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Bilateral and multilateral financial assistance for the energy sector of developing countries

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This article examines trends in development assistance funding for energy and the implications for mitigating climate change. It presents financial data from bilateral and multilateral donors during 1997–2005, a period that begins with the agreement on the Kyoto Protocol under the United Nations Framework Convention on Climate Change. During this period, aid for energy totalled over US$64 billion or 6–10% of all development assistance. Annual energy assistance was virtually stagnant at approximately US$6–7 billion from 1997 to 2005, but preliminary evidence indicates that some efforts are being made to fill the resource gap and to mitigate climate change. Analysis suggests that there has been somewhat of a shift away from fossil fuel to lower greenhouse-gas-emitting projects. However, the increases in funding and shifts to low greenhouse gas technologies are fragile. Analysis also suggests that, unless development assistance for energy increases in the coming years, the influence of multilateral banks will diminish and their ability to encourage sustainable energy projects will decline. It should be noted that funding levels for projects do not tell the whole story. There is a continuing evolution of aid modalities under way, as development financing for project-based activities is supplemented with macro-economic and sector-wide assistance targeted at promoting policy reforms, institutional change and capacity building. Several challenges will need to be met in the future: to increase funding for the MDBs by finance ministers; to 'green' private sector funds to ensure that investments made today do not pollute tomorrow; and to overcome the lack of a common reporting format by standardizing the collection and reporting of data on investments for energy.

Keywords: climate change; development assistance; finance; energy; multilateral development banks

Cet article examine les tendances dans le financement de l'assistance au développement énergetique et leurs conséquences pour l'atténuation du changement climatique. L'article présente des données financières de bailleurs bilatéraux et multilatéraux de 1997 à 2005, période qui débute avec les accords sur le protocole de Kyoto sous la Convention Cadre des Nations Unies sur le Changement Climatique. Pendant cette période, le montant de l'aide à l'énergie s'élevait au-dessus de US$ 64 milliards ou bien 6–10% de la totalité de l'aide au développement. L'aide annuelle à l'énergie stagnait pratiquement aux alentours de US$ 2–7 milliards de 1997 à 2005, mais l'évidence préliminaire indique que des efforts ont été effectués pour combler le manque de ressources et amorcer la lutte contre le changement climatique. L'analyse suggère qu'une forme de transfert au loin de projets fossiles vers des projets plus sobres en émissions de gaz a effet de serre a eu lieu. Cependant, l'augmentation du financement et le transfert vers les technologies sobres en gaz à effet de serre sont précaires. L'analyse suggère aussi qu'à défaut de l'augmentation de l'aide au développement énergetique dans les prochaines années, l'influence des banques multilatérales diminuera ainsi que leur capacité à favoriser des projets d'énergie durable. Il est à noter que le degré de financement des projets ne révèle pas toute l'affaire. Les modalités de l'aide continuent d'évoluer en conséquence à l'augmentation du financement aux projets de développement, par une assistance macro-économique et sectorielle visant la promotion de réformes des politiques, le changement institutionnel, et le renforcement des capacités. Plusieurs défis devront être affrontés à l'avenir: l'augmentation du financement aux Banques Multilaterales de Developpement (MDBs) par les ministres des finances: pour verdir les fonds du secteur privé et assurer que les investissements faits aujourd'hui ne pollueraient pas demain, pour surmonter le manque de format commun de reporting en standardisant la collecte et le rapport des données sur les investissements énergetiques.

Mots clés: assistance au développement; banques multilatérales de développement; changement climatique; énergie; finance

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1. Introduction

In his book titled *The White Man's Burden: Why the West's Efforts to Aid the Rest have Done So Much Ill and So Little Good*, Easterly (2006) examines why there have been so few improvements in the lives of poor people, after spending US$2.3 trillion in aid over 50 years. Nearly a decade earlier Kozloff (1995) asked a similar question with regard to bilateral development assistance for renewable electric power. Drawing on lessons from individual assistance projects, he noted that bilateral energy assistance has been erratic over the period 1979–1991, with renewables (mainly hydro and geothermal projects) constituting only 3% of total bilateral energy assistance. During that period, World Bank records indicate that it was focusing on improving economic efficiency and financial stability by encouraging least-cost planning, marginal-cost pricing, international accounting standards, and international competitive bidding, and that lending for the power sector in developing countries up until 1991 was about US$40 billion. The World Bank (1993) and Tharakan et al. (2007) noted that during the 1990–1997 period, reductions in official development assistance (ODA) for energy, combined with reduced private investments in energy projects, significantly affected the development of energy resources in developing countries.

The entry into force of the United Nations Framework Convention on Climate Change (UNFCCC) in 1994 created a new stimulus for the promotion of development assistance for energy projects. Articles 4.3 and 4.5 of the Convention both call for developed countries to provide new and additional financial resources to meet the agreed costs of developing countries in complying with their obligations under the Convention, including implementing measures to mitigate climate change by addressing anthropogenic emissions by sources – for example energy sources – and removals by sinks. In addition, Article 11.5 stipulates that developing countries may avail themselves of financial resources related to the implementation of the Convention through bilateral, regional and other multilateral channels. More specifically, the Convention established a new financial mechanism (the Global Environment Facility (GEF)) for the provision of financial resources on a grant or concessional basis. Articles 10(c) and 11(a) of the Kyoto Protocol reiterated and further reinforced the requirements of the Convention when it was adopted in 1997.[1] Subsequent to the entry into force of the UNFCCC and its Kyoto Protocol, the United Nations formulated Millennium Development Goals (MDGs)[2] and, while energy was not listed specifically, the Millennium Project recognized that the provision of sustainable energy services is an essential requirement if poverty is to be reduced among the world's poorest countries (Modi et al., 2005). Scaling-up energy services to address poverty will be required of energy sources, but the challenge is to provide those services in a sustainable way that makes the fulfilment of this requirement compatible with the objectives of the UNFCCC.

