

**Going Green with Sustainable Development and Energy Policies: A
National Survey of Taiwanese Local Governments**

By

**James Chaomeng Huang, Professor
Department of Public Administration and Policy
National Taipei University
Taipei, Taiwan (ROC)
chaomeng@mail.ntpu.edu.tw**

and

**Frances S. Berry
Frank Sherwood Professor of Public Administration
Askew School of Public Administration and Policy
Florida State University
Tallahassee, Florida USA
fberry@fsu.edu**

Prepared for delivery at the Fifth Sino-US International Conference on Public Administration, June 14-17, 2010 in Xiamen City, P.R. China.

INTRODUCTION

Sustainable development policy is heating up again at both the local, national and international levels as national representatives prepare to meet in Copenhagen Denmark December 6-18, 2009 to hammer out a new international agreement on climate change. Sustainable development has become the rhetoric and increasingly often, the practice of many countries and communities, especially since the United Nation's 1992 Environment and Development Conference in Rio de Janeiro highlighted these ideas, building off the Brundtland report in 1987 (OECD, 2004). While a broad literature has been written on sustainable development, three dimensions are often cited as constituting the core of the concept: environment (protecting natural resources), economy (through emphasizing place-based development) and society (promoting social equity).

Taiwan is a country with a limited land mass, especially for cultivation and building urban areas, with a dense population, a shortage of natural resources, frequent natural disasters, and a unique international political status. All of these factors lead to a pronounced need in Taiwan to pursue sustainable development, with more immediate urgency than most other countries face. Beginning in the early years of the twenty first century, the Taiwan National government drawn up its own national Agenda 21, issued a National Report on Biodiversity, developed strategies for the reduction of greenhouse gas emissions, mapped out a National Environmental

Protection Plan, and launched the plan for developing Taiwan into a “Green Silicon Island.” (Taiwan Agenda 21, 2004) Taiwan’s cabinet—the Executive Yuan established a National Council for Sustainable Development in 2002 under the sponsorship of the Premier to bring a focused and united approach to sustainable development in Taiwan. Shortly after the World Summit on Sustainable Development (WSSD) in September 2002, the Taiwanese government unveiled its Sustainable Development Action Plan and “declared 2003 as the starting year of a drive to achieve sustainable development, aiming to mobilize the ideas and efforts of the whole population to ensure that Taiwan can preserve the vitality of its ecology for all time.” (2004, p.7)

In 2001 Edward Jepson conducted a survey of U.S. cities asking what actions were being taken on policies related to sustainable development and climate change policies. Many of the same tools and policies included in that survey were used as elements in this survey. This study is an effort to assess what local governments in Taiwan are doing regarding a range of issues related to sustainable development and climate change. Surveys were sent to the chief administrative officers in Taiwan’s twenty five cities in January 2010 to determine policies and practices used in that city. Local government administrators were asked to report on policies they have adopted related to energy efficiency and green buildings, energy facilities and zoning

requirements, the utilization of alternative energy sources in their cities, land use policies related to growth and energy issues, and incentives they use for promoting energy reduction and conservation. The study also asked managers' perceptions of obstacles their city faces to reduce overall energy use in their city government, and describes the planning process used for sustainable development policies.

BACKGROUND

The implementation of local sustainable development projects and planning efforts in Taiwan began in 2004 with financial and policy support from the Council for Economic Planning and Development which provided grants to ten cities and counties to subsidize their participation in the program. {One paper notes the following localities participated in drafting and implementing County/City Sustainable Development Promotion Plans: as the "Committee for Economic Development in 2004 selected Taipei City, Kaohsiung City, Yilan County, Changhua County, Tainan County, Kaohsiung County, Pingtung County, Hualien County, Taichung City and Kinmen County for subsidies to develop their SD plans}. The Environmental Protection Administration (EPA) in 2005 became the designated central agency for sustainable development, reflecting the recognition that SD has a core environmental mission and goal orientation. In 2006, the EPA continued work on this initiative by providing grants and subsidies of NT\$5million to four local

governments—Taipei County, Taichung County, Yunlin County and Chiayi County—to assist them in implementing their local sustainable development plans. Also, in 2007 an additional NT\$8.5 million was provided to eight more local governments (Hsinchu City, Hsinchu County, Miaoli County, Nantou County, Keelung City, Taitung County, Penghu County and Lianchiang County) to assist in their efforts to implement the local sustainable development promotion plans.” (P, 1 and 2 of 4 page history of Taiwan’s SD process). Thus to summarize, the central government and the EPA have now subsidized 12 cities and counties to establish local sustainable development committees, clarify goals and objectives, analyze issues and establish strategies, set up implementation and tracking mechanisms, and devise ways to evaluate results. This work and institutionalization of the sustainable development plans should help new officials to get up to speed and continue the work that is ongoing in the sustainable development area.

