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World Bank Energy Sector Lending:

Encouraging the World's Addiction to Fossil Fuels

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The World Bank Group's finance and overall approach to the energy sector does not transition countries onto a low-carbon development path.

SUMMARY OF FINDINGS

Faced with mounting concerns over the impact of climate change, the World Bank Group (IDA/IBRD, IFC, and MIGA) pledged to assist its member countries to transition to a low-carbon economy. Carbon emission reduction targets, as well as those of other greenhouse gasses (GHG), are highly dependent on countries' overall development path, especially with regard to the energy sector. The World Bank plays an integral role in the development of many developing countries around the world. The following assessment found that even with important gains in renewable energy and energy efficiency in recent years, the World Bank Group's finance and overall approach to the energy sector does not transition countries onto a low-carbon development path.

For example, Bank fossil fuel lending is on the rise. Although lending fluctuates from year to year, data for FY06 to FY08 indicate an increase for three consecutive years, which did not take place any other time in the assessment's eleven-year time period. In addition, spending on fossil fuels in FY08 was 48% higher than the next highest year (FY00) in the series. The recent annual percentage increases in new renewable energy sources (RE) and energy efficiency (EE), amounting to 73% on average, do not compensate for the highly imbalanced financing in favor of fossil fuel development. On average, fossil fuel financing by the Bank is still twice as much as new RE and EE combined and five times as much as new renewable sources taken alone. Moreover, it is very troublesome that

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during the most recent three-year average the Bank spent more on coal than on new renewable energy by 19%. Bank lending to coal projects will make a low-carbon transition difficult given that coal emits almost twice as much CO_2 as natural gas per unit of energy.

Furthermore, when the fossil fuels involved in the WB and IFC lending projects for FY2008 are combusted, the project lifetime CO_2 emissions from this one-year of financing will amount to approximately 2,072 $MMTCO_2$ – or 7% of the world's total annual CO_2 emissions from the energy sector. Clearly, the World Bank's investments in fossil fuel-based energy are significant to climate change and yet none of their current climate change initiatives adequately incentivize for a reduction in financing for fossil fuels.

When the fossil fuels involved in the WB and IFC lending projects for FY2008 are combusted, the project lifetime CO_2 emissions from this one-year of financing will amount to approximately 2,072 $MMTCO_2$ – or 7% of the world's total annual CO_2 emissions from the energy sector.

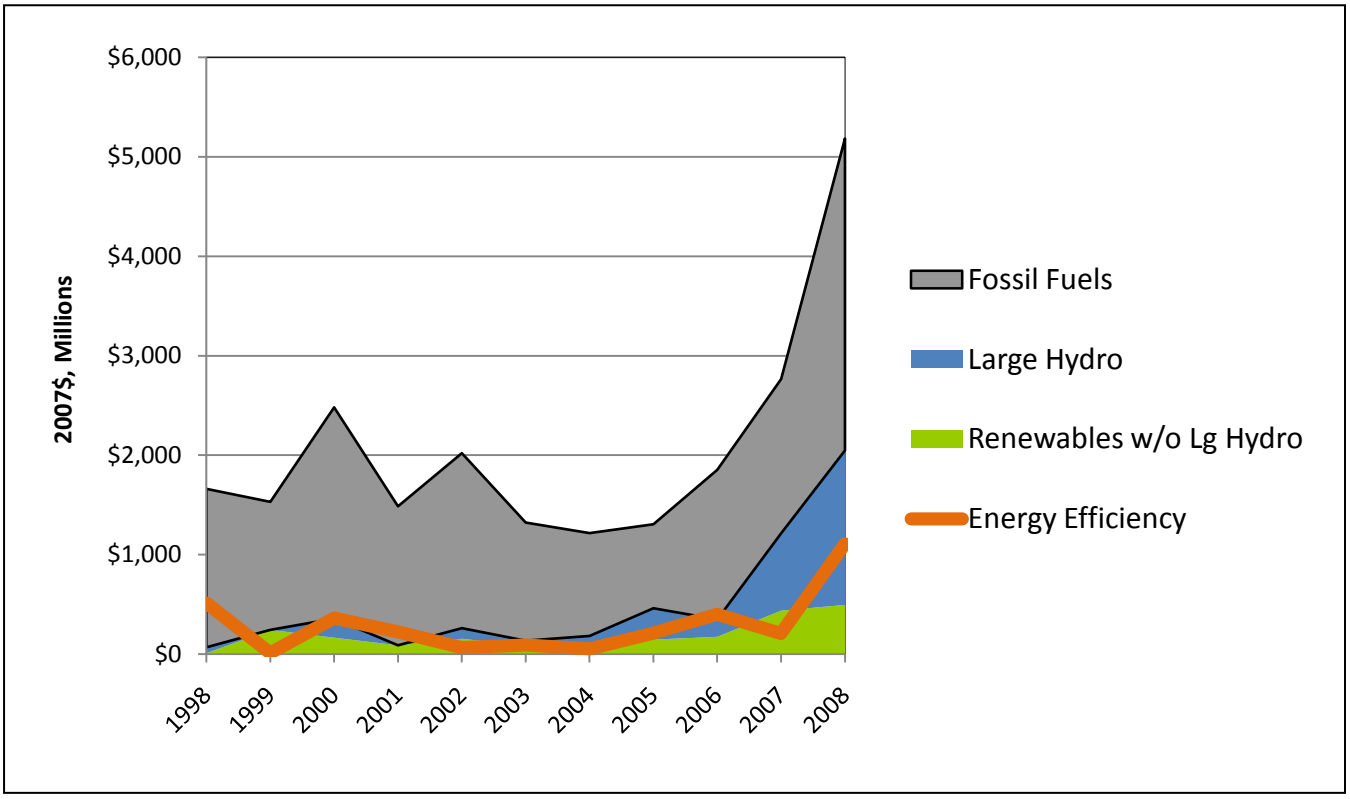
When developing countries eventually take on GHG emissions reduction targets of their own, the World Bank's current approach to energy will make meeting these targets more difficult and costly for these countries. Moreover, many of the World Bank's largest oil and gas extraction and pipeline projects have been and continue to be aimed at exports to developed countries, which further feed the developed countries' appetite for fossil fuels. As a result, the Bank is not adequately encouraging the UNFCCC Annex I countries to reduce their GHG emissions from fossil fuels.

The World Bank needs to fully recognize and take responsibility for its role in the energy sector as it relates to climate change and ensure that it is fulfilling its commitments to truly benefit and protect the poor. The impacts of World Bank financing are far-reaching and need to be sufficiently understood, including its contribution to overall GHG emissions, its role in furthering the world's reliance on fossil fuels as the dominant energy source, and how this translates into the overall well being of the impoverished. First and foremost, the Bank needs to carefully reassess its approach to financing the development of fossil fuels, including an evaluation of private sector availability of funds and direct energy delivery/benefits to the poor for every fossil fuel project. In addition, the Bank needs to embrace transparency and accuracy with regards to its energy sector project reporting, including disclosure of aggregate figures on fossil fuel lending annually, especially when reporting figures for new renewable energy and energy efficiency, producing and disclosing project-level GHG emissions, improving the tracking of financial intermediary funds' end uses, and disclosing disaggregated energy efficiency projects by demand, existing supply, and new supply.

