Foreclosing the Future

COAL, CLIMATE AND PUBLIC INTERNATIONAL FINANCE

ENVIRONMENTAL DEFENSE FUND
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AUTHOR
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Environmental Defense Fund
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The complete report is available online at www.edf.org.

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1. Introduction

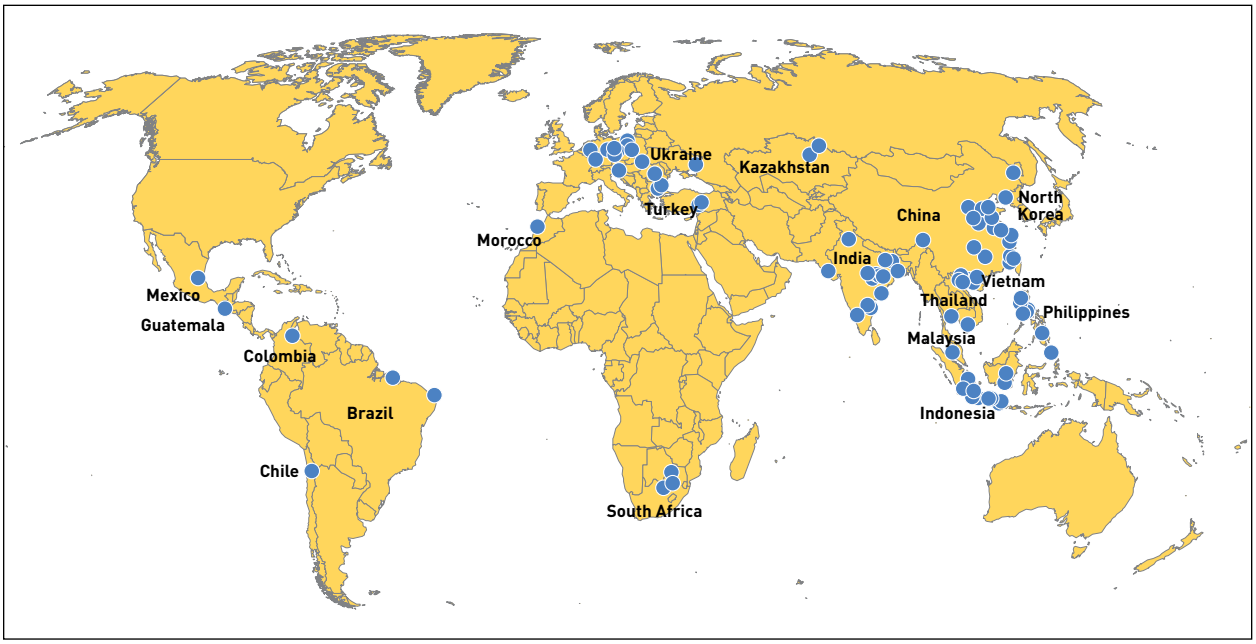
The World Bank and other international public financial institutions are continuing a 15-year trend of supporting coal-fired power plant construction throughout the developing world and economies in transition. By financing this new carbon-intensive infrastructure, multilateral development banks (MDBs) and export credit agencies (ECAs) of the industrialized world are hamstringing the fight against global warming, and setting back longer term efforts to alleviate poverty in the world's poorest countries.

A new analysis by Environmental Defense Fund of the World Bank, other MDBs and ECAs found 88 new and expanded plants financed since 1994. These plants will generate around 791 million tons of CO_2 emissions per year, or more than 77% of the current emissions for coal-fired power in the entire European Union.[1] EDF health experts have estimated that between 6000 and 10,700 additional deaths per year—just from cardio-pulmonary diseases and cancer—are attributable to the coal plants identified in this report.[2] (For an analysis of these health costs, see *Estimating the Health Impacts of Coal-Fired Power Plants Receiving Public International Financing* at: edf.org/documents/9553_coal-plants-health-impacts.pdf.)

More than $37 billion in direct (over $100 billion in indirect) financial support for new coal-fired generation has been provided by MDBs and ECAs since 1994, the year the United Nations Framework Convention on Climate Change (UNFCC) entered into force. This dwarfs the $6.36 billion mobilized by the United Nations Global Environment Facility for climate change mitigation over the same period.[3] According to the International Energy Agency (IEA), without a decisive reorientation of international energy investment from carbon intensive sources in developing countries and economies in transition, atmospheric CO_2 will overshoot the point of no return for dangerous global warming, even if the industrialized world were to reduce its CO_2 emissions to zero by 2030.[4]

This year's Spring Meetings of the World Bank and the International Monetary Fund, on April 25 and 26, takes place in the shadow of two historic crises: the worst international economic downturn since the Great

A world of coal

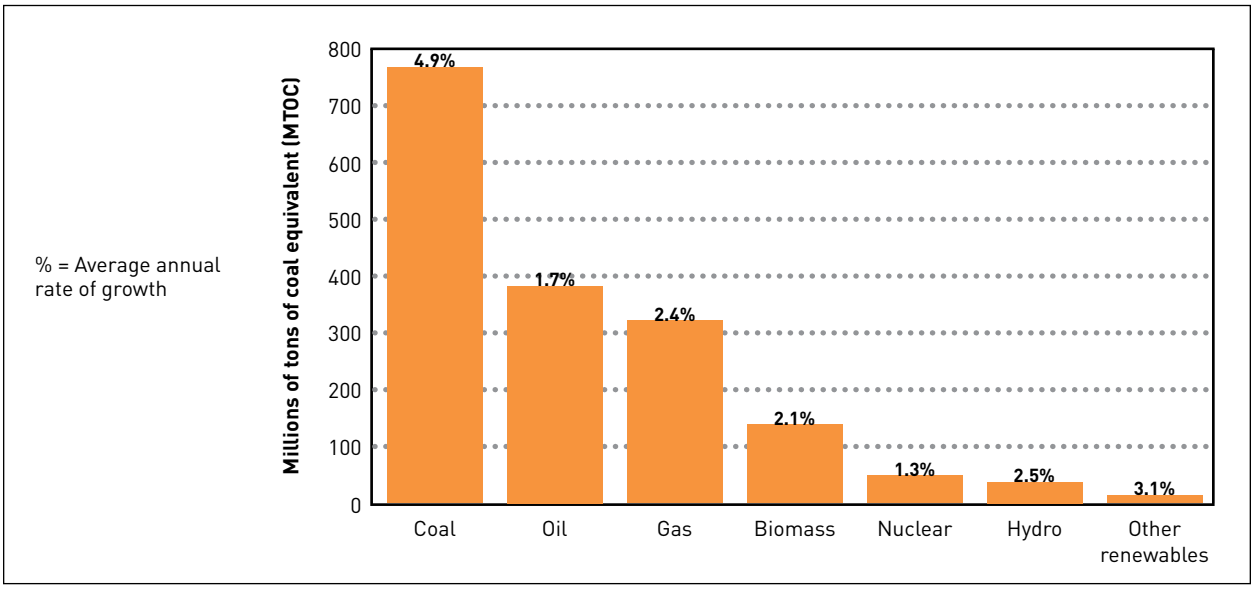


Between 1994 and January 2009, international public financial institutions provided more than $37 billion to help build 88 coal-fired plants in developing countries and emerging economies. In Europe, the plants are in Bulgaria, Czech Republic, Germany, Poland, Romania, Slovakia, Slovenia, Turkey and Ukraine. Source: Carbon Monitoring for Action (carma.org)

Depression and accelerating global warming, which new data shows is occurring more rapidly than was forecast by even the most pessimistic models one year ago.

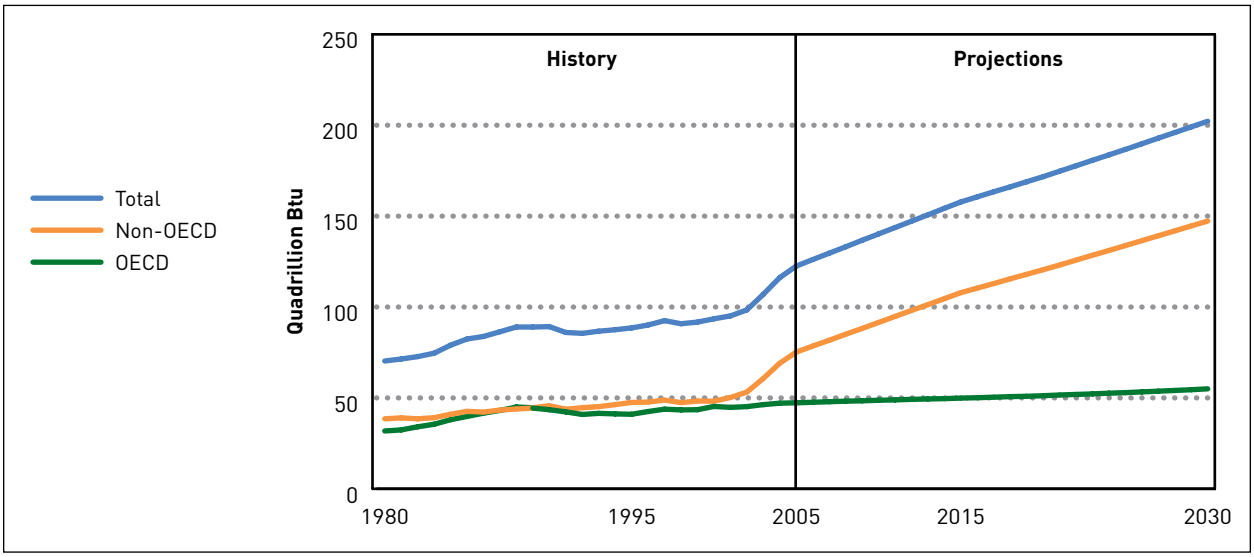
The global recession, with the accompanying collapse of much private international finance, promises to enhance the influence of the already powerful Bank and Fund. Moreover, in an effort to stimulate trade and development, the international community is preparing to greatly increase the resources of both MDBs like the World Bank and ECAs to stimulate the economies of developing nations.

Incremental world primary energy use by fuel, 2000–2006



Source: IEA, 2008

World coal consumption by country grouping, 1980–2030



Sources: History: Energy Information Administration (EIA), *International Energy Annual 2005* (June–October 2007), website eia.doe.gov/iea. Projections: EIA, World Energy Projections Plus (2008). OECD refers to the Organization for Economic Cooperation and Development, the think tank and negotiating forum for the world's 28 rich industrialized nations plus Mexico and Turkey.

The current lending strategies of these institutions in the energy sector are seriously flawed. Unless they decisively shift their energy investments from coal—the most carbon-intensive of all fuels—to available low-carbon alternatives, their work in the developing world will likely contribute to an environmental and economic crisis spurred by accelerating global warming.

Global coal use, mainly for power production in non-OECD countries, grew at 4.9% a year between 2000 and 2006, faster than any other fossil fuel, and faster than the use of modern renewable energy (wind, solar and geothermal), which grew at an annual rate of 3.1%. (World total energy demand during this same period grew at 2.6% per year).[5]

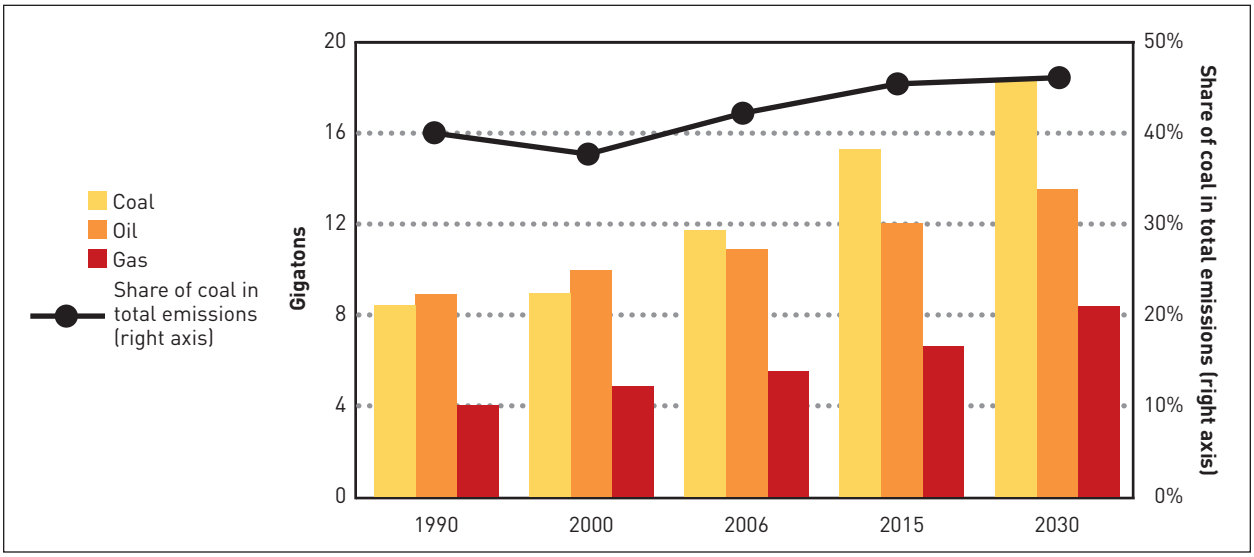
The IEA projects that if we do not change course, global use of coal will grow at 2% per year to 2030 as opposed to an overall growth of world energy demand of 1.6% annually.[6] Ninety-seven percent of this projected increase will occur in developing countries and economies in transition, much of it driven by investments in new coal-fired power plants.[7]

The warming planet: from RIO to today

In April 2008 the International Finance Corporation of the World Bank Group and the Asian Development Bank approved a total of $850 million in loans to finance the 4000 MW super-critical coal-fired private sector Tata Mundra power plant in Gujarat State, India.[8] The Export-Import Bank of Korea approved another $700 million in loans and guarantees to support the project. The Mundra plant, the first of nine similar plants planned in India over the next several years, will be one of the largest new single point sources of greenhouse gases on earth, emitting 26,700,000 tons of CO_2 a year for the next 40 or 50 years. That is equal to more than two-thirds of current annual CO_2 emissions from all the coal plants in Latin America.[9]

In comparison to the $1.55 billion in public international finance for this one coal plant, the largest existing international entity designated by the UNFCCC to finance climate mitigation in developing countries worldwide, the Global Environment Facility (GEF), is currently funding all of its climate mitigation projects at a rate of $250 million a year.[10]

World energy-related CO_2 emissions by fuel



Source: IEA, 2008. Based on the "Reference Scenario" or the business-as-usual projection of energy and CO_2 emission trends to 2030, without major changes in energy investment policy and priorities.

