Financing Major Clean Technologies

Final Report

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TABLE OF CONTENTS

1 DEFINITIONS

ADB	Asian Development Bank
AfD	The Group of French Development Agencies – 'Le Groupe de l'Agence française de Développement'
AfDB	African Development Bank
ASTAE	Asia Sustainable and Alternative Energy Program
BID	the Inter-American Development Bank
BMZ	German Federal Ministry for Economic Co-Operation and Development - Bundesministerium für Wirtschaftliche Zusammenerbeit und Entwicklung
BRIC	Countries of Brazil, Russia, India and China
CDCP	ECO-Asia Clean Development and Climate Program
CEFPF	Clean Energy Financing Partnership Facility
CIF	Climate Investment Funds
CIM	Centre for International Migration and Development - Centrum für Internationale Migration und Entwicklung
CO_2	Carbon Dioxide Gas
CTF	Clean Technology FUnd
DAC	Development Assistance Committee
DED	German Development Service
EBRD	European Bank for Reconstruction and Development
EcoISD	Environmental Conservation Initiative for Sustainable Development
EDB(EABR)	Eurasian Development Bank
EEI	Energy Efficiency Initiative
EIB	European Investment Bank
ESMAP	Energy Sector Management Assistance Programme
FAO	Food and Agriculture Organization
FC	Financial Cooperation
FfD	Financing for Development
FGEF	French Global Environment Facility
FINESSE	Financing Energy Services for Small-Scale Energy Users
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEP	USAID's Greenhouse Gas Pollution Prevention Project
GHG	Greenhouse Gases
Gt	Giga Tonnes
GTZ	German Society for Technical Co-operation - Gesellschaft für Technische Zusammenarbeit
IBRD	International Bank for Reconstruction and Development
IDB	Inter-American Development Bank

IEA	International Energy Agency
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
ILO	International Labour Organization
LDCF	Least Developed Countries Fund
LDCs	Least Developed Countries
LMICs	Low Middle Income Countries
MADCT	More Advanced Developing Countries and Territories
MDB's	Multilateral Development Banks
MFI	Multilateral Financial Institution
Mtoe	Million Tonnes Oil Equivalent
NAPAs	National Adaptation Programmes of Action
ODA	Official Development Assistance (foreign aid)
OECD	Organisation for Economic Co-operation and Development
OLICs	Other Low Income Countries
OOFs	Other Official Flows
PCD	Policy Coherence for Development
ppm	Parts per million
R&D	Research & Development
SCCF	Special Climate Change Fund
SCF	Strategic Climate Fund
SECCI	Sustainable Energy and Climate Change Initiative
SEI	Sustainable Energy Initiative
SMEs	Small and Medium sized Enterprises
SREP	Scaling-up Renewable Energy Programme
UMICs	Upper Middle Income Countries
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
USA	United States of America
WB	World Bank
WBG	World Bank Group

2 EXECUTIVE SUMMARY

The UK Department for International Development (DfID) wishes to assess the financial assistance available through donors and the private sector into low-carbon technologies and energy efficiency in developing countries. There have been increasing efforts around the world in combating Climate Change and its effects and the use of *clean* energy technologies are seen as one of the most significant ways of achieving the targets. It is also recognised that there is a significant opportunity to increase the use of clean energy technologies and energy efficiency in low and middle income countries. By definition, low and middle income countries will require short and medium term financial support to catalyze the uptake of *clean* energy technologies.

This report details IT Power's findings of Policies, Programmes and Disbursements from a desktop study and consultation with major funding bodies. The report provides information on funding by multilateral banks, multilateral donors including OECD DAC, regional development banks and private sector.

Further to the financial analyses of grants and loans, the report also briefly looks into the policies and co-ordination mechanisms of donors and investors. There is an additional specific focus in this report on the BRIC[1] countries as per the Terms of Reference provided.

Majority of the data streams available in public domain are related to financial support from public bodies such as the Word Bank, regional development banks and OECD-DAC. It has been very difficult to obtain accurate financial data for private sector disbursements, and only estimated disbursements have been mentioned in this report.

An analysis of the data shows that that a total of approximately **US$7 Billion** per annum (average of recent years) of financial assistance was disbursed through development banks, multilateral donors and OECD. Only credible data on private sector investment can be obtained from the REN21 statistics which shows a total of around **US$180 Billion** (2008) had been invested into clean technologies including large hydropower through private sector. This could not be segregated into its respective countries or donors or technologies and as such has been omitted from the benchmarking analysis.

The results of the study were compared with the figures given in the following two recent studies that have set benchmarks for investments into clean energy technologies to limit the rise in Global temperature to 2 degrees Celsius from pre-industrial levels, the so-called 2°C stabilisation goal.

- **IEA World Energy Outlook 2008**[2], and
- **Energy Watch Group Renewable Energy Outlook 2030**

[1] Brazil, Russia, India and China

[2] Energy Watch group, Renewable Energy Outlook 2030 07/11/08

Current Investment Levels	
Current annual level of funding in RE & EE from Multilaterals/OECD-DAC	US$ 0.007 trillion
Current annual level of private Sector investment into Renewable Energy	US$ 0.18 trillion[3]
IEA – World Energy Outlook 2008	
Annualised investment required for reference scenario	US$ 1.1 trillion
Annualised cumulative investment required for 550 scenario	US$ 1.3 trillion
Annualised cumulative investment required for 450 scenario	US$ 1.5 trillion
Annualised additional investment required for 550 scenario (additional to reference scenario)	US$ 0.2 trillion
Annualised additional investment required for 450 scenario (additional to reference scenario)	US$ 0.4 trillion
EWG - Renewable Energy Outlook 2008	
Total Investment in 2030 (“Low Variant”)	US$ 0.65 trillion
Total Investment in 2030 (“High Variant”)	US$ 1.3 trillion

The current level of investment is significantly behind the targets outlined by the Energy Watch group and the IEA WEO. Approximately US$ One trillion per year is required to achieve the targets but the current levels of funding are much lower.

In the medium and long term, Private Sector funding needs to increase to achieve the required levels. However, in the short term international donor funding will be needed to complement private sector funding and in particular to act as a catalyst to raise private investments. Additionally, the public sector initiatives should be tailored in a way that addresses the major needs of and underlying barriers for the private sector investment, and the national governments should put in place enabling regulatory frameworks and provide other support.

[3] Including R&D and large hydro

3 BACKGROUND

Climate Change and Energy Security are at the top of the World's political agenda due to current scientific evidence of adverse effects that climate change can have on humanity and a number of targets have been set in order to limit the effects. Consequently, there have been increasing efforts around the world in combating Climate Change and its effects, and the use of clean energy technologies are seen as one of the most significant ways of achieving the targets. With this in mind, the UK Department for International Development (DfID) has commissioned this study for a better understanding of what international support already exists in Medium Income Countries [MICs] and Low Income Countries [LICs] on clean technology. Clean Energy Technology has been defined here as *the technology with minimal or zero carbon emission during the production of energy and for the purpose of this report includes Wind, Solar, Hydro (large and small), Tidal and Geothermal energy*.

IT Power has conducted this research detailing the study's findings of policies, programmes and disbursements by way of a desktop study and consultation with major funding bodies, where possible. The report includes assessment of effectiveness and adequacy of funding streams to meet financing gaps required to meet the 2 degree stabilisation goal.

Disbursements from the following major funding sources have been analysed in various degrees of detail.

- Multilateral Development Banks and Agencies
- Regional Development Banks
- OECD-DAC
- UN System
- Private Sector

All figures are in US Dollars unless otherwise stated. The detailed Terms of Reference have been attached in Annex 2.

4 WORLD BANK & RELATED AGENCIES

The World Bank in fiscal year 2008 committed US$2.7 billion to the promotion of renewable energy and energy efficiency in developing countries. This was delivered through delivery agents IBRD/IDA, GEF and Carbon Finance as explained below.

4.1 International Bank for Reconstruction and Development (IBRD) / International Development Agency (IDA)

Both IBRD and IDA seek to reduce poverty in developing and emerging countries. The former, i.e. IBRD, serves middle-income countries with capital investment and advisory services and levers its funding on the open markets. The latter, i.e. IDA helps the world's poorest countries by providing interest-free credits and grants for programmes that boost economic growth, reduce inequalities and improve people's living conditions. This funding is provided by the wealthier developed nations.

4.2 Global Environment Facility

Originally a World Bank programme, this has grown to include other Regional Development Banks (see Section 6 below). The GEF is now the largest sponsor of environmentally focussed projects globally. The GEF is also the designated financial mechanism for a number of multilateral environmental agreements (MEAs) or conventions. As such, the GEF assists countries in meeting their obligations under the conventions that they have signed and ratified.

4.3 Carbon Finance Initiative

The carbon finance initiative includes 12 funds which are operated separately and include investment from Multilateral Development Banks (MDB) as well as individual countries to balance their allowances under the Kyoto protocol. The projects are all designed to sequester carbon, and so include a range of mechanisms from afforrestation through to renewable energy projects in developing countries.

4.4 International Finance Corporation (IFC)

IFC fosters sustainable economic growth in developing countries by financing private sector investment, mobilizing capital in the international financial markets, and providing advisory services to businesses and governments. IFC also helps companies and financial institutions in emerging markets create jobs, generate tax revenues, improve corporate governance and environmental performance, and contribute to their local communities. The goal is to improve lives, especially for the people who most need the benefits of growth.

The figures for their investment portfolio are included in the World Bank financial summary below.

5 FINANCIAL SUMMARY – WORLD BANK & RELATED AGENCIES

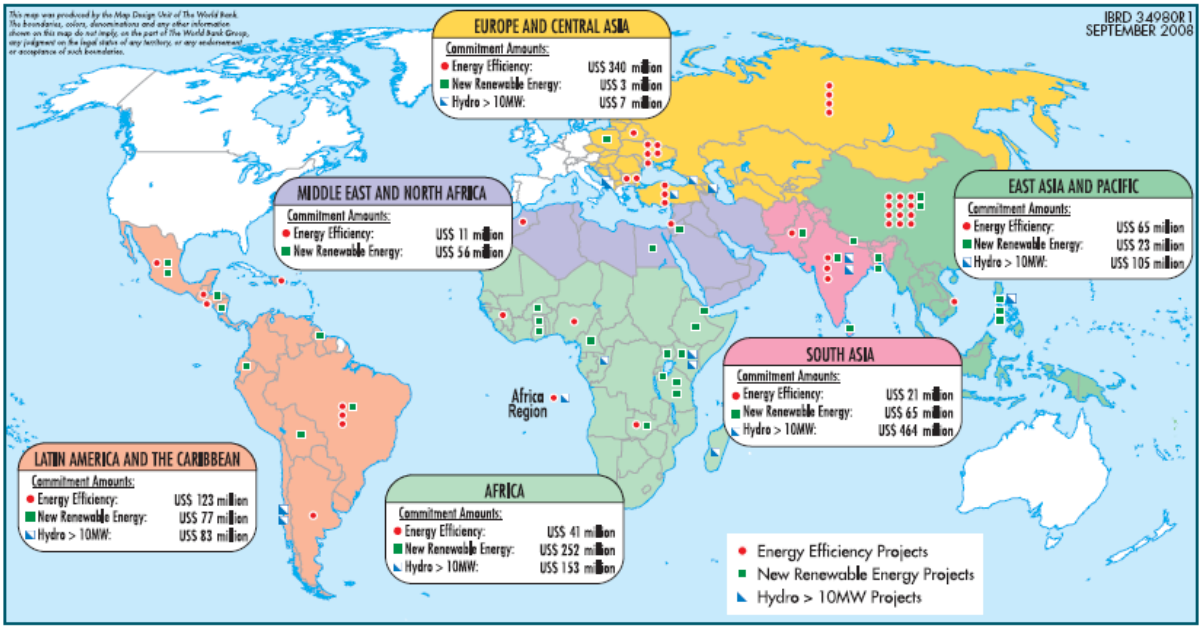
The breakdown of WB (and related bodies) funded projects can be seen in **Figure 1** and **Figure 2**. Energy efficiency and large hydro make up over 80% of the total disbursements.

	Commitments in fiscal 2008 (millions of US$)			
Source of funds	*New RE*	*Hydro > 10 MW*	*EE*	*Total*
World Bank	272	625	719	1,616
IBRD/IDA	117	601	624	1,343
GEF	90	—	55	145
Carbon Finance	65	24	40	128
IFC	115	361	473	949
Own Funds	72	361	473	906
Carbon Finance	39	—	—	39
GEF	4	—	—	4
MIGA	88	21	—	110
Total	476	1,007	1,192	2,675

Note: Some columns may not add up exactly because of rounding.

Source: WBG data.

Figure 1: WB spend in fiscal 2008[4]



Source: WBG data.

Figure 2: WB spend by location

[4] Energizing Climate Friendly Development – World Bank Group Progress on Renewable Energy and Energy Efficiency in Fiscal 2008

6 MULTILATERAL DONORS

6.1 Global Environment Facility[5,6]

The Global Environment Facility (GEF) is a global partnership among 178 countries, international institutions, non-governmental organisations and the private sector to address global environmental issues. It provides grants for projects related to six focal areas: biodiversity, climate change, international waters, land degradation, the ozone layer and persistent organic pollutants. The GEF uses funds contributed by donor countries to fund projects to improve the global environment.

A number of partners implement the GEF projects including:

- United Nations Industrial Development Organization (UNIDO)
- United Nations Development Programme (UNDP)
- United Nations Environment Programme (UNEP)
- African Development Bank (AfDB)
- Asian Development Bank (ADB)
- International Bank for Reconstruction and Development (IBRD)
- European Bank for Reconstruction and Development (EBRD)
- Food and Agriculture Organization (FAO)
- Inter-American Development Bank (IDB)
- International Fund for Agricultural Development (IFAD).

GEF projects help to contribute to the overall objective of the United Nations Framework Convention on Climate Change (UNFCCC) '*to achieve [...] stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.*' [7]

GEF allocates and disburses approximately US$250 million per year in energy efficiency, renewable energies and sustainable transportation. GEF also manages the Least Developed Countries Fund and the Special Climate Change Fund, which were established in 2001 under the UNFCCC, details of which are shown below.

- **Least Developed Countries Fund (LDCF)**: addresses the needs of the 48 Least Developed Countries (LDCs) which are especially vulnerable to the adverse impacts of climate change. This includes the preparation and implementation of National Adaptation Programmes of Action (NAPAs) which identify the urgent and immediate needs of LDCs to adapt to climate change. It is estimated that US$500 million is the amount needed to finance the NAPA implementation and to date, US$172 million in voluntary contributions has been mobilised by the GEF. Nineteen donors have pledged to the Least Developed Countries Fund (LDCF) so far.

- **Special Climate Change Fund (SCCF)**: finances projects relating to adaptation, technology transfer and capacity building; energy, transport, industry, agriculture, forestry and waste management, and economic diversification.

[5] GEF website accessed 11/05/2009 available at: http://www.thegef.org

[6] Transfer of Environmentally Sound Technologies: the GEF experience. October 2008.