WORLD BANK GROUP FINANCING IN THE ENERGY SECTOR

The aim of this study is to assess the Bank's energy sector financing in the context of the Bank's goal of helping to transition the global economy onto a low-carbon development path. As figure 1 illustrates, even with important gains in new renewable energy[1] and energy efficiency in recent years, the World Bank Group's overall financing in the energy sector does not effectively transition the world onto a low-carbon development path. Figure 1 and Table 1 demonstrate that fossil fuel lending is on the rise.[2] Although lending fluctuates from year to year, data for FY06 to FY08 indicate an increase for three consecutive years, which did not take place any other time in the eleven-year time series. In addition, FY08 is significantly higher than any other year in the series, exceeding the next highest year (FY00) for fossil fuel lending by 48% (or by $1 billion).

FIGURE 1. WORLD BANK GROUP FINANCING FOR FOSSIL FUELS, RENEWABLE ENERGY AND ENERGY EFFICIENCY **(ADJUSTED FOR INFLATION)**



Note: Data include assistance associated with guarantees from MIGA for all types of projects. Data for fiscal years is based on Board approval date and Board-approved amount. Sources of Data: Individual project documents published on the World Bank, IFC, and MIGA websites; World Bank and IFC Annual Reports 2000 to 2008; World Bank Group-supplied spreadsheet; "Clean Energy Investment Framework Progress Report" and "Improving Lives: World Bank Group Progress on Renewable Energy and Energy Efficiency in Fiscal Year 2006" (for more details, please see Endnotes).

TABLE 1. WORLD BANK GROUP FINANCING FOR FOSSIL FUELS **(MILLION $)**

	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
World Bank	577	618	599	592	544	255	291	313	758	575	199
IFC	521	229	935	373	794	488	499	409	590	824	2,988
Sub-total	1,098	847	1,534	965	1,338	743	790	722	1,348	1,399	3,187
MIGA (guarantees)	185	205	239	230	193	312	155	75	118	152	0
Total	1,283	1,052	1,773	1,195	1,530	1,055	945	797	1,465	1,551	3,187
Total Adjusted for Inflation (2007$)	**1,593**	**1,288**	**2,125**	**1,398**	**1,760**	**1,188**	**1,035**	**845**	**1,505**	**1,551**	**3,137**

Sources of Data: Individual project documents published on the World Bank, IFC, and MIGA websites; and World Bank and IFC Annual Reports 2000 to 2008 (please see Endnotes for more details).

In FY08 the World Bank and IFC increased funding for fossil fuels by 102% compared with only 11% for new renewable energy.

As shown in Table 2, in FY08 the World Bank and IFC increased funding for fossil fuels by 102% compared with only 11% for new renewable energy, consisting of solar, wind, biomass, geothermal energy, and hydropower facilities with capacities up to 10 MW per facility. Given that funding can significantly fluctuate from one year to the next, Table 2 also provides the average increase in funding over the past three years. The three-year average indicates that WBG funding for fossil fuels and new renewable energy has increased at close to the same rate, 61% and 58%, respectively. Furthermore, when combined, new renewable energy and energy efficiency represents a three-year average increase of 73%, which well exceeds the World Bank Group's Bonn Commitment to increase funding for these two sectors by 20% a year on average from FY05 to FY09.[3]

TABLE 2. WORLD BANK GROUP FINANCING THREE-YEAR AVERAGE (ADJUSTED FOR INFLATION TO 2007$)

	FY2006		FY2007		FY2008		Three-year Average	
	$ million	percent change	$ million	percent change	$ million	percent change	$ million	percent change
Fossil Fuels	1,505	78%	1,551	3%	3,137	102%	2,064	61%
Coal	119	1283%	140	18%	1,041	642%	433	648%
Large Hydro Power	180	-46%	777	333%	1,529	97%	829	128%
Energy Efficiency	399	91%	206	-48%	1,108	438%	571	160%
New Renewable Energy	176	15%	435	147%	485	11%	366	58%
New RE & EE*	576	59%	641	11%	1,593	148%	937	73%

*World Bank Group Bonn Commitment is based on increase in New RE and EE combined. Sources of Data: Individual project documents published on the World Bank, IFC, and MIGA websites; World Bank and IFC Annual Reports 2000 to 2008; Improving Lives: World Bank Group Progress on Renewable Energy and Energy Efficiency in Fiscal Year 2006; and "Clean Energy Investment Framework Progress Report" (for more details, please see End Notes).

Although important gains have been made on new RE and EE, funding for coal has increased at an alarming 648%. Given that new RE, EE, and coal financing began at relatively low baselines (compared with funding for oil and gas), it is perhaps more meaningful to look at the absolute funding amounts rather than percentage increases from such modest beginnings (note: the Bonn Commitment on new RE and EE starts from a baseline of only $209 million). From this standpoint, the overall funding amount as a three-year average for fossil fuels is twice as much as new RE and EE, and five times as large as new renewable sources of energy taken alone[4]. Moreover, in global climate change terms, it is very troublesome that the Bank spent on average $68 million, or 19% more, on coal[5] as for new renewable energy sources.[6]

It is important to note that the Bank classifies some of its coal projects as "low-carbon" projects. According to the Bank, a coal project may be designated low-carbon when it is a high-efficiency coal-fired thermal plant, such as super-critical and ultra-supercritical – where the project upgrades plant efficiency relative to the business-as-usual scenario. To term any coal-fired thermal plant as "low-carbon" seems at best misleading given

coal emits almost twice as much CO_2 as natural gas per unit of energy. The Bank also needs to be careful not to give itself credit simply because it is not investing in an old, outdated coal technology. Super critical pulverized coal technology has been around for some 20 years and has become industry standard in many countries. In addition, it is not evident that the Bank adequately assesses the availability of private sector financing for these coal technologies or a country's options for cleaner energy sources.

In global climate change terms, it is very troublesome that the Bank spent on average $68 million, or 19% more, on coal as for new renewable energy sources.

More importantly, if the Bank continues its current approach to energy sector development, i.e. no reduction in financing for fossil fuels, it runs the risk of continuing to add more carbon intensive energy sources than low-carbon sources.

The Importance of MIGA

In addition to direct financing assistance in the form of investments, development policy loans, and technical assistance, the World Bank Group also provides guarantees on investments mainly through the Multilateral Investment Guarantee Agency (MIGA). Figures in the report representing fossil fuels, renewable energy, and energy efficiency all include MIGA funding amounts as the World Bank tends to report its data this manner. Over the 11-year time period provided in Table 1, MIGA guarantees accounted for 12% of World Bank financing for fossil fuels. MIGA's insurance covers the risks of currency transfer restrictions, expropriation, war and civil disturbance, and breach of contract, typically for 15 – 20 years. MIGA's involvement plays an important role in projects' abilities to mobilize long-term commercial bank funding. The MIGA insurance role is always important for foreign investment projects in developing countries, and with the current global credit crunch situation it stands to gain importance.

