

出國報告（出國類別：國際會議）

出席臺、韓、泰三國碳足跡產品類別規則
(CFP-PCR)調和工作小組會議

服務機關：行政院環境保護署

姓名職稱：李奇樺 科長

派赴國家：泰國

出國期間：106年10月18日至106年10月21日

報告日期：107年1月20日

摘 要

一、出國計畫名稱：出席臺、韓、泰三國碳足跡產品類別規則(CFP-PCR)調和工作小組會議

二、出國地點：泰國曼谷

三、出國人員：李奇樞科長

四、出國期間：106 年 10 月 18 日至 106 年 10 月 21 日

五、心得及建議：

本次出國參加「臺、韓、泰三國碳足跡產品類別規則(CFP-PCR)調和工作小組會議」，我國與韓國、泰國代表針對調和「飲料」及「洗髮精」CFP-PCR 內容進行意見交流與討論，為建置三國通用之碳足跡產品類別規則做準備。另拜訪泰國國家金屬及材料技術中心生命週期評估研究室，瞭解泰國因應產品環境足跡發展相關計算工具及本土資料庫情形，可作為我國未來發展產品環境足跡之借鏡。心得及建議如下：

(一)持續與韓國及泰國共同發展調和碳足跡產品類別規則，維持我國在亞洲碳足跡網絡組織影響力：

1.亞洲碳足跡網絡組織(ACFN)於西元（下同）2013 年成立，我國為創始會員之一，該組織成立目的之一在於調和亞洲已發展碳標籤制度國家彼此間差異，進而達成各國碳標籤相互承認之目標。該組織會員中以我國、韓國及泰國發展碳標籤制度較為成熟，三方近年達成共同發展調和碳足跡產品類別規則之共識。本次會議延續 2017 年 5 月三方會議結果，持續完成調和「飲料」碳足跡產品類別規則具體內容，將由韓方彙整修訂並經三方確認後進行公告；另初步討論調和「洗髮精」碳足跡產品類別規則內容，將由韓方依討論結果彙整調和「洗髮精」碳足跡產品類別規則草案，及初步討論三方相互承認碳標籤之流程，並訂於 2018 年 4 月於臺灣舉辦「臺、韓、泰三國碳足跡產品類別規則調和工作小組會議」繼續討論。

2.建議持續積極與韓國及泰國共同發展調和碳足跡產品類別規則工作，相關

具體合作成果可能成為今年 ACFN 會議亮點，有助於維持我國在亞洲碳足跡網絡組織影響力，提升我國在國際會議之能見度，亦有助於我國碳標籤產品對外貿易之發展。

(二)持續關注國際發展產品環境足跡之趨勢，並投入相關研究及建立本土資料庫之能量，及早準備因應：

- 1.泰國舉辦查驗人員訓練課程，邀請我方及韓方代表團成員分享碳標籤制度及發展狀況。韓方代表指出韓國已研議將既有碳標籤及產品第三類環境宣告(EPD)制度進行整合，除碳足跡外，納入水足跡、酸化、生物多樣性等計 10 項環境衝擊指標，並發展整合性標誌及調整產品環境足跡揭露之方式。
- 2.拜訪泰國國家金屬及材料技術中心生命週期評估研究室，有鑒於歐盟於 2013 年通過「建立綠色產品單一市場」政策，並發展產品環境足跡評估方法，該研究室已著手進行相關試行計畫，並針對產品環境足跡發展相關計算工具及本土資料庫，以因應未來產業或相關計畫（如碳足跡、水足跡計畫）執行單位之需求。
- 3.我國已自 2014 年起持續發展本土碳足跡排放係數資料庫及計算工具，目前已可提供國內各界計算產品碳足跡之服務，惟針對其他環境衝擊面仍缺乏相關本土數據。為因應國際間發展產品環境足跡及歐盟建立綠色產品單一市場之趨勢，亟需投入資源進行相關研究並建立生命週期評估各項環境衝擊指標本土係數資料庫及計算工具，以及早因應此一國際發展趨勢，協助未來國內產品環境資訊揭露需求，並促進綠色經濟發展。

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壹、目的

本次出國參加「臺、韓、泰三國碳足跡產品類別規則(CFP-PCR)調和工作小組會議」，係屬「亞洲碳足跡網絡會議」(Asia Carbon Footprint Network, ACFN)之工作小組會議，「亞洲碳足跡網絡會議」於 2011 年成立，成立宗旨係作為亞洲各國間推動碳足跡工作之資訊交流平台及後續亞太各國於碳足跡相關制度(包括碳足跡盤查計算標準、碳足跡產品類別規則、碳足跡排放係數、查證制度、數據品質要求等)之合作交流管道，以有效推廣碳標籤產品，達到永續消費與生產之最終目標。我國由財團法人工業技術研究院及社團法人臺灣環境管理協會代表為「亞洲碳足跡網絡組織」之會員。

為能促使亞太地區之碳標籤調和能有明確且實質之進展，2015 年臺灣已與韓國環境產業技術研究院(Korea Environmental industry & Technology Institute, KEITI)及泰國溫室氣體管理機構(Thailand Greenhouse Gas Management Organisation, TGO)之代表達成三國共同進行碳足跡產品類別規則(CFP-PCR)調和分析之共識，並由臺、韓、泰三國輪流舉辦工作小組會議，藉以深入瞭解三國於碳足跡相關制度之差異，並發展調和彼此之碳足跡產品類別規則，有助於未來各國碳標籤相互承認。

本次出國目的有以下 2 點：

- 一、參加「臺、韓、泰三國碳足跡產品類別規則(CFP-PCR)調和工作小組會議」，我國與韓國、泰國代表針對調和「飲料」及「洗髮精」CFP-PCR 內容進行意見交流與討論，為建置三國通用之碳足跡產品類別規則做準備。
- 二、拜訪泰國國家金屬及材料技術中心生命週期評估研究室，瞭解泰國因應產品環境足跡發展相關計算工具及本土資料庫情形，可作為我國未來發展產品環境足跡之借鏡。

貳、出國行程

一、出國計畫名稱：出席臺、韓、泰三國碳足跡產品類別規則(CFP-PCR)調和工作小組會議

二、出國人：李奇樺科長

三、出國日期：106年10月18日至106年10月21日

四、出國行程與內容概要：

活 動 日 期	活 動 內 容	活 動 地 點
106年10月18日	啟程，出發至泰國曼谷。	—
106年10月19日	參加「臺、韓、泰三國碳足跡產品類別規則(CFP-PCR)調和工作小組會議」，討論調和「飲料」及「洗髮精」碳足跡產品類別規則。	Pathumwan Princess Hotel
106年10月20日	(一) 泰國舉辦查驗人員教育訓練課程，由臺灣及韓國代表分享碳標籤制度及發展狀況。 (二) 拜訪「泰國國家金屬及材料技術中心生命週期評估研究室(MTEC-LCA Lab)」，交流發展生命週期評估係數資料庫情形。	1.Pathumwan Princess Hotel 2.泰國國家金屬及材料技術中心
106年10月21日	返程，回到臺北。	

參、行程成果

一、參加「臺、韓、泰三國碳足跡產品類別規則(CFP-PCR)調和工作小組會議」

(一) 日期：2017 年 10 月 19 日

(二) 出席人員：

1. 泰國溫室氣體管理機構(TGO)代表 5 人。

2. 韓國環境產業技術研究院(KEITI)代表 2 人。

3. 我方代表 4 人：

(1) 本署管考處：李奇樺科長

(2) 社團法人臺灣環境管理協會：吳伋副秘書長、楊傑翔工程師

(3) 財團法人工業技術研究院：沈芙慧副研究員

	
<p>會場電子看板</p>	<p>各國與會代表合影</p>
	
<p>與泰國溫室氣體管理機構互贈紀念品</p>	<p>致贈紀念品予韓國環境產業技術研究院</p>

(三) 會議討論過程 (議程如附錄 1) :

1. 討論三國通用飲料碳足跡產品類別規則(草案)(草案資料如附錄 2) :

臺韓泰三方曾於 2017 年 5 月工作小組會議比較各國飲料碳足跡產品類別規則之差異，後續由韓方彙整飲料碳足跡產品類別規則草案，本次會議延續上次工作小組會議結果，討論草案內容，並調和完成不含酒精飲料碳足跡產品類別規則 (會後定稿資料如附錄 3)。會議討論過程重點如下：

- (1) 泰國代表指出，跨國碳標籤互認的過程相當複雜，且各國審核流程不盡相同，因此僅規劃碳標籤互認之架構與方向，各國可有調整的空間。三國同意將於下次工作小組會議進一步討論細節。
- (2) 因各國對於碳足跡產品類別規則編號方式並不相同，因此討論編列一項臺韓泰三方共用的碳足跡產品類別規則編號。三國同意保留原國家產品類別規則編號，並針對調和碳足跡產品類別規則給予共同編號，如：PCR KTT XXX。
- (3) 各國對於產品類別規則之適用產品範疇界定不同，為使通用產品類別規則適用於三國境內，泰國代表建議於通用產品類別規則訂定相關產品分類編號，並以聯合國 CPC Code (Central Product Classification Code) 作為通用的產品分類代碼，各國再將 CPC Code 對應到國內的產品分類編號。經討論三國均同意此一建議作法。
- (4) 韓國代表建議原料階段用 pre-manufacturing、廢棄處理階段用 end-of-life 作為通用產品類別規則中生命週期各階段之名稱，臺灣與泰國代表認為原料階段以 raw material phase 為名稱較符合 ISO 標準對於生命週期評估的概念。三國同意原料階段名稱為「raw material phase」及廢棄處理階段名稱為「end-of-life」。
- (5) 「不含酒精飲料」通用產品類別規則文件第 3.2 及 3.3 節製造階段與使用階段內容，泰國代表提出泰國於製造階段與使用階段皆有

計算逸散量，例如可樂於使用階段會釋出二氧化碳，建議納入計算，並討論是否需要有一統一的計算方式。經臺灣與韓國代表分享其計算方式後，三國同意通用產品類別規則不探討特例，再修訂第 3.2 及 3.3 節內容。

