附件一

「城市清潔空氣夥伴工作坊」、環保署空氣品質保護及噪音管制處與我國縣市政府及地方環保機關參與情形

「城市清潔空氣夥伴工作坊」、環保署空氣品質保護及噪音管制處與我國縣市政府及地方環保機關參與情形

壹、摘要

本署與美國環保署及亞洲清潔空氣中心（Clean Air Asia，CAA）共同策劃本（104）年度「國際環境夥伴會議『城市清潔空氣夥伴工作坊（Cities Clean Air Partnership Workshop）』」，活動時間自 104 年 8 月 10 日至 12 日，共計 3 天，活動地點為美國華盛頓特區（Washington，D.C.）。本次工作坊係以「城市層級（city level）」為核心組成，邀集東南亞及美國城市，探討城市認證（city certification）、城市合作（city to city cooperation）及夥伴關係（city partnering）、網路資訊平台與專家資料庫（knowledge platform & expert database）等，對於我國推廣「城市清潔空氣夥伴計畫」之貢獻，促使亞太區域空氣污染減少與空氣品質改善頗有助益。活動參與者包含各國城市代表及專家外，也邀請我國臺北市政府環保局、臺中市政府環保局、高雄市政府環保局代表參與，在此建立聯繫網絡，相互學習並分享經驗，進行空氣品質管理學習及經驗交流。

本活動係 2015 年「城市清潔空氣夥伴計畫（Cities Clean Air Partnership，簡稱 CCAP）」相關活動，我國代表團由魏署長國彥擔任團長，率領本署同仁、臺北市、臺中市及高雄市等地方環保局同仁以及技術顧問機構人員，參與該研討會。

本次出國計畫主要參與活動涵蓋：國際環境夥伴計畫會議、城市清潔空氣夥伴工作坊、夥伴城市宣誓活動、我國城市管理經驗之成果發表（臺中市改善空氣品質之策略及挑戰、臺北市自行車系統）、圓桌會議、臺美與亞洲空氣清潔中心代表會談、雙橡園晚宴及署長晚宴等。藉此，利用參與該工作坊契機，分享我國自身成功的環境保護經驗及吸取空氣品質管理技術新知外，亦與美國環保署及亞洲空氣清潔中心（Clean Air Asia，以下簡稱 CAA）夥伴團體間彼此協商與討論，建立合作默契，奠定未來執行城市清潔空氣夥伴計畫之基礎。

貳、目的

我國代表團自 104 年 8 月 10 日至 12 日赴美國華盛頓特區(Washington, D.C.)參與「城市清潔空氣夥伴工作坊（Cities Clean Air Partnership Workshop）」，該活動係由本署、美國環保署（USEPA）、亞洲空氣清潔中心（CAA）等三方共同主辦。本次工作坊係以「城市層級（city level）」為核心組成，邀集東南亞及美國城市，探討城市認證（city certification）、城市合作（city to city cooperation）及夥伴關係（city partnering）、網路資訊平台與專家資料庫（knowledge platform & expert database）等，對於我國推廣「城市清潔空氣夥伴計畫」之貢獻，促使亞太區域空氣污染減少與空氣品質改善頗有助益。活動參與者包含各國城市代表及專家外，也邀請我國臺北市政府環保局、臺中市政府環保局、高雄市政府環保局代表參與，在此建立聯繫網絡，相互學習並分享經驗，進行空氣品質管理學習及經驗交流。

本活動係 2015 年「城市清潔空氣夥伴計畫（Cities Clean Air Partnership）」相關活動，城市與城市間彼此協商與討論，建立合作默契，將有助於推動國際相關業務之發展，奠定未來計畫執行之基礎。此外，我國代表團邀集本署同仁、地方環保機關及技術顧問機構人員組團參加，透過會議討論交流，吸取空氣品質管理技術新知及尋求國際合作契機。另外，透過本次活動，與外國城市進行晤談及交流，拓展我國夥伴國家之範疇，達成國際環境夥伴計畫成立之目的。

參、代表人員

本次赴美國華盛頓特區（Washington，D.C.）參與「城市清潔空氣夥伴工作坊（Cities Clean Air Partnership Workshop）」代表如下：

服務單位		姓名	職稱
行政院環保署	空氣品質保護及噪音管制處	陳秋幸	環境技術師
		楊佳樺	約聘人員
縣市政府及地方環保機關	臺北市環保局	邱國書	主任
	臺中市政府	郭坤明	副秘書長
	臺中市環保局	陳忠義	科長
	高雄市環保局	楊宏文	簡任技正

肆、行程

本次赴美國華盛頓特區（Washington，D.C.）出國行程為 104 年 8 月 8 日至 8 月 15 日，共計 8 日，其中 8 月 10 至 12 日為工作坊議程，本次出國計畫主要參與活動涵蓋：國際環境夥伴計畫會議、城市清潔空氣夥伴工作坊、夥伴城市宣誓活動、我國城市管理經驗之成果發表（臺中市改善空氣品質之策略及挑戰、臺北市自行車系統）、圓桌會議等。另本署空保處及永續室代表於 104 年 8 月 13 日，與美國環保署代表、亞洲空氣清潔中心成員、美國認證專家，共同討論城市清潔空氣夥伴計畫之工作項目及合作目標。

伍、工作內容摘要

一、城市清潔空氣夥伴工作坊

本年度「城市清潔空氣夥伴計畫（Cities Clean Air Partnership）」三大目標，係發展城市認證、與各國城市建立夥伴關係及建立網路資訊平台，促使亞太區域空氣污染減少與空氣品質改善。本次「城市清潔空氣夥伴工作坊」旨向城市代表們推廣城市認證、夥伴關係及網路資訊平台，透過城市與城市之間溝通及研商，發展出城市未來的合作方式。該活動係由本署永續發展室劉執秘宗勇、美國環保署資深顧問 Mark Kasman、亞洲清潔空氣中心執行長 Mr. Bjarne Pedersen 進行開幕致詞，如下圖所示，本署永續室劉執秘宗勇 (左上)，美國環保署資深顧問 Mark Kasman(右上)，CAA 執行長(左下)，說明 CCAP 計畫之未來發展之方向以城市合作之重要性。現場另邀請臺中市、泰國曼谷、新加坡及日本橫濱市之針對「空氣品質改善策略之挑戰」之課題，進行分享。其他重要活動包含夥伴城市宣誓活動、我國城市管理經驗之成果發表、圓桌會議及雙橡園晚宴及署長晚宴，重點說明如下：

城市清潔空氣夥伴工作坊開幕代表致詞及與會概況

(一)夥伴城市宣誓活動（City-to-City Cooperation and City Partnering）

本次活動邀集來自日本、新加坡、泰國、印度、印尼、越南、尼泊爾、緬甸、柬埔寨、蒙古、美國等國家之城市代表們一同參與，共計 22 個城市代表參加，另我國臺北市、臺中市及高雄市亦受邀參與。

城市清潔空氣夥伴工作坊邀請城市名單

NO.	國家別	城市名單	NO.	國家別	城市名單
1	柬埔寨	Siem Reap	12	菲律賓	Baguio
2	印度	Shimla	13	菲律賓	Iloilo
3	印度	Cochin	14	新加坡	Singapore
4	印尼	Malang	15	泰國	Bangkok
5	印尼	Jakarta	16	越南	Haiphong
6	印尼	Yogyakarta	17	越南	Da Lat
7	日本	Kitakyushu	18	美國	San Diego
8	日本	Yokohama	19	美國	San Jose
9	蒙古	Ulaanbaatar	20	臺灣	臺北市
10	尼泊爾	Kathmandu	21	臺灣	臺中市
11	菲律賓	Pasig	22	臺灣	高雄市

本次會議促成 4 對城市配對，包括日本北九州市（Kitakyushu）及菲律賓海防市（Haiphong），臺中市及美國聖荷西市（San Jose），臺北市及菲律賓帕希格市（Pasig），泰國曼谷市（Bangkok）及美國聖地牙哥市（San Diego）。

我國臺北市、臺中市二個縣市，分別與菲律賓帕西格市（Pasig City）與美國聖荷西市（San Jose）市進行配對，且泰國曼谷、越南海防市亦與美國聖地牙哥（San Diego）及日本北九州市（Kitakyushu City）進行配對，說明如下：

1. 臺北市因施行 YouBike 制度成功，菲律賓帕西格市（Pasig City）欲想推廣公共自行車，故臺北市與菲律賓帕西格市（Pasig City）配對為城市合作對象，合作主題係「公共腳踏車系統」。
2. 臺中市因工業蓬勃發展而著名，而美國聖荷西市（San Jose）亦具有強大的工業基礎，且美國聖荷西市具地緣之利，靠近美國環境保護

署第 9 分署，因該團隊能提供技術相關協助，故美國環保署推薦臺中市與美國聖荷西市（San Jose）配對為城市合作對象，合作主題尚未決定，有賴後續研商。

3. 越南海防市（Haiphong City）與日本北九州市（Kitakyushu City），以綠色港口為城市合作主題。
4. 泰國曼谷與美國聖地牙哥（San Diego）雖為配對組合，但未選定城市合作主題。

城市合作及交流係以彈性、彼此有意願方式進行，城市配對結果只是開端，有關後續合作事宜，有賴後續研商討論。

四對城市配對結果
資料來源：亞洲清潔空氣中心官網

(二) 我國城市管理經驗之成果發表

1. 臺中市改善空氣品質之策略及挑戰

(1) 臺中市環境負荷及空氣品質

i. 臺中市環境負荷簡介，包含：

人口、土地面積、工廠數、機車數、營建工地數、廟宇數等。

ii. 臺中市空品現況：

說明臺中市空氣污染物濃度自 93 年自以來，整體趨勢微下降情形，惟 $PM_{2.5}$ 在 103 年的平均值為 26.98 $\mu g/m^3$，雖為歷年最低，然而離空氣品質目標 15 $\mu g/m^3$，仍有一段要努力的空間。

(2) 臺中市空氣污染管制策略措施

目前臺中市環保局針對固定源、移動源、逸散源等污染來源，皆有相關管制措施，分別為：

i. 固定源：加嚴電力業標準、加嚴鋼鐵業標準、訂定固體燃料鍋爐空氣污染物加嚴排放標準、臺中市溫室氣體排放源管理及減量辦法。

ii. 移動源：青白煙管制、二行程機車汰舊、柴油車加裝濾煙器、低污染車輛推動。

iii. 逸散源：營建工地管制、餐飲業改善、露天燃燒防制及降低河川、道路揚塵。

檢視其固定源的管制措施，以加嚴排放標準（電力業、鋼鐵業及固體燃料之鍋爐）為主要方式。另臺中市溫室氣體排放源管理及減量辦法(草案)，如「總量管制」，將能有效管制臺中電廠及中龍鋼鐵等主要之兩大污染來源。

(3) 生煤管制及臺中港區域管理

檢視 $PM_{2.5}$ 來源可以分為移動源、固定源、逸散源 3 種，固定污染源中以電力業、鋼鐵業及食品業最多。移動污染源以柴油大貨車、汽車及二行程機車為主。逸散源以建築施工、車行揚塵及餐飲業為主。其排放量分別為：

i. 固定源 3,532 噸/年，其中 2,351 噸/年來自燃煤污染源，占固定源總量 66.6%。

ii. 移動污染源 2,228 噸/年，其中柴油大貨車排放量 1,089 噸/年，占移動污染源總量 53%。

iii. 逸散源 3,334 噸/年，以建築施工最高，排放量為 754 噸/年。

(4) 中南部六縣市共同宣誓禁用生煤及石油焦

雲林縣於 104 年 4 月 14 日舉辦「雲林縣工商廠場禁止使用生煤及石油焦自治條例」，並邀請中南部六縣市一同宣誓禁燒生煤及石油焦。

由於我國空污法係對煙囪及車輛排氣等，訂定排放標準之管末管制方式，但長期且大量排放仍對環境造成嚴重負荷，因此對於現有空氣品質改善策略來說，仍需從使用的燃料（源頭）進行管制才有明顯效果。臺中市環保局修訂自治法規，則藉由多管齊下之管制方式來達到管制目標。

(5) 加嚴標準推動經驗

i.於 89 年訂定臺中市電力設施及鋼鐵業加嚴標準，排放標準施行後減量成效顯著，為有效之管制方案。

ii.於 101 年再度修正公告臺中市電力設施及鋼鐵業加嚴標準，104 年再修訂加嚴標準、制定管制生煤自治條例，並依發展低碳城市自治條例規定要求提送自主管理計畫，促請積極規劃改用燃氣機組。

iii.燃煤鍋爐部份

新燃煤鍋爐 → 不再核可，既存燃煤鍋爐 → 汽電共生鍋爐/固體燃料則自 107/1/1 適用新設污染源標準，全面改用燃氣鍋爐。

iv.堆煤場自 107/12/31 日起全面採室內堆置

v.重金屬因對人體危害極高，因此要求不得檢出

(6) 臺中港區總量管制

i.加強臺中電廠管制與提高稽核頻率。

ii.區域管理：以臺中電廠及中龍全廠許可總量控管經驗，推動港區排放量管理，包括訂定基準年排放量（101 年），並執行排放量動態管理。

圖係臺中市政府代表郭副秘書長坤明於會中發表臺中市空氣改善策略治理概況。另有新加坡及泰國曼谷代表，就同樣主題進行發表。

2. 臺北市公共自行車系統

(1) 臺北市現況簡介：

i.臺北市基本資料簡介（面積、人口、車輛登記數等）

ii.捷運及臺北市公車簡介

iii.臺北市機車數量說明

(2) 2013 年臺北市運輸比例說明

i.2013 年大眾運輸佔 57%（自行車 5.2%），期望目標年(2020 年)達 70%以上(自行車 12%)。

ii.YouBike 拓展期望：從 2008 年的 11 站拓展到 2014 年能達到 400 站。

(3) 運輸策略運用

i.過去主要以汽車、機車為主，增加停車費來限制。

由於私用小汽車的成長遠比公共道路建設的速度快，道路面積的增建不能改善塞車問題。更何況大多數的私用車輛都只有一個人卻佔用了擁擠的公共道路。塞車無解，如何改善？鼓勵民眾盡量利用大眾運輸及公共汽車等大眾運輸系統。

ii.大眾捷運系統之最後一哩路，則以 YouBike 建置來達成。

步行太遠，搭車太近的尷尬距離，藉由 YouBike 自行車的建置加上甲地借車乙地還、智慧租借(使用悠遊卡、信用卡及手機)等便利方式，不但可以提升市容景觀(減少擁擠、停車亂象)，亦能實現節能減碳、改善身心健康、促進社會祥和，更可提升城市形象。

(4) 臺北市公共自行車建置歷史簡介

i.第一代公共自行車(1997 年)

早在 1997 年，臺北市就開始籌建公共自行車系統，以大安森林公園為試辦點，捷安特捐出 1,000 台自行車供市民租用。但結果被「自行車遺失」和「不良的維護」兩大原因而導致推廣失敗。

ii.第二代公共自行車(2001 年)

在 2001 年，臺北市建立長達 112 公里的沿河綠道，使得沿河騎車在市民當中變得非常受歡迎。

iii.第三代公共自行車(2009 年)

臺北市政府思考除了於觀光地點辦理是不夠的，更應該使其為市區市民民的日常交通工具。於是在臺北市信義區選為試辦地點，建置了 11 個自行車租賃站，共投入 500 台公共自行車，組成一個位於市中心的公共自行車系統。然而因為有限的覆蓋率，繁瑣的註冊程

序和不便宜的費率，於營運 3 年後也因遺失大量單車和流失用戶為結局。

iv. 第四代公共自行車(2012 年)

臺北市公共自行車進行一重大工程。導入新一代公共自行車租賃系統，除了租賃更便利之外（可夠透過手機、捷運卡及信用卡進行租借），亦將租賃範圍擴大從信義區擴散到全臺北市，而費用亦進行調整（取消年費），更換了新版自行車，提高其舒適性、安全性。結果經過 2 年營運，新公共自行車租賃系統之每月月租用量高達 200 萬次。

(5) 結論

i. 成功關鍵

- 擴大建置：租賃站數增加：11 站→195 站，
- 服務範圍加大：信義區→全市
- 簡化認證：降低門檻：雙證件→手機，多卡使用：1 卡→5 卡
- 低廉費率：費率結構：多元→單一，30 分鐘免費：所有會員

ii. 提升綠色交通

- 1990 年私人運具佔 60%，期望在 2020 年大眾運輸達 70%。

iii. 公共自行車系統於臺灣蓬勃發展

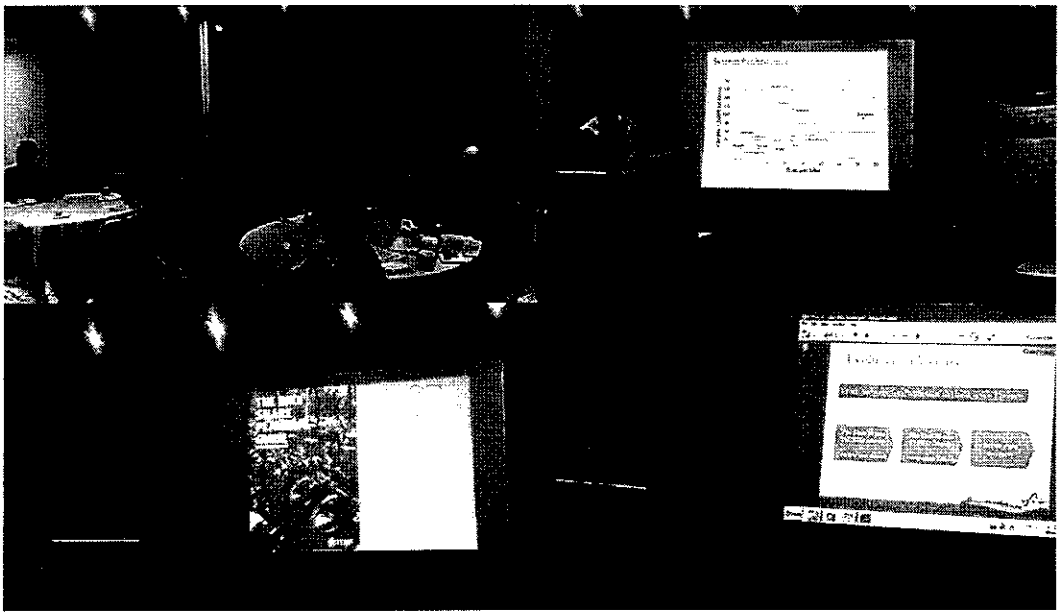
- 新北市、桃園市、新竹市、臺中市、彰化縣、屏東縣均以 YouBike 系統來進行建置。

iv. 創建自行車多樣性文化

v. 臺北市景觀改變

vi. 從補貼晉升為收支平衡

圖為臺北市環保局邱國書主任及 Jacob Mason，Institute for Transportation & Development Policy 進行簡報，另臺中市郭副秘書長坤明在場主持該會議。



城市代表簡報概況

(三)圓桌會議(Roundtable Discussion)

圓桌會議活動方式係以「城市別（city level）」隨機分組，進行討論，共分為 4 組，討論主題係以「城市認證」為主，議題如下：

1. 認證系統如何幫助您的城市空氣品質?（How could the certification program help your city's air quality program? ）
2. 哪些因素將會影響您們的行政作業，使其獲得認證?（What factors will determine whether your administration will seek to get certified? ）
3. 哪些組成及準則是您們認為最重要且有效地幫助改善空氣品質?（What elements and criteria do you think will be most important and effective in helping improve air quality in the simplest and most efficient? ）
4. 其他關切的議題?（What if any concerns do you have?）

有鑑於本年度「城市清潔空氣夥伴計畫」工作目標係完成「城市認證」規範，並建立相關制度，期望能於明年度推廣，因此需採納各個城市意見，圖 6.2.7 為圓桌會議四組發表城市認證相關意見，供現場來賓參酌。本次圓桌會議重點摘錄如下：

1. 城市認證如一股驅動力，促使城市們及有關當局著手進行更好空氣品質之工作。此外，城市認證提供一個鼓勵管道，參與認證的城市能透過該管道，獲得足夠資金及資源，實施認證系統。
2. 城市認證係一種覺醒（Awareness），促使社會大眾關切自身國家的空氣品質，甚至國際的空氣品質，提供給下一代良好可居住的遺產。
3. 參與城市認證的城市，有機會在國際間留名，提高國際聲望，進而帶動觀光產業。
4. 資金、資源及政策決定將會影響城市認證之行政程序。
5. 實施城市認證應以空氣污染較為嚴重的城市為主。
6. 實施城市認證將有助於提升清潔技術相關產業，並獲得相關清潔工業的認可及支持。
7. 有關城市認證所使用的規範（criteria）需因地制宜外，建議每個階段需設置不同標準，促使城市們朝往更好方向進行。另該認證需長期推動才有可能發揮成效，因此是否有足夠的資金及資源的投入，係城市們所關切的議題之一。

分組發表概況

圓桌會議會後各個城市代表先後上台頒獎，彼此都有共通認知，為後續城市合作案，奠定發展基礎。

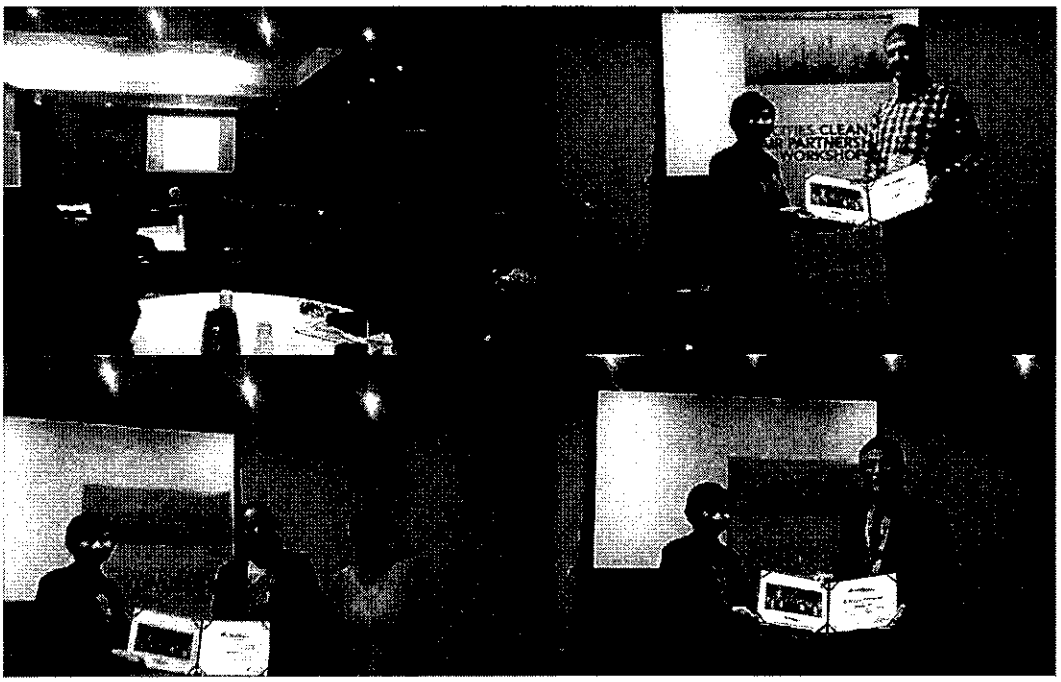


圖 6.2.8 會後頒獎

圖 6.2.9 會後大合照
資料來源：亞洲清潔空氣中心官網

二、臺美與 CAA 代表會談

本署受美國環保署及亞洲空氣清潔中心邀請，於 104 年 8 月 13 日共同進行「城市清潔空氣夥伴（CCAP）」工作會議，討論本年度 CCAP 計畫執行內容，會談重點如下：

(一)參與 CCAP 計畫的城市們，未來可能受自身國家政治高度關切，同時也需要政府支持，CCAP 計畫可能同時兼具地區性及國家層級之考量，因此該計畫之設計須有配套措施，以應變未來可能出現的問題。

(二)「公眾自行車系統」議題在本次活動廣受好評，未來希望透過廠商協助推廣該課題。另臺北市政府明（2016）年度 2 月底將舉辦「全球自行車城市大會」，係望藉由 CCAP 計畫，廣邀世界各地的城市共襄盛舉，俾利於推廣公共腳踏車。

(三)有鑑於城市發展程度不一，因此建立空氣污染排放清冊係屬重要事項。

(四)有關城市合作(C^3)議題：

1. 新加坡對於綠色港口議題具有極大興趣，希望透過該計畫，成為城市合作(C^3)夥伴之一。
2. 蒙古烏蘭巴托（Ulaanbaatar）受限於語言因素，需 CAA 協助溝通及協調城市合作相關事宜。
3. 美國蓋瑟斯堡(Gaithersburg)有興趣合作議題是森林火災（forest fire）議題，希望可以跟新加坡及馬來西亞成為配對城市。
4. 陸續追蹤美國聖地牙哥(San Diego)、聖荷西(San Jose)及奧斯丁(Austin)合作議題。

(五)有關未來計畫推廣「城市認證」， 美方與 CAA 期待我國能夠提供專家學者及相關技術，協助其他國家推動認證制度，規劃我國政府、學界或技術機構成為核心諮詢單位之一。另可透過我國地方城市參與，利用 CCAP 成為夥伴城市，無論是在國際交流及環境領域上之國際能見度亦有幫助。

陸、心得與建議

一、「城市清潔空氣夥伴工作坊」係亞太地區空氣污染防制工作之交流平台，對於國家與國家間，城市與城市間，實為一個促進國家或城市間之交流機會，本次活動參與，除能分享我國自身成功的環境保護經驗及吸取空氣品質管理技術新知外，亦增加我國環保機關於國際間環境保護能見度。

二、透過該活動設計，本署與美國環保署及 CAA 夥伴團體間彼此協商與討論，共同確定計畫內容與目標，建立合作默契，實有助於推動國際相關業務之發展，並奠定未來計畫執行之基礎。

三、透過夥伴城市宣誓活動，促使我國城市（臺北市及臺中市）與外國城市配對，促成跨國性城市合作。城市配對結果只是開端，如何達到永續經營，將臺灣城市特色推廣至國際間，乃需深思，相關合作事宜，有賴後續研商討論。

四、本年度「城市清潔空氣夥伴計畫（Cities Clean Air Partnership，CCAP）」三大目標，係發展「城市認證（City Certification）」、與各國城市建立夥伴關係（City partnering）及建立「網路資訊平台（Knowledge platform）」，促使亞太區域空氣污染減少與空氣品質改善。我國參與該計畫角色，主要以提供專家顧問及技術投入為主，進行環保外交。期望未來我國能有越來越多專家學者加入，建立專家平台，協助提供相關專業建議外，我國城市透過該計畫，發揚自身城市更好空氣品質策略，協助東南亞城市參與 CCAP 計畫，俾利本署、美國環保署及 CAA 共同推廣 CCAP。

CITIES CLEAN AIR PARTNERSHIP WORKSHOP

CITIES CLEAN AIR PARTNERSHIP

Air pollution is the world's single largest preventable environmental health risk. The World Health Organization estimates that in 2012, 7 million premature deaths were attributed to air pollution making it responsible for one in eight deaths in the world. Developing Asia is the most affected region, with 3.3 million deaths linked to indoor air pollution and 2.6 million deaths to outdoor air pollution. The good news is – proven solutions and roadmaps exist to significantly improve air quality in cities.

The Cities Clean Air Partnership (CCAP), a Clean Air Asia initiative, is focused on empowering cities to improve air quality year by year and step by step. CCAP works with partners toward the vision of "200 by 2020" - 200 cities, by 2020, as part of the CCAP initiative and on the pathway towards achieving healthier air quality. Through city-to-city cooperation, a voluntary city eco-certification (eco-label), and an experts' network, CCAP will stimulate the mainstreaming of clean air roadmaps and actions in cities. The pilot phase of the city eco-certification is set to be launched in 2016.

The CCAP workshop will start at least 25 cities on the pathway towards achieving better air quality starting with: Baguio, Bangkok, Cochin (Kochi), Colombo, Da Lat, Haiphong, Iloilo, Jakarta, Kaohsiung, Kathmandu, Kitakyushu, Malang, Pasig, Shimla, Siem Reap, Singapore, Taichung, Tainan, Taipei, Taoyuan, Ulaanbaatar, Varanasi, Yogyakarta and Yokohama. The US cities participating in the workshop include: Multnomah County (Oregon), San Diego and San Jose (California), Gaithersburg (Maryland), Delaware Valley Regional Planning Commission and Green Cities California.

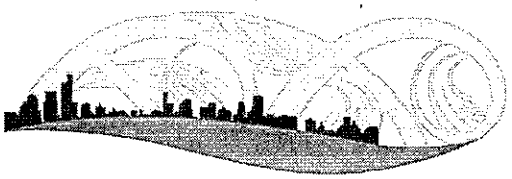
At the CCAP event –

- Cities will be introduced to roadmaps to manage air quality (developing emissions inventories, monitoring and modeling air quality, assessing health and other impacts, action planning, communicating air quality to the public), mitigate and prevent air pollution from transportation, industry and power, indoor and other sources.
- The first set of partnering cities matched through CCAP's city-to-city cooperation (C^3) program will be announced. Potential new partnering of cities will be identified at the event.
- The voluntary city eco-certification system will be introduced to the cities.

The 3-day program is organized by Clean Air Asia and hosted by the International Environmental Partnership. Clean Air Asia is an international NGO established in 2001 by the Asian Development Bank, World Bank and USAID, with the mission to promote better air quality and livable cities by translating knowledge to policies and actions that reduce air pollution and greenhouse gas emissions from transport, energy and other sectors.

For more information, please visit www.cleanairasia.org/ccap.

CITIES CLEAN AIR PARTNERSHIP WORKSHOP



Monday, 10 August 2015, 09:30 - 13:00
PRE-EVENT: FIRST CONFERENCE OF THE INTERNATIONAL ENVIRONMENTAL PARTNERSHIP (IEP)
Venue: Ronald Reagan Building (1300 Pennsylvania Ave NW, Washington DC 20004)

07:50	Bus departs from Washington Hilton. All participants must assemble at the Washington Hilton Lobby ((Terrace Level) by 07:45. Bus will be provided to bring all participants to the meeting venue and will leave promptly at 07:50.
08:20	Bus arrives at Ronald Reagan Building (14th Street entrance). All participants must wear badge and bring passport for security check and building entry procedures.
08:30	Participants proceed to Hemisphere Room A for coffee and breakfast
09:30-11:00	**IEP CONFERENCE OPENING SESSION** **Room: Ronald Reagan Building Hemisphere A**

Come learn about the many exciting programs supported by the International Environmental Partnership such as community-based air quality monitoring for students, the Cities Clean Air Partnership, the Eco-Campus schools partnership program, and other global partnerships targeting international challenges including e-waste, mercury pollution, and climate change.

