BRIEFING PAPER

LOW-CARBON DEVELOPMENT IN SOUTHEAST ASIA

ENERGY OPPORTUNITIES IN PUERTO PRINCESA, PALAWAN (PHILIPPINES) AND DENPASAR, BALI (INDONESIA)

Denise Margaret Matias

GERMANWATCH

Brief Summary

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This paper identifies opportunities in the local, national, regional, and international level that can assist the tourist island cities of Denpasar, Bali (Indonesia) and Puerto Princesa, Palawan (Philippines) in pursuing low-carbon development.

Recommendations for practical action on local levels and policy implementation on the national, regional, and international level are given.

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Contents

Executive Summary

In line with climate change, tourism is seen as more bane than boon. Tourism has become an important sector for some Southeast Asian countries, as this sector contributes much-needed income especially from international visitors. However, despite its contribution to the economy of some countries, tourism also leaves a negative impact on the environment. One of these negative impacts is tourism's carbon footprint.

Tourism's carbon footprint comes both from the destination and from the travelers. Tourist destinations generously use resources in its desire to give the best possible service to its clients, while travelers use transportation options that use big amounts of energy.

Tourism is receiving increased attention as a development option in developing countries but with the vulnerability of developing countries to climate change, it is also best to take climate change into consideration in tourism activities. There is, thus, enough reason for tourism to simultaneously pursue mitigation and adaptation measures.

Denpasar in Bali, Indonesia and Puerto Princesa in Palawan, Philippines are just two of the more popular island tourist destinations in Southeast Asia. These two destinations have common vulnerabilities to climate change in the form of droughts, floods, and landslides. They also share common energy challenges, mostly relying on diesel power plants as source of energy.

Denpasar and Puerto Princesa have the opportunity to develop in a low-carbon way. Apart from climate-friendly energy initiatives that their national governments have adopted, the local governments of Denpasar and Puerto Princesa can pursue pioneering mitigation and adaptation actions that can influence national initiatives. The decentralization process of the national governments of Indonesia and the Philippines devolved autonomy to the local governments. Denpasar and Puerto Princesa can use this opportunity to enact changes in their locality.

Addressing the challenge of energy in Puerto Princesa and Denpasar can make use of energy efficiency and renewable energy laws and directives passed by their respective national governments. Opportunities on a regional and international level are also available to support action on the ground.

Puerto Princesa is already implementing an innovative low-carbon initiative (Climate Friendly Cities Program) in cooperation with a Philippine NGO. Electric public transport is powered by energy from landfill waste, which is fed into an anaerobic digester with a capacity of 1.5 MW. This initiative, apart from addressing climate change, also addressed the issue of pollution and waste management in the locality. A "South-South Cities Partnership" may facilitate the adoption of the Climate Friendly Cities Program in Denpasar.

Denpasar and Puerto Princesa can take inspiration from existing initiatives such as that of atmosfair and local airline Cebu Pacific Air & WWF-Philippines' Bright Skies Project in simultaneously pursuing mitigation and adaptation in their areas.

The case of Puerto Princesa and Denpasar as tourist island destinations depicts the challenges that climate change poses to Southeast Asia. Puerto Princesa and Denpasar are perfectly vulnerable to the impacts of climate change, while at the same time having some contribution to it as well. Low-carbon development is a non-conventional development path that requires shifts in socio-political, economic, and cultural paradigms. Innovative local approaches may be sources of best practices in low-carbon development.

This paper identifies opportunities in the local, national, regional, and international level that can assist the tourist island cities of Denpasar and Puerto Princesa in pursuing low-carbon development. Recommendations for practical action on local levels and policy implementation on the national, regional, and international level are given.

1 Introduction

The past years have seen a steady increase in tourist arrivals in Southeast Asia. Tourism has become an important sector for some Southeast Asian countries, as this sector contributes much-needed income especially from international visitors. While tourism can positively impact the economy of some developing countries, it can also leave a negative impact on the environment. Local services such as accommodation and transportation, in its desire to give the best service to clients, consequently use generous amounts of energy from fossil fuels. In addition, international visitors primarily use air transportation to arrive at their destination.[1]

Air transportation is seen as the most problematic travel option in light of climate change, as travelling by air requires huge amounts of energy[2] and aviation emissions are released at a region where emissions have a large impact on ozone, cloudiness, and by this a far stronger radiative forcing (within 10-12 km height in the atmosphere) compared to emissions on the Earth's surface.[3] In a broader sense, tourism plays a role in environmental degradation, including climate change. On the other hand it lives form an intact environment.

With tourism receiving increased attention as a low-impact, non-consumptive development option in developing countries[4] and with tourist spots being vulnerable to climate change impacts, and a growing environmental awareness of many tourists there is enough reason for tourism to simultaneously pursue mitigation and adaptation measures.

The archipelagic countries of Indonesia and the Philippines are home to some popular island tourist destinations. Denpasar in Bali, Indonesia and Puerto Princesa in Palawan, Philippines are two of the more well-known island tourist destinations in Southeast Asia. These two are the capital and only cities of their respective provinces and throughout the years had tourism playing a big role in the local economy. On the other hand, because of their long coastline and archipelagic nature, these two countries have common vulnerabilities to climate change in the form of droughts, floods, and landslides. In addition, the Philippines is especially prone to cyclones and Indonesia is very vulnerable to sea level rise.[5]

Island tourist destinations in developing countries have special energy needs as the islands can only be reached via air or water travel and, more often than not, those needs are supplied by fossil fuel imports. As island tourist destinations, Denpasar and Puerto Princesa share a special energy situation. Both are susceptible to power shortages.

[1] Gössling, S. "Sustainable tourism development in developing countries: some aspects of energy use." *Journal of Sustainable Tourism*, 8, 5 (2000), pp. 410-425.
[2] Becken, S. "Analysing international tourist flows to estimate energy use associated with air travel." *Journal of Sustainable Tourism*, 10, 2 (2002), pp. 114-131.
[3] Gössling, S. "Sustainable tourism development in developing countries: some aspects of energy use." *Journal of Sustainable Tourism*, 8, 5 (2000), pp. 410-425.
[4] Gössling, S. "Sustainable tourism development in developing countries: some aspects of energy use." *Journal of Sustainable Tourism*, 8, 5 (2000), pp. 410-425.
[5] Yusuf, A.A. and Francisco H.A. "Climate change vulnerability mapping for Southeast Asia." (Economy and Environment Program for Southeast Asia, Singapore, 2009).

Denpasar mostly relies on energy import from Java and diesel- and gas- power plants while Puerto Princesa relies on privately-owned diesel power plants within the island. Denpasar and Puerto Princesa stand to benefit a lot from low-carbon energy development. As pointed out by the Institute for Global Environmental Strategies (IGES)[6] , low-carbon development is required in East Asia to achieve development not constrained by energy availability and to mitigate anticipated climate change.

The national governments of Indonesia and the Philippines have started to develop national climate change strategies and action plans. The alarming rate of deforestation (change rate of 0.5% during the years 2000-2010)[7] and the corresponding greenhouse gas emissions (85% of the economy's total greenhouse gas emissions)[8] in Indonesia have put it into the limelight and the government of Indonesia boldly announced in the G-20 meeting in 2009 that it will voluntarily reduce their greenhouse gas emission by 26 per cent by the year 2020 from the business-as-usual (BAU) level and by 41 per cent if with international support. The Philippines, on the other hand, has completed its National Climate Change Action Plan in April 2011 as mandated by the National Climate Change Act of 2009. This is waiting for adoption by the Climate Change Commission (CCC).

The Association of Southeast Asian Nations (ASEAN), the region's geopolitical group where Indonesia and the Philippines are part of, has also reiterated in its Asian Leaders' Statement on Joint Response to Climate Change in April 2010, to "incorporate mitigation and adaptation strategies into national development strategies and policies in line with sustainable development."[9] It has also declared to "collaborate on environmentally-sound technologies, towards low carbon and green economy." International agreements such as the UNFCCC's Cancun Agreement also encourage developing countries to develop low-carbon development strategies and plans in the context of sustainable development.

In this paper, low-carbon opportunities in the energy sector are identified for the tourist island cities of Denpasar in Indonesia and Puerto Princesa in the Philippines. Taking into consideration the role of the respective national governments in local governance, this paper aims to assist local governments of Denpasar and Puerto Princesa in identifying opportunities for low-carbon development in their region that can consequently contribute to a sustainable national development pathway in their respective countries.

[6] Institute for Global Environmental Strategies, 'Carbon Finance for Low-Carbon Community Development in East Asia Cases of the Philippines, Indonesia and China' (Institute for Global Environmental Strategies, Japan, 2009).
[7] Food and Agriculture Organization of the United Nations, "State of the World's Forests 2011"(Food and Agriculture Organization of the United Nations, Rome, 2011) .
[8] 'Indonesia' reegle REN21 <http://www.reegle.info/countries/ID#energy_efficiency> (03 August 2011).
[9] 'ASEAN Leaders' Statement on Joint Response to Climate Change' Association of Southeast Asian Nations <http://www.aseansec.org/24515.htm> (25 November 2010).

2 The tourist islands Denpasar, Bali and Puerto Princesa, Palawan

2.1 Denpasar, Bali

Geography and demography

Denpasar is the capital of the island province of Bali in Indonesia. Indonesia, an archipelago of 17,508 islands, has five large island regions known as Sumatra, Java, Kalimantan, Sulawesi, and Papua. Situated near the large island of Java, the island of Bali is one of the 33 provinces of Indonesia. Bali has eight regencies and one city, which is Denpasar.

Denpasar has a land area of 12,778 hectares, not including the reclaimed land area of 380 hectares. It has five districts and 43 local villages. It has 734.50 hectares of forest, which is roughly 5.75 per cent of its land area. It has an estimated population of 508,339[10] with a population density of 39.78 per hectare.

Economy

Denpasar's local economy is focused on agriculture and tourism, apart from the development of trade, cooperative & banking sector.[11] Denpasar's agricultural sector produces paddy crops, maize, and soybeans, along with other fruits and vegetables. According to the local government of Denpasar, tourism in Denpasar follows the direction of tourism in Bali province. Tourism in Denpasar follows the "cultural tourism" that Bali province has put a strong focus on, being highly influenced by the Hindu religion and "natural beauty." Denpasar is known for its museums and temples and for its strategic accessibility to the white beaches of Bali. Denpasar has its own international airport, Ngurah Rai International Airport, which is said to be the third busiest airport in Indonesia. The nearest port to Denpasar is the Port of Benoa, which is considered a major port of entry for domestic tourists. For accommodations, Denpasar has 248 accommodations, 23 of which are star-rated hotels, 184 non-rated hotels, and 46 tourist cottages.

The local government of Denpasar recognizes the challenges brought by security and terrorism issues along with health concerns and has attributed the fluctuation of the number of tourists to these. However, there is still a marked increase of tourists in Denpasar from approximately 1,473,250 tourists in 2005 to 1,674,896 tourists in 2009.[12]

[10] Badan Pusat Statistik, 'Bali Dalam Angka' (Badan Pusat Statistik Provinsi Bali, Bali, 2010).
[11] 'Selayang Padang Kondisi Ekonomi' Pemerintah Kota Denpasar <http://www.denpasarkota.go.id/> (22. June 2011).
[12] 'Selayang Padang Kondisi Ekonomi' Pemerintah Kota Denpasar <http://www.denpasarkota.go.id/> (22. June 2011).

Under Level I of Bali Provincial Regulation No. 14 of 1989, tourism affairs that are not within the jurisdiction of the central and regional government will be handled by the local government of Denpasar. In addition, leisure and business affairs of public entertainment (excluding discotheques and water recreation), matters relating to promotions and campsites will be handled by the local government. The city of Denpasar has its own tourism office handling all of these matters.[13]

Traditionally, Indonesia has been managed centrally, with regional and local governments mainly involved in implementing the central government's rules and regulations. Since 1999, the Government of Indonesia has two laws on decentralization, Act no. 22 and Act no. 25, which were revised in 2004. Act no. 32/2004 superseded Act. no 22/1999 and implemented political and administrative decentralization in Indonesia. This law devolved central government powers and responsibilities to local governments (provinces, districts, municipalities) in all government administrative sectors except for security and defense, foreign policy, monetary matters, justice, and religious affairs. Environmental responsibilities were, thus, transferred to the local governments. Act no. 33/2004 implemented fiscal decentralization, where as much as one-third of central government expenditures were transferred to the local governments.[14] Acts 22 and 25 took effect in 2001 while the revisions took effect on October 15th, 2004 and has been subsequently adopted by regencies (kabupaten) and cities (kota).

2.2 Puerto Princesa, Palawan

Geography and demography

Puerto Princesa is the capital of the island province of Palawan in the Philippines. The Philippines is an archipelagic country of 7,107 islands, with Luzon, Visayas and Mindanao as its three main island regions. Of the 7,107 islands, 1,780 islands belong to the province of Palawan. Palawan is part of the Visayas and is considered to be the largest city of the Philippines. It has twenty-four (24) municipalities, with Puerto Princesa being the only highly-urbanized city (HUC) in the province.

Puerto Princesa has a land area of 253,982 hectares. The estimated population of Puerto Princesa is 211,000 persons[15], with a population density of 0.83 per hectare. Known as the 'Last Frontier' and as a 'City in a Forest,' Puerto Princesa boasts of vast forests, which comprise 73 of its land area. Puerto Princesa also has ancestral domains, which comprise 37 of its land area. Indigenous groups living in Puerto Princesa are the Tagbanuas and the Bataks, while the original inhabitants of Puerto Princesa are the Cuyonons.

[13] 'Selayang Padang Kondisi Ekonomi' Pemerintah Kota Denpasar <http://www.denpasarkota.go.id/> (22. June 2011).
[14] Wingqvist, G.O. and Dahlberg, E. 'Indonesia Environmental and Climate Change Policy Brief' (University of Gothenburg Department of Economics, Sweden, 2008).
[15] '2007 Census of Population' National Statistics Office <http://www.census.gov.ph/data/census2007/index.html> (22 June 2011).

