



# The Experience of Taiwan's Hospitals in Reducing Ecological Footprint

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**Coordinator**, Taiwan Network of Health Promoting Hospitals and Health Services  
**Vice Chair**, International Network of Health Promoting Hospitals and Health Services  
**Chair**, Task Force on Health Promoting Hospitals and Environment



*Shu-Ti*

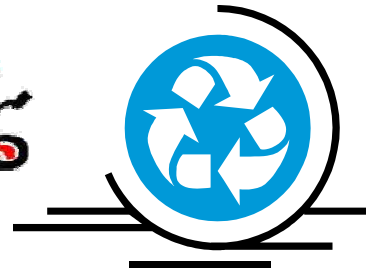
## Content

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- **Environment Benefit and Co-Benefits by health sector**
- **Actions at the **global** level**
- **Actions at the **national** level**
- **Actions at the **organizational** level**
- **The Way Forward**



# Environment Benefits and Co-benefits from the Efforts of Health Sector

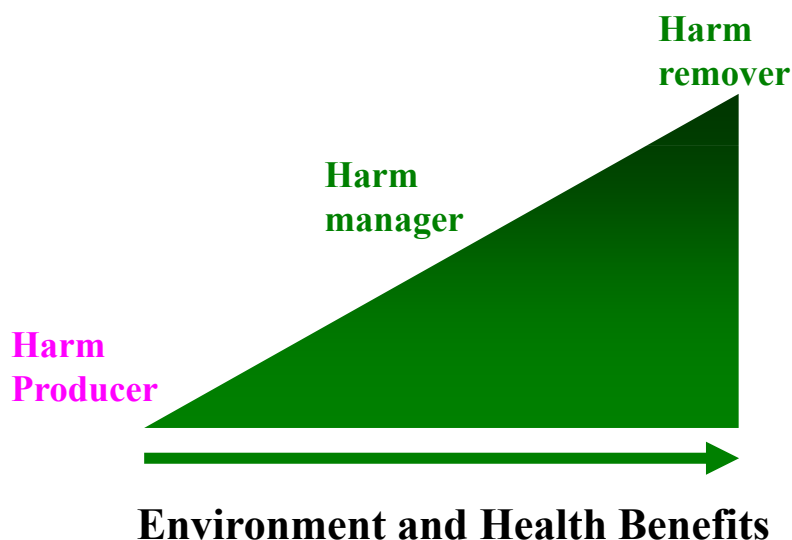


# Health Care and CO<sub>2</sub> emissions



# Health Sector and Climate Change

- From **harmful producer** to **harm manager** and **harm remover**



# Health sector and climate change

1. Identify and manage health impact of climate change
2. Take the leadership for community actions against climate crisis by
  - Raising the **public awareness** of climate crisis;
  - **Leading by example**: reduce health sector's CO<sub>2</sub> emissions by green design and green practices (**environment benefit**);
  - **Promoting healthy living** (healthy eating, green transportation, breastfeeding) and producing **environment co-benefit** at the same time;
  - **Reducing healthcare utilization** by health promotion and disease prevention, and hence reducing CO<sub>2</sub> emissions (**indirect environment co-benefit**)



# The Power of Health Sector

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- **Credible voice** on health-related issues
- **Contact with people** (ex. in Taiwan, 92% of the population utilized health services within 1 year)

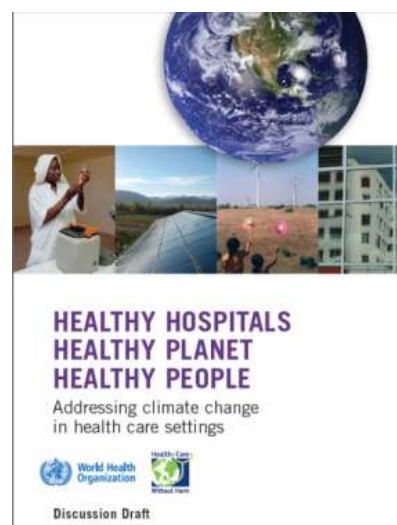


**Actions at the **global** level:**  
Task Force on HPH & Environment



## WHO and Health Care Without Harm

- Published “Healthy Hospitals, Healthy Planet, Healthy People” in 2008, addressing healthcare facilities’ impact on climate changes and their opportunity to help lead the fight against it.
- The future goal is to develop the **Global Network for Climate-friendly Health Care** through the collaboration between WHO, Health Care Without Harm, the Health and Environment Alliance (HEAL), and other NGOs.



