

# Chapter 4

## Mitigating Climate Change Via Clean Energy Financing: An Assessment of the Asian Development Bank's Mitigation Efforts in Southeast Asia

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**Abstract** As Southeast Asia has registered an impressive economic growth in recent years, considerable stress to the environment in the form of an increasing level of emissions has also been paramount. Development failed to trickle down and energy poverty remains a significant issue in Asia. While it is important to amend the current emission trajectory and, at the same time, address issues about energy access, a colossal need to mobilize funding is necessary – a gap which multilateral development banks are expected to fill. This article explores and assesses the important role the Asian Development Bank (ADB) has in addressing these issues. Drawing on the assessment of ADB Country Strategies and the energy sector portfolio in Thailand, Indonesia, the Philippines and Vietnam, the enquiry reveals, among other things, that only 42% of ADB energy financed projects contain renewable components, and that data on how ADB projects addressed on the issue of energy poverty remains unavailable. On top of the quantitative data presented, this article also presents a critical engagement of ADB's policy environmental assumptions.

**Keywords** Asian Development Bank · Clean energy investments · Climate change mitigation · Renewable energy · Southeast Asia

### Introduction

Energy security and sustainable development have both moved up the global agenda because of concerns regarding climate change, particularly over increasing emissions from conventional energy sources and economic reasons brought about

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by volatile energy prices. Both issues are important, critical even, especially for a growing region such as Southeast Asia. A viable strategy significantly focused on adequate and clean energy infrastructure is thus needed to meet the dual requirement of sustainable growth and energy security. Inadequate amount of investment, however, is hampering not only the current energy production and distribution situation but also efforts to make it clean as possible. Traditional sources of funding therefore need to be shored up by innovative financing solutions.

Multilateral Development Banks (MDBs) are considered to be at the forefront in channelling finance to the development of a low carbon economy. MDBs possess a significant role in facilitating and fostering sustainable development strategies aimed at poverty elimination in the countries they are serving. With issues on environmental sustainability and access to clean energy, development banks can advance this particular agenda by being catalysts to this much needed financial infrastructure in order to reshape the current emission trajectories of their member/client countries and address issues of energy poverty side by side.

A better understanding of these significant roles seen through the lens of Asian Development Bank's (ADB) clean energy policy is this paper's overall objective. This paper looks at the engagement of ADB in four Southeast Asian countries, namely Thailand, Indonesia, the Philippines, and Vietnam. We review the economic situation of these study countries, show the parallel increase in carbon emissions in "Economic, Energy and Emission Trends in the Study Countries", and suggest that these current growth trajectories need serious amendments. We conclude from this section that the case countries are facing a twofold challenge, that is, to meet their necessary energy requirements to sustain their economic growth and to address the development issues especially relating to energy access for the poor. The section "Nexus Between Climate Change Mitigation, the Clean Energy Paradigm, and Energy for the Poor" further discusses the relationship between these challenges by understanding the confluence among climate change mitigation, the clean energy paradigm and energy poverty issues. A discussion in "Financing Issues and the Funding Role of MDBs" regarding problems on financing clean technology and the role of MDBs in filling the gap follows. An analysis of ADB's country strategies and energy sector portfolio was finally undertaken to understand the Bank's climate engagement vis-à-vis the challenges presented earlier. Some conclusions and recommendations wrap up the paper.

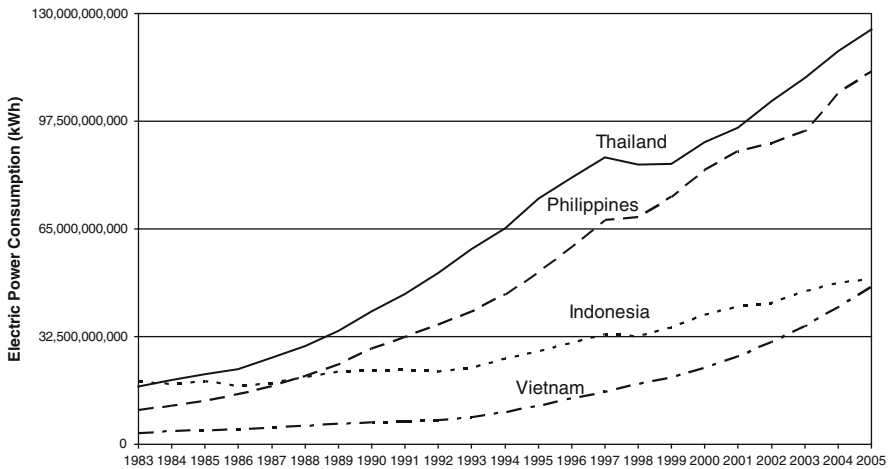
## **Economic, Energy and Emission Trends in the Study Countries**

Prior to the global financial crisis that shocked the world in late 2008, panglobal financial organizations particularly the World Bank (2007) and ADB (2008b), named Asia as among the world's most economically dynamic regions. In 2007 for instance, developing Asia's GDP posted an impressive growth of 8.7%. This is the fastest recorded rate of growth since 1988 in the region (ADB 2008b: iii).