Economy

Presently, Puerto Princesa City's economy relies on agriculture, fisheries, trade, commerce, and tourism. The image of Puerto Princesa City, however, is highly-associated with tourism, because of its numerous natural resources.

Puerto Princesa is home to the Puerto Princesa Subterranean River and National Park and is the jump-off point to the Tubbataha Reef National Marine Park, both of which are UNESCO World Heritage Sites. Local and international tourists regularly visit the site, with the total number of visitors increasing yearly. From a total of 134,824 tourists in 2005, there was a doubling to 268,942 tourists in 2009.[16] Majority of the tourists visit Puerto Princesa for leisure or vacation.

Puerto Princesa has its own domestic airport, the Puerto Princesa Airport, and a sea port, the Port of Puerto Princesa, which is also a major port of entry for local tourists. Puerto Princesa has a total of 31 accommodations, with three star-ranked hotels, 13 pension houses, six resorts, and nine tourist inns.

As a result of Puerto Princesa being declared as a highly-urbanized city, it is now governed by a city mayor instead of a provincial governor. Puerto Princesa has its own city government, which is independent of the provincial government.

With the implementation of the Local Government Code in 1991, the national government of the Philippines has given autonomy to local governments through the process of decentralization. Tourism is one such area of responsibility, which the national government has transferred to the local government. Nonetheless, the president of the Philippines still exercises direct supervisory authority over the local governments units while local government units are expected to participate in and implement national projects.

[16] Local Government of Puerto Princesa, 'Economic Sector Development Plan' (Local Government of Puerto Princesa, Palawan, 2011).

3 Challenges in Denpasar and Puerto Princesa

Due to its unique geography, island destinations have special development limitations and these become even more pronounced when they become tourist destinations. Island destinations typically have minimal sources of income, with the island economy dependent on natural resources available on the island. However, in the process of pursuing a tourist economy, tourist activities negatively impact these natural resources that the economy depends on.

Denpasar and Puerto Princesa share some common challenges as tourist island destinations. However, these challenges can also be seen - at least partly - as opportunities in the development of the cities, especially in a low-carbon way. These challenges are enumerated in the following paragraphs.

3.1 Denpasar

One of the biggest challenges of Denpasar is power shortage. Bali's energy is dependent on electricity supply from the island of Java and the long transmission lines is a contributing factor to the major power outages in the city. In March 2011, major blackouts happened in Bali, even disrupting power supply to Ngurah Rai, the international airport of Bali. The cause was not immediately identifiable and this prompted the general manager of PT PLN, Indonesia's electric company, to hypothesize that a "large tree" might have "hit the 150-kilovolt transmission cables."[17] Impending power outages also prompted PT PLN to encourage local residents to reduce power consumption and to ask hotels and large industries to use their own power generators.[18] A pre-feasibility study for geothermal power development in scattered islands of East Indonesia showed that the energy demand in the Java-Bali system is 77.2 per cent of the total energy demand in Indonesia.[19]

In the same month of March 2011, authorities in Bali have also been alarmed over the amount of garbage accumulating in Denpasar every day. Denpasar produces 5,094 cubic

[17] Wasti Atmodjo and Luh De Suriyani, 'Ngurah Rai airport crippled by power outages' The Jakarta Post <http://www.thejakartapost.com/news/2011/03/16/ngurah-rai-airport-crippled-power-outages.html> (22 June 2011).
[18] 'Bali bracing for a week of possible outages' The Jakarta Post <http://www.thejakartapost.com/news/2011/03/25/bali-bracing-a-week-possible-outages.html> (22 June 2011).
[19] 'Pre-feasibility study for geothermal power development projects in scattered islands of East Indonesia' Engineering and Consulting Firms Association, Japan <http://www.ecfa.or.jp/japanese/act-pf_jka/H19/renkei/wjec_indonesia.pdf> (22 June 2011).

meters of trash every day and not all of these are being transported to landfills right away due to the lack of garbage trucks within the province.[20]

3.2 Puerto Princesa

In the economic sector development plan of Puerto Princesa[21], the local government of Puerto Princesa has identified in their "vision-reality gap analysis" a couple of challenges that the province is currently facing. A couple of challenges identified in the “vision-reality gap analysis” were related to energy. These are the following:

- Alternative sources of power are not yet in place;
- Outdated power engines and accessories (incompatible connection between power source and distributor);
- Not enough/no spinning reserve; in case one engine fails, load shedding is inevitable; and
- Power plant and transport services emit black smokes.

Puerto Princesa also suffers from unreliable power supply. This has been a major concern of

both the local community and the business sector in Puerto Princesa. One particular instance was in February 2010 when the Palawan Chamber of Commerce and Industry (PCCI) made a press release that "power interruptions would harm tourism in the Philippines especially during the summer months.[22] The local government of Puerto Princesa recognizes the problem and is trying to address it. In 2009, an independent energy management consulting service was commissioned to identify the technical cause of problems. Overall findings suggest that the system configuration of the power plants needs improvement and that the electrical infrastructure of existing lines and substations are inadequate. The system configuration has poor voltage regulation, where location of power plants from the load center causes a "significant voltage drop at the distribution center"[23]. It also mentioned frequent “ground faults or short circuits” due to vegetation and inadequate protection system. Apart from this, the distribution system is incompatible with the generator system, which causes "ground faults and unbalances in the distribution system," which makes the system vulnerable to high voltage surges.[24]

Due to the non-payment of debts by the National Power Corporation (NPC) Small Power Utilities Group (SPUG), which handles the electrification of Puerto Princesa, petroleum

[20] ‘Don’t Trash Bali Bali Devising Policies to Deal with A Daily Mountain of Trash and Rubbish by Reusing, Recycling and Reducing’ Bali Discovery Tours <http://www.balidiscovery.com/messages/message.asp?Id=6915> (15 October 2011).
[21] Local Government of Puerto Princesa, 'Economic Sector Development Plan' (Local Government of Puerto Princesa, Palawan, 2011).
[22] Irma Isip, 'Industry warns brownouts will harm Palawan tourism' Malaya Business Insight <http://www.malaya.com.ph/02242010/busi8.html> (22 June 2011).
[23] Correspondence (copy), NEXUSPHIL with Mayor of Puerto Princesa, Puerto Princesa City, Philippines, 08 April 2009.

suppliers have refused to deliver any more supplies of diesel[25]. Power Supply Agreements (PSA) also limit the energy supply when the amount of energy to be supplied written in the contract has been exceeded.

Waste management is also one of the challenges in Puerto Princesa. Puerto Princesa has already started moving towards proper waste segregation in the city, aiming to dump only residuals in the city's sanitary landfill while recycling bottles or plastics and paper and composting organics. The only challenge identified in the city's "vision-reality gap analysis" is the institutionalization of segregation at the household level.

The local government of Puerto Princesa cooperates with several non-government organizations in order to address challenges in the tourism sector. One such cooperation that has been established in 2010 is *Pag-ambleg Y Ang Calibutan* (To Take Care of the Environment) with the Ateneo School of Government's G-Watch (Government Watch) Program, a monitoring initiative for community-based sustainable ecotourism in the city. This cooperation aims to verify if eco-tourism projects in Puerto Princesa follow the standard processes, rules and policies for community-based sustainable eco-tourism. It aims to ensure that the city's current approach to tourism promotes local economic growth and environmental conservation and protection of the environment.[26]

[24] Correspondence (copy), NEXUSPHIL with Mayor of Puerto Princesa, Puerto Princesa City, Philippines, 08 April 2009.
[25] Abigail Ho, 'Island power plants run out of fuel' National Power Corporation Small Power Utilities Group <http://www.spug.ph/fuelrunout.asp> (22. June 2011).
[26] Ateneo School of Government, 'Pag-ambleg Y Ang Calibutan: A Monitoring Initiative for Community-Based Sustainable Ecotourism Puerto Princesa Palawan Project Profile' (Ateneo School of Government, Quezon City, 2010).

4 Energy in Denpasar, Bali and Puerto Princesa, Palawan

4.1 Energy utilities

Denpasar, Bali, Indonesia

Since 1950, Indonesia has one state-owned energy monopoly company, Perusahaan Listrik Negara (PLN), which has been mandated to generate, transmit, and distribute electricity. Act number 15 of 1985 and Government Regulation number 17 of 1990 gave PLN the role of Electric Energy Authority of Indonesia. The Government Regulation number 23 of 1994 changed PLN into a Limited Liability Company from being a Public Utility Company, while still remaining as the Electric Energy Authority of Indonesia. The government of Indonesia subsidizes the electricity tariff "to provide cheaper fuel prices for domestic consumers."[27] As a result, "production costs [are] already more than the double the tariff they (PLN) can collect".[28] At the same time this subsidy undermines incentives to reduce energy consumption.

Production of electricity in Denpasar is facilitated by the UPJ Bali Selatan, which has an electricity production of 2,229.78 megawatts per hour (MWh).[29] According to the publicly available data from Bali, bulk of electricity sold in Denpasar is from the household and business sector. This is summarized in the figure below:

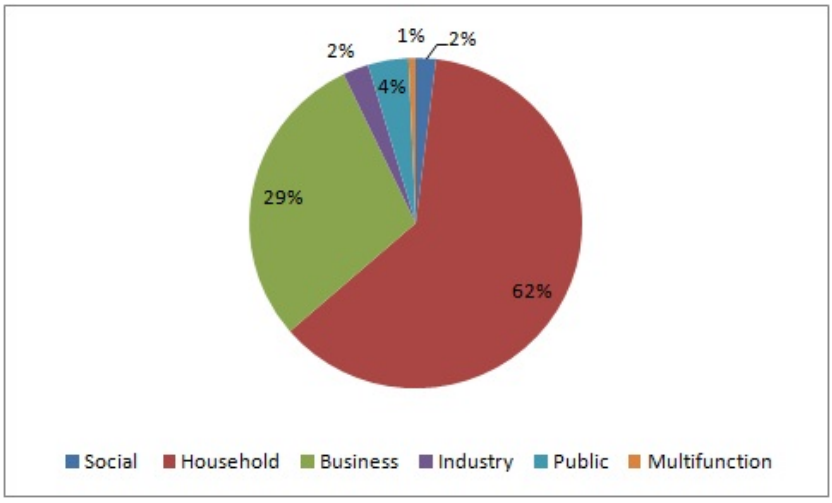

Figure 1. Distribution of electricity use in Denpasar[30]

[27] Fukuda, K. and Siagian U. 'Potential of Renewable Energy based Distributed Power Generation System toward Low Carbon Development Option for Indonesia', in Kentaro Tamura et al. (eds), *Is Indonesia in a Good Position to Achieve Sustainable Low Carbon Development? Opportunities, potentials and limitations* (Institute for Global Environmental Strategies, 2010).
[28] Montty Girianna, 'Renewable energy and energy efficiency in Indonesia' ADB Workshop on Climate Change and Energy 2009 <http://www.adb.org/documents/events/2009/Climate-Change-Energy-Workshop/Renewable-Energy-Girianna.pdf> (22 June 2011).
[29] Badan Pusat Statistik, 'Bali Dalam Angka' (Badan Pusat Statistik Provinsi Bali, Bali, 2010).

Under regulation No. 26 Year 2006, which was a result of the second amendment of *Rencana Umum Ketenagalistrikan Nasional* (RUKN), also known as the National Electricity General Plan, participation of private companies in power sector is expected to increase. This regulation requires that each business entity involved in electric power supply will prepare its *Rencana Umum Penyediaan Tenaga Listrik* (RUPTL) or the Master Plan of Electricity Supply in its own business area, and that this plan shall refer back to the RUKN. In its RUPTL, PT PLN (Persero) enumerates system development projects that will be implemented by the corporation itself. It also includes some power generation projects that Persero intends to pitch to private sector companies to build and to operate under a scheme of independent power producers (IPP). For some figures in sharing capacity of electricity generation, PLN's plants generated more than 70% of the total generation from the year 2000 – 2008. In 2008, from the total generation of 149 TWh, PLN's generated 118 TWh, while the rest were generated by IPPs.[31]

Puerto Princesa, Palawan, Philippines

Since 1936, the National Power Corporation (NPC) has been the largest provider and electricity generator in the Philippines. The Electric Power Industry Reform Act (EPIRA) of 2001 (also known as Republic Act 9136) brought two major reforms to the energy sector of the Philippines. The generation and transmission lines of the state-owned National Power Corporation were opened for privatization and the electricity industry was restructured to separate generation, transmission, distribution, and supply.[32] Generation and supply were deregulated and a "socialized pricing mechanism" was created to ensure that the marginalized sectors of the society will still have access to electricity despite the subsidy phase-out.

The National Power Corporation (NPC), a government owned and controlled corporation (GOCC), has a Small Power Utilities Group (SPUG) tasked to handle the electrification of islands in the Philippines that are not connected to the main transmission grid[33]. Puerto Princesa City, like the rest of Palawan, is not connected to the main grid and sources its energy from independent power producers (IPP) who are part of the NPC SPUG.