The loans for Tata Mundra came 16 years after the Rio Earth Summit in 1992, at which the world's nations first committed to addressing the climate crisis with "common but differentiated responsibilities." At Rio, the industrialized nations accepted their preponderant responsibility for past and current emissions of greenhouse gases (GHGs), and the special needs of developing countries to prioritize economic growth for poverty alleviation.[11]

Nearly all of the world's nations signed the UNFCCC, at Rio in 1992, and the convention legally entered into force in March, 1994. In the UNFCCC the richer industrialized nations committed to provide additional financial resources to address climate change in developing countries and to "promote, facilitate, and finance the transfer of, or access to, environmentally sound technologies" in these countries to address climate change.[12]

But was the increased financing of coal-fired power plants in developing countries really what was envisaged by the world at Rio?

The 2008 World Energy Outlook report of the IEA projects, for the years 2006 to 2030, that 97 % of the increase in world energy-related CO_2 emissions will come from poorer countries that are not members of the OECD. In fact, according to the IEA, if the current trend of increasing carbonization of new energy sources in the developing world continues, the OECD nations could reduce their CO_2 emissions to zero by 2030 and the entire planet would still overshoot irreversibly past the point of no return for climate disaster.[13]

Over the next 20 years, the world will see the greatest turnover and growth of energy-producing capital stock in history. A significant amount of that growth will occur in the developing world, and especially among the emerging economies of Asia. If the world does not make a major shift in energy investment priorities, it may well lock in its dependency on high carbon energy sources, with potentially grave effects on the world's climate.

2. MDBs and ECAs

Public international finance is dominated by two kinds of institutions: multilateral developments banks and economic credit agencies. Among the MDBs, the World Bank Group and Asian Development Bank are the two most important for our study, but there are several others, including the Inter-American Development Bank (IDB), the African Development Bank (AFDB), the European Bank for Reconstruction and Development (EBRD), and the European Investment Bank (EIB). All of these public financial institutions are largely controlled and financed by the rich industrialized nations.[1]

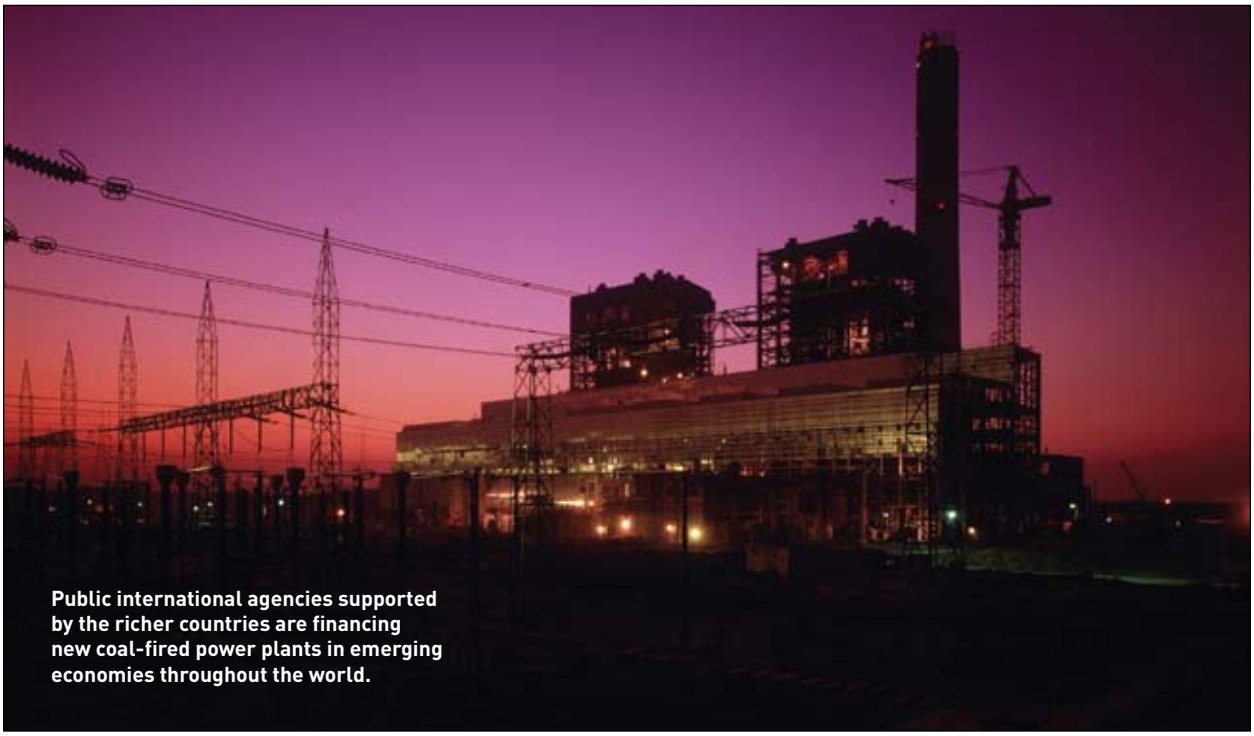
In recent years, the MDBs have loaned more than $55 billion a year, and about one third of that has gone into areas like energy, mining, industry and transportation, with major GHG implications.

The global economic crisis is leading to a greatly expanded role for these institutions. The April 2, 2009 London Summit of the Group of the world's 20 largest economies (G-20) called upon the MDBs to increase lending by $100 billion a year over normal lending amounts through 2011, as well as for substantial increases of the MDBs' lending capital. The G-20 called for a capital increase in the resources of the Asian Development Bank alone of $100 billion.[2]

ECAs are the other major source of public international finance for fossil fuel projects in non-OECD countries. They are government or government guaranteed financial institutions that provide loans, loan guarantees and/or insurance to promote the exports and investments abroad of companies and businesses in their respective home countries.

The largest ECAs among the 30 member nations of the OECD include the U.S. Export Import Bank and the Japan Bank for International Cooperation (JBIC). In 2007, the world's ECAs supported about 10% of world trade (but a greater proportion in developing countries), or about $1.4 trillion in transactions and investments.[3]

Though most ECA financial support goes for short-term trade finance, a significant portion (over $120 billion annually from OECD countries) goes for longer term loans and guarantees, most often in support of large



Public international agencies supported by the richer countries are financing new coal-fired power plants in emerging economies throughout the world.

PETER BOWATER/ALAMY

project finance in developing countries and economies in transition.[4] On average, over a third of this lending goes for climate sensitive sectors like power, industry, mining and infrastructure.

International public money for coal plants

EDF identified $37.04 billion in public international financing for some 88 new coal plants and expansions and life extensions of existing plants since 1994. It is important to note that, on average, every dollar of public finance attracts at least two to three dollars of private finance. Thus the total of public funds and private finance for our sample is very probably well over $100 billion. By comparison, the Global Environment Facility, until recently the single largest funding agency for climate change mitigation, has mobilized around $2.69 billion for climate mitigation since 1994.[5]

This data represents only a partial picture of public international financing of coal power plants over the past 15 years. (See Appendix A: Note on Methodology," page 21) Nevertheless, it gives a sense of the scale and impact of public international finance on the growth in coal power, and of the urgent need to redirect public energy finance along a climate-friendly path.

Future annual CO_2 emissions from financing of ongoing coal-generating capacity and of future operational additions to the plants in the database EDF compiled for this report, account for some 791,000,000 tons

The top 15 public international financers of coal-fired power plants 1994–January 2009

Public financial institution	Origin	Total financing (in millions US$)	Number of financing projects*
Japan Bank for International Cooperation (JBIC)	Japan	8139	21
World Bank Group (IBRD/IDA/IFC/MIGA)**	Multilateral	5315	29
Asian Development Bank (ADB)	Multilateral	3913	20
US Export-Import Bank	United States	3479	17
European Investment Bank (EIB)	Multilateral	2511	9
Nippon Export and Investment Insurance (NEXI)	Japan	2089	6
Kreditanstalt für Wiederaufbau (KfW)	Germany	1769	6
China Development Bank	China	1681	3
Euler Hermes	Germany	1174	5
European Bank for Reconstruction and Development (EBRD)	Multilateral	869	9
SACE (Instituto per i Servizi Assicurativi del Credito all'Esportazione	Italy	789	2
Export-Import Bank of Korea (Kexim)	Korea	700	1
Overseas Private Investment Corporation (OPIC)	United States	685	6
Export Credits Guarantee Department (ECGD)	United Kingdom	606	2

* It should be noted that "projects" means financing projects, referring specifically to each individual financial transaction made by MDBs and ECAs to their financing recipients. Individual power plants or power plant operators sometimes receive multiple financing transactions from repeat or multiple sources. Thus, in the spreadsheet detailing the data for the report we identify 124 separate financing projects for 88 coal plants and coal plant expansions. In the case of the World Bank Group, for example, we list 29 financing projects which have gone to 22 separate coal plants.

** The World Bank Group includes financing from IFC ($2,467 mln, 17 projects), MIGA ($393 mln, 4 projects) and IBRD/IDA ($2,455 mln, 8 projects).

annually of CO_2. This is equivalent to the CO_2 emissions of France, the Netherlands, Belgium, Switzerland and Ireland combined, or 90% of the annual emissions of Germany, the European Union's single largest source of CO_2.[6]

Among the public international financers of coal plants, Japan's export credit agency, JBIC, and public foreign investment insurance agency, NEXI, were No. 1, accounting for over $10 billion since 1994. This is no surprise given that most of the world's additional coal-fired capacity over that period has been built in Asia, Japan's fastest growing export market.

These Japanese government guaranteed funds have added future emissions of 115,966,000 tons of CO_2 annually, more than 25% of Japan's total annual CO_2 emissions from power generation, and nearly 43% of that from all existing coal-fired power plants in Japan.[7]

Next on the financing list were the United States Export-Import Bank (EXIM) and Overseas Private Investment Corporation (OPIC), with some $4.164 billion for 19 different coal-fired projects.[8] Germany, between its ECA Euler Hermes and its public development bank the Kreditanstalt fuer Wideraufbau (KfW), came in third, with some $3.131 billion in publicly supported finance.[9]

China, too, has emerged as an important public international financer of large infrastructure and resource extraction projects in developing countries. Four major Chinese public financial institutions: Bank of China, China Development Bank, China Export-Import Bank, and Sinosure (the Chinese public foreign investment insurance agency), provided $3.131 billion since 1994 for several major coal power plants in Indonesia.

The largest single category for financing coal plants, however, are the MDBs. Among them, the World Bank Group and the Asian Development Bank are the second and third largest single public financing institutions for the expansion of coal-fired power plants since 1994. Their financial commitments total $5.315 billion and $3.623 billion, respectively.

The total annual CO_2 emissions from coal fired power supported with finance from the World Bank Group and Asian Development Bank since 1994 amount to 312,579,529 tons, about 30% of the total CO_2 emissions from coal fired power plants in the European Union in 2006.[10,11]

Shortchanging greenhouse gas mitigation

As outlined above, $100-plus billion of public international financial support has been made available by MDBs and ECAs for coal-fired power over the past 15 years. This dwarfs the amounts that have gone to mitigation of GHG emissions over the same period.

