出國報告(出國類別：開會)

參加「APEC 海洋廢棄物利害關係方會議：改善數據、合作及發展新夥伴關係」報告

服務機關：海洋委員會
海洋委員會海洋保育署
姓名職務：陳曉怡專員
楊蕙禎專員

派赴國家/地區：印尼峇里島

出國期間：107 年 11 月 01 日至 11 月 04 日

報告時間：107 年 11 月 23 日

參加「APEC 海洋廢棄物利害關係方會議：改善數據、合作及發展新夥伴關係」

摘要

APEC 海洋廢棄物利害關係方會議：改善數據、合作及發展新夥伴關係(APEC Marine Debris Stakeholder Meeting: Improving Data and Coordination and Developing New Partnerships)2018 年 11 月 2 日至 3 日於印尼峇里島召開，本會議係接續 2018 年 10 月 29 至 30 日於同地舉辦之「我們的海洋大會」(Our Ocean Conference)，目的是為「更新 2009 年海洋廢棄物經濟成本報告」(Update of 2009 APEC Report on Economic Costs of Marine Debris to APEC Economies)。

2009 年海洋與漁業工作小組曾發表「理解 APEC 區域控管海洋廢棄物之經濟效益及成本」(Understanding the Economic Benefits and Costs of Controlling Marine Debris in the APEC Region)，指出海洋廢棄物每年讓 APEC 經濟體損失近 13 億美元，引起各經濟體關注。因該研究近 10 年無更新數據，2018 年該計畫與澳大利亞伍倫貢大學合作，經 APEC 提案獲准及經費支持。會議除邀請各經濟體與會外，另邀請美國國際開發署、美國國家海洋暨大氣總署、美國環境保護署外，更有非政府組織海洋保護協會參加。相關會議結論將於 2019 年 APEC 海洋與漁業工作小組發表，送 APEC 資深官員會議跟領袖會議採認。

APEC 海洋廢棄物利害關係方會議：改善數據、合作及發展新夥伴關係

目次

壹、 目的

一、2009 年發表的「理解 APEC 區域控管海洋廢棄物之經濟效益及成本」(Understanding the Economic Benefits and Costs of Controlling Marine Debris in the APEC Region)，提到海洋廢棄物除造成 APEC 經濟體產生重大的經濟影響外，在漁業、運輸、旅遊、保險、政府及社區亦同樣遭受損失。2007 年 APEC 海洋資源保護工作小組(海洋與漁業工作小組未整併前之小組名稱)批准該研究計畫，藉由提高政府、社區及私部門對海洋廢棄物造成的經濟損失認知，提供指導及實用建議，以減少其受到海洋廢棄物的影響。

二、該報告提及每年約有 640 萬噸廢棄物流入海洋，其中塑膠占了 60%至 80%，儘管採取控制措施，但海洋廢棄物數量仍不斷增加，建議在陸源垃圾進入水道及入海前，先採取簡單攔截防止措施，以降低經濟成本。另報告對各經濟體進行案例分析，可了解其面臨狀況，亦涉及非經濟體區域之研究。相關數據可幫助了解控制海洋廢棄物的經濟成本和效益，促使政府、社區及私部門採取行動。而海洋廢棄物管理需要相當的支出，報告書也評估最有效的資金運用情形，提供各經濟體控制和降低海洋廢棄物之支出參考。

三、本次會議除數據更新外，將與利害關係方協調、評估及更新經濟成本；提供政策制定者更有效的政策或措施；改進的科學知識和經濟格局；促進公私夥伴關係和協調；協調創新政策、融資和技術管理海洋廢棄物；蒐集海洋科學資訊；整合 2009 年後各經濟體對海洋廢棄物投入之議題。並促成公私部門及利害關係方合作，以創新金融與技術面向，研議預防及減量海洋廢棄物之區域合作策略。最後將用公私夥伴及利害關係方與網絡鏈結，建立研究聯絡點據以更新 2009 年報告。

貳、 會議過程

一、「APEC 海洋廢棄物利害關係方會議：改善數據、合作及發展新夥伴關係」以論壇方式進行，每節有主持人、發表人及綜合對答。本次出席的經濟體(依排序)澳大利亞、加拿大、印尼、日本、韓國、馬來西亞、紐西蘭、菲律賓、泰國、美國、越南及我國等共 12 個經濟體。未出席為汶萊、智利、香港、墨西哥、祕魯、巴布亞紐幾內亞、中國、俄羅斯及新加坡等 9 個經濟體。

二、本會議分為 10 場次進行，分述如下：

(一) 開場白和歡迎

1. 簡要歡迎與會者及講述本會議的目標及預期成果。美國國務院企劃督導(Project Overseer, U.S. Department of State) Min Kang 為主持人，先介紹與會 APEC 經濟體，並說明本會議的立意。說明海洋的陸源污染物及垃圾持續增加，對健康及環境造成影響。又因管理系統量能不足，對投資者吸引力不佳，以致 APEC 高階會議將針對海洋廢棄物管理系統，尋求金融支持及合作方式，用以解決 APEC 區域的海洋廢棄物問題。另期待 APEC 海洋與漁業工作小組整合各經濟體及區域，並持續以永續方式解決。與澳大利亞伍倫貢大學(University of Wollongong)合作之研究指出，根據過去研究資料，APEC 經濟體在海洋廢棄物支出達 1 億美元，因此需要向利害關係方尋求各種合作與發展可能。
2. 美國駐印尼泗水領事館(U.S. Consulate General Surabaya, Indonesia) Consul General Mark McGovern 報告美國與印尼正在進行合作計畫。美國剛通過新法案的授權，授權 NOAA 對於海洋廢棄物的行動方案，整合國內與國際間針對海洋廢棄物防治之政策，也尋求相關公私部門及利害關係方的合作與行動。
3. 印尼海事協調部(Coordinating Ministry of Maritime Affairs, Indonesia) Andreas Hutahaean 報告「海事協調部－挑戰和解決方案」(Coordinating Ministry of Maritime Affairs－Challenges and solutions)，提到印尼總統已簽署該國「2018 至 2025 年打擊海洋廢棄物行動計畫，總統令第 83/2018 號」(Plan of Action for Combating Marine Debris 2018-2025 Presidential decree no.83/2018)，該法案針對海洋廢棄物進行因應，並透過國家型計畫執行，目標設定 2025 年前海洋廢棄物將減量 30%。
4. 美國國際開發署經濟發展、教育及環境局助理副局長(USAID Deputy Assistant Administrator for the Bureau for Economic Growth, Education and Environment) Carrie

Thompson 口頭報告海洋廢棄物的全球挑戰議題。說明必須透過地方行動來解決，USAID 推動「市政廢棄物回收計畫」(Municipal Waste Recycling Program)並提供經費支持，亞洲地區目前進行的地區分別是印尼、菲律賓、斯里蘭卡及越南。將透過地方團體與地方經濟活動，促進固體廢棄物管理(solid waste management)。

(二) 設定場景

1. 介紹 APEC 海洋與漁業工作小組的過去與現在，及 APEC 海洋廢棄物虛擬工作小組(APEC Virtual Working Group on Marine Debris)將聚焦在 2016 年 APEC 部長批准的政策與實踐建議上，主持人為海洋保護協會塑膠總監(Plastics Director, Ocean Conservancy) Chever Voltmer。
2. 美國喬治亞大學助理教授(Assistant Professor, University of Georgia) Jenna Jambeck 博士以本會議名稱為題，分享塑膠垃圾減量之國際行動經驗，含括塑膠產品減量必須透過地方行動，經由再使用計畫與新技術讓廢棄物數量跟經濟成長脫鉤，並促進全球性的廢棄物管理減量，後續會辦理相關的工作坊，用更全面的方式去進行地方行動，並且與全球性政策管理結合。
3. 海洋保護協會國際倡議常務董事(Managing Director, International Initiatives, Ocean Conservancy) Susan Ruffo 以本節名稱為主題，報告海洋保護協會是結合公私部門的角色，許多國家、企業、學術及非政府組織等團體加入淨海聯盟(Trash Free Seas Alliance)及 2012 年的淨海行動報告。講述以科學數據與合作的方式，形成更有策略型的行動，認為海洋廢棄物不只和聯合國永續發展目標(SDGs)第 14 章的海洋議題有關，也與公共及經濟議題相關。
4. APEC 海洋廢棄物虛擬工作小組協調員(Coordinator, APEC Virtual Working Group on Marine Debris) Ryan MacFarlane 報告「APEC 海洋廢棄物虛擬工作組」(APEC Virtual Working Group on Marine Debris)，介紹小組在海洋廢棄物方面如何連結夥伴關係，例如將廢棄物與能源議題與美國電機工程合作，並將環境與風險問題傳達給投資者，使廢棄物管理議題落實至更多公私面策略。

(三) 2009 年報告回顧與 2018 至 2019 年研究及報告

1. 除回顧 2009 年 APEC 報告書的背景和前後關係外，並具體審視 2009 年報告中的若干建議，討論 2018 年至 2019 年研究的目標，並更新海洋廢棄物對 APEC 經

濟體的經濟成本，本節由本研究的承攬單位澳大利亞伍倫貢大學(University of Wollongong, 2018 Study Contractors) Alistair McIlgorm 教授及 Karen Raubenheimer 講師共同主持。

2. Alistair McIlgorm 教授先以 APEC2009 年出版「理解 APEC 區域控管海洋廢棄物之經濟效益及成本」(Understanding the Economic Benefits and Costs of Controlling Marine Debris in the APEC Region)為基礎，討論經濟體如何以不同方式(如記錄更多資料)降低陸源垃圾入海。並運用技術協助或與地方政府及私部門建立相關機制等方法進行海洋廢棄物管理。另外認為提升處理技術、加入成本效益分析及提出政策性策略建議，對海洋廢棄物管理有所幫助。
3. Karen Raubenheimer 講師則將海洋廢棄物問題以現況及政府預防等兩部分呈現，並以 7 個案例分析進行探討，含括澳大利亞之污水排放防治計畫及漁網回收計畫、菲律賓之生態磚計畫、智利之智慧 APP 回收計畫、我國之廢棄物處理及費用徵收機制、美國加州海洋保護委員會及馬來西亞生命之河計畫中之連結公私部門平臺計畫等。後續完成相關案例討論後，將於 2019 年 6 月出版探討報告。

(四) 經濟和地方層面之個體報告

1. 討論在經濟及地方層級的個人報告，主持人為澳大利亞伍倫貢大學(Lecturer, University of Wollongong) Karen Raubenheimer 講師。
2. 印尼海洋事務與漁業部(Ministry of Marine Affairs and Fisheries, Indonesia) Devi Dwiyanti 博士報告「印尼努力打擊海洋廢棄物：研究性方法」(Indonesia Efforts Combating Marine Debris: Research-based approaches)，說明印尼海洋事務與漁業部推動的政策，含括由觀光旅遊推動海洋廢棄物管理、結合地方政府推動海岸廢棄物管理、總統簽署之第 83 號行政命令「打擊海洋廢棄物行動計畫」及峇里島當地發起「海洋保育培力運動」(Gita Laut)。分享相關政府部門支持的研究計畫，以探討印尼海洋廢棄物的來源組成、分布熱區及造成影響。重要發現如季節(季風有無)影響海洋廢棄物累積量、峇里島海洋廢棄物易累積在庫塔地區及小島觀光有顯著的垃圾問題。
3. 日本環境部全球環境局局長(Director, Global Environment Bureau, Ministry of Environment, Japan) Ryuzo Sugimoto 博士報告「日本努力打擊海洋廢棄物」(Japans

Efforts to Combat Marine Litter)，講解日本 2009 年制定之海洋廢棄物保護行動，調查監測源只側重海岸廢棄物，範圍擴大至海洋廢棄物，如增加海域、海底及塑膠微粒等議題探討。另進行海洋塑膠微粒監測方法標準化計畫(Harmonization of Marine Microplastic Monitoring Methodologies)，在 2016 年至 2018 年透過專家團體及不同經濟體之實驗室合作；2018 年完成監測準則草案後導入聯合國「海洋環境保護群委員會」(The Joint Group of Experts on the Scientific Aspects of Marine Environment Protection, GESAMP)、「聯合國環境規劃署」(United Nations Environment Programme, UNEP)及「西太平洋海域共同調查」(The IOC Sub-Commission for the Western Pacific,WESTPAC)等國際合作標準；透過雙(多)邊合作或國際青年協力方式，協助經濟體，如泰國、越南及緬甸等改善海洋廢棄物及分類回收問題；邀請相關經濟體參與海洋塑膠微粒調查與訓練。預計於 2019 年規劃拓展規模，將海洋廢棄與環境議題預計在 G20 高峰會提出，並期待與東協(ASEAN)有更多合作。

4. 韓國海洋環境管理集團國際事務專家(International Affairs Specialist, KOEM, Republic of Korea) Kevin Kim 說明「海洋廢棄物管理整合策略」(Implementation of Advanced Marine Debris Management Policies)，該國家計畫第二期執行期間為 2014 年至 2018 年，以強化海洋廢棄物調查、增加海洋廢棄物移除、優化管理系統及進行相關教育培力為四大主軸，分為 21 個子任務並投入 3319 億韓元。2019 至 2013 年將進行第三期計畫，針對全球及地區性之政策趨勢及相關研究內容進行探討。另介紹「海洋廢棄物的預防及管理第二階段計畫」之目的為建立對於海洋廢棄物預防及管理政策，我國為共同提案者之一，相關內容已於 2018 年 8 月 APEC 海洋與漁業工作小組會議報告，後續依 APEC 程序送資深官員會議討論。

(五) 新興金融需求

1. 討論運用創新的融資方法解決融資缺口及改善廢棄物管理，從政府及金融機構增加支持，主持人為海洋保護協會塑膠總監(Plastics Director, Ocean Conservancy) Chever Voltmer。
2. 世界銀行集團資深環境工程師(Senior Environmental Engineer, World Bank) Delphine Arri 博士說明「發展金融於海洋廢棄物防治議題之扮演角色」(Role of DFi in financing marine litter prevention)，藍色經濟是依靠健康的海洋環境，可提供海洋

經濟活動之永續發展，因此，世界銀行也注意到海洋廢棄物與經濟影響相關的議題。該議題亦與聯合國其他的永續發展指標相關，除含括第 14 章，也連動到第 3、5、6、11、12、13 及 15 章。區域性尺度針對緬甸、格瑞那達(Grenada)、哥倫比亞、巴基斯坦及印尼方面提供資金或技術支持，以協助區域經濟體產生當地所需的海洋廢棄物管理計畫。另說明禁用、稅制及新創技術產品補助等可具推行性金融措施在海洋廢棄物相關議題方面，如管理政策、循環經濟、效益分析及促成創新等區域及跨界議題，世界銀行集團將繼續提供技術與支持角色。

3. 循環資本創辦人及執行長(Founder and CEO, Circulate Capital) Rob Kaplan 報告「東南亞海洋塑膠議題：開始解答」(Ocean Plastics in South and Southeast Asia: the solution starts now)，循環資本是針對海洋塑膠議題的新基金，由於海洋廢棄物問題耗費高額支出，並且需要從「發現問題」轉變為「解決問題」，含括如何將海洋廢棄物轉變為可用資源等方面，資金機制提供管道，以介接新創階段成長為具規模階段的資金困難。
4. 世界塑膠委員會海洋及環境管理執行長(Director, Marine and Environmental Stewardship, World Plastics Council) Stewart Harris 報告「行業參與」(Industry Engagement)，介紹世界塑膠委員會在海洋廢棄物議題的角色，並認為聯合國多項永續發展目標(1、2、3、6、7、8、9、11、12、13、14、17)與塑膠行業有關，且依美國化學理事會(American Chemistry Council)2016 年提出之報告，指出使用替代性材料反較塑膠產生高出 3.8 倍的環境成本，因此該行業承諾透過夥伴關係共同解決與防治海洋廢棄物問題，含括研究、法律管理、加強回收機會與供應鏈管理，及提供相關資金促成前瞻及技術計畫，以塑膠再造方式減少廢棄物問題。
5. 全循環公司亞太地區技術主管(Head of APAC, FullCycle) Robert Allen 先介紹全循環公司，並說明以社群創造方式，整合資本及機構等利益關係方，連結技術夥伴並導入資金，並透過數位金融，如區塊鏈(Blockchain)技術使資本公開與安全，以促進並增加資本進入與支持新創的可能機會；預計在 2025 年前提供 150 個案例。

(六) 以技術及革新，創造有利環境

1. 將以新技術開發，使經濟體回收更多廢棄物及提高經濟價值，及其他推展至公共意識及社區擴展的解決方案。由海洋改變諮商公司執行長(CEO, Marine Change)Andrew Bassford 為主持人。
2. 印尼再沉思機構理事(Director, SecondMuse Indonesia) Simon Baldwin 介紹「海洋廢棄物預防加速器」(ocean plastic prevention accelerator)，再沉思機構是以連結公私部門及地方共同解決複合型問題的新創機構，海洋廢棄物議題部分則在峇里島、泗水、雅加達、澳大利亞及美國等地有相關計畫推動，也分享、培育並擴散相關區域經驗。
3. 再冒險公司研究主管(Head of Research, Gone Adventurin' Pte. Ltd) Sumangali Krishnan 介紹該公司為著眼於東協國家循環經濟議題的商業顧問公司，近期針對 PET 塑材、鋁罐等包裝材料流進行討論，如 PET 於東協有關回收系統下，約有 66.85%被填埋；23.06%回收；以及 10.09%進入海洋。透過相關成果報告提供短程及長程建議予利害關係方，以改善回收效果。
4. 塑膠能源公司政策顧問(Policy Advisor, Plastic Energy) Cloe Ragot 報告「塑膠化學回收領域的世界領導者」(world leaders in the chemical recycling of plastics)，介紹該公司能以技術處理低價且不可回收廢塑膠並轉化為資源以降低污染，並與世界自然基金會(WWF)印尼辦公室合作，承諾於 2025 年前協助處理 10 萬噸廢棄塑膠，並簽署新塑膠經濟承諾(New plastic economy global commitment)，在 2025 年前以再生(Plastic2Plastic)方式處理 30 萬噸廢棄塑膠以加強循環經濟。
5. Gringgo 公司合夥創辦人(Co-founder, Gringgo) Febriadi Pratama 報告「垃圾科技」(trash tech)，介紹該公司如何透過數位技術與 APP 顯示，提供回收業者相關資訊，以提高垃圾收集量 199%、回收量 33%、減少儲存成本 63%及提高回收價格 600%等方式，改善峇里島 Denpasar 地區的廢棄物回收行業系統，及友善回收業者，並減少海洋廢棄物排放等環境問題。

(七) 良好的治理，以改善固體廢棄物管理

1. 討論政府層面橫向協調及經濟和地方層面縱向協調之必要性，主持人為澳大利亞伍倫貢大學 Karen Raubenheimer 講師。

2. 美國國家海洋暨大氣總署國際項目辦公室國際事務專家(US NOAA) Steve Morrison 介紹「美國海洋廢棄物政策與協調機制」(Domestic Marine Debris Coordination)。目前海洋廢棄物政策與協調由機構間海洋廢棄物協調委員會(Interagency Marine Debris Coordinating Committee，IMDCC)負責，海洋廢棄物議題起源於 2006 年 NOAA 海洋廢棄物計畫，該計畫 2018 年經總統簽署並立法通過為「拯救我們的海洋法案」(Save Our Seas Act)，負責國內、區域及國際間有關海洋廢棄物防治、減量與移除等整合協調工作。IMDCC 由 NOAA 擔任主席、環保部門(Environmental Protection Agency)擔任副主席，並由海岸警衛隊(Coast Guard)、海軍(Navy)、國務院(Department of State)、內政部門(Safety and Environmental Enforcement、Park Service、Fish and Wildlife Service)、相關委員會如 Marine Mammal Commission 等有關單位組成，以因應不同階段的管理。IMDCC 在 2008 年產製，並首次將報告提供國會，2009 年之後每兩年產製報告一次，也提供國內相關機關建議。報告中提及政策協調應該有法律授權、納入相關機關團體、評估面臨問題、提出定期報告、規律及出席狀況良好的會議，以確保機制運作。
3. 泰國亞洲理工學院亞洲及太平洋高級項目專家區域資源中心(Senior Program Specialist Regional Resource Center for Asia and the Pacific, Asian Institute of Technology) Guilberto Borongan 介紹「以橫向及縱向協調實踐 APEC 政策」(The APEC Policy and Practice Recommended in context of the Lateral and Vertical Coordination)，共同合作夥伴含括海洋保護協會、Encourage capital、Waste 2 Worth、Closed Loop Partners、Earth Engineering Center of Columbia University 等等，主動透過機制聯繫各類部門，含括政府單位、非政府組織、企業，並取得資金挹注以深化地方政府的行動，過去在 2016 年時拜訪了印尼、菲律賓及越南並進行相關行動。
4. 短片播放：菲律賓納沃塔斯市長(Mayor of Navotas, Philippines) John Rey Tiangco。因地方政府經費拮据，市政府與各個描籠涯(barangay，菲律賓最小社區單元)緊密協調固體廢棄物管理和回收，並有 20%社區基金用於此。許多社區活動含括：從沿海地區清理河流、清理運河並清理海灣；建議每星期五為無塑日及辦理教育宣導等，從國家法律層面落實到地方政府層面，最後進入住家計畫。
5. 菲律賓國家固體廢棄物管理委員會副主席(Vice Chairman, National Solid Waste Management Commission, Philippines) Crispian Lao 口頭報告自 2000 年開始進行固

體廢棄物管理，與近 40 個政府組及非政府組織共同合作及跨部門協調，與利害關係方、消費者團體及非政府組織諮商溝通。因地方政府經費拮据，且考慮民眾需要，因此從減少民眾食物浪費觀念及設立資源回收桶。然而大規模經費的開發項目，利害關係方不會支持，因投資期限過長以致回收太慢，所以要將地方利益納入在政策體制考慮。

6. 美國環境保護署國際保護專家(International Environmental Protection Specialist, US EPA) Andrew Horan「通過縱向協調實現固體廢棄物管理的良好治理」(Good Governance on Solid Waste Management Through Vertical Coordination)介紹美國環保署 1976 年公布資源保護與恢復法案，促使露天垃圾場關閉；1980 年各州提報環保署批准的固體廢棄物管理計畫。而環保署在廢棄物管理系統中之功用，含括提供一致性及可共同實施「資源保育及回收法案」(RCRA)；提供國家標準、指南及技術指導；作為協調及對話角色以解決複雜問題等。另為防止陸源垃圾進入海洋及流域，實施「無垃圾水域」(Trash Free Waters)，透過各州及當地政府，與利害關係方對話，建立合作夥伴關係。該行動亦推展至國際，美國和平工作團和聯合國環境屬加勒比海環境計畫於 2015 年在智利海洋會議上倡議無垃圾水域，其中祕魯、牙買加及巴拿馬等當地國家、區域、地方政府及非政府組織合作，含括召開相關研討會、討論各項重點計畫及項目及提高教育認知等，促使陸源垃圾回收提高。
7. 美國國際開發署市政廢棄物回收計畫固體廢棄物專家及顧問(Solid Waste Specialist & Consultant, USAID Municipal Waste Recycling Program) Widita Vidyaningrum 報告「印度尼西亞廢棄物管理快照」(Shapshot of Waste Management in Indonesia)，先分析印尼當地廢棄物資訊，總計印尼每年生產 6,550 萬噸，60%有機、40%非有機，其中 14%為塑膠。過去行政規模鬆散，所以當地以社區組織回收廢棄物方式，私部門通常不參與。現在藉由總統條例，推動國家廢棄物管理政策和戰略，預定到 2025 年減少 30%廢棄物及 70%的廢棄物處理；2018 至 2025 年實施國家海洋廢棄物行動計畫及加速從能源設施發展廢棄物再利用。
8. 短片播放：斯里蘭卡西部省廢棄物管理局長(Director, Waste Management Authority, Western Province, Sri Lanka) Nalim Mannapperuma，短片呈現斯里蘭卡西部省是該

