

**National and Subnational Linkages to Enable  
Low Carbon Development at the  
Subnational Level in Developing Countries:  
The Cases of Thailand and the Philippines**

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## **Abstract**

Rapid urbanisation has led to a host of environmental and social issues in Asia, with increased energy consumption being the most alarming. Effective low carbon development policies aimed at rational land use, energy efficiency, and improved public transport and an emphasis on renewable energy sources are the need of the hour. Such efforts are necessary not only at the national level, but also at the local or subnational levels. In order that Nationally Appropriate Mitigation Actions (NAMAs) are realised as intended, national and international efforts are needed to design and implement effective institutional linkages between national and subnational governments, so as to promote low carbon development at the subnational level.

This paper outlines important points to help design effective mechanisms linking national and subnational governments based on past experiences in the field of climate change mitigation, environmental management, and international development in developing and developed countries. The literature review helps to identify important lessons in the field of low carbon development and provides concrete suggestions for forging possible linkages among the national action plans for low carbon development in developing countries. Then, it focuses on two Southeast Asian countries, namely Thailand and the Philippines, and explores how these ideas may be applied to these particular countries.

In order to build national and subnational linkages for low carbon development, this paper argues that there is a need to develop a 'knowledge of' policy processes, in addition to specific 'knowledge in' policy processes in the field of climate change mitigation, such as regulation, taxation, economic incentives, information provision, and capacity development.

Possible institutional mechanisms, including those categorised as NAMAs, to enhance low carbon development at the subnational level include: (1) incentive provision and ownership development, (2) effective monitoring and evaluation of policies, (3) adaptation to and appreciation of diverse local conditions and contexts, and (4) support for policy diffusion and mutual learning among subnational governments.

Lastly, the paper explores the importance of much-neglected attitudinal issues, to

enable better design and execution of possible linkages between national and subnational governments towards low carbon development. Change agents (namely, national and subnational governments and international development agencies) promoting new low carbon development policies and measures at the subnational level would do well to recognise the various perceptions, views, attitudes, and priorities of different stakeholders, in particular, those at the subnational level. Continuous stakeholder dialogue and discussion without confrontation are necessary to genuinely assimilate new land and energy policies into the mainstream. To that end, a good starting point would be to appreciate existing assets, namely, the physical, ecological, and social capital, at the local level. It would also be necessary for the change agent to pay due attention to the perceptions and emotions of stakeholders, in addition to logic and facts. Lastly, while persuasion differs from understanding, both require continuous communication and interaction, so that both sides may learn from each other and transform for the better.

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## List of Abbreviations

BMA	Bangkok Metropolitan Administration (Thailand)
BOO	build-own-operate
BOT	build-operate-transfer
BT	build-transfer
CCC	Climate Change Commission (Philippines)
CDM	clean development mechanism
CEnergy	Climate Change and Clean Energy Project
CER	certified emissions reduction
CFO	Carbon Footprint for Organization
CO <sub>2</sub>	carbon dioxide
DEFRA	Department for Environment, Food and Rural Affairs (UK)
DOE	Department of Energy (Philippines)
EFA-FTI	Education for All – Fast Track Initiative
EPPO	Energy Policy and Planning Office (MOE, Thailand)
EU	European Union
GDP	gross domestic product
GEF	Global Environment Facility
GEMP	Government Energy Management Program
GHG	greenhouse gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Corporation for International Cooperation)
GOP	Government of Philippines
GOT	Government of Thailand
ICC	Investment Coordinating Committee (NEDA, Philippines)
IEA	International Energy Agency
ISO	International Organization for Standardization
IT	information technology
LCC	Low Carbon City
LGU	local government units
LOA	letter of approval
M&E	monitoring and evaluation
MNRE	Ministry of Natural Resource and Environment (Thailand)
MOE	Ministry of Energy (Thailand)
MRV	measurement, reporting and evaluation

NAMAs	nationally appropriate mitigation actions
NCCAP	National Climate Change Action Plan (Philippines)
NEDA	National Economic Development Authority (Philippines)
NFSCC	National Framework Strategy on Climate Change (Philippines)
NMT	National Municipality League of Thailand
ODA	official development assistance
PDCA	plan-do-check-action
PoA	Programme of Activities
PPP	polluter pays principle
REDD+	reducing emission from deforestation and forest degradation in developing countries
SO <sub>2</sub>	sulphur dioxide
TGO	Thailand Greenhouse Gas Management Organization (Public Organization)
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNITAR	United Nations Institute for Training and Research
US	United States



## **1 National and Subnational Linkages in National Action Plans to Enable Low Carbon Development in Developing Countries**

### **1.1 Low Carbon Development and Urbanisation in Developing Countries**

More than 50% of the world's population resided in urban areas or cities in 2011 (UN 2012). Of the 20 megacities (a city with a population exceeding 10 million) in the world, 11 are located in Asia. Thirty (30) of the 17 large cities (with populations ranging from 5 to 10 million) of the world are located in Asia. Moreover, Asia's urban population is projected to increase by 1.1 billion within the next 20 years. Carbon dioxide (CO<sub>2</sub>) emissions associated with energy consumption in developing Asian countries accounted for 30% of global emissions in 2006 and are expected to increase (IEA 2008). Most of the energy consumption will occur in urbanised areas.<sup>1</sup>

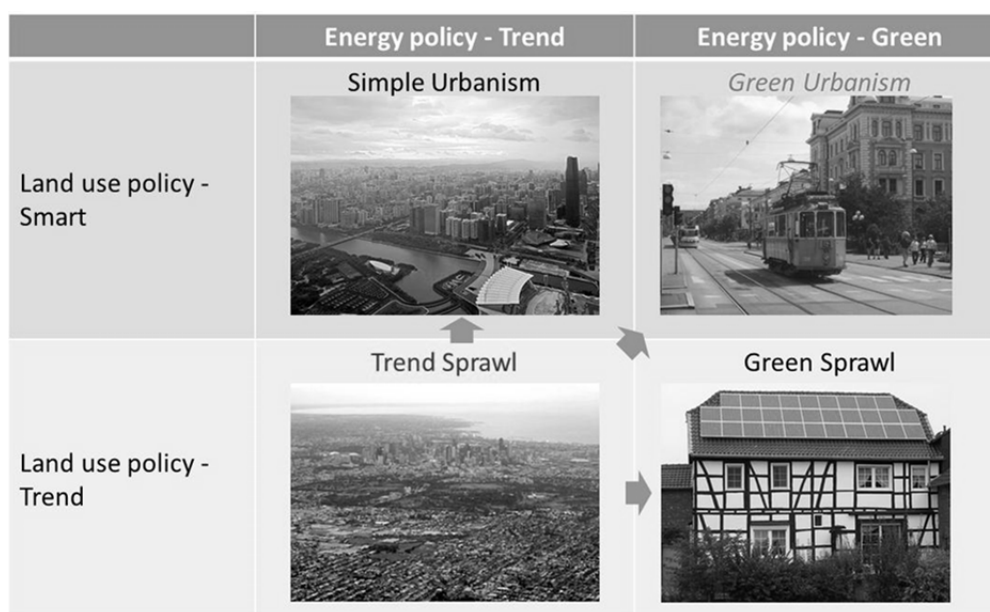
Increasing urbanisation leads to additional greenhouse gas (GHG) emissions. The Stern Report attributes 78% of anthropogenic GHG emissions to consumption activities in urban areas (Stern 2007). Aggregated estimations from energy supply, industrial processes, transport, residential and commercial buildings, and waste and wastewater plants contribute 31% to 41% of global GHG emissions to production activities in urban areas (Dodman 2009; Satterthwaite 2008). Though the figures vary based on the rules of accounting, that is, consumption-based (indirect) versus production-based (direct), it is obvious that the trend in increasing emissions is owing to urbanisation. In general, national and subnational governments could potentially take the lead in alleviating this problem through appropriate policies and interventions in diverse sectors (i.e. sectors other than those identified as being large consumers of energy).<sup>2</sup>

Calthorpe (2011) introduced one example of a framework to explore the interlinkages between urbanisation and climate change, namely, a matrix of energy, land use, and transport policies. According to this diagram, cities require to transform their policies on energy and land use to promote energy efficiency and renewable energy and provide eco-friendly transport services and infrastructure development. In other words, cities need to undertake 'green urbanism'. A green energy policy can guide energy efficiency and renewable energy interventions, while a smart land use policy can facilitate the establishment of a compact city with sustainable public transport infrastructure (see Fig. 1).

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<sup>1</sup> Adopted from Kishigami (2010).

<sup>2</sup> *ibid.*



**Fig. 1 Schematic Diagram Showing the Need for Green Urbanism**

What kinds of institutional mechanisms could encourage effective decision making and execution of such innovative and needed low carbon development policies and measures at the city/region or subnational levels? To answer this question, the extent of decentralisation needs to be considered carefully, since the degree of autonomy enjoyed by subnational governments differs from country to country. Other pertinent factors include other aspects of decentralisation, such as the process of selecting a political leader, the dependence of subnational governments on grants from national governments, the policy areas for which subnational governments are responsible, the selection/appointment/promotion/management mechanism of government officials, and so on.

To approach this far-ranging issue in a practical manner, this paper begins a theoretical analysis of aspects significant in the design of effective mechanisms to link (or separate, if appropriate) national and subnational governments based on past experiences in the field of climate change mitigation, environmental management, and international development in developing as well as developed countries. Such a review allows an examination of lessons learnt; concrete suggestions are provided for possible linkages in national action plans for low carbon development in developing countries. Then, the paper focuses on two Southeast Asian countries, namely Thailand and the Philippines, and tests how the application of these ideas may affect the per capita GHG emissions levels of the countries.

The degree of decentralisation in Thailand and the Philippines is shown in Table 1. The degree of decentralisation in the two countries is more or less similar, although Thailand appears to have a more centralised administration. A brief introduction to the administrations at the subnational level in Thailand and the Philippines are provided in subsections 3.1.1 and 3.2.1 respectively.