9

## International Network of Health Promoting Hospitals and Health Services

- A model and network **initiated by WHO**
- **More than 800 member hospitals** distributed in 5 continents; Taiwan, 2nd biggest with 77 members
- **In 2010, “Task Force on HPH & Environment”** was approved by the general assembly of the International Network of Health Promoting Hospitals and Health Services, **with joint support from WHO and HCWH**



International Network of  
**H**Health  
**P**Promoting  
**H**Hospitals & Health Services



10

# Task Force on “HPH & Environment”

## Task Force Members :

### ■ Leadership

- **Chair and coordinator: Dr. Shu-Ti Chiou**, Vice Chair of GB, International Network of HPH; Director-General, Bureau of Health Promotion, Taiwan
- **Prof. Hanne Tonnesen**, Director of WHO-CC on HPH in Bispebjerg University Hospital, Denmark, & Secretariat of International Network of HPH
- **Professor Jurgen Pelikan**, Director of WHO-CC on HPH in Ludwig Boltzmann Institute, Austria

### ■ Partnership

- **Susan Wilburn**, Technical officer, Department of Public Health and Environment, WHO
- **Dr. Gary Cohen**, Co-Executive Director, Health Care Without Harm
- **Dr. Pendo Maro**, Senior Climate and Energy advisor, Health Care Without Harm

### ■ Participation

- **Dr. Michael Wong**, Director, Health for Life Center, Khoo Teck Puat Hospital, Alexandra Health Cluster (HPH Member)
- **Dr. Chun-Lon Lin**, CEO, Tzuchi Medical Mission, Tzuchi Compassionate Foundation, Taiwan (HPH Member)



11

# Terms of References for the TF

1. **Visualizing environment-related health promotion issues** in existing HPH Models and Tools
2. **Giving examples on best evidence practice** related to HPH Models and Tools
3. **Developing tools for monitoring the effect** of environment friendly intervention programs
4. **Disseminating the best practice examples** and HPH Models and Tools through the network **and increasing the health professionals literacy** about climate change and health impacts
5. **Establishing a database for environment-friendly hospitals** and health services programs



12

## Website of Task Force on HPH and Environment

Task Force Website Consists of:

- Mission & objective
- Task force meetings
- Conference presentations
- Conference information
- Task force members
- References
- Publications
- Relevant links



<http://www.bhp.doh.gov.tw/BHPnet/English/index.aspx>

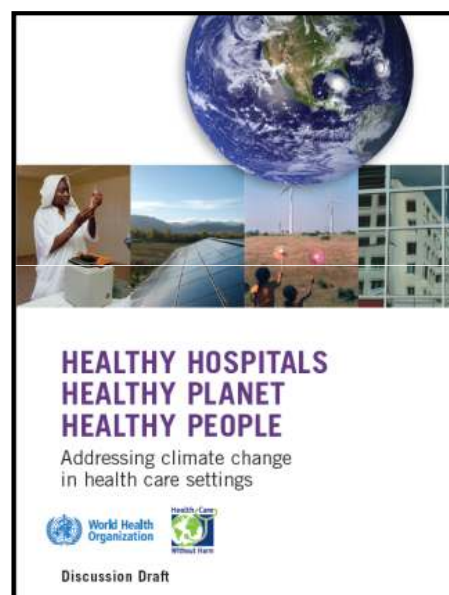
[http://www.hphnet.org/index.php?option=com\\_content&view=article&id=143%3Atf-on-hph-a-environment&catid=20&Itemid=95](http://www.hphnet.org/index.php?option=com_content&view=article&id=143%3Atf-on-hph-a-environment&catid=20&Itemid=95)



13

## 7 Elements of a Climate-friendly Hospital

- Energy efficiency
- Alternative energy generation
- Green building design
- Water
- Waste
- Transportation
- Food