國的經濟重鎮，因沿海飽受海洋廢棄物，造成約 38 億美金損失。藉由加強社區回收、教育推廣及增加資源回收桶等機制，減少陸源垃圾。

(八) 公私合作夥伴關係

1. 重點介紹成功的公私夥伴關係，當地倡導者面臨的挑戰，以及改善溝通和促進整體的方法，主持人為美國國際開發署市政廢棄物回收計畫發展創新小組主席(USAID MWRP Chief of Party, Development Innovations Group) Henri Disselkoen。
2. 短片播放：錫蘭商會高級助理秘書長(Senior Assistant Secretary General, Ceylon Chamber of Commerce) Chandrarathna Vithanage。短片提及 2016 年和 2017 年間，廢棄物填滿了科倫坡的街道、運河和海灘，在缺乏可用的垃圾填埋場及公眾抗議下，促使政府和私部門訂定新的政策和措施，以減少塑膠廢棄物。公部門公布新的行政規則，透過與私部門合作，採用「企業資源規劃 (EPR)」，結合高科技技術，提高垃圾回收機制。另在某些一次性使用塑膠實施禁令，這些使 15%的塑膠原料進口受到限制。
3. 印尼永續環境包裝與回收聯盟秘書長(Secretary General, PRAISE) Mignonne Maramis 報告「建立夥伴關係」(BUILDING PARTNERSHIPS)，先介紹該組織名稱由來，為永續發展的包裝和回收協會縮寫，願景是支持整體性、綜合性及永續性的包裝廢棄物管理。手段是提高利害關係方負責任的廢棄物管理意識；與研究教育單位合作，加強成員在包裝廢棄物的管理能力；及爭取政府、私部門與民眾參與。接著說明其在峇里島的成功經驗，以盡量減少陸源廢棄物到海洋、在當地實施大規模有效的解決方案、加速生態系統回收及廢棄物再利用、促使與利害關係方合作等方式減少海洋廢棄物。
4. 印尼 Yayasan Bina karta Lestari, Bintari 機構 Feri Prihantoro 報告「公私合作夥伴關係，提高廢棄物再循環能力」(PUBLIC-PRIVATE PARTNERSHIP (PPP) TO INCREASE WASTE RECYCLING CAPACITY)，先介紹組織在永續發展教育、路基行業、廢棄物管理及海岸管理等四方面的經驗，詳述自 2002 年起的廢棄物管理歷程。該組織以建立私人、社區及地方政府的夥伴關係，提高社區回收無機廢棄物，使夥伴關係們獲得額外收入的能力，及建立私部門環境形象，最後達到環境管理。

5. 短片播放：斯里蘭卡科倫坡市政委員會(工程服務)副市長(Deputy Municipal Commissioner (Engineering Services), Colombo Municipal Council) Lalith Wickramaratne，短片提到該市垃圾增加到 20%以上，加上環境限制，公私部門不得不面對這問題。在處理廢棄物經費上，因費用過高，占全市政府預算 20%。因政府預算不足，市府採用公私部門分工合作處理廢棄物，50%私部門處理及 50%為理事會處理。私部門可將回收廢棄物，用在製造可回收塑膠製品，及協助政府做到市府進行廢棄物管理。
6. 越南環境與社區研究中心執行主任(Executive Director, Center for Environment and Community Research) Ly Nguyen 報告「制定國家塑膠廢棄物管理行動計畫－自下而上活動的投入」(Development of National Action Plan on Plastic Waste Management －Inputs from Bottom up Activities)，提到越南是全世界 5 個沒有管理塑膠廢棄物的國家之一，在 2030 年前將進行海洋經濟永續發展戰略，以預防、控制和顯著減少海洋環境污染；前端減少海洋塑膠廢棄物的數量；在沿海省市回收 100%廢棄物等。另越南環境部海島管理局(VASI)制定國家塑膠廢棄物管理行動計畫，成立工作小組、啟動一系列諮詢研討會，並與利害關係方討論。最後，將婦女帶入塑膠廢棄物管理，並以越南峴港市為例，在當地培訓及教育婦女，成功後將擴大規模辦理。

(九) 納入廢棄物回收

1. 討論婦女、青年和弱勢群體在廢棄物部門中的作用以及激勵非正規部門的方式，主持人為美國國際開發署土地和城市辦公室高級都市專家(Senior Urban Specialist, USAID Office of Land and Urban) Clare Romanik。
2. 地球母親基金會主席(Chairman, Mother Earth Foundation) Sonia Mendoza 報告「零浪費模式」(zero waste model)，藉由轉變社區及改變社區民眾心態，達到廢棄物回收。並以菲律賓馬尼拉為例，馬尼拉為實現廢棄物回收利用最高移轉率的都市，85%回收物回收後，被轉移再利用，有 60 名人員參與廢棄物重複再利用增加生計計畫。在菲律賓聖費爾南多市，採用挨家挨戶的隔離收集方式，訓練廢棄物回收人員，協助家戶廢棄物回收。最後說明菲律賓目前塑膠袋禁令，含括 3

個月後倡議無塑膠日，6 個月後部提供免費塑膠袋、1 年後全面禁止使用一次性塑膠袋等。

3. 越南第三世界環境發展行動區域經理(Country Manager, Environmental Development Action in the Third World (ENDA) Viet Nam) Nguyen Thi Hoai Linh 報告「環境與發展行動」(Environment and Development in Action ENDA)，先介紹該機構願景，並說明在越南胡志明市的實踐，含括建立獨立廢棄物收集者、街道垃圾撿拾者、創造垃圾商店、將垃圾運數至轉移站及回收廢棄物等，並提到婦女在其中扮演著重要的角色。
4. 潛水員清潔行動(Divers Clean Action) Swietenia Lestari 報告「清潔行動」(Divers Clean Action)，介紹印尼約有 1.3 噸沒有管理的廢棄物進入海洋，海灘上 60%是塑膠垃圾。以印尼雅加達市為例，附近 11 個島嶼觀光人次驚人成長，但當地民眾生活受到海洋廢棄物影響，因此教育青年及訓練婦女，提高兩者在廢棄物管理系統中的作用。青年團體透過與周邊企業合作，以獎勵津貼方式，提高當地廢棄物回收率，並訓練青年加入潛水員清潔行動。
5. Misool 基金會(Misool Foundation) Hery Yusamandra 報告「當地社區回收項目」(Local Community Recycling Project)，提到印尼是世界第二大海洋環境廢棄物的貢獻者，自 2014 年起調查海洋廢棄物對環境及經濟威脅。於 2017 年回收 459 噸海洋廢棄物，其中有 85 噸是塑膠類。該基金會在社會及經濟上，2017 年與中央銀行 Bank Sampah 合作，向社區成員發放用於購買可回收物品的基金，婦女在回收上，除為回收者、管理者外，也為廢棄物塑膠袋製作手工藝小組。在青年參與回收上，設立回收課程及正規訓練。2018 年至今，銀行與基金會已回收 175 噸海洋廢棄物，但回收廢棄物仍不夠，目前正在思考防止塑膠廢棄物進入海洋，將與亞太地區其他國家分享與合作。

(十) 開放空間－關於選定主題的小組討論

1. 以「公私合作夥伴關係」(Public-private partnerships)、「納入廢棄物回收」(Inclusion in waste recycling)、「支持地方政府並加強協調，改善固體廢棄物管理」(Supporting local governments and increasing coordination for improving solid waste management)、

「技術及創新平臺」(Platforms for technology and innovation)及「數據收集用於告知政策」(Data collection for informing policy)等五大議題進行小組討論。

2. 在「技術及創新平臺」(Platforms for technology and innovation)小組實例探究、最佳實踐/有利環境、價值鏈的機會等三個部分討論，建議方式有雲端、衛星、簡易管理、虛擬銀行帳戶及 ID 信用紀錄等科技化管理，及提供獎勵虛擬貨幣，提高廢棄物回收機制；建議 NOAA 除在海污監控的衛星追蹤，更能發揮到船舶丟棄海洋廢棄物追蹤；開發應用程式追蹤垃圾及廢棄物外，並以當地方式解決；進行大數據及人工智慧建構模型，聯繫到物聯網，為塑膠垃圾反向追蹤，從源頭進行塑膠材料控管；改變當地行為模式，透過現有技術、社群媒體及青年教育等，提高當地家戶間回收率；辦理創新技術活動、競賽及提供獎金，增加民眾認知。
3. 「政策及數據收集」(Data collection for informing policy)小組：海洋保護協會的 ICC 行動提供了一致的行動方案，但成果數據對於政策制定不夠具體，因此需要考慮方法標準化及獲得足夠的數據品質，以提供為政策規劃使用，但在資料交換上，資料標準化是重要的；泰國、越南面臨到與中國位於河川上下游的地理環境條件，存在廢棄物如何處理與誰來負責的問題，需透過廢棄物來源辨識及協調政策來因應；數據收集後的公開政策，內容可提供為政策制定者與民眾理解，並提供政策有關科學基礎。

(十一) 摘要和總結

1. 美國、日本、韓國、泰國、印尼、菲律賓等經濟體，透過不同協調機制，如透過法律授權，簽署 MOU、專家團體及實驗室合作、專案計畫等方式，連結並確保有關及正確的政府部門、私部門、NGO 團體等方式，促成跨系統有關權益關係者之聯繫與行動落實。美國、日本及泰國亦扮演有關召集推動角色，將國內議題與行動推展至區域不同地區間進行落實。
2. 跨國金融資本(World Bank、Circulate Capital、WPC、Plastic Energy)、社群(FullCycle)及關注相關領域之新創技術顧問公司(SecondMuse、Gone Adventurin、Gringgo)等私部門，透過金融支持及新興技術方式，引導廢棄物回收再利用及循環經濟市場之推動。

3. 印尼、菲律賓及越南等經濟體，透過調查國內或區域內之廢棄物處理及回收情況，並通過有關政策，促進廢棄物回收機制並協助地方政府增加回收效能與有關設施；並透過關注婦女及青年議題之 NGO 團體，推動改善家戶垃圾回收及島嶼廢棄物管理行動，透過行動過程改善環境問題，及民眾環境管理意識之培力。
4. 印尼及斯里蘭卡利用公私夥伴關係協力方式推動廢棄物回收與再利用政策，以解決政府經費不足、改善私部門收入及環境管理問題。
5. APEC 計畫會持續蒐集有關文獻(已討論澳大利亞、菲律賓、智利、我國、美國)，將著重案例與實踐經驗，含括本次研討會所分享的案例經驗，並表達歡迎提供其他實踐案例。相關資料彙整後將提供為海洋與漁業工作小組之參考文件，以共同解決海洋廢棄物問題。

參、 心得及建議

一、我方於會議期間與各經濟體代表、專家、學者、非政府組織及私部門互動熱絡，各經濟體均非常重視海洋廢棄物影響，尤其已經深刻影響到各經濟體及亞太區域的經濟及貿易。大家均有共識會議結論能盡快提報 APEC 海洋與漁業工作小組，並將該議題凸顯至 APEC 資深官員會議中。

二、會中各經濟體對我方與 NOAA 衛星遙測合作監控海上駁油印象深刻，期望 NOAA 能技術支援經濟體對於海上幽靈漁具及海洋廢棄物之監控，預計 2019 年海洋與漁業工作小組會中發表成果報告時向大會提出。

三、會中與該計畫研究學者互相討論在我方案例分析上資料收集方式，學者表示透過問卷方式進行收集，且不限公部門與私部門，資料來源需大量且多元。將於日後持續連繫並請我方提供相關資料。

四、我方 2017 年 7 月成立海洋廢棄物治理平臺，2018 年 2 月發布臺灣海洋廢棄物治理行動方案，以源頭減量、有效管理與移除、研究調查及強化多方合作及擴大公民及相關權益者參與等四大策略，與本次會議重點相扣，建議下次相關會議請環保署及專家學者一同與會，以增加我方與各經濟體間交流，並建立日後合作及對話機制。

附錄一、會議議程

Asia-Pacific
Economic Cooperation

APEC Marine Debris Stakeholder Meeting:
Improving Data and Coordination and Developing New Partnerships

Date: November 2 - 3, 2018
Location: Inuya Putri Resort, Nusa Dua, Bali, Indonesia
Purpose of event:
The purpose of this event is to take stock of the improved scientific knowledge and changed economic landscape since the publication of the 2009 Report on the Economic Costs of Marine Debris to APEC Economies, and build on the report to promote new partnerships and coordination among public and private stakeholders. The discussions will focus on strategic implementation of the 2016 APEC Policy and Practice Recommendations on Overcoming Barriers to Waste Management Finance towards coordinated innovative policy, financing and technology solutions. The meeting will also build public and private partnerships and networks, as well as establish points of contact for the study to update the 2009 report.

2 November, 2018	
8:30 – 9:00	Registration and arrival
Session 1: Opening Remarks and Welcome	
9:00 – 9:30	Opening remarks and welcome This session will briefly welcome attendees and address the objectives and expected outcomes for the meeting. **Moderator:** Min Kang, Project Overseer, U.S. Department of State - **Consul General Mark McGovern**, U.S. Consulate General Surabaya, Indonesia - **Andreas Hutahaean**, Coordinating Ministry of Maritime Affairs - **Carrie Thompson**, USAID Deputy Assistant Administrator for the Bureau for Economic Growth, Education and Environment
Session 2: Setting the Scene	
9:30 – 10:15	Setting the scene This session will provide a brief introduction of the current landscape and previous work conducted through the APEC Ocean and Fisheries Working Group and the APEC Virtual Working Group on Marine Debris, focusing on the APEC Policy and Practice Recommendations endorsed by APEC ministers in 2016.

1

	Moderator: Chever Voltmer, Plastics Director, Ocean Conservancy **Speakers:** • **Dr. Jenna Jambeck**, Assistant Professor, University of Georgia • **Susan Ruffo**, Managing Director, International Initiatives, Ocean Conservancy • **Ryan MacFarlane**, Coordinator, APEC Virtual Working Group on Marine Debris (VWGMD) ***Question and Answer Session***
10:15 – 10:45	**Coffee Break and Group Photo**
Session 3: Recap of the 2009 Report and Objectives for 2018-2019 Study and Report	
10:45 - 11:15	This session will discuss the role of sufficient and accurate data to inform policy makers; recap the background and context of the 2009 APEC Report and discuss the expansion of knowledge since the report's publication. The session will specifically look at several of the recommendations contained in the 2009 report and discuss the goals of the 2018-2019 study to update the economic costs of marine debris to APEC economies. **Moderator: Karen Raubenheimer/Alistair McIlgorm**, University of Wollongong, 2018 Study Contractors **Speakers**: • **Prof. Alistair McIlgorm**, Professor, University of Wollongong • **Dr. Karen Raubenheimer**, Lecturer, University of Wollongong ***Question and Answer Session***
Session 4: Individual Reports at Economy and Local Levels	
11:15 – 12:30	This session will provide an overview of the 2009 APEC Report and 2018 Study followed by several individual reports at economy and local levels. **Moderator: Karen Raubenheimer**, Lecturer, University of Wollongong **Speakers**: • **Dr. Devi Dwiyanti**, Ministry of Marine Affairs and Fisheries, Indonesia • **Ryuzo Sugimoto**, Director, Global Environment Bureau, Ministry of Environment, Japan • **Kevin Kim**, International Affairs Specialist, KOEM, Republic of Korea ***Question and Answer Session***

12:30 – 14:00	**Lunch**
Session 5: The Need for New Financing Measures	
14:00 – 15:00	This session will discuss the new and innovative funding approaches required to address financing gaps and improve waste management and look at current spending levels as well as measures from governments and development finance institutions to increase that support. The session will also provide examples of the partnerships and innovative funding models. **Moderator**: **Chever Voltmer**, Plastics Director, Ocean Conservancy **Speakers**: • **Delphine Arri PhD**, Senior Environmental Engineer, World Bank • **Rob Kaplan**, Founder and CEO, Circulate Capital • **Stewart Harris**, Director, Marine and Environmental Stewardship, World Plastics Council • **Robert Allen**, Head of APAC, FullCycle ***Question and Answer Session***
15:00 – 15:30	**Coffee**
Session 6: Creating Enabling Environments for Technology and Innovation	
15:30 – 16:30	This session will cover new technologies being developed to enable economies to recover more waste and economic value as well as other solutions advancing public awareness and community outreach. Several case studies will illustrate these new technologies and the policy environment that is required for those innovative solutions to be implemented. **Moderator**: **Andrew Bassford**, CEO, Marine Change **Speakers**: • **Simon Baldwin**, Director, SecondMuse Indonesia • **Sumangali Krishnan**, Head of Research, Gone Adventurin' Pte. Ltd. • **Cloe Ragot**, Policy Advisor, Plastic Energy • **Febriadi Pratama**, Co-founder, Gringgo ***Question and Answer Session***
Day 1 Recap	

16:30 – 17:00	This session will summarize the first day's sessions and preface Day 2 discussions, including the need for local actions and economic inclusion. **Moderator: Karen Raubenheimer**, Lecturer, University of Wollongong
3 November, 2018	
Session 7: Good Governance for Improving Solid Waste Management	
8:30 - 9:00	Registration and arrival - Attendees confirm participation in small groups (session 10)
9:00 – 10:30	Lateral and Vertical Coordination This session will discuss the need for coordination between stakeholder government ministries (lateral coordination) and between economy and local levels (vertical coordination) and offer examples of good governance that has improved management of solid waste. **Moderator**: **Karen Raubenheimer**, University of Wollongong **Speakers**: • **Steve Morrison**, US NOAA • **Guilberto Borongan**, Senior Program Specialist Regional Resource Center for Asia and the Pacific, Asian Institute of Technology • **Video: John Rey Tiangco**, Mayor of Navotas, Philippines • **Crispian Lao**, Vice Chairman, National Solid Waste Management Commission, Philippines • **Andrew Horan**, International Environmental Protection Specialist, US EPA • **Widita Vidyaningrum**, Solid Waste Specialist & Consultant, USAID Municipal Waste Recycling Program • **Video: Nalim Mannapperuma**, Director, Waste Management Authority, Western Province, Sri Lanka ***Question and Answer Session***
10:30 – 11:00	**Coffee**
Session 8: Public Private Partnerships	
11:00 – 12:30	This session will highlight successful partnerships, challenges faced by local advocates, and ways to improve communication and facilitate holistic approaches. **Moderator**: **Henri Disselkoen,** USAID MWRP Chief of Party, Development Innovations Group

	Speakers: • **Video: Chandrarathna Vithanage**, Senior Assistant Secretary General, Ceylon Chamber of Commerce • **Mignonne Maramis**, Secretary General, PRAISE • **Feri Prihantoro**, Yayasan Bina karta Lestari, Bintari • **Video: Lalith Wickramaratne**, Deputy Municipal Commissioner (Engineering Services), Colombo Municipal Council • **Ly Nguyen**, Executive Director, Center for Environment and Community Research (CECR) ***Suggestions and Q&A to speakers***
12:30 – 13:30	**Lunch**
Session 9: Inclusion in Waste Recycling Sectors	
13:30 – 15:00	This session will address the role of women, youth and vulnerable populations in the waste sector and ways to incentivize the informal sector. **Moderator**: **Clare Romanik**, Senior Urban Specialist, USAID Office of Land and Urban **Speakers:** • **Sonia Mendoza**, Chairman, Mother Earth Foundation • **Nguyen Thi Hoai Linh**, Country Manager, Environmental Development Action in the Third World (ENDA) Viet Nam • **Swietenia Lestari**, Divers Clean Action • **Hery Yusamandra**, Misool Foundation ***Question and Answer Session***
15:00 – 15:30	**Coffee: Project meeting evaluation forms**
Session 10: Open Space - Small Group Discussions on Selected Topics	
15:30 – 16:30	This session will have 3-5 parallel discussions, with approximately 10-20 participants in a small group. Participants indicate their preference for a particular session during lunch. The proposed sessions and moderators are: • Public-private partnerships (Henri Disselkoen) • Inclusion in waste recycling (gender, youth, and civil society groups) (Bryan Winston) • Supporting local governments and increasing coordination for improving solid waste management (Clare Romanik)

	• Platforms for technology and innovation (Keondra Freemyn) • Data collection for informing policy (Karen Raubenheimer) **Overall moderators: USAID**
Session 11: Summary and wrap-up	
16:30 – 17:00	**Recap and next steps: Karen Raubenheimer**, University of Wollongong

附錄二、會議主持人及主講人簡歷

APEC Marine Debris Stakeholder Meeting: Improving Data and Coordination and Developing New Partnerships

2 November, 2018

Session 1: Opening Remarks and Welcome

Mark McGovern
Consul General
US Consulate General Surabaya

Mark McGovern leads a consulate team for the U.S. Mission in diplomatic engagements in the 12 provinces of eastern Indonesia - over a third of Indonesia's population. Prior to this assignment, Mark served as the Countrywide Consular Coordinator for the U.S. Mission to Vietnam, based in Ho Chi Minh City. Mark joined the Department of State as an officer in 2002, with previous assignments to Japan, Saudi Arabia, China, Afghanistan, and Pakistan. He also has worked in the Counterterrorism office and the Bureau of Consular Affairs in Washington, DC. Prior to these assignments, Mark was also a U.S. Diplomatic Courier based in Korea and Germany.

Before joining the U.S. Department of State, Mark worked for several years with the former Immigration and Naturalization Service in Honolulu, Montreal, and Washington. Mark's previous experiences also include stints as a high school economics teacher, computer software trainer, Wienermobile driver, and as an entrepreneur doing on-the-road promotions for several large American companies. Mark was born, raised, and graduated university in his home state of New Jersey.

Andreas Hutahaean
Deputy Director, Maritime Industry Empowerment
Coordinating Ministry of Maritime Affairs, Indonesia

Prior to his current position, Andreas Hutahaean was a scientist at the Agency for Research and Development of Marine and Fisheries. Since 2011, he is active in developing the Coastal-Ocean Climate Change program, in particular on Blue Carbon & Coastal livelihood, and receiving grants from institutions such as Gesellschaft für Internationale Zusammenarbeit (GIZ), The World Bank, The Global Environment Facility (GEF) and the Science and Technology Research Partnership for Sustainable Development (SATREPS) JICA-JST.
As the coordinating minister, one item of his portfolio is about marine plastic debris, in particular for the establishment of a national plan of action in combating marine debris and supervising some projects related to it. Andreas holds a Ph.D. in Oceanography (Marine Biogeochemistry) from University of Nagoya-Japan in 2010 and MSc in Marine Chemistry from the University of Bremen-Germany in 2002.

Carrie Thompson
Deputy Assistant Administrator
Bureau of Economic Growth, Education and Environment (E3), USAID

Ms. Thompson oversees the work of the Global Climate Change, Forestry and Biodiversity, Land and Urban and Energy and Infrastructure Offices, as well as the Multilateral Development Bank Team for Social/Environment Safeguards. Before returning to Washington she served as Deputy Director of USAID's Regional Development Mission for Asia based in Bangkok, Thailand, where she provided oversight on regional programs that address trans-boundary challenges such as infectious diseases, human and wildlife trafficking, economic integration and shared use of natural resources, and on bilateral programs in China, Thailand, and Laos.