In Southeast Asia, where this paper is centred, this record rate of growth has been visible especially when compared with the mid-1990's Asian financial crisis. The World Bank's 2005 Global Monitoring Report showed that Southeast Asia's real per capita GDP rose by more than 6% annually in the 1980s and 1990s, while other developing regions in the world continue to struggle. In 2007, ADB (2008b) reported that Southeast Asia's economic growth fundamentals inched up by 6.5% against 1997 figures. On a per country basis, the Philippines has expanded at a 30-year high of 7.3% in 2007 while Vietnam has continued to grow at a quick rate of 8.5%. Indonesia accelerated to 6.3% in the same year while Thailand moderated at 4.8% due to fading consumer and business confidence in the context of heightened political uncertainty in 2007 (ADB 2008b). Coupling this economic growth is the increase in demand and consumption of electrical energy which fuels the region's economy (see Fig. 4.1).

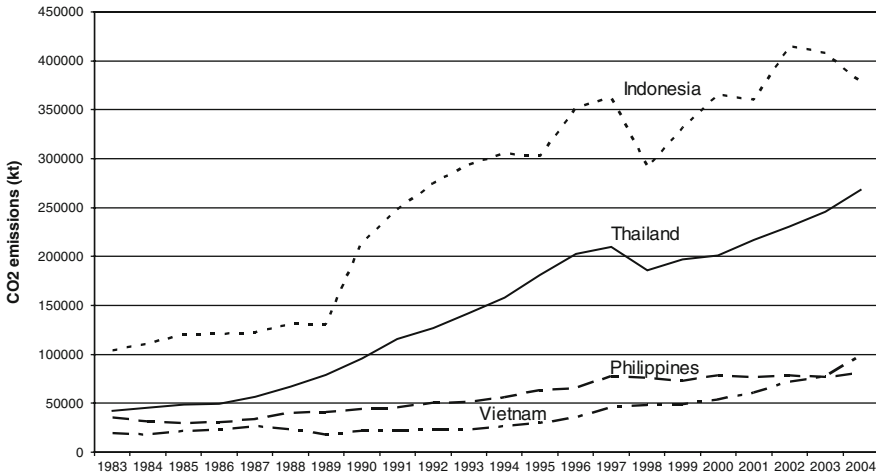
Figure 4.1 shows that electric power consumption in the four study countries has been an increasing trend, such that within a quarter of the past century, these countries had almost doubled their energy usage. This only highlights the critical role that energy has on economic development. By 2030, ADB projected that energy use in Asia will increase by 112%. This also means that by that year, the region will become a member of the world's league of large energy consumers. In addition, this will also translate into Asia being a contributor to around 42% of the total global emissions, which will place the region on the level of the world's top energy-related greenhouse gas emitters (ADB 2007: 10; Kuroda 2008: 4). This analogy between energy consumption and emissions is further demonstrated in Fig. 4.2.

While emissions are contributed by a variety of sources, the proportion of energy sector emissions has been significantly higher compared to other contributors.



**Fig. 4.1** Electric power consumption in Thailand, the Philippines, Indonesia, and Vietnam (1983–2005) in kWh

Source: World Bank (2008)



**Fig. 4.2** Carbon dioxide emissions in Thailand, Indonesia, Philippines, and Vietnam (1983–2004)  
*Source:* World Bank (2008)

The World Resources Institute (2009) through its Climate Analysis Indicators Tool shows that the energy sector contributes almost 93% of total CO<sub>2</sub> emissions in the study countries; 36% of which is from electricity sources (see Table 4.1).

