出國報告（出國類別：國際會議）

出席「亞洲碳足跡網絡 2017 年會員會議並考察韓國綠卡制度」出國報告書

服務機關：行政院環境保護署
姓名職稱：洪淑幸處長、王瑞鋐薦任科員
派赴國家：韓國
出國期間：106 年 5 月 24 日至 106 年 5 月 27 日
報告日期：106 年 8 月 16 日

出國報告摘要

一、 出國計畫名稱:出席亞洲碳足跡網絡 2017 年會員會議並考察韓國綠卡制度

二、 出國人：洪淑幸處長、王瑞鋐薦任科員

三、 出國日期：106 年 5 月 24 日至 5 月 27 日

四、 出國行程與內容概要：

日　期	工 作 內 容 概 要
106.5.24	啟程，出發至韓國首爾，拜訪韓國環境產業技術院 (Korea Environmental Industry & Technology Institute, KEITI)，與韓國環境部官員、韓國環境產業技術院研究人員、韓國 BC Card 公司營運人員訪談綠色信用卡制度於韓國推行狀況。
106.5.25	參加亞洲碳足跡網絡 2017 年會員會議及研討會，與會報告之國家或區域包括馬來西亞、香港、澳洲、日本、韓國等，議題包括建築材料之碳足跡標籤驗證、綠建築、從產品第三類環境宣告(EPDs)整合各第三類環境標誌驗證制度等。
106.5.26	偕同台灣環境管理協會與韓國環境產業技術院簽署雙方碳足跡標籤之產品類別規則調和共識合作備忘錄。
106.5.27	返程，回到臺北。

五、行程成果評估及心得建議：

（一）本次透過拜訪韓國環境產業技術研究院進行韓國綠色信用卡與我國環保集點制度交流會議，以及出席亞洲碳足跡網絡 2017 年會員會議，汲取亞洲碳足跡網絡各會員國之產品碳標籤、減碳／低碳標籤推動經驗。主要內

容包括：

1、韓國環境部為推行綠色生活與綠色消費，鑑於韓國消費習慣運用信用卡相當普及且廣泛，自 2009 年起，委由韓國環境產業技術研究院規劃、韓國 BC Card 公司投資設備建置成本，推出由韓國 20 家信用卡公司共同發行的「綠色信用卡」，提供特約場所、設施優惠並有集點機制，強調低碳生活；韓國 BC Card 公司指出目前綠色信用卡持有率已達信用卡持有人口之 50%，韓國 BC Card 認為綠色信用卡對於推行綠色生活與綠色消費成效相當顯著。

2、綠色信用卡對於消費者的誘因仍建立在信用卡各項優惠上，韓國 BC Card 公司尋求政府單位、企業贊助與低碳生活有關之各項優惠及點數，回饋約 3~24%，並協調各發卡銀行合作事項及市場面推廣與分析。綠色信用卡產生之消費、點數及帳款間之稽核作業由該國金融監察院會執行，韓國環境部及 KEITI 並無自行就管理層面進行監督，為與我國由環保署自行規劃並監督環保集點制度之最大差異。綠色信用卡推動初期亦曾面臨市場誘因不足以使零售業者參與之困境，經環境部運用政府資源使持卡數達一定規模後，讓韓國企業看到潛在誘因而陸續加入。

3、本次亞洲碳足跡網絡 2017 年會員會議，馬來西亞及香港廠商會檢定中心(CMA Testing and Certification Laborratories)為新參與的組織，於 5 月 25 日上午的會員會議中進行組織相關簡介以及與各會員國進行交流。馬來西亞於 5 月 25 日下午研討會中介紹該國對於建築材料的碳足跡驗證。韓國更對於第三類環境宣告標誌整合之機制與發展進行 3 個主題報告，透過法令修訂、檢視 10 項環境指標進行整合及改進該國碳足跡的驗證機制，日本亦有第三類環境宣告標誌整合之議題，將該國第三類環境宣告標誌（日本 EcoLeaf）與碳標籤進行整合。

4、關於我國、韓國及泰國之碳足跡標籤產品類別規則(CFP-PCR)的調和共識，5 月 26 日上午由台灣環境管理

協會與韓國環境產業技術研究院進行合作備忘錄的簽署，本次泰國因內部程序因素僅參與討論而未能加入成為簽署方。會議中並就三方的產品類別規則中不一致的內容進行討論，如運輸、能資源係數及廢棄物的處理方式，以及後續取得標籤之費用與執行方式，皆須再提出相關資料進一步研析。三方並議定於 2017 年下半年擇期於泰國再次舉辦三方碳足跡標籤產品類別規則調和的討論會議，並以洗髮精產品進行內容差異分析以及後續執行之具體方式進行溝通。

（二）心得與建議

1、 韓國綠色信用卡以該國民眾使用頻率最高之信用卡作為載具，我國環保集點制度係以結合各通路既有會員機制進行設計，兩套機制皆以便民為出發點，未來我國制度應持續朝向簡易、快速之方向改善，以利後續推廣。惟韓方指出，韓國綠色信用卡之消費者對於集點機制仍不甚瞭解，可得知消費者最在意的仍為消費當下的折扣或回饋。

2、 韓國綠色信用卡已推動 7 年，韓國環境產業技術研究院已蒐集足夠的消費樣本數進行綠色商品之商業模式分析，韓國亦遭遇雖透過推廣綠色信用卡已幫助綠色商品逐年提升營業額，惟市占率仍不高之問題。我國環保集點制度甫推動，應與韓國環境產業技術研究院持續保持溝通聯絡，未來可進行政策、技術的交流合作。

3、 聯合國亞太經濟社會東亞和東北亞辦事處(ESCAP East and North-East Asia Office)於研討會開場從巴黎協定帶出綠建築及產品第三類環境宣告之議題，並由澳洲、馬來西亞及韓國進行專題報告，對於我國而言，各國第三類環境宣告標誌整合的議題須持續關注，各國目前皆面臨政策、技術、執行等各面向整合的難題，從產品第三類環境宣告、產品全生命週期評估(LCA)等面向進行長遠的研究計畫，我國第三類環境宣告標誌目前僅碳足跡標籤，從持續關注各國最新資訊可作為未來推動減碳標籤之參考。

4、 我國、韓國及泰國等三方之碳足跡標籤產品類別規則調和議題為全球碳足跡標籤推動的重要突破，作為未來全球各國相互承認產品類別規則的基礎，甚至相互承認碳足跡標籤，未來仍須持續將三方不一致之處提出相關佐證資料後進行研析，期待簽署調和共識之合作備忘錄後，對於各國相互合作以及產業界參與能更有助益。

5、 除持續掌握亞太產品碳足跡制度發展外，也應持續關注歐盟產品環境足跡(Product Environmental Footprint, PEF)之發展，並吸取歐盟產品環境足跡類別規則(Product Environmental Footprint Category Rules, PEFCR) 清晰易懂之陳述方式、表格呈現量化結果及重視利害相關者參與過程等優點，於我國碳足跡產品類別規則文件(CFP-PCR)後續調整與轉型時一併納入參考，俾利與國際接軌。

目　　錄

壹、前言

韓國每年人均刷卡次數將近 130 次，個人消費總額近半透過信用卡支付，位居全球前茅，信用卡使用次數近 10 年來平均成長 141%，平均消費額僅 58.7 美元，低於世界主要國家平均值 98.5 美元，說明韓國信用卡小額支付的風氣盛行。韓國信用卡發卡公司競爭激烈，零售通路使用信用卡支付皆能得到一定程度的優惠，韓國環境部(Ministry of Environment, MOE)為推動綠色生活和擴展綠色消費，於 2009 年委託韓國環境產業技術院(Korea Environmental Industry & Technology Institute, KEITI)規劃、2011 年由 BC 卡公司(BC Card Co., Ltd.)出資於零售通路建置軟硬體，共同推出綠色信用卡(Green Credit Card，簡稱綠卡)作為點數載具，並由政府各部與相關企業提供各種點數及信用卡優惠，範圍包括節省能源（水費與電費）、購買綠色商品和使用大眾運輸系統等交易行為。另外，韓國各種文教設施場所皆有提供信用卡優惠服務。

目前韓國綠卡持有率已達 50%，發行超過 1,500 萬張綠卡，藉由點數及信用卡優惠廣泛的流通性，使韓國民眾樂於使用綠卡。對比我國甫起步之環保集點制度，雖於點數載具設計上迥異，環保集點制度廣納電子票證、各種會員卡，以會員帳戶為最終點數歸戶的方式，並無像韓國以信用卡作為單一載具，但同樣有多元化點數來源，如大眾運輸、購買綠色商品、參加環保活動等，與韓國或有相互借鏡或合作的空間。

聯合國亞太經濟社會東亞和東北亞辦事處(UNESCAP-ENEA)與韓國環境產業技術研究院 (KEITI)共同於 2011 年正式成立亞洲碳足跡網絡(Asia Carbon Footprint Network, ACFN)，成員包括韓國、臺灣、菲律賓、泰國、中國大陸、香港、馬來西亞、莫斯科及蒙古等 12 個會員組織，我國正式會員為財團法人工業技術研究院及社團法人台灣環境管理協會。ACFN 成立宗旨為藉由亞太碳足跡網路之建立與整合，作為亞洲各國針對碳足跡相關制度、方法論以及數據等相關資訊交流合作平台，以有效推廣碳標籤產品，達到

永續消費與生產之目標。

ACFN 自 2013 年起，除 2016 年外，每年皆舉辦研討會暨網絡會議，本次 2017 年為第四屆。為能積極提升並展現臺灣對於產品生命週期及碳足跡研究之國際能見度與影響力，並藉此即時掌握亞洲地區之產品生命週期及碳足跡發展最新訊息，以協助國內廠商及相關部會即時研擬因應策略，我國的會員組織每屆皆參與 ACFN 所舉辦之研討會暨網絡會議。本次除與 ACFN 組織成員交流外，與韓國、泰國更有產品類別規則調和共識議題，故三方研擬簽署合作備忘錄，對於碳足跡標籤國際相互承認及產業界參與能更有助益。

貳、目的

我國自 2015 年起推動環保集點制度，借鏡韓國及日本經驗，創造適合我國市場情境之綠色點數經濟市場，對於以點數鼓勵民眾落實綠色生活與綠色消費已有成果。此外，自 2009 年起我國邀集產業界共同發展產品碳足跡制度，為國際碳足跡標籤發展之先驅。近年來我國積極投入產品碳足跡計算服務平台與排放係數資料庫之建置、產品碳標籤之推動，並積極參與國際間碳足跡相關活動，持續關注國際間碳足跡之最新發展動態，並與亞太地區其他國家建立合作與資訊交流網絡。因此，為持續深化我國之良好形象與影響力，透過積極參與 ACFN 相關活動，掌握亞太地區各國於產品碳足跡之最新發展趨勢，並藉此建立國際碳足跡交流管道，更發展產品類別規則於國際間調和之議題。本次赴韓國拜訪 KEITI 交流韓國綠卡與我國環保集點制度，並且參與 2017 年亞洲碳足跡網絡會議之目的包括：

一、 與 KEITI 及 BC Card 公司交流韓國綠卡及我國環保集點制度推動成果，期未來有相互借鏡及進一步合作的可能。

二、 與會員組織進行碳標籤、減碳標籤及碳係數資料庫建置等推動經驗交流，以建立溝通管道。

三、 與韓國、泰國建立碳足跡產品類別規則調和共識，並簽署合作備忘錄，三方合作成果作為未來國際碳足跡制度調和議題之典範。

四、 掌握韓國綠卡對於綠色消費市場之分析結果以及亞洲碳足跡制度之發展趨勢，作為我國持續精進環保集點制度及綠色產品制度之參考。

參、行程及內容概要

日　期(2017年)	工 作 內 容 概 要
5月24日	啟程，出發至韓國首爾。 1. 參與韓國綠色信用卡交流會議： (1) 韓國綠色信用卡推動情形說明。 (2) 綜合討論。 2. 實地考察當地通路綠卡制度執行情形。
5月25日	參加研討會暨網絡會議： 1. 亞洲碳足跡網絡會員大會 (1) 介紹網絡新成員組織：馬來西亞(SIRIM Berhad Malaysia)及香港(CMA Industrial Development Foundation Limited)。 (2) 簡介亞洲碳足跡網絡過去的活動及未來的發展方向。 (3) 研修亞洲碳足跡網絡章程。 2. 亞洲碳足跡網絡研討會 (1) 主題一：環境資訊揭露在綠建築上的應用。 (2) 主題二：亞洲碳足跡及環境宣告制度近期的議題及其衝擊。
5月26日	參加臺灣、韓國及泰國PCR調和討論會議。
5月27日	返程，回到臺北。

肆、與會過程及內容

一、韓國綠色信用卡交流會議

(一) 會議概要

韓國綠色信用卡政策由環境部、KEITI、BC 卡公司共同推動，本次會議主要拜訪對象為 KEITI，另由 KEITI 主動邀請環境部及 BC 卡公司與會。會議當日 BC 卡公司代表說明韓國綠卡制度推動現況，由所有與會單位一同就政策制定、營運策略、執行障礙等面向進行交流。

1. 韓方出席人員：

(1) 韓國環境部代表 Kwon, Chun-Kyung

(2) KEITI 代表 Dong-Wook Lee、Jae Kwon Yang、Seongho Jeon

(3) BC 卡公司代表 Lim, Namhun、Yoon, Sung-Hwan、Nuri Esther Kim

2. 我國出席人員：

(1) 本署管制考核及糾紛處理處洪淑幸處長、王瑞鋐薦任科員

(2) 汎宇電商股份有限公司王韻慈

3. 會議地點：KEITI 會議室(613-2 Bulgwang-dong, Eunpyeong-gu, Seoul)

圖 1　韓方 BC 卡公司代表進行綠卡推動情形說明

(二) 韓國綠色信用卡推動情形

截至 2017 年 5 月，綠卡已發行超過 1,514 萬張，已有 21 家金融機構、8 家連鎖型通路、20 家產品製造商、2,902 項環保產品參與綠卡制度；此外韓國農業部和食品農業部已於 2017 年 2 月參與綠卡制度，供給消費者購買生態或有機認證食品之綠點(Eco Money)。

綠卡平均每月 3 億人次使用該卡搭乘大眾運輸，並消費超過 4 億韓元之綠色商品，綠卡用戶每年可以獲得 20 萬韓元的收益，2016 年共累積 375 億元之綠點，累計減少 249 萬噸碳排放。

表 1　韓國綠色信用卡發行銀行一覽

分類	發行銀行
一般綠卡	우리카드、하나카드、NH농협카드、IBK기업은행、BNK 부산은행、BNK 경남은행、DGB대구은행、KB국민카드、우정사업본부、MG새마을금고중앙회、수협은행、광주은행、상호저축은행、신협、제주은행
首爾生態里程卡	우리카드、Standard Chartered SC제일은행、NH농협카드、IBK기업은행
二代綠卡	NH농협카드、IBK기업은행、BNK 부산은행、DGB대구은행

表 2　韓國綠色信用卡特約通路及綠色產品製造商

分類	單位
特約通路	
製造商	

(三) 會議交流

本次會議以瞭解韓國綠卡推動過程於政策制定、營運策略、執行障礙之經驗，並分享我國環保集點制度推動情形，藉以交流兩國綠色經濟成長之政策推動心得。韓方於會議中分享之推動經驗與建議彙整如下：

1. 政策制定面

(1) 結合其民眾頻繁使用信用卡之消費習慣，推出綠色信用卡，提供低碳場所、設施優惠並搭載集點機制，讓民眾透過實際體驗，循序漸進內化為低碳生活習慣。

(2) 綠卡制度由環境部、KEITI、BC 卡公司共同營運，環境部作為政策所有人，領導政策推動及各合作單位分工；KEITI 為綠色商品銷售點系統(Green POS)開發單位，並協助推廣綠卡政策；BC 卡公司為最大出資單位，協調各發卡銀行合作事項、投資硬體設備及市場面推廣與分析。

(3) 韓國並無如我國多元載具的規劃，而綠卡產生之消費、點數及帳款間之稽核作業由該國金融監察院會依金融監督職權執行，韓國環境部及KEITI 並無自行就管理層面進行監督，為與我國由環保署自行規劃並監督環保集點制度之最大差異。

2. 營運策略面

(1) 綠卡對於消費者的誘因建立在信用卡各項優惠，故不須參與環保行動也可以使用綠卡的優惠，類似國內信用卡及其特約店家之聯名優惠，藉此提高韓國民眾申辦綠卡意願。

(2) 韓國內綠卡持有率逾 50%，已有足夠消費資料數據由 BC Card 公司進行分析韓國國內綠色消費市場並作為相關政策規劃或市場行銷之參考，數據亦回饋參加綠卡的通路，為企業參與誘因之一。

(3) 綠卡之綠色商品回饋可達 3~24%，係透過該商品自生產至販售各環節業者提供之優惠集合而成，並融入自由經濟市場，可分攤韓國環境部必須支出之點數費用。

3. 執行障礙

(1) 綠卡推動初期亦曾面臨市場誘因不足以使零售業者產生參與意願之困境，經環境部投入資源使會員數（持卡數）達一定規模後，提高業者參與意願後業者陸續加入綠卡特約商。

(2) 對於消費者使用面相而言，實際上綠卡使用者對於綠點使用仍不甚熟悉，申辦信用卡係以信用卡優惠為主要誘因，消費者使用信用卡基本優惠為大宗，累積或使用綠點折抵綠色消費者仍佔少數，將綠點使用深入消費各面向為綠卡制度下階段目標。

(3) 透過綠卡行銷綠色商品優惠，已確實提高韓國綠色商品於市場中之競

爭優勢，綠色商品之營業額亦逐年增長，惟相較一般產品市占率仍不高，為韓國政府持續努力的目標，與我國綠色商品市場情況類似。

圖 2　我方代表（洪淑幸處長）與韓方交換伴手禮（左上為環境部代表、右上為 KEITI 代表、左下及右下為 BC 卡公司代表）

圖 3　韓國綠色信用卡交流會議後合影

二、實地考察當地通路綠卡制度執行情形

(一) 考察通路介紹

KEITI 於交流會議後帶領我國代表前往 Home Plus 世界盃分店(240 Woldeukeom-ro, Seongsan 2(i)-dong, Mapo-gu, Seoul)，Home Plus 是韓國僅次於 E-Mart 的第 2 大零售商，共有 113 家分店，為 2011 年 7 月首批加入綠卡制度之 3 家連鎖通路之一，另兩家通路分別為 E-Mart 及 Lotte Mart。

圖 4　實地考察綠卡制度特約通路－Home Plus 世界盃店

(二) 考察項目與實際情形：

1. 綠卡相關 LOGO(Green Card、Eco Money)標示

(1) 賣場內未見綠卡相關店頭文宣，但可見 Home Plus 自主推動之綠色消費宣傳與將綠色商品集中陳列之作法。

(2) 商品外包裝僅少數品牌可見綠卡相關標示，多數商品僅有環保標章、碳標籤或減碳標籤之標示。

圖 5　賣場綠色專區及商品集中陳列情形

圖 6　商品外包裝綠卡 LOGO(左圖)及碳標籤(右圖)標示情形

2. 結帳櫃台處理點綠點折抵：櫃台人員熟悉綠卡之操作，結帳流程順暢。


圖 7　賣場櫃台人員操作綠卡結帳情形

3. 交易明細呈現：交易明細記有當次消費及前後點數，綠卡 APP 亦即時顯示該次交易點數變化情形。

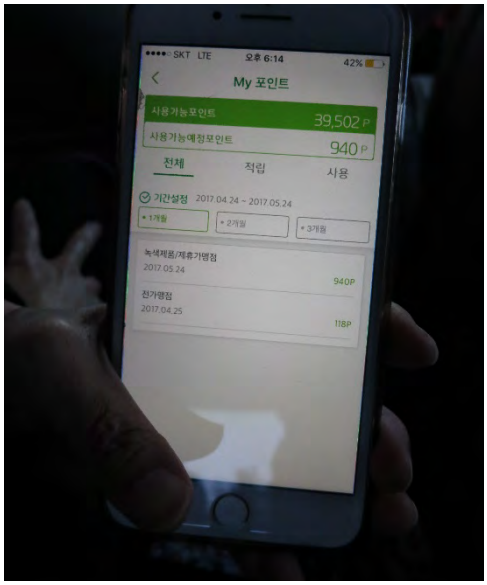

圖 8　交易明細呈現情形

三、亞洲碳足跡網絡 2017 年會員會議概要

亞洲碳足跡網絡會議(ACFN)為亞太地區國家針對各國碳足跡推動現況、相關制度、產品類別規則，以及碳排放係數資料庫等相關訊息交流與整合之重要會議。

2015 年第三屆 ACFN 特別召開閉門會議，英國碳信託公司(Carbon Trust)協助將 ACFN 會員國發展碳標籤之產品案例進行比較。該研究結果建議 ACFN 會員國進行制度調和，並提出包括碳標籤制度差異（如:土地利用改變與農業排放、碳儲存、數據品質等）、利用韓國電子產品的經驗進行調和各國產品類別規則、各國係數資料庫的整合、如何促進更多 B2B 產品進行碳足跡計算並進行亞洲區域的供應鏈整合等 4 個議題。英國碳信託公司亦主動提出願擔任制度調和的顧問工作，惟經各會員國討論後認為該公司未明確說明如何協助各會員國達到碳標籤制度調和的程序步驟、執行方法、執行時程、各會員國所需提供的文件資料（包括格式與語文要求等），以及每年度所需投入的經費等，因此對於進行碳標籤制度調和一事並未達成共識。

韓國於第三屆 ACFN 後，積極與我國及泰國聯繫希望就產品類別規則部分進行調和共識會議，為瞭解各國後續發展方向，並簽訂產品類別規則部分進行調和共識備忘錄，本年度持續派員參加於韓國舉行為期 2 天會議：

(一) 出席人員：ACFN 各會員組織代表與其他關心亞州碳足跡議題之各界人員，共約 50 餘人。

(二) 我國出席人員：

1. 本署管考處洪淑幸處長、王瑞鋐薦任科員。

2. 國立臺北科技大學環境工程與管理研究所胡憲倫教授。

3. 財團法人工業技術研究院盧怡靜博士、沈芙慧副研究員。

4. 社團法人台灣環境管理協會吳伋經理、尤奕涵工程師。

(三) 主要行程：

1. 106 年 5 月 25 日：參加會員大會及研討會。

2. 106 年 5 月 26 日：參加臺灣、韓國及泰國產品類別規則調和討論會議並與韓國簽署技術合作備忘錄。

本年度 ACFN 會員大會主要為介紹馬來西亞標準與工業研究協會(The Standard and Industrial Research Institute of Malaysia, SIRIM)及香港中華廠商聯合會(CMA Industrial Development Foundation Limited)兩個網絡新成員組織，並簡介亞洲碳足跡網絡過去的活動，包含會員組織間的相互合作、訓練課程交流等，以及與會員研析未來的發展方向與 ACFN 會員章程，重點摘述如下：

(一) 新申請成為會員之組織需向秘書處遞交申請書並經其他會員組織同意。

(二) 不再設置指導委員會，ACFN 若有重要事項需要決定則改由每年召開 ACFN 進行討論，包含未來發展方向、相關計畫的發展與實施指引、財政議題、年度會議辦理計畫及新會員申請的認可與否等事宜。

四、亞洲碳足跡網絡會議研討會

本次 ACFN 研討會主題為「藉由碳足跡與產品環境宣告計畫促進綠建築之發展(Promoting Green Buildings through Carbon Footprinting and Environmental Product Declaration Scheme)」，議題包含「環境資訊揭露在綠建築上的應用(Best practices of the application of information on environmental performances in green buildings)」與「亞洲碳足跡及環境宣告制度近期的議題及其衝擊(Recent issues and implications of Carbon Footprinting and Environmental Declaration Schemes in Asia : Challenges and the Way Forward)」。會議目的包括：瞭解產品環境宣告及碳足跡認證在綠建築的應用概況、瞭解會員組織在碳足跡和標籤制度的變革與現況。

(一) 研討會中各國報告重點

1. 聯合國亞太經濟社會東亞和東北亞辦事處處長 Kilaparti Ramakrishna 首先就本年度主題「綠建築」進行開場，在以「Paris Agreement and Its Implication for Buildings」為題的簡報中指出，根據統計，建築業（包含建材的製造）消耗的能源約占總能源消耗的 1/3，且近 30%的溫室氣體係由建築業直接或間接排放所造成。若在建築過程中選用已經環境宣告或碳足跡認證之產品，將有助於減低建築業對於環境的衝擊。

2. 澳洲代表 Nigel Howard 在「Application of information on environmental performances and Green Building Certification」的簡報中，彙整了國際間常用之綠建築評定標準對於與溫室氣體排放相關的評分項目，如表 3 所示。

表 3　國際間常用之綠建築評定標準對於溫室濟體排放之相關評分項目

評定標準	溫室氣體排放相關之評分內容摘要
BREEAM 98 onwards	1. 針對能源使用造成每平方公尺排放之二氧化碳當量評分 2. 針對運輸造成每平方公尺排放之二氧化碳當量評分
LEED V4	以美國商業建築之節能標準(ASHRAE 90.1)為基礎，評比其相關之能源表現
Green Star	1. 與二氧化碳當量產生相關的表現是否改善 2. 使用的原物料是否具有環保標章或環境宣告 3. 產品設計是否融入 LCA 的概念 4. 是否將供應鏈納入考量
HKBEAM	能源表現分數的評定是以與基線相比較少多少二氧化碳當量為依據
GBCS	針對能源的組成、是否使用再生能源及照明效能進行評分
CASBEE	針對建築造成的環境負荷進行評比，包含原物料、能源及水
BNB	以 LCA 為基礎，考量原物料及能源造成的溫室氣體排放，但不包含運輸

3.KEITI 及韓國土木工程及建築科技研究所(Korea Institute of Civil Engineering and Building Technology)分別在題為「Promoting Green Buildings through Carbon Footprinting and Environmental Product Declaration Schemes」及「Promoting Green Buildings through Carbon Footprinting and Environmental Product Declaration Schemes」報告指出，在韓國，EPDs 將是未來發展趨勢。而取得碳足跡認證的產品中約有12.2%為建築建材，可分為建築內部材料（如地板、壁紙、家具材料等）、窗戶及門的材料、建造材料（如混凝土）、設備材料（如管道材料）及其他，各該類產品碳足跡平均數值如表 4 所示。

表 4　各類建築建材產品碳足跡平均數值表

產品類別	產品數量	平均碳排放量	單位
建築內部材料	80	6,885.6	gCO_2/m^2
窗戶及門的材料	14	1,819.2	gCO_2/kg
建造材料	10	5,43.8	$kgCO_2/m^3$
設備材料	8	120.3	$kgCO_2/unit$
其他	15	--	--

4.馬來西亞標準與工業研究協會(The Standard and Industrial Research Institute of Malaysia, SIRIM)以題為「Establishment of Carbon Footprint Labelling Scheme in Malaysia」報告，於 2012 年 12 月起至 2015 年 12 月期間，開始推動 SWITCH Asia 計畫，此為針對營造跟建材進行環境宣告的計畫。該計畫與英國碳信託公司(The Carbon Trust, UK)、馬來西亞製造業聯盟(Federation of Malaysian Manufacturers, FMM)、馬來西亞綠建築聯盟(Malaysian Green Building Confederation, MGBC)及馬來西亞建材批發商協會(Building Materials Distributors Association Malaysia, BMDAM)共同合作，共有 77 家廠商參與試行計畫，22 件產品取得

碳足跡認證。

5. 2013-2015 年，日本由於參與 EcoLeaf 與碳標籤申請廠商多為重疊，為更有效率地進行管理並符合國際標準，遂進行標籤整合規劃。2016 年起，JEMAI 開始確認整合計畫是否符合國際標準與國內綠色採購規範，並逐步引入新架構進行標籤整合並確認此整合計畫是否符合社會需求。目前日本政府之政策走向並沒有提供太多誘因，促使廠商去執行生命週期(LCA)與產品環境宣告(EPDs)，主要仍著重於氣候變遷議題。但在美國或歐盟相關綠色採購政策上，LCA 與 EPDs 應用呈現漸增趨勢。
6. 韓國 KEITI 第 2 份報告「Improvement of the integrated EPD scheme and directions for development in Korea」，2015 年 5 月，韓國政府決定依據「從零開始改進之認證方案計劃(zero based improvement plan of the certification schemes)」，將國內既有碳標籤與產品第三類環境宣告制度進行整合。同時，透過推出新標誌，一方面增進產品環境績效之資訊辨識度，另一方面藉此降低消費者混淆。截至 2017 年 4 月，共有 257 家廠家，總計 2,624 項產品獲得驗證；其中取得產品第三類環境宣告之產品有 352 項，碳足跡產品有 2,284 項（碳排放有 259 家廠家，總計 1,849 項產品，低碳產品有 44 家廠家，總計 419 項產品）。
7. 日本與韓國皆發表對於 EPDs 整合之看法，重點如表 5。

表 5　日本與韓國 EPDs 整合之比較

國家	日本 （僅制度整合，沿用舊標籤）	韓國 （制度整合，並發展出新標籤）
計畫名稱	The JEMAI Environmental Label Programme	從零開始改進的認證方案計畫(zero based improvement plan of the certification schemes)
目的	參與EcoLeaf與碳標籤申請的廠商多為重疊，為更有效進行管理並符合國際標準，遂進行標籤整合的規劃	透過推出一個統一設計標誌，以增進產品環境績效的資訊辨識度，並藉此降低消費者的混淆
推展時程	2016年起	2015年5月起
揭露指標	未明確提及	將既有的EPD衝擊指標與碳標籤進行整合，並加入生態足跡、臭氧層破壞、酸化、優養化、光化學煙霧、水足跡、生態毒性、人體毒性及生態多樣性等10項指標。
標籤圖示	 沿用既有標籤圖示，若要揭露多種環境衝擊時，使用EcoLeaf圖示；揭露與溫室氣體(GHS)相關之單一環境衝擊時，使用碳標籤圖示。	 將原有標籤整合，統一為新圖示，圖形中間將以不同圖示表示揭露的環境衝擊指標(如圖1)

伍、心得及建議

一、 重要資訊及成果

本次透過與 KEITI、BC Card 公司交流韓國綠卡與我國環保集點制度，並且參與 ACFN 2017 年會員會議，汲取韓國推廣綠卡之策略與經驗，並且與 ACFN 各會員國之產品碳標籤、減碳與低碳標籤推動經驗進行交流，更與韓國簽訂產品類別規則之技術合作備忘錄。主要內容包括：

(一)韓國環境部為推行綠色生活與綠色消費，鑑於韓國消費習慣運用信用卡相當普及且廣泛，自 2009 年起，委由韓國環境產業技術研究院規劃、韓國 BC Card 公司投資設備建置成本，推出由韓國 20 家信用卡公司共同發行的「綠色信用卡」，提供特約場所、設施優惠並有集點機制，強調低碳生活；韓國 BC Card 公司指出目前綠色信用卡持有率已達信用卡持有人口之 50%，韓國 BC Card 認為綠色信用卡對於推行綠色生活與綠色消費成效相當顯著。

(二)綠色信用卡至今已推動近 7 年，對於消費者的誘因仍建立在信用卡各項優惠上，韓國 BC Card 公司尋求政府單位、企業贊助與低碳生活有關之各項優惠及點數，回饋約 3~24%，並協調各發卡銀行合作事項及市場面推廣與分析。綠色信用卡產生之消費、點數及帳款間之稽核作業由該國金融監察院會執行，韓國環境部及 KEITI 並無自行就管理層面進行監督，為與我國由環保署自行規劃並監督環保集點制度之最大差異。綠色信用卡推動初期亦曾面臨市場誘因不足以使零售業者參與之困境，經環境部運用政府資源使持卡數達一定規模後，讓韓國企業看到潛在誘因而陸續加入。

(三)對於消費者使用面向而言，實際上綠卡使用者對於綠點使用仍不甚熟悉，申辦信用卡係以信用卡優惠為主要誘因，消費者使用信用卡基本優惠為大宗，累積

或使用綠點折抵綠色消費者仍佔少數，將綠點使用深入消費各面向為綠卡制度下階段目標。

(四)本次亞洲碳足跡網絡 2017 年會員會議，馬來西亞及香港廠商會檢定中心(CMA Testing and Certification Laborratories)為新參與的組織，於 5 月 25 日上午的會員會議中進行組織相關簡介以及與各會員國進行交流。馬來西亞於 5 月 25 日下午研討會中介紹該國對於建築材料的碳足跡驗證。韓國更對於第三類環境宣告標誌整合之機制與發展進行 3 個主題報告，透過法令修訂、檢視 10 項環境指標進行整合及改進該國碳足跡的驗證機制，日本亦有第三類環境宣告標誌整合之議題，將該國第三類環境宣告標誌（日本 EcoLeaf）與碳標籤進行整合。

(五)關於我國、韓國及泰國之碳足跡標籤產品類別規則(CFP-PCR)的調和共識，5 月 26 日上午由台灣環境管理協會與韓國環境產業技術研究院進行合作備忘錄的簽署，實為我國參加 ACFN 之重要里程碑，惟本次泰國因內部程序因素僅參與討論而未能加入成為簽署方。會議中並就三方的產品類別規則中不一致的內容進行討論，如運輸、能資源係數及廢棄物的處理方式，以及後續取得標籤之費用與執行方式，皆須再提出相關資料進一步研析。三方並議定於 2017 年下半年擇期於泰國再次舉辦三方碳足跡標籤產品類別規則調和的討論會議，並以洗髮精產品進行內容差異分析以及後續執行之具體方式進行溝通。

二、 心得與建議

我國自 2015 年起從大眾運輸之綠色生活面相推動環保集點制度，以綠點鼓勵民眾購買綠色商品，至今透過多元點數載具、各種行銷活動，已與韓國綠卡制度有不同的發展，但相互間仍有可借鏡或合作之處。另一方面，我國自 2009 年起推動產品碳足跡標示制度，嗣後雖自 2013 年起推出減碳標籤，但仍屬國際之先驅者。由本次會議獲得資

訊，顯示各國除了陸續於法規建制、資訊系統及資料庫之建立，以及綠色產品之行銷推廣等工作之外，亦關注國際間的合作，例如 EPDs 之發展、資訊共享與相互承認機制等面向，同時，我國與韓國簽訂產品類別規則之技術合作備忘錄後，碳足跡制度的調和為未來發展議題。爰此，我國於推動綠色消費及環保產品驗證制度工作時，建議注意下列事項：

(一)韓國綠色信用卡以該國民眾使用頻率最高之信用卡作為載具，我國環保集點制度係以結合各通路既有會員機制進行設計，兩套機制皆以便民為出發點，未來我國制度應持續朝向簡易、快速之方向改善，以利後續推廣。惟韓方指出，韓國綠色信用卡之消費者對於集點機制仍不甚瞭解，可得知消費者最在意的仍為消費當下的折扣或回饋。

(二)KEITI 透過綠色信用卡之政策已臻成形，並著手進行綠色商品之商業模式分析，韓國亦遭遇雖透過推廣綠色信用卡已幫助綠色商品逐年提升營業額，惟市占率仍不高之問題。我國環保集點制度甫推動，應與 KEITI 持續保持交流關係，除推動困境之請益外，待環保集點制度規模相當，亦可合作擴大綠色消費市場之分析。

(三)聯合國亞太經濟社會東亞和東北亞辦事處(ESCAP East and North-East Asia Office)於研討會開場從巴黎協定帶出綠建築及產品第三類環境宣告之議題，並由澳洲、馬來西亞及韓國進行專題報告，對於我國而言，各國第三類環境宣告標誌整合的議題須持續關注，各國目前皆面臨政策、技術、執行等各面向整合的難題，從產品第三類環境宣告、產品全生命週期評估(LCA)等面向進行長遠的研究計畫，我國第三類環境宣告標誌目前僅碳足跡標籤，從持續關注各國最新資訊可作為未來推動減碳標籤之參考。

(四)我國、韓國及泰國等三方之碳足跡標籤產品類別規則調和議題為全球碳足跡標

籤推動的重要突破，作為未來全球各國相互承認產品類別規則的基礎，甚至相互承認碳足跡標籤，未來仍須持續將三方不一致之處提出相關佐證資料後進行研析，期待簽署調和共識之合作備忘錄後，對於各國相互合作以及產業界參與能更有助益。

(五)除持續掌握亞太產品碳足跡制度發展外，也應持續關注歐盟產品環境足跡(Product Environmental Footprint, PEF)之發展，並吸取歐盟產品環境足跡類別規則(Product Environmental Footprint Category Rules, PEFCR) 清晰易懂之陳述方式、表格呈現量化結果及重視利害相關者參與過程等優點，於我國碳足跡產品類別規則文件(CFP-PCR)後續調整與轉型時一併納入參考，俾利與國際接軌。

附錄一：韓國環境產業技術院綠卡簡報資料及我國環保集點制度簡報資料

Introduction of Green Card

April 2017

BCcard
Product Development Dept.