**Table 1 Population, Economic Development, and Degree of Decentralisation in Thailand and the Philippines**

Country	Population (millions; 2009)	Per capita gross national income (US dollars 2009)	Decentralisation (Selection of governor/mayor)	Decentralisation (Local government revenue/Total government revenue)	Decentralisation (Number of local government officials/Total number of all government officials)
<b>Thailand</b>	67	3,760	Direct election with appointment	< 20%	< 30%
<b>Philippines</b>	91	2,050	Direct election	< 20%	< 30%

Sources: Compiled from UNITAR (n.d.), Takeuchi (2005), World Bank (2011)

## 1.2 Exploring Effective National and Subnational Linkages

When a developing country develops national-level climate change mitigation actions, including nationally appropriate mitigation actions (NAMAs) that are to be formulated and implemented under the United Nations Framework Convention on Climate Change (UNFCCC), there is the need to (a) consider how subnational (local) level actions may be incorporated and (b) devise a solid relationship between national and subnational governments within the national action plan. Thus, this paper will also explore how low carbon development at the subnational level may be encouraged by exploring the institutional mechanisms for domestic mitigation actions that would enhance low carbon development at the subnational level.

## 1.3 'Knowledge in' and 'Knowledge of' Policy Processes: Focusing on the 'Knowledge of' Policy Process

To encourage institutional development, that is, to connect subnational and national government efforts, the 'knowledge of' policy process requires more attention than the 'knowledge in' policy process (Lasswell 1971). The latter refers to specific policy options and analytical perspectives. Examples of 'knowledge in' the environmental policy

process include (a) the provision of direct goods/services, (b) command and control (volumetric and/or intensity-based regulations with sanctions), (c) economic incentives (taxes, subsidies, cap-and-trade, and auctions), and (d) information provision. The 'knowledge of' policy process, on the other hand, refers to analytical perspectives with regard to (a) stages of policy formulation, implementation, and evaluation and (b) ideas (perceptions and views), interests (benefits and payoffs), attitudes and behaviours of the relevant stakeholders, as well as the institutional constraints influencing them within the policy process (Akiyoshi 2010). Though these two kinds of knowledge share a common ground in some cases, the emphasis of this distinction lies in the differentiation between a sector-/problem-specific 'knowledge in' policy process and the more general 'knowledge of' policy process. Both types of knowledge are produced and employed in actual policy processes.

Since linkages between national and subnational governments and their policies toward low carbon development actually concern the study of institutions, the production and application of 'knowledge of' policy processes would apply. Institutional development to enhance effective policy formulation and implementation towards low carbon development at the subnational level requires an adequate understanding of lessons learnt relevant to the 'knowledge of' policy process.

Therefore, this paper first surveys key points pertaining to the 'knowledge of' policy process and then applies such knowledge to the current state of low carbon development policies and monitoring and evaluation (M&E) mechanisms in Thailand and the Philippines. This allows us to construct preliminary suggestions for possible linkage mechanisms. As part of the M&E mechanisms, measurement, reporting, and verification (MRV) mechanisms of GHG emissions and emissions reductions at the national and the subnational levels are also discussed briefly, since they provide the basis for effective low carbon development policy formulation and implementation as well as potential carbon financing or engagement of for-profit private entities in low carbon development. Lastly, the paper discusses the attitudinal issues associated with executing new ideas or bringing about the necessary changes in outlook among people, for low carbon development to be successful.

## **2 Possible Institutional Mechanisms to Promote Low Carbon Development at the Subnational Level**

### **2.1 Incentive Provision and Ownership Development**

Incentives from national governments for policy implementation at the local/subnational

level, coupled with nurturing the ownership of such actions, constitute a core institutional mechanism for promoting local low carbon policies and measures. CITYNET and International Council for Local Environmental Initiatives (ICLEI) - Southeast Asia are examples of this mechanism, which was designed and implemented by the Secretariat of International Intercity Network Programmes in order to promote sustainable development (Nakamura 2011). The Secretariat of this international network hopes to improve results by understanding the particular needs of participating cities, providing them with useful opportunities, and nurturing ownership and commitment through calls for proposals, requests for action planning, and monitoring as part of the network's activities. Likewise, national governments could provide funding opportunities for local governments in exchange for political commitment and continued performance improvement.

A similar mechanism has also been used in social lending, such as the Education for All-Fast Track Initiative (EFA-FTI) of the World Bank. It adopted results-based lending, which disbursed payments after predefined results were attained and verified. Certain conditions were to be met before the implementation, such as appropriate action planning and submission, appropriate division of financial cost bearing, and transparent budget management and accounting (Honorati et al. 2011). The UK government has also introduced an incentive grant mechanism pertaining to climate change mitigation (DEFRA 2006).

However, some precautions are necessary before introducing incentive- or performance-based mechanisms; the mechanism should not deteriorate motivation in cases where the best intentions and efforts may not result in good performance. To cope with this issue, Aoki and Aoki (2010) proposed a fail-safe incentive adjustment approach for promoting low carbon development policies for local Japanese governments. First, the national government allowed local governments to set feasible sector-/programme-specific initial GHG reduction targets, which would be monitored for performance at a later date. Then, the national government distributed mixed fail-safe (i.e. intention-/trial-based and performance-based) forms of funding to local governments to encourage the innovation and implementation of GHG emissions reduction policies. In the case of developing countries, national governments could utilise pooled funds using international support or NAMA financing from donors (Chen 2010) to set up a national fund to support subnational governments' implementation of low carbon development policies and programmes. This might also provide valuable opportunities for donors to effectively collaborate towards the shared goal of low carbon

development.

The private sector, such as power companies, manufacturing corporates, and commercial building owners/tenants, are important players in the achievement of low carbon development at the subnational level. Subnational governments could take the lead in facilitating and coordinating these key actors to ensure that they play effective roles within their jurisdiction. Engaging the private sector in incentive provision and ownership development should also be considered by subnational governments.

One possible area for providing learning and experiencing opportunities for the private sector is cap-and-trade, which has already been demonstrated in Tokyo (Japan) and several states in the US and is planned for several cities/provinces in China (Nakamura 2012; Nakamura and Elder 2012) (see Box 1). Perhaps, a very low cost cap-and-trade mechanism (e.g. 1 US dollar per ton or so) that does not choke off economic growth might allow subnational governments to perceive carbon emission limits and understand how to work and trade within these limits in collaboration with significant GHG emitters in their jurisdictions. In this case, the initiative could focus only on CO<sub>2</sub> emissions associated with fuel, gas, and electricity consumption for the provision of government services and the services of private companies participating voluntarily in the area. To begin with, the initiative could be introduced for several small districts within one large city or province. This would help subnational governments as well as private sector players to get started on innovative ideas towards low carbon development and to open up opportunities for societal learning.

## **2.2 Effective Monitoring and Evaluation of Policies**

To enhance the effective implementation of any low carbon development policy/measure at the subnational level, it is imperative to strengthen the M&E mechanism at the administration/organisational levels. Therefore, attention should be paid to capacity development of subnational governments in terms of general management tools, such as the plan-do-check-act (PDCA) cycle. This would provide a basis for effective planning, implementation, monitoring, evaluation, and feedback toward continuous improvement. The introduction of concrete performance indicators for each division/project and feedback for the planning process of the next fiscal year/budget are essential elements that need to be embedded in such monitoring mechanisms. Moreover, when national governments extend programmatic assistance to subnational governments, the PDCA cycle of such programmes should be linked with the national level low carbon development action plan.

### **2.3 Consideration of Diverse Local Conditions/Contexts**

Before the introduction of the abovementioned incentive, ownership development, and M&E mechanisms in developing countries, it is important to take diverse local conditions and contexts into account. A tailored consideration and design are necessary. The phased approach adopted for reducing emissions from deforestation and forest degradation in developing countries (REDD+) provides a good example of how different contexts in developing countries or rural areas can be considered (Yamanoshita 2012). It basically adopts three phases: from initiation/readiness support, to demonstration/test case support, and finally, the nationwide adoption of the policy or programme.

Another example of such diversity consideration is seen in the European Union's (EU's) regional and urban policy support mechanism, where the EU-level administration provides support to local level regional/urban programme implementation (Okabe 2003). It encourages programme-based funding for particular objectives, bottom-up vision development, and policy competition. A programme-based approach requires local governments to develop cross-cutting programmes that include a variety of policies to solve the identified issue in a comprehensive manner. It should allow different grant ratios for regions at varying economic/financial levels. Even small subsidies have been shown to nurture a 'sense of pride' in being selected as the target region. The EU mechanism is also interesting in its focus on 'policy integration-orientation'. This means the programme supports bottom-up plans that include policy integration, such as public investment and economic development, building reform and social policy (unemployment), or infrastructure reconstruction and resident participation. This implies integrating 'low carbon (GHG emissions reductions)' and 'development', or linking low carbon development with non-climate urban policies, is desirable to reflect local contexts and realise the sustainability of policies and measures.

The example of the low carbon development policy formulation and implementation by the government of Hiroshima, an advanced Japanese city, also suggests the significance of the link between low carbon development policies and local issues (Hosei University 2012). The political leadership shown by the Mayor promoted the justification for and relevance of the new low carbon development policy for various contexts unique to the city and helped reap several developmental co-benefits.

### **2.4 Support for Policy Diffusion and Mutual Learning**

According to a comprehensive study of Japanese local government policy processes, local governments are not only developing and implementing their own policies and

measures, but are also mutually learning and contributing to policy diffusion and innovation as a whole (Ito 2006). Moreover, Ito (2006) revealed several key promoting factors for policy diffusion at the local level, thus leading to the promotion of low carbon development at the subnational level: (a) local governments that use the Internet extensively and are proactive in information and experience disclosure, (b) conspicuous organisational and individual networking activities at the local government level, and (c) promoting agencies that support knowledge production and dissemination to facilitate policy diffusion among local governments. Therefore, national governments can support such mutual learning processes through nationwide incentives and/or ownership-nurturing programmes for low carbon development at the subnational level.

Formal and non-formal mutual reference and learning among subnational governments and their officials/political leaders have been observed for both international and domestic networks pertaining to environmental management and urban sustainability in developed and developing Asian countries (Nakamura et al. 2010). According to Nakamura (2011), the secretariats of intercity network programmes play the role of a change agent, as seen for CITYNET, ICLEI - Southeast Asia, and the Kitakyushu Initiative for a Clean Environment. The key success factors include (a) providing incentives and nurturing a sense of ownership, (b) developing horizontal and vertical links among relevant players, such as other subnational governments, local stakeholders/resource organisations/partners, national government agencies, international organisations/foreign countries, and (c) supporting the capacity development of relevant members in subnational governments, spanning from leaders and managers to operation staff.