From its creation in 1994, through 2008, the Global Environment Facility (GEF) has been the principal financial resource for addressing climate mitigation, with some $2.69 billon in committed funds (plus about $170 million more from two affiliated programs for a total of $2.86 billion).[12]

In addition, the World Bank claims that of the $1.6 billion in GEF mitigation investment funds it has managed to date, 2.2 times as much as been leveraged from the Bank, which would amount to another $3.5 billion over the past 15 years.[13] Together, the $2.86 billion and $3.5 billion add up to $6.36 billion.

Some would argue that the market price of Clean Development Mechanism (CDM) carbon offset credits should be added to the finance totals for climate mitigation. [14,15] The World Bank estimates that since 2002 CDM carbon offsets "transacted onward from 2002," had a "cumulative value exceeding US $16 billion," an amount that was leveraged up to "US $53 billion."[16] In addition, the World Bank, in tallying its resources dedicated to climate change mitigation, includes some $2.1 billion managed in ten different carbon trading funds in its Carbon Finance Unit (CFU).[17]

Increasingly, however, the real net GHG reductions of many of these CDM carbon credits have been questioned. Among other things, CDM credits can go to subsidize new super-critical coal-fired power plants, as is the case at Tata Mundra. And the United States General Accounting Office (GAO) released a study in late 2008 questioning the real contribution to mitigating global GHG emissions of the entire CDM program.

The GAO study noted that "it is nearly impossible to ensure that [CDM] projects are additional—that is, the emissions reductions would not have occurred in the absence of the CDM."[18] Still, assuming that all CDM transactions have resulted in additional GHG reductions, the total estimated value of all of the carbon offset transactions leveraged by the CDM and World Bank carbon funds amounts to some $55 billion. If we add that amount to the $6.36 billion of cumulative mitigation finance claimed by the World Bank from the GEF, we get about $61.36 billion of net additional international funds leveraged for mitigation since 1994.

This amount still falls at least $40 billion short of the amounts catalyzed by public international financing just for coal plants since the entry into force of the UNFCCC in 1994. In reality, the disparity is probably much greater because, as we have noted, the net additional GHG reduction impact of much of the mitigation funding appears at the very least open to question.

What is clear is that over the past 15 years public international finance for new carbon intensive coal-fired plants (not to speak of other fossil fuel projects) has been considerably larger then direct new additional funds for GHG emission mitigation. This situation must be changed for there to be any hope of meeting the daunting challenges of putting the world on a path to achieving a 450 parts per million level of atmospheric $C0_2$ by 2030. That is the threshold, in the view of most scientists and many governments, beyond which the world risks dangerous, irreversible global warming. (See Appendix D, page 27, for a discussion of atmospheric levels of CO_2 and their climate effects.)

3. The cost of fighting climate change

There are a number of estimates for the cost of mitigating climate change by 2030. According to the IEA, achieving a level 450 ppm of CO_2 in the atmosphere would require both a major shift in energy investments from carbon intensive fuels and toward renewables—some $3.6 trillion additional in the power sector alone, about half of which would be in non-OECD countries. Three trillion more dollars would have to be invested in energy efficiency, and the total extra costs would amount to 0.55% of world GDP per year.[1]

The financial burden on OECD countries will be very great indeed, since they will pay not only for reducing their own GHG emission growth rates, but also for the incremental costs of less carbon intensive energy investments in non-OECD countries. OECD members will have to contribute as well to climate change adaptation in the developing world.

The most recent UNFCCC paper on the additional investment and financial flows needed to mitigate climate change came up with an annual figure of $200.5 billion to $210.5 billion in additional investments to achieve a 450 ppm CO_2 level by 2030, of which around $65 billion annually would be for developing nations. The paper calls for a global reduction of projected investments in fossil fuel power generation and transmission of $148.5 billion, accompanied by a reduction of $59 billion in projected investment in fossil fuel supply.

Most of this investment is then shifted to an increase of $148.5 billion in renewables, hydropower, nuclear and carbon capture and storage. Seventy-nine billion dollars is shifted from future fossil fuel power in developing countries, along with a reduction of $32.5 billion in fossil fuel supply investment, to an increase of $73.4 billion in low carbon energy alternatives.[2]

However, a November 2008 UNFCCC update of these estimates radically increased the amounts needed, stating that investments needed to reduce energy-related CO_2 emissions in the power sector should be revised upward by 170%, adding another $252.45 billion annually to the 2007 estimate, for a new total of around $457 billion, give or take $5 billion.[3]

These figures run along the lines of the 2008 IEA estimates—$6.6 trillion for power and energy efficiency over 20 years—or around $330 billion annually. In fact, the UNFCCC energy-related calculations are based on those of the IEA.[4]

If the increased investment in the power sector in developing countries is proportional to the overall investment figures, then an added $119.18 billion a year will be needed in new low carbon energy generation, after subtracting savings from the high carbon fossil fuel plants not built.[5]

What all these estimates make clear is that the cost of fighting climate change will be enormous, and that the new, additional funds being made available for mitigation in developing nations fall way short of what is needed.

According to the UNFCCC, prospective new multilateral and bilateral finance for mitigation totals around $18.43 billion over the period 2008–2012, or around $3.6 billion a year. Over $16 billion comes from two sources: a five-year $10 billion Japanese commitment to a "Cool Earth Partnership," and some $6.34 billion in donor commitments to new World Bank "Climate Investment Funds," of which approximately two thirds is designated for a "Clean Technology Fund."[6]

Carbon markets and the CDM could provide much larger amounts of finance for mitigation, in which the CDM could continue to play a key role, but the environmental and climate issues associated with internationally traded offsets will have to be resolved if real mitigation is to be achieved. The dilemma is that while we can be sure that every dollar of public finance for new coal-fired power plants will add massive amounts of CO_2 to the atmosphere for the next 40 or 50 years, it's not clear that every dollar for mitigation in the developing world will actually contribute to a net decrease in GHG emissions.

All of these financing considerations point to a single conclusion: additional international public contributions to developing countries will fail to avert dangerous global climate change unless public international energy sector finance is radically shifted toward decarbonization. And that must start with a shift from investing in coal plants, unless they are carbon neutral.

4. Climate and the ECAs

Disaggregated data on public international financing of fossil fuel power plants, let alone coal plants, are not readily available.[1] In fact, while the MDBs have long published annual reports listing all financing transactions for individual projects and loans, the ECAs remain for the most part relatively untransparent. Many still do not release annual information giving details on individual projects they have financed, not to speak of their GHG emissions.

There are some windows on ECA activity, however. A lawsuit filed in 2002 against US EXIM and OPIC by Friends of the Earth, Greenpeace, Boulder Colorado and three California cities alleged that over a ten-year period, EXIM and OPIC provided $32 billion in finance for fossil fuel projects that over the lifetime of the projects would discharge a total of 32 gigatons of CO_2.[2]

A 2000 study of the World Resources Institute (WRI) examined OECD ECA financing of CO_2 emission intense investments and exports in developing countries from 1994 through the first quarter of 1999.

WRI concluded that over the six-year period ECAs accounted for $44.4 billion in financial support for CO_2 intensive projects and exports that were heavily concentrated in fossil fuel power, oil and gas development. The co-financing, leverage effect of ECA involvement attracted $103 billion in public and private finance linked to ECA support for these projects and exports, or "just under half of all trade and project finance going to energy-intensive sectors in developing countries."[3]

A subsequent 2003 study by WRI staff found that between 1996 and 2001 the ECAs of the United States, Japan and Germany financed new coal-fired power plants with a capacity of 10,228 MW, and 6,715 MW of thermal generating power, a category which could be coal or gas.4 Because of the Japanese and German ECAs' lack of transparency at the time (no data on fuel type or technology was publicly released), it was impossible to determine whether the plants characterized as "thermal" were gas or coal.

The 10,228 MW of new coal generation financed by these three ECAs over just six years locked in roughly 75 million additional tons of annual CO_2 emissions to the world's atmosphere for coming decades, equivalent to over 5% of ongoing annual CO_2 emissions from all fossil fueled power for the entire European Union.[5]

The World Resources Institute has characterized the contradiction between these huge flows of OECD government-supported finance for carbon intensive capital stock and investments in developing countries as nothing less than a "policy perversity" on a global scale as rich governments urge year after year reductions in carbon emissions on their own populations and for developing nations while subsidizing huge amounts of finance annually for the most carbon intensive investments abroad.[6]

Traditionally, ECAs and public foreign investment insurance agencies did not have a development mandate per se. Their missions were, and still largely are, to promote the exports and investments of home companies and businesses abroad. Since 2003, however, the ECAs of the OECD have committed themselves to common environmental assessment procedures and standards, based largely on those of the World Bank Group.[7] A few ECAs, like the UK Export Credits and Guarantee Department, have declared that their mission includes sustainable development and human rights considerations.

The common ECA environmental procedures and standards, known as the OECD "Common Approaches on Environment for Officially Supported Export Credits," were strengthened in 2007. Strangely, however, they remain silent on climate. The OECD ECAs did adopt, in 2005, an agreement on more favorable lending and credit terms for renewable energy (wind, geothermal, tidal and stream power, wave power, solar photovoltaic, ocean thermal energy and bio-energy) and water (water supply for human use and wastewater treatment facilities). The agreement extends common allowable loan periods to 15 years, as opposed to the existing agreed limits of 12 years for loans to power projects and 8.5 to 10 years for water projects.[8]

Under this program, over a three-year period (July 2005 through June 2008) the total value of the export credit finance for renewables of all the OECD ECAs was approximately $933.6 million, but of this amount over two thirds ($624.58 million) went for a single hydroelectric dam.[9]

Thus, joint ECA efforts to promote renewables through more favorable financing terms have amounted to financial support totaling a little over $310 million a year, whereas over the past 15 years ECAs have been committing finance just for coal plants at a rate of at least $1.5 billion a year.

In recent years some ECAs have also on an individual basis done more to promote renewables, but again the relative lack of transparency of ECAs makes it difficult to ascertain what they are financing collectively, apart the joint favorable financing terms discussed above. Germany's KFW committed around $97 million annually for renewable energy projects between 2004 and 2007.[10] Probably the largest single recent new financial commitment for clean energy in developing countries involves the single largest public financer of new coal plants, Japan's JBIC. JBIC will administer a significant portion of the $2 billion annual five-year "Cool Earth Partnership" initiative launched in 2008 by the Japanese government.

Thus, ECAs could play an important role in promoting the needed transition to a low carbon future, but without a coherent climate policy their financial support just as often works at cross purposes with climate goals. For example, JBIC is also preparing to finance four new coal fired power plants in Vietnam, India and Indonesia later in 2009 with an installed capacity of 3,690 MW (with an estimated 31.84 million tons a year in CO_2 emissions); no information is yet available on the prospective loan and guarantee amounts for these projects.[11]

The American connection: a climate-friendlier future for U.S. EXIM and OPIC?

EXIM and Overseas Private Investment Corporation have been environmental leaders among ECAs and public investment insurance agencies, being the first to adopt environmental assessment procedures in the early 1990s. But EXIM to date has done little to expressly address climate change concerns, apart from reporting in an aggregate form in its annual report the CO_2 and methane emissions from projects it finances which produce over 50,000 tons of CO_2 equivalent a year.[12] EXIM also has an environmental exports program, which in 2008 provided a total of $22.9 million in financial support for renewable energy technology exports worth over $100 million.[13]

OPIC appears to have committed to more. In 2007 OPIC launched a Greenhouse Gas Clean Energy Initiative which involves:

1. annual reporting on GHG emissions from every OPIC project with major emissions, as well as projected emissions for new projects receiving OPIC support;

2. a commitment to reduce direct GHG emissions associated with projects in the OPIC portfolio by 20% over ten years from the 2007 level; and

3. more support for energy efficiency, renewable energy and clean technology.[14]

In addition, in February 2009 EXIM and OPIC agreed to a settlement to end a lawsuit brought against them in 2002 by Friends of the Earth, Greenpeace, Boulder, Colo., and four California cities over their failure to prepare Environmental Impact Statements under the National Environmental Policy Act for the climate impacts of projects they finance.[15]

EXIM agreed to account for (and disclose at least 30 days in advance any financing decision) prospective annual CO_2 emissions for all fossil fuel projects it considers. It also agreed to develop a carbon policy in consultation with environmental groups designated by the plaintiffs, which will include incentives to reduce CO_2 emission projects in its portfolio, promote energy efficiency projects and establish a $250 million Renewable Energy Loan Guarantee Facility.