Asia No.1 Payment Service Company

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Business Area of BCcard

With its core service in acquiring, BCcard is catering to various needs of its 32 financial institutions in Korea

Network | **Acquiring** | **Risk Mgmt** | **Issuer BPO** | **Marketing Service**

ACQURING ⟷ **ISSUING**

- Card Authorization Processing & STIP
- Clearing & Settlement
- Backoffice Processing

- Merchant Acquisition & mgmt.
- Merchant Settlement
- Sales Draft Collection
- Merchant Loyalty Program

- Fraud Risk mgmt. (Cardholder/Merchant)
- Credit Risk mgmt.

- Card Personalization
- Cardholder info mgmt.
- Billing
- Customer Service

- Product Development
- Cardholder Marketing
- Brand Marketing
- CRM / g-CRM

Network Capability

BCcard serves a wide clientele base providing end-to-end payment services and running actual operations for the members/clients

32 Client Banks & Security Companies

우리카드 · KDB산업은행 · 광주은행 · 수협은행 · KB국민카드 · NH농협카드 · KOREA POST · citibank · BNK 부산은행 · 제주은행 · IBK기업은행 · MG새마을금고 · 하나카드 · Standard Chartered SC제일은행 · 대구은행 · 신협 · 신한카드 · 전북은행 · 저축은행 · BNK 경남은행 · 中国银行 · …

2.5 million merchants & 102,000 ATMs

LOTTE HOTELS & RESORTS · STARBUCKS COFFEE · TESCO · NIKE · JW MARRIOTT. SEOUL · Pizza Hut · LOUIS VUITTON · … · natural story THEFACESHOP · ebay · 7-ELEVEN

Company Partners

GS Caltex · LOTTE Mart · LOTTE HOTELS & RESORTS · emart · KOREAN AIR · … · CGV · HYATT

Airlines, hotels, department stores, oil refineries, telco, movie theaters, amusement parks, government, etc.

International Networks

VISA · JCB · *52.3 million cards issued* · PLUS · DISCOVER · UnionPay 银联 · Diners Club INTERNATIONAL · Cirrus · pulse A DISCOVER COMPANY · MasterCard · …

BCcard has strived to meet the global standards for secure and stable services and been acknowledged its effort worldwide

Global Recognition

ISO/IEC 27001:2005 (Standard of Information Security Management)

Global Acceptance Locations

Brand	(mil.)
MasterCard & Visa	38.1
Discover/Diners	25.7
BC Card	25.7
RuPay	25.7
JCB	25.0
UnionPay	18.9*
American Express	16.1*

* Estimate. © 2014 The Nilson Report

Top 150 Acquirers Worldwide

Rank	Acquirer, Country	Transactions (mil.)	Rank	Acquirer, Country	Transactions (mil.)
1	Banc of America U.S.	9,260.9	51	Lloyds Banking Group U.K.	351.0
2	First Data U.S.	5,885.0	52	Sberbank Russia	350.0
3	Chase Paymentech Sol. U.S.	5,489.8	53	iPayment U.S.	335.1
4	Citi Merchant Services U.S.	5,204.7	54	PayLife Bank Austria	334.0
5	WorldPay U.K.*	4,600.0	55	BBVA Bancomer Mexico	328.0
6	Fifth Third Proc. Sol. U.S.	4,238.4	56	EVO Merchant Services U.S.	311.3
7	Cielo Brazil	4,063.0	57	SIX Multipay Switzerland	310.0
8	Barclays U.K.	2,716.9	58	Akbank Turkey	305.3
9	Credit Mutuel France	2,350.2	59	TD Merchant Services Canada	304.1
10	Redecard Brazil	2,320.3	60	Teller AS Norway	304.0
11	Elavon U.S.	1,889.6	61	La Banque Postale France	303.8
12	Heartland Pymt. Sys. U.S.	1,799.7	62	Nat'l Australia Bank Australia	298.5
13	Global Payments U.S.	1,762.7	63	B+S Card Service Germany	250.0
14	WorldPay U.S.	1,748.0	64	TransFirst U.S.	241.0
15	Swedbank Group Sweden*	1,350.0	65	Cynergy Data U.S.	240.0
16	BC Card South Korea	1,316.3	66	Transbank Chile	235.7
17	Group Credit Agricole France	1,282.2	67	Merchant E-Solutions U.S.	234.0
18	Wells Fargo Merch. Serv. U.S.	1,202.8	68	Caja Madrid Spain	230.1
19	HSBC/Global Payments U.K.	1,142.6	69	First Nat'l Bank South Africa	225.8
20	Groupe BPCE France	972.5	70	Banamex Mexico	225.2

According to Nilson Report, BCcard is …

- 3rd among international brands in '14
- 16th among top 150 acquirer worldwide in '10
- 5th among AP issuers in '08
- 4th Visa/MasterCard/General Purpose card issuers in AP in '08

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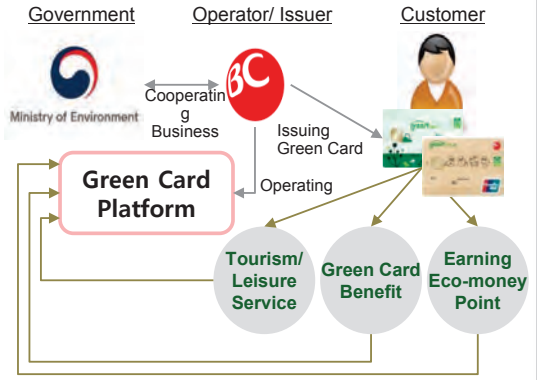
Business Concept

Issue Credit/Check Card and to use it as a medium to lead an eco-friendly lifestyle under exclusive partnership with Government

Business Concept of Green Card

Definition

Business of **"Issuing Credit/Check Card and Operating Platform"** under **exclusive partnership with Government** – *the Ministry of Environment*



Issue Green Card and use it as a medium to lead an eco-friendly lifestyle

Key figures of greencard

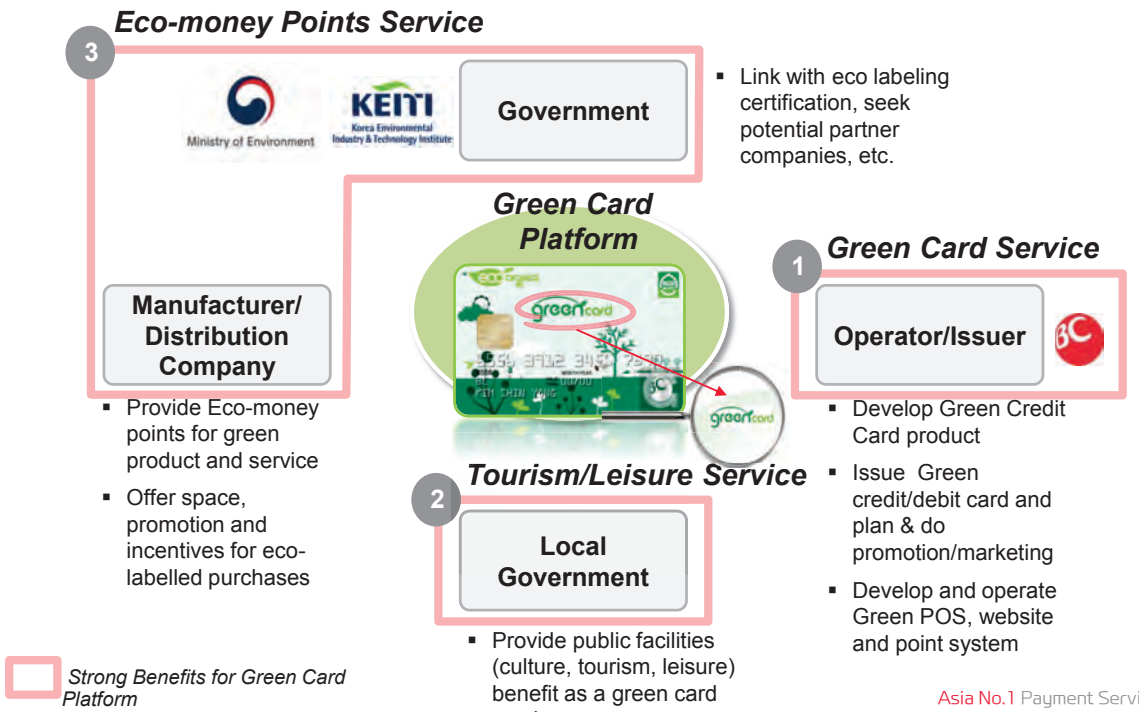
Issuers	# of Issued	Revenue
20 issuers	**16** million	**32.5** billion USD

Volume of Eco-money Points	Volume of Eco-Products Points	Co_2 Reduction
37.5 billion points	**930** million points	**2.5** million ton

Green Card Platform

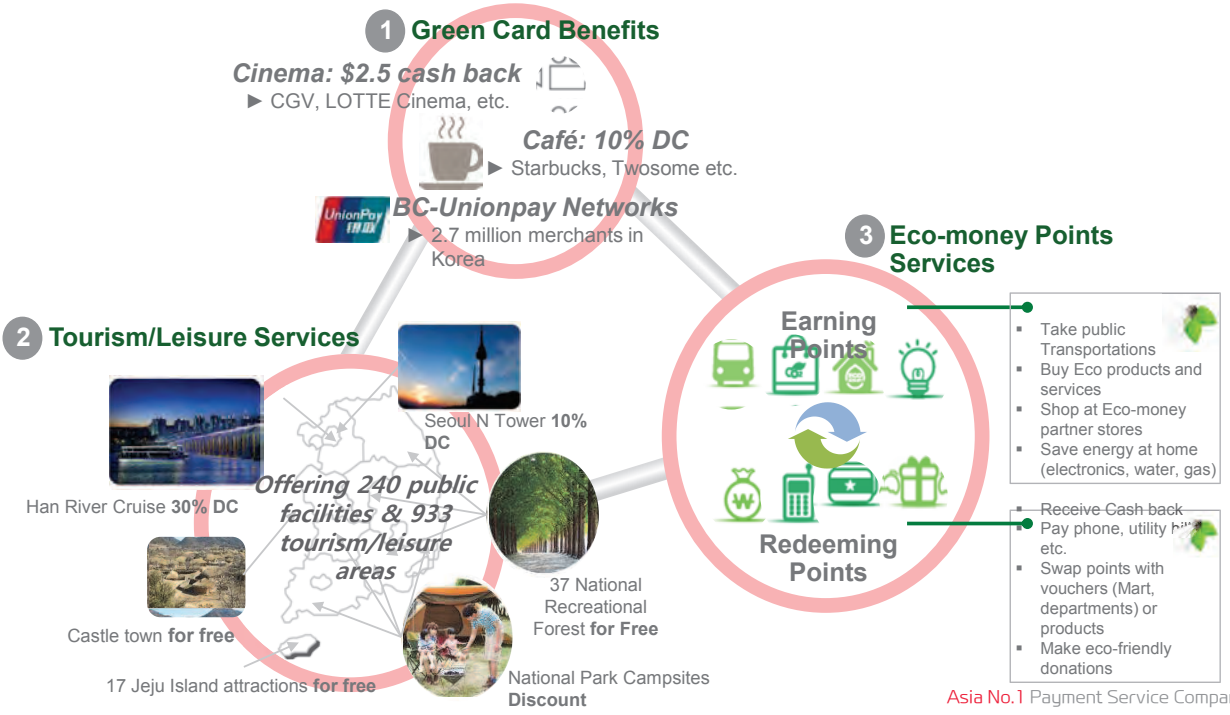
Issuer, manufacturer and operator together with government can create a virtuous cycle of green consumption, retail, and production

Overview of Green Card Platform



Green Card Platform offers various benefits, Tourism/Leisure services and Eco-money Points services

Benefits for Green Card Platform



Thank You!

그린카드 사업 소개

2017년 5월

BC card

01. 그린카드 사업 소개

1 그린카드 도입배경

공격적인 국가 중기탄소 감축목표가 설정된 후 민간 부문 탄소감축을 위해 국민들이 자발적으로 참여할 수 있는 감축수단이 절실히 필요했음

도입 배경

1 한국, 온실가스 배출 증가율 OECD 국가 중 1위
- 민간부문 배출량 지속적 증가 추세

2 한국, 자발적 탄소감축 목표 대외 제시
- 2020년까지 배출전망치 대비 30% 절감 공격적 목표 제시

"자발적 온실가스 감축 이행 및 2020년까지 세계 7대 녹색강국 추진"

3 목표달성을 위해 '민간부문' 강력한 탄소감축 수단 필요
- 민간 부문 배출량 지속 증가하나 감축 잠재량 높음
- 민간부문 감축 위해서는 국민들의 자발적 녹색생활 유도 필요
  - 조건부 친환경 소비자 특성 보유
    - 경제적 혜택 제공 시 친환경 의지 향상
  - 국민 1인당 4장 신용카드 보유
- 기후변화 대응, 친환경 상품 판로개척 등 에 대한 니즈를 보유한 제조, 유통,금융사 다수 존재

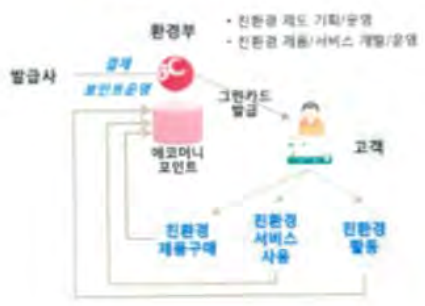
Source: 2009.12월 지경부 발표자료 기준

2 그린카드 소개

그린카드는 고객의 에너지 절약, 친환경 제품 구매 등 친환경 활동에 대하여 카드 기반 포인트 혜택 제공을 主 서비스로 하는 공공 플랫폼 카드임

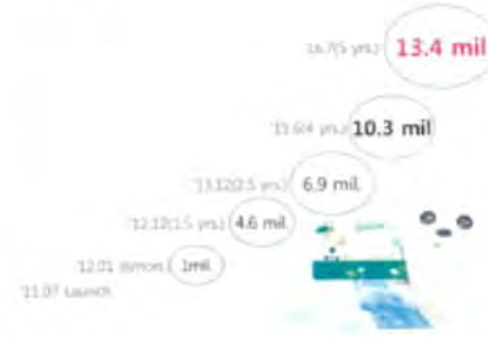
그린카드 개요

정의	환경부 독점 제휴기반의 '카드 발급 및 플랫폼 운영' 사업
모델	• 환경부 제휴를 기반으로 개방형 포인트 플랫폼 구축 및 운영 • 그린카드(신용, 체크, 멤버십)를 발급하고, 이를 매개체로 친환경생활을 주도



주요 실적

카드 발급량



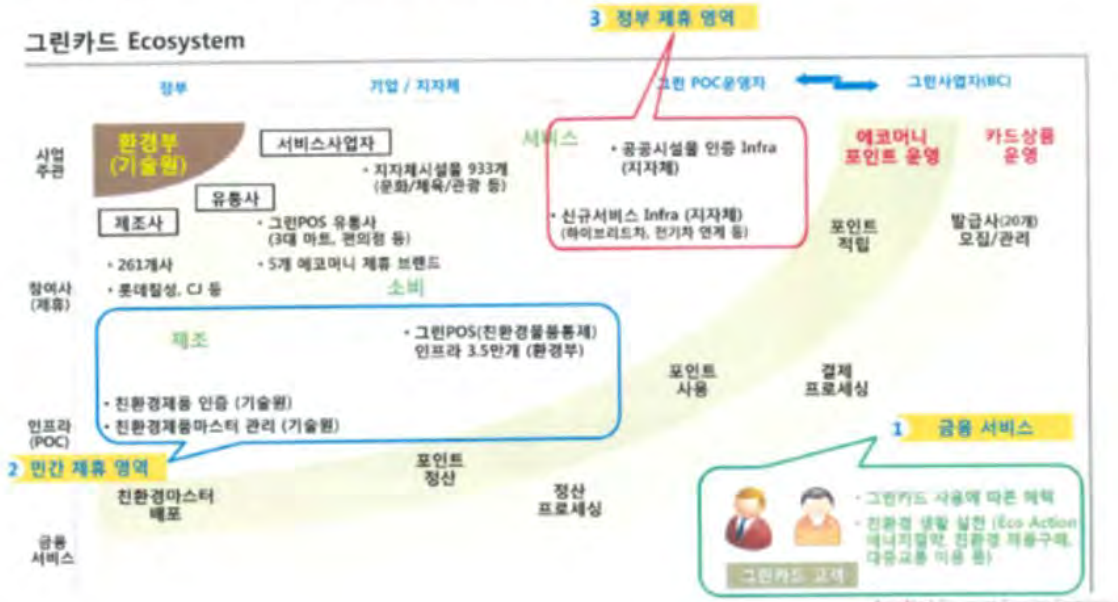
카드 이용액

"연 매출액 10조 (월 평균 8,300억) (2015.08~2016.07 기준)"

3 그린카드 운영 체계

실질적 탄소감축을 위해 카드 발급, 민간 제휴, 정부 제휴 등 3대 제휴 영역에서 고객의 친환경 생활·소비에 따른 차별화된 서비스와 가치 제공함

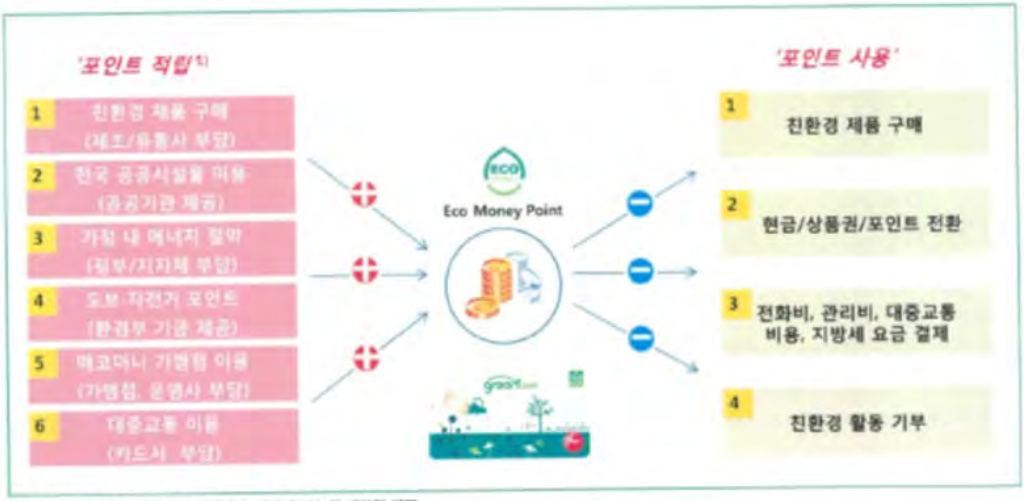
그린카드 Ecosystem



3 ① 금융 서비스 – 포인트 적립 및 사용

에너지 절약, 친환경 제품 구매, 대중 교통 이용 등 친환경 활동에 따른 포인트 적립 혜택을 제공하며, 이를 친환경 생활에 재투자할 수 있도록 '친환경 리워드 제도' 운영중임

그린카드 포인트 서비스 운영 모델



1) 적립 1, 2, 3, 4 혜택은 타 신용카드 제공 불가능한 배타적 혜택

3 ② 민간 제휴 - 그린 POS 시스템

친환경 제품 통제가 가능한 약 3.5만개의 오프라인 '그린POS 인프라'를 구축했으며, 향후 온라인·모바일 POS 등 신규 인프라의 지속 확대를 추진 예정임

친환경 제품 포인트 적립 프로세스

그린 POS 시스템

3 ③ 정부 제휴 – 생활 에너지 절감 혜택 (탄소포인트제, 에코마일리지)

서울시와 환경부 주관으로 전국 209개 지자체에서 가정내 생활 에너지 (전기, 수도, 가스) 절감 시 그린카드를 통해 포인트를 지급함

생활 에너지 절감 시 포인트 제공 프로세스

생활 에너지 절감 프로그램

구 분	탄소포인트제	에코마일리지제도
로 고		
가입 대상	전국민 (서울시민 제외)	서울시민
구 분	6개월간 전기, 수도, 가스 **개별 사용량을** 참여 당시 과거 2년 대비 10% 이상 감축 시 **연간 최대 7만 포인트** **적립**	6개월간 전기, 수도, 가스 **합산 사용량을** 과거 2년 대비 10% 이상 감축 시 **연간 최대 10만 포인트** **적립**
가입 방법	홈페이지 접속 또는 지자체 방문 신청	
홈페이지	www.cpoint.or.kr	ecomileage.seoul.go.kr

3 ③ 정부 제휴 – 지자체 문화 시설 이용 혜택

전국 240개 지자체 및 약 800개 문화, 체육, 관광시설이 그린카드 제도에 참여하여 고객들에게 무료 입장 및 할인 등 차별적 혜택을 제공 중임

공공 문화-체육 시설 현황

대분류	분류	개수	합
관광 (38%)	자연휴양림	71	359
	캠핑장	4	
	관광지	15	
	수목원	2	
	기타	267	
문화 (22%)	박물관	62	201
	미술관	18	
	도서관	14	
	문화회관	16	
	여성회관	14	
	청소년수련회관	19	
	기타	38	
체육 (32%)	수영	152	299
	헬스	115	
	체육	11	
	실내빙상장	1	
	씨름장	1	
	아이스링크장	1	
	에어로빅	2	
	육상장	1	
	정구장	1	
	종합체육	3	
	체력단련실	1	
	체육관	6	
	탁구	1	
	테니스	1	
	볼링	2	
국립공원 (8%)	국립공원	74	74

02. 현황분석

3 현황 분석

대만 그린 포인트 시스템은 정부 재원으로 멤버십 카드 기반 운영중에 있으며 대국민 대상 정부 중심으로 홍보 및 혜택을 제공하고 있음

대만 그린 포인트 시스템 분석

구분	대만 사례	한국 사례
재원	정부 100% 비용 부담	민-관 비용 분담
혜택	포인트 적립 및 사용 혜택	① 포인트 적립 및 사용 혜택 ② 정부(지자체)의 공공시설 할인 혜택 ③ 민간(카드사)의 금융상품 서비스 혜택
홍보	정부 중심 홍보 추진	민-관 긴밀한 협력하 공격적 홍보 추진
운영	멤버십 카드 기반 포인트 시스템 운영	금융형 그린카드(신용/체크/멤버십) 기반 포인트 시스템 운영
제휴 관계	정부 One 채널	정부 (환경부, 기술원, 지자체) + 민간 (유통사, 제조사, 카드사)

03. 제언

3 제언

전국 240개 지자체 및 약 800개 문화, 체육, 관광시설이 그린카드 제도에 참여하여 고객들에게 무료 입장 및 할인 등 차별적 혜택을 제공 중임

대만 그린포인트 활성화를 위한 제언

I	대만 그린 포인트 멤버십 고객 대상 혜택 확대
II	포인트 적립 및 사용 활성화를 위한 인프라 보급
III	금융형 그린카드 도입 (한국 그린카드 사례 참조)

"스마트한 소비, 가치있는 선택, 그린카드 v2"

감사합니다!

End of Document

Green Point System

in Taiwan

2017.5.24

TAIWAN EPA

universal EC Inc.

SECTION 01

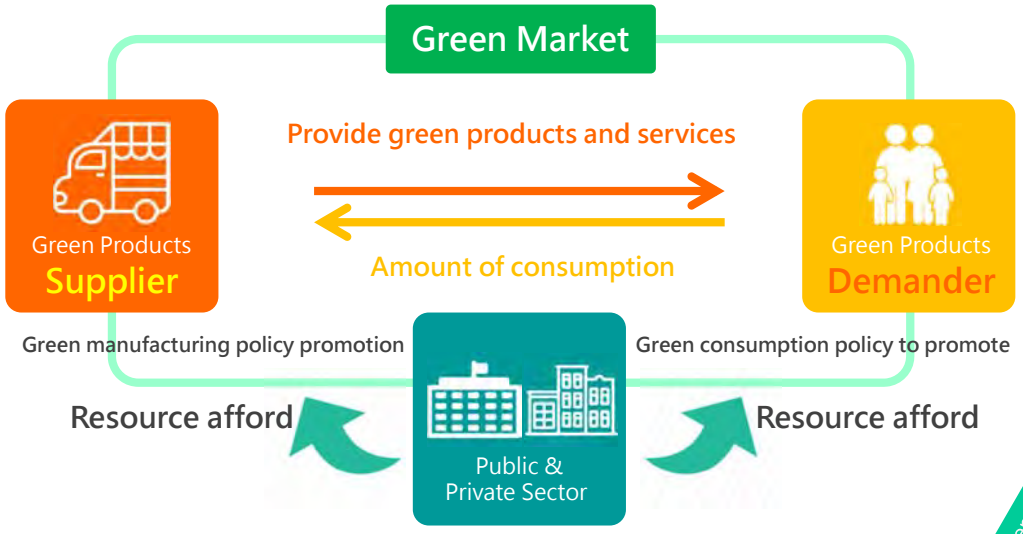
Introduction of
Green Point System

SLIDE 3

Green Point System Concept

Valuable environment protection

- Through「Green Point」Reward the purchase of environmentally friendly products and other environmental activists ， Expand the green consumer market ， Driving green economic cycle 。

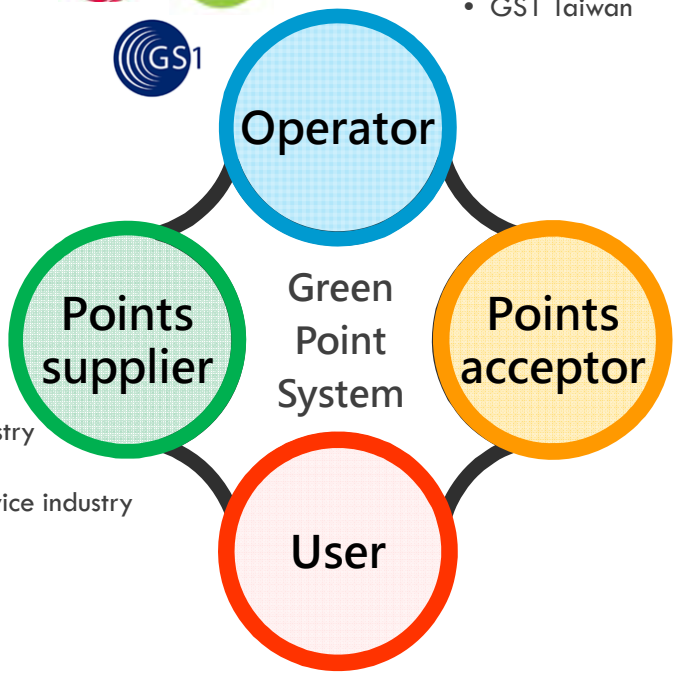


Green Point System Project

SLIDE 4

System participation level

- Taiwan EPA
- Universal EC Inc.
- GS1 Taiwan



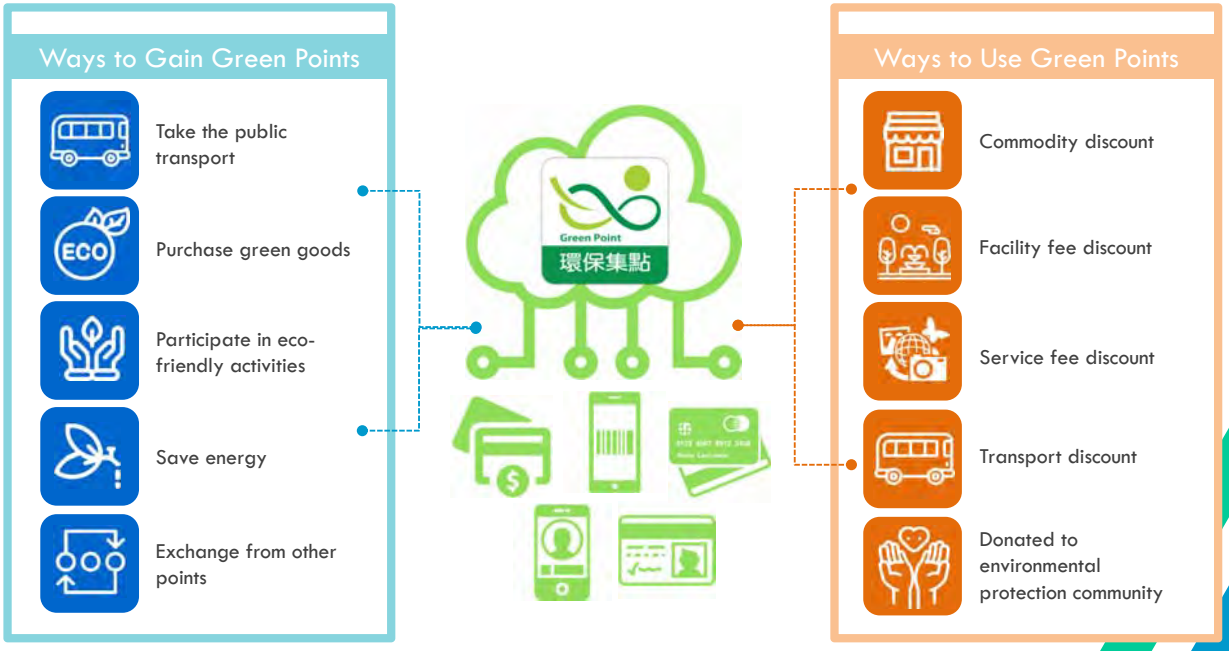
- Retailer/Wholesaler
- Energy authority
- Public transport industry
- Public facility
- Green related industry

- Taiwan EPA
- Energy authority
- Public transport industry
- Retailer/Wholesaler
- Green product /Service industry
- Credit card vender
- Regular business

Green Point System Project

SLIDE 5

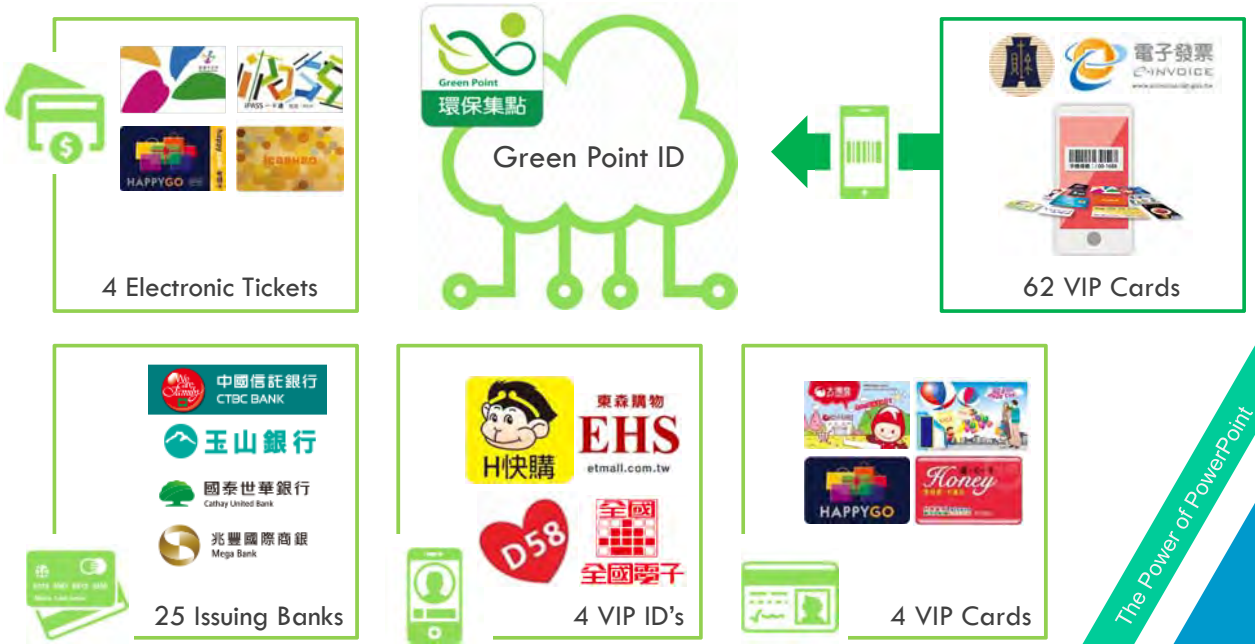
Green Point application scope



SLIDE 6

Multiple carrier integration

- The point integration by binding merchant's membership information with green point system.
- Combined with the MOF to promote the EI policy, in the green point account bound to the MOF's carrier - cell phone bar code, can be combine with all the carrier.