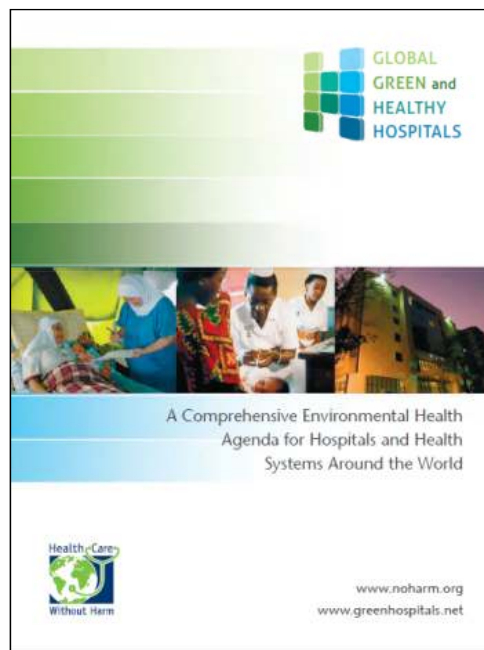
14

# Global Green and Healthy Hospitals Agenda

## THE TEN GOALS

- 1 **LEADERSHIP**  
Prioritize Environmental Health
- 2 **CHEMICALS**  
Substitute Harmful Chemicals with Safer Alternatives
- 3 **WASTE**  
Reduce, Treat and Safely Dispose of Healthcare Waste
- 4 **ENERGY**  
Implement Energy Efficiency and Clean, Renewable Energy Generation
- 5 **WATER**  
Reduce Hospital Water Consumption and Supply Potable Water
- 6 **TRANSPORTATION**  
Improve Transportation Strategies for Patients and Staff
- 7 **FOOD**  
Purchase and Serve Sustainably Grown, Healthy Food
- 8 **PHARMACEUTICALS**  
Safely Manage and Dispose of Pharmaceuticals
- 9 **BUILDINGS**  
Support Green and Healthy Hospital Design and Construction
- 10 **PURCHASING**  
Buy Safer and More Sustainable Products and Materials

## HCWH, 2011



15

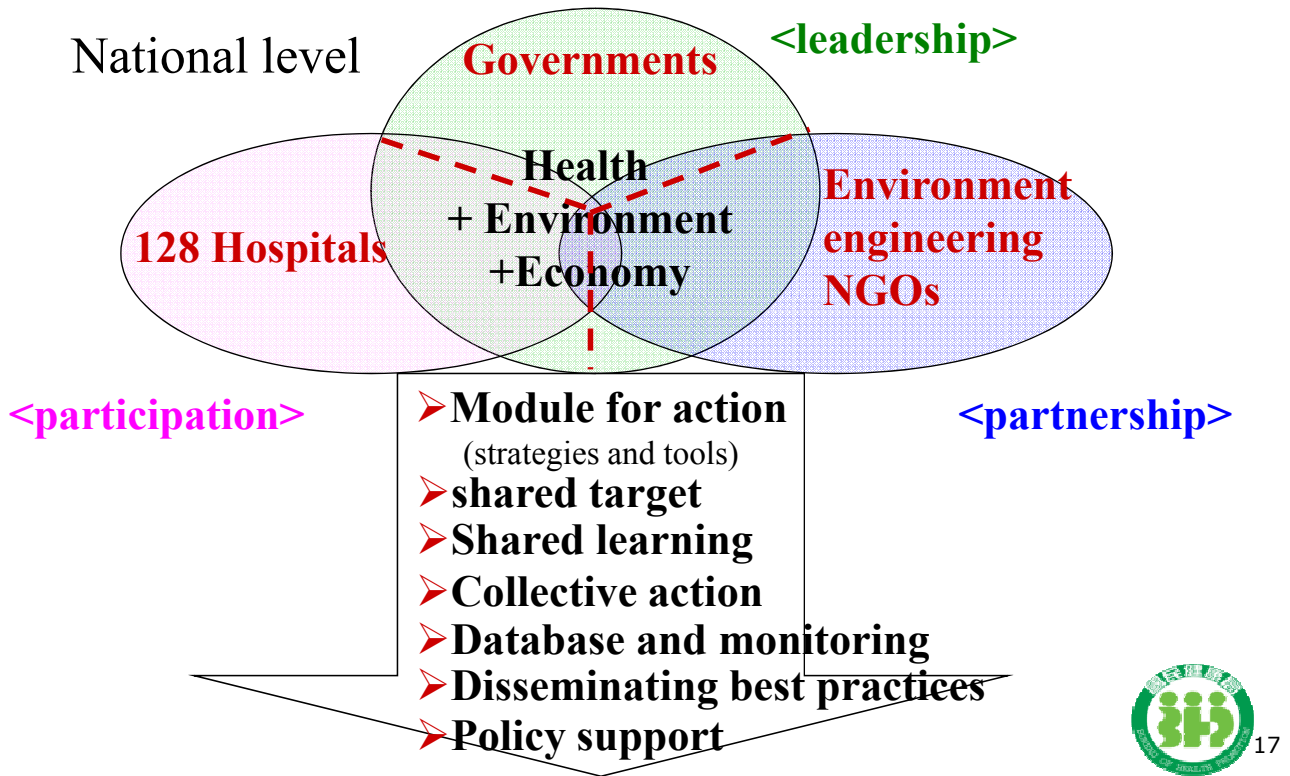
**Actions at the national level:**  
***Mission, I'm Possible!***