[7] UNFCCC Framework Convention on Climate Change, Article 2

GEF supports projects in both climate change mitigation and climate change adaptation including:

- Renewable energy
- Energy efficiency
- Sustainable transportation
- Adaptation
- New low-GHG energy technologies Enabling activities, national communications and other obligations under the UNFCCC

Since 1991 GEF has provided US$8.26 billion in grants and leveraged US$33.7 billion in co-financing for over 2,200 projects in over 165 countries[8]. GEF has a total of 663 projects recorded with a climate change focus; this includes 42 projects which are under preparation and 621 which have been approved. Of the approved projects GEF grants have totalled nearly US$ 2,280 million, with a co-financing total of nearly US$14,066 million. The majority of these projects are implemented through the UNDP (416), IBRD (155) and UNEP (82), although the largest grant value has been for projects financed and implemented by IBRD.

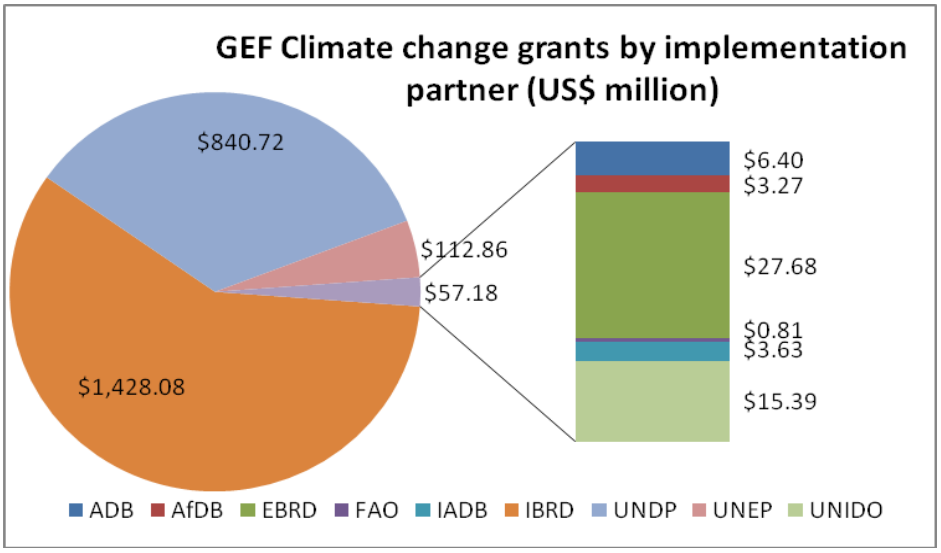


Figure 3: GEF climate change grants by implementation partner (US$ million)

[8] GEF website accessed 13/05 available at: http://www.thegef.org/interior_right.aspx?id=50

6.2 United Nations Industrial Development Organisation (UNIDO)[9]

UNIDO's primary objective is the promotion and acceleration of industrial development in developing countries and countries in transition. A designated Energy and Climate Change Branch is responsible for promoting energy use which mitigates the effect of climate change and is environmentally stable. The main focus of UNIDO's renewable energy programme has been in two areas:

- Renewable energy for enhancing access and productive uses
- Renewable energy for industrial applications: helping existing and new small and medium sized industrial enterprises (SMEs) to switch from fossil fuels to renewable energy

A key focus of UNIDO's interventions is to promote forms of Bio-energy that have a significant potential to replace fossil fuels to provide modern energy services. UNIDO has specifically been promoting Bio-energy projects for on/off grid electricity generation and process heat based on modern efficient technologies.

6.3 United Nations Development Programme (UNDP)

The UNDP investment in energy projects has seen an exponential increase in funding awards in the years 1986 to present. It has also seen a general shift in territory from conventional energy exploitation and opening of markets, to sustainable development brought about by sustainable energy usage. Lately, countrywide responses to climate change and suitable reporting to the UN have also been funded.

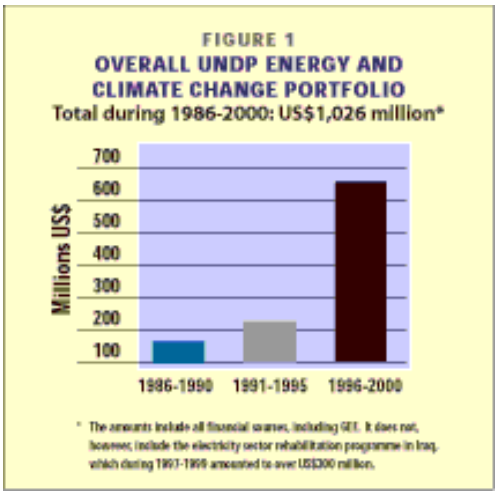


Figure 4: UNDP Energy and CC portfolio

As **Figure 4** shows, between 1986 and 1990 the total resources programmed for energy and climate-related activities amounted to over US$153 million. Over the next five-year period, beginning in 1991, energy activities totalling US$210 million were funded. This amount more than tripled to over US$663 million between 1996 and 2000. This significant

[9] UNIDO's Renewable Energy Programme

growth has been shaped by expanded collaboration with bilateral and multilateral partners, most notably through the GEF-financed portfolio on energy and climate change.

Often the total figures supplied for the UNDP include co-financing with multilaterals eg GEF. The total funding purely supplied by UNDP is indicated here:

Region	**UNDP own spend 1995-2005**
Africa	US$ 10.4m
Asia Pacific	US$ 28.8m
Arab States	US$ 7.55m
Europe and CIS	US$ 2.40m
Latin America and Caribbean	US$ 1.78m
Global Programmes	US$ 10.3m
Total	**US$ 61.3m**

6.4 Climate Investment Funds (CIF)

The Clean Technology Fund (CTF) has been developed to demonstrate new approaches and to provide lessons to contribute to the negotiations under the Bali Action Plan (2007). The fund has been developed as one of the two initiatives under the Climate Investment Funds (CIF), the other one being the Strategic Climate Fund (SCF). The recently-established CTF will look to scale up the deployment of transformational low carbon programmes in developing countries, but its primary focus will be on middle-income countries with rapidly rising greenhouse gas emissions. To complement the CTF, Scaling-Up Renewable Energy Programme (SREP) has been set up under the Strategic Climate Fund to pilot programmatic low carbon interventions in LICs with the aim of generating lessons to help inform the shape of a post-Kyoto framework for climate change mitigation.

A total of about US$ 6 billion has been committed for the Clean Investment Funds which will be administered by the World Bank through regional Development Banks.

SREP is one of the programmes designed to operate under the SCF. The SREP is expected to supplement Multilateral Development Bank (MDB) lending for generation, rural electrification, clean cooking and heating fuels, and modern lighting with renewable energy sources. It would support countries' efforts to promote energy security and sustainability, including through regional initiatives.[10] SREP is expecting to accumulate US$ 250 million before the programme is implemented.

SREP is expected to offer a mixture of grants and highly concessional loan financing, and when blended with IDA and other concessional financing available from other MDBs, will leverage other public and private sector resources. *It will fund the incremental capital cost of renewable energy investment within each program, therefore ensuring maximum financial leverage. A majority of SREP funds would be used for investment co-financing and will also*

[10] SCF-SREP Consultation Document. October 2008.

fund technical assistance for planning and pre-investment studies, policy development, regulatory reform, and business development and capacity building when they are an integral and complementary part of investment operations. This is essential for transformative and enduring change to take place.[11] It is understood that the SREP is in the final stages of design process and no project has been funded at the time of writing this report.

6.5 Other Multilateral Initiatives on Clean Technologies

6.5.1 Renewable Energy & Energy Efficiency Partnership (REEEP)

The Renewable Energy & Energy Efficiency Partnership's goal is to accelerate the global market for sustainable energy by acting as an international and regional enabler, multiplier and catalyst to change and develop sustainable energy systems. REEEP works with Governments, Businesses, Industry, Financiers and Civil Society across the world in order to expand the global market for renewable energy and energy efficiency technologies.[12]

Relevant REEEP project themes:

- Innovative Finance Mechanisms
- New forms of financing
- Risk mitigation
- Finance models to make small sized renewable and energy efficient projects bankable and economically attractive

Relevant Programmes:

Since its establishment as an NGO in 2004, REEEP has supported more than 100 projects using funding from the Governments of the United Kingdom, Norway, Ireland, Italy, and New Zealand.[13]

At the time of writing this report, REEEP were running 34 projects, most of which have relevance to this study. **Table 1** shows the projects being implemented in various countries and shows separately, projects in BRICs and allows the analysis of the allocation of funding.

Financial Disbursements

Many of the bilateral and multilateral donors deliver funding into REEEP as part of their disbursements. Therefore it is possible that there will be some duplication of figures provided by the donors. The following table highlights the current allocation of funding to each of the REEEP projects.

[11] Development of New Targeted Programmes Under the SCF. January 2009

[12] Source: www.reeep.org accessed 26/06/09

[13] Source: http://www.reeep.org/655/projects.htm accessed 26/06/09

Table 1: Allocation of Disbursements by REEEP (Predominantly 2007-2009)

Projects	Location	Duration	Budget (US$)	Implementing Agency
Commercialisation of Large Scale Solar Water Heating Systems	South Africa	2006 - 2008	352,500	E+Co
Develop Innovative Policy Framework to address barriers to RE & EE deployment in the Mediterranean	North African	2007 - 2009	197,400	Ingegneriambiente
Developing a Vehicle for Solar Water Heating Mass Implementation in South Africa	South Africa	2007 - 2009	158,179	Sustainable Energy Africa (SEA)
Developing an Integrated Rural Energy Utility Roadmap	South Africa	2007 - 2009	162,080	Restio Energy Pty Ltd
Performance and Credit Risk Guarantees and Financing Mechanisms for ESCO-structured Energy Projects	Mexico	2007 - 2009	282,000	EPS Capital Corp
Development of Financial Risk Management Instruments for supporting Energy Services in S Africa	S Africa	2007 - 2009	239,700	Econoler International
Development of Marketplace Competition for Affordable Non-Fossil Lighting in Sub-Saharan Africa	Sub Saharan Africa	2007 - 2009	2,559,150	Implementing Specialists Comp
Development of Renewable Heating and Cooling use in the Tertiary sector of Mediterranean countries	Morocco, Tunisia	2007 - 2009	169,200	Politecnico di Milano (POLIMI)
E+Co West Africa Modern Energy Fund	Mali, Senegal, Ethiopia, Ghana, Tanzania, Uganda	2007 - 2009	423,000	E+Co
Promotion of Solar Water Heating in Uganda	Uganda	2008 - 2009	531,570	Ministry of Energy and Mineral development
Engaging the banking sector in financing renewable energy	Mexico	2007 - 2009	141,000	BASE
Establish Pacific Micro Energy Service Companies (PMESCOs)	Solomon Islands, Kiribati	2007 - 2009	56,823	SOPAC
Facilitating Access to Finance for the Biodiesel Industry in Southern Africa	Lesotho, Tanzania, Zambia	2006 - 2008	108,387	African Sustainable Fuels Centre (ASFC)
Financing Cogeneration and Small Hydro Projects in the Sugar and Tea Industry in East and Southern A	Ethiopia, Mozambique, Tanzania, Uganda, Zambia	2006 - 2008	374,872	AFREPREN/FWD
REEEP Report on Energy Efficiency 2008	Broad Report	2007 - 2009	121,260	Ecofys Netherlands BV
Removal of barriers in mainstreaming the biomass gasifier systems for thermal applications in India	Broad Report	2007 - 2009	235,996	The Energy and Resources Institute (TERI)
Renewable Energies Cooperation Certificates (RECC)	Middle East	2006 - 2008	262,690	International Solar Energy Society (ISES) ? Italy
Renewable Energy Prospective Study and Proposal to remove the technical, economic, regulatory...	Broad Report	2007 - 2009	118,434	Bariloche Foundation
		Total	$6,494,241	

Projects - BRICs Focus	Location	Duration	Budget (US$)	Implementing Agency
Implementation of a Dissemination Strategy for Efficient Cook Stoves in Northeast Brazil	Brazil	2007 - 2009	152,590	Institute for Sustainable Development and Renewable Energy (IDER
Improving Electricity Governance in Brazil and South Africa	Brazil, South Africa	2007 - 2009	447,674	World Resources Institute
Standardised Financial & Legal Documentation for RETScreen	Brazil, South Africa	2008 - 2009	846,000	CanmetENERGY
Support the Implementation of Brazil grid-connected solar photovoltaic roofs programme	Brazil	2007 - 2009	208,680	RENOVE
The Center for Learning on Decentralised Generation	Brazil	2007 - 2008	190,350	IDEAAS
Scaling up a proven mechanism to implement energy efficiency street lighting projects in India	India	2007 - 2009	204,450	Econoler International
Technical Support to Energy Efficiency standards and labeling in India	India	2007 - 2009	1,493,387	Collaborative Labeling and Appliance Standards Program (CLASP)
Development of a business plan for rural electricity generation (DG) system based on biomass	India	2007 - 2009	253,800	DCM Shriram Consolidated Ltd
Creating scalable financing models for sustainable energy services via microfinance institutions	India	2007 - 2009	211,500	SELCO Solar Light Pvt. Ltd.
Design and Establish a Risk Mitigation Mechanism in India	India	2007 - 2009	141,000	PricewaterhouseCoopers (PwC) India
Financing for Bundled Small-scale Rural Renewable Ventures in India	India	2007 - 2009	191,836	Environment Energy and Enterprise Ventures
Millennium Development Goal Financing Facility (MDGFF) ? Participatory Business Planning	India, China, Brazil, South Africa	2007 - 2008	283,410	Fiorello H. LaGuardia Foundation
Using the Tamil Nadu Municipal EE Programme to create a replicable financing model.	Tamil Nadu , India	2007 - 2009	284,121	Alliance to Save Energy
Panzhihua?s Pilot Action towards Sustainable Energy City	China	2007 - 2009	377,598	Administrative Center for Panzhihua?s Agenda21 (ACPA)
Business Model Development for Biogas Electric Power Generation at Livestock Farms in China	China	2007 - 2009	172,803	Tsinghua University
Efficiency Power Plant (EPP) Implementation in Jiangsu, China	China	2007 - 2009	556,245	Institute for Market Transformation
		BRICs Total	$6,015,444	
		REEEP Grand Total	$12,509,685	

6.5.2 Global Village Energy Partnership (GVEP International)

GVEP International is among innumerable international charities working to reduce poverty by accelerating access to affordable and sustainable energy services. GVEP International links more than 2,000 organisations worldwide, is guided by their input and advice, and seeks to support and grow small Partners from the bottom up to become viable energy service providers. GVEP International is committed to fighting climate change by providing Partners with the tools to adapt to changing global conditions.[14] Financial support through international charities is a rapidly growing area for financing and disseminating 'clean' technologies.

6.5.3 Other Catalysts and Non-Financing Support Initiatives

Other, smaller organisations which are contributors, but relatively insignificant are;

- Mediterranean Renewable Energy Centre (MEDREC)

REN21, EUREC, IREA[15], CURES[16] and other such associations and support organisations support clean energy technologies and energy efficiency with dissemination of valuable information. However, the monetary value of this work cannot be quantified and therefore has not been taken into account further in this report.

Further details on policy and coordination can be found in Chapter 12.