Additional prior assignments include Director of Program Analysis, Implementation, Communication and Outreach for E3 (2009-2011), Director for East African Affairs (2007-2009), and Program Office Director for Guatemala and Central America Programs (2001-2006). She also served in USAID missions in Peru (1997 – 2001) and El Salvador (1993 – 1997). Prior to joining USAID, she worked for the Overseas Private Investment Corporation in Washington and various international trade and finance firms.

Ms. Thompson holds an M.S. in national security strategy from the National War College (2007); an M.A. in international business, trade and development economics from the Fletcher School of Law and Diplomacy (1988); and a B.A. in American studies from Northwestern University.

Session 2: Setting the Scene

Chever Voltmer
Plastics Director
Ocean Conservancy

Chever X. Voltmer joined Ocean Conservancy as the Director for Plastics Initiatives in September 2018. Previously, she worked at the Office of Ocean and Polar Affairs at the Department of State, where she was the lead for international marine debris issues, overseeing U.S. engagement on this issue in the United Nations, G7, G20, APEC, ASEAN, and other fora. A retired career member of the Foreign Service, Chever served overseas in Poland, Guyana, Russia, Ecuador, Bosnia and Herzegovina, Ukraine, and Estonia. She also spent a year as the Director for Central America and the Caribbean at the Office of the U.S. Trade Representative. Chever holds undergraduate degrees in economics and Russian Studies and holds an M.S. from the National War College, where she was a Distinguished Graduate.

Jenna Jambeck
Associate Professor
College of Engineering, University of Georgia

Jenna Jambeck is internationally recognized for her research on plastic waste in the ocean and for the Marine Debris Tracker app she co-created with fellow faculty member Kyle Johnsen. She notes that being active in research helps bring current environmental engineering issues into the classroom for students. Learn more about Dr. Jambeck's teaching and research in Focus on Faculty.

Susan Ruffo
Managing Director, International Initiatives
Ocean Conservancy

Susan Ruffo leads Ocean Conservancy's global efforts to promote a healthy ocean, on issues such as ocean acidification, marine plastics, and climate change. Previously, Susan led the Vibrant Oceans portfolio for Bloomberg Philanthropies, supporting simultaneous reform of local and industrial-scale fisheries and development of financial strategies to ease the transition to sustainable fishing. From 2011 to 2015, Susan served as Associate Director for Climate Preparedness at the White House Council on Environmental Quality. There she led development and implementation of the climate preparedness pillar of President Obama's Climate Action Plan and worked with state, local, and tribal leaders to better prepare the United States for the impacts of climate change. Susan has also worked at The Nature Conservancy and as a Foreign Service Officer with the U.S. Department of State, serving in China, Argentina, and Nigeria and in Washington D.C. Susan has degrees in Economics and Political Science from the Massachusetts Institute of Technology.

Ryan MacFarlane
Director
C&M International

Ryan helps companies, industry associations, academic institutions, and non-governmental organizations develop productive public-private partnerships. He currently serves as coordinator for the Asia-Pacific Economic Cooperation (APEC) Virtual Working Group on Marine Debris, advisor to the APEC Life Sciences Innovation Forum, and a sherpa for initiatives under the Asia-Pacific Financial Forum. Prior to joining C&M International Ryan was the Principal APEC Coordinator at the U.S. Department of State.

Prior to joining the Department of State, Ryan was awarded an American Association for the Advancement of Science (AAAS) Science and Technology Policy Fellowship and served as an international health specialist at the Department of Homeland Security, Office of Health Affairs. Earlier

in his career Ryan worked at the National Oceanic and Atmospheric Administration (NOAA). Ryan's work within the government has been recognized with multiple meritorious and superior honor awards.

Ryan earned a B.S. with Honors in Cellular, Molecular and Developmental Biology from the University of New Hampshire and a Ph.D. in Microbiology and Immunology from Stanford University School of Medicine where he was awarded the Sidney Raffel Award for Outstanding Accomplishment in Graduate Study.

Session 3: Recap of the 2009 Report and Objectives for 2018-2019 Study and Report

Karen Raubenheimer, PhD
Lecturer
University of Wollongong

Karen Raubenheimer obtained her Ph.D. from the Australian National Centre for Ocean Resources and Security (ANCORS). Her thesis, titled "Towards an Improved Framework to Prevent Marine Plastic Debris," analyzed international and regional policy measures to prevent ocean- and land-based sources of plastic pollution. Karen was the lead author of the UN Environment assessment titled Combating marine plastic litter and microplastics: An assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches (UNEP/EA.3/INF/5). Options for addressing policy gaps were identified, which Karen presented at the UN Environment Assembly meeting in December 2017.

Karen conducted two additional assessments for UN Environment. The marine litter action plans of the UN Regional Seas were assessed and guidelines developed to assist the design of new action plans for marine litter and the revision of existing action plans. In addition, the indicators for calculating the costs of marine litter at the national level were identified to assist governments in determining the benefits of preventive versus remedial action.

Alistair McIlgorm
Professor
Australian National Centre for Ocean Resources and Security (ANCORS),
University of Wollongong

Professor McIlgorm specializes in marine and fisheries economics, management and capacity development. His 30-year career in fisheries and the Australian marine sector has been with the Australian Maritime College, Principal of Dominion Consulting Pty Ltd and Director of the National Marine Science Centre (2005-2010).

He pioneered fishery management short course training and has trained many fishery administrators, managers and stakeholders in Australia, and also from 80 countries in the Asia-Pacific, Caribbean, Africa and the Indian Ocean rim, under the Australian Aid program. He has completed over 60 fisheries management projects with Australian government agencies and with a range of international organizations (UNEP, FFA, PEMSEA, and Packard Foundation).

He has numerous journal and peer-reviewed research reports including, "Measuring Marine Economies" (APEC 2004), "Understanding the Economic costs and benefits of controlling marine debris" (APEC 2009) and was a joint author of the Marine Litter governance assessment report to UNEP-UNEA in late 2017. He is a board member of the Journal of Ocean and Coastal Economics, Monterey.

Session 4: Individual Reports at Economy and Local Levels

Karen Raubenheimer, PhD
Lecturer
University of Wollongong

See previous full bio

Ryuzo Sugimoto
Director, International Cooperation and Sustainable Infrastructure
Ministry of Environment, Japan

Ryuzo Sugimoto is in charge of international cooperation with Asian and African countries, and sustainable development goals in the environmental aspect. He joined MOEJ since 1999 and has over 15 years of experience in various aspects of environment and sustainable development, including climate change, 3R, Chemicals, and EIA in Japan. Prior to this position, Mr. Sugimoto transferred to Asian Development Bank temporarily for 3 years and 9 months and established a new trust fund, the Japan Fund for Joint Crediting Mechanism (JFJCM) in ADB, which supports ADB projects to introduce advanced low carbon technology.

Mr. Sugimoto holds a Master's degree in Public Affairs from School of Public and Environmental Affairs, Indiana University, USA (2008); and a Master's (1999) and Bachelor's (1997) degrees in Civil Engineering from the University Of Tokyo, Japan.

Kevin Kim
International Affairs Specialist
Korea Marine Environment Management Corporation (KOEM)

Kevin Kim is currently an International Affairs Specialist at KOEM, which protects the health and livelihoods of its citizens through a systematic response system in the event of oil spills, conducts national projects maintaining sustainability of marine ecosystem services including the national investigation of the marine ecosystem, designation and management of Marine Protected Areas (MPAs), and collects marine debris and treats bilge

waste.

Mr. Kim holds a BA in Political Science from the Johns Hopkins University, MA in International Development and Cooperation from Korea University and is currently working on his Ph.D. from Hankuk University of Foreign Studies focusing on ASEAN studies. Mr. Kim has worked at KOEM for 7 years providing consultation for the Ministry of Oceans and Fisheries in regards to domestic and international policy recommendations for cooperation with APEC, UNEP COBSEA and NOWPAP, PEMSEA, bilateral and multilateral meetings as well as developing various projects and organizing APEC funded events. In addition, he has organized various international workshops and training programs for developing economies in areas such as marine environment management, oil spill response, marine debris management, and other issue areas.

Session 5: The Need for New Financing Measures

Chever Voltmer
Plastics Director
Ocean Conservancy

See previous full bio

Delphine Arri, PhD
Senior Environmental Engineer, Environment and Natural Resources
World Bank

Delphine Arri started her career in environmental consulting in France, leading projects in solid waste and pollution management for private companies and local governments, and in 2009 she became director of her regional business unit. In 2012 she started to work as an independent for international institutions such as the International American Development Bank and the World Bank Group, as a waste management expert or a specialist in environment and social safeguards. She worked four years in IFC, advising governments and private companies to develop infrastructure projects whilst avoiding, minimizing and compensating for environmental and social impacts. She joined the Global platform of the World Bank ENR practice in December 2017 to support the WB pollution management and environmental health program, and develop specifically a program on marine pollution, including plastic pollution, as part of the broader blue economy agenda. Delphine studied Geology and Earth sciences in Ecole Normale Supérieure, Paris, and holds a Ph.D. in Geochemistry and Hydrogeology from Mines Engineering School in Paris.

Rob Kaplan
Founder and CEO
Circulate Capital

Rob Kaplan is Founder and CEO of Circulate Capital, an impact investment management firm dedicated to financing companies, projects, and infrastructure that prevent the flow of plastic waste to the world's ocean and advance the circular economy. He is also a Co-Founder of and Senior Advisor to Closed Loop Partners, which deployed more than $40M into recycling and circular economy investment opportunities in North America; previously as Managing Director, Rob oversaw strategy and new business model development, as well as day-to-day operations.

Rob also served as Director of Sustainability for Walmart Stores, Inc. where he was responsible for packaging, customer engagement, and integration with the Consumables business, including personal care and household cleaning, leading the company's cross-functional efforts to eliminate 20 million metric tons of greenhouse gas from the supply chain.

Rob received his MBA from the Haas School where he studied marketing, corporate responsibility, and social entrepreneurship. He received his undergraduate degree in political communication from the George Washington University where he learned that perception is reality.

Stewart Harris
Director, Marine and Environmental Stewardship
World Plastics Council
Stewart Harris is the Director of Marine and Environmental Stewardship at the American Chemistry Council's (ACC) Plastics Division where he manages ACC's Marine Debris program. He is also Chair of the plastics industry's Global Action Team, which implements the Declaration of the Global Plastics Associations for Solutions on Marine Litter. As part of the Global Declaration, 75 signatories from 40 countries have implemented over 350 projects addressing marine litter since 2011. Stewart also represents the World Plastics Council (WPC) at international meetings. WPC is an organization comprised of leading companies that produce plastic resin and seeks to promote sustainability and the responsible use of plastics. Stewart has a Master of Science in Marine-Estuarine Environmental Science from the University of Maryland and a Bachelor of Science in Biology from Bucknell University.

Robert Allen
Head of APAC
FullCycle Management LLC

Robert Allen is the Head of Technology for FullCycle Management LLC, an impact investment business focused on low carbon solutions and, in particular, on waste to energy technology to tackle the issues of oceanic waste plastic. FullCycle have a mission to democratize access to investment in infrastructure projects and now are planning to raise their next fund using blockchain technology to issue tokenized securities to retail investors globally.

Robert has been building financial services technology for over 20 years and is a specialist in the delivery of Payments and Blockchain-based systems. He led PwC's fintech practice in Australia and is on the board of a number of sustainable development related startups. He is also a board member of the Australian Payments Council and the Australian Digital Commerce Association - the country's industry body for blockchain and cryptocurrency businesses.

Robert is the co-author of "Fintech Revolution: Universal inclusion in the new financial ecosystem" and is also working with the Asian Development Bank to define a fintech strategy for the South Pacific islands.

Session 6: Creating Enabling Environments for Technology and Innovation

Andrew Bassford
CEO
Marine Change

Andreas Bassford's experience spans both commercial and policy-making settings in Europe and Southeast Asia. As Director of Operations for Fishes, Europe's first certified sustainable seafood products company, he managed all sourcing and market development for this pioneering European fish brand that specialized in MSC certified fish. Over the past six years, Andrew has been at the forefront of a range of public and private sector efforts to drive the development of sustainable seafood supply chains. He has undertaken projects for development finance institutions (World Bank, Asian Development Bank, FAO), Asian Governments (Indonesia), and multi-stakeholder initiatives such as the Dutch Sustainable Trade Initiative and Fairtrade. Andrew was part of the founding team involved in creating the International Pole and Line Foundation, which encourage low- impact fishing strategies that benefit ecosystems and local communities.

Simon Baldwin
Director
SecondMuse Indonesia

Simon is the director of SecondMuse Indonesia, a collaboration agency that builds innovation ecosystems to help source, support and scale novel business ideas to market. Before joining SecondMuse, Simon worked on a range of public health and human rights issues across the globe. Along the way, he has also founded several companies. Simon's work currently focuses on exploring how companies can be supported to develop solutions to complex social and environmental problems. In addition to leading SecondMuse in Indonesia, Simon is undertaking his Ph.D. at the Royal Melbourne Institute of Technology's College of Business.

Sumangali Krishnan
Head of Research
Gone Adventurin Pte. Ltd.

Sumangali Krishnan has developed and led various research, policy and on-ground projects aimed at exploring a Circular Economy framework for Asia. Following a career in corporate law, both in private practice and more recently, in start-ups and emerging businesses, Sumangali is currently following her passion for sustainability with her role at GA.

Sumangali has a J.D. in Law and a Masters in Economics and has lived and worked in the United States prior to moving to Singapore. She is particularly interested policy, legislation and business-led interventions as a solution to resource management in Asia.

Febriadi Pratama
Co-founder
Gringgo

Febriadi Pratama is a graduate of Indonesia's top technical university ITB, majoring Interior Design, and has over 5 years of experience in system development, business development, and product development. Previous experiences include web development, building startups, working at several medium to large corporations and as a National Startup Mentor for Business & Product Development. At Gringgo, Febriadi is responsible for decisions on technology usage, supervising daily operations, leading the R&D team, and creating Gringgo's business strategy and development

3 November, 2018

Session 7: Good Governance for Improving Solid Waste Management

Karen Raubenheimer, PhD
Lecturer
University of Wollongong

See previous full bio

Guilberto Borongan
Senior Program Specialist
Regional Resource Center for Asia and the Pacific, Asian Institute of Technology

Guilberto Borongan He is involved in the development of national/city waste management and 3R strategies for the developing countries of Asia as well as the APEC policy and practices recommendations on marine litter; and UNEP funded projects on ASEAN mercury waste, among other related waste management and 3R projects. He has intensive experience in building capacities for local governments and providing technical assistance to partners at both national and regional levels on waste management.

Mr. Borongan was engaged in the regional policy development and advocacy on the environment and health of the WHO-UNEP Ministerial Regional Forum in 14 Southeast and East Asian countries. Before joining RRCAP, he served as Assistant to the Director from 2000 to 2002 with the Asia Europe Environmental Technology Center under the Asia Europe Meeting (ASEM). Mr. Borongan is a Chemical Engineer by profession and holds a Master degree in Urban Environmental Management.

Crispian Lao
Vice Chairman
National Solid Waste Management Commission

Commissioner Crispian Lao is the Vice Chairman of the National Solid Waste Management Commission under the Office of the President, Republic of the Philippines, as the Private Sector Representative for the Recycling Industry and is a Co-Convener and Founding President of the Philippine Alliance for Recycling and Material Sustainability (PARMS) which brought together stakeholders in the recycling value chain (Manufacturers, Industry Groups, Retail Groups, MRFS/Junkshops/Waste Consolidators & Haulers, Recyclers, NGOs, Academe and Government Entities) whose objective is to "Develop and Implement a Holistic & Comprehensive Program to Increase Resource Recovery and Reduce Landfill Dependence towards Zero Waste".

Within APEC, Mr. Lao also serves as the Co-Chair and Industry Sector Representative to the APEC Virtual Working Group on Marine Debris. He is a technical working group member of the Climate Change Commission; board member of the Solid Waste Management Association of the Philippines; and part of the expert panel that will develop a Global Roadmap to Achieve Near Zero Ocean Plastic Leakage by 2040.

Andrew Horan
International Environmental Protection Specialist
US EPA

Andrew Horan is responsible for broad multilateral marine pollution policy development for the Agency, with a heavy focus on marine litter and plastics. He co-leads EPA's international Trash Free Waters work on the ground in Peru, Jamaica, Panama, Canada, and Mexico from initial engagement to project completion. He also leads, as part of a team, EPA direct engagement with the United Nations on marine litter and plastics issues.

Prior to EPA, Andrew served as Peace Corps Volunteer in the Philippines working on sustainable fisheries matters with local fishing communities as well as with the local government on marine litter and plastics issues. He holds an M.S. degree in Geography from the University of Florida and a B.S. in Earth and Atmospheric Science from Georgia Institute of Technology.

Widita Vidyanigrum
Solid Waste Specialist, Consultant
USAID Municipal Waste Recycling Program

Widita Vidyaningrum is a professional working in the area of Solid Waste Management in Indonesia with numerous experiences working for international development agencies. Currently, she is the Country Liaison of Indonesia for USAID Municipal Waste Recycling program and the National Consultant for Resource and Energy Recovery from Organic Waste in Indonesia, a Strategic Sector Cooperation between Indonesia and Denmark. Starting 2016, she actively involves in the preparation of a World Bank project "Improvement of Solid Waste management to Support Regional and Metropolitan Cities"

together with related ministries in the waste sector. Prior to that, she worked at a consulting company focused in Sustainable Waste Management, as an Expert Associate and Program Manager, where she gained an opportunity to lead the coordination of Baseline Survey for Waste to Energy project in several Indonesian cities, initiated by UN ESCAP partnership with UCLG ASPAC. She has been involved in Waste Sector since 2008, where she worked as Research Assistant at Indonesian Solid Waste Association and then became a member of the association since then.

Session 8: Public-Private Partnerships

Mignonne Maramis
Secretary General
Packaging and Recycling Association for Indonesia Sustainable Environment (PRAISE)

Mignonne N.B. Maramis is Secretary General of the Packaging and Recycling Association for Indonesia Sustainable Environment (PRAISE), an association founded by six companies—Coca-Cola, Danone, Indofood, Nestlé, Tetra Pak, Unilever—which actively supports holistic and sustainable waste management solutions in Indonesia. Mignonne is also the founder of DaurEsia Jaya Trimegah, a company specializing in recycled products made entirely from post-consumer cartons.

Prior to joining PRAISE, Mignonne was Communications Director for Tetra Pak Indonesia, where she worked for over 17 years as Communications Manager, Director, and later as regional Communications Leader for South and Southeast Asia. In addition, Mignonne established and led Tetra Pak Indonesia's Environment division, serving concurrently as Communications and Environment Director.

Mignonne initiated Indonesia's first beverage carton recycling program in 2004, in partnership with a government research institute, Center for Pulp and Paper, local paper mills, waste collection partners and Tetra Pak Indonesia's customers. Tetra Pak's recycling program received the first Sustainable Producer award from the Indonesia Ministry of Environment and Forestry in 2016 for minimizing packaging waste. She also facilitated the launch of Forest Stewardship Council® (FSC®) labelling on Tetra Pak cartons in Indonesia, which ensures that the paperboard comes from responsibly managed forests.

Feri Prihantoro
Director
Yayasan Bina karta Lestari, BINTARI

Feri Prihantoro has worked in solid waste management since 2006 with composting program in the community. Since 2016, BINTARI has cooperation with Indofood to enhance plastic waste reduction, particularly low-economic plastic. Bintari recently signed an agreement with USAID's Municipal Waste Recycling Program to reduce plastics waste through extended stakeholder responsibility particularly private sector. Feri will be a project manager to ensure the goals can be achieved. The project will work with communities, private and government to collect the recyclable waste to fifty new recyclable collection/transport facilities and selected companies to facilitate the easier collection of package materials.

Nguyen Ngoc Ly
Executive Director
Center for Environment and Community Research (CECR)

Ms. Nguyen Ngoc Ly is founder and director of CECR, a local NGO in Hanoi. The Center is advocating for participatory and inclusiveness in the implementation of SDGs, environmental governance and climate change, focusing on improvement of a legal framework to protect clean water, improvement of solid waste management, promotion of greater women role in environmental protection, and creating youth leader network in environmental protection.

In Viet Nam, at the local level, currently CECR is working with the local authorities, women groups and communities to implement project Ocean without Plastics: Community-based Waste Recycling for a strong community and healthy city in Danang. The project promotes the active participation of women, men, youth, business, fishermen in managing waste at source, implementing different models to reduce of plastic use, segregate of plastic waste, composting of organic wastes.

Ms. Ly received MPA from Harvard Kennedy School, MLS from Maryland University, and MEng in Environmental Management and Technology from Asian Institute of Technology, Thailand. She got her engineering degree from Prague College of Chemical Technology, Czech Republic.

Session 9: Inclusion in Waste Recycling Sectors

Clare Romanik
Senior Urban Specialist
USAID Office of Land and Urban

Clare Romanik is the Agency's lead expert on marine plastics pollution and manages USAID's Municipal Waste Recycling Program in Indonesia, Philippines, Vietnam, and Sri Lanka. Ms. Romanik also leads the Agency's work in Urban Assessments and mobilizing domestic resources in urban areas. Prior to joining USAID, Clare was Local Governance Policy Specialist with UNDP (2010-2013), advising 22 Country Offices. As Senior Associate at The Urban Institute (1994-2009), one of Clare's assignments was serving as Chief of Party for USAID's Decentralization and Local Government Program in Kyrgyzstan (2007-2009). Over her career, she has conducted research, provided policy advice and managed development programs related to intergovernmental and municipal finance, local economic development, municipal service delivery, land and property management, citizen participation and decentralization.

Clare holds a Master in Public Affairs with a focus on Economics and Public Policy from Princeton University's Woodrow Wilson School of Public and International Affairs.

Sonia Mendoza
Chairman
Mother Earth Foundation

Sonia was awarded the Zero Waste Fellowship in 2002 and completed training on Zero Waste at the Berkeley Ecology Center in Berkeley, California, under the GAIA program.

Mother Earth Foundation (MEF) is a non-stock, non-profit NGO (Non-government Organization) actively engaged in addressing waste and toxic pollution, climate change, and other health and environmental justice issues, and is known for its community-based advocacy of zero waste.

She is a member of the Board of Trustees of GAIA Philippines, the Ecowaste Coalition, Philippines, the Board of Directors of the Zero Waste International Alliance (ZWIA) and the Break Free From Plastic Movement (BFFP). She serves as a resource person on Ecological Solid Waste Management/Zero Waste to local government units, schools, business offices, church organizations, civic organizations and in congressional hearings on solid waste management and environment concerns.

She has assisted different communities in their waste management programs and actively campaigns for ecological waste management to local government units, schools, business establishments, emphasizing waste reduction, change in lifestyle, source segregation, composting, and recycling to conserve our finite resources for the future generation, and to protect public health and the environment. She has helped establish zero waste model communities in the Philippines.

Nguyen Thi Hoai Linh
Country Manager
Environmental Development Action in the Third World (EDNA), Viet Nam

Under Nguyen Thi Hoai Linh's portfolio, she is planning, coordinating and managing the work of EDNA Vietnam on sustainable development, urbanization, natural resources management, gender, climate change, and community development fund.