### **3 State of Low Carbon Development Policies and Monitoring and Evaluation Mechanisms at National and Subnational Levels in Thailand and the Philippines**

#### **3.1 State of Low Carbon Development Policies and Monitoring and Evaluation Mechanisms at National and Subnational Levels: Thailand<sup>3</sup>**

##### **3.1.1 Subnational Administration in Thailand**

Administratively, Thailand's subnational governments are divided into provinces (*changwat*), districts (*amphoe*), sub-districts (*tambon*), and villages (*muban*, occasionally *mooban*), which are territorial or geographical subdivisions regardless of

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<sup>3</sup> The material in subsection 3.1.1 is primarily sourced from Siam CIE International Co. Ltd. (2008) and that for subsections 3.1.2 to 3.1.4, from TEI (2012).



the population size within each territory. The heads of these subnational governmental units are appointed as salaried government administrative officials (as against locally elected public officials) by the executive branch of the national government. Their main responsibility is to deliver social and other government services to the people in each of these territories, which are considered as subnational government units. Besides these territorial subdivisions, Thailand has also established 'municipalities' (*thesaban*), which are areas comprising some sub-districts within a district or a province. There are three kinds of municipalities depending on their population or per capita income:

- A city municipality (*thesaban nakhon*) with a population of at least 50,000 and a population density of 3,000 persons per square kilometre
- A town municipality (*thesaban muang*) with a population of at least 10,000 and a population density of 3,000 persons per square kilometre
- A township or sub-district municipality (*thesaban tambon*) with a population of at least 5,000 and a population density of 1,500 persons per square kilometre, a gross income of at least 1 million baht, and the consensus of the people in the area to be recognised as such.

The heads of municipalities (whether of a city, town, or township) are elected public officials and as in many other countries, are called 'mayor'. Exceptions to these usual definitions or subnational government categories are Bangkok and Pattaya, which are considered special subnational government units. Bangkok is both a province and a city, and the head is an elected governor. Bangkok is divided into districts (*khet*) and sub-districts (*kwaeng* or *khwang*). Pattaya City is an autonomous subnational governmental unit independent of Chonburi Province (where it is located), whereas normally, a city or a municipality would be under the jurisdiction of a provincial government. Pattaya City is headed by an elected mayor. Including Bangkok and Pattaya, there are 25 cities (or city municipalities) in Thailand. Most of these cities are named after the province overseeing them, such as Rayong City, ranked 24<sup>th</sup> in terms of population, and Chiang Mai City, ranked as the 5<sup>th</sup> largest city.

### **3.1.2 State of Low Carbon Development Policies at National and Subnational Levels**

In Thailand, the national level low carbon development policy or all relevant national level policies with the explicit or implicit aims of mainstreaming and promoting climate change mitigation in various development areas are governed by the 11<sup>th</sup> National

Economic and Social Development Plan (2012-2016), prepared by the Office of the National Economic and Social Development Board in consultation with relevant ministries. The Prime Minister's Government Policy Statement also puts emphasis on low carbon development. Under the overall guidance of the Plan and the Statement, specific plans such as the National Master Plan on Climate Change (2012-2050), the National Strategic Plan on Climate Change (2008-2012), and the Environmental Quality Management Plan (2012-2016) have been developed. Sector-specific plans are drawn up accordingly, although such plans also have policy objectives other than climate change mitigation. Such examples include the Alternative Energy Development Plan (2012-2021) for renewable energy promotion and Thailand's 20-Year Energy Efficiency Development Plan (2011-2030) for energy efficiency improvement, both of which are prepared and executed by the Ministry of Energy (MOE).

The 11<sup>th</sup> National Economic and Social Development Plan includes seven strategies, one of which is the Strategy for Managing Natural Resources and Environment towards Sustainability. The objective of the strategy is 'to promote production and consumption that is environmentally sound in order to redirect the country toward a low carbon emission society'. To achieve this objective, the government has set a target for improving the efficiency of GHG emissions mitigation.

The National Master Plan on Climate Change, which will ultimately serve as a framework of integrated policies and action plans in relation to climate change, is currently being drafted. Moreover, the National Strategic Plan on Climate Change sets more concrete strategies for the mitigation of GHG emissions and the increase in GHG sinks. According to the Plan, the Government of Thailand (GOT) aims to (a) promote capabilities in energy efficiency, alternative energy, and green energy and to reduce energy imports from foreign countries, with a focus on public participation, (b) implement projects to reduce GHG emissions related to the forest sector, that is, through REDD+, (c) promote and support the calculation and management of the carbon footprint for all products and services, (d) develop mechanisms for imposing carbon tax and other environmental taxes in accordance with the polluter pays principle (PPP) in a fair manner, and (e) promote and support developing cities and communities towards an efficient, sustainable low carbon society.

Specific national-level policy targets have been set for various sectors. In the energy sector, the GOT plans to reduce energy intensity by 25% by 2030 relative to 2005. This is equivalent to a reduction of 20% in energy consumption in 2030. In 10 years (i.e. by

2021), the GOT also aims to replace 25% of total energy consumption with renewable and alternative energy sources. In the building sector, the GOT is considering the introduction of a new building energy code and plans to use the same as a mandatory set of requirements for new and retrofitted buildings with areas exceeding 2,000 square metre. In forest sector, the GOT intends to increase the country’s forest cover by at least 40% relative to the total surface area of the nation. In the transport sector, the GOT is determined to promote the use of biofuels such as biodiesel and ethanol, an objective in common with the renewable energy sector.

In some cases, these national-level low carbon development policies and measures are to be implemented by engaging subnational governments. According to the National Strategic Plan on Climate Change, sector-specific policies and measures should be implemented by national as well as subnational governments. However, there are some exceptions (see Table 2). It should be noted that planning is the task of national governments while subnational governments are responsible for implementing policies and measures in tandem with national government bodies.

**Table 2 Low Carbon Development Policy Implementation in Thailand: Division of Responsibilities between National and Subnational Governments**

Sector	# of Low Carbon Dev’t Policies & Measures	National Government (# of P/M in charge)	Provincial Government (# of P/M in charge)	City/Municipal Government (# of P/M in charge)
Energy Supply	10	10	2	2
Transport	8	8	3	3
Building	1	1	0	0
Industry	3	3	0	0
Waste and Wastewater	11	11	5	5
Agriculture	4	4	1	1
Forestry	7	7	5	5

Despite the predominantly centralised state of policy planning in Thailand, some of the more advanced subnational governments have made unique strides towards low carbon development with the assistance of national governments and/or international support. Examples include Bangkok (considered as a province) and the Muang-klang Municipality of Rayong Province (considered as a township at the municipal level).

However, such instances are still quite rare.

In Thailand, Bangkok serves as a central hub of the national economy and development. Bangkok has one of the highest GHG emissions in the world. Since 2007, the Bangkok Metropolitan Administration (BMA) has been raising awareness on climate change issues among the residents of Bangkok, by promoting GHG emissions reductions and creating new green areas. The 2007-2012 Action Plan on Global Warming Mitigation was prepared and implemented by the BMA. This action plan aimed at a minimum 15% of total GHG emissions reduction in the city relative to 2005. Its implementation included five initiatives: (a) expanding mass transit and improving traffic systems, (b) promoting renewable energy use, (c) improving the energy efficiency of buildings, (d) improving energy efficiency and methane control in solid waste management and wastewater treatment, and (e) expanding park areas.

The Muang-klang Municipality of Rayong Province is located in the eastern part of Thailand. There are plans to convert it into a low carbon city, and thus, it has been implementing various environmental and energy management projects. The Municipality has received several nominations for awards pertaining to environmental management and climate change mitigation. The Municipality continues to tackle issues pertaining to solid waste, wastewater, air pollution, and the rapid growth of developed areas, leading to shrinking green areas in the city. The Municipality has also initiated GHG emissions reductions by participating in the Low Carbon City (LCC) and Carbon Footprint for Organizations (CFO) projects formulated by the Thailand Greenhouse Gas Management Organization (TGO). The Municipality is also participating in the Low Carbon City Campaign conducted by the National Municipality League of Thailand (NMT) and supported by the EU.

### **3.1.3 State of Monitoring and Evaluation Mechanisms**

Thailand does not have an overarching policy pertaining to M&E mechanisms and applicable to all ministries and agencies at the national level. However, there are ministry-specific policy-/programme-/project-level M&E mechanisms such as those for the Ministry of Natural Resources and Environment (MNRE) and the MOE. Here, the M&E of policies and measures is considered as part of the policy process that theoretically comprises formulation, implementation, monitoring, and evaluation of policies executed by government bodies with the participation of and/or in collaboration with non-government bodies such as businesses, not-for-profit organisations, and in some cases, even citizens.

For instance, e-Project Tracking was developed as a tool for M&E of projects/activities implemented by various departments under the MNRE. In this information technology (IT) system, each department records the project type, responsible organisation, budget, personnel in charge, period of the project/activity, outcome(s), and efficiency. Projects can be followed up and evaluated through this monitoring system. The system also allows messages to be conveyed from the executive director to project implementer. Thus, it is possible to provide feedback to the project implementer. The executive director alone has the authority to approve/prohibit actions and revise budgets.

Within the MOE, the Energy Policy and Planning Office (EPPO) plays a pivotal role in the formulation and administration of energy policies and planning. The EPPO is responsible for the supervision, monitoring, and evaluation of the effectiveness of the national energy policy and energy management plans. M&E is accomplished by tracking indicators for each policy, plan, and project. The EPPO consults with and conveys suggestions to the relevant departments. The EPPO hires a consulting firm with the relevant expertise and experience to support the evaluation of energy conservation projects under the plan on an annual basis. The plans are evaluated using the five-criteria model (relevance, effectiveness, efficiency, impact, and sustainability) and/or a balanced scorecard (mission, target, and management).

However, there are no systematic M&E mechanisms at the subnational level, barring case-specific operations for each subnational government. As an example, the BMA has a mechanism in which each department develops progress reports with indicators for internal monitoring purposes twice a year. For instance, the Environment Department reports the concentrations of air pollutants, ambient environmental quality, and CO<sub>2</sub> emissions. These documents are not disclosed to the public. The performance of each policy/project described in the internal progress reports might affect the budget allocations for the next period. The format for reporting on low carbon issues, however, is yet to be determined. The BMA does not receive information on energy consumption from large factories/buildings, although the same are submitted to the MOE annually. Currently, there is no requirement for the BMA to report any plans/progresses/achievements of policies/project to the national government either.