7 REGIONAL DEVELOPMENT BANKS

7.1 African Development Bank (AfDB)

The African Development Bank (AfDB) Group's mission is to help reduce poverty, improve living conditions for Africans and mobilize resources for Africa's economic and social development.

Much of the current spend from this regional bank is spent on establishing new conventional capacity and extending, reinforcing or building the means to distribute the power. It is felt that this is a systemic product of AfDB's internal set-up and could be investigated if the situation warrants significant change.

However approximately US$ 550m has been spent on clean technology measures in the years 2004-2008. There is extensive hydro capacity in central Africa and this is increasingly being exploited with associated infrastructure needed to take it to the settlements.

[14] Source: www.gvepinternational.org/about Accessed 06/07/09

[15] The International Renewable Energy Alliance http://www.ren-alliance.org/

[16] Citizens-United for Renewable Energy and Sustainability www.cures-network.org

7.2 Asian Development Bank (ADB)

The Asian Development Bank's (ADB) work is aimed at improving the welfare of the people in Asia and the Pacific and is particularly focused on those who live on less that US$2 per day.

In 2005 ADB established the Energy Efficiency Initiative (EEI) to promote greater investments in energy efficiency and renewable energy within the region. The aim was to increase ADB's lending in the renewable energy and energy efficiency sub-sector to US$1 billion per year from 2008 to 2010; this target was achieved with a total investment in clean energy in 2008 of US$1.693 billion.

The Clean Energy Financing Partnership Facility (CEFPF) was established in April 2007 to fund small energy efficiency investments that require quick transactions, finance some technology transfer costs of clean technologies, and provide grant assistance for activities such as developing the knowledge base on clean energy technologies.

Historical investments by ADB in clean energy are shown in **Table 2** below.

Table 2: ADB Clean Energy Investments

Year	**Total Approved investments with clean energy component** (US$ millions)	**Clean Energy investment** (US$ millions)
2003	1,263	226
2004	1,356	305
2005	1,785	737
2006	1,612	657
2007	1,801	668
2008	3,023	1,693

7.3 European Bank for Reconstruction and Development (EBRD)[17,18]

The European Bank for Reconstruction and Development (EBRD) is owned by 61 countries and 2 intergovernmental institutions and provides investment financing, mainly for private enterprise, in 27 countries from central Europe to Central Asia.

Energy efficiency was identified as the main priority for the East European region as EBRD countries use up to seven times more energy to produce each unit of GDP than Western Europe. EBRD addressed this by launching the Sustainable Energy Initiative (SEI) in 2006, an initiative which focuses on improving energy efficiency in the region.

The SEI is structured into the following activities:

[17] EBRD website accessed 13/05 available at http://www.ebrd.com

[18] EBRD Sustainable Energy Initiative Factsheet, March 2009.

- **Industrial energy efficiency (SEI 1):** Projects in large energy intensive industries, agribusiness and properties which reduce greenhouse gas (GHG) emissions
- **Sustainable energy financing facilities (SEI 2):** Dedicated loan facilities for local banks for on-lending to clients undertaking industrial or residential energy efficiency and small-scale renewable energy projects
- **Power sector energy efficiency (SEI 3):** Projects supporting the shift to less polluting energy sources, and energy efficiency enhancement in power plant generation and transmission network
- **Renewable energy (SEI 4):** Direct financing of large-scale renewable energy projects
- **Municipal infrastructure energy efficiency (SEI 5):** Projects to enhance energy efficiency of municipal services, including district heating, public transport and water supply/treatment projects
- **Carbon market development (SEI 6):** Technical assistance to promote carbon market developments and management of two carbon funds (EBRD-EIB Multilateral Carbon Credit Fund and the Netherlands EBRD Carbon Fund)

The first phase of the SEI ran from May 2006 to May 2008. During this phase SEI financing reached €2.7 billion, exceeding the original three year target of €1.5 billion. This financing was invested in 166 projects in 24 countries with a total project value of €14 billion. The majority of the financing was utilised in projects in the power generation energy efficiency and industrial energy efficiency sub-sectors. Overall the projects led to a total CO_2 reduction of 21 million tonnes and annual energy savings of over 8 million tonnes of oil equivalent. The share of SEI activity increased from 15% of total EBRD investment in 2006 to approximately 20% in 2008. Co-financing for Phase 1 totalled €218 million with support from 5 multi-donor funds and 22 bilateral donors, exceeding SEI's original target of €100 million. The majority of investment went to Eastern Europe the Caucasus and South-eastern Europe as shown:

Figure ***5***.

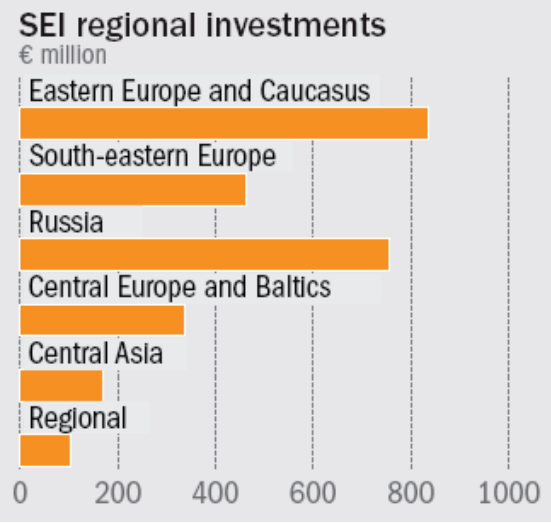


Figure 5: SEI Phase 1 Investments by Region

In Phase 2 the bank will target additional types of investment including energy efficiency in buildings and transport sector, climate change mitigation in natural resources, stationary use of biomass and investments in climate change adaptation.

The EBRD and the EIB have established the **Multilateral Carbon Credit Fund**[19] which enables private and public companies and EBRD and EIB shareholder countries to purchase carbon credits from emission reduction projects financed by the EIB and EBRD. Six countries and six companies have provided initial commitments totalling €190 million.

7.4 Inter-American Development Bank (IDB)

The IDB partners with countries to combat poverty and promote social equity through programmes tailored to local conditions. Working with governments as well as with the private sector, the Bank seeks to achieve sustainable economic growth, increase competitiveness, modernise public institutions, and foster free trade and regional integration.

Alternative energy, sustainable agriculture, climate-friendly transportation and climate resilient resource management are just some of the many areas in which the Inter-American Development Bank is involved. The IDB uses a variety of instruments to promote development in Latin America and the Caribbean.

- Project Preparation Facilities
- Financial Products
- Institutes

The Infrastructure and Environment Sector (INE) conceptualises, prepares, supports the execution and supervises the IDB's operations related to energy, transport, water and sanitation and rural development and natural disasters. Its functions include preparing the Bank sector policies, strategies, operational guidelines and programmes in infrastructure and environment; conducting relevant research and analytical work, best practices and case studies on this area; and providing specialized technical support in borrowing member countries.

The sector works with the country departments to design and execute country and regional financial and non-financial programmes and projects and evaluates the development results of such interventions. It also performs quality enhancement functions for social development projects and programmes, to include guiding, designing and preparing Bank products execution, and analysis and mitigation of risks. INE is divided in the Energy Division, the Transport Division, the Water and Sanitation Division and Environment Rural Development and Disaster Risk Management Division.

INE also leads IDB's initiatives in the areas of infrastructure and environment, such as biofuels and public-private partnerships, including the Bank's Sustainable Energy and Climate Change Initiative (SECCI). The goals of the Sustainable Energy and Climate Change Initiative are centred around the provision of comprehensive sustainability options in areas related to the energy, transportation, water and environmental sectors as well as that of building climate resilience in key priority areas vulnerable to the impacts of climate change.

[19] EBRD website accessed 13/04 available at www.ebrd.com/mccf

The Initiative consists of four strategic pillars:

- **Renewable energy and energy efficiency**
- **Sustainable Biofuel development**
- **Access to carbon markets**
- **Adaptation to climate change**

8 FINANCIAL SUMMARY - MULTILATERAL & REGIONAL BANKS

The table below (**Table**) summarises investments in clean energy technologies by multilateral and regional banks and associated funding bodies.

Table 3: Summary of Investments by selected Multilateral and Bilateral Agencies

Bank/Fund	Details	No. of Projects	Relevant Investment (US$M)	Average per annum (US$M/Yr)	Target/planned per year (US$M)
UNDP	Sustainable Energy Projects	95	61	6	-
AfDB	Clean Tech (taken from Energy and Power)	10	550	110	-
ADB	Clean energy investment	-	-	1,693	1,000
EBRD	Sustainable Energy Initiative (SEI) financing	166 ('06-'08)	3,807	1,269	705
World Bank	Exploiting renewable energy resources, supporting energy conservation and increasing energy efficiency	-	-	-	3,333
IFC	Renewable energy and energy efficiency	-	-	-	367
GEF	Projects with Climate change focus	621 ('91-'08)	2,280	134	250
Total		892	6,698	3,212	5,655

9 OECD DAC BILATERAL FUNDING

This section focuses on the major DAC bilateral donors[20] selected by total gross aid, rather than aid per capita of those donors.

It is worth noting that in May 2009, a ministerial level meeting of the current and candidate OECD countries adopted a policy guideline[21] on integrating climate change adaptation into all bilateral co-operations with a view to mainstreaming climate change.

The following sections summarise the major development assistance programmes of four of the largest OECD donors (with the UK being amongst the largest). Details of individual country assistance programmes are given in Section 15 (Annex). The following Table 4 highlights the fact that the financial support from the DAC bilateral donors only started to flow to the developing countries from 2002; in regards to renewable energy development, financial data for years 2008 or 2009 is not yet available.

In 2008, total net Official Development Assistance (ODA) from members of the OECD's Development Assistance Committee (DAC) rose by 10.2% in real terms to US$119.8 billion. Although this is a significant increase, the world's 22 rich countries were mandated by the UN General Assembly to provide 0.7 percent of their gross national product (GNP) as ODA to developing nations; however, only five countries have met this target, according to a new U.N. report on Financing for Development.

[20] Development Cooperation Report 2006 - OECD

[21] INTEGRATING CLIMATE CHANGE ADAPTATION INTO DEVELOPMENT CO-OPERATION, 2009 © OECD 2009

Table 4: Recent Disbursements of the 5 main bilateral DAC countries (million US$)

Sector	Country	2002	2003	2004	2005	2006	2007
Power generation/renewable sources	France	0.38	0.42	0.21	0.37	7.96	0.54
	Germany	15.57	9.39	27.01	8.85	12.79	20.78
	Japan	-	4.46	4.5	3.7	4.87	1.64
	UK	1.17	2.29	2.83	-	-	0.87
	USA	0.03	0.01	0.9	0.28	0.11	1.06
Hydro-electric power plants	France	1.52	2.5	2.82	3.39	9.98	5.6
	Germany	64.67	65.92	73.34	75.13	67.17	99.77
	Japan	23.06	83.13	155.93	312.5	249.01	253.41
	UK	0.34	0.48	0.4	0.16	-	-
	USA	2.33	6.4	1.71	1.84	21.4	33.86
Geothermal energy	France	4.21	0.16	-	-	-	-
	Germany	-	-	0.08	0.09	0.08	0.21
	Japan	-	-	-	0.35	1.67	8.72
	UK	-	-	-	-	-	-
	USA	0.35	0.15	0.32	0.05	0.06	-
Solar energy	France	0.02	-	-	-	0.04	-
	Germany	0.88	0.62	4.94	2.96	4.94	4.23
	Japan	-	-	0.26	0.26	0.01	-
	UK	-	-	-	-	-	-
	USA	0.22	-	-	-	-	0.29
Wind power	France	0.13	0.14	0.04	-	-	-
	Germany	13.46	20.44	11.44	2.71	64.64	129.74
	Japan	0	0	0.09	0.11	0.16	43.1
	UK	0	0.08	0.06	-	-	-
	USA	0.01	0.24	-	-	-	-
Ocean power	France	-	-	-	-	-	-
	Germany	-	-	-	-	-	-
	Japan	-	-	-	-	-	-
	UK	-	-	-	-	-	-
	USA	-	-	-	-	-	-
Biomass	France	-	-	-	-	-	0.16
	Germany	1.45	1.47	0.36	2.49	1.71	2.15
	Japan	-	-	-	0.01	0.01	-
	UK	-	-	-	-	-	-
	USA	3.83	0.25	0.07	-	0.02	0.01
Carbon Capture and Storage		-	-	-	-	-	-
Low carbon vehicles		-	-	-	-	-	-
Total		133.63	198.55	287.31	415.25	446.63	606.14

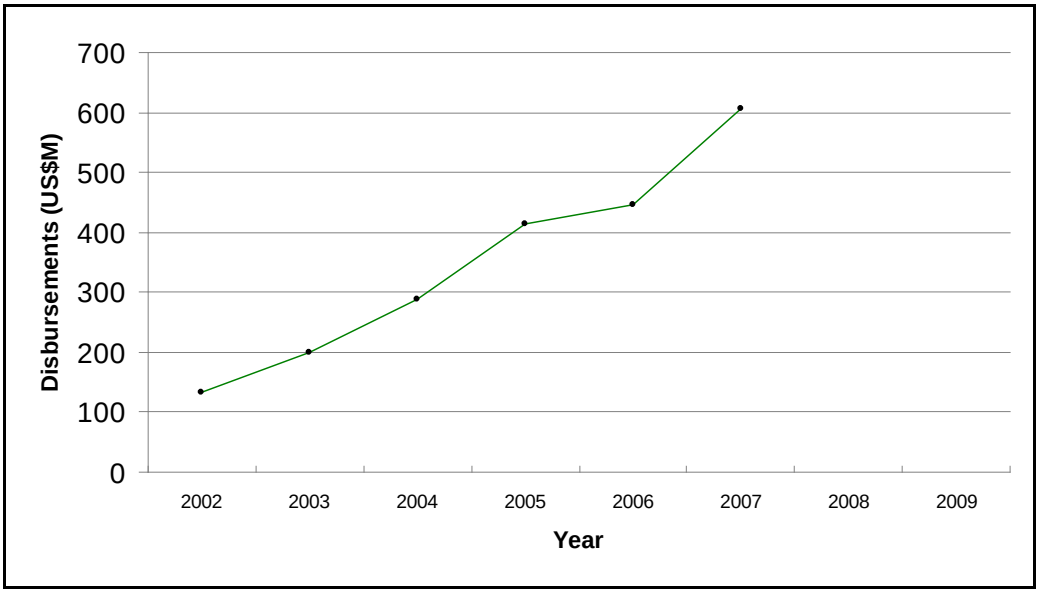


Figure 6: Total Clean Energy Technology Disbursements of the 5 main OECD DAC bilateral donors

It is clear that the amount of financial assistance has been increasing over the years, as shown in **Figure 6** and **Figure 7** below. **Figure 7** shows the cumulative disbursements of the DAC donors towards clean technologies from 2002 to 2007.