In its settlement agreement, EXIM also agreed to take a leadership role in the OECD in promoting an agreement among ECAs on climate change and GHG mitigation.[16] This latter provision is critical, since it

means that the United States will promote a common climate change policy that would be, for competitive reasons, as rigorous as EXIM's new climate polices.

For its part, OPIC agreed to prepare full environmental impact assessments for all projects that emit more than 100,000 tons of CO_2 a year, and to establish a $250 million revolving renewable energy fund with preferential financing terms. The settlement also made legally binding OPIC's commitment to reduce GHG emissions in its portfolio by 20%.[17]

OPIC also committed to develop and promote comprehensive energy efficiency requirements and benchmarks to be utilized by applicants for its insurance and loans. Moreover, OPIC-supported projects will be required to document methods to reduce energy consumption and improve efficiency.[18]

Although the detailed implementation of the Settlement Agreement will be worked out in coming months, it already provides for measures that should be part of climate change policy reforms for all ECAs.

5. Climate policies of the World Bank and the MDBs

Ever since the 1992 Rio Earth Summit, the World Bank Group has been the main executing agency for GEF investment projects, around 40% of whose funding has gone for addressing climate change. Thus it is particularly alarming that the World Bank Group and the ADB in particular, not only devoted portions of their energy sector financing over the past decade and a half to new coal plant power generation, but that over the last year or two the rate of their financing for coal plants has accelerated.

There appears to be an operational disconnect between climate impacts of the energy lending of these institutions on the one hand, and the additional funds from the donor community these institutions, particularly the World Bank Group, are seeking to address climate change mitigation and adaptation.

Our research identified a number of pending and proposed loans, with the World Bank leading the way, that, if approved, will push the planet further towards dangerous climate change.[1]

During the climate negotiations in Poznan in December 2008, for example, the World Bank's International Finance Group (IFC) and the South African electric utility ESKOM announced a commitment by the bank to lend $5 billion for ESKOM's power generation expansion plan.[2]

This plan calls for putting on line six coal plants from 2009 through 2016, with a generating capacity of 12,316 megawatts.[3,4] The rest of the ESKOM expansion plan includes just one investment in what the World Bank calls "new renewables" (wind and solar)—a 100 megawatt wind farm. (The African Development Bank has approved a loan of $500 million to help begin construction on two of the six coal plants, one of which is also being supported by an export credit of 250 million Euros from the German KfW.)[5]

In Botswana, the World Bank Group is considering financing the $3 billion private sector Mmambula coal mining and power generation project, which plans to mine 3 billion tons of coal to power as many as three new coal-fired plants with a generating capacity of 4800 megawatts.[6] Initial plans are to construct a 2100–2400 megawatt plant that would emit 17 to 19 million tons of CO_2 yearly, making it one of the top 150 point sources of CO_2 on the planet.[7]

The World Bank is already a preparing a loan for the first 600 megawatts of coal-fired power at Mmambula, for which it estimates that some $450 million in direct public financing will be made available from the African Development Bank, various ECAs and the Bank itself. The World Bank will also provide guarantees for $350 million in private bank loans.[8]

Yet, the advisability of continued World Bank financing of fossil fuel dependent energy in non-OECD countries was questioned in the 2004 World Bank-sponsored Extractive Industries Review (EIR). This unprecedented three-year independent study, involving participants from government, business, labor and civil society in both developing and donor countries, was charged with examining the future role of the World Bank Group in support of oil, gas and mining, including coal. The director of the EIR was Dr.Emil Salim, former head of Indonesia's national coal company, Indonesia's first environmental minister, and Chair of the 2002 Johannesburg United Nations World Summit on Sustainable Development

In the final EIR report, Dr. Salim recommended decisive action to move World Bank energy lending away from fossil fuels, including an immediate cessation of coal financing and a phase out of support for oil development projects. He emphasized that:

> *While recognizing that it is each country's right to set its own energy strategy, IBRD and IDA [the two main lending arms of the Bank] should position themselves to help governments adopt sustainable energy strategies that address the energy needs of the poor and that minimize climate change, which will disproportionately affect the poor. Countries should be helped to remove subsidies from carbon-based fuels, taking due account of the potential impacts on the poor, by shifting subsidies to meet the basic needs of the poor and by ensuring mitigating plans. And WBG lending should concentrate on aggressively promoting the transition to renewable energy and endorsing natural gas as a bridging fuel building new pipelines and renovating leaking ones.*[9]

The EIR reiterates that the World Bank "should devote its limited scarce resources to investments in renewable energy resource development, emissions-reducing projects, clean energy technology, energy efficiency and conservation, and other efforts that delink energy use from greenhouse gas emissions."[10]

Yet, despite the urging of six Nobel Peace Laureates and the European Parliament, World Bank management refused to endorse the EIR recommendations concerning lending for fossil fuels.[11,12] (It did agree to increase its lending for renewables at a rate of 20% a year above a relatively modest baseline as well as endorse recommendations for more rigorous environmental standards for mining projects).

The EIR report documented the severe environmental and social costs of mining and other fossil fuel production. In the case of coal mining, most of which is used to generate power, the EIR also recommended a moratorium on all World Bank Group financing except to help shut down superannuated facilities.

While EDF does not examine in this report all the huge associated environmental and social costs of coal mining, which have been amply documented in many studies, it is important to remember that the true costs of any new coal-fired power plant should internalize the associated environmental and social costs of its fuel supply. This is particularly true for coal, since the argument often proffered for its use in power generation is that it is the "least expensive" available fuel.

Four years after the EIR release, in early 2008 the World Bank's internal performance auditor, the Independent Evaluation Group (IEG), initiated a three-phase study of the World Bank Group and climate change. It noted that, 15 years after the UNFCCC entered into force, and 17 years after the Rio Earth Summit, "the World Bank Group has never had an explicit corporate strategy on climate change against which evaluative assessments could be made."[13]

However, the Bank did begin to think about climate more comprehensively at the request of the heads of state of the leading industrialized countries when they met in 2005 at the G8 economic summit in Gleneagles, UK. The G8 asked the World Bank to prepare an analysis of how the energy needs of developing countries could be met while at the same time addressing climate change. The result was the 2006 World Bank Clean Energy Investment Framework (CEIF). The CEIF is a critical document, because it not only sets out climate-related energy lending priorities for the World Bank, but also for the other MDBs.

The CEIF report identified a large gap in the electric power investment needs of developing countries and economies in transition: $160 billion annually in total power investment would be needed through 2030, but only $80 billion annually appeared to be available. Moreover, "because the industrialized countries are responsible for most of the anthropogenic greenhouse gases currently in the atmosphere, developing countries are not expected to bear the additional costs of a low-carbon economy."[14]

The report recommended the establishment of new donor funds, such as a "Clean Energy Financing Vehicle (CEFV), administered by the Bank, that could help bear some of the additional costs of spurring this transition to a low-carbon economy.[15] CEIF, however, ignored the recommendations of the EIR and suggested that the World Bank and other international financial institutions support increased investments in more efficient, super-critical coal plants.

Significantly, the bank's vision for the CEFV included "resources to implement new low carbon technologies and other mitigation measures…" that would include "a mandate focused exclusively on climate change with initial focus on high impact, high return investments: e.g. introduction of supercritical boiler technology for coal based power generation."[16]

Thus the increase in lending and interest in lending of the World Bank and Asian Development for new, super-critical coal plants just over the past three years should not come as a surprise.

A subsequent Bank progress report on the CEIF, dated September 2006, sounded a more cautionary tone, noting in response to IEA reports of the rapidly growing use of coal for power in developing countries that "reducing emissions from these plants must be a part of the long-term solution." The report concluded that "higher-efficiency plants (e.g., super-critical and ultra-super-critical) are of limited benefit in this regard as efficient coal-fired plants would still emit more than twice the CO_2 of efficient gas-fired technologies."

It continued:

> *Thus, carbon capture and storage (CCS) is expected to be an important component of a low carbon economy. Although components of CCS have been implemented, it has, not yet, been tested with coal-fired plants. The earliest pilot is expected to be commissioned in 2012. Therefore, an optimistic date for CCS commercialization is around 2020 given the time required for testing and design modifications. In the interim, coal-fired plants can be designed to be CCS-ready so that the technology can be adopted when it becomes viable."*[17]

Appendix C, page 25, addresses the issue of "carbon capture and sequestration ready" in more detail, but it is enough here to note that prominent technical studies, such as the 2007 MIT study "The Future of Coal," have questioned "CCS-ready" as a criterion, suggesting that public funds should only go to new coal plants that have CCS operationally in place, making them carbon neutral. Over the next decade or so these plants would effectively be pilot programs for acquiring the knowledge for possible post-2020 larger scale deployment and commercialization.[18]

Following the CEIF the Bank proceeded to develop a Strategic Framework on Climate Change and Development for the World Bank Group, which was released in September 2008. The framework promised a number of policy initiatives, including designing climate adaptation and resilience into its operations, particularly in the agriculture and water resource sectors.[19] It identified expanding the scale and development of carbon markets, emphasizing that it "will work with partners to improve monitoring of climate finance and its 'additionality'"—an interesting acknowledgment of the growing criticisms of the additionality of much carbon finance, particularly the CDM.

The report also committed to raising new resources for climate change mitigation and adaptation, namely through the its proposed Climate Investment Funds, with $6 billion in tentative commitments. The biggest of these is the Clean Technology Fund (CTF), with around $4 billion in prospective donor commitments, which will provide finance for low-carbon, GHG-saving technologies and projects. Another $2 billion or so has been committed to a Strategic Climate Fund, which will support a number of smaller pilot programs, the first being a Climate Pilot Program for Climate Resilience (adaptation) (PPCR).[20]

The heart of the Framework lies in its proposed new financial commitments and priorities. There is a commitment to increase finance for energy efficiency and "new renewable energy" (wind, solar, small hydro, geothermal, biomass) on average 30% a year from a baseline of $600 million annually.

It is crucial to note, however, that although the Bank's support for energy efficiency and renewables has been increasing, it is from a very low baseline—efficiency and renewable energy support in the early 2000s was actually lower than in the 1990s. In contrast, 2008 World Bank Group financing for fossil fuel projects, according to the latest tally from the Bank Information Center (BIC), totaled $3,137 billion.[21] In fact, according to BIC, from 2007 to 2008 the Bank increased its fossil fuel project lending by 102% compared with just 11% for "new renewables."

A lending culture that discourages energy efficiency investment

There may in fact be deep institutional barriers to increasing the Bank's energy efficiency lending. A 2008 review by the Bank's IEG examined the Bank's record in efficiency lending, compared with its official policy commitments. "Despite emphasis on energy efficiency in Bank statements and in Country Assistance Strategies (CASs), the volume and policy orientation of IBRD/IDA efficiency lending has been modest," the IEG found.[22]

Indeed, World Bank financial commitments for energy efficiency averaged only 5% of the value of energy finance from 1991–2007.[23] The IEG attributed this "underemphasis" on "win-win" efficiency investments to deep seated perversities in the Bank's unwritten internal incentive structure:

> *Internal Bank incentives work against these [efficiency] projects because they are often small in scale, demanding of staff time and preparation funds, and may require persistent client engagement over a period of years. There is a general tendency to prefer investments in power generation, which are visible and easily understood, over investments in efficiency, which are less visible, involve human behavior rather than electrical engineering, and whose efficacy is harder to measure. A general neglect of rigorous monitoring and evaluation reinforces the negative view of efficiency.*[24]

These criticisms of the "pressure to lend" embedded in the Bank's career incentives, and the neglect of monitoring and evaluation of results, have existed for decades and have been repeated in numerous internal and external studies, as well as having been the subject of numerous Congressional hearings from the early 1980s through the mid-2000s. Yet Bank management has been intransigent.

The IEG recommended that the Bank develop internal incentives to promote energy efficiency, like metrics and indicators of progress in achieving efficiency, that would be linked to country strategies and project decisions. Here is the published response of Bank management:

> *"In terms of internal incentives, the discussion on developing appropriate metrics has been ongoing with [sic] International Energy Agency and with UN Energy, but to date it has been inconclusive.…management is not prepared to agree with establishing new metrics that focus solely on energy efficiency."*[25]

Coal as "low carbon"

The Bank also claims in its Strategic Framework on Climate Change and Development that 40% of its energy lending is already "low carbon," and that it will increase this proportion to 50% by 2011. However the Bank's definition of "low-carbon" includes new, large, coal-fired power plants, provided they are super-critical, and giant hydroelectric dams, which have been the subject of social and environmental controversy.[26] The World Bank IFC commits to leverage more private sector funding for such "low carbon" projects, promising that every public dollar will attract four dollars of private finance by 2011.[27] But if a significant portion of "low carbon" financing is for new coal plants, from the standpoint of mitigating climate change this is as much a cause for alarm as for optimism.

