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Investing in low-carbon energy technology in the EU

ITRE

EN

2010

EUROPEAN PARLIAMENT

DIRECTORATE GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

INDUSTRY, RESEARCH AND ENERGY

Investing in low-carbon energy technology in the EU

Workshop Report
26 April 2010

Abstract

In light of the financing needs identified in the Communication from the Commission on the SET-Plan of November 2009, a workshop was held in the European Parliament on 26 April 2010. It aimed at assessing the experience of public/private investors with investments in innovative energy technologies or projects integrating climate change and eco-efficiency criteria. Discussion focused on the status of clean energy investments markets, factors/criteria influencing decisions and investments into clean energy technology, current barriers, possible EU regulatory issues that would promote further uptake and means necessary for improving access to venture capital.

IP/A/ITRE/2009-15 JUNE 2010

PE 440.279 EN

This document was requested by the European Parliament's Committee on Industry, Research and Energy.

AUTHORS

Briefing notes on the workshop held on 26 April 2010

Note 1:	Mr Karsten Löffler	Allianz Climate Solutions GmbH
Note 2:	Mr Guido Agostinelli	Good Energies
Note 3:	Ms Kirsty Hamilton	Renewable Energy Finance Project, Chatham House

RESPONSIBLE ADMINISTRATOR

Ms Camilla BURSI
Policy Department Economic and Scientific Policy
European Parliament
B-1047 Brussels
E-mail: Poldep-Economy-Science@europarl.europa.eu

LINGUISTIC VERSIONS

Original: [EN]
Translation: [DE, FR]

ABOUT THE EDITOR

To contact the Policy Department or to subscribe to its monthly newsletter please write to: Poldep-Economy-Science@europarl.europa.eu

Manuscript completed in June 2010.

This document is available on the Internet at:
http://www.europarl.europa.eu/activities/committees/studies.do?language=EN

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CONTENTS

INTRODUCTION

In light of the financing needs identified in the Communication from the Commission on the SET-Plan of November 20091, the aim of the workshop was to assess as far as possible the experience of private investors with investments in innovative energy technologies or projects integrating climate change and eco-efficiency criteria.

Discussion focused on the status of clean energy investments markets, factors/criteria influencing decisions and investments into clean energy technology, current barriers, possible EU regulatory issues that would promote further uptake and means necessary for improving access to venture capital.

The workshop aimed at gathering expert's contributions in this area and have an exchange of views and discussion with MEPs and relevant stakeholders in the field on the policy aspects of interest to their policy making work.

The experts contributing have provided written briefing notes after the workshop addressing main questions discussed during the workshop.

WORKSHOP AGENDA

15:00 Welcome and introduction by the Chair: MEP Paul Rübig

15:10 Obstacles and incentives in clean energy investments
Mr Karsten Löffler - *Allianz Climate Solutions*
Financial advice / Investments and Insurance sector
15:25 Questions & answers session

15:40 Role of Venture Capital (VC) and increase access to VC investments
Dr Guido Agostinelli - *Good energies*
Investors and Venture Capital
15:55 Questions & answers session

16:10 Mobilising public financing institutions
Status and perspectives of EIB initiatives in clean energy financing. Status of « Fond Marguerite » and EIF initiatives.
Mr Edward Calthrop - *European Investment Bank*
16:25 Questions & answers session

16:40 EU Policy options for supporting and facilitating financing of low-carbon energy technologies
International climate policy and clean energy investment and policy expert
Ms Kirsty Hamilton - *Chatam House*
16:55 Questions & answers session

17:10 General discussion with MEPs and interventions from the Commission and relevant stakeholders

18:00 End workshops

[1] (COM (2009) 519) on Investing in the Development of Low Carbon Technologies and accompanying Technology Roadmap SEC(2009) 1295.

ABSTRACTS

Note 1: K. Löffler

Insurance companies have the potential to invest significant amounts of money in clean energy in case of attractive risk return patterns. Additionally, insurance coverage for new technologies like carbon capture and storage and off-shore wind is key to hold (industrial) investors free from severe risks and to secure project finance. The note illustrates the preferences in terms of risk-return profiles, shows the opportunities and obstacles within the real estate sector and demonstrate examples for the importance of insurance for successful financing / new technology implementation.

Note 2: G. Agostinelli

This note deals with Venture Capital investments in the Cleantech sector and the role the Venture Capital industry can play in the context of the Strategic Energy Technology Plan and the EU 2020 strategy. Statistics on investments in the cleantech sector are given as well as some basic recommendations for promoting innovation and improving the existing environment for investing in clean technologies.

Note 3: K. Hamilton

This Briefing outlines how policy interacts with investment decisions, with a particular focus on renewable energy as illustrative of one set of low carbon technologies. A definition of elements of 'investment grade' policy is provided, based on extensive work with mainstream renewable energy financiers over the last five years. This illustrates the policy and finance interaction, rather than a prescription of what is required at present in the EU.

The expert's presentations can be found on the European Parliament's website at the following link:
http://www.europarl.europa.eu/activities/committees/hearingsCom.do?language=EN&body=ITRE

BIOGRAPHIES

Speaker's biographies

Karsten Löffler

10.1991 - 05.1996	Universität Göttingen, Diploma in Business Administration, 2007 Certified International Investment Analyst (CIIA)
Since 02.2008	Allianz Climate Solutions, Head of Operations & Projects, Manager global cooperation project Allianz SE / WWF International on various climate change issues. Product related asset management and insurance issues with regard to climate change. Carbon neutralisation projects.
04.2001 –01.2008	Allianz Global Investors, Head of Product Management, Product positioning, Product lifecycle management, Product change projects
10.1997 – 04.2001	Dresdner Bank, Sales Manager, Distribution strategy, SME sales desk for securities, FX and interest rate products.
02.1989 – 09.1997	Dresdner Bank: Vocational training, Talent program, Trainee program
Since 06.2008	Board Member of Oikocredit International Share Foundation, The Netherlands
05.2004 – 04.2010	Board Member of Oikocredit Hessen-Pfalz, Germany

Guido Agostinelli is a senior associate in the venture capital team at Good Energies, a leading investment fund in renewable energies. Prior to joining Good Energies, Guido Agostinelli has built nearly 15 years of specific experience in research, technology and development in the field of photovoltaics. From 1994 to 2001 he worked at the Joint Research Centre of the European Commission in Ispra, Italy and in 2001 he joined IMEC, the largest independent R&D centre in the field of micro and nano electronics, as Senior Research Scientist and team leader. Guido Agostinelli has taken part in several task forces of public bodies such as the International Panel on Climate Change (IPCC), the European Commission, the International Energy Agency. He is member of the steering committe of European Photovoltaic Technology Platform and member of the environmental taskforce of the Venture Capital Platform Council. Guido received his master degree in physics in 1998, from the University of Milan, his doctoral degree in engineering in 2002, from the University of Gent, and is completing a global EMBA program with SDA Bocconi in Milan. He has Italian citizenship and resides in Switzerland since 2007.

Edward Calthrop is a senior economist at the European Investment Bank. After completing a PhD in economics from K.U.Leuven (Belgium), and post doctoral research at Oxford University, he worked within the consulting sector and private industry. He joined the Bank in 2005, working on the appraisal of projects presented for financing. He is currently based in Brussels, and actively involved in the discussions with Commission and other institutions on the role of the Bank in promoting EU policy.

Kirsty Hamilton is an Associate Fellow at Chatham House (Royal Institute of International Affairs) the strategic foreign policy think tank, and leads the Renewable Energy Finance Project, working for the last five years with leading mainstream financiers and senior policy counterparts at the intersection of finance and policy. Kirsty has 20 years experience as an Observer at the UN climate change negotiations (NGO and Business category), and is currently part of the World Economic Forum's Global Agenda Committee on Sustainable Energy, the Advisory Board of UNEP Finance Initiative (Climate Change work), and the Steering Committee of the REN21 policy network. She is an IPCC Expert Reviewer. Kirsty also does consulting work in these areas.

NOTE 1: INCENTIVES AND OBSTACLES FOR INVESTING IN CLEAN ENERGY

BY MR KARSTEN LÖFFLER, ALLIANZ CLIMATE SOLUTIONS GMBH

1. INTRODUCTION

KEY FINDINGS

- Investors in renewable energy plants need:
  Attractive risk-return profiles
  Sound, reliable and uniform regulatory environments, steady local parameters
  An healthy financial environment
  Building sector: Solutions for letted buildings (principal-agent dilemma)
- Insurance is often crucial for successful financing / implementation
  CCS: Long term insurance potentially only feasible with state support
  Off-shore wind: Long term experience crucial

1.1. Insurance companies as clean energy investors

Insurance companies, particularly the ones with a strong life division, and pension funds are major asset gatherers. European insurance companies gathered approximately 6,900bn Euro (2008)

[2], which compares to 51% of European GDP[3]. Due to that role they potentially are important investors in clean energy assets and buildings.

Common to insurance companies across Europe is that the large bulk of their investments is under relatively tight regulatory supervision, i.e. the restricted assets. General requirements for the investment of restricted assets are “maximum security and profitability, while maintaining the insurance undertaking's liquidity at all times, maintaining an adequate diversification and spread”[4] liabilities are usually largely long term. Assets with a comparatively long duration are normally not available in abundance. In addition, to diversify the portfolio across asset classes it is an important strategy to lower the anticipated risk of a portfolio.

Clean energy assets comprise all investments in renewable energy installations, energy efficiency and other low carbon technologies.

[2] CEA Statistics N°37: European Insurance in Figures, Oct 29, 2009, p. 20.
[3] Ibid., p. 22.
[4] Art 54, para 1 German Act on the Supervision of Insurance Undertakings (Insurance Supervision Act - VAG).

1.2. Risk tolerance and portfolio impact

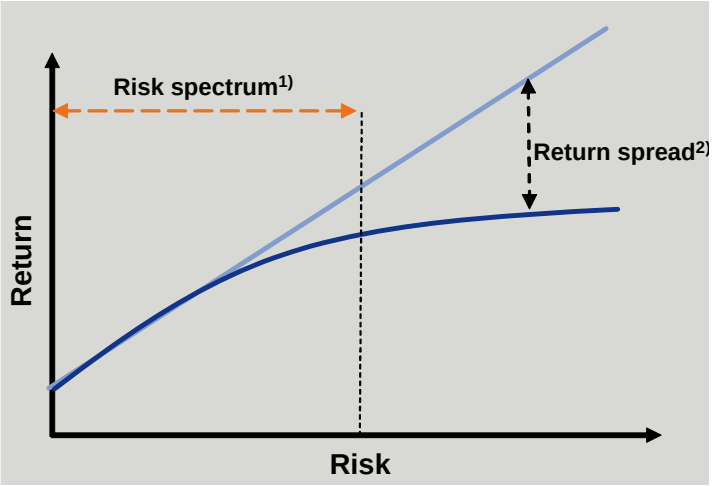


Figure 1: Schematic risk-return profile

1) Defined by regulatory framework for investors
2) Accrued from additional risk exposure without added return potential

Due to the regulatory framework, most insurance companies tend to invest primarily in low- to medium-risk assets. Higher risk-levels, which e.g. come along with the development/application of new technologies, are often less attractive because the additional risk is frequently not sufficiently rewarded (see figure 1)

Closing the gap would require either to lower the investment risk, e.g. by transferring risk to third parties, or respective higher returns on investment.

Lowering the investment risk could also be achieved by utilising **expert investment know-how**, either internally or externally. Specifically larger insurance companies tend to rely on internal know-how which implies that an asset class has to be (i) sufficiently large to make an impact on the overall portfolio and (ii) promising in terms of risk, return and diversification in order to be worth the setup of an internal specialist team.

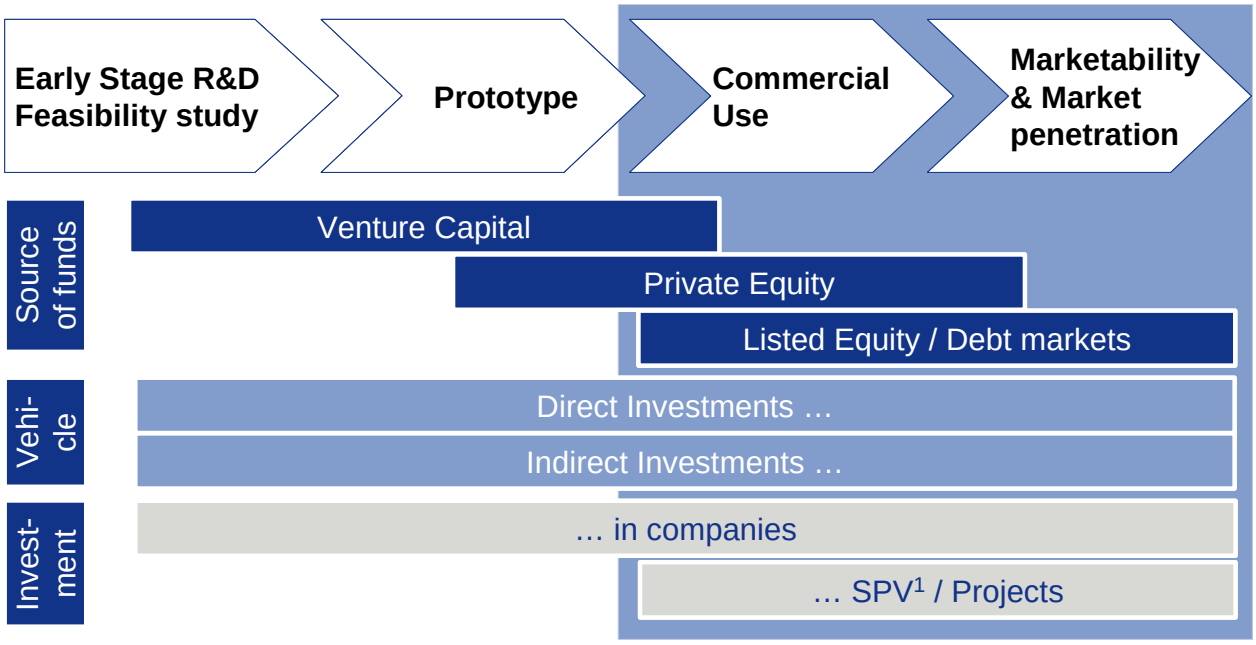
Though clean energy investments are usually long term assets and therefore often beneficial in term of asset-liability matching for insurers, a further limitation to the volume of clean energy investments comes from their **illiquidity**.

