 2010, amounting to about €700 million a year. The European Bank of Reconstruction and Development (EBRD) is also moving in this direction: it is looking for feedback on a proposed Renewable Energy Financing Entity – a new form of financing for renewable energy projects. It is expected to provide equity for smaller projects, as well as technical assistance to help cover the project preparation costs required to raise additional debt finance.¹³

On the regulatory side, the Brazilian Government's Alternative Energy Sources Incentive Programme, 'Proinfa', offers 20-year Power Purchase Agreements (PPAs) at set (adjusted) prices for commercially bid wind, biomass and cogeneration projects, enabling project developers to have a



secure income stream, a key part of improving project bankability. Meanwhile, China is developing its Renewable Energy Act, including mechanisms to meet its renewables target of 10% of installed power generation – about 60 GW – by 2010, announced during the Bonn conference. Of this, about 50 GW is expected from small hydro, and 10 GW from wind and biomass together: this will be a €49 billion investment opportunity, according to the Chinese Government. How investors from outside China react will depend to a large extent on the exact content of the Act, and confidence in the reliability of investment contracts.

CARBON FINANCE

Carbon finance is gaining attention as a means of increasing project returns by using the Kyoto Protocol mechanisms to reward the carbon benefits of small decentralized energy systems. Specialized carbon facilities have already been developed by a number of institutions, both public and private. However, a note of caution is due here. The London-based financiers consulted on renewable energy in emerging markets were somewhat sceptical about the role of carbon finance as a decisive factor in overcoming investment risk – particularly political risk and issues to do with scale and confidence in the project developers. It was viewed more as the ‘icing on the cake’, and most relevant for projects such as landfill gas capture (which can demonstrate high carbon savings), allowing carbon finance to exert a positive result on the internal rate of return of the project.

This just means that, until the carbon price in the market is more certain, and the transaction costs for accessing the

carbon benefit are reduced, carbon finance may play a limited role, in comparison with the impact of strong national policy frameworks.

With regard to industrialized nations, the focus remains on the policy framework and incentive structures. The finance sector has some interesting observations on policy experience to date – for example, in the debate on feed-in versus tradeable market incentive structures for renewable energy – which are relevant for a review of the European approach to renewables that is coming up next year.¹⁴ Also relevant are the innovations in financing approaches and product developments, such as risk management tools, and the emergence of new firms such as Climate Change Capital.¹⁵

LOCAL GOVERNMENT INVOLVEMENT

The importance of municipal, local and state-level government engagement in DE is now becoming more recognized, as evidenced by the innovative approaches being rolled out at state level in the US. Local governments have procurement options and property under management, as well as the capacity to underwrite risk and issue bonds to raise finance. They often also have a significant policy and regulatory mandate.

In California, for example, the San Francisco Public Utility Commission has required the solar industry to demonstrate maximized energy efficiency when bidding for state contracts. This then enabled the SF PUC to use the significant cost savings from energy efficiency to cross-subsidize the high upfront costs of the solar PV, also stimulating technical innovation as a side benefit. While several states are taking leading positions on DE, currently driven by high natural gas prices and concerns over energy and infrastructure security, federal policy is at a standstill. It is likely to remain so until after the US Presidential election: the vagaries of the Production Tax

Credit for wind power, which expired in December 2003, are still casting a shadow: with further activity uncertain until legislation extending of the tax credit is passed. This is disappointing, particularly at a time when US finance institutions may be looking for scaled-up investment opportunities in new energy technologies.

Certainly an audience of 350 attending the Wall Street renewables financing forum¹⁶ in the US indicates an appetite for learning more about market and investment opportunity. Bill Richardson, former Energy Secretary, now Governor of New Mexico, responded by calling for a ‘new alignment’ between Wall Street and state governments as he announced a West Coast bi-partisan initiative on renewable energy led by himself and Governor Arnold Schwarzenegger of California.