The two independent power producers operating in Puerto Princesa are Delta P, Inc. (DPI) and Palawan Power Generation, Inc. (PPGI). The power distributor is the Palawan Electric Cooperative (PALECO). DPI is the largest IPP in the region and operates a sixteen (16) megawatt (MW) bunker-fired power plant with four units of four MW generator sets. It generates sixty-five (65 per cent) of the energy requirement of the Palawan grid.[34] PPGI, on the other hand, operates a nine (19) MW diesel power plant with a net dependable capacity of 11.6 MW. The NPC SPUG maintains a peak and

[30] Badan Pusat Statistik, 'Bali Dalam Angka' (Badan Pusat Statistik Provinsi Bali, Bali, 2010).
[31] Wattimena, B. A. 'Pelangi Indonesia Working Paper on Energy Efficiency and GHG Mitigation Potential' (Pelangi Indonesia, Jakarta, 2010).
[32] 'EPIRA (R.A. 9136)' Official Website of the Philippine Department of Energy <http://www.doe.gov.ph/faq%27s/epira.htm> (24 June 2011).
[33] 'Small Power Utilities Group' National Power Corporation <http://www.spug.ph/> (24 June 2011).
[34] 'Delta P, Inc.' Vivant Corporation <http://vivant.com.ph/holdings/delta-p-inc/> (24 June 2011).

reserve capacity of about five (5) MW[35], short of Palawan and Puerto Princesa's peak requirement of thirty (30) MW.[36]

Table 1. Existing Small Power Utility Group (SPUG) power plants in Puerto Princesa City[37]

Plant Name	Rated Capacity (MW)	Dependable Capacity (MW)	Distributor	Role
1. Delta P, Inc.	16.0	13.4	PALECO	Peaking & reserve power supplier
2. Irawan Modular	10.0	10.0	PALECO	Support
3. Puerto Princesa Diesel Power Plant	19.0	11.6	Palawan Power	Base load supplier
(Total)	45.0	35.0		

Electricity generation in Puerto Princesa contributes 52 per cent of the city's total greenhouse gas emissions while road transportation contributes 30 per cent.[38]

4.2 Renewable energy potentials

In a working paper released by the International Energy Agency in 2010, the potential for renewable electricity in Southeast Asian countries Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam (called the ASEAN-6) for the medium term (2030) is about 1.8 times the total electricity consumption of the region in 2007. Additionally, it says that the current deployment of renewable energy in the region is twelve times less than the realizable potential, especially for non-hydro renewable energy like biomass, onshore wind, geothermal and solar photovoltaics.[39]

There are a couple of energy resources available in Puerto Princesa, Palawan and Denpasar, Bali that can be tapped in the future. These are the following:

[35] 'Business groups call for quick solution to Palawan brownout problem; fear severe damage to tourism industry' Philippine Chamber of Commerce and Industry <http://www.philippinechamber.com/index.php?option=com_content&view=article&id=739:business-groups-call-for-quick-solution-to-palawan-brownout-problem-fear-severe-damage-to-tourism-industry&catid=31:energy&Itemid=78> (24 June 2011).
[36]'P140M power generation project eyed in Puerto Princesa' The Palawan Times <http://thepalawantimes.wordpress.com/2009/02/23/p140-m-power-generation-project-eyed-in-puerto-princesa/> (24. June 2011).
[37] Correspondence (copy), NEXUSPHIL with Mayor of Puerto Princesa, Puerto Princesa City, Philippines, 08 April 2009.
[38] 'Puerto Princesa, First Carbon Neutral City in Southeast Asia' Republic of the Philippines Philippine Information Agency < http://www.pia.gov.ph/?m=1&t=1&id=46442> (15. August 2011).
[39] Ölz, S. and Beerepoot, M. 'Deploying renewables in Southeast Asia trends and potentials' (International Energy Agency Working Paper, France, 2010).

Puerto Princesa, Palawan

Geothermal: In Sta. Lucia-Iwahig, Puerto Princesa, Palawan is an area of 18,024.36 hectares, which has a potential to generate zero to one MW of geothermal power. The area has a geothermometry of 46 - 125°C and a hot spring of 42 - 53°C. This is considered a moderate temperature.[40] The hot spring has a slightly alkaline sodium (Na) - chlorine (Cl) type of water.[41] The sodium chloride water is the most common type of fluid found at depth in large water-dominated geothermal systems.[42]

Hydropower: There are a total of 13 sites in Palawan that are potential locations of hydropower plants. The estimated capacities of the locations are 35.03 MW.[43]

Wind: The province of Palawan has a wind electric potential of 3,000 - 5,200 MW. In the immediate vicinity of Puerto Princesa, wind resource is classified as marginal for utility-scale applications and moderate for rural power applications.[44]

Solar: Palawan has an annual solar electric potential ranging from 4.5 - 6.0 kWh/m^2/day. The solar resource, indeed, varies between the dry (March - May) and wet seasons (November - January) in the Philippines. The dry season brings in more solar radiation than the wet season.[45]

Biomass: Existing biomass potentials in Palawan are from rice hull, rice stalks, coconut shell, and coconut husks. In addition, landfill waste also holds biomass potential from the methane generated from the waste. In 2009, a biomass potential of 2.5 MW was predicted for the province of Palawan.[46]

Denpasar, Bali

Geothermal: 60 KM northwest of Denpasar is the Bedugul Field, which has already been formerly explored.[47] The reservoir is liquid-dominated that is relatively dilute with neutral pH, NaCl fluids with a geothermometry of 280-320ºC, which is considered a high temperature.[48] The reservoir lies at depths of 1500-2500 meters, below a thick, low-permeability cap-rock composed of clay-rich, argillic altered volcanic rocks. In 2005,

[40] 'What is Geothermal?' Geo-Heat Center <http://geoheat.oit.edu/whatgeo.htm> (24 June 2011).
[41] 'Sta. Lucia – Iwahig, Puerto Princesa' Primary Energy Corporation <http://www.primaryenergycorp.com/iwahig.php#location> (24 June 2011).
[42] Gupta, H. and Roy, S. *Geothermal Energy: An Alternative Resource for the 21st Century* (Elsevier, the Netherlands, 2007).
[43] 'P1-B Hydro Power Plant Up in Puerto Princesa City' Langogan Power Corporation <http://www.langoganpower.com/p1-b-hydro-power-plant-up-in-puerto-princesa-city/> (24 June 2011).
[44] Elliot *et al*., 'Wind Energy Resource Atlas of the Philippines' National Renewable Energy Laboratory <http://spug.ph/wind_atlas_philippines.pdf> (24 June 2011).
[45] 'Assessment of Solar Resources in the Philippines' National Renewable Energy Laboratory <http://spug.ph/Solar.pdf> (24 June 2011).
[46] 'Biomass' Invest Philippines <http://www.investphilippines.gov.ph/downloads/sector/Biomassper cent20Energy.pdf> (24 June 2011).
[47] Darma et al. 'The Role of Pertamina Geothermal Energy (PGE) in Completing Geothermal Power Plants Achieving 10,000 MW in Indonesia' Proceedings World Geothermal Congress 20120 <http://b-dig.iie.org.mx/BibDig/P10-0464/pdf/0402.pdf> (24 June 2011).
[48] 'What is Geothermal?' Geo-Heat Center <http://geoheat.oit.edu/whatgeo.htm> (24 June 2011).

plans of constructing a geothermal power plant with a capacity of 175 MW have been confirmed albeit construction and commercial operation has been postponed to 2012.[49]

Hydropower: There is not a big hydropower resource potential in Denpasar or Bali but there are a lot of small hydropower resources that can be developed as micro- or pico-hydropower systems.[50]

Wind: The potential of wind in Indonesia, in general, is relatively small. There is also not much potential for wind power in the area of Denpasar or Bali but from the south of Bali island to Nusa Tenggara there is a potential of energy exceeding the cut-off wind speed of 3m/s.[51]

Solar: Most of the areas in Bali receive around 6 – 6.5 kWh/m^2/day of solar radiation.[52] This is considered by the Indonesian Renewable Energy Society as a high heat radiation, which is an optimal condition for solar power as an energy source.

Biomass: Rice husk is one of the biomass opportunities that PT PLN has identified in Bali.[53] The rice husk can be considered as a second – generation biofuel.

[49] Darma et al. 'The Role of Pertamina Geothermal Energy (PGE) in Completing Geothermal Power Plants Achieving 10,000 MW in Indonesia' Proceedings World Geothermal Congress 20120 <http://b-dig.iie.org.mx/BibDig/P10-0464/pdf/0402.pdf> (24 June 2011).
[50] Suarda *et al*., 'Experimental Work on Modification of Impeller Tips of a Centrifugal Pump as a Turbine' < http://www.jgsee.kmutt.ac.th/see1/cd/file/B-008.pdf> (24 June 2011).
[51] Ir Djuwarno, 'Distributed small scale power plant in Indonesia' <http://www.egnret.ewg.apec.org/meetings/egnret20/Korea%20day%201/Indonesia.ppt > (24 June 2011).
[52] Ir Djuwarno, 'Distributed small scale power plant in Indonesia' <http://www.egnret.ewg.apec.org/meetings/egnret20/Korea%20day%201/Indonesia.ppt > (24 June 2011).
[53] Anasia Silviati, 'Indonesia Renewable Energy Market' <http://www.climatelaw.org/laws/indonesia/indonesiaenergy> (24 June 2011).

5 Low-carbon development opportunities: institutional, policy, and regulatory frameworks

5.1 International

The UNFCCC, as an international framework, is supposed to guide its member countries towards effective climate action. The Bali Action Plan (BAP), adopted during the Conference of the Parties (COP) at its thirteenth session in 2008 in Bali, Indonesia, emphasized the need for "deep cuts in global emissions."[54] It also saw "enhanced national or international action on mitigation of climate change" as one of the ways by which "cuts in global emissions" can be achieved. The Bali Action Plan (BAP) currently serves as a guiding path by which negotiations in the UNFCCC shall move. It includes clauses for action for both developed and developing countries. It identified actions that developing countries can contribute, taking into consideration the principle of "common but differentiated responsibility." The following are some of the actions identified by the BAP for developing countries that can enhance "national/international action on mitigation of climate change":

- Nationally appropriate mitigation actions (NAMAs) by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner;
- Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries;
- Various approaches, including opportunities for using markets, to enhance the cost-effectiveness of, and to promote, mitigation actions, bearing in mind different circumstances of developed and developing countries.

The Bali Action Plan (BAP) also "decided" that the process by which "deep cuts in global emissions" are to be agreed on shall be "conducted under a subsidiary body under the Convention," which is the Ad Hoc Working Group on Long-Term Cooperative Action (AWG-LCA). The AWG-LCA was initially tasked to complete its work in 2009 at the fifteenth session of the Conference of the Parties in Copenhagen, Denmark. It was, however, decided at the fifteenth session[55] of the Conference of the Parties that the "mandate of the AWG-LCA under the Convention" will be extended "to enable it to

[54] ‘United Nations Framework Convention on Climate Change‘ Part two: Action taken by the Conference of the Parties at its thirteenth session <http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf> (15 October 2011).
[55] 'United Nations Framework Convention on Climate Change' Part two: Action taken by the Conference of the Parties at its fifteenth session <http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf#page=3> (20 June 2011).

continue its work with a view to presenting the outcome of its work to the Conference of the Parties for adoption at its sixteenth session" in 2010 in Cancun, Mexico.

The Conference of the Parties at its sixteenth session in 2010 adopted the Cancun Agreement as its first decision. The Cancun Agreement as an outcome of the work of the AWG-LCA under the Convention had a section on "Enhanced action on mitigation," which included a subsection entitled "Nationally appropriate mitigation actions (NAMAs) by developing country Parties." The subsection recognizes "that developing country Parties are already contributing and will continue to contribute to a global mitigation effort" and reaffirms "that social and economic development and poverty eradication are the first and overriding priorities of developing country Parties, and that the share of global emissions originating in developing countries will grow to meet their social and development needs." In line with this, the subsection "agrees that developing country Parties will take nationally appropriate mitigation actions in the context of sustainable development, supported and enabled by technology, financing and capacity-building, aimed at achieving a deviation in emissions relative to 'business as usual' emissions in 2020."[56]

Indonesia and the Philippines have both signed and ratified the Climate Change Convention[57] in 1992 as well as the Kyoto Protocol in 1998.[58] Both countries have signed as Non-Annex 1 countries to the Convention. Both countries have also submitted national communications to the UNFCCC, Indonesia in 1999 (presently being updated) and the Philippines in 2000. Both are, thus, part of an international agreement that calls for developing countries to develop NAMAs.

Indonesia can use a NAMA to reduce its emissions as it currently stands as the fourth biggest emitter in the world due to deforestation. It is also now a net energy importer and no longer an energy exporter like before when it was part of the Organization of Petroleum Exporting Companies (OPEC). The Philippines is also a net energy importer. Developing a NAMA on the energy sector can contribute to the development of Indonesia and the Philippines in a sustainable direction. NAMAs in Indonesia and the Philippines or in Southeast Asia in general can be seen as a safeguard not to confine or lock-in developing Southeast Asian countries to fossil-intensive infrastructure and technologies and keep emissions low in the course of the region's development. This is in line with projections that show Indonesia and the Philippines, along with other countries in the region, have more than tripled their energy consumption within the past three (3) decades and will double this number within the next two (2) decades.[59]

[56] 'United Nations Framework Convention on Climate Change' Part two: Action taken by the Conference of the Parties at its sixteenth session <http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2> (20 June 2011).
[57] 'Status of the Ratification of the Convention' United Nations Framework Convention on Climate Change <http://unfccc.int/essential_background/convention/status_of_ratification/items/2631.php> (15 October 2011).
[58] 'Status of the Ratification of the Kyoto Protocol' United Nations Framework Convention on Climate Change < http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php> (15 October 2011).
[59] World Bank, *Winds of Change: East Asia's Sustainable Energy Future*, 2010.

In March 2011, the UNFCCC released a compilation of submissions by developing countries on the NAMAs that they wanted to implement[60]. Indonesia submitted a voluntary NAMA echoing the declaration of President Susilo Bambang Yudhoyono at the G-20 Meeting in 2009 that Indonesia will voluntarily reduce its greenhouse gas emissions by 26 per cent by 2020. Fittingly, Indonesia stated that they aim to achieve this reduction through the following:

- Sustainable peat land management;
- A reduction in the rate of deforestation and land degradation;
- The development of carbon sequestration projects in forestry and agriculture;
- The promotion of energy efficiency;
- The development of alternative and renewable energy sources;
- A reduction in solid and liquid waste;
- Shifting to low-emission modes of transport.

Indonesia also mentioned that with international support, it can reduce its greenhouse gas emissions up to 41%. The Philippines, on the other hand, did not yet voluntarily submit a NAMA that the country would like to implement.