11:00	**GROUP PHOTO I Venue: Ronald Reagan Building Atrium**
11:10-13:00	**LUNCH I Venue: Ronald Reagan Building Food Court**

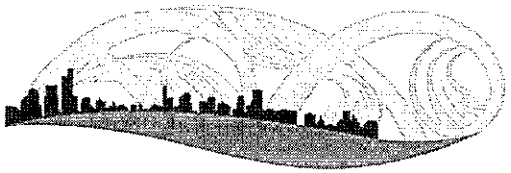
Monday, 10 August 2015, 13:00 - 21:00
CITIES CLEAN AIR PARTNERSHIP WORKSHOP
Venue: Ronald Reagan Building (1300 Pennsylvania Ave NW, Washington DC)
Moderator: Glynda Bathan, Clean Air Asia

13:00-13:30	**WELCOME REMARKS AND INTRODUCTION OF PARTICIPANTS** **Room: Ronald Reagan Building Hemisphere A** - **Mark Kasman**, United States Environmental Protection Agency (US EPA) - **Bjarne Pedersen**, Clean Air Asia - **Tsung-Yung Liu**, Environmental Protection Administration Taiwan (EPAT)
13:30-13:45	**OVERVIEW OF THE 3-DAY PROGRAM by Glynda Bathan, Clean Air Asia** **Room: Ronald Reagan Building Hemisphere A**
13:45-14:30	**FRAMING THE CITIES CLEAN AIR PARTNERSHIP by Mark Kasman, US EPA** **Room: Ronald Reagan Building Hemisphere A**

An introduction to CCAP's mission and vision, the important role that cities play in attaining healthy air quality, and the support available to cities in CCAP: city-to-city cooperation, city certification and knowledge platform

14:30-14:45	**COFFEE BREAK**

CITIES CLEAN AIR PARTNERSHIP WORKSHOP



ROADMAP TO CLEAN AIR IN CITIES 1 I Venue: Ronald Reagan Building
Moderator: Kaye Patdu, Clean Air Asia

14:45-16:00 **CITY PRESENTATIONS ON CHALLENGES AND GOOD PRACTICES IN IMPROVING AIR QUALITY**
Room: Ronald Reagan Building Hemisphere A

Cities speak about why they are participating in CCAP and how they see CCAP helping with their programs.

Siriporn Piyanawin, Bangkok Metropolitan Administration
Bangkok, a rapidly developing city, speaks on how peer-to-peer learning under CCAP would build on the learning gained from its clean air programs.

Kunming Kuo, Taichung City
Taichung, an industrial port city and home to the largest coal-fired power plant in the world, shares how it would like to learn from other cities how to increase public engagement in air pollution issues.

Takashi Kondo, International Affairs Bureau, Yokohama City
Yokohama City emerged from severe industrial air pollution in the 1960s to become a livable city with clean air. It will speak on the importance of sharing good practices with other cities and how CCAP, as a platform for city outreach, could complement the work of city associations it supports (such as CITYNET).

Indrani Rajaram, Pollution Control Department, Singapore
The presentation will delve on Singapore's challenges in achieving clean air quality and how cooperation among cities and countries is important, and how CCAP could potentially help strengthen capacity and cooperation of and among cities.

Open Discussion

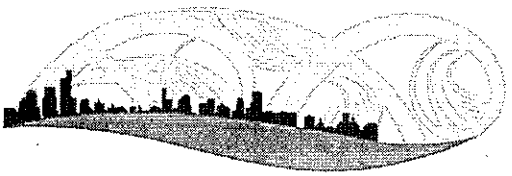
16:00-16:30 **ROADMAP TO CLEAN AIR IN CITIES**
by Gary Haq, Stockholm Environment Institute (SEI)
Room: Ronald Reagan Building Hemisphere A

This presents a bird's eye view of the roadmap to manage air quality in cities (including developing emissions inventories, monitoring and modeling air quality, assessing health and other impacts, action planning, communicating to the public) and to mitigate and prevent air pollution from transportation, industry and power, indoor and other sources in cities or affecting cities. This session serves as a springboard to more in-depth discussions on actions that cities can take to prevent and control emissions from mobile, stationary, indoor and other sources in the parallel sessions on Days 2 and 3.

16:30-17:00 **OPEN FORUM (Questions and Answers)**
WRAP-UP by Glynda Bathan, Clean Air Asia

17:00 Bus will depart from Ronald Reagan Building to Washington Hilton

CITIES CLEAN AIR PARTNERSHIP WORKSHOP



19:00-21:00 **WELCOME BANQUET | Venue: Twin Oaks Estate**
Hosted by the Taipei Economic and Cultural Representative Office in the US
Logistics note: All participants must assemble at the Washington Hilton Lobby by 18:15. Bus will be provided to bring all participants to the dinner venue.

Tuesday, 11 August 2015, 09:00-13:00
Venue: Rachel Carson Great Hall (Green Room), US EPA William Jefferson Clinton South Building (1200 Pennsylvania Ave NW, Washington DC 20460)

07:50 Bus departs from Washington Hilton. All participants must assemble at the Washington Hilton Lobby (Terrace Level) by 07:45. Bus will be provided to bring all participants to the meeting venue and will leave promptly at 07:50.

08:30 Bus arrives at US EPA Building (12th Street entrance). All participants must wear badge and bring passport for security check and building entry procedures. Please refrain from bringing laptops.

INTRODUCTION TO CCAP CITY-TO-CITY COOPERATION (C3) PROGRAM
Moderator: Robert O'Keefe, Clean Air Asia and Dale Evarts, US EPA

09:00-09:10 **WELCOME REMARKS**
by Acting Assistant Administrator Jane Nishida and Senior Advisor for Congressional and International Affairs William Niebling, US EPA

09:10-09:30 **GET INVOLVED: CCAP CITY-TO-CITY COOPERATION (C^3) PROGRAM**
by Glynda Bathan, Clean Air Asia
C^3 is a program of CCAP that promotes city-to-city learning and collaboration to drive measurable results through city-level actions. It is the volunteer "partnering" of cities to work together, exchange information on good practices, and implement innovative solutions to reduce air pollution. Clean Air Asia will introduce the program and speak of the mechanics for joining the program.

09:40-10:00 **CITY-TO-CITY COLLABORATION: KITAKYUSHU-HAIPHONG EXPERIENCE**
by Seiko Kubo, Kitakyushu City and Le Son, Haiphong City
Kitakyushu City speaks about the lessons they learned from addressing industrial air pollution in the 1950s and how they would like to share these with other cities. Haiphong City speaks about how it is working towards becoming a green port city and that it would like to learn from cities such as Kitakyushu.

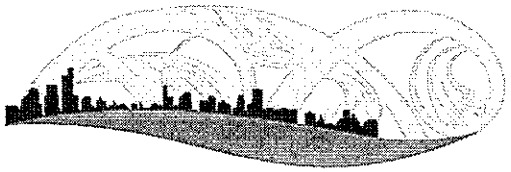
10:00-10:15 **COFFEE BREAK**

CITIES CLEAN AIR PARTNERSHIP CITY-TO-CITY COOPERATION (C3) EVENT
Moderator: Acting Assistant Administrator Jane Nishida, US EPA

10:15-10:20 **Message from the US EPA Administrator Gina McCarthy**

10:20-10:25 **Message from Minister Kuo-Yen Wei of EPAT**

CITIES CLEAN AIR PARTNERSHIP WORKSHOP



10:25-10:35 **Message from Robert O'Keefe, Chair, Clean Air Asia Board of Trustees and Vice-President, Health Effects Institute**
Recognition of CCAP C³ Pilot Cities

10:40-11:00 **GROUP PHOTO**
- CCAP C³ Pilot Cities: San Diego and Bangkok, San Jose and Taichung, Taipei and Pasig, Kitakyushu and Haiphong
- All CCAP city and partner representatives

11:00 Bus departs from US EPA to Washington Hilton

11:30-13:00 **LUNCH | Washington Hilton Gunston Room (Terrace Level)**

Tuesday, 11 August 2015 13:00-17:00 ROADMAP TO CLEAN AIR IN CITIES 2
Venue: Washington Hilton [Terrace Level] (1919 Connecticut Ave NW, Washington DC 20009)
Moderator: Glynda Bathan, Clean Air Asia

13:00-13:45 **AIR QUALITY MONITORING IN CITIES**
by Kaye Patdu, Clean Air Asia and Phil Dickerson, US EPA | Room: Gunston

Clean Air Asia will present the status of air quality monitoring in Asian cities. US EPA will then present the importance of monitoring air quality; and how it has, through the years, addressed some of the same challenges faced by Asian cities – proper siting of air quality monitors; providing adequate funding for operations and maintenance of monitoring systems; and ensuring good data quality and data analysis. It will also present a range of options of air quality monitoring systems which cities could opt to use for certain monitoring objectives.

13:45-14:30 **DEVELOPING EMISSIONS INVENTORIES OF AIR POLLUTION SOURCES**
by Norlito Bautista, Iloilo City and Alison Simcox, US EPA | Room: Gunston

This presentation will start with Iloilo City describing its experience in developing a preliminary or simplified emissions inventory of air pollution sources and how it can be done with minimal resources through partnerships (e.g., with universities for data collection, with industries through self-monitoring reports). It will be followed by a presentation by US EPA describing how US cities are involved in emissions inventory development, the importance of developing an emissions inventory of air pollution sources.

14:30-14:45 **OPEN FORUM (Questions and Answers) | Room: Gunston**

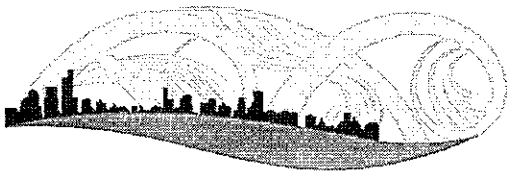
14:45-15:00 **COFFEE BREAK**

15:00-16:30 **PARALLEL SESSION 1**

OVERVIEW OF AIR QUALITY DECISION SUPPORT SYSTEM AND AIR POLLUTION CONTROL COST, BENEFIT AND ATTAINMENT ASSESSMENT
by Carey Jang, US EPA
Room: Gunston

In managing air quality, cities need tools to support decision-making and to develop programs that reduce and prevent air pollution. In this session, the US EPA expert will share available tools that cities can use for science-based decision-making and planning (e.g., BenMAP and ABaCAS).

CITIES CLEAN AIR PARTNERSHIP WORKSHOP



CLEANER FUELS AND CLEANER COOKSTOVES TO REDUCE INDOOR AIR POLLUTION
by Sumi Mehta, Global Alliance for Clean Cookstoves
Room: Dupont
Reducing exposure of household members from indoor air pollution requires an integrated approach. This session will explain the health and environmental impacts of air pollution from inefficient cookstoves, the role of cleaner cookstoves and cleaner fuels, and the most effective solutions Asian cities can adopt to reduce indoor air pollution.

REDUCING EMISSIONS FROM INDUSTRY AND POWER GENERATION
by Jeremy Schreifels, US EPA
Room: Embassy
Emissions from industry and power generation are of concern to several Asian cities. This session presents the emissions from industry and power generation that Asian cities should prioritize as most important to address, the cost-effective solutions to reduce pollution from these sources, and the role that Asian cities play in preventing and reducing pollution from these sources and protecting the public from the harm their emissions bring.

16:35-17:00 **WRAP-UP by Kaye Patdu, Clean Air Asia | Room: Gunston**

Wednesday, 12 August 2015, 09:00-12:00 ROADMAP TO CLEAN AIR IN CITIES 3
Venue: Washington Hilton [Terrace Level] (1919 Connecticut Ave NW, Washington DC 20009)

09:00-10:00 **PARALLEL SESSION 2**

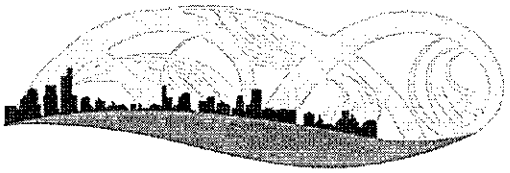
DEMAND MANAGEMENT MEASURES TO REDUCE EMISSIONS FROM TRANSPORTATION
by Todd Litman, Victoria Transport Policy Institute
Room: Gunston
Studies show that motor vehicles are significant sources of harmful emissions in Asian cities. This session will provide a roadmap for cities to reduce and prevent emissions from transportation through measures such as better land-use and transport planning, and promotion of public transit, walking and cycling. It will highlight a holistic and integrated approach (including "avoid-shift-improve" solutions) most relevant to the Asian context.

MONITORING AND COMMUNICATING AIR QUALITY IN THE UNITED STATES
by John White, US EPA
Room: Dupont
Public access to easily understandable air quality information has been shown to catalyze political will and action to stem increasing air pollution. This presentation shows why it is important to communicate air quality levels to the public, effective ways to communicate air quality data, and how cities benefit from sharing this information.

REDUCING EMISSIONS FROM COMMERCIAL COOKING
by Alison Simcox, US EPA
Room: Embassy
Outdoor, commercial grilling and cooking are prevalent in many Asian cities, are a source of livelihood for many, and a source of emissions as well. In this session, the US EPA expert will present concrete actions that cities can take to reduce harmful emissions from outdoor commercial grilling and cooking.

10:00-10:15 **COFFEE BREAK**

CITIES CLEAN AIR PARTNERSHIP WORKSHOP



10:15-11:15 PARALLEL SESSION 3

CLEANER FUELS AND VEHICLES, AND VEHICLE I&M SYSTEMS TO REDUCE MOBILE SOURCE EMISSIONS
by Francisco Posada, International Council on Clean Transportation
Room: Embassy
Policies that promote cleaner fuels and cleaner engine technologies and efficient vehicle inspection and maintenance (I&M) systems can significantly reduce emissions from motor vehicles. This session will provide a roadmap for cities to reduce motor vehicle emissions through policies and approaches covering new vehicles (promotion of "zero emission" vehicles, i.e. electric vehicles), in-use vehicles (I/M, vehicle replacement programs) and complementary policies (low emission zones).

DEVELOPING PUBLIC BIKE-SHARING SYSTEMS
by Kuo-Su Chiu, Taipei City and Jacob Mason, Institute for Transportation & Development Policy (ITDP)
Host: Kunming Kuo, Taichung City
Room: Dupont
A 2011 survey by Clean Air Asia shows that roughly 4% of trips in Asian cities are short trips using private motorized vehicles. Efficient and safe public bike-sharing systems could result in a shift from motorized trips to non-motorized trips over distances less than 250 meters, and avoid or reduce vehicle emissions. This session provides the building blocks for setting up city-wide public bike sharing systems.

11:20-12:00 PUTTING IT ALL TOGETHER: EMISSIONS REDUCTIONS IN THE REAL WORLD
by Justin Spenillo, US EPA | Room: Gunston
An interactive session focused on reviewing the technical elements involved in assessing air quality, identifying emissions control strategies, and working with the affected community for effective implementation, and showing how these elements are transferrable to communities globally. The session will present these elements as experienced in real communities in the Pacific Northwest region of the United States and talk candidly about what has and has not worked. Discussion of how this can apply to participant cities will be encouraged.

12:00-13:30 LUNCH

Wednesday, 12 August 2015 13:30-17:00
HOW CCAP LINKS TO THE ROADMAP TO CLEAN AIR IN CITIES
Venue: Washington Hilton (1919 Connecticut Ave NW, Washington DC 20009)
Moderator: Glynda Bathan, Clean Air Asia

13:30-13:50 THE CITY CERTIFICATION FRAMEWORK
by Carolyn Cairns, Clean Air Asia | Room: Gunston
The speaker introduces the general concept of eco-certification, how it can help, and how it works; delve into the elements of the city certification framework – governance, criteria, accountability, and incentives – being developed; provide a progress update, timeline and next steps; and explain how the city certification system links with the roadmaps to clean air in cities discussed in the previous days. At the end, the speaker poses

CITIES CLEAN AIR PARTNERSHIP WORKSHOP

three consultation questions to the cities: 1) How do you think the certification program could help support your city's air quality program? 2) What factors will determine whether your administration will seek to get certified? 3) What elements and criteria do you think will be most important and effective in helping improve air quality in the simplest and most efficient ? 4) What concerns do you have, if any?

13:50-14:15 **ROUNDTABLE DISCUSSIONS**
Room: Gunston

The participants will be divided into four groups to discuss the consultation questions. Each group will assign a rapporteur to report the group's inputs back to the plenary.

14:15-14:30 **REPORTING BACK**
Room: Gunston

14:30-14:45 **COFFEE BREAK**

14:45-15:00 **KNOWLEDGE PLATFORM DEMO LAUNCH**
by Chee Anne Roño, Clean Air Asia | Room: Gunston

This is a presentation on the online knowledge resources and experts database available to cities through CCAP and how these could help cities implement the roadmap to clean air.

15:00-16:15 **CITY-TO-CITY COOPERATION (C^3) WORKSHOP**
Moderated by Rakhi Kasat, US EPA | Room: Gunston

The C^3 program is available to participating CCAP cities who are ready and committed to take specific actions via short-term, targeted peer-to-peer learning – in 6 easy steps! It is designed to initiate the process of determining potential mentor and learning cities from among the CCAP cities. The interactive workshop seeks to determine other possible matching cities (learning and mentor cities) and identify technical assistance needs.

16:15-16:30 **CLOSING SPEECH: THE WAY FORWARD**
by Glynda Bathan, Clean Air Asia | Room: Gunston

The closing speech will emphasize what exciting next steps are expected in 2016 and express our continued support to CCAP cities on their path towards improving air quality year by year, step by step.

16:30-17:00 **AWARDING OF CERTIFICATES | Room: Gunston**

18:00-20:00 **FAREWELL BANQUET**
Venue: Kalorama Room, Washington Hilton
Hosted by the Environmental Protection Administration Taiwan (EPAT)

CITIES CLEAN AIR PARTNERSHIP WORKSHOP

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CITIES CLEAN AIR PARTNERSHIP

LIST OF CITIES

BAGUIO. Baguio City is located in the Cordillera ranges of the Luzon Island in the Philippines. It is the highest city in the country at an elevation of 1,417 meters above sea level. Baguio forms part of what is known as the BLISTT Metropolitan Planning Area sharing a common airshed. It is home to a population of 331,130 that can easily swell to half a million a day during peak tourism season. The city's economy relies on trade and commerce, tourism and services as primary drivers.

Contact: MS. MARIA ADELAIDA C. LACSAMANA | Department Head, City Environment and Parks Management Office; ANGELINA VICTORIA M. FERRER | Engineer, City Environment and Parks Management Office

BANGKOK. Bangkok is the capital city and the economic center of Thailand accommodating almost 10 million residents and 8.5 million vehicles. These vehicles and the influx of migration, industries, major constructions are the major sources the city's air pollution. Air quality monitoring data has shown remarkable improvements over the last 20 years but particulate levels, both PM 2.5 and PM10, still exceed the ambient air quality standard especially on congested roads. The urban ozone also frequently exceeds the standard. Bangkok Metropolitan Administration (BMA) has put in place the 20-year Bangkok Development Plan to bring air quality within the ambient air quality standards. The activities include pollution control from vehicles, constructions, grilled food vendors, open burning, etc. Around 46 new ambient air quality monitoring stations will be located in Bangkok by next year.

Contact: MS. SIRIPORN PIYANAWIN | Director, Air Quality and Noise Management Division, Department of Environment Bangkok Metropolitan Administration

COCHIN. Cochin is the biggest city in Kerala by volume of trade. This metropolitan in the recent years has been witnessing heavy investments, making it one of the fastest growing second-tier metro cities in India. Construction activity, including road and Metro works, has pushed up pollution levels across the city and its suburbs.

Contact: MR. RAJAN CHEDAMBATH | Director, Centre for Heritage, Environment and Development (C-HED)

DA LAT. Da Lat city, located in the middle of Viet Nam, is at 1,500 m above sea level with complex terrain and cool climate. Due to the natural conditions, tourism and agriculture are the key sectors of the city. It is known as the "city in the forest and forest in the city" and environmental quality of the city has been kept in acceptable conditions: air quality is considered good with concentrations of PM, CO, SOx, NOx lower than national standards. In 2014, Da Lat received an award under the ASEAN Environmentally Sustainable Cities program.

Contact: MR. LA THIEN LUAN | Head of Division of Pollution Control, Environmental Protection Branch Department of Natural Resources and Environment

HAIPHONG. Haiphong Port was established in 1876 and is the 3rd largest seaport city in Vietnam. Major industries in the city include: ship building, repairing and breaking; seaport and logistic; steel production; construction materials (cement, brick); shoes; clothing, electronic production. It is home to 80,813 motor vehicles and close to 1 million motorcycles.

Contact: MR. TRAN VAN PHUONG | Secretary on Environmental Affairs, Haiphong City's People Committee Office; MR. PHAM QUOC KA | Deputy Director, Department of Natural Resources and Environment; MR. LE SON | Inspector in Chief, Department of Natural Resources and Environment

ILOILO. Iloilo City is an educational, tourism and business hub in the central region of the Philippine Islands. In a recent emissions inventory supported by GIZ, major air pollution sources identified are jeepneys and commercial cooking and grilling. "Jeepneys" are light duty vehicles used for public passenger transport running on diesel fuel and imported second hand engines. Charcoal is the predominant fuel used for cooking and grilling. Powering the city is a 164 MW coal-fired power plant located within its boundaries.

Contact: MR. NORLITO BAUTISTA | City Administrator

JAKARTA. Jakarta, the capital city of Indonesia, inhabited by approximately 10 million people as of 2014. Fuel consumption (LPG for households, gasoline and diesel for transport) increases with an annual average of 2.6% per annum. The number of motor vehicles, which is a main source of air pollution in the city, has been increasing rapidly with an average annual rate of around 15 %. Almost 50 % of motorized vehicles registered in Jakarta are motorcycles. Road capacity is insufficient compared to the massive increase of vehicles which leads to high traffic congestion hence further urban air quality deterioration.

Contact: MR. GAMAL SIHOL MARITO SINURAT | Head, Jakarta Environmental Management Board; MR. FANDY RAHMAT | Pollution Control and Supervision Division Staff, Jakarta Environmental Management Board

KAOHSIUNG. Kaohsiung is a massive port city in southern Taiwan. The air pollution situation has worsened through the years as the clustering of industrial sectors, such as steel factories, power plants and petrochemical manufacturers, began in Greater Kaohsiung four decades ago. The city's natural geographic setting and climatic conditions are not conducive to the natural dispersion of smog and air pollutants.

Contact: MR. HUNG-WEN YANG | Senior Technical Specialist and Office Director, Kaohsiung Environmental Protection Bureau

KATHMANDU. Kathmandu is the capital of Nepal and the center of the country's economy. The city stands at 1,300 meters above sea level in a valley. A rapid assessment by ICIMOD showed "the road network, with daily traffic of more than 15,000–20,000 vehicles, is a major polluter; the major source of SO2, NOX, and particulate emissions is vehicle exhaust. PM10 was higher along the roads and high-traffic areas than elsewhere, while other pollutants such as SO2, CO, and NMVOC were higher at the city centre since these are produced by the fuel used in cooking and industry."

Contact: MR. RABIN MAN SHRESTHA | Chief and Senior Engineer, Kathmandu Metropolitan Council

KITAKYUSHU. Kitakyushu City has been a leading industrial city in Japan and has supported the development of Japan's industrialization as an international trading port. It is a manufacturing city and an international logistic hub with transport infrastructure such as harbors, airports, railways and highways. It has an international reputation for overcoming pollution and extending international environmental cooperation, and has a proven track record as a recycling-based society.

Contact: MS. SEIKO KUBO | Director, International Environmental Strategies Division, Environment Bureau

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MALANG. Malang is renowned for its beautiful landscape and cooler air. It has, for years, been a favorite getaway for many people in East Java. The growth of residential developments continues unabated. Increase in the use of motor vehicles and traffic congestion cause severe air pollution. Nevertheless, it was one of the three cities awarded with the best air quality by the Environment Ministry in 2014.
Contact: MR. ARIF DERMAWAN I Staff, Malang City Environmental Board

PASIG. Pasig City is the 4th most populated city (with 670,000 population in 2010) and is the 4th highest income earning city in Metro Manila, Philippines. Previously an industrial city, it is transforming into a business, financial and trade center. It won the Gold Award in the International Awards for Liveable Communities (LivCom) 2013. Its environmental programs include: car-free Sundays on four major city streets, bike-sharing pilot program, development of a greenways project, cycling promotion.
Contact: MS. RAQUEL AUSTRIA NACIONGAYO I City Government Department Head II, City Environmental & Natural Resources Office (CENRO)

SIEM REAP. It is the closest city to the world famous temples of Angkor Wat and Tonle Sap Lake, the greatest water reserve in whole Southeast Asia. Because of the growing tourism industry, the industrial structure of the city has been changing from an agricultural practice to a tourism-led zone, and new types of industries have arisen, such as handicraft, souvenirs, hotels, tourist bars restaurants, tour operators and other hospitality services. More than 5 million tourists visited Siem Reap in 2014.
Contact: MR. PLATONG SO I Governor, Siem Reap City

SINGAPORE. Singapore as a city-state has vision and plans for a more liveable and sustainable nation. The main sources of air pollution in Singapore can be grouped into three categories: stationary sources such as power stations, oil refineries and industries; mobile sources (motor vehicles); and open burning of waste materials, transboundary air pollution.
Contact: MR. ZHANG KANG EN I Senior Assistant Director, Ministry of Environment & Water Resources; MS. INDRANI RAJARAM I Project Director & Chief Scientific Officer/ Pollution Control Department, National Environment Agency; MR. LEE HONG WEI I Senior Executive (Clean Air), Environmental Protection Policy Department National Environment Agency; LIM YAN RU I Engineer, National Environment Agency

SHIMLA. Shimla City was established by the British on a hill top and is presently the capital of Himachal Pradesh State, India. Being an important tourist destination and the hub of the state's apple trade that is crucial to its economy, the number of vehicles plying in or passing through Shimla's hilly terrain is very high - increases five-fold in the April-July tourist season and doubles in October. The 2013 ban on the use of coal heaters in offices and residential buildings of Shimla town has brought in positive results, with a marked improvement in the hill town's air quality.
Contact: MR. SANJAY CHAUHAN I Mayor, Municipal Corporation of Shimla

SURABAYA. Surabaya is the capital of East Java province. It was chosen as the city with the best air quality in the metropolitan category for the Langit Biru (Blue Sky) Program of the Environment Ministry awarded in 2014. This program rated cities' air quality based on traffic management, fuel quality, vehicle emission testing results and air quality monitoring.
Contact: TRI RISMAHARINI I Mayor, City Government of Surabaya; ERI CAHYADI I Head of Public Work and Spatial Planning Department, City Government of Surabaya; MUSDIQ ALI SUHUDI I Head of Environment Bureau, City Government of Surabaya; WIWIEK WIDIYANTI I Head of General Affairs and Protocol Division, City Government of Surabaya; PERTIWI AYU KRISHNA I Councilor, City Government of Surabaya; NANIEK ZULFIANI I Councilor, City Government of Surabaya

TAICHUNG. Taichung, in a key central Taiwan location, plays an essential role in both Taiwan's economic development and transportation systems. It is the hub for the five cities and counties in the central Taiwan region. Taichung City Government has adopted stricter PM2.5 standards that will be implemented for the power and steel industry. Electric cars and motorcycles are actively promoted by the city.
Contact: KUN-MING KUO I Deputy Secretary General of Taichung City Government; CHUNG-YI CHEN I Specialist and Section Chief, Taichung City Environmental Protection Bureau

TAINAN. Tainan is a city on Taiwan's southwest coast known for its centuries-old fortresses and temples. To address air pollution, the city government set up an inter-bureau action plan focused on pollution reduction from diesel vehicles. The city aims to strengthen the implementation of motor vehicle emissions testing, roadside inspection and fleet management.
Contact: CHIEN-SAN LIN I Deputy Director, Tainan City Environmental Protection Bureau

TAIPEI. There are three main objectives of Taipei's air quality improvement plan, namely Cleaner Air, Healthier Environment, and Better Services. Motor vehicles are considered the main air pollution source in Taipei City. Public dynamometers have been set up to measure the emissions from diesel vehicles and awarding "low-pollution identification symbols" control PM2.5 emissions from diesel buses and trucks. Taipei City Government prioritizes increased use of public transport and the YouBike services. In 2013, the daily traffic volume of MRT (Taipei Metro) and bus system already exceeded 3.3 million, representing a growth of 22.4 percent from 2003.
Contact: KUO-SU CHIU I Director, Department of Environmental Protection, Taipei City Government

ULAANBAATAR. Ulaanbaatar is the coldest capital city in the world and the largest city of Mongolia. Because of its topographic features, it is consistently in the list of cities with the worst air quality primarily due to the household coal and wood burning for cooking and heating. An Air Quality Agency, under the Office of the Mayor, was established in October 2006.
Contact: MR. BATSAIKHAN CHULTEMSUREN I Head, Air Quality Agency of Ulaanbaatar City

VARANASI. Varanasi Nagar Nigam is perhaps the most crowded and populated area in the world. The deterioration in air quality is caused primarily by vehicular exhaust and fugitive dusts (mostly from road construction). Varanasi is categorized as one of the 'non-attainment cities' identified by the Central Pollution Control Board (CPCB).
Contact: MR. MOHLEY RAM GOPAL I Mayor, Varanasi Municipal Corporation

YOGYAKARTA. Yogyakarta City is the Capital City of the Yogyakarta Special Region with many heritage sites and buildings. Tourists visiting the city by car contribute a great deal to the city's worsening traffic congestion, especially during long weekends and holidays. Numerous new hotels have emerged in the city over the last two years, especially around downtown Yogyakarta, aggravating fugitive dusts.
Contact: MR. WAHYU HANDOYO HARDJONO PUTRO I Division Chief, Local Development Planning Agency of Yogyakarta City

YOKOHAMA. Yokohama originated as an international port city in 1859. Since then the city has rapidly developed not only as a trade hub but also as the largest municipality in Japan with the population of 3.7 million. Especially noteworthy achievement is its solution for the severe environmental problems that inflicted people during the time of rapid economic growth in 1960s.
Contact: MR. TAKASHI KONDO I Manager, Development Cooperation Division, International Affairs Bureau

CITIES CLEAN AIR PARTNERSHIP

The **Cities Clean Air Partnership (CCAP)** asserts that city-level action is the foundation for addressing the global challenge of air pollution and its impact on public health. **CCAP** establishes a comprehensive platform for cities to cooperate and jointly address air quality challenges. The initiative will strengthen air quality management capacity in Asian cities and drive measurable results through city-level actions. We aim to reach more than 200 cities across Asia.

Photo: spectrumseo

We recognize that cities are on the ront lines in the fight against air ollution and climate change, and hat managing air pollution and reenhouse gas emissions are omplex tasks requiring long-term ommitment and multi- stakeholder ctions at the city level.