Table 3 indicates how the share of financing for each type of energy category has changed during ten years (taken as a percentage of total energy sector assistance). Over the ten-year period, new RE and EE do not appear to be consistently increasing their share of energy sector funding. From FY05 to FY07, each of the categories of new RE and EE only exceeded the relatively low shares once, 10% in FY07 for new RE and 9% in FY06 for EE. While conversely, fossil fuels continue to consistently comprise the largest share of energy sector lending remaining on top for all ten years.

TABLE 3. SHARE OF WORLD BANK GROUP TOTAL ENERGY SECTOR FINANCING

	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007
Total Energy Sector (mill $)	4,150	2,327	2,834	3,048	2,902	2,390	1,691	2,865	4,585	3,604
Fossil Fuels	30%	45%	63%	39%	53%	44%	56%	28%	32%	43%
Lg Hydro	1%	0%	4%	0%	2%	1%	3%	8%	4%	19%
EE	10%	0%	7%	5%	1%	2%	1%	5%	9%	5%
New RE	0%	5%	3%	2%	3%	2%	2%	3%	4%	10%

Note: The total energy sector includes: new renewable energy, large hydropower (capacity >10MW), energy efficiency, power transmission and distribution, coal, oil and gas, and general energy sector. Fossil fuel figures include oil, gas, and coal, including extraction, production, pipelines, power generation, and policy lending. Percentages reported in table do not add up to 100% because general energy sector figures are not included. Data Source: Total Energy Sector lending figures were obtained from WWF-UK "The World Bank and Its Carbon Footprint" (June 2008).

Looking only at the private sector lending portfolio, IFC new investments overall totaled $16.2 billion in FY2008, a 34% increase over the previous year. For the same year, the increase in IFC fossil fuel investments considerably exceeded the overall portfolio rate, increasing by over 250%. Conversely, IFC investments in new RE and EE were a mixed bag in FY08 - decreasing by about 50% for new RE and increasing by about 190% for EE. The IFC's performance is important given that it represents efforts to attract the private sector's interest in renewable energy and low-carbon alternatives.

Evaluating Renewable Energy and Energy Efficiency Funding

Figure 2 represents the funding distribution among World Bank Group institutions for new renewable energy during FY05 to FY08. Carbon offsets and the Global Environment Facility (GEF) funding accounted for 30% of overall funding for new renewable energy. It is important to make note of this because this money is derived from special funds that were specifically created to address climate change. These funds, plus an additional 1% from the Global Partnership on Output Based Aid (GPOBA), do not originate from the Bank's own portfolio of funds. For the Bank's own account, the World Bank (IDA & IBRD), IFC, and MIGA funds comprised 69% of new RE finance during the four-year period.

Figure 2. New RE by Institution, FY05-08 (2007$)

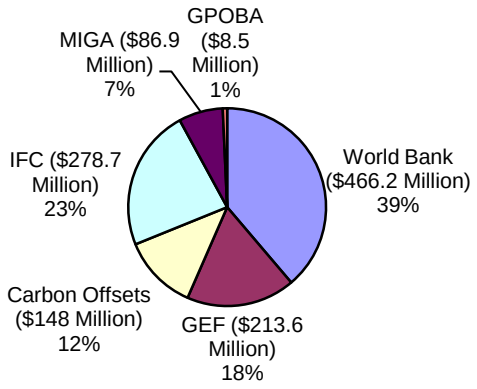


Figure 3 depicts the funding distribution among World Bank Group institutions for energy efficiency during FY05 to FY08. The World Bank is using much more of its "own" money for EE than for RE - 92% of funding was allotted to EE finance during the examined four-year period. Assistance stemming from carbon offsets and GEF funding accounted for only 8% of overall funding.

Figure 3. Energy Efficiency by Institution, FY05-08 (2007$)

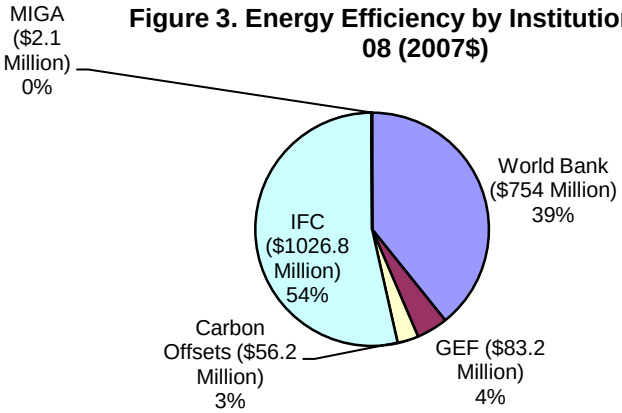


Table 5 provides lending statistics for new renewable energy and energy efficiency over the four-year period following the Bank's Bonn Commitment on new RE and EE. When solely considering the World Bank Group's own funds, EE monies increased 165% on average, which is slightly higher than the average for all sources of funding. New RE only increased by 27% as compared to 58% percent when considering all funding types. Even so, this increase alone still exceeds the Bonn Commitment of an annual average increase of 20% for both new RE and EE from FY05-FY09 (Note: see discussion above on relevance of percentage increases versus absolute funding amounts).

TABLE 5. WORLD BANK GROUP'S OWN FUNDS FOR NEW RE AND EE* (2007$, MILLIONS)

	2005	2006	2007	2008	Annual Ave
New Renewable Energy					
WBG Total	144	158	244	285	208
% change		10%	54%	17%	27%
Energy Efficiency					
WBG Total	187	392	189	1,015	399
% change		110%	-52%	436%	165%
Total RE & EE					
WBG Total	331	550	433	1,300	654
% change		66%	-21%	200%	82%

*Excluding lending from special funds, i.e., Carbon Offsets Financing, GEF, and the Global Partnership on Output-Based Aid (GPOBA).

***Financial Intermediaries*:** Another so urce of funding for new RE and EE that is important to highlight is the amount of funding going through financial intermediaries (FI) – typically commercial banks or special fund management operations, as opposed to direct project financing by the Bank. It is important to understand that the FY08 Bank funding figures for new RE and EE include approximately $300 million in FI projects or 19% of the total funding going to new RE and EE.[7] It is more difficult to determine

the actual amount being spent on new RE and EE for funding that is diverted through financial intermediaries. The FI projects are often aimed at both a mix of project types and measures and depend on unknown future opportunities/proposals for projects. Thus, FI funds included in new RE and EE totals potentially introduce an over-estimation of Bank funding for low-carbon energy investments. In the case of fossil fuels, funding through FI's is often not accurately captured because of the categorization system used by the Bank, which likely results in under reporting of funding to fossil fuels.

