Report on the state of sustainable building in Taiwan

Prepared for SB08 Melbourne by

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SB Report in Taiwan Area

A. Status of national or regional development of performance targets for SB

(A) Action by the Architecture and Building Research Institute under the Ministry of the Interior (ABRI), the executive Yuan

Green building has become one of the most efficient measures to pursue a sustainable built environment over the past fifteen years. Therefore, the government of Taiwan established the Commission on Sustainable Development in 1996 under the Executive Yuan, to come up with policy guidelines and implementation plans. The concept of green building and its corresponding promotion programs were thus initiated and later involved into the "National Development Plan - Challenge 2008" as one of the major priority works.

In further response to the public concerns of improving the deteriorating living environment, the ABRI proposed the "Green Building and Living Environment Technology Research Plan" in 1998, which first stage was from 1998 to 2001 and the second one from 2002 to 2006. The Plan essentially emphasized on the topics of sustainability and efficiency, such as ecological environment design for building sites, building energy saving, resources recycling, building pollution prevention, indoor environmental quality, and green building demonstrative projects. In comparison with green building studies around the world, the compatibility of these systems that were developed within temperate or frigid zones with subtropical Taiwan needs to be investigated. The evaluation system for green building in Taiwan should be simplified and localized, in order to accommodate with the climatic characteristics (high humidity and high temperature), and to solve Taiwan's local environmental problems, in particular.

In 2007, the ABRI further prolonged and expanded the research scope based on the results gained from the first and second stage research and started the "Green Building and Sustainable Environment Technology Plan" focusing on topics of human health, environmental sustainability, and industrial development, in order to create a sustainable development turning point with the balance of Life, Ecology, and Production. With respect to policy implementation, the concept of green building was further extended its scope into eco-community and eco-city to establish pilot evaluation indicators and implementation strategies as a preparation for the next-phase policy making work.

(B) Action by Construction and Planning Agency under the Ministry of the Interior (CPA hereafter), the executive Yuan

Taiwan has been establishing the national agendas for 21st century and the reports of national biodiversity. In order to temporize the progress of sustainable environment related subjects between countries, also starts working on strategy of emission of greenhouse gases, as well as drawing up the national environment protection plan to promote the green silicon island plan. Construction and Planning Agency (CPA hereafter) carries the goal of creating a fine, expedient, safe and sustainable living environment. Under the Ministry of the Interior, has been finding methods to ensure sustainable development use of environmental resources on national lands. To promote biodiversity conservation, coastal areas, marshes and national parks. According to Taiwan's special environmental conditions, CPA gradually follows out the system of green building in both urban and rural living environment so as to create the communities and cities of sustainable development which can save energy, conform biological and other environmental considerations. However, it will be the target that we work on at the current stage.

1. Planning on National Land

The insufficient legislation, integration and management for urban and rural planning from Taiwanese authorities concerned have led to unrestrained developments in many cities and impacting the landscape and environment and causing traffic, noise, and pollution and eco systems. To ensure the sustainable and balanced planning on national land, it is now the critical and important work to accelerate the legitimate orientation on national resources, effectively protect the nature, implement the needs for economy and cultural development and improve life quality.

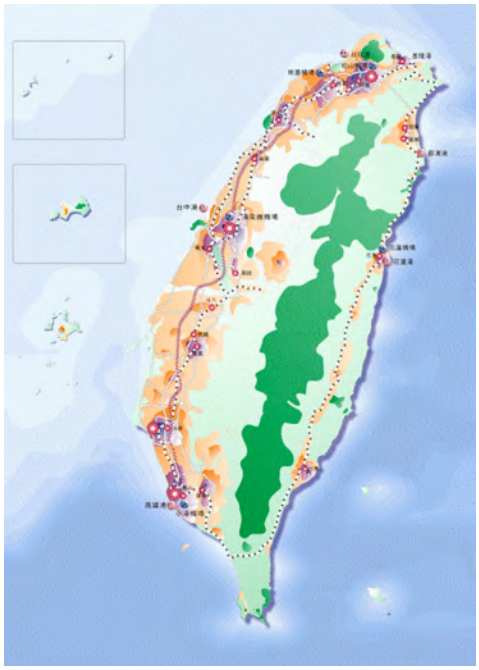
According to the most recent law (in protocol stage) - "The National Lands Act," there will be three major functional zonings: Reserved Area, Agricultural Development Area and Urban & Rural Development Area. The top governing principles for "Reserved Area," is protection and security; developments prohibition applied on sensitive lands like: ocean, coast, forest, mountain, etc. Lands that are subject to national security and environmental protection shall be public owned and governed. The top governing principles for "Agricultural Development Area" is agricultures developments, basal food provision, active protect and infrastructure on

agricultural land. In addition, avoid the fragmentary developments and ensure the integrity of agribusiness. The top governing principles for "Urban/Rural Development Area" is substantial developments and growth supervision, all of which creating appropriate living and productivity environments.

Prior to "The National Lands Act," the major three zoning plans are Regional Plan, Urban Plan and National Park Plan; the associated land developments are governed and controlled by "Regional Plan Act," "Urban Plan Act." and "National Park Act" individually. Ever since November 1995 (The 1st Comprehensive Review,) which was heavily focus on Taiwan Natural Resource Protection; bulletins and regulations in successions for land exploitation in Northern, Central, Southern and Eastern Taiwan has been strictly oversaw, including: hillside, forest, sensitive environments. Legislators have categorized the lands into "Restricted Area" and "Exploitable Area." Developments such as road, park, water supply and sewage, postal, telecom, electricity, transformer station, public facility, resource protection necessity, etc. within "Restricted Area" have to submit to Central government and approved by Regional Plan Office; all other private activities are barred. Developments within "Exploitable Area" have been governed with specific proposals, applications and permits before utilization.

Coastal area is part of national land, and is being in the amphibious border of the environment sensitive area. In the past, the coastal lands were developed massively so the problem of water cement seemed to be serious. According to CPA's statistics of 2007, the natural coastal line proportion for Taiwan and Penghu remains approximately 50.85% (see attached graphic). Therefore, the recent years the government pays much attention to the issues caused by the destruction of coastal area environment. CPA continuously impels "The Coast Law" legislation (draft), in order to construct the reparable mechanism for integral plan of coastal area, as well as the protection and development instruction impact. Moreover, with the perfect coastal area managed foundation, using conformity related objective to ensure the beach for public pass through and public use. Before the legislation of "The Coast Law" (draft), under the basic idea of coastal sustainable development, we must restore the natural features for coastal area and maintain the natural coastal line proportion no longer reducing. To prevent from improper coastal area construction, the Executive Yuan approved "Sustainable Overall Coastal Zone Development" which integrated with six items, such as fishing port, coast highway, mole, sightseeing recreation, sea area and

coastal plan. These items take for the major action program and to pursue the coastal space between conservation and development. Make sure the sustainable use of natural environmental resource and try to avoid inappropriate coastal construction. And further, the urban and rural bureau of CPA is handling the regional plan for the second time discussion (The 2nd Comprehensive Review,) (draft), will integrate the sea area into regional plan. To prevent from reducing natural coastal area proportion, the Executive Yuan will not accept application of the sea area development anymore, only except for important event. In the past decades, Taiwan has been driven by economic development and created cynosural miracles globally; however, the price that all Taiwanese has to pay is the excessive exploitation in land and natural resource, eco system is destroyed mercilessly in various scales. In the future, the momentum on the Plan of National Lands has to switch from “Develop & Growth” to “Sustainability and Management;” from ”Utilization” to “Conservation” and co-exist peacefully with the Nature; this is the correct path that Taiwan has to stride for.