(6)各國產品類別規則之截斷原則(cut-off rule)不盡相同，臺灣與泰國以任何單一溫室氣體源之排放貢獻占產品預期之生命週期內溫室氣體排放量 $\leq 1\%$ 者，此程序/活動可於盤查時被忽略，累計不得超過 5%，除使用階段外，其納入評估的排放貢獻至少應包含 95%的功能單位預期生命週期溫室氣體排放。韓方則以納入評估的排放貢獻至少應包含 95%的功能單位預期生命週期溫室氣體排放作為原則。經討論決定依各國規定自行管理，但在通用產品類別規則載明截斷原則依各國的規定處理。

(7)各國對於廢棄處理階段情境假設方式不盡相同，韓國代表不瞭解臺灣對於廢棄處理階段的情境假設如何提供相關資訊予廠商，因此希望臺灣能夠在附錄中提供案例或說明。我方代表回應表示，因臺灣環保署官方網站有公告相關物品的回收率，可作為計算相關物品廢棄處理階段碳排放之依據，並將提供相關資訊予韓方彙整。

2.討論臺韓兩國洗髮精碳足跡產品類別規則差異及調和方式(會議資料如附錄 4)：

臺韓泰三方曾溝通選定「飲料」及「洗髮精」2類產品優先研擬通用之碳足跡產品類別規則，本次會議由韓方說明比較臺韓兩國洗髮精碳足跡產品類別規則內容之差異，因泰國並無針對「洗髮精」訂定專用的碳足跡產品類別規則，故未納入比較，再由三方代表討論差異處之調和方式，作為後續研擬三國通用洗髮精碳足跡產品類別規則草案之基礎。會議討論過程重點如下：

(1)由於臺灣近期已將「洗髮精」碳足跡產品類別規則修訂為「液劑化粧品及肌膚毛髮洗潔產品」碳足跡產品類別規則，整合其他產品並擴大適用產品範圍，故我方代表提議是否擴大通用碳足跡產品類別規則之適用範疇。經三方代表討論結果，同意我方代表之提議，並將通用產品類別規則名稱修訂為「**Skin and Hair Cleaning Product**」。

(2)因相關洗潔產品會有固狀、液狀及粉狀等不同型態，三國同意各自使用碳足跡產品類別規則內容，但針對彼此有差異之處，須提出佐證資料予對方確認，並依對方國的規則進行審核。

(3)各國對於產品使用階段的情境假設不盡相同，臺灣會計算用水及水加熱時的能資源使用，泰國會計算用水但不包括加熱，韓國則沒有計算使用階段。經三方討論同意將使用階段納入計算，且產品計算使用階段及廢棄處理階段碳足跡時，需採用對方國的產品使用與廢棄處理假設情境，並同意於通用產品類別規則文件中增加附錄補充說明各國使用及廢棄處理階段的情境假設方式。

(4)各國對於產品運輸的計算方式亦不盡相同，臺灣是以去程滿載及回程空載作計算，韓國僅計算 1 趟的距離，泰國則有空車、25%、50%、100%載運等 4 種計算方式，且包括去程及回程。經討論三國同意採用臺灣的計算方式，即以去程滿載及回程空載作計算。

3.討論下次工作小組會議舉辦時間及地點：

依據臺韓泰三方共識，工作小組會議由三方輪流主辦，故下次工作小組輪由臺灣主辦，會議日期暫定於 2018 年 4 月 11 日至 12 日。下次工作小組會議討論重點包括三國通用「**Skin and Hair Cleaning Product**」碳足跡產品類別規則草案，並討論三方碳標籤相互承認的程序。



工作小組會議現場討論情形(一)



工作小組會議現場討論情形(二)

二、泰國舉辦查驗人員教育訓練課程（課程表如附錄 5）

（一）日期：2017 年 10 月 20 日

（二）教育訓練重點：

- 1.邀請臺灣及韓國代表分享碳標籤制度及發展狀況。
- 2.韓方代表簡報於產品環境宣告(Environmental Product Declaration, EPD)整合機制與發展（資料如附錄 6），重點說明如下：
 - (1)緣起：韓國政府於 2015 年 5 月決定依據「零基改善認證方案計畫 (zero based improvement plan of the certification schemes)」，將既有的碳標籤與產品環境宣告制度予以整合。
 - (2)相關修訂內容如下：
 - A.修訂產品環境宣告驗證費用與文件審查天數。
 - B.修訂環境技術和產業支持法施行規則(Enforcement Rule of the Environmental Technology and Industry Support Act)。
 - C.修訂產品環境宣告指引(Guideline for the EPD)。
 - D.修訂產品環境宣告驗證條例。
 - E.統一產品環境宣告與碳標籤的指引。
 - F.修訂產品環境宣告驗證之公告內容，包括產品環境宣告指引、驗證費用與驗證者資格等。
 - (3)增加為 10 項產品環境衝擊指標：將既有的 EPD 環境衝擊指標與碳

標籤揭露之碳足跡予以整合，納入水足跡、人體毒性、生物毒性及生物多樣性等指標（示意圖如圖 1）。

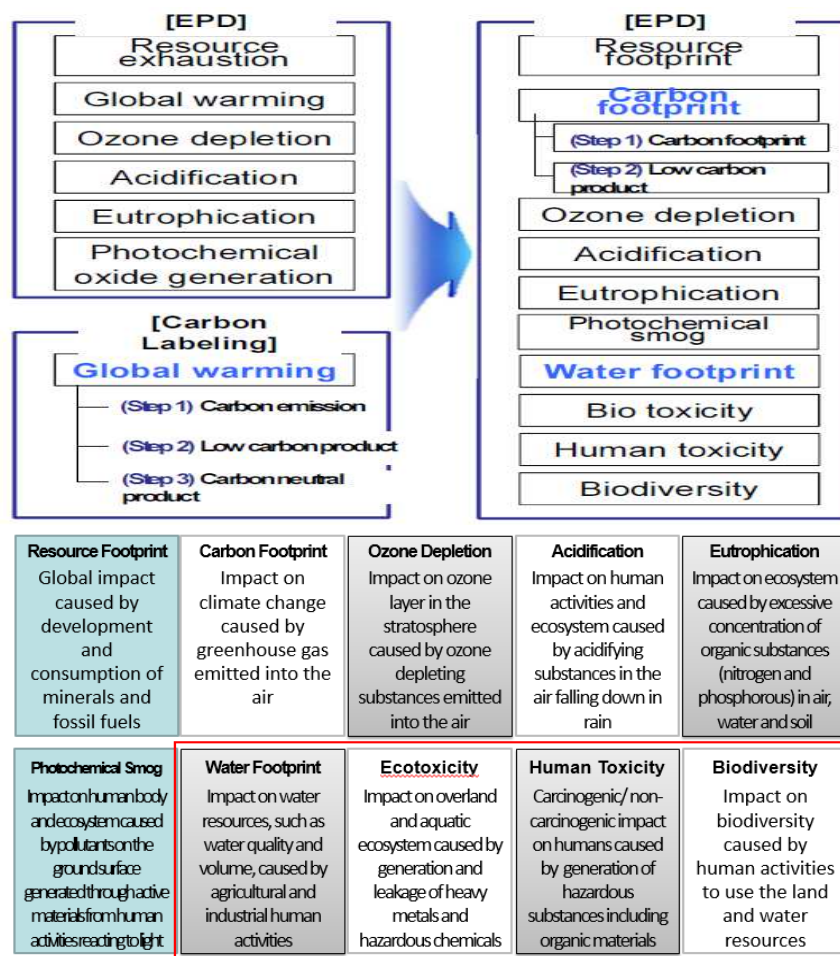


圖 1 10 項產品環境衝擊指標示意圖

(4)調整產品環境績效揭露方式：依據各項產品環境衝擊指標與低碳產品標誌，發展出整合性的產品環境績效揭露標誌（示意圖如圖 2）。

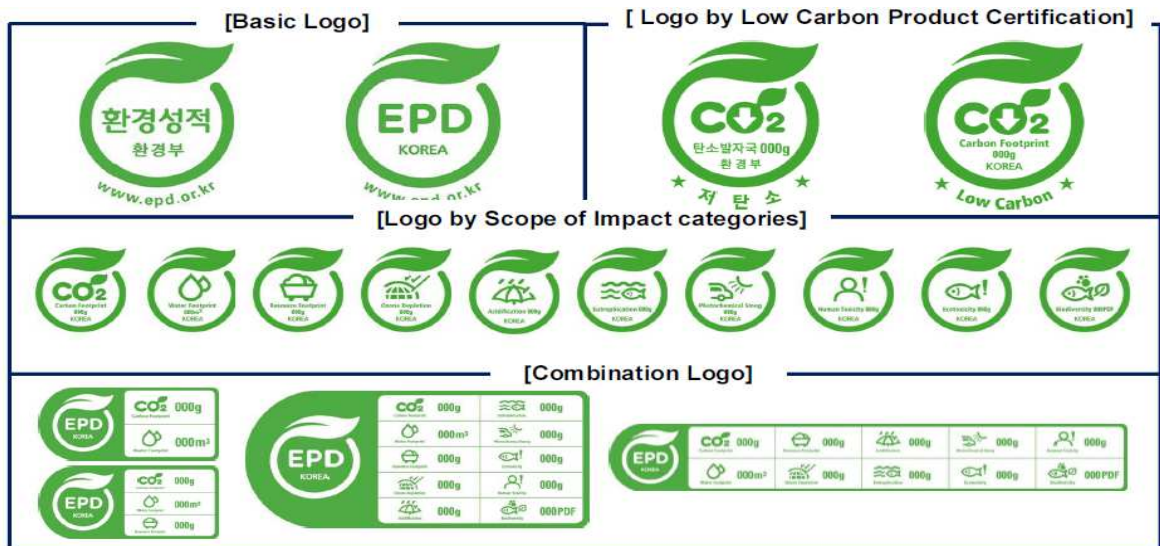


圖 2 產品環境績效揭露方式示意圖



教育訓練現場情形(一)

教育訓練現場情形(二)