DATA AND ANALYSIS

The data for the descriptive analysis presented in this paper were acquired through an online survey sent by the authors to the chief administrative officers in Taiwan’s twenty-three counties and cities in January 2010, with data collection completed by March 2010. Fourteen cities and counties in Taiwan returned their questionnaires with valid responses, hence the response rate is about 60.8%.

SURVEY RESULTS

Energy and Climate Policy

The first section of the survey asked the respondents to indicate the energy related issues that their jurisdictions officially address with regard to their government facilities and the communities at large. As can be expected, all of the issues are officially addressed by at least two cities or counties, and they are implemented more in the government facilities than in the communities. Within the government facilities, the issues that have received most attention include green procurement (100%), green buildings (92.9%), retro-fitting existing buildings for energy efficiency (92.9%), Regional air quality (92.9%), and Energy efficient devices (92.9%). On the other hand, the issues are addressed much less in the communities. Even the most accepted issues, such as Retro-fitting existing buildings for energy efficiency and energy efficient devices, are addressed in only about half of the cities or counties.

The second section of the questionnaire is composed of the green construction and technology issues that might be taken into consideration by the site plans and development reviews of the cities and counties. The survey results (see table 2) show that the site plans and development reviews of all of the cities and counties account for reduced water use. More than 75% of the cities and counties also take energy efficient buildings, solar orientation for passive and active solar collection, and certified green buildings into considerations. On the other hand, light pollution reduction (14.3%), on-site renewable energy sources (21.4%), and heat island reduction (28.6%) are only accounted for by only a small percentage of the cities or counties.

Table 1 about here

Table 2—Does your site plan and development review account for the following Green Construction & Technology issues?

	No. of cities/counties	%
Reduced water use	14	100%
Energy efficient buildings	12	85.7%
Solar orientation for passive and active solar collection	12	85.7%
Certified green buildings	11	78.6%
Green roofs	9	64.3%
Daylighting	5	35.7%
Heat island reduction	4	28.6%
On-site renewable energy sources	3	21.4%
Light pollution reduction	2	14.3%

Zoning Regulations Subdivision Regulations and Permitting

In terms of energy considerations in siting, only three of the cities and counties (21.4%) responded that they have siting standards for power generation and distribution facilities, and these are also the only cities and counties that have an energy demand standard that it applies when approving site plans.

With regard to providing incentives to encourage sustainable development, more than half of the cities and counties offer fast track development-review incentives in their development review system to encourage green neighborhood design. More specifically, three (21.4%) of them offer expedited or streamlined permitting, another three (21.4%) cities or counties offer reduced permitting costs, and two (14.28%) other cities or counties offer some other incentives to encourage green neighborhood design. In contrast, only a small percentage (21.4%) of the cities and counties offer any density bonus to developers for incorporating energy efficiency or sustainable elements into their projects.

Table 3 shows the energy efficient facilities that are currently included in the zoning regulations of the cities and counties in Taiwan, as well as local governments that are considering including these elements in their zoning laws. The survey results

show that it is not very common for these practices, such as solar easements, geothermal or biomass facilities and nuclear plants, to be included in the present zoning regulations of the jurisdictions. Among the facilities, solar and wind easements (28.6%) and solar PV farms (28.6%) are the most well accepted practices, and two governments regulate wind farms. None of the local governments currently have zoning regulations in place for nuclear plants, or geothermal or biomass facilities.

However, at least twice as many local governments considering including one or more of these items in their zoning regulations. For example, half of the respondents identify wind farms and biomass facilities as under consideration in their zoning regulations, and more than one-third (35.7%) of the cities and counties are considering solar and wind easements, and relief from restrictions for renewable energy devices (i.e., height, location). Two of the respondents say their local governments are considering regulations for nuclear plants.

These responses seem to indicate that local governments are undergoing a significant change in what they are considering in their zoning regulations, and that energy facilities and new production methods are becoming discussed or considered by investors in the local jurisdictions. This appears to indicate a higher level of interest and attention to these types of policy and zoning approval issues in Taiwan’s local government forums.

