

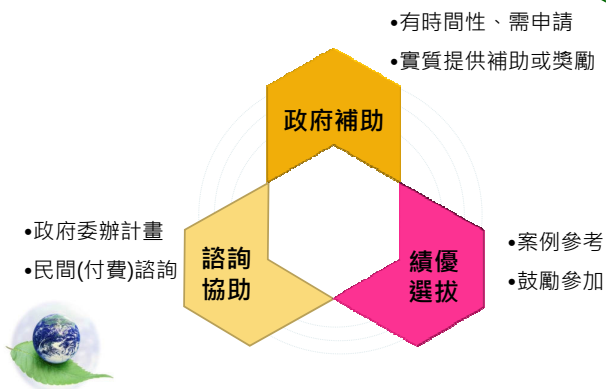
醫院營造環境友善最新趨勢與國內外資源分享

環境品質文教基金會
 研究發展部研究員：黃立維
 報告日期：2012/10/24



國內環境友善補助與資源

依資源類別



1.政府補助-經濟部能源局

- 民國100年經濟部能源局資源手冊
<http://www.envi.org.tw/eh/download/100年經濟部能源局資源手冊.pdf>
- 經濟部太陽能熱水系統推廣獎勵計畫(75年)
- 補助條件:產品係由經濟部認可之合格製造供應廠商製造，並由合格安裝銷售廠商安裝；產品由經濟部能源會認可之合格產品。
- 補助金額：台灣本島集熱器每平方公尺新台幣1000-1500元；離島2500-3000元。
- 聯絡窗口：成大研究發展基金會06-3300691
http://solar.rsh.ncku.edu.tw/t03_flow.php

1.政府補助-經濟部能源局

- 再生能源發電設備示範獎勵辦法(99年)
- 獎勵條件:設置方式係與建築物整合或以附加整合方式取代部分建材；總裝置容量超過十峰瓩((kWp)；屬新品。
- 獎勵金額：採用非雙面玻璃模組者：每峰瓩以8萬元為限；採用雙面玻璃模組者：每峰瓩以10萬元為限。每一申請案獎勵總額不得超過 5,000 萬元。
- 聯絡窗口：經濟部能源局能源技術組(再生能源科)：
- 王妍方小姐 · 02-2772-1370 · 分機776

1.政府補助-經濟部能源局

- 經濟部節能績效保證專案示範推廣補助計畫
- 申請期間：每年1月中旬截止，需提交專案申請書經審核。
- 申請條件：單位用電契約容量達400瓩以上，或整合自身或所屬(轄)單位且累積用電契約容量達2千瓩以上。
- 補助金額：一般500萬元為上限，但用電契約容量達2千瓩以上，以1,500萬元為上限；且未超過計畫執行經費1/3為原則。
- 聯絡窗口：綠色生產力基金會
 葉家宏 · 02-2911-0688 · 分機766
 何皇智 · 02-2911-0688 · 分機737
<http://esco.tgpf.org.tw>

1.政府補助-內政部建築研究所

- 建築能源效率提升補助計畫
- 補助對象：**公立醫院**。
- 申請方式：針對中央機關發出申請通知，配合書面審查與分析耗能系統，以初步篩選出適合改善之建築對象。針對篩選出之**舊有**中央廳舍進行建築耗能診斷並確定改善對象。
- 執行方式：利用低成本或是零成本之改善策略，進行小量改善工程投資及運轉與管理策略之調整。主要針對**空調及動力**系統進行改善。
- 連絡電話：02-8912-7890

<http://beeup.cernet.com.tw/html/status.html>

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1.政府補助-改善案例

- 建築能源效率提升補助計畫 - 行政院衛生署玉里醫院(100年)
- 現場量測空調系統性能，建立建物實際耗能基線 (Baseline)，作為下階段擬定改善策略之參考。
- 依據耗能系統現況，提出改善策略。
- 進行長期之追蹤考核 (Follow-up)，確保改善節能效果，並建立維修保養制度。
- 改善項目及對策：