#### **3.1.4 Monitoring, Reporting, and Verification of GHG Emissions and Emissions Reductions**

In Thailand, the monitoring, reporting, and verification (MRV) mechanism is applied toward the implementation of various policies at the national level. While the

measurement and reporting of nationwide GHG emissions has been demonstrated once in the process of preparing and submitting the National Communication to the UNFCCC, no regular reporting mechanism has been developed so far. Existing mechanisms for private users/emitters reporting to the government do not include GHG emissions reductions at this time. Examples of existing MRV measures include the energy management of designated factories and buildings enforced by the Energy Conservation Promotion Act. Some factories are also required to submit a Toxic Chemicals Report to the Department of Industrial Work. At this moment, however, CO<sub>2</sub> and methane do not fall under this purview.

At the subnational level, a few committed local governments have developed their GHG inventories under the auspices of ICLEI - Local Governments for Sustainability (Siam CIE International Co. Ltd. 2008). With funding from the Global Environment Facility (GEF), the TGO is in the process of developing an LCC project in collaboration with the United Nations Development Programme (UNDP).

During 2011-2012, the TGO received government finding to implement the CFO programme in collaboration with 27 municipalities. The TGO had developed the CFO guideline for local administrative offices based on the relevant International Organization for Standardization (ISO) guideline. Activities included helping participating subnational governments develop their GHG inventories, formulating a plan for GHG emissions reductions, and setting boundaries and targets for GHG emissions reductions. In 2013, the TGO plans to launch the CFO programme with 20 other municipalities.

The Khnon-kaen Municipality located in north-eastern part of Thailand is one of the subnational governments that have participated in the abovementioned TGO project. Moreover, Khnon-kaen Province also completed its GHG inventory with assistance from Deutsche Gesellschaft für Internationale Zusammenarbeit (GTZ; German Corporation for International Cooperation) and the Khnon-kaen University.

The MRV of GHG emissions reductions are conducted for clean development mechanism (CDM) projects only. While national and subnational governments have not been engaged in GHG measurement and reporting, they have been associated with tracking the carbon credits based on the calculated/estimated GHG emissions reductions attributable to the CDM projects.

While the BMA did disclose its expected GHG emissions reductions consequent to the

implementation of its Action Plan on Global Warming Mitigation (2007-2012), an ex post evaluation of emissions reductions was neither planned nor conducted.

### **3.2 State of Low Carbon Development Policies at the National and Subnational Levels and Monitoring and Evaluation Mechanisms: Case of the Philippines<sup>4</sup>**

#### **3.2.1 Subnational Administration in the Philippines<sup>5</sup>**

In the Philippines, subnational governments are called local government units (LGUs). An LGU can be a province, a city, or a municipality (see descriptions below).

*Province:* Provinces are primary administrative divisions. There are around 80 provinces to date, excluding Metro Manila (which is strictly considered as an Administrative Region), and each province is further subdivided into cities and municipalities.

*City:* At present, there are 122 cities in the Philippines. Cities are defined as either of the following, based on population and per capita income: (a) highly urbanised - with a population of not less than 200,000 and per capita income of not less than 50 million pesos, (b) independent components - not highly urbanised but independent of the provincial government (only five cities belong to this category: Dagupan, Cotabato, Naga, Ormoc, and Santiago), and (c) component cities - considered to fall under the jurisdiction of the provinces.

*Municipality:* Municipalities are distinct from cities in that they are always part of the province in which they are geographically located. To date, there are 1,512 municipalities throughout the country.

A political leader, such as the governor of a province and the mayor of a city that is independent of a province, or a chief executive officer, is elected by the designated constituency. Component cities and municipalities do not have elected leaders of their own. Governors of the provincial government enjoy the authority and responsibility of leaders.

#### **3.2.2 State of Low Carbon Development Policies at the National and**

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<sup>4</sup> The information presented in subsection 3.2.1 and subsections 3.2.2 to 3.2.4 was primarily sourced from ASoG (2011) and ASoG (2012), respectively.

<sup>5</sup> The Philippines adopts a presidential administration system that has three equally powerful branches at the national level: the Executive, the Legislative, and the Judicial. Different ministries are governed under the Executive branch.

## **Subnational Levels**

The government of the Philippines (GOP) has established an institutional mechanism to manage climate change issues, including mitigation and adaptation. In 2009, the Climate Change Commission (CCC) was created under Republic Act 9729, also known as the Climate Change Act. In 2012, the Climate Change Act was amended through Republic Act 10174. The CCC serves as the lead policymaking body of the government on matters related to climate change and is especially tasked to coordinate, monitor, and evaluate the government's climate change programmes and plans. The mitigation-related functions and powers of the CCC include (a) coordinating and synchronising the climate change programmes of national government agencies, (b) formulating a framework strategy on climate change to serve as the basis for climate change planning, research and development, extension, and monitoring, (c) recommending legislation, policies, strategies, programmes, and appropriations for climate change adaptation and mitigation and other related activities, (d) creating an enabling environment to promote broader multistakeholder participation and integrating climate change mitigation and adaptation, and (e) formulating strategies on mitigating GHGs and other anthropogenic causes of climate change.

Accordingly, the CCC formulated the National Framework Strategy on Climate Change (NFSCC) and the National Climate Change Action Plan (NCCAP). Signed in 2010, the NFSCC provides the policy framework and guiding principles for the national strategy on climate change. The guiding principle of the NFSCC includes adaptation and mitigation, with an emphasis on the former. Mitigation actions are to be pursued as a function of adaptation, whenever possible.

Signed in November 2011, the NCCAP outlines the country's agenda for adaptation and mitigation for 2011-2028. Seven (7) priorities have been identified to address the impacts of climate change on the country: (a) food security, (b) water sufficiency, (c) ecosystem and environmental stability, (d) human security, (e) climate-smart industries and services, (f) sustainable energy, and (g) knowledge and capacity development.

The Philippines sees opportunities in reducing GHG emissions by promoting green growth in partnership with the private sector and by creating green jobs and sustainable livelihoods in rural areas and in the most vulnerable communities. There are plans to utilise resources more efficiently, support renewable energy development in order to achieve eco-efficient production, and implement ecological waste management.



The NCCAP aims to take strategic action towards sustainable energy development by giving priority to the following: (a) promotion of energy efficiency and energy conservation, (b) development of sustainable and renewable energy, (c) promotion of environmentally sustainable transport, and (d) climate-proofing and rehabilitation of energy systems infrastructure.

The NCCAP recognises two very important aspects of implementation at the national and subnational levels. For implementation at the national level, strong coordination among national agencies and sectoral groups is crucial, since strategic priorities are defined along thematic rather than sectoral outcomes. At the subnational level, the implementation will be anchored on the concept of ecologically stable and economically resilient towns or ecotowns, wherein an ecotown is a planning unit composed of municipalities or a group of municipalities located within the boundaries of critical key biodiversity areas, highly vulnerable to climate change risks owing to geography, geographic location, and poverty. These ecotowns will receive financial and technical support to develop climate change-resilient communities.

The CCC has identified the first batch of ecotowns, which will be assisted with the following programmes/activities: (a) natural resource assessment, (b) vulnerability assessment, (c) environment and natural resources accounting, (d) application of climate change adaptation and mitigation technologies, including support services, (e) financial scheme design, and (f) local action plan development.

Moreover, there are numerous policies and programmes promoting low carbon development and climate change mitigation, which include environmental laws and policies intended for specific purposes other than climate change mitigation. Such policies and measures are intended for the energy supply, energy efficiency improvement, transport, waste management, commercial and residential buildings, agriculture, and forestry sectors. The major relevant laws and policies can be summarised in Table 3, which also depicts the division of responsibilities between national and subnational governments for policy implementation. Laws and policies are formulated at the national level without the participation of subnational levels, although subnational governments with elected leaders also have the authority to develop and implement local ordinances in devolved policy areas, including environmental management.

**Table 3 Division of Responsibilities between National and Subnational Governments for Low Carbon Development Policy Implementation in the Philippines**

Sector	Policies and Measures	National Government	Provincial Government	City/Municipal Government
Energy Supply	Renewable Energy Act	Yes	Yes	Yes
	Biofuel Act	Yes	--	--
Energy Efficiency	Government Energy Management Program	Yes	Yes	Yes
Transport	Clean Air Act	Yes	--	--
	Natural Gas Vehicle Program for Public Transport	Yes	--	--
	Unified Vehicular Volume Reduction Program (UVRP) under the Metro Manila Development Authority (MMDA) Regulation 96-005, as amended	--	Yes (within Metro Manila and selected areas)	Yes
	National Environmentally Sustainable Transport Strategies (NESTS) e.g. e-trike and auto-Liquefied Petroleum Gas (LPG)	Yes	--	Yes
Commercial and Residential Buildings	An Act to create the Green Building Code Commission to draft the National Building Code	--	--	Yes
Waste and Wastewater	Ecological Solid Waste Management Act	Yes	Yes	Yes
	Environmental Impact Assessment	Yes	--	--
Agriculture	Organic Agriculture Act (OAA) of 2010	Yes	--	Yes
	Memorandum from the Secretary (8 Feb 2011)	Yes	--	--
	Department of Agriculture Climate Change Policy	Yes	--	--
Forestry	Moratorium on the cutting and harvesting of timber	Yes	--	--
	National Greening Program (NGP)	Yes	Yes	Yes
	Philippine National REDD-Plus Strategy (PNRPS)	Yes	--	--

Climate-related programmes are commonly undertaken at the national or city/municipal level rather than the provincial level, except in areas like disaster risk reduction and solid waste management. The national law pertaining to solid waste management, or Republic Act 9003, stipulates that the provincial government, through its solid waste management board, will provide the necessary logistical and operational support to component cities and municipalities. The provincial government is also tasked to review and integrate the plans of its city/municipal governments to ensure that they contain the requisite components and complement each other. The provincial solid waste management plan should reflect the general functions of the province, namely, to support the implementation and initiatives of the city/municipal governments.