16



# The Power of Change



## International Conference on Healthy Hospitals & Healthy Environment in Taipei on Oct. 22-23, 2010

- More than 250 participants from 106 hospitals, government departments, and academic institutions



EPA Deputy Minister Chang TC

- **Task-oriented training with target of action**
- **Ministries of Health + Environment + Energy**
- **& International experts**



# 128 Taiwanese hospitals said “yes, we can!” on Oct. 23, 2010

Shu-Ti

- Calculate reduction of CO<sub>2</sub> emission according to potential reduction in consumption of **electricity, water, oil, and gas**, and production of **waste**.
- 128 hospitals joined and committed to achieve **13% reduction of annual CO<sub>2</sub> emissions** (164,648 tons of CO<sub>2</sub> emissions) **by 2020 compared to the level in 2007**
- The amount in CO<sub>2</sub> reduction is equivalent to the annual absorbing capacity of **34 New York Central Parks**

Health Minister Yang CL



19

## Collection of Best Practice Evidences

Shu-Ti

- Bureau of Health Promotion published the manual of “**Green Hospital, Green Life, Green Planet: Experience Sharing on Green Hospital**” in December 2010 – **Updated in 2012**
- Practice examples from 12 Taiwan Hospitals and the Alexandra Health Group in Singapore covering 8 major scopes: **Energy Efficiency, Alternative Energy, Food, Waste, Water, Transportation, Building and Education**.
- Available in Chinese and English.
- Free download from <http://www.bhp.doh.gov.tw/BHPnet/English/ClassShow.aspx?No=201101190001>



20

## Shared Learning

- Workshops
- Site visits
- Compile FAQs for hospital



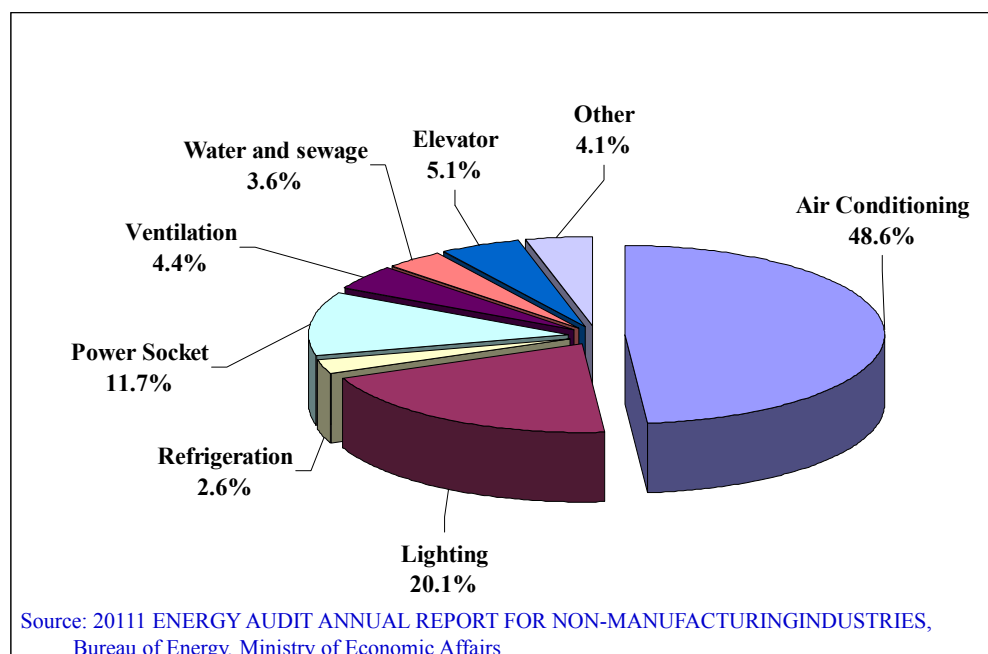
## Environment-friendliness in Hospital Accreditation

- Current: require the appropriate management of hygiene and waste
- Future: encourage the mitigation and adaptation of climate change