The United Nations World Tourism Organization (UNWTO) has convened two international conferences on Climate Change and Tourism, the first in 2005 and the second in 2007. The Second International Conference on Climate Change and Tourism in 2007, held in Davos, Switzerland, resulted in the Davos Declaration. The Davos Declaration[61] "agreed" that the tourism sector is dependent on climate and is "highly sensitive" to climate change impacts. It recognized that the tourism sector will contribute “approximately 5% of global carbon dioxide (CO_2) emissions” and that the tourism sector must "rapidly respond" to climate change if it were to have sustainable growth. This statement enumerated the following as the actions required to "progressively reduce the greenhouse gas emission (GHG) contribution" of the tourism sector:

- Mitigate its GHG emissions, derived especially from transport and accommodation activities;
- Adapt tourism businesses and destinations to changing climate conditions;
- Apply existing and new technology to improve energy efficiency; and
- Secure financial resources to help poor regions and countries.

In addition to these, the Davos Declaration also called for actions in governments and international organizations, tourism industry and destinations, consumers, and research and communications networks. The Davos Declaration is a clear call to everyone engaged

[60] 'United Nations Framework Convention on Climate Change' Compilation of information on nationally appropriate mitigation actions to be implemented by Parties not included in Annex I to the Convention <http://unfccc.int/resource/docs/2011/awglca14/eng/inf01.pdf> (20 June 2011).
[61] 'United Nations World Tourism Organization' Davos Declaration Climate Change and Tourism Responding to Global Challenges <http://www.unwto.org/pdf/pr071046.pdf> (18 July 2011).

in tourism to act on tourism's contribution to climate change in order to minimize the impacts of climate change on tourism.

5.2 Regional

The Association of Southeast Asian Nations (ASEAN), the geopolitical organization of ten Southeast Asian member countries, has institutional and policy frameworks for climate change and energy in the Southeast Asian region.

The geopolitical work of the ASEAN is organized into three communities: the ASEAN Political Security Community, the ASEAN Economic Community, and the ASEAN Socio-Cultural Community (ASCC). Each community has their own blueprint and own areas of work. The ASEAN Socio-Cultural Community is the community where environmental issues are tackled.

5.2.1 ASEAN Socio-Cultural Community

Under the environment section of the ASEAN Socio-Cultural Community (ASCC), the ASEAN Ministerial Meeting on the Environment (AMME) was established in 1981 as a platform to discuss environmental issues in the region. There is also an "informal" AMME, which meets in between the successive "formal" AMME.

Climate change was identified as one of the ten priority areas of the AMME.[62] The ASEAN Socio-Cultural Community Blueprint, published in 2009 by the ASEAN Secretariat,[63] dedicated a subsection to "Responding to climate change and addressing its impacts" under the section "Ensuring environmental sustainability." The strategic objective of the subsection suggests enhancing "regional and international cooperation to address the issue of climate change and its impacts on socio-economic development, health and environment in ASEAN member states through implementation of mitigation and adaptation measures...." An important action under this subsection is the encouragement of efforts to "develop an ASEAN Climate Change Initiative (ACCI)." The ACCI was seen as a "consultative platform" that will strengthen collaboration within and implement concrete actions on climate change issues in the region. The scope of collaboration in the ACCI is enumerated as follows:[64]

- Policy and strategy formulation;
- Information sharing;
- Capacity building;
- Technology Transfer.

At the 11th ASEAN Ministerial Meeting on the Environment (AMME) in 2009, the terms of reference of the ASEAN Climate Change (ACCI) were adopted and the establishment

[62] 'Association of Southeast Asian Nations' An overview on ASEAN environmental cooperation <http://environment.asean.org/index.php?page=overview> (20 June 2011).
[63] 'Association of Southeast Asian Nations' ASEAN socio-cultural community blueprint <http://www.asean.org/5187-19.pdf> (20 June 2011).
[64] 'Association of Southeast Asian Nations' An overview on ASEAN environmental cooperation <http://environment.asean.org/index.php?page=overview> (20. June 2011).

of the ASEAN Working Group on Climate Change (AWGCC) was endorsed. The AWGCC's task is to implement the ACCI. It is the subsidiary body that is in-charge of the priority area of climate change, with Thailand as the lead country.

The ASEAN has declared to take action towards an "ASEAN Community resilient to climate change" in its Leaders' Statement on Joint Response to Climate Change in April 2010. In order to achieve this, the ASEAN leaders declared to "incorporate mitigation and adaptation strategies into national development strategies and policies in line with sustainable development." The ASEAN leaders also declared to "collaborate on environmentally-sound technologies, towards low carbon and green economy." Leaders of the ASEAN countries clearly have a commitment towards low carbon development.

5.2.2 ASEAN Economic Community

For energy cooperation within the ASEAN, the Senior Officials on Energy Meeting (SOME) takes the lead in overseeing the energy projects and activities within the region while the ASEAN Ministers on Energy Meeting (AMEM) takes the lead in identifying issues and setting policy and program directions for the region.[65] Since 1999, the ASEAN continually released an ASEAN Plan of Action for Energy Cooperation (APAEC), a five-year plan detailing identified actions that can lead to the achievement of "enhanced energy security and sustainability for the region".[66]

The APAEC 2010-2015 identified seven program areas of action. There are also specialized bodies that are in-charge of program areas identified in the ASEAN Plan of Action for Energy Cooperation (APAEC). Summarized in the following table are the program areas of action together with its corresponding specialized bodies:

Table 2. APAEC 2010-2015 program areas of action and specialized bodies[67]

Program area of action	Specialized bodies in-charge
ASEAN power grid	HAPUA - Head of ASEAN Power Utilities / Authorities
Trans-ASEAN gas pipeline	ASCOPE - ASEAN Council on Petroleum
Coal and clean coal technology	AFOC - ASEAN Forum on Coal
Energy efficiency and conservation	EE&C-SSN - Energy Efficiency and Conservation Sub-Sector Network
Renewable energy	RE-SSN - Renewable Energy Sub-Sector Network
Regional energy policy and planning	Regional Energy Policy and Planning Sub-Sector Network
Civilian nuclear energy	ACE - ASEAN Center of Energy as Secretariat

[65] 'Association of Southeast Asian Nations' ASEAN plan of action for energy cooperation <http://www.asean.org/22675.pdf> (20 June 2011).
[66] 'Association of Southeast Asian Nations' ASEAN plan of action for energy cooperation <http://www.asean.org/22675.pdf> (20 June 2011).
[67] 'Association of Southeast Asian Nations' ASEAN plan of action for energy cooperation <http://www.asean.org/22675.pdf> (20 June 2011).

Part of the ASEAN Economic Community is the area of tourism. While there is no explicit recognition that tourism is also a major contributor to climate change, the ASEAN Economic Community's area of tourism tries to incorporate climate change in its agenda as part of its efforts in strengthening climate change cooperation within the ASEAN. An example would be a workshop held in October 2010 in Indonesia on developing the framework of ASEAN tourism standards in responding to climate change. One recommendation made was the preparation of a work plan on tourism activities within the ASEAN region that can contribute to "climate change [reduction] initiatives."[68] The said workshop was conducted with technical assistance from the government of New Zealand through NZAID.

In January 2011, the Fourteenth Meeting of ASEAN Tourism Ministers (M-ATM) was held in Cambodia at the same time as the ASEAN Tourism Forum (ATF)[69]. A distinguishing landmark decision was the adoption of an ASEAN Tourism Strategic Plan (ATSP) 2011-2015. Acknowledging that tourism can be a "tool for development and change in the region," the ministers adopted the ATSP with the view of promoting "growth, integration and competitiveness of the tourism sector (...)" in the region. The ATSP also aims to "enhance the ability of ASEAN tourism to address the climate change issue."[70] According to the ATSP, in January 2011, baseline data on risks and opportunities of climate change to tourism in the ASEAN region will be developed and a work plan on ASEAN tourism activities to contribute to climate change reduction initiatives should be developed in January 2012.

5.3 National / Country responses

Indonesia and the Philippines have a couple of national initiatives on climate change, energy efficiency, and renewable energy. These country responses are enumerated below, along with the existing institutional, regulatory, and policy frameworks on energy in each country.

5.3.1 Indonesia

Climate Change

Apart from ratifying the UNFCCC in 1994 by virtue of Act no. 6/1994 and the Kyoto Protocol in 2004 by virtue of Act no. 17/2004, Indonesia has played a prominent role in the UNFCCC process in recent years. In December 2007, it hosted the UNFCCC 13th Meeting of the Conference of the Parties and the 3rd Meeting of the Conference of the Parties serving as meeting of the Parties to the Kyoto Protocol (COP 13 / CMP 3) on its

[68] 'Association of Southeast Asian Nations' Joint media statement of the fourteenth meeting of ASEAN tourism ministers (14th M-ATM) <http://www.aseansec.org/25762.htm> (20 June 2011).
[69] 'Association of Southeast Asian Nations' Joint media statement of the fourteenth meeting of ASEAN tourism ministers (14th M-ATM) <http://www.aseansec.org/25762.htm> (20. June 2011).
[70] 'Association of Southeast Asian Nations' Joint media statement of the fourteenth meeting of ASEAN tourism ministers (14th M-ATM) <http://www.aseansec.org/25762.htm> (20. June 2011).

island of Bali. The key decision of this dramatic meeting was a decision on the Bali Action Plan (BAP), which was referred to in section 5.1 of this paper.

Indonesia started more ambitious climate change efforts in 2003 by creating a National Committee on Climate Change (NCCC) and Environment by virtue of the Ministry of Environment decree No. 53/2003. The NCCC is composed of representatives from different government agencies and from the civil society, academic, and business sectors. The NCCC is tasked to coordinate the different government agencies in implementing Indonesia's climate change-related actions.[71]

In July 2005, the Ministry of Environment (MoE) of Indonesia established the National Committee for the Clean Development Mechanism (locally known as *Komisi Nasional Mekanisme Pembangunan Bersih* or KOMNAS MPB) through the MoE decree no. 206/2005. The mandate of the KOMNAS MPB is to approve clean development mechanism (CDM) projects that are able to satisfy criteria of sustainable development.

In December 2007, the government of Indonesia formulated its National Action Plan (NAP) Addressing Climate Change (also known locally as *Rencana Aksi Nasional Perubahan Iklim* or RANPI). The NAP is seen as a "dynamic policy instrument" that will be subjected to periodic evaluation. The NAP identified immediate, short-, medium-, and long-term actions for the climate, with short-term actions targeted from 2009-2012.

In June 2008, Indonesia's National Planning Agency (BAPPENAS) released Indonesia's Yellow Book, which is also known as Indonesia's Development Planning: Response to Climate Change. The Yellow Book is seen as a "bridging document to include the consideration of sectoral and cross-sectoral concerns to climate change into the ongoing mid-range development plan of Indonesia".[72]

In July 2008, one month after the release of the Yellow Book, a National Council on Climate Change (NCCC) locally known as Dewan Nasional Nasional Perubahan Iklim (DNPI) was established by the Indonesian president through Presidential Regulation no. 46/2008 and was chaired by the President himself, with support from Coordinating Ministers for Economic Affairs and for People‘s Welfare both as vice-chairs, and 16 cabinet ministers plus the Head of Meteorology, Climatology and Geophysics as council members. The Council has an Operating Secretariat and 7 Executive Working Groups of (1) Mitigation, (2) Adaptation, (3) Technology Transfer, (4) Financial Mechanism, (5) Land-use and Land-use Change and Forestry (LULUCF), (6) Post 2012 Program, and (7) Science Basis and Climate Data Inventory.[73] The NCCC / DNPI then became Indonesia's national focal point on climate change with tasks defined as the following:

[71] Government of Indonesia State Ministry of Environment, 'National Action Plan Addressing Climate Change' (Government of Indonesia State Ministry of Environment, Jakarta, 2007).
[72] Eka Melisa, 'National Action Plan and International Partnership: Indonesia's Response to Global Efforts to Improve the International Regime on Climate Change' Paper and presentations from the Asia Climate Change Policy Forum <http://www.crawford.anu.edu.au/accpforum/presentations.php> (09 May 2011).
[73] National Climate Change Commission of Indonesia ‘National Economic, Environment and Development Study (NEEDS) for Climate Change Indonesia Case Study’<http://unfccc.int/files/adaptation/application/pdf/indonesianeeds.pdf> (15 October 2011).

- Formulate national policies, strategies, programs and activities on climate change control;
- Coordinate the activities in the implementation of control tasks that include climate change adaptation activities, mitigation, technology transfer and financing;
- Formulate a mechanism for setting policies and procedures for carbon trading;
- Carry out monitoring and evaluation of policy implementation on climate change control; and
- Strengthen Indonesia's position to encourage developed countries to take more responsibility in controlling climate change.

In 2009, at the G-20 Meeting, President Susilo Bambang Yudhoyono declared that Indonesia will voluntarily reduce greenhouse gas emissions by 26 per cent in the year 2020. With international support, Indonesia intends to reduce greenhouse emissions by up to 41 per cent. In the same year, Indonesia also revised its Environmental Management Act (EMA) No. 23/1997 to include climate change. The revised act is now called the Environmental Protection and Management Act or Act No. 32/2009. The EMA is said to be the "main environmental protection legislation" in Indonesia. Through the EMA, the Ministry of Environment of Indonesia is able to coordinate with other government agencies and draft national policies for environmental protection.[74]

In March 2010, the National Development Planning Agency (also known locally as *BAPPENAS*) of Indonesia released the Indonesia Climate Change Sectoral Road Map (ICCSR). The ICCSR is seen as the "first step" towards the realization of President Yudhoyono's declaration in 2009 towards reducing greenhouse gas emissions in Indonesia. The ICCSR was drafted in order to "provide inputs for the next five-year Medium-Term Development Plan (RPJM 2010 - 2014) and also for the subsequent RPJMN until 2030."[75]

Currently, the government of Indonesia is finalizing its National Action Plan for Greenhouse Gases Reduction (RAN-GRK) consistent with the declaration of the president to reduce GHG emissions by 26 per cent in the year 2020. After the issuance of the *Rencana Aksi Nasional Penuruanan Emisi Gas Rumah Kaca* or RAN-GRK, regional action plans will also be drafted. [76]

[74] Laode Syarif and Andri Wibisana, 'Strengthening Legal and Policy Frameworks for Addressing Climate Change in Asia: Indonesia' UNEP Case Studies <http://www.unep.org/dec/PDF/Casestudies/CCIndonesiadraft.pdf> (28 May 2011).
[75] Republic of Indonesia Ministry for National Development Planning, 'Indonesia Climate Change Sectoral Roadmap Energy Sector Part 2 Sumatera System' (Republic of Indonesia Ministry for National Development Planning, Jakarta, 2010).
[76] 'Government finalizing emissions reduction plan' The Jakarta Post <http://www.thejakartapost.com/news/2011/07/19/govt-finalizing-emissions-reduction-plan.html> (01 August 2011).