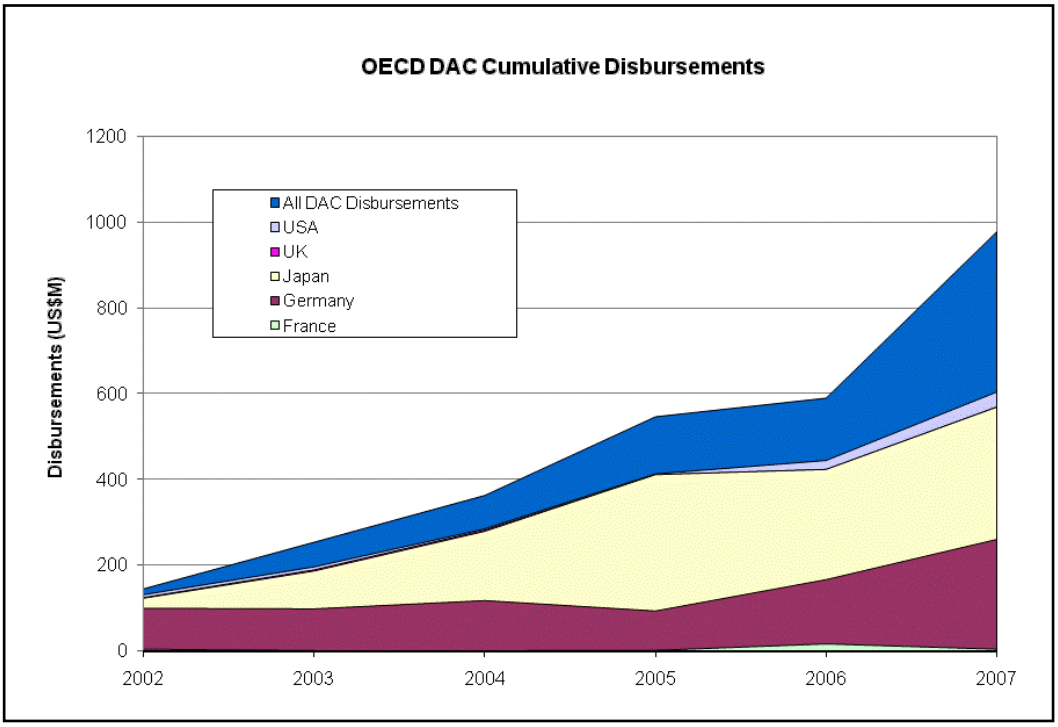


Figure 7: Cumulative Clean Technology disbursements, from OECD DAC donors, 2002-2007[22]

It can be seen from **Figure 8** that disbursements by USA and France in terms of % GDP are small compared to those of other countries (with the UK being almost invisible), which can

[22] Source; http://stats.oecd.org/qwids Accessed 24/06/09

be taken as true reflections of the commitments made to Clean Technologies. This is obviously a direct comparison of disbursements made by each developed DAC country, notwithstanding the actual Gross Domestic Product (GDP) or size (Populace) of each donor country. Similarly, **Figure 9** shows disbursements Per Capita and **Figure 10** shows % of total by each country.

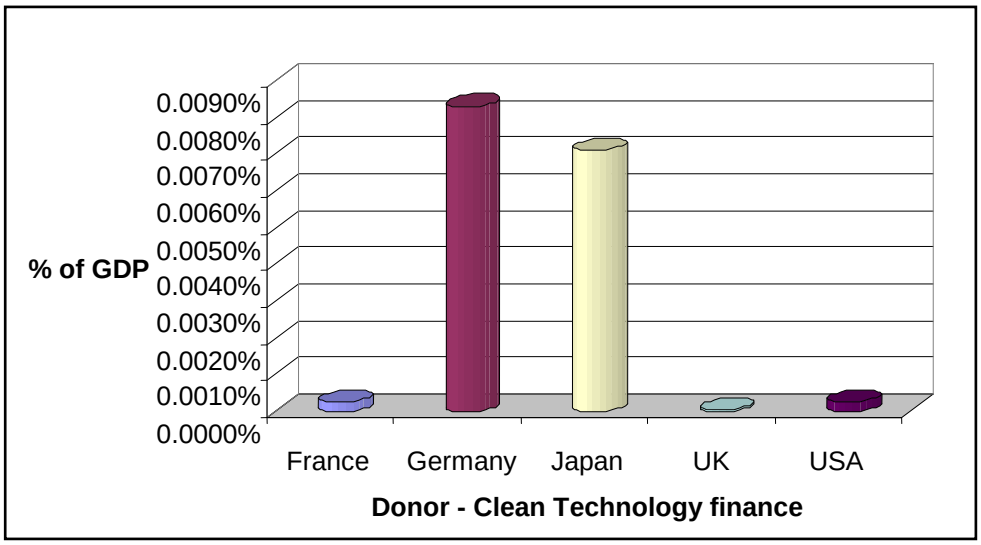


Figure 8: Bilateral Clean Technology Disbursements as a percentage of GDP[23] (2007 figures)

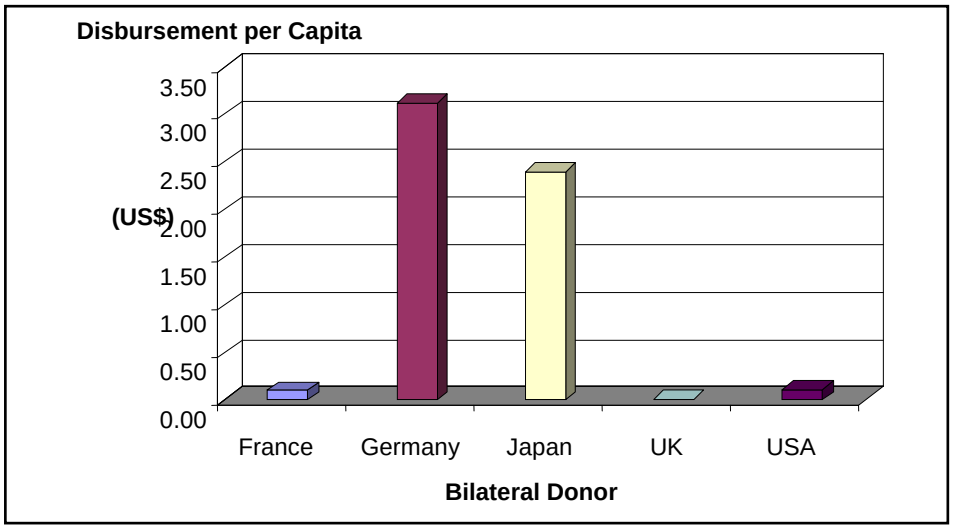


Figure 9: Bilateral Clean Technology Disbursements per Capita[24] (2007 figures)

[23] World Economic Outlook Database, April 2007. International Monetary Fund.

[24] World Economic Outlook Database, April 2007. International Monetary Fund.

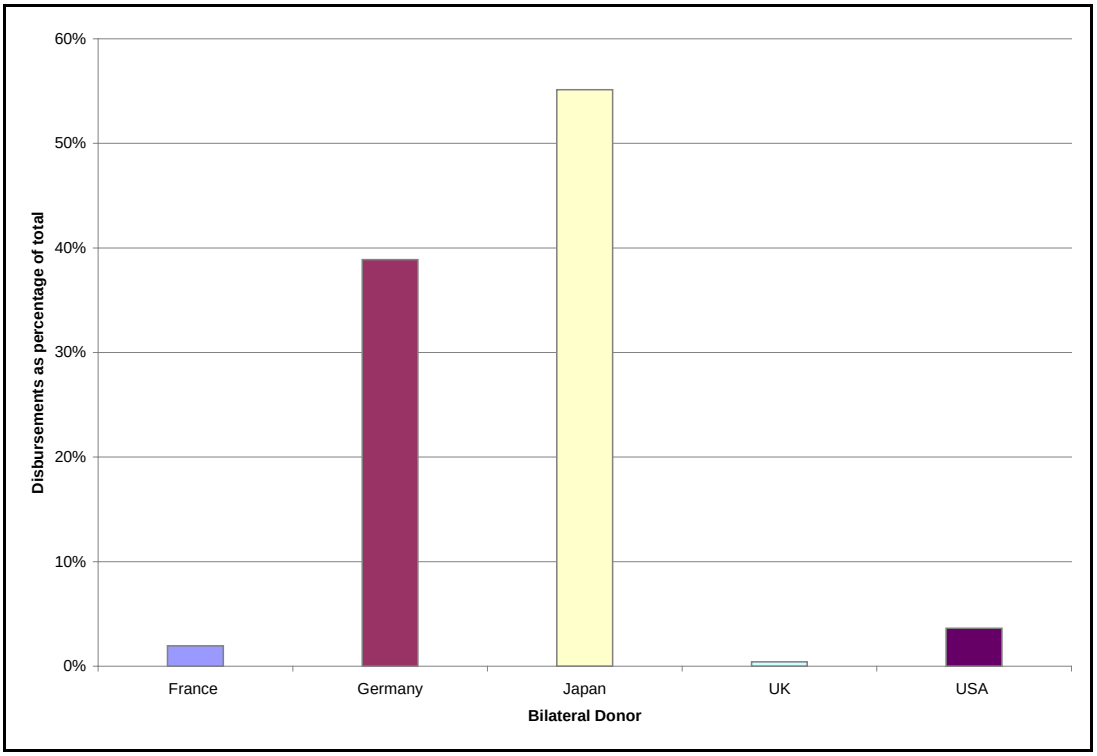


Figure 10: Bilateral Clean Technology disbursements as a percentage of total (2002-2007)[25]

Financial support available encompasses a large range of technologies and programmes but the overwhelming majority of funding has been for hydro-electric power schemes (see Figure 11). This is likely to be project funding rather than support for the so called "catalyzing" activities. It appears that there is very little or no funding available for Ocean Energy or energy efficiency measures, key players in the energy field, as the potential for producing and reducing (respectively) is huge, except in LIC's where the country is predominantly land-locked with little energy use within the country.

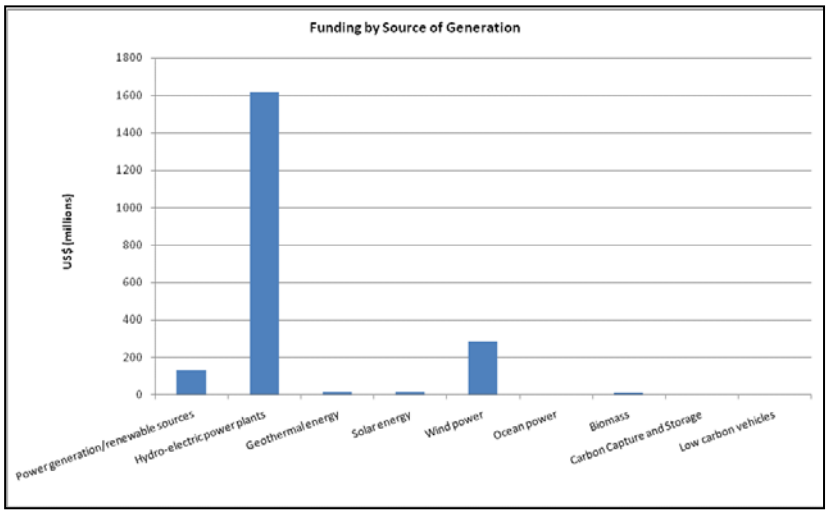


Figure 11: Total OECD DAC Disbursements by technologies (2002-2007)

[25] Source: http://stats.oecd.org/qwids accessed 24/06/09

10 PRIVATE SECTOR INVESTMENTS

Accurate summary of total investment from the private sector donors is extremely difficult to obtain, as it is not monitored by any authority or body.

The following section aims to provide an accurate calculation using known figures and documents, as its economic value is known to be great, and therefore important to this study.

The sources of funding from the private sector which are evaluated here are;

- Clean Development Mechanism (CDM)
- Joint Implementation (JI)
- Other Private Sector Investments

10.1 Clean Development Mechanism (CDM)

CDM and JI (see Section 10.2) are the two project-based mechanisms which feed the carbon market. They are both Kyoto implemented (market-based) mechanisms which greatly affect the international support of the private sector. JI enables industrialised countries to carry out joint implementation projects with other developed countries, while the CDM involves investment in sustainable development projects that reduce emissions in developing countries.

As defined in Article 12 of the Kyoto Protocol, CDM allows a country with an emission-reduction or emission-limitation commitment under the Kyoto Protocol (Annex B Party) to implement an emission-reduction project in developing countries. Such projects can earn saleable certified emission reduction (CER) credits, each equivalent to one tonne of CO_2, which can be counted towards meeting Kyoto targets.

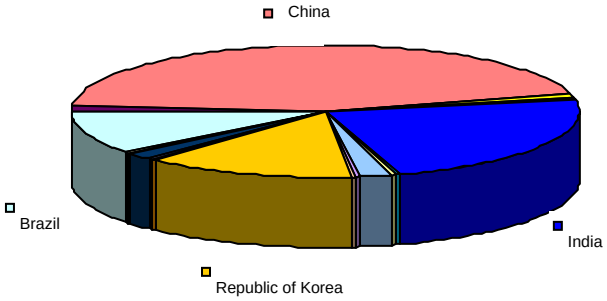
The CDM's primary goal of supporting sustainable development whilst creating cost effective greenhouse gas emission reductions is achieved through the buying and selling of Certified Emission Reductions (CERs). The International Transaction Log (ITL), run by the UNFCCC, verifies transactions proposed by registries to ensure they are consistent with rules agreed under the Kyoto Protocol.

The total Certified Emission Reductions given to date is **295,172,166** CERs. The following table and Pie Chart gives the breakdown of the issuing countries of these certificates (see Table 5 and **Figure 12**). It should be noted that almost all the CDM CERs are issued to one of the BRIC countries, where Russia is an Annex 1 country which is not eligible for CDM projects.

Table 5: Total CERs issued since inception, 2005

Issuing Country	Total CERs
Argentina	889,563
Bhutan	474
Bolivia	725,875
Brazil	30,016,720
Chile	3,165,786
China	126,872,554
Colombia	449,432
Costa Rica	21,226
Cuba	166,744
Ecuador	500,910
Egypt	3,107,192
El Salvador	215,782
Fiji	18,176
Guatemala	644,397
Honduras	201,005
India	65,895,500
Indonesia	212,644
Israel	100,727
Jamaica	172,206
Malaysia	648,718
Mexico	5,842,658
Morocco	26,213
Nicaragua	372,056
Pakistan	962,221
Papua New Guinea	215,424
Peru	159,161
Philippines	64,568
Republic of Korea	38,018,414
South Africa	701,368
Sri Lanka	182,039
Thailand	815,224
Uruguay	40,613
Viet Nam	4,486,500

Figure 12: Certified Emission Reductions issued (by Country)



These CER investments constitute significant private sector investment into low and middle income countries. By way of comparison this has been converted into dollar equivalent investments into the World Bank regions with linear assumptions about annual spend from 2005-present. Clearly as the CER is a tradable commodity this simple rounding of US$ 12/ CER is an oversimplification, but is useful as a comparator.