Many subnational government officials still encounter difficulties in differentiating climate change mitigation and disaster risk reduction. However, there are some subnational governments, especially in the urban areas, which are already implementing programmes to reduce their GHG emissions and move towards low carbon development.

Subnational governments are free to implement such policy initiatives without seeking the authorisation of the national government; Quezon City and Makati City are already implementing their respective green building codes, while the national government is still in the process of drafting the national green building code. Other low carbon development policies and measures currently in place in these two cities are energy efficiency improvements for street lighting, waste reduction, and recycling. However, none of the policies aims at changing the behaviours of residential and industrial stakeholders.

### **3.2.3 State of Monitoring and Evaluation Mechanisms**

In the Philippines, the National Economic Development Authority (NEDA) is primarily responsible for formulating continuing, coordinated, and fully integrated social and economic policies, plans, and programmes for the national government. As such, its role includes: (a) formulating annual and medium-term public investment programmes, (b) approving programme official development assistance (ODA) in the form of grants and concessional loans from foreign governments, multilateral agencies, and organisations, and (c) monitoring and evaluating the implementation of the investment plan.

All national government agencies are required to submit and seek approval from NEDA's Investment Coordinating Committee (ICC) for all planned programmes and projects involving national government investments, including government funds, grants from local and foreign donors, and loans. Specifically, the following types of programmes and projects are required to seek approval from the ICC: (a) any independent undertaking of the public sector with a total project cost of 300 million pesos or more, resulting in new capital formation in the economy, irrespective of the mode of financing (i.e. local funding or foreign-funded loans/grants), (b) public sector projects with foreign borrowing of at least 5 million US dollars, and (c) projects of the private sector seeking concessional ODA financing under on-lending arrangements and/or national government financing guarantees, including infrastructure projects to be implemented under the build-operate-transfer (BOT), build-own-operate (BOO), and build-transfer (BT) schemes. Projects/programmes not defined above are considered on a case-to-case basis (e.g. those not endorsed by the ICC Secretariat when relevant policy issues may remain unresolved). However, the following types of projects are excluded from seeking approval: (a) projects funded entirely by subnational governments as well technical assistance projects (e.g. training and expert services)

and (b) private sector projects availing of special credit facilities.

Projects and programmes under the abovementioned purview of the NEDA must prove their eligibility using the ICC's Project Evaluation Standard Forms when the committee considers approving the project. These forms require details such as the project description, sources of funding, estimated project costs, and estimated project benefits, and revenues. The resulting M&E results provide the bases for budget releases from the government or the reallocation of funds.

In the Philippines, apart from the NEDA-ICC driven mechanism, the M&E process is effectively institutionalised at the subnational level. First, targets and indicators of major policies are defined through multistakeholder processes. Then, monitoring of targets and indicators is undertaken by the department-in-charge and multipartite teams. Reports are provided by the department to the mayor and the constituents on a regular basis. Achievements are often reflected in budget allocations for the next year.

Regarding the M&E of the climate policy, the CCC is currently crafting an M&E system particularly for the implementation of the NCCAP, as it is tasked to monitor activities pertaining to climate change mitigation and adaptation.

In the case of Makati City, the city's development agenda has guided each department/office to set its own performance indicators so as to monitor and evaluate their work. The indicators/targets are defined by each department/ office through a consultative process requiring multistakeholder consultations. The implementation progress seen through these indicators is reported to the mayor twice a year. The Environmental Services Department, for example, is tasked to oversee waste collection and implement activities concerning waste management for the city government. The indicators in this case include the amounts of solid waste generated, collected, and diverted (to composting, materials recovery facilities, etc.). The mayor discloses this performance annually to the public in his State of the City Address. These activities are also reported in the city's Annual Accomplishment Report and form the bases for the department's budget allocation for the following year. Performance indicators are also set for individual officials and staff/employees. Incentives are provided to deserving individuals so as to encourage dedication and commitment. These include overseas training and promotions for deserving employees. The Environmental Service Department has received numerous achievements and awards for its good performance. It has also been certified as being ISO 14001 compliant.

Makati City, like other LGUs in the country, nurtures a multistakeholder participatory approach in implementing its projects and programmes. Thus, multistakeholder consultations before the finalisation of a major plan/measure are a common practice. Multipartite organisations are also formed to monitor and evaluate the programmes of the city government.

### **3.2.4 Monitoring, Reporting, and Verification of GHG Emissions and Emissions Reductions**

The GHG inventory is a prerequisite to monitor and evaluate low carbon development policies at the national and subnational levels. In the Philippines, institutions for measurement and reporting of GHG emissions are currently at an early stage of preparation at both levels. The national inventory has been developed using a top-down approach; the national government submits National Communications to the UNFCCC secretariat, with the assistance of climate experts.

Aside from the conscious effort of compiling the national GHG inventory as part of its national communication report to the UNFCCC, the Philippines is currently in the process of institutionalising the National GHG Inventory process in key government agencies/ministries. The Department of Energy (DOE) is to be the lead agency for the National GHG Inventory for the energy sector. The Climate Change Office of the CCC is undertaking capacity building efforts to prepare these agencies for their roles at the National GHG Inventory, as the CCC intends to sustain its effort of inventorying by mainstreaming it as part of the government's regular functions.

Unlike the national level approach, subnational level inventories are to be developed using a bottom-up non-systematic approach. Compiling the subnational level inventory is voluntary at this stage, and thus, the verification mechanism has not been institutionalised yet; it is still at the trial stage.

In August 2010, the Climate Change and Clean Energy Project (CEnergy) of the United States Agency for International Development (USAID), in partnership with the Philippine League of Local Environmental and Natural Resources Officers (PLLENRO) and the Greenhouse Gas Management Institute, launched a training series called 'Responding to Climate Change through Greenhouse Gas Accounting and Management'. The training aimed to capacitate LGUs in developing, implementing, and/or supporting climate change mitigation policies and programmes through GHG accounting and management. The Greenhouse Gas Management Plan is slated to be developed

alongside the inventory. Around 37 LGUs participated in the pilot training program. Of these, more than 10 were able to finish their entity- (organisational-) level inventory reports and were able to proceed to community-level (city-/region-wide) reporting. The LGUs discussed below are participants of the CEnergy project.

#### *The Aurora Province*

The Environment and Natural Resources Office of the Provincial Government of Aurora spearheaded the preparation of the first provincial GHG inventory in the Philippines. The provincial GHG inventory of Aurora was undergoing a third-party review by international experts and was to be finalised by the end of 2012.

#### *Quezon City*

The Plans and Programmes Division of the Environment Protection and Waste Management Department spearheaded the preparation of the city's entity-level GHG inventory and is presently finalising their community-level GHG inventory. The sectors included in their community-level inventory are energy (stationary, mobile, and electricity consumption), waste, and forestry. Lack of available data poses the biggest challenge in the preparation of a more comprehensive GHG inventory. To address these data gaps, they plan to institutionalise data collection and improve data archiving for future GHG inventories. The community-level inventory will serve as guide in the preparation of their GHG Management Plan. They also hope to quantify the potential emission reductions of the various climate change mitigation programmes they are implementing and set emission reduction targets.

#### *Makati City*

The Environmental Services Department initiated the preparation of the city's entity-level GHG inventory and is presently finalising their community-level GHG inventory. The sectors included in their community-level inventory are energy (stationary, mobile, and electricity consumption) and waste. They have also recently held a multistakeholder consultation in order to draft their GHG Management Plan.

In terms of the MRV of GHG emissions reductions through policies/programmes/projects, the MRV for CDM projects, in particular, for the programme of activities (PoA), provides the most relevant experience. In the Philippines, Executive Order 320 designated the Department of Environment and Natural Resources as the Designated National Authority (DNA) for the CDM in the Philippines in

2005. Since then, a total of 131 projects have applied for approval from the DNA. Of these, 110 projects have been given a letter of approval (LoA) by the DNA, 58 have been registered, and as of June 2012, 5 projects have been issued certified emissions reductions (CERs) representing 551,281 emissions reduction credits. Seventy (70) per cent of the projects issued the LoA are small-scale. Compared to the annual expected CERs of CDM projects, the CERs issued range from 52% to more than 100% depending on the year of issuing. As of 30 June 2012, the Philippine's PoA statistics indicate that 13 projects were being validated, 2 stood cancelled, and 0 were registered.

Of the 58 registered projects, only 2 projects enjoy subnational government autonomy: the Quezon City Controlled Disposal Facility Biogas Emission Reduction Project and the Laguna de Bay Community Waste Management Project, which concerns the avoidance of methane production from biomass decay through composting. Of the 13 PoAs, 6 include national government participation, 3 from the Land Bank of the Philippines, 2 from the DOE, and 1 from the Department of Environment and Natural Resources. Of the 6 projects with national government participation, 1 PoA (the DOE's E-trike Project) involves participation of subnational governments as conduits in the financing scheme for the project. There is also the need to document lessons learnt and best practices from CDM experiences, especially in PoA implementation, to facilitate improved measurement and reporting of GHG emissions reduction by national and subnational governments.

#### **4 Possible Application of the Linkage Concept**

##### **4.1 Case of Thailand**

###### *Phased Approach: Diversity, Incentives, Ownership, and M&E*

In Thailand, the state of low carbon development policies and measures at the subnational level and its M&E mechanism can be assessed at the early stage of preparedness rather than the implementation stage. Even advanced and committed subnational governments, such as the BMA and the Muang-klang Municipality, are in the process of completing their first PDCA cycle for low carbon development (or more specifically, GHG emissions reductions). There are close natural linkages with existing conventional developmental policies, programmes, and projects. Measurement and reporting of GHG emissions, both within national and subnational governments and by private entities to the government, are currently at the institutionalisation, learning-by-doing, and doing-by-learning stages.

Under these circumstances, the GOT would do well to adopt a phased approach, while taking into account the different levels of understanding, commitment, and capacity for low carbon development policy formulation, implementation, and the MRV capabilities for GHG emissions reductions of subnational governments.