# Source of Energy Consumption in Hospital

## Major electricity consumption:

**Air conditioning: 48.6%; Lighting: 20.1%; Power socket: 11.7%**



## Case Examples of Taiwanese Hospitals Adopting ESCO Programs - 1

Year	Contracting Unit	Total Amount (million TWD)	BoE Reimbursement (million TWD)	Energy-Saving Rate(%)	Oil-Saving Equivalent (kloe/ yr)	CO2 Reduction (ton/yr)	Total Saving Amount (million TWD/yr)
2006	NCKU Hospital	15	5	15	598.51	1500.81	4.225
2007	NCKU Hospital	11.96	3.99	63	221.8	556.18	45
2007	NTUH Yunlin Branch	13.5	4.5	56	44.4	111.34	1.1
2008	Taipei Veterans General Hospital	16.88	5	50	282.2	707.64	4.647
2008	Puli Veterans Hospital	12.83	4.277	37.8	290.067	727.36	4.104
2008	DOH Miaoli Hospital	17	5	35	188.65	473.05	252.6
2008	DOH Chang-Hua Hospital	14.39	4.977	33.2	227.3	569.97	3.356
2009	Taipei Veterans General Hospital	17.45	5	30	131	328.49	1.933
2009	DOH Hualien Hospital	7.04	2.348	55	125.104	313.71	1.448
2009	Yuli Veterans Hospital	19.26	5	36.4	121.17	303.84	2.354
2009	Zhudong Veterans Hospital	15.7	5	40.2	104.31	261.57	1.629
2010	Chia-Yi Veterans Hospital	16.67	5	40.29	174.39	437.3	2.472

## Case Examples of Taiwanese Hospitals Adopting ESCO *Shu-Ti* Programs - 2

Year	Contracting Unit	Total Amount (million TWD)	BoE Reimbursement (million TWD)	Energy-Saving Rate(%)	Oil-Saving Equivalent (kloe/ yr)	CO2 Reduction (ton/yr)	Total Saving Amount (million TWD/yr)
2011	DOH Taitung Hospital	24.52	5	34	279.3	700.37	4.087
2011	Yuli Veterans Hospital	0.38	0.18	67.39	2.53	6.34	0.03
2011	DOH Chang-Hua Hospital	20.32	5	33.53	194.69	488.2	2.444
2011	Taipei City Hospital Zhongxiao Branch	4.5	1.5	50	39.5	99.05	1.268



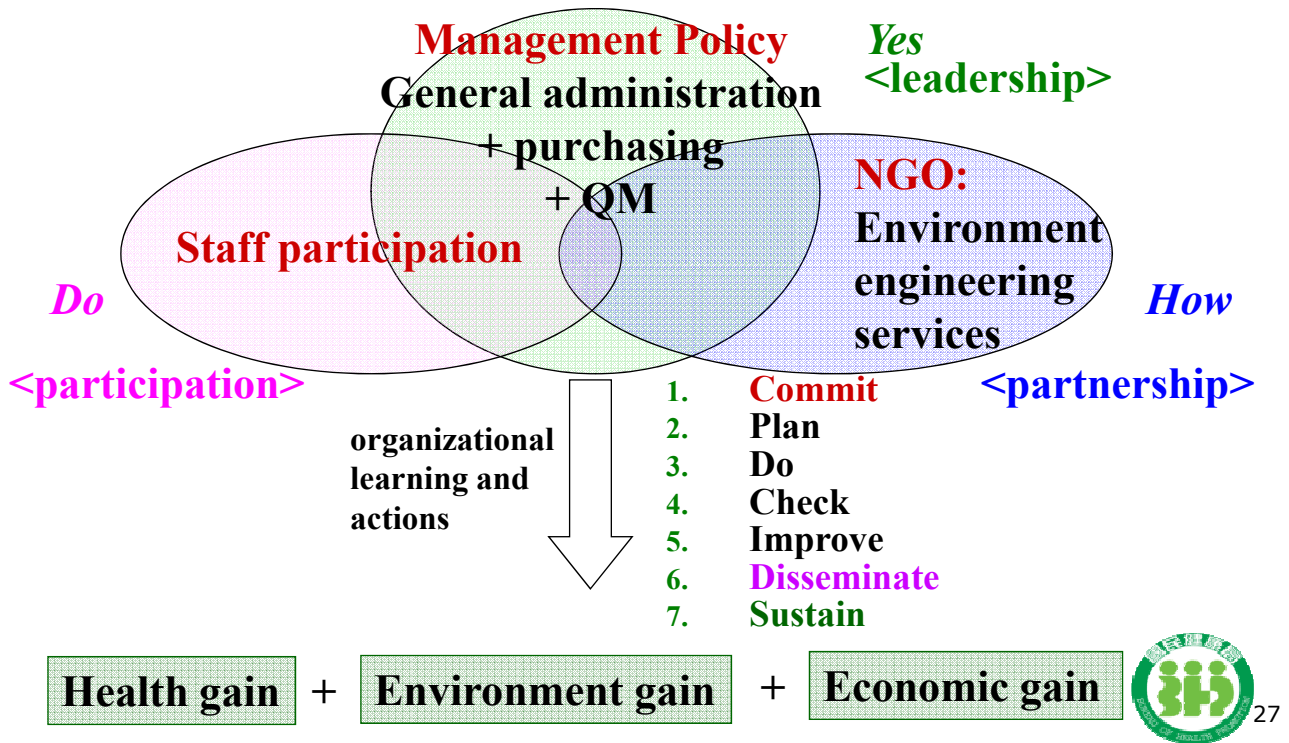
*Shu-Ti*

Actions at the **organizational** level :  
**Front-line Actions**  
**in Health Promoting Hospitals**