In general, the prerequisite for every investment is a favourable investment climate which includes political and economic minimum requirements.

1.3. Development stages of clean energy assets and their sources of financing

The source of financing depends largely on the business stage of a specific clean energy technology (see figure 2). Technologies in early stage / development are usually financed with venture capital (and often subsidies). When commercial use has been achieved private equity financing steps in. Access to debt financing and equity markets come along with increased market penetration.

Figure 2: Schematic overview of clean energy financing



[1] Special Purpose Vehicle

Due to the regulatory and virtual requirements for insurance companies the following paragraphs will focus on clean energy projects, e.g. photovoltaic parks or wind farms.

A further traditional focus area for investments for insurers is real estate. As the building sector stands for a considerable amount of carbon emissions, the importance of a transition to energy efficient buildings cannot be overstated.

2. INCENTIVES AND OBSTACLES FOR INVESTING IN CLEAN ENERGY

2.1. General factors

2.1.1. Country specific

Certain requirements are absolute minimum conditions for investments and can represent clear obstacles if not met. Some examples are:

(a) **Political and social stability, investor's rights,** e.g.:

- Stable legislative and judicial environment with regard to investments including protection of investments and the avoidance of retroactive changes. A trustworthy policy with regard to retroactive changes is highly critical because clean energy project investments come along with high initial investments and the inability to adjust cash flows during the lifespan of a project.
- Governments that in practice follow the rules and act in a reliable and transparent manner.
- Allowance for foreign investors to take company stakes larger than 50% and to secure land titles.

(b) **Stable economy / taxation,** e.g.:

- Moderate actual and expected inflation (especially for long-term assets).

- Moderate taxation, allowing an adequate return for the investor, specifically in comparison to countries with comparable investment opportunities.
- Leading to stable foreign exchange (FX) rates (in case of investments in a currency other than the home currency). FX-hedging should be possible and would require liquid markets to do so.

(c) **Infrastructure,** e.g.

- Reliable access to investment site (roads), availability of reliable electricity infrastructure, access to grid.
- Local expertise in constructing and running a clean energy project.

(d) **Municipality and local support**, e.g.:

- Willingness of local authorities and citizens to make clean energy projects happen, i.e. actively supporting and enabling the permission process.
- Being supportive in case of any difficulties including security issues (theft, vandalism).

(e) **Negotiation and contract ethics**, e.g.:

- Finalisation of negotiation process within an adequate time frame.
- Reliable contractual partners, sticking to what has been agreed upon.

(f) **Clear requirements for used clean energy equipment**, e.g.:

- Technical obligations, defined ex ante rules for the respective installation, their financial impact and relevant accounting procedures.

2.1.2. Other points

Certain other requirements and points of interest are ex ante important when investors consider a renewable energy project investment. Any of these examples would represent an obstacle for the investment if not met for a certain project setting.

(a) **Track record**, e.g.:

- Past experience with renewable energy projects in a certain country, number of successful projects and installed capacity, timeframe for permissions.
- Project developers' track record and their communication lines to local authorities.
- Track record of engineering, procurement and construction (EPC) contractor

(b) **Performance guarantees**

- It is market practice for manufacturers of photovoltaic modules to provide performance guarantees for their products relative to the expected standard power production. As the majority of manufacturers are medium sized enterprises their balance sheet is not necessarily sufficiently strong so that an investor could consider the real value of those guarantees. So far, only first efforts have been undertaken to cover that risk since insurance solutions are challenging.

(c) Support of grid operators

- In most countries, grid operators are required by law to ensure the timely access of a new project to the national grid. Nevertheless, due to capacity constraints or other reasons, grid operators sometimes delay the connection to the grid considerably. Consequently the start of an installation would be heavily protracted.

2.2. Regulation

Clean energy regulation on various levels is a decisive lever to incentivise investments in projects like solar parks or wind farms. Common to all kinds of regulation should be the goal of making clean energy investments attractive in terms of risk and return. In general, regulation should aim to increase the expected return and / or reduce the level of risk.

2.2.1. Financial incentives for electricity fed into the local grid

From a financial investor's point of view, **feed-in tariffs are key and one of the strongest incentives for clean energy investments**.

Important are three factors: (i) incentive level, (ii) guaranteed period and (iii) reliability.

Factors (i) and (ii) together should allow for an adequate risk adjusted investment, i.e. taking into account the asset cost, input of e.g. solar irradiation or wind, the guaranteed character of the project cash flows and the relatively low input factor volatility.

Feed-in tariffs are either fixed or indexed to inflation. In order to protect investors, a periodical adaptation in line with the inflation rate is preferred.

A real obstacle for the development of new renewable energy plants are installation caps, specifically when clearance regarding their eligibility for a feed-in tariff is only made after they have been connected to the grid. To align with developers' and investors' need for planning security, law makers and regulators should aim for the **avoidance of caps or allow for ex ante application procedures for feed-in tariffs**.

Feed-in tariff schemes helped to bring down unit costs. Consequently, feed-in tariffs should be **revised regularly** in order to align the incentive levels with the market competitiveness of the subsidized technologies.

Alternative incentive schemes like **quota obligations are not considered as favourable for long term financial investors**. Compared to feed-in tariffs they lack the long term reliability of minimum required cash flows.

Alternative sources of financing for incentive schemes usually originate from the national budget or energy bill. Budget financing would be aligned to the ability to pay principle, whereas financing via energy bill would be aligned to actual energy consumption. Due to often constrained national budgets **a broad diversification via energy bill may be preferred from an investor's point of view** in order to dispel doubts about retroactive changes of feed-in tariffs.

2.2.2. Permission processes (examples)

Permission processes for clean energy installations are the second most important cause for concern. Not only are they often very **fragmented**, differing from region to region, but also **complex and lacking clear regulation**. This increases project costs considerably in order to cope with all peculiarities because of the need for dedicated local expertise and lawyers who are deeply familiar with the local legal environment. Ideally, consistent nationwide or preferably European standards should be considered in order to save costs and avoid delays.

A further obstacle for clean energy projects seems to be the contradiction between the general willingness to foster investments and the constraints raised either on a local level ("not in my backyard" principle) or due to worries about alternative land use (such as competing use for fuel crops or photovoltaic installations) or the protection of the countryside (affecting wind farms).

When implementing permission procedures, it is crucial to ensure a proper risk transfer between seller and buyer which is of utmost importance to many financial investors.

Accordingly, as long as opposition notices can be filed by somebody, a full risk transfer could be hindered. That could imply that the closing of a transaction will be delayed unless the seller can provide sufficient guarantees to the buyer. For project developers with less strong balance sheets this could represent an insurmountable obstacle.

Therefore, **easily understandable permission procedures and short objection periods are crucial**.

2.2.3. Grid

Preferred grid access for electricity produced by renewable energy plants ensures that the production is reliably transformed into cash flows and independent of grid capacity and energy supply.

Naturally, the **grid infrastructure needs to be strengthened** due to increasing electricity supply most notably by off-shore wind farms. Technology development shall include intelligent storage facilities for electricity in order to be able to use as much energy produced by renewable energy installations as possible.

2.2.4. Insurance companies specifics

Equity investments in renewable energy plants made by insurance companies should be eligible to be counted as **restricted assets**. Law makers and regulators should check whether this crucial requirement has been achieved.[5] In addition, investors often invest via equity but also simultaneously provide the investment vehicle with a shareholder's loan. Consequently, **debt / mezzanine financing of such an investment vehicle** should be eligible as restricted assets as well.

With regard to **cross border investments**, it is important to mention that investments have to be denominated in the same currency in which the obligations under the insurance contracts have to be fulfilled (matching rule).[6] This implies that investments in non Euro countries may not be eligible for insurers domiciled in the Euro zone and vice versa. With Solvency II coming into effect likely by 2012 assets covering technical provisions for EU / EEA related risk have to be situated in the community or in any particular member state. Hence, the matching requirement might be eased. Simultaneously, more regulatory capital might be required.

2.3. Financial Markets

Renewable energy assets have high up-front and low running costs. Because of their low volatility and regulation they offer long-term pre-defined revenue streams. Financing is often strongly leveraged with an equity ratio often below 30%. That makes such projects **exposed to the availability of project finance**.

During the financial crisis, at least some of the banks involved to a larger extent in project finance have suffered badly, with the effect of lower risk budgets available and therefore a sudden **scarcity of project finance loans**.

At the same time, the demand for fossil fuels decreased considerably and therefore prices fell (i.e. without the external costs of their pollutive effects). Therefore, the relative position of renewable energy vs. energy production from fossil fuels deteriorated.

[5] E.g. in Germany, shares in renewable energy special purpose vehicles are not eligible as restricted assets as they have to be qualified as group companies, Art. 2, para 4,lit. c) Ordinance on the Investment of Restricted Assets of Insurance Undertakings (Anlageverordnung), 21.07.2007.

[6] Art 5 German Ordinance on the Investment of Restricted Assets of Insurance Undertakings (Anlageverordnung), 21.07.2007.

After the crisis, the required equity for project finance has tended upwards. Increasingly, personal liability for renewable energy projects is required for debt financing whereas formerly non-recourse financing was the norm. In consequence, business plans for project development tend to be less reliable.

2.4. Buildings

Investments in energy efficient buildings, either newly built or refurbished, usually entail lower running costs e.g. via energy savings. Investors hope to serve tenants' requirements, which means that buildings would be easier lettable (or vice versa, energy inefficient buildings would not be lettable that easily) and thus ultimately increase the asset value. Additionally, investors would be better prepared for the case of tightened regulation.

Most important when considering energy efficiency measures is to ensure that the investment makes sense financially. Thus, a **diligent evaluation** would have to be undertaken in order to be able to identify the financially feasible measures. When looking at an existing real estate portfolio, a lot can often be achieved with low capital expenditure (quick wins). But, significant reductions in energy use in existing buildings often come along with high investment requirements and long payback periods.

Investors are faced with two major obstacles:

(i) the **principal agent dilemma for letted building**s, i.e. the lack of clarity how the property owner can benefit (and could be incentivised) when the tenant has nearly all the advantages coming along with a lower energy bill; and

(ii) the **ex ante impact analysis of energy savings measures** is often very challenging due to the lack of a data warehouse, property data access in general and various local differences (e.g. the definition of lettable space – gross vs. net).

2.5. Insurance

With regard to certain technologies, insurance coverage is a major issue, and if not sufficiently available, it can represent a severe obstacle. Carbon capture and storage (CCS) and off-shore wind are two important low carbon technologies for which insurance is a challenge.

CCS technology in general including transport is insurable. But, the **long-term liability with regard to CO_2-leakage after the CO_2 has been pumped underground is key for operators**. So far, it is unknown what is going to happen long term with CO_2 stored underground and how any leakage could be reliably measured. Therefore the impeding risk is unclear and very difficult to be privately insured.

Off-shore wind installations lack a sufficient long-term track record. Main challenges are the **unclear long-term effect of salt water, potential basement problems, collision with ships, submarine earthquakes, extreme weather conditions and fire danger** (e.g. lightning, overheating of brakes) while at the same time difficult / limited immediate access to site can be subject to weather conditions.

As long as experience with new technologies is insufficient, **state run insurance schemes would help to bridge this gap** and foster the success of a new technology. In case some long-term risks cannot be borne by privately run insurance schemes, (additional) state coverage should be considered (i.e. for CCS).

NOTE 2: ROLE OF VENTURE CAPITAL AND INCREASE ACCESS TO VC INVESTMENTS

BY MR GUIDO AGOSTINELLI, GOOD ENERGIES

List of Abbreviations

EU	European Union
IPO	Initial Public Offering
M&A	Mergers and Acquisitions
NER	New Entrants Reserve
PE	Private Equity
R&D	Research and Development
SET	Strategic Energy Technology
US	United States
USD	United States Dollar
VC	Venture Capital

List of Figures

Executive summary

Venture Capital is highly selective capital which is invested in young, high growth potential companies. Contrary to what is sometimes believed, Venture Capital is invested *post* the R&D phase i.e. even when it is invested in early stage companies, VC money does not finance 'pure' R&D projects. VC/Private Equity (PE) funds have already spent over 30 billion USD in pre-Initial Public Offerings (IPO) deals in low carbon technologies, to which we can add over 140 billion in Mergers & Aquisitions (M&A) and public markets investments. The cleantech sector has been going through a rapid growth phase that started over ten years ago and still has a strong momentum. Based on this data it may be expected that the private sector contribution to the SET plan will be significant; however, the ambitious goals of the 2020 strategy imply a need for a strong acceleration of the base case scenario. Unless the institutions will deploy regulatory and financial instruments providing them with sufficient leverage it may be challenging for them to steer the process and attain these goals.

The aim of this brief note is to provide the reader with background information on the Venture Capital/Private Equity industry and the venture capital model for financing innovative companies. The intention is to provide a quick overview on the topic; the reader will be provided with some basic statistics on financing markets and the global context, as well as recommendations for promoting innovation and improving the existing environment for investing in clean technologies.

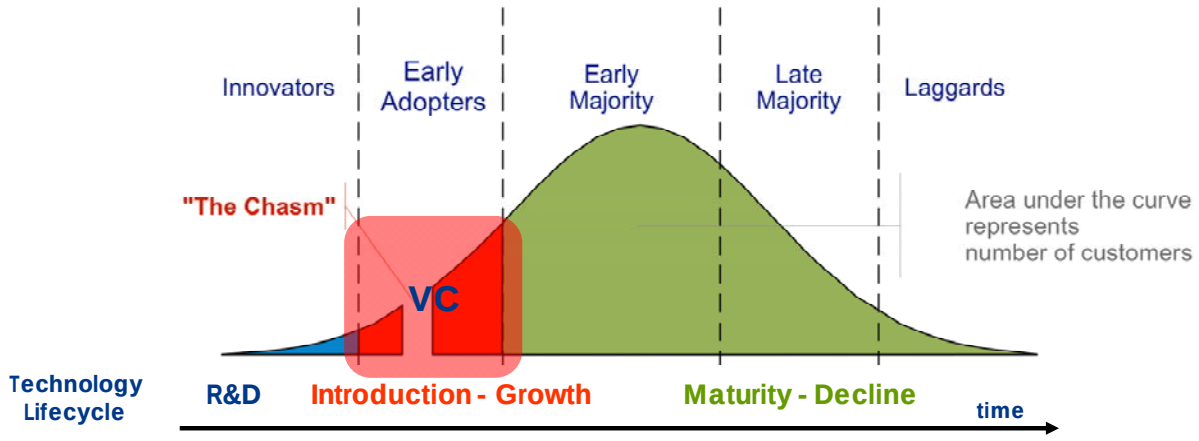
1. INTRODUCTION

This note deals with Venture Capital (VC) investments in the Cleantech sector and the role the Venture Capital industry can play in promoting low carbon technologies in the context of the Strategic Energy Technology (SET) Plan and the EU 2020 strategy.