In the first phase, the GOT—in particular, the TGO—could extend the existing LCC project in two ways. First, the TGO could solicit more subnational governments to join the project and let them initiate the first step of learning-by-doing. Early participants could provide a good source of experiences in terms of difficulties encountered as well as good practices in formulating and implementing relevant plans/policies/projects. Second, the TGO could develop and streamline project activities so that participating subnational governments could undertake more advanced activities, depending on their capacity and intent. Such activities could range from participatory vision/mission/strategy development, participatory action planning with/without quantitative targets, participatory M&E of integrated community development plans, sector-specific policy/programme/project development and their M&E, community-level and/or entity-level inventory development and implementation, and measurement and reporting of GHG emissions reductions. The TGO would also support capacity development pertaining to M&E of low carbon development policies and measures by participating subnational governments. Moreover, the TGO would benefit by learning from the experiences of the PDCA cycle of low carbon development projects and take the necessary actions to make improvements and disseminate good practices.

In the coming years, the GOT may consider a second phase, whereby it would provide selected (advanced) subnational governments with fail-safe performance-based grant mechanisms (see section 2.1) to support (a) low price cap-and-trade and/or (b) sector-specific low carbon development projects, such as those in solid waste management (sanitary landfilling and composting), energy efficiency improvement in buildings, and renewable power generation, and projects that subnational governments have already initiated. For low price cap-and-trade, wilful subnational governments in collaboration with capacitated private entities in the same jurisdiction could develop a voluntary coalition of GHG emissions reductions and trade emissions quotas with other participating provinces/cities. The GOT could provide the needed initial funds for institutional and capacity development and/or bear the operational (including information technology (IT) system) costs to help foster cap-and-trade.

### *Mutual Learning*



Besides providing incentives to subnational governments and nurturing a sense of ownership for low carbon development programmes/projects, the GOT could also facilitate mutual learning among them at the subnational level. In particular, it is desirable for the GOT to promote effective communication within and between subnational governments, as well as among other stakeholders. Experiences pertaining to communication, namely coordination and networking among stakeholders, such as individuals, communities, and organisations within and outside the subnational government, are significant in adopting and institutionalising new policies (Nakamura 2010). Using the existing networks of subnational governments, government officials, and other relevant private/not-for-profit organisations, the TGO could seek out opportunities for experience sharing, which may include IT-based communications, face-to-face workshops, knowledge production and dissemination, and field visits with discussions. External stakeholders, with different perspectives and experiences, are likely to provide valuable insights to internal stakeholders, and vice versa. The TGO could act as a change agent by coordinating and facilitating this societal learning process (Ito 2006).

Mutual learning must occur vertically as well as horizontally. National governmental officials should meet their subnational counterparts and other stakeholders at the subnational level more frequently so that each understands the perceptions and capacities of the other. To guide such efforts, joint projects could be conducted on a trial basis. Examples include community consultation workshops for readiness construction (or action planning, in some cases) of low carbon communities, with the participation of national and subnational government officials, local stakeholders, and relevant experts/consultants/researchers. The perceptions, willingness, and capacity of the community can be evaluated by those with the power to mobilise resources, and appropriate steps can be taken. In other words, it becomes possible to take a 'collective' decision, which is particularly relevant as the 'do no harm' precautionary principle continues to be applicable for low carbon projects also.

## **4.2 Case of the Philippines<sup>6</sup>**

### **4.2.1 National and Subnational Linkage of Low Carbon Development Policies**

Based on the four considerations listed in section 2, the following mechanisms should

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<sup>6</sup> The information presented in this section was primarily sourced from ASoG (2012).

be explored in order to link national and subnational policies on low carbon development in the Philippines:

#### *Incentive provision and ownership development*

Incentive provisions are already included in some national policies and are being replicated at the local government level. The Government Energy Management Programme (GEMP), for example, provides national agencies a 10% annual reduction on electricity and fuel consumption. This mechanism allows the agencies to use 100% of the monetary value of their savings as their incentive, provided they achieve the required 10% reduction. This kind of mechanism provides a good incentive for the agencies to promote specific GHG reduction goals and allows them to devise their own strategies to achieve the 10% target. LGUs, on the other hand, have also been implementing their own energy conservation measures, by replicating the goals of the GEMP. Other national laws offer subsidies for infrastructure and technical assistance to LGUs to engage them in developing projects that support the goals of specific policies, such as waste management.

Moreover, the GOP might provide self-nominated LGUs with a fail-safe and performance-based grant mechanism (see section 2.1) to support (a) low price cap-and-trade and/or (b) sector-specific low carbon development projects. In the Philippines, in particular, some central business districts could utilise this mechanism as green building owners.

#### *Effective monitoring and evaluation of policies*

Certain M&E mechanisms to evaluate policy measures have already been institutionalised at the national level. Similarly, subnational governments have also instituted M&E mechanisms for their programmes/projects through specific criteria and indicators. The percentage of budget releases is often proportional to the extent of success or failure as per the projects' indicators and criteria. However, in terms of carbon governance, indicators and criteria are often lacking. Therefore, effective M&E of policies in this area has not been possible to date.

In general, the myriad of environmental policies and projects could be rich sources of baseline data, which could help the development of effective monitoring schemes to promote low carbon governance. While there is an absence of an institutional unified strategy to measure GHG emissions and reductions on the national level, the following

existing mechanisms can be utilised to institutionalise the same:

- The CCC, which is in charge of the overall coordination of climate change related policies and measures
- The NEDA-ICC, which monitors national programmes and projects for their contribution to the Philippine economy
- Project implementers/national agencies, which are also charged with the monitoring of national programmes and projects

However, there is a need to include a climate change dimension in the monitoring of all programmes and projects. This includes defining sources of GHGs and providing criteria and indicators to measure these sources, as well as measuring how the programme or project can contribute to their reduction.

Presently, at the subnational level, it is acknowledged that LGUs have differing progress in terms of monitoring low carbon development in their localities; while some are advanced, the others are just beginning. Looking at the experiences of the different LGUs that were studied, a common set of capacity building measures is needed such that

- LGUs can to evaluate their contribution to GHG reductions for existing programmes and projects, thus enabling them to address the larger goals of climate change and sustainable development
- LGUs are provided with/set their own criteria and indicators to measure their contribution to GHG reductions
- LGUs can easily include a climate change dimension in their local development plans by institutionalising a working low carbon development policy in their localities

Note that these plans may not be necessarily new and may merely be an enhancement of existing LGU plans.

#### *Diverse local conditions*

Under the Local Government Code, LGUs discharge the functions and responsibilities of national agencies devolved to them, such as environmental management, which includes policies on low carbon governance. Thus, the implementation of policies

related to low carbon governance are LGU-specific, depending on each LGU's priorities, resources, vulnerabilities, etc. Therefore, LGUs can learn to apply best practices from the implementation experiences of the national government, namely pilot projects undertaken by national agencies in implementing their specific low carbon policies and measures.

#### *Support of policy diffusion and mutual learning*

Information, Education and Communication (IEC) activities have become an integral part of many, if not all, national policies and programmes. IEC facilitates easier implementation of national policies and programmes at subnational levels.

Nationwide organisations of local government officials, such as the PLENRO, encourage sharing and mutual learning among its members. Best project practices implemented by a member of these organisations can easily be shared or reproduced by the other members. LGUs can also modify/adapt these best practices to suit their specific needs.

#### **4.2.2 Engaging Subnational Governments in Future Carbon Market Regimes**

Given the limited opportunities for the CDM, national and subnational governments may benefit instead from other future carbon market regimes using the lessons learnt from the CDM. The case studies in ASoG (2012) list the various possible barriers against as well as lessons learnt from the CDM for national governments and LGU participation. The PoA provides a viable avenue for national governments and LGUs to participate in the CDM or carbon financing through the MRV of GHG emissions reductions. The national government can develop nationwide programmes for implementation at the subnational level. Notable examples include National Environmentally Sustainable Transport Strategies and the PALIT-ILAW (literally translated as 'CHANGE LAMP' in Filipino, this is a project for replacing inefficient lighting in government-owned buildings with compact fluorescent lamps). In these programmes, the LGUs are encouraged to actively participate as conduits or implementers of policies promulgated by the national government.

A balance should be made between the principles of relevance, transparency, accuracy, credibility, and completeness while defining how to measure and report GHG reductions and defining sound GHG management plans at both the national and subnational levels.

The CDM has traditionally favoured accuracy and credibility over relevance, but as is the case with climate change and GHG reduction policies, undertaking monitoring and reporting also requires due consideration.

### **4.3 Low Cost Carbon Cap-and-Trade Scheme**

One way to promote learning opportunities for low carbon development policies and measures in Thailand and the Philippines would be set up a cap-and-trade system with a very low carbon starting price, that is, 1 US dollars per ton (see Box 1 for the experiences of emissions quota trading in Japan, China, and the US). One advantage of the low price is to check how high the caps can be set and how far the companies are able to meet those caps (or need offsets or trading permits). At this price, there is usually little incentive for companies to change their carbon emitting behaviour. However, if the pilot programme is structured with certain key elements, it could have a significant effect on the reduction of carbon emissions at limited or zero cost to economic growth. Such key elements are as follows:

- Companies achieving significantly consistent emissions reductions could be given the status of preferred suppliers for government procurement contracts
- For companies showing very high reductions and approaching near-market conditions with plans to reduce emissions even further (e.g. large-scale solar panels supplying a large factory, or supply of wind mills to an office complex), some form of concessional lending by government development banks can make such projects attractive and reduce the company's energy bills
- Some form of large social media and text-based publicity for such companies would be useful. Such publicity would entail a nominal expenditure by the government and could also take the form of free/cheap advertisement space for the companies. It would help increase goodwill among consumers, employees, and suppliers, and eventually earn tangible benefits for the companies.
- The technology platform could be connected to large strategically placed digital and non-digital billboards/displays in the city for publicity purposes. This would also allow companies that perform well to reap tangible benefits from public goodwill.

### **Box 1 Some Examples of Cap-and-Trade Schemes**

**The Japanese prefecture-level subnational government of Tokyo** is like a country in its own right in terms of its energy consumption and regional GDP (Tokyo Metropolitan Government 2012). In terms of the regional GDP, Tokyo would rank as the world's 16<sup>th</sup> largest country. It introduced a cap-and-trade system covering around 1,000 large commercial buildings and 300 industrial facilities. The first phase extends to 2015, and depending on the type of facility, these entities are required to reduce their emissions by 6 to 8%. Further reductions (17%) are required in the second phase (2015-2019). Companies that fail to operate within their emission caps after 2011 are required to purchase emission allowances to cover any excess emissions, or alternatively, invest in renewable energy certificates or offset credits. In the first year of operation (FY 2010), the city saw a reduction of almost 13% in its emission levels. The long-term aim (by 2020) is to cut the metropolis' carbon emissions by 25% from 2000 levels.