# The organizational level: the action of change

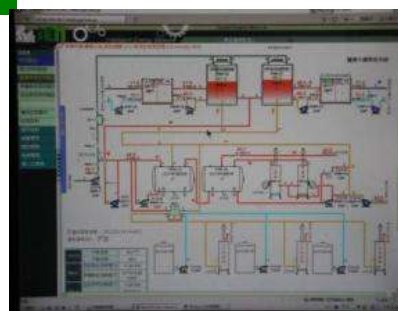
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Shu-Ti

# Energy Efficiency

- Energy-saving management: Dx, Centralized plan, and control
- Install energy saving LED lights
- Replace old and inefficient facilities/ purchase machines with high EER
- Energy circulation technique (ex. heat pump)
- Energy saving practice by staff



Miao-Li General Hospital – IEN monitoring system



Buddhist Dalin Tzu Chi General Hospital- Heat pump system



Chiayi Christian Hospital- Heat Recovery Boiler system schematic diagram

# Alternative Energy Generation

- Install roof-top **solar panels** to reduce sunlight exposure and air conditioning  
Subsidized by the Bureau of Energy, Ministry of Economic Affairs, for solar panel installations.



Buddhist Taichung Tzu Chi General Hospital- Solar lamps



Mackay Memorial Hospital Taitung Branch- Photovoltaic system



Changhua Christian Hospital- Photovoltaic system



# Green Building Mark

- ◆ Green Building system (EEWH) in Taiwan:
- ◆ Ecology, Energy Saving, Waste Reduction, Health (EEWH)
- ◆ Nine Indicators: **Greenness, Rainwater retention, Water, Daily Energy Saving, CO<sub>2</sub> Reduction, Waste Reduction, Sewage and Waste, Biodiversity, Indoor Environment**, all certified by Architecture and Building Research Institute, Ministry of Interior
- ◆ The Green Building mark is based on the sub-tropical climates of Taiwan, which differs from European and North American standards.



GBM0100288



# Green Building Candidate

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- **Hospitals began applying for Green Building since 2007**
- **13** Green Building certified hospitals (2008 to 2011),  
7 HPH hospitals.
- **44 candidate hospitals** (Green Building Label awarded only after construction is completed)
- The renovation of existing hospital buildings is the most important.



# Green Building Design in Hospitals

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National Taiwan University Hospital- The garden on the top floor.



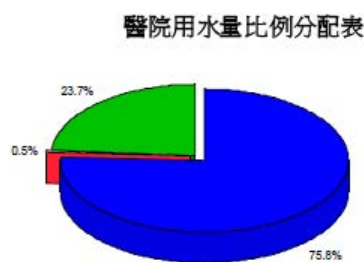
Chang Gung Memorial Hospital Kaohsiung Branch- Yung Ching Memorial Park

# Water

- Recover rain water and ground water for vegetation
- Recovery and treatment of waste water for use in toilet flushing, biological ponds and vegetation irrigation



National Taiwan University Hospital - Rainwater recycling system panel



■ 自來水用量  
 ■ 井水用量  
 ■ 中水回收用量



# Waste

- Replace
- Reduce
- Reuse
- Recycle



Buddhist Dalin Tzu Chi General Hospital- Reusable utensils only in the hospital.



- Paperless and filmless hospitals



Shuang Ho Hospital- The general waste handling area and biomedical waste storage area.



Chang-Gung Memorial Hospital Taoyuan Branch- Tunnel washers



# Recycling



Nov 2009 - Doctor's Day - at a recycling station in Xindian



Changhua Christian Hospital- Christmas tree was made by recycled IV bottles.



# Food

- Use locally produced ingredients for meal service to patients and employees
- Sign purchasing contracts with local farmer's and fisherman's associations, purchase local goods
- Organization culture:  
i.e. Monday as meatless,  
low carbon day.



37



38

# Transportation

- BMW: B(bus), B(bike), M(metro), W(walk)
- Subsidize public transportation
- Encourage walking by placing staff parking further away from the hospital.