Therefore, bilateral and multilateral assistance programmes which aim to expand sustainable energy services in developing countries must now aim to achieve multiple goals. However, this article attempts to address a narrower question relating to climate change; namely, what has been bought with over US$60 billion in financial assistance for energy projects since the Kyoto Protocol came into existence? Put another way: has the mix of investments for energy projects in developing countries changed in recognition of the Convention, the Protocol, and the need for a more sustainable energy development path? In assessing the data on development assistance for energy, we also seek to identify critical issues that need to be addressed by bilateral donors and multilateral banks (MDBs) in the future.

2. Methods and data

This article uses official development assistance (ODA) data from the Creditor Reporting System (CRS) database of the Organisation for Economic Cooperation and Development (OECD).

The original data were reported by bilateral donors who include the 22 members of the OECD's Development Assistance Committee (DAC) and the European Commission (OECD, 2007). The objective of the CRS is to create a comparable reporting basis for all DAC members through the use of common guidelines and definitions. Data from multilateral organizations were obtained directly from those institutions, since they are not obliged to report to the OECD.

This article does not cover aid activity comprehensively. Not all donors supply data to the OECD. The coverage of donors' activities varies over time, although activity data have been more complete since 1999. Reporting of data may be influenced by staff changes in aid agencies, and may often be subjective, despite adherence to the guidelines. The major gaps in coverage post-1999 in official bilateral development assistance reporting come from Japan and the European Commission. The former does not report technical cooperation activities, while the latter does not report activities financed through the budget of the European Commission. Information on data quality indicators and a list of DAC members can be found in the CRS online User's Guide.[3]

Within the CRS database, aid activities are recorded on the basis of commitments according to a 'marker' system that identifies the purpose of the aid. For DAC purposes, grants and 'soft' loans are recorded on the face value of the activity at the date a grant or loan agreement is signed with the recipient. Cancellations and reductions of previous years' agreements are not included in the database. This article reports bilateral assistance using the markers for all energy generation, including coal, oil and gas development. Energy efficiency projects are not readily captured by the DAC marker system, hence the total amounts reported for energy efficiency from bilateral sources may be somewhat of an underestimate.

We had hoped to provide data on funding from multilateral agencies using the same set of markers, but data were not available at the same level of detail. Data from multilateral institutions are reported in a simplified format using categories drawn from the approach used by the World Bank Group to classify energy projects. While energy efficiency data are reported, such projects present a particular challenge in their classification. For example, a transmission line project may be reported by some organizations either as an expansion of the grid or an improvement in efficiency.

To keep the analysis manageable, this article mainly includes projects over US$1 million. This leads to the exclusion of many valuable projects aimed at building capacity, training, feasibility studies, planning, enabling activities and, in some cases, small projects aimed at reforming the market. These types of project are essential to filling the 'project pipeline' with high-quality projects. We estimate that approximately one-third of all projects may fall into this category, but we have made no attempt to estimate the level of funding for these activities. We have also grouped together approved loans and grants. While most projects are supported through loans (for example, in the case of bilateral projects, loans account for 83% of all projects), grants play a special role by reducing the risks associated with new technologies which may not otherwise be deployed. We have also excluded loan guarantees, make no attempt to account for leveraging – that is, the extent to which projects are co-funded with private sector funds – and have not attempted to reconcile disbursements against approved loans and grants.

3. General trends in foreign direct investment (FDI) and official development assistance (ODA)

Over the period 1997–2005, ODA for all purposes totalled approximately US$490 billion. This has risen from the low levels observed in 1997 (US$60 billion) to US$106.8 billion in 2005, the highest level ever in both real and nominal terms. The increase was exceptionally high due to the Paris

Club's debt relief effort for Nigeria and Iraq, which accounted for nearly 20% of the total. However, tsunami relief and other humanitarian needs also contributed to the increase. In the next one or two years, official development assistance (ODA) is expected to decrease slightly as debt relief efforts taper off. Over a slightly longer period, aid donors will have to increase funding in order to fulfil their commitments to increase aid to $130 billion and double aid to Africa by 2010 (OECD, 2006).

During the same period (1997–2005), inflows of all foreign direct investment (FDI) to developing countries totalled over US$2 trillion. Inflows of FDI to developing countries were US$267, 164 and 334 billion in 2000, 2002 and 2005, respectively, with FDI nearly three times higher than ODA in 2005. FDI therefore tends to rise and fall with financial cycles and be risk-averse (UNCTAD, 2006). It is also selective – it will only flow to those countries where relatively strong enabling conditions for investment exist. These include stable political environments, strong legal systems, macro-economic stability, readily available skilled labour, and good institutions. Since many of the poorest countries do not have these basic governance conditions, ODA remains an important source of funding for technology transfer for these countries (Ellis et al., 2007).

In recent years, strong economic growth has reduced demands for aid from large and medium-sized Asian countries. For example, India's net ODA receipts fell below US$1 billion, the lowest level since the 1970s, as it repaid loan principal of US$1.8 billion in 2003. Net aid to China also fell by two-thirds from its level in the early 1990s as it increased its repayments in 2003. As a result, ODA is increasingly being concentrated on the most needy countries, with sub-Saharan Africa receiving more than one-third of country-allocable ODA in 2002/2003. At the same time, the war on terrorism has boosted aid flows to some countries, for example Iraq.[4]

4. Bilateral assistance for energy development

Bilateral energy development assistance represents approximately 31% of the funding of all aid for energy, totalling over US$20 billion during the period 1997–2005. Funding was at its highest in 1997, reaching nearly US$4 billion, and was at its lowest in 2000 (approximately US$1.3 billion), before recovering in more recent years, during which it has averaged slightly more than US$2 billion annually (see Table 1).