三、拜訪「泰國國家金屬及材料技術中心生命週期評估研究室(MTEC-LCA Lab)」

因應國內外相關碳足跡係數資料引入本署碳足跡資料庫需求，於 106 年度起臺灣即與泰國係數資料庫之管理單位-泰國國家金屬及材料技術中心 (Thailand National Metal and Materials Technology Center, MTEC)之生命週期評估研究室(LCA Laboratory)進行交流，藉此次赴泰國參加會議，該單位邀請我方代表於 10 月 20 日至該研究室交流參訪。

(一) 日期：2017 年 10 月 20 日 (下午)

(二) 出席人員：

1.泰國國家金屬及材料技術中心生命週期評估研究室代表 5 人。

2.我方代表 2 人：

(1)本署管考處：李奇樺科長

(2)財團法人工業技術研究院：沈美慧副研究員

(三)交流過程：

1.泰方簡介泰國國家金屬及材料技術中心及生命週期評估研究室：

MTEC 係屬泰國國家研究中心之機構，由泰國國家科學和技術發展局管理，職員超過 2,600 位，主要任務在於促進及開發研究金屬、陶瓷和相關材料。

生命週期評估研究室是隸屬於 MTEC 之研究單位，目前有 16 位研究員，每年約執行 10 至 15 項計畫，每年研究經費約 50 萬美元，主要業務包括生命週期評估顧問諮詢、工具開發、人才培訓及永續發展等議題。

2.交流內容：

(1)生命週期評估係數資料庫相關工作：

該研究室已建置泰國本土生命週期評估係數資料庫 (DALA)，係數建置方式是先選定標的產品，再蒐集該產品產量達 60%以上之廠商資料，據以建置係數，若遇到廠商不願意配合提供資料，則使用二級資料取代。

該研究室因應泰國各方需求提供各類型生命週期評估係數，包括碳足跡、水足跡等，例如提供碳足跡係數予 TGO 並每年更新 2 次。另該研究室已加入全球生命週期評估資料庫網絡，針對數據品質達 Level 10 以上之係數，可提供於該網絡進行國際間交流，但臺灣並非聯合國會員，可能無法加入全球生命週期評估資料庫網絡。

(2)產品環境足跡相關工作：

因應歐盟於 2013 年宣布綠色產品單一市場政策及發展產品環境足跡指引(PEF Guide)，泰國於 2014 年開始依據 PEF Guide 針對農產品進行產品環境足跡試行計畫，該研究室亦開發產品環境足跡計算工具與資料庫。該研究室管理者 Mr. Jitti 表示後續願意進一步分享建置產品環境足跡計算工具與資料庫之經驗。

(3)我方代表亦向泰方介紹臺灣發展的產品碳足跡計算服務平臺與碳足跡係數資料庫，並說明建置過程及數據品質計算方式，後續也願意進一步分享我方的建置經驗。



MTEC-LCA Lab 技術交流會議合影(一)



MTEC-LCA Lab 技術交流會議合影(二)

肆、心得及建議

本次出國參加「臺、韓、泰三國碳足跡產品類別規則(CFP-PCR)調和工作小組會議」，我國與韓國、泰國代表針對調和「飲料」及「洗髮精」CFP-PCR 內容進行意見交流與討論，為建置三國通用之碳足跡產品類別規則做準備。另拜訪泰國國家金屬及材料技術中心生命週期評估研究室，瞭解泰國因應產品環境足跡發展相關計算工具及本土資料庫情形，可作為我國未來發展產品環境足跡之借鏡。心得及建議如下：

一、持續與韓國及泰國共同發展調和碳足跡產品類別規則，維持我國在亞洲碳足跡網絡組織影響力：

(一) 亞洲碳足跡網絡組織(ACFN)於 2013 年成立，我國為創始會員之一，該組織成立目的之一在於調和亞洲已發展碳標籤制度國家彼此間差異，進而達成各國碳標籤相互承認之目標。該組織會員中以我國、韓國及泰國發展碳標籤制度較為成熟，三方近年達成共同發展調和碳足跡產品類別規則之共識。本次會議延續 2017 年 5 月三方會議結果，持續完成調和「飲料」碳足跡產品類別規則具體內容，將由韓方彙整修訂並經三方確認後進行公告；另初步討論調和「洗髮精」碳足跡產品類別規則內容，將由韓方依討論結果彙整調和「洗髮精」碳足跡產品類別規則草案，及初步討論三方相互承認碳標籤之流程，並訂於 2018 年 4 月於臺灣舉辦「臺、韓、泰三國碳足跡產品類別規則調和工作小組會議」繼續討論。

(二) 建議持續積極與韓國及泰國共同發展調和碳足跡產品類別規則工作，相關具體合作成果可能成為今年 ACFN 會議亮點，有助於維持我國在亞洲碳足跡網絡組織影響力，提升我國在國際會議之能見度，亦有助於我國碳標籤產品對外貿易之發展。

二、持續關注國際發展產品環境足跡之趨勢，並投入相關研究及建立本土資料庫之能量，及早準備因應：

(一) 泰國舉辦查驗人員訓練課程，邀請我方及韓方代表團成員分享碳標籤

制度及發展狀況。韓方代表指出韓國已研議將既有碳標籤及產品第三類環境宣告(EPD)制度進行整合，除碳足跡外，納入水足跡、酸化、生物多樣性等計 10 項環境衝擊指標，並發展整合性標誌及調整產品環境足跡揭露之方式。

- (二) 拜訪泰國國家金屬及材料技術中心生命週期評估研究室，有鑒於歐盟於 2013 年通過「建立綠色產品單一市場」政策，並發展產品環境足跡評估方法，該研究室已著手進行相關試行計畫，並針對產品環境足跡發展相關計算工具及本土資料庫，以因應未來產業或相關計畫（如碳足跡、水足跡計畫）執行單位之需求。
- (三) 我國已自 2014 年起持續發展本土碳足跡排放係數資料庫及計算工具，目前已可提供國內各界計算產品碳足跡之服務，惟針對其他環境衝擊面仍缺乏相關本土數據。為因應國際間發展產品環境足跡及歐盟建立綠色產品單一市場之趨勢，亟需投入資源進行相關研究並建立生命週期評估各項環境衝擊指標本土係數資料庫及計算工具，以及早因應此一國際發展趨勢，協助未來國內產品環境資訊揭露需求，並促進綠色經濟發展。

附錄 1

「臺、韓、泰三國碳足跡產品類別規則
(CFP-PCR)調和工作小組會議」議程



**Asia Carbon Footprint Network (ACFN)
 Technical Workshop on Product Category Rules (PCRs)
 : Thailand, Korea, Chinese Taipei**

**Thursday, 19th October 2017, 09:00-16:30
 At Executive 3 room, Pathumwan Princess Hotel, Bangkok**

Time	Topic
09:30 – 09:45	<i>Registration /Refreshment</i>
09:45 – 10:00	Welcome and Opening and Remarks <ul style="list-style-type: none"> ▪ TGO ▪ ACFN Secretariat (UNESCAP, KEITI)
10:00 - 10:30	Progress and Plan of ACFN Work Programme by ACFN Secretariat <ul style="list-style-type: none"> ▪ Current Status of ACFN activity in 2017 ▪ 2018 ACFN Plan and beyond
10:30 - 10:45	<i>Coffee break</i>
10:45 - 11:00	Progress on the development of common Beverage PCR <ul style="list-style-type: none"> ▪ ACFN Secretariat
11:00 - 11:45	Discussion on the common Beverage PCR <ul style="list-style-type: none"> ▪ KEITI ▪ TEMA, Taiwan EPA, ITRI ▪ TGO ▪ UNESCAP
11:45 - 13:00	<i>Luncheon (hosted by TGO)</i>
13:00 - 15:15	Discussion on the common Beverage PCR (cont.)
15:15 - 15:45	<i>Coffee break</i>
15:45 - 16:15	Discussion on the common Shampoo PCR (Korea and Taiwan) <ul style="list-style-type: none"> ▪ KEITI ▪ TEMA, Taiwan EPA, ITRI ▪ UNESCAP
16:15 - 16:30	Closing remarks
17:00 - 19:30	<i>Welcome Dinner (hosted by TGO)</i>

附錄 2

飲料碳足跡產品類別規則（草案）

<PCR #01>

已註解 [0]현회1): Registration code required

Product Category Rules for Non-alcoholic beverages

0. General Introduction

This PCR was developed as a part of activities to share experiences and achievements of each system and promote deeper understanding and cooperation among Korea, Taiwan and Thailand, which are successfully operating carbon labeling schemes in Asian region.

The three countries will be respected the independence and uniqueness of its respective carbon labeling schemes and the parties will be able to utilize this PCR for the mutual development and international application.

0.1 This PCR was based on existing PCR developed by each country.

0.2 This PCR may be used for mutual recognition between the three countries, in which case the regulations and procedures established by the relevant shall be applied.

已註解 [0]현회2):

- ① Do you agree Annex for explanation of mutual recognition (concept, procedures, etc.) is necessary?
- ③ If you don't agree, what is your idea to be able to recognize differences (such as round-trip transportation..) of each country's PCR?

1. Definition of the product group/ Scope

This PCR applies to non-alcoholic beverages listed products corresponding to the following CPC codes. It excludes milk and dairy products.

CPC 2143 Fruit juices

CPC 2449 Other non-alcoholic caloric beverages

已註解 [0]현회3): Review is requested. (Missing parts must be added.)

1.1 Functional unit or declared unit

The declared unit is unit packaged product or sales unit.

1.2 Specification of the product

Information related to product characteristic shall be provided.

(e.g.) product name, product capacity (weight or volume), packaging material (bottle, can, carton, etc), refrigerated storage

2. References

There are existing PCR documents developed by each country. The documents, in whole or in part, are normatively referenced and indispensable for the application of this guideline. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including all amendments) applies.

** The list of documents is in alphabetical order of the country.

- (Korea) National Guideline for the Environmental Product Declaration (Notification

of Environment, Republic of Korea)

- (Taiwan) *Fill out the title of the related document.*
- (Thailand) *Fill out the title of the related document.*

已註解 [이 현회 4]: Please fill out the country-specific PCR documents that are essential for this PCR.