Summarized below are the important climate change initiatives that the government of Indonesia has undertaken so far.

Table 3. Summary of Indonesia's climate change initiative[77]

Name of Program	Contents
National Action Plan Addressing Climate Change (RAN PI), (December 2007) Ministry of Environment (MoE)	Guidelines for agencies to execute coordinated and integrated mitigation and adaptation actions. Contains strategic objectives of national development addressing impact of climate change, which govern plans of action in adaptation and mitigation per sector, institutional capacity building, technology and funding, design and development action of adaptation and mitigation program, international cooperation, M&E, implementation of action to reduce impact of climate change. In addition, policy and regulatory framework for sustainable development are continuously adjusted and renewed as demands raise.
Indonesia Climate Change Sectoral Road Map (ICCSR) (March 2010) National Development Planning Agency (*BAPPENAS*)	The Climate Change Roadmap is prepared to cover a timeframe of 20 years (2010-2029). Priority programs of the Roadmap are outlined in four phases of five years in relevant Regional Long-Term Development *(Rencana Pembangunan Jangka Menengah or RPJM)*. The program under ICCSR should then be integrated to the National Medium- Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional or* RPJMN 2010-2014). This roadmap shall also be considered further in the strategic plans of each ministry or agency and to provide inputs for the subsequent RPJMN until 2030.The sectors covered are energy (power generation), industry, transportation and waste for mitigation while for adaptation it covers coastal, health and agriculture sector.
National Development Planning: Indonesia Responses to Climate Change (2008 revised 2010) (*BAPPENAS*)	Complementary to ICCSR, this document allows the GOI to incorporate climate change mitigation and adaptation planning into the national development process. It aims to sharpen the current development plan as well to bridge to the next development plan to be more climate-responsive, especially in formulating the National Mid-Term Development Plan (RPJMN 2010-2014) and Government Annual Workplan (RKP 2009 and RKP 2010).
National Action Plan in Reducing Greenhouse Gases Emission (2011) (*BAPPENAS*)	National Action Plan for Emissions Greenhouse Gases Reduction (RAN-GRK) is a working document that provides the basis for various ministries or institutions as well as the local governments to implement various activities that directly and indirectly reduce greenhouse gas emissions under the global climate change reduction rate framework. Greenhouse Gas Emission (GHG) itself, generated from various development activities especially from forestry, peat, waste, agriculture, transportation, industry and energy. This document is prepared as part of mid-term development plan (RPJM) to address climate change impacts, which are expected to reduce GHG emissions, mainly from the fields of development priorities.

Renewable energy

Indonesia also continues to refine frameworks that would support the uptake of renewable energy in the country.

In 2006, the government issued its National Energy Policy (Presidential Regulation no. 5/2006). The regulation set a target for 2025 regarding energy elasticity and energy mix of Indonesia. It aims to "ensure sufficiency of domestic energy supply and to support sustainable development" and thus the National Energy Policy became the "guidelines for national energy management."[78]

Renewable energy purchase mechanisms were also set in place by the Indonesian government, such as requiring PLN to buy energy from non-PLN renewable energy producers and setting a purchasing tariff from renewable energy power plants for PLN. Summarized below are the other relevant regulations that promote the uptake of renewable energy in Indonesia.

Energy efficiency

The Indonesian government also has laws and regulations on energy efficiency. In 1999, the government of Indonesia, through the Directorate General of Electricity and Energy Development (DGEED) implemented a voluntary comparative labeling for refrigerators and refrigerator-freezers. The rating system included information on energy consumption (kWh per year), a dual efficiency rating system with a rating of one up to five stars (five stars being the highest), and a comparison of the consumption of similar products.[79] In 2005, a presidential instruction (no. 10/2005) instructed government offices and government officials to conserve energy through energy efficiency measures. A ministerial regulation (no. 31/2005) followed from the MEMR, with a more detailed instruction on energy efficiency initiatives.

The Directorate General of Electricity and Energy Utilization of the MEMR first issued in 1995 and revised in 2005 a National Energy Conservation Master Plan (also known locally as RIKEN or *Rencana Induk Conservasi Energi Nasional*) under no. 100.K/48/M.PE/1995. The RIKEN serves as a guideline for the national and local governments of Indonesia to implement energy conservation activities and reduce intensity of 1 per cent per year.[80]

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[77] Syam, D.A *et al.*, ‘Pelangi Indonesia Working Paper on Promoting GHG Emission Reduction through Energy Saving/Efficiency Project in Indonesia‘ (Pelangi Indonesia, Jakarta, 2011).
[78] Republic of Indonesia, 'National Energy Policy Presidential Regulation no. 5/2006 dated January 25, 2006' (Republic of Indonesia, Jakarta, 2006).
[79] Harrington, L. and Damnies, M. 'Energy Labelling and Standards Throughout the World' (The National Appliance and Equipment Energy Efficiency Committee Australia, Victoria, 2001).
[80] 'Compendium of Energy Efficiency Policies of APEC Economies Indonesia' The Energy Conservation Center Japan Asia Energy Efficiency and Conservation Collaboration Center <www.ieej.or.jp/aperc/CEEP/Indonesia.pdf> (03 August 2011).

Table 4. Regulatory framework for promoting renewable energy development in Indonesia[81, 82]

Regulations	Contents
Ministerial Regulation (MEMR or Ministry of Energy and Mineral Resources) No.1122 K/30/MEM/2002	Required PLN to buy energy from non-PLN renewable energy producers with projects of up to 1 MW generation capacity
Geothermal Law (No.27/2003)	Set guidelines for geothermal exploration (e.g. granting of exploration licenses up to three years with a possible extension of two years)
Ministerial Regulation (MEMR) (No.2/2004) Green Energy Policy	Proposal for several alternative energy sources such as biomass, geothermal, hydropower, solar energy, wave energy, and wind energy
Government Regulation No.3/2005	Prioritized the utilization of renewable energy as energy source, set guidelines for independent power producers (IPPs) partnership with PLN, set parameters of the national power requirement (RUKN or *Rencana Umum Ketenagalistrikan Nasional*)
Ministerial Regulation (MEMR) No.2/2006	Revised the MEM no.1122/2002 to extend the pricing for non-PLN renewable energy producers with projects greater than 1 MW up to 10 MW generation capacity
National Energy Policy also known as *Kebijakan Energi Nasional* (Presidential Regulation No. 5/2006)	Targets for 2025 were set including energy elasticity to be less than one and energy mix (> five per cent from biofuel, > five per cent from geothermal, > five per cent from other renewables such as biomass, micro-hydro, solar and wind)
Government Regulation No. 26/2006	Amended Government Regulation no. 3/2005 to include a no bidding process for generation of renewable energy
Law of Energy (No.30/2007)	Issued a presidential regulation on new and RE and created a National Energy Council (DEN or *Dewan Energi Nasional*), which was tasked to develop a National Energy Plan (RUEN or *Rencana Umum Energi Nasional*) and a National Energy Policy that addresses "availability of energy, energy development, utilization of domestic energy sources, and energy supply reserves."
Ministerial Regulation (MEMR) No.31/2009	Set a purchasing tariff for PLN from renewable energy power plants of different voltage of interconnection: 1) Medium Voltage: 656 Rp/KWhxF 2) High Voltage: 1004Rp/KWhxF where F stands for island specific load factor F=1.0 for Java and Bali F=1.2 for Sumatra and Sulawesi F=1.3 for Kalimantan , East and West Nusa Tenggara F=1.5 for Maluku and Papua
Ministerial Regulation (MEMR) No.32/2009	9.7cents/KWh as the ceiling purchasing tariff for PLN from geothermal-based power
Ministerial Regulation (MOF or Ministry of Finance) No.24/2010	1) Income Tax Facility (5 per cent reduction of net income per annum for six (6) years 2) Value Added Tax Facility (exemption of VAT on imported RE machines and equipment 3) Import Duty Facility (exemption of import duty)

[81] Fukuda, K. and Siagian U. 'Potential of Renewable Energy based Distributed Power Generation System toward Low Carbon Development Option for Indonesia', in Kentaro Tamura et al. (eds), *Is Indonesia in a Good Position to Achieve Sustainable Low Carbon Development? Opportunities, potentials and limitations* (Institute for Global Environmental Strategies, 2010).

[82] 'Indonesia' reegle REN21 <http://www.reegle.info/countries/ID#energy_efficiency> (03. August 2011).

In 2006, a National Energy Management Blueprint 2006 - 2025 (also known locally as Blueprint PEN or *Pengelolaan Energi Nasional* 2006 - 2005) was released in accordance to the National Energy Policy (Presidential Regulation no. 5/2006) article 4. The MEMR is directed to "stipulate [a] National Energy Blueprint after being discussed in the National Energy Coordinating Board." The PEN contains a policy that addresses "sufficiency of energy domestic supply" and deemed to be the "foundation for arrangement of policy for development and exploitation of each kind of energy."[83]

The law of energy no. 30/2007 has provisions for incentives and disincentives for energy conservation and energy wasting, respectively. In 2008, there was another presidential instruction (no. 2/2008) that called for a regulation on energy and water efficiency in Indonesia. This presidential instruction called on government officials to implement efficiency measures in their offices, particularly on water, electricity and oil consumption and efficiency of electric equipment, vehicles, and government buildings. A government regulation (no. 70) in 2009 focused on energy conservation as a responsibility of the central and local government, private sector and the local communities. It also has a provision on energy performance standard and energy label of appliances. The producers and importers of energy efficiency appliances both bear the responsibility of implementing the energy efficiency label. Incentives are available for producers and importers of energy-efficient appliances.

The MEMR launched in March 2011 a service facility called Energy Efficiency and Conservation Clearing House Indonesia (EECCHI), which is tasked to "promote and enhance energy conservation and energy efficiency in Indonesia."[84] The EECCHI is supported by the government of Denmark through the Danish International Development Assistance (DANIDA) component 2 of the Environmental Support Programme 2 called, "Energy Efficiency in Industrial, Commercial and Public Sectors, Indonesia." The EECCHI is housed on a pioneering low energy office, retrofitted from an old government office through "passive and active energy strategies" aimed at reducing energy consumption.[85]

In a presentation by the MEMR DGEEU at the 37th Expert Group on Energy Efficiency and Conservation Meeting in 2011, the MEMR identified a couple of barriers to the promotion of energy-efficient appliances in Indonesia. These are the following:[86]

- Lack of laboratories for testing energy performance
- Consumer choice of cheapest appliances, which are generally inefficient
- Low cost of energy especially for the household sector
- Lack of awareness and knowledge on energy efficiency

[83] Republic of Indonesia, 'National Energy Policy Presidential Regulation no. 5/2006 dated January 25, 2006' (Republic of Indonesia, Jakarta, 2006).
[84] 'About EECCHI' Energy Efficiency and Conservation Clearing House Indonesia <http://energyefficiencyindonesia.info/about-eecchi> (03. August 2011).
[85] 'EECCHI Low Energy Office: Impressive Energy Savings' Ministry of Foreign Affairs Denmark Embassy of Denmark, Jakarta <http://www.ambjakarta.um.dk/en/servicemenu/News/EECCHILowEnergyOfficeImpressiveEnergySavings.htm> (03 August 2011).
[86] 'Economy Update - Indonesia: Energy Efficiency and Labeling Program in Indonesia' Asia Pacific Economic Cooperation Energy Standard Information System <http://www.apec-esis.org/www/UploadFile/11_egeec_014.pdf> (03 August 2011).

Conventional energy

Despite promising regulations on energy efficiency and renewable energy, Indonesia continues to depend on conventional energy to support its energy needs. Under Presidential Regulation no. 71 issued in 2006, the Indonesian government launched the Acceleration Program Phase 1, which aimed to build an additional 10,000 MW power plants with the use mostly of coal and then to diversity the fuel mix with the addition of another 10,000 MW hydropower and geothermal sources in the second phase Acceleration Program.[87]

One example of the projects under Acceleration Program 1 is the 990 MW coal-fired power plants in Indrayu, West Java opened in October 2011,[88] which will reportedly be fed with "4.2 million tons of low-grade coal each year" from local sources.

5.3.2 Philippines

Climate change

The Philippines has been one of the first ASEAN countries to integrate climate change in governmental processes. In May 1991, the Inter-Agency Committee on Climate Change (IACCC) was created under the Environmental Management Bureau (EMB) of the Department of Environment and Natural Resources (DENR). The IACCC was created in order to coordinate various climate change initiatives from the government and civil society.

In 2007, it has created the Presidential Task Force on Climate Change (PTFCC), which was subsequently abolished together with the IACCC when the Climate Change Act of 2009 (Republic Act number 9729) was passed. This law, in turn, created the Philippine Climate Change Commission (CCC), which was tasked to be the "sole policy-making body of the [Philippine] government" that will "coordinate, monitor and evaluate the programs and action plans of the government relating to climate change [...]"[89] The law also included a clause on the formulation of a "Framework Strategy on Climate Change" by the CCC. The Framework was seen as a "basis for a program for climate change planning, research and development, extension, and monitoring of activities to protect vulnerable communities from the adverse effects of climate change."[90] The Framework was also seen as a guide for "development planning processes" in the country.