She has worked with UN-ESCAP, European Commission, I-NGOs, and the private sectors in Asian countries on the initiatives on "waste to resources". Currently, she manages projects related to plastic waste under the support of USAID: "Towards a Higher Effectiveness (THE) of the INFORMAL SECTOR of waste pickers in (i) the MSWM and (ii) increased recycling of valuable waste components with a focus ON PLASTICS, achieved by increased social protection and income for Independent Waste Collectors" and Gender on solid waste management among Ho Chi Minh City. Throughout her professional career, she has taken leading roles in forums and initiatives, and has conceptualized projects and initiatives and fundraised to implement activities in the areas of her work.

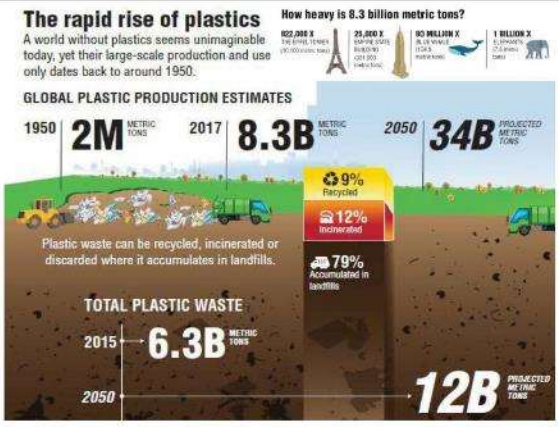
Swietenia Puspa Lestari
Founder & Executive Director
Divers Clean Action

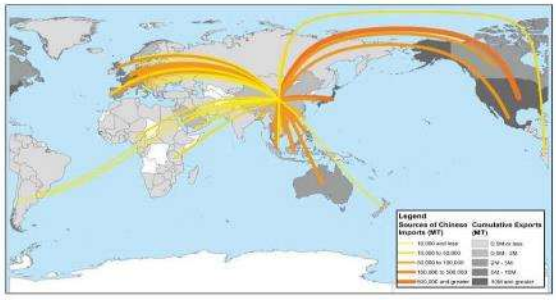
Swietenia Puspa Lestari is the Executive Director of Divers Clean Action, which is a youth-led organization focusing on marine debris issue. Divers Clean Action (DCA) has been established since 2015; with the main programs being research, community development, campaign, workshops, and EPR collaboration partners. DCA has been working with 8 energized and multi-sector youth, and 1,500 volunteers across South East Asian Countries to develop small islands and coastal areas to have an integrated waste management system so the waste that goes to the ocean can be decreased. Swietenia graduated from environmental engineering major in Bandung Institute of Technology and works together with her university, LIPI (Indonesian Institute of Science), as well as Padjajaran University, local-national governments, and various private sectors. Divers Clean Action first pilot project area in Kepulauan Seribu is monitored by the government to become a model to integrate waste management system in municipal and tourism sector.

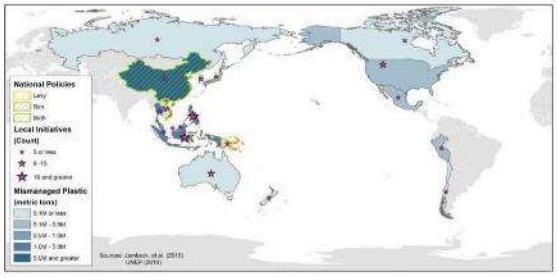
附錄三、會議資料

APEC Marine Debris Stakeholder Meeting: Improving Data and Coordination and Developing New Partnerships

Jenna R. Jambeck
Associate Professor, University of Georgia
Director, Center for Circular Materials Management
Bali, Indonesia
November 2 -3, 2018







Intervention Framework

- Consumers demanding less packaging (some markets)
- Local initiatives (e.g., bans, taxes)
- Voluntary industry actions

- Sustainable packaging associations (pre-competitive collaborations)
- *Truly* biodegradable alternatives (e.g., PHA)
- Packaging with more value (e.g., single materials, design for recycling/end-of-life)
- Design out problematic items/materials (e.g., caps/lids)

- Sharing, Collaborative Economy concepts
- Decouple waste generation with economic growth (facilitated by technology)
  - Reuse programs
  - RFID, mobile phones, smart-labels, etc.

Meet needs – Reduce waste

- Collect
  - Traditional, on-demand, decentralized waste collection
- Capture
  - MRFs, depots, waste banks, community centers
- Contain
  - Recycling or engineered disposal
- **Context and Culture**

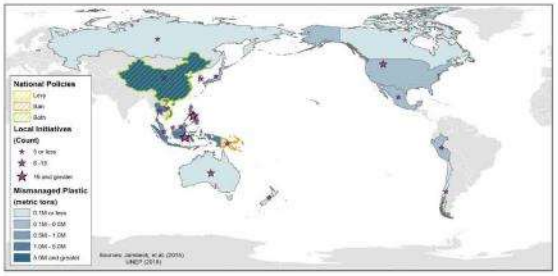
NextWave Plastics

- Engineered, mechanical systems
  - Mr. Trash Wheel
- Manual (by hand)
  - Cleanups, use catalyzes infrastructure
- **Data** to feed back to #1-4

Global Outreach, Policy

- **US State Dept. (SOS Act):** Chile, Philippines, Indonesia, Japan, South Africa, Vietnam, Thailand, Israel, Jordan, South Korea, India
- **World Bank, G7 (declarations, plastics charter), G20,** *APEC (+OC), NGOs,* **Volvo Ocean Race, NatGeo**
- **UN Environment** -- **UNEA2,3,** Clean Seas, Conventions (Abidjan, Nairobi), **Our Ocean**
- **Other Countries/Bilateral:** Denmark, Norway, UK, Canada, Germany, *and more...*
- **Prizes:** EMF Design Competition, Think Beyond Plastic Innovation Prize, NatGeo Innovation prize
- **Global Investment Strategies:** Moss, E., Eidson, A., and Jambeck J., 2017. **Sea of Opportunity: Supply Chain Investment Opportunities to Address Marine Plastic Pollution.**

What's Next?



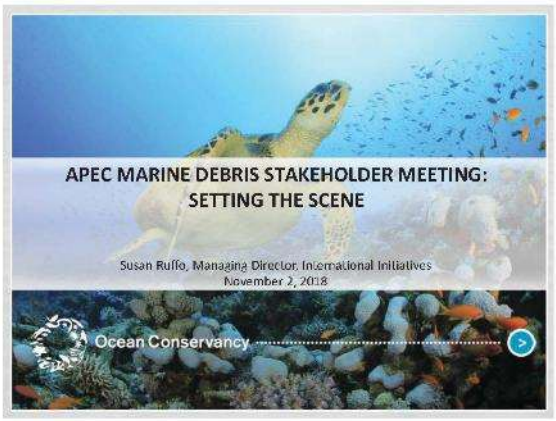
Global to Local

To all of the people working to address this issue around the world... Thank You.

@JambeckResearch
@DebrisTracker
@UGANewMaterials
Jenna Jambeck, PhD
jambeck@uga.edu
http://jambeck.engr.uga.edu/
New Materials Institute
UNIVERSITY OF GEORGIA

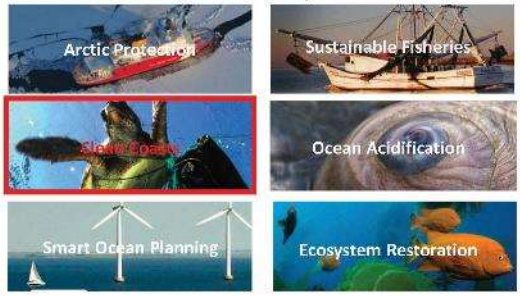
NATIONAL GEOGRAPHIC

11TH HOUR RACING



Ocean Conservancy

Science-based solutions for a healthy ocean



Ocean Conservancy | TRASH FREE SEAS ALLIANCE

TRASH FREE SEAS ALLIANCE

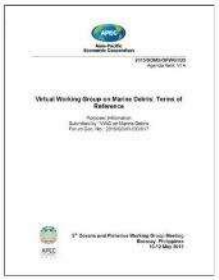
Ocean Conservancy, ALGALITA, amcor, American Chemistry Council, Bank of America, Berry, Coca-Cola, Conservation International, The Ocean Conservancy Forum, COVANTA ENERGY, Cox Conserves, CVS Health, DANONE, DART, DOW, XG, ITW, KEEP AMERICA BEAUTIFUL, The Nature Conservancy, Nestlé Waters, NCLH Norwegian Cruise Line Holdings Ltd., Ocean Recovery Alliance, PEPSICO, P&G Procter&Gamble, AWARE, The Recycling Partnership, rozalia project, vancouver aquarium, Walmart, World Animal Protection, World Plastics Council, WWF

8M TONS OF PLASTIC ENTER THE OCEAN ANNUALLY

Ocean Conservancy | TRASH FREE SEAS ALLIANCE

VIRTUAL WORKING GROUP ON MARINE DEBRIS

- Established in 2014/2015 by APEC Chemical Dialogue and Ocean and Fisheries Working Group
- Focused on solutions to land-based waste management
- Involves public and private sectors
- Co-chaired by the United States (Government) and the Philippines (Industry)
- Working to share best practices and experiences



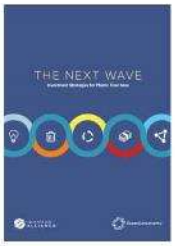
Ocean Conservancy | TRASH FREE SEAS ALLIANCE

A FULL RANGE OF SOLUTIONS IS REQUIRED

Photo Credit: Jeff Fiedler

Ocean Conservancy | TRASH FREE SEAS ALLIANCE

DATA DRIVEN POLICY RECOMMENDATIONS



Ocean Conservancy | TRASH FREE SEAS ALLIANCE

IMPROVE WASTE COLLECTION AND RECYCLING

POLICY AND PRACTICE RECOMMENDATIONS

- Set waste management targets
- Measure and reward progress
- Address definitional barriers to trade and investment in sustainable solutions
- Concentrate solid waste responsibilities within a single government department or agency
- Increase funding for all phases of integrated waste management systems
- Enable innovative, transparent funding approaches
- Reward recycling and innovative, environmentally sound waste treatment
- Work with and incentivize the informal labor force
- Establish strong environmental standards

Ocean Conservancy

TRASH FREE SEAS ALLIANCE

KEY TAKEAWAYS FROM HIGH-LEVEL MEETING

- Strong consensus among all that a systematic de-risking of the waste management asset class is essential
- Collection and sorting determines the economic viability of all subsequent steps. Investment is more likely in cities with higher and more consistent rates of collection
- International Finance Institutions play a critical role in providing guarantees and have much greater capacity for this
- Transparency and longevity in the regulatory process is essential – currently, developers and investors have far too much exposure to regulatory uncertainty but are able to adapt if conditions are stable
- Institutional investment arrangements need more clarity – project-by-project financing is rarely attractive to investors, and sophisticated project development entities will need to be involved

Ocean Conservancy

TRASH FREE SEAS ALLIANCE

Coral Reef, Bali Indonesia

APEC Virtual Working Group on Marine Debris

Ryan MacFarlane, Ph.D.
Coordinator, VWG on Marine Debris

1

Outline

1. Briefly describe the VWG – its objectives and stakeholders.
2. Highlight some of the principles and recommendations that have been developed.
3. Future plans and strengthening of the VWG.

2

Virtual Working Group on Marine Debris

- Established in 2014/2015 by APEC Chemical Dialogue and Ocean and Fisheries Working Group
- Focused on solutions to land-based waste management
- Involves public and private sectors
- Co-chaired by the United States (Government) and the Philippines (Industry)

Virtual Working Group on Marine Debris

- Working to share best practices and experiences
- Developing tools to help economies implement the APEC Policy and Practice recommendations
  - E.g. addressing definitional barriers to trade and investment
- Convening government officials responsible for marine litter policy and land based waste management policy, private sector, academia, NGOs, and other stakeholders.

4

Partnering with other groups

- APEC Senior Official group on urbanization
- APEC High-Level Meeting on Sustainable Tourism
- Work recognized in APEC Leaders, Annual Ministerial Meeting and Ministers Responsible for Trade Meetings
- Partnering with the APEC Business Advisory Council, the Asia-Pacific Financial Forum, and the Asia-Pacific Infrastructure Partnership
- Invited by APEC Finance Ministers to present at their recent meeting in Papua New Guinea.

5

Asia-Pacific Infrastructure Partnership

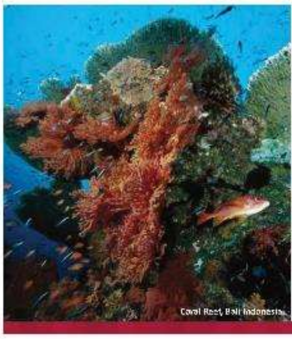
- Asia-Pacific Infrastructure Partnership (APIP) work stream currently focused on waste management sector.
- APIP convenes government officials, senior private sector infrastructure experts, representatives from multilateral development banks and others.
- Some of the key challenges identified during meetings include:
  1) streamlining institutional arrangements
  2) insufficient funding
  3) inadequate collection
  4) insufficient data
  5) legislative and regulatory uncertainty
  6) limited use of available tools

6

Network of government and private sector stakeholders

- One of the objectives of project is to develop a network of officials and private sector stakeholders to share:
  - marine debris abatement strategies and policies
  - best practices and experiences regarding waste management system financing and development
  - information relevant to the 2009 study update.
- Hope to expand the VWG through this meeting.

7



Coral Reef, Bali Indonesia

Thank you!

8

U O W

APEC ML STUDY 2018:

To update the 2009 *Understanding the Economic Benefits and Costs of Controlling Marine Debris in the APEC Region* report.

Professor Alistair McIlgorm, ANCORS, UOW.

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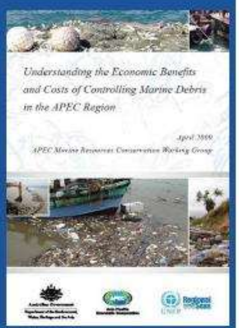
The APEC MRC 2009 study

Objective- *"to improve awareness amongst governments, communities and industry within the APEC region of the economic implications of marine debris and provide guidance and practical advice for governments, communities and industry within APEC Economies on targeting resources to mitigate the impacts of marine debris and adopting economic instruments".*



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Damage from marine debris

- Industries
  - **Shipping** - large and small ships – propellers/thrusters, ropes/stern tubes, blocked cooling fittings/engine damage;
  - **Fishing/leisure** – more frequent than small ships, catch sorting/handling/ and food health issues;
  - **Insurance** – To ship underwriters Marine Debris is not an obvious "cause of loss"…an issue for small boats and fishing vessels.
  - **Tourism** – lost income and health issues for existing operators; MD is a barrier to new investments in beach hotels.
  - Est. cost in APEC **US$ 1.265 billion** p.a.(2008)

Damage from marine debris

- ….as a proportion of the marine economy.

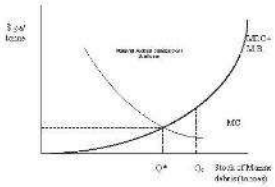
Sector of the Marine Economy	Percentage of the Marine economy (Aus, Canada, NZ and US)	Sector GDP in APEC at 2008 price levels (billions USD)	The GDP of Debris Impacted Sectors (billions USD)	The estimated value of damage from marine debris in the APEC region (billions USD)
i. Oil and Gas (minerals)	[illegible]	[illegible]	n/a	n/a
ii. Fisheries/Aquaculture (living resources)	[illegible]	[illegible]	[illegible]	[illegible]
iii. Shipping (transport and shipbuilding)	[illegible]	[illegible]	[illegible]	[illegible]
iv. Defence/Government (government services)	[illegible]	[illegible]	n/a	n/a
v. Marine Construction (coastal defences/reclamation)	3.9%	[illegible]	n/a	n/a
vi. Marine Tourism (leisure services)	[illegible]	[illegible]	[illegible]	[illegible]
vii. Manufacturing (equipment, medicines etc)	[illegible]	[illegible]	n/a	n/a
viii. Marine Services (mapping, surveying, consulting)	[illegible]	[illegible]	n/a	n/a
ix. Marine Research and Education	[illegible]	[illegible]	n/a	n/a
Total	[illegible]	[illegible]	[illegible]	[illegible]

- Est. cost in APEC US$ 1.265 billion p.a. (2008)

The economic costs of marine debris

- Economic costs, are the benefits lost to society by the impacts of debris.
- Marine debris is an "avoidable cost".
- Marine debris economic impacts are seen:
  - In the diminished opportunities to exploit the marine environment for pleasure, leisure or profit.
  - A reduction in the value of marine goods and eco-system services (degraded ecosystems, life lost…)
- There are a range of direct, indirect and non-market economic impacts from marine debris
- The economic value of all the impacts is unknown
- How do we control marine debris?

Control – theory & practice



Q* the optimal amount of marine debris

– To the right of Q* the marginal clean up or prevention cost is less than the marginal damage cost. Hence economic benefits from reducing debris. At less dense stock levels, marginal clean up is costly.....

~~Cleaning hotspots has economic merit!~~

Recommendations - Control

- ***Recommendation 1:..*** *joint action between marine agencies and municipal and government authorities in charge of land waste…are to work together on reducing land debris and hence marine debris.*
- ***Recommendation 3:*** *…Consider the use of paper or bio-degradable packaging materials to reduce debris entering the environment.*
- ***Recommendation 12:*** *..to identify urban marine "hotspots" by area or issue, that may benefit from MD control workshops and funding for delivery.*
- *Project workshops to explain MD control (with UNEP)*

Extension: MRCWG workshop in Jakarta, August 2008

Some of the 18 registered participants

Case studies: Korea, Hong Kong, Yellow sea, Peru, Hawaii, Alaska.

Identified the need for a large Jakarta Bay project...

Second project workshop, World Oceans Conference, Manado May 2009 – 75 persons.

Recommendations - Measurement/data

- ***Recommendation 2:*** *…record the national cost of cleaning up marine debris involving data from national, state and municipal government levels..*
- ***Recommendation 5:*** *….record weight or volume units, to calculate the cost per tonne, or cost per cubic metres m^3* for prevention and clean up.
- ***Recommendation 4: ..****the impacts of marine debris on environmental values of the sea (non-market values)*
- ***Recommendation 7:*** *…work with insurance industry to collect data on accidents and incidents caused by marine debris.*

Recommendations – Technical projects

- ***Recommendation 6:*** *..Introduce arrangement for return of debris & fishing gear into harbour waste facilities & low cost re-cycling facilities.*
- ***Recommendation 11: ..*** *that explores technical effectiveness and operational costs of litter devices, such as litter traps and river and harbour booms, to make information and experience in technical control of marine debris available to other communities in APEC.*

Recommendations – Case studies

- ***Recommendation 8:*** *undertake two case studies exploring the design and implementation of market-based instruments(MBIs) to reduce marine debris - explore deposit-refund system and a sales tax on plastic bags and plastic bottles… (…tradeable permits, cap and trade considered too complex at that time)*
- ***Recommendation 9: ...****case study examining the feasibility of "cost sharing" of clean up between adjacent nations….for economic benefit.*
- ***Recommendation 10:*** *APEC economies to encourage municipal authorities to work jointly with the private sector to share the costs of beach clean up.*

Summary-2009 study

- Identified the costs of marine debris and the need for a benefit-cost approach to prevention and control.
- Having an economic impact value of MD on industries and the community is useful.
- There have been few subsequent economic studies, reflecting the governance gaps for this issue.
- While most MD comes from land, marine agencies and municipalities on the coast need to play their key part in control of marine debris.
- APEC have a role in information sharing on MD solutions between economies.

New APEC Report Deliverables
AIMS

- Provide an updated assessment on the economic impacts of marine debris in APEC economies.
- Identify major urban marine debris "hot spots" that may benefit from targeted control interventions.

Case studies

- Evaluate the technical effectiveness of marine litter devices such as river traps and harbor booms.
- Provide a cost-benefit analysis of potential solutions.
- Provide policy recommendations that may lead to reductions in the amount of litter leaking into the ocean.

U O W

APEC Marine Litter Study 2018

Proposed Case Studies

Dr Karen Raubenheimer | ANCORS, University of Wollongong, Australia
APEC | Bali | November 2018

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New APEC Report Deliverables
AIMS

- Provide an updated assessment on the economic impacts of marine debris in APEC economies.
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Case studies

- Evaluate the technical effectiveness of marine litter devices such as river traps and harbor booms.
- Provide a cost-benefit analysis of potential solutions.
- Provide policy recommendations that may lead to reductions in the amount of litter leaking into the ocean.

Case Studies – Categories
THREE PRIMARY AREAS OF CONCERN

Debris present in environment

1. **Leakage**
   - Land-ocean boundary
     - Point of entry
   - Filtration & nets
2. **Collection & transport**
   - Initial cost
     - waste to resource
   - Prohibitive
     - infrastructure, geography

Prevention, governance

3. **Funding**
   - Special funds
     - collection & recycling
   - EPR
4. **Inter-ministerial cooperation**
   - Land & ocean/coastal ministries
   - Horizontal and/or vertical

Case Studies
LEAKAGE

Australia
- Yarrabah community
- Data collection
- Source to Sea plan
- Designed for storm surge
  - Retains capture
- Grant: Queensland Dept. of Aboriginal & Torres Strait Islander Partnerships

Debris in environment

Case Studies
COLLECTION & TRANSPORT COSTS

Philippines
- Ecobricks
- In situ - *removes* need for transport
- Reduces open burning, dumping
- Construction guides
- Reused
- School curriculum
- Vulnerable communities

Debris in environment

Case Studies
COLLECTION & TRANSPORT COSTS

Australia – fishing gear
- *Reduce* cost of transport
- Empty return transport
  (Reverse logistics)
- Trucks, barges, gov't agencies
- Volunteers, Aboriginal Councils, Land & Sea Rangers
- Baled at local council
- Non-critical timeframe
- Scale up to domestic waste

Debris in environment

Case Studies
COLLECTION & TRANSPORT COSTS

Chile - technology

- ReciclApp
- *Reduces* cost of transport
- On-demand, removes middle man
- Employs wastepickers
- Women, vulnerable communities
- Social outcomes – health, income, community status
- No formal waste collection

"Families value us as workers now, not as the lady who asks for donations and picks through the garbage."

Debris in environment

Case Studies
FUNDING

Chinese Taipei

- Recycling Fund
- Recycling, clearance & disposal fees collected from manufacturers & importers
- Extended Producer Responsibility
- Subsidize recycling
- Waste legislation amendments

Funding

Case Studies
INTER-MINISTERIAL COOPERATION

California

- Ocean Protection Council (OPC)
- 2018 Ocean Litter Prevention Strategy
- Guide work of State on ocean litter for next 6 years
- Stakeholders = Federal, State, Local, NGOs, Academia, Industry

Governance

Case Studies
INTER-MINISTERIAL COOPERATION

Malaysia

- River of Life project
- Water quality improved by 2020
- Multiple river basins & catchments
- Department of Irrigation & Drainage (DID) Malaysia
- 26 gov't agencies across 4 ministries
- Economic Transformation Programme

Governance

Case Studies - Sections
APPROACH TO STUDIES

Each case study will identify:

- Issue/gap addressed
- Background
  - policy, infrastructure, systems, services, etc.
- Benefits
  - economic, environmental, social
- Level of technology, complexity
- Types & level of funding required
- Potential for APEC region

Case Studies
FUNDING

Peru

- Ponchilas – "backpack ponchos"
- Industry initiative - improve school attendance in vulnerable communities high in the Andes
- 80 recycled plastic bottles in each
- Nearly 40% supermarket customers now recycle plastic
- Gov't promoting Circular Economy bill

Funding

Next steps
Contacts and interviews

Confirm focal points
- Relevant ministries in each economy

Interviews
- Focal points, NGOs, academia

Literature review
- Summary of sources of marine debris
- Identification of high leakage areas / cities
- Contribution of marine sector to APEC economies (per economy)

Costs of marine debris
- Based on calculations from latest publications (global, economies)

Follow up
- With gov't officials to confirm findings (logical, consistent)

Case studies

Draft reports & publication
- June – Dec 2019

WE WANT TO TALK TO YOU!