The overall percentage of bilateral aid for energy has averaged approximately 2% of total development assistance for the period 1997–2005. Japan, having provided over two-thirds of all bilateral aid for energy during the period 1997–2005, is the most significant donor, out-distancing by far the next most important donors, namely Germany (12.0%) and France (3.4%). These countries, particularly Japan and Germany, have an opportunity through their cooperation with developing countries to influence the type of technologies being diffused to developing countries. Assuming they continue to be the most important donors, they have a great opportunity as they work together with developing countries to ensure that the lowest greenhouse-gas-emitting technologies are transferred to those countries. However, it is not clear why bilateral assistance for energy has remained static while ODA in general has increased, even accounting for debt relief. One answer may reside in the form of development assistance; that is, some countries provide multi-sector funds and general programme assistance which may incorporate or obscure support for energy activities. While more efficient for donors and more flexible for recipient countries, assistance of this type could limit the ability of donors to promote and track energy policy reforms (OECD, 2006).

Figure 1 identifies bilateral development assistance by sector by year and Figure 2 identifies total funding over the period 1997–2005 for different energy categories. Expanding or upgrading electrical transmission lines and power projects have both received approximately US$4.4 billion

TABLE 1 Bilateral assistance to all energy sectors in the period 1997–2005 from major donors (US$ million)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	Country total 1997–2005 (million USD)	% of grand total 1997–2005 (million USD)
Japan	3,088.3	1,746.2	1,204.7	803.9	888.5	1,332.9	2,151.8	1,666.5	1,035.6	13,918.4	69.2
Germany	387.2	316.7	298.6	81.9	229.5	100.9	188.0	319.8	496.5	2,419.1	12.0
France	94.1	187.2	66.9	27.0	25.8	38.9	77.1	80.5	82.3	679.7	3.4
Spain	166.0	54.5	62.4	112.6	14.2	75.4	36.3	0.5		521.9	2.6
Italy	24.1	4.2	9.1	13.1	13.2	29.5	53.3	22.6	273.4	442.7	2.2
United Kingdom	18.4	58.1	45.8	69.3	48.7	43.8	48.7	73.2	1.8	407.9	2.0
United States	6.6	10.1	17.6	59.6	46.9	148.5	15.0	8.1	69.0	381.4	1.9
Norway	55.7	45.2	20.9	34.0	60.4	23.7	30.1	19.1	23.3	312.5	1.6
Denmark	31.4	30.3	15.4	18.6	5.1	55.0	24.6	40.4	64.3	285.3	1.4
Netherlands	23.7	23.7	12.2	29.2	24.6	44.6	14.8	3.5	9.4	185.8	0.9
Canada	66.6	19.3	33.1	11.3	0.2	11.1	9.4	3.1	6.6	160.5	0.8
Sweden	9.1	13.2	14.4	20.3	8.0	13.3	29.5	19.1	23.4	150.2	0.7
Finland	2.1	2.7	5.6	0.5	0.4	4.7	15.0	12.0	33.3	76.1	0.4
Belgium	1.8	1.0	6.5	3.9	1.1	6.4	3.2	14.3	6.0	44.3	0.2
Switzerland	0.7			1.3		0.4	26.7	10.9		40.1	0.2
Australia	16.1	8.2	3.5	5.0	2.2	2.1	0.0	0.3		37.4	0.2
Austria	0.9	1.9	4.1	3.1	2.5	16.6	0.7	1.0	4.2	35.0	0.2
New Zealand						1.0	0.8	0.4	1.8	4.0	0.0
Portugal				0.0	0.4	0.9	1.0	0.5	0.2	3.1	0.0
Luxembourg					0.4				0.4	0.8	0.0
Greece						0.1		0.1	0.2	0.4	0.0
Ireland				0.1	0.1	0.1		0.0		0.3	0.0
Total	3,992.8	2,522.6	1,820.8	1,294.6	1,372.4	1,950.1	2,725.8	2,295.9	2,131.8	20,106.880	100.0

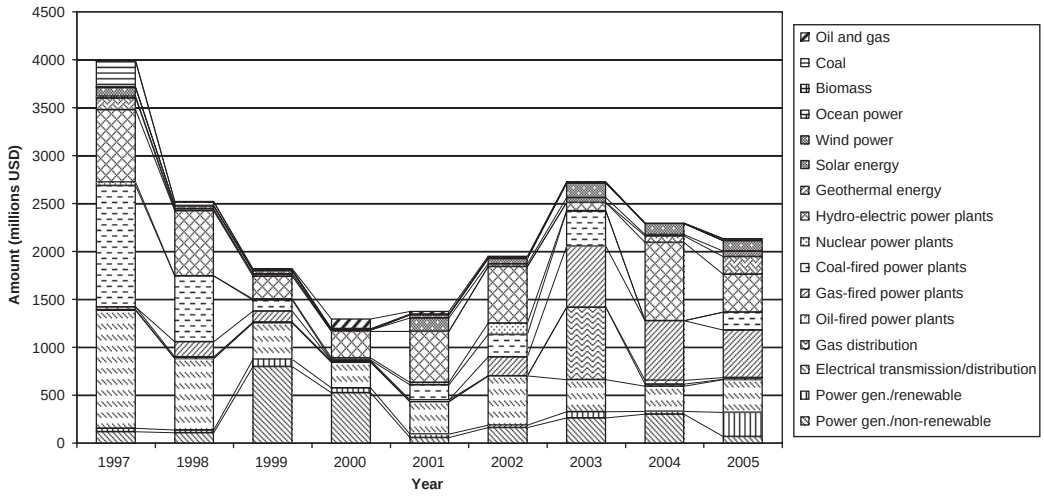

FIGURE 1 Bilateral development assistance by sector by year from 1997–2004 in US$ million.