Differences between BIC Study and World Bank Group-reported Funding Figures

As noted in the study, energy sector funding figures have been developed through the utilization and comparison of several sources including: reviewing individual project documents, World Bank and independent assessments, independent organizations' databases, and a World Bank-provided spreadsheet of energy sector lending data. All of these sources were examined in an attempt to produce the most accurate and most comprehensive aggregate figures. As such, the BIC study figures differ from the World Bank Group-reported figures on their website and in recent press releases.[8] Annex 3 provides a project-by-project list of differences for FY2008. The main reasons for discrepancies are described below.

Unlike the Bank, the BIC study counts both A loans and B loans – This study aims to provide a complete account of the Bank's assistance to energy sector development. B loans are considered a means of mitigating sovereign risk. Under these structures, the IFC makes a loan to a private-sector borrower, thereby becoming the "lender of record," i.e., the sole contractual lender on the books of the borrower, with this status acknowledged by the government of the borrower's country. However, instead of maintaining the entire loan on its own books, the IFC maintains only a portion-the "A" loan-and participates the remainder-the "B" loan-to commercial banks and/or institutional lenders, either directly or through a securitization. Loan agreement documentation ensures, through pro rata sharing provisions, that both "A" and "B" loans receive identical treatment. Therefore, if a government grants preferred creditor treatment to the IFC's "A" loan, it must also do so to each participant's "B" loan, in effect passing on the preferred access to foreign exchange to non-preferred-creditor lenders (i.e., placing them "under the umbrella" of the IFC).

In FY2008, B loans equaled $796 million or 25% of funding for fossil fuels (see Annex 3). In FY2007, B loans only accounted for $97 million or 7% of the fossil fuel funding total.[9]

Funding data for fiscal years is based on Board approval date and Board approved amount – The Bank's fiscal year runs from July1 to June 30. In some cases, projects approved by the Board in June are reported by the Bank in the next fiscal year. One reason could be that the Bank is reporting by the date invested instead of approved. However, the study found that the Bank was not always consistent with the invested date either. In addition, sometimes the ultimate amount invested in the project differs from the amount that was approved by the Board. The study made attempts to correct for this when possible.

Differences in categorization – Some projects (e.g., infrastructure, technical assistance, and EE projects) are categorized differently by the study. The differences in categorization for projects in FY2008 are noted in Annex 3.

The WBG's annual CO_2 emissions from FY08 funding are approximately equal to the country of Iraq's or Greece's energy sector emissions and exceed Portugal's and Austria's.

Greenhouse Gas Emissions of World Bank Fossil Fuel Lending

When the fossil fuels involved in the WB and IFC lending projects for FY2008 are combusted, they will account for more than: **97.42 MMTCO$_2$ annually** and approximately **2,072 MMTCO$_2$ for project lifetime emissions** (see Annex I for methodology and assumptions)**.** The WBG's annual CO_2 emissions from FY08 funding are approximately equal to the country of Iraq's or Greece's energy sector emissions and exceed Portugal's and Austria's (see Table 6 for more country comparisons). The project lifetime CO_2 emissions from this one year of WBG financing represents approximately **7% of World annual CO_2 emissions from the energy sector** or more than twice as much as all of Africa's annual energy sector emissions (see Table 6). Clearly, World Bank Group financing for fossil fuels is significant to the issue of climate change.

Please note, the CO_2 emissions estimates do not account for related policy lending, technical assistance, or several fossil fuel project investments for which there was not enough information to base an estimate, such as exploration projects (see Annex I for a list of projects).

TABLE 6. COMPARISON TO COUNTRY AND REGIONAL ANNUAL ENERGY SECTOR CO_2 EMISSIONS

Country / Region	$MMTCO_2$	Country / Region	$MMTCO_2$
Portugal	64.97	Africa	1,042.92
Israel	65.01	Central & South America	1,096.16
Chile	66.19	India	1,165.72
Korea, North	73.50	Japan	1,230.36
Philippines	78.06	Middle East	1,450.81
Austria	78.17	Russia	1,696.00
Vietnam	80.38	**WBG FY08 Lifetime**	**2,072.00**
WBG FY08 Annual	**97.42**	Eurasia	2,577.82
Iraq	98.13	Europe	4,674.75
Romania	99.34	China	5,322.69
Greece	103.16	United States	5,956.98
Nigeria	105.19	North America	6,987.78
Czech Republic	112.83	Asia & Oceania	10,362.49
World Total			**28,192.74**

Country data source: US Energy Information Administration, country emissions estimates for 2005. Note: the World Total does not include WBG GHG emissions.

For comparison, the World Wildlife Fund-UK's (WWF-UK) World Bank Carbon Footprint report (2008)[10], which uses only partial data from FY2008, indicates that since 1997 the World Bank has financed more than 26Gt (or 26,000 $MMTCO_2$) worth of CO_2 emissions in total. Furthermore, when each project's lifetime emissions are attributed to the year in which it was approved, the WWF-UK report found that the World Bank has financed a yearly average of just over 2.6Gt (or 2,600 $MMTCO_2$) worth of emissions per year. Using the independently estimated WWF-UK figure, the World Bank energy sector emissions represent 9% of the World total – a slightly higher figure than the 7% estimate of this report.

The World Bank does not provide GHG emissions estimates for its projects and does not yet commit to publicly reporting GHGs in any of its climate change initiatives (please see Annex 2).

Accounting for GHG Emissions throughout the Value Chain

This study attributes the CO_2 emissions associated with the combustion of fossil fuels to the World Bank's financing. In some cases, this CO_2 is not emitted within the project boundaries but is a product of the end-use consumption of the fossil fuel. It could be argued that the emissions associated with projects that do not involve direct combustion, such as extraction/production and transmission projects, should only include GHG emissions involved in those specific activities, which tend to release fewer emissions as compared to fossil fuel combustion.[11] However, the aim of this study is to assess the Bank's energy sector financing within the context of the Bank's goal of helping to transition the global economy onto a low-carbon development path. Thus, the impact of World Bank financing on overall GHG emissions, including furthering the world's reliance on fossil fuels as the dominant primary energy sources, needs to be demonstrated and fully appreciated.

Climate change impacts are not bound by project or country boundaries and are anticipated to negatively affect developing countries and the poor of the world disproportionately – the very countries (and people) Bank assistance is trying to benefit.

Such an approach is consistent with the perspective that the Bank and its Executive Board of Directors take when they consider proposed projects' overall development impact in justifying project approvals, and the Bank's more recent approach to account for the costs and benefits throughout the entire value chain for extractive industry projects (initially referred to as EITI++). Moreover, the full contribution to climate change of each project needs to be considered as climate change impacts are not bound by project or country boundaries and are anticipated to negatively affect developing countries and the poor of the world disproportionately – the very countries (and people) Bank assistance is trying to benefit.