2. Regional Development

Creating the double win situation and functional complementation are platforms for key roles in different regions to affiliate and coordinate and form a multi-nucleus on national lands. Take advantage of unique land features of different regions will further enhance the competitiveness; prerequisites shall be always complied to plan for a quality urban and rural environment, such as living, eco, economic, social and cultural awareness and standards.

Therefore, it is essential to build each and every region upon different characteristic and function; of which it leads to evenly disperse population, business, administration, etc. In the future, all national and regional plans for transportation, infrastructure, and communication development shall surpass the existing living and economic nucleus. This will allow constructive interchange and cooperation among regions and eventually form sets of optimized nucleus.

Based on above guideline, Taiwan and its adjacent islands can be divided into

five regions for their individual characteristic and function study and layout plans that will enable local, national and global integration. Western Taiwan will have major three nucleuses with population more than three million – Taipei in the North, Taichung in the Center and Kaohsiung in the South; Eastern Taiwan and adjacent islands will form special functional nucleuses depend on their natural and civilized assets and developments.

(1) North Area:

Based on its concrete foundation, life and technology in Taipei are very close-knitted and the vision shall be focus on "Technology evolution and life creativity" of which alluring more talents and upgrade the total competiveness. To go with the global trend of the regional economic power integration, it already has the integrity of IT and service oriented industry, top-notched educational system; on top of that it can conjugate the international airport easily and positioned Northern Taiwan as the "Trading base for global technology and merchandise."

(2) Center Area:

Taichung is situated in the linkage point of Northern Taiwan (Know-how intensive) and Southern Taiwan (Resource intensive). It has performed dynamically in the past few years, thanks to the ascendant innovations of transportation, industrial, and urban zoning. "Wurih station," the nearest high speed railway station is bringing streams that enriches and mobilizes the development and upcoming exploitation. Thus Central Taiwan benefits from "operational pivot and cultural linkage" and has sunny vision and role plays as a developed "Premium Civil and Culture Hub" regionally and cross Taiwan straight.

(3) South Area:

With the unsurpassed strength of resource industry, sea port mobility, Kaohsiung shall continue to amplify its influences in Asia-Pacific region, in terms of its geological advantages, ocean liners' transit service, and the nearby ancestral Tainan castles. The developing services in international logistics, cruiser and yacht industry, green energy, cultural tourism through the twin-cities (Kaohsiung and Tainan) will identify Southern Taiwan as the "Ocean Service Capital for Asia Pacific Region

(4) East Areas:

It is a must to maximize the natural tourism resource in Eastern Taiwan, at the same time embracing the elegant beauty of land and keeping low density of urban developments within. A greater vision is to create experience combining the

recreational & sports activities in land, sea, and sky that all are built with clean energy. The irreplaceable assets of Eastern Taiwan will be further enhanced as multi-cultural exchange, eco friendly, superb living standard, even international tourism attractions and this region is second to none holding the title "Right Spot for Wealth and Health."

(5) Adjacent Islands:

Islands on Taiwan Straight: Penghu, Kinmen, Matsu, Liuchiu, etc. all have better basic infrastructure, military and war history, archaeological resource, wider variety of costal lines. Hence, they can be planned as "International Islands for Getaways." Islands on West & South Pacific Ocean: Turtle Island, Lyudao, Lanyu, Dongsa, Nansa, etc. can be promoted as wild-life reserved area and designed to meet the "Substantial Eco Paradise in the Sea."

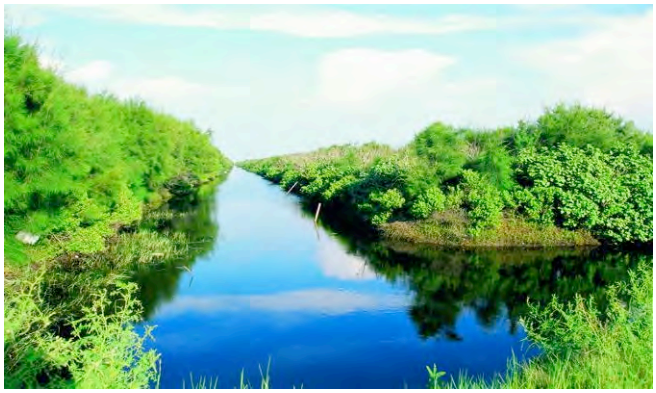
3.Conservation of Coastal Areas and Marshes

To promote sustainable development of coastal lines and protect the natural landscape, CPA , in compliance with " Plan on Monitoring of National Land Utilization," has used high-tech satellite to oversee changes in natural coastlines in various countries and cities and then to the public regularly. To prevent Taiwan's natural coastal lines from serious damages, the Executive Yuan approved and put into force "Sustainable Overall Coastal Zone Development" in 2007. Before the legislation of "the Coast Law," the plan will serve as the supreme guiding principle of government in revising and screening plans for coastal areas. In addition, according to the "Public Land Restoration Strategy and Action Plan", approved by the Executive Yuan in 2005, currently in Taiwan there are 33 such marked areas, with a total area of 1,811 Km^2, with 328.24 Km^2 land area and 1,482.77 Km^2 sea area. All these areas will be served as reference for masking of protection areas under "the Coast Law" in the future.

CPA is currently implementing locating and marking of important marshes and coral reef areas in response to the "Ramsar Convention on Wetlands". By December, 2007, the government recognized 75 "important marshes," including 2 "international class" marshes with an area of 3,765 hectares , 41 places with national status with an area of 35,748 hectares, and 32 places with local status with an area of 4,865 hectares.

In 2008, CPA will apply for "International Society of Wetland Scientists" (SWS), holding "the first Asian Wetland Convention and Workshop", subject is "Asian Wetlands, Global Position", surely it is meaningful to Taiwan for the issue

of global sustainable environment. Furthermore, we will proceed towards the following 4 major substance in “hold the discussion of wetlands and conservation system”, “publish the guidebook of national important wetlands”, “select poems, literary works and biodiversity images of wetlands” and “establish NGO guided tour and foundation of wetlands” as the year of 2008 Taiwan Wetlands.



臺灣國家重要濕地地圖

Map of Taiwan Wetlands

● 國際級濕地 NO.：1～2　● 國家級濕地 NO.：3～43　● 地方級濕地 NO.：44～75

台灣和所屬島嶼位於亞熱帶，氣候溫暖，雨水充沛，全島山巒綿延，溪谷縱橫，孕育出豐富的濕地環境。在濕地系統中，串連成綿密的濕地網絡，是生物棲息繁衍的家，也孕育出豐富生物多樣性的「濕地銀行」。國家重要濕地評選是本部營建署95年開始推動的重要計畫，這份「國家重要濕地地圖」是展現計畫初步成果。如果國家經建發展成果象徵台灣的父親；那麼，哺育我們的這片土地，象徵著我們的母親。逸洋樂於為所有愛台灣的朋友推薦這份精彩的地圖，讓我們共同關心與愛護大地母親。