Table 6: CER investment by Region[26]

WB Region	CERs	Value (million)
AFR	701,368	$1.68
EAP	171,352,222	$411.25
ECA	43584134	$104.60
LCR	43,584,134	$104.60
MNA	3,234,132	$7.76
SAR	66,078,013	$158.59
		$ 790

[26] AFR – Africa, EAP – East Asia & Pacific, ECA – Europe & Central Asia, LCR – Latin America & Caribbean, MNA – Middle East & North Africa, SAR – South Asia

10.2 Joint Implementation (JI)

The mechanism known as "joint implementation," defined in Article 6 of the Kyoto Protocol, allows a country with an emission reduction or limitation commitment under the Kyoto Protocol (Annex B Party) to earn emission reduction units (ERUs). These would be earned from an emission-reduction or emission removal project in another Annex B Party, each equivalent to one tonne of CO2, which can be counted towards meeting its Kyoto target.

Joint implementation offers Parties a flexible and cost-efficient means of fulfilling a part of their Kyoto commitments, while the host Party benefits from foreign investment and technology transfer.

38 projects to date have been funded through this project in 8 countries who are currently taking part. It has not been possible to identify the total investment into these countries as they are not disclosed on the UNFCCC website. However it is understood that they form a comparatively small percentage of the Kyoto commitments and as such their omission is not considered significant.

10.3 Other Private Sector Investments

Statistics on private sector investments are very difficult to obtain. The only significant source of information obtained for this study is the recent REN21 report[27] on global renewable energy. According to the report, the global investment in renewable energy in 2008 was US$ 120 billion, a four-fold increase from the 2004 figure and almost twice the figure of 2006. The trend of annual investment in global renewable energy is shown in **Figure 13**. The report also mentions that an additional US$ 40-50 billion was invested in large hydropower. The figures for first half of 2009 are not available, but it will be interesting to see how the current global financial downturn has affected the renewable energy investment by private sector.

At country level for instance, China has been providing growing amounts of public finance to renewable energy in recent years—about $300 million equivalent for one period in 2007/2008.

[27] Renewables Global Status Report. 2009 Update. REN21

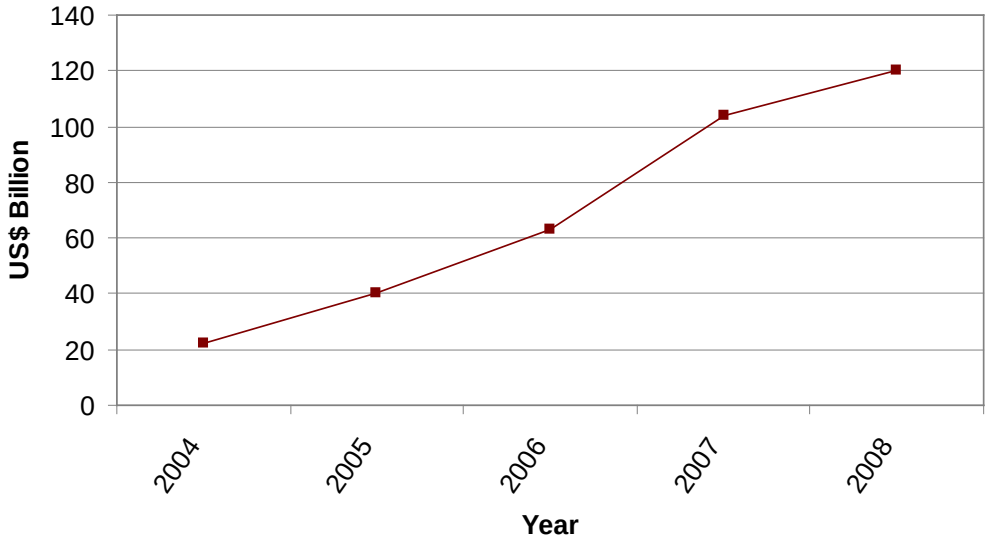


Figure 13: Total global investment in renewable energy technologies 2004-2008 [28]

The report goes on to state that the total global research and development (R&D) spending most likely exceeded US$15 billion. Therefore it is apparent that the total global investment (including large Hydro and R&D) in renewable energy was approximately US$ 200 billion in 2008. These figures, according to the REN21 report, do not include investments such as venture capital and private equity.

A significant proportion of the figures from REN21 is likely to be from private sector finance since the grant/loan from multilaterals and bilaterals are small compared to the total figure of US$120 billion.

11 FINANCIAL SUMMARY

The data captured in the above sections have been compiled here to provide an overall representation of the investment into low and middle income countries in the field of clean energy technologies. It should be noted that the figures provided are likely to be approximate, however this can be used to indicate trends and overall context.

11.1 Overview of Investments

According to the REN21 report, development assistance for renewable investments in developing countries has expanded greatly in recent years and reached about $2 billion in 2008, up from $500 million in 2004. **Table 7** below shows the financial assistance provided in clean technologies by various agencies including the World Bank, OECD-DAC and UN. It should be noted that in the case of UNDP and regional banks, an average per annum figure has been used.

The figure presented in the table, based on research undertaken during this study, is much higher than the figures quoted by REN21. However it should be noted that the investment categories used by REN21 are likely to be different, and so the figures will not be directly comparable.

[28] REN21 publication – Renewables Global Status Report, 2009 Update, page 14

Table 7: Overview of Total Financial Disbursements

WB Regions	World Bank Inc. IBRD Carbon Finance, IBRD/IDA, IFC, IFC Carbon Finance, MIGA, GEF, REEEP('08)			UNDP (Average '95-'05)	Regional Development Banks Inc. EBRD, IDB, ADB, AfDB (Average '04-'08)	OECD DAC Bilateral Donors (2007)	Total Donor Disbursements (US$M Per Annum)	Private Sector investment (Average Annual Disbursements)	Total Donor Disbursements+ Private Sector (US$M Per Annum)	Population (million)	Approx spend per capita ($)
	New Renewable Energy	Energy Efficiency	Large Hydro					CDM			
AFR	254	42	153	1	110	131	691	2	693	800	**0.87**
EAP	24	656	105	3		232	1,019	411	1,430	1,912	**0.75**
ECA	4	341	202	2	900	36	1,486	105	1,590	445	**3.57**
LCR	79	124	83	2	1,693	159	2,139	105	2,244	561	**4.00**
MNA	58	12		8	22	304	403	8	411	313	**1.31**
SAR	66	22	464			123	674	159	833	1,522	**0.55**
								Grand Total (US$M Per Annum)	**7,200**		

AFR – Africa, EAP – East Asia & Pacific, ECA – Europe & Central Asia, LCR – Latin America & Caribbean, MNA – Middle East & North Africa, SAR – South Asia

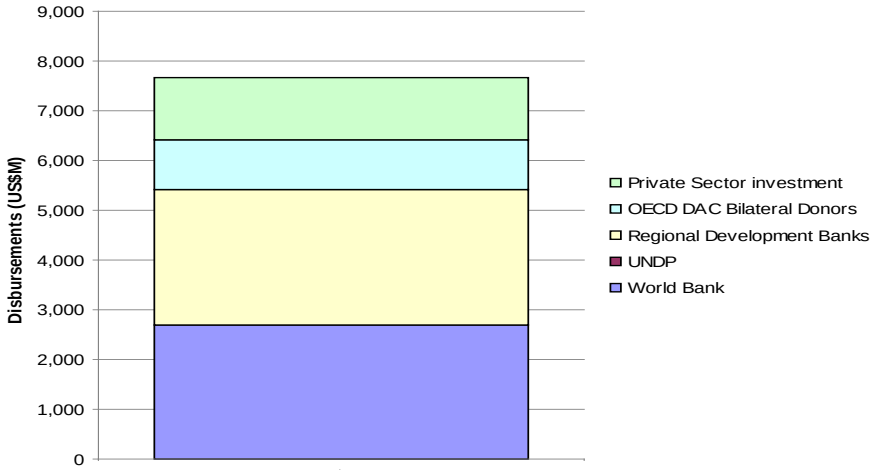


Figure 14: Average Annual Disbursements by Donor into Clean Technologies.

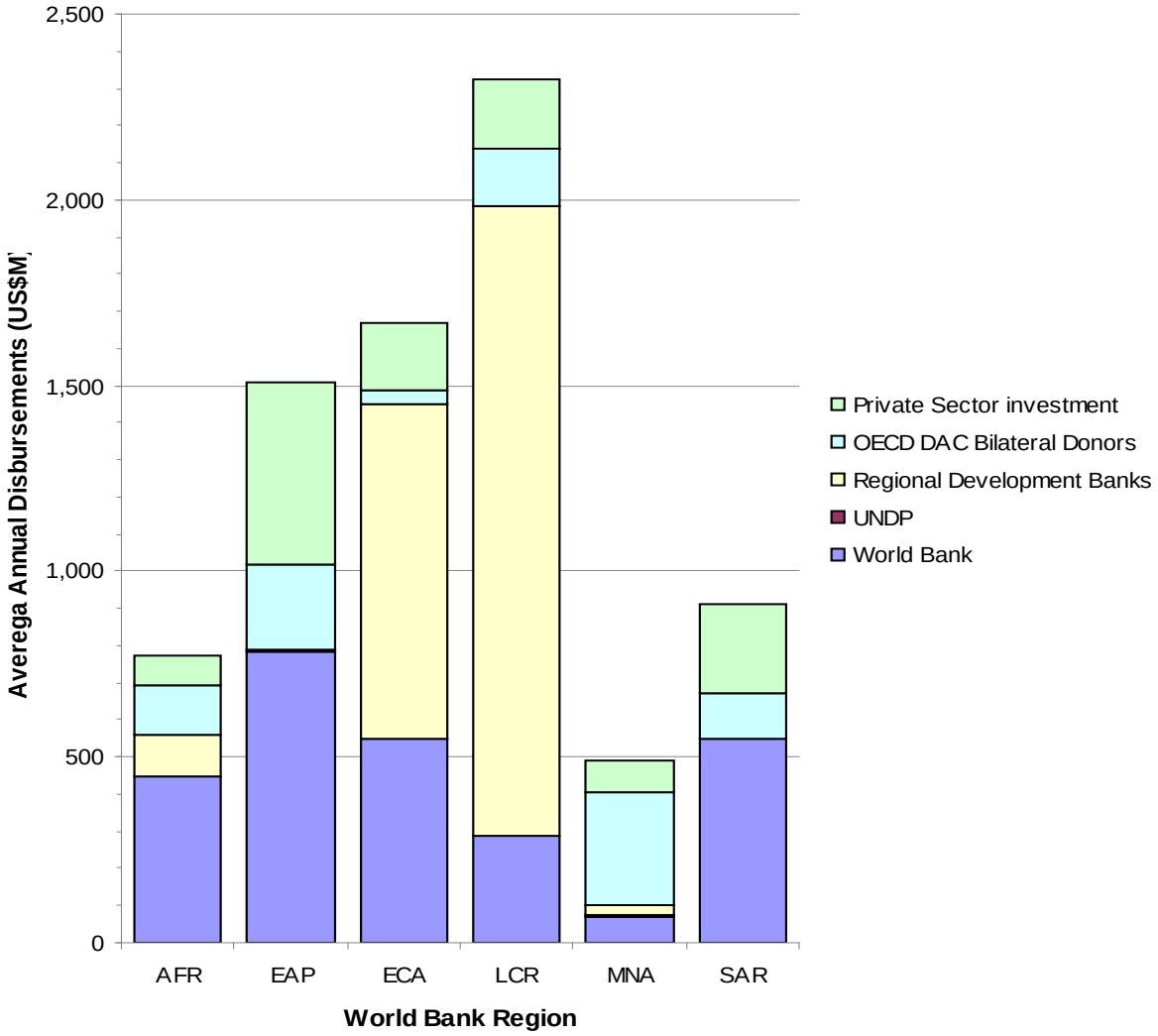


Figure 15: Overview of Financial Assistance by Region, Sector, and Agency

It can be noted here that the disbursements made by the UNDP are relatively insignificant as it does not even appear in the chart in **Figure 15**.

On the surface of this graph the region reported as MNA – Middle East & North Africa seems to be a neglected region, although in terms of spend per capita the region does appear in the chart in **Figure 16**. **Figure 16** below outlines these disbursements 'Per Capita', although it should be noted that the influence of the disbursements within MIC's as opposed to LIC's naturally varies with the relative wealth of the region.

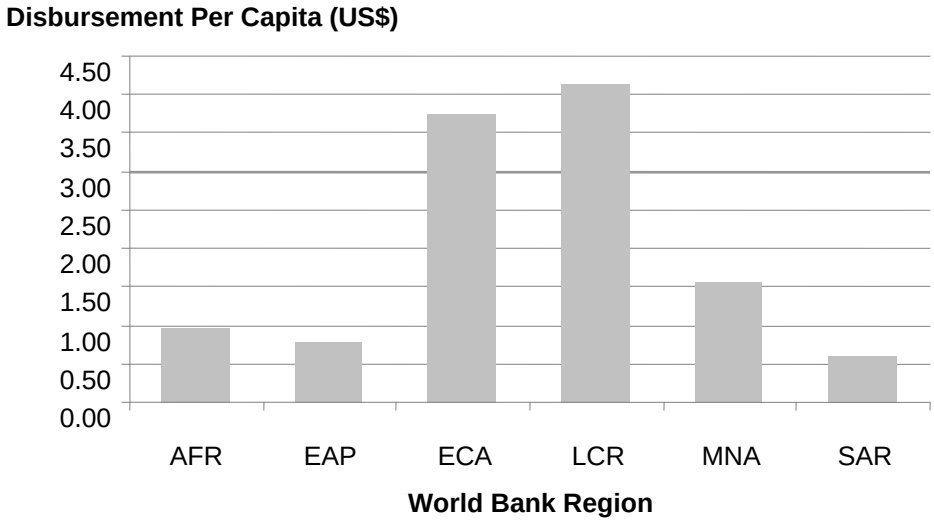


Figure 16: Average Annual Disbursements per capita, by region

12 POLICIES AND COORDINATION SUPPORT

In addition to financial support from Multilaterals and OECD among others, assistance in areas such as policy guidance and capacity building and coordination among the players in the sector is key to the success of an energy programme. There are various organisations around the world that support the efforts in clean energy technology by providing policy advice to the actors in the sector, including the governments and the private sector. Some of the organisations involved and initiatives taken in Policy and Coordination in clean energy technology sector are given below.

12.1World Bank

In addition to operational activities, the World Bank Group (WBG) engages in a variety of economic sector work and technical assistance focused on renewable energy and energy efficiency. This work is an integral part of WBG activities, which paves the way for additional investments by public and private sectors and accounts for 30% of total WB spend. Activities performed in the past year include studies, reports, and policy notes on renewable energy policy in Brazil, Mexico, and Sri Lanka. The majority of the Analytical and Advisory Activities in renewable energy were in the form of non-lending technical assistance. Two major projects to benefit from this are ESMAP and ASTAE.

The Energy Sector Management Assistance Programme (ESMAP) is a global knowledge and technical assistance partnership administered by the World Bank and sponsored by bilateral official donors since 1983. ESMAP's mission is to assist clients from low-income, emerging, and transition economies to secure energy requirements for equitable economic growth and poverty reduction in an environmentally sustainable way.