CAP aims to provide cities with ncentives, direct support, and echnical assistance to keep them oving incrementally and ontinuously towards their clean ir targets through:

City-to-City Cooperation (C³) rogram to promote city-to-city earning and collaboration to drive easurable results through city-level ctions. The "twinning" of volunteer ities will allow exchange of effective ractices and innovative solutions o help address specific air quality anagement challenges faced by ities.

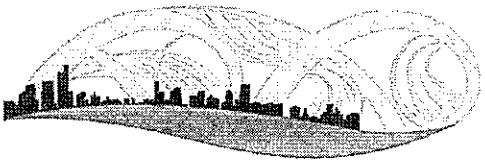
he Bay Area and South Coast Air uality Management Districts are itial US partners that support the reation of this new framework of ooperation which will be an open itiative involving more participating ities and partners in the future.

City Certification Program to rovide incentives for implementing ransformational change for better air uality and livable cities. Cities will be ble to communicate their achieve- nents made towards air quality anagement goals through a "seal f approval" (or co-label).

"In 2012 around 7 million people died – one in eight of total global deaths – as a result of air pollution exposure... the new data reveals a stronger link between both indoor and outdoor air pollution exposure and cardiovascular diseases, such as strokes and ischaemic heart disease, as well as between air pollution and cancer." - World Health Organization, 2014

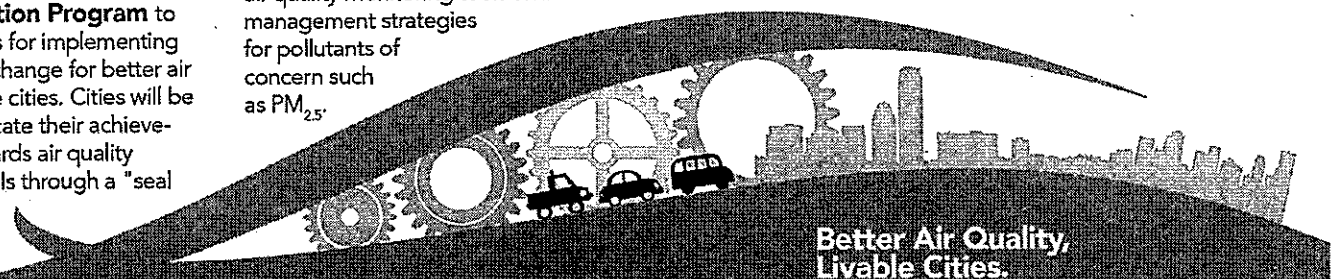
The program offers international recognition for cities taking significant steps to improve their air quality and gives a clear roadmap to continually improve capacity to manage air pollution.

- **Knowledge platform** to share best practices and networking, including an online experts database accessible to CCAP cities. This platform includes city training programs to strengthen capacity of cities on emissions inventory, air quality monitoring tools and management strategies for pollutants of concern such as $PM_{2.5}$.



CITIES CLEAN AIR PARTNERSHIP WORKSHOP

Washington Hilton Hotel 18-12 August 2015
Participating Cites: Baguio | Bangkok | Cochin (Kochi) | Colombo | Da Lat | Haiphong | Iloilo | Jakarta | Kathmandu | Kitakyushu | Malang | Pasig | Shimla | Siem Reap | Singapore | Surabaya | Taichung | Taipei | Taoyuan | Ulaanbaatar | Varanasi | Yokohama | Yogyakarta



Better Air Quality, Livable Cities.
www.cleanairasia.org/CCAP

Clean Air Asia, an international NGO established in 2001 as the premier air quality network for Asia by the Asian Development Bank, World Bank and USAID, implements the Cities Clean Air Partnership (CCAP). Our mission is to promote better air quality and livable cities by translating knowledge to policies and actions that enable Asia's 1000+ cities to reduce air pollution and greenhouse gas emissions from transport, energy and other sectors.

The Cities Clean Air Partnership is an initiative of Clean Air Asia supported by the International Environmental Partnership. IEP

CITIES CLEAN AIR PARTNERSHIP WORKSHOP

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LIST OF SPEAKERS

ALISON SIMCOX is a U.S. EPA Region 1 specialist in particle pollution, power plant emissions trading, and biomass fuels. She is also certified in Hazardous Waste Operations and Emergency Response. She has led teams in developing three GIS-based models for New England: (1) SPARROW for estimating total nitrogen and total phosphorus levels in over 40,000 stream segments, (2) MERGANSER for estimating mercury Hg levels in fish and common loons in over 4,400 lakes, and, most recently, (3) a model for identifying areas at risk for elevated wood smoke.

BJARNE PEDERSEN is the Executive Director of Clean Air Asia. He is an accomplished expert in environmental issues paired with more than ten years of strategic leadership experience in international development organizations with comprehensive experience in leading and developing NGOs. Recognized as trusted advisor and excellent strategist and fundraiser with unparalleled insight into environmental issues and sustainable development. Bjarne has lived and worked in Europe, Africa and Latin America before taking up the post as Executive Director of Clean Air Asia in Manila, Philippines in 2013. He holds a masters degree in international environmental issues from Strathclyde University, UK.

CAREY JANG serves as a national expert and scientific advisor at U.S. EPA's Office of Air Quality Planning and Standards. He has more than 20 years of experience on air pollution issues ranging from urban and regional air pollution, international transport of air pollution, to global climate change. Dr. Jang is currently leading an international team to develop a next-generation air quality decision support system, the "Air Benefit and Cost and Attainment Assessment System (ABaCAS), and has coordinated a series of ABaCAS conferences and training workshops in Asia since 2013.

CAROLYN CAIRNS is an environmental health, sustainability and product safety scientist. Prior to her current consulting position with Clean Air Asia, she spent 15 years at Consumer Reports, U.S., leading environmental health and product safety programs designed to support sustainable consumption and production practices. Her portfolio includes laboratory test projects, risk assessments and policy analysis focused on product environmental impacts, eco-certification and other topics to advance necessary changes in product design, purchasing and public policy for a healthier planet.

CHIH-WEI CHANG is the Senior Environmental Technical Specialist for the Soil and Groundwater Remediation Fund Management Board of the Environmental Protection Administration. He specializes in the fields of Total Maximum Daily Loadings (TDLs), Contaminated Sediment Remediation and Modeling, Marine and River Pollution Emergency Response, Environmental Impact Assessment, and Modeling the Fate of Organic Contaminants in Water, Sediment, and Biota in Urban Estuaries.

CHEE ANNE ROÑO is the Cities Clean Air Partnership (CCAP) Manager of Clean Air Asia. She previously handled the south-south knowledge partnership for Clean Air Asia's country networks (China, India, Indonesia, Malaysia, Nepal, Pakistan, Philippines, Sri Lanka, Vietnam) and managed projects under Clean Air Asia's Clean Fuels and Vehicles Program.

FRANCISCO POSADA is a senior researcher with the International Council on Clean Transportation (ICCT). His work focuses on developing technology roadmaps for criteria pollutant and greenhouse gas emission reductions from new passenger cars, and on assessing the cost of implementing those technologies in emerging markets. He is an expert on in-use vehicle emission control programs and has written a series of reports on the topic. He leads projects on passenger vehicle emission and fuel economy measurement in Europe and the U.S.

GARY HAQ is a Human Ecologist and Senior Research Associate at the Stockholm Environment Institute, University of York (UK). Gary undertakes research on climate change, urban air pollution, transport, behavioral change, community resilience and environmental impact assessment in Africa, Asia and Europe.

GINA MCCARTHY is the Administrator of the U.S. EPA. Appointed by President Obama in 2009 as Assistant Administrator for EPA's Office of Air and Radiation, she has been a leading advocate for common-sense strategies to protect public health and the environment. Previously, she served as the Commissioner of the Connecticut Department of Environmental Protection. During her career, which spans over 30 years, she has worked at both the state and local levels on critical environmental issues and helped coordinate policies on economic growth, energy, transportation and the environment. She received a Bachelor of Arts in Social Anthropology from the University of Massachusetts at Boston and a joint Master of Science in Environmental Health Engineering and Planning and Policy from Tufts University.

GLYNDA BATHAN is the Deputy Executive Director of Clean Air Asia. A lawyer with more than 16 years of experience in the environment sector, she leads teams in assisting national and city governments develop and implement environment policies and roadmaps through Clean Air Asia's four programs – Air Quality and Climate Change, Low Emissions Urban Development, Clean Fuels and Vehicles, and Green Freight and Logistics, the most significant being the Roadmap for Cleaner Fuels and Vehicles in Asia, Euro 4 vehicle emission standards and low sulfur fuel policies in the Philippines and Vietnam.

INDRANI RAJARAM is the Project Director and Chief Scientific Officer of the Environmental Monitoring and Assessment Unit of the Pollution Control Department, National Environment Agency, Singapore. She oversees the ambient air and water quality monitoring programs. She has contributed to the development of Singapore's air quality targets and played a key role in the recent review and enhancements to the air quality monitoring and reporting system for Singapore.

JACOB MASON is a DC-based urban planner and engineer at the Institute for Transportation and Development Policy (ITDP). He develops tools to spread best practices in sustainable transportation, with a focus on Bus Rapid Transit (BRT), active transportation, and urban growth, particularly in developing countries. This work includes ITDP's BRT Standard and Bike Share Planning Guide.

JEREMY SCHREIFELS is a senior policy analyst with the U.S. EPA where he applies the tools of economic and policy analysis to design and implement environmentally- and cost-effective pollution control policies. His work is mainly focused on market-based policies, emission control technologies, emission monitoring and verification, and cost-benefit analysis.

JOHN WHITE has managed the AirNow program for the U.S. EPA since 2000 and has 24 years of experience in the air quality modeling, permitting, forecasting, data analyses and information management arena. He is responsible for overall program development, implementation, and operation of AirNow as well as managing and coordinating the AirNow-International program. He supports the communication and coordination of Air Quality Index (AQI) activities for AirNow partner agencies and organizations, the media, and public.

The Cities Clean Air Partnership is an initiative of Clean Air Asia supported by the International Environmental Partnership. IEP

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JUSTIN SPENILLO is currently with the U.S. EPA working with State and Local air quality agencies to provide air quality protection through regulatory, technical and implementation support. In his prior positions at U.S. EPA, he has worked with Tribal air quality programs and governments on developing air quality programs in the Pacific Northwest.

KAYE PATDU is Head of Programs of Clean Air Asia and oversees Clean Air Asia's four programs – air quality and climate change, green freight and logistics, clean fuels and vehicles, and low emissions urban development. She is one of the key developers of the Clean Air Scorecard – an AQ management assessment tool for cities and one of the lead authors of the "Guidance Framework for Better Air Quality in Asian Cities" which aims to provide a recognized guidance for cities to improve air quality.

KUNMING KUO is the Deputy Secretary-General at the Taichung City Government in Taiwan. He is currently taking charge of the 2018 Taichung World Flora Exposition. The World Expo will be presenting Discover GNP: Green, Nature, and People. He has been contracted to develop the new Central Taiwan Science Park and has working experience in all of the three science park administrations in Taiwan.

KUO-SU CHIU is the Director of the Technical Laboratory of the Department of Environmental Protection in Taipei city. He focuses on environmental quality examination to help prevent environmental pollution and improve Taipei residents' living quality. He worked as an engineer at China Technical Service Agency guiding many industrial factories to do air pollution prevention and regulation. He then moved to the Department of Environmental Protection as the Division Chief and worked at the Air Pollution Prevention and Control Division.

KUO-YEN WEI was appointed Minister of Environmental Protection Administration in 2014. Under his leadership, the Taiwan EPA is pursuing sustainable development, systematic approach and good governance through safeguarding intergenerational justice, advancing environmental rights, making good use of science and technology, application of big data analytics, establishing environmental cloud computing, realizing environmental justice and incorporating public opinions.

LE SON is the Inspector-in-Chief of the Inspection Division of the Department of Natural Resources and Environment (DONRE) in Haiphong City, Vietnam. He has worked for the Department of Science, Technology, and Environment in Haiphong City as both the Environmental Manager for two years before becoming the Deputy Head of the Environmental Management Division.

LYUSHUN SHEN is the Representative of the Taipei Economic and Cultural Representative Office in the United States (TECRO) and has held the position since 2014. Previously, he had held the position in the UK and EU in Belgium.

MARK KASMAN is Director-Designate for the U.S. EPA's Office of Regional and Bilateral Affairs and Acting Senior Advisor for EPA's Asia-Pacific and Europe Programs. He manages all of EPA's bilateral and regional work overseas to protect human health and the environment upon which it depends. In 2003-2005, Mark served on secondment as the Environment Management Specialist for the Greater Mekong Subregion at the Asian Development Bank. Prior to coming to EPA as a Presidential Management Fellow 28 years ago, he worked for the United Nations Development Program in Jakarta, and at the Carter Center in Atlanta.

NORLITO BAUTISTA is the City Administrator of Iloilo City, Philippines. His primary function is to implement and oversee the executive agenda of the Chief Executive. As such, he has supervision and control over the various departments and offices of the Iloilo City Government.

PHIL DICKERSON is Director of the AIRNow Program, which provides realtime air quality data, forecasts, and educational materials to the public. He was a founding member of EPA's AIRNow team, serving as the IT advisor for the program since its inception in 1998. He was also part of the team that developed the EnviroFlash real-time notification system, providing the public with real-time alerts based on air quality forecasts.

RAKHI KASAT manages U.S. EPA's cooperation with Southeast Asia. She is also an experienced meeting facilitator. Since joining EPA in 2007, she has facilitated a diverse set of meetings and conferences, including high-level strategic planning meetings, trainings, interagency discussions, and workshops.

ROBERT O'KEEFE is Vice President of the Health Effects Institute (HEI) responsible for management of key programs, including the Institute's international program to assess the health effects of air pollution in developing countries and its work to apply the Global Burden of Disease estimates to air pollution and source specific impacts in developing Asia. He is a member of the U.S. EPA's national Clean Air Act Advisory Committee and Chairs the Board of Directors of the Clean Air Asia, the premier air quality network for Asia.

SEIKO KUBO is the Director of the City of Kitakyushu in Japan, which has been selected by the Japanese government as an Eco-Model City and Future City, and is the first city in Asia to have been tapped by the Organization for Economic Co-operation and Development (OECD) as a green growth city. She began her professional career in the Kitakyushu City Government in 1990 and later on appointed as the Deputy Director for Kitakyushu City Promotion Headquarters in Tokyo. In 2011, she went back to Kitakyushu and worked at the International Environmental Strategies Division of Environment Bureau.

SIRIPORN PIYANAWIN is the Director of the Air Quality and Noise Management Division in the Department of Environment in Bangkok, Thailand. She is a lecturer on environmental management in distinguished universities, a speaker on air quality and noise management, and is on multiple committees and working groups of various projects in environmental management, including the Bangkok Master Plan on climate change and the Public Education Awareness campaign for raising air quality in Bangkok.

SUMI MEHTA is the Director of Programs for the Global Alliance for Clean Cookstoves. Prior to joining the Alliance, she was the scientific lead for the Health Effects Institute's Public Health and Air Pollution in Asia Program. She collaborated with Kirk Smith to produce the first estimates of the global burden of disease from HAP. She co-authored chapters on exposure assessment and susceptibility in the latest WHO Global Air Quality Guidelines, and is a member of the WHO Expert Group for developing health-based guidelines for household air pollution.

TAKASHI KONDO has mainly engaged in international affairs at the Port and Harbor Bureau and the General Affairs Bureau. In April 2015, when the city organized the International Affairs Bureau, he was positioned as Manager of the Development Cooperation Division and has since been promoting Yokohama's international cooperation through activities such as CITYNET and Partnership with the private sector.

TODD LITMAN is founder and executive director of the Victoria Transport Policy Institute, an independent research organization dedicated to developing innovative solutions to transport problems. His work helps expand the range of impacts and options considered in transportation decision-making, improve evaluation methods, and make specialized technical concepts accessible to a larger audience. His research is used worldwide in transport planning and policy analysis.

The Cities Clean Air Partnership is an initiative of Clean Air Asia supported by the International Environmental Partnership. IEP

CITIES CLEAN AIR PARTNERSHIP

The **Cities Clean Air Partnership (CCAP)** asserts that city-level action is the foundation for addressing the global challenge of air pollution and its impact on public health. **CCAP** establishes a comprehensive platform for cities to cooperate and jointly address air quality challenges. The initiative will strengthen air quality management capacity in Asian cities and drive measurable results through city-level actions. We aim to reach more than 200 cities across Asia.

We recognize that cities are on the front lines in the fight against air pollution and climate change, and that managing air pollution and greenhouse gas emissions are complex tasks requiring long-term commitment and multi- stakeholder actions at the city level.

CCAP aims to provide cities with incentives, direct support, and technical assistance to keep them moving incrementally and continuously towards their clean air targets through:

- **City-to-City Cooperation (C^3) Program** to promote city-to-city learning and collaboration to drive measurable results through city-level actions. The "twinning" of volunteer cities will allow exchange of effective practices and innovative solutions to help address specific air quality management challenges faced by cities.

The Bay Area and South Coast Air Quality Management Districts are initial US partners that support the creation of this new framework of cooperation which will be an open initiative involving more participating cities and partners in the future.

- **City Certification Program** to provide incentives for implementing transformational change for better air quality and livable cities. Cities will be able to communicate their achievements made towards air quality management goals through a "seal of approval" (or eco-label).

"In 2012 around 7 million people died – one in eight of total global deaths – as a result of air pollution exposure... the new data reveals a stronger link between both indoor and outdoor air pollution exposure and cardiovascular diseases, such as strokes and ischaemic heart disease, as well as between air pollution and cancer." - World Health Organization, 2014

The program offers international recognition for cities taking significant steps to improve their air quality and gives a clear roadmap to continually improve capacity to manage air pollution.

- **Knowledge platform** to share best practices and networking, including an online experts database accessible to CCAP cities. This platform includes city training programs to strengthen capacity of cities on emissions inventory, air quality monitoring tools and management strategies for pollutants of concern such as $PM_{2.5}$.

CITIES CLEAN AIR PARTNERSHIP WORKSHOP

Washington Hilton Hotel 10-12 August 2015
Participating Cities: Baguio | Bangkok | Cochin (Kochi) | Colombo | Da Lat | Haiphong | Iloilo | Jakarta | Kathmandu | Kitakyushu | Malang | Pasig | Shimla | Siem Reap | Singapore | Surabaya | Taichung | Taipei | Taoyuan | Ulaanbaatar | Varanasi | Yokohama | Yogyakarta

Better Air Quality, Livable Cities.
www.cleanairasia.org/CCAP

Clean Air Asia, an international NGO established in 2001 as the premier air quality network for Asia by the Asian Development Bank, World Bank and USAID, implements the Cities Clean Air Partnership (CCAP). Our mission is to promote better air quality and livable cities by translating knowledge to policies and actions that enable Asia's 1000+ cities to reduce air pollution and greenhouse gas emissions from transport, energy and other sectors.

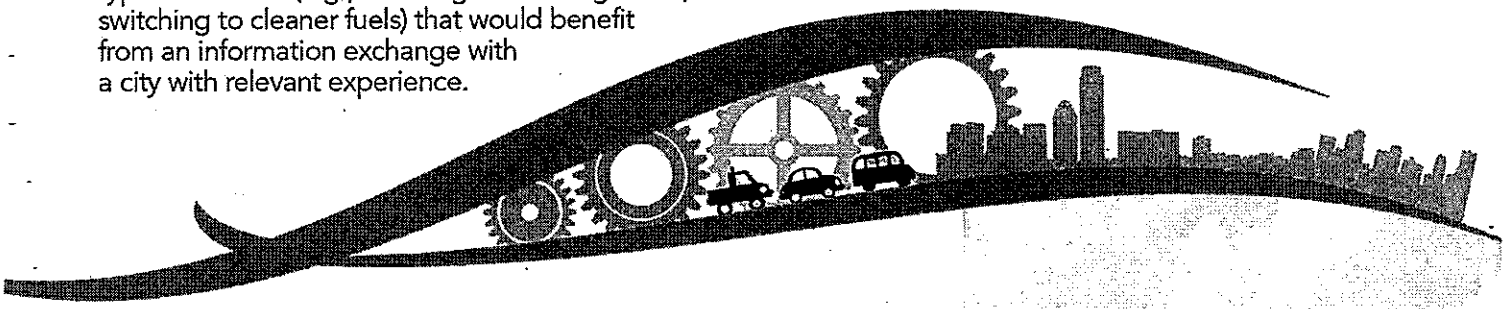
The Cities Clean Air Partnership is an initiative of Clean Air Asia supported by the International Environmental Partnership. IEP

What is C³?

C³ is a program under **Cities Clean Air Partnership (CCAP)** that promotes city-to-city learning and collaboration to drive measurable results through city-level actions.

CITIES CLEAN AIR PARTNERSHIP

- The **C³** program is available to cities committed to taking action to reduce air pollution.
- The volunteer "partnering" of cities allows cities to exchange information on good practices and innovative solutions to reduce air pollution.
- The starting point for the **C³** program is the City Registration Form. On this form, a city that wants to partner with another city through the program describes its current air quality challenges and the types of actions (e.g., reducing traffic congestion, switching to cleaner fuels) that would benefit from an information exchange with a city with relevant experience.

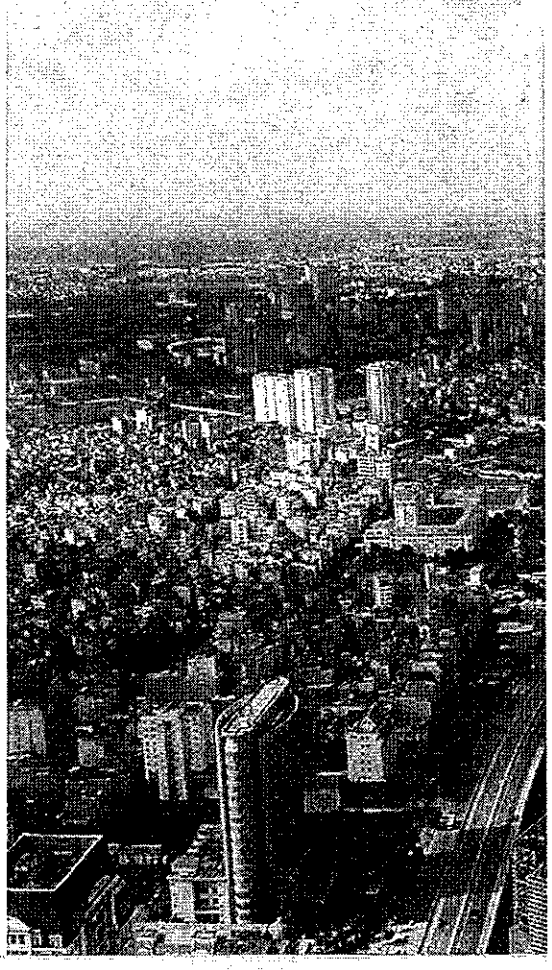


Why C³?

Cities are on front lines against air pollution, including short lived climate pollutants. Asian cities are particularly vulnerable and bear the greatest burden of disease from air pollution, especially fine-particle ($PM_{2.5}$) pollution. In 2012, of 7 million premature deaths globally from air pollution, 3.3 million deaths linked to indoor air pollution and 2.6 million deaths related to outdoor air pollution were estimated to have occurred in Asia (WHO, 2014). With the continued rapid urbanization of this region, more people are being exposed to urban air pollution and suffering serious health impacts. Cooperation between cities in taking action to improve air quality is imperative as scientific evidence mounts showing the serious health and economic consequences of air pollution from local, regional, and even global sources.

This Guidance document is a step-by-step guide to participation in the **C³** program. It describes how to:

1. Identify and match cities
2. Hold launch meeting and develop Action List
3. Implement Action List
4. Share results and lessons learned
5. Complete the **C³** program or extend **C³** program activities
6. Be recognized



CITIES CLEAN AIR PARTNERSHIP

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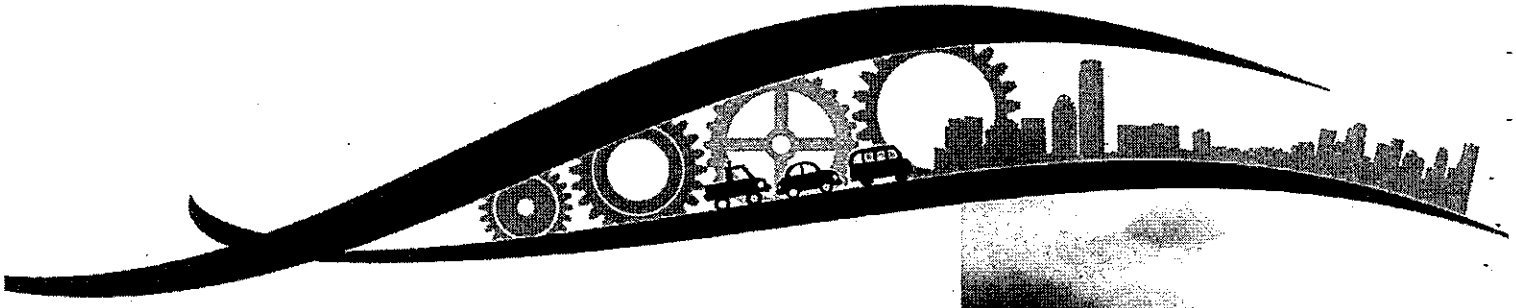


Cities Clean Air Partnership (CCAP)

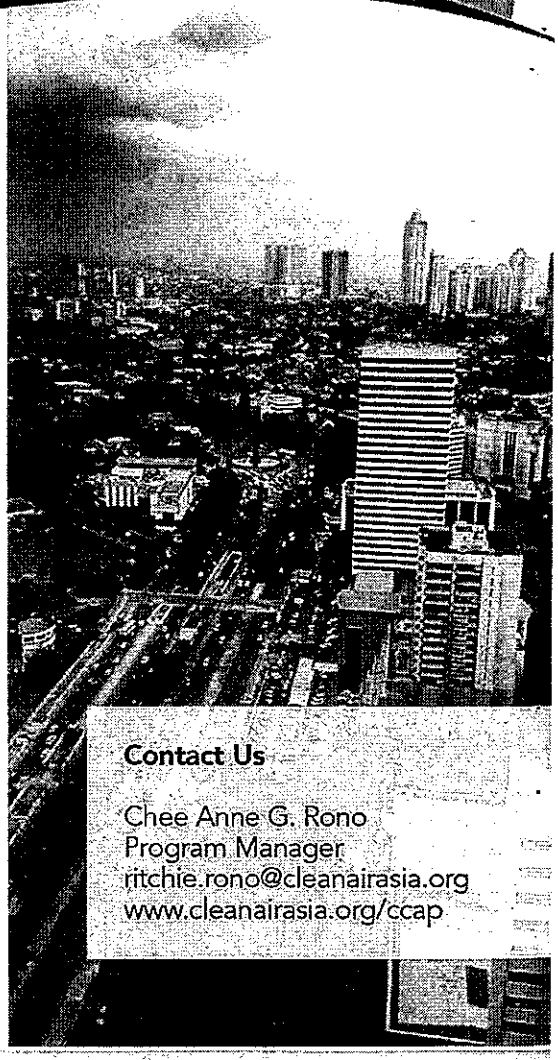
CCAP is an initiative which empowers cities to achieve clean air targets through:

- Voluntary city-to-city cooperation,
- A knowledge platform and expert community, and
- Voluntary eco-label that recognizes cities for taking significant steps to improve air quality and their capacity to manage air quality (currently being developed, to be piloted in 2016).

We aim to reach more than 200 cities across Asia.

Clean Air Asia, an international NGO established in 2001 as the premier air quality network for Asia by the Asian Development Bank, World Bank and USAID, implements CCAP. Our mission is to promote better air quality and livable cities by translating knowledge to policies and actions that enable Asia's 1000+ cities to reduce air pollution and greenhouse gas emissions from transport, energy and other sectors.

CCAP is supported by the International Environmental Partnership, an environmental collaboration program established by the Environmental Protection Administration Taiwan and the United States Environmental Protection Agency aimed at assisting environmental agencies and organizations around the globe strengthen their capacity to manage the environment and protect human health.



Contact Us

Chee Anne G. Rono
Program Manager
ritchie.rono@cleanairasia.org
www.cleanairasia.org/ccap

1 IDENTIFY AND MATCH CITIES

Guiding Principles

- City partnering is voluntary and designed to foster city-to-city learning and information exchange.
- Cities eligible for partnering are members of the Cities Clean Air Partnership.
- Mentor cities are those with demonstrated success in taking actions to reduce emissions of air pollutants, including short lived climate pollutants.
- Learning cities are those that have initiated steps towards developing and/or implementing policies or actions to reduce air pollution, but need some external guidance to achieve the desired results.

Process

A city expresses interest in joining the **C³** program by completing the City Registration Form. This city (called the "learning city") provides information on action categories or specific action(s) for which it seeks support from a city with expertise (called a "mentor city"). The applicant specifies the desired partnering period - when, ways of working - how, and ways in which they can contribute (e.g., staff time).

Clean Air Asia will identify possible mentor cities based on these criteria:

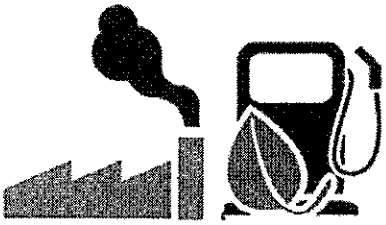
- Action categories or specific actions: match between requested assistance and experience and expertise of mentor cities.
- Language: potential challenges in communicating, e.g., can both use English or other common language?
- Location: ease and cost of getting to and from both cities. (Note: Partners are encouraged to use, to the extent possible, electronic means of communication and learning.)
- Prior engagement: extent to which cities have an existing relationship.

If a mentor city is not identified, Clean Air Asia will suggest ways for the learning city to access the expertise it needs through the CCAP network (e.g., technical training, mentoring by an expert from academia or national government agency).

2 HOLD LAUNCH MEETING AND DEVELOP ACTION LIST

Guiding Principles

- A launch meeting, preferably via conference call, will be held to introduce the cooperating cities and to discuss the objective(s), scope, and specific actions ("Action List") that the cities will work on.
- Clean Air Asia will facilitate this meeting.
- The meeting minutes, which will be taken by Clean Air Asia and reviewed and approved by both cities, will be sufficient documentation to proceed with the city-to-city cooperation.



Process

Proposed meeting agenda:

- Introduce city representatives and meeting objectives (by Clean Air Asia)
- Develop the Action List (facilitated by Clean Air Asia)
  - Identify what the cities want to achieve by the end of the C³ program (objectives)
  - Develop the specific actions for the city-to-city cooperation (C³) program
  - Establish a timeline for implementing the Action List

In developing their Action List, the cities may refer to the "C³ Model Action Lists" with recommended voluntary actions that cities could work on.