改善項目	問題診斷	改善對策
增設熱泵系統進行熱水預熱作業。	原使用柴油鍋爐能源成本太高。	增設熱泵系統(水對水)及預熱儲水槽對進水(自來水)先預熱，大幅提高進水溫度，減少已設柴油鍋爐能源費用。
設置能源管理系統，有效管理空調系統。	缺乏中央監控系統。	改善後之設備納入既設空調監控系統，使其升級為BEMS能源管理系統，有效管理空調設備轉及操作，提高整體系統運轉效率。

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1.政府補助-改善案例

- 改善成效總結：

說明	增設熱泵主機(熱水側)	增設熱泵主機(冰水側)	增設BEMS系統
系統節能效益(%)	-	-	10
系統節能效益(kWh)	82,889	26,244	8,289
系統節能效益(元)	804,417	81,355	25,696
減少CO ₂ 排放量(kg)	60,476	16,350	5,164
系統節能效益(kWh)	117,422		
系統節能效益(元)	885,772		
系統減少CO ₂ 排放量(kg)	81,990		

- 更多案例請見：

<http://beeup.cernet.com.tw/html/achieve.html>

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2.諮詢協助-經濟部節能減碳服務團隊

- 機關學校服務團 - 機關節能技術服務隊
- 服務對象：中央及地方行政機關、**公立醫院**、公立學校。
- 服務方式：臨場輔導節能技術輔導、溫室氣體盤查輔導；非臨場服務電話諮詢、網路資訊交流、提供教育訓練。
- 聯絡窗口：綠色生產力基金會
黃建誠經理 · 02-29110688 · 分機734
- http://www.go-moea2.tw/service_group_info.asp

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2.諮詢協助-經濟部節能減碳服務團隊

- 商業服務團 - 醫院、旅館節能技術服務隊
- 服務對象：住商及公部門能源大用戶、**私立醫院**。
- 服務方式：臨場輔導節能技術輔導；非臨場服務電話諮詢、網路資訊交流、提供教育訓練。
- 聯絡窗口：綠色生產力基金會
謝維晃經理 · 02-29110688 · 分機742
- http://www.go-moea2.tw/service_group_info.asp

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2.諮詢協助-衛生署廢棄物、廢水自主管理輔導作業

- 申請期間：至7月底
- 輔導內容：
 - 廢棄物：廢棄物清除處理、再利用、重量管理、減量措施、自主管理措施診斷及輔導。
 - 廢水：廢水處理技術支援、廢水自主管理措施診斷及輔導。
- 輔導方式：電話初訪、現場輔導、改善輔導與諮詢服務。
- 聯絡窗口：環境資源研究發展基金會
吳春滿小姐 · 02-23753013 · 分機121
李毓偉先生 · 02-22993279 · 分機3948
http://114.34.107.17/medical/work2_2a.aspx?s_index=286

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2. 諮詢協助-水利署民生節水技術輔導計畫

- 申請期間：每年6月中旬，7到11月進行輔導。
- 服務對象：民生及公共用水戶(含醫院)，提供 30 案次免費節水技術輔導。
- 輔導項目：設備用水減量、省水器材換裝、設備排水處理回用、雨水貯留、中水回收評估、效率用水管理、其他類別用水改善。
- 聯絡窗口：台灣產業服務基金會
紀裴欣工程師·02-23255223·分機135
連振廷工程師·02-23255223·分機198
<http://www.ftis.org.tw/active/w1010711.htm>