ESMAP follows a three-pronged approach to achieve its mission: think tank or horizon scanning, operational leveraging and knowledge clearinghouse functions (knowledge generation and dissemination, training and learning events, workshops and seminars, conferences and roundtables, website, newsletter, and publications). ESMAP activities are executed by its clients and/or by World Bank staff.

In 2007, ESMAP provided US$1.6 million for 11 new energy efficiency activities and US$1.7 million for 11 new renewable energy activities. Overall, as of June 30, 2008, ESMAP's energy efficiency portfolio comprised 37 activities totalling US$5.8 million, while the renewable energy portfolio comprised 32 projects activities totalling US$4.4 million. Additionally, ESMAP is also helping prepare strategies to promote low-carbon energy economies through eight activities totalling US$1.8 million.

The Asia Sustainable and Alternative Energy Program (ASTAE) grew out of the Financing Energy Services for Small-Scale Energy Users (FINESSE) Project initiated by ESMAP and bilateral donors in 1989. Following a joint request from Asian borrowers and donor partners, the Bank acted to implement the FINESSE recommendations by creating ASTAE in January 1992. ASTAE's current mandate rests on three pillars: improving energy efficiency, scaling up the use of renewable energy, and increasing access to energy to reduce poverty. In all three pillars ASTAE has developed a strong portfolio of activities in East Asian and Pacific countries.

12.2International Energy Agency

The International Energy Agency (IEA) is an intergovernmental organisation which acts as energy policy advisor to its member countries in their effort to ensure reliable, affordable and clean energy for their citizens. It carries out research primarily to collect energy related data for dissemination and is well known for its publications of energy statistics, one of which is a key document being referenced in this study. Even though IEA advice is not focussed towards LICs or MICs, the publications are equally useful for these countries, and the data includes Oil & Gas, not only clean energy technologies.

12.3International Renewable Energy Agency (IRENA)

IRENA was established in April 2009 to provide advice and support to governments worldwide on renewable energy policy, capacity building, and technology transfer. It was established by 78 countries from around the world, including most of the countries of the EU, Africa, Asia-Pacific and Latin America.

IRENA will also improve the flow of financing and know-how and will collaborate with existing renewable energy organizations. IRENA's goal is ultimately to increase the share of renewable energy worldwide. Such a dedicated multilateral agency for renewables has been conspicuously absent from the international landscape, and IRENA's founding reflects a growing consensus among governments around the world on the need to actively support the expansion of renewable energy.[29]

[29] Renewables Global Status Report. 2009 Update.

13 BENCHMARKING

The data in **Table 7** shows a snap-shot of the current investment levels. These figures can be compared with the figures given in two recent studies, IEA World Energy Outlook, 2008, and Energy Watch Group Renewable Energy Outlook 2030 that indicate the amount of investment necessary to limit the rise in temperature below 2 degrees Celsius from pre-industrial levels. As this is seen as a significant point at which the climate will affect the Worlds balance, Sections 13.1and 13.2 explain further.

13.1World Energy Outlook

In the World Energy Outlook (2008)[30], the IEA reference scenario predicts that the world primary energy demand will increase by 45% in the period from 2006 to 2030, rising to just over 17,010 Mtoe. This reference scenario takes into account existing government policies and measures which were adopted up to mid-2008 but not the most recent. In the reference scenario fossil fuels will account for 80% of the world's energy mix with oil remaining the dominant fuel.

Global primary energy demand is set to grow by 1.6% per year on average in the period 2006-2030.[31] The graph in Figure 17 shows that the global energy demand growth shows no sign of slowing its pace in this timeframe, although the demand from the OECD members (developed countries) sees a levelling over the period.

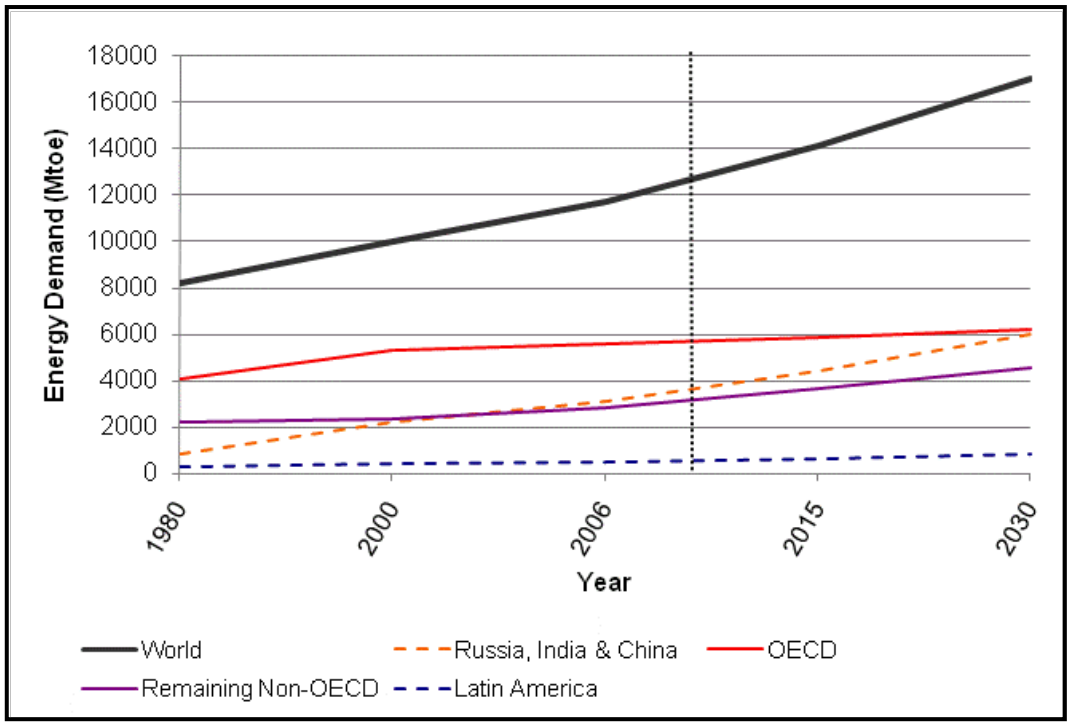


Figure 17: World Primary Energy Demand by Region[32]

[30] World Energy Outlook, 2008. © IEA.

[31] IEA World Energy Outlook 2008 part 1 page 77

[32] Source data - IEA World Energy Outlook 2008 part 1 page 82,

This will result in a 45% increase in CO_2 from 2008 to 2030 with 41 Gt of CO_2 emissions in 2030. As shown in **Figure 18** below, non-OECD countries account for all of the projected growth in world emissions to 2030. Under this scenario a cumulative investment of **$26 trillion** ($US\$_{2007}$) is needed from 2010 to 2030.

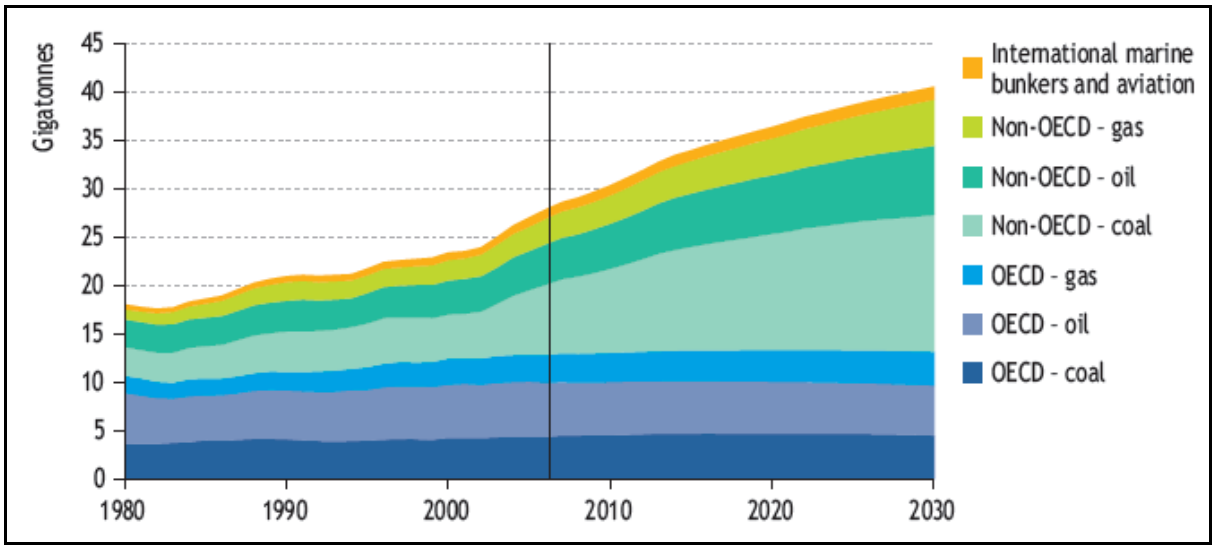


Figure 18: Energy Related CO_2 emissions in the IEA Reference Scenario

Two climate-policy scenarios have been developed by the IEA which limit the greenhouse-gas concentration at 550 and 450 parts per million (ppm) of CO_2 equivalent, limiting the global temperature rise to 3°C and 2°C respectively as shown in Table 8 on the following page:

Table 8: IEA World Energy Outlook Energy Scenarios Summary

	Reference	**550 ppm**	**450 ppm**
Global energy related CO_2 emissions 2030	41 Gt	33 Gt	25.7 Gt
Global Temperature increase	Up to 6°C	3°C	2°C
Cumulative Investment (US_{2007}$)	$26 trillion	$30.2 trillion	$35.3 trillion
Major investment areas	Power sector, oil and gas exploration and development mostly in non-OECD regions	Reference + Deploying and improving existing technologies, investment in power plant and improving energy efficiency	Reference + 550 + Low or zero carbon power generation capacity and more energy efficiency equipment, appliances and buildings
Share of renewables in global primary energy mix in 2030	10%	18%	23%
Additional Investment in Renewables and EE	0	US$4.2 trillion	US$9.3 trillion

Under the reference scenario the total cumulative investment in renewable energy supply in 2007-2030 amounts to $5.5 trillion ($\$_{2007}$), over 20% of the total cumulative investment. The greater part of this investment is for electricity generation and renewables account for just under half of the total projected investment in electricity generation. To achieve the 550 or 450 scenarios, additional investment of $4.2 trillion and $9.3 trillion respectively, is required as well as changes in the areas of investment compared to the reference scenario. These values include power generation and energy efficiency measures.

For the 550 and 450 scenarios, the investment in renewables will be increased to meet the higher demand for renewables in the energy mix necessary to meet the targets on carbon and greenhouse gas emission reductions. A major expansion in power plants will be required from 2020 onwards as many of the existing plants will be decommissioned, $13.6 trillion will be required for the reference scenario and an additional $3.6 trillion will be required to meet the 450 scenario to bring forth more renewables, nuclear power and CCS. The greater part of this additional investment falls outside of the OECD+ countries with $1.4 trillion in the other major economies and $0.6 trillion in other countries.

13.2 Energy Watch Group – Renewable Energy Outlook 2030.

In Renewable Energy Outlook 2030, the Energy Watch Group assessed the chances of the future use of renewable energy in the global energy supply. Two scenarios were developed which considered the possibilities if moderate investments were made into renewable energy. Target levels for annual investments per inhabitant were determined, assuming there is a growing willingness to pay up to 2030.

1. High Variant: 29% renewable supply of heat and electricity (final energy demand) by 2030 on the global scale. Global average of 124 $€_{2006}$ to be spent per capita in 2030.
2. Low Variant: 17% renewable supply of heat and electricity (final energy demand) by 2030 on the global scale. Global average of 62 $€_{2006}$ to be spent per capita in 2030.

In the non-OECD region, the share of renewables rises to 30% in the "High Variant" ("Low Variant" 18%). Increases due to renewables account for almost 68% in regard to electricity, while renewable heat contributes about 17% of final heat demand ("Low variant": 36% of electricity and 11% of heat).

Table 9: Target investment in 2030 per capita per year in various regions

World Region	Investment per capita per year in 2030 [€2006/cap*a]		Total investment budgets in 2030 [billion €2006]	
	Low Variant	High Variant	Low Variant	High Variant
OECD Europe	111	223	60	121
OECD North America	110	220	59	118
OECD Pacific	112	224	22	44
Transition Economies	91	180	31	60
China	102	204	149	299
East Asia	41	81	33	66
South Asia	35	71	73	147
Latin America	46	91	26	52
Africa	20	41	30	59
Middle East	101	202	28	55
Global Scale	**62**	**124**	**510**	**1021**

All regions start with a low amount in 2010. [33]

[33] Energy Watch Group, 2008

13.3Current Funding vs Targets

As the World Energy Outlook predicts (see Section 13.1), massive amounts of additional investment to that of the reference scenario is necessary to achieve one of the 550 or 450 policy targets – both in renewable energy and energy efficiency. However, the current levels of funding appear to fall far short of the reference scenario, let alone the 450 or 550 scenarios.

As described elsewhere in the report, the data on funding available from various sources and benchmarking data available do not match in category and region and hence direct comparison is not easy. However, the discrepancy in the current funding levels and the targets set is large enough to provide an indication of the rise in effort and funding that will be required to achieve various scenarios of sustainable development and energy use. The data in **Table 10** attempts to highlight such discrepancies.

Table 10: Current and target investments

Current Investment Levels	
Current annual level of funding in RE & EE from Multilaterals/OECD-DAC	US$ 0.007 trillion
Current annual level of private Sector investment into Renewable Energy	US$ 0.18 trillion[34]
IEA – World Energy Outlook 2008	
Annualised investment required for reference scenario (see **Table 8**)	US$ 1.1 trillion
Annualised cumulative investment required for 550 scenario	US$ 1.3 trillion
Annualised cumulative investment required for 450 scenario	US$ 1.5 trillion
Annualised additional investment required for 550 scenario (additional to reference scenario)	US$ 0.2 trillion
Annualised additional investment required for 450 scenario (additional to reference scenario)	US$ 0.4 trillion
EWG - Renewable Energy Outlook 2008	
Total Investment in 2030 (“Low Variant”)	US$ 0.65 trillion
Total Investment in 2030 (“High Variant”)	US$ 1.3 trillion

It is clear from the table above that the current level of funding falls short of the targets suggested by the two reports. The current level of funding including private sector is in the order of less than US$ 200 billion per year, which seems short of the funding required in case of the Reference Scenario but the investment is expected to increase year on year and reach the reference scenario targets.

However, the Reference Scenario is far from ideal and is expected to cause a 6°C rise in global temperature. To achieve a more acceptable 550 or 450 scenario, clearly a much

[34] Including R&D and large hydro

higher level of funding will be necessary. As discussed in Section 10.3, even though the private sector investment is significantly larger than the multilateral and DAC type support, there is still clearly a huge scaling up in investment required to meet the targets.

It would appear that the financial support from multilaterals, DAC and others is tiny compared to the investment that is going on in renewable energy around the world. However it is important that these types of support are available to catalyse the massive amount of investment increase necessary to achieve the global targets of CO_2 reduction. Therefore it is imperative that the development grant and support available is used strategically in programmes and projects that provide incentives for private sector participation in renewable energy around the world.