This text shall not be considered exhaustive of an issue which has a much greater complexity than that which can be addressed in a short contribution; its intention is to send a few key messages to policy makers, namely that Venture Capital can be a strong technology accelerator, but that its model is not applicable in every situation; which role can innovation play in the positioning of the EU in the global context, specifically in the Cleantech sector; and which are some of the basic conditions to attract private investments in SET technologies and contribute to the creation of a sustainable VC industry in Europe.

2. BACKGROUND INFORMATION ON VENTURE CAPITAL

Figure 1: the Technology Lifecycle curve



Source: Roger, *Diffusion of innovation*, and Moore, *Crossing the Chasm*

Venture Capital could be described as **highly selective capital which is invested in young, high growth potential companies**. Contrary to what is sometimes believed, Venture Capital is invested post the R&D phase i.e. even when it is invested in early stage companies, VC money does not finance 'pure' R&D projects.

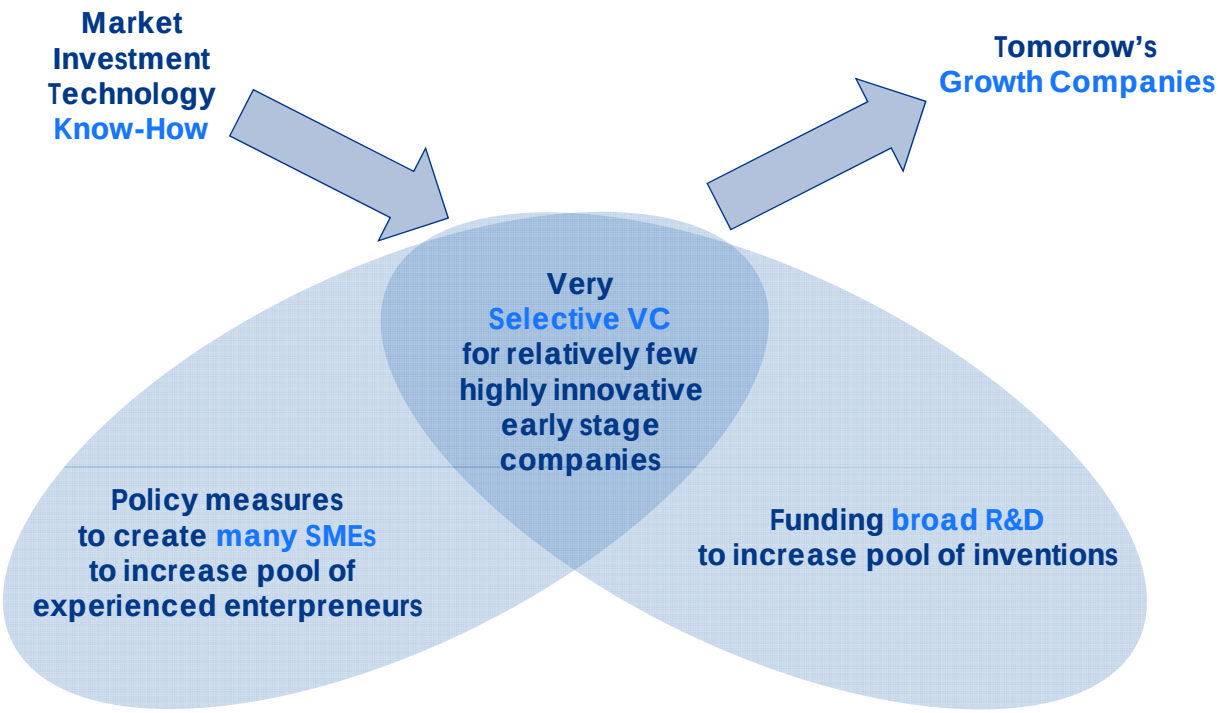
Figure 1 illustrate the role of Venture Capital using the well know Roger's bell curve representing the technology lifecycle of a product. The most difficult phase in the lifetime of a product/technology is the period at the end of the R&D phase, starting with its introduction in the market, till it reaches a condition of sustainable growth. This phase, also known as **"valley of suffering" or "chasm" presents high risks as well as the potential for high rewards**; many companies attempting to cross the chasm will fail, but a few will become successful and experience a steep growth. In absence of external funding, though, even companies that may be poised for success could have to stand several lean years before getting traction, or close down.

Venture Capital provides funding to these start-ups in exchange of equity, therefore sharing with them risks and rewards, and allows a few of them to eventually cross the chasm. It is important to stress that **this funding model is not suitable for any company**. 'Throwing' money at a large number of companies would not increase the chances of success and would rather decrease overall returns. Tying funding to specific policy objectives, geographical locations or preferences for certain technologies without an underlying pool of valid ideas and entrepreneurs would also be counterproductive.

Good ideas and entrepreneurs have to exist ex-ante, VCs are selecting existing opportunities and in so doing they are not creating anything new. Focussed on these specific opportunities, however, **Venture Capital becomes a strong technology accelerator**[7].

It is important to understand that Venture Capital is a key driver for innovation, but that there needs to be three ingredients for this to happen: ideas, entrepreneurs and supply of selective capital. Policies should address the whole ecosystem (Figure 2). For a more detailed discussion on this topic the reader is referred to the white paper of the European Venture Capital Association (EVCA, March 2010, available on their website)

Figure 2: promoting innovation through the Venture Capital model



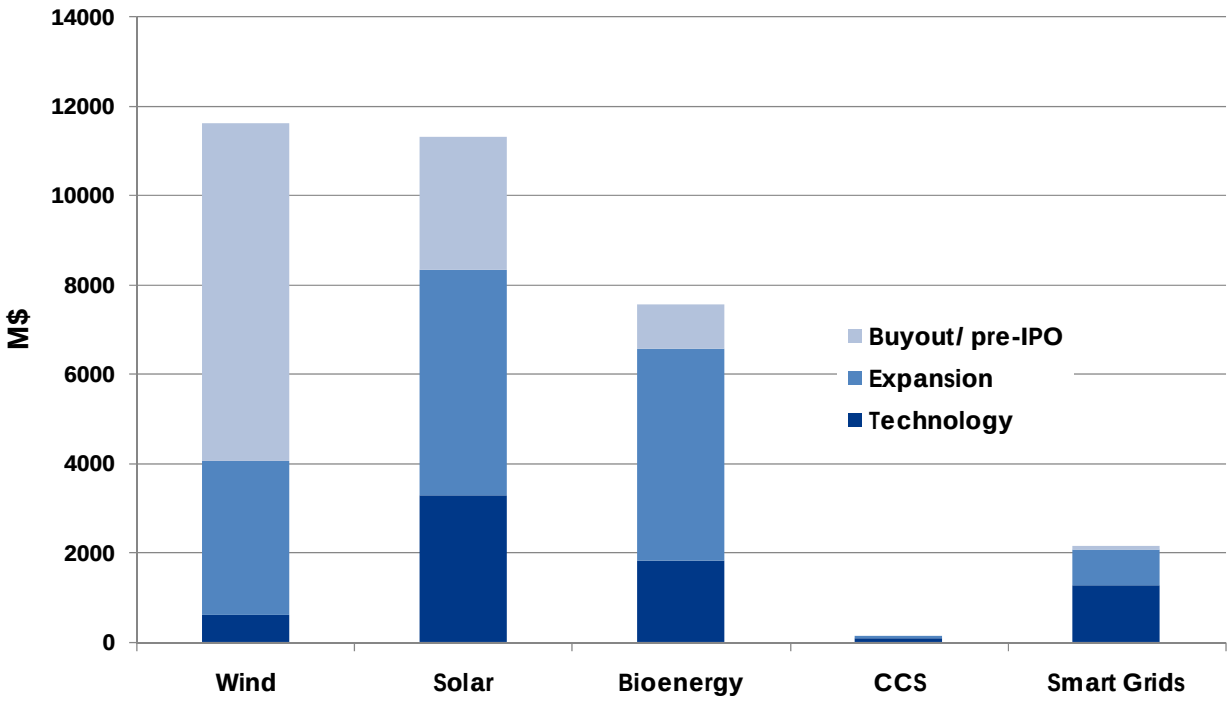
3. VC/PE INVESTMENTS IN THE CLEANTECH SECTOR

Figure 3 shows a synthesis of Venture Capital/Private Equity investments in five out of six of the SET markets for the period 2000-2010. These markets are Wind, Solar, Bioenergies, CCS, Smart Grids and Nuclear. No reliable data on VC investments could be found on the latter, but it is reasonable to assume that these are limited to a handful of deals.

At a glance, we can see that the **private sector has already spent over 30 billion USD in pre-IPO deals in low carbon technologies**, **to which we can add over 140 billion in M&As and public markets investments.** Remarkably, more than half of these investments, or nearly 120 billion, have been flowing in the wind and solar industries alone, a figure worth reflecting upon when/if doubting the payback of renewable energy policies and subsidies to date (and future liabilities).

[7] Several examples taken from the renewable energy industry, for instance, may show that some innovations have taken 15-20 years to get to market versus 5 to 7 years for comparably innovative technologies backed by venture capital

Figure 3: VC/PE investments in SET technologies, 2000-2010



Source: Bloomberg New Energy and Finance

- The Bio-energy sector has raised private investments for close to 8 billion.
- Smart Grids have received 2 billion USD from private investors to date, mainly technology investments and follow up rounds, but these type of investments are gaining an incredible momentum. Most analyst agree that the sector is due to grow as much as the renewable energy markets, if not more.
- Investments in Carbon Capture and Storage in the last 10 years have totalled only a little over 100 million for a total of 9 tracked deals. The poor pull of CCS for VC/PE capital depends, among other things, on its early stage, its capital intensity, as well as on the difficulty of establishing business models that offer the possibility of attractive returns for this specific class of investors. This is just to say that capital to finance this technology will rather have to come from corporate equity and bank debt, eg through project finance, than venture capital.

The last example underlines a crucial point for the implementation of the SET plan: **the six technologies cannot be treated as a whole**, and this goes beyond the obvious. Financial instruments, policy instruments, strategies that may seem to be adequate for all in realty are not, like it turns out for NER3008. Financing of the low carbon technologies in the SET plan will be different in different industrial initiatives. Policy makers should have very clear the scope and limits of the various policy instruments and incentives they intend to deploy for a technology (or, following this line of reasoning, possible disincentives resulting from them for other markets).

Let us conclude this paragraph with one additional remark. The cleantech sector has been going through a rapid growth phase that started over ten years ago and still has a strong momentum.

[8] Beside the complexity of the disbursement process in the versions that became public domain, which seem to be dictated by the necessity of treating plants with different fixed/operating cost structures in an equivalent manner, it is questionable whether projects that take 6 months planning and 6 months for commissioning are tendering - with the same deadlines- with projects that require 2 years planning and several more years for commissioning

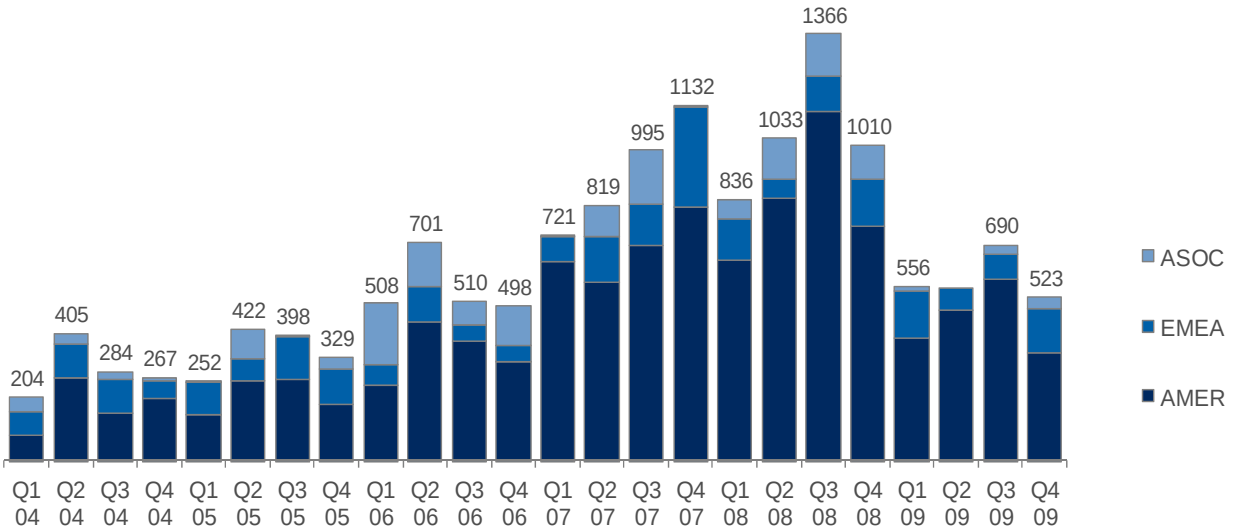
Based on this data it may be expected that **the private sector contribution to the SET plan will be significant**; **however, the ambitious goals of the 2020 strategy imply a need for a strong acceleration of the base case scenario**.

60 billion Euro for the next ten years9 may not be adequate to meet the 2020 targets. More worryingly, the unclear situation concerning financial commitment and its timing on the Commission side -compare it with the US economic stimulus package- brings uncertainty and will deter private investments on the scale required. Unless the institutions will deploy regulatory and financial instruments providing them with sufficient leverage, it may be challenging for them to steer the process and attain these goals.

4. THE GLOBAL CONTEXT

Figure 4: VC investment in low carbon energy companies by region 2004 –2009

Amounts in $ million



Source: Bloomberg New Energy and Finance

Figure 3 reports investments in low carbon energy companies by region, in the period 2004-2009.

The good news, looking at the data, is that the economic crisis has hit investments in cleantech, but not as much as it had been feared given the overheated market in 2007-2008. The bad news for the European Union is that despite meaningful business shares in the early 2000s, by the end of the decade over **80% of these investments have taken place in the US**, ending up reflecting more or less the disproportion between the size of the venture capital industries in these two areas.