Model Action Lists are available for a variety of Action Categories (e.g., commercial cooking, bike sharing, port emissions management); the specific actions on these lists are good practices supported by scientific literature and city case studies.

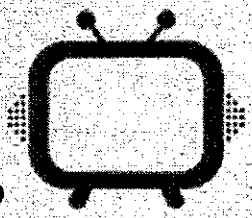
3 IMPLEMENT ACTION LIST

Guiding Principles

- City-to-city cooperation is a two-way exchange that helps learning cities to make progress in a specific area of air quality management.
- Both mentor and learning cities work together based on the agreed Action List and timeline.

Process

The cooperation can take different forms. For example, cities may share technical information via email, webinars, teleconferencing meetings. This may be supplemented with face-to-face meetings or study tours.



4 SHARE RESULTS AND LESSONS LEARNED

Guiding Principles

- Communication between the cooperating cities, either via phone, in meetings, or in writing (e.g., emails) is key to success of the **C³** program.
- Reporting the results of the city-to-city cooperation through video or audio interviews conducted or other means (e.g., presentations) by Clean Air Asia are easy and fun ways of sharing lessons learned to other cities.

Process

To facilitate communication, information on focal points for learning and mentor cities will form part of the Action List.

Video or audio recorded interviews of city representatives on the city-to-city cooperation will be shared with other cities primarily through the CCAP knowledge platform. Cities have the option to prepare a final powerpoint presentation to share results and achievements under the cooperation.

5 CONTINUING COOPERATION

Guiding Principles

- Cities that have successfully completed their **C³** program Action List are welcome to continue their partnership on other air pollution reduction actions.
- If they agree to, the cooperating cities may extend their city-to-city cooperation.

Process

Cities that wish to extend their cooperation or continue cooperating on other areas to reduce air pollution are encouraged to do so. Clean Air Asia requests the cities to inform it of such arrangements so it can continue to document and share the results of their cooperation with other cities.

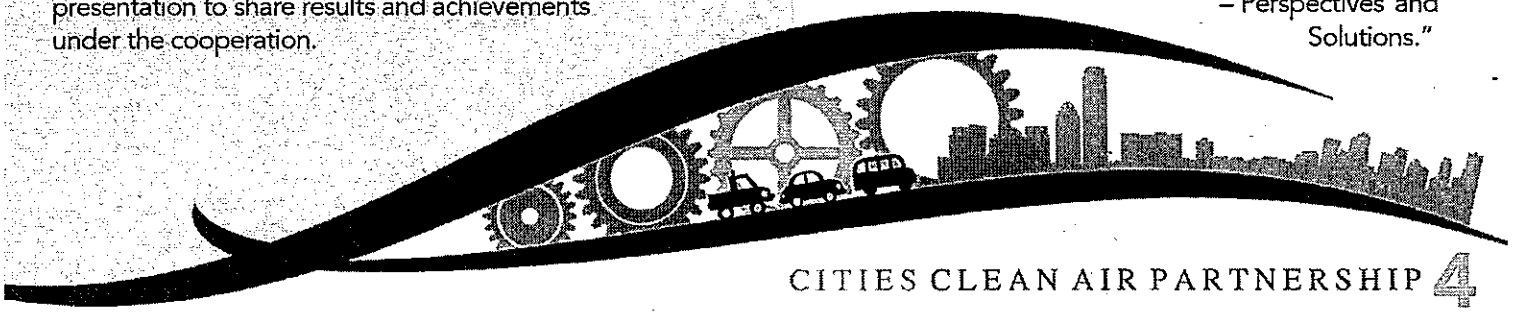
Once a city-to-city cooperation is successfully completed, the partnering cities remain part of CCAP and will be kept informed of CCAP activities. Learning or mentor cities can also opt to withdraw from the **C³** program by mutual consent.

6 BE RECOGNIZED

Cities will be recognized for exceptional performance in the **C³** program. The mechanics of the recognition program will be announced in 2015.

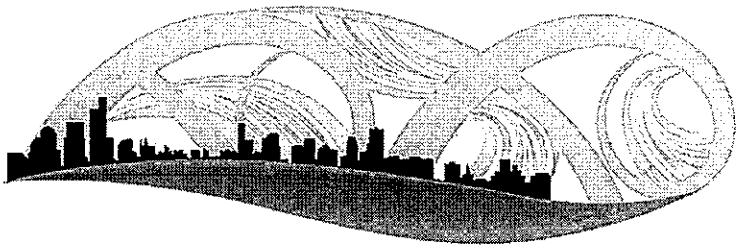
Exceptional performance worthy of recognition include, among others, learning cities that are recommended by their mentor cities as deserving of recognition with reasons listed by the mentor city in the letter to Clean Air Asia.

An exclusive "Community Day" only for CCAP cities will be held at the biennial Better Air Quality (BAQ) conference where the most successful **C³** program cities will be recognized for their achievements. The BAQ 2016 will be jointly held with the World Clean Air Congress in Busan, S. Korea on 29 August to 2 September 2016 with the theme "Clean Air for Cities – Perspectives and Solutions."



REGISTRATION FORM

Cities Clean Air Partnership
City-to-City Cooperation (C^3)



CITIES CLEAN AIR PARTNERSHIP

Desired learning area that your city needs

Please state learning area/s that your city needs. This should be in the context of an existing project, policy measure or air quality intervention that the city is already implementing or seriously planning to implement.

Describe the project/policy/intervention	Specific city-to-city cooperation need

Partnering period

Please indicate the estimated length of time that your city would like to engage in city partnering under the city partnering and to foster peer-to-peer learning.

☐ 3 months ☐ 1 year ☐ 6 months ☐ 1.5 years ☐ Other_____

How would you like to conduct technical exchanges through this city-to-city cooperation?

- ☐ Sharing technical information via email
- ☐ Webinars
- ☐ Teleconferencing or Skype meetings
- ☐ Face-to-face meetings
- ☐ Study tours
- ☐ Joint project planning
- ☐ Others, please specify:

What can your organization contribute to the partnership?

- ☐ Staff time
- ☐ Travel funds for study tours or in-person exchanges
- ☐ Funds to invite foreign experts
- ☐ In-kind resources
- ☐ Others, please specify:

Section D: Additional Information & Supporting Documents

Please attach any information that may be helpful for a mentor city. This could include links to your agency's website, a recent emissions inventory, or local initiatives addressing air quality that will provide additional context.

CLEAN AIR ASIA

REGISTRATION FORM

Cities Clean Air Partnership
City-to-City Cooperation (C^3)

CITIES CLEAN AIR PARTNERSHIP

Name of City		
Designated Point-of Contact	Name Title / Position Department/ Office E-mail Phone No. (Office)	Phone No. (Mobile)
Alternate Contact	Name Title / Position Department/ Office E-mail Phone No. (Office)	Phone No. (Mobile)

Feel free to provide additional contact persons on a separate page.

What does your city expect to accomplish through city-to-city cooperation?
This section aims to generate a broad indication of your city's priorities in the field of air quality management

- ☐ Emissions inventory of air pollution sources
- ☐ Air quality monitoring
- ☐ Clean air plan development
- ☐ Controlling emissions from diesel vehicles
- ☐ Reducing emissions from 2-3 wheeled motorized vehicles
- ☐ Port emissions management and control
- ☐ Controlling emissions from open burning of solid waste
- ☐ Managing emissions from power plants
- ☐ Managing emissions from industrial facilities (please specify)
- ☐ Controlling emissions from commercial cooking
- ☐ Controlling emissions from re-suspended road dust
- ☐ Controlling emissions from household cooking
- ☐ Setting up a public bike sharing system
- ☐ Pedestrian facility improvement to reduce transport emissions
- ☐ Promoting non-motorized transportation
- ☐ Citizen engagement in reporting polluting vehicles
- ☐ Improving enforcement of air pollution laws (please specify)
- ☐ Others, please specify:

City-to-City Cooperation
Cities wanting to be actively engaged in the city-to-city cooperation (C^3) component of the Cities Clean Air Partnership must fill in the requested information below. Answers in this section will be given due consideration in the matching process.

Expertise that your city can offer
Please state area/s of expertise that your city can offer. This could be a demonstration project, policy measure or intervention which has shown to result in air quality improvements.

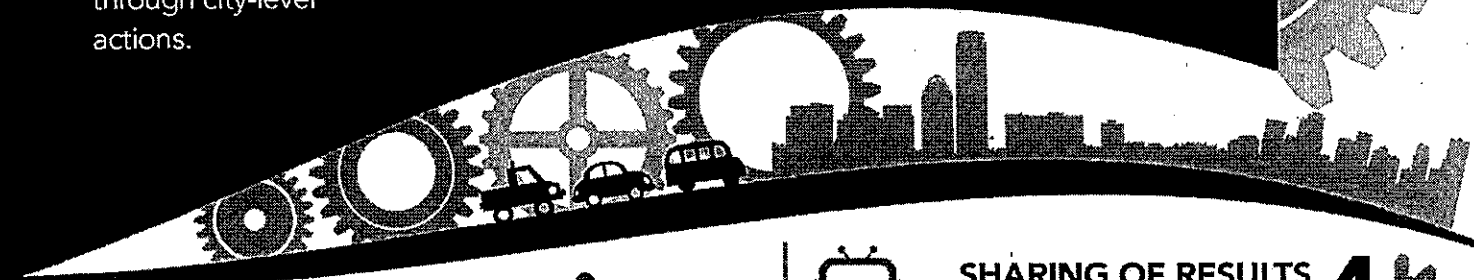
Describe the project/policy/intervention	What was achieved?

C³

A program under Cities Clean Air Partnership (CCAP) that promotes city-to-city learning and collaboration to drive measurable results through city-level actions.

Available to cities committed to taking action to reduce air pollution.

Volunteer partnering of cities allow exchange information on good practices and innovative solutions to reduce air pollution.



1 MATCHING CITIES

Learning City provides information on action categories or specific action(s) for which it seeks support from a **Mentor City**. The applicant specifies the desired partnering period - when, ways of working - how, and ways in which they can contribute (e.g., staff time).

2 DEVELOPING THE ACTION LIST

A **launch meeting**, preferably via conference call, will be facilitated by the Clean Air Asia to introduce the **Cooperating Cities** where objectives will be discussed and specific actions and timeline will be developed for the **C³** program.

3 IMPLEMENTATION

Cooperating Cities may share technical information via email, webinars, teleconferencing meetings. This may be supplemented with face-to-face meetings or study tours.

SHARING OF RESULTS AND LESSONS LEARNED 4

Video or audio recorded interviews of city representatives on the **C³** will be shared with other cities primarily through the **CCAP** knowledge platform.

CONTINUING COOPERATION 5

Cities that wish to extend their cooperation or continue cooperating on other areas to reduce air pollution are encouraged to do so. **Clean Air Asia will document the progress**, as informed.

ON AIR

RECOGNITION 6

The **most successful C³ program cities** will be recognized on the exclusive "Community Day" only for CCAP cities at the biennial Better Air Quality (BAQ) conference in 2016.

CITY-TO-CITY COOPERATION

CCAP is an initiative which empowers cities to achieve clean air targets through voluntary city-to-city cooperation, knowledge platform and expert community, and voluntary eco-label that recognizes cities for taking significant steps to improve air quality and their capacity to manage air quality (currently being developed, to be piloted in 2016). We aim to reach more than 200 cities across Asia.

The Cities Clean Air Partnership is an initiative of Clean Air Asia supported by the International Environmental Partnership. IEP

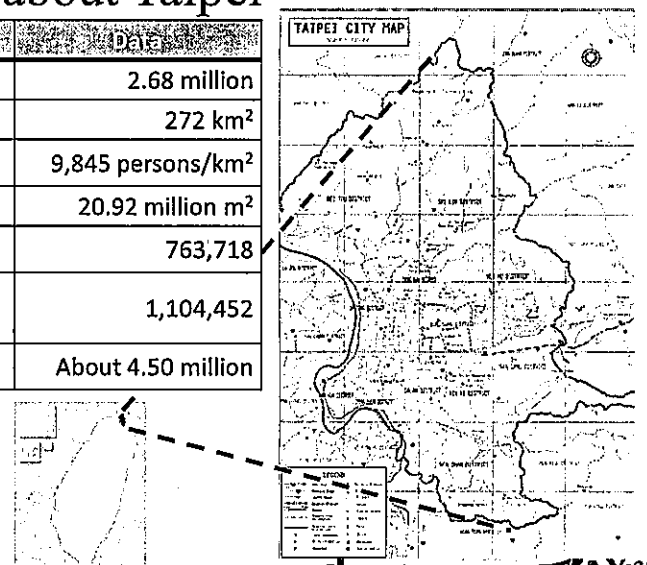
CITIES CLEAN AIR PARTNERSHIP

Developing Public Bike-sharing Systems: Bike Sharing Scheme in Taipei

Director Kuo-Su Chiu
Technical Laboratory
Department of Environmental Protection
Taipei City Government, Taiwan
12 August 2015

Fast Facts about Taipei

Characteristic	Data
Population	2.68 million
Area	272 km²
Population Density	9,845 persons/km²
Road Area	20.92 million m²
Registered Vehicles	763,718
Registered Motorcycles	1,104,452
Daytime Population	About 4.50 million



Contents

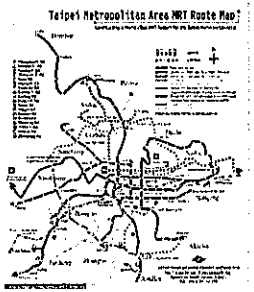
Fast Facts about Taipei

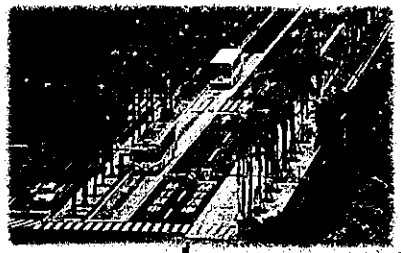
Metro

- 14 lines
- 134.6 km
- 116 stations
- 2 million passengers/day

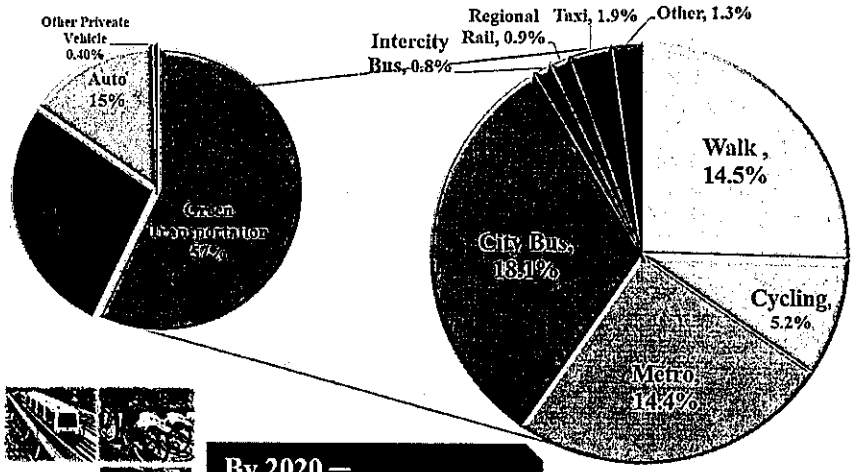
City Bus

- 3,313 buses
- 284 routes
- Service coverage to within 500 meter of all city residents:97.5%
- 1.43 million passengers/day





The Modal Split in 2013



By 2020 —
Green Transportation : 70%
Cycling : 12%

Mode Transition Strategy

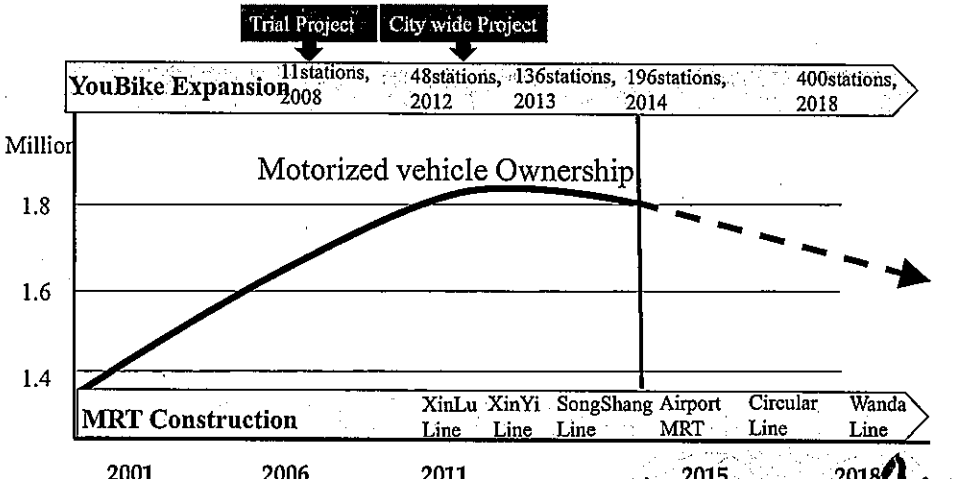
Auto & Motorcycle	Public Transportation
• Accessibility • Lower Travel Cost	• Inaccessibility • Higher Travel Cost

Parking Fee (Reasonable Cost)

Bike Sharing System (Last Miles)

PT+YouBike

Motorized Mode Ownership in the future

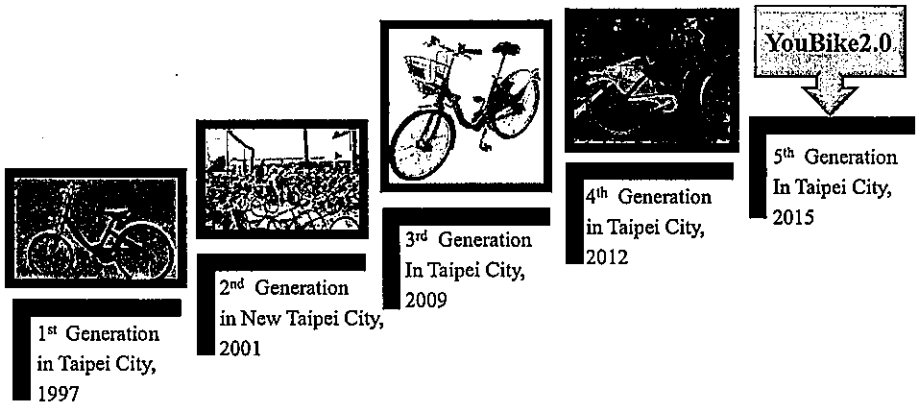


Environmental Impact

Cycling in Taipei

Global Warming

History of Bike Sharing System



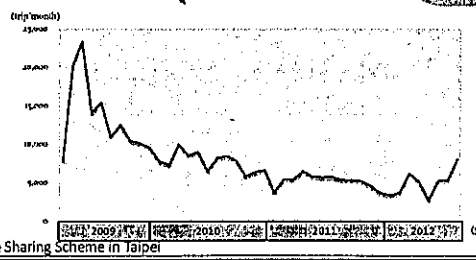
3rd Generation Taipei Bike Sharing System (2009)

Failure

- 5,000 trips per month in 2011 & 2012
- Turnover Rate: almost one time/day

Reasons

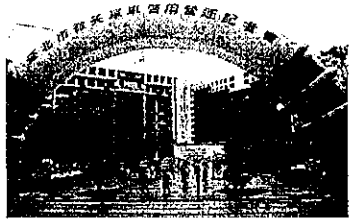
- Limited coverage
- Unfriendly registration process
- Similar fare as other PT modes



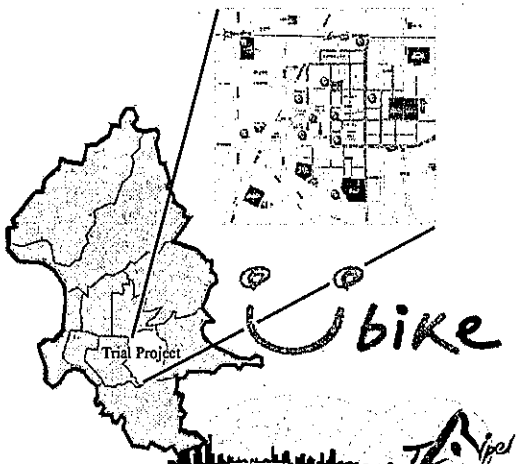
Analyzed the users' behavior.

3rd Generation Taipei Bike Sharing System (2009)

A story about persistence pays off



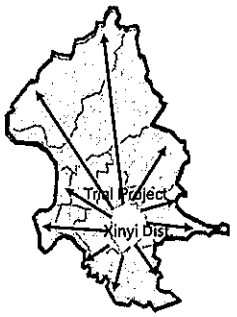
Trial project started from Mar. 2009
11 stations 500 bikes in Xinyi district

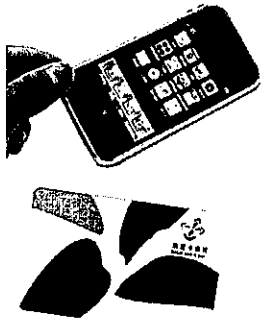


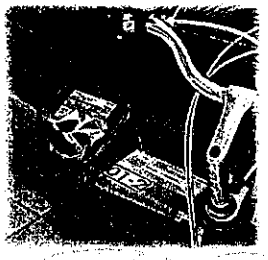
4th Generation Taipei Bike Sharing System (2012)

Restart Program

Network Expansion to Taipei City | **Easy to Register in Kiosk** | **Fare strategy No Annual Fee**







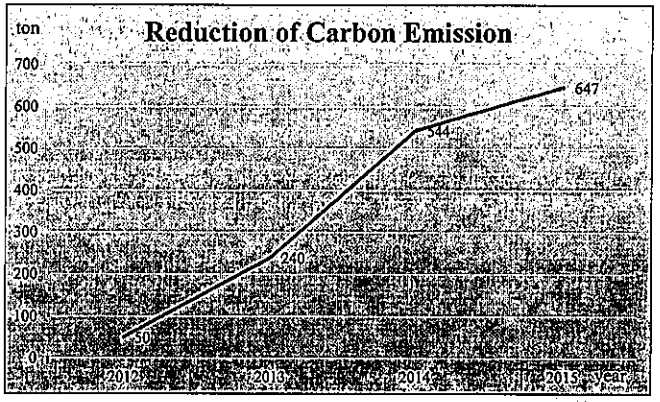
4th Generation Taipei Bike Sharing System (2012)

The Bike

1. RFID technology
2. One Size Fits All
3. Auto light in the head and trail
4. With convenient lock
5. Anti-rust material
6. Strengthened basket
7. U-shape structure
8. Easy to sit on

Innovation of Cycling

Reduction of Carbon Emission



Innovation of Cycling

Reallocated with MRT construction

Innovation of Cycling

Green, Sustainable,

Healthy, Lifestyle

The keys to success

- Connect to the Public Transportation Systems
- Easy Registration and No Annual Fee
- Easy Accessible and Proper Maintenance

Evolution of Youbike

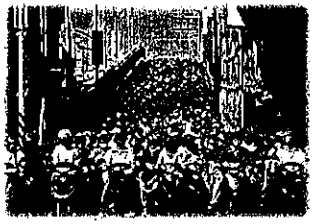
From Motorized Mode to Green Transportation

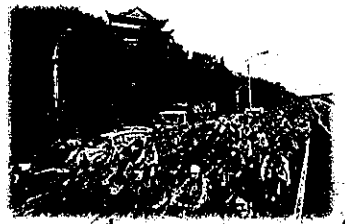
60% in 1990

Auto & Motorcycle

70% in 2020

Green Transportation
Bus, MRT, Bike and walk





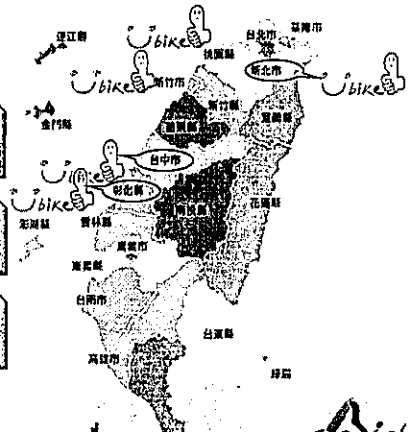
Evolution of Youbike

Public Bike Design from normal to high quality

Evolution of Youbike

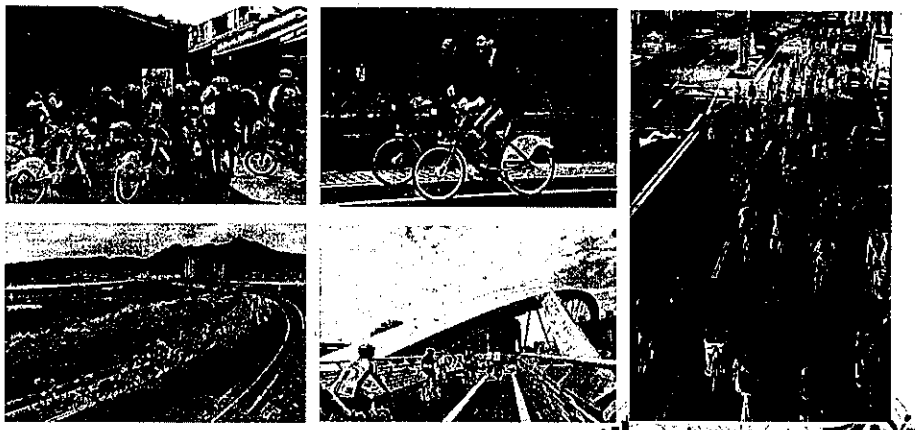
Bike Sharing Systems boomed in Taiwan

- New Taipei City
- Taoyuan City
- Xinzhu County
- Taichung City
- Changhua County
- Pingtung County



Evolution of Youbike

Creating Diversity Culture of Cycling



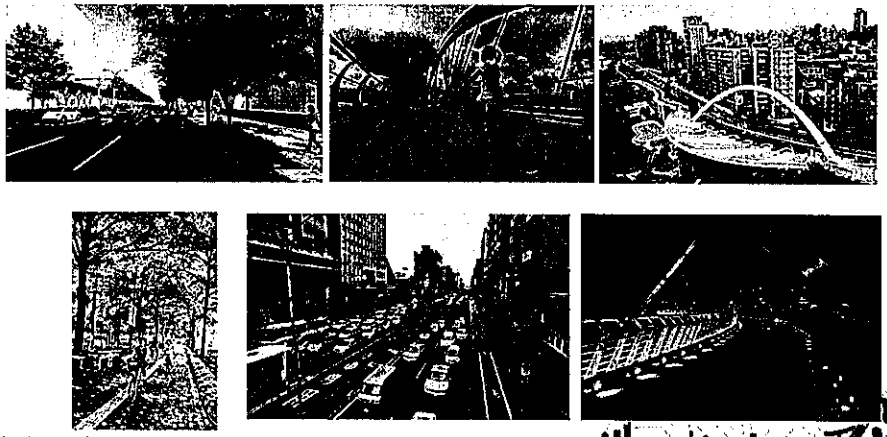
Evolution of Youbike

From Subsidy for Promotion to Break-even Finance

2012	2015	2019
The First 30 min $10 NTD subsidy + Construction subsidy	**The First 30 min** $5 NTD subsidy + Construction subsidy	**Break-even Business**

Evolution of Youbike

The Changing Landscape in Taipei City



Welcome to Velo-city Global 2016 in Taipei

CITIES CLEAN AIR PARTNERSHIP

TAICHUNG CITY PRESENTATIONS ON CHALLENGES IN IMPROVING AIR QUALITY

Outline

1.

2. Taichung City Air Pollution Control strategies and measures

3. Bituminous control and regional management Taichung

ENVIRONMENTAL PROTECT ON BUREAU,TAICHUNG

1. Environmental Impact and Air quality in Taichung

ENVIRONMENTAL, TAICHUNG

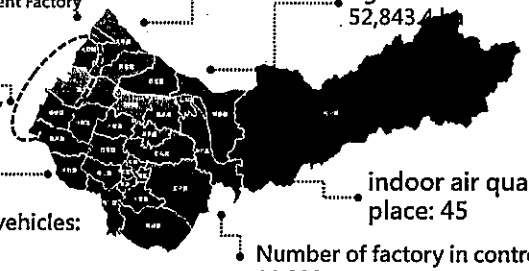
Population of 2,719,835 people
Land area of 2,214.9 square kilometers

Factory Registration Number: 17610
- Number of management Factory 2,914

Number of Temple1,064

Agricultural land area 52,843.4 ha

Taichung Harbor: Electric power industry, steel industry, tanks, diesel trucks, ocean-going vessel



indoor air quality control place: 45

Number of motor vehicles: 2,662,965

Cars : 1,015,213
- Diesel Cars : 25,716

Motorcycle : 1,647,752
Two stroke motorcycle : 302,550

Number of factory in control: 11,800
- Number of the first stage construction site : 3,827件
- Number of the second stage construction site : 5,628

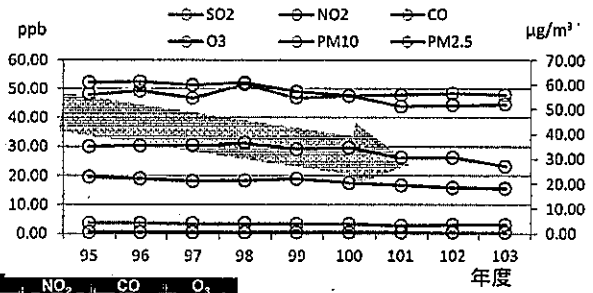
Statistic until End of December 2014

ENVIRONMENTAL PROTECT ON BUREAU, TAICHUNG

2. Taichung City Air pollution control strategies and measures

Air Pollutants, Taichung

Taichung 2006-2014 air quality trends



Year	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	O_3
Unit	μg/m³	μg/m³	ppb	ppb	ppb	ppb
95	60.90	34.94	3.64	19.51	0.57	48.06
96	61.17	35.38	3.76	19.02	0.56	49.34
97	59.77	35.56	3.53	18.10	0.51	46.83
98	60.80	36.52	3.49	18.49	0.49	51.53
99	57.29	34.09	3.46	19.03	0.51	46.93
100	55.60	34.73	3.31	17.58	0.47	47.61
101	51.34	30.60	2.89	16.73	0.46	47.81
102	51.74	30.64	3.14	15.86	0.44	48.39
103	52.07	26.98	3.12	15.60	0.43	47.90
Air quality standard	65 Annual Av.	15 Annual Av.	30 Annual Av.	50 Annual Av.	9 8hrs	60 8hrs

Taichung air pollutants data from 2006 to 2014

Discription1 : NO_2、SO_2、O_3、Co (Unit is ppb)、$PM_{2.5}$、PM_{10} (Unit is μg/m³)
Discription2 : PM2.5 data for the automatic monitoring station data

2. Taichung City Air Pollution Control strategies and measures

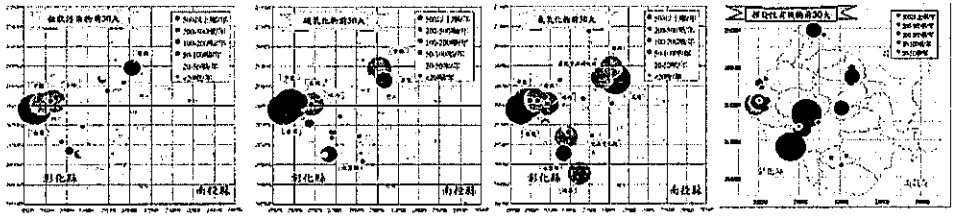
Item	Tactics	Action
1.	Initiate cross Bureau Air pollution reduction and control of the total amount	Establish Taichung Air pollution reduction groups and promote control of the total amount
2.	Taichung greenhouse gas emissions management and reduction	Based on the development of low-carbon city Taichung Autonomy fixed under section 24, 25 methods of control, out of the amount of major sources emissions required self control of reduction
3.	The development of regulatory of bituminous coal and prohibit autonomous regulations for petroleum coke	Basic development environment based on low-carbon city of Taichung cum Autonomy fixed under section 24,25,26 regulatory approach, requiring bituminous reduction and disabled petroleum coke Article 22
4.	Stringent emission standards for stationary sources together	1. Set emission standards for air pollutants coal-fired boiler
		2. Revised Taichung emission standards for electric power facilities
		3. Revised Taichung steel industry emission standards
5.	Green space beautification - Urban Afforestation	1.Set Taichung space management autonomy regulations
		2. Promote Taichung City Forest Green Gallery - Million Forestation

ENVIRONMENTAL PROTECT ON BUREAU,TAICHUNG

3. Bituminous control and regional management Taichung

Stationary source emissions Distribution

➢ Distribution of each emissions



Taichung Harbor~ The region with the highest environmental impact

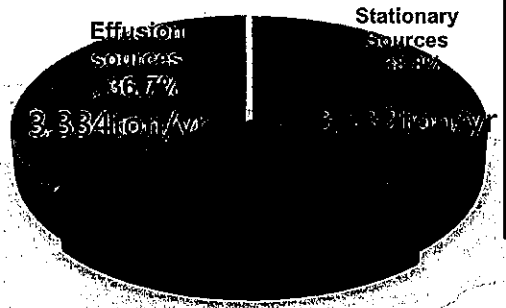
Items	Stationary source emissions per unit area (mt / km)			
	TSP	SOx	NOx	VOCs
Taichung Harbor	117.3	690.7	1,022.3	39.8
Taichung	2.7	8.9	13.6	2.7
Excluding Port of Taichung	1.4	1.0	2.1	2.3

Bituminous coal combustion~ high proportion of emissions

Particulate matter produced by the combustion of bituminous coal, sulfur oxides and nitrogen oxides are about 48 per cent of the city's total emissions from stationary sources tube, 90% and 85%.