14 CONCLUSIONS AND RECOMMENDATIONS

This study has attempted to document the type and amount of historical and current financial assistance provided in the sector of clean energy technology by MFIs, OECD, UN system and the Private Sector. Most of the funding in clean energy technologies from OECD-DAC appears to be going to the hydropower sector, which is likely to be project funding for large scale hydropower. Very little information is available regarding private sector funding.

To meet the 450 parts per million of CO_2 equivalent stabilisation goal, considered to be necessary to reduce the global temperature rise to 2°C, the IEA estimate that $35.3 trillion ($\$_{2007}$) is needed in energy investment from 2010 to 2030. The reductions in emissions in comparison to a 'business as usual' reference scenario will be achieved through increases in renewables, nuclear, low carbon vehicles, carbon capture and storage and energy efficiency.

The major cuts in greenhouse gas emissions over the 2010-2030 timeframe will be in the OECD+ countries where demand will be reduced by energy efficiency and lower carbon sources of energy will be increasingly utilised to supply the required energy. The overall emissions from the non OECD+ countries are set to increase over the 20 year period to 2030 as the energy demand will inevitably rise with economic growth.

However it is essential that this rise is minimised through energy efficiency measures and the use of low carbon sources of energy. Some of the zero and low carbon technologies are currently still at the development stage - for example carbon capture and storage and electric and hydrogen vehicles. The MICs and LICs often lack the technical capacity and expertise for the introduction of these new and emerging technologies and are reliant on the OECD countries for the development and commercialisation of the technology. An important component of the clean technology projects financed by the development banks is also the knowledge transfer which occurs from the OECD countries.

The current levels of funding available for low and zero carbon is far from sufficient to meet the 2° stabilisation goal. In 2008, the funding from the development banks on low carbon technologies in the MICs and LICs was just under $7 billion. In addition to the multilateral and bilateral funding, private funding in the form of the clean development mechanism and others in 2008 was in the order of US$ 180 billion, which is still smaller than what is required.

The current funding level is in sharp contrast to IEA & EWG's targets of generally over a trillion US$ per year for the next 20 years or so. Although it is predicted by the Energy Watch Group that the investment in the early years from 2010 is low with a gradual ramping up to the 2030 levels, a drastic change is required to meet the anticipated investment requirements.

It should be noted it is not necessarily the amount of funding that is a problem but the political will to do so. In order to lever such funding levels, climate change needs to be

perceived as a large enough threat as other threats facing the world, so as to warrant greater spend.

Some key recommendations on how these levels of funding could be achieved can be listed as follows.

1. In the medium and long term, Private Sector funding needs to increase to achieve the required amounts. However, in the short term, international donor funding will be needed to complement private sector funding and in particular to act as a catalyst to raise private investments.

2. The public sector initiatives should be tailored in a way that addresses the major needs of and barriers for the private sector investment i.e. take away regulatory risk (carbon funds from ADB and EIB/kfW for instance cover the risk for post-2012 price-drop of carbon), take away political risk for the private sector to gradually take over

3. Donor funding support should be provided in capacity building for local stakeholders (public and private) to raise the levels of awareness of need to invest in clean energy technologies (especially in LDCs)

There is a clear responsibility for private sector and individual countries as well. National governments should put in place enabling regulatory frameworks or at least have institutions appointed and operational to approve carbon reduction projects under the CDM cycle; the private sector must be creative in finding ways to deal with small-scale nature of projects in joint efforts with local government and international funds.

15 ANNEX 1 CLEAN TECHNOLOGY ASSISTANCE PROGRAMMES IN OECD-DAC DONOR COUNTRIES

The following sections highlight major development assistance programmes of the main OECD-DAC donor countries.

15.1 France

15.1.1 The Group of French Development Agencies – 'Le Groupe de l'Agence française de Développement' (AfD)

France's Ministry of Foreign Affairs - 'France Diplomatie' focuses its international development support through AfD.

15.1.1.1 Policies

The AFD's strategy is based on three objectives:[35]

- Promoting development that is largely carbon-free
- Linking global issues with local concerns
- Working with vulnerable populations.

15.1.1.2 Co-Ordination Mechanisms

AfD and Proparco, (its private sector financing arm) work together to provide support to developing countries. Through the AfD, France contributes to the World Bank's ESMAP programme, which is also dealt with in this report. The AfD also provides support to the Secretariat of the French Global Environment Facility (FGEF), described below.

15.1.1.3 BRICs Focus

China - The strategy of intervention of the AfD is mainly centred on the problems of climate change, which is a shared interest of France and China. Thus, the projects which allow a reduction of greenhouse effect are given a priority. The sectors of intervention of the AfD in China are:

Electricity Production: Low Carbon technologies that includes cogeneration with natural gas, renewable energies and collection and sequestration of CO2;

Urban development: improvement of urban transport (city planning, efficient and clean transport systems), improvement of construction systems, district heating and air-conditioning (construction standards, optimisation of energy efficiency) and management of urban waste (energy from gases resulting from waste);

Rural development: Afforestation (biological sequestration of CO2, production of biogas)

Energy efficiency in industry and services: Improvement programmes of the existing systems.

[35] http://www.afd.fr/jahia/Jahia/home/NosProjets/Energie/EnergieChangementClimatique accessed 11/05/09

15.1.2 French Global Environment Facility (FGEF or FFEM)

Although not listed on the OECD DAC list of bilateral donors, the FGEF is a bilateral fund which was set up in 1994 by the French government following the Rio Summit. Its aim is to promote protection of the global environment in developing and transitional countries.

As this organisation is not within the DAC list, its disbursements are not included in the financial analysis at the end of this bilateral donor section.

15.1.2.1 Policies

Together with its main focus of the global environment the FGEF encourages projects that reduce the consumption of fossil or organic carbon through:

- Improved energy efficiency
- Renewable energy and substitution by energy sources producing fewer CO2 emissions
- Carbon sequestration in forests and soils

15.1.2.2 Co-Ordination Mechanisms

Many of the FGEF programmes focus on the reduction of greenhouse gas emissions.

<table>
<tr><td colspan="3">1 • Limiting and reducing emissions of greenhouse gases: CO_2, CH_4, N_2O, SF_6, PFC, HFC</td><td colspan="2">2 • Carbon capture and sequestration</td></tr>
<tr><td colspan="3">Promoting renewable energy souces and improving energy efficiency</td><td>Preserving natural carbon sinks</td><td>Developing new carbon sinks</td></tr>
<tr><td>Supply-side</td><td colspan="2">Demand-side</td><td rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td rowspan="3">Promoting renewable energy sources
Hydraulic
Wind power
Geothermal
Solar</td><td rowspan="3">Buildings</td><td>Planing urban development
Local Urbanisation Plans (PLU)
Managing and recycling organic waste</td></tr>
<tr><td>Improving constructions
Heat insulation: efficient materials and bioclimatic design
Thermal control systems</td><td rowspan="4">Primary forests
Controlling deforestation</td><td rowspan="5">Biological captation
Forest plantations</td></tr>
<tr><td>Distribution of energy-efficient household appliances
Low-energy lamps and refrigerators</td></tr>
<tr><td rowspan="3">Energy recovery from biomass
Biogas (from waste)
Biofuels
Fuelwood</td><td rowspan="3">Transports</td><td>Organising urban and interurban journeys
Passengers/freight</td></tr>
<tr><td>Promoting integrated public transport
Trains, metro, buses</td></tr>
<tr><td>Improving engines
Energy-efficient motors and low-emission fuels</td><td rowspan="4">Soils
Agro-ecology
Agro-forestry
Action against desertification</td></tr>
<tr><td rowspan="4">Developing efficient energy production systems
Natural gas and liquid petroleum gas (LPG))
Clean coal, mmmine gas
Combined cydes
Tri/cogeneration
Interconnection</td><td>Integrating new Information and Communication Technologies (NICTs)</td><td rowspan="4">Geological sequestration
Injecting CO_2 into underground reservoirs</td></tr>
<tr><td rowspan="3">Industry</td><td>Distribution of recyclables, low energy-intensity finished products</td></tr>
<tr><td>Improving productivity in manufacturing processes
Research into efficient innovations with low energy intensity and low GHG emissions</td></tr>
<tr><td>Promoting recyclable
low energy-intensity raw materials</td></tr>
<tr><td rowspan="2">Agriculture</td><td>Promoting less energy-intensive ans more efficient agriculture (water, electricity, processing and transport)</td><td rowspan="2">Oceans</td></tr>
<tr><td>Disseminating technical advances
Optimising digestion in ruminants (livestock production)
Rational use of inputs (plant production)</td></tr>
<tr><td colspan="5">Specialised funds for energy efficiency and renewable energies, carbon funds, flexible mechanisms.</td></tr>
</table>

Table 11 overleaf shows the relation of the aims and methods of FGEF programmes in relation to GHG emissions reductions or sequestration.

1 • Limiting and reducing emissions of greenhouse gases: CO_2, CH_4, N_2O, SF_6, PFC, HFC			2 • Carbon capture and sequestration	
Promoting renewable energy souces and improving energy efficiency			Preserving natural carbon sinks	Developing new carbon sinks
Supply-side	**Demand-side**			
Promoting renewable energy sources Hydraulic Wind power Geothermal Solar	Buildings	**Planing urban development** Local Urbanisation Plans (PLU) Managing and recycling organic waste	**Primary forests** Controlling deforestation	**Biological captation** Forest plantations
		Improving constructions Heat insulation: efficient materials and bioclimatic design Thermal control systems		
		Distribution of energy-efficient household appliances Low-energy lamps and refrigerators		
Energy recovery from biomass Biogas (from waste) Biofuels Fuelwood	Transports	**Organising urban and interurban journeys** Passengers/freight		
		Promoting integrated public transport Trains, metro, buses		
		Improving engines Energy-efficient motors and low-emission fuels	**Soils** Agro-ecology Agro-forestry Action against desertification	
Developing efficient energy production systems Natural gas and liquid petroleum gas (LPG)) Clean coal, mmmine gas Combined cydes Tri/cogeneration Interconnection		**Integrating new Information and Communication Technologies (NICTs)**		**Geological sequestration** Injecting CO_2 into underground reservoirs
	Industry	**Distribution of recyclables,** low energy-intensity finished products		
		Improving productivity in manufacturing processes Research into efficient innovations with low energy intensity and low GHG emissions		
		Promoting recyclable low energy-intensity raw materials		
	Agriculture	**Promoting less energy-intensive ans more efficient agriculture** (water, electricity, processing and transport)	**Oceans**	
		Disseminating technical advances Optimising digestion in ruminants (livestock production) Rational use of inputs (plant production)		
Specialised funds for energy efficiency and renewable energies, carbon funds, flexible mechanisms.				

Table 11: FGEF Energy and Carbon programmes run in developing countries[36]

15.1.2.3 BRICs Focus

A selection of the FGEF ground-level programmes within BRICs can be seen here, with a diverse range of channels from which this organisation can concentrate its efforts.

BRAZIL Bahia - Solar-powered rural electrification

RUSSIA & EASTERN EUROPE - Energy efficiency 21 Programme (CEENU)

RUSSIA, KOLGUJEV ISLAND - Recycling petroleum gases

CHINA, Harbin, Beijing, Shanghai - Low-cost housing (energy efficiency)

[36] Table source: AfD

15.2Germany

15.2.1 Federal Ministry for Economic Co-Operation and Development - Bundesministerium für Wirtschaftliche Zusammenerbeit und Entwicklung (BMZ)[37]

15.2.1.1 Policies

The interdepartmental Programme of Action comprises ten priority areas for action designed to help realise the Millennium Declaration and the Millennium Development Goals derived from it, with the sixth (as below) being pertinent to this study:

- ❖ Ensuring access to vital resources and fostering an intact environment[38]

15.2.1.2 Co-Ordination Mechanisms

The BMZ commissions the implementing organisations to execute the German government's development projects. The individual implementing organisations include:

- GTZ and KfW, both as highlighted in the Sections 15.2.2 and 15.2.3 respectively
- German Development Service (DED). The DED is financed from the federal budget. It is one of seven officially recognised agencies in Germany that second development workers. (Does not form part of the DAC)
- DEG (which is a member of KfW, DEG finances investments of private companies)
- InWEnt is an organisation which BMZ deals with to provide bilateral development.

The duties of these organisations include:

- Implementing projects within financial co-operation and technical co-operation
- Preparing and seconding German experts and development workers
- Providing training for managers and technical experts from partner countries.

These organisations are further discussed below.

15.2.2 Society for Technical Co-operation - Gesellschaft für Technische Zusammenarbeit (GTZ)

15.2.2.1 Policies

- Environmental protection and sustainable management of natural resources

[37] http://www.bmz.de/en/index.html accessed 11/05/09

[38] http://www.bmz.de/en/principles/aims/programme2015/index.html accessed 11/05/09

15.2.2.2 Co-Ordination Mechanisms

GTZ operates development projects and programmes in more than 120 countries. To ensure optimum project implementation in Brazil, GTZ also works closely with other German and European institutions, including:

- German Development Service (DED)
- KfW development bank
- Capacity Building International, Germany (InWent)
- Political foundations

GTZ also cooperates with international development agencies such as the United Nations Conference on Trade and Development (UNCTAD), the Inter-American Development Bank (IDB), the World Bank and the International Labour Organization (ILO).

15.2.2.3 BRICs Focus

The following programmes are currently being run by GTZ in the BRICs.

Brazil - Provision of the '*Centre for Energy and urban-industrial environmental protection*'

- GTZ works together with the German Federal Employment Agency to place highly qualified experts and management staff with Brazilian employers, as part of its joint operations with the Centre for International migration and Development (CIM)[39],

Russia – Is not featured on the GTZ agenda in the respect of this research.

India – *Indo-German Energy Programme*

China - *Wind Energy Training and Research Centre*

- *Energy Efficiency in Existing Buildings* which provides services in the following areas:
  - Policy and Standards
  - Demonstration Projects
  - Technology Introduction and Transfer
  - Industrial Cooperation
  - Knowledge Management

- *Environmental protection in the coal and power plant sector*, which holds elements of energy efficiency within it.

- *Sustainable Urban Development Programme*, which holds elements of energy efficiency within it.[40]

[39] Centre for International Migration and Development - Centrum für Internationale Migration und Entwicklung

[40] http://www.gtz.de/en/weltweit/asien-pazifik/china/24285.htm accessed 11/05/09

- Renewable Energies: Rural Development and Qualification, which comprises four components:

- Renewable energies in rural areas
- Vocational training and qualification
- Erosion control
- Sustainable use of small hydropower plants

15.2.3 KFW Entwicklungsbank (KFW)

According to the latest figures published by REN21, 2008 KfW committed a total of €340 million for investment in renewable energies (not including large-scale hydropower) in 2008. In contrast, in that same year the World Bank provided US$ 280 million to fund renewables in developing countries (not including large-scale hydropower).

The objective of Germany's development co-operation is to improve the economic and social conditions of people in developing countries. One of the most important instruments which the German government employs to reach this objective is "Financial Co-operation" (FC).