3. System boundary

System boundary for non-alcoholic beverage product includes pre-manufacturing phase, manufacturing phase, use phase, and end-of-life phase.

<< Figure – Presentation of general system boundary >>

*Taiwan will draw a picture of the system boundary
(Please note that it reflects the Thailand's system boundary)*

已註解 [이 현회 5]: In charge of TEMA.

3.1 Pre-manufacturing phase

"Pre-manufacturing phase" comprises cradle-to-gate information on the production of raw materials and packaging materials for the product.

Such as: Production of ingredients used in the product

Production of semi-product

Production of primary, secondary, and tertiary packing materials

Transportation from production site of raw materials and packaging materials to manufacturing site

The requirements and transportation scenarios specified in the reference are followed.

3.2 Manufacturing phase

"Manufacturing phase" comprises gate-to-gate information on the product production and handling of processes-related emissions and waste. This phase includes processes related to the production of the product. **In the case of carbonated beverages, direct CO2 emission shall be considered.**

Such as: Food processing

Packaging processes (e.g. filling, labeling...)

Cold or frozen storage

Waste treatment of waste generated during manufacturing

Transportation from manufacturing site to distribution platform

The requirements and transportation scenarios specified in the reference are followed.

3.3 Use phase

"Use phase" is considered when the product needs a cold storage at manufacturing or at retail site for preserving its shelf life, the environmental impact related to this process shall be estimated. Electric energy due to cold storage shall be evaluated with the formula in the reference.

~~In the case of carbonated beverages, it is assumed that no direct CO₂ emission in this phase.~~ In the case of carbonated beverages, direct CO₂ emission shall be considered.

已註解 [0] 현회6]: Reconfirm the content

3.4 End-of-life phase---這名字ok 範圍 各國家的規矩 放在Annex A 以後若有什麼改革或盤點 以Annex A為主

"End-of-life phase" comprise quantitative information on recycling or handling of product after use. Treatment methods for packing materials are in accordance with relevant laws and regulations.

End-of-life scenarios for the geographical area are specified in Annex A.

4. Data collection and data quality

One year of data shall be collected and be representative of the product. Primary data (also referred to as site-specific data) shall be taken precedence. The requirements specified in the reference are followed.

4.1 Cut-off rule

Using cut-off rule depends on each country scheme but it should not give the perceptions of hiding information, but rather to facilitate the data collection for users. It is assumed that the defined cut-off rules in the references ensure the representativeness of the collected data.

4 Allocation

If allocation is necessary, it should be performed with the most suitable parameters. The criteria for the allocation shall be in accordance with the reference.

5 CFP calculation

The details shall be as specified in the reference are followed.

6 Displaying the CFP result

The requirements specified in the reference are followed.

7. Changes in this PCR document

<PCR #01> 2017-00-00

Original version published.

已註解 [0] 현회7): Registration code required

[Annex A] End-of-life scenario

This annex provides country-specific end-of-life scenarios to assist in calculating GHG emissions for waste associated with the product.

已註解 [0] 현회8): Fill out country specific end-of-life scenario in English.

B.2 - Taiwan

B.3 - Thailand

B.1 Republic of Korea

- a) As for products, parts or raw ancillary materials, the recycling ratio shall be calculated under the "Mandatory Recycling Ratio depending on each product and packing material", specified in Article 17.1 of the 「Act on the Promotion of Saving and Recycling of Resources」.
- b) As for electrical and electronic products, the "mandatory recycling by product group" specified in Article 16.3 of the 「Act on Resource Circulation of Electrical and Electronic Equipment and Vehicles」 shall be applied.
- c) The amount of substances of landfill, incineration and recycling identified by a) and b) should be determined depending on the ratio of landfill, incineration and recycling per material specified by the 'separate disposal of recyclable resources' of domestic wastes that the Ministry of Environment announced in the "National waste generation & treatment status".
- d) As for substances not subject to recycling items or materials identified by a) and b), or substances not specified as recyclable by a) and b), the amount of landfill, incineration and recycling should be determined depending on the rates of landfill, incineration and recycling per material specified in the 'integrated disposal by volume-rate (waste) disposal system' of domestic wastes that the Ministry of Environment announced in the "National waste generation & treatment status".
- e) All greenhouse gas such as refrigerants contained in product packages and products are considered to be discharged at the stage of disposal. However, if a system to recollect all or part of the greenhouse gas (such as refrigerants contained in products) is established and it is deemed desirable to recognize such performance, clear evidence data that proves as much should be offered.
- f) As for statistical data concerning wastes applicable from a) to d), the head of an organization shall make notifications based on relevant data.

B.2 Taiwan

B.3 Thailand

附錄 3

不含酒精飲料碳足跡產品類別規則

Product Category Rules for Non-alcoholic beverages

0. General Introduction

This PCR was developed as a part of activities to share experiences and achievements of each system and promote deeper understanding and cooperation among Korea, Taiwan and Thailand, which are successfully operating carbon labeling schemes in Asian region.

The three countries will be respected the independence and uniqueness of its respective carbon labeling schemes and the parties will be able to utilize this PCR for the mutual development and international application.

0.1 This PCR was based on existing PCR developed by each country.

0.2 This PCR may be used for mutual recognition between the three countries, in which case the regulations and procedures established by the relevant shall be applied.

1. Definition of the product group/ Scope

This PCR applies to non-alcoholic beverages listed products corresponding to the following CPC codes. It excludes milk and dairy products.

UN CPC 2143 Fruit juices

UN CPC 2449 Other non-alcoholic caloric beverages

1.1 Functional unit or declared unit

The declared unit is unit packaged product or sales unit.

1.2 Specification of the product

Information related to product characteristic shall be provided.

(e.g.) product name, product capacity (weight or volume), packaging material (bottle, can, carton, etc), refrigerated storage

2. References

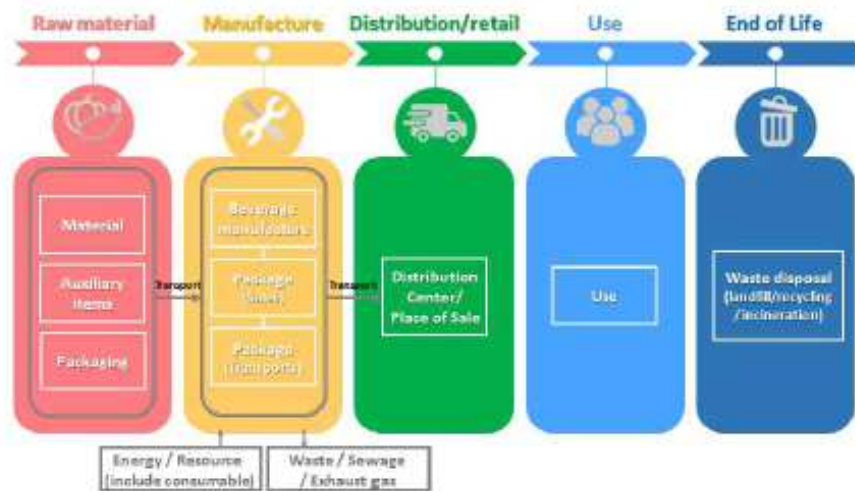
There are existing PCR documents developed by each country. The documents, in whole or in part, are normatively referenced and indispensable for the application of this guideline. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including all amendments) applies.

- (Korea) National Guideline for the Environmental Product Declaration (Notification of Environment, Republic of Korea)

- (Taiwan) Guidelines for the development, reference and revision of product category rules for carbon footprints of products
- (Thailand) Thai National Product Category Rules for beverages

3. System boundary

System boundary for non-alcoholic beverage product includes pre-manufacturing phase, manufacturing phase, use phase, and end-of-life phase.



<Figure> Presentation of general system boundary

3.1 Raw material acquisition phase

"Raw material acquisition phase" comprises cradle-to-gate information on the production of raw materials and packaging materials for the product.

- Such as: Production of ingredients used in the product
- Production of semi-product
- Production of primary, secondary, and tertiary packing materials
- Transportation from production site of raw materials and packaging materials to manufacturing site

The requirements and transportation scenarios specified in the reference are followed.

3.2 Manufacturing phase

"Manufacturing phase" comprises gate-to-gate information on the product production and handling of processes-related emissions and waste. This phase includes processes related to the production of the product. In case of carbonated beverages, direct CO₂ emission shall be considered.

- Such as: Food processing

Packaging processes (e.g. filling, labeling...)

Cold or frozen storage

Waste treatment of waste generated during manufacturing

Transportation from manufacturing site to distribution platform

The requirements and transportation scenarios specified in the reference are followed.

3.3 Use phase

"Use phase" is considered when the product needs a cold storage at manufacturing or at retail site for preserving its shelf life, the environmental impact related to this process shall be estimated. Electric energy due to cold storage shall be evaluated with the formula in the reference. In case of carbonated beverages, direct CO₂ emission shall be considered.

3.4 End-of-life phase

"End-of-life phase" comprise quantitative information on recycling or handling of product after use. Treatment methods for packing materials are in accordance with relevant laws and regulations.

End-of-life scenarios for the geographical area are specified in **Annex A**.

4. Data collection and data quality

One year of data shall be collected and be representative of the product.

Primary data (also referred to as site-specific data) shall be taken precedence.

The requirements specified in the reference are followed.

4.1 Cut-off criteria

Using cut-off criteria depends on each country scheme but it should not give the perceptions of hiding information, but rather to facilitate the data collection for users.

It is assumed that the defined cut-off criteria in the references ensure the representativeness of the collected data.

4 Allocation

If allocation is necessary, it should be performed with the most suitable parameters. The criteria for the allocation shall be in accordance with the reference.

5 CFP calculation

The details shall be as specified in the reference are followed.

6 Displaying the CFP result

The requirements specified in the reference are followed.

7. Changes in this PCR document

[PCR KTT 2017-01] 2017-10-19, Original version published.

[Annex A] End-of-life scenario

This annex provides country-specific end-of-life scenarios to assist in calculating GHG emissions for waste associated with the product.