If we look at markets, technology, mass manufacturing, capital, even regulations, we can observe that in ten years we have **moved from an EU concentration/leadership to a global green economy**, where Europe becomes just one of many players, and its position is being challenged. It is common sense that mass manufacturing of green technology is moving to the Asian region.

What many fail to observe is that technology leadership is moving, too, and that it starts to happen for incremental process innovations as well as for new technologies. Wind, photovoltaic, battery industries serve as an excellent example of this trend.

[9] Communication on Investing in the Development of Low Carbon Technologies, COM(2009)519

On the game changing, high tech side, as shown in Figure 3, the competition from the US, until a few years ago absent, has grown to the point where it has outpaced the EU by large, both in number and size of deals.

Given its early start, however, the **EU has still a remarkable base of educated human capital with leading edge know-how**. It is an intangible asset that will either be valorized through innovation, or be displaced; much of the future of the EU economy may depend on grabbing this opportunity correctly. In a defensive strategy, efforts would be concentrated on maintaining a technology leadership that anyway, in the long run, is impossible to keep away from the physical site(s) of manufacturing10. The process of seeding new ventures, instead, can provide the base for a sustained competitiveness of the European economy.

5. PROMOTING INNOVATION

The **ancillary benefits of venture capital investment**, such as innovation, potential job creation and economic growth, mean that correctly fostered over the long-term, venture capital has the ability to promote an economy's growth and competitive position.

However, the European VC ecosystem is facing significant issues and challenges, namely a **high fragmentation and a significant funding gap**. Without addressing these issues, and succeeding in attracting a larger institutional investors base to VC, Europe's rich potential for innovation and entrepreneurship can't be exploited.

Scaling up the EU VC industry, facilitating cross border investments and making it sustainable should therefore be a priority within the 2020 strategy11.

6. ATTRACTING INVESTMENTS IN SET TECHNOLOGIES

Finally, we would like to focus on three key recommendations of a more general nature which would significantly improve the existing environment for investing in clean technologies:

- **There must be no regulatory uncertainty.**

  Demand side policies have demonstrated to attract significant private capital investments, to be a strong driver for systemic technology innovation and cost reduction. Continued, declining, predictable market pull mechanisms remain paramount. Feed in tariffs have emerged as a success story, their inefficiencies can and should be addressed with appropriate programming, but they have shown already that their benefits outshine their liabilities.

- **Access to finance for low carbon technologies needs to be eased.**

  As clean markets grow, growth finance has to me made available. Suppliers of bank debt are conservative (or expensive); this is a fact that does not play in favour of innovation and hinders growth.

- **Technology Push must continue.**

  Technology remains the key for innovation and it should be addressed on two levels. As innovation is unpredictable by definition, increased public funding should be made available for basic research. Then, as technologies do not only need to be proven but also to be made viable, procurement programs for R&D for SMEs should be enhanced so as to favour business kick starts and reduce the capital intensity of potential equity investments.

[10] For a good example of how this strategy is not sustainable in the long run we may look at the telecom or flat panel displays industries

[11] For a detailed discussion of these issues, we refer the reader once again to the EVCA white paper.

NOTE 3: EU POLICY OPTIONS FOR SUPPORTING AND FACILITATING FINANCING OF LOW-CARBON ENERGY TECHNOLOGIES

BY MS KIRSTY HAMILTON, CHATHAM HOUSE, Renewable Energy Finance Project

List of Figures

Executive summary

Policy plays a central role in providing conditions for investment in renewable energy and other low carbon technologies. During the 2005-2010 period examination of policy developments in EU and UK with mainstream transactions-focused financiers investing in renewable energy has provided a clear perspective on the importance not only of targets and objectives being clearly set out in a legislative framework by Governments, but also the critical importance of policy design.

Financiers and investors have options on where and how they deploy capital. Renewable energy, or other low carbon technologies, therefore have to provide a commercially attractive risk-adjusted return, in the context of other investment opportunities.

The EU Renewable Energy Directive provides a clear, legal mandate on national governments, however policy at national level must provide commercial conditions for investment. At present there are relatively few EU countries (around one third, or less) that provide attractive conditions.

Understanding the range of risks that financiers will consider, and the role of support mechanisms or incentives in enabling commercially attractive returns, can provide a basis for the development of 'investment grade' policy conditions. Policy needs to cover all the issues that financiers will assess involved in a successful deal: from planning issues to final connection to the grid. The latter highlights the importance of 'delivery' infrastructure such as transmission and distribution networks, regulation and trans-boundary issues, particularly as renewable energy scales up.

Background

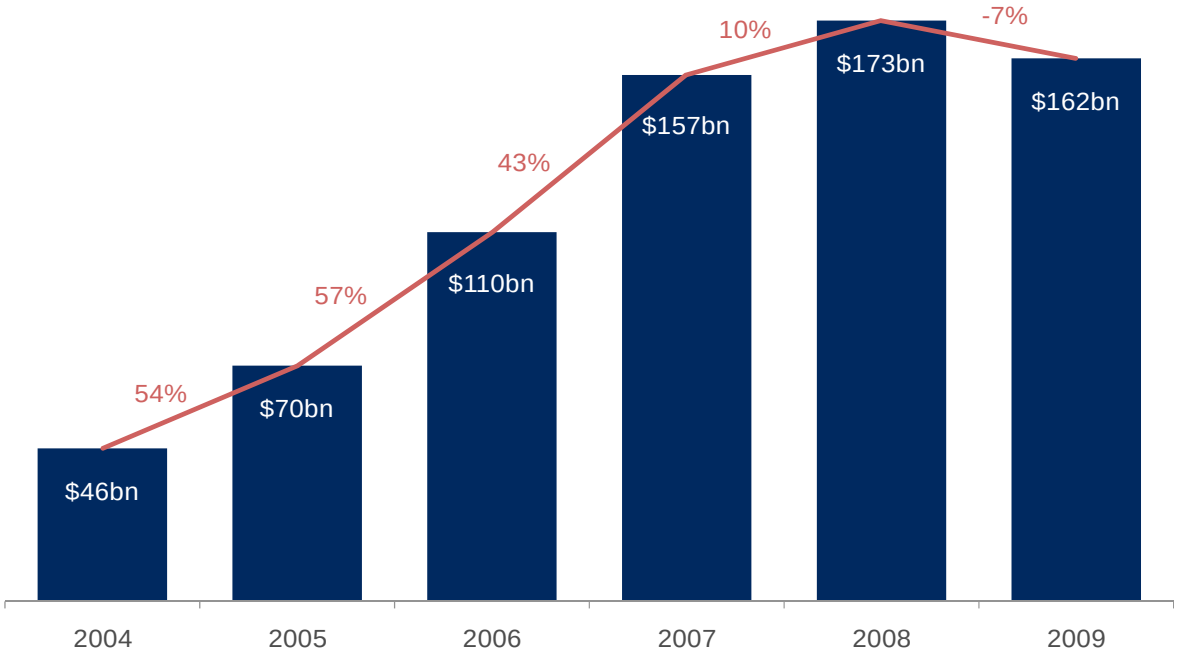
A series of structured Finance Roundtables were held during the 2005-2010 period, including two organised in conjunction with the European Commission in 2007, to discuss actual policy developments in the UK and EU, and latterly issues around the financial crisis, and emerging markets, the latter not being directly relevant to this Briefing. Those involved were mainstream renewable energy financiers from leading commercial banks, often from power or project finance divisions, and specialised private equity. Many financial institutions based in London invest across Europe, or indeed cover the EMEA region: Europe, Middle East and Africa.

1. FINANCING TRENDS

To set the European picture in context it is useful to briefly outline recent investment trends for renewable energy: it is a sector that has experienced rapid growth since the middle of last decade, and is an increasingly mainstream sector for financiers and investors (it is already mainstream in Europe). Global investment into 'clean energy' (renewable energy and energy efficiency) grew exponentially between 2004/2005 and mid-2008, as data from Bloomberg New Energy Finance[12] shows. The financial crisis impacted renewable energy investment, in common with other sectors, and although remaining positive growth dropped sharply in 2008, and declined, albeit modestly, in 2009 (see Figure 1. below).

Despite the impacts of the financial crisis, discussed further in section 1.1. below, 2008 marked a watershed: investment in renewable energy globally (including large scale hydro) surpassed investment in conventional power generation[13]. This underscores the changing nature of the power mix: while renewable energy (RE) is currently a relatively small proportion of the energy mix, nevertheless investment figures indicate that the is well underway in the future energy profile (particularly the power sector).

Figure 1. Total new investment in clean energy, 2004-2009 ($billion).



Source : Bloomberg New Energy Finance, 20 May 2010[14].

1.1. The financial crisis

The financial crisis, emerging in the second half of 2008, resulted in dramatic liquidity constraints in the marketplace. The availability of debt was severely constrained in some places, and where debt was available it was at high cost, and generally for short tenors (typical project finance might cover a 15 year period).Many banks retrenched to home markets, particularly those recapitalised by governments.

[12] Bloomberg New Energy Finance has produced detailed analysis of investment data based on actual deals since 2004 ; it is the main data and information analyst specialising in this field. (www.newenergyfinance.com)
[13] UNEP 'Global Trends in Sustainable Energy Investment 2009'; June 2009.
[14] Note with graphic: total values include estimates for undisclosed deals. Data based on estimates from industry sources.

With stronger internal competition for capital, banks favoured known relationships and low risk technologies, such as onshore wind with its longer track record; often debt was provided by banks clubbing together and negotiating terms collectively. However, **even at the height of the crisis in the first half of 2009, there remained a clear interest in the RE sector**, if internal conditions could be met.

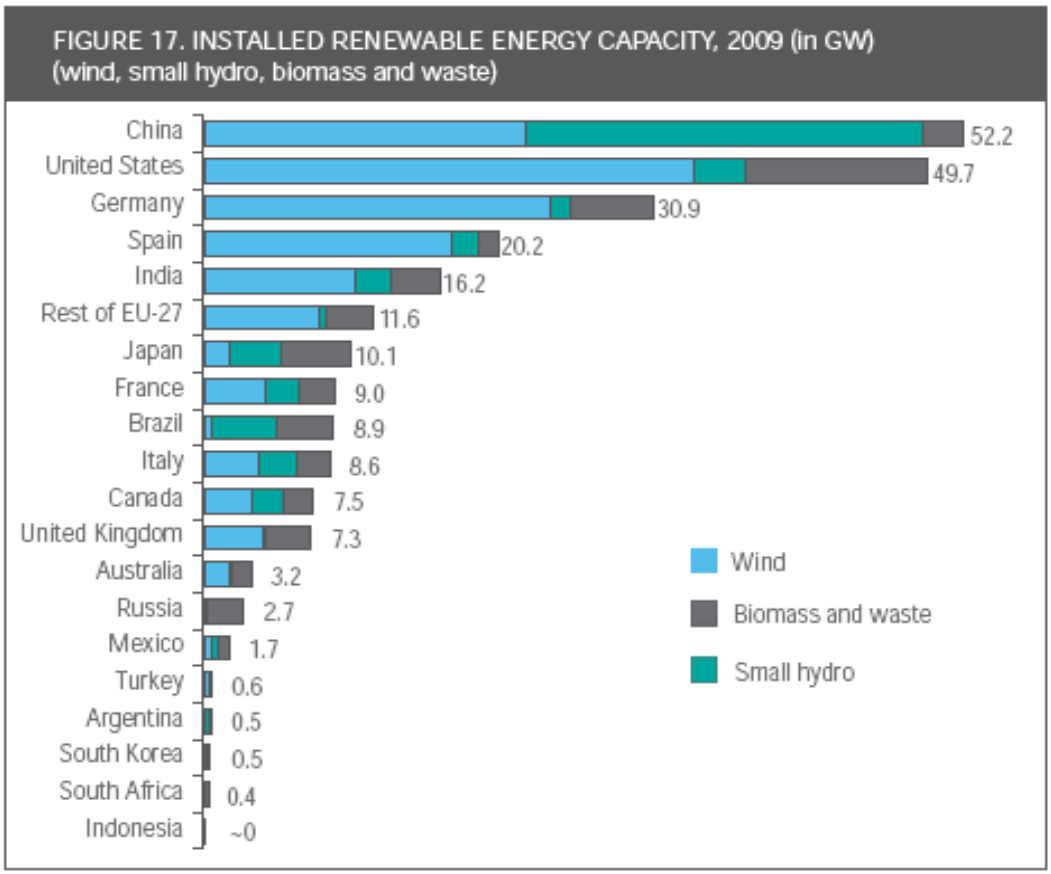
By the end of 2009, longer term loans were becoming available, and capital costs had come down; however there is a sense that it may take a further 2-3 years, if not more, for banks to rebuild their balance sheets, and even then, institutions will be more rigorous in the provision of capital compared to the height of the market in 2007.

1.2. Where is the money going?

The growth centres in the global renewable energy market changed in 2009 as a result of the impact of the financial crisis. Investment in the Europe, Middle East and Africa (EMEA) region dropped 14% in that year; Americas dropped 25%; whereas Asia-Oceania increased 25%[15]. The latter reflects the strength of the Chinese market, where wind new-build finance was up 27% ($21.8bn) and solar up 97% ($1.9bn). In 2009, China also became the largest wind turbine manufacturer (it was already the largest solar manufacturer).

As reference, and to give a sense of Europe's place globally in renewable energy installed capacity, below are two graphics from a 2010 report on clean energy investment in the G20 countries[16], based on Bloomberg New Energy Finance data.