Table 3— Do your jurisdiction’s zoning regulations facilitate the following?

	Included in present zoning regulations	Under consideration	Not included, nor under consideration
wind farms	2 14.3%	7 50.0%	1 7.1%
solar and wind easements	4 28.6%	5 35.7%	0 0.0%

relief from restrictions for renewable energy devices (i.e., height, location)	0 0.0%	5 35.7%	1 7.1%
distributed generation energy systems	3 21.4%	2 14.3%	2 14.3%
geothermal facilities	0 0.0%	4 28.6%	3 21.4%
biomass facilities	0 0.0%	7 50.0%	1 7.1%
solar PV Farms	4 28.6%	4 28.6%	1 7.1%
cogeneration facilities	3 21.4%	2 14.3%	2 14.3%
nuclear plants	0 0.0%	2 14.3%	5 35.7%

While it is not very common to include energy efficient facilities in the zoning regulations in Taiwan, many cities and counties have actually seen some of the facilities developed and operated, either the government or private corporations. Table 4 shows that the majority of the cities and counties (64%) have had wind farms in place, while the majority of the wind farms are operated by the government. In addition, half of the local governments (50%) have cogeneration facilities in place, also mostly owned by the government.

Table 4—Within your jurisdiction are any of the following facilities in place? And if so, who operate them?

	% Yes		% Government		% private		% another	
	Yes	Yes	Government	Government	private	private	another	another
wind farms	9	64	8	57	3	21	0	0
distributed generation energy systems	2	14	1	7	1	7	0	0
geothermal facilities	1	7	0	0	0	0	1	7
biomass facilities	0	0	0	0	0	0	0	0
solar PV	3	21	2	14	2	14	0	0
cogeneration	7	50	5	36	1	7	1	7
nuclear plants	3	21	0	0	0	0	2	14

Land Use and Open Space

Local government have a significant opportunity to influence how their communities grow and develop, and to what extent sustainable development regulation is included in the land use planning and regulation process. The respondents are first asked to identify the environmental policies or programs that are encouraged or required in their jurisdictions. As shown in Figure 1, most of the local governments encourage regulations that are related to energy efficiency and efficient land use for housing and other development, although fewer requirements these regulations. More specifically, compact development in new and existing neighborhoods, mixed-use development, in-fill development, and individual developments to design streets for multi-modal mobility are those most encouraged by the local governments. More than eight-five percent of the jurisdictions have established certain policies or programs to encourage these practices. On the other hand, the items that have been required by more than half of the cities and counties include individual developments to incorporate bicycle facilities, reduced greenhouse gas emissions in developments, community-wide pedestrian plans, and community-wide bicycle plans, so the local jurisdictions are taking significant regulatory action to promote bicycle use and safe walking.

Next respondents were asked if they have enacted environment-friendly zoning policies that promote higher density and mixed use development. (See Table 5 for these survey results.) According to the survey results, a half (50%) of the local governments in Taiwan have established up-zoning policies to bring areas that were less dense to higher density standards. In addition, about 30 percent (29%) of the cities and counties have enacted urban growth boundary. A little more than 20

percent (21%) of the respondents indicate that they have inclusionary housing policies.