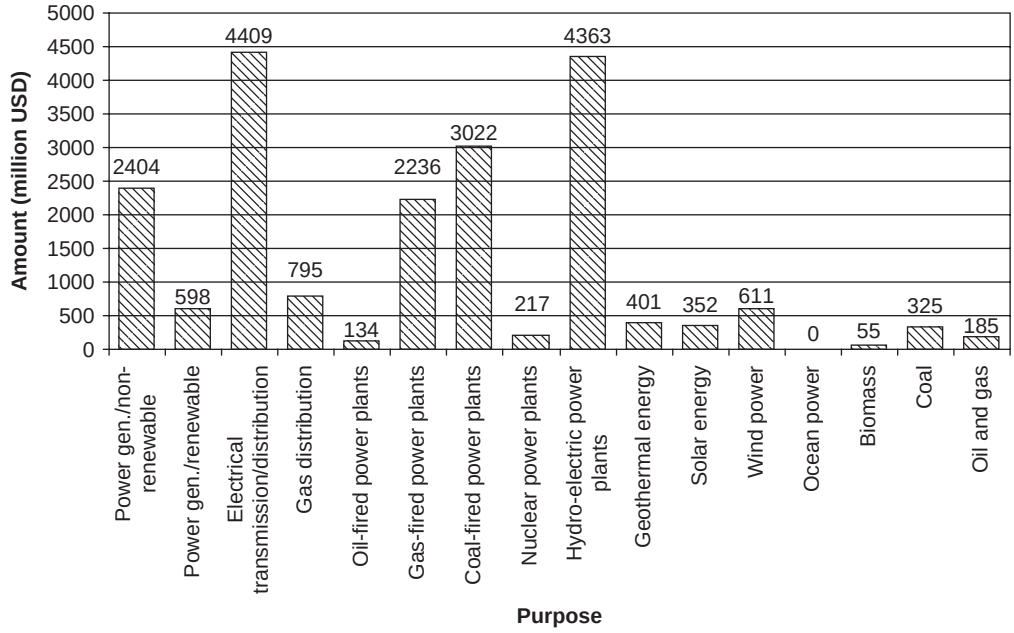

FIGURE 2 Total bilateral assistance for energy by category over the 9-year period from 1997 to 2005 by sector in US$ million.

(22% for each). Funding for these two categories has been relatively stable throughout the period. Coal-fired power plants received approximately US$3.0 billion (15%), but most of this funding occurred in the first two years of the period. Funding for gas power plants has increased, particularly in the last three years, averaging approximately US$590 million annually during those years.

Total support for all renewables (excluding hydropower) was approximately US$2 billion (10%) over the period, with wind energy receiving the most support (over US$600 million). The increase in spending on solar power was due to a large increase in spending by Germany in 2001, followed by an increase (albeit smaller) in spending by Spain in 2003. The increase in spending on wind power can be attributed to two years in which Japan made large contributions (2002 and 2003), and also to Germany, which has been gradually increasing its spending on wind power since 2002. Over the period examined, the number of renewable projects per year has doubled from approximately 100 to 200, while the number of non-renewable projects has remained nearly static at approximately 50. This may reflect the larger size of coal, oil and gas projects and the relatively small size of many renewable projects.

In general, there is an apparent shift to less greenhouse-gas-intensive energy systems through bilateral assistance programmes, but the variability and low levels of funding suggest that this trend is fragile and not well established as an existing policy among donors, or is not supported strongly among recipient countries. Consequently, there appear to be ample reasons for all donors to assess their assistance for energy projects, given the goals of the UNFCCC, while working cooperatively with, and respecting the priorities of, the recipient countries.

The top 20 recipients of bilateral development assistance for energy are listed in Table 2. These recipients include 14 Asian countries, 3 African countries and 2 Latin American countries. While China and India are among the recipients who received the largest amount of bilateral assistance over the time period covered (that is, 33%), they also emitted approximately 52% of developing-country CO_2 emissions from fossil fuel combustion in 2005. Their relative proportion of aid is thus somewhat high, but their rapid growth over the last decade seems to warrant higher assistance. Assistance to other developing countries, particularly those undergoing rapid growth, is also warranted because collectively they account for 48% of developing-country emissions (IEA, 2007).

However, the listing in Table 2 does not reflect the growing influence and market power of China and India. As of 2006, the two richest energy entrepreneurs in the world were Tulsi Tanti – Suzlon (India) and Zhengrong Shi – Suntech Power (China); the largest wind power company by capitalization is Suzlon (India), and the largest recipients of venture capital money were the USA and China.[5]

There is also anecdotal information indicating that India and China have recently begun to reverse the direction of development assistance by providing support for projects in Asia and Africa. The total level of aid from these countries for all purposes is small relative to bilateral and multilateral sources (in the range of US$3 billion). Data on aid for energy projects is not available. It is yet to be determined whether these countries will promote the same standards and consideration for the environment that OECD countries and the multilateral banks have come to adopt over time (Miller, 2008).[6] It is also difficult to say whether the emergence of energy entrepreneurs and the transformation of these countries into lenders reflect a success story for development assistance programmes, but two things appear to be clear. First, the growing economic power of these countries and their strategic interests in ensuring adequate raw material supplies is enabling them to emerge as 'players' capable of influencing the development, including energy development, of poorer developing countries. Secondly, any future development assistance to large developing countries will need to be carefully focused on areas where market forces are not already working and where further economic reforms are needed to match the strategic interests of OECD countries, such as ensuring open access to markets. Recently, the 'Group of Eight' industrial nations (G8), in its communiqué, encouraged the emerging economies as well as developing countries to associate themselves with the values and environmental standards contained in these OECD guidelines (G8, 2007).