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2. 諮詢協助-內政部建築研究所

- 101年民間建築物綠建築更新診斷及改造評估計畫
- 申請對象(請於8月31日前提出)
 - (一)私有住宅、依法成立管理委員會並向主管機關報備，適用公寓大廈管理條例之建築物
 - (二)私有辦公、商辦、廠辦空間
 - (三)已立案之私立社會福利機構
 - (四)其他(除1~3項外之民間建築物) > 尚未有私立醫院提出申請
- 輔導內容：經審查同意者，免費提供諮詢、輔導及診斷評估
- 聯絡窗口：台灣建築中心
陳靜美小姐·02-866-76111·分機133
<http://122.248.241.79/02plan-3.html> (100年度網站)

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2. 諮詢協助-節水案例

- 以水利署民生節水技術輔導計畫為例

《案例1:中水回收再利用》

評估中水替代環境飲用水之可行性，進行再生水水量水質分析及處理系統規劃設計，藉此降低自來水使用，擴大流污水回收量及利用率。

- 節水回收量：10,920 噸/年
- 經濟效益：179,380 元
- 回收年數：0.8 年

《案例2:雨水貯留利用》


針對雨水貯留利用進行技術評估，包括可替代用途研判、以及水量水質需求調查和分析，雨水收集面規劃利用量設計，貯槽型式容積估量等程序。藉此增補替代水源，同時可取代自來水供應澆灌、景觀與其他等用水用途。

- 年雨水利用量：4,334 噸/年
- 經濟效益：37,775 元/年
- 回收年數：5.4 年

前/後水平衡圖繪製
<http://www.ftis.org.tw/active/w1010711.htm>

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3. 績優選拔

- 行政院國家永續發展獎(97年起)：表揚對象為推動永續發展績效優良、表現卓越之學校、企業、社會團體及政府機關(未有醫院獲獎)。
- <http://nsdn.epa.gov.tw/CH/NEWS/NEWS001.HTM>
- 環保署節能減碳行動標章(98年起)：鼓勵民間企業、團體及社區落實節能減碳行動，需提供節能減碳行動標章指標自評表、節能減碳重點摘要表等(未有醫院獲獎)。
- http://ecolife.tenki.tw/apply_ex4/apply_1.php
- 能源局節約能源園區節約能源績優獎(89年起)

<http://www.energypark.org.tw/topgoal/topgoal/list.asp>

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3. 績優選拔

- 環保署事業廢棄物與再生資源清理及資源減量回收再利用績優優良獎(92年起)：依規模分醫療一組、二組。
- http://waste1.epa.gov.tw/ier_web/
- 水利署節約水績優單位及個人專輯(87年起)：機關團體組醫院可報名。
- http://www.ftis.org.tw/water/2011_html/history.html
- 數位時代雜誌綠色品牌大調查(99年起)：開放網友投票，醫療服務類組。
<http://www.bnnext.com.tw/edm/2012GreenBrand/>

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綠色採購工具

- 經濟部工業局產業永續發展整合資訊網：
 - 2011年整合式產品綠色採購評估工具下載(正式版 v2.0)
 - 2011年產品能源效率評估工具下載(正式版 v1.0)
- 台灣產業服務基金會開發，協助國內企業簡化國際環保規範收集及符合度評估等作業。
- 協助企業查詢產品之國際能效標準及能效標示規範，亦可自行輸入產品規格，自動判定/計算該產品之國際能效標準符合性及其能效等級。
- <http://proj.ftis.org.tw/isdn>

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國外環境友善 工具與資源

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Environmental Checklist for Healthcare Facilities(2003)

• Greener Hospitals:
Improving
Environmental
Performance (2003)

• 環境管理系統、能源
、廢棄物、水、廢水、
有害物質、空氣品質與
環境偏好採購

• [http://www.bms.com/
Documents/sustainabi
lity/downloads/greenh.p](http://www.bms.com/Documents/sustainability/downloads/greenh.pdf)

6. Environmental Checklist for Healthcare Facilities

This following checklist includes a number of elements of an environmental management system. By answering YES or NO to the various elements of the checklist, it is expected that you will become more knowledgeable about the current status of your environmental management system. A "YES" answer signifies that your facility's environmental management system already includes that particular element. A "NO" answer indicates that the element is not currently part of your environmental management system. The latter elements should be reviewed for applicability to your healthcare facility and incorporated into your environmental management system as appropriate.