B.1 Republic of Korea

- a) As for products, parts or raw ancillary materials, the recycling ratio shall be calculated under the "Mandatory Recycling Ratio depending on each product and packing material", specified in Article 17.1 of the「Act on the Promotion of Saving and Recycling of Resources」.
- b) As for electrical and electronic products, the "mandatory recycling by product group" specified in Article 16.3 of the「Act on Resource Circulation of Electrical and Electronic Equipment and Vehicles」shall be applied.
- c) The amount of substances of landfill, incineration and recycling identified by a) and b) should be determined depending on the ratio of landfill, incineration and recycling per material specified by the 'separate disposal of recyclable resources' of domestic wastes that the Ministry of Environment announced in the "National waste generation & treatment status".
- d) As for substances not subject to recycling items or materials identified by a) and b), or substances not specified as recyclable by a) and b), the amount of landfill, incineration and recycling should be determined depending on the rates of landfill, incineration and recycling per material specified in the 'integrated disposal by volume-rate (waste) disposal system' of domestic wastes that the Ministry of Environment announced in the "National waste generation & treatment status".
- e) All greenhouse gas such as refrigerants contained in product packages and products are considered to be discharged at the stage of disposal. However, if a system to recollect all or part of the greenhouse gas (such as refrigerants contained in products) is established and it is deemed desirable to recognize such performance, clear evidence data that proves as much should be offered.
- f) As for statistical data concerning wastes applicable from a) to d), the head of an organization shall make notifications based on relevant data.

B.2 Taiwan

- a) The process of clearing and transporting to the designated disposal site the unwanted materials used in the packing of a product (if taking recycling system into consideration) should be included in the calculation of Carbon Footprint.
- b) No primary activity data is required in the waste disposal stage. Incineration or landfill of all waste items related to the product should be ascertained, except those for recycling

(as the raw materials for other products). Please refer to the official website of Recycling Fund Management Board (<http://recycle.epa.gov.tw/recycle/index2.aspx>) for the recycling items and recycling rate.

c) The secondary data in the waste disposal stage depends on the actual situation. It is prior to adopt the carbon emission factor on the Carbon Footprint Calculation Platform (http://exforum.itri.org.tw/cfpc/cfpc_Discussion.htm#). Thereafter, databank of life cycle assessment or reference to public credibility is taken into account.

B.3 Thailand

a) waste disposal:

The GHG emissions from the final waste disposal phase shall be included in the full carbon footprinting (B2C) case as landfill scenarios but excluded for the partial carbon footprinting (B2B) case. For recyclable materials, the GHG emissions shall be calculated as follows;

$$EEoL = \sum [(1-RR,i) \times Ed,i] + EtW$$

Where -

EEoL = emissions factor of the final waste disposal phase of product

RR,i = recycle ratio of material i (table 1)

Ed,i = emissions factor of the final waste disposal phase of material i

EtW = emissions factor of waste transportation

Table 1: recycle ratio of industrial waste

Type	Recycle ratio (%)
Paper	59
Plastic	38
Rubber	25

Source: Pollution Control Department (2013)

The GHG emissions of products in the final disposal phase that are transferred to another system (e.g. methane recovery from landfill) shall be taken into account.

If primary data cannot be collected, then secondary data can be used that shall be based on the IPCC Guideline for National Greenhouse Gas Inventories – Volume 5: Waste (see Table 2), on waste disposal in a shallow landfill. For waste types other than those included in Table 1 of the IPCC Guidelines, and wastes that have carbon content, the GHG emission factor of 2.32 tCO₂ per ton of waste shall be used. In case of wastes with no carbon content, the GHG emissions shall be zero. For on-site waste treatment,

the GHG emissions shall be based on the actual practice of waste disposal.

In the case of products that are disposed by another system, such as infectious waste rubber gloves, the GHG emissions shall be calculated from its incineration or actual treatment.

In the case that the methane emitted from the landfill is flared, the reduction of GHG emissions must be taken into account.

Table 2: GHG emissions from a shallow landfill (IPCC, 2006)

Waste type	GHG emissions (tCO ₂ e per ton of waste)
Paper	2.93
Fabric	2.00
Food	2.53
Wood	3.33
Garden wastes (i.e. leaves, grass)	3.27
Paper diaper	4.00
Rubber and leather	3.13

Source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories – Volume 5: Waste

The transport of waste to a landfill site shall be based on the following scenario: Transportation by 10-wheel, 16-ton truck through a distance of 40 km; 100% loading on trip to landfill and empty return.

附錄 4

臺韓洗髮精碳足跡產品類別規則差異比較

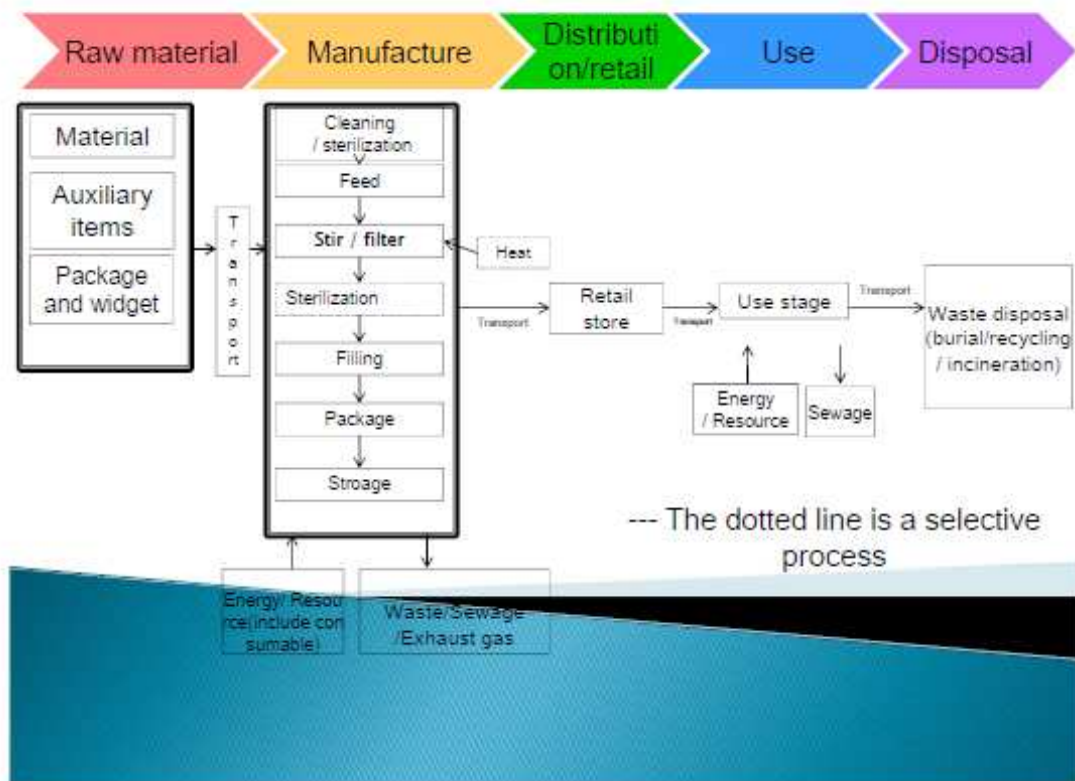
Comparison of PCR - Shampoo -

3rd Working Group Meeting
October 19th, 2017

1. Comparison of PCR - Shampoo

	Taiwan		
Product Category Definition	Shampoo including conditioner, extract, emulsifier, thickening agents, additive ???		
Declared unit	Packaging unit of shampoo, with the indication of product volume, <u>usage count</u> , and <u>usage amount</u>	Unit product as sold in the market	△
System Boundary	- Raw materials acquisition - Manufacturing - Distribution and marketing/retail - <u>Use</u> - End-of-life ?? picture sharing is required	- Raw materials acquisition - Manufacturing - Distribution and marketing/retail - End-of-life	△

Apply to the outside of the human body, used to clean, moisturize the skin to stimulate the smell to hide the smell or repair the appearance of liquid items, including liquid cosmetics.
Please see the attached file



1. Comparison of PCR - Shampoo

	Taiwan	Korea	Degree of similarity
Data Quality	<ul style="list-style-type: none"> - Primary data (site-specific data) by priority - Secondary data 	<ul style="list-style-type: none"> - Primary data (site-specific data) by priority - Secondary data 	○

	Taiwan	Korea	Degree of similarity
Data_ Raw materials & Packaging	<ul style="list-style-type: none"> - Processes related to production of <u>main ingredients</u> in shampoo, conditioner, extract, emulsifier, thickening agent, additive and package - Processes related to treatment and disposal of sewage and waste are generated through the processes mentioned above, including all treatment processes 	<ul style="list-style-type: none"> - Processes related to production of inputs over 95% of cumulative mass - Treatment & disposal of waste - Fuel & electricity consumption - Minimum packaging - same as "Data_raw materials" - Shipment packaging - material usage 	△
Data_ Transportation	<ul style="list-style-type: none"> - Regarding transportation scenario - Distance, transport mode, loading rate, tonne-kilometers, freight rate, average price of oil 	<ul style="list-style-type: none"> - one-way trip - vehicle type, distance - Domestic/Import(*) (*) including inland transport in importing country 	△



	Taiwan	Korea	Degree of similarity
Data_ manufacturing	<ul style="list-style-type: none"> -GHG emission from the process related to production includes agitation, mixing, stuffing, packing and the other related process - Processes related to treatment and disposal of sewage and waste are generated through the processes in the factory. 	<ul style="list-style-type: none"> - electricity, heat, fuel consumption for manufacturing -Waste/waste water treatment(*) (*) emission factor - Fuel & electricity consumption 	△
Data_ Distribution/ Sales	<ul style="list-style-type: none"> - <u>One-way trip from the manufacturing plant to the distribution/retail sites</u> - Distance, transport mode, loading rate, tonne-kilometers, freight rate, average price of oil 	<ul style="list-style-type: none"> - One-way trip - weight of product, distribution by region, vehicle type (*) distance by region is provided - Domestic 	△
Data_ Use	not provided		✗
Data_ End-of-life	<ul style="list-style-type: none"> - no standard scenario - national regulations 	<ul style="list-style-type: none"> - Scenario based on national waste treatment statistics (recycling/ incineration/ landfill) 	△



1. Comparison of PCR - Shampoo

	Taiwan	Korea	Degree of similarity
Cut-off rule	- Not specified in PCR	- More than 95% of the cumulative mass contribution Raw materials, ancillary input, minimum packaging	△
Allocation	- Basic parameters such as actual quantity, weight - Economic value if necessary	- Physical relationship - Economic value if necessary	○



2. Taiwan's PCR - Use stage

< Use stage >

	Taiwan
System boundary	The use stage shall be considered: <ol style="list-style-type: none"> 1. Resources consumption during the use stage. (E.g., water) 2. Energy consumption of equipment required for the use stage. 3. Process related to disposal of sewage during the use stage. 4. Process related to the use stage.
Data collection	(primary activity data) - The component for the weight of the waste vessels (secondary data) 1. outsourcing fuel and electricity. 2. process related to the supply of running water.