The Power of PowerPoint

SLIDE 7

Green Point merchants

4,941 Green Label Products
284 Carbon footprint Label Products

82 Bus Co.'s
All MRT Co.'s
All Train Co.'s
City Bike

9,468 CVSs
948 Marts
322 3C Marts
3 Online Shops

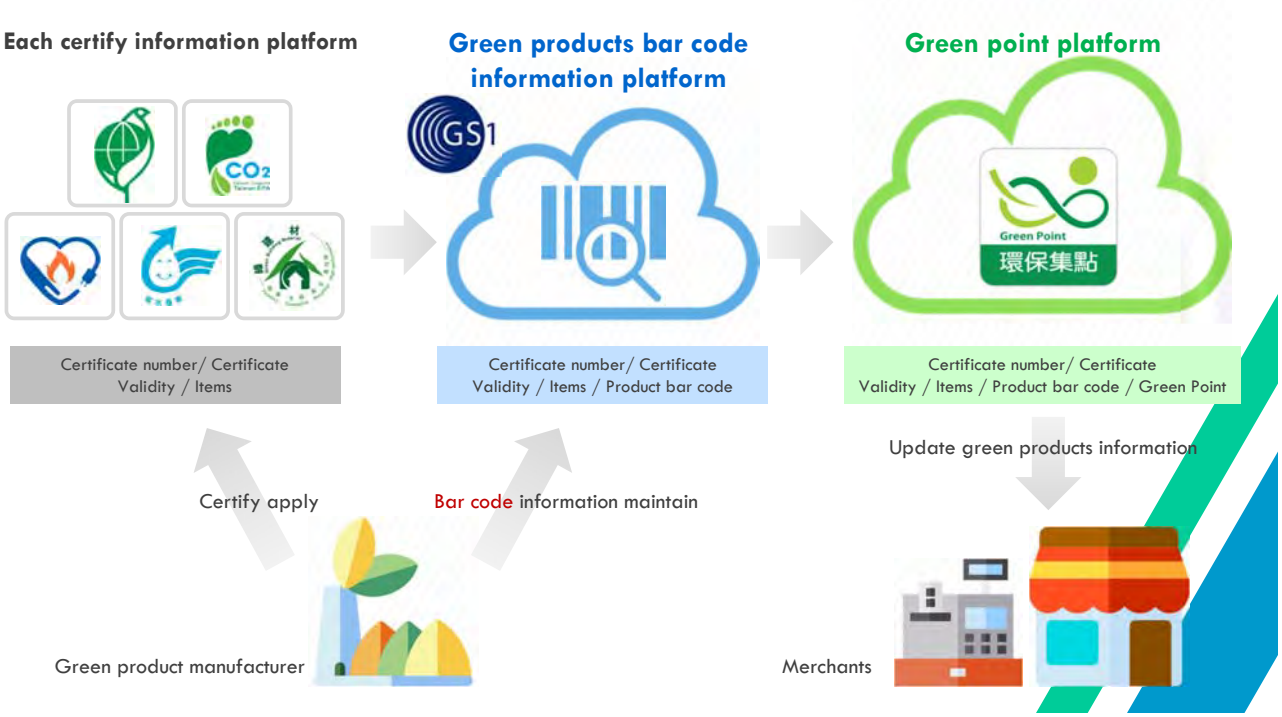
15 Hotels
10 Travel Agencies

120 Environmental Education Fields

SLIDE 8

Green products bar code information platform

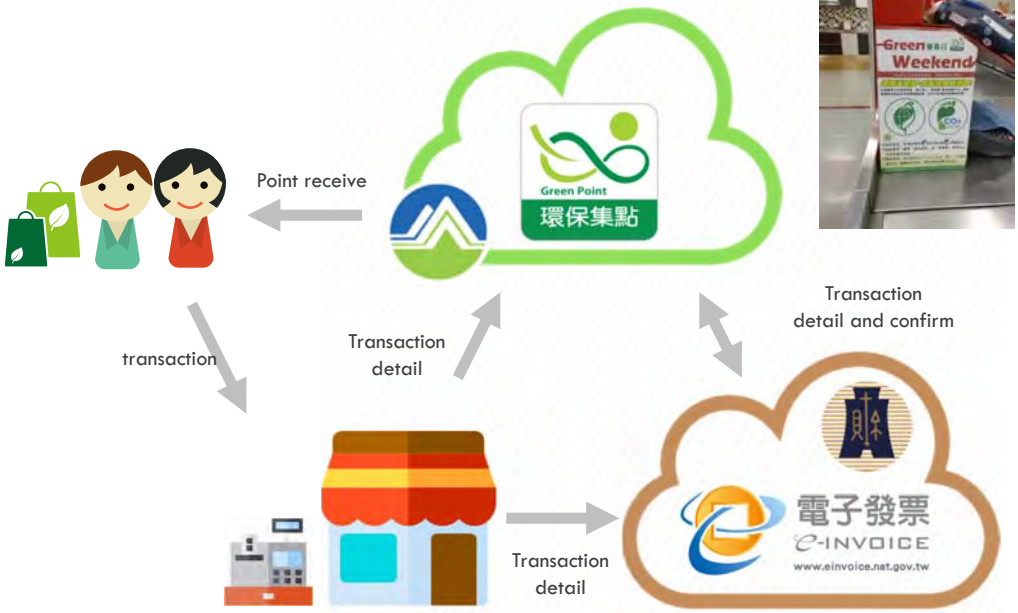
- Work with GS1 Taiwan, built 'Green Product Bar Code Big Data Framework', created 'Taiwan green products database'.
- Through the information platform, the merchants can update green product's information by bar code.



SLIDE 9

Identification & Auditing of Consumer items

- Auditing by MOF EI system.
- In EI detail, use bar code to identify consumer items and trace the flow.

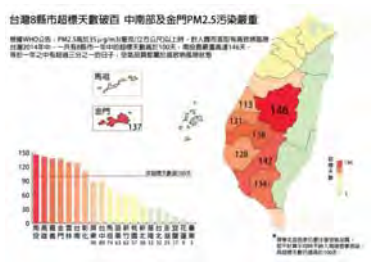


SLIDE 10

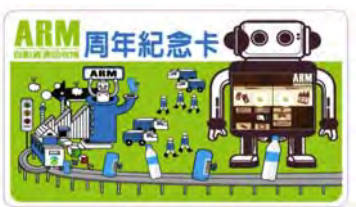
Multiple point given mechanism

- Tandem air quality monitoring system to predict air quality, automatically adjust the multiples of points to encourage using public transport.
- Tandem 'Automatic Recycling Machine '(ARM), get the recycle amount，import the point into carrier。
- Combined with all kinds of environmental activities ， customized point QR Code。

Taiwan AQI Monitoring System



Automatic Recycling Machine



QR Code with Points

SECTION 02

Introduction of
Universal EC Inc.

Universal EC Inc. (UEC) has 30 years of professional networking services experience. It provides B2B, B2C and B2G e-commercial solutions for governments, companies and banks.

- Cooperating with the Taiwan EPA, UEC integrated multiple IT platforms for smooth operations of the Green Point System Project, including a green product information system, green product marketing, an official website, and a member's management platform.
- UEC also established a project office for EPA to provide customer services for the companies in the green supply chain and consumers as well.

Thanks for your attention!

附錄二：亞洲碳足跡網絡2017年會員會議議程、簽到表及會議資料

Asia Carbon Footprint Network: Annual Meeting & Seminar 2017

Promoting Green Buildings through Carbon Footprinting and Environmental Declaration Schemes

Seoul, 25-26 May 2017

A. Background and Objective

UNFCCC COP21 in 2015 brought a new attention to the role of buildings in reducing energy demand and greenhouse gases (GHG) emissions and in developing resilience in the face of climate change through the first-ever Buildings Day. In addition, a new coalition was introduced, the Global Alliance for Buildings and Construction to promote energy efficiency and other green building practices. Buildings were specifically called out in the INDCs of 46 countries, including some of the top emitters of greenhouse gases.

Buildings are responsible for an enormous amount of global energy use, resource consumption and GHG emissions. Buildings accounts for over 30% of global energy consumptions and are responsible for almost 20% of GHG emissions (9 GtCO2e/year or around 30% of all energy-based CO2 emissions). According to a recent report by the Intergovernmental Panel on Climate Change (IPCC), the consumption of resources in establishing buildings can be reduced by 46% by 2050 if the construction sector adopts more sustainable practices. Thus, the building sector can play a major role in reducing the threat of climate change, and green buildings, therefore, have tremendous potential.

Green buildings, also known as green construction or sustainable buildings, is the practice of creating structures and using processes that are environmentally responsible and resource efficient throughout a building's life-cycle from planning to design, construction, operation, maintenance, renovation, and deconstruction. Even though the concept of "green buildings" seems to differ slightly between countries, green buildings are generally known to reduce energy consumption up to 30-40% and water consumption up to 50-60%. Furthermore, there are various certification schemes such as Leadership in Energy and Environmental Design (LEED, US), BCA Green Mark Scheme (Singapore), Beam (Hong Kong), BREEAM (UK, EU, EFTA member states, etc.), CASBEE and EDGE (Japan), KGBC (ROK), etc.

In this connection, carbon footprint labeling can be a practical tool to support green buildings. Countries in EU and Asia have taken initiatives to introduce product carbon footprint labeling schemes to low-carbon products and materials in the building and construction sector. In particular, Hong Kong Construction Industry Council (CIC) launched a voluntary and HK-based Carbon Labelling Scheme for Construction Products in 2014. Three categories of carbon-intensive construction products including cement, reinforcing bar, and structural steel, ready-mixed concrete are now in operation. In the Republic of Korea, there are 262 certified products for construction products as of 2016. The Green Building Certification scheme in Korea launched in

2002 and newly-built or extended public institutions with a total floor area more than 3,000 square meters and multi-residential buildings of around 1,000 households must acquire higher than the certification of outstanding level (green 2nd class). Especially, in the process of green building's certification assessment, the use of construction products certified by EPDs, Carbon footprint labeling can earn maximum 14 points. This scheme provides institutional and financial support to encourage voluntary purchasing of the certified construction products. And Malaysia recently introduced the labelling scheme to the construction sector. Under the scheme, 10 Product Category Rules have been developed and published by SIRIM Berhad to cover 10 product categories in the construction and building materials and manufacturing sector.

Also, environmental product declarations (EPDs), detailed reporting of the environmental impact of products from Life-cycle analysis (LCA), allow designers, owners, contractors, and other stakeholders to make educated decisions about the materials and equipment that go into buildings. EPDs have also made their way into green building certification programs.

Against this background, the seminar will be the occasion to understand how Type III eco-labels are applied to certifying green buildings in Europe and Asia.

B. Target Participants

The seminar is expected to have representatives from the ACFN member organizations and local CFP, EPD and Green Building practitioners from public and private sectors.

C. Venue

Main auditorium (the 2nd Floor) at KEITI, Seoul

Asia Carbon Footprint Network (ACFN) Annual Meeting and Seminar 2017

Promoting Green Buildings through Carbon Footprinting and Environmental Product Declaration Schemes

KEITI, Seoul, 25 May 2017

PROGRAMME

A. Annual Meeting

ACFN Members' Meeting 2017	
09:30-09:40	● **Opening and welcoming remarks by the ACFN Secretariat** - Mr. Sangmin Nam, Deputy Head, UN ESCAP East and North-East Asia Office - Ms. Hye Won Bang, Director, Environmental Declaration Office, Korea Environment Industry and Technology Institute (KEITI)
09:40-11:30	● **Discussion on the Network Operation** - Terms of Reference - Governing Structure ● **Review/Plan ACFN Work Programme** - Review the programme 2016 - Plan the programme 2017 and beyond
11:30-13:00	**Lunch hosted by KEITI**

B. Seminar

Opening Session	
13:30-13:40	● **Opening and Welcoming Remarks by the Ministry of Environment of Korea and KEITI** - *Mr. Kwang Hee Nam, President, Korea Environmental Industry & Technology Institute (KEITI)* - *Mr. Suk Tae Hwang, Director-General, Environmental Policy Convergence Bureau, Ministry of Environment of Korea*
13:40-14:05	● **Keynote Address** - *Paris Agreement and Its implication for Buildings by Mr. Kilaparti Ramakrishna, Head, UN ESCAP East and North-East Asia Office*
14 :05-14 :15	● **Group Photo**

Session I Best practices of the application of information on environmental performances in green buildings	
EPDs are required for every material and component intended to be used in "Green Buildings." In Europe, the building sector is the most advanced case of increasing traceability of supply chain using EPDs. This session provides an overview of the current application of EPDs in green building and discusses the development direction of green buildings through EPDs.	
14:15-15:55	*Presentations* • **Application of information on environmental performances and Green Building Certification** *by Mr. Nigel Howard, President, Clarity Environment, Australia* • **Environment as competitive advantage** *by Mr. Hakan Hauan, Managing Director, The Norwegian EPD Foundation* • **Strategies for effective connection of EPDs and Green Building Certification in Korea** *by Mr. Chang-U Chae, Head of Building and Urban Research Center, Korea Institute of Civil Engineering and Building Technology* • **Switch Asia Project – Establishment of Carbon Footprint Labelling Scheme in Malaysia** *by Ms. Mazlina W. Hussein, Senior Researcher, Environmental Technology Research Center, SIRIM Berhad, Malaysia*
15:55-16:15	Q & A
16:15-16:30	Coffee break
Session II Recent issues and implications of Carbon Footprinting and Environmental Declaration Schemes in Asia : Challenges and the Way Forward	
As businesses and organizations have become more sensitized to environmental concerns, the standards for environmental performance of products have been strengthened in many countries. Korea and Japan are also integrating Carbon Footprint and Environmental Declaration scheme to provide customers with various information on their environmental performances. This session introduces the state of the integrated EPD in these two countries and discusses the prospects of these schemes.	
16:30-17:20	*Presentations* • **Integrated JEMAI Environmental Labelling Programme- Trend in Construction Industry in Japan** *by Mr. Akira Kataoka, General Manager, Japan Environmental Management Association for Industry* • **Improvement of the integrated EPD scheme and directions for development in Korea** *by Ms. Hye Won Bang, Director, Environmental Declaration Office, Korea Environment Industry and Technology Institute*
17:20-17:40	Q & A
17:40-	Dinner hosted by KEITI

C. Working Group Meeting on Product Category Rules (PCRs)

Friday, 26 May 2017	
Working Group Meeting on Product Category Rules(PCRs) : Korea, Chinese Taipei and Thailand	
09:00-11:10	Discussion on the common PCR(Beverages, Detergent) development
11:10-11:30	The Signing Ceremony of Technical Cooperation Agreement among KEITI, TEMA and TGO
11:30-13:00	Lunch

Asia Carbon Footprint Network Meeting 2017

* **For attendee conformation, sign on this form please.**

No.	Country	Name	Position	Organization	
1	Malaysia	Wan Mazlina Wan Hussein	Senior Researcher	SIRIM Berhad	
2	Thailand	Phakamon Supappunt	Program Manager	Thailand Greenhouse gas management Organization	
3	Philippines	Albert Magalang	Head of Climate Change Office	Environmental Management Bureau-DENR	
4	Mongolia	Oyunchimeg Jigjid	Department Head	Mongolian National Chamber of Commerce and Industry	
5	Russia	Iuliia Gracheva	Director	NP "Ecological Union" St. Petersburg	
6	China	Qiuwei Deng	Director	China Standard Conformity Assessment Co., Ltd	
7	China	Joseph Chiu	Certification Manager	CMA Testing and Certification Laboratories	
8	Chinese Taipei	Shu-HsingHung	Director general	Taiwan Environmental Protection Administration	
9	Chinese Taipei	Jui-Hung Wang	Senior Officer	Taiwan Environmental Protection Administration	
10	Chinese Taipei	Yun-Tzu Wang	Project Manager	Universal EC Inc.	

No.	Country	Name	Position	Organization	
11	Chinese Taipei	Allen Hu	Professor	National Taipei University of Technology	
12	Chinese Taipei	Gaia Lu	Researcher	Industrial Technology Research Institute	Gaia Lu
13	Chinese Taipei	Kristin Shen	Researcher	Industrial Technology Research Institute	Kristin Shen
14	Chinese Taipei	Young Ku	Chairman of the Board	Taiwan Environmental Management Association	
15	Chinese Taipei	Chi Wu	Manager	Taiwan Environmental Management Association	Chi Wu
16	Chinese Taipei	Yi-Han Yu	Program Manager	Taiwan Environmental Management Association	Yi-Han, Yu
17	Hong Kong	Linda Wai Ping Ho	CEO	Green Council Hong Kong	
18	Japan	Akira Kataoka	General Manager	Japan Environmental Management Association Industry	
19	UN ESCAP	Sangmin Nam	Deputy Head	UNESCAP-ENEA	
20	UN ESCAP	Minkyung Carrie Hong	Research Associate	UNESCAP-ENEA	
21	Korea	Gyung-Ho Kim	Department Head	Korea Environment Industry and Technology Institute	Kim
22	Korea	Hye Won Bang	Director	Korea Environment Industry and Technology Institute	Bang Hyewon
23	Korea	Chan Rae Gim	Researcher	Korea Environment Industry and Technology Institute	
24	Korea	Eunah Hong	Researcher	〃	

No.	Country	Name	Position	Organization	
25	Korea		Researcher	Korea Environment Industry and Technology Institute	
26	Korea	Minji Park	Researcher	〃	
27	Korea	Joon Jae Lee	Researcher	〃	

201510/V2

CMA Testing and Certification Laboratories
廠商會檢定中心

The Experience Sharing & Brief Introduction for the Hong Kong Product Carbon Footprint Label Project

The Chinese Manufacturer's Association of Hong Kong (CMA)

- Established in 1934， Not-for-profit industrial organization
- Representative in Legislative Council, Industrial (Second)
- **Industrial committees:33**

香港品牌發展局
Hong Kong Brand Development Council

CMA Exhibition
香港中華廠商聯合會
展覽服務有限公司
CMA Exhibition Services Ltd.

CMA Testing and Certification Laboratories
廠商會檢定中心

香港中華廠商聯合會
The Chinese Manufacturer's Association of Hong Kong

CMA Insurance
香港中華廠商聯合會
保險代理有限公司
CMA Insurance Agent Limited

香港中華廠商聯合會
秘書服務有限公司
CMA Secretarial Services Limited

CMATRAINING
廠商會培訓中心

CMA Testing and Certification Laboratories
廠商會檢定中心

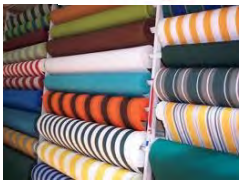
Supported by SME Development Fund, HKSAR Government

Tailor-made a “Carbon footprint” certification program for HK

Implemented by the Carbon Trust and HK Univ. of Sci. and Tech.

Food
- Live Fish

CMA CO_2



Textile
- T-shirt

Packing box
- Paper box

Electronic
- Weighing scale

CMA Testing and Certification Laboratories 廠商會檢定中心

Latest Progress

- Downturn in retailing and exporting
- Cost (both external and internal) concern for product labelling

CMA Testing and Certification Laboratories 廠商會檢定中心

Latest Progress

- Simplified version:
- "Green Manufacturing Index for Hong Kong and Guangdong"
  - Cooperation with CQC and Carbon Trust
  - Government funded granted

CMA Testing and Certification Laboratories 廠商會檢定中心

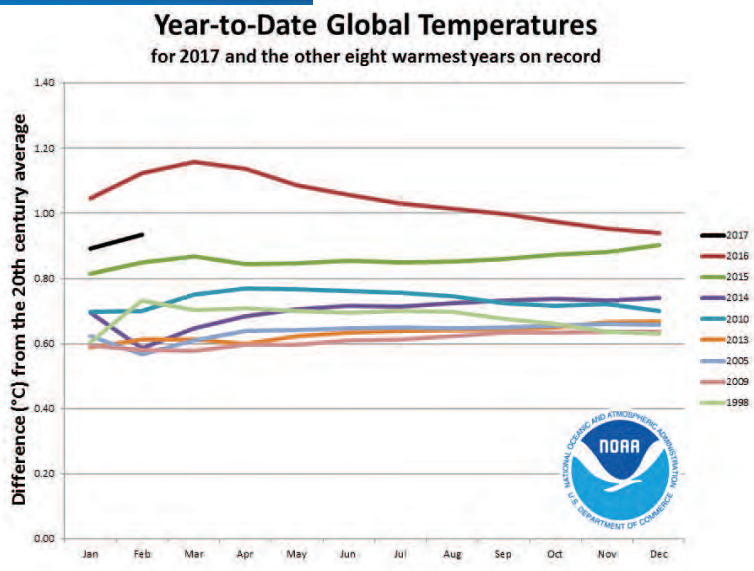
UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

Paris Agreement and Its implication for the Green Buildings

ACFN Annual Seminar 2017: *Promoting Green Buildings through Carbon Footprinting and Environmental Product Declaration Schemes*

25 May 2017, Seoul

Kilaparti Ramakrishna
Director
ESCAP East and North-East Asia Office



Paris Agreement

Limiting temperate increase well below 2°C above pre-industrial levels

↓

Stabilizing GHG at the level of 350 or 450 ppm CO_2 eq.

↓

Cutting emissions at least 50% of 1990 level by 2050

↕

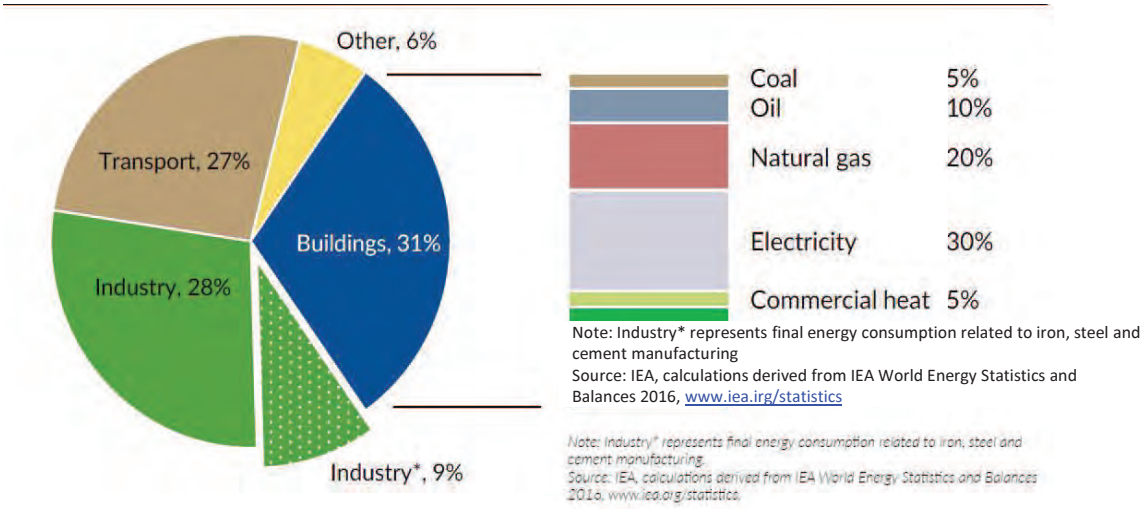
Nationally Determined Contribution (NDC) by 2030
(update every 5 years, Transparency Framework, Compliance Mechanism)

Developed Countries: **quantified economy-wide emission absolute reduction target**	Developing Countries: **diversified/ enhanced mitigation actions (BAU, Intensity targets, etc.)**

USD 100 billion + (per year), Technology Framework, Paris Committee on Capacity-building

Buildings and construction, including manufacturing of materials, account for more than **one-third** of global final energy consumption

Global final energy consumption and building energy use by fuel share, 2014

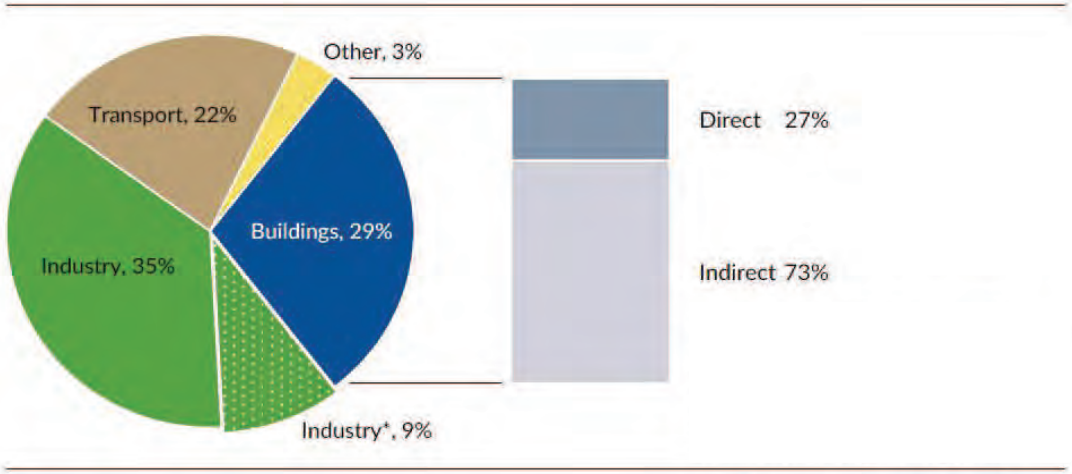


Note: Industry* represents final energy consumption related to iron, steel and cement manufacturing
Source: IEA, calculations derived from IEA World Energy Statistics and Balances 2016, www.iea.irg/statistics

Note: Industry represents final energy consumption related to iron, steel and cement manufacturing.*
Source: IEA, calculations derived from IEA World Energy Statistics and Balances 2016, www.iea.org/statistics.

Buildings and construction represent nearly **30%** of energy-related CO_2 emissions if indirect building emissions from power generations are included.

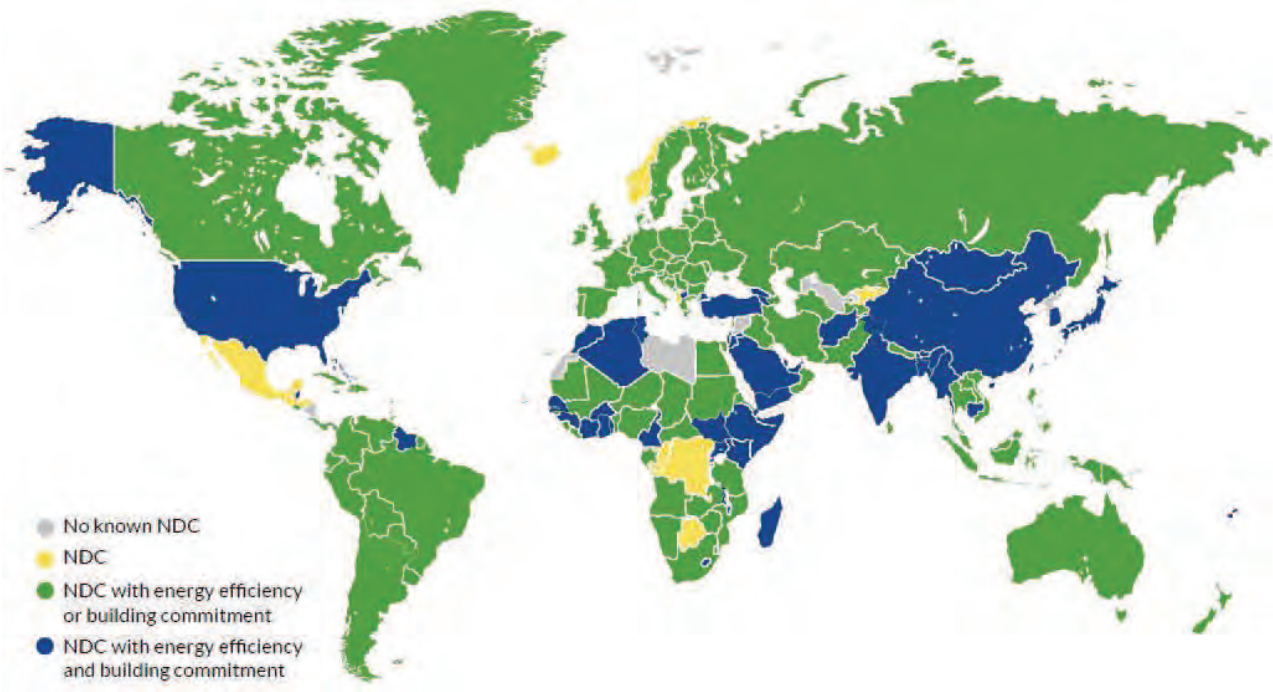
Buildings' contributions to GHG emission, 2014



Note: Shares represent energy-related CO_2 emissions, which account for roughly two-thirds of global GHG emissions; indirect emissions include upstream CO_2 emissions from power generation for building consumption of electricity and commercial heat. Industry represents CO2 emissions related to energy consumption for iron, steel and cement manufacturing.*
Source: IEA, calculations derived from IEA World Energy Statistics and Balances 2016, www.iea.org/statistics

Need to reduce E & C in buildings and construction

the Paris Climate Agreement and Nationally Determined Contributions (NDC) including building and energy commitments



Source: Towards zero-emission efficient and resilient buildings-Global Status Report 2016

COP 21 (in Paris) and Buildings

Buildings were featured prominently at **COP 21 in Paris** for the first time

- **18 countries and over 60 organizations launched the Global Alliance for Buildings and Construction**
- **16 major European firms** made pledges to **develop 'nearly zero energy buildings (nZEB)'** for new build by 2020, and refurbished by 2030

50% or more

Building sector energy savings potential in 2050 in support of a below 2°C pathway.

Global Alliance for Buildings and Construction

Green Buildings

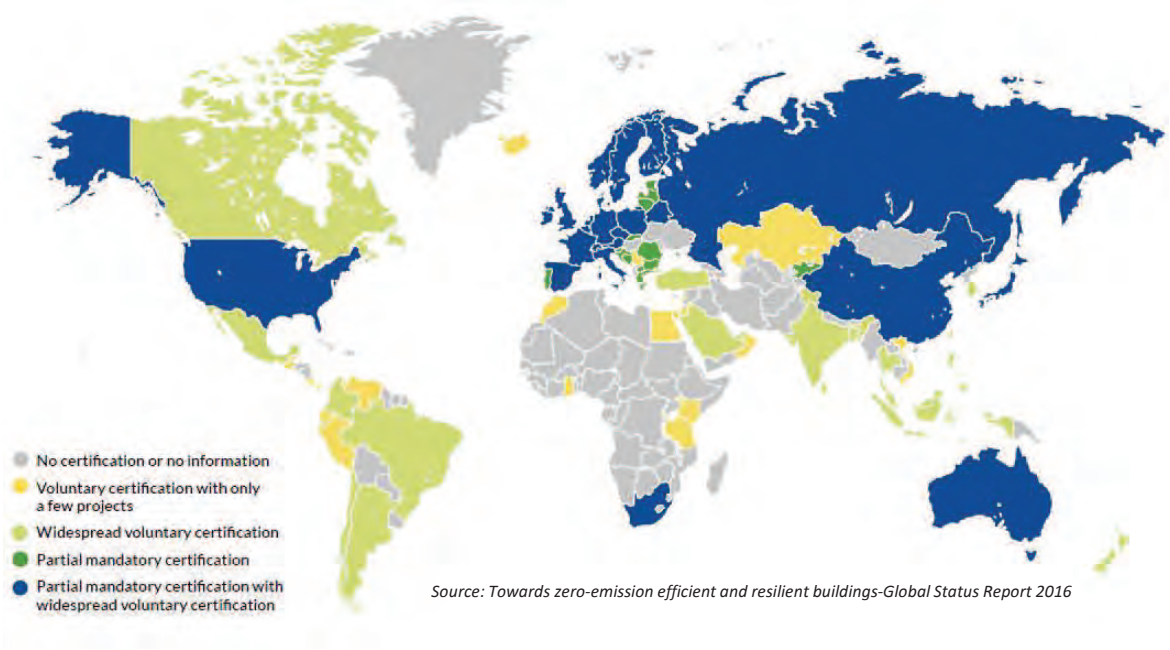
Green building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from siting to design, construction, operation, maintenance, renovation and deconstruction.

Green buildings are generally known to reduce energy consumption by 30-40% and water consumption by 50-60%. Various certification schemes exist in the world.

<Mostly Used Green Building Rating and Certification Systems>

	Year established	Buildings certified	Rating schemes	Certification Levels	Categories
BREEAM (UK)	1990	More than 560,000	• Communities • Courts • Education • Health care • Homes • Industrial • International • Multi-residential • Offices • Retail • Other	• Pass • Good • Very good • Excellent • Outstanding	• Energy • Health and well-being • Land use and ecology • Management • Materials and water • Pollution • Transport • Water
LEED (USA)	2000	More than 103,000	• Building design and construction • Interior design and construction • Building Operations and Maintenance • Neighborhood Development • Homes	• Certified • Silver • Gold • Platinum	• Awareness and education • Energy and atmosphere • Indoor environmental quality • Innovation in design • Location and linkages • Materials and resources • Regional priority • Sustainable sites • Water efficiency

Building Energy Certification



Source: Towards zero-emission efficient and resilient buildings-Global Status Report 2016

As of 2016, there are almost 40 countries with mandatory certification programmes. Voluntary certification programmes are even more widespread, with over 80 countries using systems including LEED, BREEAM and others

Green Buildings and Key benefits of EPD/CFP certified products

Green buildings require product material selection criteria.

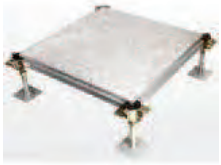
Environmental Product Declaration(EPD): quantitative environmental impact data of a product.

Carbon Footprint of Products (CFP): numerical values of CO_2 by converting the amount of GHG emission.

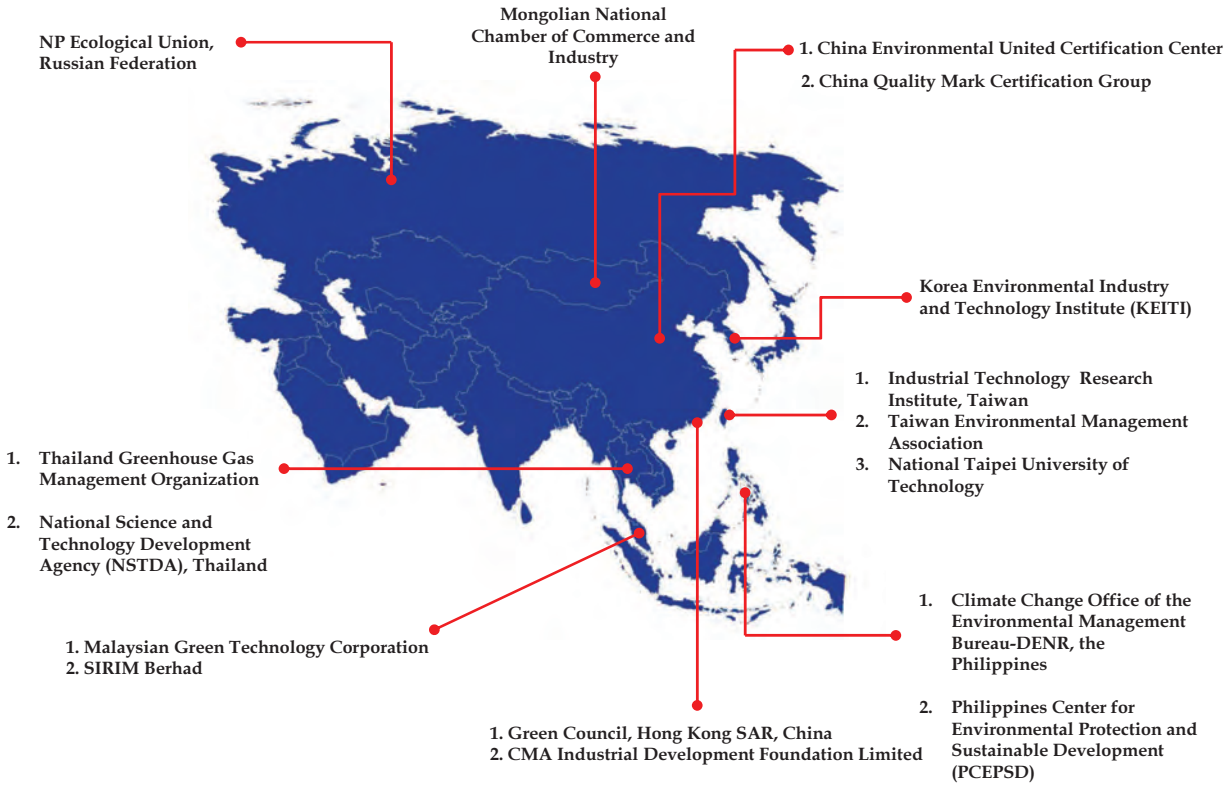
With detailed reporting of environmental impact of products, both EDP and CFP certified products can

- contribute credits towards green building certification.
- allow designers, owners, contractors, customers, and other stakeholders to make informed decisions about the materials and equipment that go into buildings.
- help reduce a building's environmental impact.