It is important to note that the report does not attempt to represent a complete inventory of GHG emissions from the World Bank's lending portfolio. Such figures would need to omit GHG reductions that could be attributed to WBG assistance, e.g., from energy efficiency projects. But, this also means that the report does not include emissions attributed to other WBG projects in other sectors, e.g., transportation, industrial, land-use change, and policy lending operations, which would account for a significant amount of additional GHG emissions. The main point of the report still stands that the WBG's fossil fuel lending patterns are significant to climate change.

Conclusion

The Bank's continued emphasis on fossil fuels, especially the large financing spike in 2008, commits many developing countries to fossil-fuel based energy for the next 20 to 40 years. The Bank's current levels of lending to fossil fuels, especially oil and coal, marginalizes the Bank's efforts to transition the world to a low-carbon economy. Furthermore, when developing countries eventually take on GHG emissions reduction targets of their own, the World Bank's current approach to energy will make meeting these targets more difficult and costly for these countries. With that said, it is important to fully appreciate the Bank's role in increasing developing countries' access to energy. The Bank's approach to energy sector investments needs to balance climate change concerns and impacts with the availability of energy for the poor. It is very important to note however, that in its energy development decisions, it is not evident that the Bank adequately assesses the availability of private sector funding, the costs of GHG emissions and their impacts on the poor, the actual energy/benefit delivery to the poor or alternative energy options/country opportunities.

It is necessary to consider the full impact of the World Bank's financing policies upon overall GHG emissions and the poor, including furthering the world's reliance on fossil fuels as the dominant primary energy sources. To begin, the Bank needs to carefully reassess its approach to financing the development of fossil fuels.

Overall, the World Bank Group needs to improve transparency and adequately assess energy sector projects in order to better understand their role, both positive and negative, with regards to global climate change. To start, the Bank needs to:

- Report funding for fossil fuels annually and always include it in comparison when reporting Bank activity on new renewable energy and energy efficiency;
- Accurately track and publicly report the amount of funding going to overall fossil fuel development (including B loans);
- Account for fossil fuel development taking place through financial intermediaries and Bank projects that involve services to the fossil fuel industry;
- Develop and publicly report GHG emission estimates for all projects;
- Comprehensively assess the availability of private sector funding for fossil fuel projects and determine the energy/benefit delivery to the poor;
- Assess alternative energy options/country opportunities and compare them to fossil fuel options;

- Indicate which specific IFC projects are considered to be energy efficiency improvements and what percentage of that project is required to go toward EE measures; and
- Provide a breakdown of EE projects according to demand-side, existing supply, and new supply.[12]

ANNEX 1: METHODOLOGY

WORLD BANK CO_2 EMISSIONS ESTIMATES FROM THE ENERGY SECTOR

This report only estimates CO_2 emissions associated with fossil fuel combustion, which represents the primary gas emitted by energy-related combustion. In some cases, this CO_2 is not emitted within the World Bank project boundaries but is a product of the end-use consumption of the fossil fuel (see main paper text discussion on GHG Emissions throughout the Value Chain). Fossil fuel combustion also emits CH_4 (methane) and N_2O (nitrous oxide), as well as criteria pollutants such as nitrogen oxides, carbon monoxide, and non-methane volatile organic compounds, none of which are accounted for in this assessment.[13]

The amount of CO_2 emitted from the combustion of fossil fuels is dependent upon the carbon content of the fuel source (see also paragraph below on the fraction of carbon that is oxidized). In general, the carbon intensity per unit of energy of fossil fuels is the highest for coal products, followed by oil and then natural gas. For each World Bank project, the total carbon dioxide emissions were estimated by multiplying the amount of fuel consumed, produced, or transported by the CO_2 emissions factor for each fuel. The CO_2 emissions factors used are based on figures from the US Energy Information Administration (2007)[14]:

Coal = 207 lbs CO_2 / MMBtu (pounds per million British thermal units);

Distillate fuel oil = 161 lbs CO_2 / MMBtu;

Crude oil = 164 lbs CO_2 / MMBtu;

Natural gas = 117 lbs CO_2 / MMBtu; and

Projects representing a mix of crude oil and natural gas,

assumed equal mix = 140 lbs CO_2 / MMBtu

Additional assumptions include:

0.85 capacity factor for coal and natural gas power plants (typical for base load plants)

7.8 MMBtu/MWh heat rate for natural gas combined-cycle power plant

8.75 MMBtu/MWh heat rate for supercritical pulverized coal plant

10.2 MMBtu/MWh heat rate for conventional pulverized coal plant

10,000 barrels of oil per day per oil rig

0.70 oilrig utilization rate

Project life assumptions (when unspecified):

New power plants: 30 years (Tata Ultra Mega = 35 yrs)

Coal plant privatization: 20 – 30 years (depending on age of plant)

Oil and gas production: 10 – 15 years

Pipelines: 10 - 15 years

Oil rigs: 10 years

This report's emissions estimates are not adjusted for the amount of carbon that does not get oxidized during combustion, which remains behind in soot or ash. Not accounting for these small amounts of incomplete combustion (on the order of 0.5 to 1%) introduces a small error relative to other uncertainties in this assessment. Other uncertainties include individual power plant efficiencies (i.e., heat rate), project life, and production volumes.

Fossil fuels can be used in non-energy end-uses, e.g., petrochemicals. The amount of fossil fuels going to non-energy related sectors from World Bank financing is assumed to be small relative to energy use and thus, is not accounted for in this study.

In addition to fossil fuel combustion associated with end-use consumption, other activities such as production, transmission, storage, and distribution of fossil fuels also emit greenhouse gases. These emissions primarily consist of CH_4 from natural gas systems, petroleum systems, and coal mining. This study does not estimate these emissions.

Unaccounted Fossil Fuel Projects

There were several FY2008 World Bank Group energy sector projects for which there was not enough project information disclosed on which to base CO_2 emissions estimates assumptions. These projects have not been included in the estimates and thus, represent an understatement of the emissions from FY08 financing. Such projects include three World Bank development policy loans (2 oil and gas, 1 coal and gas), World Bank Senegal Energy Sector Recovery Development Policy Financing (restart

state oil refinery), IFC Peru Maple Energy (oil and gas exploration), IFC Argentina Roch (oil and gas production), IFC Peru Block Z-1 (additional funding to gas project), IFC Ukraine Galnaftogaz II (expansion of gas connections), IFC India Gujarat State Petronet Ltd (expansion of gas network), IFC Europe and Central Asia SENCAP (electricity investment company), IFC IPR Egypt (oil and gas exploration), and IFC Turkey Delta Petroleum (port).

ANNEX 2: WORLD BANK GROUP CLIMATE CHANGE INITIATIVES AND COMMITMENTS

The Global Environment Facility (1991)

A resolution by the World Bank's Board of Executive Directors in 1991 led to the establishment of the Global Environment Facility (GEF), which was designated as the financial mechanism for the U.N. Framework Convention on Climate Change in 1992. Since then, the WBG has administered the GEF trust fund and has been the GEF's primary implementing agency for investment projects meant to address climate change (note the GEF was set up to also specifically address biodiversity and desertification).