Table 5—Zoning

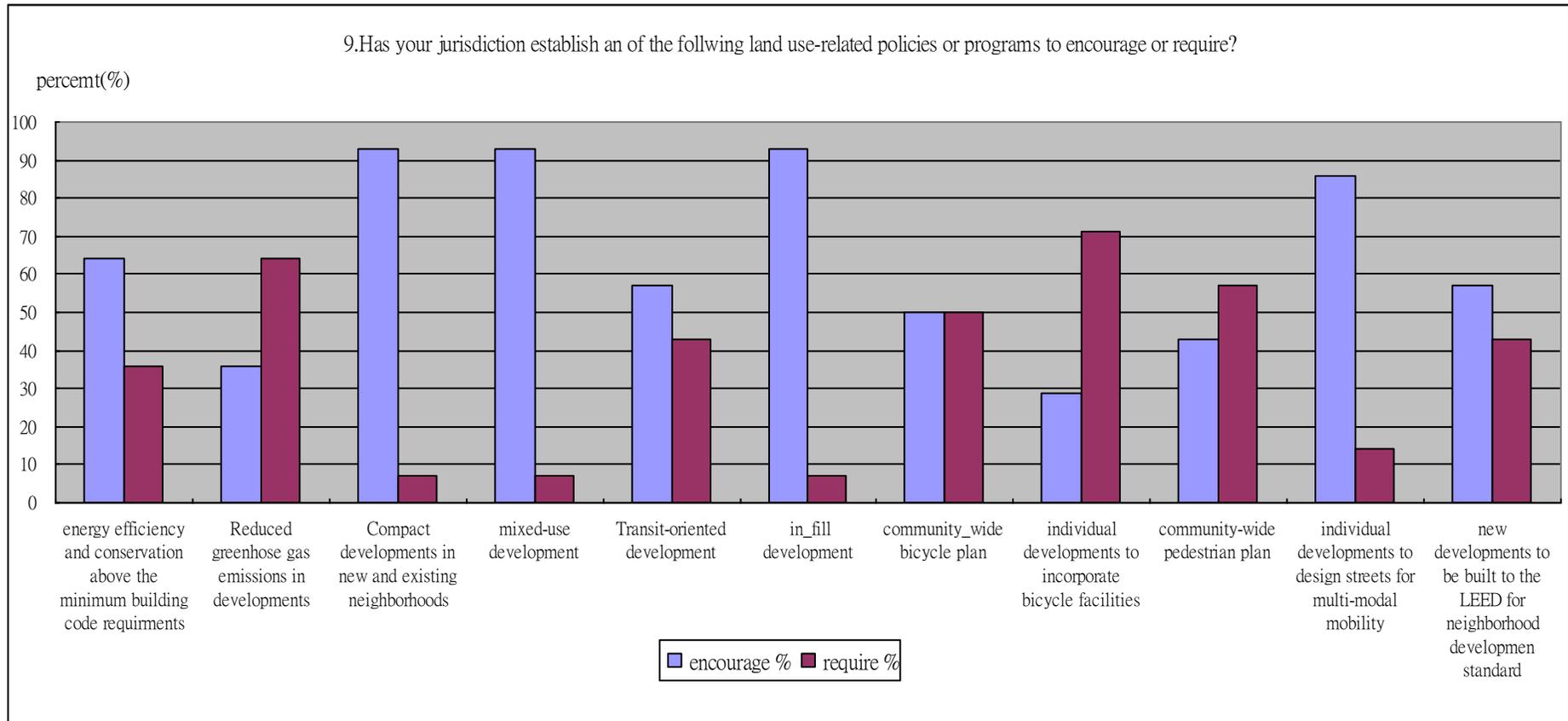
	Yes	No
Up-zoning to bring areas that were less dense to higher density standards	7 50%	7 50%
inclusionary housing policy	3 21%	11 79%
urban growth boundary	4 29%	10 71%

Table 6 summarizes the questions related to whether the respondent’s jurisdictions have any of the policies, plans or regulations related to planting and open space. Almost all of the cities and counties have had policies related to tree preservation (86%) and tree planting (93%) in place. More than sixty percent (64%) of the local governments have paid attention to prime farmland preservation. Only two (14%) respondents indicate that they have policies on forest management. Finally, five (36%) of the cities and counties have published open space plans.

Table 6—Tree Planting, Forest Management and Open Space

	Yes	%
tree preservation	12	86
prime farmland preservation	9	64
tree planting	13	93
forest management	2	14
Open space plan	5	36
other	13	93

Figure 1: land use related policies or programs



Green Housing and Buildings

We next asked respondents if their jurisdictions provide incentives to encourage energy efficiency or energy savings. (See Table 7 for the survey results.) Apparently, solar energy is an important energy source that has received the most attention from the cities and counties. The survey results show that over seventy percent (71%) of the local governments offer incentives for solar hot water heating panels, while over sixty percent (64%) of them also provide incentives for solar PV panels. There are also over one third (36%) of the local governments providing incentives for upgrading appliances for energy conservation. In addition, about thirty percent (29%) of the local governments offer incentives for green roofs, and about twenty percent (21%) of them provide incentives for upgrading electrical systems.

Table 7—Incentives for Green Housing and Buildings

	Yes	%
incentives for solar hot water heating panels	10	71
incentives for solar PV panels	9	64
incentives for upgrading appliances for energy conservation	5	36
incentives for green roofs	4	29
incentives for upgrading electrical systems	3	21
incentives for upgrading or retrofitting buildings	2	14
incentives for upgrading building HVAC systems	1	7

Energy Cost Reduction by Government

The next section explores the efforts made by the local governments to reduce their own energy cost. (See Table 8 for the survey results.) All of the respondents indicate that they have set up green procurement policies. About eighty percent (78.6%) of the cities and counties have implemented LEED sustainable building certification, and more than half (57.1%) of them are using hybrid/alternative fuel vehicles. These practices are now very common for governments in Taiwan to follow for themselves.