EPD & CFP are a key tool for assessing and promoting green buildings



Asia Carbon Footprint Network



ACFN Activities

Seminar - knowledge sharing and awareness raising

- Organized annual seminars and workshops to share best practices in carbon management and carbon labelling schemes with various stakeholders in Seoul, Bangkok, Hong Kong, and Guangzhou.

Training - capacity building

- Provided opportunities to build capacities of policymakers and technical experts in the Philippines and Malaysia facilitated the transfer of knowledge and best practices from the ACFN member organizations.

Joint Research –Common product carbon footprinting framework for Asia

- with Carbon Trust, UK and partners
- Financial support from the British government

Pilot Project –Common Product Category Rules (Beverages, Shampoo) Development with ITRI, KEITI, TGO

THANK YOU

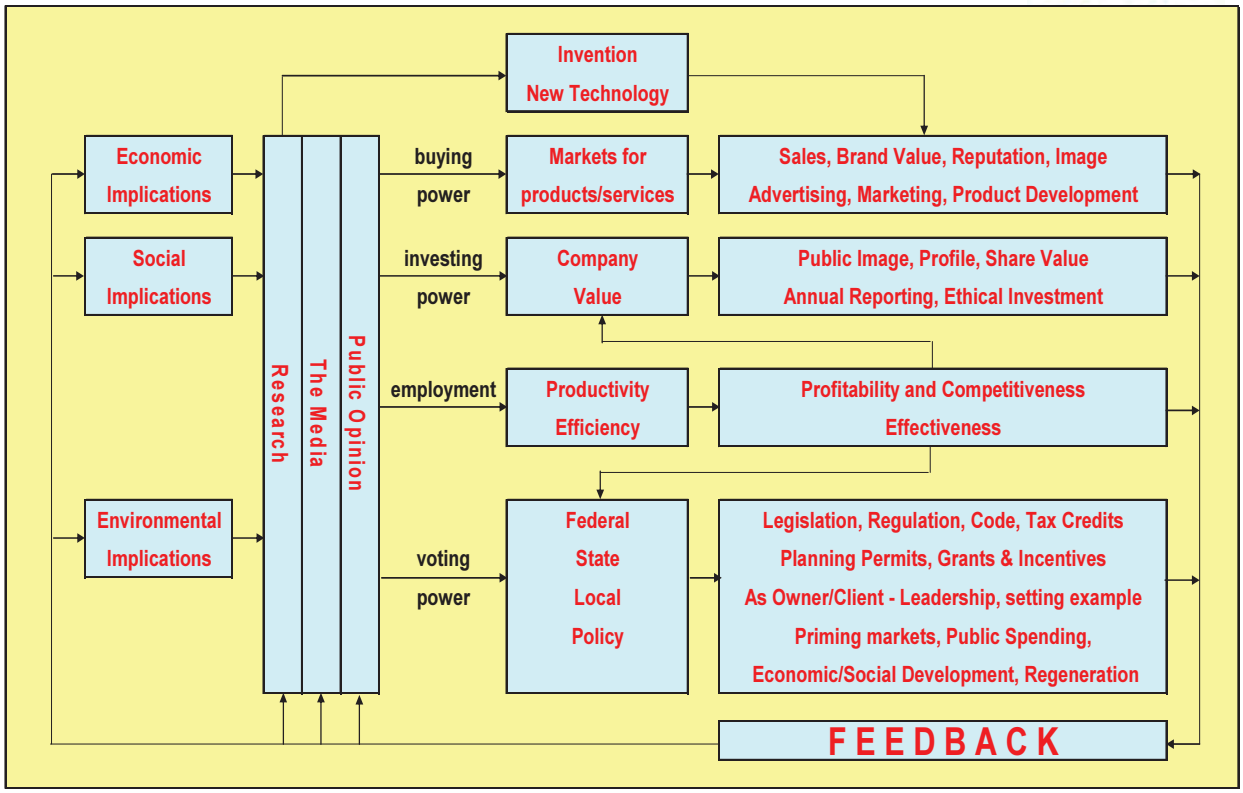
ESCAP ENEA Office
http://enea.unescap.org

Facebook:
/UNESCAP.ENEA
Twitter:
@UN_EastAsia

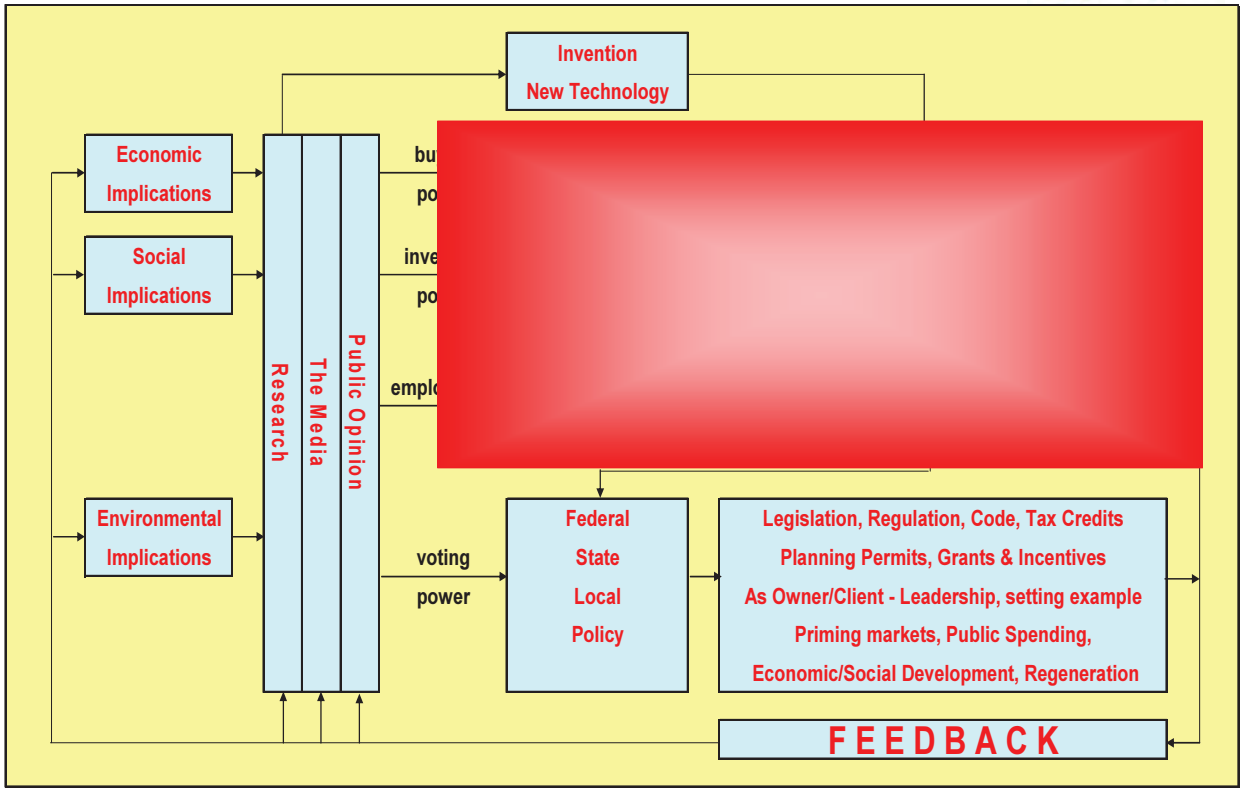
Application of information on environmental performances and Green Building Certification

Nigel Howard, President,
Clarity Environment, Australia

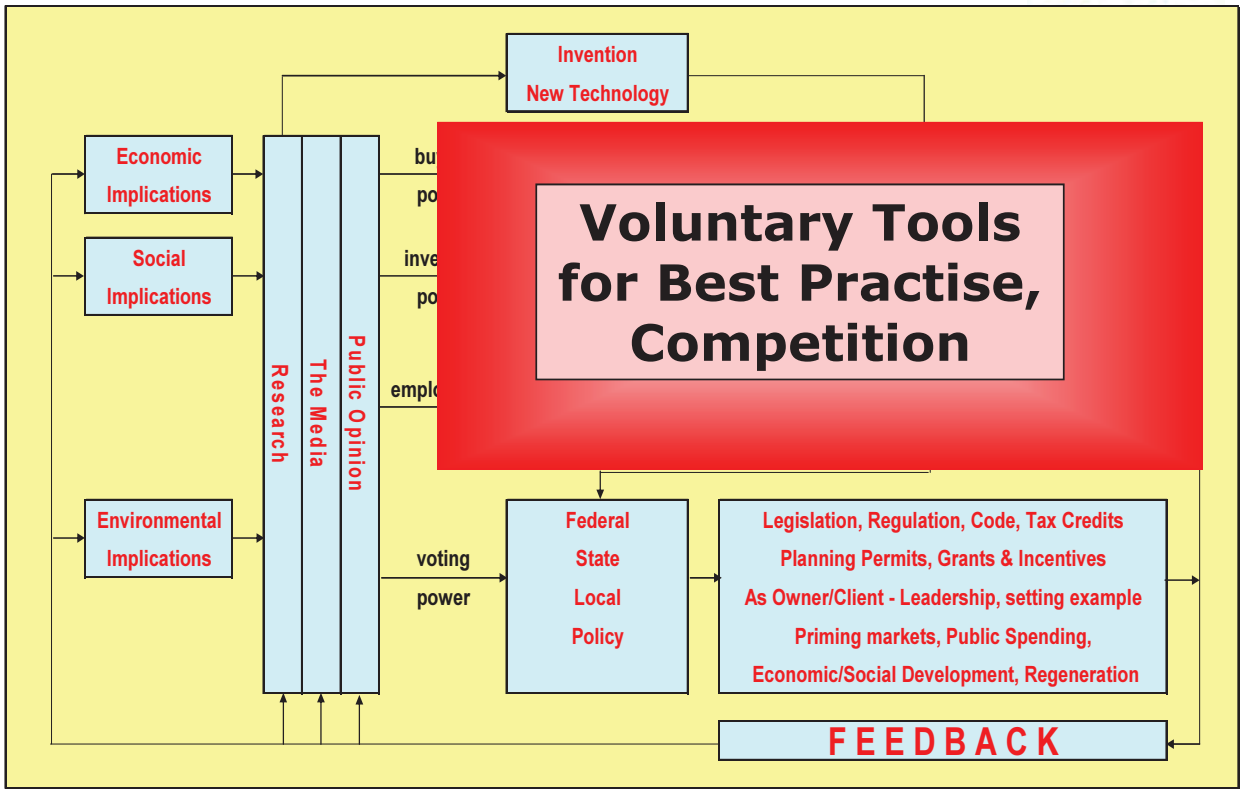
Drivers for Sustainable Change
UK 1985



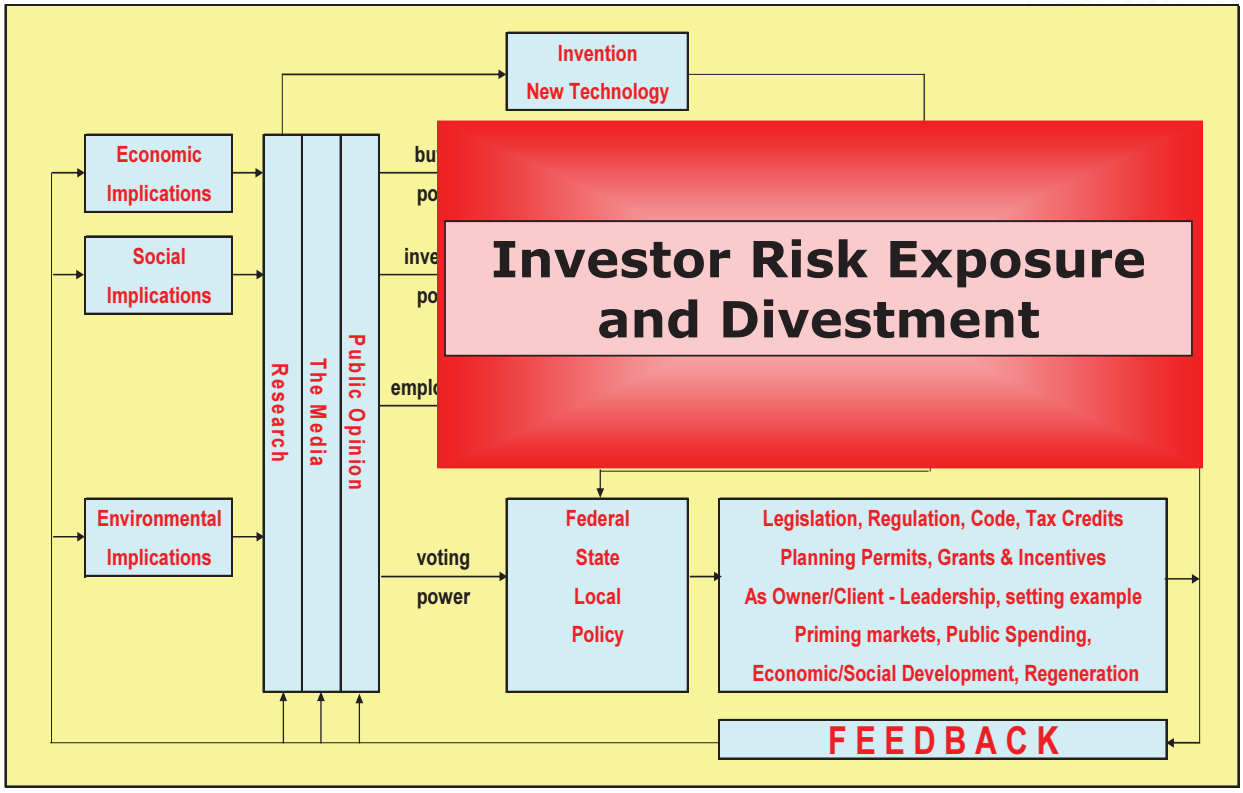
Drivers for Change



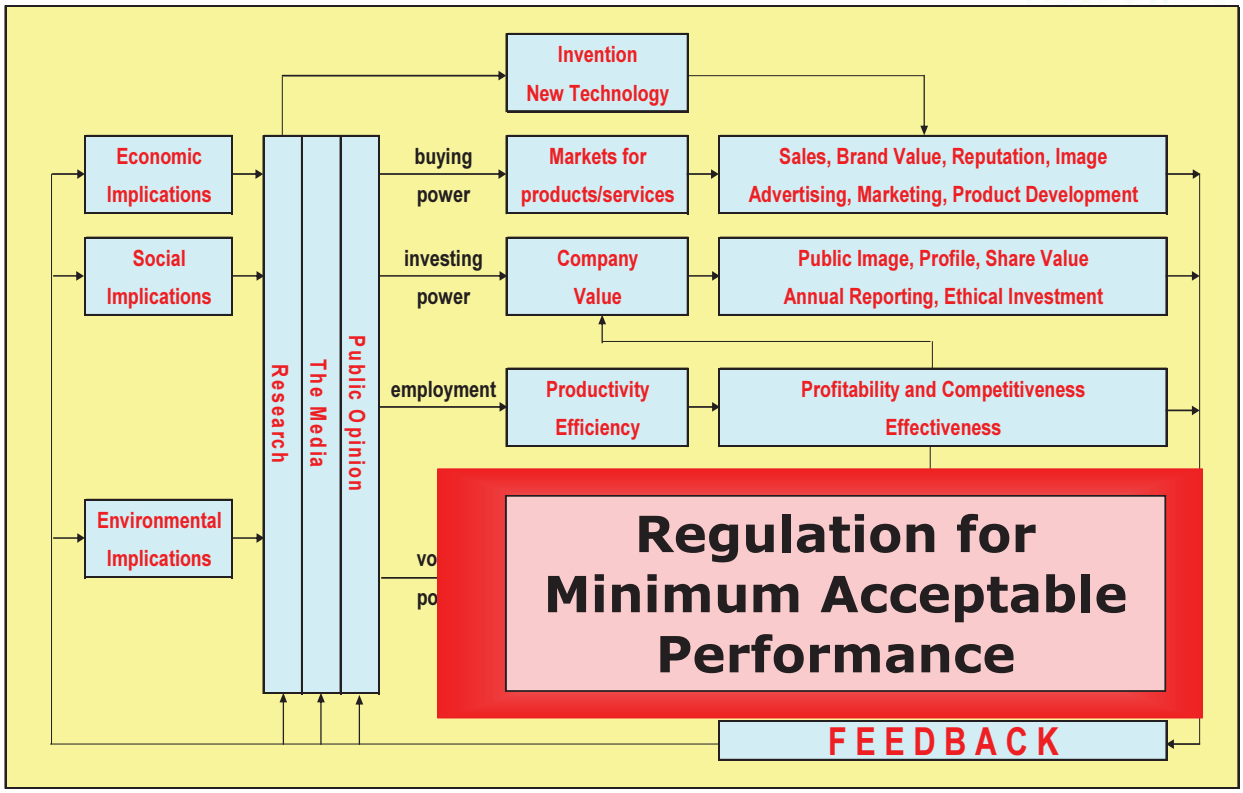
Drivers for Change



Drivers for Change

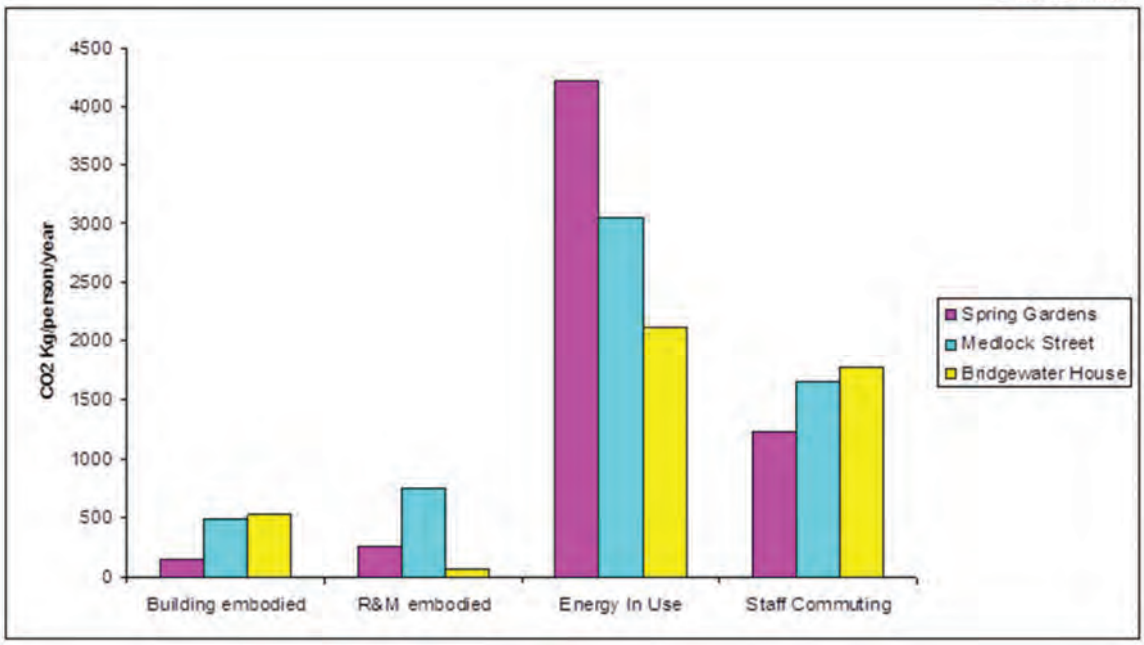


Drivers for Change



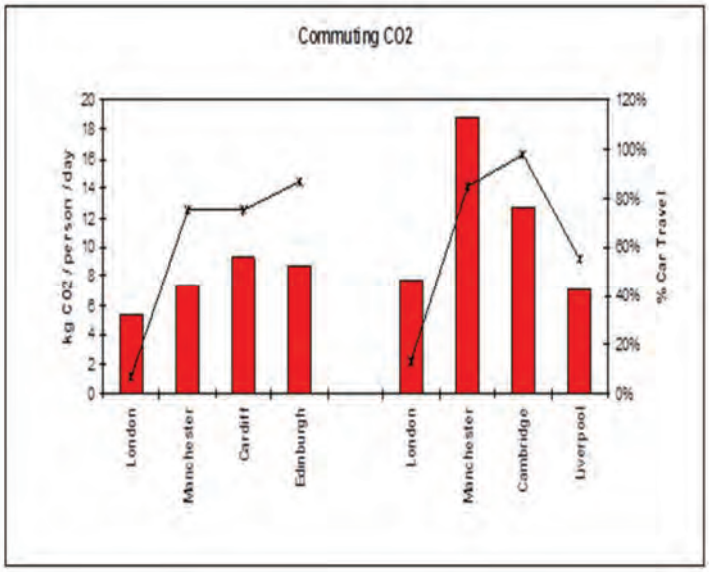
CO_2-e From Buildings (UK 1985)

Clarity Environment

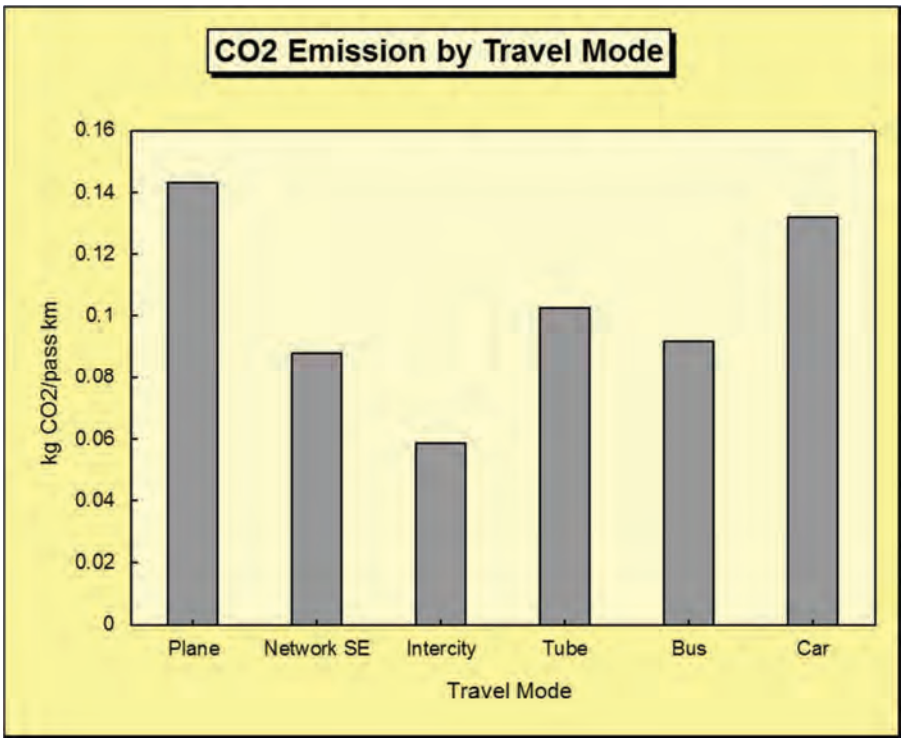


CO_2-e from Commuter Transport The Forgotten Factor

- Location Type - CBD, City, Suburb or Rural
  - Mix of Modes - Public Transport → Car
  - Distance & Time
- Parking Spaces
- Car-sharing
- Cycling Terrain and Facilities
- Working practices – teleworking etc.
- City Connectedness & Convenience, Comfort & Security of Public Transport



Transport Modes



BREEAM 98 Onwards

Embodied CO_2-e Key Materials

- Aggregates and fill materials (transport & location quarry to site and mode of transport really matters)
- Cement (therefore Concretes & Mortars)
- Brick & Clay products
- Wood products
- Plasterboard & Plasters
- Steel
- Glass and ceramics
- The rest – building services equipment & fitout
- But BEWARE over the life, replacements add up especially for:
  - Floorcoverings - carpet
  - Fit-out of commercial buildings – 5 yr churn

99% of Mass only 60% of cost

~70% of embodied CO2-e

~30%

Can Add up to a significant Lifetime proportion

BREEAM98 onwards and ECOHOMES

- Credit for CO_2-e from buildings operation on an absolute performance basis compared to Typical Building Regulations standards
- Credit for CO_2-e from commuter transport based on:
  - Location - CBD/City/Suburbs/Rural
  - Parking Spaces
  - Cycling/Walking provision
  - Work Culture – Teleworking etc.
- Credit for materials based on the LCA-based Green Guides to Specification A-rated specs – where CO_2-e is the dominant parameter

Green Guides to Specification

Insulated cladding on concrete frame with metal stud infill All building types	Element number	Summary Rating	Climate change	Water extraction	Mineral resource extraction	Stratospheric ozone depletion	Human toxicity	Ecotoxicity to freshwater	Nuclear waste (higher level)	Ecotoxicity to land	Waste disposal	Fossil fuel depletion	Eutrophication	Photochemical ozone creation	Acidification	Typical replacement interval	Embodied CO_2 (kg CO_2 eq.)	Recycled content (kg)	Recycled content (%)	Recycled currently at EOL (%)
Brick faced non-loadbearing precast concrete sandwich panel, reinforced concrete frame, light steel studwork, plasterboard, paint	806390025	D	E	B	B	E	A	A+	A	E	E	E	E	B	C	60+	350	33	4	89
Coated aluminium composite profiled panel with pentane blown PUR/PIR insulation and steel liner on steel support:																				
structural concrete frame, cement-bonded particle board, light steel frame, vapour control layer, plasterboard on battens, paint	806390499	A	B	C	A+	A	A	A	A	B	A	B	A	A	A	35	150	12.6	15	61
structural concrete frame, no sheathing, light steel frame, vapour control layer, plasterboard on battens, paint	806390508	A	A	C	A+	A	A	A	A	B	A	A	A+	A	A	35	120	11	16	75
structural concrete frame, OSB/3 sheathing board, light steel frame, vapour control layer, plasterboard on battens, paint	806390507	A	A	C	A+	A	A	A	A	B	A	A	A	A	A	35	120	15.7	21	67
structural concrete frame, sheathing ply, light steel frame, vapour control layer, plasterboard on battens, paint	806390500	A	A	C	A+	B	B	A	B	C	A	B	A	B	A	35	120	11	14	64

Sections for Housing and All Building Types

LEED

LEED Energy & Atmosphere Addresses CO_2-e Indirectly

Energy and Atmosphere		33
Prereq	Fundamental Commissioning and Verification	Required
Prereq	Minimum Energy Performance	Required
Prereq	Building-Level Energy Metering	Required
Prereq	Fundamental Refrigerant Management	Required
Credit	Enhanced Commissioning	6
Credit	Optimize Energy Performance	18
Credit	Advanced Energy Metering	1
Credit	Demand Response	2
Credit	Renewable Energy Production	3
Credit	Enhanced Refrigerant Management	1
Credit	Green Power and Carbon Offsets	2

LEED Energy & Atmosphere Addresses CO_2-e Indirectly

- Based on ASHRAE90.1 improved energy performance – a relative standard which factors out location
- Indirectly correlated with CO_2-e i.e ignores grid CO_2-e per kWh

		33
		Required
		Required
		Required
		Required
Credit	Enhanced Commissioning	6
Credit	Optimize Energy Performance	18
Credit	Advanced Energy Metering	1
Credit	Demand Response	2
Credit	Renewable Energy Production	3
Credit	Enhanced Refrigerant Management	1
Credit	Green Power and Carbon Offsets	2

LEED Energy & Atmosphere Addresses CO_2-e Indirectly

- Ad-Hoc
- Not Equivalent

Energy and Atmosphere		33
Prereq	Fundamental Commissioning and Verification	Required
Prereq	Minimum Energy Performance	Required
Prereq	Building-Level E	Required
Prereq	Fundamental Re	Required
Credit	Enhanced Commissioning	6
Credit	Optimize Energy Performance	18
Credit	Advanced Energy Metering	1
Credit	Demand Response	2
Credit	Renewable Energy Production	3
Credit	Enhanced Refrigerant Management	1
Credit	Green Power and Carbon Offsets	2

LEED Location & Transport Addresses CO2-e Very Indirectly

Location and Transportation		16
Credit	LEED for Neighborhood Development Location	16
Credit	Sensitive Land Protection	1
Credit	High Priority Site	2
Credit	Surrounding Density and Diverse Uses	5
Credit	Access to Quality Transit	5
Credit	Bicycle Facilities	1
Credit	Reduced Parking Footprint	1
Credit	Green Vehicles	1

LEED Location & Transport Addresses CO2-e Very Indirectly

- Ad-Hoc
- Not Equivalent in CO2-e terms
- Unrelated to CO2-e from Energy Use

Location and Trans		
Credit	LEED fo	
Credit	Sensitive	
Credit	High Priority Site	2
Credit	Surrounding Density and Diverse Uses	5
Credit	Access to Quality Transit	5
Credit	Bicycle Facilities	1
Credit	Reduced Parking Footprint	1
Credit	Green Vehicles	1

LEED Materials & Resources

Materials and Resources		13
Prereq	Storage and Collection of Recyclables	Required
Prereq	Construction and Demolition Waste Management Planning	Required
Credit	Building Life-Cycle Impact Reduction	5
Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
Credit	Building Product Disclosure and Optimization - Material Ingredients	2
Credit	Construction and Demolition Waste Management	2

LEED Materials & Resources

- Not LCA - this is really about retaining building elements during redevelopment

Mate		13
Prereq	Storage a lection of Recyclables	Required
Prereq	Construction nd Demolition Waste Management Planning	Required
Credit	Building Life-Cycle Impact Reduction	5
Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
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Credit	Construction and Demolition Waste Management	2

LEED Materials & Resources

Materials and Resources		13
Prereq	Storage and Collection	Required
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Credit	Building Life-Cycle Impact [illegible]tion	5
Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
Credit	Building Product Disclosure and [illegible] Material Ingredients	
Credit	Construction and Demolition Waste [illegible]	

- Environmental Product Declarations
- No criteria for performance improvement

- Credit stringency reduced from 500miles to 100 miles

LEED Materials & Resources

Materials and Resources		13
Prereq	Storage and Collection	Required
Prereq	[illegible]	[illegible]quired
Credit	[illegible]	5
Credit	[illegible]	2
Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
Credit	Building Product Disclosure and [illegible] Material Ingredients	
Credit	Construction and Demolition Waste [illegible]	

- Environmental Product Declarations
- No criteria for performance [illegible]

- No consistent systematic crediting of CO_2-e within materials credits

- Credit stringency reduced from 500miles to 100 miles

CO_2-e in Other Building Rating Tools

Rating System	Countries	CO_2/e Implication	Relevant Credits Summary
BREEAM	UK, NL,ES,	Operating	Credits for CO_2-e/m2 from energy use - absolute reference
98 onwards	NOR, SE, DE	Transport	Credits for transport CO_2-e/m2 - absolute reference
	50 countries	Materials	Credits for A-Rated Specification in Green Guides to Specification - Performance
		Materials	Separate credits for products with EPD's - no criteria
LEED V4	US,Ch,Ca,In,	Operating	Relative energy performance credits based on ASHRAE90.1
	Br,Kp,Tai,Ge,	Transport	Ad-hoc credits for transport implications incompatible - operating energy or materials
	Tu,SE,UAE,	Materials	EPD's without performance criteria
	70 countries	Materials	Alternative pathway using LCA Design vs Reference
Green Star	Au,SA	Operating	Relative CO_2-e performance improvement over code, or deemed to satisfy criteria
		Transport	Ad-hoc credits for transport implications incompatible - operating energy or materials
		Materials	Credits for Ecolabelled products and EPD's - no performance criteria
		Materials	Credits for use of LCA in design, especially early design - relative to base design - Problematic!
		Materials	Credits for supply chain consideration - no performance criteria
HKBEAM	HK	Operating	Energy perormance credits based on CO_2-e/m2 reduced from code baseline design
		Transport	Ad-hoc credits for transport implications incompatible - operating energy or materials
		Materials	Materials credits not LCA-based
GBCS	Korea	Operating	Credits for energy consumption, renewable energy & lighting efficiency - ad-hoc and not CO_2-e based
		Transport	Ad-hoc credits for transport implications incompatible - operating energy or materials
		Materials	Credits for wasdte reduction, reuse & recycling - not LCA or EPD based
CASBEE	Ja	Various	Quantitiative assessment of Building Quality:Building Environmental Load - materials, energy & water
		Various	Performance criteria - no recognition of EPD's found
BNB	Ge	All except Transport	LCA based system (BNB 2013) that considers materials and energy but not transport implications

Rating Tools Summary

- All green building rating tools internationally address operational energy/CO_2-e
- Many do this badly by using relative performance which factors out climate, leading to perverse outcomes
- Most green building rating tools address embodied impacts directly or indirectly – EPD's
- Few set performance criteria – their intent is simply to motivate producing data!!!
- Few building rating tools address transport implications
- Only BREEAM addresses operational, embodied and transport in a systematically compatible way for addressing CO_2-e emissions
- BREEAM also has Ad-hoc credits to encourage EPD's

Rating Tool Suggestions

- Develop rating tool credits that systematically and compatibly address the three major components of CO_2-e arising from buildings:
  1. Operational energy credits for CO_2-e/m^2 in absolute terms
  2. Transport CO_2-e/m^2 implications of buildings, perhaps based on UK BREEAM method adapted relevant to country of use
  3. Embodied CO_2-e/m^2 adopting either
     - A simplified "Green Guide to Specification" approach
     - A whole LCA of building approach using EPD's
     - An LCA Design Tool like ENVEST©
     - Simplified LCA based on key components as per GBTool.