Approximately, US$ 15 million from a Special Climate Change Fund (a GEF-administered UNFCCC Special Fund) is available for technology transfer. With respect to World Bank engagement on GEF funding for climate change projects, cumulative GEF resources committed to mitigation projects reached US$ 1.64 billion at mid-FY08, with a leverage on IBRD/IDA resources of roughly 2.2 billion (World Bank, SFDCC 2008).

World Bank Group Energy Sector Strategy (2001)

GHG 2010 target for developing and transition countries: Reducing the average intensity of carbon dioxide emissions from energy production from 2.90 tons per ton of oil equivalent to 2.75

Policy measures supported:

Reducing gas flaring and facilitating carbon trading and joint investments to reduce greenhouse gas emissions.

Energy Efficiency 2010 target for developing and transition countries: Reducing the average energy consumption per unit of GDP from 0.27 ton of oil equivalent per thousand dollars of output to 0.24

Policy measures supported:

Removing market and regulatory barriers to renewable energy and energy efficiency investments for power and biomass (such as improved cooking stoves for the poor)

Promoting energy-efficient and less polluting end-use technologies for traditional fuels

Fossil Fuels Policy measures supported:

Switching from coal to gas

Facilitating environmentally sustainable extraction, production, processing, transport, and distribution of oil, gas, and coal

Closing loss-making coal mines and oil refineries and financing restructuring costs that fall on government budgets

Extractive Industries Review / Bonn Commitment (2004)

In the Management's Response to the Extractive Industries Review (2004) and at the International Renewable Energies Conference in Bonn, June 2004, the World Bank Group announced a commitment to scaling up lending for new renewable energy and energy efficiency by at least 20% annually over five years (FY05-FY09), and leading a Renewable Energy and Energy Efficiency Financing and Policy Network for developing countries.

Clean Energy Investment Framework (2006)

In 2006, responding to a request from the G8, the Bank developed the Clean Energy Investment Framework (CEIF) intended to help scale up investments in clean energy and integrate climate change into development assistance. The CEIF set out four primary World Bank strategic activities:

1. Promoting transition to a low-carbon economy – especially in Brazil, China, India, Mexico, and South Africa – by increasing analytical, knowledge, and investment support;

2. Accelerating investments that help increase supplies of clean energy;

3. Improving access to affordable energy for the poor, particularly in Africa; and

4. Assisting developing countries with adaptation to the impacts of climate change through analytical work and development of risk-management tools.

Strategic Framework on Development and Climate Change (October 12, 2008)

At the October 2008 annual meetings, the Bank's Development Committee approved the successor to the CEIF, the *Strategic Framework on Development and Climate Change* (SFDCC), which spells out a much broader role for the Bank in climate change issues. The SFDCC provides the IFC, MIGA, IDA, IBRD, and other entities of the Bank Group objectives, guiding principles, areas of focus, and major initiatives to guide the operational response for the **next three years**. An interim progress report will be prepared in the second half of fiscal year 2010.

SFDCC sets out six action areas:

1. Support climate actions in country-led development processes;
2. Mobilize additional concessional and innovative finance;
3. Facilitate the development of market-based financing mechanisms;
4. Leverage private sector resources;
5. Support accelerated development and deployment of new technologies; and
6. Step up policy research, knowledge, and capacity building.

In partnership with others, major initiatives of the Bank will include:

- Help some of the most vulnerable countries increase resilience to climate risks, with new adaptation financing.
- Support carbon market development through investments in longer-term assets and currently by-passed reduction potentials, financial and quality enhancements of carbon assets, methodology development, and sharing lessons of experience.

Out of the major initiatives, the Bank has signaled emphasis on the first two - adaptation/resilience and carbon finance[15] and overall for the three-years will be in the learning and capacity building mode.

- Enhance development effectiveness of its operations by screening for: (i) climate risk in hydropower and major water investments with long life spans, and (ii) energy efficiency opportunities starting with energy projects (Note: the WBG will expand project screening for energy efficiency opportunities, already initiated by IFC, to include WB projects, starting with select energy sector projects in fiscal year 2009).
- Operationalize, execute, and share lessons from the Climate Investment Funds, Carbon Partnership Facility, and Forest Carbon Partnership Facility, and work with partners to improve monitoring of climate-related finance and its "additionality".

- Facilitate customized applications of climate risk insurance products.[16]
- Promote packaging of its development finance instruments with instruments provided by Carbon Finance, the Global Environment Facility, and the Climate Investment Funds.
- Pilot new initiatives to support development and dissemination of new energy technologies.
- Scale up support to Reduced Emissions from Deforestation and Degradation (REDD), while improving the livelihoods of forest-dependent local and indigenous communities.
- Facilitate global dialogue by launching the World Development Report on climate change.
- Enhance the knowledge and capacity of clients and staff to analyze and manage development-climate linkages at the global, regional, country, sector, and project levels.

Specific Outcomes/Targets

The Bank is developing a Results Framework over the next two years. The current SFDCC offers an initial Results Framework in its Annex III, which includes:

- Increase WBG financing for energy efficiency and new renewable energy by an average 30 percent a year, from a baseline of US$600 million in average annual commitments during FY05-07.
- Increase the overall share of "low-carbon projects" rising from 40 percent in fiscal years 2006–08 to 50 percent in fiscal year 2011 (this includes the already stated increases in RE and EE and expanding lending to hydropower).
- IFC adds in a separate Issues Brief (September 2008) that it aims to support low-carbon growth in developing countries and is committed to increasing its investments in renewable energy and energy efficiency from $1.1 billion in fiscal years 2005-07 to over $3 billion in fiscal years 2009-11.
- Increased demand for and lending in support of modal shifts in freight and public transport (as compared to FY06-08).
- MIGA guarantee instruments increasingly used for low carbon (RE/EE) investments - at least 10 guarantees provided over FY09-11.
- Innovative financing packages combining CF, GEF and/or CIF to leverage private investments structured and applied by IFC - at least 10 during FY09-11.
- IFC leverage of low carbon private investment is at least 4 to 1 in dollar values.

- Sub-national level application of financial tools is tested for projects with climate cobenefits – at least 3 in a pilot phase (further estimates to be provided if/when post-pilot stage approved).
- GHG analysis is developed and applied in IFC real investment portfolio and select WB energy, transport, and forestry sector projects (FY09-FY11). [See below]
- GHG emissions for all WBG offices enrolled in the carbon-neutral program reduced by 7 % by 2011 & remaining emissions offset by purchase of carbon credits (FY11).

Climate Investment Funds

The Climate Investment Funds (CIFs), which fall under the SFCCD, are the most recent financing mechanisms approved by the Bank's Board to support its increased engagement in climate change. In September 2008, donors from ten countries pledged $6.1 billion for the CIFs, with the majority coming from the US ($2 billion), the UK ($1.5 billion) and Japan (up to $1.2 billion). The CIFs include two funds, the Clean Technology Fund and the Strategic Climate Fund.