BELOW Scaling up: the first wind turbines were installed at this site in Muppandal, India in 1993, with more added over the subsequent ten years VESTAS WIND SYSTEMS A/S
FACING PAGE Tightening the screws: wind turbine manufacturing GE WIND





THE TRUE VALUE OF RE AND DE

Financing itself is only one element of what is required to significantly scale up the DE, energy efficiency and renewables markets, in both developed and developing countries. Other factors – including the regulatory and incentive framework, the strength of distribution networks for equipment, expertise and experience along the ‘supply chain’ from DE project developers and local banks to the local community using the technology, the existence of detailed resource mapping – can all be a constraint on the speed of development of DE, as well as being of relevance to the financing equation. Tom Lord, of the Distributed Energy Financial Group, points out that the whole electricity system and market trading incentives and disincentives need to be reconsidered in order to value the full service provided by distributed energy and renewables.¹⁷ For example, the ‘grid cost’ of a consumer is not fully assessed at present, and energy plus infrastructure and reliability costs should all be incorporated.

The failure to recognize the true value of DE and RE is also a conclusion of Shimon Awerbuch’s assessment.¹⁸ He uses



RE and DE can achieve overall price reductions, even if upfront costs are higher

finance and portfolio theory to assess the benefits these energy technologies provide in reducing the overall costs of electricity supply. The volatility of fossil fuel prices exerts a financial risk on conventional energy delivery but overall reductions can be achieved with the use of RE/DE, even if upfront costs are higher. Awerbuch comments that talking about generation without factoring in fuel price risk ‘is like watching a movie with the sound turned off: you miss a big part of the story’.

In conclusion, the level of interest and engagement in this complex area is reaching a new tier – where money comes in. From the highly practical measures and tools currently emerging, to the more fundamental elements needed to bring the policy, business and financing communities into alignment, the debate is clearly opening up.

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NOTES

1. www.renewables2004.de, background documents. Virginia Sonntag-O'Brien is Managing Director of BASE – the Basel Agency for Sustainable Energy; Eric Usher leads the sustainable energy financing activities within UNEP's Department of Technology, Industry and Economics.
2. For example, Brown and Minett, 'Strategies for Success in International Cogeneration Markets'. In *Cogeneration and On-Site Power Production*. May-June 2004. James & James (Science Publishers).
3. This statement is available on www.reeep.org, it is a summary of key points raised in consultations not formally representing individual companies.
4. www.defgllc.com
5. For a detailed assessment of risk management tools, refer to UNEP's report 'Finance Risk Management Instruments for Renewable Energy Projects', 2004. Summary downloadable from: www.uneptie.org/energy/publications/pdfs/RE_Risk_Manag.pdf
6. Agenda, papers and conclusions from UNEP's Sustainable Energy Finance Initiative (SEFI), www.sefi.unep.org
7. REEEP was launched at the Johannesburg World Summit on Sustainable Development in August 2002. www.reeep.org
8. www.raps.co.za
9. www.energyhouse.com
10. HRLI is part of the Himalayan Finance Facility, which is designed to lead private capital for small-scale renewable energy transactions linked to agricultural ventures in the rural Indian Himalayas, www.e3vplc.com; see also the Small-Scale Sustainable Infrastructure Development Fund, www.s3idf.org
11. Refer to the Bonn 'International Action Programme', www.renewables2004.de page 155.
12. For example, 'Financing CHP and DE Projects in Development Countries: The Role of the World Bank and the IFC', Dana Younger presentation at the USCHPA/WADE International Conference, May 2003.
13. Contact Peter Hobson, hobsonp@ebrd.com, www.ebrd.com
14. For notes on the London 'REEEP' consultations with financiers on public policy priorities, please e-mail Kirsty Hamilton: kirsty.hamilton@bcse.org.uk. The consultations were organized by the UK Business Council for Sustainable Energy, as part of work under the REEEP.
15. www.c-c-capital.com
16. See www.americanrenewables.org for more information on this event, held in conjunction with Euromoney conference organizers, June, New York.
17. www.defgllc.com – see some interesting background papers on its 'DE Sector Review' and key market drivers in the US. DEFG also seeks to play a role as a bridge between the DE companies and the capital markets, bringing together technical, financial and regulatory metrics on both sides.
18. See for example his article in *Renewable Energy World* March-April 2003, p. 52. Dr Awerbuch is the Tyndall Centre Fellow at SPRU, University of Sussex. www.tyndall.ac.uk