Finally, the Framework also clearly suggests that the new Clean Technology Fund could be used to support new coal-fired power plants, provided they use super-critical technology.[28] (The latest proposals for the CTF have a more rigorous standard that would not support supercritical plants, but only superefficient so-called ultra-critical coal plants under very rigorous conditions—but the loophole for some coal financing, at least in theory, remains).

We have dwelt on the climate policies of the World Bank Group at some length, since it is, and has sought to be, the acknowledged leader among public international financial institutions in climate and other aspects of sustainable development. Indeed, several other MDBs such as the IDB, AFdB, and EBRD have acknowledged the guiding role of the CEIF and their prospective participation in the World Bank-administered CTF. They have all made new commitments to increase support for "clean energy" (ADB, AFdB) and "sustainable energy" (EBRD and IDB).[29]

The Asian Development Bank

The Asian Development Bank is particularly important for this study, since our data show that the ADB has over the past 15 years been the third biggest financial supporter of coal fired plants, outranked only by JBIC and the World Bank Group. Since 2008, the ADB has been preparing a new Energy Policy. Drafts of the policy openly declare the ADB's intention to continue lending for coal-fired power plants.

The bank's proposed Energy Policy also commits to promoting energy efficiency and renewable energy. It promises to increase its annual lending for "clean energy" to $2 billion annually by 2013, and claims it is already lending for "clean energy" at a rate of more than $1 billion year, exceeding that target in 2008.[30]

But like "low carbon" for the World Bank, "clean energy" has an Alice in Wonderland quality for the ADB, in that the words do not mean what one would think they mean, but what the ADB decides they mean. For example, the ADB counts lending for new giant supercritical coal plants like Tata Mundra in its tally of "clean energy"—in fact it includes every coal plant it lent to in 2008 in that category.

But unlike the World Bank, the ADB counts only part of each loan for a coal plant as "clean." For the 4000 MW Tata Mundra plant, for example, 20% of its $450 million loan—$90 million—counts as part of the ADB's new-found commitment to fight global warming. In fact, this $90 million is counted as an investment in energy efficiency![31]

How the ADB decides what is (or isn't) an investment in energy efficiency, and how it calculates its value is a mystery. But what is clear is ADB's fundamental support for more new coal plants, even for less efficient "sub-critical" plants. The new draft Energy Policy unequivocally states that in Asia "large capacity additions will be required for which coal-based generation will grow."

The bank, then, will "selectively support coal-based [power] projects if cleaner technologies are adopted" and continue to support new sub-critical coal plants "in the interest of economical and developmental needs… if found justified after due diligence."[32]

Why not subsidize new super-critical coal plants?

One of the MDBs' main justifications for subsidizing new super-critical coal plants is that they produce 15% lower CO_2 emissions than a new sub-critical plant. Another is that, without such support, developing countries would simply build cheaper sub-critical plants.

The Center for Global Development points out that in India, for example, most new coal plants—whether publicly or privately financed—are already planned as super-critical, without World Bank subsidization. The extra capital cost, it appears, is at least partly offset by reduced operating costs and reduced fuel use. In fact, in India private sector investment already actually favors supercritical more than public investment—of planned new private sector coal-fired capacity for 2012, 70% of the new plants will be super-critical as opposed to 60% for the private and public sectors combined.[33]

Indeed, the World Bank itself published a study in 2007 that concluded that super-critical plants have lower delivered electricity costs than sub-critical plants, a conclusion also reached by the 2007 MIT study, "The Future of Coal."[34]

It appears, then, that in its support of financing super-critical coal plants, the World Bank is wasting scarce public international financial resources on projects that do not need them. This is all the more disturbing if one considers the huge opportunity cost of not investing in emerging carbon-free energy technologies.

In India's Gujarat State, for example, site of the Tata Mundra 4000 megawatt plant, AES, a U.S.-based energy company, is planning to build a 1000 megawatt solar thermal array at a cost of $1.2. billion. It's part of a targeted 7000 MW of renewable energy Gujarat hopes to add within three to four years.[35]

Former President Bill Clinton's Foundation is reported to be studying with India's Tata Energy Research Institute the feasibility of a large solar thermal project in the state.[36] All of this is occurring in Gujarat with the World Bank and Asian Development Bank missing in action

There is a growing amount of literature that suggests that with relatively modest international subsidies, solar thermal power and other renewables could achieve cost competitiveness with super-critical coal in some developing nations within a decade.[37]

6. Conclusion and recommendations

The continued funding by public international financial institutions for coal-fired plants that cannot sequester their CO_2 emissions is a policy for which the world will ultimately pay dearly in financial and ecological terms.

It is difficult to understand why, 15 years after the entry into force of the UNFCCC, there is no overall climate policy among the ECAs supported by the world's richest nations. It is equally difficult to understand the reaffirmation of lending for coal plants in the new climate and energy policies of the MDBs, particularly the World Bank Group and the Asian Development Bank. In the words of a recent study of four NGOs in the United States and Italy on the World Bank's new climate policy framework, "dirty is the new clean."[1]

Meanwhile, the IEA's latest report concludes that to limit global warming to 2 degrees centigrade by 2030, with concentrations of CO_2 of no more than 450 ppm, "the rate of decarbonization of the energy sector required after 2020 is unprecedented."[2]

A number of authorities maintain that world energy needs could be met without financing new coal plants through a massive scaling up of energy efficiency and investment in renewables.[3] In the words of William Moomaw, Director of the Center for International Environment and Resource Policy at the Fletcher School at Tufts University, "renewable energy combined with energy efficiency can do the job, and renewables are the only technologies available right now that can achieve the emissions reduction needed in the near term."[4] Other studies indicate that in many developing countries, the opportunities for renewables are substantially more promising than in OECD nations.[5]

With this in mind, and as officials from finance and development ministries gather in Washington for the IMF and World Bank spring meetings, Environmental Defense Fund urges the leaders of the MDB and ECA communities to hasten the necessary shift from coal to renewable energy by adopting the following recommendations:

1. Reallocate energy finance from new coal plants, or renovation projects to extend the operating life of old coal plants, unless the plants are deployed with carbon capture and sequestration (CCS).
The world cannot achieve an unprecedented decarbonization of the energy sector by continuing to invest in the most carbon intensive of energy infrastructure, infrastructure which lasts moreover for nearly half a century. To justify new investments in coal on the grounds they are marginally more efficient is, from a climate perspective, folly.

MDBs and ECAs should only finance new plants if they are also linked to simultaneous investments for the capture and storage of CO_2. In effect, such plants would be pilot or demonstration projects, since CCS is still an experimental technology which optimistically, following experience gained with large-scale pilot programs, would only be technically and commercially replicable on a large scale after 2020.

2. Deploy public international finance in support of scaling up renewable energy, energy efficiency and other alternatives to coal.
The opportunity cost of not using relatively scarce public international finance for scaling up investments in renewables and energy efficiency is huge. Every public international dollar invested in coal is a dollar diverted from supporting the inevitable long-term transition of the global economy, and of developing economies in particular, to a low carbon future. Moreover, projecting into the near- to middle-term future, large scale renewables, particularly solar thermal, will become less expensive, while the cost of coal plants with carbon-capturing technology will become greater. By 2020 or later, renewables on their own could very well be cost-competitive with super-critical coal even without CCS.

In many developing countries the opportunities for renewables may be substantially more promising than in temperate OECD nations. A number of sub-Saharan African countries have enormous solar energy potential, including Botswana, where the World Bank Group is preparing loans to finance the gigantic Mmamabula coal mining and coal-fired power development program.[6] Other sub-Saharan countries, such as Chad, have

also been the site of huge World Bank Group fossil fuel extraction projects, with disastrous environmental and social consequences. Thus, there is a sad irony and sense of forgone opportunities for sustainable development when one reads the following excerpts from a 2007 study published by the World Bank:

> *With the exception of a few small states (Equatorial Guinea, Rwanda, Cape Verde, Comoros), all countries in Sub-Saharan Africa have a clean energy [defined as solar, wind, hydro, and geothermal] potential that at least matches their current domestic energy consumption. Most have potentials that are many times their current consumption. The same pattern holds in Latin America and the Caribbean, South Asia, the Middle East and North Africa and the developing countries of Europe and Central Asia. In the East Asia / Pacific region, the ratio of clean energy potential to current Energy consumption is 60% or higher for all countries except Samoa, Tonga and Korea. Remarkably, we find that even China and India have estimated clean energy potentials that exceed or nearly match current domestic energy consumption (120% for China, 90%cfor India). World-wide, the countries whose clean energy potential is at least 50 times current annual energy consumption include Mongolia (515), Namibia (101) and five Sahelian states in Africa: Central African Republic (91), Mauritania (86), Chad (77), Mali (58) and Niger (50).*[7]

3. Agree on greatly increased support for climate mitigation funding by rich industrialized nations to help cover the short-term costs of the urgently needed energy transition in poorer nations.
Although the longer term external environmental, social and economic costs of accelerated global warming will pose a tremendous financial burden for developing nations, including the very countries that currently rely on coal for much of their energy, as a matter of global equity the short-term additional costs of promoting the needed transition to low-carbon alternatives should be supported by the richer countries. This principle was recognized in the Rio Declaration as well as in the UNFCCC. As discussed above, current commitments of additional finance are not near to closing the financing gap. The global economic crisis provides an opportunity in this regard. A large proportion of the huge increase in resources for the MDBs and ECAs envisaged by the G-20 to deal with the global financial crisis should be directed in new low-carbon energy infrastructure investments in emerging economies.

4. Create, under the auspices of the UNFCC, the first international database of GHG-intensive investments and their GHG emissions (including coal plants) by public finance institutions.
No such database currently exists. Reorienting public international financial institutions to support a transition to a low carbon economy first requires comprehensive, accurate, publicly transparent data on their current patterns of energy investments, including data on individual project emissions as well as aggregate emissions. These data are not readily available or compiled, and are impossible to obtain for most ECAs. Many ECAs still do not publish data on past transactions.

5. Calculate coal's true cost; MDBs and ECAs should institute comprehensive Greenhouse Gas Screening and Accounting and Shadow Carbon Pricing for all projects that emit greenhouse gases. (Shadow Carbon Pricing factors in the social and economic cost of carbon emissions).
The added annual hundreds of millions of tons of $C0_2$ emissions from MDB- and ECA- financed coal power projects are a very real global economic externality. We already have an initial, very conservative idea of this cost if we look at the price of a ton of CO_2 on existing carbon markets: EU CO_2 allowances (emission permits) were trading in early April 2009 on the European Carbon Exchange over-the-counter market for about 13.32 euros a ton, or around $17.58.[8] If valued at this level, the annual future CO_2 emissions of the 88 plants identified in our study represent some $13.92 billion in external costs passed on every year for decades to come to the world's population, the vast majority of which lives in developing nations—or nearly $700 billion for the operating lifetime of the plants.

The recommendation to internalize the cost of carbon in new GHG intensive investments has been made in different forms by various experts and studies. The 2004 Extractive Industries Review again pointed the way:

> *The WBG should apply carbon shadow value analysis systematically to its cost-benefit analysis and rate of return calculations in order to internalize the currently externalized costs of all energy projects, such as greenhouse gas emissions, as a follow-up to its carbon back-casting as input for its strategies to encourage investment in low and no-carbon energy alternatives. Shadow pricing should internalize both local costs, like pollution, and global costs, such as climate change.*[9]

Several large private international financial institutions adopted last year a common commitment to at least consider GHG accounting in appraising future loans for fossil fuel power projects. In the "Carbon Principles" six banks—Citi, JP Morgan Chase, Morgan Stanley, Credit Suisse, Wells Fargo, and Bank of America—agreed on an "Enhanced Environmental Diligence Process" for new fossil fuel power generation investments over 200 megawatts that will examine the CO_2 footprint of such projects, review carbon mitigation plans, and consider the potential financial impacts associated with future CO_2 limits and costs.[10]

In the United States, pressure has been growing in Congress over the last year for the MDBs to initiate systematic GHG accounting in their analyses of all future operations. Last June legislation was introduced in the House of Representatives that would require the Treasury Department to seek to ensure that all MDBs the United States participates in adopt and implement GHG accounting "in analyzing the benefits and costs of all projects for which funding is sought from the bank." The proposed legislation defines in detail what the required GHG accounting must include:

> *(1) calculating net carbon flows;*
> *(2) establishing uniform calculation techniques, with provision for modification as professional standards evolve;*
> *(3) making public the calculation techniques and the calculations;*
> *(4) adopting and making public a uniform carbon charge rate which appropriately reflects the global social cost of a unit of carbon emissions; and*
> *(5) performing carbon GHG accounting, including a full carbon charge for each project, defined as the net carbon flow multiplied by the carbon charge rate.*[11]

Although the bill—H.R. 6315—did not come up for a vote last year, it could very well be revived in a new session of Congress in 2009.