U O W

Terima kasih! Thank you

Thanks to APEC, OFWG

UNIVERSITY OF WOLLONGONG AUSTRALIA

APEC Marine Debris Stakeholder Meeting

Improving Data and Coordination and Developing New Partnerships

2-3 November 2018 Inaya Putri Resort, Nusa Dua, Bali, Indonesia

Indonesian Efforts Combating Marine Debris: Research-based Approaches

Dr. Devi S. Suryono, S.KM.M.Si

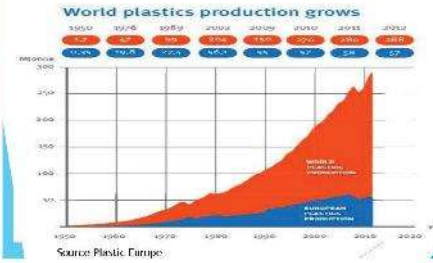
Dr.-Ing. Semeidi Husrin, ST. M.Sc

Marine Research Centre

The Agency for Research and Human Resource Development

Ministry of Marine Affairs and Fisheries – The Republic of Indonesia

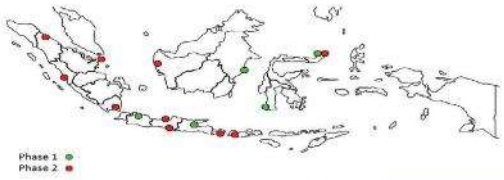
Indonesian Plastic Production (2013), 1.9 million ton. Average Production 1.65 juta ton/year (Ministry of Industry Indonesia 2013)



Source: Plastic Europe

Survey Plastics Leakage Plastik in 15 City in collaboration with WB

Indonesia Marine Debris Rapid Hotspots Assessment Focal Cities



MARINE DEBRIS COMPOSITION

Material	Weight (gr)
Bahan Lainnya	3,416,597.22
Batteries (torch type)	1,975.37
Busa Plastik	5,286.03
Kaca dan Keramik	301,410.86
Kain	72,781.91
Karet	737,800.43
Kayu	2,273,888.38
Kertas dan Kardus	75.83
Logam	189,054.03
Plastics	[illegible]
Grand Total	11,882,923.76

41%

Source : Ministry of Environment and Forestry, 2017

MMAF COMMITMENT

1. Policy :
   a. Waste Management Guideline for Beach Cullinary Tourism
   b. Guideline of Coastal Domestic Waste Management
   c. National Action Plan → Presidential Decree No. 83/2018
2. Public Campaign : Gita Laut, Beach Clean Up
3. Public Awarness : Training
4. Technical Support
4. Research

MMAF'S ACTION IN 2017

Gita Laut
Gerakan Cinta Laut

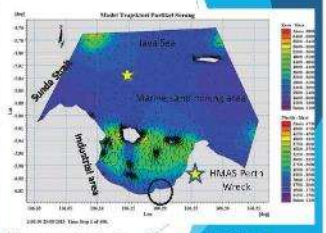
1. Beach and Underwater Clean Up (Gerakan Bersih Pantai dan Laut)
2. Indonesian Coastal Recreation (Sekolah Pantai Indonesia)
3. Bay scout Coastal Tambora
4. Procurement of Waste Processing Machinery (Plastic Crusher, Conveyor Block and Composting)
5. "Go to Local" and Produk Laut Nusantara
6. Active in National and International Conferences

MMAF'S EFFOTS IN 2017

Some Examples: Research on Marine Litters (MMAF)

1. Marine litters in Banten (industrial area)
2. Marine litters in Bali (touristic area)
3. Marine Litters in Small Islands

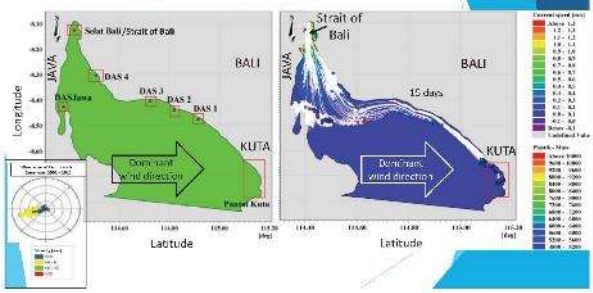
1. Marine Litters in Banten Bay (Industrial)

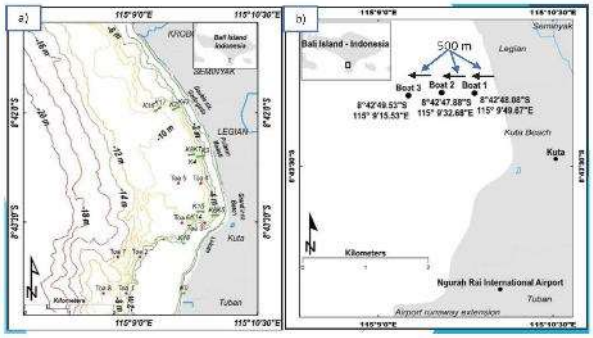


Litters accumulated during west monsoon and the following transitional seasons. During east monsoon and the following transitional seasons, marine litters were transported out of the Bay.

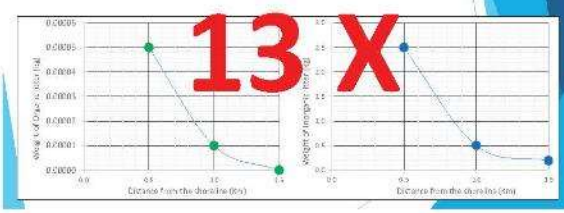
2. Marine Litters in Bali (Touristic area)

Modeling of Litter Transport and Distribution



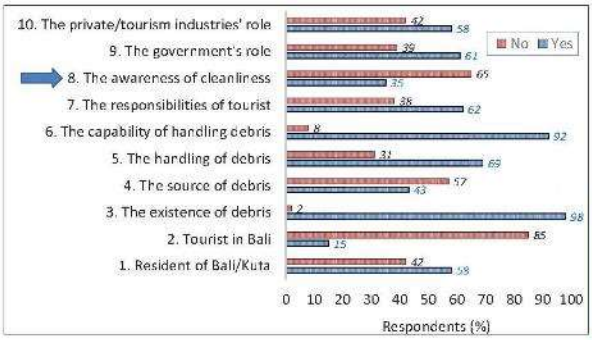


Station	Distance from the beach (km)	Weight of organic litter (kg)	Weight of inorganic litter (kg)	Total weight of litters (kg)
1	0.5	0.000005	2.5	2.500005
2	1	0.00001	0.5	0.50001
3	1.5	0	0.19	0.19

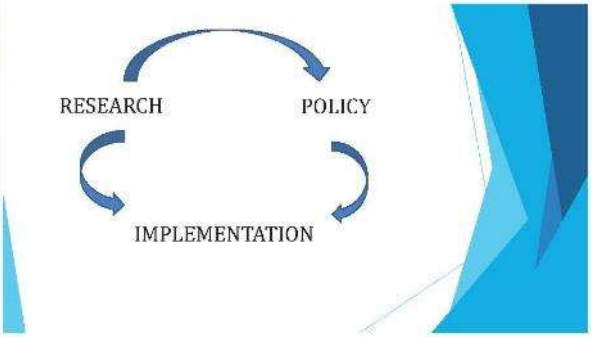


13 X

Underwater Litters (During Transitional Season)



3. Marine Litters in (Very) Small Islands

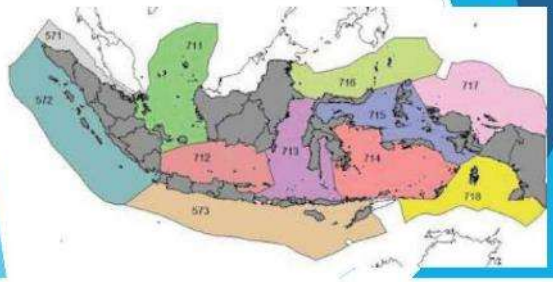


EFFORTS TO IMPROVE DATA IN 9 WPP (FISHERIES MANAGEMENT ZONES)
MARINE RESEARCH CENTER, MINISTRY OF MARINE AFFAIRS AND FISHERIES - (2018 – 2022)

- Identification of Source and Characteristic of Marine Plastics Debris and Micro Plastics Pollution
- Modeling of Marine Plastics Debris and Micro Plastics in Indonesian Waters
- Impact of Marine Plastics Debris Pollution
- Trapping Technology for Marine Plastics Debris

NEEDS COOPERATION

9 WPP : FISHERIES MANAGEMENT ZONES



CONCLUSION

1. Marine Plastic Debris is A WORLDWIDE ISSUES
2. Indonesia has established a National Ocean Policy
3. Indonesia invites cooperation: Combating Marine Debris, Training, Pilot Projects, Research.
4. Integrated Research and Sustained

TERIMAKASIH

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www.pusriskel.litbang.kkp.go.id

Japan's Efforts to Combat Marine Litter

Ministry of the Environment, Japan (MOEJ)

Marine Litter Drifted Ashore 海洋環境室

1

Enhancement of Legal Framework on Marine Debris

Act on Promoting the Treatment of Marine Debris Affecting the Conservation of Good Landscapes and Environments on Coast, and Marine Environment, to Protect Natural Beauty and Variety
(enacted in 2009, enhanced in 2018.6)

Objectives: Conserve landscape and environment on coast, and marine environment, by promoting smooth treatment of marine debris and effective control of its generation.

Basic Policy and Formulation of Regional Plans
National Government establishes the 'Basic Policy' to achieve the comprehensive and effective promotion, and local government formulate 'Regional Plan' for Marine Debris based on the 'Basic Policy' to promote their measures against marine litter drifting ashore.

Responsibility for Management of Marine Debris on the Coast
Coast managers must implement necessary measures to manage marine debris on the coast.
(Coast manager: a coast manager as defined in the Coast Act or a person who manages a facility and coastal land owned by governments based on the provisions of other laws and regulations.)

Financial Measures
National Government must take financial measures for the promotion of measures against marine litter drifting ashore.

Enhanced

Wider Scope
Floating and seabed debris are newly added to the targets of measures.

New Measures for Microplastics
Business entities should suppress the use of microplastics in products and the emission of waste plastics, in case such products contains microplastics and are discharged to water bodies.
National government is to promptly consider measures against marine microplastics, and take necessary actions.

2

1. EFFORTS IN JAPAN

A. MONITORING

Marine Litter Research by the Ministry of the Environment

Visual observation of floating marine litter; Microplastics survey; Seabed marine litter survey in coastal waters and open oceans.

Marine Litter Monitoring on the Coasts
Conducted on 28 coasts for 5 years.
Information concerning amount, items, composition and languages printed (for estimating the origins), etc. is collected and analyzed.

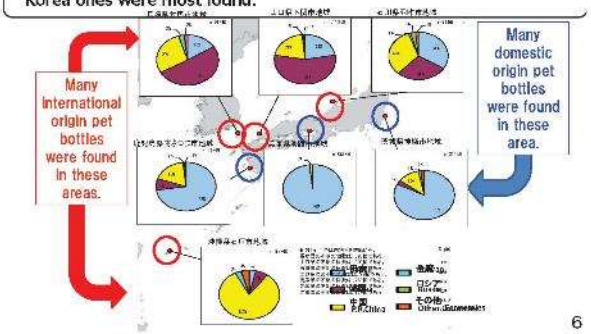
Visual Observation of Floating Marine Litter
Using vessels in coastal waters and open oceans.
Density and amount are estimated on each areas.

Seabed Marine Litter Survey
Monitored with trawl net in coastal waters and open oceans.
Density and amount are estimated.

Microplastics Survey
Conducted to facilitate research on marine pollution.
- Distribution of microplastics around Japan
- Amount of hazardous chemical substances such as PCB adsorbed on microplastics

Aggregate Result of Drifted Pet Bottles by Manufactured Economies (Total of FY2010-2014)

- In Pacific Coast, made-in-Japan pet bottles were most found. In the coast of East China Sea and Japan Sea, made-in-China and made-in-Korea ones were most found.

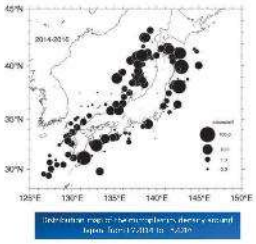


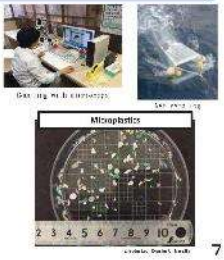
6

Microplastics

- Recently, there is also a concern on chemical substances adsorbed on marine microplastics* could effect on ecosystem through food chain etc.
- According to a 3-year survey, microplastics are distributed entire marine water around Japan.

*Microplastics: small plastic pieces less than five millimeters in length, categorized into two types; deliberately-made microplastics and pet-bottle-originated ones that are degraded into smaller plastic fragments in nature.





7

Need for Harmonization of Marine Microplastic Monitoring Methodologies

Background

- Marine litter including microplastic is very urgent matter. Measures against marine litter and microplastics need to be considered and taken, based upon scientific knowledge.
- Understanding their actual condition is important.
- Comparing and synthesizing measured data of microplastic abundance obtained by various researchers are currently difficult due to the diversified monitoring methods taken.

→
- Harmonization of monitoring methodologies
- Exploring how to compare/evaluate existing data

- 'G7 Action Plan to Combat Marine Litter' was agreed in G7 Elmau Summit in 2015.
- Communique adopted at G7 Toyama Environment Ministers' meeting in 2016 committed to implementing five priority measures, including **actions towards standardizing and harmonizing monitoring methodologies for microplastics.**
- Expert workshop held in Germany in 2015 following-up G7 Elmau Summit agreed that **Japan would lead the field of standardization and harmonization**

→ **New project of 'Harmonization of Marine Microplastics Monitoring Methodologies' was launced by MoEJ in FY2016.**

8

The Project of Harmonization of Marine Microplastic Monitoring Methodologies

- Developing a horizontal distribution map of maicroplastics drifting on sea surface.
- For such occasions, setting technical parameters for harmonization (on sampling net (type, mesh size, etc.))

→ **Developing Guidelines and Recommendations on Marine Microplastics Monitoring**

FY2016	●Initial draft of recommendation of microplastic monitoring by international expert group
FY2017	●Revising the draft focusing analyzing method in cooperation with laboratories in 10 economics using standardized samples.
FY2018	●Revising the draft focusing of field sampling on sea surface based on the comparison experiments of different sampling methods ●Finalize draft **Guidelines of Marine Microplastic Monitoring**

→ **Inputs to GESAMP, UNEP, and WESTPAC (IOC-UNESCO)**

9

B. MEASURES ON COLLECTION

Financial Measure under the Act : Subsidy Project

Subsidies are provided to local governments for cleaning up their coastal debris, including awareness raising.

Ministry of the Environment
Total 30million dollar for each year

Proposal with Plan ↑ — **Subsidy** ↓ — ↑ **Completion Report**

Actions by local government:
Collection, removal, treatment of coastal marine debris, involvement of stakeholder and citizens, as well as relevant awareness raising

3

Beach Cleanup under the Project Promoting Costal Marine Debris Local Treatment

Japanese government supports the collection of marine debris under the Project Promoting Costal Marine Debris Local Treatment

4

C. MEASURES AGAINST THE SOURCES OF MARINE LITTER

Policy Measures to Combat Marine Litter

Continuing Efforts in Reducing Land-based Source of Marine Litters/Debris
- Proper Solid Waste Management
- Promoting 3Rs (Reduce, Reuse and Recycle), Sustainable Consumption & Production, Circular Economy, etc.
- Developing new 'Resource Circulation Strategy for Plastics'

Cleaning Up Coastal Marine Debris
- Legal Framework (2009-, Upgraded: 2018)
- Financial Assistance for Cleaning Activities

Regional/Sub Regional Cooperation
- NOWPAP, Asia 3R Regional Forum, Technical Assistance for developing economies etc.
- Efforts in Harmonizing Monitoring Methods on of Marine Microplastic

11

Developing new 'Resource Circulation Strategy for Plastics'

- Based on 4th National Plan for a Sound Material-Cycle Society (2018.6)
- Covering: Reduction, Reuse and Recycle of Plastics; Utilization of Recycled Plastics & Bio-plastics
- Finalized by G20 Summit 2019 (held in Japan, 2019.6)

Basic Principles
1. Corresponding to various challenges - Resource & Waste restriction, Marine Litter, Climate Change etc.
2. Establishing Sustainable Society & Hand Over Rich Environment to the Next Generation
3. Reducing the dependence on non-renewable resources & shifting to renewable one
4. Collecting used resources thoroughly & re-utilizing (reusing and recycling) them many times, considering on economic and technological feasibility

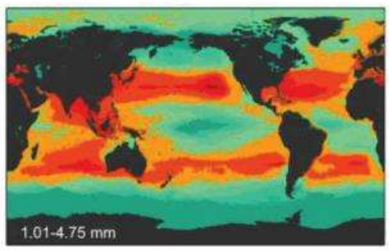
Concrete Measures to be Elaborated
1. Reducing plastics use, such as single-use packaging and products, for lowering environmental adverse impacts
2. Collecting and Recycling of used plastic as resources in radical, effective and efficient manners
3. Improving Practicality of Bio-plastics; and Replacing Fossil-fuel based Plastics with Bio-plastics

12

2. INTERNATIONAL EFFORTS

The Status of Pollution in the World

- Marine pollution by marine plastics is spreading on a global scale.
- There are also reports that microplastic has been observed even in Arctic and Antarctica.



Density distribution of microplastic (1 to 4.75 mm) (prediction by model) (piece/km2)

(source) Eriksen (2014), "Plastic Pollution in the World's Oceans: More than 5 Trillion Plastic Pieces Weighing over 250,000 Tons Afloat at Sea", PLoS One 9(12), doi:10.1371/journal.pone.0111913

1

MOEJ's International Cooperation for waste management and International Contribution by Advanced Technologies

1. Bilateral Cooperation

Support for Improvement of Legal Systems and others

Example:

(Thailand) Concluded MOU on management of industrial waste with Ministry of Industry in March 2016.

In addition, support for making laws on 3R and waste disposal in Viet Nam and support for formulating guidelines on introduction of WtE facilities in Philippines and others.

2. Multilateral Cooperation

The Regional 3R Forum in Asia and the Pacific
- Organized the eighth meeting in Indore, India from 9 to 12 April 2018.
- More than 700 people participated. It includes minister and vice minister-level officials of more than 40 economies like Asian economies, the Pacific Island economies and others, international organization and assistance agency. State Minister Ito and others participated from Japan.

3. International Contribution by Japan's Advanced Technologies

Incubation and Overseas Promotion of Waste Management and Recycling Industry

Utilize advanced technologies of our Circulatory Industry to solve waste problems. Conduct Project Formation Investigation and Feasibility Study of Private Enterprise.

[Case 1]
Design and Construction of WtE facility in Greater Yangon in Myanmar
Incinerator (60t/disposal scale per day) started into the operation from 2017.

[Case 2]
WtE business in Philippines Quezon
Business constructing waste incineration plants (3,200t/disposal scale per day) and conducting electric generation and energy recovery (cooperate with Osaka)

[Case 3]
Recycle industrial complex project near Hanoi, Vietnam
Business recovering waste product (electric appliance and tire, etc.) and establishing recycling/disposal system in industrial complex

Transfer advanced waste treatment/recycling technologies and systems from Japan to developing economies, as a package.

Efforts to support developing economies (Lao PDR)

In areas where garbage separation was not done yet, JICA implemented support for dissemination and awareness of collection of separated garbages.

13

Efforts to support developing economies (Yangon, Myanmar)

In many developing economies where waste disposal facilities are not well developed, wastes are often piled outside, which lead to discarding them in the ocean. In Myanmar, in cooperation with the Ministry of the Environment a new waste treatment plant(waste-to-energy plant) that incinerate waste to generate electricity was constructed.

Wastes that are piled up at the repository

Waste-to-energy plant constructed under the support of Japan

15

環境省
Ministry of the Environment

Soft Infrastructure Support and Waste Management Project Development

Davao City: Example of Soft Infrastructure Support in the Field of Waste Management Leading to Project Development

1. Japan-Philippines Policy Dialogue

2. Feasibility Studies

3. Guideline Development Support & Training Visits to Japan

4. Grant Aid

International Resource Circulation -The 8th Regional 3R Forum in Asia and the Pacific-

- Ministry of the Environment of Japan (MOEJ) hosted "The 8th Regional 3R Forum in Asia and the Pacific" jointly with Ministry of Housing and Urban Affairs of India and the United Nations Centre for Regional Development (UNCRD) on April 10 – 12, 2018 in Indore, India (State Minister ITO from MOEJ attended).
- The theme of the forum was "Achieving clean water, land and air through 3R and resource efficiency - 21st century's vision in Asia and Pacific regions". More than 700 participants joined the forum from governments, international organizations, private companies and others in 40 economies located mainly in Asia Pacific regions. As side events, the Asian Mayors' Policy Dialogue, International Exhibitions, Asia 3R Citizens Network events and others were held and Japanese local governments, private companies, and NGOs participated in these events.
- The White Paper on Asia-Pacific 3R was published which was mainly edited by Japan.
- Indore 3R Declaration was adopted by mayors attended to Asian Mayors' Policy Dialogue

Discussion themes

①3R and clean water – circular economy's role in water pollution reduction
②3R and clean land – circular economy's role in land pollution measures
③3R and clean air – circular economy's role in air pollution measures
④3R for coastal and marine ecosystem protection
⑤SMEs' activities and productivity - circular economy's role
⑥Resource security and 3R technology
⑦Financing 3R – domestic and overseas investment

Opening Address by State Minister ITO

Next forum Next March in Thailand

22

World Circular Economy Forum (WCEF) 2018

- WCEF2018 was held from October 22nd to 23rd, 2018 in Yokohama, with the attendance of Yoshiaki Harada, Minister of the Environment and Kimmo Tiilikainen, Minister of the Environment, Energy and Housing of the Republic of Finland. Tsukasa Akimoto, State Minister of the Environment and Jyrki Katainen, Vice-President of European Commission also attended the Forum. More than 1,000 people from approx. 85 economies, including those from governments, international organizations, industry, and NGOs also participated in the Forum.
- 4 plenary sessions and 12 parallel sessions were held, and best practices by each individual for the realization of circular economy and future issues were discussed. 9 side events by international organizations, an industry organization, and an embassy in Tokyo etc. were also held.
- From Japan, Prime Minister Abe expressed the determination to lead the establishment of global circular economy and the will to vigorously advance international efforts on marine plastic issue in the video message in the Opening Session. Minister Harada expressed a message on taking measures against marine plastic pollution through "Plastics Smart" Campaign announced on October 18th etc. and a circulation-focused paradigm shift etc.
- Ministries of the Environment of Japan and Finland concluded MoC in the Fields of the Environment.
- Ministry of the Environment announced its participation in the Platform for Accelerating Circular Economy (PACE), which is the initiative by World Economy Forum etc.