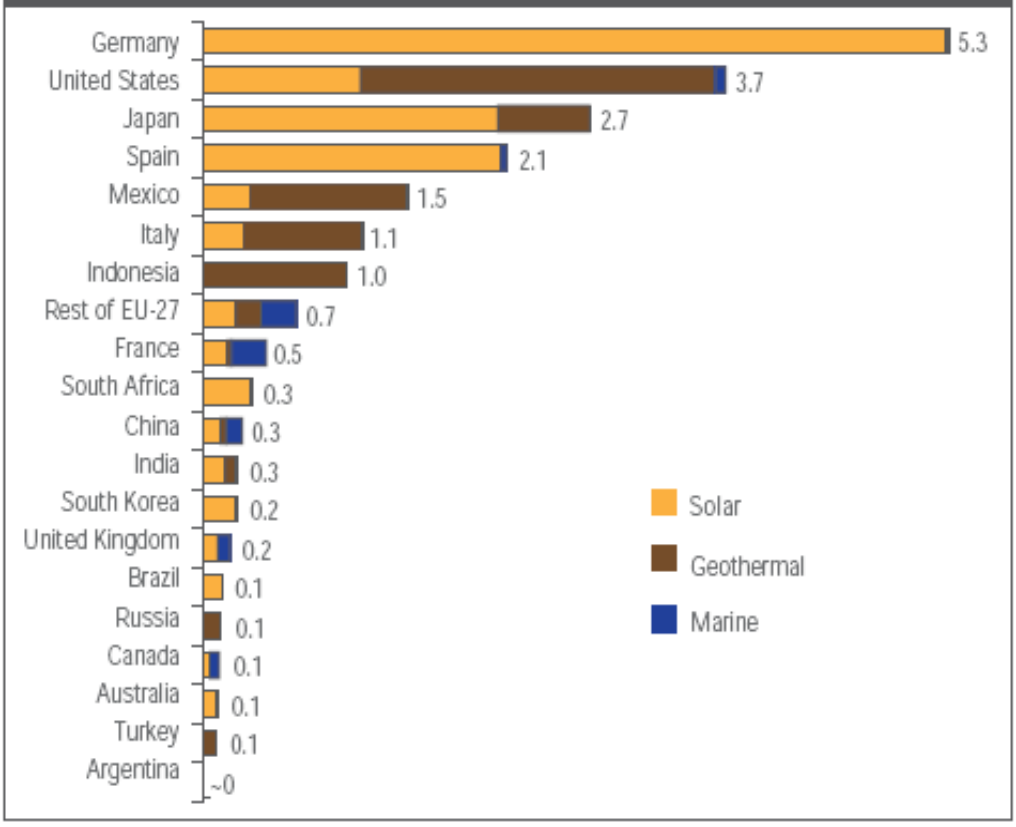
Figure 2. Graphic from the G20 Clean Energy Factbook, showing installed capacity of wind, small hydro, biomass and waste. From the EU this covers France, Germany, Italy, Spain and the UK, along with a category representing the rest of the-EU27.



y of

[15] 'Clean Energy Finance down just 6.5% in 2009 ; Asia outstrips the Americas', press release Bloomberg New Energy Finance, 7 January 2010.
[16] 'Who's Winning the Clean Energy Race ?', G-20 Clean Energy Factbook, 2010, by The Pew Charitable Trusts.

FIGURE 18. INSTALLED RENEWABLE ENERGY CAPACITY, 2009 (in GW) (solar, geothermal, marine)



1.3. Stimulus packages

During the financial crisis, robust policy became even more important to build confidence that governments would remain committed to the sector, even in the face of economic recession. There was also greater interest in access to public finance, such as through public stimulus packages, the EIB or national export credit agencies, both to fill credit gaps and also to reduce risk. Key to the provision of public capital, was the design of those programmes, their timeliness and the ease with which private investors could access the resources.

Around **US$184 billion was allocated to so-called 'green stimulus' packages by a range of governments in 2009**, according to Bloomberg New Energy Finance. However, the bulk of the stimulus monies are still to be disbursed: of the $184 billion an estimated $17 billion was paid out in 2009, and an estimated $55-60 billion is anticipated in 2010-2011. This is expected to amplify the recovery over the 2009 market globally. One estimate by Bloomberg New Energy Finance is that in 2010 the global market will grow around 25% to a total of $200 billion in investment.

A second issue linked to the stimulus packages, however, is the design and timing of disbursement: this is a crucial aspect for private financiers, and further analysis in this area would be relevant to discussion over provision of public finance for renewable energy and related infrastructure.

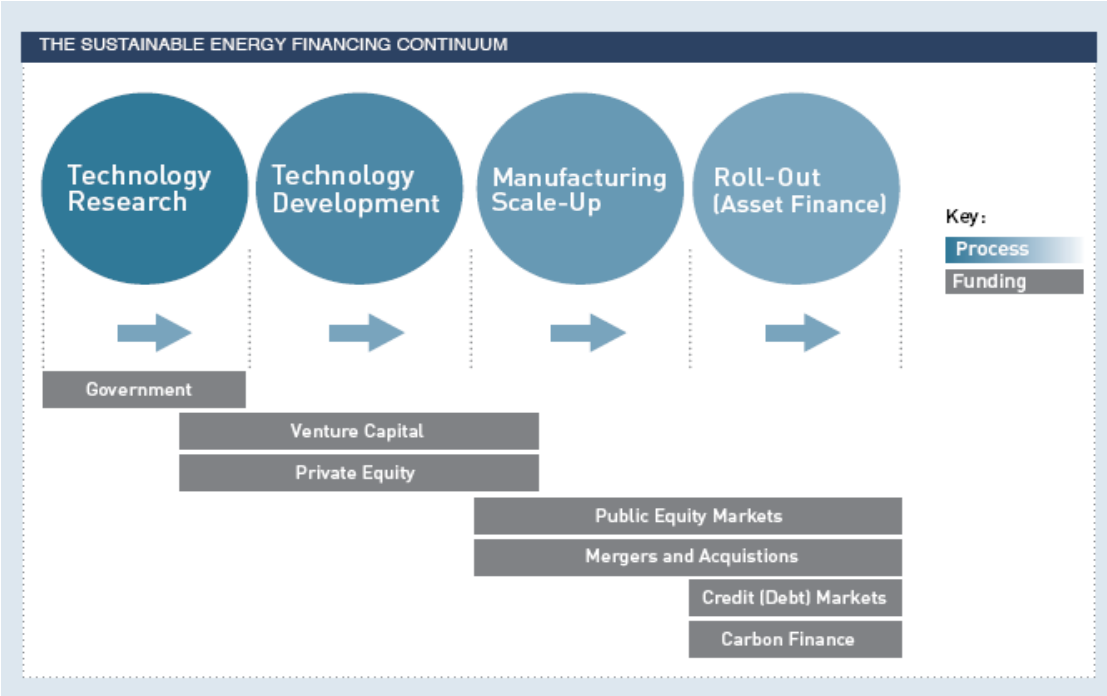
A question emerged in the second half of 2009 in the UK, linked to the perception that there would be a capital shortfall out to 2020 and beyond, given the scale of renewable energy and other infrastructure investment in the power sector (offshore wind, transmission grid etc). There is a short discussion of the UK debate over the creation of a 'Green Investment Bank' below in section 3.4., and the facilitation of institutional investor engagement in the sector.

2. FINANCE AT DIFFERENT STAGES OF TECHNOLOGY DEVELOPMENT

The SET plan is linked to accelerating new technology development and commercialisation, examining the costs of research, technological development, demonstration and early market take-up.

The graphic illustrates the fact that different sources of finance will engage at different points of the technology development 'continuum' (with differing expectations of the risk they will take, and the returns they expect). Government policy and public finance will play a different role in each segment.

Figure 4: The Sustainable Energy Financing Continuum.



Source: 'Global Trends in Sustainable Energy Finance 2009', UNEP, June 2009.

This Briefing is predominantly concerned with the final 'roll out' segment, or asset financing. It may be useful to note, however, that a strong, stable and long-term policy to promote growth in renewable energy uptake, is likely to feed through into stronger private sector research efforts as market demand over decades can be better anticipated.

The so-called **'valley of death'** is one such well recognised gap in access to finance. As one international private equity firm specialising in renewable energy investment describes: "valley of death projects sit between the venture capital and project finance worlds. They are too capital-intensive for venture capital, too risky for private equity in that they require investors to bear technology and scale-up risks."[17] This is one reasonably well-defined area where government interventions can play a role in reducing the level of those risks such that private finance can come in.

However, engagement with private equity and particularly venture capital players, alongside RE sector representatives, will help define specific gaps in the earlier parts of the spectrum above, and options for government to assist [the presentation to the ITRE Committee 'VC Investments in Clean Technologies' by Good Energies, 26 April 2010 addresses this area]. The design and ease of access to public funds may be as important as the actual level of funding (direct or indirect).

[17] This description was part of a power point presentation, 'Investing in Clean Technology Deployment', 2009, by Kassia Yanosek, Hudson Clean Energy Partners.

2.1. Accelerating deployment of existing RE technologies

There is a clear evidence base[18] that policy has a central role in to creating conditions to attract capital for deploying more mature RE technologies. Investors want to be able to anticipate demand in the market, as well as the pace of change in the energy sector, particularly if they are involved in conventional as well as renewable energy. A variety of factors mean that RE is not yet fully competitive with conventional sources, including technology costs, characteristics of RE projects – high up front capital costs ; direct and indirect subsidies in energy systems, and others.

It is worth noting that planning or licensing, generation and system operation, as well as many delivery infrastructure aspects (e.g. distribution and grid networks in the case of electricity ; district heating networks in the case of heat) are national, if not more local, so policy at national level remains critical; although broader cross border issues (networks, electricity trading) also need understood, particularly as higher penetration of RE may mean balancing the system across a broader network.

Risk and return are central to the financial equation, financiers will want to assess risks across the whole deal or project: the policy framework can play a role in reducing risk as well as enabling commercial returns, given that a bank or fund manager are likely to have a range of options (e.g. technology, geography) for deploying capital and therefore will be looking for the most attractive opportunities to meet its return expectations.

In a policy driven market, policy is both essential to create investment conditions, but as such is itself also a risk in that policy changes, over which the investor has no control, can impact and even destroy revenues.

3. 'INVESTMENT GRADE' POLICY[19]

Financiers and investors want to understand and manage risks to expected returns: policy needs to be well-designed so that the package covering all aspects of the deal, or project, are attractive, not only the support mechanism.

A highly informal survey during the ITRE workshop, April 2010, revealed that financiers viewed less than 10 member state markets as attractive locations for RE investment. This rather sobering figure indicates that the policy, and market, conditions are not yet producing accelerated deal flow.

For a project to be successful, a due diligence process will assess a set of technical, market and policy risks. This would include an assessment of the actual natural resource (eg wind regime), a set of technical issues such as technology risk, construction risk (what could prevent it being built on time); and operations and maintenance issues (these may be quite technically complicated, for example in offshore wind). Risk factors that have a more direct link to policy decisions include those involved in building, plugging into the grid; and selling the power to an offtaker (thereby creating the revenue stream).

Key factors at the national level include:

- **Clear objectives**: is the policy regime well designed to meet its stated objective – a simple volume increase (technology blind) is a different objective than a diversity of renewable technologies being deployed. The objective is important as financiers will want to anticipate a policy change or review, should it appear that progress is not on track.

[18] Hamilton, K. 'Unlocking Finance for Clean Energy : the Need for 'Investment Grade' Policy', Chatham House, December 2009. This synthesises the series of Finance Roundtables examining specific UK and EU policy developments.

[19] A backdrop to this section of the Briefing are two reports by the RE Finance Project :
'Unlocking Finance for Clean Energy, the Need for Investment Grade Policy', RE Finance Project, December 2009 ; and ' Private Financing of Renwable Energy – A Guide for Policymakers', produced by RE Finance Project, Chatham House, published by UNEP, Bloomberg New Energy Finance and Chatham House, December 2009.
Available from URL :
http://www.chathamhouse.org.uk/research/eedp/current_projects/renewable_energy_finance_policy/

- **Stability across project-relevant time horizon**: this theme is consistently reinforced, particularly as project finance might cover a 15+ year period. The legal or mandatory nature of goals or support mechanisms (as well as cross-party support) can foster greater confidence in policy and regulatory stability. A clear enforcement and penalty regime is another important ingredient in this regard, and financiers often want to be assured that regimes have 'teeth' in this area.
- **Simplicity**: complex market systems can increase risk and uncertainty, compared to more straightforward ones; financiers e.g. banks have to explain to their credit committees, which may be located in head office, how support mechanisms work, and why they are reliable.
- **Planning/licensing procedures**: clarity over average timeframe, success factors, and number of hurdles or layers involved is important ;
- **Support mechanisms/incentives**: a crucial part of making returns attractive; the design of mechanisms, including feed-in tariffs, will be important ; and review provisions will be closely scrutinised. The support mechanism, while central, is only one part of this package;
- **Grid or infrastructure availability, access and related costs**: may be critical e.g. for offshore wind. The ability to sign a power purchase agreement from an offtaker is also a key part of the equation where this is not utility investment. This element has implications for sequencing of policy and anticipating regulatory needs, as grid related matters (or other delivery infrastructure) may need planned early.
- **Policy coherence across relevant supply chain**, e.g. biomass (see section 3.1 below), and other relevant policy linkages.

A clear, longer-term framework also builds confidence around the scale of ambition, and timing of market transformation, as many of these investments will be for 20 or 30 years if not longer, and 10 year visibility (i.e to 2020) will not cover the project finance period.

3.1. Regional policy

There are two issues to note briefly. Firstly, the EU Renewable Energy Directive provides an important backdrop for national legislation, and adds an extra layer of 'comfort' for financiers that national plans for RE are not only determined by domestic politics. A common question, however, is the **level of enforcement that the EU is able to exert** on member states. The perception of rather lax allocations under the EU ETS to some sectors does not build confidence in implementation of EU climate change goals. However, the translation through to the **renewable energy National Action Plans** will be the detail that financiers will assess during due diligence.

A second point, is the EU-wide regional context of energy policy and infrastructure more broadly. In general, **embedding RE** (and energy efficiency) **into broader energy policy development** (e.g. as underway in the infrastructure package, or linked to EU regulatory coordination) **can help provide consistency** of the EU policy pieces that need to be in place, coupled with the fact that RE sits in the context of drivers of other parts of the energy sector. One might say that in common with the finance continuum above, there **needs to be a policy continuum** – not only to avoid lumpiness on the technology front, but also to identify and enable regional approaches to other potential bottlenecks.

The next three examples, based on Finance Roundtables, serve to illustrate aspects of the role of policy.

3.2. Example: feedstock supply chain, biomass & biofuels

A Roundtable mid-2007 on biofuels, organised in consultation with the European Commission, highlights the importance of **policy integration**, and also the different issues linked to the risk profiles of the different renewable energy subsectors, in this case biofuels (and also pertaining to biomass).

Issues raised included:

Feedstock 1: he importance of addressing sustainability issues thoroughly so that the solutions fit a long-term context, and the risk of further review or change would be minimised;

Feedstock 2: the ability to sign long-term or stable contracts for supply is key and may link through to agriculture policy at national or Europe-wide level;

Market issues: a key aspect for biofuels of biomass is the non-correlation between the feedstock market and the retail fuel/power market, which means producers cannot necessarily pass through costs. This was clearly an issue in 2007 when commodity prices were rising. This means that there are already potential complex risks built into the finance model making it more important that risks in other areas are reduced as far as possible;

Trade issues: policies in other countries, in areas such as agriculture, sustainability, subsidies or border tariffs, are out of the control of investors or project developers and yet could significantly impact project economics. A discussion between the EU and Brazil linked to EU biofuel imports was a case in point: the outcome of diplomatic discourse left a high degree of uncertainty over whether a change was pending, and if so when.