The Clean Technology Fund (CTF) provides finance for low carbon energy projects or energy technologies that reduce emissions. It will not limit the types of technologies eligible for financing to new renewables (like solar, wind, small hydro power), but instead keeps the door open to support for "clean coal" and large hydroelectric dams. According to the Bank "clean coal" represents "highly cost effective opportunities for significant GHG emissions reductions and/or there is potential for developing readiness for carbon capture and storage." Thus, the CTF supports technologies that reduce the carbon intensity of development, but not necessarily overall GHG emissions. Critics argue that the CTF supports a "business-as-usual" approach, rather than a real transition, to energy development.

Under pressure from introduced Congressional bills connected to US funds, investment guidelines excluding supercritical coal and projects not CCS-ready were promised at the Annual Meetings, but the official framework documentation has yet to include any real limitations on coal-fired power eligibility.

The Strategic Climate Fund (SCF) will be broader and more flexible and will support a variety of programs that tackle climate change. The primary program of the SCF is the Pilot Program for Climate Resilience (PPCR – which replaces the previously proposed Adaptation Pilot Fund).

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Annex 3: Differences between Study and World Bank-reported Funding Figures, FY2008

Country	Project Name	Institute	WBG Classification / CEIF Reporting	BIC Classification	WBG Amount (m$)	BIC Funding (m$)	Difference	Approval Date	BIC Notes from WBG documentation
Cote d'Ivoire	**Governance and Institional Development**	IDA	Other Energy / Access	Oil	77 (0 to fossil fuels)	13	13	12-Jun-08	Policy goals: a) strengthen public financial management; b) **capacity to manage upstream petroleum sector**, including revenue transparency and **ability to attract new investments into petroleum sector**
Tanzania	**Energy Development and Access Expansion**	IDA / GEF	Transmission & Distribution and New RE / Access and low carbon	gas and new renewable	105 (0 to fossil fuels)	26.4	26.4	13-Dec-07	Project involves refinance costs of Ubungo Expansion Project (substation using natural gas, 132 KW), and additonal new substation at airport (132 KW). BIC used Project Appraisal Document estimates on cost for substations using natural gas (26.4 million$). BIC also allocated New renewable - solar 4 million $. [Project also involves support to implementing IPTL heavy fuel oil to gas conversion - BIC did not allocate an amount of money to this activity - counted as transmission/access by Bank] [The Bank allocates 11.55 to new renewable / 90.3 to transmission / 6.5 GEF New R]
Ukraine	**Second Development Policy Loan**	IBRD	Other Energy / Other	coal and gas	57 (0 to fossil fuels)	57	57	20-Jan-07	1. Support for better regulation and transparent privatization in energy subsectors [of coal and gas]; and 2. DPL II benchmark: law on privatization of coal mines
India	**Cairn India II**	IFC	none	Oil	none	250	250	24-Jun-08	Production, pipeline, processing facility - Approved late in FY2008, Bank is probably counting it for FY2009
Argentina	**Pan American Energy LLC - Argentine Branch (II)**	IFC	Oil, gas and coal	Oil and Gas	150	550	400	05-Jul-07	BIC includes 400 in participating B loans that are part of the IFC package of funding
Argentina	**ROCH**	IFC	Oil and Gas	Oil and Gas	17	37	20	28-Feb-08	17 million A loan and 20 million B loans
Russian Federation	**Vostok**	IFC	gas	gas (exploration/production)	20	50	30	14-Dec-07	$20 million equity and $30 million long-term mezzaning and senior debt financing (B loans). IFC says the company will help increase production from minimal levels to 46 million cubic feet a day (16.8 billion cubic feet per year).
Indonesia	**Salamander**	IFC	Oil and Gas	Oil and Gas	50	75	25	6-Jun-08	SPI states $75 million
Philippines	**Calaca Power**	IFC	none	Fossil based power generation	none	300	300	12-Jun-08	Privatization of coal fired power plant. $150 mill is from B loan. Approved late in FY2008, Bank may be counting it for FY2009
Turkey	**Enerjisa Enerji Uretim A.S.**	IFC	thermal generation	gas and hydro	84.22	280.5	196.28	13-Mar-08	The gas thermal plant accounts for 933 Mw and the 10 hydro plants account for 972 Mw. IFC contribution is $200 mill A loan, $25 mill C loan, and $600 mill B loan. BIC allocated 34% of $825 mill (matches Bank percentage).
Egypt (& Bulgaria)	**Melrose II Expansion**	IFC	Oil, gas and coal	Oil	35 (for FY08)	50 (for FY07)	-35	11-Jun-07	Approved late in FY2007.
Pakistan	**Engro Energy Ltd.**	IFC	thermal generation (gas)	power generation from previously flared gas	56.9	0	-56.9	19-Dec-07	development, construction and operation of a 217 MW combined cycle power plant to be located in Qadirpur, District Ghotki, Pakistan. The power plant is expected to be a base load plant fueled by low btu gas, which is currently being flared. [The Bank counts this as thermal generation - BIC did not count this against fossil fuels or GHG emissions because the gas would otherwise be flared.]
Peru	**BPZ RI**	IFC	Oil, gas and coal	none	4	none	-4		Can not find this project on IFC website
China	**Far East Energy Corp (FEEC)**	IFC	Oil, gas and coal	Coalbed methane	19.3	0	-19.3	23-Aug-07	BIC does not count coalbed methane against fossi fuels. IFC counts this as coal in their spreadsheet.
Total Fossil Fuel Difference							**1,202.48**		
Mexico	**Integrated Energy Services**	GEF	New renewables / blended low carbon and access	Wind, biomass, solar	15	5.87	-9.13	17-Jan-08	The project mainly involves capacity building and investmet for rural electrification. Only part of the project specifies the promotion of renewables for rural electrification (GEF breif specifies 5.8 for this activity, which doesn't only involve renewable).
Philippines	**Ambuklao-Binga - SN Aboitiz Power Benguet**	IFC	none	Large hydro	none	85		12-Jun-08	Approved late FY2008 (signed August 6, 2008)
Turkey	**Enerjisa Enerji Uretim A.S.**	IFC	large hydro (and thermal generation) / blended low carbon and access	large hydro (and fossil fuel power generation)	163.48	544.5		13-Mar-08	The gas thermal plant accounts for 933 Mw and the 10 hydro plants account for 972 Mw. IFC contribution is $200 mill A loan, $25 mill C loan, and $600 mill B loan. BIC allocated 66% of $825 mill (matches Bank percentage).
Chile	**La Confluencia**	IFC	large hydro / blended low carbon and access	Large hydro power	83	208		04-Oct-07	IFC contribution: $83 mill A loan and $125 mill B loan