'Financial Co-operation steps in where long-term capital is lacking, where the market fails or does not yet function adequately. This is where KfW is called upon'[41]:

- As the German Development Bank it supports developing countries with investments in infrastructure, financial systems and environmental protection. This way it encourages the introduction of technical, economic and institutional innovations.
- The creation of efficient financial systems offers small and medium-sized enterprises new opportunities. We create opportunities for income and employment.
- The reduction of poverty is the overriding objective of FC.
- In crisis regions, for instance, it contributes towards stabilising social conditions by financing employment programmes.
- Its financing operations are not directed at isolated projects with limited local effects. KfW supports its partners in overcoming structural obstacles and initiating an economically sustainable and socially just development.

KfW concentrates its operations in a country on selected priority areas. The funds which KfW Entwicklungsbank extends are provided from different sources, most funds are from the federal budget.

In 2008, German KfW committed US$440 million in public budgetary funds and private market funds excluding large hydropower. KfW also committed US$530 million as part of its "Special Facility for Renewable Energies and Energy Efficiency" [42], which was established in 2005 to provide concessional loans as part of Germany's international development cooperation; in total it is to provide a total of €1.3 billion for the period 2005–11.

[41] http://www.gtz.de/en/weltweit/asien-pazifik/china/24285.htm accessed 11/05/09

[42] Source: REN21 2009 Update, Page 14

DEG (German Development and Investment Company) is a member of KfW Bankengruppe. Its mission is to promote private enterprise initiatives in developing countries and countries undergoing reform. Its aim is to contribute thus to sustainable growth and a lasting improvement in the living conditions of the local population. It does so by providing private companies with long-term capital for investments in the partner countries of German development cooperation.

15.2.3.1 BRICs Focus

Brazil - Renewable Energy and Energy Efficiency Programme via Corporacin Andina de Fomento (CAF)43 (Andean Countries), whereby the total investment volume is approximately US$115 million

- Private wind park in Brazil (DEG Project)

Russia **–** Rather than a focus on Russia, KFW's focus for development in the envelope of this study seems to be in the 'Caucasus region' which lies relatively close to the Russia and China borders (Georgia, Azerbaijan, Khazakstan, Kyrgyzstan, Armenia, Turkmenistan, Uzbekistan and Tajikistan)

India – Promotion of Renewable Energies IREDA, supported by supported by the Indian "Ministry of Non-Conventional Energy Sources (MNES)

- REC Energy Efficiency Programme

China - KFW recognises that regarding China's transport sector growth, "it is crucial to steer and support its development in an environmentally sound direction."

15.3Japan

15.3.1 Ministry of Foreign Affairs

15.3.1.1 Policies

Japan's mid-term Policy lays out priority to actions against global warming, such as controlling and reducing emissions of greenhouse gases through the use of renewable energy sources and energy saving measures (including assistance regarding use of the Kyoto Mechanism)

'Japan will actively address environmental problems and natural disasters by making use of its ODA based on initiatives such as the Environmental Conservation Initiative for Sustainable Development (EcoISD), the Kyoto Initiative, and the Initiative for Disaster Reduction through ODA.'

Japan will support the following measures: energy saving, the utilization of solar and wind power and other renewable energy sources, the introduction of coal-related technologies with reduced environmental burden, and the preservation and development of forests as a source of firewood.

[43] Renewable Energy and Energy Efficiency Programme via CAF, Programme Brief, 2005.

Japan, aiming at improving energy accessibility and global warming countermeasures, actively supports the provision of electricity to rural areas, energy saving, and introduction of renewable energy in developing countries.

The following pie chart illustrates Japan's previous year's commitment to improving global energy supplies.

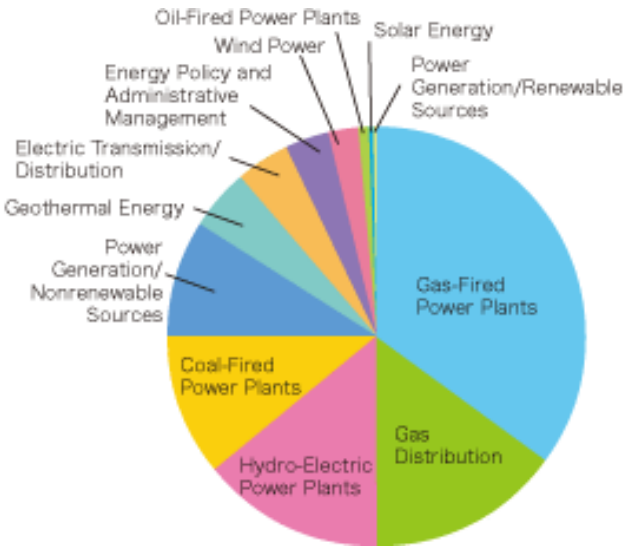


Figure 19: Japan's ODA Commitments by Category: 2003-2005 [44]

15.3.1.2 Co-Ordination Mechanisms

For exploitation and transfer of Japanese technology and know-how, Japan aims to;

- 'Send teams to diagnose global warming prevention measures in manufacturing plants', which equates to increasing energy efficiency and promoting the use of Low and Zero Carbon technologies
- 'Set up information networks related to global warming prevention technology'
- 'Hold workshops on global warming prevention'

Japan's Energy Co-operation Initiative aims to give "Alleviation of Poverty in Energy"45 and promote energy security in East Asia.

15.4 United States of America

15.4.1 USAID

[44] Energy Statistics, based on annual totals, Commitments include grant aid, Japanese ODA loan, and technical cooperation.

[45] http://www.mofa.go.jp/policy/oda/sector/energy/action.html 11/05/09

15.4.1.1 Policies

USAID Energy Policy[46] states;

'Because of the pervasive role of energy on all economic sectors USAID will encourage the development of indigenous energy supplies fossil fuels and renewables.'

USAID *will:*

- Encourage and assist host government conservation programmes to improve energy efficiency for both modern and traditional fuel systems
- Help to evaluate the nature and extent of indigenous energy resources, including coal, oil, gas, hydro, solar, wind and geothermal
- Help conduct feasibility studies to evaluate the most efficient energy systems options
- Use its "front-end" technical assistance efforts to catalyze and leverage follow-on capital investment by others, especially the international financial institutions.

In the light of the above, the following statements regarding programmes were made:

USAID programmes will:

- undertake needs assessments in specific countries to determine what training is needed, for how many people, and who should be trained
- Develop curricula and teaching materials for developing country energy problems, to be used in developing countries and the U.S.
- Finance major programmes targeted to identified training needs at the senior and middle level
- Expand ties with U.S. universities, government laboratories, research institutions, consulting engineers, energy companies, and professional societies that can offer expertise to developing countries and establish long term institution-to-institution relationships.

USAID will support programmes that assist developing countries in research and risk-taking to help them accelerate the transition to sustainable energy supplies.

USAID will finance policy research to help officials implement;

- Energy efficiency
- Energy's relationship to the environment

USAID will provide technical assistance to:

- Promote increased energy efficiency in urban applications, especially in industry, buildings and transport systems
- Investigate the use of biomass and other renewable energy systems for urban application
- Assist electric utilities to improve management and efficiency of their systems, and examine means

[46] U.S. Agency for International Development Energy Policy 1984

15.4.1.2 Co-Ordination Mechanisms

The United States participates in the major international co-ordination groups and numerous local aid groups at the field level. The Japan-US Common Agenda and the New Transatlantic Agenda are mechanisms that have intensified and improved the United States' co-ordination with Japan and the European Commission respectively. (In the multilateral sense)

In the eyes of Bilateral Aid - The relative shrinkage of US aid resources appears to have further reinforced the awareness at all levels in USAID of the need to improve co-ordination on the international and country levels, and of USAID's stake in doing more to help make this improved co-ordination happen. This is recognised in the Strategic Plan and in the very definition USAID uses of a "result" in a results-based management system: a "result" is brought about "by the intervention of USAID in concert with its development partners." It is always difficult to assess aid co-ordination efforts of a donor in the field, particularly one like the United States, which has an extensive, world-wide programme. Given USAID's own analysis of the need of improved co-ordination and indications of uneven aid co-ordination in the field, other donors and partners will look to US approaches for building the difficult work of co-ordination into the normal, and recognised, tasks of its staff, and helping to make co-ordination much more systematic.

Examples of programmes run by USAID are:

Georgia - Energy and Environment Programme

A number of energy efficiency projects, using locally available renewable resources, will explore greater use of biomass (crop and processing wastes), biogas (generated by livestock production), solar power and other energy sources. These projects will power community health facilities, schools, small businesses and value-added production centres.

Georgia - The Rural Energy Programme

USAID is involved in empowering local businesses to provide a workshop on Environmental Aspects and Construction Management of Small Hydro Power Plant (SHP) Projects.

‘Owners of small hydro power plants are now able to properly manage the construction and rehabilitation of SHPs, and can take into account the many social and environmental aspects they may not have previously been aware of.

15.4.1.3 BRICs Focus

Brazil - USAID plays an important role in bringing the Government of Brazil, donor community, civil society and private sector together to leverage the broad expertise and resources necessary to address many of Brazil's most pressing development challenges. The major Programme appropriate to this study is:

- Reduction of greenhouse gas emissions through the promotion of alternative energy and energy efficiency; the programme seeks to stimulate economic growth, reduce poverty, and address climate change and other adverse environmental impacts through delivery of renewable energy and energy efficiency services

Russia – USAID is not focussed on the study topics within Russia, although Georgia, a neighbouring country has some programmes of focus.

India - USAID’s Greenhouse Gas Pollution Prevention Project (GEP) helps India reduce its greenhouse gas emissions by introducing new technologies and best practices to promote the use of clean energy. GEP introduces technologies and best-practices to enhance the

efficiency of India's coal-fired power plants and promotes the use of alternative energy sources and decentralized renewable energy production and distribution systems. Working directly with the Indian power sector, GEP:

- Conducts demonstration economic and technical feasibility studies for advance power generation technologies;
- Provides technical assistance to optimize the performance of power plants;
- Trains power plant managers and engineers in clean, cost-saving energy practices
- Fosters the use of alternative fuels such as biomass and bio-gas for efficient on-site power generation.

USAID's Trade in Environmental Services and Technologies/Clean Technologies Initiative (TEST/CTI) has long promoted the voluntary adoption of environmental management systems and clean, climate-friendly technologies to help mitigate India's pollution. Past TEST/CTI efforts financed demonstration projects to Indian industry on the advantages of using internationally recognized environment management systems.

TEST/CTI also develops private-public alliances to advance energy and environmental activities such as promoting green businesses, financing renewable energy projects, and improving environmental law compliance by small and medium industries. The use of public-private alliances has forged successful projects such as the Green Business Centre (GBC), a fully functional and environmentally certified office building that showcases green technologies and helps Indian businesses and industries become more energy efficient. The GBC provides a concrete example to business leaders of how strategic design and the use of clean, climate-friendly technologies can save money, make buildings and industries more efficient, and benefit surrounding communities.

USAID's South Asia Regional Initiative for Energy (SARI/Energy) facilitates the cost-effective use of energy through cross-border trade and investment between Bangladesh, Bhutan, Maldives, Nepal, Sri Lanka, Afghanistan, Pakistan and India. Promoting regional energy security through increased energy diversification, reduced prices and improved accessibility for consumers, SARI/Energy:

- Shares and replicates regional models for productive energy use in vulnerable communities
- Provides technical assistance to help participants identify their energy needs and create energy development plans
- Trains energy sector leaders in energy security, distribution and regulatory reform, and cost efficiency
- Increases the region's institutional capacity to collect, analyze and disseminate energy data
- Opens dialogues between the private and public sectors on key energy issues.

SARI/E's efforts have produced important transnational projects such as the Indian firm TATA's construction of a US$2 billion power plant in Bangladesh. At the local level, standards and quality control mechanisms have been developed to allow communities to access energy through micro-hydro systems and small wind farms.

China – USAID's clean development and climate project offers assistance and training to officials and experts supporting good governance activities for clean energy and reduced greenhouse gas emissions.

USAID established Environmental Cooperation-Asia, or ECO-Asia, a regional platform that promotes a range of initiatives designed to:

- Promote clean energy and mitigate climate change impacts;
- Improve sustainable management of natural resources and biodiversity conservation; and;
- Strengthen environmental governance.

ECO-Asia provides a platform for sharing and replicating experiences, technical innovations and expertise, and for improving cooperation between Asian countries, cities, and communities. Partners in promoting regional dialogue include Asia Pacific Economic Cooperation, the Association of South East Asian Nations, the Asian Development Bank, the World Bank, the Mekong River Commission, and the U.S. Environmental Protection Agency.

Clean Development and Climate Program (CDCP)

USAID/RDMA's ECO-Asia Clean Development and Climate Program (CDCP) works to catalyze policy and finance solutions for clean energy in Asia's largest developing economies through targeted technical assistance and training, regional cooperation, and knowledge sharing. The programme is helping Asia's fastest growing economies meet their energy needs through initiatives that reduce greenhouse gas (GHG) emissions and enhance energy security. In its first two years, ECO-Asia CDCP has initiated programmes with partners that are expected to avoid 1.6 million metric tons of CO_2 emissions from fossil fuel consumption, equivalent to the annual CO_2 emissions from 3.1 million developing Asian households.

15.4.2 Millennium Challenge Corporation (MCC)

MCC is US government funded corporation designed to work with some of the poorest countries in the world. It defines "eligible" and "threshold" countries and provides specifically targeted financial assistance.

MCC provides financial support to a wide variety of project areas such as education, governance and health. There is no clearly defined area of clean energy or energy per se, but one of the areas is Environment whereby it has funded construction of a small run-of-river hydropower plant in Tanzania.

16 ANNEX 2 : TERMS OF REFERENCE FOR THE STUDY

Background: A better understanding of what international support, policies and coordination mechanisms already exist in MICs and LICs on (low carbon) technology (that already exist or are planned), including some, and coordination mechanisms in the following principal sectors:

(i) energy efficiency measures
(ii) renewables (wind, solar, hydro (large and small), tidal, geothermal)
(iii) CCS
(iv) low carbon vehicles

To cover the following main financing streams

(i) non concessional loans to non-IDA eligible countries
(ii) grants and concessional to IDA eligible countries
(iii) equity and other financing catalysed by the private financing arms of the Banks e.g. IFC, MIGA.

To be benchmarked against what IEA and/or others [e.g. Energy Watch group, Renewable Energy Outlook 2030] recommend as the financing needs by 2030 to combat climate change for each sector i.e. mapping supply against assessment of their relative effectiveness and adequacy to meet financing and delivery gaps required to meet the 2 degree stabilisation goal. Should cover support by:

(i) the Multilateral Development Banks (World Bank (including IFC and MIGA)
(ii) Regional Development Banks (AfD, ADB, IDB etc..) including, if possible, private sector
(iii) main OECD DAC bilateral donors
(iv) where possible, at national level, in the BRICS and other developing countries.

Scope: Short piece of analysis by agency assessing current levels of support (what they are spending currently and/or plan to spend on clean technologies (including technology licences and support for pre-commercial status), policies demand.

Also to provide some assessment of adequacy to meet financing and delivery gaps required to meet the 2 degree stabilisation goal, including recommendations for scaling up or new mechanisms.

Output: Short note with attached data, illustrative graphs, and source material.