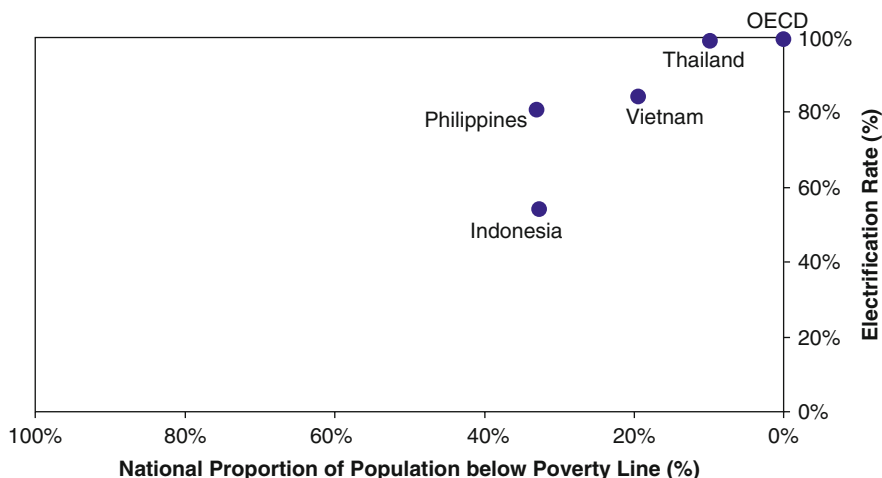
Despite the evidence that the study countries had boosted their economic fundamentals and that energy consumption is on the rise, development was not as encompassing as it should be. The continuing massive inequalities in terms of energy access and consumption describe this failure to make development felt across spectrums of society especially by the bottom poor. While affluent communities enjoy easy access to energy, living without electricity continues to affect other dimensions of human development (UNDP 2007). The World Energy Council verifies these disparities: around 20% of the world population living in industrialized countries consume nearly 60% of the world's energy supply, while 27% of the world population continue to live deprived of electricity access. In the study countries, World Energy Outlook (2006) estimates that around 131 million or 29% of the entire population are living without access to modern electricity. These are people who live without one light bulb in their homes and continue to rely on firewood for cooking. Figure 4.3 tells more about this disparity.

International development organizations such as the World Bank (2007) have acknowledged the relationship between poverty eradication and access to energy. The achievement of the United Nations' Millennium Development Goals (MDGs), has been continually hindered by a situation where a large proportion of the world's population are confronted by energy poverty. While changing this picture is vital for development, it should not be forgotten that the challenge extends beyond providing electricity. It moves further to include providing the necessary solutions which seek to decrease the depth of per capita carbon footprint in the developing world. What matters from the perspective of GHG emissions is how these energy

**Table 4.1** Carbon dioxide emissions by sector (excludes land use change)

Sector	Thailand		Philippines		Indonesia		Vietnam		Total	
	MtCO <sub>2</sub>	%	MtCO <sub>2</sub>	%	MtCO <sub>2</sub>	%	MtCO <sub>2</sub>	%	MtCO <sub>2</sub>	%
Electricity and heat	91.60	39.30	31.90	38.30	135.10	36.77	21.70	22.72	280.30	35.97
Manufacturing and construction	51.90	22.27	11.00	13.21	93.30	25.39	27.50	28.80	183.70	23.57
Transportation	55.90	23.98	28.00	33.61	73.90	20.11	20.30	21.26	178.10	22.85
Other fuel combustion	14.80	6.35	5.60	6.72	38.70	10.53	10.90	11.41	70.00	8.98
Fugitive emissions			0.30	0.36	8.00	2.18	0.60	0.63	8.90	1.14
Total for energy	214.20	91.89	76.80	92.20	349.00	94.99	81.00	84.82	721.00	92.52
Industrial processes	18.90	8.11	6.50	7.80	18.40	5.01	14.50	15.18	58.30	7.48
Total	233.10		83.30		367.40		95.50		779.30	

Source: World Resources Institute (2009)



**Fig. 4.3** Link between poverty and access to electricity (2004)

Sources: ADB (2008a, b, c, d, e); IEA (2008)

services are being provided for the poor, not just the presence of the provision. Socolow (2006 in Miller 2008) calculated that if the basic human needs for the estimated 1.6 billion people without electricity access and the 2.6 billion people without clean cooking fuel were to be met overnight, the increased energy use required would produce less than a 3% increase in global carbon emissions. However, emissions could be much greater if the poor are provided with electricity supplied by inefficient coal plants using poorly managed transmission systems with high loss rates. The need to provide electricity to the world's poor, therefore, has extended to include ways on how to ensure that energy production and distribution is done in a clean and efficient manner.

Providing the necessary resources, constructing pro-poor financial mechanisms, and developing and implementing clean policies to address this issue are not only functions of individual states and governments but also of development agencies and multilateral and bilateral donors. These agencies are expected to commit sufficient funds to support the needs of developing countries and address the clean energy challenge.