Items to be Tackled for the Future (Results of the Forum)
- Establishing common vision by each entity such as economies, companies, and individuals
- Sealing and sharing concrete targets for achieving the vision
- Promoting movement toward establishing circular economy
- Expanding actions by public-private partnership
- Contribution of promotion of circular economy to climate changes and job creation
- Necessity of international cooperation


Opening Speech by Minister Harada

2018 in JAPAN

Invitation Programmes for Manpower Training for Personnel to Survey Marine Litter Drifting Ashore Including Microplastics

- Starting in FY 2016, we have invited programmes to promote survey marine litter drifting ashore including microplastics, in particular for Asian economies.

【Contents】
- Visible observation of marine litter drifting ashore from survey vessels
- Collection of marine micro plastics by survey vessels
- Analysis of collected samples of micro plastics in laboratories (of numbers, plastic composition etc.)


Gathering microplastics

- We invited them from Indonesia and Thailand in FY 2018, and are on the track to consider to expand the scale in FY 2019 as well.


Analyzing microplastics

10

Moving Forward

– **G20 Summit and Environment/Energy Ministerial Meeting**

The following remarks were made by Prime Minister Abe;

"It is necessary to deal the issue of marine litter as a global issue including the developing economies.",

"We would like to address this issue in G20 next year."

– **Cooperation in the field of marine litter related to ASEAN**

Necessity of cooperation in waste disposal and 3R, ocean monitoring and sharing scientific knowledge.

Progress in Addressing Marine Debris in Korea

Recent Policies and Efforts to Protect the Marine Environment from Marine Debris

November 2~3, 2018

APEC Marine Debris Stakeholder Meeting, Indonesia, Bali

APEC Asia-Pacific Economic Cooperation · Ministry of Oceans and Fisheries · KOEM

1

Organizational Structure

● Organizational Structure

2

National Marine Debris Management Plan

● National Marine Debris Management Plan (2nd, 2014-2018)

*Established every 5 years according to the Marine Environment Management Act

3

National Marine Debris Management Plan

● National Marine Debris Management Plan(3rd, 2019~2023)

Scope of the Plan

- **Evaluation of the 2nd National Marine Debris Management Plan(2014~2018)**
  - Evaluate Action Programs
  - Problem Analysis
- **Global and Domestic Trends in Marine Debris Management**
  - Research on Global and Domestic Trends and Policies in Marine Debris
  - Business Demand Research
- **Research and Estimation of Domestic Marine Debris Volume**
  - Data collection and analysis, estimation of marine debris volume, establishment of systems for research and statistics
- **Establishment of Objectives and Strategies for the 3rd National Marine Debris Management Plan**
  - Establishment of directions for policies and management objectives, suggestion of execution strategies
- **Establishment and Implementation of Execution Plans(Business/Project) for Each Objective, Management, Arrangement of Evaluation Methods**
  - Suggestion and implementation of detailed tasks for each strategy and execution plans, arrangement of plans to acquire financial resources

4

Current Issues Regarding Marine Debris Faced in Korea

- Reinforcement of Management Foundation through Improved Marine Debris Related Policies
  - Improvement of management laws and subordinate statutes for marine debris and marine pollution deposits, Improvement of recycling system for marine waste resources
  - Establishment of foundation for management and recycling of marine debris generated from fisheries through the establishment of the Fishing Gear Management Act
- Establishment of Management Foundation for Marine Debris Led by Local Areas
  - Reinforcement of local capabilities for marine debris issues led by the central government in order to overcome the marine debris management limit
  - Establishment of local area-oriented management environments such as local public offering business and local specialization business
- Response to International Issues such as Plastic Marine Debris and Micro Plastic
  - Expansion of research investments for responses to safety issues of micro plastic in the marine ecosystem and seafood
  - Inter-departmental collaboration to reduce discharge of plastic wastes such as disposable plastic products to the ocean
- Expansion of Resource Recycling Policies Including Marine Waste Resource Recycling
  - Reinforcement of policies to increase recycling of marine waste resources generated from fisheries such as fishing nets
  - Development of eco-friendly materials such as buoys for aquaculture and fishing nets, policies to encourage changes in consumption patterns of fishermen

5

Capacity Building for Marine Debris Prevention and Management in the APEC Region Phase II

Implementation of Advanced Marine Debris Management Policies

November 2~3, 2018

APEC Marine Debris Stakeholder Meeting, Indonesia, Bali

6

Project Overview

Project Title	**Capacity building for marine debris prevention and management in the APEC Region Phase II** - Implementation of Advanced Marine Debris Management Polices
National Agency	Ministry of Oceans and Fisheries, Republic of Korea
Project Overseer	Korea Marine Environment Management Corporation (KOEM)
Start/Completion Date	January 2018 – December 2018
Co-sponsoring Economies	Chile, China, Chinese Taipei, Indonesia, Japan, Peru, Russia, Thailand, United States
Total Cost	$200,000 - APEC Funding: $128,000, Self Funding: $72,000

7

Significance

8

Objectives

Develop, design an implement policy at the regional level *by*

- Informing participants of the latest research from experts and international organization
- Convening NGO, official and industry stakeholders to develop regionally appropriate marine debris management measures and related policies
- Sharing best practices and develop economy specific measures
- Discussing methods for expert agencies to inform policy makers for marine debris management policies of APEC member economies

9

Major Agenda

- **Key Note Speech by Dr. Jenna Jambeck (Univ. Georgia)**
  - Plastic Waste Input from Land into the Ocean
- **Global efforts to combat marine debris**
  - UNEP NOWPAP, ASEAN, World Bank, Ocean Conservancy etc.
- **Current Issues on Marine Debris Management**
  - Microplastic, Styrofoam buoy waste management, economy report on marine debris management, CD-VWG updates
- **Drafting an APEC Marine Debris Management Guideline**
- **Technical tour : Land and Ocean based waste management**
  - KOEM Busan Branch Office(Marine debris clean up vessel), Busan Environment Corporation (Recycling and incinerator center)

10

Trainee and Expert Speakers

52 Participants from 16 APEC Economies, non-member economy and International Organizations

No	Economy	Participants
1	Chile	2
2	People's Republic of China	2
3	Indonesia	4
4	Republic of Korea	16
5	Malaysia	2
6	Papua New Guinea	1
7	Peru	2
8	Russia	2
9	Chinese Hong Kong	1
10	Canada	1
11	Thailand	2
12	Viet Nam	3
13	Australia	1
14	Japan(Observer)	1
15	Mexico	1
16	United States	3
17	Timor Leste(Observer)	2

No	International Organization	Participants
1	UNEP NOWPAP	2
2	ASEAN	1
3	World Bank	2
4	Ocean Conservancy	1
	Total	62

Outputs

- **Establishing a regional network between participants and experts for continued collaboration**
- **Develop a first draft of marine debris management guideline in the APEC region**
  - working in coherence with guidelines established by other international organizations
- **Drafting Group Session**
  - Science Aspect –Dr. Jenna Jambeck (University of Georgia)
  - Policy Aspect –Dr. Lev Neretin (UNEP NOWPAP)
  - Regional Aspect –Dr. Karen Raubenheimer (University of Wollongong)
  - Stakeholder Aspect –Ms. Keondra B. Freemyn (Ocean Conservancy)

12

Outputs

- **Suggested APEC Guideline**

❖ Policy Development and Coordination
- Developing an APEC Marine Debris Strategy and Action Plan

❖ Capacity Building
- Evaluate the utility and effectiveness of existing APEC platforms

❖ Research and Innovation
- Apply recommendations of the 'Facilitating Trade and Investment in Sustainable Materials Management Solutions in the APEC Region: Promoting an Enabling Regulatory Environment

❖ Financing and Private Sector Engagement
- Encourage and facilitate PPP to increase investments, productive partnership arrangement and outputs, for example through ABAC.

13

Indicators

Indicators	# planned	# actual	Details or notes
# workshops / events	1	1	19 – 22 June 2018, at Busan, Republic of Korea
# participants	50	52	19 Expert speakers and 30 trainees ,3 observer(Japan, Timor Leste)
# Female participants	22	26	13 Expert speakers and 13 trainees
# economies attending	17	16	Including Expert speaker economies (Philippines could not attend due to visa problems)
# speakers engaged	19	19	Including Korean Expert Speakers
# other organizations engaged	3	3	Experts from United Nations Environmental Program (UNEP) ROWPAP, World Bank and Association of Southeast Asian Nations (ASEAN)
# publications distributed	1	1	Training Manual was distributed to all participants and the APEC Secretariat
# guidelines drafted	1	1	Produced a draft guideline for marine debris management for the APEC region, which all delegations of participating economies agreed upon

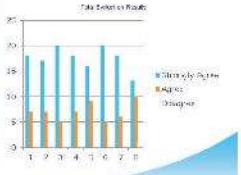
14

Evaluation

❖ **Project Evaluation Survey**

- High level of satisfaction for the program
- Participants commented that the program gave insight into marine debris and different methods to combat marine debris in their economies

	Strongly Agree	Agree	Disagree
1	77%	19%	4%
2	77%	19%	4%
3	88%	12%	0%
4	77%	19%	4%
5	96%	4%	0%
6	88%	12%	0%
7	85%	15%	0%
8	93%	4%	4%



15

Photos(In class workshop and drafting group)




16

Photos(Land based debris management field trip)




17

19

Photos(Ocean based debris management field trip)

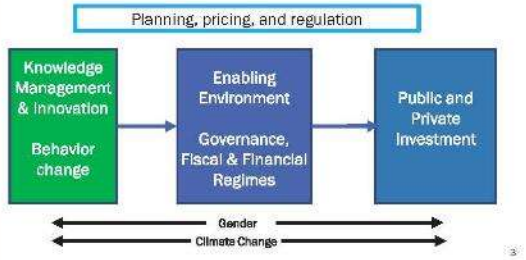



18

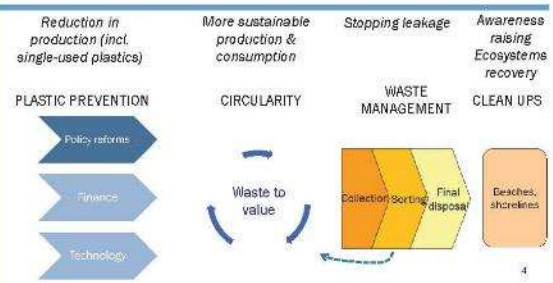
Marine litter prevention crucial to the Blue Economy

- Blue economy: development of oceanic economic activities in an integrated and sustainable way in healthy oceans.
  - Healthy oceans are critical for food, jobs and to drive economic growth and reduce poverty
  - World Bank Multi-donor trust fund **PROBLUE** to support the **Blue Economy**
    - Includes marine plastics and marine pollution prevention, and aim at supporting the development of operations and strengthening capacity in country

Creating the conditions for marine litter prevention operations



Solutions at national, regional, global scale



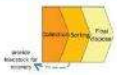
Solutions are country specific

In Myanmar and Cambodia:
- analytical work to support development of Plastic Management Plans
- Explore opportunities for circular economy and developing legal framework for EPR

In Grenada, Fiscal Resilience and Blue Growth Development Policy Credit includes total ban on Styrofoam food containers and plastic shopping bags

Pakistan: Green growth Project
- Development of a Plastic Management Strategy
- regulation on the production and consumption of single-use plastics

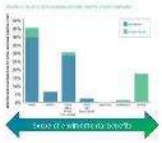
Consumer use, reuse, behavior change
Innovation
Most cost-effective and sustainable solutions?



In Indonesia:
- World Bank Indonesia Ocean Multi-donor trust fund
- Marine litter rapid hotspot assessment
- Improvement of Solid Waste Management to Support Regional and Metropolitan Cities Program - $100 m leverages $1.2 b Government Program

Preventive actions: possible policy tools to price environmental costs

- **Regulatory Instruments**
  - *Bans & regulations on single use plastics (bags, straws, utensils, etc.)*
  - *Development of regulations for circularity, e.g., recyclability targets in plastics*
  - *Awareness & Education campaigns*
- **Pricing or fiscal Instruments – inclusive and equitable**
  - *Tax on single-use plastics*
  - *Carbon pricing on feedstock, pollution taxes*
  - *Extended Producer Responsibility*
- **Subsidize Innovation**
  - *Alternative packaging and product technologies*
  - *Changes in product & business design*
  - *Recycling technologies*
  - *Recovery of fishing gears*
  - *Clean-ups*



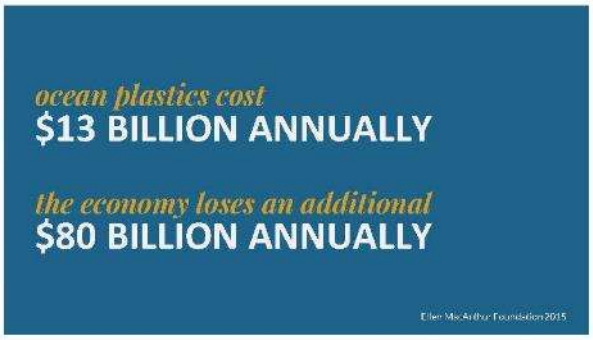
Possible roles of DFIs

- The World Bank Group supports low, middle and high-income countries to establish the kinc of **policy environment and infrastructure** that contribute to reducing and abating marine plastics pollution (incl. SWM, circular economy, reduction)
- We can **support regional and transboundary solutions**, and knowledge generation and sharing, and best practices
  - *E.g., knowledge exchange platforms*
- We offer **technical expertise across many sectors** (including waste management, environment, climate change, water, agriculture, transport)
- We **provide financing** (various instruments):
  - *E.g., including mobilization and catalyzation of private sector financing, sovereign bonds, water bonds (SDG 6 and 14)*

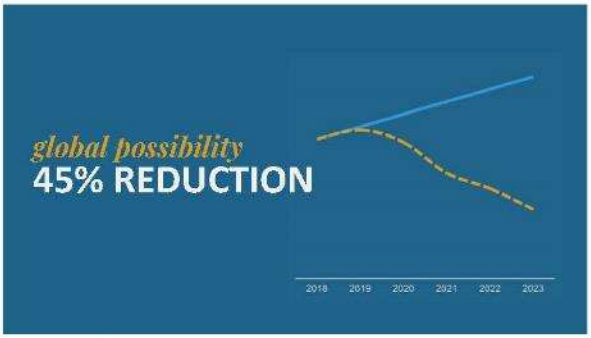
Few takeaways

- **Multiple solutions are possible**
  - *Solid Waste Management SWM, Policy Changes, Introducing Circular Economy, Reduction at source, Product & packaging innovation, Clean-ups*
- **Each with different time horizons**
  - *Policy changes: immediate & permanent*
  - *SWM: medium term & continuous O&M*
  - *Innovation: long term & permanent*
- **And require a country specific comprehensive approach**
  - *Limited economic costs & benefit analysis*
  - *Behaviors matter: No available behavior economic analysis*
  - *Economies of scope from SWM*
  - *Induced innovation*
- **Roles of DFIs: enabling government actions, develop partnerships**


ocean plastic
IN SOUTH AND SOUTHEAST ASIA
THE SOLUTION STARTS NOW
CIRCULATE CAPITAL


ocean plastics cost
$13 BILLION ANNUALLY
the economy loses an additional
$80 BILLION ANNUALLY
Ellen MacArthur Foundation 2015


SOUTH + SOUTHEAST ASIA
INDIA
INDONESIA
VIETNAM
THAILAND
THE PHILIPPINES
University of Georgia 2015


global possibility
45% REDUCTION
2018
2019
2020
2021
2022
2023

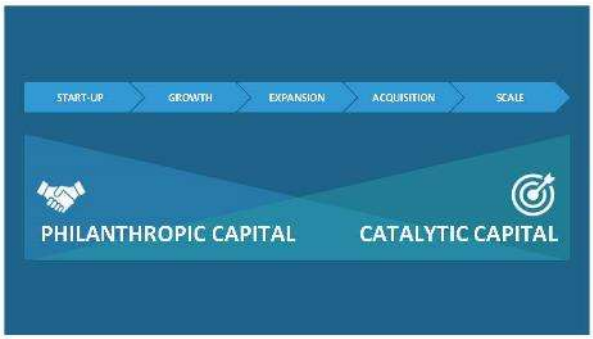

START-UP
GROWTH
EXPANSION
ACQUISITION
SCALE
INVESTOR SIZE
~$20m
~$200m
~$800m
~$2b
TODAY'S PIPELINE
THE MISSING MIDDLE
THE CAPITAL WE NEED TO ATTRACT


CIRCULATE CAPITAL
THE WORLD'S FIRST INVESTMENT FIRM DEDICATED TO PREVENTING OCEAN PLASTIC

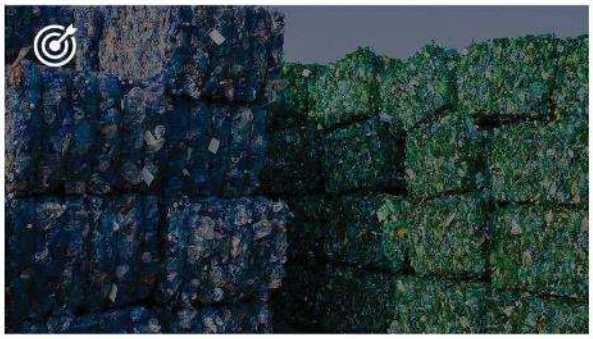

CIRCULATE CAPITAL
PEPSICO
DOW
P&G
DANONE
ONE PLANET. ONE HEALTH
Unilever
Coca-Cola


Cooperative
Aggregator
Recycler
Other
With investment at each stage, waste plastic can be converted to revenue


Evidence-based track records
Pipeline of opportunities
Intermediated investment process


START-UP
GROWTH
EXPANSION
ACQUISITION
SCALE
PHILANTHROPIC CAPITAL
CATALYTIC CAPITAL


Solutions
START WITH PEOPLE




A SUITE OF SOLUTIONS
Public policy
Corporate commitment
Financial incentives
Changes in behavior


we believe in
"Yes, and."

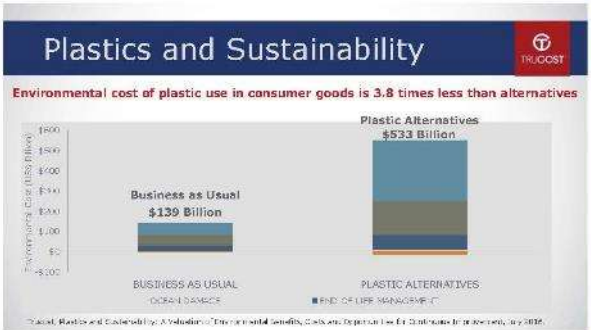

ocean plastics
THE SOLUTION STARTS NOW
CIRCULATECAPITAL.COM

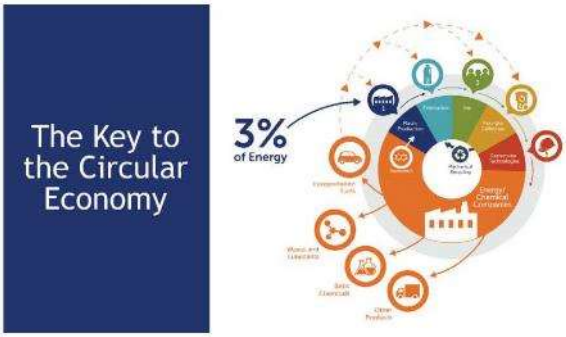

APEC Marine Debris Stakeholder Meeting: Industry Engagement
Stew Harris
November, 2 2018


World Plastics Council
AmericasStyrenics
BASF
We create chemistry
BOREALIS
Keep Discovering
Borouge
Braskem
Chevron Phillips
CPCIF
covestro
DOW
EQUATE
ExxonMobil
lyondellbasell
NOVA Chemicals
ptt
Reliance
Shell
SCG
SIBUR
sabic
STYROLUTION
TOTAL
TRINSEO


Marine Debris - Our View
Plastic & other litter in the environment is unacceptable
Plastics deliver significant societal benefits
Plastic makers have a role in providing solutions


Plastic and the SUSTAINABLE DEVELOPMENT GOALS
SUSTAINABLE DEVELOPMENT GOALS


Plastics and Sustainability
TRUCOST
Environmental cost of plastic use in consumer goods is 3.8 times less than alternatives
Business as Usual
$139 Billion
Plastic Alternatives
$533 Billion
BUSINESS AS USUAL
PLASTIC ALTERNATIVES
OCEAN DAMAGE
END OF LIFE MANAGEMENT


The Key to the Circular Economy
3%
of Energy

Industry Commitments

We will:

- Contribute solutions through partnerships to prevent marine debris
- Research to understand scope, origin, impacts
- Promote enforcement of existing laws to prevent marine litter
- Spread knowledge of efficient waste management systems
- Enhance recycling/energy recovery opportunities
- Steward plastic pellets from supplier to customer

Industry's Role

- Provide catalytic capital to de-risk deals and crowd-in additional capital from commercial and institutional investors.
- Develop pilot projects to accelerate the development of local waste management by raising collection rates and reducing post collection leakage that can then be scaled.
- Re-engineer plastic lifecycle through innovation to minimize waste and design for re-use and recycling.
- Utilize our strengths in terms of providing technological solutions and outreach capabilities.

Enabling policies

- Implement the APEC Policy and Practice Recommendations
- Reduce legislative and regulatory uncertainty
- Appropriately assign risk to the party best able to mitigate it
- Get the incentives right
- Ensure a level playing field
- Public sector commitment

Thank you!