Following strong encouragement from the national government, although the private sector is not usually required to follow similar policies (cite needed). About half of the respondents say their local government uses hybrid or alternative fuel vehicles in its fleet while 21% offer energy audits to citizens in the community.

Table 8—Governmental Energy Cost Reduction

	yes	%
energy audits	3	21.4
hybrid/alternative fuel vehicles	8	57.1
green procurement policies	14	100
LEED sustainable building certification	11	78.6

The second question on energy reduction efforts asks the respondents to rate the obstacles their jurisdiction faces in its effort of reducing overall energy use (See Table 9 for the survey results.) According to the survey results, the most important obstacle relates to financial constraints and lack of funds for new programs, while conflict with other budget priorities is a close second in the list of obstacles noted. This suggests that sustainable development policies that relate to energy conservation and reduction conflict with economic development and growth policies that may be high on officials' agendas, especially among elected officials. In addition, length of time needed for approval by governing body (mean=3.43), and length of implementation time (mean=3.14) are also ranked very high by the respondents.

Table 9—Obstacles

Obstacle	n	Min	Max	Mean	Std. Dev.
cost/lack of funds	14	2	5	4.00	0.96
conflict with other budget priorities	14	2	5	3.64	0.93
lack of time/expertise to design and plan the project	14	1	4	2.64	0.93
lack of information resources	14	1	4	2.43	1.02
no contractors with experience	14	1	5	2.86	1.17
lack of political will	14	1	4	2.58	0.85
length of time needed for approval by governing body	14	1	5	3.43	1.16
length of implementation time	14	1	4	3.14	0.95

Strategic Planning and Sustainable Policies

As strategic planning by local governments has become more common, and cross-disciplinary program areas, such as sustainable development are more critical to the environmental and economic health of communities, the question arises about how these various planning efforts are conducted, and how, if at all, they are linked to each other. Our survey found that about half (50%) of the local governments said that their overall local government strategic plan is highly linked to the community sustainable development plans, so these two types of planning are not being conducted separately, even though the sustainable development planning may be conducted by a different department that is conducting the overall local government strategic plan, as most of our respondents said sustainable development is overseen within a department of energy conservation.

The national government of Taiwan has worked to develop extensive measures of sustainable development policy and achievements over the past several years, and is considering requiring local governments to use an extensive set of performance measures to track their sustainable development policy progress. Our study indicates that this top-down implementation of sustainable development performance measures is likely to create new work for the local governments as not many are currently collecting performance measure data on a regular basis. While most of the local governments use the concept of performance management in their sustainable development plans and policy work, outcome measures are currently collected and used in only about one-third of the jurisdictions (35.7%). Input and outputs measures are also not widely used as only four (28.6%) local governments collect either input or measures on sustainable development policy in their strategic planning process.

With regard to the planning efforts related to sustainable development policies, most (78.6%) of the local governments have a separate agency responsible for implementing energy conservation. In addition, most of the cities and counties produce a strategic plan for their jurisdictions regularly, with two (14.3%) of them reviewing their plans annually, six (42.9%) reviewing the plans every two to three years, and three (21.4%) reviewing the plans about every five years.

In terms of the content of the plans, more than seventy percent of them include a mission statement, a vision, goals and objectives, feasibility assessment, and action plans. (See Table 10 for the survey results.) In addition, more than half (57.1%) of the local governments include the development of strategic agendas in their strategic plans. Only half of the plans contain an evaluation of the city's strengths and weaknesses.

The local governments seem to pay less attention to the external environment and their stakeholders than to the program goals and policy issues. Only about twenty percent (21.4%) of the sustainable development strategic plans even include identification of stakeholders' needs and concerns, or an assessment of external threats and opportunities.