Morocco	**Office National de L'Electricite (ONE) Support Project**	World Bank	(other, EE, and transmission; no renewables)	new renewables / Wind	0	15	15	10-Jun-08	Promotion of Wind
India	**Rain Carbon Delivery Guarantee (CDG)**	IFC	new renewables	carbon credits	39	0	-39	13-Dec-07	The proposed transaction involves providing an IFC Carbon Delivery Guarantee (CDG) for Certified Emissions Reduction Credits (CERs) generated by Rain Calcining Limited. In 2004, IFC financed Rain's expansion, which involved establishing a new 300,000 tpa kiln and associated facilities, doubling the Company's CPC capacity. A benefit from this project was that waste heat from the new kiln could be used to eliminate Rain's dependence on fossil fuel for power generation, leading to CERs. **IFC documents state that the IFC will purchase and on-sell CERs. "There is no investment or project financing involved in this transaction." So, BIC did not give a funding amount. However, the Bank's Energy figures spreadsheet assigns $39 million.**
Ukraine	**ISD II (Industrial Union of Donbas - Alchevsk)**	IFC	Energy Efficiency	EE (Improving competitiveness of steel mills)	41.1	20	-21.1	20-Dec-07	It is unclear by the SPI how much investment would actually go to energy efficiency (carbon finance is already providing approx. 13 mill). The SPI never uses the terms energy efficiency, only modernization and competitiveness. (Bank spreadsheet allots $40 mill of the $100 mill of IFC A loan. There is also potential for $250 B loan, not yet obtained.)
Turkey	**Petlas**	IFC	Energy Efficiency	tire production/ distribution	29.25	0 (for EE)	-29.25	14-Jun-08	It is not clear how much the project will involve actual energy efficiency. The SPI mainly talks about expansion and helping a company break into and hold its position in the market.
Cameroon	**Energy Sector Development SIL**	World Bank	new renewables / blended low carbon & access	mixed (Fossil-based power generation & renewables)	48.75	0 (no allocation)	-48.75	24-Jun-08	objective is to increase access to modern energy in targeted rural areas and improve the planning and management of sector resources by all energy sector institutions. A) $45 million financing and planning mechanism for rural energy; B)improving legal and regulatory framework; C) improving the preparation of energy projects, thru technical assistance on specific projects,
Total RE and EE Difference							-132.23		

Endnotes

[1] The World Bank defines ***new* renewable energy** as energy from solar, wind, biomass, geothermal energy, and hydropower facilities with capacities up to 10 MW per facility.

[2] Data on oil, gas, and mining project financing was obtained from individual project documents published on the World Bank, IFC, and MIGA websites; from World Bank and IFC Annual Reports (FY2000 to FY2008); from the WBG's Implementation of the Management Response to Extractive Industries Review (November 2005 and December 2006); FY2008 figures were adjusted using a World Bank Group-supplied spreadsheet; and additional data for oil, gas, and mining for FY2000 to FY2004 were obtained using End Oil Aid's database from its website at: http://www.endoilaid.org/. World Bank project financing data on renewable energy and energy efficiency for FY1998 to FY2006 and for FY2008 were obtained from individual project documents published on the World Bank website. IFC and MIGA project financing for renewable energy projects for FY1998 to FY2006 and for FY2008 were obtained from individual project documents published on the IFC and MIGA websites; World Bank, IFC, and MIGA RE and EE data for FY2007 were obtained from Annex 3 of "Clean Energy Investment Framework Progress Report".
IFC energy efficiency aggregate figures for FY2006 were obtained from "Improving Lives: World Bank Group Progress on Renewable Energy and Energy Efficiency in Fiscal Year 2006"; and IFC energy efficiency figure for FY2008 was obtained from an IFC-provided spreadsheet and checked against individual project SPIs.

[3] In the Management's Response to the Extractive Industries Review (2004) and at the International Renewable Energies Conference in Bonn, June 2004, the World Bank Group announced a commitment to scaling up lending for new renewable energy and energy efficiency by at least 20% annually over five years (FY05-FY09), and leading a Renewable Energy and Energy Efficiency Financing and Policy Network for developing countries.

[4] Excluding funding from B loans, WBG financing for fossil fuels is still more than 3 times as much as new renewables.

[5] Coal-based projects include: Tata Ultra Mega construction of super critical coal plant (India), Calaca Power privatization of coal-fired plants (Philippines), Masinloc Power Partners Co. privatization of coal-fired plant (Philippines), and PT Makmur Sejahtera Wisesa (MSW Power) (Indonesia). Note: $150 million for coal projects was from IFC-facilitated B loans.

[6] A study of WBG energy sector lending conducted by WWF (June 2008) found that the World Bank and IFC's proportion of financing going towards gas as opposed to oil had increased over the five-year period from FY03 to FY07, from 52% to 71% respectively. Unfortunately, this trend did not continue in FY08. Although much of the World Bank's fossil fuel-based lending continues to be largely for natural gas, the IFC, which lends exclusively to the private sector, lent a significant portion of its portfolio to oil and coal. In FY08, the IFC provided approximately $1 billion to oil, over $1 billion to coal, and approximately $730 million to gas (plus $150 million went to projects involving a mix of oil and gas).

[7] In FY08, FI accounted for $42.3 million of new RE funding and $255 million of EE funding.

[8] The World Bank Group press release (September 25, 2008; "Renewable Energy and Energy Efficiency Lending Up 87 Percent") stated that the Bank had increased spending on renewable and energy efficiency projects by 87 percent over the past year, with $2.7 billion spent on low-carbon projects or about 35 percent of its total energy lending for the fiscal year. The 87% increase includes large hydro power and includes funding from IDA/IBRD, IFC, MIGA, GEF, Carbon Offsets, and the GPOBA fund.

[9] There are also some B loans involved in large hydro power projects, but given large hydro power is not a main focus of the paper, the statistics were not compiled.

[10] WWF-Craeynest, Lies and Daisy Streatfeild, June 2008. "The World Bank and Its Carbon Footprint: Why the World Bank is still far from being an environmental bank. WWF-UK-World Wide Fund-United Kingdom. June 23, 2008

[11] This study does not account for the GHG impacts of these additional processes involved in fossil fuel consumption. Combustion accounts for the vast majority of the GHG emissions associated with fossil fuels.

[12] This study attempted to provide the latter breakdown, but found in most cases that there was not enough project information to clearly determine demand and supply projects, especially in the case of FI-based projects.

[13] US EPA, 2001. Inventory of US Greenhouse Gas Emissions and Sinks: 1990 – 1999. US Environmental Protection Agency, April 2001.

[14] US Energy Information Administration (2007), Documentation for Emissions of Greenhouse Gases in the United States 2005, DOE/EIA-0638 (2005), October 2007, Tables 6-1, 6-2, 6-4, and 6-5.

[15] The goal of the World Bank Bali Breakfasts is to bring finance and economic ministers around a table to talk about climate change, an issue they rarely otherwise discuss. There have been two Bali Breakfasts so far, during the Spring Meetings (May 2008) and during the Annual Meetings (October 2008), which focused on carbon markets.

[16] Carbon Delivery Guarantee product - IFC assures delivery of carbon credits from companies in developing countries to buyers in developed countries that can help clients maximize the potential for clean energy and other climate friendly and low carbon investments.