Ways Forward

- Life cycle approaches – using EPD data SHOULD provide a robust path forward
- **BUT** Current LCA and EPD's have major problems:

Fundamental Problems in LCA

- Confused, muddled and inconsistent methodology – between attributional, consequential and hybrid approaches
- A weak international foundation standard - ISO14040/4 that is no longer fit-for purpose – every practitioner interprets the standard to best benefit their client
- LCA databases that LCA practitioners rely on globally are compromised with data that distorts physical reality and mass/elemental/thermodynamic balance
- A conspiracy of silence from a practitioner community that is commercially and reputationally vested in a broken status quo
- Institutions and the peer review process are failing to enforce rigour and integrity

LCA Fundamental Problems

- Confused, muddled and inconsistent methodology – between attributional, consequential and hybrid approaches
- A w… lon… be… glo… rea…
- A … co…
- Institutions and the peer review process are failing to enforce rigour and integrity
- LCA is no longer the pinnacle of scientific environmental assessment it is now the pinnacle of sophisticated greenwash

- The “LCA Round Table” LinkedIn Group is challenging these problems in LCA and has proposed the draft “Grail” methodology to supplement/replace ISO14040/4

EPD's Fundamental Problems

- PCR's developed because a client would pay, rather than independent of client interest
- Ad-hoc PCR criteria published ignoring ISO14025 requirements to base these on research of the product function
- No common consistent LCA methodology adopted for all products or even up and down the supply chain of a particular product
  - Attributional/Consequential/Hybrid/I-O LCA
  - Inconsistent goal, scope (physical & lifetime) and functional unit
  - Inconsistent allocation rules for multi-output processes
  - Inconsistent treatment of recycling
  - Inconsistent impact categories, assessment models, timeframes
- Misleading EPD's that use inappropriate goal, scope and functional units
- Misleading EPD's that cheat on EN15804 Module D declarations (disgracefully mandated by CENTC350 WG3 interpretation rulings)

EPD's Fundamental Problems

- PCR's developed because a client would pay, rather than independent of clie
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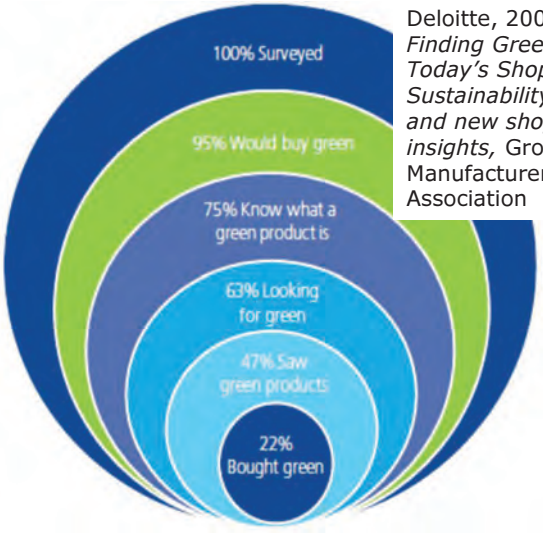
- Mis
- Misleading EPD's that cheat on EN15804 Module D declarations (disgracefully mandated by CENTC350 WG3 interpretation rulings)

- The "LCA Round Table" LinkedIn Group is challenging these problems and vested interest interference in EPD's and Ecolabels, CEN TC350 WG3 rulings on Module D of EN15804 are particularly challenged

What Consumers See

- The sponsors product is always the best
- Even for competing products
- The consumer does not trust green claims
- LCA and EPD's have lost credibility
- Which will be hard to rebuild



Deloitte, 2009, *Finding Green in Today's Shoppers: Sustainability trends and new shopper insights,* Grocery Manufacturers Association

Net Balance, 2010, *Green Shopper Summary Report*, Australian Food and Grocery Council

LCA

the pinnacle of scientific environmental assessment OR

the pinnacle of sophisticated greenwash

Suggestions

- Single consistent, universally applicable LCA methodology that exceeds the minimal requirements of ISO14040/4.
- Master list of PCR's reconciling the interests of users rather than providers (e.g. do users want one PCR for floorcoverings or separate ones for carpet, resilient flooring, timber flooring)
- Research each product category (ISO14025) for:
  - best functional unit,
  - range of available products in the market,
  - full LCA performance for the product range
- PCR criteria based on key characteristics and impacts
- Add non-LCA matters of concern
- All relevant industry and user stakeholders participate
- Peer review of all EPD submissions – protect the integrity of your EPD's

Suggestions

- Single consistent, universally applicable LCA methodology that exceeds the minimal requirements of ISO14040/4.
- Master list of PCR's reconciling the
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- PCR criteria based on key characteristics and impacts
- Add non-LCA matters of concern
- All relevant industry and user stakeholders participate
- Peer review of all EPD submissions – protect the integrity of your EPD's

e.g. UK Ecoprofiles methodology, BPLCI V1, LCA Round Table "Grail" draft methodolgy

Suggestions

- Single consistent, universally applicable LCA
  the minimal requirements of
- iling the interests of users rather than
  nt one PCR for floorcoverings or
  separate ones for bet, resilient flooring, timber flooring)
- Research each product category (ISO14025) for:
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- PCR criteria based on key characteristics and impacts
- Add non-LCA matters of concern
- All relevant industry and user stakeholders participate
- Peer review of all EPD submissions – protect the integrity of your EPD's

e.g. National Standards Development Organisation
http://www.nsdo.org.au/

Clarity Environment

Clarity Environment

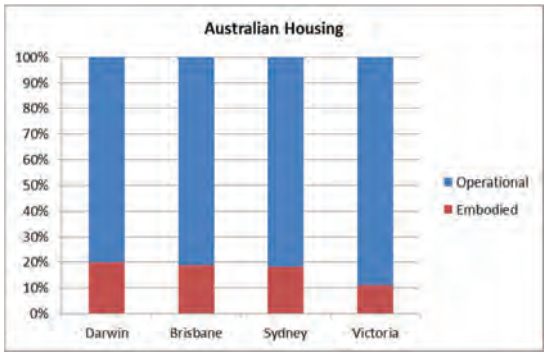
THANK YOU

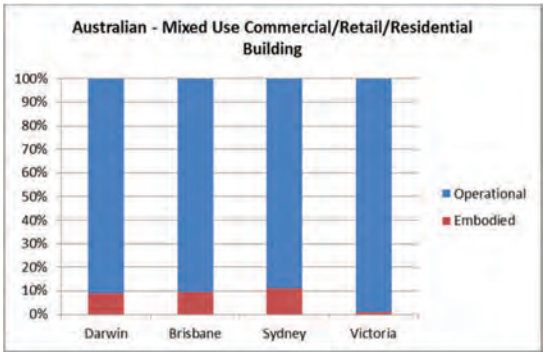
[redacted]

CO2-e in Buildings
Embodied or Operational

Clarity Environment

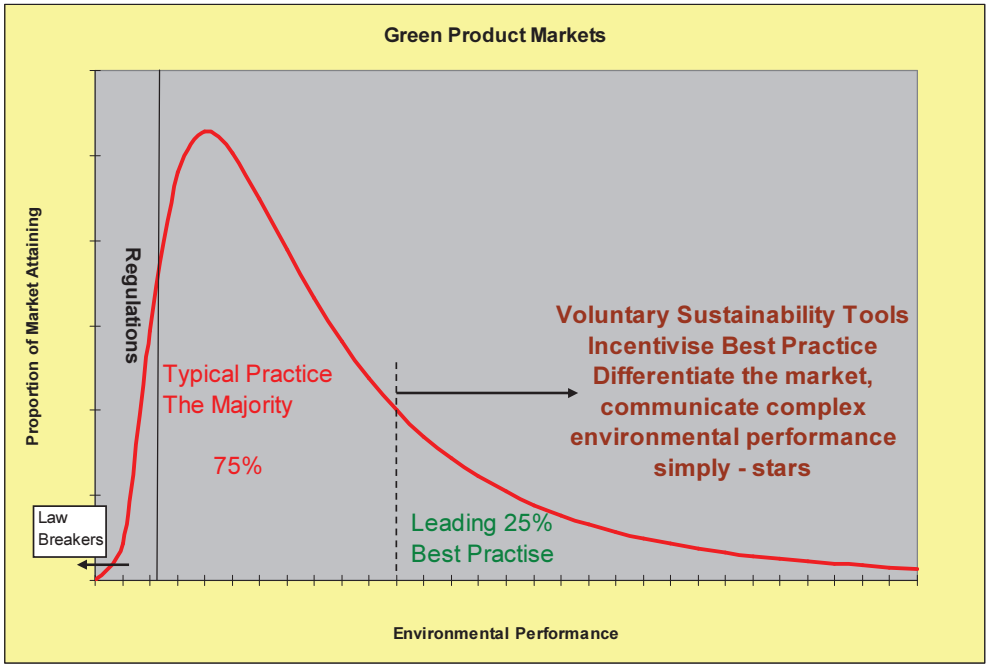
- Depends mostly on:
  - Grid Electricity CO2-e
  - Housing or Commercial
  - Lifetime assumed
  - Methodology, Attributional or Consequential
- Usually 10-20%, but can be 100% for unserviced or 100% passive buildings
- 20-40% for unbounded consequential methodology



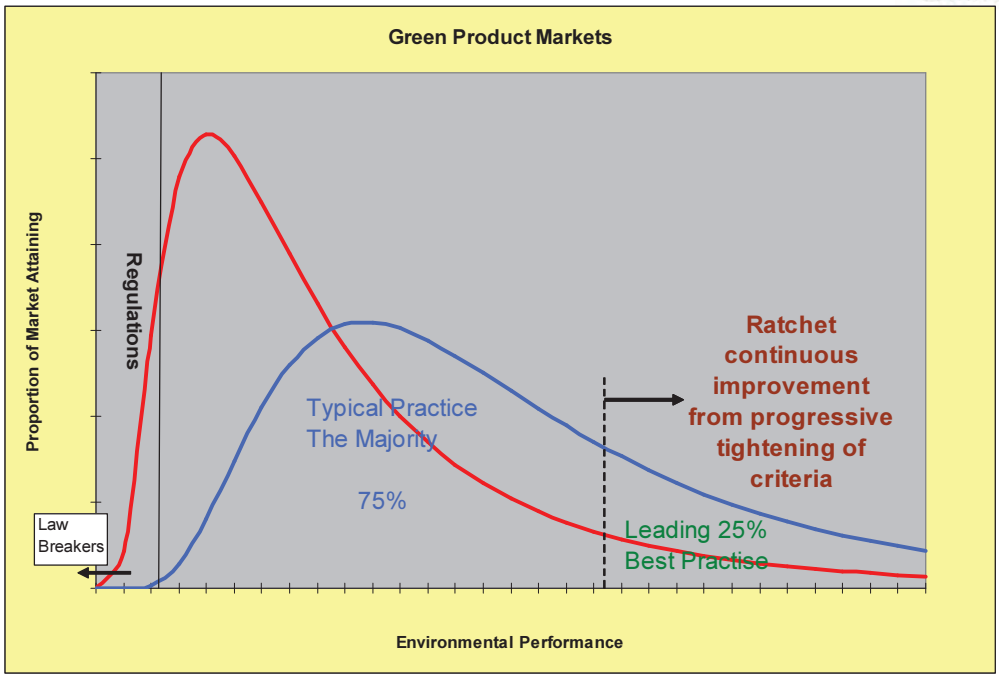


Estimated Using ENVEST V1 Prototype Apr 2017'

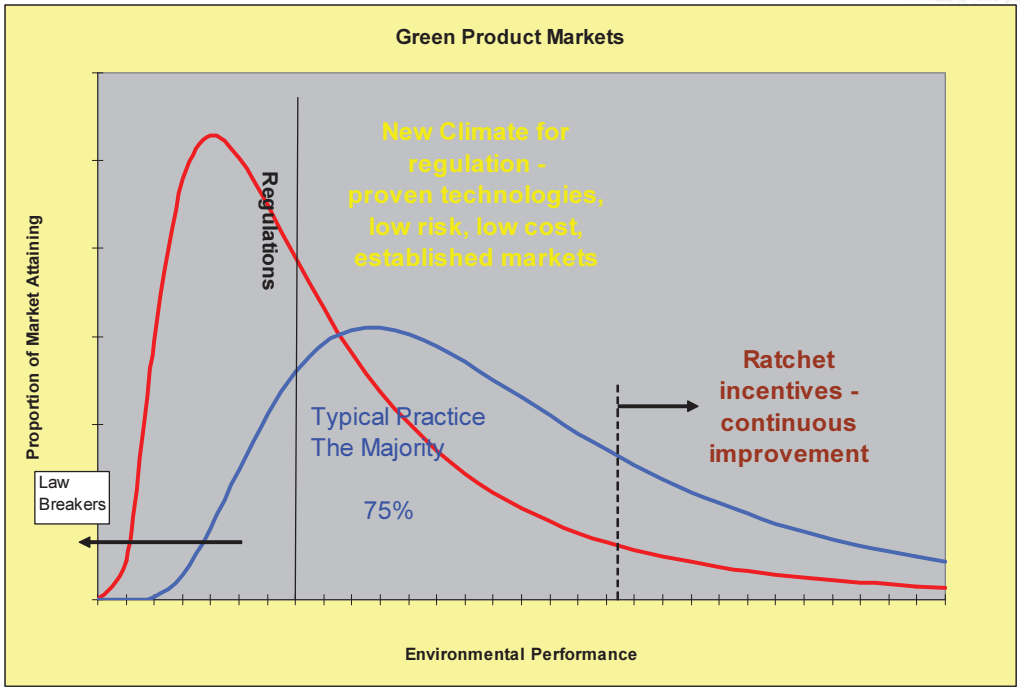
Sustainability in Markets



Sustainability in Markets



Sustainability in Markets



Asia Carbon Footprint Network

Promoting Green Buildings through Carbon Footprinting and Environmental Product Declaration Schemes

Seoul
2017-05-25

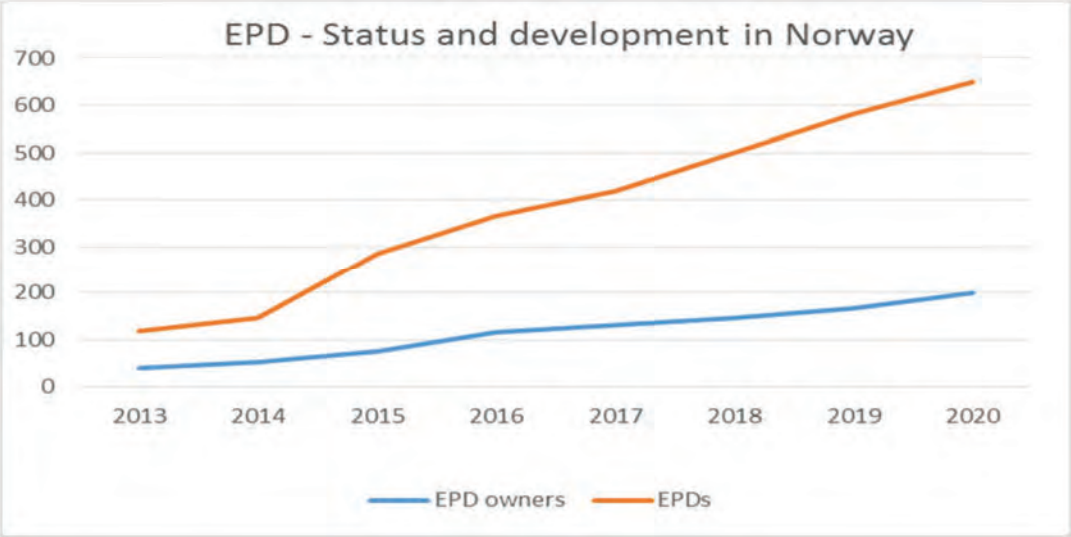
Håkon Hauan, CEO - The Norwegian EPD Foundation & ECO Platform Board Member

epd-norge.no
The Norwegian EPD Foundation

EU, Current State and Future Prospects of ECO Platform and application of EPDs

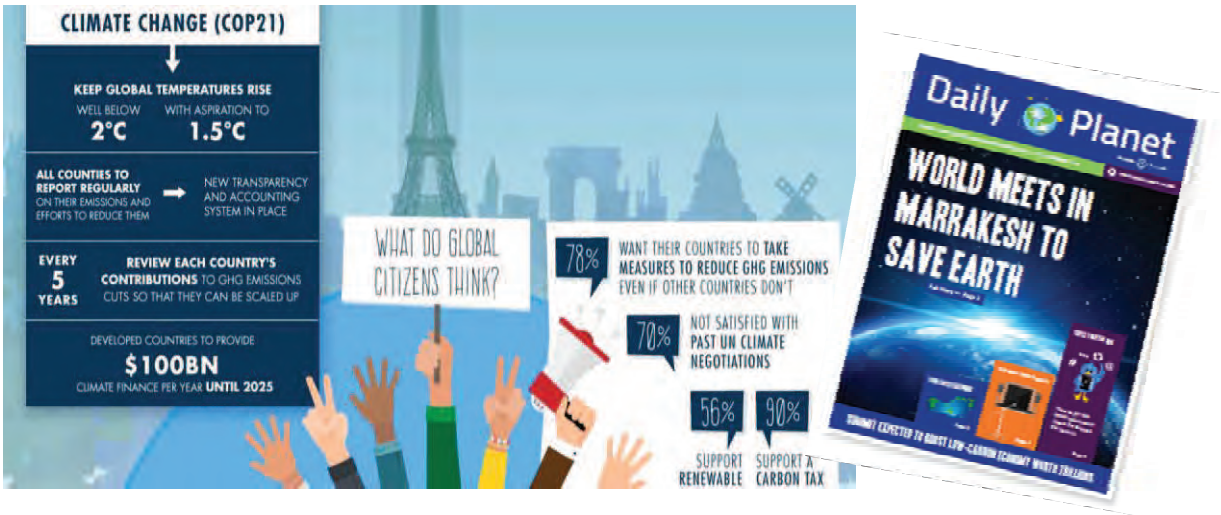
epd-norge.no
The Norwegian EPD Foundation

Status & trends

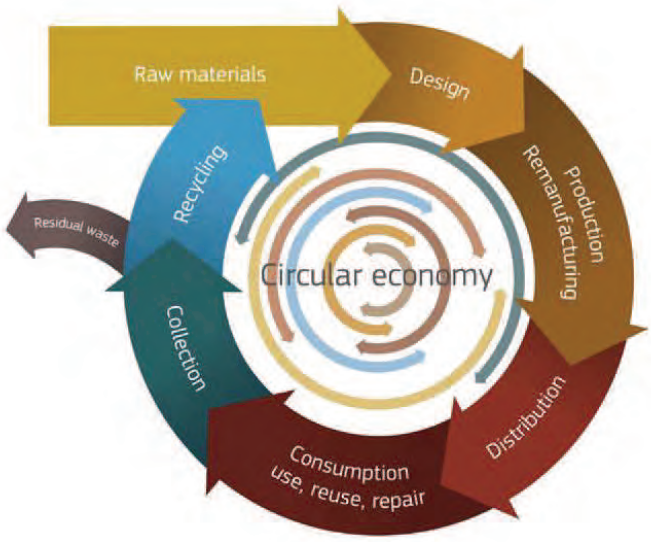


	2013	2014	2015	2016	2017	2018	2019	2020
EPD owners	39	52	76	115	130	145	165	200
EPDs	117	147	286	366	420	500	580	650

Status & trends



Status & trends



Status & trends

Why buy green?

Government expenditure on works, goods and services represents around 14% of EU GDP, accounting for roughly EUR 1,8 trillion annually[4]. By using their purchasing power to choose goods, services and works with a reduced environmental impact, they can make an important contribution towards local, regional, national and international sustainability goals. GPP can be a major driver for innovation, providing industry with real incentives for developing green products and services. This is particularly true in sectors where public purchasers represent a large share of the market (e.g. construction, health services, or transport).

Status & trends

Single Market for Green Products Initiative

A company wishing to market its product as environmentally friendly in several Member State markets faces a confusing range of choices of methods and initiatives. Sometimes they have to use different ones for different markets. This results in costs for companies and confusion for consumers.

The European Commission proposes the Product Environmental Footprint and Organisation Environmental Footprint methods as a common way of measuring environmental performance.

Status & trends

Status & trends

EPD generator tools:

- ✓ Automation
- ✓ Volume
- ✓ Lower costs
- ✓ Lower competence barriers
- ✓ Time effective
- ✓ Project Specific EPPs

ECO Platform

Objectives and added value of ECO Platform

The objective of ECO Platform is the development of verified environmental information of construction products, in particular type III declarations called EPD (Environmental Product Declarations). The added value of EPD under the ECO Platform framework is the possibility to use these declarations in all European but also international markets.

ECO Platform

THE ECO PLATFORM EPD

ECO Platform EPD are the best way to provide quantitative and verified information about the environmental performance of products, seen from a comprehensive life cycle perspective.

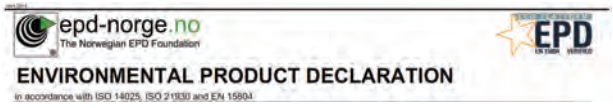
The following advantages of ECO Platform EPD should be highlighted

- Homogeneous approach between products
- Neutrality because the development is not based on rating schemes
- Credibility supported by audits, reviews and third party verification
- Accuracy due to the frequent revisions of the system

The added value for the industry is the reduction of the efforts to provide environmental information to any interested stakeholder. The information of ECO Platform EPD also is valuable to optimise the production, to understand the impact of the processes and to obtain a value for the environmental performance of the products.

ECO Platform

"410 EN 15804 EPD are now listed on Eco Platform, http://eco-platform.org."



"More EN 15804 EPD were published between March 2016 and January 2017 than had already been published in March 2014, or were published between March 2014 and March 2016."

ECO Platform

- ✓ Further harmonization
- ✓ PCR registry
- ✓ Mutual Recognition agreements
- ✓ Co-operation with other sectors
- ✓ Increased volume of ECO EPDs
- ✓ Increased number of EPD Operators

epd-norge.no
The Norwegian EPD Foundation

EPDs as competitive advantage

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The Norwegian EPD Foundation

EPDs as competitive advantage

ECO PLATFORM

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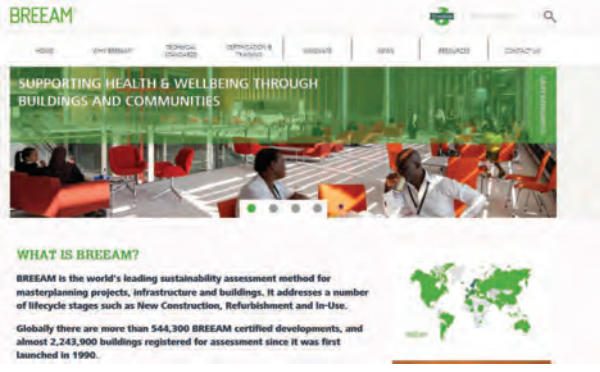
The Norwegian EPD Foundation

EPDs as competitive advantage

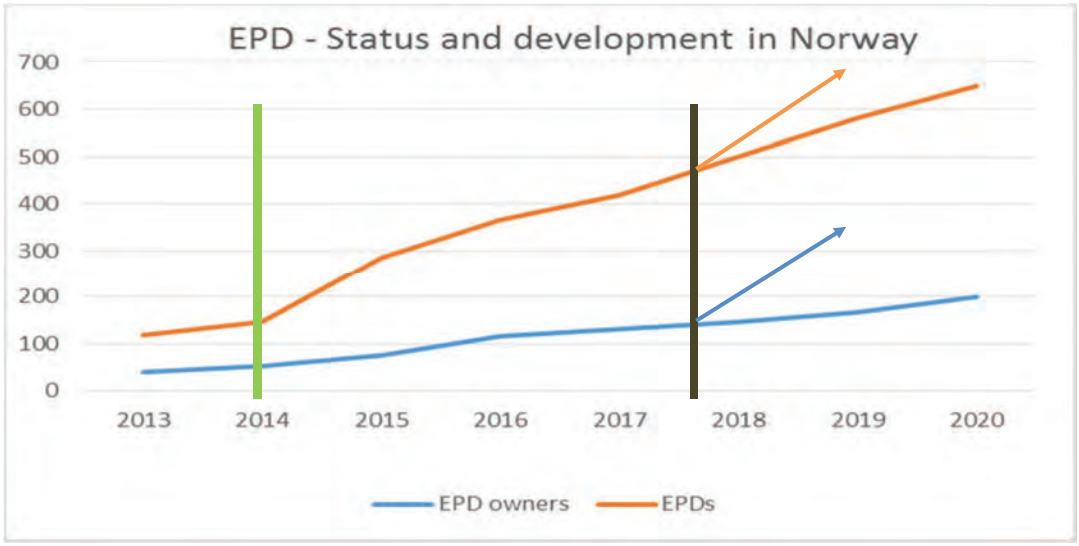


LEED, or Leadership in Energy and Environmental Design, is changing the way we think about how buildings and communities are planned, constructed, maintained and operated. Leaders around the world have made LEED the most widely used third-party verification for green buildings, with around 1.85 million square feet being certified daily.

LEED works for all buildings—from homes to corporate headquarters—at all phases of development. Projects pursuing LEED certification earn points across several areas that address sustainability issues. Based on the number of points achieved, a project then receives one of four LEED rating levels: Certified, Silver, Gold and Platinum.

epd-norge.no
The Norwegian EPD Foundation

The Future Prospects of ECO EPDs



BREEM Nor implemented points for high volume construction material EPDs

Asphalt PCR and EPD Generating tool is approved

ECO PLATFORM

ESCAP

KEITI

Thank you Seoul, for your attention

2017 ACFN

Strategies for effective connection of EPDs and Green Building Certification in Korea

MAY 25, 2017

Chang-U Chae, Head of Building and Urban Research Center

KICT KOREA INSTITUTE of CIVIL ENGINEERING and BUILDING TECHNOLOGY

Contents

I Green Building Certification

Ⅰ. Green Building Certification

Green Building Certification Scheme (G-SEED)

A scheme for assessing eco-friendliness of buildings in order to reduce environmental burden caused by energy/ resource use and pollutant discharge in the life cycle of a building, and thus to create a pleasant environment.

- Target Buildings: New and existing buildings for all purposes (public mandatory, private recommended)
- Applicants: Building owners, building clients, builders

Certification Performance (8,363 certifications until Mar. 2017)

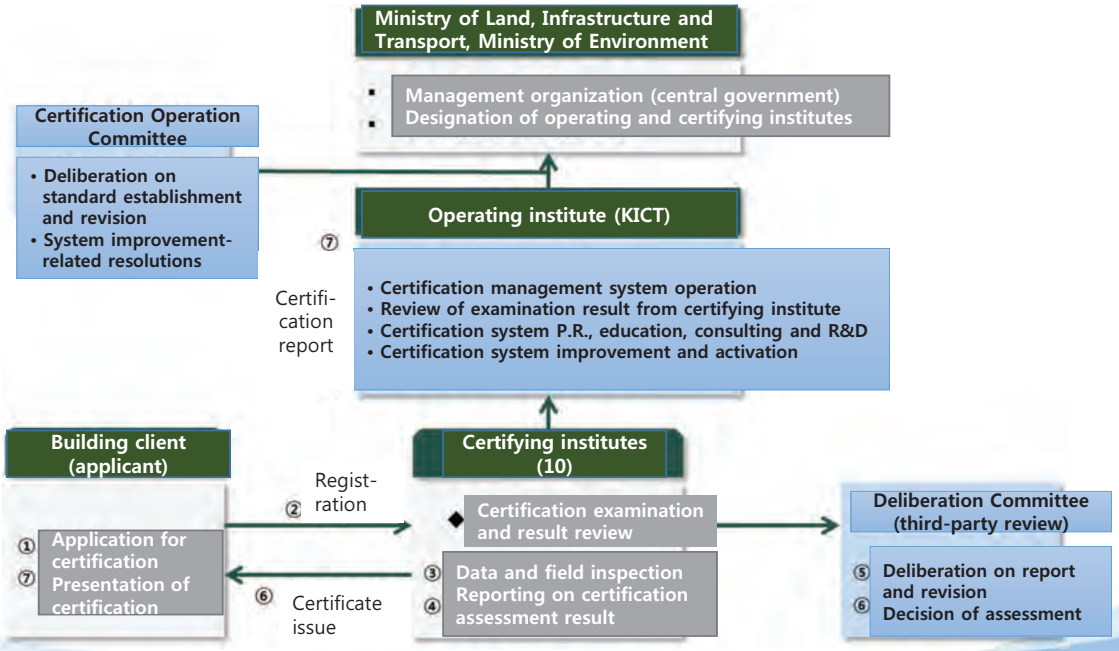
Category	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17.3	계
Main Certification	-	-	3	3	8	36	153	251	278	218	179	244	351	510	567	155	2,956
Preliminary Certification	3	3	12	30	155	263	261	319	352	282	390	483	683	859	1,072	240	5,407

Expansion and Improvement of Certification Criteria for Existing Buildings (G-SEED 2016)

- Reflecting trend of change in global standards: Introducing LCA concept, highlighting importance of certification, such as GHG reduction
- Reflecting changes according to improvement of green building criteria: Introducing new certification items, adjusting certification level
- Restructuring certification criteria operation and management system: Building categorization & assessment criteria (346 items)
- Expanding certification targets of existing buildings and introducing green remodeling certification criteria
- Introducing innovative design and green building certification expert qualification systems

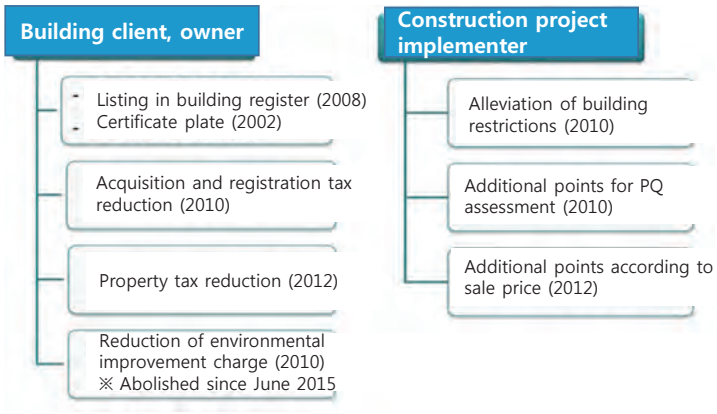
Ⅰ. Green Building Certification

G-SEED Operation System



Ⅰ. Green Building Certification

Incentives for G-SEED Acquisition



Local Tax Reduction

Category	Energy Efficiency Level 1	Energy Efficiency Level 2	Other Levels
Green Building Certification Top Level	Acquisition tax 15%, property tax 15%	Acquisition tax 10%, property tax 10%	Property tax 3%
Green Building Certification Excellent Level	Acquisition tax 10%, property tax 10%	Acquisition tax 5%, property tax 3%	-
Other Levels	Property tax 3%	-	-

Alleviation of Building Restrictions [Annexed Table 9: Energy Saving Design Criteria for Buildings]

- **Alleviation by 3 – 9% according to max. floor area ratio and max. height restrictions specified in the ordinances of local governments**

Ⅱ EPD and Carbon Footprint in Building

Ⅱ. EPD Support Schemes

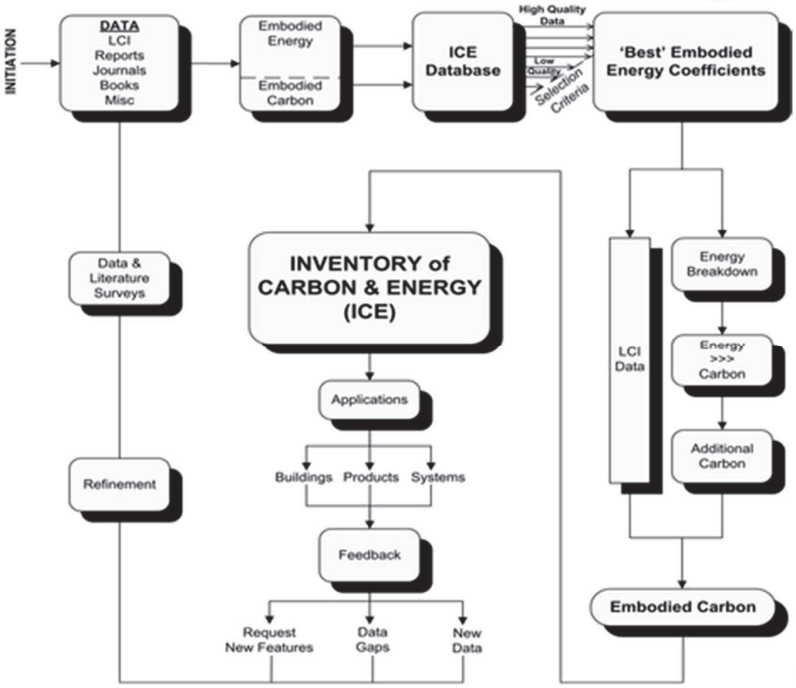
Drivers

- **Certification schemes for buildings**
  - LEED, BREEAM, DGNB
- **European standards for sustainable buildings**
  - CEN/TC 350 (EN 15643, EN 15978, EN 15804)
- **Regulations on construction materials**
  - LCA and EPD products in construction materials
- **LCA-related building requirements**
  - In the Netherlands, etc.
- **Minimum mandatory standards and requirements**
  - Public buildings in the U.K. and Germany
- **Regulations on the use of EPD certified products for construction**
  - Requirements for government buildings in Norway

Ⅱ. National Databases

Countries with National Databases

- Germany
- Netherlands
- U.K.
- Austria
- Korea



ICE Carbon Inventory (U.K.) Utilization Process

Ⅱ. National EPD Programs

Utilization of National EPD Programs

※ EPD programs are well established and gradually spreading across the world.

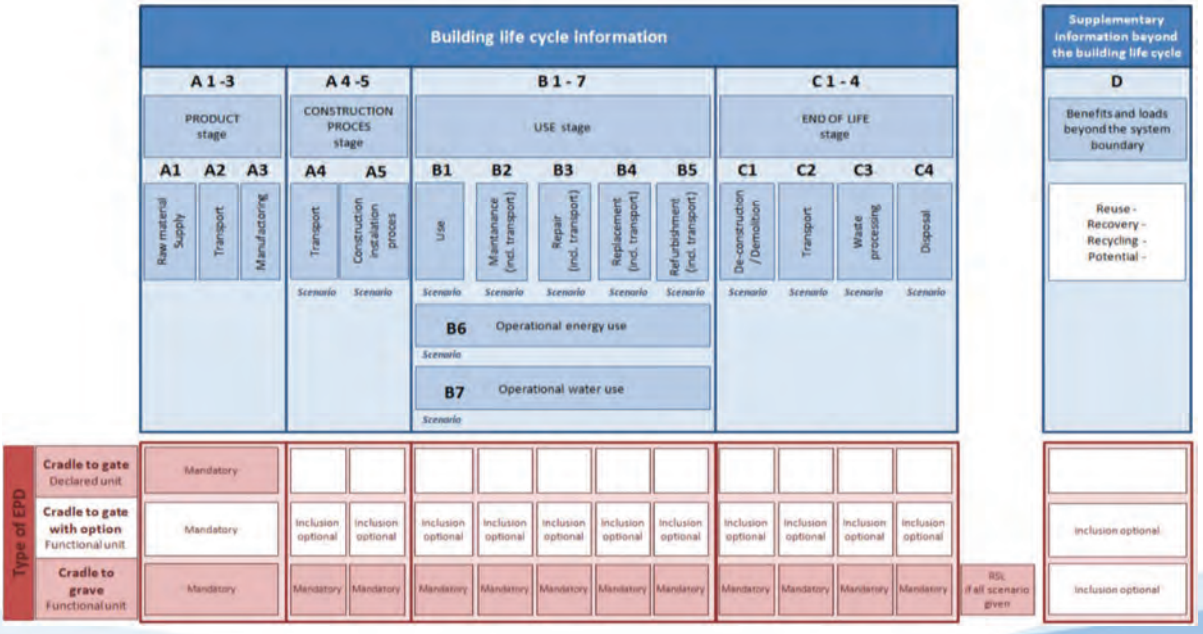
- Germany
- Norway
- U.K.
- Netherlands
- Austria
- Denmark
- France
- Korea, etc.

※ In Europe, a platform for EPD is established and operated (ECO Platform)

Ⅱ. EPD Information Modules

Implementation Method

NS-N 15804:2012 Information Module Configuration



Ⅱ. ECO Platform

http://www.eco-platform.org/

ECO PLATFORM

ABOUT US | MEMBERS | WG | ECO PLATFORM EPD | EVENTS | CONTACT | JOIN US | MEMBER LOGIN

THE ECO PLATFORM EPD

ECO Platform EPD are the best way to provide quantitative and verified information about the environmental performance of products, seen from a comprehensive life cycle perspective.