## **Nexus Between Climate Change Mitigation, the Clean Energy Paradigm, and Energy for the Poor**

Recognizing the gargantuan challenge posited in the preceding section and in light of the current climate regime which established that excessive emissions have brought about tremendous changes in the climate system, some world governments-particularly advanced economies- have agreed to reduce their emissions to

1990 levels. Given the magnitude of the challenge, it is imperative that mitigation and adaptation actions are not focused only in developed countries but should also be jointly shared in developing countries.

The orthodox paradigm to combat climate change has stressed on the exclusive utilization of market mechanisms, common to which are carbon trading, carbon taxation, and implicit pricing via regulations and standards. This policy is clearly embedded in the international convention on climate change (the UNFCCC) and its subsequent Kyoto Protocol. This market-based climate policy, however, has been regularly criticized. For instance, Stern (2008) acknowledges that carbon markets cannot simply correct the burgeoning climate problems, in the same vein that Bluhdorn (2007) lucidly discounted this exclusive reliance in the market paradigm. Market-based policy, Bluhdorn (2007: 85) posits, has reduced “the ecological problematic to concerns about resource consumption and waste emissions which completely eclipses all other dimensions of the ecologist critique”. Nevertheless, we do not fully discount the role of the market in our environmental conversations. The role of the market is essential, however: Irwin (2008: 49) argues that it is not “the only explanatory and theoretical principle capable of advancing arguments and solutions to the vast, interrelated cosmos of environmental problems”. We need to put up additional infrastructure to encourage significant change in energy consumption and GHG emissions (Irwin 2008). It is also important to stress that taking climate action is essentially more about limiting the extraction and usage of fossil fuel at levels below the current trend. We can only advance this policy by shifting extensively towards the utilization of readily available clean and renewable sources.

In the international arena, the Johannesburg Plan of Implementation not only called for action at all levels to substantially increase the global share of renewable energy sources, but also to improve rural access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services and resources as a major requirement to meeting the MDGs (World Summit on Sustainable Development 2003). In their 2008 theme study on energy security in the Asia Pacific region, the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) suggests that renewable energy technologies can help optimize energy consumption and widen access to energy services for poor rural populations. Moreover, renewable energy technologies also address environmental issues as they are built on an ecologically benign system.

Despite claims that small energy projects offer unstable and frail rates of return on investment, there is a growing body of evidence to suggest that such investments are in fact far less risky than they are often perceived to be. Miller (2008), for instance, has provided several examples about how smaller scale renewable energy technologies are advantageous. These examples are followed up by a list of several donors which have actually financed small enterprises and nurtured small clean energy companies which provide energy services to electricity-deprived rural households. Practical Action (2006) has also reported the noteworthy progress of some smaller scale decentralized renewable energy projects such as solar photovoltaic (PV) systems, small-scale wind electricity generators, small-scale hydro schemes and biomass

systems. These energy systems are considered appropriate in a small community setting because they “use local resources, can be sized according to need, operated and managed locally, and because local people can participate in the process of planning and installation” (Practical Action 2006). To illustrate that these systems work, Practical Action (2006) statistics reported the following figures: 150,000 decentralized renewable energies in Kenya, 100,000 in China, 85,000 in Zimbabwe; around 150,000 PV and wind systems for health clinics, schools and other communal buildings worldwide; over 45,000 small-scale hydro schemes in China; and more than 50,000 small-scale wind turbines in remote rural areas in the world.

In the case of Southeast Asia, the region has yet to demonstrate practice and exploit the bulk of power that may be generated from its renewable energy resources despite the already established commercial competitiveness of renewable energy systems (UNESCAP 2008). Issues related to financing remain one of the immediate causes for this deficiency.

## Financing Issues and the Funding Role of MDBs

Recognizing the role of an enabling environment for technology demonstration and transfer in order to realize the shift towards clean energy sources in developing countries, Stern (2008) argues the need for adequate financing flows to cover for the extra costs needed. Unless financing issues are addressed, Stern (2008) warns that developing countries are extremely unlikely to join the effort to mitigate climate change on the scale and pace required. For a long time, developing countries have acutely felt the inequities of the situation and since they are just beginning to overcome poverty, they argue that they should not be asked to slow down, especially on the way they use conventional energy sources to fuel their economic growth. Stern (2008), however, is convinced that with adequate financing infrastructure, these countries will be easily converted to moving towards a low-carbon growth path.

Energy projects are often capital-intensive in nature, thus, the availability of financing is critical (Miller 2008). The World Bank (2007) foresees this problem when it predicts a huge funding gap for energy infrastructure for the period 2005–2030 in developing countries. The same concern is echoed in the UNESCAP (2008) study in the Asia-Pacific region. While the private sector traditionally provides sources of funds, it is essential to remember that these conventional private investors are always focused on maximizing returns. Thus, they would hardly be attracted by the idea of providing energy access for the poor unless subsidies or other financial incentives are in place and unless clear policies on tariffs and risks are set in advance (Miller 2008). It must also be understood that providing subsidies, especially large ones, can also harm the already weak economies of developing countries. In this case, development institutions are expected “to take the lead in finding ways to address funding issues” (Whaley 2008: 13).