Delivery infrastructure: who is responsible? This may have been a particularly UK issue, however in the case of biofuels questions were raised over whether delivery infrastructure should be done by the forecourt/oil company (delinked from the actual project); the fuel supplier (ie added to project costs) or other, and effectively who was in charge of issues like this – this is clearly an issue for independent project developers.

3.3. Example: renewable energy trading

This is also an older debate, but illustrative of how **'cost efficient' market systems may not be an optimal outcome** for those at the front end of the investment equation. This highlights the need to consider both the objectives of the instrument and its impact on investment issues.

A Roundtable was held in late 2007 linked to the matter of RE trading across Europe, at the point when this was not restricted to trading arranged between member states. In general while financiers thought this worked in theory, it was not seen to translate through at the level of individual deals, at least for an initial period. Issues raised included:

- How long the new market would take to 'bed down' such that supply and demand for the commodity (e.g. RE certificates) and commodity values become 'known' and bankable in a project finance context (one estimate was that this could take anywhere between 4-10 years).
- Uncertainty over the interaction with domestic support schemes, and potential impact on existing or pipeline of investments which could impact cash flow expectations.
- A greater range of issues that could destabilise national support schemes: e.g. if one country was seen to benefit at another's expense, deemed unacceptable by taxpayers in the latter potentially leading to policy change.
- Perception of reduced pressure to improve national policy design which may result in barriers to investment remaining in place.

3.4. Capital shortfall/infrastructure and the role of public finance: the 'Green Investment Bank' discussion in UK

A contemporary issue in the UK, and which may have a bearing on the broader infrastructure discussion in the EU, is whether there is a capital shortfall emerging this decade for RE and infrastructure financing. This has links to the aftermath of the financial crisis, but probably more importantly to greater realisation of the scale of the challenge and the short timeframe.

The overall investment for new infrastructure investment for RE and power in the UK is estimated to be at a scale that will be beyond the current availability of debt required, and also beyond utility balance sheets, not least as the majority of utilities active in UK generation are European, and therefore have geographic options of where to invest. The 'large number' that is likely to be required for investment (e.g. for offshore wind over the next 5 or 6 years), together with the 'green economy' solution to the financial crisis/economic recession, has catalysed cross-party political support to develop a 'Green Investment Bank'.

Finance Roundtables at the end of 2009 and 2010 discussed with banks, private equity and some institutional investor input what the underlying issues are for greater scale of financing in the 2020+ period.

Policy-related solutions remain a central part of the equation, and there are a range of views between existing RE financiers already active in the UK market, and those looking for engagement in the sector, although not yet with UK investments. Not only the support mechanism, but also planning and grid-related issues are relevant in this context.

There are **questions raised about what the objective of such an institution would be**: the commercialisation of earlier stage technologies; or tackling the potential capital shortfall for larger RE infrastructure, particularly offshore wind. In the case of the latter, would it be actively providing capital – if so at what scale - or would it be taking up some of the risks in the equation.

There are a set of issues around **what 'products' this entity will provide**, including what might assist with facilitating the engagement of institutional investors who have large funding pools but don't get involved at project-by-project level.

There are also **warnings about taking on roles that private sector financiers are actually well placed to manage**, and also avoiding 'death by announcement' (as described in the US context) where an announcement of a particular support facility was not followed quickly by its availability, and the market simply stalled and waited.

These matters are only now going to be discussed. Direct engagement from the finance sector will be an important part of teasing out where policy solutions are needed, as well as the best way to use public finance to reduce risks or fill gaps for a larger number of players representing different sources of capital.

4. SOME CONCLUDING POINTS

One theme for this decade is an emerging competition for capital for this 'low carbon' sector: both for transforming the mix of the energy sector, and to secure parts of the supply chain for employment and 'future economy' reasons.

To succeed, member states and the EU as a whole will require **'investment grade' national and regional policy as a critical plank of attracting capital**, specific enough to reduce risks and enable commercially attractive returns. For scale of investment these need to be embedded in broader energy and infrastructure policy.

The importance of the **EU role is in taking an overview in particular on scale and timing issues for market transformation and embedding those across policy and regulation**.

Questions include: what is the overall energy sector going to look like in 2020-2030+, what is the sequencing of decisions that are required to deliver this, particularly those involving infrastructure; and anticipating and coordinating trans-boundary regulation.

Linked to the above, any debate over new public financing approaches needs to be resolved at specific level of what is actually required that private finance is unable to deliver, and over what timeframe, rather than a general debate about large numbers (estimates of capital requirements). Obviously in an EU context there are already institutions such as the European Investment Bank, alongside national Export Credit Agencies, such as EKF in Denmark, and national public institutions such as KFW. These institutions, together with the private financiers and investors that have used products and services to enable deals to get done, will have valuable experience as to what has been effective to date.

Understanding how risk can be managed through both the policy and finance components of any package of actions is an important exercise: what needs to be in place by when, in a practical sense, to meet objectives.

Finally, the 2030-2050 period is increasingly close and expectations need to be 'shaped' very soon, as the 2020 time horizon, currently built into the RE Directive, is already very short for investment in longer term assets.

Regular engagement with the appropriate financiers and investors in policy design issues, and understanding market conditions (for example technology cost reduction) will be an important part of creating policy frameworks that are 'investment grade'.

CONTRIBUTION OF THE EIB

FINANCING LOW CARBON TECHNOLOGY
The role of the EIB

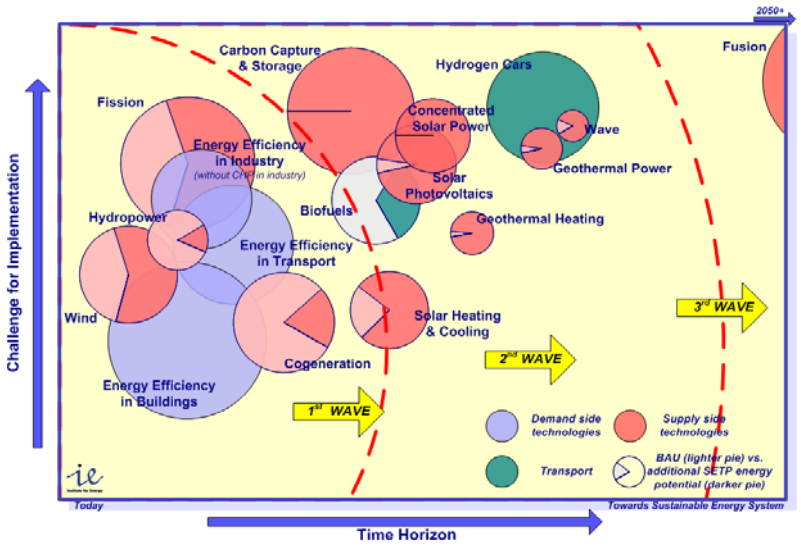
ITRE Workshop, European Parliament 26 April 2010

E.J. Calthrop

1

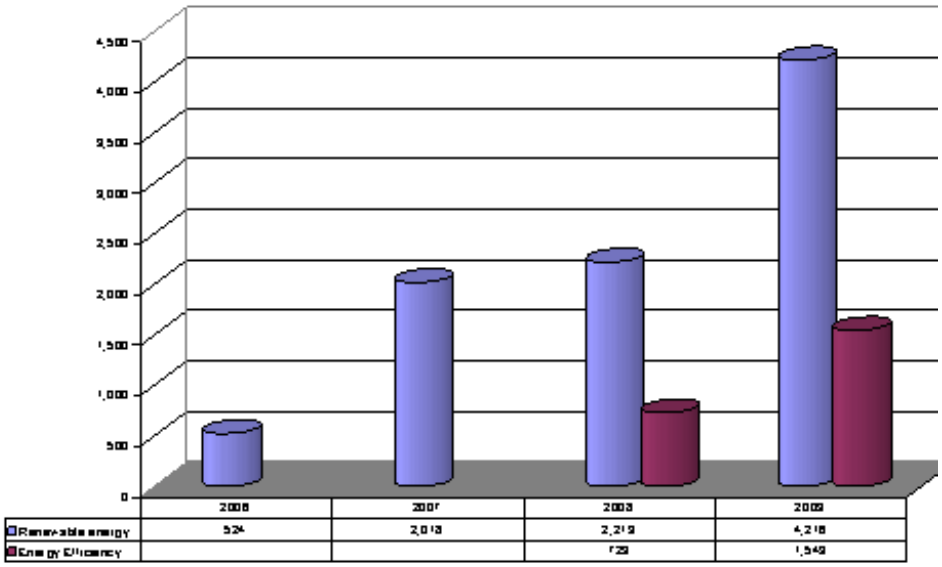
The technological challenge

European Investment Bank



2

Sharply increasing EIB support to RES/EE



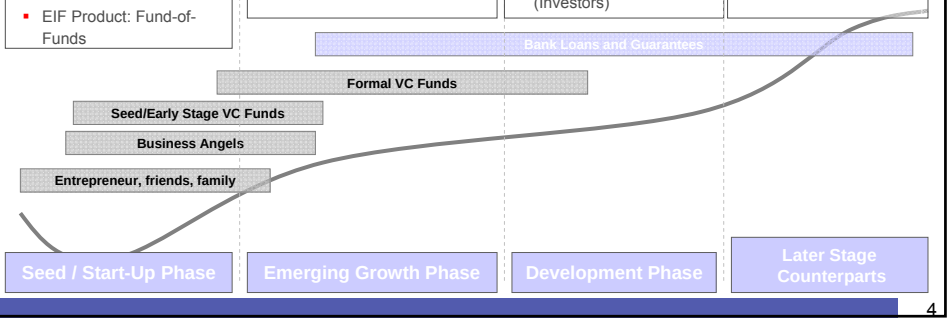
Figures relate to inside EU-27 only

3

Spectrum of financing needs

EIB and EIF

1 Risk Capital	2 CIP Resources (SME)	3 RSFF (SME / MidCap)	4 Investment Loans
▪ Facility: High Growth Innovative SME Scheme (GIF), Ecotech ▪ Purpose: IP financing, technology transfer, seed financing, investment readiness ▪ Target Group: VC Funds, Business Angels ▪ EIF Product: Fund-of-Funds	▪ CIP Guarantee schemes ▪ Growth financing for SMEs ▪ Formal VC Funds, CLOs ▪ SME guarantees (loans, microcredit, equity/mezzanine, securitisation	▪ RSFF ▪ RDI financing ▪ SMEs/MidCaps, Banks, PE Investors (sub-investment grade) ▪ Loans (incl. Mezzanine), Funded Risk Sharing Facilities with Banks (Investors)	▪ Investment Loans ▪ RDI financing ▪ MidCaps/Large Corporates/Public Sector Entities (investment grade) ▪ Loans, Guarantees



4

Risk-Sharing Finance Facility (RSFF)

Marguerite Equity Fund

EIF / CIP for innovative SMEs

5

Risk Sharing Finance Facility

European Investment Bank

Key Sectors

1	Engineering/Automotive
2	Energy
3	ICT
4	Life Science
5	RDI Infrastructures

Rationale for Selection

- Scope of Sector
- EU Policy Dimension
- Key RDI Trends
- Strong EIB Track Record in the industry
- RSFF Implementation Strategy

Product Development | **Sector Know-How** | **Long Term Financing**

6

Risk Sharing Finance Facility

Eligibility categories

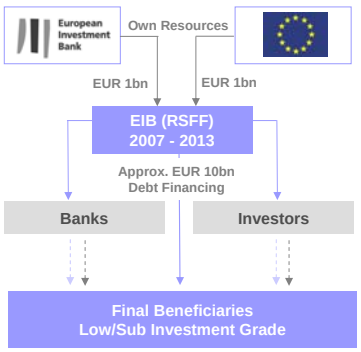
Fundamental research
Definition stage / feasibility studies
Industrial research
Pre-competitive development activity
Pilot and demonstration projects
Innovation

- Geographic Scope: EU 27 and Associated countries (Iceland, Liechtenstein, Norway, Switzerland, Israel, Turkey, Croatia, FYROM, Serbia, Albania and Montenegro)

7

Risk Sharing Finance Facility

A new €10bn Source of Risk Capital



- EIB RSFF funds complement other sources of debt capital available for low/sub investment grade RDI intensive corporates
- EIB RSFF funds are well suited for potential beneficiaries because of:
  1. Competitive terms & conditions
  2. Long maturities of up to 10 years or more
  3. Debt and Mezzanine Debt Product
  4. Direct EIB participation of up to EUR 300m per transaction (depending on CRPG/Loan Grading)
  5. Strong technology/industry expertise
  6. EIB's hold strategy does not sell assets on the secondary market
  7. No cross selling (just long-term lender)
  8. Signalling Effect: EIB as a quality stamp

8

Risk Sharing Finance Facility

Risk categories

Moody's	S&P and Fitch
…	…
A1	A+
A2	A
A3	A-
Baa1	BBB+
Baa2	BBB
Baa3	BBB-
Ba1	BB+
Ba2	BB
Ba3	BB-
B1	B+
B2	B
B3	B-

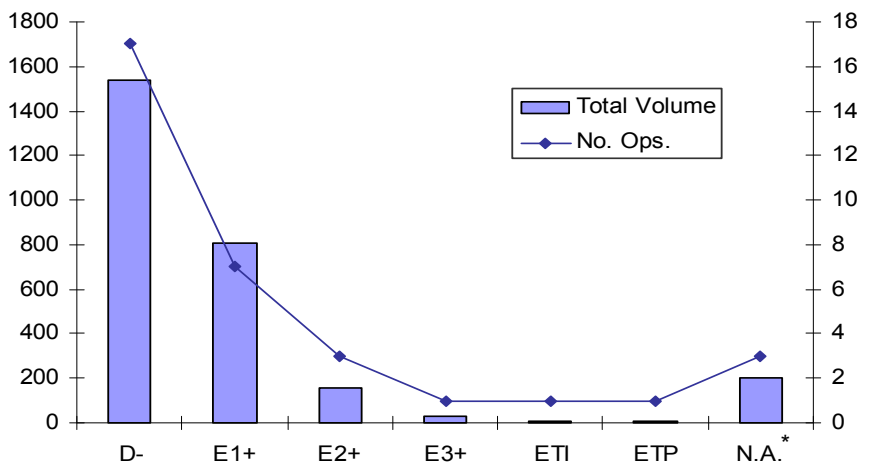
- RSFF is a debt based instrument not a grant
- Financing does not involve a subsidy element
- The facility does not concern risk capital such as venture capital