The following advantages of ECO Platform EPD should be highlighted

- Homogeneous approach between products
- Neutrality because the development is not based on rating schemes
- Credibility supported by audits, reviews and third party verification
- Accuracy due to the frequent revisions of the system

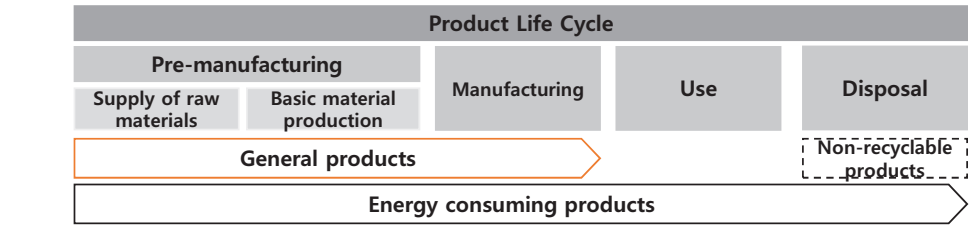
The added value for the industry is the reduction of the efforts to provide environmental information to any interested stakeholder. The information of ECO Platform EPD also is valuable to optimise the production, to understand the impact of the processes and to obtain a value for the environmental performance of the products.

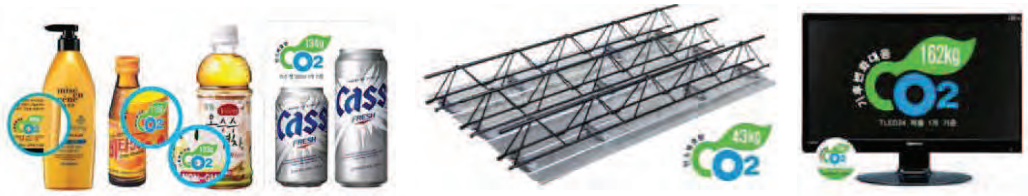
ECO Platform EPD are also important for regulators, building rating schemes and designers who will understand the impact of construction products in construction with reliable information obtained from trusted sources.

Manufacturers or associations are invited to contact the program operators of ECO Platform to develop and ECO Platform EPD for their products.

Carbon Footprint Certification Scheme

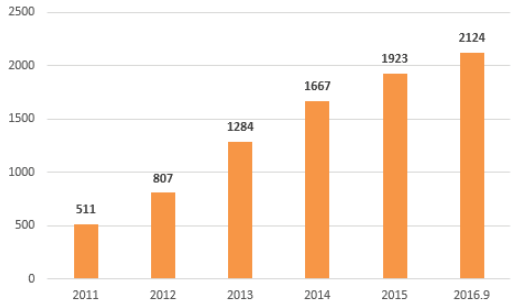
- Carbon emission amount throughout the life cycle of a product is displayed on the product so as to contribute to the spreading of low-carbon consumption culture led by the market.
- Main purpose is to improve the image of a business that manufactures the certified product by publicizing that the product is in compliance with the government's low-carbon green growth policy and climate change.

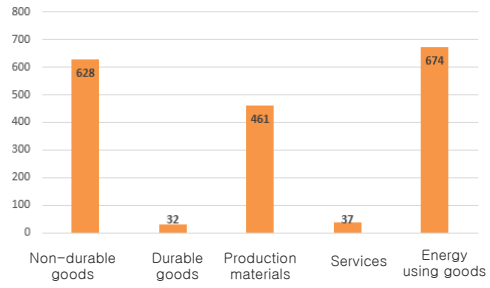




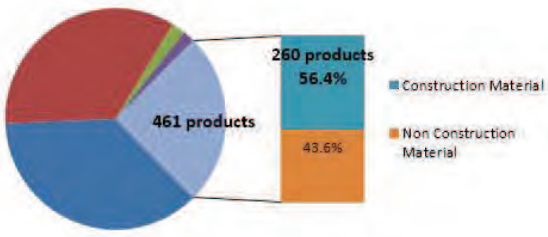
Ⅱ. Korea - Carbon Footprint - Building Materials

Carbon Footprint Certification Status



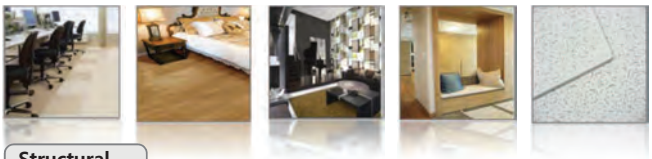


- Continuous expansion of carbon footprint certification
- A total of 2,124 products acquired carbon footprint certification
- Building materials are categorized as general products. A total of 260 products acquired certification
  (12.2% of all products, 56.4% of production materials, as of 2016)



Construction Material Carbon Footprint Certification Data Analysis

Interior Materials (Flooring materials, wallpaper, furniture finishing materials, sum boards, interior finishing materials)



Window & Door Materials (Window and door profile)

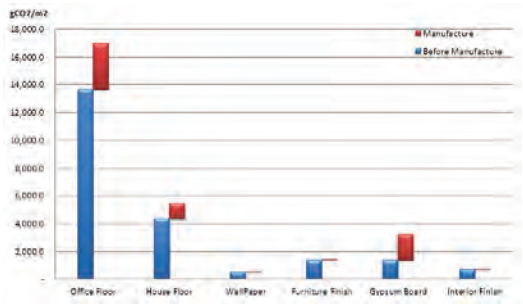
Structural Materials (Ready-mix concrete, precast concrete)

Equipment (Piping)

Product Group	No. of Certified Products	Average Carbon Generation Amount	Unit
Interior Materials	80	6,855.6	gCO_2/m^2
Window and Door Materials	14	1,819.2	gCO_2/kg
Structural Materials	10	543.8	$kgCO_2/m^3$
Equipment	8	120.3	$kgCO_2$/unit
Others	15 products (landscape, exterior and construction materials)		

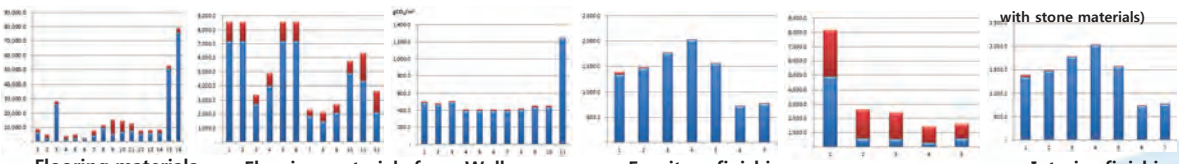
Distribution of Carbon Emissions from Carbon Footprint Certified Products

Interior Materials A total of 80 certified products analyzed, interior materials accounting for 62.5% of building materials



- For carbon footprint of construction materials, carbon emission amount from pre-manufacturing and manufacturing stages is assessed.
- Interior materials, which account for the highest percentage of building materials, are comprised of flooring materials (offices and residential buildings), wall paper, furniture finishing materials, gypsum boards and interior finishing materials.
- With an exception of specific products, similarities of carbon emission amounts can be compared. Products of similar performances can be assessed based on their carbon footprints.

* Specific Products: Access floors, reinforced flooring materials, wallpaper made with stone materials)

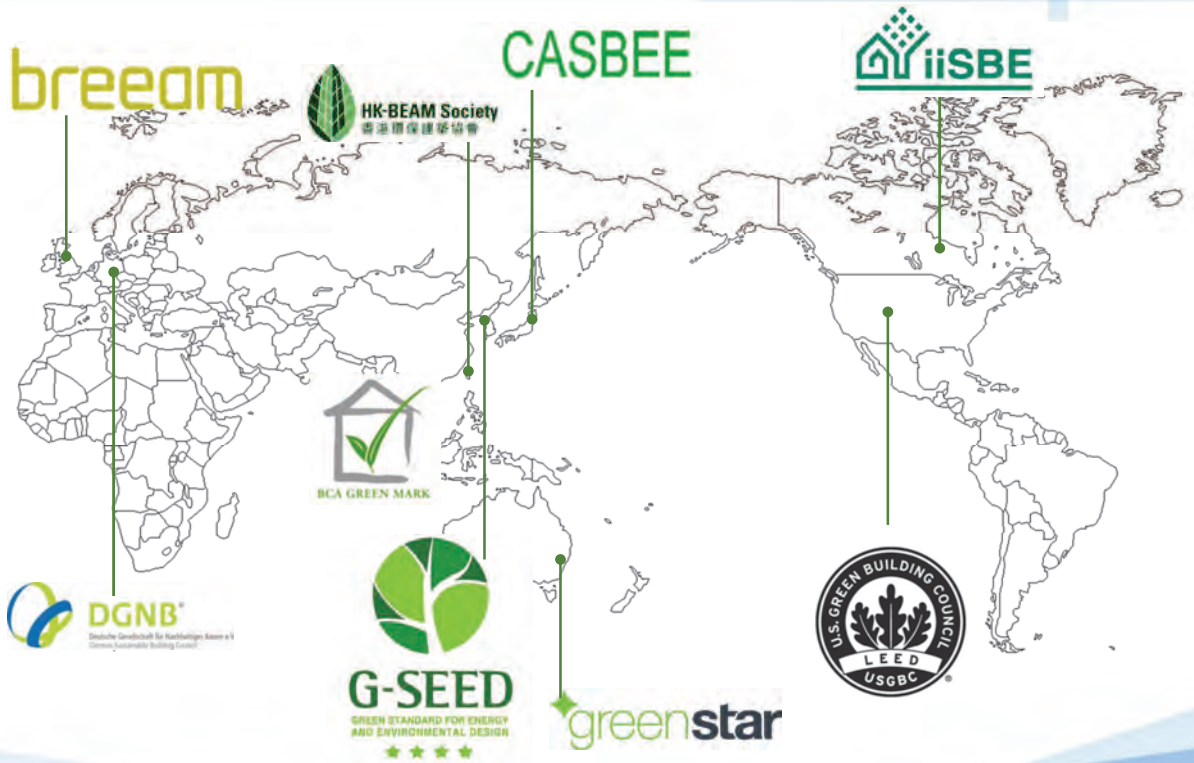


Flooring materials for offices | Flooring materials for residential buildings | Wallpaper | Furniture finishing materials | Gypsum boards | Interior finishing materials

Ⅲ

EPD Use in Green Building Certification

Ⅲ. Green Building Certifications in the World



Ⅲ. Green Building Certification - BREEAM Materials

BRE, BREEAM – Materials (Points Allocated: Max. 18 points)

Category	Point Allocations	
	Point	Distribution(%)
Mat 01 Life cycle impacts (Exemplary level criteria)	Max. 6 (Add. 3 points)	Approx. 33% (Max. 50%)
Mat 02 Hard landscaping and boundary protection	1	Approx. 5.6%
Mat 03 Responsible sourcing of materials Responsible Sourcing of Materials (RSM) (Exemplary level criteria)	1 Max. 3 (Add. 1 points)	Approx. 5.6% Approx. 16.7% (Max. 27.8%)
Mat 04 Insulation	1	Approx. 5.6%
Mat 05 Designing for durability and resilience	1	Approx. 5.6%
Mat 06 Material efficiency	1	Approx. 5.6%

Ⅲ. Green Building Certification - BREEAM Materials

BRE, BREEAM – Materials

Category

Mat 01 Life cycle impacts

(1) Allocation of credits by building type and Mat 01 points

Office	Retail	Industrial	Education	Healthcare	Prisons	Courts	Multi-residential	Other buildings
5	5	2	6	6	4	6	6	6

(2) Exemplary level criteria

① Access by area: Using Green Guide to Specification: 1 point

② Access to whole building: Using LCA software tools: 2 points

Mat 03 Responsible sourcing of materials

(1) Pre-requisite : Transparent production process of all wooden materials used in the project
(2) Sustainable procurement plan: 1 point
(3) Responsible sourcing of materials (RSM): Max. 3 points
(4) Exemplary level criteria: Additional 1 point

Mat 06 Material efficiency

▪ A plan to maximize efficiency of materials in order to minimize environmental load caused by material use and disposal
- Reduce material use
- Recycle previously disposed and dismantled materials
- Use appropriately treated high-quality recycled materials
- Set up alternatives for reduction of material use and waste generation in other areas

Ⅲ. Green Building Certification - LEED Materia

USGBC, LEED BD+C: New Construction – Materials and Resources (Points Allocated: Max. 14 points)

Category	Point Allocations	
	Point	Distribution(%)
✓ Storage and Collection of Recyclables ✓ Construction and Demolition Waste Management Planning ✓ PBT Source Reduction-Mercury(Healthcare)	Prerequisite | Required	
MR 1 Building Life-Cycle Impact Reduction	2~5	Max. 36%
MR 2 Building Product Disclosure and Optimization-EPD	1~2	Max. 14%
MR 3 Building Product Disclosure and Optimization-Sourcing of Raw Materials	1~2	Max. 14%
MR 4 Product Disclosure and Optimization-Material Ingredients	1~2	Max. 14%
MR 5 PBT Source Reduction-Mercury	1	Approx. 7%
MR 6 PBT Source Reduction-Lead, Cadmium and Copper	2	Approx. 14%
MR 7 Furniture and Medical Furnishings	1~2	Max. 14%
MR 8 Design for Flexibility	1	Approx. 7%
MR 9 Construction and Demolition Waste Management	1~2	Approx. 14%

Ⅲ. Green Building Certification - LEED Materia

USGBC, LEED BD+C: New Construction – Materials and Resources

	Category
PREREQUISITE	**Storage and Collection of Recyclables** ▪ Prepare a space to collect recyclable/ reusable items (min. 4 types) by category **Construction and Demolition Waste Management Planning** ▪ Plan waste reuse/ recycling in the stage of construction and demolition **PBT Source Reduction-Mercury (Healthcare)** ▪ Reduce the use of products that contain mercury through product substitution and recycling
MR 1	**Building Life-Cycle Impact Reduction** ▪ OPTIONS (1) Historic Building Reuse : 5 points (2) Renovation of Abandoned or Blighted Building : 5 points (3) Building and Material Reuse : 2~4 points (4) Whole-Building Life Cycle Assessment : 3 points ⇒ Min. 3 of the six environmental impact categories, min. 10% ↓ from baseline (reduction, GWP to be included)
MR 2	**Building Product Disclosure and Optimization-Environmental Product Declarations** ▪ OPTIONS (1) Environmental Product Declaration (EPD) : 1 point ⇒ Min. 20 items for permanent use, min. 5 suppliers (to comply with official product-specific declaration, environmental declaration according to international standards or USGBC approved program) (2) Multi-Attribute Optimization : 1 point ⇒ Of products of permanent use applied to a building, those completed of third-party verification must have environmental impact lower than the industry average (min. 3 categories) and the products must be supplied from a location within 160km from project site.

3.1 Use of EPD (Environmental Product Declaration) Certified Products

Purpose of Assessment	To improve awareness of environmental impacts caused by buildings by using EPD certified products in building projects	
Calculation Criteria		4 points

Level	Description	Weight
Level 1	4 or more key building components, total of 6 or more EPD products used	1.0
Level 2	3 or more key building components, total of 5 or more EPD products used	0.8
Level 3	2 or more key building components, total of 4 or more EPD products used	0.6
Level 4	1 or more key building components, total of 3 or more EPD products used	0.4

※EPD products refer to those specified by the head of operating institute including EPD and carbon footprint certified products. Recognition as "other EPD products," when necessary, can be carried out according to standards and procedures set out in the detailed operation rules.

※ Key building members refer to structural materials and materials applied to inner/ outer walls, roofs, floors and windows/ doors.

※ As for the same EPD product, up to two building components are recognized.

3.2~3.4 Use of Green Building Materials (Low-carbon, Recyclable, Reduction of Hazar

Purpose of Assessment	To consider and use green building materials, such as low-carbon materials, recyclable materials and materials to reduce hazardous substances	
Use of Low-carbon Materials		2 points each
Use of Recyclable Materials		
Use of Materials to Reduce Hazardous Substances		

Level	Description	Weight
Level 1	7 or more low-carbon materials used	1.0
Level 2	5 – 6 low-carbon materials used	0.8
Level 3	3 – 4 low-carbon materials used	0.6
Level 4	1 – 2 low-carbon materials used	0.4

Level	Description	Weight
Level 1	20 or more recydable materials used	1.0
Level 2	15 or more and less than 20 recydable materials used	0.8
Level 3	10 or more and less than 15 recydable materials used	0.6
Level 4	5 or more and less than 10 recydable materials used	0.4

Level	Description	Weight
Level 1	20 or more materials to reduce hazardous substances used	1.0
Level 2	15 or more and less than 20 materials to reduce hazardous substances used	0.8
Level 3	10 or more and less than 15 materials to reduce hazardous substances used	0.6
Level 4	5 or more and less than 10 materials to reduce hazardous substances used	0.4

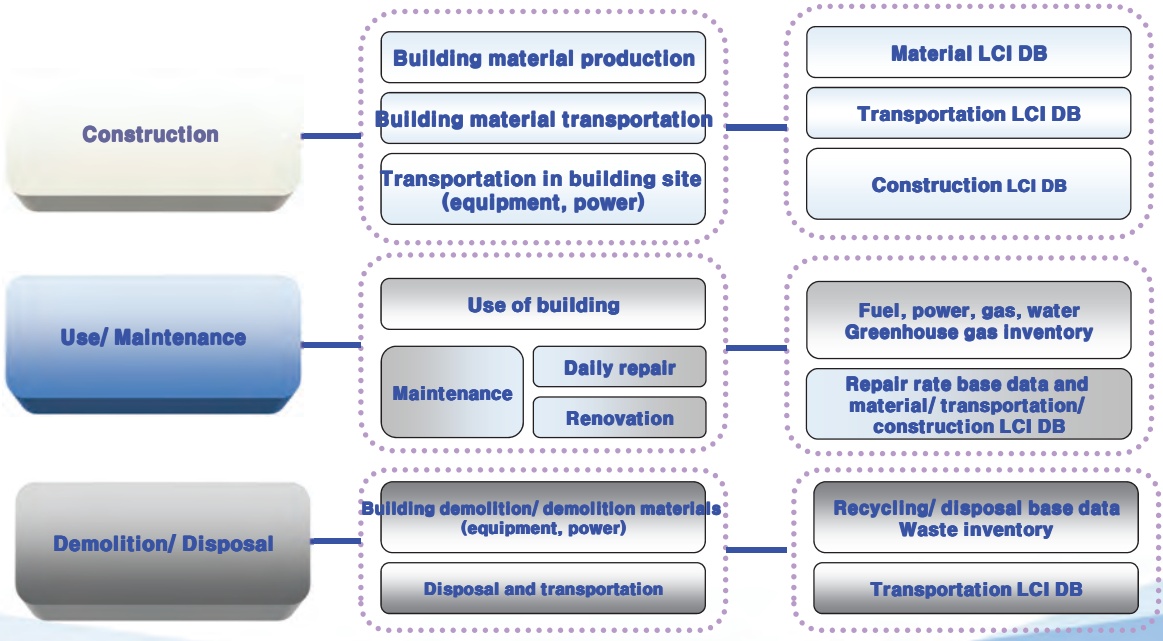
※ Applicable limitedly to green building materials announced by the head of operating institute. Separate material recognition, when necessary, can be carried out according to standards and procedures set out in the detailed operation rules.

※ Products applied to auxiliary welfare facilities and neighborhood living facilities and electronic home appliances are excluded (specified in manual).

Ⅳ Suggestions for Efficient Application

Ⅳ. Suggestions for Efficient Application

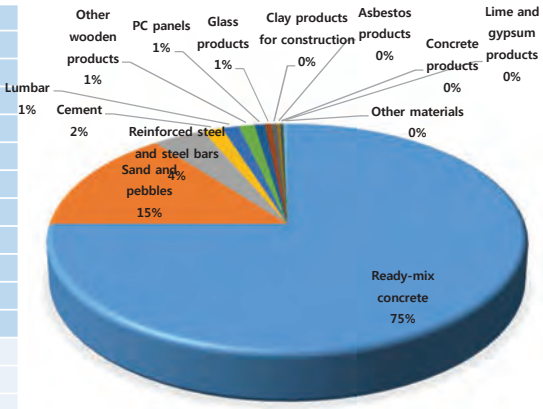
Considerations for Life Cycle Building Environmental Impact and Securing of Related Data



Ⅳ. Suggestions for Efficient Application

Selection of Key Materials through Accumulated Mass Contribution Analysis

No.	Category	Input Amount (kg)	Ratio (%)	Accumulated Ratio (%)
1	Ready-mix concrete	2,379,155	75.0	75.0
2	Sand and pebbles	459,200	14.5	89.5
3	Reinforced steel and steel bars	127,696	4.0	93.5
4	Cement	47,090	1.5	95.0
5	Lumbar	40,347	1.3	96.3
6	Other wooden products	38,731	1.2	97.5
7	PC panels	24,700	0.8	98.3
8	Glass products	16,451	0.5	98.8
9	Clay products for construction	11,862	0.4	99.2
10	Asbestos products	10,853	0.3	99.5
11	Concrete products	4,124	0.1	99.6
12	Lime and gypsum products	2,829	0.1	99.7
13	Paints	2,291	0.1	99.8
14	Adhesives and gelatin	1,813	0.1	99.9
15	Steel pipes	1,787	0.1	100.0
16	Stone materials for construction	1,004	0.0	100.0
17	Steel wires	668	0.0	100.0
18	Rolled steel materials	662	0.0	100.0
19	Others	1,024	0.0	100.0
	Total	3,172,285	100	100.0

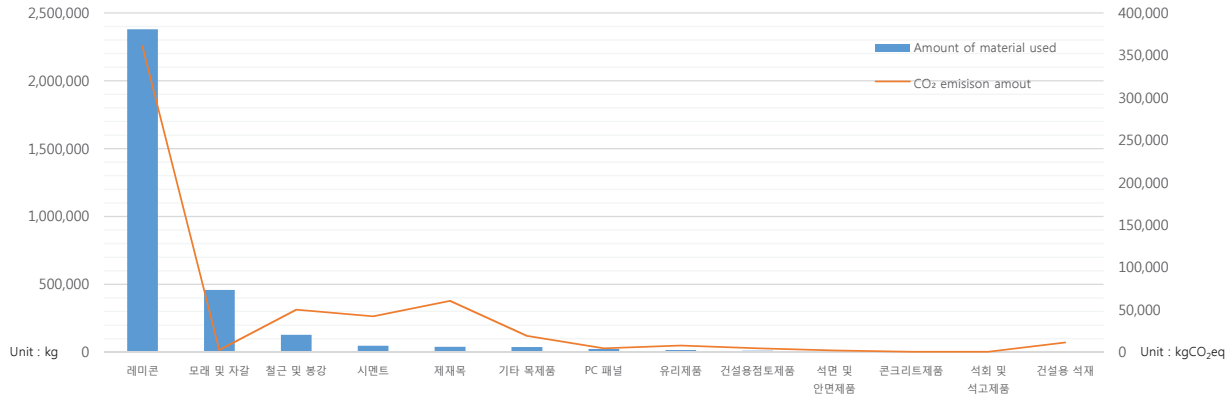


❖ Accumulated mass contribution analysis carried out on the basis of total amounts used in building including reference housing and actual housing as well as communal area

- The amounts of materials used are in the order of **ready-mix concrete (75%) > sand and pebbles (14.5%) > reinforced steel (4%)**
- Emission amount assessment is carried out on product groups in the top 99.7%

Ⅳ. Suggestions for Efficient Application

Considerations for Emission Contribution by Building Material



Classification	Ready-mix concrete	Sand and pebbles	Reinforced steel and steel bars	Cement	Lumbar	Other wooden products	PC panels	Glass products	Clay products for construction	Asbestos products	Concrete products	Lime and gypsum products	Stone materials for construction	Total	Unit
Amount of Material Used	2,379,155	459,200	127,696	47,090	40,347	38,731	24,700	16,451	11,862	10,853	4,124	2,829	1,004	3,164,042	kg
CO_2 Emission Amount	360,577	2,647	50,247	42,404	60,469	19,304	4,485	7,959	4,486	2,062	508	608	11,400	567,158	$kgCO_2eq$

- As a result of calculating carbon emission amounts through application of carbon emission factors by product group,
- **The amounts of materials used were found to be in the order of ready-mix concrete (63.6%) > lumbar (10.7%) > reinforced steel and steel bars (8.9%) > cement (7.5%).**

Ⅳ. Suggestions for Efficient Application

- To make life cycle assessment of buildings for green building certification mandatory
- To assess building impact contribution of building materials in carbon footprint and EPD assessment
- To develop building material information modules considering life cycle building environmental impact
- To develop programs and establish a system for linked assessment of building materials and buildings
- To increase importance of material and building impact assessment in green building certification system
- To shift the focus of building impact assessment from used energy to embodied energy

Thank You !

SWITCHAsia Project - MySuBuMa

Establishment of Carbon Footprint Labelling Scheme in Malaysia

Mazlina W. Hussein
Environmental Technology Research Centre
SIRIM

Contents

The Starting Point for CFP Labelling Scheme

SWITCHAsia Project: Environmental Declaration Scheme for Construction and Building Materials

Dec 2012 - Dec 2015

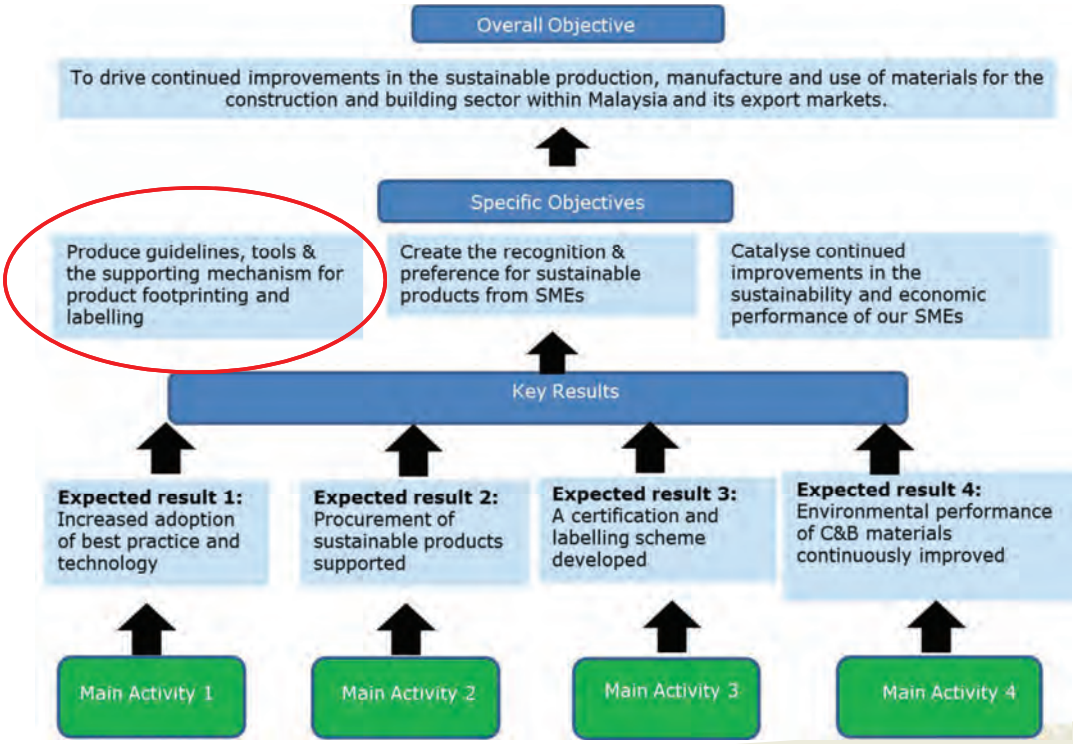
Collaborators:

- The Carbon Trust, UK
- Federation of Malaysian Manufacturers (FMM)
- Malaysian Green Building Confederation (MGBC)
- Building Materials Distributors Association Malaysia (BMDAM)

The Starting Point for CFP Labelling Scheme

Enabling Businesses. Enhancing Lives

Promoting Sustainable Consumption and Production



Institutional Supports

SIRIM Ecolabelling Criteria Committee (SECC)

SIRIM STS	SIRIM	SIRIM QAS INTERNATIONAL
SIRIM STS (subsidiary) (STANDARDS DEPARTMENT)	**SIRIM Berhad (ENVIRONMENTAL TECHNOLOGY RESEARCH CENTRE)**	**SIRIM QAS INTERNATIONAL (subsidiary) (PRODUCT CERTIFICATION & INSPECTION DEPT)**
• Secretariat of WGs: - Establishment of WG by nomination of potential members (experts) - Coordination of WG meetings - Finalization and approval of PCD	• Technical input provider : - Carrying out study on comparative data - Conducting literature search - Drafting of preliminary documents	• Identification of product for the “green market” sectors • Provide independent verification, certification and labelling

Facility Supports for CFP Labelling

- 2004: Life Cycle Assessment (LCA)
- 2010: Life Cycle Inventory Database (MYLCID)
- 2014: Carbon Foot-printing (CFP)
- 2014: Product Category Rules (PCR)
- 2014: In-house Tool for Carbon Footprint Analysis

http://lcamalaysia.sirim.my

Enabling Businesses. Enhancing Lives

Guidance Documents & Calculation Tool

Product Category Rules (PCR)

In-house CFP Calculator

Enabling Businesses. Enhancing Lives

CFP Calculation Tool

In-house CFP Calculator:

- ✓ Simplified calculation process with application system
- ✓ Facilitated verification process
- ✓ Streamlined database of CO_2e factors
- ✓ Limited capability & versatility (constrained to current PCR for construction products)

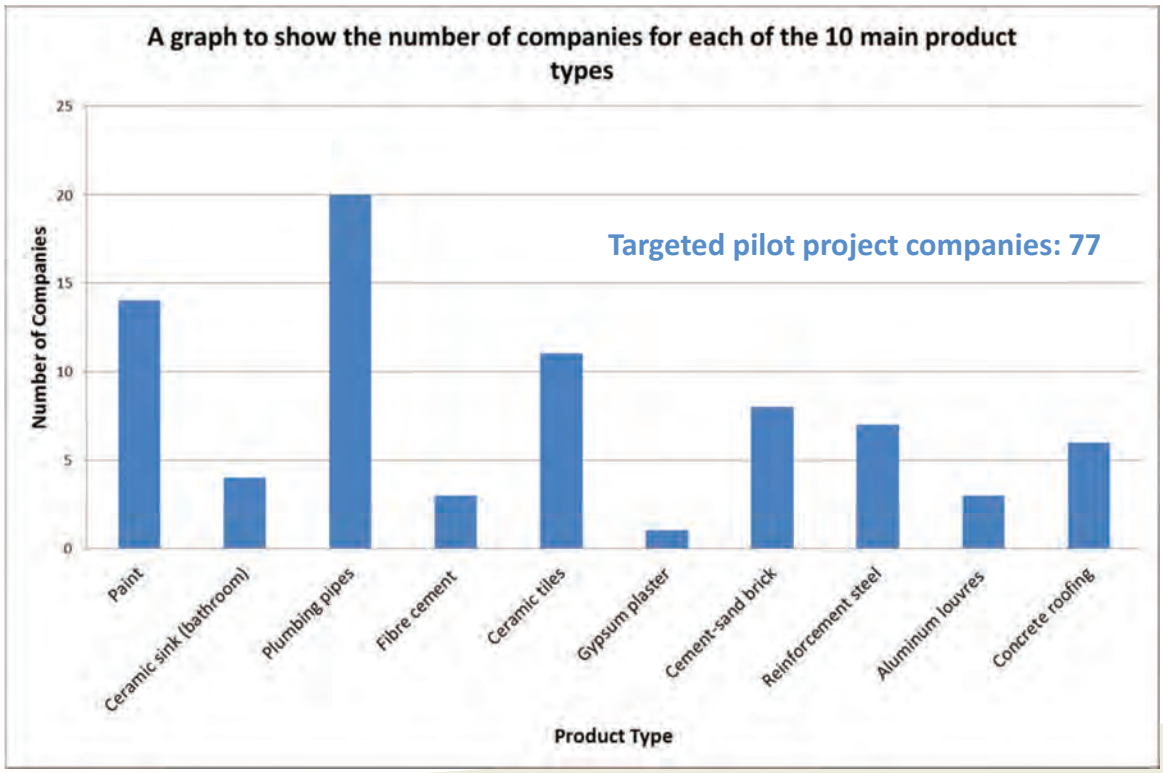
CFP Guidance Document & Product Category Selection

Product Category Rules (PCR):

- ✓ Limited to construction & building materials
- ✓ Basis of select product categories
  - ✓ Low hanging fruits
  - ✓ Association-based statistics
  - ✓ Target groups beyond SMEs

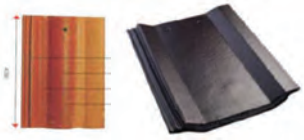
Date	Sessions	Attended by
14 Mar 2013	FMM	39 industry representatives
15 Mar 2013	MGBC	48 industry representatives
19 Mar 2013	BMDAM	23 industry representatives
21 Mar 2013	SIRIM	Project Partners (FMM, MGBC, BMDAM, Carbon Trust)

Product Category Selection

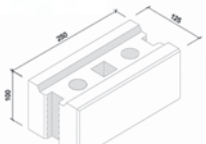


CFP Certified Products

No.	PRODUCT CATEGORY	Certified Products
1.	Masonry	7
2.	Gypsum Board	1
3.	Plumbing pipes	0
4.	Sewerage pipes	2
5.	Architectural roofing tiles	2
6.	Ceramic basin	0
7.	Ceramic Tiles	3
8.	Metal decking and paneling	1
9.	Reinforced steel	0
10.	Fibre cement ceiling sheets	3
11.	Paint	2
12.	Adhesive	1
	Total	22



Concrete Interlocking Roofing Tiles



Eco-block / bio-brick (masonry)

Standard core plasterboard

Fibre cement ceiling sheet

Vitrified clay pipe

Paint

CFP Certified Companies

No.	COMPANIES
1.	White Horse Ceramic Industries
2.	UAC Berhad
3.	Sequoia Marketing
4.	Exxomas (PG)
5.	Novaplast
6.	CSL Technologies (M)
7.	Hume Cemboard Industries
8.	Kilo Industries (Caylo)
9.	Hap Seng Clay Products
10.	Terreal Malaysia
11.	Boral Plasterboard (M)
12.	Niro Ceramic (M)
13.	Golden Clay
14.	Ban Soong Heng
15.	ASC Tiles
16.	YS Success Industries
17.	Monier
18.	Bina Integrated
19.	Wilron
20.	ICEB Trading
21.	Akzo Nobel Paint
22.	IBS Coordination

Business Category	Participation in Pilot Project (%)
SME	33%
Large	33%
MNC	33%

Way Forward – Supporting GGP

GGP Product Categories	GGP Product Categories
1. Paper	11. Multipurpose printing device
2. Cement	12. Hotel services
3. Paint	13. Printing/ publication
4. ICT	14. Plastics products (construction and road materials, food and non-food containers, office supplies, household products, flexible packaging products)
5. Indoor energy efficient lighting	15. Rubber products (glove, tyre, building and construction materials, household supplies, containers)
6. Cleaning services	16. Automotive workshop service
7. Data center	17. Water efficient appliances (water closet, showerhead, water taps and mixers, urinal equipment, washing machine)
8. Apparel	18. Rain water harvesting
9. Building facilities energy management service	19. Stationeries
10. Air-conditioning system	20. Furniture

Existing PCR

Malaysia's SCP Blueprint

Way Forward – Supporting GGP

Eco-labelling to Support GGP in Malaysia:

- SIRIM Eco-Labelling Scheme (certification & testing)
- Development of eco-labelling standards
  - 2004: Ecolabelling Criteria Documents for Products & Services
  - 2015: Product Category Rules for Carbon Footprint of Products

Alignment to national initiatives:

✓ Government Green Procurement (GGP)