In 2010 the Climate Change Commission drafted the Philippine National Framework Strategy on Climate Change (NFSCC) 2010-2022. The NFSCC prioritizes both mitigation and adaptation, albeit with a stronger focus on adaptation, with "mitigation

[87] M. Sidik Boedoyo and Agus Sugiyono, 'Decentralized Power Generation in Indonesia Current Issues and Prospects' Tech Monitor < http://www.techmonitor.net/tm/images/b/be/10may_jun_sf3.pdf> (15 October 2011).
[88] Ririn Kusuma, 'Indramayu plants to help power Java, Bali' The Jakarta Globe < http://www.thejakartaglobe.com/business/indramayu-plants-to-help-power-java-bali/471257> (15 October 2011).
[89] Republic of the Philippines, *Republic Act No. 9729 Climate Change Act of 2009*, (2009).
[90] Republic of the Philippines, *Republic Act No. 9729 Climate Change Act of 2009*, (2009).

actions pursued as a function of adaptation."[91] The NFSCC also sees "integrated ecosystem-based management" as an important process towards climate resiliency.

The CCC was also mandated to develop a National Climate Change Action Plan (NCCAP) as a complement to the NFSCC. The NCCAP should be formulated within one year of the adoption of the NFSCC and should be drafted after proper consultation and with participation of different stakeholders[92]. The NCCAP was finished in March 2011 and was consequently subjected to stakeholder consultation.

The Climate Change Act of 2009 also includes a section on the Local Climate Change Action Plan (LCCAP). It states that, "The LGUs [Local Government Units] shall be the frontline agencies in the formulation, planning and implementation of climate change action plans in their respective areas, consistent with the provisions of the Local Government Code, the Framework, and the National Climate Change Action Plan."[93] The NFSCC also stipulated that local government units (LGUs) shall prepare a Local Climate Change Action Plan (LCCAP) for their respective areas based on the NCCAP. The NCCAP is thus seen as a master plan guiding local government units in the preparation of their respective LCCAP. With the NCCAP finished in March 2011, the next step is for local government units to study the NCCAP and develop their own LCCAP.

These institutional frameworks for climate change action in the Philippines are summarized in Table 2, along with the corresponding governmental regulations and their dates of adoption.

Table 5. Climate change institutional framework in the Philippines

Regulations	Contents
Presidential Administrative Order No. 220 (8 May 1991)	Created the Inter-Agency Committee on Climate Change (IACCC), with the DENR Secretary as the Chair and the DOST Secretary as Co-Chair and the EMB-DENR as the Secretariat
Presidential Executive Order No. 320 (25 June 2004)	Named the DENR as the Designated National Authority (DNA) for the Clean Development Mechanism (CDM)
Presidential Administrative Order No. 171 (20 February 2007)	Created the Presidential Task Force on Climate Change (PTFCC) with the DENR Secretary as the Chair and with the DOE, DOST, DA & DILG Secretaries and two (2) representatives from the Private Sector and/or Civil Society as members,
Presidential Executive Order No. 774 (26 December 2008)	Reorganization of the Presidential Task Force on Climate Change (PTFCC) designating the President of the Philippines as the Chair
Republic Act No. 9729 (also known as Climate Change Act of 2009) (25 August 2009 & 2 September 2009)	Created the Climate Change Commission (CCC) and abolished the IACCC & PTFCC

[91] Republic of the Philippines Climate Change Commission, *National Framework Strategy on Climate Change 2010-2022*, (2010).
[92] Republic of the Philippines Climate Change Commission, *National Framework Strategy on Climate Change 2010-2022*, (2010).
[93] Republic of the Philippines, *Republic Act no. 9729 Climate Change Act of 2009*, (2009).

Energy efficiency

The Philippine government, through the Department of Energy (DOE), had directives and projects for energy efficiency as early as 1983. The Air Conditioners Standards and Labeling Program was conceived in 1983 identifying several appliances (air conditioners, fluorescent lamp ballasts, and refrigerators) as priority target for energy savings based on their contribution to peak load and on their energy consumption.[94] The program was only fully implemented ten years later. It was only in 1992 when agreement was reached on a test procedure, a plan for minimum standards and a labeling program. With approval from the Department of Trade and Industry (DTI) Bureau of Product Standards (BPS), a Philippine National Standard (PNS) 396 was formally adopted. The Fuels and Appliance Testing Laboratory (FATL) was established in 1991 under the DOE and in 1992, testing of air conditioner units began. The PNS 396 became mandatory on 1 June 1994.[95]

The Executive Order (EO) 123 was signed in 1993 as a response to the power crisis at that time. Apart from institutionalizing a Committee on Power Conservation and Demand Management, it also launched in 1994 the "Power Patrol Program," an information campaign on energy conservation for the academe, commercial, household, and industrial sectors.

EO no. 472 was passed in 1998 in order to "ensure the adequate supply of energy" by "conservation, renewal and efficient utilization of energy" in road transportation.[96] The EO targeted a five per cent decrease in fuel consumption by users of road transport. It also institutionalized a committee on fuel conservation and launched a campaign called "Road Transport Patrol," which aimed to disseminate information on efficient utilization of fuel through the local chapters within the country.[97]

In 2004, the President of the Philippines launched a campaign called "EC [Energy Conservation] Way of Life," which aimed to popularize the National Energy Efficiency and Conservation Program (NEECP) of the government. The program aimed to attain a total of 229 MMBFOE energy savings during the period of 2005 - 2014 through the implementation of energy efficiency and the use of alternative fuels.[98] The NEECP included the following programs: Vehicle Use Reduction Program, Voluntary Agreement (government - private sector partnership for energy monitoring), Partnership for Responsive Ecozones (PEREZ), Placemats Program (information campaign on placemats of food chains), *Palit Ilaw* (Change Light) Program (incandescent bulbs to compact fluorescent lamps).

In 2005, the DOE in cooperation with the Global Environment Facility (GEF) and the United Nations Development Programme (UNDP) launched the five-year Philippine

[94] Rumsey, P. and Flanigan, T. 'The Philippines Residential Air Conditioner Program' (International Institute for Energy Conservation, Washington, D.C., 1995).
[95] 'PNS 396 Household Appliance' Republic of the Philippines Department of Energy <http://www.doe.gov.ph/efficiency/standards.htm> (28 July 2011).
[96] 'Executive Order no. 472' Chan Robles Virtual Law Library <http://www.chanrobles.com/executiveorders/1998/executiveorderno472-1998.html> (28 July 2011).
[97] 'Energy Efficiency Information Education Campaign' Republic of the Philippines Department of Energy <http://www.doe.gov.ph/EE/IECC.htm> (28 July 2011).

Efficient Lighting Market Transformation Project (PELMATP), which aimed to "address the barriers on the widespread utilization of energy efficient lighting system" while at the same time contributing to the "reduction of greenhouse gas emissions to the environment."[99] The PELMATP evolved to the Philippine Energy Efficiency Project (PEEP) in the latter part 2009, part of which is financed by a loan from the Asian Development Bank (ADB), which aims to distribute 13 million compact fluorescent lamps (CFLs) for free to homes and businesses in the Philippines.[100]

In 2008, the DOE issued a circular, which sets out the requirement for the accreditation of an Energy Service Company (ESCO). [101]The accreditation of ESCOs promotes the establishment of such companies that are geared towards improving energy efficiency and encouraging energy savings in respective projects. According to the DOE, there are currently four ESCOs accredited in the Philippines.

Currently, the Philippines is preparing new standards for energy efficiency and aims to finish it by the end of 2011. The DOE recognized that the current standards are already outdated, with the air-conditioning industry supporting the need for a new set of standards in order to boost competition.[102]

Table 6. Energy efficiency directives in the Philippines

Regulations	Provisions
Executive Order no. 123 (8 September 1993)	Institutionalized the Committee on Power Conservation and Demand Management
Executive Order no. 472 (25 March 1998)	Institutionalized the Committee on Fuel Conservation and Efficiency in Road Transport
Administrative Order no. 103 (31 August 2004)	Directing the Continued Adoption of Austerity Measures in the Government
Administrative Order no. 110 (25 October 2004)	Government Energy Management Program (GEMP)[103]
Administrative Order no. 117 (28 March 2005)	Providing for Adjusted Official Hours in Departments, Bureaus, Offices and Other Agencies in the Executive Branch, including Government-Owned and Controlled Corporations, for the Months of April and May 2005
Administrative Order no. 126 (13 August 2005)	Strengthening Measures to Address the Extraordinary Increase in World Oil Prices, Directing the Enhanced Implementation of the Government's Energy Conservation Program

[98] 'EC Way of Life' Republic of the Philippines Department of Energy <http://www.doe.gov.ph/neecp/aboutus.htm> (28 July 2011).
[99] 'Philippine Efficient Lighting Market Transformation Project' Republic of the Philippines Department of Energy <http://pelmatp.doe.gov.ph/index.htm> (21 July 2011).
[100] 'Fast Facts Philippine Energy Efficiency Project' Asian Development Bank <http://www.adb.org/media/articles/2009/13006-philippines-energies-projects/fast-facts.pdf> (28 July 2011).
[101] 'Energy Service Companies Accreditation' Republic of the Philippines Department of Energy <http://www.doe.gov.ph/EE/ESCOs.htm> (28 July 2011).
[102] Donabelle Gatdula 'DOE prepares new standards for Energy Efficiency' The Philippine Star <http://www.abs-cbnnews.com/business/07/07/11/doe-prepares-new-standards-energy-efficiency> (06 August 2011).
[103] 'Government Energy Management Program' Republic of the Philippines Deparment of Energy <http://www.doe.gov.ph/popup/AO%20110.pdf> (21 July 2011).

Conventional energy

The Philippine energy mix is still largely dominated by conventional energy, with coal contributing 27 per cent to the power generation mix in 2005.[104] Coal development in the Philippines started as early as 1976 when Presidential Decree 972 was passed, which promulgated the promotion of accelerated exploration, development, exploitation, production and utilization of coal.[105] Through this law, a coal operating contract system was established along with operating guidelines for coal exploration, development, exploitation, production and utilization in the Philippines.

Gas is also another conventional energy that the Philippines utilizes. In 2001, Executive Order no. 66 was passed designating the Department of Energy (DOE) as the lead agency in developing the Philippine natural gas industry. The following year, the DOE released the Interim Rules and Regulations Governing the Transmission, Distribution and Supply of Natural Gas.[106]

Renewable energy

The Philippines has been at the forefront of renewable energy policy implementation in the ASEAN region. The passage of the Renewable Energy Bill in 2008, with its range of fiscal and non-fiscal incentives, opened opportunities for the entry of renewable energy in the Philippines both on-grid and off-grid. In June 2011, the Philippines launched a National Renewable Energy Program (NREP) that aims to triple the 2010 renewable energy capacity of 5,400 MW to 15,300 MW in 2030.[107]

The Implementing Rules and Regulation (IRR) of the Renewable Energy Bill of 2008 has a separate rule for off-grid development. It states that, "[...] the National Power Corporation - Small Power Utilities Group (NPC-SPUG), distribution utilities and/or qualified third parties in off-grid areas shall, in the performance of its mandate to provide missionary electrification, source a minimum age of its total annual generation from available renewable energy resources in the area[s] concerned [....]"[108] It further states that, "eligible renewable energy generation in off-grid and missionary areas shall be entitled to the issuance of renewable energy certificates. These renewable energy certificates can then be credited in compliance with any obligation under the renewable portfolio standards (RPS).[109]

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[104] 'Energy Resources Coal' Republic of the Philippines Department of Energy <http://www.doe.gov.ph/ER/coal.htm> (10. September 2011).
[105] Republic of the Philippines, *Presidential Decree 972,* 1976.
[106] Jesus Tamang,'The Philippine Natural Gas Industry' Republic of the Philippines Department of Energy <http://www.doe.gov.ph/ER/archives/pcr/Pdf/pdf%20Philippine%20natural%20gas%20industry.pdf> (15 October 2011).
[107] Aurea Calica 'PNoy launches National Renewable Energy Program' The Philippine Star <http://www.philstar.com/Article.aspx?articleId=696271&publicationSubCategoryId=63> (25 June 2011).
[108] Republic of the Philippines Department of Energy, *Rules and Regulations Implementing Republic Act No. 9513 Rule 4. Sec. 12*, 2009.
[109] Republic of the Philippines Department of Energy, *Rules and Regulations Implementing Republic Act No. 9513 Rule 4. Sec. 12*, 2009.

5.4 Local responses

5.4.1 Denpasar, Bali, Indonesia

In mid-2010, the province of Bali has declared that it aims to be the first "green province" of Indonesia. It has formulated the Road Map for Bali Green Province (*Peta Jalan Menuju Bali Green Province*), where strategies for developing into a green province have been identified. It revolves around three main strategies namely Green Economy, Green Culture, and Clean and Green.[110]

Climate change has been mentioned twice in the Bali Road Map: in the Green Economy and in the Medium-Term (2014-2018) Performance Indicators sections. In the Green Economy section, the goal was to "encourage every business or activities to make efforts in mitigation and adaptation to climate change impacts." In Bali's Medium-Term (2014-2018) Performance Indicators section, "optimization of mitigation and adaptation to climate change" is one indicator to becoming a successful green province.

In order for Bali to become what it has set as one of its Long-Term (2018-2028) Performance Indicators of showcasing a pilot community-based environmental management, it should definitely streamline climate change in its planning processes.

5.4.2 Puerto Princesa, Palawan, Philippines

Puerto Princesa has been a subject of a couple of national legislations for environmental protection. Puerto Princesa is guided by the Strategic Environmental Plan (SEP) for Palawan (Republic Act number 7611) adopted on June 19, 1992. The SEP created the Palawan Council for Sustainable Development (PCSD), which is tasked to manage the implementation of the SEP. The SEP aims to protect premier tourist spots in Palawan, two of which are UNESCO World Heritage Sites. The SEP, thus, serves as a guiding framework in "the formulation and implementation of plans, programs and projects affecting the environment and natural resources of Palawan."[111] In tourism matters, the city government is essentially in-charge after having signed a “memorandum of understanding (MOU)” with the national Department of Environment and Natural Resources (DENR) in 1992, giving the municipality responsibility in the core areas of “forest management, protected areas and wildlife management, environmental management, mines and geo-sciences development, and land management”.