TABLE 2 Top 20 Recipients of bilateral development assistance for energy (US$ million) and the percentage of aid for renewables during the period 1997–2005

	Total 1997–2005	Percentage of all bilateral assistance (%)	Percentage for renewables* (%)
India	2,433.7	17.6	30
Indonesia	2,418.6	17.5	11
China	2,146.4	15.5	28
Viet Nam	1,960.6	14.2	33
Malaysia	1,087.3	7.9	14
Azerbaijan	585.0	4.2	0
Sri Lanka	453.7	3.3	59
Thailand	363.5	2.6	0
Philippines	356.8	2.6	47
Peru	204.0	1.5	2
Uzbekistan	199.2	1.4	0
Armenia	192.0	1.4	0
Egypt	159.6	1.2	73
Pakistan	158.0	1.1	78
Kenya	154.9	1.1	100
Morocco	152.4	1.1	0
Costa Rica	137.3	1.0	100
Mongolia	85.3	0.6	0
Iran	69.5	0.5	100
Bosnia-Herzegovina	57.0	0.4	0

* Renewables includes power generation, hydropower, geo-thermal, solar, wind, ocean and biomass.

5. Multilateral assistance for energy development

Data on energy projects funded by the multilateral institutions[7] are generally available only in an aggregated format, with the exception of the GEF. The categories used for the compilation of multilateral development assistance generally reflect those of the World Bank Group. Refer to Table 3 for a description of these categories (World Bank, 2007).

Funding for energy projects has exceeded US$44 billion over the period 1997–2005; however, levels of funding have been virtually stagnant, despite demands for energy to alleviate poverty, increase economic growth and address climate change (see Table 4). The reasons for this are undoubtedly complex and may include: shifting donor and developing country priorities, competition with emergency humanitarian needs, the long process of identifying and implementing high-quality projects, and the abundance of and ease of access to private-sector capital in some large countries. However, many small countries, such as those in Africa, cannot easily access capital and tend to rely on bilateral and multilateral institutions to help launch many projects. Stagnant funding therefore represents a real challenge to their development goals. Nevertheless,

TABLE 3 Categories used for compilation of multilateral development assistance

Power	Includes generation, collection, transmission, and distribution of electric energy for sale to household, industrial and commercial users.
Renewable energy	Hydro, wind, geothermal, biomass, solar for electricity production and for thermal applications.
Energy efficiency	Includes efficiency improvements in energy supply and demand and improvements in district heating.
Coal	Includes support for mine rehabilitation and mine closing and coal, lignite, and peat mining.
Oil and gas	Includes crude oil and natural gas liquids (NGLs), fuel quality, gas distribution, oil and gas pipelines, liquefied natural gas (LNG) plant, liquid fuels, including liquefied petroleum gas (LPG), manufactured gases, natural gas and its fuel products, refineries.
General energy sector	Classification used if no other energy sector category is appropriate, or for activities that span more than five sectors.

there is evidence that the situation is changing. The World Bank's Clean Energy and Development Investment Framework (World Bank, 2007) highlights the need to address poverty reduction (particularly in Africa), low-carbon growth strategies for key developing countries, diffusion of clean energy technologies, and other climate change issues. It reports on efforts to scale-up investment in these areas and to enhance coordination among multilateral development banks.

The World Bank Group has been the largest source of multilateral funds, contributing nearly 39% of all funding, including bilateral funds. Support for the power sector, while down from earlier years, has dominated energy funding. Funds for the oil and gas category have been relatively constant, while support for energy-efficiency measures and renewables has been variable, despite efforts since the early 1990s to expand both portfolios. Collectively, the power, coal, oil and gas categories account for 75% of all funding (Table 5).

One question that arises when examining the data is: 'Why did World Bank support for the power sector decline during the mid-1990s?' Bayliss and McKinley (2007) suggest that, during this

TABLE 4 Multilateral and bilateral funding for energy during the period 1997–2005 (US$ million)

	Multilateral and Bilateral Support for Energy Projects									
Source	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Bilateral Development Assistance	3,992	2,522	1,820	1,294	1,372	1,950	2,726	2,296	2,132	20,104
World Bank Group	3,633	3,833	2,258	2,643	2,642	2,817	2,450	1,828	2,794	24,898
EBRD	357	357	357	587	620	680	667	768	765	5,158
GEF	136	113	83	113	134	97	120	134	124	1,054
Asian Development Bank	824	400	699	1,042	663	927	654	707	677	6,593
Inter-American Development Bank	1,131	1,261	464	1,172	1,188	184	379	152	1,056	6,987
Total	10,073	8,486	5,681	6,851	6,619	6,655	6,996	5,885	7,548	64,794

period, the hopes for privatization were so high that donor spending on infrastructure fell, in the expectation that the private sector would take up the slack. For example, World Bank lending for infrastructure investment declined by 50% between 1993 and 2002 – with much of the remaining amount directed towards preparing firms for privatization. During the period 1993–1997, the World Bank Group increased its support for private investment in utilities through its International Finance Corporation and its Multilateral Investment Guarantee Agency.

These authors go on to argue that this has largely been a failure and that the Bank needs to revert to much greater investment in public utilities. This is confirmed by the World Bank, which notes that private flows fell from a peak of US$50 billion in 1997 to US$7 billion in 2002. The bank attributes this to difficulties in sustaining reforms to place the power sector on a commercial footing in some countries, a wide reduction in investments flows in emerging markets, and a withdrawal of investors (World Bank, 2003, 2004).

However, the WBG is the largest single source of funds for both renewables and energy efficiency projects and is committed to increasing support for renewable energy and energy efficiency by 20% per year between 2005 and 2009 (World Bank, 2006a). The exact level of support for the energy-efficiency projects is particularly hard to estimate, due to ambiguities in the classification of projects. For example, in some cases, a transmission line upgrade might be classified as an efficiency project, while in other cases it may have been classified as a power project. With regard to renewables, some of the funds for renewable energy come from the GEF, which often co-finances projects with the WBG (see Annex 3 in World Bank, 2006a).