In the 2005 meeting of the world's leading industrialized nations in Gleneagles, MDBs were called upon to broaden and accelerate their activities on providing access to energy via clean energy programmes (G8 2005; ADB et al 2008; Miller 2008). In 2007, the Bali Action Plan adopted through the United Nations Framework Convention on Climate Change's (UNFCCC) Conference of Parties in Bali, Indonesia reiterated the emphasis to support developing countries in identifying suitable actions to address climate change via clean energy financing (Miller 2008; Nakhooda 2008). This emphasis is specifically expressed in Paragraph 1(b) of the Bali Plan of Action which conditions "nationally appropriate mitigation actions by developing country Parties" on the provision of "technology, financing and capacity-building". The importance of commitments to financial assistance, investment and technology transfer to developing countries is emphasized in Paragraph 1(e), which states that "resources should be additional, adequate, predictable and sustainable; 'positive incentives' should be created for developing country implementation of mitigation strategies; innovative means of funding for meeting the costs of adaptation by particularly vulnerable countries; public- and private-sector funding and investment should be mobilized (UNFCCC 2007).

MDBs are created to realize an ambitious agenda of eliminating poverty and fostering sustainable development. Support to energy work by providing financing and policy advice for economic development is among their core works. In light of the climate change regime, the challenge for these development banks also means helping their client countries identify opportunities to reduce emissions associated with economic development. One opportunity involves investment in clean energy.

## **ADB's Engagement in Clean Energy Finance: A Case Study**

The Asian Development Bank (ADB) is the only MDB based in Asia. ADB puts forward its energy vision through its Clean Energy and Environment Programme, which concentrates on clean energy and efficiency measures to improve energy security and to reduce emissions. It accomplishes this task by helping countries promote clean energy technologies and services, and by building their capacities.

In 2006, ADB claimed that 20% of its lending portfolio was spent on projects with environmental components. In 2007, the Bank provided \$1.4 billion (or 14% of total 2007 lending of \$10.11 billion) for investment in the energy sector (ADB 2008e). In 2008, ADB had strengthened its operations, begun refocusing on the environment, and put a premium on climate change consideration. This new strategic orientation is embedded in the Bank's landmark document called Strategy 2020, which directs the Bank's operations into five core specializations which include environment and climate change.

Parallel to the release of Strategy 2020, ADB also came up with its climate change strategy to help the Bank's developing member countries (DMCs) move their economies on to low-carbon growth paths through activities such as expanding the use of clean energy sources, improving energy efficiency, reducing fugitive

GHG emissions, such as methane released from landfills, modernizing public transport systems, and arresting deforestation (ADB 2008a: 14). To achieve this goal, ADB sets up its clean energy and environment programmes, which include the Energy Efficiency Initiative, Carbon Market Initiative, and Sustainable Transport Initiative (ADB 2007: 16).

### *Assessment of ADB's Clean Energy Strategies in Southeast Asia*

In this paper, ADB's climate strategies and exposure on clean energy investment are assessed to specifically determine the degree to which climate change concerns are reflected in the Bank's activities. This article follows the following framework. The assessment was accomplished at two levels: conceptual and operational. The conceptual level of analysis dissects the Bank's country strategies and its climate considerations, whereas the operational level assesses the Bank's energy lending portfolio.

Two questions guided the assessment. At the conceptual level, we ask how ADB acknowledges climate change considerations and the need to mainstream climate change into its operations in the four study countries, while at the operational level, how ADB incorporates opportunities to mitigate emissions and reduce climate risk in its strategies and project development.

#### **Conceptual Assessment of ADB's Country Strategies**

Answering question 1 entails the evaluation of the degree to which climate change concerns are reflected in the Bank's Country Partnership Strategies (CPSs) and the succeeding Country Operations Business Plans (COBPs). These documents show ADB's plans of actions with regard to a specific DMC and are publicly available (ADB 2008c). The strategies and/or plans were evaluated based on four indicators as to whether the Bank has (1) identified its priority sectors that will be affected by climate change and are central to climate change mitigation, (2) set any goals to mitigate GHG emissions in these identified sectors, (3) consider the additional costs of adaptation, and (4) consider options that will meet costs of low carbon development. The result of this assessment is presented in Table 4.2.