Puerto Princesa, as a locality, has long been undertaking environmental initiatives and has currently started to undertake low-carbon initiatives. Despite having no legislation regarding low-carbon development, Puerto Princesa is already undertaking these low-carbon initiatives with or without international support. The following are examples of the low-carbon initiatives being currently implemented in Puerto Princesa:

[110] 'Bali Clean and Green' Pemerintah Provinsi Bali <http://www.baliprov.go.id/index.php?page=2&action=detail&id=134> (21 June 2011).
[111] ‘Municipality of Puerto Princesa Case Study' The World Bank <http://info.worldbank.org/etools/docs/library/230308/Session%203/Session%203%20Case%20Study%202.pdf> (14 October 2011).

Zero Carbon Resorts: Reducing tourism's carbon footprint

Funded by the European Union's SWITCH - Asia Programme,[112] the Zero Carbon Resorts project recognizes that tourism generates a large amount of greenhouse gas emissions and aims to reduce tourism's carbon footprint through three steps known as the "3R approach: Reduce energy consumption, Replace inefficient technologies, and Redesign buildings and systems."[113] The four-year project is being implemented at small and medium enterprises (SMEs), especially hotels and resorts in the province of Palawan. The project makes use of "local low-carbon technologies and green technologies" as a way of enabling the SMEs to provide services that are "cost-effective, energy-efficient and sustainable". In addition, training courses are also held for staff of SMEs involved in the project. There are currently twenty six (26) SMEs participating in the project. The European Union's SWITCH-Asia Programme aims to promote Sustainable Consumption and Production (SCP) in Asia.[114] Along this line, the Zero Carbon Resorts project can be more innovative if it also addresses air transport emissions, the largest contributor to tourism's carbon footprint. In the latter part of this paper, existing initiatives that address air transport emissions are enumerated and the Zero Carbon Resorts project can take inspiration from these.

Electric Jeepneys (E-jeepneys): Greening public transport

The local government of Puerto Princesa has entered a partnership with Institute for Climate and Sustainable Cities (iCSC), a non-government organization based in the Philippines working on "sustainable energy solutions and fair climate policy."[115] This partnership is under the Climate-Friendly Cities initiative of the iCSC, an initiative which combines "waste management, renewable energy generation and sustainable transport programs for sustainable, climate-resilient city and community development." Currently, Puerto Princesa has electric jeepneys (e-jeepneys) in its public transport fleet as well as electric tricycles (e-trikes), which are makeshift three-wheeled vehicles from motorcycles. The concept of e-jeepneys was developed by iCSC through a funding by Dutch foundation, Stichting DOEN. E-jeepneys were introduced in Puerto Princesa in 2009, with political cooperation playing a major role in the institutionalization of the electric vehicles as public transport. Today, the electric jeepneys are locally-made by local private companies and are operational in Puerto Princesa City and Makati City, the financial capital of the Philippines.

Maldives & Scotland Marine Energy Partnership: South – North cooperation

The tourist island nation of Maldives has entered into a partnership with the government of Scotland to develop "marine energy" sources in order to reach Maldives' goal of becoming carbon-neutral.[116] The partnership was reported to start with a feasibility study by the Robert Gordon University, which is said to be a member of Scotland's Energy Technology Partnership (ETP). The study is envisioned to give a "comprehensive assessment of the wave, tidal and thermal gradient energy potential of the Maldives."

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[112] 'SWITCH-Asia Programme' SWITCH-Asia <http://www.switch-asia.eu/> (14 October 2011).
[113] 'Project background' Zero Carbon Resorts <http://www.zerocarbonresorts.eu/index.php?option=com_content&view=article&id=46&Itemid=53> (14. October 2011).
[114] 'SWITCH-Asia programme' SWITCH-Asia <http://www.switch-asia.eu/> (14 October 2011).
[115] 'About us' Institute for Climate and Sustainable Cities < http://www.ejeepney.org/home/static-data/about-us> (14 October 2011).
[116] 'Maldives marine energy partnership' The Scottish Government <http://www.scotland.gov.uk/News/Releases/2010/12/08131508> (15 October 2011).

6 Recommendations on how to bring low-carbon energy development in the region

Both Indonesia and the Philippines are now net energy importers, albeit earlier Indonesia was a net energy exporter for many years. In the working paper released by the International Energy Agency (IEA) in 2010,[117] it has stated that Indonesia has already started to import crude oil and oil products. The new position as a net energy importer had repercussions on its international standing in energy export. Indonesia, thus, has suspended its membership at the Organization of Petroleum Exporting Countries (OPEC) when it has become a net energy importer. Consequently, it is also already importing fossil fuels in order to address the growing demand for energy in the country. The IEA report further says that, "the rising dependency on fossil fuels is one of the incentives for the ASEAN countries [such as the Philippines and Indonesia] to look for enhanced uptake of renewable energy in order to diversify the energy mix and to decrease dependency on imported energy." With the relatively high renewable energy potentials of Indonesia and the Philippines, the countries must then work on creating an enabling environment for the development of renewable energy. An enabling environment should reduce institutional (policy) and financial (economic) barriers, which can then stimulate investments that can potentially reduce technological barriers.

The following are recommendations for local tourist islands of Denpasar and Puerto Princesa on how they can further develop in a low-carbon and environmentally friendly way. Denpasar and Puerto Princesa are in the right position to influence other tourist islands within the region to pursue low-carbon development. These two tourist island destinations have already taken small steps towards low-carbon development and, with additional guidance and support, can take bigger steps towards more ambitious low-carbon development plans whose effects go beyond their locality.

6.1 Recommendations for current energy situation

Energy efficiency

According to the World Energy Council, energy efficiency is the "winning strategy" to address various challenges such as energy security, climate change, and economy. Energy efficiency allows for the reduction of energy imports and, in the process, improves the security of supply of energy. It contributes to the reduction of greenhouse gas emissions at a low cost.

[117] Ölz, S. and Beerepoot, M. 'Deploying renewables in Southeast Asia trends and potentials' (International Energy Agency Working Paper, France, 2010).

Energy efficiency also allows for increased competitiveness of industries, as it reduces energy costs. In addition, it also diminishes the need for investment in energy infrastructure to address growing energy demand especially in developing countries. This, consequently, then "frees capital" that can otherwise be used for other development needs such as food security, healthcare, and education.[118]

Energy efficiency is one of the wiser steps to take in pursuing low-carbon development and in tackling climate change. Below are some recommendations for energy efficiency in the tourist islands of Denpasar and Puerto Princesa as well as recommendations for their respective national governments and geopolitical region.

a) **Local tourist destinations.** The national governments of Indonesia and the Philippines already have a variety of initiatives on energy efficiency. The local governments of Denpasar and Puerto Princesa can follow suit and consider institutionalizing energy efficiency in their locality at the soonest time possible. Both local tourist destinations stand to benefit a lot from energy efficiency, given their common challenge of power shortage.

   In the short-term, local governments should implement energy efficiency on the governmental level (government buildings or public properties), especially in the Philippines, following the implementation of an energy efficiency strategy on the national level in January 2005 (as discussed in section 5.3.2 of this paper). An energy audit should be implemented and energy efficiency measures in local governments can start with ensuring a switch to efficient lighting in public lighting and all government buildings or government offices. Local governments should also study inefficiencies in energy generation, transmission, and distribution and in cooperation with the academe or independent energy management firms, should identify possible solutions in reducing losses from energy generation (transformation), transmission and distribution.

   In the medium-term, local governments should be able to develop energy efficiency standards for new buildings (whether residential, industrial or governmental) in their locality. This would also entail an interdisciplinary cooperation of engineers and architects as well as scientists in the area, to take into consideration the cheapest cost of energy-efficient building material along with the local climatic conditions. The local government should also be able to institutionalize demand-side management and have an energy efficiency plan for the government buildings and public properties and recommendations to small and medium enterprises and industries (if any). The identified solutions to energy generation, transmission and distribution losses should be implemented in the medium-term.

[118] World Energy Council, *Energy Efficiency: A Recipe for Success*, 2010.

In the long-term, local governments should be able to enforce the energy efficiency standards and benefit from a tariff-based compliance mechanism especially in accordance to thatformulated by the national government. The funds that will be collected from the tariff-based compliance mechanism can be pooled into a local "Energy Efficiency Fund," which can be used to micro-finance energy efficiency initiatives in the locality.

Throughout all these phases, constant information education campaigns and consultations should be carried out in and with the local communities (residential, industrial, or governmental) about the benefits of energy efficiency and on energy efficiency plans within the locality. These should be spearheaded by the different *barangays* (villages) in the Philippines and different *desa* (villages) in Indonesia.

b) **National governments**. The Philippine and Indonesian governments already have a couple of energy efficiency initiatives, starting with the government offices up to suggested voluntary measures. These can be further strengthened and become low-cost opportunities for low-carbon development in their countries, which can be success stories for the Southeast Asian region.

In the short-term, the two national governments should aggressively campaign for energy efficiency in all sectors, focusing on standby loss in residential, government, business, and industrial sectors. It should also study how to regulate energy efficiency in the energy sector and whether incentives should be applied to voluntary actions. It should also establish cooperation with the academe in developing labeling standards and energy efficiency standards for appliances. Both countries already have promising laws and regulations on energy efficiency and there is room for improvement in the implementation phase.

The Department of Energy (DOE) in cooperation with the Department of Environment and Natural Resources (DENR) of the Philippines and the Ministry of Energy and Mineral Resources (MEMR) in cooperation with the Ministry of Environment (MoE) in Indonesia should take the lead in implementing energy efficiency in their offices. These agencies should also push for the presidential offices to be the leader in implementing energy efficiency regulations that have been passed in their respective countries. The national government of Indonesia and the Philippines should strive to become leaders in the Southeast Asian region and be able to lead its cities by example.

Recognizing the decentralized nature of cities in Indonesia and the Philippines, the national governments of Indonesia and the Philippines can encourage cities to implement energy efficiency through recognition of pioneering energy efficiency efforts of several cities. Inspiration can be taken from a project implemented in Germany, the competition for the "Federal Capital of Climate Protection" also known as *Wettbewerb Bundeshauptstadt im Klimaschutz.*[119] This can be modified

[119] 'Durchfuehrung eines Vorprojektes zum Wettbewerb Bundeshauptstadt im Klimaschutz' Deutsche Bundesstiftung Umwelt < http://www.dbu.de/projekt_23872/_db_1036.html> (15 October 2011).

to a competition for a "National City of Energy Efficiency" in Indonesia and the Philippines.

In the medium- to long-term, both of these governments should be able to implement mandatory labeling in major appliances such as compact fluorescent lamps, refrigerators, refrigerator-freezers, television, air-conditioners, and electric fans. Strategies to internalize external costs into the electricity prices should be developed. A study was done in 2005 by the Universitas Kristan Indonesia[120] to examine factors affecting the reduction of CO_2 emissions due to the internalization of external cost in electricity development in Indonesia from 2006-2025. According to the study, reduction of CO_2 emissions will increase to 82.5 per cent from 3.7 per cent if the external cost is internalized at a high-level. The study also found out that internalization of external costs also leads to decrease in SO_2 and NO_x. The study basically shows that internalizing external costs in electricity development can lead to decreases in greenhouse gases and air pollutants, which are very important in attaining low-carbon development especially in the energy sector.

Finally, national governments can also set non-fiscal and fiscal incentives for energy-efficient appliances. Non-fiscal incentives can include national certification (akin to endorsement) of energy-efficient appliances, while fiscal incentives can include tax breaks (specifically tax deduction) for companies producing energy-efficient appliances

Renewable energy

a) **Local tourist destinations**. While Puerto Princesa has already started using biomass from residuals to power its electric public transport fleet, its energy sector is still wanting of reform. There is a marked difference in the nature of ownership of the diesel power plants in Puerto Princesa and Denpasar. Diesel power plants in Puerto Princesa are privately-owned and are thus more sensitive to changes such as deployment of renewable energy while those in Denpasar (or Bali, in general) while they may be from independent power producers, they are still technically controlled by PT PLN, with subsidies from the national government.

   In the short-term, energy efficiency in the diesel power plants should be studied and implemented by the energy companies and they should create an energy efficiency plan for their power plants and a renewable energy road map in compliance with national directives for enhanced uptake of renewable energy in the country. Local governments, in relation to energy efficiency, should set a target for renewable energy within their locality (in the case of Denpasar, a target that should be consistent with the national target and in the case of Puerto

[120] C.O.P. Marpaung, A. Soebagio and R.M. Shrestha, 'Internalizing external cost in electricity development in Indonesia: a factor decomposition analysis' http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=1546869 (15 October 2011).

Princesa, a pioneering target that should put the province at the forefront of low-carbon development in the Philippines). Puerto Princesa can also put the target when they are formulating the Local Climate Change Action Plan (LCCAP), which is mandated by the Climate Change Act of 2009. The Renewable Energy Bill of 2008 also enumerated fiscal and non-fiscal incentives for renewable energy generation in the Philippines. In the short-term, scaling up energy generation from biomass sources is a renewable energy option that can also address problems in the waste sector.

In the medium- to long-term, Indonesia should be able to reduce of transform subsidies in the energy sector in order to attract renewable energy investments in its energy sector. Both countries should also make use of co-generation or combined heat and power systems in the medium-term. In the long-term, Puerto Princesa and Denpasar should be able to generate 100 % electricity from renewable energy sources, with the right political framework and the transition by the independent power producers currently operating the diesel power plants in the areas.

b) **National governments**. The Philippines has sent a strong positive signal towards renewable energy development through its launching of a National Renewable Energy Program along with the passage of the Renewable Energy Bill in 2008. Indonesia, on the other hand, has submitted a NAMA to the UNFCCC which includes “the promotion of energy efficiency” and “the development of alternative and renewable energy sources” but still has no direct incentives for renewable energy development in the country. In the short-term, Indonesia can review its existing regulatory laws on promoting renewable energy and find a way to introduce direct incentives for renewable energy development in the country. And because there is only one state-owned power utility in Indonesia, with heavy subsidies from the national government, the national government of Indonesia can consider a subsidy reform and giving additional incentives to renewable energy independent power producers that cooperates with PLN in power generation.