內政部部長 李逸洋

濕地與森林、海洋並稱全球三大生態系統，是世界上生產力最高的地區之一。根據1997年英國《自然》雜誌評估，全球生態系統每年的生產價值是33兆美元，其中全球的濕地系統價值每年是14.9兆美元。拉薩姆會議也在2002年評估濕地每年的生產經濟價值是15兆美元，可見濕地的重要。本署評選出國家重要濕地，除「生態價值」以外，還具備「知識經濟」和「市鄉美學」的新意，充滿無限想像空間，等待所有關心濕地的朋友細心品味。企盼透過生產、生活、生態和濕地主體概念，締造我國成為全球濕地復育、保育及教育的典範中心。

內政部營建署署長 林欽榮

International Class Wetlands: No.1~2

National Class Wetlands: No.3~43

Local Class Wetlands: No.44~75

01.Tseng-Wen Estuary Wetland

02. Shihchu Wetland

03. Meng-Huan Pond Wetland

04. Guandu Wetland

05. Dahan Xindian Wetland

06. Wazihwei Wetland

07. Tamshui Hung Shulin Wetland

08. Wugo Wetland

09. Taoyuan's Reservoir and Canal Wetlands

10. Sinfong Wetland

11. Yuanyang Lake Wetland

12. Siangshan Wetland

13. Cijiiawan Wetland

14. Gaomei Wetland

15. Dadu Estuary Wetland

16. Biwgu Wetland

17. Haomeiliao Wetland

18. Budai Yantian Wetland

19. Bajhang Estuary Wetland

20. PeiMen Wetland

21. KuanTien Wetland

22. Chiku Yan-Shuei Estuary Wetland

23. Yangshuei Eatuary Wetland

24. Nazih Siian Wetland

25. Daguei Lake Wetland

26. Jhouzai Wetland

27. Nanren Lake Wetland

28. Longluan Lake Wetland

29. ShiWuCheng Wetland
30. Dapo Pond Wetland
31. Beinan Estuary Wetland
32. Siiaoguei Lake Wetland
33. Hualien Estuary Wetland
34. Mataian Wetland
35. Suanlien Wetland
36. Lanyang Estuary Wetland
37. Wushiherjiia Wetland
38. Wuwei Harbor Wetland
39. Nao-ao Wetland
40. Cingluo Wetland
41. Cihu Wetland
42. Ching-Sui Wetland
43. Chinanbei Wetland
44. Sinhai Artificial Wetland
45. Artificial Wetland
46. Jhubei Liabhua Temple Wetland
47. Jhunan Artificial Wetland
48. Siiangtian Lake Wetland
49. Danan Lake Wetland
50. Dongshih Artificial Wetland
51. Caonan Wetland
52. Caodi Wetland
53. Cheng-long Wetland
54. YiWo Wetland
55. Mituo Wetland
56. Bajhang River Wetland
57. Baihe Elementary Artificial Wetland
58. Chia-nan University of Pharmacy and Science Artificial Wetland
59. Jhuhu Yantian Wetland
60. Yongan Yantian Wetland
61. Dashu Artificial Wetland
62. Niaosong Wetland

63. Linguan Artificial Wetland
64. Yuangjhong Harbor Wetland
65. Banping Lake Wetland
66. Fengshan Reservoir Wetland
67. Wuluo Estuary Wetland
68. Pingtung University of Science and Technology Artificial Wetland
69. Haisheng Hall Artificial Wetland
70. Cuanshan Artificial Wetland
71. Luan Mountain Lake Wetland
72. Jinlong Lake Wetland
73. Lioushishi Mountain Wetland
74. Jhuan Wetland
75. Caiyuan Wetland

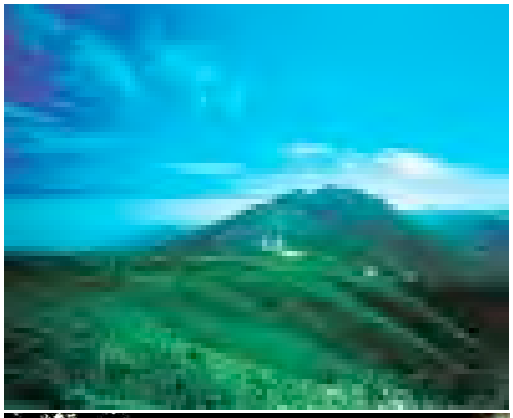
Taiwan and the respective islands are located at the subtropics, the climate is warm, the rain water is abundant, the mountain range is allover the entire island, the ravine and river extend vertically and horizontally, breeds the rich wetland environment. In the wetland system, establishes contacts the wetland network which becomes the home of the biology perches the multiplication, also gestates rich biodiversity “the wetland bank”. The national important wetland evaluation is the major plan which CPA sets into action since 2006, “the map of national important wetland” spreads out the early result. If the national economic construction develops the achievement to symbolize Taiwan's father; Then, nurtures us this land is symbolizing our mother. I would like to recommend this wonderful map for all friends love Taiwan, lets us care and love the earth mother.
Ministry of Interior Minister the Li Yiy-ang

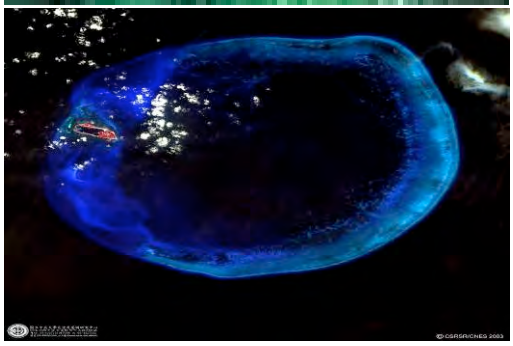
The wetland, the forest, and the sea are said that the three big global ecosystem, are also the highly productive areas in the world. According to 1997 Britain “Nature” magazine appraisal, the yearly production value of global ecosystem is 33 trillion USD, the global wetland system value for every year is 14.9 trillion USD. In 2002, the Ramsar conference also appraised wetlands in the annual production of economic value is 15 trillion USD, obviously shows the importance of wetland . CPA evaluates the national important wetland, not only has“ecological value”, but also with the

idea “the knowledge economy” and“urban and rural esthetics”, fills the infinite imagination, waiting for friends who care wetland. Hopefully, having the production, the life, the ecology and the wetland as main concept, establishes our country to become the global wetland conservation and the education model center.

The Ministry of Interior builds bureau chief Lin Qin-rong

4.National Parks





Under the condition of the sustainable building policy, since January 1st, 2005, the new application construction license, should depend on the building technology by the rule 17th chapter “the green construction label” the verification, conforms to the related design standard to stipulate, the beginning issues after due investigation, various administrative offices and impels the office shed and the illustration demonstration facility positively apply to construct the green construction label. For example, the Rushan visitor center of Jinmen National Park namely conforms to 7 targets, awarded the green construction label in 2006, and subscribed “the maintenance of tradition construction style and reward subsidy implementation main point”, so as to the achievement encourages the campus resident to construct or reward of basis the restoration tradition construction, it can preserve the traditional wisdom and common memory.

In fact, national parks work on the conservation research, illustration of education, have integrated sustainable environment with its spirit. For example, during 2008 to 2011, CPA impels the 4th year plan in accordance to the global warming and environmental trend. In 2008, first carries on “the global warming to

affect the pioneer plan to the national park environmental change", major project including takes main department and local community as object planning for action composition, as well as correct knowledge, concept and manner guidance and so on. In addition, the Yangming Mountain National Park Administrative Office established the ecology corridor for the sake of offering the animal migration way for the small animals to travel roads, is to respect the environment and carry out managing specifically of real example.