**The Chinese Government's cap-and-trade programme will cover about 7-8 major cities**, accounting for around a billion tons of CO<sub>2</sub> emissions per year, that is, around 3% of global CO<sub>2</sub> emissions (Takahashi and Zhang 2012). It will be the second largest emissions trading system in the world after that of the EU. The idea is to cut down emissions per unit of GDP by about 40-45% by 2020 compared to 2005 levels. Already, there has been positive movement in this scheme, with four large cement producers buying around 1.3 million tons worth of CO<sub>2</sub> offsets at a price of around 9 US dollars per ton, which is a very high price when compared to the CDM and EU carbon prices. Local innovations to reduce emissions without affecting GDP growth would offer valuable lessons for other Asian countries and the rest of the world.

The North American program called the **Regional Greenhouse Gas Initiative (RGGI)** covers the States of Connecticut, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New York, Rhode Island, and Vermont (RGGI 2012). It covers fossil fuel-fired power plants that are 25 MW or greater in size (currently, 168 facilities across the region) with a cap of around 165 million tons (2012). Emissions are expected to reduce by 2.5% per year between 2015 and 2018, amounting to a total reduction of 10%. The programme has already had a significant positive impact with over 80% of the participants having invested significantly in consumer benefit programmes, such as energy efficiency, renewable energy, bill assistance programmes, and so on.

The other big cap-and-trade programmes (i.e. almost covering their entire economies) are those of Australia, Mexico, South Korea, and California.

One of the biggest successes of the cap-and-trade scheme is the sulphur dioxide (SO<sub>2</sub>) reduction programme (or the Acid Rain Programme) in the US (Chan et al. 2012). The stated purpose of this programme was to reduce total annual SO<sub>2</sub> emissions in the US by 10 million tons relative to 1980, when total SO<sub>2</sub> emissions were about 26 million tons. By 2007, annual SO<sub>2</sub> emissions had declined below the programme's 9 million ton goal (a 43% reduction from 1990 levels), despite electricity generation from coal-fired power plants increasing by more than 26% from 1990 to 2007.

Another way to offer further incentives for GHG emissions reductions would be to promote healthy competition among and within cities. Companies/factories in different parts of cities (or across cities) can compete with one another using social media and the Internet could offer further incentives for reductions.

Once the subnational unit/city has had some experience with cap-and-trade and there is considerable enthusiasm among the companies/factories, the next steps to be taken would include:

- Some form of an agreement with another city through a 'sister city programme' in another country; this would help more companies join the programme and allow diverse trading and learning experiences.
- 'Opt-in' measures into the cap-and-trade system for rural companies, where costs of carbon offsets may be lower, thus encouraging trade with urban counterparts; this also creates concrete and healthy linkages between cities and nearby rural areas pertaining to environmental issues.

If the low cost cap-and-trade scheme is successful, the city government could negotiate higher priced carbon exchanges with traders from other countries (e.g. Australian, Korean, or Californian traders (see Box 1)) who wish to buy carbon savings from the city's companies. Higher priced exchanges (above 15 US dollars per ton) offer concrete incentives for companies to cut their emissions further.

Other higher priced carbon exchanges could be realised through voluntary buying by large companies who pay higher prices per ton for 'social' carbon credits and emerging market credits for marketing purposes, such as carbon offsetting from the credits generated by developing countries/cities.

However, how would one verify these reductions? The companies would have to show a strong track record of reducing emissions, and more importantly, must possess very tight verification/monitoring mechanisms to assure potential buyers that the emission reductions are authentic and have been verified.

Recent studies (e.g. Zusman et al. 2012) show that soot or black carbon plays a role second only to CO<sub>2</sub> in climate change. Thus, low cost cap-and-trade scheme could also experiment with multiple prices depending on the types of emissions. For example, diesel vehicle emissions (or other soot/black carbon sources) could be priced at 1.50 US dollars per ton, while other emissions could be priced at 1 US dollars per ton. Note

that the impact of differential prices will be discernible only when the pricing works in conjunction with other the key actions mentioned above. The price differential on higher impacting soot/black carbon could also extend its beneficial impact to visible improvements in the atmospheric conditions in the city.

## **5 Attitudinal Issues**

### **5.1 Desirable Attitudes for Relevant Parties at the National and Subnational Levels**

Given the resource constraints exacerbated by accelerated urbanisation, more effective policy formulation and implementation at the subnational level is needed for rational land and energy use. However, such needs are often not recognised or are passed off as trivial, as solving visible local environmental pollution issues appears more urgent. Therefore, the perceptions and attitudes of local players, including political leaders, senior and junior government officials, businesspersons, and ordinary citizens, matter immensely in the mainstreaming of low carbon development policies and measures at the subnational level. The narrow definition of 'capacity development' is not enough to change such perceptions and attitudes. However, the IEC method cannot be initiated without a proper understanding of the current state of perceptions and attitudes towards energy, environmental, and climate issues.

Hence, before developing institutional mechanisms related to incentives/ownership, M&E, regional diversity, and mutual learning, effective linkages between national and subnational governments would require the identification of differences in perceptions and attitudes among all relevant players and stakeholders. Divergent perceptions/attitudes would lead to different priorities, thus complicating the development of a shared mission/vision/strategy. Thus, change agents for low carbon development must make efforts to clearly understand such differences and foresee possible commonalities that would allow a shared sense of significance and effectiveness among different players, in particular, those at the national and subnational levels. Such agents could be individuals or institutions at either the national or subnational level. Both top-down and bottom-up approaches could be used to realise the effective institutional linkages between them.

### **5.2 Requirements for International Partners**

International actors have played significant roles in institutional changes in developing



countries. In order to ensure good performance, such interventions should also respect the difficulties in and the importance of identifying perceptions/prioritisation gaps before initiating new programmes/projects.

More significantly, to avoid confusion and complications, international partners of developing Asian countries in low carbon development should openly and frequently share their plans and intentions to support the region. National and subnational governments in the designated country may take a lead in coordinating financial and capacity building support. In some cases, such efforts may not be effective, because of the lack of skilled personnel/organisational resources. International partners, therefore, should closely monitor the progress and development of partner organisations/departments/sectors. It would be also desirable to consider joint support to counterpart-coordinated policies/programmes/projects and/or fund development, including fail-safe performance-based grant mechanisms for subnational governments.

### **5.3 Justification for Innovation<sup>7</sup>**

#### **5.3.1 Reasons for Innovating**

It is natural to ask why innovation is needed when current practices/habits appear to serve just as well. Conventional practices, deeply rooted perceptions, and cultural beliefs/values are likely to hinder innovation. Likewise, low carbon development also encounters the same setbacks and requires innovators and change agents (or even evangelists). Such innovators have to challenge and change people's perceptions, and in a broader sense, ensure resource prioritisation. In reality, change agents who promote new beliefs, perceptions, and improved resource prioritisation, also report alterations in their perceptions after effective interactions and communication with others. Thus, interaction itself becomes a process of learning development at the individual and collective levels.

#### **5.3.2 Recognising Differences**

How may a change agent recognise differences in perception? One way would be to make a collective classification of different persons depending on the reasons for their perceptions. In most cases, persons with relatively similar perceptions—and hence,

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<sup>7</sup> This subsection was developed using Takeishi et al. (2012) as the inspiration. Relevant literature on social innovation includes Drucker (1985), Ellerman (2006), and Westley et al. (2006). Moreover, this paper focuses on policy/institutional innovation rather than the technology elements needed for low carbon development (e.g. more efficient solar photovoltaic electricity generation systems). Readers interested in technological innovation may refer to the abovementioned studies for a discussion of the same.

attitudes and practices—would be included in the same group. Thus, the change agent who wishes to promote a concept or an idea would do so by using different reasons tailored according to the perceptions of the group in question. It is prudent to avoid unnecessary conflicts/confrontations because of different perceptions. In fact, varying perceptions themselves could be a potential trigger for productivity, as they can help stakeholders to appreciate different viewpoints and innovate further.

Such communication is likely to be effective when people are aware of the theoretical difference between ‘understanding’ and ‘being persuaded’ (Matsui 2007). A person would have her/his reasons for accepting/rejecting an idea based on his/her perceptions and emotions, which could be intertwined. In general, a person may arrive at an understanding by using only logic, facts, and evidence. The process of ‘being persuaded’, however, cannot take place without paying due consideration to emotions. Therefore, an innovator must be able to develop a strategy for connecting with people, making them understand an idea and persuading them about the need to pursue it, by exploring and studying the backgrounds that construct and constrain people’s emotions.

### **5.3.3 Constructing Questions Rather Than Solutions**

Another way to encourage innovation is to identify, study, and appreciate existing assets or the physical, ecological, and social capital in the local areas of focus, rather than idealise about things that may not exist therein.<sup>8</sup> It is possible that other parties will introduce fresh perspectives on local assets, compared to people who are already accustomed to them. This would also help the locals to understand and appreciate their current assets, rather than focus negatively on the lack of resources. Incremental capacity development should be undertaken only when crucial.

In many cases, one may recognise an initiative as being innovative, when, in fact, the solution is present already. Therefore, there is a need to develop genuine questions, rather than becoming misguided with false priorities. Developing relevant questions is also a skill: one would need to take careful stock of the present, rather than focusing on the future alone. Indeed, individual and collective observation capacities would govern the quality and feasibility of the endeavour and would help ‘find’ the appropriate questions so as to uncover solutions that are already present.

A gap analysis should be conducted between the shared vision and the current state (as required by the PDCA cycle), as well as between the perceptions of the local people and

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<sup>8</sup> See Yoshimoto (2008) for a concrete application of this concept in Minamata, Japan.

the external stakeholders. Self-accounting on all sides would lead to rediscoveries of what already exists. In order to ensure that they are executed in a truly mainstreamed, embedded, and sustainable manner, new policies and measures should pay heed to such findings. Executing such a process imparts true meaning to the terms 'transformative learning' and 'social learning', elevating them from mere textbook definitions.

Additionally, learning from the failures<sup>9</sup> (rather than successes alone), is also invaluable. It is much easier and effective to identify the reasons for failure and avoid repeat failures. To enable such systematic learning, societal values such as trust and honesty are necessary, since people would not disclose such experiences otherwise. Therefore, collective and individual integrity would go a long way in encouraging low carbon development.