6.2 Recommendations for international cooperation

Energy efficiency

Apart from financing, capacity-building and sharing of lessons learned are two key areas of action by which international cooperation can be useful. South – South or South – North cities partnership can be helpful for Denpasar and Puerto Princesa. Because Denpasar and Puerto Princesa have already taken some low-carbon initiatives in specific sectors (especially Puerto Princesa with the electric public transport), co-operation with partner cities can help Denpasar and Puerto Princesa to pursue a road map towards holistic low-carbon development.

Renewable energy

There are a couple of multilateral funds available that Denpasar and Puerto Princesa can take advantage of. The Clean Technology Fund (CTF) within the Climate Investment Funds (CIF) is just one of the "multi-donor" trust funds[121] that Denpasar and Puerto Princesa can access in the process of pursuing low-carbon development. The Cancun Agreement also included technology transfer as a support for mitigation and adaptation actions and while parties are still talking about elements to make the Technology Mechanism be fully operational by 2012, other options should be explored.

Developing an ambitious low-carbon development plan for Denpasar and Puerto Princesa is a must and various sources of support internationally (or even nationally) may be available. Within the UNFCCC framework, low-carbon development plans can be submitted as NAMAs requiring international support or as gold-standard CDM projects. In the next section, one of the existing international initiatives reviewed has CDM projects in developing countries, all of which are certified as gold-standard projects.

6.3 Recommended initiatives

Most of the "high-value tourism markets" of developing countries depend on air travel that is mid- or long-haul in distance, thereby making air travel by far the major contributor to emissions of tourism.[122] With tourist island destinations like Denpasar and Puerto Princesa being vulnerable to climate change, it is in their interest to address aviation emissions even on an indirect level. Offsetting aviation emissions can be used as an income source to co-finance a low carbon strategy within the islands. A couple of other issues identified earlier in this paper such as waste management should also be addressed in light of tourism and climate change. Below are some recommended project initiatives for the local areas of Denpasar and Puerto Princesa that can take inspiration from existing initiatives.

Local adaptation projects funded by tourism

There are aviation carbon-offsetting programs available such as that of atmosfair (see Box 3), however, these are voluntary in nature. But in case that tourists islands make sure that "their" tourists use such a program, actors like atmosfair would most likely be ready to finance with the relevant money low carbon projects within these islands (see down below). Some airlines also have climate-related initiatives such as that of local Philippine airline Cebu Pacific Air (see Box 4), however, these do not lead to quantified emission reductions as its focus is on adaptation.

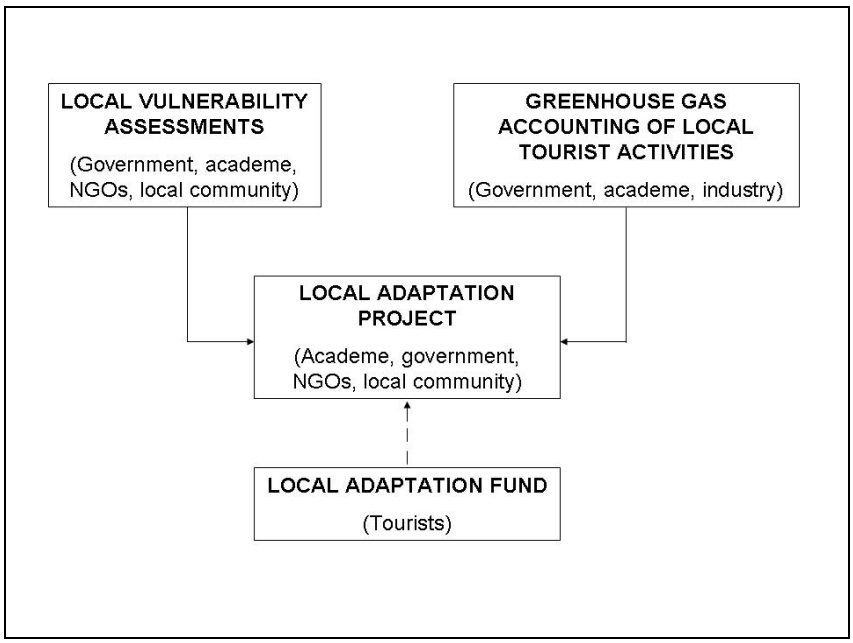
[121] 'Clean Technology Fund' Climate Funds Update <http://www.climatefundsupdate.org/listing/clean-technology-fund> (25 June 2011).
[122] Gössling, S., Hall, M.C., and Scott, D. 'The Challenges of Tourism as a Development Strategy in an Era of Global Climate Change', in Eija Palosuo (ed), *Rethinking Development in a Carbon-Constrained World Development Cooperation and Climate Change* (Ministry for Foreign Affairs Finland, 2009).

Given the vulnerability of Denpasar and Puerto Princesa, these two tourist islands can pursue mitigation in the form of local adaptation projects. Local adaptation projects should be a product of local vulnerability assessments and an accounting of the carbon footprint of local tourist activities. Local vulnerability assessments would ensure that the adaptation project addresses a real vulnerability that the locality faces in light of climate change, with the inclusion of scientific and social processes. Greenhouse gas accounting of local tourist activities, on the other hand, can give a measure of the carbon footprint that tourists leave when they undertake a certain activity. This may, indeed, discourage some tourists from doing pursuing some activities, this increases awareness that the local area they are visiting is vulnerable to climate change and that tourism has a role to play in it.

In line with the local adaptation project, a Local Climate Change Adaptation Fund should be established, which will fund adaptation projects in the locality. This fund can be sourced initially from a voluntary donation by the tourists and, as adaptation projects are being established and developed, should eventually be sourced from a mandatory fee that tourists pay upon arrival. This will allow for a more direct participation and contribution of tourists in climate adaptation in the areas they are visiting.

Below is a chart of the steps recommended for designing local adaptation projects in the tourist islands of Denpasar and Puerto Princesa.

Figure 2. Flowchart for developing a local adaptation project[123]



Local mitigation projects funded by external support

There are possibilities for local mitigation projects to be funded through external means such as the projects of atmosfair (Box 1) and Cebu Pacific & WWF Philippines' Bright Skies (Box 2). There is a possibility with atmosfair for external parties to "Propose a

[123] Own Figure

Project" that atmosfair can adopt as one of their projects. One of atmosfair's criteria for the proposed project is the ability of the project to meet the CDM Gold Standard, with quantifiable emissions reductions. In return, atmosfair can assist with the review of the project idea and with the project idea's compliance to the CDM Gold Standard. In addition, atmosfair can also help with the project design documents including "baseline study, monitoring methodology, and demonstration of additionality." They can also help with coordinating the "validation and registration processes" of the project idea.[124]

Box 1: Atmosfair: International initiative to mitigate aviation's contribution to climate change

Atmosfair gGmbH is an offsetting service that allows flight travelers to calculate their emissions and consequently pay a corresponding amount to offset the carbon emission of their flights. The payment is then used to finance mitigation projects in developing countries, thereby allowing the people to "carry out their daily activities in an energy-efficient and environmental-friendly way."[125] Atmosfair has proven to be one of the more reliable and effective offsetting initiatives as all their projects are designed and certified as Clean Development Mechanism (CDM) projects (under the international climate agreement Kyoto Protocol). In addition, all these projects also meet the Gold Standard, which is a standard recognizing "best practice methodology and a high quality carbon label for both Kyoto Protocol and voluntary markets."[126]

Box 2: WWF-Philippines' Bright Skies: adaptation as a function of mitigation

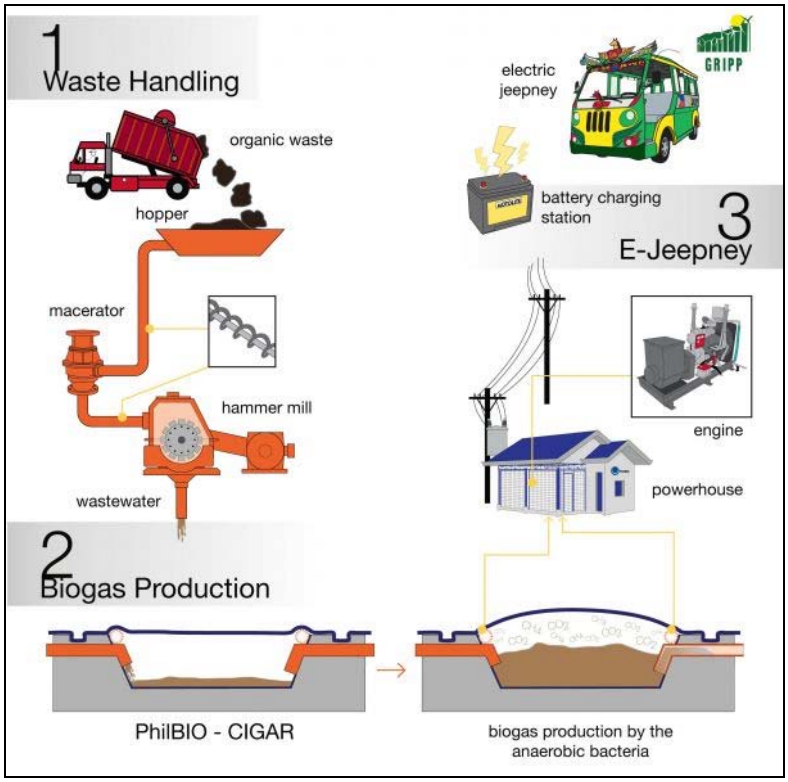
Local Philippine carrier Cebu Pacific Air has partnered with World Wildlife Fund (WWF)-Philippines in supporting community-based adaptation project in one of the islands in the Philippines.[127] Flight travelers on Cebu Pacific Air have the option to donate an amount of money to the Bright Skies project upon payment of their flight. While the initiative does not have a quantifiable mitigation outcome, it opens an opportunity for addressing adaptation, which is a major need in a highly vulnerable country like the Philippine archipelago. It should be noted, however, that the airline only liaises between its customers and WWF in financing the community-based adaptation project and does not really have its own innovative contribution to adaptation or mitigation.

[124] 'Propose a Project' atmosfair <https://www.atmosfair.de/en/our-projects/propose-a-project/> (05 August 2011).
[125] 'Fly and Pay for the Greenhouse Gases' atmosfair <https://www.atmosfair.de/en/about-us/what-is-atmosfair/> (03. August 2011).
[126] 'The Gold Standard Premium Quality Carbon Credits' CDM Gold Standard <http://www.cdmgoldstandard.org/> (03. August 2011).
[127] 'Cebu Pacific Bright Skies for Every Juan' Cebu Pacific Air <http://www.cebupacificair.com/wwfbrightskies/index.html> (03. August 2011).

Puerto Princesa's cooperation with iCSC on a Climate Friendly Cities (CFC) Project (see section 5.4.2 of this article) and with the EU-funded Zero Carbon Resorts Project are two mitigation projects that can be replicated in Denpasar.

A scheme such as iCSC's CFC Project can address two of Denpasar's pressing problems at the same time. Denpasar has been reported to be Indonesia's sixth most traffic congested city[128] and electric public transport can partially be a solution to traffic congestion and its immediate environmental consequences such as air pollution. The CFC project can also address Denpasar's waste management problem (mentioned earlier in section 3) through the use of organic waste as energy source for the electric public transport.

Figure 3. iCSC's Climate Friendly Cities (CFC) project[129]



Replicating the Zero Carbon Resorts Project in Denpasar will benefit not just the climate but also the 248 tourist accommodations in Denpasar. The retrofits that energy efficiency entails may be an opportunity for the tourist accommodations to upgrade their services, while at the same time ensuring savings in the long-term. It is recognized, however, that not all of the tourist accommodations have access to capital that such retrofits require. It is, therefore, recommended that projects of this nature should take advantage of opportunities for external support such as that of atmosfair especially when government support or public money is not available.

[128] 'Denpasar: the Sixth most Traffic Congested City in Indonesia' The Beat <http://daily.beatmag.com/latest-news/denpasar-the-sixth-most-traffic-congested-city-in-indonesia.html> (03. August 2011).
[129] 'Climate Friendly Cities' Institute for Climate and Sustainable Cities <http://www.ejeepney.org/home/climate-friendly-cities/climate-friendly-cities> (03. August 2011).

7 Conclusion

The case of Puerto Princesa and Denpasar as tourist island destinations presents a microcosm of climate-related challenges in Southeast Asia. These two destinations are very vulnerable to the impacts of climate change but at the same time have some contribution to it as well. Development is a priority of developing countries but they also recognize the importance of pursuing development alongside global issues such as climate change. Low-carbon development is no longer confined to being a theory but is already a reality in some developing countries, specifically in some localities. However, low-carbon development is a development pathway that is still non-conventional and requires shifts in socio-cultural,-political, and economic paradigms.

The energy sources of tourist island destinations Puerto Princesa and Denpasar leave a lot of room for low-carbon energy development and it is good to know that national policies are in place to support a shift towards renewable energy. While the ASEAN as a geopolitical organization of Southeast Asian countries does not have any binding agreement on low-carbon energy development in the region, it recognizes renewable energy as one of the potential energy sources for energy security in the region. The ASEAN and the national governments of Indonesia and the Philippines, however, should recognize that the energy choice of today will have a big impact on the region and the respective member countries' emissions tomorrow. It is a fact that local or national governments are only in office for a short period of time, ,but this should not hinder ambitious decision-making that may prove to be landmark decisions in the future. Pursuing low-carbon development can be one of those decisions.

The international community also has in their interests to support low-carbon energy development in developing countries. This will ensure that the world is moving towards one direction in tackling climate change while battling poverty. International support whether financial or technological and knowledge transfer will be a big boost towards the mainstreaming of climate change in the development plans of developing countries.

Puerto Princesa and Denpasar as tourist island destinations are attractions to international tourists. International tourists and locals alike should be reminded that as with any holiday break, the beauty of these island destinations can also be short-lived if they are not taken care of and if the climate is not taken care of. It is thus of interest to everyone to take care of their destinations and of the climate.

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