Environmental Management System	Yes <input type="checkbox"/>	No <input type="checkbox"/>
1. Does your healthcare facility have a set of principles or guidelines?	<input type="checkbox"/>	<input type="checkbox"/>
2. If yes, do these guidelines include environmental protection?	<input type="checkbox"/>	<input type="checkbox"/>
3. Are these guidelines communicated not only internally to staff but also externally to the public?	<input type="checkbox"/>	<input type="checkbox"/>
4. Are tasks and responsibilities relating to environmental protection clearly defined and assigned to medical staff, nursing staff, engineering staff and the hospital administration?	<input type="checkbox"/>	<input type="checkbox"/>
5. Has your healthcare facility appointed a person with special responsibility for waste, hazardous substances, effluent, energy, pollutants and harmful emissions, radiation safety, hygiene, etc.?	<input type="checkbox"/>	<input type="checkbox"/>
6. Are all members of the staff aware of their specific responsibilities relating to environmental protection?	<input type="checkbox"/>	<input type="checkbox"/>
7. Do you have working groups concerned with special topics such as energy, water, pollution prevention, and environmentally responsible purchasing?	<input type="checkbox"/>	<input type="checkbox"/>
8. Does your organization have a program to routinely leverage the value of new building design or equipment purchases to incorporate green practices (for example, energy, and water conservation) into design, construction, and operations?	<input type="checkbox"/>	<input type="checkbox"/>
9. Have you implemented an environmental management system?	<input type="checkbox"/>	<input type="checkbox"/>
10. Has your organization developed measurable annual environmental objectives/ goals?	<input type="checkbox"/>	<input type="checkbox"/>
11. Does your organization have a system in place to periodically evaluate your continued	<input type="checkbox"/>	<input type="checkbox"/>

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Eco-Checklist™ for Operations(2009)

• Practice Greenhealth Eco-Checklist for Operations v.1 (2009)

• 環境管理系統、教育與傳
播、環境偏好採購、廢棄物
管理與減量、能源/水/氣候
、食物系統、交通與化學物
質管理。

• [http://practicegreenhealth.
org/pubs/EcoChecklist_R5.pdf](http://practicegreenhealth.org/pubs/EcoChecklist_R5.pdf)