Taichung PM2.5 emissions analysis (including primordial and derivatives)

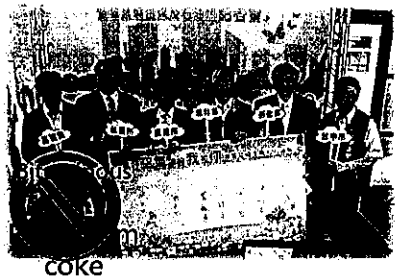
$PM_{2.5}$ Emission Ratio (including primordial and derivatives)



Items	$PM_{2.5}$ Amount	The proportion accounted for stationary sources(%)	The city's total proportion(%)
Taichung Power Plant One to fourth machine	771	21.8	8.5
Taichung whole power plant	1,841	52.1	20.2
Coal-fired sources (Including Taichung Power Plant)	2,351	66.6	25.8

Source: Environmental Protection Agency, Executive YuanTEDS8.1

Six counties in central and southern common agreed with disabled bituminous coal and petroleum coke



coke

Enhance air quality in the city and neighboring counties and reduce the city's greenhouse gas emissions from fuel use need (source) of bituminous control and disable the petroleum coke in order to achieve goals。

Revision Autonomy Statute

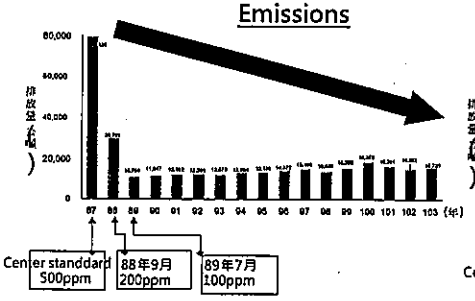
Control bituminous autonomous regulations + Tightened discipline + Self-Management Plan = Pollution Reduction

Tightened Standard and promoting experience

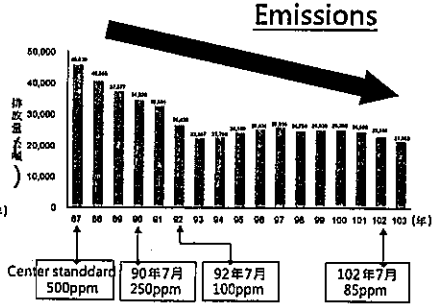
13

➢ Power facilities tightened standard

SOx Emissions



NOx Emissions



Formulate autonomous regulations and amendments tightened standards

~$PM_{2.5}$、SOx、Nox may further reduce 470、6,052、5,297ton/year。

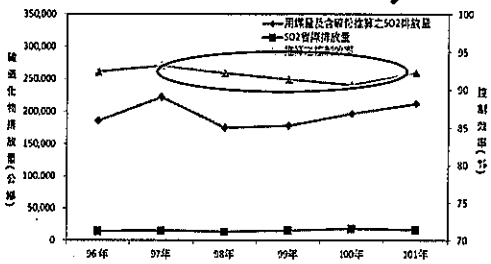
Taichung Harbor Cap

15

➢ Taichung power plant control FGD Check

- ✓100 years of power generation increased by 2.86%, but the increase in emissions intensity of 26.93%。
- ✓Control equipment performance degradation is a key factor.

Combined with changes in the mas balance verification efficiency



Method

Narrows down the whole plant allowa -nces

- Sulfur coal-fired Control Manager
- FGD efficiency Co ntrol Manager

Large Polluted Source Control expand to Taichung Harbor management~development of low-carbon urban autonomy under section 24-26

Total area control extends to the whole plant

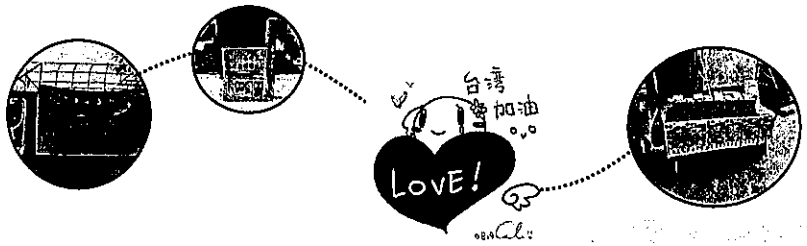
With the total area of the implementation of regulatory framework

Bituminous reductions, Multi-pronged, Integrated solutions

14

Repair updating focus	Limit coal autonomous regulations	Power facilities / solid fuel standards
New Coal-fired boiler	No new sources of bituminous coal licenses issued	Set coal-fired pollution sources to a difficult achievement for the new standards
Existing coal-fired boilers	• Six months after the exchange of high-quality bituminous coal, reduce the amount of bituminous coal by 40% in four years • Review every three years	Stream power unit • From the fourth year emissions shall not exceed 2014 of emissions by 60 percent • Power One to four planes from 2020/1/1 to apply the new change standard • Cogeneration boiler / solid fuel: 2018/1/1 apply new pollution standards
Heap of coal field	2018/12/31 starting to use the close coal storage room building	The second stage of raw materials storage site of the particulate matter standard purposes 2018/12/31
Heavy Metal		• Regular testing every year • New polluting sources in the pipeline can not be detected to have heavy metals

Presentation finish



The Basic Elements

- **Monitoring**
  - Funding
  - Monitor siting and density
- **Data Acquisition**
  - Ensuring quality
  - Timeliness
- **Health-based information**
  - Sound science
  - Actionable information
- **A community**
  - Self-supporting
  - Important input on direction
  - Amplify the messages

Communicating Air Quality to the Public: A case study

Phil Dickerson
US Environmental Protection Agency
dickerson.phil@epa.gov

Beyond the basics

- **Analysis Tools**
  - Event analysis, trends, forecast development
  - AirNow Tech
- **Forecasting**
  - Most protective to warn ahead of time
  - Variety of options to build a forecast program
- **Modeling**
  - Useful for forecasting, evaluating control scenarios, and predicting attainment of standards
  - Realtime data provides an excellent model evaluation dataset

Beyond the basics

- **Satellite**
  - Increasing availability of global air quality satellite products, e.g. AirNow Satellite Data processor
  - Can show transport from other areas, as well as provide a global dataset
- **Small Sensors**
  - Citizens are taking their own measurements
  - How good are these instruments?
- **Mobile monitors**
  - Especially for emergency response
  - Issues similar to small sensors

AIRNOW as a case study

- **Year Round 24/7 coverage** delivers real-time data for 50 States, 6 Canadian Provinces and 24 U.S. National Parks
- **AQI forecasts** for over 400 cities
- **State-of-the-science information** about air pollution health effects for the public, media and stakeholders
- **Public/Private partnerships** with The Weather Channel, USA Today, CNN, weather service providers, NOAA National Weather Service

AIRNOW as a case study

- Started in 1990s in a single city – Baltimore
- Concept spread rapidly from city, to state, to EPA regional office, to national program
- Began with ozone, due to extensive ozone monitoring network
- Went through the "growing pains" of PM2.5 monitoring in the early 2000s
- "Iterative development" – started small, made many, many changes and eventually became a national program
- AirNow International is the fruit of those labors

How AirNow fits

- **Monitoring**
  - AirNow both capitalizes on the existing monitoring programs and give them a public face
- **Data Acquisition**
  - AirNow has very robust automated QA
  - Built with timeliness as a major goal
- **Health-based information**
  - The AQI's "public face"
  - Central repository for health information
- **A community**
  - AirNow Community of international experts has bimonthly webinars, an online forum

How AirNow fits…

- **Analysis Tools**
  - Event analysis, trends, forecast development
  - AirNow Tech
- **Forecasting**
  - State, local, and sometimes city officials determine their forecast, AirNow simply distributes
  - AirNow provides national consistency and a national data product for the media
- **Modeling**
  - AirNow data feeds into a number of models, notably the NOAA Air Quality Forecast model

AQI
AIR QUALITY INDEX
Your forecast to breathe by

Regulatory requirement for cities > 350,000 people

State and local agencies are required to report the AQI to the public daily

When AQI > 100, agencies must also report sensitive groups

How AirNow fits…

- **Satellite**
  - AirNow Satellite Data processor
  - Provides PM2.5 estimates in areas with no monitors
- **Small Sensors**
  - AirNow is the data management center for EPA's Village Green benches
  - Could we collect actual citizen measurements?
- **Mobile Monitors**
  - AirNow receives data from US Forest Service mobile monitors deployed for fires

Resources for you

- **AirNow.gov**
- **AirNow Community**
  - The more members, the more help!
  - Online resources: web page, forum, webinar
- **AirNow International**
  - The entire data management infrastructure
  - Used in several sites in China and Mexico
- **AirNow Tech**
  - Taiwan submits their data only
  - That data allows them to use tools like the HYSPLIT trajectory model, and view satellite data

Questions?

You can do it!!

- Start small
- Capitalize on existing resources
- Build communities, then build systems
- Raise public awareness

- **Ask for help when you need it**

CITIES CLEAN AIR PARTNERSHIP WORKSHOP | Washington D.C., USA, 10-12 August 2015

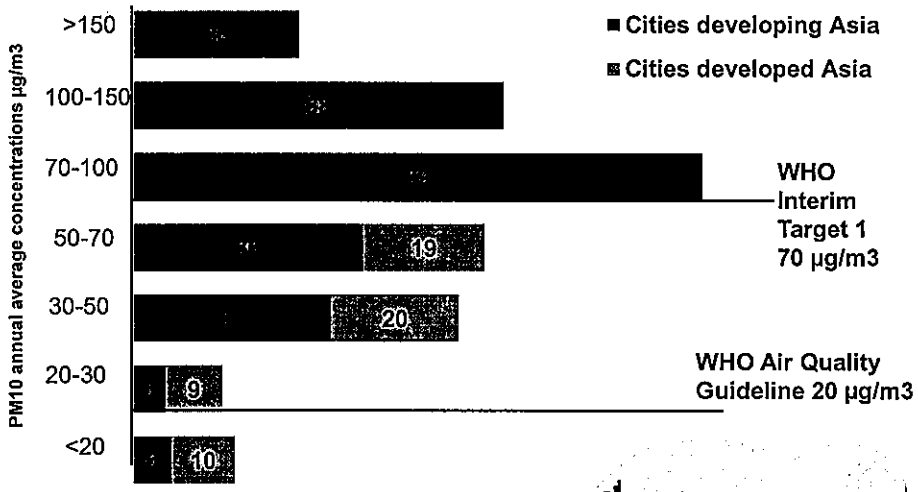
下午 3/11 ②

CITIES CLEAN AIR PARTNERSHIP

Status of Air Quality Monitoring in Asian Cities

Kaye Patdu
Clean Air Asia
Kaye.Patdu@cleanairasia.org

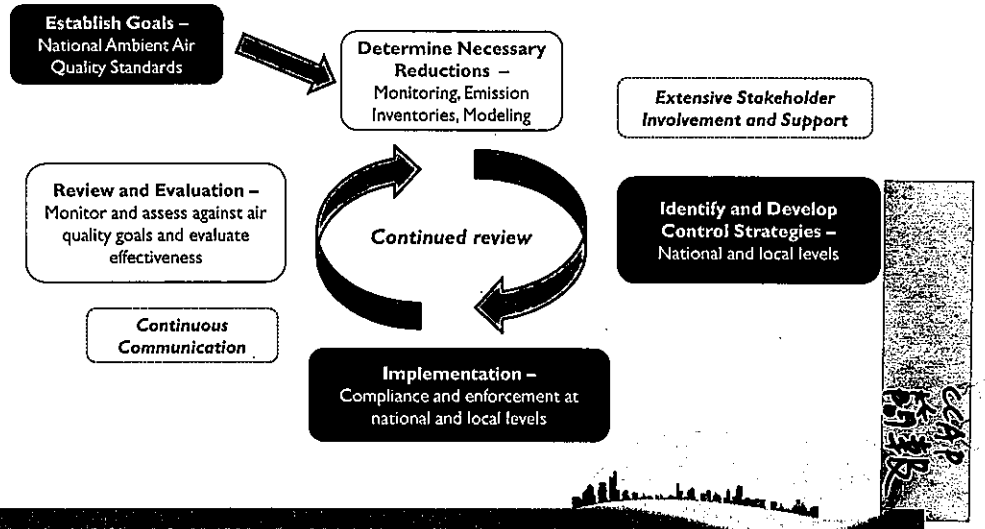
Air pollution challenge:
7 out of 10 cities in developing Asia have poor air quality



Source: Clean Air Asia, 2013.

CITIES CLEAN AIR PARTNERSHIP WORKSHOP | Washington D.C., USA, 10-12 August 2015

Reliable air quality monitoring is important



Adapted from Beeldcamp, 2007

CITIES CLEAN AIR PARTNERSHIP WORKSHOP | Washington D.C., USA, 10-12 August 2015

Status of air quality monitoring in Asian cities

- Based on results of ADB TA 6422
- AQ Monitoring Survey Respondents
  - 39 valid city respondents, covering 14 countries (Bangladesh, Bhutan, China, India , Indonesia, Japan , Lao PDR, Mongolia, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, Vietnam)
  - 11 megacities that responded to the survey, namely, Tokyo, Jakarta, Seoul, Delhi, Mumbai, Manila, and Dhaka.

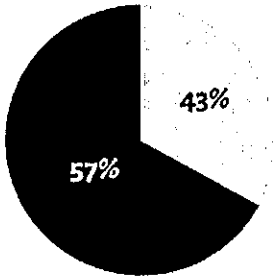
Which pollutants are regularly monitored? Are these in line with national standards?

Countries and selected major cities		Pollutants							
		TSP	PM_{10}	$PM_{2.5}$	Pb	NO2	SO2	O3	CO
India	With standard/GV		✓	✓	✓	✓	✓	✓	
• Delhi	Monitored	✓	✓	✓	✓	✓	✓	✓	✓
Indonesia	With standard/GV	✓	✓	✓	✓	✓	✓	✓	✓
• Jakarta	Monitored	✓	✓	✓	✓	✓	✓	✓	✓
Lao PDR	With standard/GV	✓	✓		✓	✓	✓		✓
• Vientiane	Monitored								
Mongolia	With standard/GV	✓	✓	✓	✓	✓	✓	✓	✓
• Ulaanbaatar	Monitored		✓	✓		✓	✓	✓	✓
Nepal	With standard/GV	✓	✓		✓	✓	✓		✓
• Kathmandu	Monitored								
Philippines	With standard/GV	✓	✓	✓	✓	✓	✓	✓	✓
• Manila	Monitored	✓	✓	✓		✓	✓	✓	✓
Thailand	With standard/GV	✓	✓	✓		✓	✓	✓	✓
• Bangkok	Monitored	✓	✓	✓		✓	✓	✓	✓
RO Korea	With standard/GV		✓		✓	✓	✓	✓	✓
• Seoul	Monitored	✓	✓	✓		✓	✓	✓	

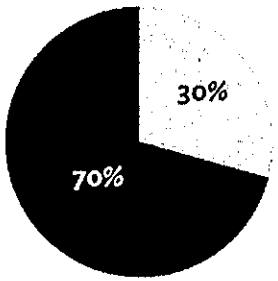
Source: Clean Air Asia

Is the number of monitoring sites sufficient to represent the city?

(a) Including 69 cities



(b) Developing cities only (excluding Japan, Singapore and Republic of Korea)



Cities within recommended number of stations
Cities below recommended number of stations

Are the sites properly sited?

Specific in-situ characteristics

Assessment of in-situ characteristics of AQMt stations was included during assessment of AQMt in selected cities (Bangkok, Bandung, Delhi, Hanoi, HCMC, Jakarta, Rayong, Seoul, Surabaya, Singapore, and Ulaanbaatar).

Some of the observed include:

- Most fixed stations were within breathing zone
- There were flow obstructions observed in some of the stations
- Uncertainty regarding representativeness of existing stations

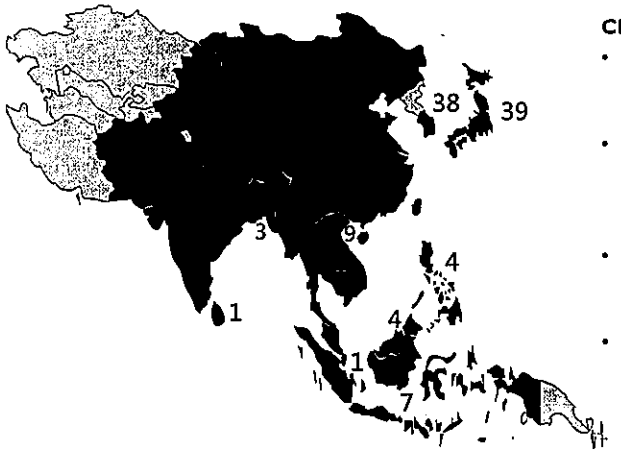
Monitoring Meteorological Data

Several monitoring stations in developing Asian cities do not collect meteorological information

Challenges of air quality monitoring in Asian cities

Limited Scope	Issues with data quality
• Few cities with AQ monitoring systems • Few pollutants monitored • Limited number of monitoring stations	• Unclear AQ monitoring guidelines and siting criteria • Frequency of monitoring • QA/QC procedures
Sustainability of monitoring	**Use of Data**
• Technical capacity • Monitoring equipment after sales service • Budget for capital investment and budget for operations • Alternative Financing options for AQ monitoring	• Lack of linkages with standards review and revisions
Other issues	
• Power fluctuation, outages, security	

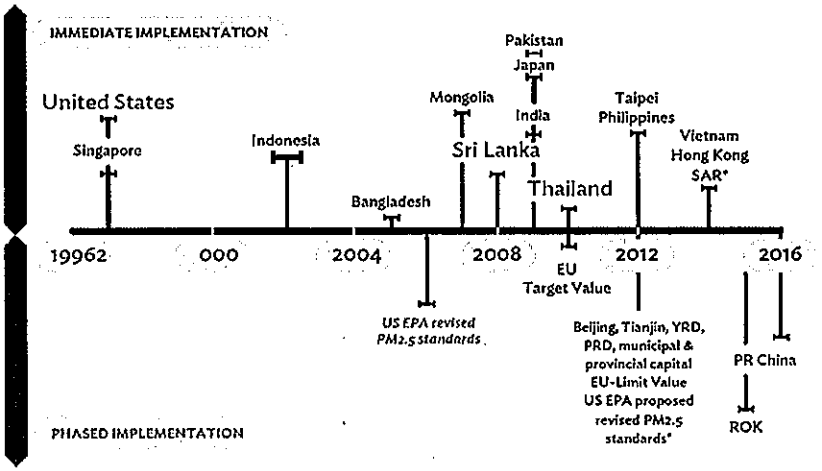
Increased access to air quality data



Clean Air Asia AQ Database

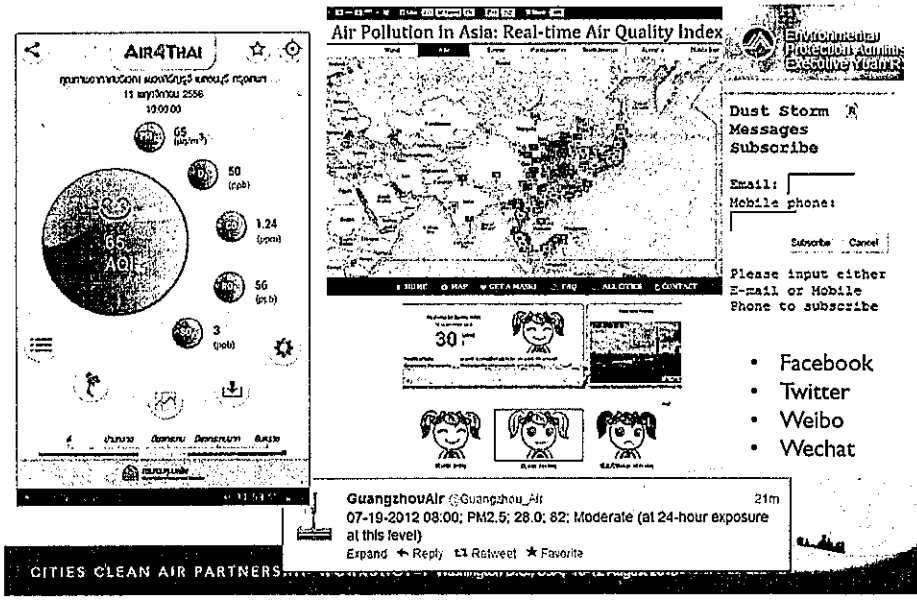
- **Pollutants covered:** PM_{10}, SO_2, NO_2 ($PM_{2.5}$ for few cities)
- **Geographic scope:** collecting data for 20 Asian countries (total of over 400 cities)
- **Frequency:** annual concentrations from 1993 to 2014
- **Source:** Secondary data from environment bureau website, national statistics websites, request from city contacts

Asia moving from monitoring TSP towards monitoring PM10 and PM2.5



Source: Clean Air Asia

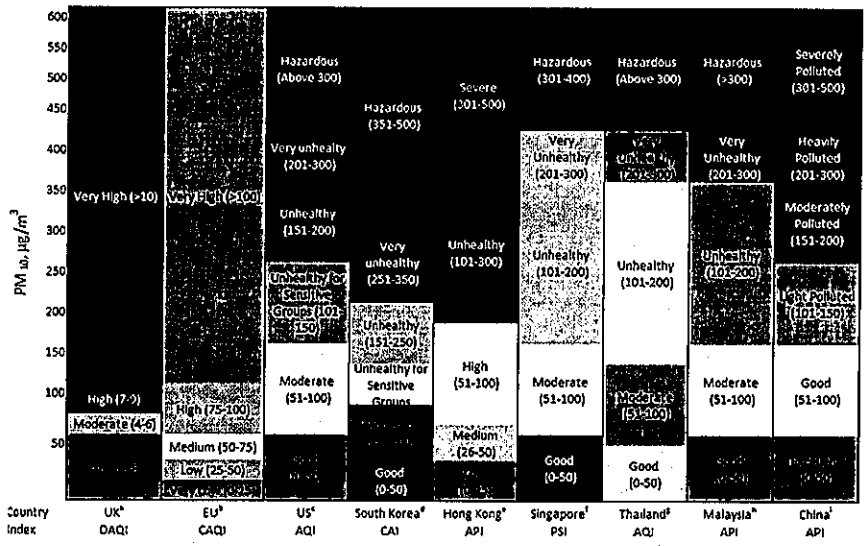
Increased use of social media and mobile technology



Communicating air quality status in simple way through indexes

Countries	Status	Reporting Frequency
Bangladesh	Proposed	Daily
Brunei Darussalam	Implemented	Daily
PR China	Implemented	Hourly
India	Proposed	Daily
Indonesia	Proposed	Daily
Malaysia	Implemented	Hourly
Pakistan	Implemented but irregular	Daily (Irregular)
Philippines	Implemented but selected cities only	Daily
Republic of Korea	Implemented	Hourly
Singapore	Implemented	Daily, 3-hr
Sri Lanka	Established but not implemented	Daily, weekly
Thailand	Implemented	Running Mean Hourly for some stations, daily for others
Vietnam	Implemented	Hourly

Possibility for miscommunication



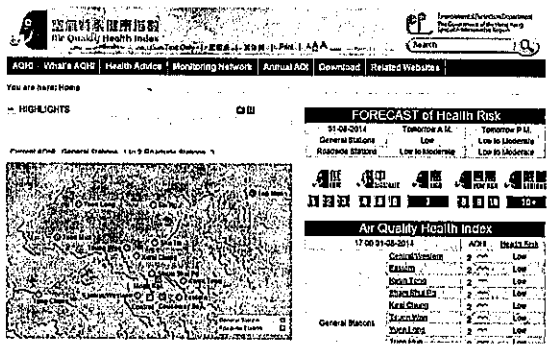
Source: Clean Air Asia, 2013.

Differences in AQI can confuse public

And communicating the associated health risk of air quality

Hong Kong SAR. Developing APHI for short-term health risk communication

- HK EPD launched the Air Quality Health Index (AQHI) to replace the Air Pollution Index (API) from 30 December 2013.
- Informs public of short-term health risk of air pollution.
- AQHIs are reported on a scale of 1 to 10 and 10+ and are grouped into five health risk categories.
- Developed using Canada AQHI as basis.



http://www.aqhi.gov.hk/en.html

Highlighting the importance of partnerships

- **EANET – Acid Deposition Monitoring Network in East Asia**
  - *Countries covered:* Russia, Mongolia, China, ROK, Japan, Philippines, Lao PDR, Thailand, Vietnam, Cambodia, Myanmar, Malaysia, Indonesia
  - *Pollutants monitored:*
    - Dry Deposition: Gases: concentrations of SO_2, NO_2, O_3 and others; Particulate components
    - Wet Deposition: Precipitation analysis: pH, EC, concentrations of SO_4^{2-}, NO_3^- and other ions
- **Male Declaration**
  - *Countries covered:* Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, Sri Lanka
  - *Pollutants monitored:* varied
- **Regional Cooperative Agreement (RCA) under the International Atomic Agency**
  - *Countries covered:* Australia, Bangladesh, China, India, Indonesia, Korea, Malaysia, Mongolia, New Zealand, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam
  - *Pollutants monitored:* PM2.5, PM10, BC/OC
- **ASEAN Transboundary haze monitoring**
  - *Countries covered:* Brunei Darussalam, Cambodia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam
  - *Pollutants monitored:* hotspots monitoring

Key points

- AQ monitoring is important! It helps understand status of AQ, which guides the development of an effective AQM strategy and other relevant applications
- There are challenges in AQ monitoring in Asia which needs to be addressed,
- Nonetheless, there is clear demand for air quality information and this provides opportunities for improving existing systems
  - Learning from other cities and existing partnerships

T 8/11 (3)

CITIES CLEAN AIR PARTNERSHIP

Emission Inventory as a Foundation of Air Quality Management (The Case of Iloilo City)

Norlito C. Bautista, MMPM
City Administrator

Iloilo City, Philippines

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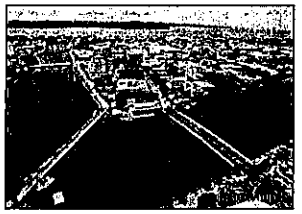

The Case of Iloilo City

Overview

- Highly urbanized city, daytime population of half a million (1.8% growth rate)
- Robust economy
- Roads – 132 km., generally narrow with traffic congestion in major routes
- Modern airport with more than 20 commercial flights daily
- Port facilities which receives more than 22,000 ship call annually.