The assessment suggests that recent ADB country strategies in the four study countries have increasingly made note of opportunities to reduce emissions. Of the strategies reviewed, all have recognized interventions in the energy sector and have included the need to improve efficiency and reduce emissions. The strategies for Indonesia have noted the need to enhance energy efficiency and reduce dependence on oil, and have then set goals to reduce air emissions. They further note the need to find opportunities to finance some of the country's lower emission options particularly related to Kyoto Protocol's Clean Development Mechanism (CDM). On the other hand, the strategies for Vietnam have explicitly mentioned vulnerability concerns while identifying specific outputs and targets to increase resilience to the

**Table 4.2.** Assessment of ADB country strategies in four Southeast Asian study countries

Country	Document assessed (type/date)	Priority sectors with significant implications for climate change	Climate change mitigation – specific indicators or goals and targets	Includes climate adaptation – specific indicators or goals and targets	Explores options to finance costs of low carbon development
Thailand	CPS/April 2007	Infrastructure, energy	Yes – energy efficiency and renewables in energy sector	No	Yes – trading of carbon credits under CDM
Indonesia	CSP/October 2006, and COBP/October 2008	Agriculture, energy, transport	Yes – energy efficiency and renewables in energy sector	Yes – flood management	Yes – trading of carbon credits under CDM
Philippines	CSP/June 2005 and COBP/October 2008	Infrastructure, energy, agriculture, water supply	Yes – energy efficiency and renewables in energy sector	No	No
Vietnam	CSP/September 2007 and COBP/October 2007	Agriculture, water supply, energy, transport, forestry	Yes – energy efficiency, notes GHG emissions in energy and agriculture sectors, renewable energy in energy sector	Yes – increased capacity for disaster management and mitigation	Yes – considering opportunities for ADB's carbon market initiative

*Acronyms:* CPS Country partnership strategies, CSP Country strategy and program, COBP Country operations business plan  
*Source:* ADB (2008c)

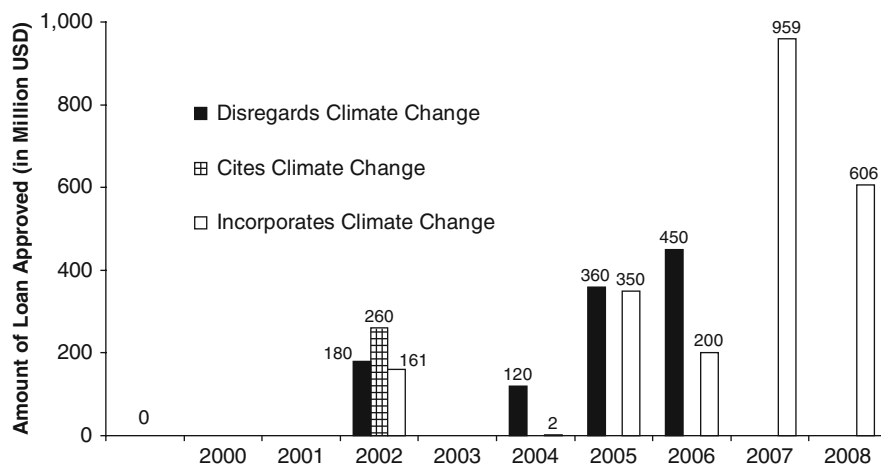
likely impacts of climate change in the country. Although ADB mentioned expected impacts of climate change in the study countries, the strategies and plans have inconsistently noted vulnerabilities, as illustrated in the strategy for the Philippines. The strategies also lack succinct ideas as to how the Bank and the DMC can cooperate with respect to harnessing and expanding renewable technologies.

## Operational Assessment of ADB Energy Sector Lending

Since energy is central to the challenge of climate change mitigation, this paper took the assumption that ADB's energy sector portfolio should reflect the extent to which climate change issues have been mainstreamed into the Bank's overall operations. This involves an assessment of the Bank's energy sector loans and was accomplished by reviewing documents for energy-supported projects during the period 2000–2008. Like country strategies, the Bank has also made the database all of its supported projects publicly available (ADB 2008d).

Three-question criteria guided the evaluation of each energy sector loan. These are (1) Were GHG emissions associated with the project accounted for? (2) Were alternative climate-friendly approaches considered? And, (3) were other options to access additional resources to meet the costs of less GHG-intensive technology considered? The conclusion would be, if a project answered “yes” to two or three of the criteria, then climate change should have been “incorporated”; if one, then climate change should have been “cited”; and if none, then climate change is considered to be “disregarded”. The result of the assessment is presented in Fig. 4.4 and presented in more detail in the Appendix.