Environmental Sustainability System	Yes	No
1. Does your organization have an environmental policy statement and a strategic plan program? If so, please describe.	<input type="checkbox"/>	<input type="checkbox"/>
2. Does your organization have a goal to steadily increase employee access to local, sustainable food in your cafeteria and vending areas?	<input type="checkbox"/>	<input type="checkbox"/>
3. Do you participate in any public reporting, such as through the Global Reporting Initiative (GRI), www.globalequity.com, Green, or similar programs? If yes, please list.	<input type="checkbox"/>	<input type="checkbox"/>
4. Other aspects of local, regional, or international environmental laws and regulations?	<input type="checkbox"/>	<input type="checkbox"/>
5. In the previous fiscal year (FY), what was the monetary value in US dollars of significant fines (including those levied under appeals, and total number of non-monetary sanctions, for non-compliance with local, regional, or international environmental laws and regulations?	<input type="checkbox"/>	<input type="checkbox"/>
6. In the previous FY, what percent of total waste generated by your company and its subsidiaries was recycled or reused?	<input type="checkbox"/>	<input type="checkbox"/>
7. Other aspects of local, regional, or international environmental laws and regulations?	<input type="checkbox"/>	<input type="checkbox"/>
8. Do you offer an end-of-life product take-back program, including electronics? If so, please list all items you take back for responsible recycling, donation, or reuse, and outline the process for participating in the program.	<input type="checkbox"/>	<input type="checkbox"/>
9. Do your internal and take-back recycling programs exclusively use qualified or certified e-Stewards (http://www.e-stewards.com) to ensure proper handling of all electronic equipment and materials through that disposition?	<input type="checkbox"/>	<input type="checkbox"/>
10. Have you measured and taken steps to reduce your company's and its subsidiaries' greenhouse gas emissions (GHG)? For how many years? Have you opted to report your GHG and climate change strategy to the Carbon Disclosure Project (CDP)?	<input type="checkbox"/>	<input type="checkbox"/>
11. In the previous FY, what percent of energy your company and its subsidiaries consumed was derived from eligible renewable sources?	<input type="checkbox"/>	<input type="checkbox"/>
12. Does your company require the purchase of EPA-CR registered electronic products for internal use (www.epra.net)?	<input type="checkbox"/>	<input type="checkbox"/>
13. Does your company require the purchase of EPA-CR registered electronic products for external use (www.epra.net)?	<input type="checkbox"/>	<input type="checkbox"/>
14. Are all vendors required to provide an environmental policy statement (EPA Security Partners)? If so, please list all vendors you take back for responsible recycling, donation, or reuse, and outline the process for participating in the program.	<input type="checkbox"/>	<input type="checkbox"/>
15. In the previous FY, what percent of energy your company and its subsidiaries consumed was derived from eligible renewable sources?	<input type="checkbox"/>	<input type="checkbox"/>
16. Does your company require the purchase of EPA-CR registered electronic products for internal use (www.epra.net)?	<input type="checkbox"/>	<input type="checkbox"/>
17. Does your company require the purchase of EPA-CR registered electronic products for external use (www.epra.net)?	<input type="checkbox"/>	<input type="checkbox"/>
18. Are all vendors required to provide an environmental policy statement (EPA Security Partners)? If so, please list all vendors you take back for responsible recycling, donation, or reuse, and outline the process for participating in the program.	<input type="checkbox"/>	<input type="checkbox"/>

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實踐綠色健康組織(1998)

• 綠化供應鏈倡議

✓ 許多醫療器材有對環境更友善的替代
產品可供選擇，更可降低病患與員工
的健康影響、根除有毒廢棄物、節能
省水，甚或降低醫療院所的溫室氣體
排放。(如DEHP Free IV set)

• 綠化手術室倡議

✓ 管制性醫療廢棄物的減少與分類
✓ 一次性使用器材的再加工處理
✓ 廢麻醉氣的捕捉與回收利用



Environmental Sustainability Getting Started Guide (2011).
Catholic Health Association and Practice Greenhealth

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Sustainability Scorecard for Medical Products(2010)