Table 10—Contents of Local Government Strategic Plans

	Yes	%
Development of a vision	11	78.6
Development of goals and objectives	11	78.6
Feasibility assessment	11	78.6
Mission statement	10	71.4
Development of action plans	10	71.4
Development of strategic agenda	8	57.1
Evaluation of the city's strengths and weaknesses	7	50.0
Identification of stakeholders' needs and concerns	3	21.4
Assessment of external threats and opportunities	3	21.4

This internal focus of the strategic plans is also reflected in considering the key persons involved in developing the strategic plans. (See Table 11 for the survey results.) The survey results show that it is primarily people from the higher level of executive branch management and the mayor who participate the most heavily in the strategic planning systems of the local governments. Specifically, about eighty percent (78.6%) of the respondents indicate that their mayors are centrally involved in the process, and seventy percent (71.4%) of the cities and counties answer that their chief administrative officers play a key role in developing their strategic plans. While half (50%) of the respondents indicate that their department heads and other senior managers are centrally involved, only 14.3% of the respondents think that lower-level employees play an important role in the strategic planning processes.

The strategic planning process is much more oriented to executive branch involvement and responsibility as only 14.3% of the respondents indicate that city councils and their elected officials are centrally involved. No respondent said that either citizens or other external stakeholders are important with regard to strategic planning in their city. Thus in Taiwan, strategic planning remains the province of bureaucratic officials as well as the elected mayors of cities, and is not oriented towards citizen involvement at the local levels of government.

Table 11—Key Persons Involved in Developing Strategic Plans

	Yes	%
Mayor	11	78.6
City Council	2	14.3
Chief administrative officer	10	71.4
Department heads and other senior managers	7	50
Citizens and other external stakeholders	0	0
Lower-level Employees	2	14.3

DISCUSSION AND CONCLUSION

Our survey is the first comprehensive examination of energy-oriented sustainable development policies and zoning regulation policies in place in Taiwan’s city and county governments. The results show that while one-quarter to one-third of the respondents have sustainable development policies in place, there are also policies under consideration for future adoption in even more of the cities and counties responding to our survey. Thus the topics of energy efficiency and sustainable development are on the agenda of many local governments, but policies are still in the early stages of adoption and diffusion. Our results also show that government itself has taken the lead in adopting energy efficient standards as Table 1 shows that the large majority of energy-related

policies are used by the majority of local governments themselves, but many fewer governments require the community and the private sector to adopt these policies, thus governments in Taiwan are leading the process for implementing sustainable development and energy efficiency or green policies. Little data is available to determine the extent to which the private sector has also adopted these policies so the extent of their use in the private sector is unknown although there are well-publicized examples of large companies adopting the LEED standards and other green policies.

This survey has provided a solid baseline for tracking the progress of city and county governments in Taiwan to adopt sustainable development and energy efficiency policies and land use regulations. The results show that a large number of local governments have already taken action and more are likely considering what policies, regulations and other actions they can take to further the goals of sustainable development at the local government level.

BIBLIOGRAPHY

- Betsill, Michele M., and Harriet Bulkeley. 2006. "Cities and the Multilevel Governance of Global Climate Change." *Global Governance* 12:141-59.
- Jepson, Edward J. 2004. "The Adoption of Sustainable Development Policies and Techniques in U.S. Cities." *Journal of Planning, Education and Research*, 23: 229-241.
- Organization for Economic Co-operation and Development (OECD). 2008. Sustainable Development: Linking Economy, Society and Environment.
- 2007. *Statistics. Knowledge and Policy 2007: Measuring and Fostering the Progress of Societies.*
- 2006. *Statistics, Knowledge and Policy: Key Indicators to Inform Decision Making.* OECD Publications: Paris, France.
- Taiwan Council for National Sustainable Development. 2004. *Taiwan Agenda 21: Vision and Strategies for National Sustainable Development.* Council for Economic Planning and Development, Executive Yan of Taiwan.

Table 1—Energy related issues officially addressed

	Government (n/%)	Community (n/%)
1. Green procurement	14 100%	6 42.9%
2. Green buildings/neighborhoods	13 92.9%	6 42.9%
3. Retro-fitting existing buildings for energy efficiency	13 92.9%	8 57.1%
4. Regional air quality	13 92.9%	5 35.7%
5. Energy efficient devices	13 92.9%	7 50%
6. Green infrastructure	12 85.7%	1 7.1%
7. Alternative transportation	11 78.6%	4 28.6%
8. Technology innovation/demonstration projects	11 78.6%	2 14.3%
9. Renewable energy	10 71.4%	3 21.4%
10. Waste-to-energy	8 57.1%	1 7.1%
11. Alternative fuels	8 5.1%	2 14.3%
12. Energy related development incentives	7 50%	1 7.1%
13. Incorporating energy use in land use decisions	6 42.9%	2 14.3%
14. Smart grid/net metering	2 14.3%	1 7.1%