Until 2002, the online database lacks data with regard to ADB-supported energy projects, which explains the absence of data for years 2000 and 2001 in Fig. 4.6.



**Fig. 4.4** ADB support for energy projects in Thailand, the Philippines, Indonesia, and Vietnam (2000–2008)

Source: ADB (2008d)

Climate change tended to be a marginal consideration among ADB-sponsored energy projects until 2006. However, shortly after the launch of the Bank's new programmes on clean energy and climate change in 2007, there was a 100% improvement in the extent to which climate change considerations are reflected in project documentation. This improvement seems to stem in part from implementation of the Bank's Energy Efficiency Initiative, which involves screening all projects for efficiency opportunities, and monitoring efficiency components in its energy portfolio.

Figure 4.6 also shows that attention to climate change as measured in the Bank's energy portfolio has varied significantly from year to year. This is in part because support towards the energy sector tends to be "lumpy", which often involves several large-scale discrete conventional projects. Twelve of the seventeen projects assessed in this paper, which amount to US\$ 100 million and more, show this overwhelming support towards conventional projects. Only 42% (7 of the 17) of the energy projects assessed had renewable components while 52% (or the other ten) remain conventional, mainly involving coal power.

## Some Conclusions and Policy Recommendations

The conceptual and operational assessment of ADB's strategies and energy investment has yielded valuable and timely data. The figures presented in this paper tell us that the Bank has remained engaged in energy-intensive and fossil-fuelled sectors and is expected to follow the same trajectory in the years to come.

At the conceptual level, ADB country strategies show that until 2008, climate change was not a major agenda in the study countries and the Bank. The inconsistency of attention granted to climate change in these strategies and plans may reflect, in part, the priorities of national development agendas of the study countries, which may not always place due emphasis on climate change. This tells us that the countries have to incorporate low carbon growth paradigms in their development aspirations. Although the energy sector was identified in all strategy documents as among the Bank's priorities, these documents need realignment, particularly in terms of focus, that is, a shift from conventional and carbon-intensive infrastructure towards more environmentally benign renewable systems, which are missing in the current documents. These strategies also need rewriting to reflect the paramount concerns to address climate change and specifically incorporate clean energy actions, among other climate mitigating efforts.

At the operational level, the trend with respect to ADB's investments in climate-friendly technologies has shown promise. This is shown especially in 2008 when all project documentation began considering climate change across the board. This is indeed a notable improvement and needs to be sustained and increased. The challenge for climate policy remains unchanged and that is to move quickly and encompassingly in order to promote changes on a much larger scale than before. ADB is therefore expected not only to expand its energy investments but also to radically shift towards clean energy projects regardless of size.

ADB has indeed begun raising its support for low carbon technologies especially regarding energy efficiency. However, this needs to be increased to significant levels and incorporated in the Bank's country strategies. While it is notable that the Bank has adopted specific targets to increase support for renewable energy and energy efficiency, a colossal scope to scale up these efforts remains vital. The Bank still needs to realign its investments in the most climate-sensitive and energy-efficient ways possible. While its conventional energy projects such as coal are often lucrative commercial investments, it does not deliver real sustainable development outcomes. ADB therefore needs transformative (and radical) changes in the energy sector to immediately steer investment from business-as-usual towards low carbon and environmentally sustainable choices. This will be difficult to achieve currently and in the years to come if the Bank opts to remain invested in many huge and often conventional coal energy projects as it does at the moment.

Investments need to be scaled up and targeted specifically at decentralized renewable energy systems to address the challenge of limiting the expansion of energy poverty in rural communities. Studying China's energy sector, Karplus (2007) found that innovation performance is strongest in industries that have experienced institutional decentralization. It therefore follows that ADB needs to assess its existing financing mechanisms against their real impact in ensuring energy access for the poor and consider community-based, off-grid, decentralized renewable energy systems. This proportion of pro-poor clean energy investments should also increase speedily and consistently considering the magnitude of the current climate and energy challenge. These projects, although small in size, possess greater "added value" on a longer term basis, as compensated by environmental, social and developmental impacts. These efforts are also essential seed capital for future development and can provide the necessary framework and reference for other investors to tolerate small-scale investments.

The challenges in accessing clean energy services are huge. While this paper discussed the financial constraints and how development banks such as ADB can fill funding gaps, lack of money is not the only constraint: there are other important barriers, including social, technical, managerial, and institutional issues that need to be addressed. In terms of financial barriers, however, the Bank is best positioned to take the lead in ensuring that growth is sustainable without compromising the environment. That change includes the radical reduction of the amount of fossil fuels Southeast Asia is burning, an immediate shift towards clean and environmentally benign energy sources, and allowing the poor to share the fruits of development by providing their much needed energy. The clock is ticking. Unless significant changes in terms of how Southeast Asia fuels its growth are put into action, the struggle to mitigate the ill effects of the changing climate remains.