B. Status of adoption of policies (tax, programs, regulations etc) that will further SB

(A) Action by the Architecture and Building Research Institute under the Ministry of the Interior (ABRI), the executive Yuan

Despite a latish start of the green building development, the recent aggressive action in promoting green building in Taiwan has become a globally unique initiative. In its pioneering stage, Taiwan incorporated the energy saving design for architecture into the Building Regulation in 1995. The green building evaluation and labeling system launched in 1999, also adopted by the Ministry of the Interior as a national standard for green building certification, subsequently formed the basis of the following policy to speed up the adoption of green building for both public and private sectors. The system was still a voluntary mechanism until the evaluation and labeling system was designated as a mandatory regulation for building design in the public sector in the "Green Building Promotion Program" in 2001. The objective of the program was to promote green buildings that can protect ecological environment so as to build Taiwan as a "Green Silicon Island." The program essentially forged a comprehensive mechanism providing resources, research, guidance, training, and education to support the adoption of green building in Taiwan. The major work emphasized on site ecological environment technology, construction waste reduction, building energy conservation, natural resource usage, indoor environmental quality control, and green building demonstrative projects. The mandatory requirement started from the central government buildings and extended to all public-owned buildings in 2003. According to the Green Building Promotion Program, the public-owned building project required mandatory green building design to receive green building candidate certificate prior to the issuance of building permit. On the current stage, the requirement has been expanded to the acquisition of green building label certification that will be done after the completion of construction work and before the government acceptance and auditing process. Such a requirement is capable of ensuring the proper implementation of the policy as well as controlling the quality of the building environmental performance

Furthermore, the green building design for new construction was institutionalized and officially involved into the Building Regulation in 2004 and had been effective since January 2005, which represented compulsory green building design being extended to the private sector. In addition to green building design,

building materials are one of the major components of the entire building industry. Therefore, a green building material evaluation and labeling system was established and implemented in 2004. In July 2006, at lease five percent of green building material utilization for public building projects was adopted in the Building Regulation too. In addition, a pilot version of the new rating system was launched in 2006, which was developed based on the previous green building certification database and the distribution of evaluation results. The system defined five classes, Certified, Bronze, Silver, Gold, and Diamond, to encourage better green building practices and innovative design techniques. All the efforts that have been lasting around a decade reveal a new opportunity for constructing a more sustainable living environment and upgrading the traditional building industry.

Besides, in order to achieve a comfortable and healthy living environment and to drive the building material industry upgrade, the ABRI also established the Green Building Material Evaluation and Labeling System in 2004 based on long-term research and deliberate development. The system evaluates and examines building materials according to basic performance and special characteristics(for example, healthy, ecological, recycling, or high-performance). It can not only provide substantial encouragement for excellent building materials, but also prevent imported low-grade materials and promote a sustainable conversion opportunity for the local building material industry.

The green movement under sustainable development represents an inevitable trend and requires a long-term commitment. The ABRI currently continues implementing a new policy “Eco-city and Green Building Promotion Program ” to extend the scope of green building promotion into the community and city scale to show Taiwan’s successive endeavors in global sustainability with local action. The goal is to develop eco-cities and to promote green buildings in response to global climate change and to mitigate the heat island effect so as to achieve homeland sustainability. Its implementation period is planned to start from 2008 to 2011. Based on the current framework of green building promotion, several tasks will be continuous executed and further expanded to eco-city development.

(B) Action by Construction and Planning Agency under the Ministry of the Interior (CPA hereafter), the executive Yuan

1. Promotion of construction in urban & rural style and features

(1)Promotion of beginning and current situation

Since 1999, Taiwan started by spreading type, locality, delicate style, variety, endogenous way, small and beautiful condition to transform the urban and rural environment and construction community, and also encouraged the community to follow out green buildings, green construction as well as ideas of ecology labor law and the technical impetus ecology community demonstration plans and so on. For the extension "the creation with the local culture style, green, comfortable, enjoyable, and sustainable homeland" is the long term overall prospect. In addition to taking "the culture, greening, beautiful nature" are as the motion slogan, by "competition", "innovation", "participation", and "study" are as the motion spirit, returns examination and the discussion with related system surface, in accordance to the recent development circumstance, momentarily carries on the policy direction, the subsidy strategy and the coordinated sets of measures research and development, the adjustment and the innovation.

It has been subsidized 4,764 plans by the deadline of 2007, the accumulation subsidy funds approximately 21.4 billion NTD, subsidizes the category including the parks green space, mountains water affinity, the coastal landscape, the paths landscape, the local culture characteristic spaces, each kind of city and countryside public living space, the community living environment transformation, the bike path, sidewalk areas, the community pass walk to school , community public spaces on simple green beautification, city night scene and so on, after many years of investments and effort through the central and committee, it has improved the city and

countryside environment gradually and promoted highly of people living conditions quality, and strengthened between the communities.

(2) Current planning and directions of development.

Nowadays, no matter the economic society, urban development or local construction are directions for fashion strategies development. Emphasizes “the urban competition”, no doubt is the important power, but promotes “the city border cooperation” and “the region cooperation”, is helpful to the resources uses effectively and leads the whole performance to promote, causes the government and the society obtaining the biggest benefit. Therefore, the city and countryside style takes one of national overall competitive performance ways, will use by “sustainable national land space” as competition of pattern and transformation for the carrier, the policy-type encourages all levels of local self-government entity participation state-level cities reform transformation plan, regarding the common problems, the demand and the solution, creative dialog, the cooperation thought by planning proposal that will be helpful to the breakthrough politics and carries on the step transformation and development to essence environment by the system viewpoint, opens the new possibility for Taiwan.

The affiliation competition, region of urban and rural style takes the central lead as the unclear, the hypothesis covers with the whole national wetlands, the coastal areas, the generalized parks green space system, the river and the forest forms the blue green line ecosystem, and other transformation subjects for urban and rural style, truly establishes the ecology, the living as the connotation, continuous, systematic and the network linked vein.

In addition to achieve constructs goal of the national land esthetics, in the future, will have plans in the rural streets, use urban design as the main idea, regarding the industrial development, the humanities history, the natural ecology and the space quality will carry out the conformity plan, and the execution of related transformation construction in past years. The future plan of the impetus will proceed with the inspection and the reinforcement, in order to reaching the promotion gradually for rural streets.

(3) Future Forecast and Prospect

In the future, will subsidize various places to draw up urban street plan and rural style and regarding to the subject on the living space environment quality improvement, like the living and the ecology park green land system, the living

commuting with the green pass for going to school, public living space of urban and rural neighborhood, the urban living spots and the square and so on, according to the urban and rural development characteristic to give the suitable localization and will induce the local officer to unfold the creativity idea, will proceed the local resources conformity, the creation representing case, will lead the rural street style transformation between the industrial promotion and the new value quality of movement.

In addition, will coordinate the urban reform plan to be continued in Taiwan, funds of subsidy the policy guidance plan, will also work on the goal. Therefore the local space administration and specializes reforming ability, as well as how to use people's strength to work on the update culture is the key point.

But facing ecology sustainable environment, strengthening the international competition ability, will be the new task for urban and rural style building with the national land space and the esthetics development. Except concerning for the substantive environment quality, at the same time, we should continue the mission in the national land space and sustainable development, as well as transformation the responsibility and mission of ecology environment.