The U.S. Export Import Bank and Overseas Private Investment Corporation will be obliged by their legal settlement of the lawsuit brought against them by two U.S. environmental groups and four cities to develop more robust GHG accounting for their operations.[12] Moreover, U.S. EXIM is also committed under the settlement to promote in the OECD a common, climate/GHG policy for OECD ECAs, and a cornerstone of any such policy would have to include, as basis for any subsequent action on mitigating climate impacts, GHG accounting and carbon shadow pricing.

6. Agree to a common international climate/GHG policy for ECAs, which should be negotiated in the OECD.

The ECAs are a more neglected source of public international finance than the MDBs, particularly the World Bank Group, yet their financial and carbon footprint is huge. At a time when scarce public international finance must be mobilized efficiently, effectively and coherently in order to address the global climate crisis, the negotiation of a climate agreement for all the ECAs of the OECD is a critical element in the effort to combat global climate change.

APPENDIX A

A note on methodology

We reviewed public international financing of over 140 larger coal-fired power plants (mostly larger than 500 MW; however, in our data base there are also several in the 60–500 MW range), mainly in non-OECD countries, to get an idea of the scale of the past and ongoing public international financial support for this most carbon intensive of energy sources.

The goal was to identify, to the extent data is available, the biggest public internationally financed coal-fired power plants, in terms of annual CO_2 emissions, over the 15-year boundary time frame of the study. The period examined was from early 1994, when the UNFCCC legally entered into force, through January 2009.

We include in the data base plants for which financing was approved through January 2009. The data base lists the name and location of the coal-fired plant, where available the names of the operating company, where available the type of coal burning and pollution control technology used, the annual and future CO_2 emissions, the names of public financial institutions and the amounts, types and dates for the financial support they provided for each financing transaction and project.[1]

Current CO_2 emissions refers to annual CO_2 emissions of individual coal plants as of January 2009, as reported by the Center for Global Development CARMA (Carbon Monitoring for Action) data base, http:carma.org. Future CO_2 emissions refers to expected annual emissions from plants that have already been financed, but which are not yet operational, and also to future emissions from existing facilities with future expansions and additions as reported by CARMA.

We have also included existing plants where significant financial support has been provided for modernization, rehabilitation and reconstruction programs, and in some cases privatization programs, that will significantly extend the operating lifetime of the plants.[2]

In a few cases where CARMA calculations were not available, we estimated annual CO_2 emissions based on an assumption of new plants and additions to plants operating at 85% capacity, an estimate which corresponds to the average real time operating capacity of most new coal-fired power plants.

CARMA is in our view the most comprehensive, up-to-date, accurate data base for CO_2 emissions of power plants around the world. Almost all of the plants on our data base can be found on the CARMA data base, and on the web we have provided hyperlinks for plant names and companies that will take the interested reader to the CARMA data base. The Center for Global Development has published a Working Paper which describes in detail the methodologies used by CARMA.[3]

By clicking on the hyperlinks, readers can examine CARMA maps of the locations of the power plants as well as go directly to operating and sponsor company web sites, where that information is available. The CARMA website also provides direct links to specific information on individual coal plants and companies.

We asked the Dutch project finance research firm Profundo to use the publicly available data on coal plants on CARMA to conduct further research identifying which larger coal plants since 1994 have received public international financing as well as details on this financing. Much specific financing information, particularly for ECAs, is not readily available; some of it can be found through commercial project finance data bases and commercial project finance publications and magazines.

The report may very well err in individual cases by overstating or understating the future CO_2 emissions of the 88 coal plants identified, since both for many plants identified by CARMA and for the few not identified in CARMA for which we estimated emissions, the capacity factor (the percentage of power capacity actually employed over a given time period) had to be estimated. The capacity factor can also alter from one time period to another.

We also believe that the report understates the actual number of coal plants receiving public international support since there are a significant number of projects supported in the 1990s and early 2000s by the larger ECAs for which it is not possible to obtain disaggregated information on financing because many ECAs still do not publicly provide this data for past transactions.

In terms of total finance and CO_2 emissions, our results may err then on the conservative side; the real scale of finance and of CO_2 emissions may be significantly higher.

We are confident that every plant we have identified has received public international financing; plants were double checked first against commercial project finance data bases and then second, through available information in annual reports, press releases, and the financial, trade, and project finance press.

Our study did not examine public international financing of coal supply, i.e. coal mines, nor did it include associated projects to finance transmission and distribution associated with coal-fired power generation. Coal supply is relatively inexpensive compared to other supply investments for power generation, one of the reasons why coal-fired power appears to be an economically attractive option for some countries, particularly those with substantial domestic supplies. But the external environmental and health costs of coal mining are considerable. Associated transmission and distribution investments are expensive: according to the IEA, in general on average every new dollar invested in power generation is accompanied approximately by another dollar in investment in transmission and distribution.[4]

APPENDIX B

The climate crisis and coal

The climate crisis, in the words of the United Nations Development Program (UNDP), is "cumulative, urgent, and global," the "defining human development issue of our generation."[1] According to the most recent reports of the OECD IEA, at the moment the world is currently on a path of doubling current CO_2 in the atmosphere by the end of the century, resulting in average warming of 6 degrees centigrade or more. Earlier estimates of the IPCC Fourth Assessment in 2007, project a likely increase of at least 3 degrees centigrade or more, but the most recent information from the IPCC indicate that its 2007 estimates underestimated the ongoing acceleration in GHG emissions.[2]

Global warming above 2.5 degrees centigrade could entail catastrophic negative economic, geo-political, and demographic consequences.[3] There is a consensus that an acceptably safe level of climate change would limit warming to 2 degrees centigrade or less.[4]

Limiting warming to 2 degrees centigrade or less entails limiting growth of global CO_2 concentrations in the atmosphere to no more than 450 ppm from current levels of around 385 ppm.[5] Some scientists maintain that warming above 1.7 degrees over pre-industrial levels would entail unacceptably dangerous risks for the sustainability of global ecosystems and human societies.[6] The target of 1.7 degrees, proposed by James Hansen and nine other scientists, would entail actually reducing current levels of CO_2 in the atmosphere to at least 350 ppm in the future.[7]

Since 2000, global GHG emissions have risen at an accelerating rate, beyond even what were the most pessimistic scenarios of several years ago. Numerous authorities now attribute most of this acceleration to the rapid growth of new coal-fired generating power plants in developing, non-OECD nations, especially in Asia.[8] The IEA reports an accelerating "re-carbonization" of world energy production since the 1990s, particularly in the power sector.[9]

Today, the IEA says, "preventing catastrophic and irreversible damage to the global climate ultimately requires a major decarbonization of world energy sources."[10] To achieve even the 450 ppm target there is a consensus that reductions of GHG emissions in the power sector will be critical, and this will mean shifting future power investments worldwide from coal-fired power to low carbon alternatives, unless the emissions from new coal plants can somehow be captured and sequestered, an as yet untried technology that even in the most optimistic scenarios would not be applicable on a large scale until after 2020.[11]

The most recent (November 26, 2008) UNFCC technical paper on investment and financial flows to address climate change calls for a major shift and increase of international finance to non-emitting technologies, "especially in the power sector."[12] The shift in projected global energy investments from a reference, business as usual scenario to a "mitigation scenario" (roughly equivalent to the IEA 450 ppm 2030 scenario) amounts to an estimated *disinvestment* of $155 billion a year from projected investments in fossil fuel power generation, transmission and distribution in a business-as-usual scenario, with an increase of nearly the same amount to low-carbon alternatives like renewables, nuclear, and also CCS.[13,14]

Of this shift, $79 million annually would be reduced from projected fossil fuel power sector investments from developing countries, to contribute to a recommended annual increase of around the same amount for low carbon energy alternatives above the projected annual investment and finance for such energy sources in the business-as-usual scenario.[15]

The need to shift global finance away from the coal-fired power sector is even greater than the mere percentage contribution of coal-fired plants to current and projected GHG emissions might indicate. For one thing, coal is the most carbon intensive by far of fossil fuels: it releases twice the of CO_2 of natural gas, and 40% more than oil.[16] Ominously, according to the UNDP, "current investment patterns are putting in place a carbon intensive energy infrastructure, with coal playing a dominant role."[17]

This trend is particularly worrisome because every new investment in a coal-fired plant locks in future CO_2 emissions for as long as a half century. Of all energy infrastructure, coal plants, with a projected operating life

of 50 years, last longer than everything other than hydro-electric projects. By comparison, nuclear power plants last 45 years, combined cycle gas turbine plants around 25 years, and wind and solar power infrastructure about 20 years.[18]

The climate consequences of this long operating life are exacerbated by the accumulation of CO_2 in the atmosphere. Fifty-eight percent of the CO_2 in the atmosphere released over the past 50 years is still there. Even after 1,000 years, somewhere between 17% to 33% of CO_2 emitted today will remain; 10% to 15% will still be there after 10,000 years.[19] Moreover, as global ecosystem CO_2 removal processes such as oceans become saturated, the level and time span of CO_2 retention in the atmosphere may grow.[20]

APPENDIX C

Carbon capture and sequestration: not ready for prime time

Numerous studies have identified CCS as the only viable option for reconciling continued use of coal for power production and avoiding dangerous global warming.[1]

Yet these same studies also emphasize the cost and the technological uncertainties of CCS. The 2007 MIT "Future of Coal" study, while recommending major investments in pilot CCS projects in the United States, also concludes the following: "In sum the demonstration of an integrated coal conversion, CO_2 capture, and sequestration capability is an enormous system engineering and integration challenge….This is an enormous and complex task and it is not helpful to assume it can be done quickly or on a fixed schedule."[2]

Just the scale of geological storage capacity would pose a huge challenge for CCS. Taking the estimates of the MIT "Future of Coal" study, to sequester the 791,000,000 tons of annual CO_2 emissions for the coal plants in our data base would require 791 CO_2 injection projects on the scale of the largest such project that currently exists on earth, the Norwegian Statoil Sleipner project.[3]

Assuming CCS becomes replicable on a large scale, it would still greatly increase the capital and operating costs of new, super-critical plants. According to the MIT study, the estimated cost of a new 500 megawatt net capacity super-critical plant with CCS is around 61% higher than one without CCS, generating efficiency is reduced from 38.5% to 29.3%, and the amount of coal feed in kilograms per hour increases from 185,000 to 243,000, a 31% increase in coal consumption to produce the same amount of electricity. In terms of "levelized cost of electricity" over the plant life, electricity cost is again around 61% higher, an estimated 7.69 cents per kilowatt hour equivalent versus 4.78 cents for a subcritical plant without CCS.[4,5]

Other studies come to similar cost conclusions, and also note that CCS is perhaps less of a GHG solution than it might first appear. According to researchers at Germany's Wuppertal Institute for Climate, Environment and Energy, the entire life cycle of fuel use should be counted in examining coal plants, and particularly CCS since it requires increased coal use of 20–44% to achieve the same energy output.

"Recent life cycle assessments show that assuming a CO_2 capture rate of 88 percent, GHG emissions along the whole value chain can be reduced only by 67–78 percent, depending on the fuels and power station technologies used," the Wuppertal researchers write.[6] Moreover, they say, "other environmental impacts like photo-oxidant formation, eutrophication, or particle emissions will increase with CCS, while acidification will decrease slightly."[7]

Both coal mining and coal-fired power production use large amounts of water: according to the Wuppertal researchers, a CCS plant uses 90% more water then one without CCS.[8] Finally, both the Wuppertal researchers and the IEA note the severe local environmental and social impacts associated with increased coal extraction.[9]

In developing countries the impacts are often especially dramatic. In World Energy Outlook 2008, the IEA observes "at the local level, the water and other infrastructure demands of coal mining in arid regions of China's northwest will place enormous strains on a delicate ecosystem; in India, the loss of forests and villages, and the displacement of people, make any expansion of its largely open-cast industry politically challenging."[10]

In Bangladesh, plans of the Asian Development Bank and private investors to develop the large open pit Phulbari coal mine have met with violent resistance. The Phulbari coal mine would displace 40,000 poor villagers to produce fuel for a planned 1000 MW in coal-fired power capacity. In 2006 the Bangladesh army confronted a demonstration of 20,000 people against the project, opening fire and causing hundreds of injuries and three deaths.[11] In April, 2008, the ADB withdrew its planned $300 million in proposed finance for Phulbari.[12]

Some experts and studies have suggested that future coal plant investments should be concentrated in Integrated Gas Combustion Cycle (IGCC) plants, since these could be most readily adapted in the future to CCS.[13] But there are only four operational IGCC power plants in the world—in the United States and Europe, and six others operating in refineries to gasify waste.