✓ MyHijau Programme

SIRIM Eco-Services	Status
SIRIM Eco-Labelling Scheme (ISO 14024 Type I Eco Labels)	95 eco-label licenses 450 models of products (89 companies)
SIRIM Eco-labelling Criteria (ISO 14024 Type I; multiple criteria, 3rd party verification)	56 PCDs (8 in progress)
National Eco-labelling Criteria	16 PCDs (4 in progress)
CFP Labelling - Product Category Rules	13 PCRs (2 in progress)
SIRIM Carbon Footprint Labelling Scheme (partial ISO 14025 Type III Eco Labels)	22 companies

Way Forward – Enhancing CFP Labelling Scheme

Work in progress (post SWITCHAsia)

- Upgrading of *SIRIM Karbon Kalkulator*
  - Increase versatility beyond building materials
- Expansion to other product sectors (GGP)
- Current new work items for PCR (by industry request)
  - Solid biofuel
  - Bio-fibre composite plank

Thank you

SIRIM Berhad
No. 1, Persiaran Dato' Menteri
Section 2, 40700 Shah Alam
Selangor, MALAYSIA
Website: www.sirim.my

Integrated JEMAI Environmental Labelling Programme

Trend in Construction Industry in Japan

ACFN Annual Meeting & Seminar 2017

25 May 2017

Akira Kataoka
Eco-Design Office
LCA Centre
JEMAI

Part 1
About Integrated JEMAI Environmental Labelling Programme

History of JEMAI's environmental labelling programmes

EcoLeaf (type III environmental declaration)

Prior to labeling programmes, JEMAI launched:
1995: **LCA Society of Japan (LCA Forum)**
1998 - 2005: **LCA National Project**
1999: **Annual Eco Products exhibition**

2000 — Feasibility study of type III programme in Japan conducted by Ministry of Economy, Trade and Industry (METI)

2002 — EcoLeaf launched by JEMAI

Experience & expertise gained through EcoLeaf fed into CFP Program

2011 — No. of registered products exceeded 1,000

CFP Communication Program

2008 — Preliminary feasibility study conducted by METI

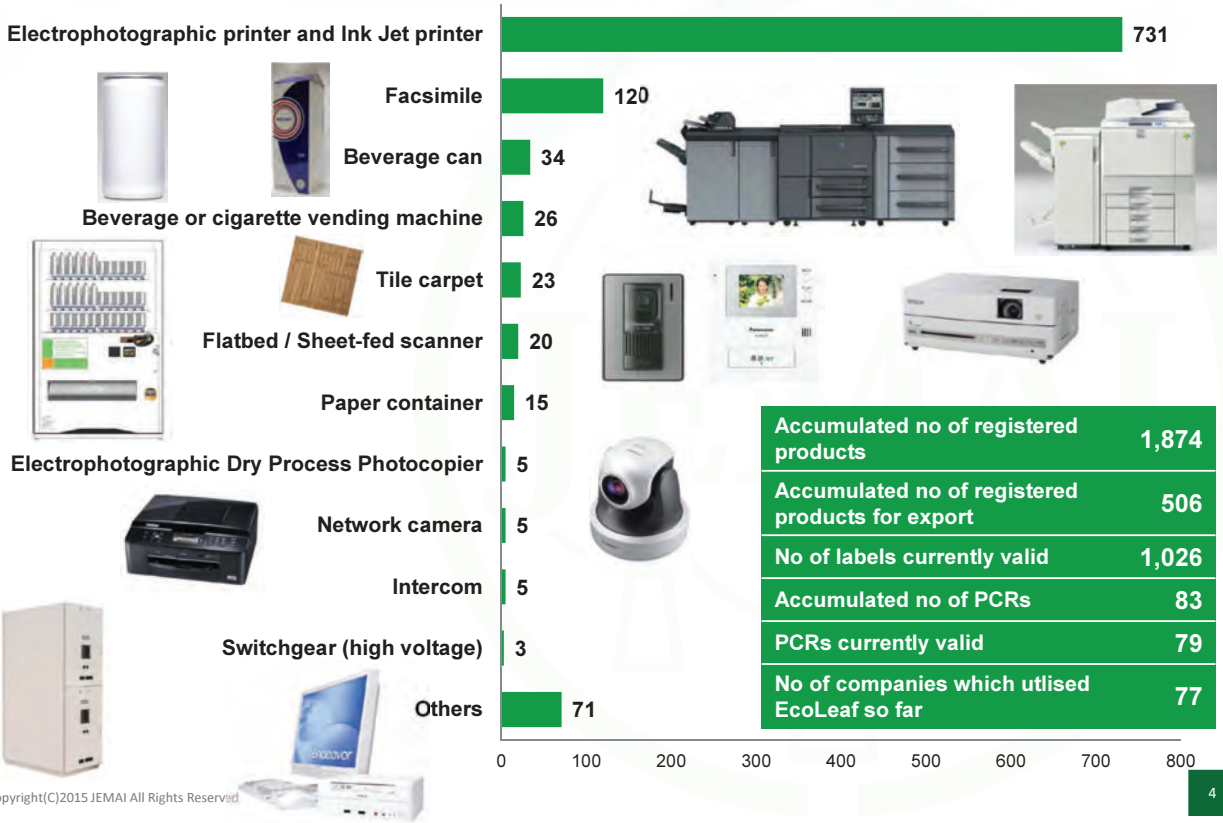
2009 — 3-year national pilot project started (fy2009 – fy2012)
- Basic Guidelines and PCRs developed
- CFP Forum launched

Privatisation (project transferred to JEMAI)

2012 — CFP communication program launched by JEMAI

May 2017 — **New framework for integrated environmental labeling programmes launched in 2017**

No. of registered products (as of 31 March 2017)



Accumulated no of registered products	1,874
Accumulated no of registered products for export	506
No of labels currently valid	1,026
Accumulated no of PCRs	83
PCRs currently valid	79
No of companies which utlised EcoLeaf so far	77

No. of registered products (as of 31 March 2017)

Accumulated no of registered products	1,351
No of labels currently valid	594
Accumulated no of PCRs	107
PCRs currently valid	70
No of companies which utlised CFP Program so far	199

Action Plans and Background

- From Action Plan 2013-2015
  - ...based on requests and needs of the participating companies of both EcoLeaf and CFP Program, the operation and the programmes rules are to be integrated for more efficient management of the programmes, while ensuring conformity with international standards…
- From Action Plan 2016-2020
  - ...ensure that JEMAI programmes are fully compliant with international standards and green purchasing programmes requirements abroad…
  - …introduce a new framework to integrate EcoLeaf and CFP Program…
  - …improve JEMAI programmes to meet needs in the society…

- In Japan, government policies offer little initiative for utiling LCA and EPDs. Emphasis is on climate change.
- In overseas countries, notably US and EU, LCA and EPDs are increasingly utlised for green purchasing programmes (e.g. EPEAT, LEED, Construction Products Regulation, EU GPP Criteria)

About the new programme framework

- Aims to integrate EcoLeaf and CFP Program in a new framework. Both are similar in structures based on LCA

- New framework will be titled “The JEMAI Environmental Label Programme”
- Existing names and logo marks will remain:
  - EcoLeaf for declaration of multiple environmental aspects
  - CFP Program for declaration of single environmental aspect (GHG)

- Existing, complex programme rules will be replaced with integrated, simpler ones, thereby making it easier to operate for both companies and JEMAI

- Enhance compliance with international standards and green purchasing requirements overseas. E.g. ISO standards, EPEAT, LEED, etc.

JEMAI Japan Environmental Management Association for Industry

About the new programme framework

Integrated PCR:

- EcoLeaf and CFP Program will no longer use different PCRs. Integrated PCRs are being created.

Common LCI Database:

- EcoLeaf and CFP Program now use common LCI database, IDEA v2. Excerpted version of IDEA v2 is built into the new quantification tool
- JEMAI programme can meet major green purchasing criteria as IDEA v2 supports more precise multi-criteria analysis

New quantification tool:

- Applicants only need to input activity data and select corresponding basic data in the tool. The tool will automatically calculate and create documents for verification and declaration, reducing applicants’ workload and mistakes
- The tool simultaneously calculates for both EcoLeaf and CFP Program

Integrated and simplified verification rules and procedure

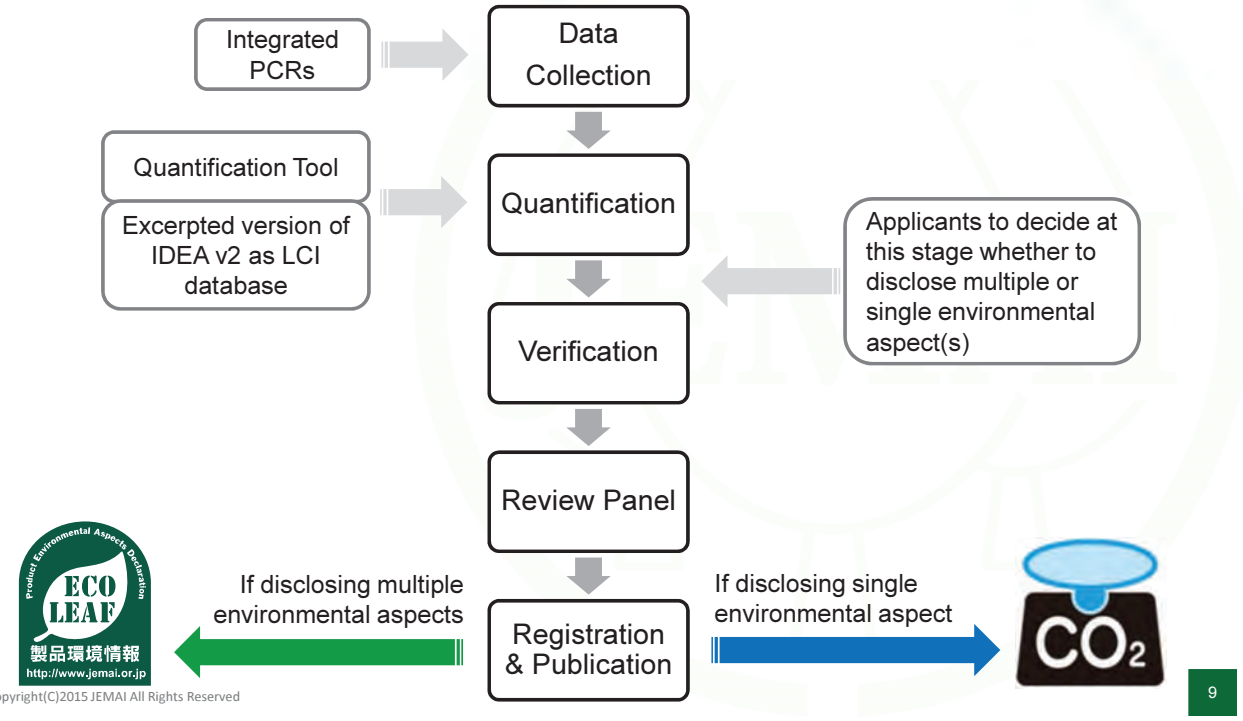
- Verification rules are integrated and based on the existing CFP rules
- Verification procedure is simplified with the introduction of the new calculation tool

New fee structure

- Simple fee structure has been introduced and is common for EcoLeaf and CFP Program
- More participation of micro companies and SMEs as well as the continuity of JEMAI programme have been the major consideration.

Overview of new framework

JEMAI programme now offers the integrated procedure and the common LCI database for EcoLeaf and CFP Program



About IDEA v2

- Jointly developed by JEMAI and AIST (National Institute of Advanced Industrial Science and Technology
- Comprehensively covers almost all business activities in Japan
- Includes more than 3,800 processes based on the Japan Standard Commodity Classification
- Version 2 covers a wider range than the databases developed for previous EcoLeaf and CFP Program of environmental impact areas used in LCA, such as climate change, acidification, ozone depletion, urban air pollution, mineral and fossil resources, water resources, land use.

IDEA
Inventory Database for Environmental Analysis

About IDEA v2

- IDEA v2 is provided as an Excel file that aggregates all the upstream processes.
- Also provided as a group of interlinked unit processes implemented to be used on major LCA software. Other software and file formats are being developed as well.

For further information, please contact: jemai-lca@jemai.or.jp

Part 2
Trend in Construction Industry In Japan

CO2 emissions from life cycle of buildings

Since CO_2 emissions from operation stage is high, emphasis is on energy saving at the time of operation and the effective use of renewable energy.

Targets for the latest 2014 Basic Energy Plan:

ZEB (Zero Energy Building) target
- Realize ZEB for newly constructed public buildings by the year 2020.
- Realize ZEB for an average of newly constructed buildings by the year 2030.

ZEH (Zero Energy Houses) target
- Achieve zero emission in standard newly-constructed houses by 2020.
- Achieve average zero emission in newly-constructed houses by 2030.

↓

Support for dissemination and utlisation of ZEB and ZEH

↓

Further accelerate the development of low carbon technologies at the operation stage

↓

As CO_2 emissions at the operational / use stage decrease, % of CO_2 emissions at the construction stage will increase in relation to operation / use stage in the life cycle of the buildings

While the development of these technologies and construction methods progress, there is currently no unified way to evaluate how much they will actually reduce CO2 emissions associated with the construction of buildings

Emphasis on environmental consideration should move on from the operation / use stage alone to the entire life cycle of buildings and houses.

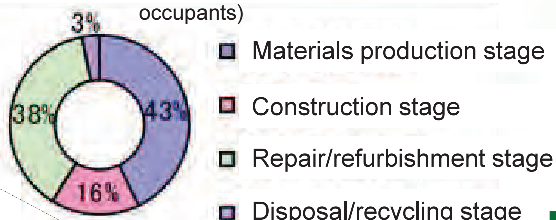
Result of CFP calculation of building (by Hazama Ando Corp)

カーボンフットプリント
登録情報

1．製品情報			
1.1	登録番号	CR-DX02-16001	1.7 製品写真
1.2	製品名称（日本語）	TTCつくば	
	製品名称（英語）	TTC TSUKUBA	
1.3	製品型式	－	
1.4	製品の主要仕様・諸元	用途：寄宿舎　建物規模：地上3階 建築面積：1120.23 ㎡　延べ床面積：2755.58 ㎡ 構造：鉄筋コンクリート造（柱、梁、壁：PCa造），独立基礎 架構形式：X方向ラーメン構造（Wise-Beam工法），Y方向耐震壁付ラーメン構造	
1.5	CFP算定単位	1棟あたり・耐用年数65年あたり	
1.6	公開日	2016年5月30日	
2．事業者情報			
2.1	事業者名（日本語）	株式会社　安藤・間	
	事業者名（英語）	HAZAMA ANDO CORPORATION	
2.2	電話番号	029−858−8811	
3．CFP算定結果およびCFP宣言の内容			
3.1	CFP算定結果（カーボンフットプリント）	4,100	$t\text{-}CO_2e$（端数処理により左記の値は内訳の合計値と若干異なる場合があります）
3.2	内訳（ライフサイクル段階別、プロセス別、フロー別、等）		
	資材製造段階	1,800	$t\text{-}CO_2e$
	施工段階	670	$t\text{-}CO_2e$
	修繕・改修段階	1,600	$t\text{-}CO_2e$
	廃棄・リサイクル段階	130	$t\text{-}CO_2e$
3.3	数値表示、追加情報の内容		
	数値表示	＜記載内容＞	＜数値表示の単位＞
		1.5　$t\text{-}CO_2e$	床面積1m²・耐用年数65年あたり
	追加情報の記載内容	設計情報に基づいた算定結果です。 また、設備と建築物運用段階は調査範囲に含まれていません。 （3%、43%、16%、38%：資材製造段階、施工段階、修繕・改修段階、廃棄・リサイクル段階）	
3.4	備考	3.2および3.3に示した数値の単位は$t\text{-}CO_2e$で示されていますが、CO_2以外の温室効果ガスの排出は考慮しておりません。	

Interpretation
- CO_2 emissions at material manufacturing stage and at repair / refurbishment stage were found to be high.
- As CO_2 emissions from manufacturing of concrete and reinforcing bars were found to be significant, we realise that measures to reduce CO_2 emissions during production of these materials are important.
- For building materials that require repair and refurbishment, we found out energy saving at the time of manufacturing and improving durability of materials are effective measures to reduce CO_2 emissions.
- CO_2 emissions at the construction stage wasn't exactly negligible. It turned out that energy saving at the time of construction is also an important factor.

- Estimated useful life: 65 years
- 1.5 $t\text{-}CO_2e$ per 1 m of floor area
  (CO_2 emissions at operation stage are excluded as they're largely affected by the occupants)

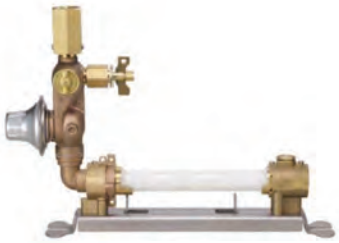


Examples of construction materials registered in EcoLeaf and CFP Program

CFP: Buildings

CFP: Curtain rail / window shades

CFP: Wood and wood-based materials



EcoLeaf: Meter units for water supplies

EcoLeaf/CFP: Tile carpets

CFP: Heat insulation materials

PCRs developed so far for construction materials

	PCR number	PCR name
EcoLeaf	DP-01	Fire-rated glass ceramics (intermediate product)
	DD-01	Vinyl floor tile (homogeneous)
	DB-01	Amorphous-Silicon thin-film photovoltaic module
	CS-01	Bath units for homes
	CD-01	Faucet fittings
	CC-01	Toilet bowl
	BQ-01	Tile carpet
	BE-02	Free access floor
	AU-04	Drain lid
	AN-03	Structural aggregate
	AM-03	Warm water washing and toilet seat
	AK-04	Meter box for water supply
CFP Program	PA-EI-01	Housing (frame and finishing materials)
	PA-EE-01	Wooden Fittings (Intermediate Goods)
	PA-ED-01	Heat resistant Paint (Intermediate goods)
	PA-DW-01	Insulation material for construction
	PA-DI-01	Thermal insulator by spraying wood fiber
	PA-DE-01	Carpet
	PA-DB-01	Resilient floor coverings
	PA-CL-02	Plastic tile
	PA-CK-02	Insulation material for construction
	PA-CD-02	Wood Products
	PA-CC-03	Wood, Wood Materials
	PA-CB-01	Wood-plastic Composite
	PA-BZ-01	Rubber Chip Products
	PA-AV-02	Universal steel pipe pile
	PA-AY-01	Road bed Material made from Inorganic Sludge

LEED is creating significant interest in EPDs. Industry associations and companies are discussing more PCRs.

Since PCRs for "Housing" and "Buildings" have been developed, CO_2 quantitation of the whole building is gathering interest.

Thank you for listening.

For further information

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Email: a.kataoka@jemai.or.jp

JEMAI
http://www.jemai.or.jp/

EcoLeaf
http://www.ecoleaf-jemai.jp/

CFP communication program
http://www.cfp-japan.jp/

Life Cycle Assessment Society of Japan (JLCA)
http://lca-forum.org/

MiLCA (LCA calculation software)
http://www.milca-milca.net/

[Asia Carbon Footprint Network International Seminar]

Improvement of the integrated EPD scheme and directions for development in Korea

May 25, 2017

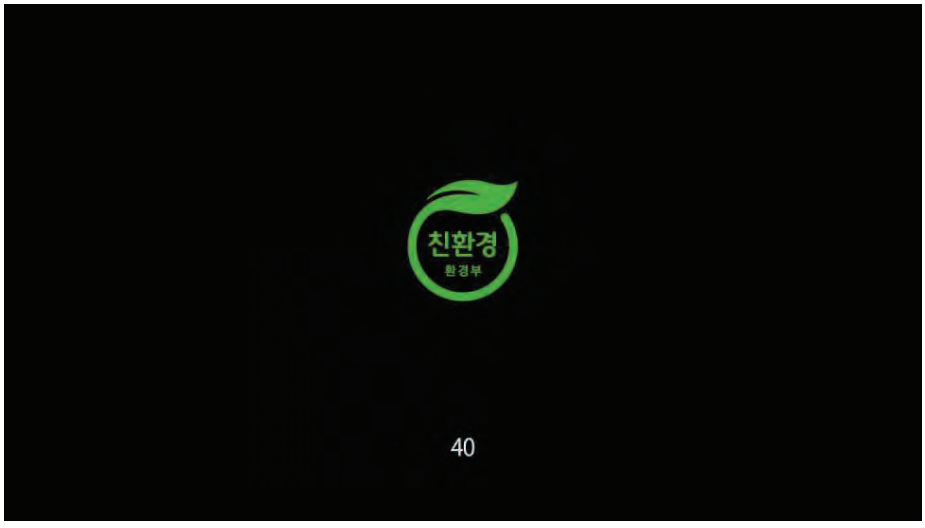
KEITI 한국환경산업기술원

Contents

1. Status and plans of integrated EPD scheme

Integrated Logo Promotion Video

[Integrated Logo Promotion Video (KBS Public Service Advertising)]



1.1 Overview

EPD (Environmental Product Declaration)

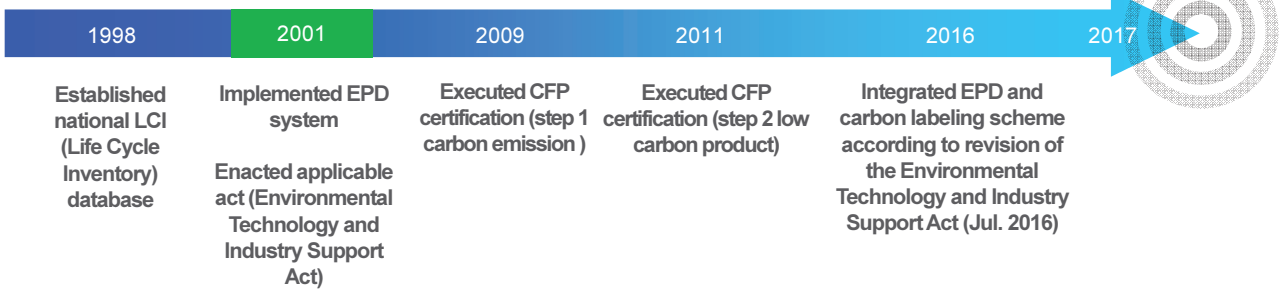
Measuring and displaying information on environmental performance (environmental impact) generated during lifecycle of a product (including service), such as from acquisition of the raw materials to production, distribution, use and disposal

※ Environmental Impacts: resource footprint, carbon footprint, ozone depletion, acidification, eutrophication, photochemical smog, water footprint

Contributing to consumer-led sustainable consumption and production system establishment by providing accurate and transparent information on environmental performance of products

Type III Eco labeling according to ISO 14025

Legal Ground: Article 18, Environmental Technology and Industry Support Act



1.2 Background of Integrated Scheme

Background

- **(Korea)** Decided integration of carbon footprint labeling with EPD scheme according to the government-wide "zero-based improvement plan of the certification scheme (May 2015)" implementation (Nov. 2015)

  - Carbon footprint labeling integrated with EPD, "calculation of carbon emissions" managed as "one of the information on environmental performance of product" in EPD

  - Improved product's information on environmental performance on display method (logo) to a unified design logo

  Improving recognition of certification systems implemented by the Ministry of Environment, using the unified logo in corporate marketing

- **(Abroad)** "Single Market for Green Products Initiative" of EU ※announced, Product Environmental Footprint (PEF) ※recommended (May 4, 2013), '13.5.4.), systemization promoted until 2020

  ※ Established according to the Single Market Act of EU, which was enacted to fulfill the goal of "Europe with high resource efficiency" to achieve sustainable growth in line with "Europe 2020 Strategy" (Apr. 9, 2013)

  ※ PEF refers to life cycle environmental impact of products and services calculated according to PEFCRs * (Product Environmental Footprint Category Rules).

  * PEFCRs (Product Environmental Footprint Category Rules) are guidelines of the information on environmental performance for each product group as of guideline for the EPD in Korea (based on ISO 14044).

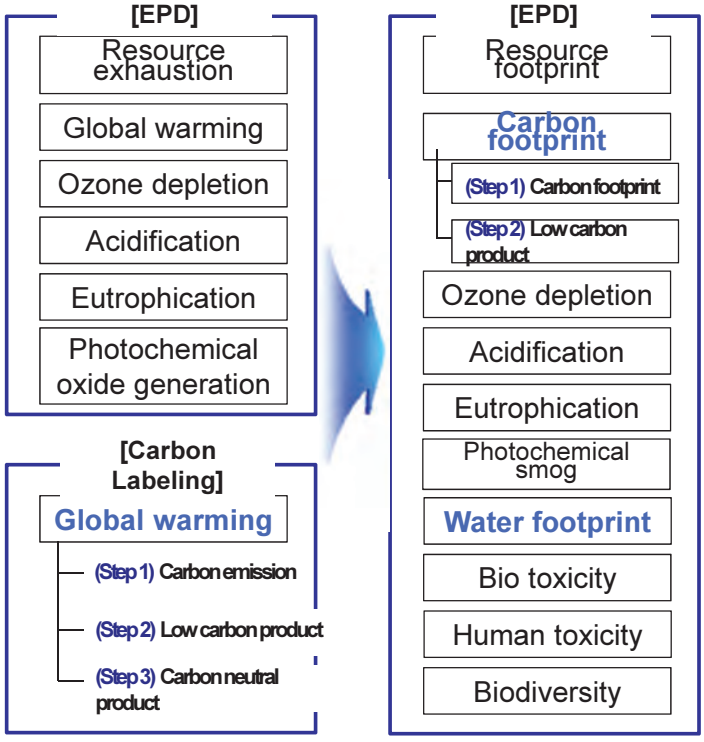
1.3 Revision of Related Laws

- Revision of "EPD Certification Application Fees (Ministry of Environment Announcement No. 2016-256)" (Dec. 30, 2016)
  - Unifying EPD and carbon footprint labeling application fees (adjusted reviewing days)
- Revision of "Enforcement Rule of the Environmental Technology and Industry Support Act" (Jan. 28, 2017)
  - Revising environmental certification integrated logo (environmental mark and EPD)
- Revision of "Guideline for the EPD (Ministry of Environment Announcement)" (Apr. 14, 2017)
  - Establishing [Annexed Table 6]: Prepared methods of using design by scope of impact, low carbon product certification design and combination design
- Revision of "EPD Certification Regulations" (Apr. 10, 2017)
  - developing Guideline for the EPD & carbon footprint labeling and unifying certification-related regulations
- Revision of "Guideline for the EPD (Ministry of Environment Announcement)" (second half of 2017)
  - Unifying Guideline for the EPD and Carbon Footprint Labeling
- Revision of "Announcement on EPD Certification (provisionally named, Ministry of Environment Announcement)" (second half of 2017)
  - Unifying guideline for the EPD , certification application fees and certification reviewer qualifications
    - · Guideline for the EPD (Ministry of Environment Announcement)
    - · EPD Certification Application Fees (Ministry of Environment Announcement No. 2016-256, Dec. 30, 2016)
    - · EPD Certification Reviewer Qualifications (Ministry of Environment Announcement No. 2016-91, May 3, 2016)

1.4 Status of integrated EPD scheme

Diversifying the display methods of information on environmental performance

- **Introduction of new information on environmental performance**
  - **Water footprint**, eco toxicity, human toxicity, biodiversity
- **Scheme improvement**
  - **Changed term**
    - ※ EPD, carbon labeling
      - → **EPD, carbon footprint**
  - **Changed carbon footprint steps from 3 to 2**
    - ※ Carbon emission (step 1), low-carbon product (step 2), carbon neutral product (step 3)
      - → **Carbon footprint (step 1), Low-carbon product (step 2)**



1.4 Status of integrated EPD scheme

Introducing new information on environmental performance

Resource Footprint	Carbon Footprint	Ozone Depletion	Acidification	Eutrophication
Global impact caused by development and consumption of minerals and fossil fuels	Impact on climate change caused by greenhouse gas emitted into the air	Impact on ozone layer in the stratosphere caused by ozone depleting substances emitted into the air	Impact on human activities and ecosystem caused by acidifying substances in the air falling down in rain	Impact on ecosystem caused by excessive concentration of organic substances (nitrogen and phosphorous) in air, water and soil
Photochemical Smog	**Water Footprint**	**Ecotoxicity**	**Human Toxicity**	**Biodiversity**
Impact on human body and ecosystem caused by pollutants on the ground surface generated through active materials from human activities reacting to light	Impact on water resources, such as water quality and volume, caused by agricultural and industrial human activities	Impact on overland and aquatic ecosystem caused by generation and leakage of heavy metals and hazardous chemicals	Carcinogenic/ non-carcinogenic impact on humans caused by generation of hazardous substances including organic materials	Impact on biodiversity caused by human activities to use the land and water resources

※ Redefined through reference to Guideline for the EPD and overseas impact assessment methodologies, such as CML and ReCiPe

1.4 Status of integrated EPD scheme

Improving the display method of information on environmental performance

- **Develop integrated environmental certification scheme logo**

  - Unifying logos used in various certification systems in order to prevent consumers' confusion and improve recognition

  - It is inevitable to use various certification scheme in order to achieve the environmental goals. However, for certification scheme implemented by the Ministry of Environment, it is necessary to use an integrated logo in order to improve public awareness of the systems.

[Before Improvement]

[After Improvement (Jan. 28, 2017)]

1.4 Status of integrated EPD scheme

Improving the display method of information on environmental performance

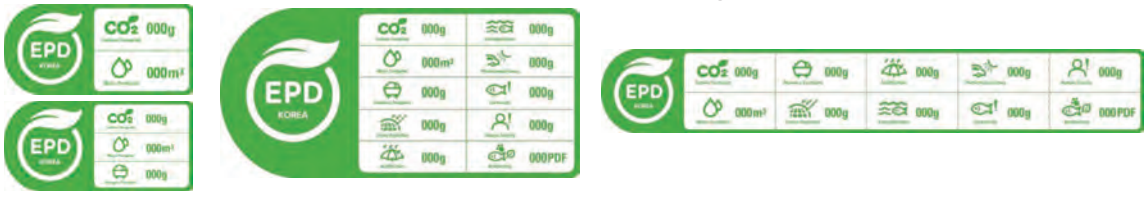
- **Developing logo by scope of impact categories, low carbon product certification and combination (Apr. 14, 2017)**

[Basic Logo]

[Logo by Low Carbon Product Certification]

[Logo by Scope of Impact categories]

[Combination Logo]



2. Operation of the scheme

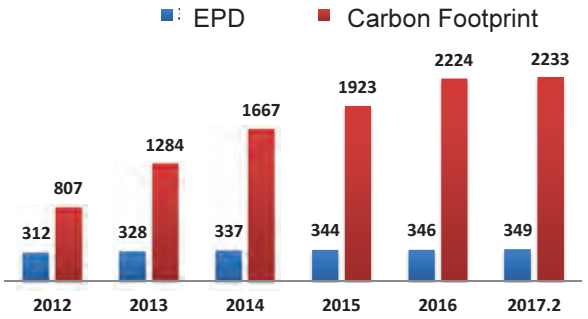
2.1 Certification Status and Recognition

Carbon footprint established as a key climate change certification in Korea

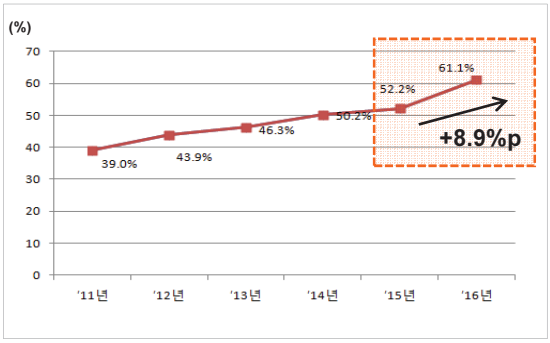
- **2,624 products of 257 companies certified** (accumulated, as of Apr. 2017)
  - EPD: 352 products
  - Carbon Footprint: 2,284 products
    (Carbon Emission: 1,849 products of 259 companies/ Low Carbon Product: 419 products of 44 companies)

Establishing direction of scheme operation by reflecting national recognition survey result each year

- **Public Recognition Increasing Each Year**: 39% (2011)→43.9% (2012)→46.3% (2013)→50.2% (2014)
  → 52.2% (2015) → **61.1% (2016) +8.9%p**



[Certification by Year]



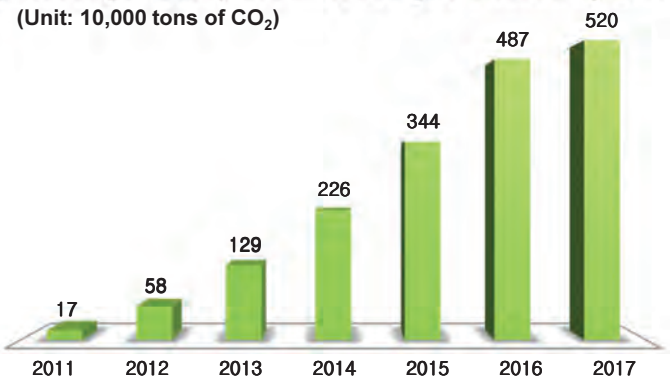
[Carbon Footprint Recognition by Year]

2.2 GHG Reduction Effect

Reducing greenhouse gas by 5.12 million tons (CO_2_eq) through low carbon product certification

(419 products (accumulated) as of Apr. 2017)

- (Human Activities) Greenhouse gas emitted by 380,000 people in Korea (13.8 tons of CO_2/ person) (National Greenhouse Gas Inventory Report 2014)
- (Forestation Effect) Equivalent to planting 790 million of 30-year-old pine trees (6.6kg of CO_2/ year/ tree)
- (Passenger Cars) Greenhouse gas emitted by 2.17 million cars a year



[GHG Reduction Amount]

Planting trees in an area 7.9 times that of Seoul (605km²)

[Forestation Effect]

2.3 Expansion of Certification Support

Giving additional points to green building certification assessment

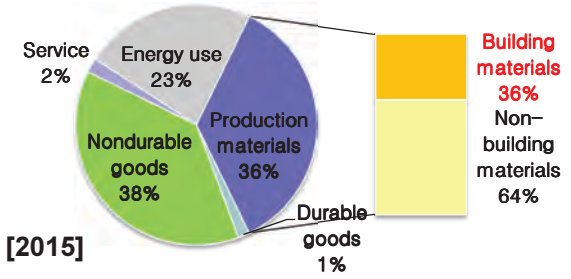
Give additional points when EPD certified building materials are used

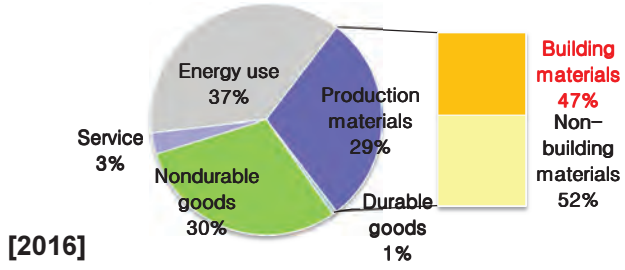
Field	Certification Item	Allocated Points
3. Materials and resources	3.1 Use of EPD products (0.4~1.0)	4
	3.2 Use of low-carbon materials (0.4~1.0)	2
	3.5 Green building material application ratio (0.4~1.0)	4

녹색건축인증
최우수(그린1등급)

Increase environmental performance certification (carbon footprint) of building materials in addition to expansion of certification benefits