Air Pollution Trends

- Rapid urbanization
- Increasing demand for transportation
  - More than 62,000 registered motor vehicles in the city
  - 20% of total registered vehicles are for hire
  - More than 4000 tri-cycles, 65% of which are 2 stroke
  - More than 5000 jeepneys, all of which are diesel fed
  - More than 1000 taxis

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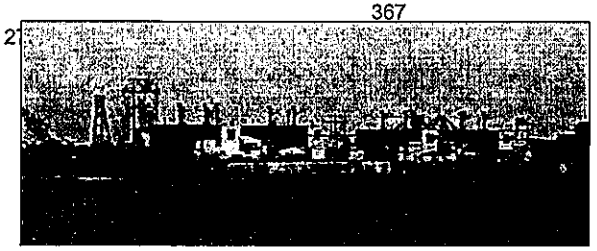
Iloilo City

Air Pollution Trends

- Increasing demand for power

Year	Demand	Supply	Gap (Megawatts)
2015	266	301	35
2020	21	367	



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The Case of Iloilo City

Air Quality Situation before Emission Inventory

- National Emission Inventory (2007) indicate that Iloilo City could be the major contributor of air pollution in Region 6 = **needs confirmation**
- Air pollution and haze appears to be a growing problem, but air quality in Iloilo City **is not comprehensively monitored**
- Two monitoring stations in Iloilo measures Total Suspended Particulates (TSP) only and **is not a reliable health impact indicator**
- Initial observation that principal sources of air pollution are agricultural waste, open burning, transport and power station is not yet reliable (limited scientific basis)

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The Case of Iloilo City

Health Implications Studies Before EI

- No epidemiological study available on the health impacts of air pollution
- However extensive international studies have been carried out, this helped in the understanding of the health impacts of air pollution :

- Nitrogen Dioxide - may irritate the eyes, nose, throat and lower respiratory tracts. Aggravates ashma and existing chronic respiratory diseases
- Sulfur Dioxide – irritates the eyes and nose, and causes narrowing of airways. Aggravates asthma.
- Suspended Particulates – increase in concentration may increase hospital admission and deaths due to respiratory and heart diseases

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The Case of Iloilo City

Emission Inventory

- Started June 2011 and completed on June 2012, covering :
  a) Mobile sources
  b) Area sources
  c) Point sources
  d) Port emissions
- Pollutants covered
  a) No_x, So_x, and PM
  b) CO, CO_2, NMVOV, NH_3
- Partners : University of San Agustin, Central Philippine University, University of the Philippines

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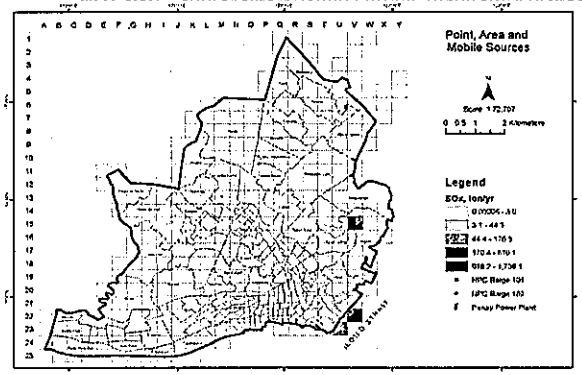
The Case of Iloilo City

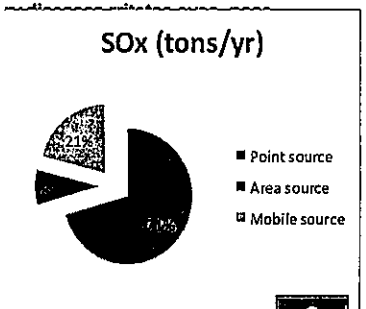
Emission Inventory Results

Sulfur Dioxide (SOx) Emission ***increase response to allergens (for those with asthma).***

NO2 also aggravates existing chronic respiratory diseases may i may irritate the eyes,

se to allergens (for those with





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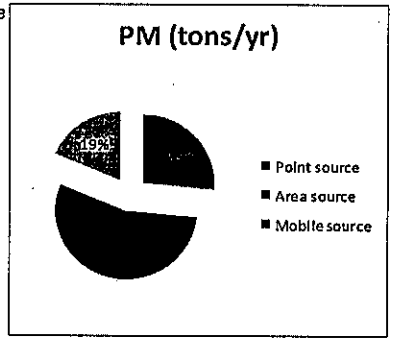
The Case of Iloilo City

Emission Inventory Results

Particulate Matter Emissions Increase response aggravates existing chronic re

- ❑ The PM emissions are dominated by the area sources which emitted 55% of PM per year
- ❑ This is mainly due to cooking and electric generator sets of major business establishments
- ❑Other contributors of PM are the on-road sources, particularly jeepneys and tricycles.



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The Case of Iloilo City

Emission Inventory Results

Nitrogen Dioxide Emissions *increase response to allergens (for those with asthma). NO2 aggravates existing chronic re*

- ❑ Coverage : Sea vessels, Non-road (port and farm equipment) , and on road (jeepneys, cars, tricycles, motor cycles, heavy duty vehicles, light vehicles)
- ❑ Nox – 60% from road traffic
- ❑Sox – 70% from sea vessels
- ❑PM – 80% from road traffic
- ❑Among the on-road vehicles, jeepney accounts for 58% of Sox, 60% of Nox and 65% of PM

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The Case of Iloilo City

Emission Inventory Results

Area Sources increase response to aggravates existing chronic re

- ❑ Coverage : Landfill, agriculture, cremation, generating sets, solvents, evaporative emissions, cooking
- ❑ Nox – 90% from generating sets
- ❑Sox – 83% from cooking
- ❑PM – 100% from cooking

Point Sources increase response existing chronic re

- ❑ Coverage : Powerplant, fuel depot, seaport
- ❑ Nox – 96% from powerplants
- ❑Sox – 100% from powerplants
- ❑PM – 98% from powerplants

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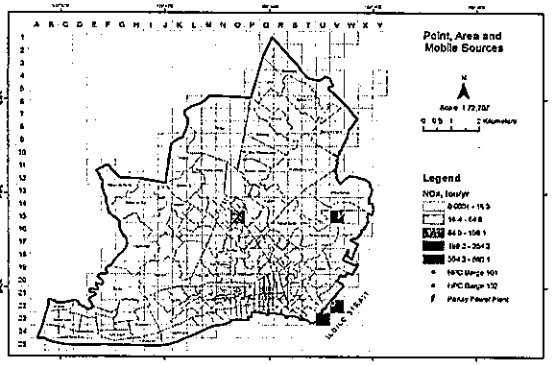
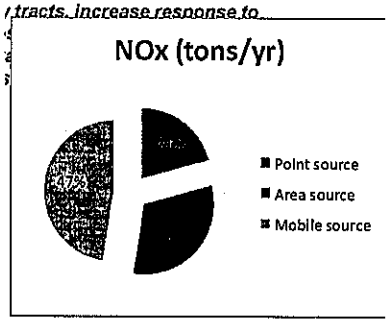
The Case of Iloilo City

Emission Inventory Results

tracts. Increase response to





The Case of Iloilo City

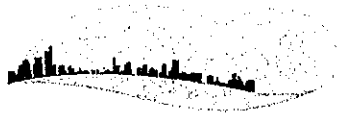
After the Emission Inventory → Clean Air Plan development

- Emission Inventory **provided important insights** that became the **central basis of the city's Clean Air Plan:**

  a) public transport accounts for most of emission generated by mobile sources – this confirms everyone's belief

  b) indoor cooking was never thought to be a threat until the EI results came out

  c) likewise before the EI, port emissions was taken lightly and was perceived to have very little emissions contribution



The Case of Iloilo City

Benefits of the Emission Inventory

- Emission Inventory helped the City develop its first ever Clean Air Plan
- Basis to determine strategic initiatives :

  a) *Social Marketing Information and Education Campaign*

  b) Roadside Air Quality Monitoring

  c) Number Scheme for Jeepneys and Private Cars

  d) Pilot Mass Transit in Select Areas of the City

  e.) Anti-smoke Belching Program

  f.) Massive SMIEC (Awareness) in all the barangays

  g.) On-shore Power Sourcing

The Case of Iloilo City

After the Emission Inventory

- The Emission Inventory inspired our stakeholders to initiate related studies :

  a) **Rapid Assessment on the Impacts of Air Pollution on Traffic Policemen -** confirmed health impacts of roadside air pollution

  b)**Baseline Pulmonary Profile of the City's Traffic Enforcer -** baseline data for validation in 2015 to study impacts of roadside air pollution on city's traffic aide

  c) **Jeepney Study -** a comparative study on performance of old diesel engine (Isuzu & Mitsubishi - Circa 1960s, 1970s) and latest diesel (Euro IV)

The Case of Iloilo City

After the Emission Inventory

- Emission Inventory and the Clean Air Plan **provided the basis** for drafting of two city regulation ordinances :

  a.) ordinance **regulating volume of public utility jeepneys** within the city

  b) **anti-smoke belching** ordinance

- Emission Inventory and Clean Air Plan :

  a) brought together 3 universities who are now considering to establish a Clean Air Institute

  b.) **helped in securing funds** for the Social Marketing Information and Education Program

  c.) helped in **securing smoke testing machine** for city's anti-smoke belching program

CLEAN AIR PARTNERSHIP

2015 Urban Environment Accord (UEA) Iloilo Summit
September 15-17 2015 | Iloilo City

Thank you!

Contact:

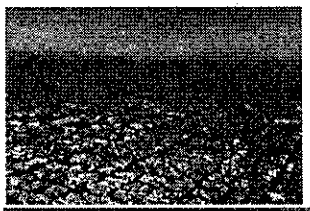
ocailoilocity@yahoo.com

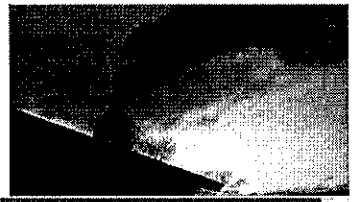
CITIES CLEAN AIR PARTNERSHIP

Developing Emissions Inventories Of Air Pollution Sources

Alison C. Simcox, PhD
US EPA, Region 1

Cities Clean Air Partnership Workshop
Washington, DC
11 August 2015



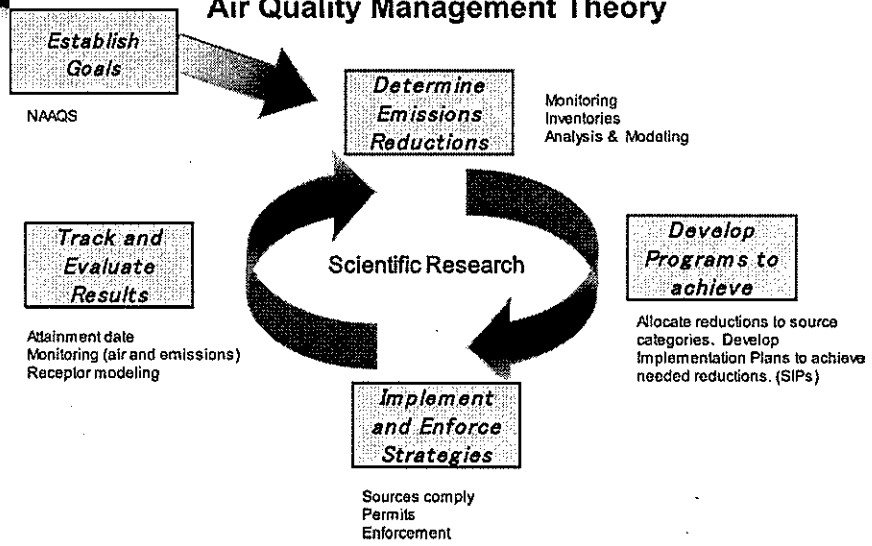


Contents

What is an emissions inventory?

- The "cornerstone of air quality management."
- List of pollution sources, pollutants, and their relative impact on air quality for a specific location and time period.
- Objective report of emissions for stakeholders.
- Used to identify opportunities to reduce emissions.

Air Quality Management Theory



From Bachman, 2007:
www.environmental-expert.com/Files%5C6477%5Carticles%5C15683%5Cbachman.pdf

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Some history …

- 1907 - Smoke Prevention Society (now Air & Waste Management Association (A&WMA)) - founded in Pittsburgh by (coal-burning) boiler operators.
- 1950s, 1960s
  - California's "Rule 66" addressing solvent emissions from industry and motor vehicles in South Coast basin (Los Angeles County)
  - US Public Health Service's AP Division, Bureau of Abatement & Control (predecessor of EPA OAQPS) used Taft Sanitary Engineering Center in Cincinnati, Ohio, for early studies to measure & control AP and assess health effects.

History continued …

- Late 1960s
  - Robert Dupree of PHS compiles emissions factors - leading to 1st edition of AP-42
  - Regional Air Pollution Study (RAPS) in St Louis
- 1970 – EPA formed and 300+ US PHS officers were detailed to agency. Congress enacted Clean Air Act of 1970.
- Early 1970s – National Emissions Data System (NEDS)
  - First computerized point (and area/mobile) source inventory
  - Data elements completed by state personnel for each point source, stack, control device, etc.
  - Process operations linked to emission calculations = origin of Source Classification Codes (SCCs)

Emission inventory basics

- Define area and time period (specific years, whether annual or seasonal).
- Identify all emission sources in defined area (also sources outside area that impact area).
- Select data sources for activity levels & other parameters needed to estimate emissions from each source.
- Calculate emissions using direct measurements, mass balance, or emission factors (use local emission factors if available).

- Note: focus is typically on direct emissions, but need to consider other emissions such as fugitive emissions (leaks, fine dust), vehicle emissions, emissions from purchased electricity, waste disposal, outsourced operations, etc.)

Sources

Stationary sources
Refineries
Manufacturing
Food processing
Electric utilities
Chemical production

Mobile sources
Cars
Trucks
Buses
Aircraft
Trains
Ships

Area sources
Paved & unpaved road dust
Solvent sources (garages, cleaning products, dry cleaners, etc.)
Indoor & outdoor cooking
Waste/open burning
Agriculture

Non-anthropogenic sources
Wild fires
Biogenics
Wind-blown dust

Pollutants

Criteria pollutants	Toxics (HAPs)
CO	Diesel PM
NO_x	VOCs
So_x	Benzene (gasoline)
PM_{10}	Perchloroethylene (dry cleaning)
$PM_{2.5}$	Methylene chloride (solvent & paint stripper)
Ozone s (VOCs & NOx inventoried as precursors).	Asbestos
Lead (Pb)	Metals (e.g., Cd, Hg, Cr, Pb)

Emission factors

- Used, if necessary, in lieu of source-specific test data or direct monitoring data, which are expensive to acquire and often unavailable.
- An EF is ratio of amount of a pollutant emitted per throughput of material (e.g., pounds NOx per gallon of residual oil burned).
- Another definition: an estimate of quantity of pollutant emitted as result of activity (e.g., combustion, industrial production), divided by level of that activity.
- Assumptions (1) linear relationship exists between emissions and activity level. (2) assumed to represent average emissions for all emitting processes of similar design and characteristics
- Area source emissions, in particular, rely to large extent on use of emission factors.

Calculating emissions using emission factors

$E = A \times EF \times [1 - (ER/100)]$

Where:

E = emissions estimate

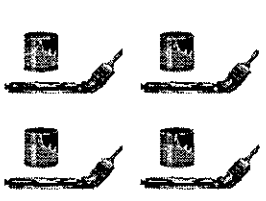
A = activity rate (process input or output per time - lbs PM emitted/ton coal burned; gallons oil burned per hour; tons cement produced per day).

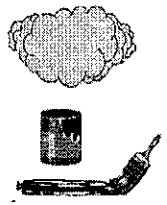
EF = emissions factor

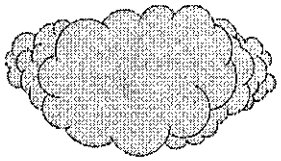
ER = overall emissions reduction achieved by controls (%)

Calculating emissions using emission factors

Process Rate (Activity) x Emission Factor = Emissions







Number of Units x Emissions per Unit = Total Emissions

Calculating emissions using emission factors

- Example: fuel combustion

ER (emissions pollutant) = EF (#benzene / MMBtu heat) x CF (MMBtu heat / tons coal) x A (tons coal)

Calculating emissions

Example: Area Source – agriculture

- Activity Data (Process Rate) = Vehicle Miles (or Km) Traveled, Acre-Passes
- Emission Factor = lbs PM_{10} per acre (hectare) tilled
- Emissions = EF x PR

Emission factors for complex processes/activities

- Paved and unpaved roads, organic liquid storage tanks, etc.
  - EFs expressed using empirical equations that relate independent variables to source emissions.
  - Ex: vehicles on unpaved surfaces at industrial sites:

$$E = k\,(s/12)^a\,(W/3)^b$$

Where:

E = particle size-specific emissions factor (pound/vehicle miles traveled),

k = particle size multiplier (pound/vehicle miles traveled),

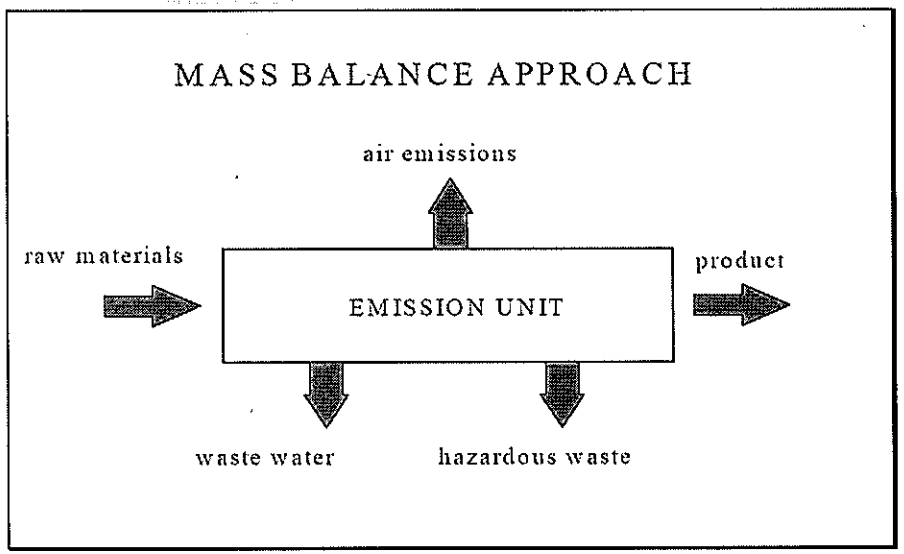
s = surface material silt content (%),

a, b = particle size-specific empirical constants, and

W = mean vehicle weight (tons).

Mass balance approach

- Estimate emissions by analyzing inputs of raw materials to emission unit and account for all possible outputs of raw materials in form of air emissions, wastewater, hazardous waste, and/or final product.
- For situations where most of material lost to atm (sulfur in fuel, solvent loss in coating process).
- Simplest mass balance assumes all solvent used in a process evaporates.



Example mass balance: SO2 emissions from oil combustion

- Using fuel analysis results and information on fuel flow

fuel flow rate R = 46,000 lbs/hr
percent sulfur (% S) in fuel = 1.17

ER = R * PC * (MW_p/MW_f)
= (46,000) * (1.17/100) * (64/32)

= 1,076 lbs SO_2/hr

US emission factors and emissions inventories

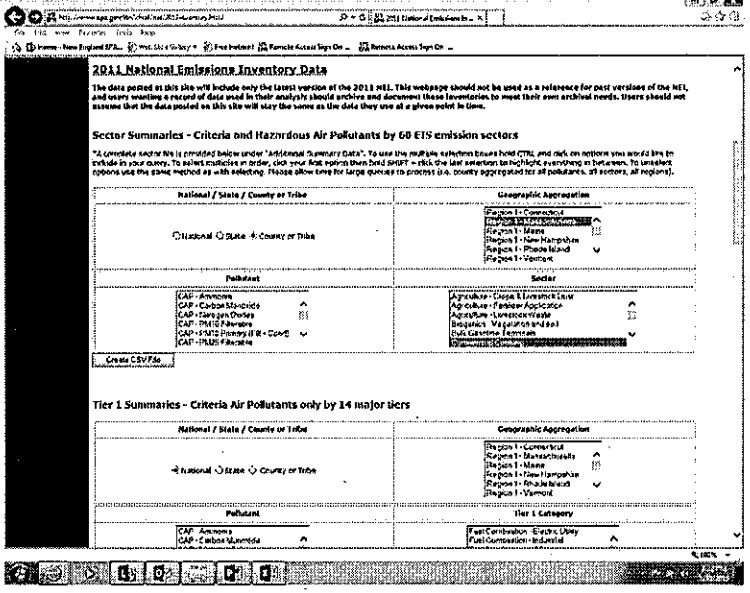
- Web Factor Information Retrieval System (WebFIRE)

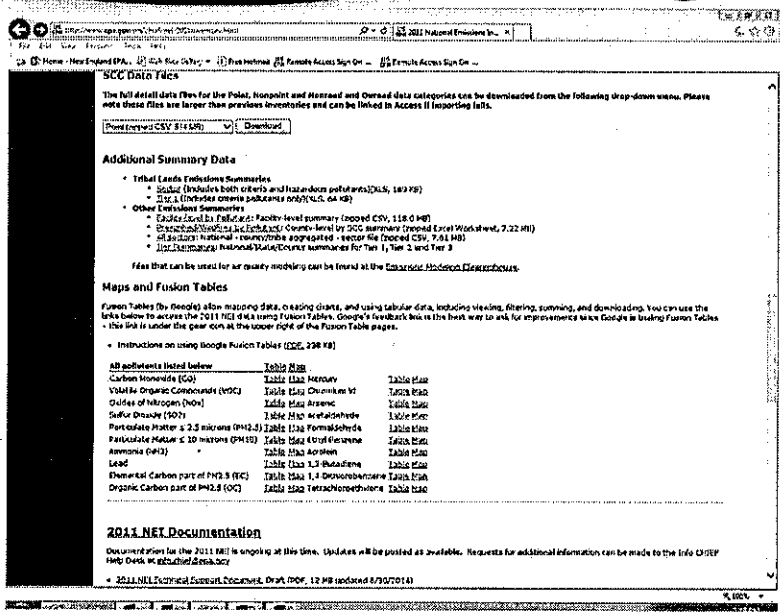
http://epa.gov/ttn/chief/webfire/index.html (contains link to AP-42)

Note: facility conditions (raw materials, combustion temp, controls) affect emissions. If possible, use local emission factors.

"Recommended Procedures for Development of Emissions Factors and Use of the WebFIRE Database"
http://www.epa.gov/ttn/chief/efpac/procedures/procedures81213.pdf

- Clearinghouse for Inventories & Emissions Factors: http://www.epa.gov/ttn/chief/eiinformation.html





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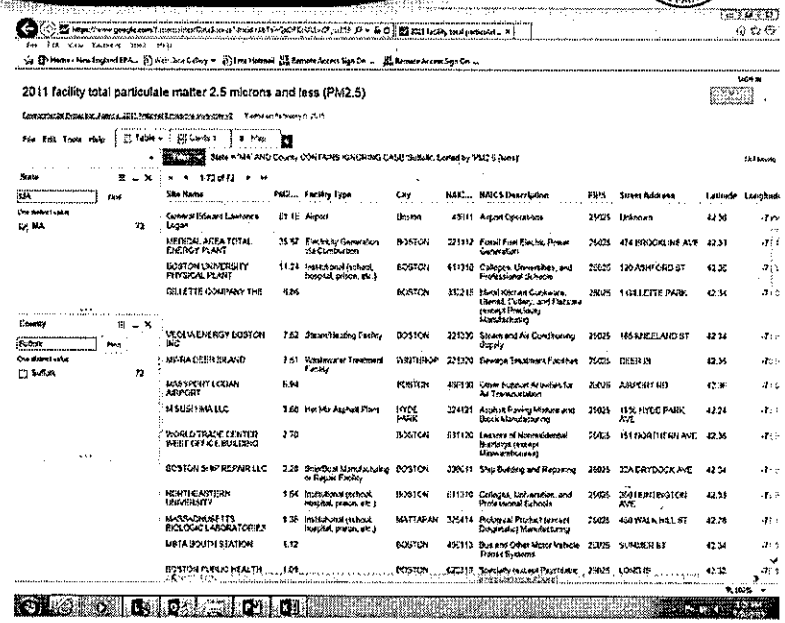

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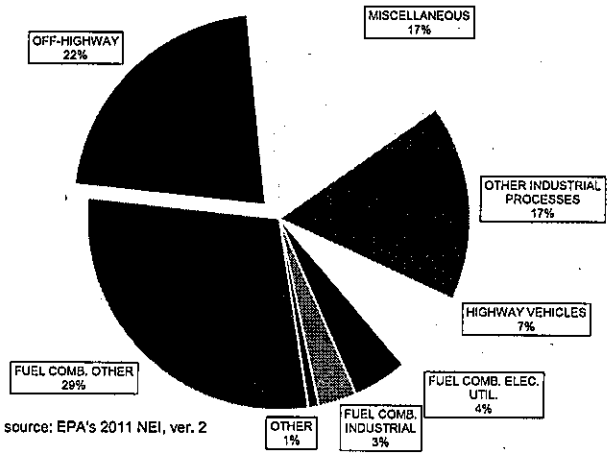
Suffolk County, MA, PM2.5 Emissions. Ex: Non-road sector



Data source: EPA's 2011 NEI, ver. 2

http://www.epa.gov/ttn/chief/net/2011inventory.html

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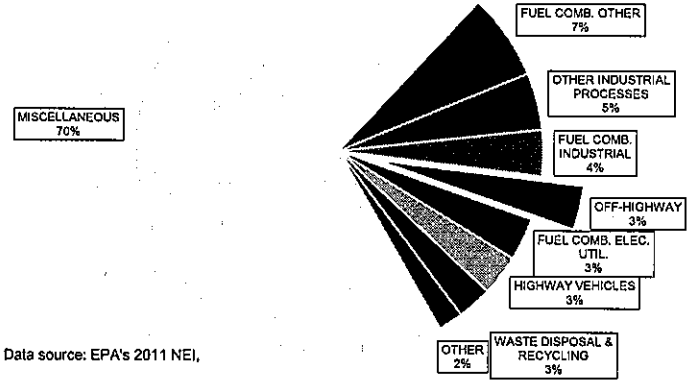
U.S. PM2.5 Emissions. Ex: Non-road sector



Data source: EPA's 2011 NEI,

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Improving the process: E-Enterprise

- EPA and states working together to reduce redundancy in air-emissions reporting.
- Goal: to allow facilities to submit data through single mechanism to meet reporting requirements of Compliance and Emissions Data Reporting Interface (CEDRI), GHG, NEI, Toxic Release Inventory (TRI).
- Provide consistent and unified access to emissions data by internal and external stakeholders.

http://www2.epa.gov/e-enterprise

More Information - US

- Industry emissions data: ampd.epa.gov/ampd/
- Emissions inventories & emission factors: www.epa.gov/ttn/chief/
- PM emission inventory resource center http://www.epa.gov/ttn/chief/eiip/pm25inventory/index.html
- Emission Inventory Improvement Program http://www.epa.gov/ttn/chief/eiip/techreport/volume02/index.html
- Michigan air emissions reporting system (MAERS) https://www.michigan.gov/documents/deq/deq-ead-caap-maers-CalculatingAirEmissionsforMAERSFinal_411012_7.pdf
- EPA wood stove and fireplace emissions calculator http://www.epa.gov/burnwise/resources.html#air
- Emissions Inventory guidance: http://www.epa.gov/ttn/chief/eidocs/eiguid/2014revisedeiguidance.pdf

More Information - International

- SIM-air: http://urbanemissions.info/model-tools/sim-air.html
- Asia Center for Air Pollution Research(ACAP): guidelines for developing emissions inventory in East Asia: http://www.acap.asia/publication/index.html
- The World Bank: http://documents.worldbank.org/curated/en/1997/11/693931/urban-air-quality-management-strategy-asia-guidebook
- European Environment Agency: http://www.eea.europa.eu/publications/emep-eea-emission-inventory-guidebook-2009
- SYKE: The Finnish Environment Institute: http://www.apef-library.fi/index.php
- UK NAEI - National Atmospheric Emissions Inventory: http://naei.defra.gov.uk/

US EPA Contacts:

- Alison C. Simcox, Ph.D., Air Quality Planning Unit, Office of Ecosystem Protection (AQP, OEP), Boston, Massachusetts simcox.alison@epa.gov
- Justin J. Harris, Office of International & Tribal Affairs (OITA) harris.justin@epa.gov

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Demand Management Measures to Reduce Emissions from Transportation

Todd Litman
Victoria Transport Policy Institute
litman@vtpi.org

CITIES CLEAN AIR PARTNERSHIP WORKSHOP | Washington D.C., USA, 10-12 August 2015

Creating Paradise

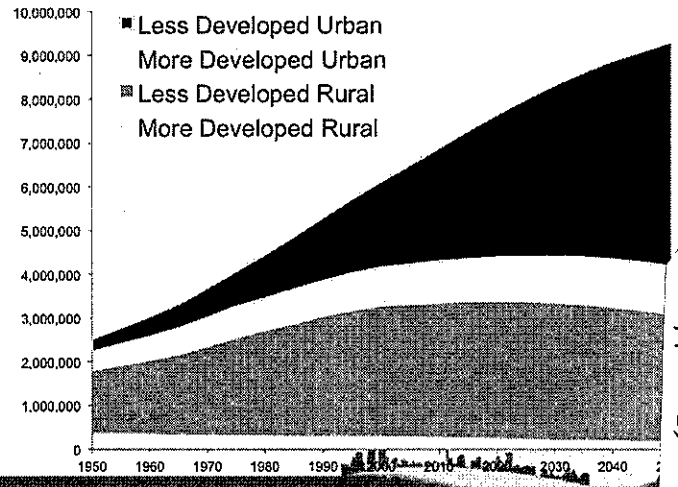
Paradise is not a distant destination, it is something we create in our own communities.

CITIES CLEAN AIR PARTNERSHIP WORKSHOP | Washington D.C., USA, 10-12 August 2015

The World is Urbanizing

The United Nations predicts that during the next 35 years, 2.2 billion more people will become urban residents, mostly in developed countries.

This will result in a huge increase in total urban populations.



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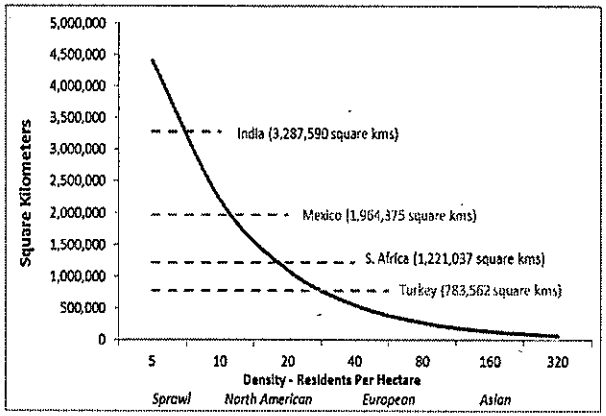
How Much Land Will This Require?

The density with which new urban residents live will significantly affect the total amount of openspace (farmland and natural habitat) that will be displaced by development.

More compact development (more than 20 residents per hectare) provides large savings and benefits.

Our challenge is to increase both density and residents' quality of life.



Limited Capacity

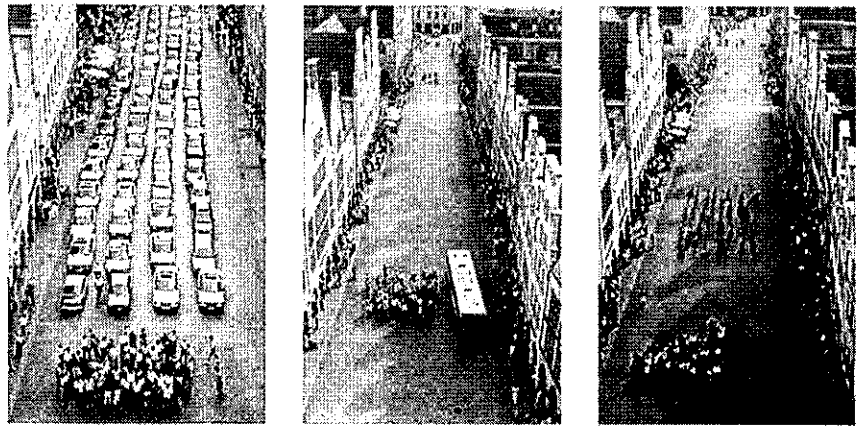
How much water can a one-litre bottle hold?