Therefore, regardless of being "the sustainable national land space and continues forever" the subject competition or "rural street promotion" the policy guidance plan, they both take the emission of carbon dioxide as the target, each type and the standard of energy saving, waste reducing, well ventilated, the water percolation, the green duplicate rate promotion and also green building, green construction, and to build the ecological engineering technology, will integrate the related plan proposal and the execution request, and to face the overall resources general objective of direction utilization the construction ecology city, will reach the goal of island temperature decreased.

In addition, urban area is the main dangerous source caused the global warming, future also will begin on population highly crowded in certain cities. First, should give the ecology urban transformation plan on high population rate, then begin ideas of overall construction ecology urban. Finally, it can carry on demonstration plan and the substantive improvement.

2. Green Building

(1) Sustainable development policy to the green construction level

In the 21st century, humanity living environment suffers and experiences ecology unbalanced difficult position, in 1992, “The Earth Summit” namely to establish the earth environmental protection the urgency, and was announced. In 1995, “construction the white paper” was to declare that impels the green construction policy comprehensively. In the same year, the Ministry of Interior increased the plan for the building technology rule which subscribes “energy saving” the stipulation, like the standard office, the department store, the international sightseeing hotel, the sightseeing hotel and so on, 4 kinds of buildings integrate the outer shell to consume energy and its design management. In 1996, Executive Yuan continues the sustainable development committee, green building has become the important subject to integrate “urban and rural development policy”, therefore it is like to spread the new page for improvement system of domestic construction environment.

It was 1998 when the Architecture Research Center, Ministry of the Interior published the “Technology Plan for Green Architecture and Environments” along with the regular “National Energy Committee” meetings. Sub-Tropical climate of Taiwan was the key factor to conference and outline the green building appraisal evaluations and has set-up the marking system for National Green Buildings. Ministry of the interior has started processing the application of green buildings in September, 1999. The Executive Yuan has initiated the “Scheme for Green Building Promotion” policy which regulates and takes the lead in promoting the government owned estates as green buildings.

(2) From “Green Building Marking” to “Green Building Seal”

The Ministry of Interior has, according to three zones respectively – Northern, Central and Southern Taiwan, broaden the design and application range and upscale the standard of energy consumption level for buildings envelope.

For sake of promoting the green buildings and maintain the sound Eco

environment, fulfilling the energy saving, lowing down the energy waste, Carbon Dioxide emission, trash disposal, pollution impact; as well as improving the utilization of resources and balancing the environment, Taiwan has published an updated "Official Architectural Guidelines and Relevant Specifications." This legal system can regulate all constructions, namely: green ratio, underground water integrity, energy saving, rain and sewage water recycle, green structure, green construction material. As a matter of fact, each and every large building for public or private purposes have been encouraged and inspected during the planning and design stage, and it has been promoted by official reward, compensation, regulation, specification, etc. The government understands that it takes time for the "Green Building Seal" to be fully adopted and practiced; an annual inspection and review is always held for feasibilities and results in the past years. Each indicator definition of applicable scope appraisal datum and implementation date will be the following table:

Indicator	Purpose and Definition	Execute Date
Greening at building sites	In order to reduce the impact of carbon dioxide concentration by planting trees for the best economic effect, stipulated the promotion on green quality design.	Jan. 2005
Water conservation at building sites	After sites developed, to ensure the ability of keeping implication or store, save infiltration the rain water, develop the function of natural climate, and reduce the hot island effect for cities, required as the best usage design.	Jan. 2005
Energy saving of buildings	To conduct an energy saving project for Taiwan, consider its subtropical climate characteristics and use building outer shell design to achieve the method for saving energy.	Jan. 2005
Reuse and Recycle of rain water at buildings	For water resource to be used effectively, stipulated to store the collection, the filtration the rain water and reuse design by without obstructing living environment for safe, health and comfortable conditions.	To be arranged
Reuse and recycle of living dirty and waste water at buildings	By the technical rules for recycling and reusing living dirty and waste water in safe, healthy and sanitation ways. Also stipulated living water to be reused and collected.	To be arranged

Green building structure	In order to reduce the energy and resource consumption, to reach the subtraction of construction waste and emission of carbon dioxide. Stipulated to use the design that can reduce the environment impact on construction buildings, so as encouraging the buildings to adopt the lightweight wooden structure and steel structure system.	To be arranged
Green building materials	In order to reduce the energy and resource consumption, protect indoor environment and biodiversity environment sustainable development. The Ministry of the Interior stipulates to use the construction materials as ecological, recycling, environmental, healthy and high-performance characteristics.	July. 2007

(3)Reward and Compensation on Building Demonstrative Renovation

To speak the Taiwanese building industry as a whole, the number of the existing structures is much greater than the newly built structures. Most of the aging buildings are facing minor to huge problems and would be less attractive to buyers and investors, there are material failure, equipment and facility malfunction, worsen interior that bring about hygiene issues, irregular building layouts, chaotic surrounding environments, etc. Building materials on the aged architectural structure are often not environmental and eco-friendly because of none green building regulation. It is a trend and also a deep lesson for Buildings' energy consumption and efficiency, all the Taiwanese authorities concerned have to carefully research the improvements on quality and function for both interior and exteriorly, eventually achieved targets on eco-friendlier, lowered energy and waste, healthier, safer, sustainable development and change that all "Architectural Guidelines and Relevant Specifications" have met.

Design and construction technique chapters illustrated in the "Architectural Guidelines and Relevant Specifications" apply on recently built buildings only; however, the number of the existing structures is much greater than the newly built

structures. In order to fulfill the energy saving legislation, it has been promoted by the Ministry of Interior, and has been contracted to expertise group and societies that are encouraging and consulting private parties to further participation on green building seal.

The qualifications for sponsored parties can be: licensed schools, commercial and residential buildings and registered structure(s) with a legal management committee. Items to sponsorship for are: Eco protection, Building waste reduction, Interior well-being status, etc. and has successfully awarded to 45 parties from year 2004 ~ 2007.

(4) Vision on the Official Green Building Promotion

Numerous of draw-backs in the building interior can cause many kinds of contamination, especially the air pollution due to incorrect A/C system layout or maintenance, decorative material, O/A equipments and chemical products like spray, detergent, solvent, etc. For instance, the building syndrome, retired serviceman sickness, SARS, used to widely spread to panic the world and they all highlight the importance of how interior environment impact health. In the 21st Century, every country has the awareness that there will be more challenges and threats to mankind on this very planet earth that we live. Virus mutation can attack with large quantity and fierce fashion, people has to establish prevention medication systems against the potential crisis. The living environment where we have relied on, has to be built on conditions that protecting lives and providing comfort, as such the architectural profession and concepts shall always answer to all environmental challenges and constantly improving.

Now days, our life have unbreakable bonds to the rapidly growing and popular "Information and Communication Technology" (ICT.) Along with the technology evolution, and all data – wire, wireless, audio, video, communication and broadcasting can be quickly shared by the digitalized Internet and also bring great convenience in many aspects.

For Taiwan, the information technology (IT) development is mature and is beneficial to the integration in building energy reduction, waste control, health, security systems. Taiwanese have good answers to the trend of well-being, green energy, aging population, living security, IT development and integrate the intelligence to meet healthier, more comfortable living spaces that are cost-effective and meet all quality standards.