2. Taiwan's PCR - Use stage

< Use stage >

- In this PCR, besides shampoos and rinse we have other products to simulate the scenario.
- The products include: (1) medicated hand cleansing preparations (2) dentifrice (3) aftershave and pre-shave (4) organic surface-active products and preparations (5) preparations for permanent waving or straightening, hair lacquers, hair shaped liquid, and hair tonic.

	Taiwan
scenarios	<p>1. Reasonable scenario assumptions for using the shampoos and rinse:</p> <p>(1) The shampoos and rinse consumption of washing hair each time.</p> <p>(2) There is a scenario about the water consumption which is 22.5 liter for flush after using the shampoo each time.</p> <p>(3) The water is heated from 25 to 37 degrees.</p> <p>(4) The scenario that is illustrated by the product instruction.</p> <p>(5) The scenario about maintaining the product.</p> <p>2. It has no scenario about maintaining the product because there are no GHG emissions from the process related to the storage during the usage of shampoo.</p>



2. Taiwan's PCR - Use stage

< Use stage >

- In this PCR, besides shampoos and rinse we have other products to simulate the scenario.
- The products include: (1) medicated hand cleansing preparations (2) dentifrice (3) aftershave and pre-shave (4) organic surface-active products and preparations (5) preparations for permanent waving or straightening, hair lacquers, hair shaped liquid, and hair tonic.

	Taiwan
scenarios	<p>3. The scenario assumptions for using the medicated hand cleansing preparations:</p> <p>(1) Use the products with water.</p> <p>(2) The water consumption which is 2 liter each time.</p> <p>4. The scenario assumptions for using the dentifrice:</p> <p>(1) Use the products with water.</p> <p>(2) The water consumption which is 0.3 liter each time.</p> <p>5. The other reasonable scenario assumptions for using the pre-shave, shaving or after-shave preparations:</p> <p>(1) Use the products with water.</p> <p>(2) The water consumption which is 6.5 liter each time.</p>



2. Taiwan's PCR - Use stage

< Use stage>

- ▶ In this PCR, besides shampoos and rinse we have other products to simulate the scenario.
- ▶ The products include: (1) medicated hand cleansing preparations (2) dentifrice (3) aftershave and pre-shave (4) organic surface-active products and preparations (5) preparations for permanent waving or straightening, hair lacquers, hair shaped liquid, and hair tonic.

	Taiwan
scenarios	<p>6. The scenario assumptions for using the organic surface-active products and preparations (in the form of liquid or cream) for washing the skin:</p> <ul style="list-style-type: none"> (1) The water consumption of shower is 100 liter each time. (2) The water consumption of bathing is 200 liter each time. (3) The water is heated from 25 to 37 degrees. <p>7. The scenario assumptions for using the preparations for permanent waving or straightening, hair lacquers, hair shaped liquid, and hair tonic:</p> <ul style="list-style-type: none"> (1) The water consumption which is 25 liter each time. (2) The water is heated from 25 to 37 degrees.



2. Taiwan's PCR - Use stage

< Use stage>

- ▶ electricity
 - The cost of 1 kwh is consumed when you heat 71.70 liter of water from 25 to 37 degrees .
- ▶ natural gas
 - The cost of 1 cubic meters(m3) is consumed when you heat 748.88 liter of water from 25 to 37 degrees .
- ▶ liquefied petroleum gas
 - The cost of 1 cubic meters(m3) is consumed when you heat 553.30 liter of water from 25 to 37 degrees .



附錄 5

泰國查驗人員教育訓練課程表



Tentative Agenda
"Technical Workshop for Sharing Knowledge on
Certification and Verification of CFP and EPD in Korea and Taiwan"
Organized by
Thailand Greenhouse Gas Management Organization (Public Organization)
October, 20th 2017, 09:00-16:00 pm
At Executives 1-2 room, Pathumwan Princess Hotel, Bangkok

Time	Topic
09.00 – 09.30	Registration /Refreshment
09.30 – 09.45	Welcome Remarks By Dr. Pongvipa Lohsomboon Deputy Executive Director Thailand Greenhouse Gas Management Organization (TGO)
09.45 –10.30	Development of the integrated EPD scheme in Korea <ul style="list-style-type: none"> • Status of CFP in Korea • Status and plan of integrated EPD scheme • Implementation of integrated EPD scheme <ul style="list-style-type: none"> - Standard and guideline - Consumer information - Verification system - Certification status • Lesson learnt • Future Plan By Ms. Eunah Hong Researcher, Environmental Declaration Office Korea Environmental Industry & Technology Institute (KEITI)
10.30 –10.45	Coffee Break
10.45 –11.30	Development of the integrated EPD scheme in Korea (Cont.) By Ms. Eunah Hong KEITI
11.30 –11.45	Discussions
11.45 –13.00	Lunch
13.00 –14.30	Status of CFP Scheme in Taiwan <ul style="list-style-type: none"> • Current status of CFP • Common PCRs • Future plans • Lesson learnt By Representative from Taiwan
14.30 – 14.45	Discussions
14.45 – 15.00	Coffee Break
15.00 – 16.00	Sharing Knowledge on guideline for Soil Carbon Stock Change By Prakaytham Suksatit Engineer, Life Cycle Assessment Lab. (LCA Lab) National Metal and Materials Technology Center (MTEC)
15.45 – 16.00	Discussions
16.00	Closing Remarks

附錄 6

韓國於產品環境宣告整合機制與發展簡報



Overall Status and Prospects of Environmental Product Declaration (EPD) in Korea

2017. 10. 20.



Ministry of Environment



Korea Environmental Industry & Technology Institute

Contents

- 1 Introduction of KEITI
- 2 Korea's EPD Scheme
- 3 Operation of the Scheme
- 4 Future Plans



KEITI

1. Introduction of KEITI

1. Introduction of KEITI

History and Vision



History

- July 2005
 Establishment of Korea Institute of Environmental Science and Technology (KIEST)

- September 2005
 Establishment of Korea Eco-products Institute (KOEKO)

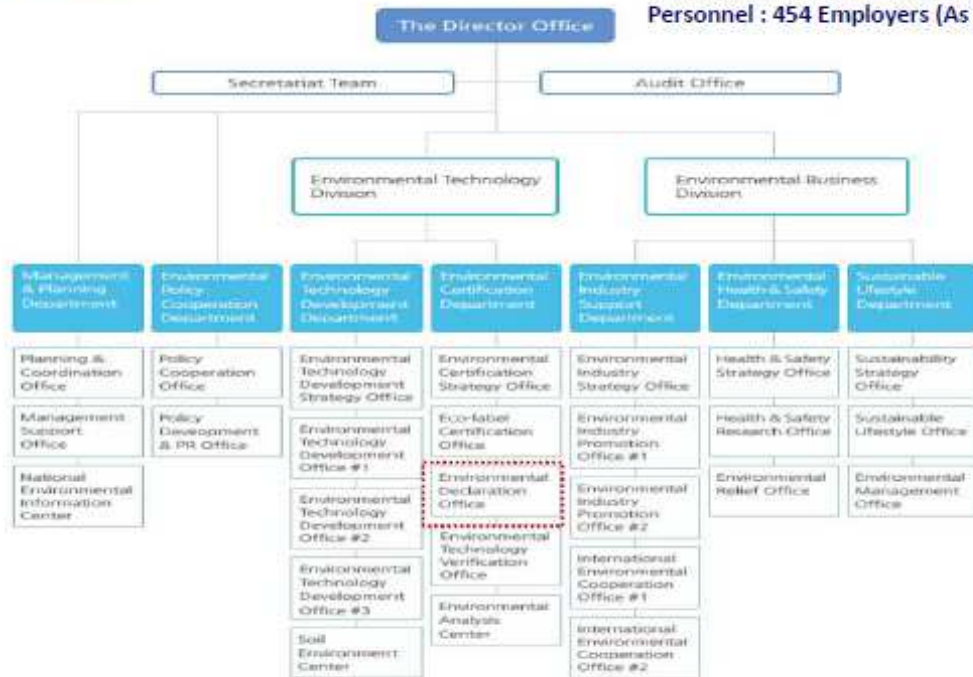
- April 2009
 Establishment of Korea Environmental Industry and Technology Institute(KEITI)
 (Merger between KIEST and KOECO)



1. Introduction of KEITI

Organization

7 Departments : 24 Offices and 5 Centers
 Personnel : 454 Employers (As of June, 2017)



1. Introduction of KEITI

Development during last three years



Environment-Certification

- Eco-Label
Less pollution or using less resources in the production
- EPD
The environment information resulted from the life cycle assessment
- G-SEED
The environmental performance of buildings by evaluating various factors of environmental impact
- NET&ETV
New and superior technology by evaluating environmental technology



2. Korea's EPD Scheme

2.1 Overview

EPD (Environmental Product Declaration)