## Biking to a summit meeting



Buddhist Dalin Tzu Chi General Hospital- The free shuttle bus provide services each 15 minutes



Buddhist Dalin Tzu Chi General Hospital- Healthy stairways within hospital



## Encourage use of stairs

### 謝堂：誰看過我搭電梯？

謝堂副院長爬樓梯當運動 平均每天爬十層樓 比賽得第三

【記者潘香妃／台北報導】台北長庚醫院副院長謝堂，年屆五十歲，身材魁梧，完全沒有小肚腹，常有人問他怎麼保養？原來他在醫院從不搭電梯，每天在高達十一層樓的長庚醫院爬十層下，他說平均每天要爬十層樓，使他在昨天長庚醫院舉辦的一爬樓梯比賽一戰敗一眾年輕住院醫師，勇奪第三名。

「身體活動的謝堂，昨天在廿分鐘內，來回十一層樓爬六趟，臉不紅、氣不喘，他說這是平常爬樓梯訓練出來的。身為婦產科醫師兼副院長的他，平常十分忙碌，但為了運動健身，不搭電梯，只爬樓梯，他笑稱為了不讓自己懈怠，他在院內對同事說：「誰看到我搭電梯，我就請客！」

台北長庚醫院的婦產科病房在十一樓，產房在八樓，副院長辦公室在國際大樓建築的五樓，謝堂說他爬樓梯，每天平均要爬十層樓，不過他對熱愛運動的謝堂來說，不是難事。

他的「運動史」從小學開始，從小學到大學都是棒球隊，初中到大學同時是足球隊，進入長庚醫院後加入羽毛球隊，另外也常和同學去打保齡球、乒乓球、回力球，還曾在台灣五千公尺馬拉松比賽中勇奪冠軍。

為何喜歡運動？謝堂表示，「可以發洩壓力」，身為婦產科醫師面對壓力很大，「又不能對病人發脾氣」，謝堂常開玩笑說，只好靠運動大吼大叫發洩了。

昨天長庚醫院的「爬樓梯比賽」中，參賽者中有一位美女也深受吸引，除了白帶大眼講人驚聲之外，她還是運動完乳房切除手術，兩年來化療治療的癌人，她是台北長庚骨科護士劉美玲。

如果不說，劉美玲看來實在不像乳癌病人，一副燦爛的微笑和活潑的氣質，再加上「身運動背心和短褲，尤其可愛的她十分正面看待生癌一事」。

台北長庚醫院昨天舉辦護理人員「七上八下」樓梯健走比賽，由平常就利用爬樓梯當作運動的副院長謝堂（前）領軍。記者林錫銘／攝影

# Green Purchasing

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- Purchase low-carbon, environment-friendly **products**;
- From: low-carbon, environment-friendly **suppliers**



## What else can we do to help the environment?

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- Environment-Friendly can be achieved through **health promotion** and lifestyle intervention
- Being healthy can:
  - Lessen chances of non-communicable diseases
  - Improving well-being and quality of life
  - Reduce use of medications, surgeries, intensive interventions
  - Reduce emission of medical wastes and harmful substances