C. Status of adoption of SB by the investor community

(A) Action by the Architecture and Building Research Institute under the Ministry of the Interior (ABRI), the executive Yuan

Since of the mandatory green building design requirement, by the end of 2007, 245 buildings were certified as Green Buildings, and 1,359 projects received Candidate Certificates. Total building floor areas reached 18.65 million m^2, electricity saving 483.81 million KWH that equals to 318.35 million CO_2-kg, and water saving 20.45 million ton per year. The estimated monetary saving reached about 46 million USD. According to the estimation made by the Ministry of Economic Affairs of Taiwan, the direct industry value of green buildings by 2015 will soar in an increasing speed of 2 billion USD annually.

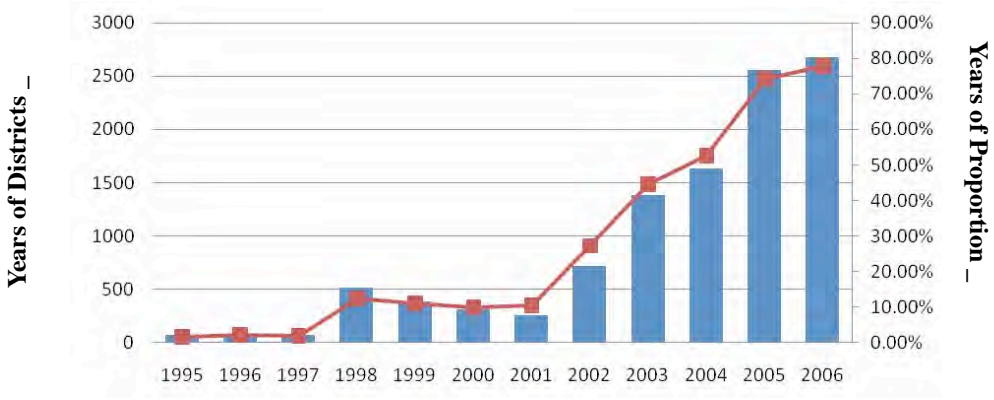
For green building materials, by the end of 2007, 103 green building material labels were conferred, which covered 859products in total. Today the green building material label has gradually become an identifier for customers to purchase good-quality building materials. Supported by this system, the indoor environment quality of buildings can be gradually enhanced through the increasing adoption of green building materials. The estimated value for the green building materials is about 100 million USD per year.

Today, all of new buildings in Taiwan, both in the public and private sectors, are required with mandatory green building design. Meanwhile, many green remodeling and improvement projects for existing public buildings and schools are currently in progress. Significant savings on electricity and water resources will be accumulated year after year. All the projects and regulations derived from the green building research and policy are expected to carry out a sustainable conversion in the traditional building and material industries. The policy can also bring out many opportunities for architects, professional consultant services, and the entire construction industry. For the building industry, first of all, the fact of the market for architects and professionals is that “knowing nothing about green buildings, no cases for your business.” Second, in the building market, 12-litre toilets simply vanished since they had been replaced by new water-efficient fixtures. According to the latest statistics, the market of water-efficient fixture obviously rose about 40%. The other remarkable case was for traditional ironworks. After these years of promotion, sun-shading plates offered a whole new opportunity for traditional ironworks and, shortly within three years, facilitated the diverse choices of various products with 30%

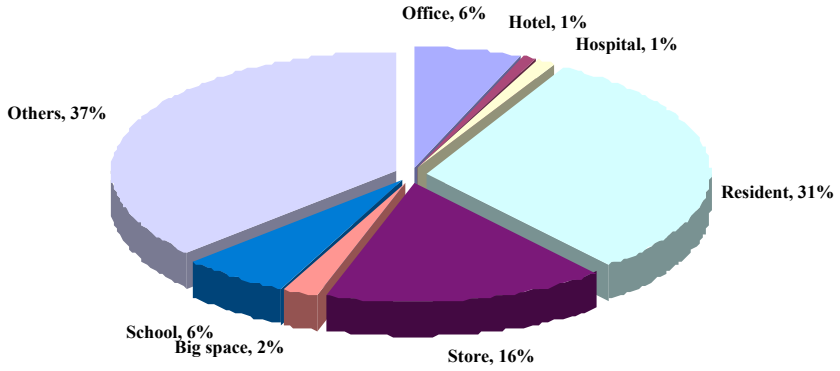
cheaper prices. More and more investors, developers, and architects are willing to build green or to adopt green building materials in their projects. In the future, the green building practices will move from distinctive cases to the mainstream.

(B) Action by Construction and Planning Agency under the Ministry of the Interior (CPA hereafter), the executive Yuan

In 1985, amendment legislations on Taiwanese Building Energy Design Standard was announced, and the cumulative floor area from 1995 to 1006 are 106,740,000_. 77.91% out of all floor area is subject the "green building seal" management. Analysis shows that, in the past 10 years, residential building dominated 31%, commercial building takes 16%; These 2 architectural types occupies 49% of all registered floor area. Taking the formula to determine the result in CO_2 emission, it sum-up to a dramatic 1,870,000 Ton (from 1995 to 1006); and the electricity saving adds-up to approximately 3 billion degree.



Green construction label proportion and districts changing graphic



According to different types to divided the floor of Districts Proportion

D. Status of education and training in SB

(A) Action by the Architecture and Building Research Institute under the Ministry of the Interior (ABRI), the executive Yuan

The ABRI promoted the green building concept through a series of activities, including seminars, training courses, conferences, technical tours, green building award competition, and green building expo. For encouraging outstanding architects to respond to the sustainable development and green building policy by adopting green building concept in better design, the ABRI has conducted the competition of the Green Building Award of Excellence annually since 2003. Through the competition, the award-winners were selected and recognized in the public, in order to inspire more superior green building design and to expand people's identification of green building. By the end of 2006, 52 green buildings received the award of excellence. As for popularizing the green building concept and promulgating green building education, the ABRI conducted a series of workshops, seminars, training courses, and technical tours in recent years and the statistics showed more than 8,400 attendants. In addition, for providing an opportunity for the public to learn more about green building, the ABRI hosted a Green Building Expo in 2004, which attracted 100 thousand people to visit the Expo and 170 thousand to check out its interacting website. All of these efforts are believed to gain success and expected to efficiently transform the built environment in Taiwan.

In addition, for promoting the development experiences and interchanging latest research of green building, the ABRI conducted green building forums in 2003 and 2004, and regularly hosted annual subtropical green building international conference from 2005 to 2007, so that the information of the advanced research and innovative technology undertaken by many scholars and professionals of the countries in the subtropics and tropics can be transferred and learned from each other. Through actively participating in major international events, working groups, conferences, workshops, and meetings, the green building evaluation tool and design concepts for the subtropics can be interchanged with the international community, and the building industry in Taiwan can be internationalized so as to expand its overseas business.

(B) Action by Construction and Planning Agency under the Ministry of the Interior (CPA hereafter), the executive Yuan

All the National Park Management offices of the Ministry of the Interior have constantly providing lectures to public, in correspondent to each and every recourses

feature and practice, for instance: “Environment Education and Design Studio;” “Green Campus Concept and Maintenance;” “Abundant Wildlife in Kinmen and Reservation;” “Historical and Cultural Heritage in Kinmen;” “Interactive Geographical Information Introduction and Execution:” “Community Participation and Reform,” etc. in Kinmen National Park. The Substantial Building idea and spirit has cultivating precisely to people.