## **Appendix: Assessment of ADB Energy Sector Portfolio**

(Loans and grants to both public and private sectors in Thailand, Indonesia, Philippines, and Vietnam, 2000–2008). Source: ADB [2008d](#)

Country/Project name	Project Identification No./ Approval Date	Documents Reviewed	Amount (US\$ Million)	(1) GHG emissions accounted?	(2) Alternative climate-friendly approaches identified?	(3) Options to access additional resources to meet the costs of less GHG intensive technology considered?	Overall consideration of climate change	Energy poverty statistic available?
<i>Thailand</i> /BLCP Power Project (Private Sector Loan)	37904/November 2003	Summary Environmental Impact Assessment	110	Yes	No	No	Cites	No
<i>Indonesia</i> /South Sumatra to West Java Phase II Gas Pipeline Project (Private Sector Loan)	39928/August 2006	Environmental Assessment Report	200	Yes	Yes	Yes	Incorporates	No
<i>Indonesia</i> /Tanggulih LNG Project (Private Sector Loan)	38919/December 2005	Summary Environmental Impact Assessment	350	Yes	Yes	Yes	Incorporates	No
<i>Indonesia</i> /Power Transmission Improvement Sector (Loan)	35139/December 2002	Report and Recommendation of the President to the Board of Directors	140	No	No	No	Disregards	No
<i>Indonesia</i> /Renewable Energy Development (Loan)	34100/December 2002	Report and Recommendation of the President to the Board of Directors	161	No	Yes	Yes	Incorporates	No
<i>Philippines</i> /Privatisation and Refurbishment of the Calaca Coal-Fired Thermal Power Plant Project (Private Sector)	41958/June 2008	Environmental Assessment Report	210	Yes	Yes	Yes	Incorporates	No
<i>Philippines</i> /Acquisition and Rehabilitation of Masinloc Coal-Fired Thermal Power Plant (Private Sector)	41936/January 2008	Environmental Assessment Report	200	Yes	Yes	Yes	Incorporates	No
<i>Philippines</i> /Power Sector Development Program Loan (Loan)	37752/December 2006	Report and Recommendation of the President to the Board of Directors	450	No	No	No	Disregards	No

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(continued)

Country/Project name	Project Identification No./ Approval Date	Documents Reviewed	Amount (US\$ Million)	(1) GHG emissions accounted?	(2) Alternative climate-friendly approaches identified?	(3) Options to access additional resources to meet the costs of less GHG intensive technology considered?	Overall consideration of climate change	Energy poverty statistic available?
<i>Philippines</i> /Renewable Energy and Livelihood Development project for the poor in Negros Occidental (Grant)	37267/January 2004	Proposed Grant Assistance	1.5	No	No	Yes	Incorporates	No
<i>Philippines</i> /Electricity Market and Transmission Development (Loan)	36018/December 2002	Report and Recommendation of the President to the Board of Directors	40	No	No	No	Disregards	No
<i>Vietnam</i> /Song Bung 4 Hydropower Project (Loan)	36532/June 2008	Environmental Assessment Report: Technical Assistance Report	196	Yes	Yes	Yes	Incorporates	No
<i>Vietnam</i> /Mong Duong 1 Thermal Power Project – Project 1 (Loan)	39595/October 2007	Environmental Assessment Report	27.86	Yes	Yes	Yes	Incorporates	No
<i>Vietnam</i> /Multiranche Financing Facility Mong Duong 1 Thermal Power Project (Loan)	39595/September 2007	Environmental Assessment Report	930.71	Yes	Yes	Yes	Incorporates	No
<i>Vietnam</i> /Northern Power Transmission Expansion (Sector) Project (Loan)	38196/December 2005	Summary Initial Environmental Examination Report	360	No	No	No	Disregards	No
<i>Vietnam</i> /Northern Power Transmission (Sector) Project (Loan)	32273/December 2004	Summary Initial Environmental Examination Report	120	No	No	No	Disregards	No
<i>Vietnam</i> /Phu My 3 Power (Private Sector)	36901/October 2002	Extended Annual Review Report; Summary Environmental Impact Assessment	75	Some	No	Yes	Cites	No
<i>Vietnam</i> /Mekong Energy Company Ltd (Phu My 2.2 Power) (Private Sector)	35914/July 2002	Summary Environmental Impact Assessment	75	No	Yes	No	Cites	No



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