How many **vehicles** can city streets accommodate?

How many **people** can city streets accommodate?

Road Space Requirements

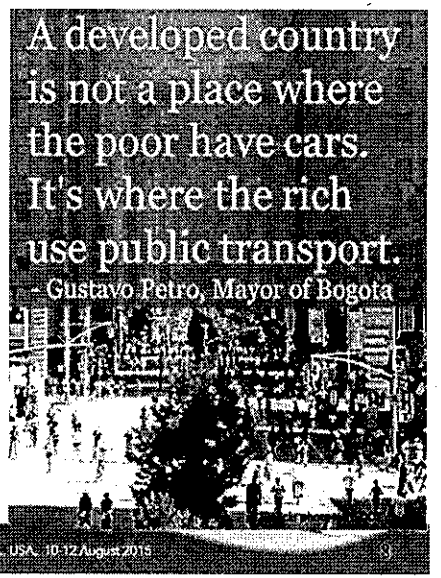
space required to transport the same number of passengers by car, bus or bicycle. (Poster in city of Muenster Planning Office, August 2001)



Move People Efficiently

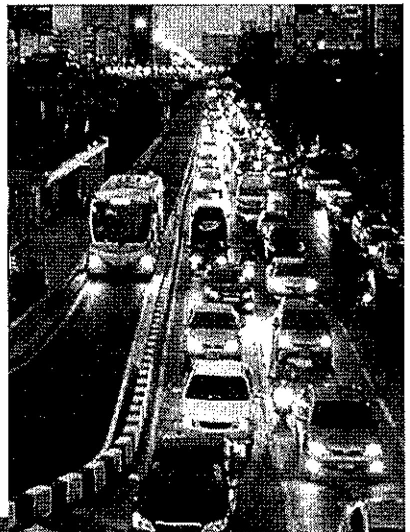
An efficient urban transport system encourages people to use the most efficient mode for each trip:

- Walking and cycling for local travel.
- Public transit for travel on busy corridors.
- Driving only when necessary.



Avoid – Shift - Improve

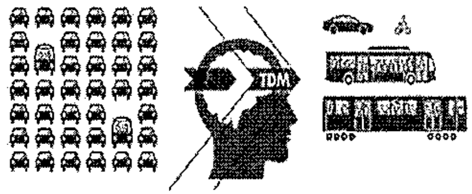
- Invest in **walking, cycling and public transport**.
- Implement **transportation demand management** strategies which encourage travelers to use the most efficient mode for each trip, considering all impacts.
- Use **smart growth** development policies to create compact, multi-modal communities.
- **Improve vehicle performance**, so motor vehicles are safer and less polluting.



Travel Demands

"Transportation Demand Management" (TDM also called *Mobility Management*) refers to various strategies that affect travel behavior in order to increase efficiency and achieve various planning objectives.

TDM is increasingly used in cities around the world.



TDM Strategies

Improves Transport Options	Incentives	Land Use Management	Programs
Transit improvements and fare reductions	Vehicle purchase or registration fees	Complete streets	Campaigns and events
Walking & cycling improvements	Distance-based fees	Smart growth/New Urbanism	Commute trip reduction programs
Rideshare programs	Commuter financial incentives	Transit oriented development	School and campus transport management
HOV priority	Fuel tax increases	Location-efficient development	Freight transport management
Flextime	Parking pricing	Parking management	Tourist transport management
Car- and bikesharing	Parking regulations	Carfree planning	Transport planning reforms
Telework	Road Tolls/ Congestion pricing	Traffic calming	
Taxi service improvements	Driving restrictions		
Guaranteed ride home			

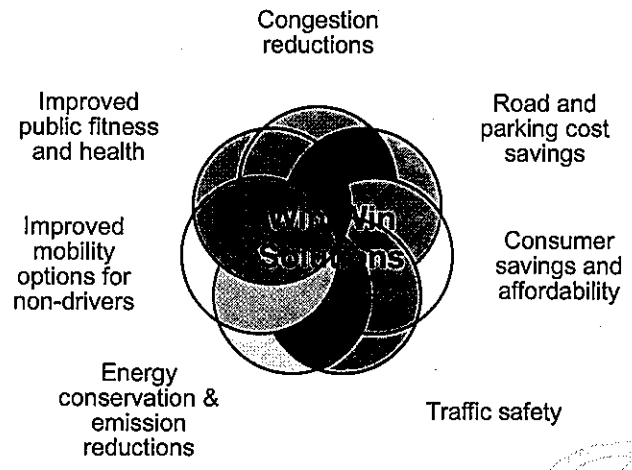
Cities Implementing TDM

		Cooperation and dialogue		High-quality implementation					Strategy		
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Public transit service improvements											
Bogotá	Bus Rapid Transit			✓	✓					✓	
Seoul	Bus Rapid Transit	✓	✓	✓						✓	
Non-motorised transport											
Berlin	Cycling infrastructure and management	✓		✓							
New York	Human-scale road design	✓		✓	✓						
Seoul	Reclaiming of road space	✓			✓					✓	
Parking management and pricing											
Chicago	Long-term lease of curbside parking (privatisation)		✓		✗			✓		✗	
New York	Escalating parking fees, peak hour parking, hour-limit parking, new design of onstreet parking	✗		✓	✓					✓	
Portland	Freeze of parking space, flexible land use management									✓	
San Francisco	Introduction of maximum parking requirements, reform of curbside parking, parking unbundling	✓	✓	✓	✓		✓		✓	✓	✓
Seoul	CCTV parking supervision and enforcement			✓				✓		✓	
Efficient road pricing											
London	Fee on driving in central London (rebate for residents and some exempted vehicles)				✓	✓	✗			✓	
Singapore	Electronic Road Pricing	✓		✓				✓		✓	
Stockholm	Congestion pricing with exemptions for alternative-fuel vehicles				✓					✓	
Vehicle restrictions											
Berlin	Environmental Zone	✓				✓		✓	✓	✓	
Milan	Environmental Zone									✓	
Singapore	Vehicle registration quota									✓	
Smart growth land use policies											
Curitiba	Transit oriented development									✓	

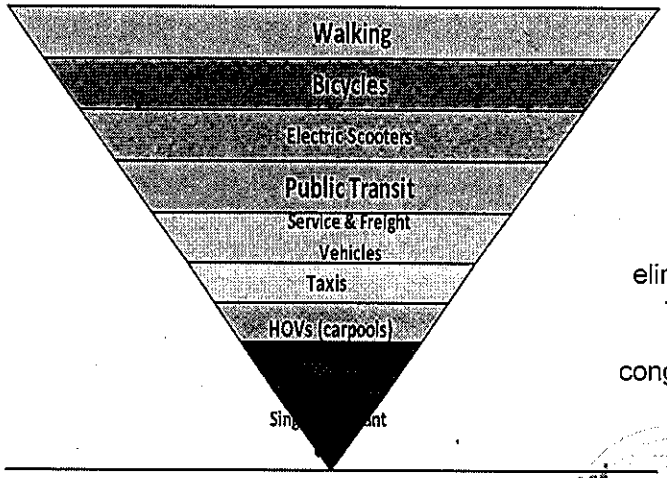
✓ - Consideration of success factor contributed to effectiveness of TDM measure

✗ - Non-consideration of success factor contributed to failure or reduced effectiveness of measure

Win-Win Solutions



Sustainable Transport Hierarchy



An efficient urban transport system favors resource-efficient modes.

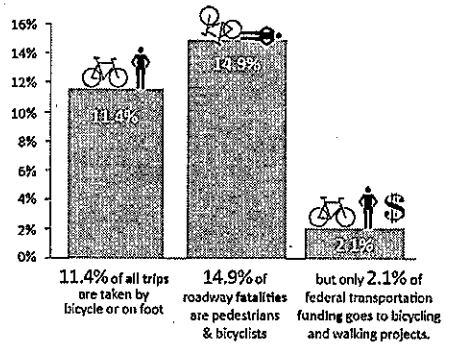
This does not eliminate automobile travel, but limits it, particularly under congested conditions.

Affordable-Efficient Modes

Walking, cycling and public transport are resource efficient and affordable, and so tend to be most sustainable.

Yet, they often receive less than a fair share of public investment.

Disparity of Pedestrian and Bicycle Mode Share, Fatalities, and Funding



(US Data, ABW 2014)

Mode Shifts

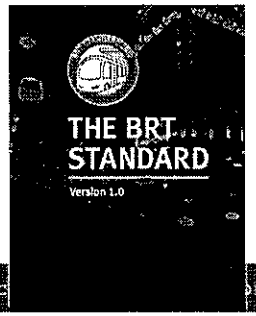
How do we convince people who drive luxury cars to shift mode?

Public Transit Improvements

- Increase service (routes and frequency)
- Grade separation (bus lanes)
- Better customer service (e.g., nicer drivers)
- Nicer vehicles
- Nicer stops
- Better walking and cycling access
- Reduced fares
- More convenient information
- Amenities (attractive stations, on-board wifi, etc.)
- Positive Image

The BRT Standard

The BRT Standard, being developed by the Institute for Transportation and Development Policy, is a scoring system that defines world-class bus rapid transit (BRT) systems. It allows transit planners to evaluate BRT system performance and set targets for improvement.



BRT Standard Scorecard

This scorecard shows the criteria and point values that make up the BRT Standard, followed by a detailed description for each.

CATEGORY	MAX POINTS
SERVICE PLANNING	
Off-board fare collection	7
Minimum speed	4
Peak frequency	4
Off-peak frequency	1
Express, limited, and local services	1
Control center	1
Vocabulary and line services	1
Hours of operations	2
Multi-corridor network	3
INFRASTRUCTURE	
Busway alignment	7
Segregated right of way	7
Intersection treatments	6
Passing lanes at stations	4
Minimizing bus emissions	4
Stations set back from intersections	3
Center stations	3
Pavement quality	2
STATION DESIGN AND STATION-BUS INTERFACE	
Platform-level boarding	6
Safe and comfortable stations	3
Number of doors on bus	3
Boarding bus and exit of bus	2
Sidelong doors in BRT platform	1
QUALITY OF SERVICE AND PASSENGER INFORMATION SYSTEMS	
Branding	3
Passenger information	2
INTEGRATION AND ACCESS	
Universal access	3
Integration with other public transport	3
Prioritized access	3
Secure bicycle parking	3
Bicycle lanes	2
Bicycle sharing integration	1
TOTAL	100

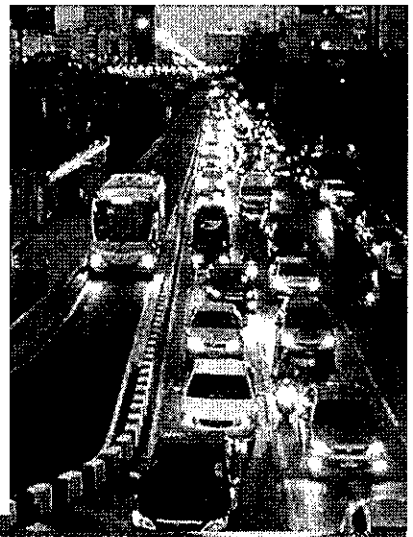
Transit-Oriented Development

- Compact, mixed-use development within ten-minute walk of high quality transit (train stations or bus stops with frequent service).
- This creates "urban villages" where commonly-used services (shops, restaurants, schools, parks, etc.) and a significant number of jobs are easily accessible without a car.

Transit Priority

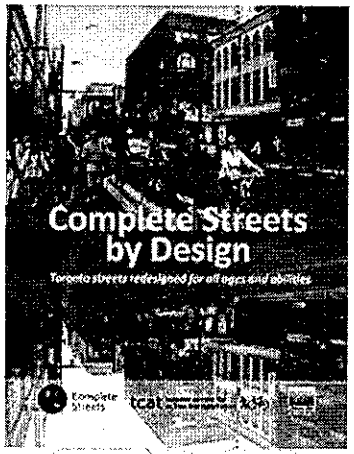
Transit passengers requires far less road space than automobile travel.

Dedicated bus lanes are warranted on urban streets that carry more than 800 passengers (about 20 buses) per peak hour.



Complete Streets

A Complete Street is designed for all activities, abilities, and travel modes. Complete Streets serve pedestrians, cyclists, transit users and motorists, and provide a livable environment for visitors, customers, employees and residents in the area.



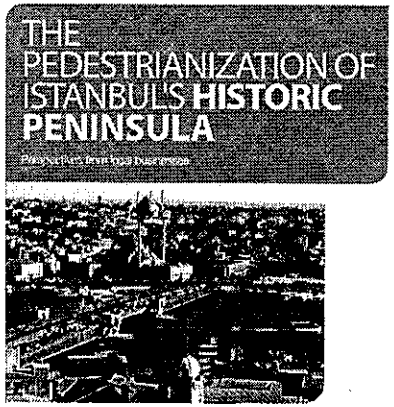
Walking and Cycling Improvements

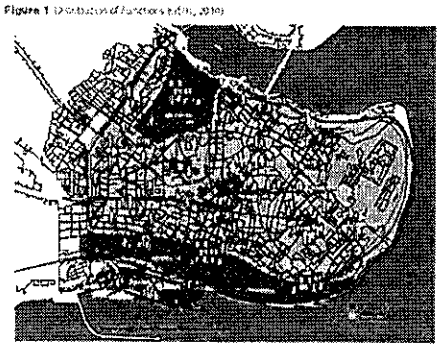
- More investment in sidewalks, crosswalks, paths and bike lanes.
- More traffic calming and speed control.
- Bicycle parking and changing facilities.
- Encouragement, education and enforcement programs.

Avenue de Clichy, 17 & 18e arr. Paris

Rue d'Avron, 20e arr. Paris

Istanbul: Accessible City – A City for People





EMBARQ Türkiye

www.embarqturkiye.org

Bicycling Is Efficient

Bicycling is the most resource-efficient travel mode:

Faster than walking.

Bicycles are inexpensive to own and operate.

Requires less space for travel and parking than cars.

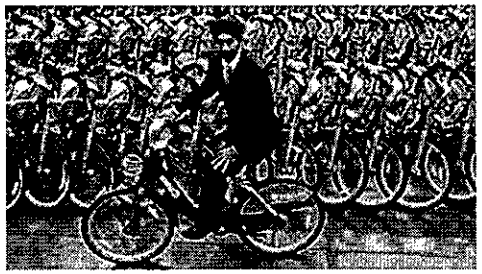
Consumes no fuel and produces no pollution.

Is healthy and enjoyable.

Is a good complement to public transit.

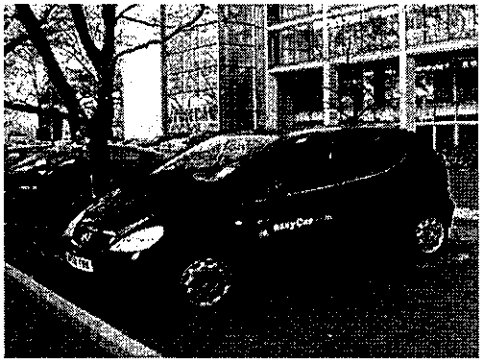
Bikesharing

Bicycle rental services distributed around a city so travelers can pick up a bike in one location and drop it off at another.



Carsharing

Automobile rental services intended to substitute for private vehicle ownership.



Employee Trip Reduction Programs

Employers encourage employees to walk, bicycle, carpool, ride transit and telework rather than drive to work.

School & Campus Transport Management

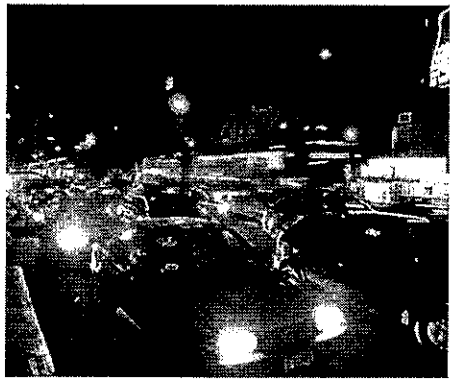
Programs that encourage parents and students to use alternative modes to travel to schools, colleges and universities.

Pricing Reforms

- Increase vehicle registration fees.
- Predictable, regular fuel tax increases.
- Require motorists to have an off-street parking space before they can register a vehicle.
- Efficient parking pricing.
- Parking cash out and unbundling.
- Congestion pricing.
- Pay-as-you-drive insurance and registration fees.
- Improve enforcement of vehicle registration, fuel tax and parking fees collection.

Pricing Increases Efficiency and Fairness

- Pricing allows higher value trips and more efficient modes to outbid lower-value trips and less efficient modes for scarce road space.
- Pricing creates transparency. It explicitly tests motorists' willingness-to-pay for infrastructure expansion.
- It also generates revenues that can be used to improve transport (sidewalks, roads and public transit) or other useful public services.

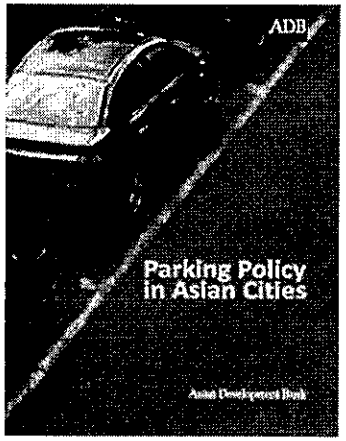


Vehicle Purchase and Ownership Fees

- High fees or auctions to limit total vehicle purchases.
- Higher fees for larger or more polluting vehicles.
- Higher annual registration fees.

Parking Management

Various strategies that result in more efficient use of parking supply



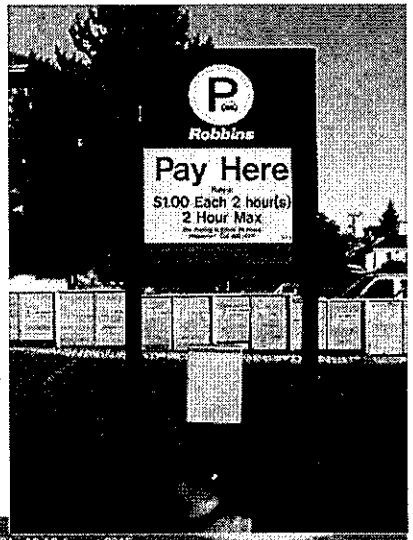
Why Parking Management?

- Improves motorist convenience.
- Creates more attractive streetscapes.
- Housing affordability.
- Downtown redevelopment.
- More walkable communities.
- Economic development.
- Reduced pavement.
- Encourages walking, cycling and public transit use.

Parking Pricing

Charge motorists for using parking facilities.

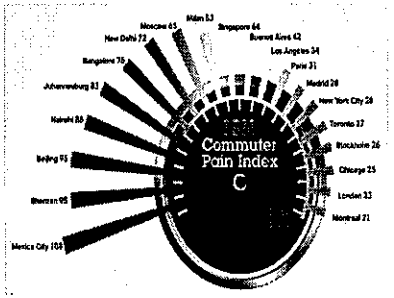
- Expand when and where parking is priced (e.g., evenings and Sundays, residential streets).
- Congestion pricing, with higher rates at times and locations with higher demand to encourage more efficient use of parking facilities.
- Reduce long-term discounts and "early bird" specials. Shift to shorter time periods (e.g, hourly rather than daily).



Very Appropriate In Developing Cities

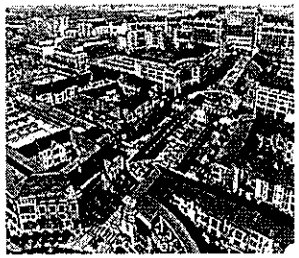
Efficient road pricing is very appropriate in developing country cities because:

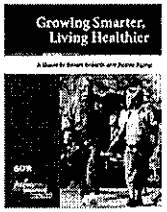
- Traffic congestion is particularly intense.
- Vehicle ownership rates are low, so pricing benefits most residents and is progressive with respect to income.
- There is insufficient money to significantly expand roadways.
- It can help prevent automobile dependency and sprawl. It helps preserve walking, cycling and public transit use.
- They can adopt new pricing technologies at relatively low costs.

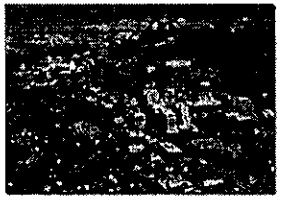


Smart Growth

- Compact (higher density)
- Mixed use
- Diverse housing types
- Connected roads
- Multi-modal
- Good walking and cycling conditions
- Good public transit services
- Efficient parking management
- Emphasis on the public realm (public places where people interact)

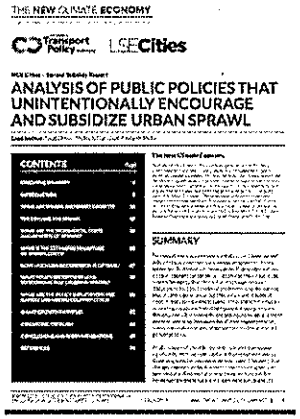




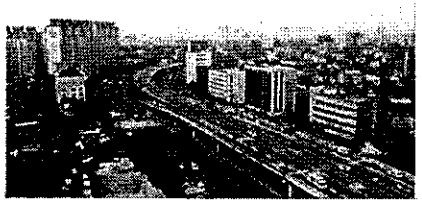


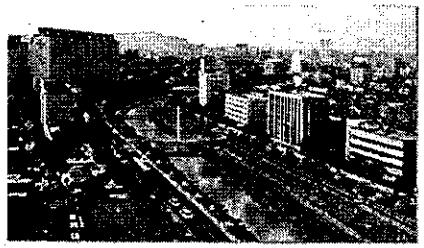
Sprawl Costs – Smart Growth Benefits

The report, *Analysis of Public Policies that Unintentionally Encourage and Subsidize Sprawl*, for the New Climate Economy, describes and quantifies the costs of sprawl and benefits of smart growth policies, and identifies specific policy reforms for more efficient development.



Redesigning City Centers



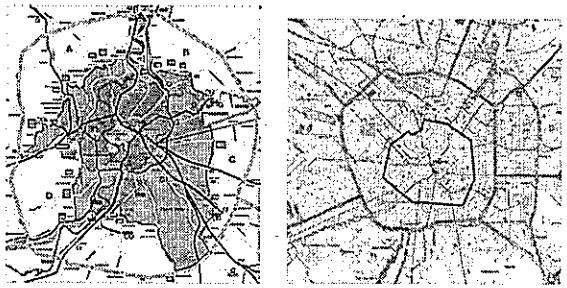


The Cheonggyecheon River in Seoul (South Korea) before (top) and after (bottom) the project. Claiming back urban space from road vehicles can dramatically improve the liveability of cities.

Photos by Seoul Development Institute

Vehicle Restrictions

Many cities are now restricting the number and types of vehicles that may enter central areas to reduce traffic and pollution problems.

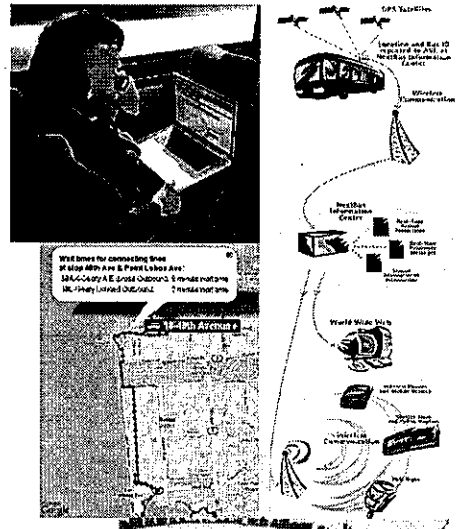


Rome and Milan Traffic Restricted Zones

User Information

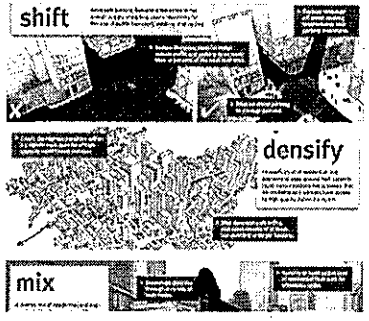
Provide information when and were users need it:

- Walking and cycling wayfinding.
- Transit route, schedule, fare and real-time arrival.
- Travel times for various modes (e.g., transit vs. driving).
- Special problems (warnings of delays).
- On-board wifi services.
- Parking availability and price.
- Discounts and incentives.



Institutional Reforms

- Comprehensive, multi-modal transport planning.
- Integrate transport and land use planning.
- Sustainable transport hierarchy.
- Set performance targets
- Interagency coordination.
- Improve user information.
- Improve enforcement.
- Identify best practices and appropriate innovations from other countries, including Northern Europe, Brazil, South Korea and India.



Comparing Benefits

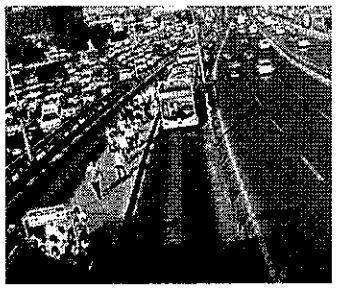
Planning Objectives	Expand Roadways	Efficient and Alt. Fuel	TDM Programs
Vehicle Travel Impacts	*Increased*	*Increased*	*Reduced*
Improve travel experience	✓		✓
Reduce traffic congestion	✓		✓
Roadway cost savings			✓
Parking cost savings			✓
Consumer financial savings	✓		x
Improve mobility options			✓
Improve traffic safety			✓
Energy conservation		✓	✓
Pollution reduction		✓	✓
Land use objectives			✓
Economic development	?	✓	✓
Public fitness & health			✓

Potential For Change

Some people would prefer to drive less and use alternatives more. *Focus on them.*

What would help these people change their travel behavior?

Latent Demand



Experience indicates that there is significant latent demand for alternative modes: Many people want to walk, bicycle and use public transit more than they currently do, provided that those options are convenient, comfortable and affordable to use.

- In a major U.S. study, community-wide walking increased 22% and bicycling increased 49% after sidewalks, crosswalks and bicycle parking were improved
- Public transit ridership often increases significantly after rail lines or BRT systems are developed.
- Market surveys indicate that most households want to live in walkable neighborhoods with local shops and transit services.

Successful TDM Programs

Singapore (restricting car ownership, improving alt. modes)

Chinese cities (limiting car ownership, improving alternative modes (walking, cycling and BRT), parking pricing)

Tokyo (parking pricing, improve alt. modes)

Vancouver (improve alt. modes, encourage downtown housing)

Various European cities (restricting driving and parking in central city neighborhoods, increasing parking pricing)

London (congestion pricing; improve alternative modes)

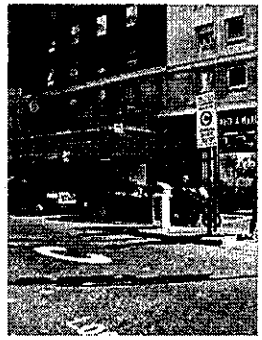
Seoul (reduce road space, improve alt. modes, parking pricing)

Paris (improve alternative modes, public bike systems)

New York (reallocate road space, improve alternative modes)

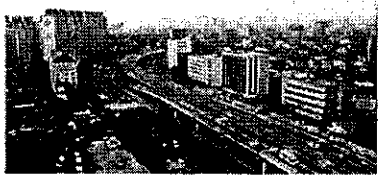
Los Angeles (improving alternative modes)

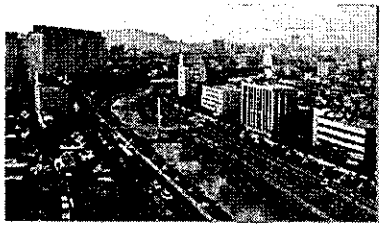
Stockholm (congestion pricing, improve alt. modes)



Example: Public Transport Reform in Seoul

In 2002 Seoul developed a new BRT system with more than 5,000 high-quality buses operating on 107 km of median busways. As a result, public transit customer satisfaction improved, transit ridership increased and accidents declined. The bus lanes carry six times more passengers than car lanes.





This allowed the city to replace a large highway with a beautiful river park. Downtown traffic and congestion declined and liveability improved.

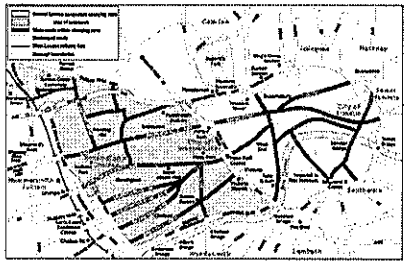
Road Pricing in Singapore

Singapore first implemented an Area Licensing Scheme in 1975 and Electronic Road Pricing in 1998. It is designed to minimize traffic congestion and maintain optimal traffic speeds of 45 to 65 km/h for expressways and 20 to 30 km/h for arterial roads.

Several Studies have concluded that the ERP has reduced congestion and pollution significantly and, in conjunction with a comprehensive TDM strategy maintained high mobility. The establishment of the restricted zone (RZ) led to a reduction of 31% of traffic in the city area which is mainly due to motorists not using the CBD as a bypass.

Example: London

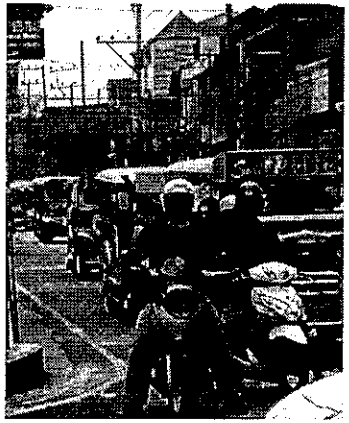
Since 2003 London has charged for driving private automobiles in its central area during weekdays. This significantly reduces congestion in that area, improved bus and taxi service, and generates substantial revenues (although more than a third are used to finance the payment system). The program expanded to new areas in 2007 but was reduced back to its original size in 2011.



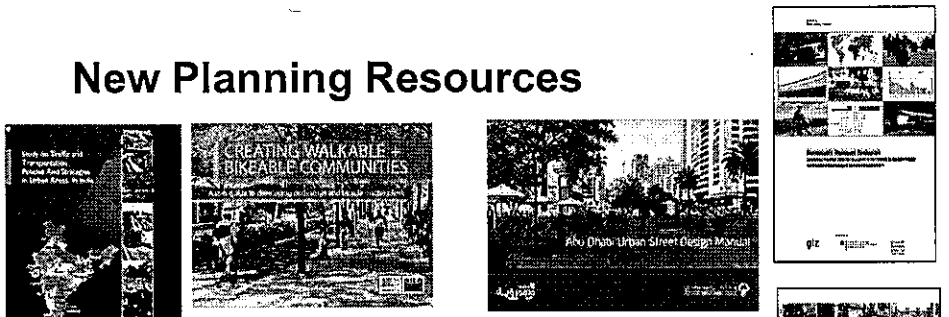
Motorists pay by Internet or at kiosks. License numbers of vehicles driving in the area are tracked using roadside cameras.