The plants are both significantly more expensive than super-critical plants to build, and are also considerably more complex and challenging to operate.[14] The MIT study notes that "neither IGCC nor other coal

technologies have been demonstrated with CCS. It is critical that the government RD & D not fall into the trap of picking a [coal] technology 'winner.'"[15]

Proposals to subsidize new coal plants that would be "carbon capture ready" have been criticized by the MIT study, which recommends that in the United States no public funding go to support "carbon capture ready" installations.[16]

At a minimum, then, new public international finance should only support coal projects that would include carbon capture and storage.

In the words of David Wheeler of the Center for Global Development:

> *The UN cannot declare that carbon emissions are creating a planetary emergency and identify myriad clean-power options, while UN-affiliated institutions such as the World Bank Group and the Clean Development Mechanism continue to subsidize coal-fired power generation without CCS. The message for these agencies (as well as other multilateral and bilateral lending institutions) is clear: Stop this practice, now. Build your future on expanding clean power as rapidly as possible, or you won't have a future.*[17]

APPENDIX D

CO_2 fossil fuel emissions of MDBs, ECAs

This snapshot of public international financing of coal-fired plants provides an insight into just one aspect of overall financing of GHG emission intensive investments by MDBs and ECAs, albeit in an energy sub-sector—coal—where radical reductions of use in non-OECD countries are viewed by many scientists and experts as an absolutely necessary condition for achieving levels of atmospheric CO_2 no higher than 450 ppm by 2030.

Other studies over the past decade have attempted to estimate the overall contribution of the World Bank Group, MDBs and ECAs fossil fuel project lending (including extraction projects as well as power generation infrastructure) to increases in GHG emissions. These studies also include investments in natural gas extraction and gas powered generation, which we would argue, along with the Extractive Industries Review recommendations, is the one fossil fuel source that still should receive selective public international support as a transition fuel to still cleaner renewables.

While these studies use methodologies that differ in some respects from one to another, they are worth citing because they all concur that current financing policies and priorities of the MDBs and ECAs are leaving a growing global carbon footprint every year that is very large.

A 2004 study by the Washington-based Sustainable Energy and Economy Network (SEEN) found that the World Bank Group has financed between 1992 and late 2004 128 fossil fuel (oil, gas, coal) extraction projects totaling $10.98 billion in approved loans, guarantees and insurance, along with 124 fossil fuel power plants (coal, gas and oil) with WBG funding of another $11.264 billion. The SEEN study estimated lifetime CO_2 emissions for the extraction projects of 37.455 gigatons, and of the power projects at 5.97 gigatons.[1]

For the sake of comparison, the total, by this study's calculation, of over 43 gigatons is near equal to current world annual GHG emission from all sources (around 44Gt CO_2-equivalent).[2] The high lifetime figure for the extraction projects results from counting both estimated direct emissions associated with the projects and also counting the estimated CO_2 emissions from eventual consumption of oil, gas and coal over the lifetime of the extraction projects, much of it, especially for oil and gas, exported to industrialized economies.

A 2007 study by the Washington DC-based group Oil Change examined public international financial assistance for the oil and gas sectors, finding that a total of $61.3 billion had gone to subsidize projects in these industries since 2000.

The U.S. government in the seven-year period covered by the report had provided some $15.6 billion of aid to oil and gas projects worldwide mainly through the U.S. Export-Import Bank and OPIC (U.S. EXIM alone accounted for $12.3 billion of the total). The European Investment Bank provided $7.3 billion in lending support for "oil aid," and the European Bank for Reconstruction and Development $5.6 billion, but the World Bank Group won the multilateral competition with some $8 billion in financial commitments for gas and oil projects over the period 2000–2007.[3]

A 2008 World Wildlife Fund UK study sought to calculate the carbon footprint of the World Bank Group's energy lending between June 30, 1997 and June 30, 2007 (the WBG's fiscal year begins July 1). According to WWF UK, cumulative lifetime CO_2 emissions for WBG energy projects financed in that time period are more than 26 gigatons, some 45 times the annual CO_2 emissions of the United Kingdom, or nearly the equivalent of current world annual energy-related CO_2 emissions, which according to the IEA were 28 Gt in 2006.[4]

Finally, a February 2009 study of the Washington based Bank Information Center (BIC) examined World Bank Group trends in lending for fossil fuel projects from 1998 through 2008. The BIC study defined fossil fuel projects as including projects such as fossil fuel power generation that directly produces substantial CO_2 emissions, and fossil fuel extraction and production infrastructure (oil, gas and coal production infrastructure, oil rigs, pipelines, coal mines, etc.) where end use consumption of fossil fuels releases large amounts of CO_2, in addition to any emissions directly associated with the ongoing operation of extraction and production infrastructure.

The findings show an accelerating increase in WBG fossil fuel lending: FY 2008 levels were 48% higher than the next highest year, 2000 over the ten year period.[5] WBG financing for fossil fuels in 2008 totaled $3.137 billion, more than double the 2007 and 2006 amounts of $1.551 billion and $1.505 billion, respectively.[6] The most alarming increase, however, was for coal, which increased 642% in 2008 over 2007 levels, $1.041 billion as opposed to $140 million in 2007 (and $119 million in 2006). The BIC study calculates that just for fossil fuel projects financed by the WBG in 2008 alone, annual CO_2 emissions will total 97.4 million tons, and lifetime emissions will total 2,072 million tons.[7].

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World Wildlife Fund UK. 2008. *The World Bank and its carbon footprint: Why the World Bank is still far from being an environment bank.* World Wildlife Fund UK. 23 June 2008. wwf.org.uk/search_results.cfm?uNewsID=1794.

Notes

Introduction

1 IEA 2008, p. 521.

2 Air pollution from coal-fired power plants is also associated with other health outcomes, including infant deaths, asthma and other lung diseases. Estimates of the number of people experiencing these additional health outcomes were not made in this study as the necessary data from the countries where the power plants are located was not available. This suggests that the deaths estimated here are represent only a portion of a larger overall health burden related to air pollution from these power plants.

3 For most of the 15-year period the Global Environment Facility has been the principal source of additional financial resources to deal with mitigation, with some $2.69 billion committed through the end of 2008, plus $16.2 million as of November, 2008 for mitigation from the Special Climate Change Fund (SCCF), also administered by the GEF, and $154 million administered by the GEF for sustainable forest management. UNFCCC 2008b, p. 91. The World Bank claims that of the $1.6 billion in GEF mitigation investment funds it has managed to date, 2.2 times as much has been leveraged from the Bank, which would amount to another $3.5 billion over the past 15 years for mitigation. World Bank 2008b, p. 34, footnote 16. Adding the World Bank's claims of leverage, this still only amounts to $6.36 billion over a decade and a half.

4 IEA 2008, p. 418.

5 IEA 2008, pp. 123-124.

6 IEA 2008, pp. 77-78.

7 IEA 2008, p. 123.

8 The World Bank Group advised the project sponsor, Tata Energy, to also seek carbon credits for 3.6 million tons of CO_2 equivalent a year from the Kyoto Protocol Clean Development Mechanism (CDM). The CDM Executive Board decided in September 2007 that new super-critical coal-fired power plants could qualify for certified carbon credits if the typical CDM conditions of additionality are demonstrated (i.e. the more efficient coal plants would not otherwise be built; and less efficient plants would be built without the additional support from CDM carbon credits). These CDM Certified Emission Rights (CERs) would be sold to carbon emitting utilities and industries in Europe, allowing them to continue to emit 3.6 million tons of CO_2 that they otherwise would have had to reduce. Even at the depressed carbon market prices of early 2009, the 3.6 million CERs would still be worth at least 36 million Euros, or $46 million, annually.

9 According to the International Energy Agency World Energy Outlook 2008, current (2006 estimates) annual CO_2 emissions from coal-fired power in Latin America are 39 million tons. IEA 2008, p. 539.

Introduction (continued)

10 World Bank 2008b, p. 34. The Clean Development Mechanism supported $8.4 billion (as of 2008; UNFCCC 2008b, p. 91) worth of projects with tradable carbon emission rights intended to mitigate GHG emissions, but the net climate mitigation value of these projects has been increasingly questioned by sources as diverse as the United Nations Development Programme and the U.S. Government General Accounting Office. UNDP 2007, p. 132; US GAO 2008, p. 7. The decision by the CDB Board to grant CDM credits to subsidize new coal-fired power plants in certain circumstances does not add to its credibility.

11 Rio Declaration 1992, Principles 6 and 7; UNFCC 1994, Article 3.1.

12 UNFCC Article 4.5,4.8, 4.9. Indeed the Preamble to the UNFCCC recognized that "all countries, especially development countries, need access to achieve sustainable social and economic development and that, in order for developing countries to progress towards that goal, their energy consumption will need to grow taking into account the possibilities for achieving greater energy efficiency and for controlling greenhouse case emissions in general, including through the application of new technologies on terms which make such an application economically and socially beneficial."

13 IEA 2008, p. 418.

2. MDBs and ECAs

1 Over half of the Voting Shares of the World Bank, for example, are controlled by the ten richest industrialized nations. The Inter-American Development Bank, by way of exception, has a slight voting majority of the borrowing nations.

2 G-20 Declaration on Delivering Resources through the International Financial Institutions, 2 April 2008.

3 Wiehl, 2008 in Berne Union 2008, p. 13.

4 According to the 2008 Yearbook of the Berne Union (International Association of Trade and Investment Insurers) Berne Union Members (which goes beyond the OECD to include developing nation ECAs and a few private insurers) approved loans, loan guarantees and insurance that covered $1.4 trillion in international trade and investment transactions, at lest 10% of world trade. If previous year patterns were repeated, about $130–140 billion went for longer term loans and guarantees, mainly for project finance. At least 80% of that came from OECD ECAs (author's estimate). See Berne Union 2008, pp. 13, 91.

5 UNFCCC 2008b, p. 91.

6 UNFCCC 2008a, p. 18.

2. MDBs and ECAs (continued)

7 IEA 2008, p. 517. According to the 2008 IEA World Energy Outlook, Japan's 2006 CO_2 emissions from power generation were 456,000,000 tons, of which 271,000,000 tons came from coal-fired generation.

8 After having supported many coal plants during the mid- and late-1990s, the U.S. Export-Import Bank has not financed any new plants in nearly a decade. This drop-off is not a result of a change in lending policy, however, but is likely due to other counties securing a competitive advantage in exporting equipment for coal-fired power.

9 Four of the projects in our database were within Germany; they all received finance from the multilateral development bank of the European Union, the European Investment Bank.

10 The total is less than the sum to avoid counting twice the CO_2 for three plants in our data base co-financed by the ADB and World Bank Group—Tata Mundra, Mansinloc and Sual—(finance for these two was both for construction and subsequent privatization).

11 IEA 2008, p. 521.

12 UNFCCC 2008b, p. 91.

13 World Bank 2008, p. 34, footnote 16.

14 The CDM is a financing mechanism established under the Kyoto Protocol to allow rich industrialized nations who are obligated to reduce their GHG emissions to achieve part of their emission reductions by paying for GHG-reducing projects in developing countries, which under Kyoto have no obligation to reduce their emissions. Prospective CDM projects must demonstrate "additionality" i.e. the projects must show that they contribute to a net reduction in GHG emissions as opposed to a "no project" scenario, and that without the help of CDM, financing would not have taken place. For more information see cdm.unfccc.int/about/index.html.

15 UNFCCC 2008b, p. 91. The market value was estimated as of 2007. Since then the price per ton in the European Emissions Trading Scheme (ETS) of CDM Certified Emission Rights has collapsed by over 60%.

16 World Bank 2008b, p. 34.

17 World Bank 2008b, p. 35.

18 US GAO 2008, p. 7.

3. The cost of fighting climate change

1 IEA 2008, p. 479.

2 UNFCCC 2008b, p. 54.

3 UNFCCC 2008b, p. 54.

4 UNFCCC 2008b, p. 54.

5 UNFCCC 2008b, p. 54. Other estimates come up with still greater costs: The United Nations Development Program comes up with an estimate of 1.6% of global GDP to achieve 450 ppm CO_2 by 2030, and suggests that a United Nations Climate Change Facilitation Facility should be established "to mobilize the U.S. $25-50 billion annually to support low carbon transitions in developing countries." UNDP 2007, p. 41. The United Kingdom 2006 Stern Review estimates that an additional trillion dollars a year, or 2% of world GDP annually, will be needed for mitigation, combining costs for both industrialized and developing nations. World Bank 2008b, p. 26.

6 UNFCC 2008b, p. 92.

4. Climate and the ECAs

1 Detailed, project specific data identifying the financing institution, amounts and kinds of financial support, dates of finance and technical information on CO_2 emissions.