RSFF Risk Coverage Range

- RSFF concerns companies or projects mature enough to demonstrate capacity to repay debt on the basis of a credible business plan.
- An external rating is not required

9

RSFF Signatures
By Loan Grading



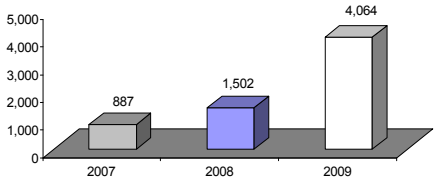
* Risk Sharing Operations with banks - Loans pending assigned to individual allocations

10

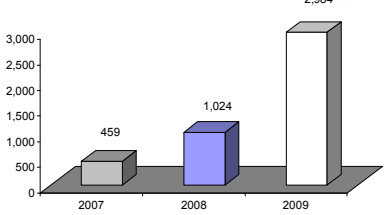
RSFF Results 2007 - 2009

European Investment Bank

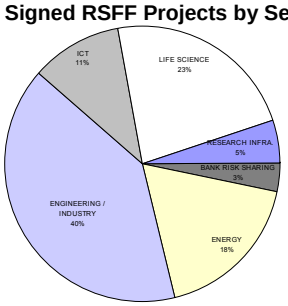
RSFF APPROVALS (2007 - 2009)



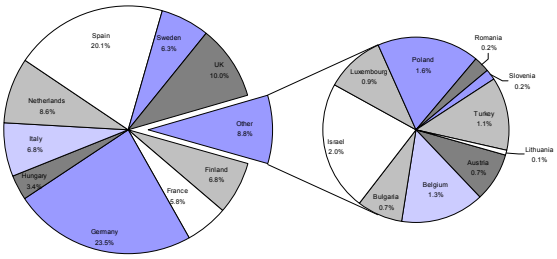
RSFF SIGNATURES (2007 - 2009)



Signed RSFF Projects by Sector



Signed RSFF Projects by Country



- Total RSFF signatures amount to EUR 4.5 bn. Approvals reached EUR 6.5 bn at the end of December 2009.
- Main sectors financed so far: renewable energy technologies, engineering industry and life science.

11

RSFF – Energy-Related Projects

European Investment Bank

Signed Operations

Project Name	EUR M
ABENGOA RDI LOAN	49.0
ACCIONA RDI	185.0
ANDASOL SOLAR THERMAL POWER	60.0
ANDASOL SOLAR THERMAL POWER II	60.0
GAMESA WIND POWER RDI II	200.0
SOLNOVA 1&3 CONCENTRATED SOLAR POWER	110.0
SOLUCAR SOLAR THERMAL POWER	50.0
THERMOSOLAR GEMASOLAR SPAIN	80.0
	794.0

Approved Operations

Project Name	EUR M
SE POWER PLANT AND FOREST INDUSTRY R&D	150.0
THE SILICON MINE	100.0
	250.0

12

Risk Sharing Finance Facility
Outlook & Challenges

- Mid-term review of RSFF by Panel of Independent Experts (IEG) supported by EV/EIB to review overall results and confirm/revise objectives.
- Completion of RSFF Programme with full geographic and sectoral roll-out by 2013. Monitoring and management of the RSFF Portfolio.
- Potential broadening of RSFF Programme in 2011 and/or 2014 to include additional joint products to be developed by EIB in collaboration with the Commission.
- Possible revision of organisational and procedural arrangements for RSFF within EIB.

13

Risk Sharing Finance Facility – Contacts

Jukka Luukkanen
Head of Division

Phone: (+352) 4379 86412
Fax: (+352) 4379 67397
eMail: luukkane@eib.org

European Investment Bank
100, boulevard Konrad Adenauer
L-2950 Luxembourg

Marc D'hooge
Deputy Head of Division- RDI
Structured Finance and Advisory
Phone: (+352) 4379 87211
Fax: (+352) 4379 67292
eMail: dhooge@eib.org

European Investment Bank
100, boulevard Konrad Adenauer
L-2950 Luxembourg

14

Risk-Sharing Finance Facility (RSFF)

Marguerite Equity Fund

EIF / CIP for innovative SMEs

15

European Investment Bank

Marguerite - 2020 European Fund for Energy, Climate Change and Infrastructure

Caisse des Dépôts · cdp · European Investment Bank · ICO Instituto de Crédito Oficial · kfw BANKENGRUPPE · PKO BANK POLSKI

16

Main points

- The Fund's objective is to make a significant contribution to the development of Trans-European Networks in Transport and Energy (TEN-T and TEN-E) as well as to the combat of climate change and implementation of the EU's 20/20/20 objectives, in particular by supporting renewable energy technologies.
- The Fund targets an equity base of EUR 1.5bn and an associated Credit Facility of EUR 5bn focused on TEN-T; TEN-E and Renewables. First close was over €700 m.
- Major publicly funded Core Sponsors (EIB, CDC (France), CDP (Italy), ICO (Spain), KfW (Germany) and PKO (Poland)) as well as the Commission and CGD (Portugal) have invested in this Fund
- Substantial long-term private sector provision as well as other public sector institutional investors expected
- Access to significant deal flow potential in priority sectors throughout Europe
- Core Sponsors maintain close dialogue with regulatory & public authorities in their home countries and with EU
- Focus on solid IRR targets - Fund to give preference to projects with satisfactory Economic Rates of Return (ERR)

17

Development Role of the Fund

The Fund will fulfill a clear EU policy role by the following means:

- Geographic investment area targets all 27 EU Member States.
- Investments to focus on sectors/projects with solid IRR and satisfactory Economic Rates of Return (ERR)
- Focus on projects in priority energy and infrastructure sectors as identified by **the Fund** as well as the Commission; the Core Sponsors and other investors
- Fund will be an investment vehicle for long term institutional investors from both the public and private sectors.
- First Closing is targeted by end 2009 to help to promote additional infrastructure investments in the EU, through the provision of additional equity & debt for investment purposes.
- Priority towards Greenfield projects with an minority of Brownfield projects.

18

Investment Strategy

Investment focus: mainly Greenfield projects in **three priority sectors**:

- Transeuropean Transport Networks (TEN-T);
- Transeuropean Energy Networks (TEN-E) and particularly interconnectors, gas storage and LNGs;
- Renewable energies, including, distribution and hybrid transport systems, such as wind power, photovoltaic, biogas, etc;

Expected **sector breakdown**:

- 35% - 45% for renewable energies, 30% - 40% in TEN-T, 25% - 35% in traditional energies/TEN-E, subject to market conditions.
- 85% of the fund should be invested in the above, the balance would be in related sectors, particularly those with innovative or security of supply features. Investments in telecom or social infrastructures are excluded.

19

Investment Style

The Equity Fund will:

- Take equity stakes potentially combined with quasi-equity as fresh capital primarily for new (Greenfield) and a minority for existing (Brownfield) infrastructures
- Focus on medium (over EUR 200m) to large (over EUR 500m) scale Transport and Energy projects of national and European importance and Renewable Energy projects of over EUR 50m
- Invest only in unlisted shares & other instruments
- Invest only in minority positions and team up with strategic or other financial investors
- Invest in existing transactions to provide capital increase that facilitate the achievements of its investment strategy
- Fund would itself not provide debt products nor be leveraged
- Investors may be given additional equity investment opportunities alongside the Fund on the basis of standard co-investment rights

20

Debt Co-financing Initiative (DCI)

- A **Debt Co-financing Initiative (DCI)** of up to EUR 5 bn will also be put in place whereby investors in **the Fund** may also provide senior and mezzanine debt (whether in the form of loans or guarantees) for co-financing with **the Fund** in the projects in which **the Fund** invests.
- The purpose of this DCI will be to complement the investment capacity of **the Fund** in order to meet the broader credit needs of the infrastructure sectors targeted:
- Utilisation of the DCI will be subject to the individual approval by the relevant credit provider on a project-by-project basis

21

Contact for further information

Nick Merigo
Chief Executive Ofiicer
Marguerite Fund
nmerigo@margueritefund.eu

Thomas C. Barrett
Director
European Investment Bank
98-100, bld Konrad Adenauer
L-2950 Luxembourg
Tel: + 352 4379 87006
Email: Barrett@eib.org

Bernardo Bini Smaghi
Director
Phone: (+39) 0642216232
Fax: (+39) 0642216702
eMail: bernardo.binismaghi@cassaddpp.it
Cassa depositi e prestiti S.p.A.
Via Goito, 4 00185 Roma – Italy

Antonio Bandres
Head of International Finance
Instituto de Credito Oficial (ICO) Madrid
antonio.bandres@ ico.es / Phone 00-34-915 921-8091

Gisela von Krosigk
Senior Vice President
KfW IPEX-Bank GmbH
Palmengartenstr. 5-9
D- 60325 Frankfurt
Tel.: +49 69 7431 3557
Email: Gisela.vonKrosigk@kfw.de

Jean Sebeyran
Contrôleur Général, Directeur Général
Caisse des dépôts et consignations
51, Rue de Lille
75007 Paris
Tel : + 33 1 58 50 30 62
Jean.Sebeyran@caissedesdepots.fr

Lukasz Dziekonski
Senior Advisor
Phone 00-48 666 821 800
Powszechna Kasa Oszczędności -PKO Bank
Warsaw
Lukasz.Dziekonski@pkobp.pl

22

Risk-Sharing Finance Facility (RSFF)

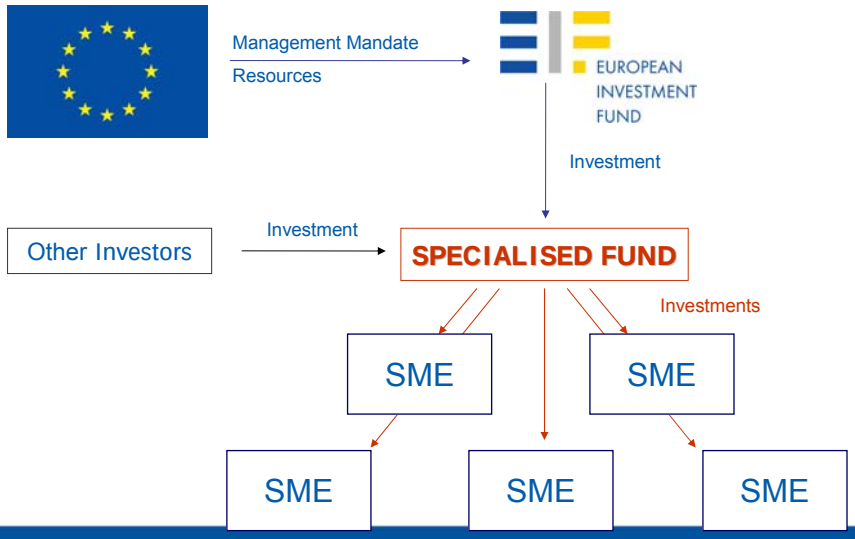
Marguerite Equity Fund

EIF / CIP for innovative SMEs

23

EUROPEAN INVESTMENT FUND

Investment funds



24

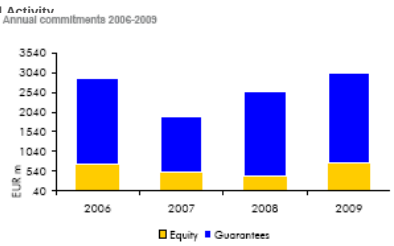
The European Investment Fund (EIF)

Venture capital & SME guarantees

- Established in 1994
- Owned by:
  - EIB
  - European Commission
  - Other European financial institutions
- Resources:
  - Own funds – subscribed capital
  - EU programmes
  - Trust operations (EIB, German Government)
- 2009 figures (signatures):
  - Venture capital funds: EUR 733m
  - Guarantee operations: EUR 2 298m
- Portfolio at end 2009:
  - Equity commitments: EUR 4.1bn in over 300 funds
  - Guarantee: EUR 13.6bn in some 170 transactions

25

European Investment Fund Activity

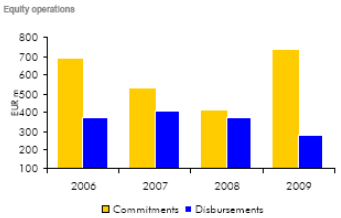


- The EIF is Europe's leading developer of risk financing for entrepreneurship and innovation.
- The EIF delivers a wide spectrum of SME financing solutions for selected intermediaries. By taking SME risk, it promotes the implementation of Community policies, particularly in the field of entrepreneurship, technology, innovation and regional development.
- The EIF has a unique shareholding structure. It is part of the EIB Group and owned by the EIB (61%) and the European Community, through the European Commission (29%). Additionally, a significant stake in the EIF is held by public or private banks and financial institutions (30 from 17 countries, making up 9%)1. The EIF has two main statutory goals:
  - to support EU policy objectives
  - to generate an appropriate return on capital for its shareholders.
- The EIF indirectly supports SMEs by means of equity (venture capital and private equity) and guarantee instruments, using either its own funds or those available through mandates given by the EIB (the Risk Capital Mandate or RCM), **the EU (the Competitiveness and Innovation Framework Programme or CIP),** Member States or other third parties.
- Complementing the EIB product offering, the EIF has a crucial role to play throughout the value chain of enterprise creation, from the earliest stages of intellectual property development to mid and later-stage SMEs. The EIF provides an "integrated offer" of SME finance and covers a wide range of market segments.

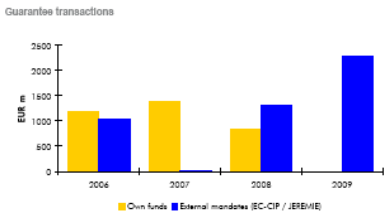
•1 1% of the shares have yet to be issued

26

- While the EIF equity instruments aim to improve the availability of capital for high-growth and innovative SMEs, it is equally important to target the debt requirements of SMEs seeking finance through this more traditional route. By providing guarantees and securitisation, the EIF can improve the availability and terms of debt for beneficiary SMEs and the lending capacity of financial intermediaries.
- In 2009, the EIF entered into the operational implementation phase of JEREMIE (Joint European Resources for Micro-to-Medium Enterprises). To date the EIF has signed 10 agreements with Member States and regions, six of these regions. The total funds committed to these agreements by the end of 2009 amounted to EUR 1bn.
- During the year, the EIF started to implement other instruments designed in 2008 in conjunction with the EIB, in particular for mezzanine finance and microcredit in order to better meet market needs in this strategic area.
- In late 2009, the EIF responded to an open call for tenders for the UK Innovation Investment Fund to manage a proportion of the Government's Fund for technology investments. The EIF was selected in December to manage a GBP 200m Technology Fund-of-Funds which will invest in digital/ICT, life sciences and advanced manufacturing, primarily in the UK.