Stewart_Harris@americanchemistry.com
202-249-6626
MarineLitterSolutions.com

FULLCYCLE

Robert Allen, FullCycle

APEC Marine Debris Stakeholder Meeting
2nd November 2018

FULLCYCLE

Our vision

To build the world's largest stakeholder community investing in the transition from the high carbon to the low carbon future

How we do this

We aggregate capital from all stakeholders, institutional, donor and retail, and deploy it to fund a global network of carbon negative infrastructure assets

FULLCYCLE

The FullCycle Approach

1. Invest in Technology
   - Invest in:
   - market-ready technologies
   - high carbon abatement impact
   - strong pipeline of projects
   - proprietary access to tech
   - excellent returns
2. Focus on Impact
   - Empower communities to participate in the development and economic returns of new technology and systems
3. Be Forward Thinking
   - Intelligently source and finance infrastructure and use blockchain as an accelerator of participation and impact

FULLCYCLE

But … waste is also a $220B/year market with untapped potential

	Developed Countries	Developing Countries
Competing Waste Solutions	Sanitary landfills ~17% · Recycle & compost ~16% · Incineration ~10%	Dumps ~40% · Recycle & informal ~7% · Incineration ~5%
Market Dynamics	• High disposal fees: $40-$100/ton • Cheap power: $50/MWH	• Low disposal fees: +/- $5/ton • Costly power: > $120/MWH
Synova Opportunity	• 50%-70% lower capital cost than dominant solutions • 0.3 ton /Ton CO2e reduction	• 30% more capacity • X% cleaner solution • 0.3 ton / ton CO2e reduction
Market Size	$85+ Billion/Year	$135+ Billion/Year

FULLCYCLE

FULLCYCLE

FINANCING 2.0

1. Invest directly in the company
2. Finance waste to energy projects globally
3. Democratize impact investment via our Sustainability Securities using blockchain technology

FULLCYCLE

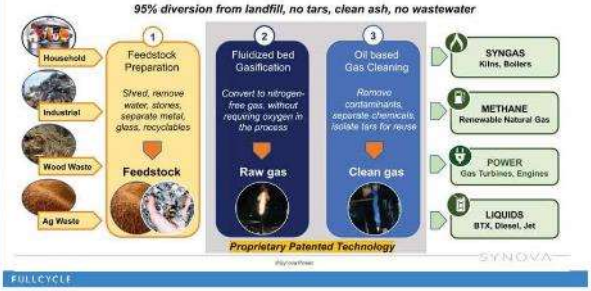
SYNOVA

WASTE 2 ENERGY 2.0

1. Commitment to bring effective waste technologies to all communities
2. Large, vetted pipeline of projects ready to deploy
3. Deliver the technology and manage its deployment and operations

This technology converts many types of waste into valuable energy

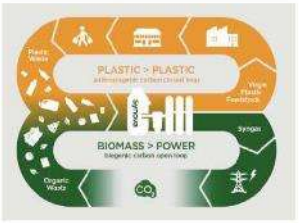
95% diversion from landfill, no tars, clean ash, no wastewater



FULLCYCLE

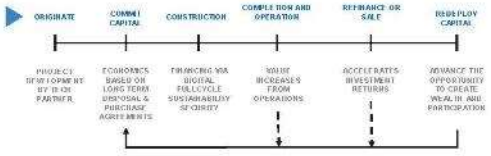
Enabling a closed loop for plastics in waste

- Municipal Solid Waste (MSW) typically has 40-60% anthropogenic carbon from plastic
- Oil-based cleaning can selectively preserve molecules
- Virgin plastic feedstock will be harvested
  - "Closes the loop" on plastics
  - Further enhances the CO_2e benefits
- Improves profits (~40%) where power is cheap
- Capital efficient path to a "circular economy" for plastic and carbon



FULLCYCLE

FullCycle: an investment process that is simple, scalable and inclusive



We plan to invest in **150** waste-to-energy plants by 2025

FULLCYCLE

FULLCYCLE

DIGITAL SUSTAINABILITY SECURITIES

- A DIGITIZED SECURITY
- GLOBALLY COMPLIANT
- LIQUID & TRANSPARENT
- WIDELY ACCESSIBLE
- DESIGNED FOR SCALE

FULLCYCLE

The FullCycle innovative financing model aggregates capital and democratizes access to infrastructure investments

1 FullCycle Fund

FullCycle Fund: a traditional model for LPs and institutional investors who prefer to invest within fund structures

Fund Limited Partners

2 FullCycle Sustainability Security

Our tokenized security offering will launch next year fulfilling on our promise of democratizing investment and enabling high yield returns

Retail Impact Investors

3 Project Investment

Project level co-investment on specific projects or country portfolios

Commercial banks, Funds, Donor orgs, HNWs or Private Equity

FULLCYCLE

Join us and capitalise a better future

For further information please contact:

Robert Allen

FullCycle, Head of Technology and Head of APAC

Email: robert@fullcycle.com
Mobile: +61 439 270718

FULLCYCLE

FULLCYCLE

OCEAN PLASTIC PREVENTION ACCELERATOR

Creating community-sourced innovation for ocean plastic prevention

ABOUT SECONDMUSE

OCEAN PLASTIC PREVENTION ACCELERATOR

Secondmuse is a global innovation agency, convening relevant stakeholders to collaborate in building resilient communities.

Working together with innovators, governments, smart cities, businesses, and start-ups, we are building the future of economy that creates lasting social and environmental impact.

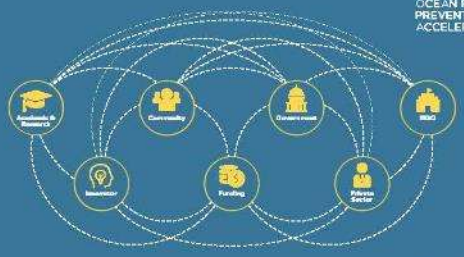
NASA NYCEDC NYSERDA

OCEAN PLASTIC PREVENTION ACCELERATOR

"We are building innovation ecosystem to prevent plastic entering the ocean."

SECONDMUSE

OCEAN PLASTIC PREVENTION ACCELERATOR



SECONDMUSE

JOURNEY

OCEAN PLASTIC PREVENTION ACCELERATOR

SECONDMUSE

HOW DOES OPPA ACCELERATE INNOVATIONS?

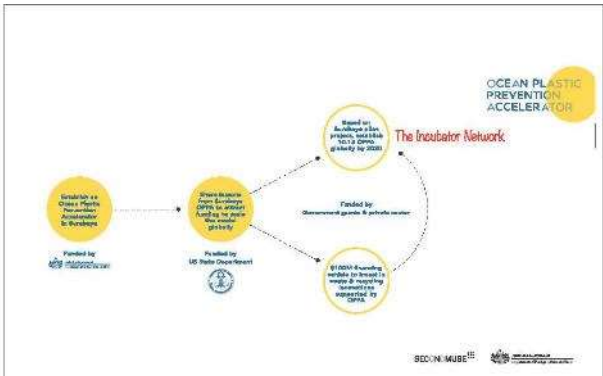
OCEAN PLASTIC PREVENTION ACCELERATOR

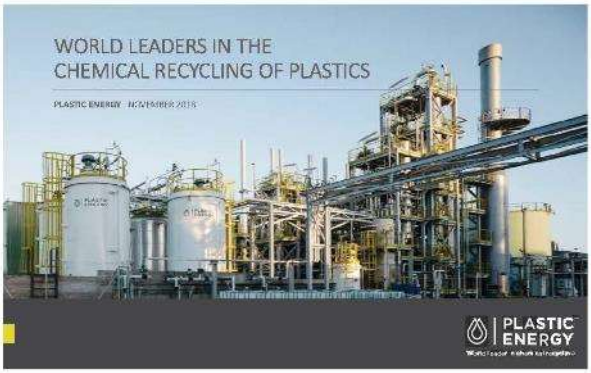
Source Accelerate Scale

SecondMuse

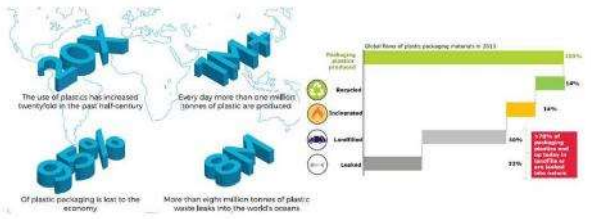
Circulate Capital

SECONDMUSE





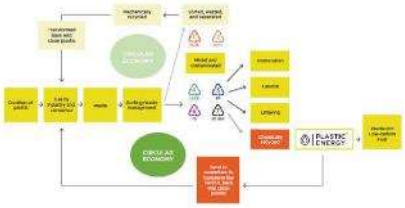
Global situation



Given the extent of the problem and its consequences, many APEC countries have committed to reduce marine litter, improve waste management, and reduce landfills.

Chemical recycling is complementary to mechanical recycling

What we do: deal with the low-value contaminated plastic that cannot be mechanically recycled.



Who are we and what have we so far achieved?

Video: https://www.youtube.com/watch?v=jbhlo8o-Jul

Our Commitments

Plastic Energy partnership with WWF Indonesia:
Commitment to divert at least 100,000 tonnes of end-of-life plastic waste annually away from Indonesia's landfills and our oceans by 2025.

Plastic Energy has signed the New Plastic Economy Global Commitment
By 2025, Plastic Energy will convert at least 300,000 tonnes of low-grade plastic waste into feedstock for new plastic manufacturing (Plastic2Plastic).
Plastic Energy has also committed to promote the circular economy in countries that so far would prefer using the output as transportation fuels.

Enabling chemical recycling

What is the EU doing?

- Circular Economy Package: By 2025, 50% of plastic packaging should be reused or recycled, and 55% by 2030.
- Plastic Strategy: Recognition that chemical recycling "could more than double the present recycling rate."
- Renewable Energy Directive II: Covers liquid and gaseous fuels produced from waste streams of non-renewable origin', which includes plastic-derived fuels as long as it does not undermine the recycling efforts and works towards the decarbonization of the economy.

Asia-Pacific Economic Cooperation

Concrete steps to enable the development of Plastic Energy in your region

- Supporting us in finding land for the chemical recycling plant.
- Enabling the diversion of waste from landfills.
- Creating opportunities for the use of our output either into new recycled plastic and/or into plastic-derived fuels.
- Reducing the cost of managing waste per tonne.

PLASTIC ENERGY

Summary

- Our uniqueness stems from three key factors:
  - Chemically recycling dirty feedstock
  - Established industrial
  - Patented technology developed over a decade
- Our technology provide a long-term, global, and sustainable solution to the low-value plastic waste challenge.
- We are in the vanguard of the development of industrial plant that can successfully transform end-of-life contaminated plastic into new plastic (Plastic2Plastic) and contribute to the creation of a circular economy of plastic.
- We will help local economies and create job opportunities with every plant that is opened.

PLASTIC ENERGY

Thank you

Find us on:

Website: www.plasticenergy.com
Email: dow.agent@plasticenergy.com
Twitter: @plasticenergy

PLASTIC ENERGY

GRINGGO

-TRASH TECH-

Bali, Indonesia

±898,000	43	±700,000 TONS	333,955 TONS
POPULATION (2017)	VILLAGES	TOTAL WASTE GENERATED (PER YEAR)	TOTAL WASTE COLLECTED (PER YEAR)

2C Denpasar Project

AAG

GRINGGO PPLH

http://2cdenpasar.com

The 2C Denpasar Team

non-profit organization based in Indonesia specializing in community resource management

The surveyor & Administrator

both for-profit and non-profit organization based in Indonesia specializing in technology development for waste sector

The technology & Project manager

GRINGGO

PPLH

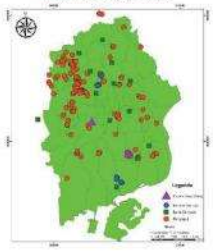
non-profit organization based in Indonesia specializing in Environmental education

The networker, public relation & Gov't liason

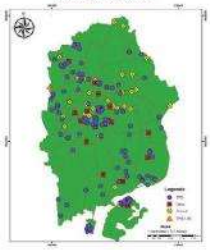
Secondary Cities Project Denpasar

Survey Summary (May 2016 – Sept 2017)

Waste Processing Facilities

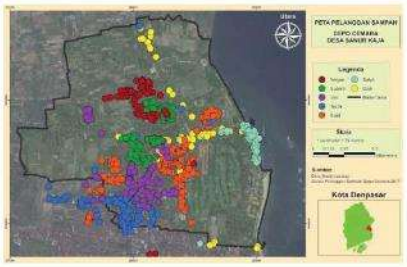


Waste Dumping Area



Sanur Kaja Village

Sanur Kaja Village



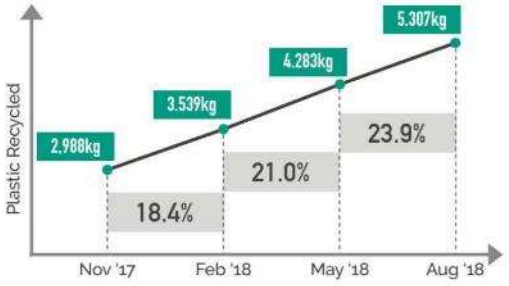
Sanur Kaja Village

PILOT PROJECT DENPASAR, BALI

2. Revenue Generated per collectors and number of people engaged

	Monthly income in USD in early 2016					Per 2016
Name	Basic	Customer Fees	Recyclables Sales	Other	Total	Household coverage
Wayan	$100	$178	$82		$360	64
Veri Junianto	$69	$223	$90		$382	112
Saleh	$69	$223	$123		$415	76
Taufik Hidayah	$69	$134	$82		$285	115
Baidi	$69	$256	$82		$407	163
Supardi	$69	$134	$82		$285	119
Ferdian	$69	$178	$82		$329	63
Sukma*						
Pak Mun**			$82	$14	$96	
Total	$607	$1,504	$705	$14	$2,559	712

	Monthly income in USD in Aug 2018					Per 2018
Name	Basic	Customer Fees	Recyclables Sales	Other	Total	Household coverage
Wayan	$124	$287	$164		$575	84
Veri Junianto	$69	$287	$164		$520	132
Saleh	$69	$342	$246		$657	96
Taufik Hidayah	$69	$287	$164		$520	135
Baidi	$69	$287	$164		$520	183
Supardi	$69	$287	$164		$520	139
Ferdian	$69	$287	$138		$494	83
Sukma	$69	$246	$164		$479	72
Pak Muri			$164	$14	$178	
Total	$607	$2,310	$1,532	$14	$4,463	924



U.S. Domestic Marine Debris Coordination

Steve Morrison
U.S. National Oceanic and Atmospheric Administration

U.S. Marine Debris Research, Prevention and Reduction Act

Became U.S. law in **2006** by Congress and established the NOAA Marine Debris Program as the U.S. lead for marine debris
'Reauthorized' in 2012; and again in Oct 2018 as the **Save Our Seas Act**

Legislative mandates:

- Identify, determine sources of, assess, prevent, reduce, and remove marine debris
- **Provide domestic and regional coordination**
- Reduce adverse impacts of lost and discarded fishing gear
- Conduct outreach and education
- Address severe marine debris events (2012)
- International engagement (2018)

NOAA Marine Debris Program Overview

Vision: the global ocean and its coasts free from the impacts of marine debris
Mission: to investigate and prevent the adverse impacts of marine debris

5 Program Pillars:
- Research
- Removal
- Prevention
- Emergency Response
- Regional Coordination

2018 reauthorization:
Increased international engagement

U.S. Legal Framework for Marine Debris

- Anadromous Fish Conservation Act
- Act to Prevent Pollution from Ships
- Coral Reef Conservation Act
- Clean Water Act
- Coastal Zone Management Act
- Driftnet Act Amendments
- Energy Policy Act
- Endangered Species Act
- Flood Control Act
- Marine Debris Research, Prevention, and Reduction Act
- Marine Mammal Protection Act
- Marine Plastic Pollution Research and Control Act
- Marine Protection, Research, and Sanctuaries Act
- Magnuson-Stevens Fishery Conservation and Management Reauthorization Act
- National Marine Sanctuaries Act
- National Wildlife Refuge System Act
- National Wildlife Refuge System Improvement Act
- Outer Continental Shelf Lands Act and Amendments
- Oil Pollution Act
- Pollution Prevention Act
- Resource Conservation and Recovery Act
- Rivers and Harbors Act
- Shore Protection Act
- U.S. Coast Guard Act

U.S. Interagency Marine Debris Coordinating Committee (IMDCC)

- From Marine Debris Act of 2006, IMDCC:
  - *"…to coordinate a comprehensive program of marine debris research and activities among [U.S.] agencies, in cooperation and coordination with NGOs, industry, universities, and research institutions, [U.S.] States, Indian tribes and other nations, as appropriate."*
- Multi-agency body to coordinate and streamline U.S. efforts to address marine debris
- Oversees a comprehensive program of marine debris activities and makes recommendations for U.S. action

5

IMDCC Roles & Responsibilities

- Share information, assessing and implementing best management practices
- Coordinate:
  - interagency responses to everyday marine debris and severe marine debris events
  - U.S. research priorities
  - monitoring techniques
  - educational programs
  - regulatory actions
- Recommend priorities and strategies, both domestically and internationally, to assess, reduce, and prevent marine debris

6

IMDCC Composition

- **Department of Commerce, National Oceanic and Atmospheric Administration (Chair)**
- **U.S. Environmental Protection Agency (Vice-Chair)**
- **Department of Homeland Security, U.S. Coast Guard**
- **Department of State**
- **Department of Defense, U.S. Navy**
- **Department of the Interior**
  - Bureau of Safety and Environmental Enforcement
  - U.S. Park Service
  - U.S. Fish and Wildlife Service
- Department of Defense, U.S. Army Corps of Engineers
- Department of Justice, Environment and Natural Resources Division
- Marine Mammal Commission
- Others (e.g., GAO, OSTP)

7

U.S. Domestic Agency Roles

Land and Ocean-Based Debris

- Nat'l Oceanic & Atmospheric Administration
- Environmental Protection Agency
- Department of State
- Fish & Wildlife Service (Dept of Interior)
- U.S. Park Service (Dept of Interior)
- Dept of Justice

Ocean-Based Debris

- U.S. Army Corps of Engineers
- U.S. Navy
- U.S. Coast Guard
- Bureau of Safety and Environmental Enforcement (Dept of Interior)
- Marine Mammal Commission

8

IMDCC Operations

- Domestic coordination body
- Conduct quarterly meetings
- Comprised of senior agency officials
- Reports to U.S. Congress (every 2 years)

IMDCC Recommendations

- From 2008 biennial report to Congress
- 25 recommendations to guide U.S. agencies' work
- In 8 areas:
  - Education and Outreach; Legislation/ Regulation/Policy; Incentive Programs, Enforcement; Cleanups; Research; Technology Development; and Fostering Coordination

10

IMDCC Recent Focus

- Examining emergent marine debris issues:
  - evaluating economic costs of marine debris
  - emergency response planning
  - potential marine debris impacts of opening arctic shipping routes
  - region specific marine debris issues and efforts.
- Increasing coordination of international engagement

11

IMDCC Cooperative Activities Examples

- Ocean/marine debris research priorities for the U.S.
- Microplastic monitoring in U.S. Park Service sites
- Ocean Plastics Lab (2018 visit)
- Inventory of marine debris activities
- Marine debris action planning coordination

12

Ensuring Successful Coordination

- Legislative mandate or policy requirement
- Including all relevant ministries/entities
- Reporting mechanism to legislative body
- Identifying new opportunities for coordination/emerging issues
- Requiring regular and well-attended meetings (through mandate)

13

Thank you for your time!
marinedebris.noaa.gov

Good Governance on Solid Waste Management Through Vertical Coordination

APEC Marine Debris Stakeholder Meeting:
Improving Data and Coordination and Developing New Partnerships
Bali, Indonesia
Andrew Horan, *U.S. Environmental Protection Agency (EPA)*

Overview of Solid Waste Management in the United States

- **The Resource Conservation and Recovery Act of 1976 (RCRA)**
  - Set up minimum national requirements for solid waste facilities
  - Lead to the closure of open dumps
- States and local government are the leads in determining what approaches to take for waste management and minimization
  - States submitted solid waste management plans in the 1980s that were approved by U.S. Environmental Protection Agency (EPA)
- State solid waste management plans and laws have changed over the years but key aspects remain the same.

Environmental Protection Agency (EPA): Our Role in Implementing Integrated Waste Management Systems

- EPA provides national consistency and co-implements RCRA with the states.
  - Provides national standards, guidelines and technical support
- EPA facilitates collaboration and dialogue to address complex challenges in managing natural resources.
- EPA acknowledges environmentally sound waste management practices, material recovery , and waste reduction are essential components to productive and sustainable use of materials.

EPA's Voluntary Programs in Integrated Waste Management

Sustainable Materials Management Program (SMM) - a systemic approach to using and reusing materials more productively over their entire lifecycles.

- Life Cycle Thinking
  - Built environment, food, electronics, and packaging
- Measurement
- International Efforts

Example: MoU with Wrap Recycling Action Program (WRAP)

- Nov. 15, 2016 (America Recycles Day) – Partnership announced between American Chemistry Council (ACC) Plastics Division, SPC, and EPA's Office of Resource Conservation and Recovery on the WRAP campaign.
- WRAP aims to:
  - Create opportunities for consumers to recycle plastic films
  - Improve public awareness and educate consumers
  - Build demand for recycled film and products
- Activities include:
  - Steering Committee formed with EPA, ACC, and SPC
  - Leveraging EPA's role as a convener to engage stakeholders
  - Improving availability of recycling information labels

How does EPA further address land-based sources of marine litter?

- **Implements *Trash Free Waters*** - a stakeholder-based, community-driven approach to reducing and preventing land-based trash from entering watersheds and the marine environment.
- Trash Free Waters works with stakeholders at the local level to address the gaps in our solid waste management systems

EPA employees facilitating Trash Free Waters workshop in U.S. Territory American Samoa

EPA's *Trash Free Waters* Initiative and Vertical Coordination

Trash Free Waters Initiative

- EPA Headquarters and Regional Offices
- U.S. States
- Local Governments to address land-based sources of marine litter

- EPA is a catalyst and facilitator for strategic planning.
- We work with States and municipalities to convene stakeholder dialogues in communities that are focused on marine litter reduction and prevention.
- We build and use stakeholder networks to leverage resources for project implementation.
- We publish and disseminate quarterly newsletters to stakeholders nationwide to showcase best practices.
- We develop informational tools for stakeholders that support marine litter reduction and prevention.
- We work with States and cities to build partnerships that address marine litter locally.

Trash Free Waters model applied internationally

International Collaboration

EPA, U.S. Peace Corps, and UN Environment's Caribbean Environment Program launched Trash Free Waters international initiative at the Our Ocean Conference in Chile in 2015.

In-Country Projects

Projects in Peru, Jamaica, and Panama, working with national, regional and local governments and NGOs to build local capacity and connect solid waste to marine litter efforts.

Tools and Resources

Trash Free Waters International Toolkit (nearing completion) will help countries develop their own Trash Free Waters programs

Waters off Kingston, Jamaica – June 2018

Vertical Coordination with the Peru *Trash Free Waters* Initiative

- Bilateral, multi-stakeholder engagement with the U.S. Government and the Government of Peru
  - U.S. government agencies: U.S. Embassy Peru, USEPA, U.S. Agency for International Development (USAID)
  - Peruvian agencies: Ministry of Environment, GORE Ica (Regional Environment), City of Chincha, Ciudad Saludable (Civil Society)
- Governments convened a Trash Free Waters stakeholder workshop that involved 70 participants from local, regional, and national agencies across all relevant sectors
- Stakeholders discussed plans and potential projects spanning 5 focus areas: **Infrastructure, Technology, Policy and Governance, Coordination and Collaboration, and Awareness Raising and Education**
- The selected project built capacity of informal waste pickers in Chincha to collect more recyclable material. The project helped formalize these workers with the City of Chincha and connected them to a regional Materials Recovery Facility (MRF) as a collection site

Peru *Trash Free Waters* Stakeholder Workshop

Stakeholders in breakout groups during Trash Free Waters workshop, Fall 2018

Peru Trash Free Waters Project Implementation

Left: Formalized waste pickers transferring collected material

Upper right: Conducting community perception surveys

Lower right: Waste picker formalization trainings

EPA Trash Free Waters HQ Program Contacts: Questions/Comments? Thank you!

Andrew Horan – +1202-564-5383

Email: Horan.Andrew@epa.gov

EPA Trash Free Waters Website: **https://www.epa.gov/trash-free-waters**

Snapshot of Waste Management in Indonesia

APEC Marine Debris Stakeholder Meeting: Improving Data and Coordination and Developing New Partnerships

Nusa Dua, Bali - Indonesia 2-3 November 2018

Widita Vidyaningrum

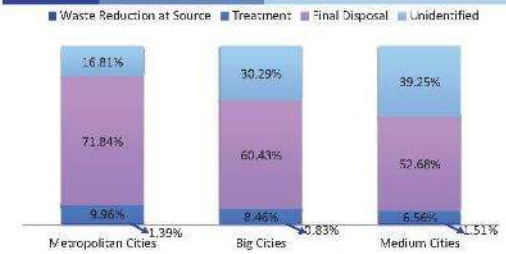
APEC
Asia-Pacific Economic Cooperation

Overview of Waste Management in Indonesia

Indonesia	Information
Total population (2017)[a]	262 Million (1.1% annual growth)
Total urban population (2017)[a]	56.7% (144 Million in 2017, (2.3% urban growth)
Waste generation rate[b]	0.68 kg/capita/day
Waste generation (estimation)	175,514 tons/day or 65.5 Million tons/annum (total); 98,121 tons/day or 35.8 Million tons/annum (urban)
Waste composition (2018)[c]	60% organics, 40% non-organics (14% plastics)
Administrative model[b]	Highly decentralized, responsibility of the municipality
Operational model[b]	Communities organize waste collectors with user fees, city organizes waste transport and disposal from local budget, private operators are typically not involved

Source: [a]World Development Indicators (World Bank, 2018), [b]What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2025 (World Bank, 2018), [c]Min'Stry of Environment and Forestry (2013)

Estimation of Waste Management Performance (104 cities)



* Data from 104 Cities/Districts, covering Metropolitan, big and Medium city → Population > 250K people
Source: Study of Solid Waste Management Sector Roadmap – Preparation Phase of Improvement of Solid Waste Management to Support Regional and Metropolitan Cities P157245. World Bank (2017)

Recent Policies and Target

- **Presidential Regulation No. 97/2017:** National Waste Management Policy and Strategy (**30% waste reduction** and **70% waste handling** by **2025**; as **reference** for developing the policy and strategy at the **Provincial** and **City** level). **(24 Ministries involved)**
- **National Action Plan on Marine Debris 2018- 2025. Presidential Decree No.83/2018:** adopting **5 main pillars** and applying **5 strategy programs** to achieve **70 %** of marine plastic debris reduction by **2025 (16 Ministries involved)**
- **Presidential Regulation No.35/2018:** The acceleration of development of waste to energy facilities (**12** major cities,**feed-in tariff, tipping fees**)

Thank you.