Certification Ratio of Building Materials among Production Materials: 36% (2015) → 47% (2016), increase by 9%



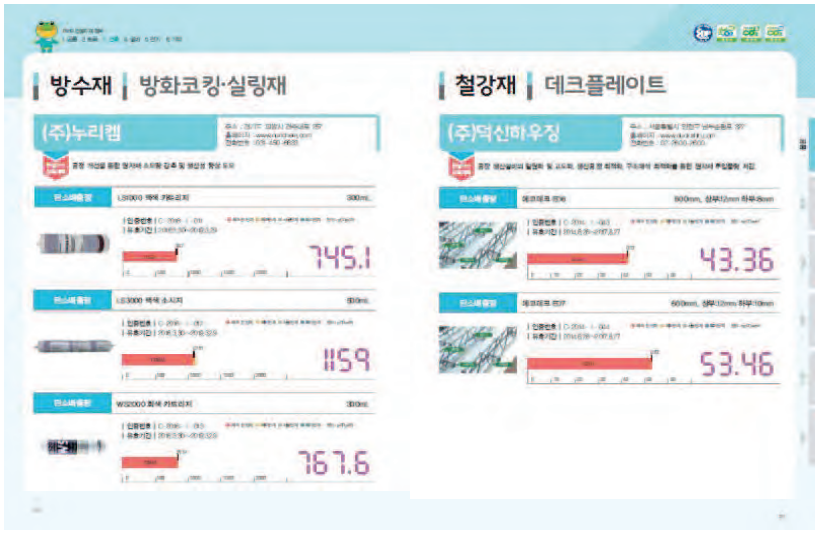


2.3 Expansion of Certification Support

Publishing EPD and carbon footprint construction materials information book

Publishing information book in order to ensure convenience of EPD certified product information search

- Listing information on 262 certified products (products with valid certification as of Dec. 2016)



2.3 Expansion of Certification Support

Reflecting comprehensive bidding system of Public Procurement Service

To decide successful bid by comprehensively considering product price, quality and environmental value (Public Procurement Service Order No. 1631)

- **No. of products for PPS comprehensive bidding system environmental superiority criteria application: 9 in total**

Environmental value assessed with life cycle carbon emission

Target Items		Application Factors	Remarks
Applied Products	Air conditioner, washing machine, LCD monitor, desktop computer	Price (40%) + quality (30%) + **environmental value (30%)**	Calculated by dividing carbon emission amount of a product from a bidding company with average carbon emission amount of products from all companies in the bidding **※ "Carbon labeling certification" presented as the base data for carbon emission amount**
Products for Expanded Application	Laptop computer, TV, printer, LCD lamp, air purifier	Price (40%) + quality (20%) + **environmental value (40%)**	

2.3 Expansion of Certification Support

Promoting sale of certified products through a link with Green Card

Green Card

- Point accumulation when practicing low carbon/ eco-friendly living, such as saving energy, using public transportation and purchasing green products, through government offices, local governments and businesses by using credit cards and point system
- Customer consumption pattern/ trend analysis using Green Card v1→ Green Card v2 issued in 2016
  - **Made using wooden material, reducing greenhouse gas emission down to approx. 4.7% of PVC cards**
    (PVC) approx. 2,150g → (wooden material) approx. 102g
  - Expanding Green Card benefits by reflecting consumer needs

Green Card v1 Benefits	Additional Benefits of Green Card v2
Eco Money when purchasing eco-friendly products (up to 24%) Using public transportation (bus, subway, KTX, express bus) - Up to 10,000 points a month Up to 100,000 points for energy saving Using public facilities (tourism, culture, sports) - Discount including free admission to 933 facilities across the country	**5% accumulation for automatic payment of living expenses** **5% accumulation for online businesses** **KRW 2,000 discount on claim for online movie ticket booking** **10% discount on claim for coffee** **5% discount on claim for used automobile parts** (scheduled)

2.3 Expansion of Certification Support

Expanding carbon labeling certification support to SMBs

Expanding carbon emission calculation support for products from Small and medium-sized companies (2012~)

- Provide free consulting on carbon labeling certification application and acquisition, foster professional human resources for carbon emission calculation
- To support **60 products from 30 companies (2017)** * Accumulated, 259 products from 119 companies

Reducing 50% of certification-related charges for SMBs (sales less than KRW 100 billion) (2013 – 2016)

- Reduce certification charges by approx. 50%
- Alleviate the burden of certification cost and simplify procedures for certification application by SMBs

Supporting carbon label design use on products from SMBs (2016~)

- Promote design use and improve P.R. effect by supporting carbon label mold manufacturing cost
- KRW 24 million to 12 companies (2016) → to support **KRW 30 million to 15 companies (2017)**

2.3 Expansion of Certification Support

Publicizing corporate image and certified product through promotional activities

- **Publicize EPD system and certified product through various channels**
- **Publicize certified product through mass media (TV, newspaper), exhibitions, newsletter and shows**
- **Operate Eco Friends Supports (2013~)**

[YTN Science – Easy Science, "Protecting Green Earth']

[K-TV Live Issue "Eco Tourism"]

[Promotional Article in September Issue of Best Baby]

[University Students' Supporters Campaign]

[Business Agreement for Environmental Olympic Games]

2.3 Expansion of Certification Support

Installing and expanding operation of exhibition areas for EPD certified products

Expanding exhibition areas across the country, opening permanent exhibition halls for long-term operation (2013~)

- Exhibition of EPD certified products (food and beverage, household items), educational programs

*Opened 18 exhibition areas including Climate Change Experience Centers in Suwon and Gimhae, Climate Change Response Education Center in Wonju and Green Purchase Support Centers on Chungcheongbuk-do, Daejeon and Jeju

Participating in domestic and international events, operating P.R. booths in exhibitions (as frequently as necessary)

- EPD booth at "ECO-EXPO Korea 2016" (Oct. 18 – 21, 2016, COEX)

[Climate Change Education and Experience Center, Yongin(2017)]

[Gulponuri Climate Change Experience Center, Bupyeong (2016)]

[Green Future Science Hall, Gimcheon (2015)]

[Climate Change Experience Center, Gimhae (2015)]

Publicizing certification system and certified products by publishing/ using leaflets, information book and USB

[Carbon Footprint P.R. Leaflet]

[Information Book on Certified Products]

[Carbon Footprint P.R. Video (Episodes 1 – 3)]

[Carbon Footprint P.R. DVD and USB]

2.4 International Cooperation

Developing network with Asian countries (ACFN)

Asia Carbon Footprint Network (ACFN) launched, operating Secretariat

- Entered into MOU on international cooperation with UNESCAP (Oct. 2012)
- Organized consultative body with 15 organizations from nine Asian countries (Oct. 2013)

- Taiwan, Russia, Malaysia, Mongolia, China, Thailand, Philippines, Hongkong, Korea

- Operated ACFN Secretariat with UNESCAP (2013 – 2016)

Strengthening competency by building close cooperation system with ACFN members

- ACFN annual meeting

- Share information on carbon footprint among Asian countries (2014: Thailand/ 2015: Hong Kong/ 2016: China)
- Set carbon footprint goals in Asia areas and identify detailed of cooperation

2.4 International Cooperation

Activating ACFN as a global carbon footprint network

Strengthening relationship with relevant organizations through ACFN

- Information Exchange and Cooperation: PCRs and emission factor calculation methodology development

- Korea – Thailand carbon footprinting cross-certification pilot project (2014 – 2015)

- Korea – Taiwan – Thailand working-level conference for common product EDP framework development (Dec. 2016)

Spreading advanced carbon footprint expertise to countries for extensive cooperation

- Specialized Competency Improvement: Spreading Korea's system operation expertise for introduction of carbon footprinting scheme to other Asian countries

- Educational programs in the Philippines (2014, Ministry of Environment), Malaysia (2015, SIRIM) and China (2016, CQC)



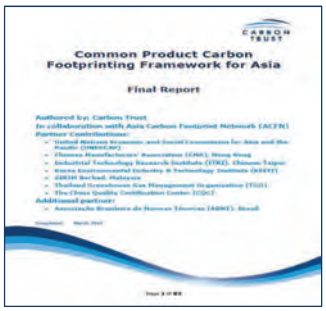
2.4 International Cooperation

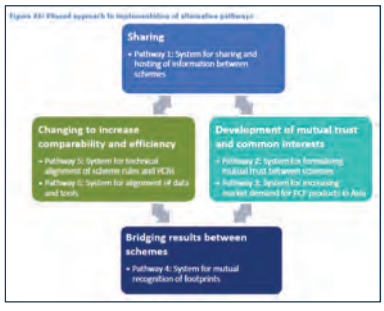
Developing common footprinting framework and providing other supports for international cooperation

Developing common carbon footprinting framework for Asia based on the concept of "sharing, bridging and changing"

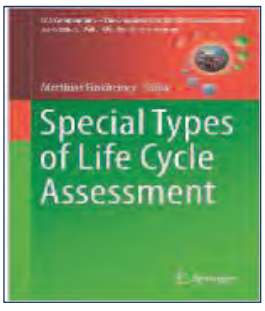
- **Published report on common product carbon footprinting framework for Asia (Mar. 2016)**
- **(Background)** To support/ supplement ACFN activities and maximize value creation for carbon footprinting stakeholders
- **(Key Content)** Comparison/ analysis of differences in carbon footprinting systems by country, derivation of promotional strategies for common framework development

Korean carbon footprinting system introduced in 「Special Types of Life Cycle Assessment」





<Report on Common Product Carbon Footprinting Framework for Asia>



<Special Types of Life Cycle Assessment>

2.4 International Cooperation

Asia Carbon Footprint Network (ACFN) International Seminar (2013~, annually)

- **(Purpose)** To develop an international cooperation system with a goal to realize low-carbon, eco-friendly society and establish sustainable consumption and production culture by spreading carbon footprinting scheme
- **(Attendants)** Climate change policy makers, environmental footprint experts, carbon footprint certified companies, students and general attendants from Asian countries
- **(Key Content)** Recent trend of environmental footprints in the international society, Korea's EPD promotion status, success cases of certified companies by industrial sector

<Progress>

2011	2012	2013	2014	2015	2016
• Asia Carbon Footprint Program • Korea – Thailand MOU on carbon footprinting business cooperation	• Asia Carbon Footprint Program • KEITI-UNESCAP MOU for international cooperation	• 1st Asia Carbon Footprint Network Seminar • ACFN inauguration ceremony	• 2nd Asia Carbon Footprint Network Seminar • Certificate award ceremony for Korea – Thailand carbon footprinting cross-certification pilot project	• 3rd Asia Carbon Footprint Network Seminar • Korea – Thailand carbon footprinting cross-certification	• 4th Asia Carbon Footprint Network Seminar • Korea – Taiwan – Thailand conference for common product EPD framework development

3. Future Plans

3.1 Future Plans

Strengthening basis of integrated EPD

▪Update product environmental impact assessment methodology and scope of impact categories

- Reexamine carbon reduction rate standard in low-carbon product certification guidelines and review update of characteristic parameters by scope of impact

▪ Execute water footprint pilot project (Apr. 2017~)

- Prepare water footprint calculation method in Guidelines for the EPD (Jan. 9, 2017) → Field application and pilot project

▪ Update EPD carbon emission factors (scheduled to be executed in Oct. 2017)

- Conduct cross-verification on and correct errors in national LCI DB, environmental performance calculation software (TOTAL) and carbon emission factors

▪ Suggest carbon emission calculation guidelines by publishing and distributing EPD certification casebook (for 12 product groups)

▪ Strengthen reviewer refresh education and introduce online seminar (webinar)* system

- Increase opportunities for participation in refresh education and strengthen expertise of reviewers through webinar system implementation/ utilization

※ This is a compound word of "web" and "seminar." Webinar refers to an interactive multimedia presentation carried out in a website.

3.1 Future Plans

Strengthening EPD customer service

▪ Promote designation of low-carbon certified products as "products sold in green stores," secure status of low-carbon products as "green products"
▪ Renew environmental performance calculation software (TOTAL)
▪ Expand certification of consumer experience-type services
- Expand certification of hotel, tourism and transportation services and promote link with the certifications
▪ Publish and distribute newsletters for general consumers (Who left the footprint?)
▪ Renew P.R. content to improve understanding of integrated system

Spreading certification scheme across the world

▪ Developing common criteria for environmental performance calculation applied to products in Korea, Taiwan and Thailand
- Compare and analyze guidelines for beverages in each country and develop common criteria based on the international standard
▪ Strengthen cooperation through participation in international LCI DB initiatives
-Promote national LCI DB registration in ILCD data network for response to the EU PEF
※ International Reference Life Cycle Data System: System led by the EU to unify LCI DB implementation methods and data formats, which vary by country, so as to objectively compare environmental performances of products
- Promote international standardization of national LCI DB and join/ perform in LCA initiatives
▪ Operate low-carbon practice program to host environmental Olympic Games

Communicate with EPD!

Facebook www.facebook.com/carbonlabel
Website www.epd.or.kr

Thank you!

Environmental Declaration Office, Environmental Certification Department/ Environmental Technology Division

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KEITI 한국환경산업기술원

附錄三：產品類別規則(PCR)調和會議摘要、簽到表及臺韓技術合作備忘錄簽署文件

Meeting for developing common PCR 2017

*** For attendee conformation, sign on this form please.**

No.	Country	Name	Position	Organization	
1	Thailand	Phakamon Supappunt	Program Manager	Thailand Greenhouse gas management Organization	
2	Chinese Taipei	Shu-HsingHung	Director general	Taiwan Environmental Protection Administration	
3	Chinese Taipei	Jui-Hung Wang	Senior Officer	Taiwan Environmental Protection Administration	
4	Chinese Taipei	Yun-Tzu Wang	Project Manager	Universal EC Inc.	Yun-Tzu Wang
5	Chinese Taipei	Allen Hu	Professor	National Taipei University of Technology	
6	Chinese Taipei	Gaia Lu	Researcher	Industrial Technology Research Institute	Gaia Lu
7	Chinese Taipei	Kristin Shen	Researcher	Industrial Technology Research Institute	Kristin Shen
8	Chinese Taipei	Young Ku	Chairman of the Board	Taiwan Environmental Management Association	
9	Chinese Taipei	Chi Wu	Manager	Taiwan Environmental Management Association	Chi Wu
10	Chinese Taipei	Yi-Han Yu	Program Manager	Taiwan Environmental Management Association	Yi-Han, Yu
11	UN ESCAP	Minkyung Carrie Hong	Research Associate	UNESCAP-ENEA	

No.	Country	Name	Position	Organization	
12	Korea	Gyung-Ho Kim	Department Head	Korea Environment Industry and Technology Institute	
13	Korea	Hye Won Bang	Director	Korea Environment Industry and Technology Institute	
14	Korea	Chan Rae Gim	Researcher	Korea Environment Industry and Technology Institute	
15	Korea	Joohee La	Researcher	Korea Environment Industry and Technology Institute	
16	Korea	Hyunhee Lee	Researcher	Korea Environment Industry and Technology Institute	
17	Korea	Minji Park	Researcher	Korea Environment Industry and Technology Institute	
18	Korea	Eunah Hong	Researcher	"	
19	Korea	Joon Jae Lee	Researcher	"	
20	Korea	Suin Hwang	Researcher	"	
21	Korea	Hae Jeng Jung	Researcher	"	

Developing common PCR for carbon footprint

2nd Working Group Meeting
May 26th, 2017

Agenda

- **Objective of common PCR project**
  - Each country's position on purpose and utilization of participation in the project
  - Suggestion & Agreement
- **Comparison of PCR in each country**
  - Beverage

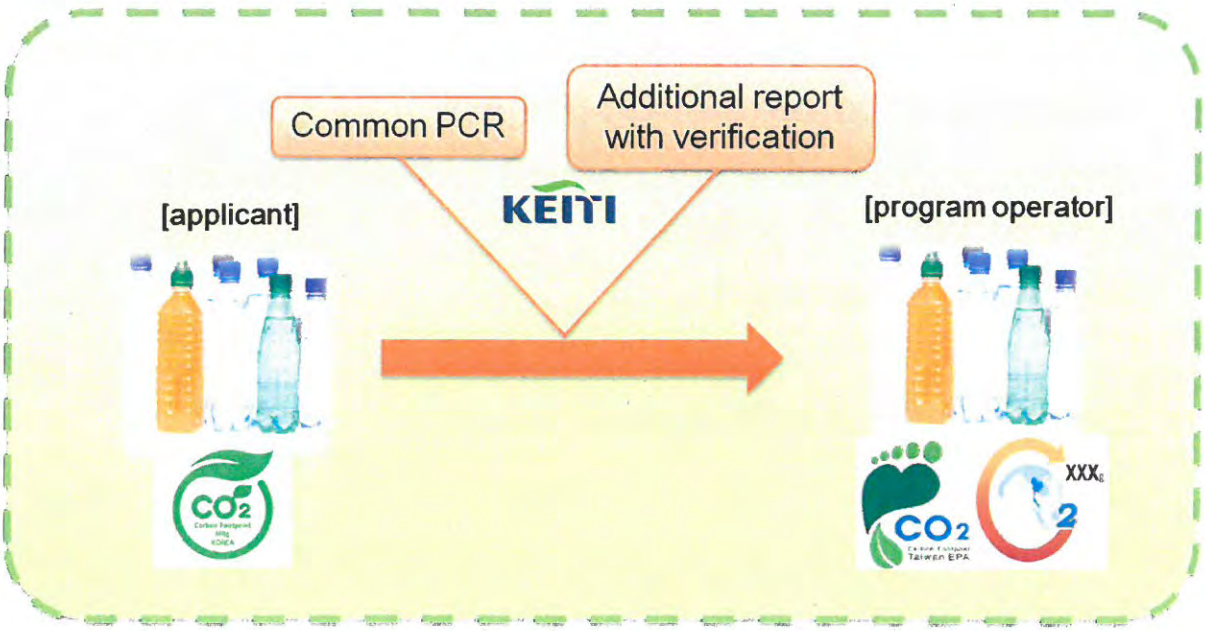
KEITI Korea Environmental Industry & Technology Institute

1. Objective of common PCR project

- **Whole vs. Partial**
- **"Incomplete" mutual recognition**
  - Approval for the result of carbon footprint from corresponding country
  - Verification for non-matching parts by submitting additional information/report
  - Carrying out the verification of the additional information by the relevant country

KEITI Korea Environmental Industry & Technology Institute

- **Concept of incomplete mutual recognition**



KEITI Korea Environmental Industry & Technology Institute

1. Objective of common PCR project

Process of developing common PCR

(1) Product Category Choice

- Select product category based on mutual suggestions and agreement

(2) Analysis and Discussion on PCR

- PCR analysis to check correspondence and discrepancies of content

(3) Development and Application of Common PCR

- Documentation of correspondence and discrepancies
- Agreement for mutual recognition

KEITI Korea Environmental Industry & Technology Institute

1. Objective of common PCR project

[Case] Agreement on Common Certification Rule of Eco Labelling among China, Japan and Korea

- Developing common guidelines for product categories, such as Copiers, Clothing, Paper Shredder, etc and making the agreement
- Confirming that it is in harmony with common criteria such as scope, related laws and regulations, quality Criteria, etc of product category
- Discussing when there is disharmony with common criteria


AGREEMENT
ON TEXTILE COMMON CERTIFICATION RULE
OF ECOLABELLING
AMONG CHINA, JAPAN AND KOREA

China Environmental United Certification Center Co., Ltd. (CEC), Japan Environment Association (JEA) and Korea Environmental Industry & Technology Institute (KEITI)

BASED ON the "Basic Agreement on Partial Mutual Recognition of Ecolabelling among China, Japan and Korea" signed on 16th of November, 2007,

RECOGNIZING their mutual interests in promoting the distribution and sales of environmental friendly products in three countries and of the harmonization of respective ecolabelling criteria for such purpose, agree to pursue Common Certification Rule on Points as set forth below:

1. CEC, JEA and KEITI agree on Common Certification Rule on Textile specified in the Annex to this agreement.
2. The Agreed Points Common Certification Rule will be defined as "CJK-06-2013(A) for Textile".

KEITI Korea Environmental Industry & Technology Institute

1. Objective of common PCR project

- **Opinions**
  - Position on purpose and utilization of participation in the project

- **Suggestion & Agreement**
  - Incomplete mutual recognition

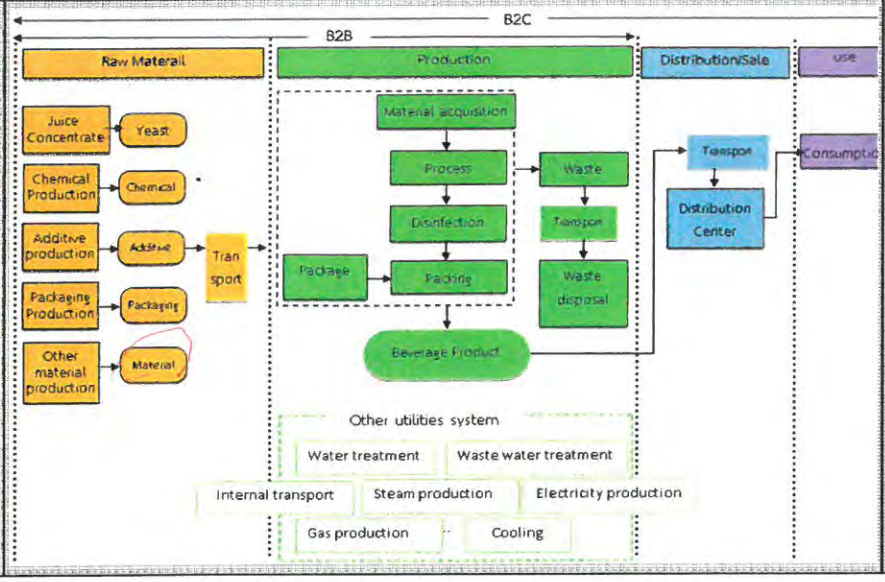
KEITI Korea Environmental Industry & Technology Institute

2. Comparison of PCR

	Taiwan	Thailand	Korea	Degree of similarity
Product Category Definition	1. Aerated water 2. Fruit juices 3. Packed grains and beans beverage 4. Tea drinks and sport drinks	Alcoholic and non-alcoholic beverages except for beverages containing milk and dairy products	Sub-category of non-durable goods : Carbonated drinks, ionic drinks, tea drinks, fruit juices, beer etc.	△
Declared unit	Smallest individual packaging	Sales unit	Unit product as sold in the market	○

KEITI Korea Environmental Industry & Technology Institute

2. Comparison of PCR

	Taiwan	Thailand	Korea	Degree of similarity
System Boundary				○

2. Comparison of PCR

	Taiwan	Thailand	Korea	Degree of similarity
Data Quality	- Site-specific data(primary data) by priority - Secondary data	- Site-specific data(primary data) by priority - Secondary data	- Site-specific data(primary data) by priority - Secondary data	○

KEITI Korea Environmental Industry & Technology Institute

	Taiwan	Thailand	Korea	Degree of similarity
Data_ Raw materials	- Processes related to production of main formulations/ingredients and auxiliary materials - Waste treatment & disposal - Fuel & electricity consumption	- All material inputs & outputs related to the production processes	- Processes related to production of inputs over 95% of cumulative mass - Treatment & disposal of waste - Fuel & electricity consumption	△
Data_ Transportation	- Round trip - Distance, weight of vehicles, fuel type & consumption, unit shipping distance/fuel consumption, loading rate, unoccupied rate	- Round trip - Fuel consumption, vehicle type, distance, payload - Domestic/Import	- one-way trip - vehicle type, distance - Domestic/Import(*) (*) including inland transport in importing country	△
Data_ Packaging	- Same as "Data_raw materials"	- excluding packaging with CF impact less than 5%	- Minimum packaging : same as "Data_raw materials" - Shipment packaging : material, usage	△

	Taiwan	Thailand	Korea	Degree of similarity
Data_ manufacturing	- Processes related to product(beverage) manufacturing - maintenance & repairs of equipment -Waste/waste water treatment (*) including transportation - Fuel & electricity consumption	- electricity, heat, fuel consumption for manufacturing processes - GHG leakage -Waste treatment & disposal(*) (*) including transportation	- electricity, heat, fuel consumption for manufacturing -Waste/waste water treatment(*) (*) emission factor - Fuel & electricity consumption	△
Data_ Distribution/ Sales	- Return trip - Distance, gross weight of vehicles, empty rate, fuel types & consumption, unit shipping distance fuel consumption	- Return trip - weight of product, materials & packaging used, energy used in handling & storage, fuel type, vehicle type, weight loading, ratio of product loading, distance - Domestic/ Export	- One-way trip - weight of product, distribution by region, vehicle type (*) distance by region is provided - Domestic	△

2. Comparison of PCR

	Taiwan	Thailand	Korea	Degree of similarity
Data _ Use	1. Electricity consumption during the refrigeration 2. Consumption of materials required for the refrigeration	1. Direct CO2 emission from carbonated soft drink 2. Storage in refrigeration condition	1. Electricity consumption during the refrigeration 2. Consumption of materials required for the refrigeration	△
Data _ End-of-life	Waste recycling & disposal	- Disposal - Energy used during waste transportation	Disposal : recycling, incineration, landfill	△

KEITI Korea Environmental Industry & Technology Institute

2. Comparison of PCR

	Taiwan	Thailand	Korea	Degree of similarity
Cut-off rule	Not specified in PCR	Total cut-off cannot be more than 5% of the anticipated GHG emissions	More than 95% of the cumulative mass contribution - Raw materials, ancillary input, minimum packaging	△
Allocation	(Pre-manufacturing) -sugar, packaging : weight - remainder: basic parameters such as weight, work-hrs (Manufacturing) - Product production	- Mass unit - Alcohol content for alcohol beverage - economic value	-Physical relationship - economic value	○

KEITI Korea Environmental Industry & Technology Institute

TECHNICAL COOPERATION AGREEMENT

KEITI

Korea Environmental
Industry & Technology Institute

TECHNICAL COOPERATION AGREEMENT
BETWEEN
THE KOREA ENVIRONMENTAL INDUSTRY AND TECHNOLOGY INSTITUTE (KEITI)
AND
TAIWAN ENVIRONMENTAL MANAGEMENT ASSOCIATION (TEMA)

I. OBJECTIVES

As the member of ACFN; KEITI from Korea and TEMA from Taiwan (KEITI, TEMA are at times hereinafter referred to individually as "Party" and collectively as the "Parties") agree to work on the development of a common Product Category Rules (PCR) between the two nations for the increased understanding of mutual scheme, laying the groundwork for mutual recognition and expansion cooperation of the base.

II. JOINT ACTIVITIES

(a) Each Party shall exert its best efforts to understand and harmonize differences in approved carbon footprints between schemes.

(b) The target product category shall be selected after mutual agreement between Parties.

(c) Cooperation between the Parties considered to be necessary or requested, will be possible throughout relevant ways such as mutual visiting.

(d) Carbon footprint calculation guidance shall be determined by mutual consultation between the parties on the principle of comparability referred to ISO 14025 and ISO 14040s.

III. EXCHANGE OF INFORMATION

(a) Each Party is required to determine contact persons who take charge of PCR development.

(b) The key contacts shall respond with any request or opinion upon each Party's demands.

(c) Communications shall be conducted in English preferentially or the Party's national language through the managers set forth in the preceding paragraph.

(d) Replacement of the contact persons shall be promptly notified to the other country.

IV. DEVELOPMENT PROCEDURE AND DOCUMENTATION

(a) Development of PCR follows the steps as below;

(b) To identify a common PCR document, a systematic system (e.g. the United Nations Central Product Classification (UNCPC)) for structuring PCR documents may be used.

(c) Final Development and Application of common PCR is translated and released in English.

V. MISCELLANEOUS

(a) This Agreement will be valid for two years and enter in force upon signature of the date of the Parties.

(b) This Agreement may be amended or terminated at any time by mutual written consent of the Parties.

For the Taiwan Environmental Management Association

Young Ku
Chairman of the Board of TEMA

Date: 26 May, 2017

New Taipei City, Taiwan

For the Korea Environmental Industry and Technology Institute

Gyung-Ho Kim
Department Head of KEITI

Date: 26 May, 2017

Seoul, Republic of Korea

附錄四：照片集錦

圖 1　拜訪 KEITI 交流綠卡制度及我國環保集點制度一景

圖 2　2017 亞洲碳足跡網絡(ACFN)會員會議討論會員事務一景

圖 3　ACFN 會員國合影

圖 4　ACFN 餐敘

圖 5　ACFN 餐敘洪淑幸處長與聯合國亞太經濟社會東亞和東北亞辦事處(ESCAP)Kilaparti Ramakrishna 處長交流

圖 6　ACFN 研討會茶敘交流

圖 7　ACFN 研討會會員國合影

圖 8　ACFN 研討會晚宴合影

圖 9　拜會 KEITI 金貞柱執行長

圖 10　台灣環境管理協會顧洋理事長與 KEITI 簽署合作協議

圖 11　臺灣及韓國參與技術合作協議簽署成員合影

圖 12　PCR 調和暨臺韓合作協議簽署會議餐敘

附錄五：公務期間國外人士個人資料彙整表

公務出國期間國外人士個人資料彙整表

會議/活動名稱	姓名	單位及職稱	國別	專長領域	會晤日期	聯絡電話	電子郵件	我方接洽者姓名職稱	交流內容	備註
韓國綠色信用卡交流會議	Kwon, Chun-Kyung	Ministry of Environment/Deputy Director	韓國	綠色信用卡	106.05.24	+82-44-201-6669	kwonck61@korea.kr	洪淑幸處長 王瑞鋐科員	韓國綠色信用卡及我國環保集點制度推動現況經驗交流	
	Dong-Wook Lee	Keiti Sustainable Lifestyle Office/Office Director	韓國	綠色信用卡	106.05.24	+82-2-2284-1910	daeyoung@keiti.re.kr	洪淑幸處長 王瑞鋐科員	韓國綠色信用卡及我國環保集點制度推動現況經驗交流	102 年拜訪 KEITI 之代表
	Jae Kwon Yang	Keiti Sustainable Lifestyle Office/Principal Researcher	韓國	綠色信用卡	106.05.24	+82-2-2284-1912	jkyang@keiti.re.kr	洪淑幸處長 王瑞鋐科員	韓國綠色信用卡及我國環保集點制度推動現況經驗交流	
	Seongho Jeon	Keiti Sustainable Lifestyle Office/Senior Researcher	韓國	綠色信用卡	106.05.24	+82-2-2284-1914	jsh@keiti.re.kr	洪淑幸處長 王瑞鋐科員	韓國綠色信用卡及我國環保集點制度推動現況經驗交流	本次行前聯繫窗口
	Lim, Namhun	BC Card Co, Ltd. Product Development Dept./ Head of Department	韓國	綠色信用卡	106.05.24	+82-2-520-4013	imnamhun@bccard.com	洪淑幸處長 王瑞鋐科員	韓國綠色信用卡及我國環保集點制度推動現況經驗交流	本次會議簡報韓國綠卡
	Yoon, Sung-Hwan	BC Card Co, Ltd. Product Development Dept. Public Business Team/Team Leader	韓國	綠色信用卡	106.05.24	+82-2-520-4192	sean@bccard.com	洪淑幸處長 王瑞鋐科員	韓國綠色信用卡及我國環保集點制度推動現況經驗交流	

會議/活動名稱	姓名	單位及職稱	國別	專長領域	會晤日期	聯絡電話	電子郵件	我方接洽者姓名職稱	交流內容	備註
	Nuri Esther Kim	BC Card Co, Ltd. Product Development Dept. Public Business Team/Associate	韓國	綠色信用卡	106.05.24	+82-2-520-8438	nkim77@bccard.com	洪淑幸處長 王瑞鋐科員	韓國綠色信用卡及我國環保集點制度推動現況經驗交流	
亞洲碳足跡網絡2017年會員會議	IK Kim	KEITI/EDP Management Team/Manager	韓國	LCA、碳足跡	106.5.25	+82-2-3800-659	kohung@keiti.re.kr	洪淑幸處長	碳標籤制度及推動現況	
	Akira Kataoka	JEMAI/Eco-Design Office of LCA Centre/General Manager	日本	LCA、碳足跡	106.5.25	+81-3-5209-7712	a.kataoka@jemai.org.jp	洪淑幸處長	碳標籤制度及推動現況	
	Wan Mazlina Wan Hussein	SIRIM/Environmental Management Section/Senior Researcher	馬來西亞	LCA、碳足跡	106.5.25	+60-3-5544-6569	wmazlina@sirim.my	洪淑幸處長 王瑞鋐科員	碳標籤制度及推動現況	
	Linda W.P. Ho	Green Council/Chief Executive Officer	香港	LCA、碳足跡	106.5.25	+852-2810-1122	lindaho@greencouncil.org	洪淑幸處長	碳標籤制度及推動現況	
	Oyunchimeg Jigjid	Mogolian National Chamber of Commerce and Industry/Head	蒙古	LCA、碳足跡	106.5.25	+976-11-329167	Oyunchimeg.j@mongolchamber.mn	洪淑幸處長 王瑞鋐科員	碳標籤制度及推動現況	
	Joseph Chiu	CMA Testing and Certification Laboratories/ Certification Manager	香港	LCA、碳足跡	106.5.25	+852-2690-8280	josephchiu@cmatcl.com	洪淑幸處長 王瑞鋐科員	碳標籤制度及推動現況	

會議/活動名稱	姓名	單位及職稱	國別	專長領域	會晤日期	聯絡電話	電子郵件	我方接洽者姓名職稱	交流內容	備註
	Jung-Ju Kim	KEITI/Environmental Technology Department/Executive Director	韓國	LCA、碳足跡	106.5.25	+82-10-3268-4846	Jjkim4846@keiti.re.kr	洪淑幸處長 王瑞鋐科員	碳標籤制度及推動現況	
	Kwang-Hee Nam	KEITI President	韓國	LCA、碳足跡	106.5.26	+82-10-5603-1201	Khnam03@keiti.re.kr	洪淑幸處長 王瑞鋐科員	碳標籤制度及推動現況	
	Ji-Hyae Noh	KEITI/Carbon Management Office/associate researcher	韓國	LCA、碳足跡	106.5.25-26	+82-2-380 0-659	jhnoh@keiti.re.kr	洪淑幸處長 王瑞鋐科員	碳標籤制度及推動現況	
	Kim Yong-Jin	KEITI/Environmental Business Division/Excutive Director	韓國	LCA、碳足跡	106.5.25-26	+82-10-6674-1292	rjkim@keiti.re.kr	洪淑幸處長 王瑞鋐科員	碳標籤制度及推動現況	
	Minkyung Carrie Hong	ESCAP/Research Associate	韓國	LCA、碳足跡	106.5.25-26	+82-32-458-6605	hong06@un.org	洪淑幸處長 王瑞鋐科員	碳標籤制度及推動現況	
	Hyun-Hee Lee	KEITI/Carbon Management Office/researcher	韓國	LCA、碳足跡	106.5.25-26	+82-2-380 0-659	hh_lee@keiti.re.kr	王瑞鋐科員	碳標籤制度及推動現況；臺、韓、泰 PCR 調和事宜	
	Phakamon Supappunt	TGO/ Carbon Business Office/Manager	泰國	LCA、碳足跡	106.5.25-26	+66-0-214 19829	pongvipa@tgo.or.th	洪淑幸處長 王瑞鋐科員	碳標籤制度及推動現況；臺、韓、泰 PCR 調和事宜	