2 Friends of the Earth, Inc., et al. 2002, p. 36.

3 Maurer and Bhandari 2000, p. 4.

4 Maurer 2003, p. 11.

5 IEA 2008, p. 521.

6 Mauer and Bhandari 200, p. 1.

7 The OECD "Common Approaches on the Environment and Officially Supported Export Credits." For the latest, updated version, seeolis.oecd.org/olis/2007doc.nsf/linkto/tad-ecg(2007)9. It should also be noted by way of exception the U.S. OPIC has had something of a development mandate since its founding, though its primary mission is foreign investment insurance for U.S.companies and businesses.

8 OECD 2005.

9 OECD 2008.

10 UNEP 2008, p. 49.

11 The only way to identify prospective financing of projects is through the list of projects undergoing environmental review that JBIC has published since 2003 in accordance with an international agreement in the OECD for Common Approaches on Environment for ECAs. The JBIC list is atjbic.go.jp/en/about/environment/guideline/projects/classify/project.php. In response to inquiries, JBIC environmental staff disclosed the estimated capacity of the coal plants.

12 U.S. Export Import Bank 2008a, para. 17.

13 U.S. Export Improt Bank 2008b. In these figures one sees the high leverage that ECAs and other forms of public international finance can provide—in this case to alleviate climate change, but to date more often to leverage investment into high-carbon energy generation.

14 OPIC 2007.

15 Friends of the Earth, Inc., et al. vs. Spinelli 2009a.

16 Friends of the Earth, Inc., et al. vs. Spinelli 2009a.

4. Climate and the ECAs (continued)

17 The 20% reduction applies to the sub-group of all projects in the portfolio with emissions of over 100,000 tons of CO_2 a year.

18 Friends of the Earth, Inc., et al. 2009b.

5. Climate policies of the World Bank and the MDBs

1 These are listed under the "pending" tab in the data base.

2 Roelf 2008.

3 Three are new generating facilities, including two giant plant complexes of more than 4000 MW each, and three are smaller mothballed coal plants that will be put back into operation.

4 ESKOM 2008, p. 66.

5 Engineering News 2008.

6 MIGA 2009.

7 Wheeler, 2008, pp. 3–4.

8 World Bank 2009, PID Botswana Morupule B Generation and Transmission Project.

9 World Bank 2004, p. 64.

10 World Bank 2004, p. 65.

11 Williams 2004. The Nobel laureates were Jody Williams, Archbishop Desmond Tutu, Rigoberta Menchu Tum, Sir Joseph Rotblat, Betty Williams and Mairead Maguire.

12 In 2004 the European Parliament passed a resolution endorsing the recommendations of the EIR report, pointing out its implications for the lending activities of other MDBs such as the EIB and EBRD, and expressly called on the European "Council and Commission to explore the possibility for a regulation with aim of coordinating the procedures and policies of the national export credit agencies of the Member States, in support of the implementation of the EIR findings." European Parliament 2004, paras. B and 8. In late 2007 the European Parliament went further in a resolution concerning trade and climate change, calling on the European "Commission and the [EU] Member States to propose legislative instruments in order that Member State export credit agencies and the European Investment Bank take account of the climate change implications of the funded [fossil fuel] projects when making or guaranteeing loans and impose a moratorium on funding [of fossil fuel projects] until sufficient data are available, in accordance with the OECD, the G8, and the Extractive Industries Review." European Parliament 2004, paras. B and 8. European Parliament 2007, para. 30.

13 IEG 2008, p. vi.

14 World Bank 2006a, pp. vii–viii.

15 World Bank 2006a, p. ix.

5. Climate policies of the World Bank and the MDBs (continued)

16 World Bank 2006a, p. 132.b.

17 World Bank 2006b, p. 17.

18 MIT 2007.

19 World Bank 2008b, p. 13.

20 World Bank 2008b, pp. 4, 12. Other prospective programs include a Forest Investment Program and Program for Scaling Up Renewable Energy in Low Income Countries. See World Bank, "Climate Investment Funds: Strategic Climate Fund," Power Point Presentation, December 2008, siteresources.worldbank.org/INTCC/Resources/World_Bank_Climate_Investment_Funds_(CIF).pdf.

21 Mainhardt-Gibbs 2009, p. 4.

22 IEG 2008, p. vii.

23 IEG 2008, p. vii.

24 IEG 2008, p. viii.

25 IEG 2008, p. xv.

26 According to a recent study by researchers at Brazil's National Space Institute, methane emissions for dam reservoirs may account for as much as 4% of world annual GHG emissions. Lima et al. 2007. For a bibliography of scientific articles on the subject, see internationalrivers.org/node/2362.

27 World Bank 2008b, pp. 4, 14, 38.

28 World Bank 2008b, p. 15.

29 See the presentations of the MDBs at World Bank 2008c.

30 ADB 2009, p. 6.

31 ADB 2008.

32 ADB 2009, p. 7.

33 In Wheeler's words "India's public and private sectors are moving to supercritical technology anyway, without IFC subsidies. A big driver is the rapidly-rising price of coal, which puts a premium on combustion efficiency." Wheeler 2008b.

34 Wheeler 2008b, p. 6, citing World Bank ESMAP 2007, and MIT 2007.

35 Kraft 2009; Solar India Online 2009.

36 Pathak 2009; Express India 2009.

37 See e.g. Ummel and Wheeler 2008. Ummel and Wheeler examine proposals of the Union for the Mediterranean to deploy 20 gigawatts of solar thermal (or "concentrating solar power"—CSP) generating capacity in North Africa and the Middle East for electricity export to Europe by 2020. They calculate that with subsidies of $2 billion annually for ten years "the expected profitability of unsubsidized CSP projects is competititve with that of coal and gas power generation in Europe." Ummel and Wheeler 2009, p. 2. See also Sawin, Janet L., and William R. Moomaw, "An Enduring Energy Future," and

cited references, in Worldwatch 2008, *State of the World 2009. Into a Warming World.*W.W. Norton & Company, New York and London, 2009, pp. 130–150.

6. Conclusion and recommendations

1 IPS et al. 2008.

2 IEA 2008, p. 446.

3 Viehban, Fischedick, and Vallentin 2008, p. 102, citing, inter alia, at the national level, German Ministry for the Environment, Nature Conservation and Nuclear Safety, 2007.

4 Sawin and Moomaw 2008, p. 131.

5 Buys et al. 2007.

6 Wheeler 2008a, p. 8.

7 Buys et al. 2007, p. 13.

8 Point Carbon Home page, April 9, 2009. pointcarbon.com.

9 World Bank 2004, p. 65.

10 The Carbon Principles. 2008.

11 United States House of Representatives 2008, Sec. 2 "Use of Greenhouse Gas Accounting by the Multilateral Development Banks"

12 Discussed above, p. 11.

Appendix A

1 The tab "power plant overview" lists 88 plants singly, with future emissions and future annual power consumption. The "public financing tab" lists each of the financial transactions we found separately, including specific loan/guarantee/insurance amounts, the financial institution involved and the date; some power plants are listed more than once since they were recipients of several different financing packages from different financial institutions. In the "power plant overview" tab, the "effective annual CO_2 emissions figure at the bottom of column G is somewhat lower than the future annual emissions for the 88 plants (791,748,310 tons versus 826,338,213 tons) because for four plants—Petacalco, Dailin, Fuzho, and Arnot—public international financing expanded already-existing capacity built before 1994, and the pre-1994 capacity has been subtracted to give the "effective annual CO_2 emissions" figure.

2 Sometimes these modernization investments, while significantly extending the lifetime of the coal plants, and their cumulative CO_2 emissions, involve at the same time substantial environmental mitigation investments, such as flu-bed desulfurization. We have included some of these plants in the total where significant operational lifetime extension is involved,, since the net effect of the investments supported by public international financial institutions will be to increase cumulative CO_2 emissions. In these cases we recognize there is a quandary: should scarce public international finance be used for modernization of existing plants or be focused on the long-term transition to low carbon energy? In the case of the Belchatow coal plant complex in Poland, for example, the modernization program involves bringing the Belchatow facilities up to state-of-the-art EU pollution control standards for coal plants, as well as adding new capacity to replace older units that will go off line, and modernization investments that will extend the operating lifetime of the entire complex.

3 Wheeler and Ummel 2008.

4 This is the IEA projection for 2007-2030. IEA 2008, pp. 89, 151.

Appendix B

1 UNDP 2007, pp. 1, 4–5.

2 International Energy Agency 2008, pp. 45; 382; 401. IPPC 2007, cited in UNDP 2007, p. 34. Carnegie Institution for Science 2009.

3 There are numerous studies that indicate that warming of over 2.5 degrees centigrade would already entail disastrous consequences. See, for example, Worldwatch 2009, pp. 28–21, and footnote 24, p. 210; UNDP 2007, pp. 35–37; Watson 2008, slides 10 and 12.

4 See, for example, the discussion in Worldwatch 2008 pp. 18–22; UNDP 2007 pp. 17, 33–39; Watson 2007.

5 IEA 2008, p. 47

6 Hansen et al. 2008. "If humanity wishes to preserve a planet similar to that on which civilization developed, and on which life is adapted, paleoclimatic evidence and ongoing climate change suggest that CO_2 will need to be reduced from its current 385 ppm to at least 350 ppm, but likely less than that. Hansen et al., p. 217.

7 Hansen et al. 2008, p. 217.

8 Carnegie Institution for Science 2009.

9 IEA 2008, pp. 384.

10 IEA 2008, p. 37.

11 UNDP 2007, pp. 40-41, 133; Watson 2007; Hansen et al., 2007.

12 UNFCC 2008b, p. 11.

13 The "mitigation scenario" referred to in the 2008 UNFCCC paper envisages achieving a return to current energy-related CO_2 emissions (28 Gt in 2006) by 2030, and an overall reduction of global GHG gases of 25% from 29.1 Gt CO_2 eq, which would be less than half of the business-as-usual reference projection of 61.52 Gt CO_2 eq, and a reduction of 25% below 2000 global emissions levels of 38.90 Gt eq. UNFCC 2008, p. 17. For energy-related CO_2 emissions, this is roughly the same as the 2030 450 ppm of the IEA 2008 World Energy Outlook, which envisages a reduction of world energy related CO_2 emissions to 25.7 Gt by 2030. IEA 2008, p. 442.

Appendix B (continued)

14 UNFCCC 2008b, p. 53.

15 UNFCCC 2008b, p. 53.

16 UNDP 2007, p. 55.

17 UNDP 2007, p. 8.

18 IEA 2008, p. 75.

19 IEA 2008, p. 401; Archer, D., H. Kheshgi and E. MaierReimer,1997, and D. Archer 2005, cited in Worldwatch 2008 pp. 23-24.

20 IEA 2008, p. 401.

Appendix C

1 IEA 2008; MIT 2007; UNDP 2007.

2 MIT 2007, p. 101.

3 IEA 2008, p. 43.

4 "The constant collar electricity price that would be required over the life of the plant to cover all operating expenses, payment of debt, and accrued interest on initial project expenses, and the payment of an acceptable level of return to investors." MIT 2007, p. 18.

5 MIT 2007, p. 19.

6 Viebahn, Fischedeck and Valentin, 2009, p. 101.

7 Viebahn, Fischedeck and Valentin, 2009, p. 101.

8 Viebahn, Fischedeck and Valentin, 2009, p. 101.

9 The cumulative external environmental and social costs of coal are huge. Greenpeace International published a study in December 2008 which concluded that the annual external costs of coal-fired plants and the associated coal mines to supply them worldwide through air pollution, health costs and climate change in 2007 were 360 billion euros. Greenpeace 2008, p. 9. Whether one agrees or not with the methodology in the Greenpeace study, it is hard to contest that coal-fired power has very large environmental, public health and social external costs.

10 IEA 2008, p. 128.

11 BIC 2009.

12 BIC 2008.

13 UNDP 2007, p. 18.

14 MIT 2007, pp. 32, 38-39.

15 MIT 2007, p. xiii.

16 "In sum, engineering and policy uncertainties are such that there is no meaningful basis to support an investment decision to add significant 'capture ready' features to IGCC or pulverized coal plants, designed and optimized for operation without CO_2 capture." MIT 2007, p. 99.

17 Wheeler 2008a.

Appendix D

1 SEEN 2004, p. 15.

2 IEA 2008, p. 46.

3 Oil Change 2007, pp. 1-2.

4 World Wildlife Fund UK 2008, p. 5; IEA 2008, p. 46. It should be noted that the WWF UK study as well as some others cited in this section compare lifetime, cumulative emissions of WBG fossil fuel projects over a time period (ten years for the WWF UK study) with current annual emissions (in the WWF UK study, of the UK), which can be confusing. It might be more appropriate to compare annual emissions with annual emissions, or lifetime cumulative emissions with lifetime cumulative emissions, but not to mix the two concepts in the same comparison.

5 Mainhardt-Gibbs 2009, p. 1.

6 Mainhardt-Gibbs 2009, p. 5.

7 Mainhardt-Gibbs 2009, p. 11.

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