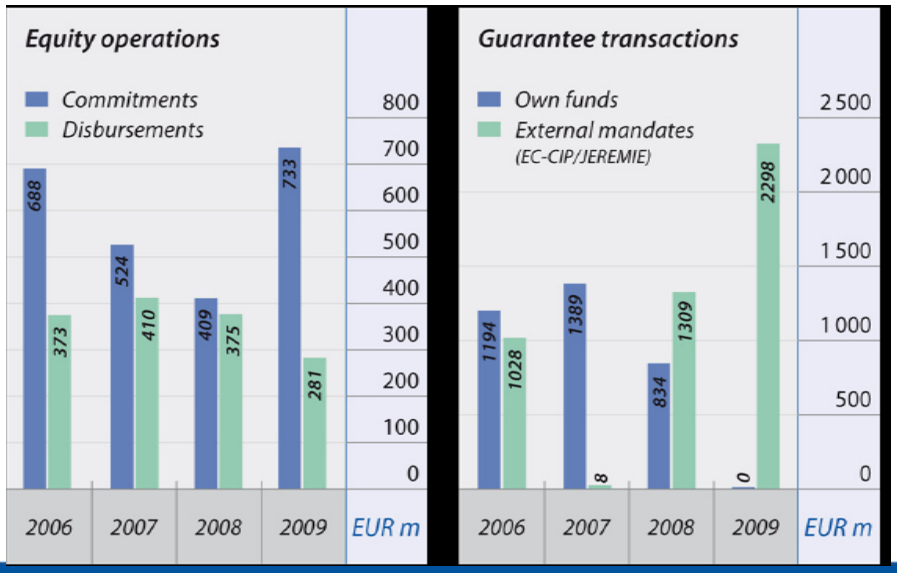


- In 2009, the EIF made, across all funding sources, total unconditional equity commitments of close to EUR 518m. However, given the difficult market conditions seen in 2009, the EIF reinforced its catalytic role by making over EUR 215m in conditional commitments to help teams in their fundraising. This amount can also be added, resulting in a combined total of close to EUR 733m.
- Although the level of EIF equity disbursements decreased when compared with 2008, the amount of signatures nearly doubled that of 2008 despite the difficult market conditions. Throughout the year, the EIF maintained a high level of support by backing teams in the early stages of their fundraising. In the current harsh economic environment, the EIF has played an instrumental role in helping fund managers to attract co-investors and reach a sufficiently viable fund size to implement their investment strategies.
- Total net equity commitments amounted to EUR 3.9bn at the end of the year. With investments in over 300 funds, the EIF remains the leading player in European venture capital and small to mid-cap funds and the Fund continued to broaden its investment strategy across venture capital and mid-stage funds.
- In April 2009, the EIF's Board approved the Mezzanine Facility for Growth, a new EUR 1bn fund-of-funds mandate granted by the EIB to be invested in hybrid debt/equity funds all over Europe, with a view to playing a catalytic role in this market segment. The EIF has approved EUR 282m in seven funds to date and has already signed commitments of EUR 160m in funds managed by leading independent mezzanine players (MML Capital Partners Fund V, Syntaxis, Accession Mezzanine Capital 3, Avenir Entreprise Mezzanine).
- In 2009 the EIF also conducted a strategic review of its technology transfer activity to determine the potential for increasing its support to this asset class. EIF investments in technology transfer are expected to increase in 2010.



- The EIF offers two main product lines for its SME guarantee activity: credit enhancement-securitisation (guarantees for securitised SME financing instruments) and guarantees/counter-guarantees for portfolios of micro-credits, SME loans or leases.
- EIF credit enhancement activity supports the securitisation of SME loans and leases pooled by financial institutions either in 'synthetic' transactions or distributed on the capital markets.
- In its guarantee and counter-guarantee schemes for portfolios of SME or microcredit loans or leases, the EIF takes up to 50% of the expected loss or credit risk on every individual loan or lease in the portfolio. The effect is to provide loss relief to the financial intermediaries and create scope for extending further SME loans.
- The absence of securitisation (own funds) transactions, as illustrated in the graph above, is due to the prevailing market conditions. However, the EIF successfully provided guarantee instruments using CIP resources throughout 2009. Twenty-one new guarantee agreements and extensions of existing agreements amounting to over EUR 2.2bn were signed in 2009. At end-2009, cumulative signatures2 of EUR 10.7bn had been made using European Commission mandates, with a budgetary allocation of EUR 620m.
- Total EIF guarantee transactions in 2009 amounted to nearly EUR 2.3bn while the total outstanding guarantee portfolio stood at EUR 13.6bn at year-end, comprising some 170 transactions.

29



30

Contact for further information

Richard Pelly
Chief Executive Officer

European Investment Fund
96, bld Konrad Adenauer
L-2950 Luxembourg

Tel: + 352 42 66 881
Fax: +352 42 66 88 200
Email: pelly@eif.org

www.***eif***.org.

31

Annex : EIB

32

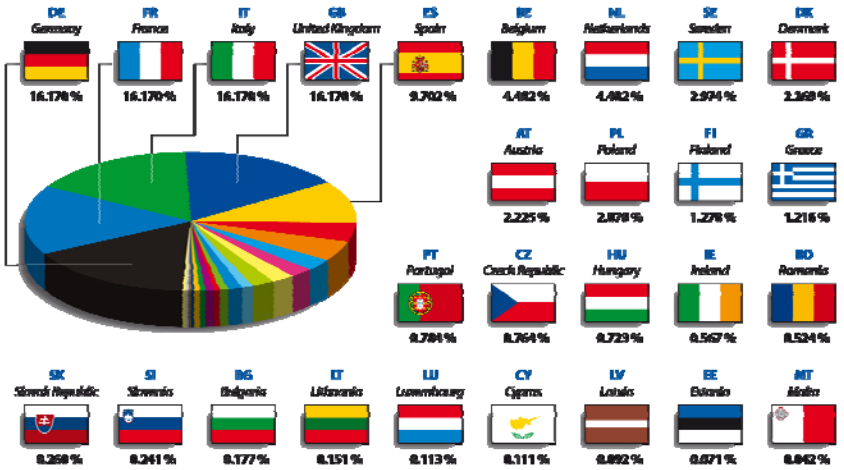
The European Investment Bank (EIB)

Long-term finance promoting European objectives

- European Union's long-term lending bank set up in 1958 by the Treaty of Rome.
- Shareholders: 27 EU Member States
- Governance
  - Board of Governors – EU Finance Ministers
  - Board of Directors - Member States & European Commission
  - Management Committee –EIB's executive body
  - Audit Committee – independent, non-resident

33

Breakdown of the EIB's capital



34

The European Investment Bank (EIB)

European priority objectives

- Within the Union:
  - Cohesion and convergence
  - Small and medium-sized enterprises (SMEs)
  - Environmental sustainability
  - Knowledge Economy
  - Trans-European Networks (TENs)
  - Sustainable, competitive and secure energy

35

The European Investment Bank (EIB)

European priority objectives

- Outside the Union:
  - Private sector development
  - Infrastructure development
  - Security of energy supply
  - Environmental sustainability
  - Support for EU presence in Asia and Latin America via Foreign Direct Investment (FDI)

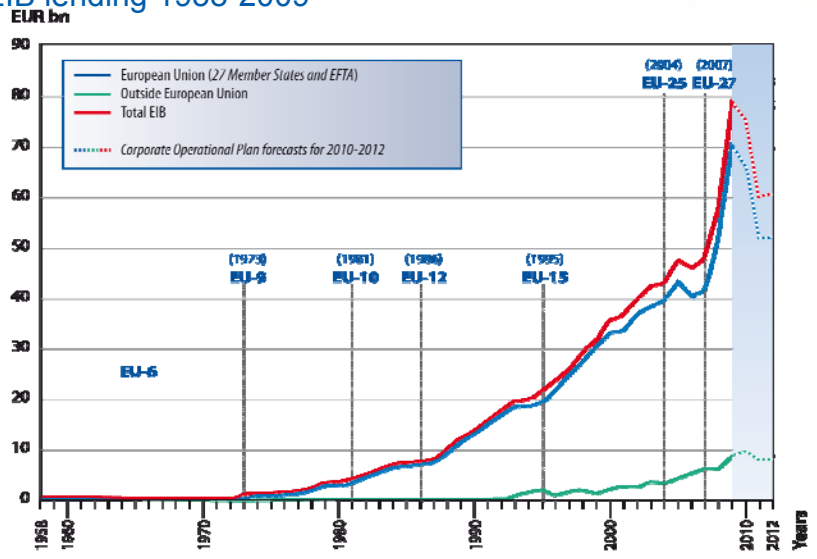
36

2009 key figures

- European Union: EUR 70.5bn
- Partner countries: EUR 8.6bn
- Total lending: EUR 79.1bn
- Borrowings: EUR 79.4bn
- Subscribed capital: EUR 232.4bn
  (at 01/04/2009)

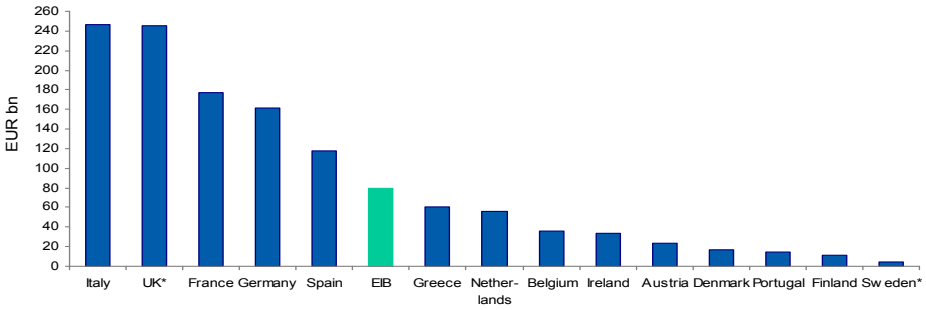
37

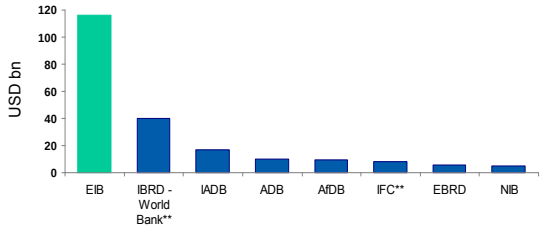
EIB lending 1958-2009



38

Large Volumes of Issuance





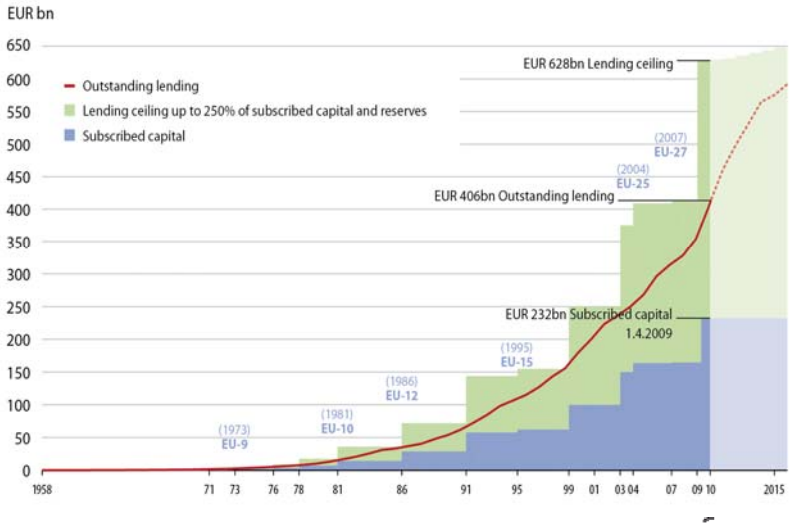
*Gross financing requirement for FY2009-10

** Fiscal years from July to June

Source: Barclays Capital research as of 31 December 2009

39

EIB Capital Increases and Outstanding Loans



40

Knowledge Economy

- A competitive, innovative and knowledge-based European economy
- Job creation and sustainable growth

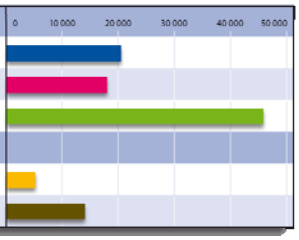
- Individual loans of EUR 17.1bn in EU in 2009 for:
  - Research, development
  - Education and training
  - Innovation and ICT infrastructure
- Individual loans of EUR 58.0bn 2005-2009

41

EIB Group contribution to the Lisbon Agenda

- Loans signed: EUR 86.7bn since launch in 2000
- Venture Capital - assets under management: EUR 4.1bn
- Guarantees for SME loan - positions: EUR 13.6bn

EIB	EUR m
Information & Infrastructure ICT	20 447
Education & Training	17 951
Research & Development	45 906
EIF (Portfolio)	
Venture Capital	5 136
Guarantees for SME loan portfolios	13 987



42

Sustainable, Competitive and Secure Energy

- Four priority areas:
  - Renewable energy
  - Energy efficiency
  - Diversification and security of internal supply (including TEN-E)
  - External energy security and economic development
- Individual loans of EUR 13.5bn in EU in 2009:
  - EUR 4.0bn for renewable energy projects (1)
  - EUR 2.0bn for TEN-E projects
- Individual loans of EUR 34.2bn 2005-2009 in EU
  - EUR 8.3bn for renewable energy projects (1)
  - EUR 6.9bn for TEN-E projects

(1)Includes renewable energy sources and manufacturing projects.

43

EUROPEAN PARLIAMENT

DIRECTORATE-GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A
ECONOMIC AND SCIENTIFIC POLICY

Role

Policy departments are research units that provide specialised advice to committees, inter-parliamentary delegations and other parliamentary bodies.

Policy Areas

- Economic and Monetary Affairs
- Employment and Social Affairs
- Environment, Public Health and Food Safety
- Industry, Research and Energy
- Internal Market and Consumer Protection

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