“Education” is the most essential factor to literally change the face of city and country and is integral to social movements; the Ministry of the Interior will keep planning and offering all sorts of encouragement, guidance, seminar, training and providing more educational opportunities for enrolled participants. The Ministry will always strive on conducting the training program for community planner and architect, contribute to elevate their profession and role play, also urge local expertise to involve. Meanwhile, the lecture achievements would put to practice in local architectural industry, so is the protocol stage of all legislations. The lessons also cover how to popularize and encourage architect, also urban and landscape designer to explore regional characters, to unite the regional force, to elaborate local realization and independence, to stimulate tourism, even to create a macro economic model (further working with employment center.) The ultimate educational goal is to form a self-sufficient society and gradually reduce the construction and development fund & resource from the central government.

In order to promote the related specialists understanding of regarding the green construction label system, CPA committee has distinguished by Republic of China Architect Trade union National association, it conducted 11 meetings by north, central and south of Taiwan, counted 2503 people in the seminar, the participates including the invitation building technology rule of the green construction label system and the building construction in wooded structures building design and the construction technique standard, as well as construction specifications of cold-formed steel structures for buildings, ground in view of the laws and regulations subscribes in the legislative meaning and the practice application strategy that carries on the explanation. Moreover, we should have the ideas of energy saving, recycling, sustainable and healthy by starting the daily life. From 2004, CPA has been giving the budget prize to help various either the county or city government and assign the director of building construction and manages to promote the guidance plans on sustainable development and idea of green buildings.

E. Status of adoption of new SB technologies and techniques

(A) Action by the Architecture and Building Research Institute under the Ministry of the Interior (ABRI), the executive Yuan

The adoption of new SB technologies and techniques covers four aspects: Ecology, Energy Saving, Waste Reduction, and Health.

1. Ecology

The category includes the enhancement of biodiversity and greening, as well as the mitigation of heat island effect. Biodiversity is the first indicator of the Green Building evaluation system. The technical items include ecological network, biotopes, plant diversity, soil ecology, and obstacles to symbiosis. The Greening indicator introduces the CO_2 absorption factor as the conversion unit for different types of plantings, such as trees, shrubs, climbers, etc. The CO_2 absorption factor, which is evaluated over a building life cycle of 40 years, can quantify any types of green design because the total planting effect can be converted into a single CO_2 absorption index. As a qualified greening design for Green Building, the total CO_2 absorption should reach a level 50% higher than the basic requirement of green building regulation. The Soil Water Content indicator is introduced for maintaining water retention and infiltration of the building site to mitigate heat island effect. An index for the permeable ratio of a constructed site in comparison to a bare site is adopted to evaluate the water content capacity of the site. The calculation of the permeable ratio is expected to encourage permeable pavement, ponds, permeable lowlands, and gardens on impermeable floors or rooftops in the site design. A building project can pass the requirement of the indicator if the permeable site design is greater than 80% of its open space.

2. Energy Saving

The Energy Conservation is the most sophisticated field in the Green Building evaluation system. The evaluation mainly focuses on the energy performance of the building envelope, cooling, and lighting, which occupy over 80% of the total building energy consumption. In the Green Building evaluation, the energy saving rates for these three indicators, building envelope energy performance, HVAC, and lighting. The building envelope design should be 20% higher than the basic requirement of building regulation. For HVAC and lighting, the indicator encourages innovative design, high-efficiency facilities, better energy management techniques, as well as renewable energy.

3. Waste Reduction

The category includes CO_2 emission reduction and construction waste reduction. The CO_2 Emissions Reduction indicator is an important tool for reducing pollution emissions through building material choice and construction design. This evaluation can especially encourage lower environmental impact structures, such as lightweight steel-structure buildings, automatic construction methods or wooden buildings. The Construction Waste Reduction indicator is utilized in evaluating solid waste and particle pollution, from basement excavation, construction and demolition in the life cycle of the building. This evaluation can encourage more natural site design with fewer landscape changes, less basement excavation, and low pollution construction, such as industrialized building methods and steel or wooden buildings. Recycled material technologies, such as recycled blocks, tiles, aggregate, are particularly encouraged and adopted in the category.

4. Health

The category includes Indoor environment Quality, Water resource conservation, and sewage and garbage improvement. The Indoor Environment Quality indicator focuses on the evaluation concerning building acoustic environments, lighting and ventilation environments, as well as building materials. The indicator also encourages the utilization of green building materials, which are natural, ecological, recycled, or high-performance. The Water Conservation indicator is aimed at saving water resources. Many types of water saving fixtures, such as faucets, toilets, bathtubs, showers, etc., are encouraged in the indicator. Water reuse systems for wastewater or rainwater are especially encouraged in the calculation as well. The adoption of water conservation technology has shown a significant market transformation in water saving fixtures and products. The Sewage and Garbage Improvement indicator involves stringent regulations for proper sewer and daily use water plumbing, and evaluates the landscape environment and garbage recycling system in residential communities. The adoption of relevant techniques includes waste compressor, centralized freezer, isolated air-conditioning design for water storage spaces, etc.

For future research, the ABRI aims for promoting better practices in sustainability and efficiency by adopting the green building design in the aspects of ecology, energy saving, waste reduction, and health, for both new and existing buildings in Taiwan. It will also consider the requirement of international environmental protection issues and provide a safety and comfortable living space for

people, with the expectations of reducing CO_2 emission, protecting human health, preserving ecological environment, as well as fulfilling the responsibility of the building sector for global sustainability. The research in next phase will also extend the scope of green building into eco-community and eco-city. In order to effectively utilize research resources, the interdisciplinary integration is a necessary and important approach, covering architecture, urban planning, urban design, transportation, environment, energy, water resources, waste management, building materials, neighborhood security, public health, etc. From green building moving towards urban sustainability and eco-city development, the ABRI will remain an open and balanced thought and keep an energetic momentum to take the leadership in advanced architectural research and viable policy development, for achieving the triple-win in human health, industrial development, and environmental sustainability.

(B) Action by Construction and Planning Agency under the Ministry of the Interior (CPA hereafter), the executive Yuan

Various national parks in impetus conservation research projects, devotes to promote of application value the research results, expecting to be able to carry out the conservation idea in the substantive environment improvement. For instance, without affecting the wild animal to roost the quality ecological engineering, as well as the utilization of traditional technology and so on. And using illustration, the amusement system and rest function with the activation use. Hopefully, it can penetrate the traditional construction, again to continue forever and to use the preserved settlement culture value.

But construction industry not only to select material from the earth resource, but also affects the terrestrial environment to be really great, and soon influence living. Therefore, to promote sustainable construction, the promoted ecology city green construction impetus plan, seeks the construction and the external environment, co-prosperity, and carries out the green building materials by using response environment load and the human health, achieves “human is healthy, the Earth is sustainable” the spirit, and coordinates this building research institute to promote the establishment the green building materials label system's appraisal mechanism: The ecology, the health, the high performance and regenerate to be the four categories, the time localization climatic conditions, the custom public sentiment, building materials of industry diagnosis for the home market, to check on the living conditions for the people, the

promotion building materials performance, with the international building materials label appraisal system trail connection. Also, the establishment appraise the mechanism mutually, the promotion of country image and the international industry competitiveness. Currently, CPA already integrated the law and regulations for green building of proportion, forces the way of request, and will coordinate development of the green building materials to examine the promotion and use proportion gradually, expands the green building materials market.

Under the globalization market economy system, surrounds the subtropics region country to massively accept the product and technology from the temperate zone country's suggested. This result should create the link subtropics region, but not correcting the product to use and to construct the building idea, even of ecological environment and housing living conditions serious influence this region. This vicious circle result, in faces 21st century under the challenge, the link subtropics region must face up to the important issues, but this also builds the industrial promotion for Taiwan the profitable target.