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<sup>9</sup> Identifying existing assets/treasures and learning from failures also corresponds to (a) high ex post valuation and (b) low ex post valuation, both of which are associated with low ex-ante valuation by stakeholders. See Garud et al. (1997) for the matrix of ex ante and ex post valuations of projects or investments.

## References

- Akiyoshi, T. 2010. Kokyo seisaku to ha nani ka, kokyo seisaku gaku to ha nani ka – Shakai no mondai wo kaiketsu suru tame no kangaekata (What is policy, what is policy studies – Ideas to solve social problems). In Akiyoshi, T., S. Ito and T. Kitayama (Eds.). *Kyokyo Seisaku Gaku no Kiso (Foundations of Policy Studies)*. Tokyo: Yuhikaku, pp. 3-21.
- Aoki, K. and T. Aoki. 2010. Teitanso shakai no sohatsu ni muketa bunken gata insentyibu sutorakucha no kochiku: chiho jichitai wo shutai to shita onshitsu koka gasu sakugen saku no khon koso to seido sekkei shian (Development of decentralised incentive structure towards emergence of low carbon society: Basic concept and temporal institutional design of local government-based greenhouse gas reduction measures). *Fudai Keizai Ronshu (University of Toyama Economics Journal)* 56, 137-172.
- Ateneo School of Government (ASoG). 2011. *Study on Carbon Governance at Sub-national Level in the Philippines*. Final Report (Revised Version). Hayama, Japan: Institute for Global Environmental Strategies.
- . 2012. *Support of the Capacity Development on Low Carbon Development Policies at the Sub-national Level through NAMAs in the Philippines*. Final Report. Hayama, Japan: Institute for Global Environmental Strategies.
- Calthorpe, P. 2011. *Urbanism in the Age of Climate Change*. Washington D.C.: Island Press.
- Chan, G., R. N. Stavins, R. Stowe and R. Sweeney. 2012. The US sulphur dioxide cap and trade programme and lessons for climate policy. *VOX columns*. Available at <http://www.voxeu.org/article/lessons-climate-policy-us-sulphur-dioxide-cap-and-trade-programme>
- Chen, C.-C. 2010. A new NAMA framework for dispersed energy end-use sectors. *Energy Policy* 38, 5614–5624.
- Department for Environment, Food and Rural Affairs (DEFRA). 2006. *The UK's Fourth National Communication under the United Nations Framework Convention On Climate Change*. London: Department for Environment, Food and Rural Affairs.
- Dodman, D. 2009. Blaming cities for climate change? An analysis of greenhouse gas emissions, *Environment and Urbanization* 21, 185-201.
- Drucker, P. F. 1985. *Innovation and Entrepreneurship*. New York: HarperCollions Publishers

- Ellerman, D.P. 2006. *Helping People Help Themselves: From the World Bank to an Alternative Philosophy of Development Assistance*. Ann Arbor, USA: University of Michigan Press.
- Garud, R., P. R. Nayyar and Z. B. Shapira. 1997. Technological choices and the inevitability of errors. In R. Garud, P. R. Nayyar and Z. B. Shapira (Eds.). *Technological Innovation: Oversights and Foresights*. Cambridge: Cambridge University Press, pp. 20-40.
- Honorati, M., L. Rawlings and J. Van Domelen. 2011. *Results-Based Lending Approaches in Social Protection and Labor: World Bank Experiences*. Washington DC: World Bank.
- Hosei University. 2012. *Nihon no Jichitai ni okeru Teitanso Shakai Kochiku oyobi Chikyu Kankyo Mondai heno Torikumi Sokushin Shisaku ni kansuru Kenkyu (Study of promotion measures for low carbon society development and initiatives towards global environmental issues in Japanese municipal governments)*. Tokyo: Hosei University.
- International Energy Agency (IEA). 2008. *World Energy Outlook 2008*. Paris: International Energy Agency.
- Ito, S. 2006. *Jichitai Hatsu no Seisaku Kakushin: Keikan Jorei kara Keikan Ho he (Policy Innovation Emerging from Local Governments: From Landscape Conservation Local Ordinances to Landscape Conservation Law)*. Tokyo: Bokutakusha.
- Kishigami, M. 2010. Tei Tanso Shakai Kochiku ni muketa Jichitai no Yakuwari to Katsudo (Local governments' roles and activities towards constructing low carbon society). In Hamanaka, H. (Ed.). *Tei Tanso Shakai wo Dezain Suru: Tanso Shuyaku Gata Keizai Shisutemu kara no Tenkan no tame ni (Designing Low Carbon Society: Towards Transition from Carbon Intensive Economic System)*. Tokyo: Keio Gijuku Daigaku Shuppan Kai (Keio University Press), pp. 159-180.
- Lasswell, H.D. 1971. *A Pre-view of Policy Sciences*. New York: American Elsevier.
- Matsui, T. 2007. <Wakaru> to <Nattoku suru>: Hito ha Naze Ese Kagaku ni Hamaru no ka (<Understanding> and <Being Persuaded>: Why People are Tapped by Fake Science? Tokyo: Wedge.
- Nakamura, H. 2010. Political factors facilitating practice adoption through Asian intercity network programmes for the environment. *IGES Discussion Paper*. Hayama, Japan: Institute for Global Environmental Strategies.
- . 2011. *Lessons Learnt from Regional Intercity Networking - To Promote Sustainable Cities in Asia -*. Hayama, Japan: Institute for Global Environmental

Strategies.

- , 2012. Sub-national Carbon Governance in Asian Developing Countries: Cases of China, India, Indonesia and the Philippines. *IGES Discussion Paper GC-2011-03*. Hayama, Japan: Institute for Global Environmental Strategies.
- Nakamura, H. and M. Elder, 2012. Practical Measures to Promote Japanese Local Governments' Environmental Collaboration with Developing Countries with Citizens' Support. *IGES Policy Brief 18*. Hayama, Japan: Institute for Global Environmental Strategies.
- Nakamura, H., Elder and H. Mori. 2010. *Mutual Learning through Asian Intercity Network Programmes for the Environment*. Hayama, Japan: Institute for Global Environmental Strategies.
- Okabe, A. 2003. *Sasuteinaburu Shityi: EU no Chiiki Kankyo Senryaku (Sustainable City: Regional and Environmental Strategy of EU)*. Kyoto: Gakugei Shuppan Sha.
- Regional Greenhouse Gas Initiative (RGGI). 2012. About the Regional Greenhouse Gas Initiative. Available at [http://www.rggi.org/docs/Documents/RGGI\\_Fact\\_Sheet\\_2012\\_09\\_28.pdf](http://www.rggi.org/docs/Documents/RGGI_Fact_Sheet_2012_09_28.pdf)
- Satterthwaite, D. 2008. Cities' contribution to global warming: Notes on the allocation of greenhouse gas emissions, *Environment and Urbanization* 20, 539.
- Siam CIE International Co. Ltd. 2008. *Final Report for Study of Practice Diffusion and Adoption Process under Cities for Climate Protection (CCP) Program in Thailand*. Hayama: Institute for Global Environmental Strategies.
- Stern, N. 2007. *The Economics of Climate Change: The Stern Review*. New York: Cambridge University Press.
- Takeuchi, A., Y. Aoshima and M. Karube 2012. *Inobeshon no Riyu: Shigen Doin no Sozo teki Seito ka (Reasons for Innovation: Creating Legitimacy for Resource Mobilisation)*. Tokyo: Yuhikaku.
- Takahashi, K. and M. Zhang. 2012. Institute for Global Environment Strategies Market Mechanisms Country Fact Sheets: People's Republic of China. Available at [http://enviroscope.iges.or.jp/modules/envirolib/upload/984/attach/china\\_final.pdf](http://enviroscope.iges.or.jp/modules/envirolib/upload/984/attach/china_final.pdf)
- Takeuchi, T. 2005. Chiho bunken: Higashi ajia shokoku no infura seibi ni taisuru inpakuto (Decentralisation: Impacts on infrastructure development in East Asian countries). *Kaihatsu Kinyu Kenkyujo Ho* 25, 43-68. Available at [http://www.jica.go.jp/jica-ri/research/archives/jbic/pdf/25\\_05.pdf](http://www.jica.go.jp/jica-ri/research/archives/jbic/pdf/25_05.pdf)
- Thailand Environment Institute (TEI). 2012, *Support of the Capacity Development on Low Carbon Development Policies at the Sub-national Level through NAMAs in Thailand*. Final Report. Hayama, Japan: Institute for Global Environmental

Strategies.

- Tokyo Metropolitan Government. 2012. Tokyo's Green Building and Cap-and-Trade Programs. Paper presented at ICLEI World Congress 2012. Belo Horizonte, Brazil, 14-17 June 2012. Available at <http://worldcongress2012.iclei.org/fileadmin/templates/WC2012/Documents/Presentations/A3-Suzuki.pdf>
- United Nations (UN). 2012. *World Urbanization Prospects: The 2011 Revision*. New York: United Nations.
- United Nations Institute for Training and Research (UNITAR). (n.d.) *Process of Decentralisation*. Available at [http://dcp.unitar.org/IMG/pdf/The\\_process\\_of\\_decentralization\\_1\\_.pdf](http://dcp.unitar.org/IMG/pdf/The_process_of_decentralization_1_.pdf)
- Westley, F., B. Zimmerman and M. Q. Patton. 2006. *Getting to Maybe: How the World is Changed*. Ontario, Canada: Random House of Canada, Ltd.
- World Bank. 2011. *World Development Indicators*. Available at <http://databank.worldbank.org/ddp/home.do>
- Yamanoshita, M. 2012. COP17 REDD+ Report. *IGES Conference Report FC-2011-01*, Hayama, Japan: Institute for Global Environmental Strategies.
- Yoshimoto, T. 2008. *Jimoto gaku wo Hajime yo (Let Us Get Started the Study of Places Where We Live and Play)*. Tokyo: Iwanami Shoten.
- Zusman, E., M. Akiko, J. Romero M. Arif. 2012. Bridging Research and Policy on Short-Lived Climate Pollutants (SLCPs) in Asia. *IGES Working Paper CC-2012-06*, Hayama, Japan: Institute for Global Environmental Strategies.