• Kaiser Permanente 計分卡要求供應商提供資訊，包括其
公司的環境承諾、其產品使用的潛在有害化學物質，以及
關於產品及包裝回收的資訊。

• 自然資源使用/廢棄物、能源/氣候變遷、化學品等三面向
、共17項評估查核表。

Category	Question	Answer	Annual Total Score
Corporate level questions:	1. Does your organization have an environmental policy statement and a strategic plan program? If so, please describe.	Y/N	100
	2. Does your organization have a goal to steadily increase employee access to local, sustainable food in your cafeteria and vending areas?	Y/N	100
	3. Do you participate in any public reporting, such as through the Global Reporting Initiative (GRI), www.globalequity.com, Green, or similar programs? If yes, please list.	Y/N, # of years	100
	4. Other aspects of local, regional, or international environmental laws and regulations?	Y/N	100
	5. In the previous fiscal year (FY), what was the monetary value in US dollars of significant fines (including those levied under appeals, and total number of non-monetary sanctions, for non-compliance with local, regional, or international environmental laws and regulations?	Y/N, \$	100
	6. In the previous FY, what percent of total waste generated by your company and its subsidiaries was recycled or reused?	Y/N, %	100
	7. Other aspects of local, regional, or international environmental laws and regulations?	Y/N	100
	8. Do you offer an end-of-life product take-back program, including electronics? If so, please list all items you take back for responsible recycling, donation, or reuse, and outline the process for participating in the program.	Y/N, list	100
	9. Do your internal and take-back recycling programs exclusively use qualified or certified e-Stewards (http://www.e-stewards.com) to ensure proper handling of all electronic equipment and materials through that disposition?	Y/N	100
	10. Have you measured and taken steps to reduce your company's and its subsidiaries' greenhouse gas emissions (GHG)? For how many years? Have you opted to report your GHG and climate change strategy to the Carbon Disclosure Project (CDP)?	Y/N, # of years, Y/N	100
	11. In the previous FY, what percent of energy your company and its subsidiaries consumed was derived from eligible renewable sources?	Y/N, %	100
	12. Does your company require the purchase of EPA-CR registered electronic products for internal use (www.epra.net)?	Y/N	100
	13. Does your company require the purchase of EPA-CR registered electronic products for external use (www.epra.net)?	Y/N	100
	14. Are all vendors required to provide an environmental policy statement (EPA Security Partners)? If so, please list all vendors you take back for responsible recycling, donation, or reuse, and outline the process for participating in the program.	Y/N, weighted avg	100

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Global Green and Healthy Hospitals Agenda by HCWH(2011)

• 加盟醫院案例
• 環境友善醫院新知
• 10大面向行動項目
• <http://greenhospitals.net/>

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環境友善面向的跨大

2009年·7大面向

2011年·10大面向



**HEALTHY HOSPITALS
HEALTHY PLANET
HEALTHY PEOPLE**
Addressing climate change
in health care settings



**GREEN and
HEALTHY
HOSPITALS**
A Comprehensive Environmental Health
Agenda for Hospitals and Health
Systems Around the World

www.who.int
www.greenhospital.net

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2009年WHO-HCWH報告

• 「健康醫院—健康地球—健康人群」(Healthy Hospitals - Healthy Planet - Healthy People)。

• 建議從7大面向著手，邁向氣候友善 (climate-friendly)。省時、省錢外，並兼具健康、環境和社會的共同利益。



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2011年全球綠色與健康醫院進程

- 更著重管理層面與間接之環境影響。
- 修正提出新的10個面向：**領導、化學品、藥品、採購、**
- 替代能源有達成困難性，併入能源效率面向。



全球綠色與健康醫院進程(2011, 無害醫療組織, 27

Environmental Responsibility by CHAUS (2010-2012)

- 天主教健康協會設立環境資源專區包含：**環境永續入門指南(2010)**、**氣候變遷與健康說明手冊(2012)**以及相關**領導、院內溝通教學簡報**

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Environment Tools Directory

- 超過500種以上環境工具
- <http://www.environmenttools.co.uk/>

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Task Force on HPH & ENVIRONMENT

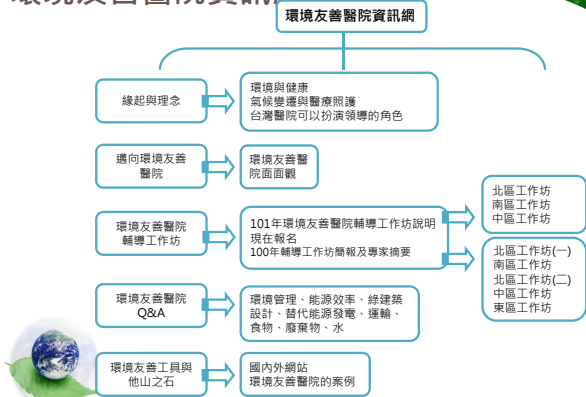
30

環境友善醫院資訊網

• <http://www.envi.org.tw/eh/index.htm>



環境友善醫院資訊網



感謝聆聽！