The regional development banks individually provide less than one-quarter of the funding provided by the World Bank Group. However, they play a unique role in meeting the special energy needs of their regions. They generally do not have an explicit mandate to address climate change, but their collective influence through energy programmes is important (see Table 6). Among the regional banks, the EBRD has focused the most on energy efficiency, including the upgrading of heat and power systems, the refurbishment of power plants in Eastern Europe, and on the need to diversify sources of oil and gas in an effort to promote energy security. EBRD countries of operations use up to seven times the amount of energy it takes to produce each unit of GDP, relative to Western Europe. These countries also emit more greenhouse gas per unit of GDP consumed than do Western European countries – 30 times more in some cases. Businesses and governments in the region are starting to see that the highly inefficient use of energy undermines their competitiveness in global markets. To underline the importance of energy

TABLE 5 World Bank Group support for energy during the period 1997–2005 by category (US$ million) (World Bank 2007)

World Bank Group	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total	Percent of total
Power	2,685	1,613	1,026	1,179	1,589	1,861	1,257	705	1,064	12,979	52%
Renewable energy	351	477	239	765	26	350	342	273	666	3,488	14%
Energy efficiency	56	356	26	295	193	67	168	67	243	1,469	6%
Coal	255	902	254	51	116	194	75	160	234	2,239	9%
Oil and gas	283	412	462	178	544	292	438	494	462	3,565	14%
General energy sector	3	74	251	176	175	55	170	128	125	1,157	5%
Total	3,633	3,833	2,258	2,643	2,642	2,817	2,450	1,828	2,794	24,898	

efficiency, the Bank has adopted a formal energy efficiency and renewable energy target which is synergistic with climate change goals. The target is to lend or invest a minimum of US$1 billion in energy efficiency and renewable energy projects during the period 2006–2010. This figure compares to a total of €674 million achieved during the 5-year period 2001–2005 (EBRD, 2006).

Projects supported by the Asian Development Bank (AsDB) in the Asian region tend to focus on the expansion and upgrade of electrical transmission lines, reflecting the large and growing population and rapid economic growth, although support for energy reforms has also been a priority up until the most recent years. As in the case of the EBRD, the AsDB is attempting to promote energy efficiency projects as part of a portfolio of activities in selected countries. The AsDB has developed a new Clean Energy and Environment programme, which is made up of several initiatives. The first stage of the Energy Efficiency Initiative (EEI), which defined an action plan, was completed in June 2006. Operational details will be prepared in consultation with its developing member countries up until December 2007 and implemented between 2007 and 2010. The EEI will target US$1 billion annual lending for energy efficiency through a proposed Asia Pacific Fund for Energy Efficiency (World Bank, 2007).

TABLE 6 Regional bank support for energy 1997–2005 by category (US$ million)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
European Bank for Reconstruction and Development										
Power	133	133	133	326	326	326	326	326	326	2,355
Renewables						13			1	14
Energy efficiency	41	41	41	20	53	100	100	201	197	794
Oil and gas	183	183	183	241	241	241	241	241	241	1,995
Total	357	357	357	587	620	680	667	768	765	5,158
Asian Development Bank										
Power	471	100	217	484	499	400	404	520	410	3,505
Renewables				58	6	305			37	406
Efficiency	40									40
Oil and gas	150					72		187	230	639
General energy	163	300	482	500	158	150	250			2,003
Total	824	400	699	1,042	663	927	654	707	677	6,593
Inter-American Development Bank										
Power	307	606	461	757	826	25	194	31	202	3,409
Renewables	337	50	3	207				81	786	1,463
Energy efficiency	35	30		137	361		50	35	58	706
Oil and gas	450	326		70		132	135			1,113
General energy	2	250		1		27		5	10	295
Total	1,131	1,261	464	1,172	1,188	184	379	152	1,056	6,986

The Inter-American Bank supports projects throughout Latin America, and power generation to meet the needs of the poor has been the most dominant category for funding. Support for energy projects has generally declined over the period 1997–2005. However, in 2005, a single large hydro-electric dam in Venezuela was approved for funding, thereby skewing the amount of funds for renewables.

The Global Environment Facility (GEF) is a unique mechanism among the institutions supporting energy projects. It occupies a special position in the context of the UNFCCC as the operating entity of the financial mechanism of the Convention. It has committed $1.6 billion for all projects relating to climate, since its foundation as a pilot programme in 1991 (GEF, 2004). Regarding energy, the GEF's mission is to develop and transform markets for energy and mobility in developing countries so that over the long term, they will be able to grow and operate efficiently towards a less carbon-intensive path. However, GEF funding is limited, representing only 2% of funds from bilateral and multilateral sources for energy projects. While the level of support is small, the operational programmes of the GEF focus mainly on cost-effective energy efficiency and renewable energy investments, as well as on providing the incremental cost of promising climate-friendly technologies, e.g., solar thermal power plant, mobile and stationary fuel cell applications, grid-connected photovoltaic, and advanced biomass combustion (World Bank, 2006b; see also Table 7).

There are two other multilateral banks that also support energy projects in developing countries, namely the African Development Bank (AfDB) and the European Investment Bank (EIB). A review of the limited data for 2004/2005 from the AfDB suggests that the categories receiving the most support include health, education, water and sanitation, and emergency relief, although a few energy projects were funded in these years.[8] A general lack of data prevents the inclusion of the African Development Bank in this article, but the information available for 2004/2005 suggests that the addition of the AfDB would make only a marginal difference to the broad conclusions drawn in this article. The AfDB is promoting regional electricity markets in Africa via investments in transmission infrastructure to improve energy access. The AfDB is also revising its Energy Sector Policy, which is expected to place greater emphasis on the financing of low-carbon projects, including renewable energy and energy efficiency projects (World Bank, 2007).