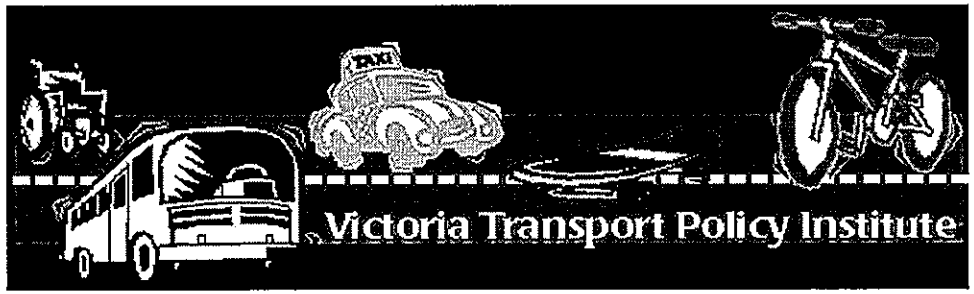
Implications

- Without improvements to alternative modes and efficient pricing, urban traffic congestion is virtually unavoidable.
- Motorists either spend time or money. Spending money is more efficient overall because it allows higher value trips to "outbid" lower-value trips, and generates revenue.
- Urban traffic congestion is increasingly severe in developing countries.
- Pricing reforms can reduce congestion and help achieve other planning objectives. Although road tolls are most effective at reducing congestion, other pricing strategies (parking pricing, higher fuel taxes, and distance-based fees) are easier to implement and may provide greater total benefits.



New Planning Resources





"Public Policies that Unintentionally Encourage and Subsidize Sprawl"
"Evaluating Public Transit Benefits and Costs"
"Parking Pricing Implementation Guidelines"
"Transportation Cost and Benefit Analysis"
"Parking Management Best Practices"
"When Is A Bus Lane Warranted?
"Online TDM Encyclopedia"
and more...

www.vtpi.org

Discussion Questions

- What TDM strategies are being implemented in your cities?
- What additional TDM strategies could be implemented?
- What obstacles must be overcome for these to be implemented as much as justified?
- What policy reforms can help support TDM?
- What partnerships can help implement TDM?

F 8/12 Emission Reduction

CITIES CLEAN AIR PARTNERSHIP

Overview

- Speaker Background
- Elements of Air Quality Management
- How this applies to your Cities

CITIES CLEAN AIR PARTNERSHIP

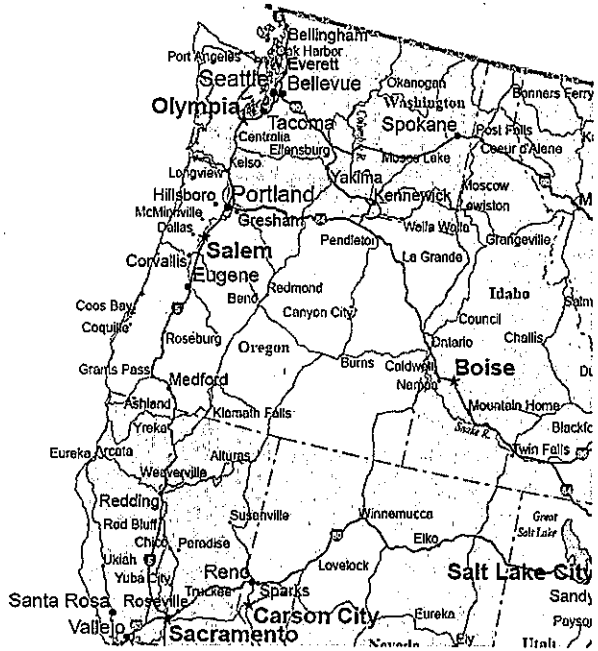
Putting it all Together:

Emissions Reductions in the Real World

Justin Spenillo
US Environmental Protection Agency
Spenillo.justin@epa.gov, 206.553.6125

Speaker Background

- US EPA
  - 13+ years in the environmental sector
  - 7+ years in air quality in the Pacific Northwest (PNW)
- Air Quality
  - PNW Tribal programs development
  - Government to Government interactions with Tribal governments
  - Air quality management with State and Local air agencies
  - Interact with the affected community



Elements of Air Quality Management – applying the pieces

- Once the major types and sources of emissions are understood, then a control strategy can be developed
- Control strategy = action(s) taken to reduce emissions, for example…
  - Power plants (stationary sources)
  - Vehicle emissions standards (mobile sources)
  - Woodstoves / cookstoves (area sources)
- Each action will have its own set of steps

Elements of Air Quality Management – "the pieces"

Technical Inputs

- Monitoring
- Emissions Inventories
- Modeling

They provide an understanding of

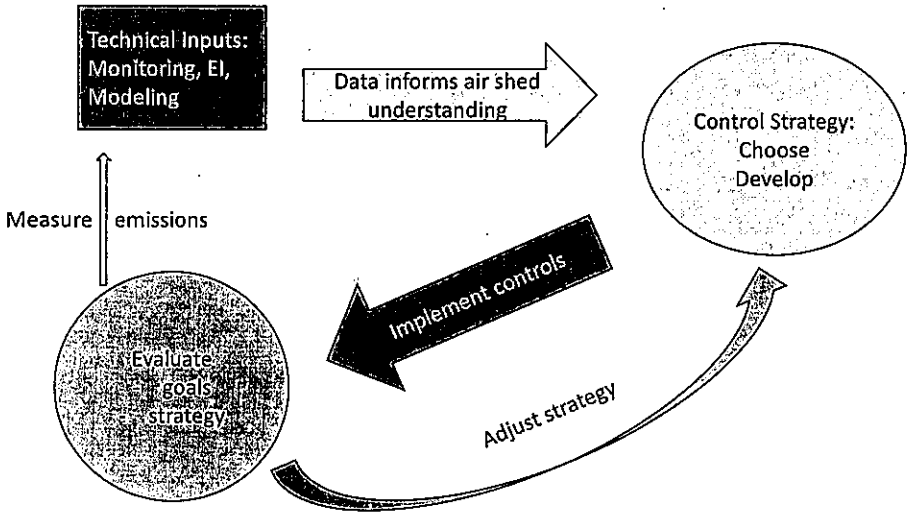
1. What types of emissions are causing the problem
2. What are the primary sources of problematic emissions

They help set and measure goals

Elements of Air Quality Management – implementation and evaluation

- Once a control strategy is chosen and in place, then each action will need to be implemented
- Evaluation measures progress towards goals
- Evaluation will ensure that
  1. Each action is properly being managed and provided sufficient resources
  2. Emissions reductions are verified with monitored data
  3. Emissions reductions are permanent, not temporary

Putting it all Together



How this applies to your Cities

- These elements are foundational to air quality management, anywhere, and that is good for you

- Use existing resources as a starting point
- Learn from others
  - Partnerships with other cities or air quality agencies
  - Develop relationships
- Leverage local resources

A Closer Look - Monitoring

- For compliance with standards and characterizing the airshed, monitoring is the foundation for air quality management

BUT

- Monitoring is not essential for emissions reductions

What Can You Do

1. Partner with another agency or city (WADOE/PNW Tribes)
2. Invest in a shared expert and/or in house expertise
3. Do without it in the short term, health comes first

A Closer Look – monitor saturation study

- Klamath Falls OR
  - Lesson = Invest in communications

  - Monitor sited in an area with elevated particulate matter
  - Saturation studies were conducted to identify a representative site
    - These studies have been essential when the monitor site has been questioned
    - By informing the public of results/conclusions, and providing a forum for discussion, communities generally have been more supportive
  - It makes sense to involve the community as they benefit from emissions reductions and their support is essential

A Closer Look – Emissions Inventories

- Emissions Inventories characterize the air shed in terms (1) types and (2) sources of emissions
- They are important guides to understand the air shed

What Can You Do

1. Partner with another agency or city (ODEQ/LRAPA)
2. Invest in a circuit rider or in house expertise
3. Use a similar city's EI – or – just develop a basic EI

A not so Closer Look – Modeling

- Modeling refines the understanding of the airshed and source contribution and this helps to better determine ways to reduce emissions in a control strategy
- If you have limited resources or expertise, monitoring and emissions inventories can provide adequate information to manage air quality
- But if you insist, agencies have leveraged relationships to get assistance with basic air quality monitoring support

A Closer Look – PMF study

- PMF – Positive Matrix Factorization, in basic terms it creates an emissions "fingerprint" that helps characterizing sources in an airshed
- It requires a high level of expertise to complete.
- Share resources for specialized studies
    1. Reuse comparable studies - when unable to fund recent studies, utilize studies from places with similar characteristics
    2. Develop partnerships - EPA has assisted state/local air agencies to complete studies where they do not have the technical expertise...a good relationship facilitates these exchanges better than a formal agreement

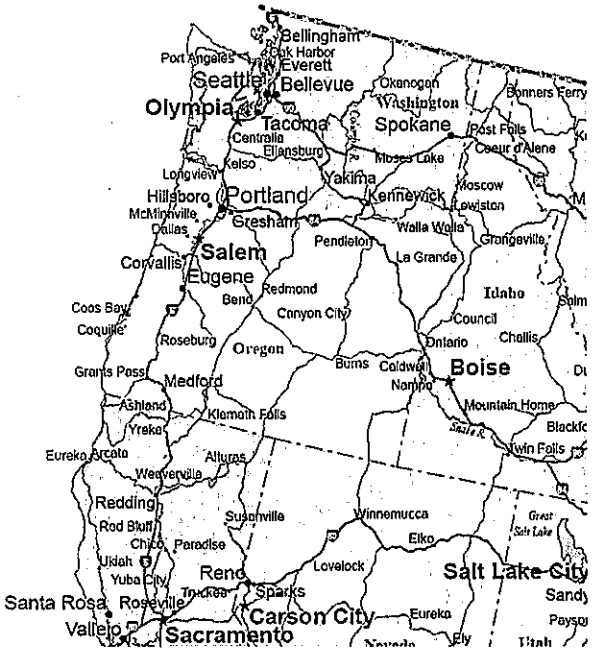
Control Strategy, development

- A control strategy is unique to each air shed, but...

...many air sheds are similar.

What Can You Do

1. See what measures have worked in other cities / communities have done. (Small mountain communities)
2. Develop a partnership with a similar city(s). (Lakeview, Oregon)



Implementation

- Implementation is key to success of the control strategy
- Invest in relationships, personnel and communications
  - Relationships - Smoke Management Program, Annual meetings and pre/post season conferences
  - Personnel - A Tale of a Few Cities
    - City 1. Invested heavily in implementation
    - City 2. Invested in its strategy more than implementation
    - City 3. Invested only in the strategy
  - Communications - Regional Haze required conversations between government and industry

Control Strategy, advisory committee

- Advisory Committees are essential to the success of a control strategy
  - The committee actively represents the stakeholders and varying viewpoints in a community
  - Involvement of the stakeholders constructively manages varying opinions to develop solutions and/or consent
- In the PNW, these committees are essential for developing and sustaining community support (West Silver Valley, ID)

Evaluate

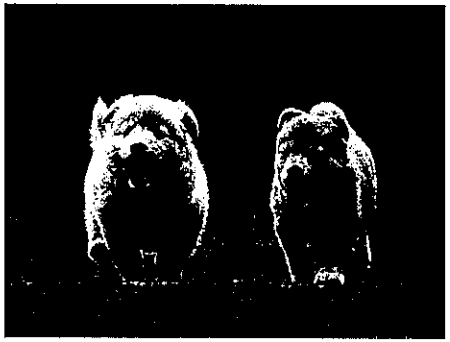
- Review Data
  - Regularly evaluate data to determine program efficacy (monthly meetings, monitoring networks)
    - This allows early detection of when a measure is not working (exceedance notifications)
    - Chart emission reduction progress with respect to goals
- Strategy Adjustment
  - Increase resources (enforcement)
  - Add measures (contingency)
  - Review plan

Closing Thoughts

- Solutions exist – Look to and learn from others who have dealt with similar issues
- Communications - Many often fall short in communications with the affected community
- Partnerships – We become stronger when we work together…

….find a friend

and take the first step



F 8/12 certification

CITIES CLEAN AIR PARTNERSHIP

Clean Air City Certification

- What Eco-Certification is all about
- How it can Support Cities Build Strong Air Quality Management Programs
- CAA's plans to create a city certification program
- Feedback we need from YOU!

CITIES CLEAN AIR PARTNERSHIP

The City Certification Framework

Carolyn Cairns
Clean Air Asia
canunca@gmail.com

CITIES CLEAN AIR PARTNERSHIP WORKSHOP | Washington D.C., USA, 10-12 August 2015

What is Eco-Certification?

A program that verifies compliance with a set of principles, actions and criteria that define good social and environmental practices in a specific sector, crop or industry.

From Products to Institutions and Operations

Mechanisms for Credibility, Accountability and Incentives

Governance Structure	List of Actions (Certification Criteria)	Accountability Mechanisms	Incentives
Key to **credibility**, with strict **governance policies** against financial, political, or other vested interests in the design and outcome of decisions regarding certification.	As cities move from capacity-building to implementation of **specific actions** they earn higher grade ratings, tied to measurable reductions PM, toxic air pollutants, greenhouse gases.	Third party auditors verify **compliance** have no stake in the program itself, the air quality management strategies, or outcome of certification.	•**Technical assistance** to support capacity-building and sustainable infrastructure; •**Marketing** and communications ; and •**Access** to global processes, finance initiatives, and business development opportunities.

Why Certify?

•**GUIDANCE AND INCENTIVES**
Captures and champions best practices, training, tools and robust science for AQM

▪***ASSURANCE and VERIFICATION*** of compliance with criteria, with **TRANSPARENCY** which inspires confidence of investors, the public and other key stakeholders.

▪**CONSISTENT TRACKING** of **PROGRESS** with action plans and roadmaps that guide and measure improvements.

▪ **EVALUATION** and **RECOGNTION of ACHIEVEMENTS** in a form that guides funding, technical support, and enabling policies.

Elements of Clean Air City Certification Framework

•City Training and Baseline Air Quality Assessment

•Strategic Action Plan for Certification:

- Requirements for All Cities
- City-Specific Requirements

•Action Plan Implementation

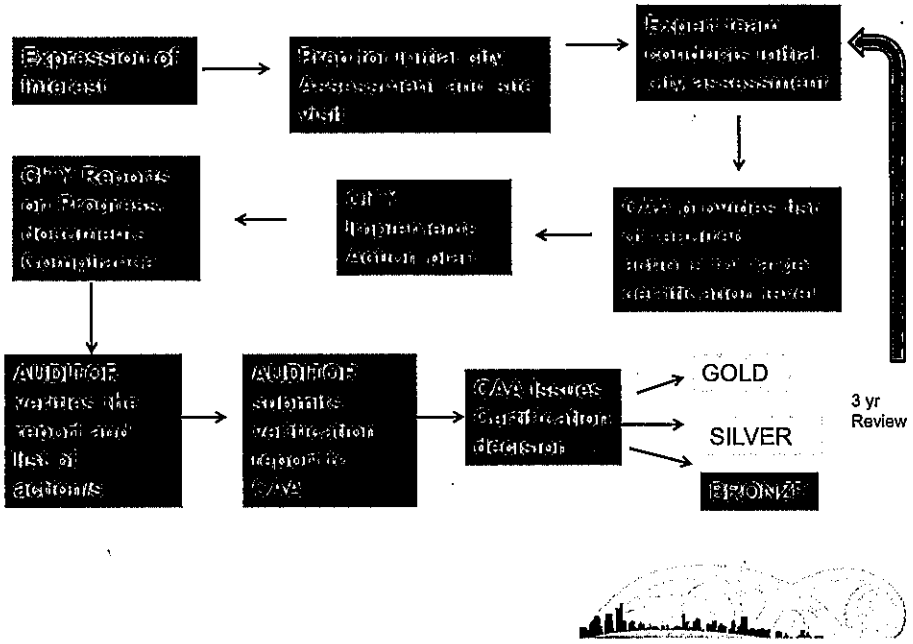
•Monitoring and Reporting of Air Quality Management Actions and Achievements

•Auditing /Verification

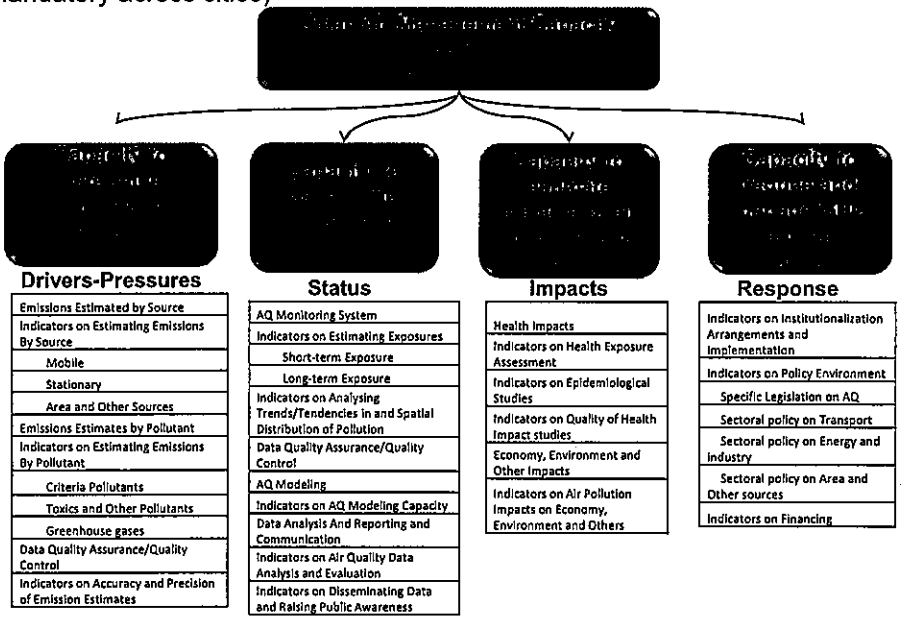
•Certification Award and Recognition

•Reassessment and Roadmap to next level certification

CCAP City Certification Process (working document)



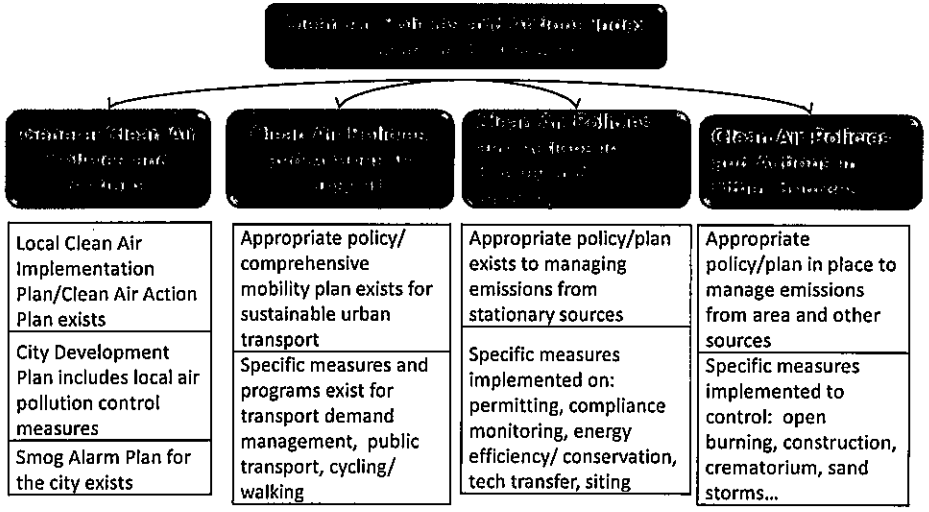
Proposed Categories of Actions (mandatory across cities)



Key Criteria: Requirements for Certification

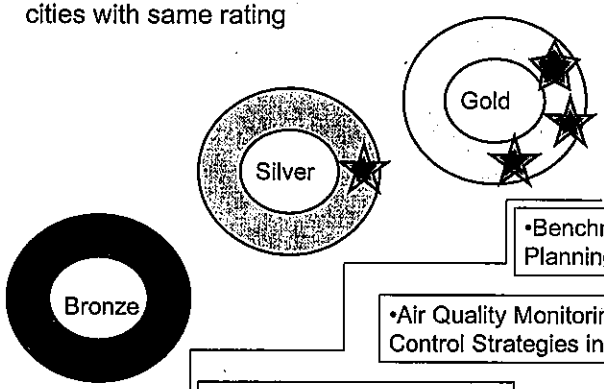
1. **COMMITMENT** and **CAPACITY-BUILDING**
2. **BASELINE CITY ASSESSMENT**
   - Scorecard Roadmap Capacity Assessment
   - Ambient air pollutant monitoring and health assessment
   - Release inventory and source characterization
   - Action Plan with Time-bound goals and objectives
   - Legal and economic carrots and sticks (incentives and regulatory requirements).
3. **IMPLEMENTATION DOCUMENTATION** and **ASSURANCE**
   - Specific policies and programs in place
   - Sustained source emissions controls
   - Sustained air quality improvements (benchmark indicators)

Examples of city-specific actions



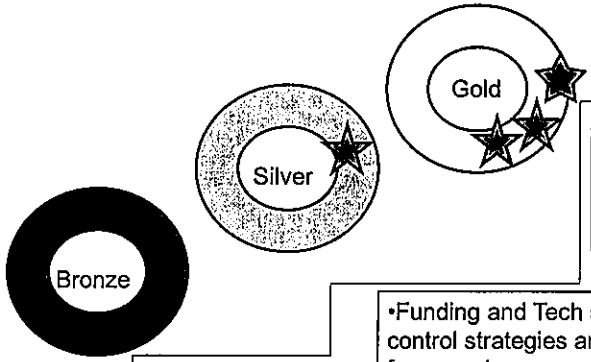
Progressive Levels of Certification

- Three or Five levels
- Equivalency of achievements among cities with same rating



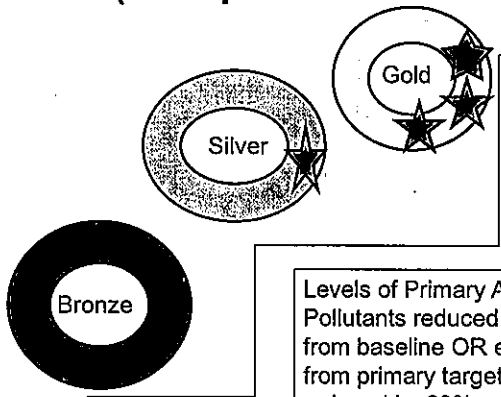
- Benchmark AQ levels achieved, Planning for level 2 improvements
- Air Quality Monitoring, Source Control Strategies in Place
- Commitment, Training, Assessment.

Incentives Adapt with Air Quality Management needs



- Green business development resources; regional coordination, regulatory support
- Funding and Tech support for source emission control strategies and infrastructure; regulatory framework
- Training and funding for AQM program development

Progressive Air Quality Improvement (example benchmarks)



- Levels of Primary Air Pollutants reduced by 50% from baseline OR consistently meet WHO occupational exposure limits
- Levels of Primary Air Pollutants reduced by 20% from baseline OR emissions from primary target sources reduced by 30%
- Assessment completed, source characterization monitoring and control strategies launched

Program Development

Phased Approach

- Recruit cities for pilot program bronze level certification (2015)
- Review, revise and codify criteria (2015)
- Launch full program. Increase stakeholder engagement and expand incentives (2016)
- Encourage inter-city coordination/explore regional certification (2016-2017)

Please Share your Feedback:

1. How could the certification program help your city's air quality program?
2. What factors will determine whether your administration will seek to get certified?
3. What elements and criteria do you think will be most important and effective in helping improve air quality in the simplest and most efficient ?
4. What if any concerns do you have?

CLEAN AIR PARTNERSHIP

City to City Cooperation Workshop

Cities Clean Air Partnership Workshop

August 12, 2015 3-4:15 PM

Welcome to the City to City Cooperation Workshop!

- Please select a networking table with a topic of interest to you:
  - Clean Fuels and Vehicles and Sustainable Transportation
  - Air Quality Monitoring and Decision Support Tools (Modeling)
  - Communicating with the Public
  - Emissions Inventory
  - Indoor Air/Cookstoves
  - Fugitive Dust Control
- No more than 6-8 people per table, please!
- Don't worry, you'll have a chance to pick another topic later in the session! ☺

Purpose

- Provide you with an opportunity to network with other CCAP cities with similar interests

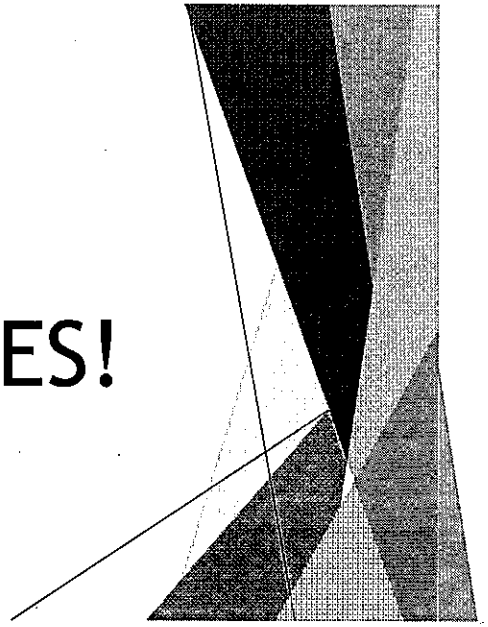
At your tables....

- Introduce yourselves by sharing your:
  - Name
  - Position
  - City
- Share your response to the following question:

Imagine that, a year from now, CCAP has reconvened and you are attending the meeting. Over the last year, you've formed a successful partnership with another city over the last year on (insert topic name here) that has benefitted both of your cities. How would you describe the focus of that partnership to your fellow participants?

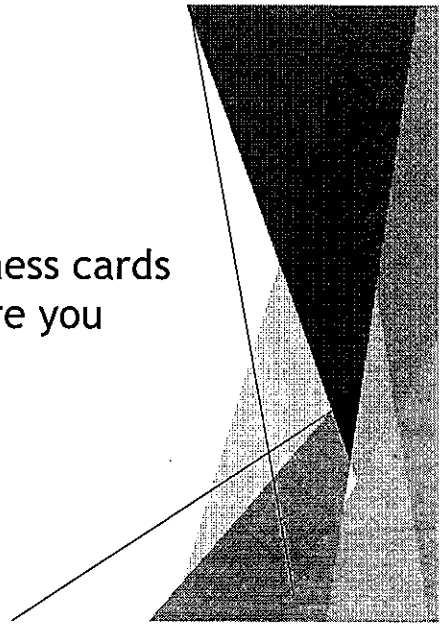
F 8/12 C3

SWITCH TABLES!



Thank you!

- Don't forget to add your business cards to the networking board before you leave today!



F 8/12 closing

CITIES CLEAN AIR PARTNERSHIP

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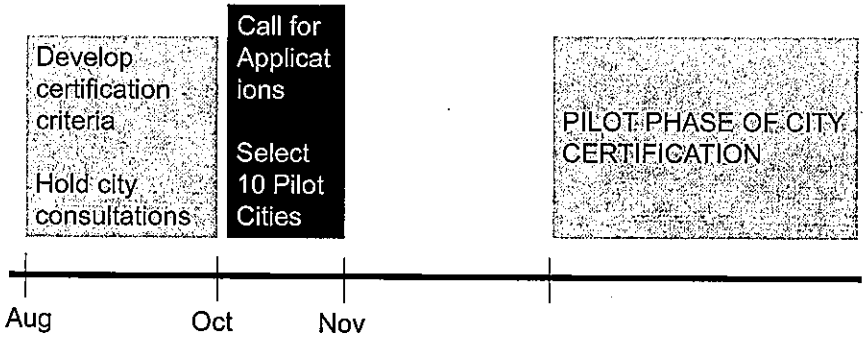
Closing Remarks

Bjarne Pedersen and Glynda Bathan
Clean Air Asia

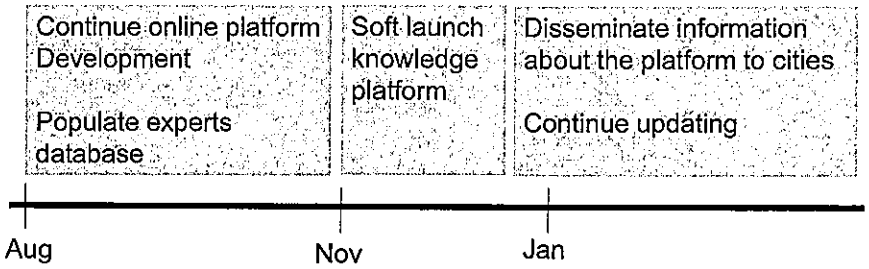
WE'VE ONLY JUST BEGUN

WHAT'S IN STORE IN 2015 AND 2016

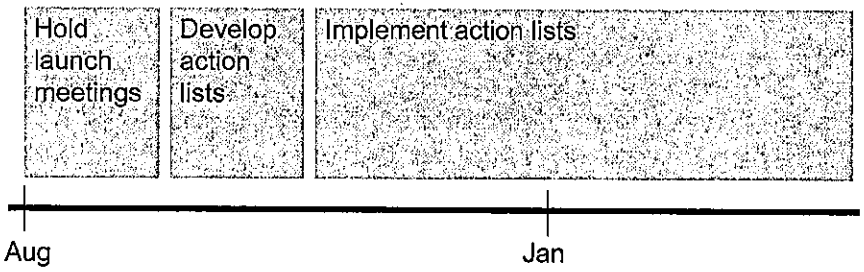
CITY CERTIFICATION



KNOWLEDGE PLATFORM



C^3



About Clean Air Asia

Clean Air Asia is an international NGO established in 2001 as the premier air quality network for Asia by the Asian Development Bank, World Bank and USAID. Our mission is to promote better air quality and livable cities by translating knowledge to policies and actions that enable Asia' s 1000+ cities to reduce air pollution and greenhouse gas emissions from transport, energy and other sectors.

We became a UN-recognized partnership in 2007, our network spanning 250 organizations in 31 countries in Asia and worldwide. Our core programs are: air quality and climate change, clean fuels and vehicles, low emissions urban development, and green freight and logistics.

www.cleanairasia.org

About CCAP

Cities Clean Air Partnership (CCAP), an initiative led by Clean Air Asia, establishes a comprehensive platform for cities to cooperate and jointly address air quality challenges.

CCAP is supported by the International Environmental Partnership (IEP).

www.cleanairasia.org/ccap

Clean Air for Cities – Perspectives and Solutions

With air pollution implicated in the deaths of 7 million people annually around the world, the Better Air Quality (BAQ) Conference and the World Clean Air Congress are meeting jointly in a landmark event to explore the scientific, technological and policy advances and innovations - at local, national and international levels - that could solve the global challenges to health and the environment.

Download the Conference Brochure

Organized by:

CLEAN AIR ASIA

IUAPPA

Contact:
iuappa@wcac2016.org
baq@cleanairasia.org

Dynamic BUSAN

bto

Program Manager

Chee Anne Rono
ritchie.rono@cleanairasia.org