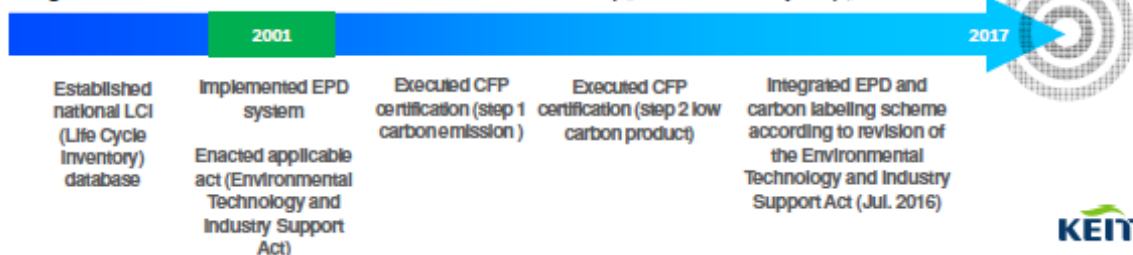
Measuring and displaying information on environmental performance (environmental impact) generated during lifecycle of a product (including service), such as from acquisition of the raw materials to production, distribution, use and disposal

※ 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



2.2 Background of Integrated Scheme

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Background

- (Korea) Decided integration of carbon footprint labeling with EPD scheme according to government policy (June, 2016)
 - 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) EU : "Single Market for Green Products Initiative" announced, Product Environmental Footprint (PEF) ※recommended (May , 2013), systemization promoted until 2020
 - ※ PEF refers to life cycle environmental impact of products and services calculated according to PEFCRs* (Product Environmental Footprint Category Rules).
- Japan: integration of EcoLeaf (type III environmental declaration) and CFP(carbon footprint of products) Program in a new framework (April, 2017)
 - New framework will be titled "The JEMAI Environmental Label Programme"

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2.3 Revision of Related Laws

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Revision

- 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

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2.4 Status of integrated EPD scheme

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Diversifying the display methods of information on environmental performance

- Introduction of new information on environmental performance

- **Water footprint**, eco toxicity, human toxicity, biodiversity

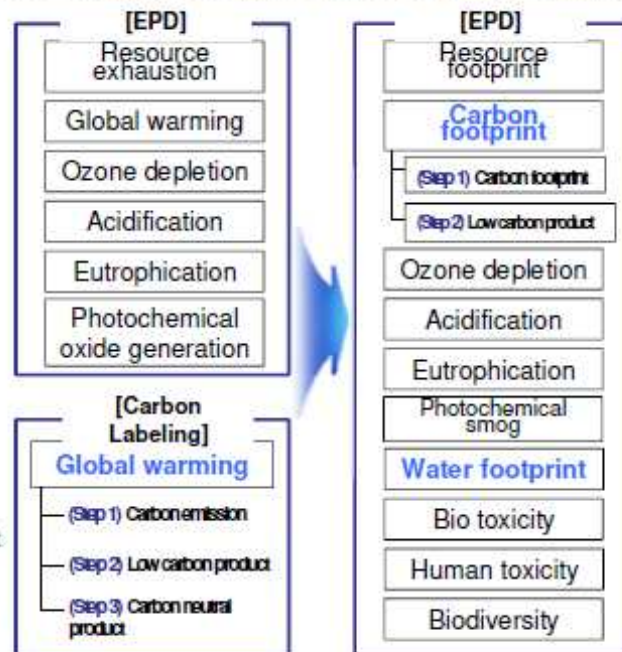
- Scheme improvement

- 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)**



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2.4 Status of integrated EPD scheme

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Introducing new information on environmental performance

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

※ Redefined through references to Guideline for the EPD and overseas impact assessment methodologies, such as CML and R. KEITI

2.4 Status of integrated EPD scheme

Case of EPD certified product



- Product Model: Color Laser Copier (MultiXpress X7600GX)
- Certification No. : 2017-003
- Product Category: Laser copier
- Valid: Feb 23, 2017 – Feb 22, 2020
- Certified by: KEITI



Life cycle stages

Impact category (Unit)	Raw material	manufacturing and production	Use	Disposal	Total
Resource Footprint (Kg Sb-eq)	3.58E+00	4.10E-01	1.02E+02	3.98E+00	1.10E+02
Carbon Footprint(Kg CO ₂ -eq)	5.74E+02	6.69E+01	1.52E+04	2.80E+03	1.87E+04
Ozone layer Depletion (Kg CFC11-eq)	4.47E-05	3.58E-06	4.12E-03	8.00E-05	4.24E-03
Acidification (Kg SO ₂ -eq)	1.69E+00	6.11E-01	6.10E+01	5.68E+00	6.90E+01
Eutrophication (Kg PO ₄ ³⁻ -eq)	6.64E-01	5.74E-02	1.22E+01	8.33E+00	2.12E+01
Photochemical smog(Kg C ₂ H ₄ -eq)	5.83E-01	4.51E-02	2.74E+01	1.78E+00	2.98E+01

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2.4 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.



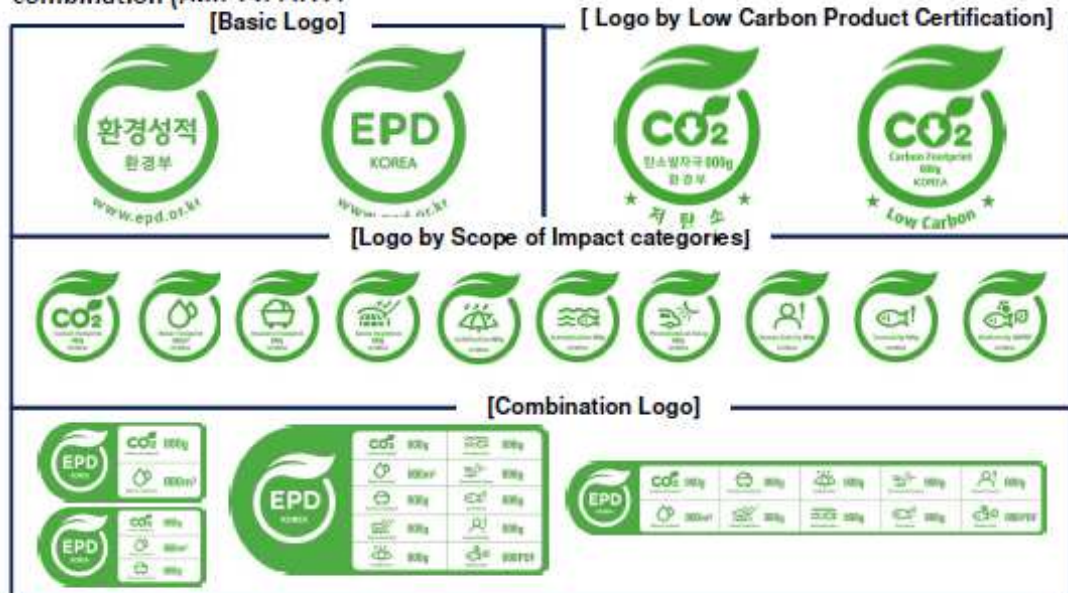
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2.4 Status of integrated EPD scheme

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Improving the display method of information on environmental performance

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



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2.5 National LCI DB

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History of Korea LCI DB development

- ME (Ministry of Environment) and MOTIE (Ministry of Trade, Industry and Energy) have been developing LCI DB jointly since 1998.
 - 330 LCI DB modules were developed from 1999 to 2017 from MoE
 - 240 LCI DB modules were developed from 1999 to 2011 from MoTIE

LCI DB developed by other ministry

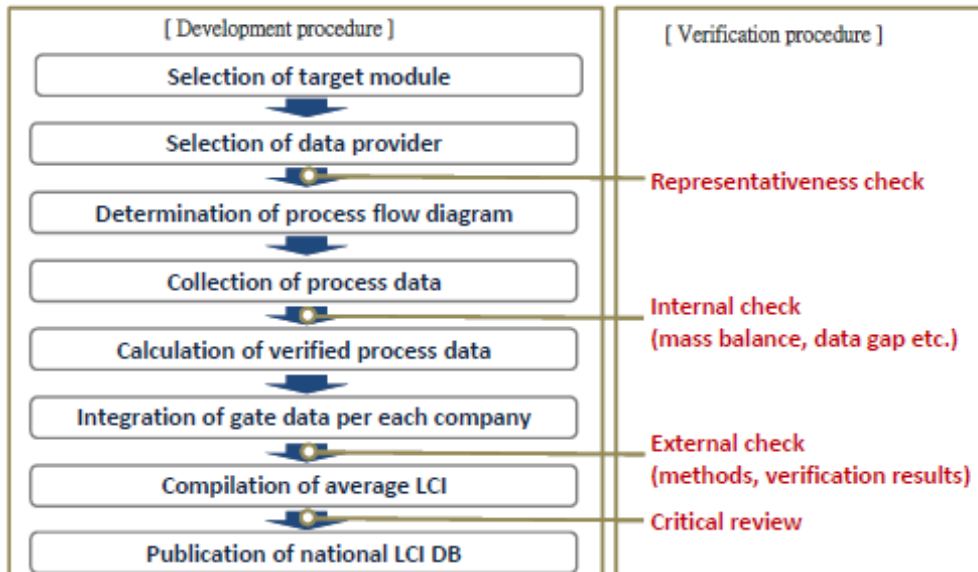
- MOLIT (Ministry of Land, Infrastructure and Transport)
 - 69 LCI DB modules were developed from 2005 to 2017 for building material
 - 40 LCI DB modules are renewing from 2012 ~
- MOAFRA (Ministry of Agriculture, Food and Rural Affairs)
 - 76 LCI DB modules were developed from 2008 to 2012 for agriculture
 - 46 LCI DB modules were developed from 2010 to 2012 for livestock

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2.5 National LCI DB

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Development and Verification Procedure



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2.5 National LCI DB

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Target module

- New development
 - Demand research for company which got certification
 - Case survey for foreign country DB is used because of lack of national data
- Revision
 - The module which is developed more than 5 years ago
 - The module which have significant technical change

Selection of data provider

- over than 50% of market share for representativeness

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2.5 National LCI DB

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Data Quality

- Primary(on-site) data for 1 year at least should be collected.