Because Taiwan has the advantageous geography and the climatic environment superiority, if can aim at this link subtropics region, the development acts of circumstances permit the construction environment application science and technology, it may contribute achievement and promote this region to develop the sustainable construction, achieves the international division and trail connection, advances towards to the sustainable development role.

Natural and Artificial Coastal Lines for Each City and County Proportion in 2007

City and County Name	Coastal Line Length(m)	Natural Coastal Line Length (m)	Artificial Coastal Line Length (m)	Natural Coastal Area /Coastal Length Percentage (%)	Artificial Coastal Area/ Coastal Length Percentage (%)
Taipei City	0	0	0	0	0
Nantou County	0	0	0	0	0
Taichung City	0	0	0	0	0
Chiayi City	0	0	0	0	0
Chiayi County	41,452	2,176	39,276	5.25%	94.75%
Changhua County	75,648	3,801	71,848	5.02%	94.98%

Yunlin County	63,976	3,293	60,683	5.15%	94.85%
Kaohsiung County	42,367	2,183	40,184	5.15%	94.85%
Hsinchu City	24,476	1,283	23,194	5.24%	94.76%
Taichung County	48,573	3,842	44,731	7.91%	92.09%
Hsinchu County	12,450	1,170	11,281	9.39%	90.61%
Keelung City	18,130	2,593	15,537	14.30%	85.70%
Tainan City	24,799	4,693	20,107	18.92%	81.08%
Miaoli County	51,384	13,221	38,163	25.73%	74.27%
Kaohsiung City	37,566	10,960	26,605	29.18%	70.82%
Taipei County	142,977	56,685	86,292	39.65%	60.35%
Tainan County	44,391	20,399	23,992	45.95%	54.05%
Taoyuan County	46,164	20,796	25,368	45.05%	54.95%
Yilan County	111,011	67,769	43,243	61.05%	38.95%
Hualien County	118,275	77,885	40,390	65.85%	34.15%
Taitung County	242,856	168,727	74,128	69.48%	30.52%
Pingtung County	169,693	126,365	43,328	74.47%	25.53%
Total(1)	1,316,188	587,841	728,350	44.66%	55.34%
Penghu County	368,579	268,846	99,732	72.94%	27.06%
Total(2)	1,684,767	856,687	828,082	50.85%	49.15%
Kinmen County	129,536	115,514	14,022	89.18%	10.82%
Lienchiang County	131,316	118,131	13,185	89.96%	10.04%
Total Amount	1,945,619	1,090,332	855,289	56.04%	43.96%

(C) Symbiosis by Archilife Research Foundation

Archilife Research Foundation proposed Symbiosis from the aspect of living. It is based on the biological sense. We have a vertical planting system beside the construction's wall. Through the dry toilet, our output will be the nutrition of the plants, and the output of plants will be our food. We hope through this high-efficient recycling system, it might help to release the burden of the environment. Also, by the evaporation of plants, it might help cool down the high temperature.

In terms of GB, it should adopt the most efficient structure and build the vertical planting system around the structure to form a green wall. By applying the symbiotic theory to the daylight working model, we can promote the recycling of daily

necessities in order to create a self-sufficient lifestyle. In other words, the use of the Solar Energy creates a self-sufficient lifestyle. We call it Symbiotic life, and use the digital instrument to create spiritual product and promote to the whole world to achieve the spiritual life. Finally, we feel happy and healthy.

In order to create a self-sufficient lifestyle, we have four components to form a recycling life, including the vertical planting systems, the nucleic acid meal, the cleaning and the compost. The vertical planting systems can be built besides the construction's wall to catch the sunshine more easily and their baskets can be also run to absorb the water in the bottom. The wild edible plants and other vegetables can be grown together to reduce infection and pest. It will also form a green wall after these vegetables grow prosperously. In addition to cooling down the environment by sheltering the building from direct exposure to sunlight, this can also help to reduce the workload of air-conditioning and provide a reliable vegetable source. Together with some protein, such as fish contains more nucleic acid, this will become a perfect nucleic acid meal that can provide healthy diets. Waste and wastewater produced from everyday life will be cleaned before entering the recycling system, including the dry toilet, wastewater treatment system etc. For the reason of safety, the compost function of the dry toilet will need a 2-step compost or sterilization before mixing with the soil to produce nutrition for plants. Wastewater will also be feedback to the vertical planting system after treatment in order to form a closed symbiotic recycle.

We believe if we have these four components, it can make the symbiosis come true. Following the accumulation of civilization, these four components can accommodate more micro-scaled or multiple recycling systems to complete the most needed recycling structure under the concept of sustainable development. By doing so, it will be easier for us to spread the idea of symbiosis from a single building to the entire society and even a country and build recycling society in order to reduce the workload of environment and to make the developments of human-beings will not the burden of the environment. While human is the center of this recycling system, human and green plants together form the foundation for symbiotic recycle, because by using solar energy, air and water, green plants form the environment for human survival and provide us food. Green plants have long been existed in our environment. While they have already formed the mimicry in nature with soil, microorganisms and insects, they are resistant with one another during the course of evolution. Therefore, we need to understand the position of food chain in nature and we can use the

mechanism of symbiosis. If we understand the mechanism of symbiosis, we can use artificial treatment to expand its survival quality and quantity to support further development. In doing so, we need to protect the nature and the environment as the foundation for sustainable use on the one hand, and to promote further development by selecting the required species to achieve sustainability on the other hand.

F. Status of adoption of SB whole-building performance rating systems

(A) Action by the Architecture and Building Research Institute under the Ministry of the Interior (ABRI), the executive Yuan

The major outcome of the research plan at the first stage was to establish a green building evaluation system that was capable of accommodating the subtropical/tropical climate condition and local environmental issues, and providing quantitative formulae and explicit criteria to effectively increase its operational feasibility. Taiwan's green building evaluation system was first announced in 1998. Originally, the system comprised of seven evaluation indicators, green, soil water content, energy saving, water conservation, CO_2 emission reduction, construction waste reduction, and sewage and garbage improvement. Due to the increasing interests of health and biodiversity issues globally, the ABRI modified the evaluation system via introducing two additional indicators, Biodiversity and Indoor Environment Quality in 2003. The current evaluation system, integrated with nine indicators, was thus set up. These indicators can be divided into four categories, Ecology, Energy Saving, Waste Reduction, and Health (known as EEWH system). In addition to the evaluation tool itself, a Green Building Labeling system for green building certification was also established in 1999. The certification now consists of two parts: Green Building Label for completed buildings, and Green Building Candidate Certificate for building projects. The minimum requirement for green building certification is to pass two prerequisites (energy saving and water conservation), and two optional indicators from among the other seven indicators. These nine indicators are evaluated independently in order to reply to the various impacts upon the earth environment. Each category has quantitative calculation methods, equations, and criteria for the evaluation judgment. The system has proved to be simplified, quantified, and localized for the subtropical climate of Taiwan and regarded as a standard evaluation method for green building by the Ministry of the Interior of Taiwan. In 2007, a new rating system was established to aim at improving green building design, which was classified into five levels: certified, bronze, silver, gold, and diamond. Moreover, for green building education, the ABRI also published a standard manual for Green Building and Green Building Material evaluations that had been distributed widely to building designers, teachers, architects and contractors.