TABLE 7 Global Environmental Facility support for energy between 1997 and 2005 by category (US$ million)

GEF	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total	Percentage of total
Energy efficiency	44.5	42.8	45.9	13.3	53.6	45.4	42.6	45.6	39.1	372.8	35%
Gas power			0.7							0.7	
Hydro		4.9	1.5	0.7			0.4		0.5	8	1%
Gas Dist.	5.1			6.5			3.3			14.9	1%
Coal bed methane		6.2								6.2	1%
Wind				2.9	15.4		25.3	16.8	12.4	72.8	7%
Geothermal						5	26.7			31.7	3%
Power renew	56.3	55.3	21.6	39	60.7	33.8	19.9	15.6	71	373.2	35%
Solar	30.3	3.9	13.6	50.6	4.1	13.6	2.6	56.6	1.7	177	17%
Total	136.2	113.1	83.3	113	133.8	97.8	120.8	134.6	124.7	1,057.3	

The main mission of the EIB is to contribute towards the integration, balanced development, and economic and social cohesion of the member countries. It is governed by mandates from the European Union (EU). It began lending to Asia and Latin America in 1993, mainly for manufacturing, transport and telecommunication projects. For the period 2007–2013, the EIB is authorized to lend up to €3.8 billion for these regions. The €3.8 billion regional ceiling is broken down into indicative sub-ceilings of €2.8 billion for Latin America and €1.0 billion for Asia. It also operates in 79 African, Caribbean and Pacific countries.[9] In 2003–2008, the EIB is expected to channel €3.7 billion to these countries. The amounts allocated per country or per sector for both regions are not available. It has also announced plans to sell a 5-year euro 'climate awareness bond', whose returns are linked to the performance of a new index of companies with environmentally friendly policies. The proceeds will be used for renewable energy efficiency projects (EIB, 2007).

Several United Nations programmes also support energy projects in developing countries. For example, the United Nations Development Programme (UNDP) supported 546 energy-related projects between 1996 and 2005, with total financing of US$2.5 billion. This figure includes UNDP regular resources, resources from the Thematic Trust Fund, GEF grants and parallel funding, as well as other co-financing, such as government contributions. Improving equitable access to energy services by poor women and men to alleviate poverty and improve living conditions is an important goal that ranks higher than concern for climate change in many developing countries (Reddy, 2002). The UNDP's energy projects focus on three priority areas:

- strengthening national policy frameworks to support energy for poverty reduction and sustainable development
- promoting access to energy services in rural areas to support growth and equity
- financing for clean energy technologies for sustainable development.[10]

The UNDP plays an important role in promoting many small-scale projects to reach the poor, for example expanding access to modern cooking and heating fuel and decentralized electrical energy systems. Almost all UNDP funding comes from the GEF, bilateral sources and private financing. To avoid double-counting, these funds have not been included in our analyses.

6. Conclusions

Bilateral and multilateral support for energy projects totalled over US$64 billion during 1997–2005, with multilateral institutions accounting for nearly 70% of the support. It has remained in the range of 6–10% of all development assistance during this period, but has generally declined in real terms for the last 7 years. There has been a shift among the major categories receiving support. As can be seen in Figure 3, all bilateral and multilateral funds are averaged over two periods (1995–1997 and 2003–2005) to smooth the influence of individual years. Between those two periods, the power sector declined markedly, due largely to a decrease in support from the World Bank Group, IADB and bilateral programmes, as has support for coal projects. Energy efficiency has doubled on a percentage basis, while renewables have increased less dramatically. In many cases, these trends have probably been driven by factors other than climate change, but there apparently has been some recognition that lower GHG-emitting technologies need to be promoted and diffused among developing countries.

The various energy efficiency and renewable energy initiatives identified in this article tend to suggest that the MDBs are getting the message; that is, that the goals of mitigating

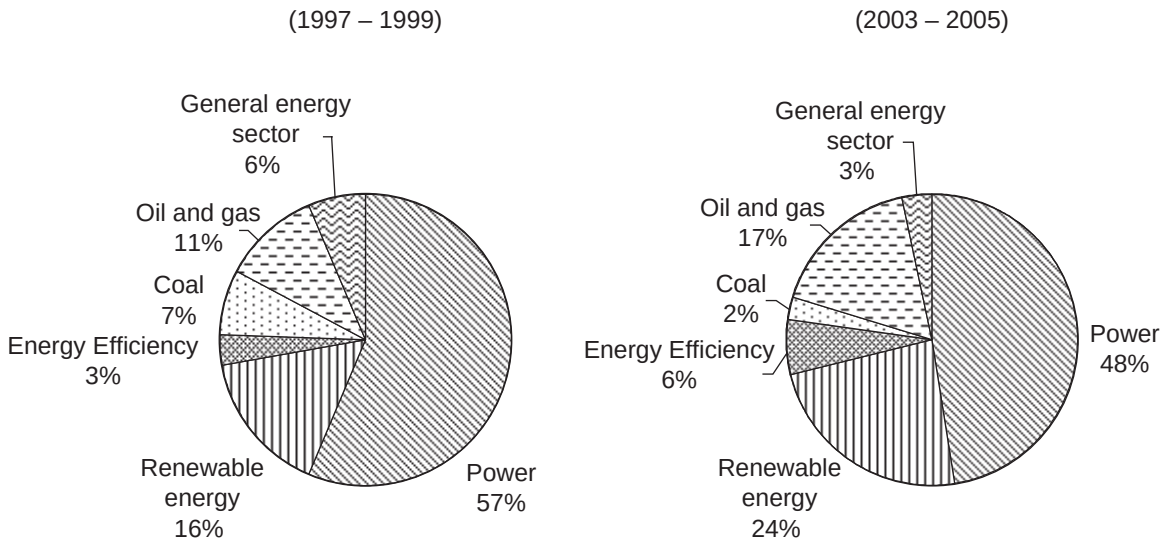

FIGURE 3 Bilateral and multilateral support for energy by category for selected periods