	Up stream & down stream	Manufacturing
Time related coverage	Within the past 5 years	Within the past 1 year
Geographical coverage	Local or national generic data	On-site
Technical coverage	-	Best Available Technology

- Priority of general data
 - National LCI DB
 - Industry average data (e.g. APME, IISI, etc)
 - Other general data (e.g. DB installed in S/W, eco-invent, etc)

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2.5 National LCI DB

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LCI DB Publication

The screenshot shows the 'Korea LCI Database Information Network' website. It features a navigation menu, a main heading, and a detailed table titled 'List of Korea LCI database'. The table is organized into two columns: 'Pre-manufacturing Stage' and 'Manufacturing Stage', each with sub-columns for 'Life Cycle Stage', 'Data Category', and 'Number of Data'.

Life Cycle Stage	Data Category	Number of Data	Life Cycle Stage	Data Category	Number of Data
Pre-manufacturing Stage	Building Material	23	Manufacturing Stage	Metal Processing	12
	Rubber	23		Component Processing	0
	Wool	23		Plastic Processing	22
	Rubber Component	23		Others	0
	Basic Chemical	23		Land Transport	10
	Water Treatment	11		Air Transport	1
Pre-manufacturing Stage	Storage	0	Transportation Stage	Sea Transport	10
	Paper & Paper	0		Others	0
	Plastic	23		Land	0
	Others	11		Waterway	10
			End-of-life Stage	Recycling	10
Total		241		Others	1

MOEC: Ministry of Commerce, Industry and Energy.
MOEL: Korea Eco-Labeling Center.

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3. Operation of the scheme



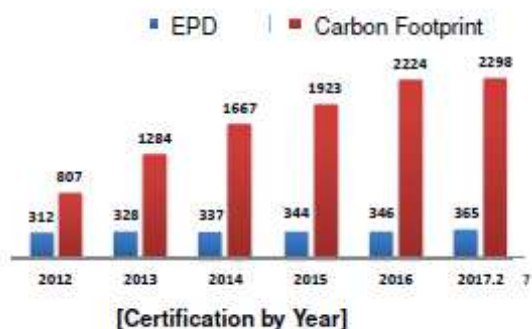
3.1 Certification Status and Recognition

Number of EPD products

- 2,663 products of 272 companies certified (accumulated, as of July, 2017)
 - EPD: 365 products
 - Carbon Footprint: 2,298 products, established as a key of climate change certification in Korea (Carbon Emission: 1,863 products of 259 companies/ Low Carbon Product: 435 products of 43 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**



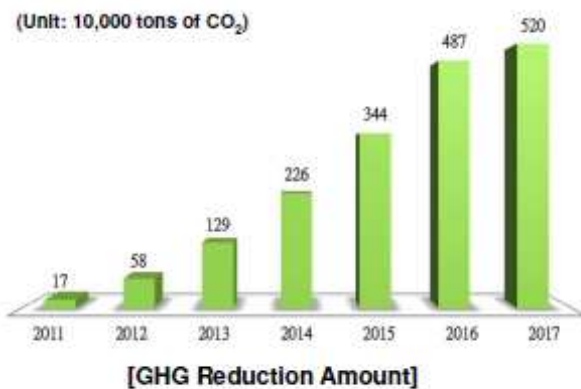
3.2 GHG Reduction Effect

Reducing greenhouse gas by 5.2 million tons (CO₂_eq) through low carbon product certification

(435 products (accumulated) as of July, 2017)

- **(Human Activities)** Greenhouse gas emitted by 380,000 people in Korea (13.8 tons of CO₂/ person) (National Greenhouse Gas Inventory Report 2014)
- **(Forestation Effect)** Equivalent to planting 790 million of 30-year-old pine trees (6.6kg of CO₂/ year/ tree)
- **(Passenger Cars)** Greenhouse gas emitted by 2.17 million cars a year

(Unit: 10,000 tons of CO₂)



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

[Forestation Effect]



3.3 Expansion of Certification Support

Giving additional points to green building certification assessment

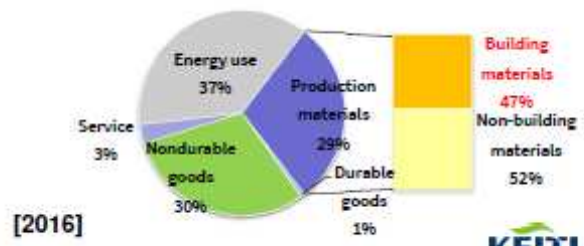
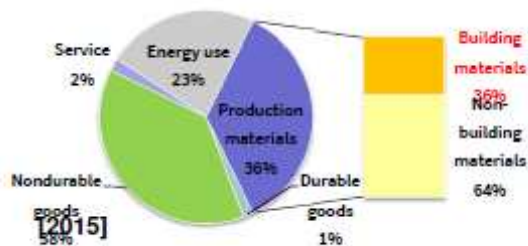
Give additional points when EPD certified building materials are used

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



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%



3.3 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)



3.3 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)

- Target items which are applicable for environmental superiority criteria of comprehensive bidding system in PPS : 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%)	



3.3 Expansion of Certification Support

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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

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)

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3.3 Expansion of Certification Support

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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

Applying to exemption from overhead expenses out 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)

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3.3 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] KEITI



[University Students' Supporters Campaign]



[Business Agreement for Environmental Olympic Games]

3.3 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)]



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



[Green Future Science Hall, Gimcheon (2015)]



[Climate Change Experience Center, Gimhae (2015)]

Distributing leaflets, information book and USB for EPD certified products



[Carbon Footprint P.R. Leaflet]



[Information Book on Certified Products]



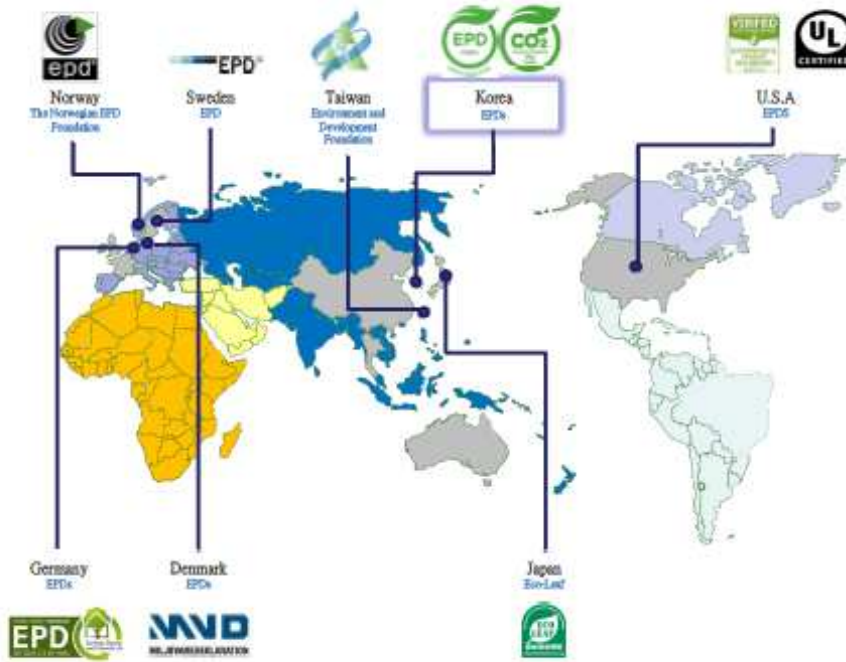
[Carbon Footprint P.R. Video]



[Carbon Footprint P.R. USB] KEITI

3.4 International Cooperation

8 Countries in the world have EPD Scheme



3.4 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 16 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:Hongkong/2016:China)
 - Set carbon footprint goals in Asia areas and identify detailed of cooperation



3.4 International Cooperation

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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 standards for 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)



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3.4 International Cooperation

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Developing common footprinting framework and providing other supports for international cooperation

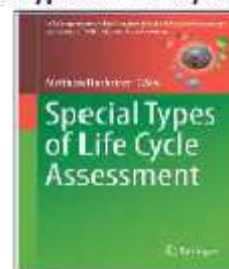
Developing common product carbon footprinting framework for Asia based on the concept of "sharing, bridging and changing"

- 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 scheme by country, derivation of promotional strategies for common framework development

Korean carbon footprint scheme introduced in 「Special Types of Life Cycle Assessment」



<Report on Common Product Carbon Footprinting Framework for Asia>



<Special Types of Life Cycle Assessment>

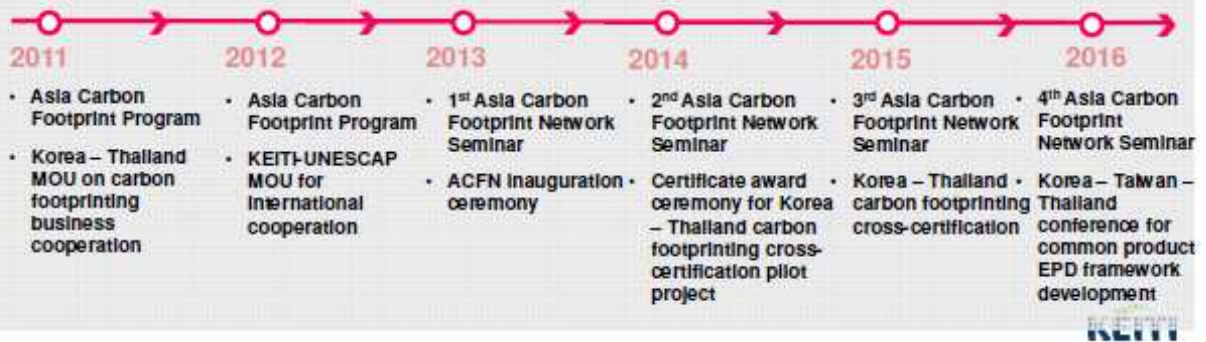
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3.4 International Cooperation

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>



4. Future Plans



4.1 Future Plans

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Strengthening basis of the integrated EPD

- **Update the methodology of product environmental impact assessment by scope of impact categories**
 - Reexamine carbon reduction rate 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 → Field application and pilot project
- **Publish and distribute 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

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4.1 Future Plans

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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

Spreading certification scheme across the world

- **Spreading carbon footprint scheme in partnership with UNESCAP**
- **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
- **Operating low-carbon practice program and exhibition to host eco-friendly Winter Olympic Games(Feb. 2018, PyeongChang)**

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Communicate with EPD!

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Thank you!

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