BUILDING PARTNERSHIPS

PRAISE

PRAISE

We are PRAISE

(Packaging and Recycling Association for Indonesia Sustainable Environment)

OUR VISION

We actively support the implementation of holistic, integrated and sustainable packaging waste management in Indonesia.

OUR MISSION

1 Increase awareness that each stakeholder is responsible for waste management in an integrated and sustainable way.

2 Strengthen the capacity of members in the field of packaging waste management through research, education and collaboration.

3 Enhance participation of government, private sector and the public to actively take part in reducing impacts of packaging waste on the environment.

PRAISE

Our Focus

Optimize the potential of the circular economy through three key areas

ADVOCACY

To support holistic solutions in waste management through Extended Stakeholder Responsibility

RESEARCH & EDUCATION

To create awareness about the importance of sustainable waste management practices

PARTNERSHIPS & COLLABORATION

To engage with and empower stakeholders through collaborative action

In partnership with government and all relevant stakeholders to implement a holistic, integrated and sustainable approach to packaging waste management in Indonesia.

BALI BERSIH PROGRAM | PRAISE

BALI BERSIH

PRAISE

AIMS

- Minimize leakage of waste to the ocean
- Generate on-ground evidence of effective solutions that can be scaled up across Bali
- Accelerate the enabling ecosystem for recycling and reuse of waste
- Facilitate collaboration with stakeholders, especially in Sarbagita (Denpasar, Badung, Gianyar, Tabanan)

KEY STAKEHOLDERS

- Ministry of Environment & Forestry
- Coordinating Ministry for Maritime Affairs
- Ministry of Public Works
- Ministry of Industry
- Bali Provincial, District and Municipal Government

PREPARATORY PHASE

PRAISE

SCOPING STUDY & SOCIALIZATION

- Scoping study conducted from December 2017 to February 2018 to map waste management ecosystem in Bali
- Over 70 people surveyed from across waste value chain
- Socialization to local government, private sector, NGOs held in January 2018
- Hotspots identified along rivers and coastlines

'DESA' SELECTION CRITERIA

PRAISE

MEDIA ENGAGEMENT

PRAISE

MEDIA GATHERING

- Results of scoping study shared at Media Gathering in February in observance of National Waste Awareness Day
- Media Gathering attended by
  1. Director General of Waste Management, Ministry of Environment and Forestry
  2. Assistant Deputy of Maritime Science and Technology Utilization, Coordinating Ministry for Maritime Affairs

PROGRAM PHASE

PRAISE

ACTIVITY PLATFORM

PRAISE

TIMELINE

PRAISE

Activity	Aug	Sept	Oct	Nov	Dec	2019
Alignment with local stakeholder						
Set up Working Team						
Program Implementation at Desa						
Enabler Workstream - Communications Forum Bali Bersih						

TRANSITION TO THE CIRCULAR ECONOMY IN BALI

PRAISE

A COLLABORATION BETWEEN

PRAISE + McKinsey.org

Supported by

PROGRAM DESA KEDAS

Accelerating the transition to a circular economy through community based recycling

PROGRAM DESA KEDAS
JOINT COLLABORATION WITH MCKINSEY.ORG

GOAL

Develop an economically sustainable waste management system that maximizes recycling and environmental benefits, creates jobs and empowers local communities, and accelerates the transition to a circular economy

OBJECTIVES

- Optimize waste collection through education on waste separation
- Improve efficiency of TPS3R sorting facilities through training and professionalization
- Secure demand for recycled materials

TERIMA KASIH

PRAISE

USAID

BINTARI FOUNDATION

PUBLIC-PRIVATE PARTNERSHIP (PPP)

TO INCREASE WASTE RECYCLING CAPACITY

ORGANIZATIONAL PROFILE

USAID

Bina Karta Lestari (BINTARI) Foundation is an environmental NGOs that promotes resilient and sustainable communities since 1986

For further information: www.bintari.org

EDUCATION FOR SUSTAINABLE DEVELOPMENT

LAND BASED SECTOR

WASTE MANAGEMENT

COASTAL MANAGEMENT

SUSTAINABLE DEVELOPMENT — CLIMATE CHANGE

SOLID WASTE MANAGEMENT

USAID

- 2002 – promoting composting (70% of solid waste from households)
- 2006 – promoting 3R processing site for 1,000 households
- 2007 – promoting 3R integration in local government policies & composting for households
- 2008 – promoting 3R in coastal area conservation and flood prone areas
- 2010 – facilitating community waste banks with local governments
- 2016 – facilitating partnerships by private – community – local government to reduce plastic waste

PARTNERSHIP: PRIVATE – COMMUNITY – LOCAL GOVERNMENT

USAID

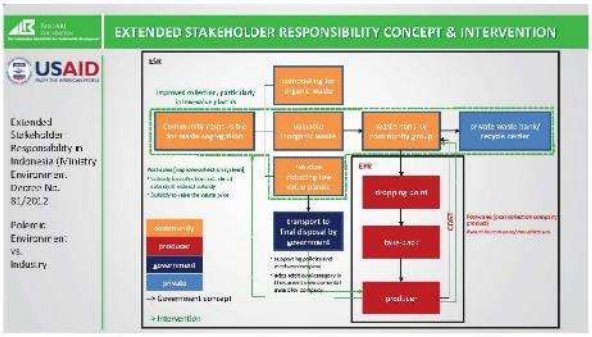
INTERVENTION

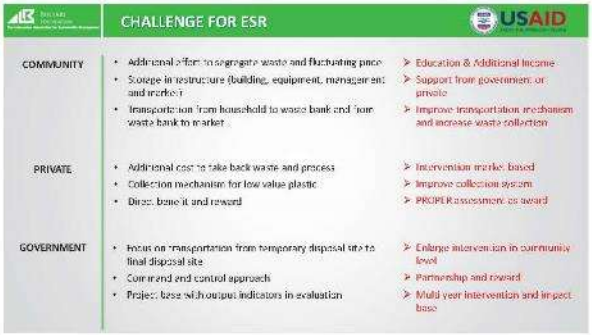
- Partner Indofood (food company, noodle division) and Semarang City government
- 2016, Study Trash to Cash in Semarang City : to identify potential location for waste bank where located nearby of Indofood Factory
- 2017, Develop 2 waste banks (Kaliparcel and Tambak Aji) supported by Indofood CSR fund and Semarang City budget. 700 kg of inorganic waste/month/waste bank
  Study to identify potential noodle plastic waste from Indofood in Semarang
  - Household produces 2,5 kg per year (300 pieces)
  - Noodle stall (WARMINDO) produces 50 kg per year
  - In Semarang, there are 1,000 WARMINDO
- 2018, Collecting plastic waste from 28 WARMINDO (2 clusters). 55 kg/mo. of plastic wrap

STAKEHOLDER MOTIVATION

TARGET:

- Increase community capacity to collect inorganic waste and obtain additional income
- Building company image on environment and to achieve environmental Management Company Performance Program (PROPER) by Ministry of Environment
- Increase practice of 3R in Semarang City





USAID CECR

Development of National Action Plan on Plastic Waste Management – Inputs from Bottom up Activities

Nguyen Ngoc Ly
Center for Environment and Community Research (CECR)
Bali, Indonesia - November 3, 2018

Solid Waste Management in Vietnam

Subsidy on Household Solid Waste Landfilling

- Family or per capita based fee on sanitation and environment collected every month. ($2/family or $0.30/person per month)
- Main treatment method is landfilling, not sorting at source
- Fees collected cover only part of the city's SWM costs. Government budget covers primarily collection, transport and treatment. (Note: Hanoi and Ho Chi Minh City SWM annual budgets are about VND 1,300 billion – USD 56 million)
- The city governments cannot continue to subsidize forever these high SWM costs.

Plastic Waste Pollution

Vietnam is one of five countries with unmanaged plastic waste.

RESOLUTION
The Strategy for Sustainable Development of the Marine Economy of Viet Nam until 2030, Vision to 2045

On Environment:

- Prevent, control and significantly reduce pollution of the marine environment;
- Pioneer minimizing the amount of ocean plastic waste.
- In coastal provinces and cities, collect 100% of hazardous waste and domestic solid waste and dispose in accordance with environmental standards.
- Plan and build coastal economic zones, industrial zones, and municipal areas with a focus on sustainability, adaptation with climate change and sea-level rise, and meeting environmental standards.

National Action Plan on Plastic Waste Management

- Vietnam Administration on Sea and Island (VASI) under the Ministry of Environment is responsible for preparation of the National Action Plan for Plastic Waste Management.
- VASI Task Force was formed and has initiated a participatory development process.
- The first national consultation conference will be in December.
- A advisory team will prepare the National Action Plan and there will be a series of consultation workshops.
- Key stakeholders, areas of focus, and the structure of the discussions are being identified at this time.
- The schedule for finalized the National Action Plan will be in the second quarter of 2019.

WOMEN AND PLASTIC WASTE MANAGEMENT

Ocean without Plastic: Community Recycling Program for Strong Community and Green City Da Nang City, Vietnam

Sites: Thanh Khe and Son Tra districts, Da Nang City

Project Elements

- 360,000 people, 1,910 residential areas, 395 women's units
- Women-led community-based pilot separation of plastic waste, organic waste and other recyclables at the household level → Reduction of waste going to the city landfill
- Project provides training of local leaders, technical solutions, and educational campaigns

Plastic bag waste

- Apply citizen science in collecting data on plastic bag waste.
- Residential area of 120 families records how many thin plastic bag waste is collected in one month:
  - Results are communicated with environmental authorities and communities.

WOMEN-LED MODEL of Community-Based Plastic Collection and Recycling Program

Women measure the quantity of collected waste in each household.

Men and women collect and segregate plastic waste for sale to the private sector.

Women-Led Models in Plastic Management

- Women's groups pilot community-based plastic collection and recycling and scale them up in 2 districts.
- Funds generated from waste recycling go into a community fund to assist poor households.
- Women reduce plastic use and separate waste at home.
- Partnerships are strengthened between community residents, city government, and informal sector in plastic waste management.
- Collect data on women's contributions in waste management.

Observations from Action Study in Da Nang City

Men and women are involved in segregating, collecting, and recycling plastic waste.

- Recycling behavior of women and men are different
  - Men pick up and purchase high-value recyclables
  - Women are involved in lower-earning activities
- Female waste collectors should be recognized as environmental champions in plastic waste management instead of as "scavengers" which have a bad reputation
- Women are agents of change in plastic waste management

Research and Policy Discussion Focusing on Informal Sector

- Issue-based studies: Institutional analysis of city SWM system; Formal vs informal sector in SWM; Role of scavengers and private recycling centers: Role of women; Stakeholder analyses.
- Results from recent policy forum:
  - 3R needs support of the community and private sector
  - Greater recognition of the women and men working in the informal sector
  - Reducing and eliminating SWM subsides will require applying 'Polluter Pay Principles'
  - Data and lessons learned are valuable inputs for the development of National Action Plan

Thank you!

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Center for Environment and Community Research (CECR)
Hanoi, Vietnam
www.cecr.vn

ZERO WASTE MODELS

Sonia S. Mendoza
Chairman

Mother Earth Foundation

Barangay Fort Bonifacio

- Signed MOA with Barangay Chairman Lino Cayetano (now Congressman)
- Assisted by the Office of Senator Pia Cayetano

Transforming Communities

Before

Before

Transforming Communities

Before

After

Transforming Communities

- Compliance rate of 98% for at source segregation
- Current diversion rate: 92%
- Changed community mindset

- Achieved the highest diversion rate in Metro Manila. 85% of the waste collected is diverted at the Material Recovery Facility (MRF) but total diversion rate including diversion at the household level is currently at 92%
- Covered 100% of households for Information Education and Communication (IEC) Campaign
- Trained 15 informal waste pickers (11 are women) and absorbed as official collectors of the barangay

- Reduced the number of city trucks collecting waste from the barangay, from the daily average of 4 trips per day, down to only 1 trip per day resulting to savings of around P10,000 (~USD 200) per day for the City
- Operates the only complete and operational MRF Model for the City of Taguig
- Trained 60 residents on livelihood programs reusing materials from waste

Massive IEC Campain

Door to door segregated collection

Transforming Lives

- Green jobs:
  - 15 waste pickers to collectors
  - 5 MRF personnel
- Living wage /month
  - Before: PHP 3,000 (USD 70)
  - Now: PHP 8,000 (USD 186) + Income from Recyclables

Barangay Fort Bonifacio won the 2015 Grand Award of P1 million (USD 20,000) in the Parangal sa Barangay Category B as "Cleanest and Best Barangay" in Solid Waste Management of Metropolitan Manila

Scaling Up to a City Model:
San Fernando City, Pampanga

- Population: 300,000 residents
- Provincial Capital and Regional Center

San Fernando City, Pampanga

- 35 barangays, urban and rural
- Population of about 300,000; with a daytime population of 1 million plus
- Villages and schools have established their MRFs
- The total number of city MRFs is 102
- Waste Diversion: 72%

San Fernando City, Pampanga

House-to-House Collection of Segregated Waste

Working Models

San Fernando City

- Created green jobs: more than 100 formal waste workers
- Organized waste workers into an association
- President of the Waste Workers Association sits in the City Solid Waste Board

Working Models

San Fernando City

- Model for Decentralized Waste Management: MRFs in all 35 barangays.

102

MRFs

Plastic Bag Ban

95% compliance

- After 3 months, plastic free-day
- Not allowed to be given for free after 6 months (with fee)
- After 1 year → total ban

New Partner: Province of Nueva Vizcaya for a Province-wide Zero Waste Program

Eco-Shed

Herbal Garden

Vermi Composting

1	Eco Shed for Recyclables	5	Organic garden
2	MRF	6	Compost Pit
3	Perimeter Fence	7	Compost Heap
4	Collection Cart	8	Containment Area for Residuals

Environment and Development in Action (ENDA)

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Tel: (84-28) 39700243/ 39703273
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ENDA's Vision

"A Vietnamese society where people can live together in a peaceful, democratic and equal manner, and where governments, citizens and social organizations work together to fight poverty and injustice as well as to build healthy environmental conditions".

ENDA's Operations:

- Started in Vietnam in 1995
- Works in urban areas with the poor and migrants with a focus on community-based solid waste management systems, environmental awareness-raising, housing, community savings, slum upgrading, and networking communities and cities.

Contents

1. *Critical role of informal waste collectors in SWM and recycling.*
2. *Engage IWCs with local governments*
3. *Incentives for IWCs for health care and to collect low-value plastic waste*
4. *Critical role of women in SWM and recycling*

Role of informal sector in SWM

Informal sector in SWM in Ho Chi Minh City, Vietnam:

- Independent waste collectors (IWCs): collect waste from households; transport waste to transfer stations; and remove recyclable materials including plastics. (~4,200 IWCs in HCMC with **40% female**) .
- Street waste pickers: pick up recyclables on the street and/or purchase them from households for resale (~2,000 with **85% female**).
- Junkshops: purchase recyclables (1,816 with **75% female**).

Role of informal sector in SWM

Makes important contributions to the city's SWM system, keeping the environment clean and reducing negative health impacts.

- Collect 65-70% domestic waste from households and transports to transfer stations.
- Recycle waste, especially plastic waste => reduce the volume of waste going into landfills and the marine environment and reduce the city's transport and treatment costs.

Working conditions

- IWCs work independently and need further support from local authorities.
- Difficult for IWCs to access social protections (95% without social insurance; and 85% without health insurance) although they work in complex, high risk, hazardous environments.
- The voices of IWCs are not heard by the city government and community.

=> Necessary to organize IWC organizations as cooperatives & unions.

Establish cooperatives & unions

ENDA-Vietnam has worked with IWCs to establish them as cooperatives/unions:

- Assist IWCs to strengthen voice and influence with the city government and communities.
- Represent and protect the legitimate rights and interests of IWCs.
- Advise and provide IWCs with a range of support services.
- Assist IWC organizations to collaborate with domestic and foreign organizations.
- **Empower women to assume leadership roles within the IWC cooperatives & unions.**

Incentives for the informal sector to access health care

Incentives and support from the government and private sector for IWCs to collect low-value plastic waste and obtain basic services:

- Support community revolving fund for health incentives
- Support 60% of health insurance (IWCs contribute 40%)
- Support accident insurance
- Provide protective supplies/equipment (clothes, boots, masks)
- Support access to annual health check-ups and tetanus vaccinations

Critical role of women in SWM and recycling

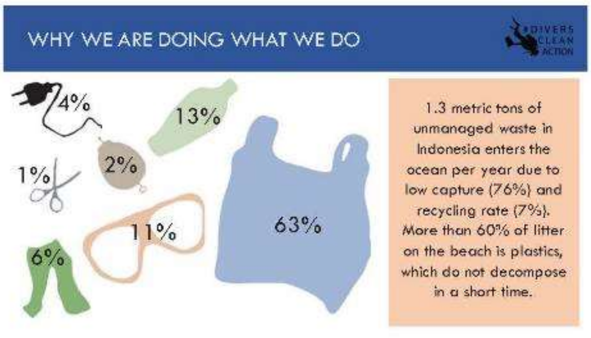
With the growing global paradigm shifts around "waste as resource", the move away from landfilling towards waste prevention, 3Rs (reuse, recycling and recovery), and the fervour around circular economy opportunities, women find the sector an attractive place to develop their careers.

- In HCMC, women comprise: 40% IWCs; 85% street waste pickers; 75% junkshop owners).
- Women are flourishing as waste collectors, recycling entrepreneurs, researchers, and senior managers in their organizations. SWM offers women career opportunities and a space for contributing solutions to serious global environmental problems.
- Socio-cultural barriers and market-oriented risks still exist.

=> **Women are making valuable contributions through a range of SWM and recycling services.**

2003-2007 : Partially lived in the island
2003: 1.000 visitors
2016: 81.480 visitors

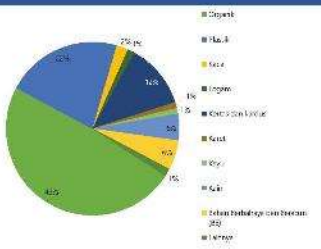

DIVERS CLEAN ACTION PROGRAMS
Our Program
Research
Campaign and Workshop
Community Development
CSR/EPR Collaborator


WHY WE ARE DOING WHAT WE DO
4%
13%
2%
1%
11%
63%
6%
1.3 metric tons of unmanaged waste in Indonesia enters the ocean per year due to low capture (76%) and recycling rate (7%). More than 60% of litter on the beach is plastics, which do not decompose in a short time.


WASTE PRODUCTION IN KEPULAUAN SERIBU
affected by practical
kg/person/day.

WASTE COMPOSITION IN KEPULAUAN SERIBU

Organic waste is the highest waste produced in the islands (49%). Kepulauan Seribu also dependent with plastic since they production of waste consisting 22% of plastic



THE POWER OF YOUTH

Investing in youth leadership ensures necessary competencies in leading their future generation to turn our dreams into reality.

40% of world population is under age of 25

59.39% of population in Indonesia is under age of 35 (154,750,445)

32.24% of population in Kepulauan Seribu is under age of 35 (7,319)

WOMEN ENGAGEMENT

Women' roles in waste management system:

Increase collection rate in each house as someone responsible of the waste

Educate their family especially children to help

Generate more income

YOUTH ENGAGEMENT

Youth inclusion strengthens the Informal Sectors' work through increasing capture rate of recyclables by collaborative approach to their surrounding area.

PROJECTS ACROSS INDONESIA

Divers Clean Action with 64 most dynamic young leaders across Indonesia make tremendous movements in small-scale yet strong impacts on communities.

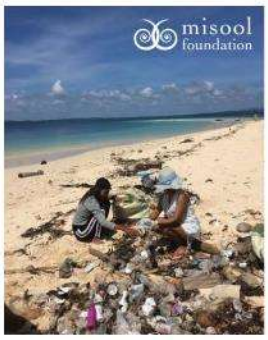
SAVE OUR SMALL ISLANDS

- Zero Waste Catering & Eco- Tourism:
  - Increasing 30% of the locals income
  - Adding additional job for 30 woman
- Recycling Efforts:
  - Develop Waste Banks
  - Integrating the IWCs
  - Ecobricks Development

USAID

ol Community Recycling Project (Bank Sampah)

- Indonesia is the world's second largest contributor of plastics pollution of the marine environment
- Since 2014, Indonesia's Misool Foundation has provided a scalable, replicable systemic solution to this very real environmental and economic threat
- The 459 tons of recyclable trash it took in during last year alone — 85 tons of which was ocean-bound plastic — accounts for almost half of the program's historical total of 1,088 tons.



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Social & economic influences

- The participating members of Misool's network of bank sampahs has grown to 3,743 individuals
- 100 informal waste collectors
- Misool's central bank sampah fuels local economic growth. In 2017, Misool distributed $48,500 to community members for purchasing their recyclables and paid out $72,000 in local staff salaries.

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Women have important roles in recycling

- Our bank sampah members: 2,620 women and 1,123 men
- 40 from the total 67 bank sampah managers are women
- 5 of 5 (100%) of the sorting crew at our bank sampah are women
- Established a craftsman group of 9 women that make handicraft products from discarded plastic sachets

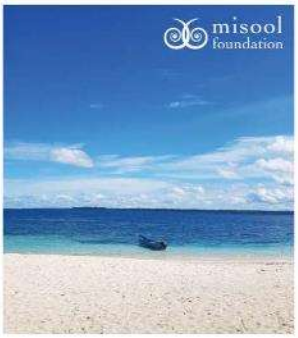
USAID

Waste Warrior Program

Collect Your Stamp	Collect Your Stamp
Collect Your Stamp	Collect Your Stamp

Next plan…

- ***TODAY*** - Local communities, governments and a variety of stakeholders are embracing the project.
- Bank sampahs have brought the benefits of cleaner beaches and water, plus economic growth
- The Misool bank sampah will increase the amount of ocean-bound plastic being recycled from 85 metric tons last year to 175 metric tons this year (2018)
- It's not enough just to clean up our small region. If we are to prevent plastic waste from entering our marine environments, we need to work on producing less of it and expanding sustainable operations like the Misool central bank sampah to cover more of Indonesia. What works in Indonesia can be shared and replicated in other countries in the Asia-Pacific region.



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