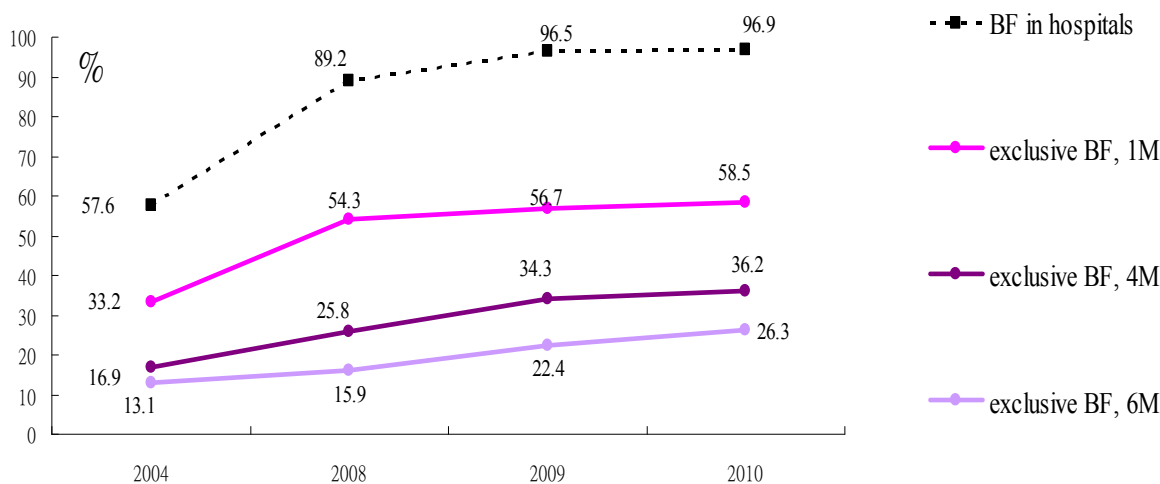


## Health Promotion in Hospital: Healthy Weight Loss

- 2011: **164** hospitals in total pledged and successfully lost a total of **156 tons** excessive weight through healthy weight management!
- 2012: **126** hospitals will again pledge to lose **93.3 tons** through healthy weight loss.
- Strategies: support from administrative staff, employee competitions, community events, etc....



## Health Promotion: Breastfeeding



# Environment Co-Benefits of Breastfeeding

## 1. Direct benefits:

- ❑ Reduced need of cow milk and cattle breeding
- ❑ Reduced use of cans and bottles
- ❑ Reduced transportation of milk
- ❑ Reduced washing of bottles

## 2. Indirect benefits:

- ❑ Reduced acute and chronic illness for babies leading to reduced healthcare utilization and reduced carbon footprint
- ❑ Reduced chronic illness for mothers



# Environment Literacy

The collage features several key resources:

- Energy Reduction Handbook (節能減碳手冊):** A green and white booklet from Taipei Medical University, featuring a globe and a building.
- Energy Conservation Service Network (節能服務網):** A website with a green header and a navigation menu listing services like energy audits, energy management systems, and energy conservation training.
- Newspaper Article:** A yellow and white article titled 'E3 消費' (E3 Consumption) with the headline '全台首創APP 保護地球少碳氣' (First APP in Taiwan to protect Earth, reduce carbon gas). It mentions a 3000-person volunteer team for carbon footprint tracking.
- Government Website:** A blue and white website titled '政府機關學校節能服務' (Government, School Energy Conservation Services). It lists services such as energy audits, energy management systems, and energy conservation training. A red circle highlights a section about energy conservation services.

Here and at home!!



# Environment-Friendly Culture



■ Hospital staff engage in agricultural hands-on activities



## The Way Forward





## What Are the Next Steps?

- Analyze and publish the experiences; generate evidences of effective implementations.
- Provide international platform for shared learning, benchmarking and collaboration.
- Call for papers with the thesis and case study to draw more hospitals to take action :
  - Scientific Journal: *Clinical Health Promotion – research and best practice for patient, staff and community*
  - 2013 International Conference in Sweden



49



## Visibility in HPH 2012

- The pre-conference
- 2012 Plenary 3
  - **Responding to Climate Change with Green and Healthy Hospitals** -- Joshua Karliner, International Team Coordinator, HCWH
  - **16:00pm-17:30pm, April 12th, 2012**
- **HPH and Environment Symposium:**
  - 11:00am-12:30pm, April 12<sup>th</sup>, 2012
  - Venue: South Foyer
- The parallel sessions



50

**April 12<sup>th</sup>, 11:00 – 12:30 South Foyer**

1. **Review and Perspective of the TF on HPH and Environment** - Dr. Shu-Ti Chiou
2. **Role of the Health Care in Addressing Climate Change, Given the Current Science and Political Agreement** – Pendo Maro, Senior Climate & Energy Advisor, Health Care Without Harm Europe
3. **Business Perspective of Making Environmental Improvements in Healthcare** - Dr. Peter Orris, Director of Occupational Health Service Institute, University of Illinois, USA
4. **Best Practice Examples** –
  - Lund University (Sweden)- Daniel Eriksson, Director, Consulting Services, TEM Foundation
  - Taipei Medical University Hospital - Tu-Bin Chu, Vice-Superintendent
  - Changhua Christian Hospital – Chin-San Liu, Vice-Superintendent



51

- **Thursday, April 12, 14:00pm – 15:30pm**  
**Oral 2.6: Creating Environment Friendly Hospitals and Health Services**  
**5 presentations**
- **Friday, April 13, 11:00pm – 12:30pm**  
**Oral 3.8: Creating Environment Friendly Hospitals and Health Services – 5 presentations**
- **Friday, April 13, 2012 13:30pm-14:00pm**  
**Poster 2.8: Safe Guarding the Environment and Addressing Climate Change – 10 posters**
- **20 Submissions from Italy, Great Britain, Finland, Korea, Thailand, and Taiwan – A good increase from last year's conference !**



52

*Let Health be Our Only Product for the Planet!*