climate change, promoting sustainable development, and reducing poverty, can be complementary and integrated into operational programmes. Improving coordination among MDBs is now also a recognized need, and a few donors have taken steps to fill the resource gap.[11] However, given the need for a revolution to transform the global energy system, a much broader and sustained commitment will be needed by donors. The variability and decline in overall funding for lower GHG-emitting technologies over the 1997–2005 period suggests that programmes that address poverty, sustainable energy and climate change are fragile at best.

It should be noted that funding levels for projects do not tell the whole story. There is a continuing evolution of aid modalities under way as development financing for project-based activities is supplemented with macro-economic and sector-wide assistance. Increasingly, development assistance is being targeted at promoting policy reforms, institutional change, and capacity building, which are all needed to create enabling conditions for, and to reduce the investment risk of, private investors. Support for these activities is small relative to project investments,[12] but conceptually it may lead to more lasting and far-reaching changes than single projects in the energy sector of developing countries. How the environmental opportunities and consequences of these approaches will be addressed, and whether all such reforms will be 'climate-friendly', is not evident at this point (OECD, 2005).

In the coming decades, the demand for energy and financing in developing countries will be great. The International Energy Agency has projected a need for US$20 trillion, most of which will be needed by developing countries, to meet the demand for energy by 2030 (IEA, 2006). There is therefore a considerable gap between current public funding and projected financing requirements. While most of this gap may be filled by private capital, public funding, particularly grants, will be needed in order to reduce the risks associated with the introduction of new technologies and to encourage developing countries to implement the more environmentally

friendly, but more costly, options. If large developing countries begin to fill this gap, and if their lending standards differ from those of the OECD countries, the ability and efforts of OECD countries and the MDBs to promote environmentally sustainable energy projects could be undermined.

The data also suggest that too much attention has been focused on the GEF in the context of the UNFCCC process. While this is understandable, given the unique relationship between the two, it seems apparent that greater attention should be directed to bilateral (OECD and non-OECD) and multilateral development assistance efforts, in order to encourage a further shift in the direction of renewables and energy efficiency. Japan and Germany, in particular, have a great opportunity to provide leadership by further mainstreaming energy efficiency and renewable projects in their development assistance portfolios, while still supporting the specific needs of developing countries. It might be said that 'as Japan and Germany go, so goes the direction of bilateral development assistance for energy'.

Several challenges will need to be met in the future. The first is to increase funding for the MDBs, to ensure that they do not become irrelevant and can remain viable institutions that promote a sustainable energy future (World Bank, 2007). While this article has shown that the level of MDB funding for energy is small relative to overall ODA and FDI, it is not irrelevant, as the MDBs often leverage project support with those of the private sector by a factor of five or more (EBRD, 2006). Filling the resource gap is largely the job of finance ministers, but ensuring that the ministers are 'educated, engaged and committed' will require a sustained effort. The meetings of the G8, UNFCCC and the annual meetings of the MDBs are forums wherein this dialogue can take place on a regular basis. The second challenge is to 'green' private-sector funds so as to ensure that investments made today do not pollute tomorrow. Governments can help through educational programmes, and the MDBs by catalysing investments in low-carbon technologies with private banks, but coalitions of stockholders, environmental non-governmental organizations and insurance companies who are concerned about climate change and financial risks will need to be mobilized, and in some cases empowered, to create this 'green energy' revolution. To be effective they will need good data on private sector investments, which are not easily accessible in most countries today.

Finally, as noted previously, different institutions use different categories and formats for tracking funding for energy projects. The lack of a common reporting format makes it difficult to determine whether and how multilateral institutions and bilateral programmes are shifting to respond to climate change and the challenge of building a more sustainable energy future. Tracking investments over the coming decades may become as important to the UNFCCC process as the monitoring of emission inventories, since investment data will enable short-term forecasts of changes in emissions to be made. An effort to standardize the collection and reporting of data on investments for energy projects appears warranted in order to make data more comparable and trends more reliable.

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Notes

1. The Conference of the Parties to the UNFCCC, at its thirteenth session (Bali, Indonesia), established an *ad hoc* working group to address long-term cooperative actions beyond 2012, including the need to address enhanced financial resources (see UNFCCC Decision 1/CP.13).
2. See www.un.org/millenniumgoals/
3. See www.oecd.org/dac/stats/crs/guide
4. Iraq was excluded from the analysis of bilateral assistance for energy development in this article.
5. Personal communication from Eric Usher, United Nations Environment Programme, Paris.
6. See 'G8 calls for increased scrutiny of aid', *Financial Times*, 28 March 2007.
7. Multilateral institutions included in this study are: the World Bank Group (WBG), Asian Development Bank (AsDB), European Bank for Reconstruction and Development (EBRD), Inter-American Development Bank (IADB) and the Global Environment Facility (GEF).
8. See www.afdb.org/portal/page?_pageid=473,1&_dad=portal&_schema=PORTAL
9. See www.eib.europa.eu/
10. Personal communication with Luis Gomez-Echeverri, United Nations Development Programme, New York.
11. The UK has pledged US$1.6 billion for an environmental Transformation Fund and Japan has pledged US$2.1 billion in aid to the ADB to combat climate change and promote greener investment in the Asian region.
12. We estimate that, for the period covered by this article, bilateral funding for energy policy and administrative management was approximately US$2.5 billion.

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