

出國報告（出國類別：考察）

參加 2019 年印度「智慧城市案源開發團」暨「亞洲智慧城市論壇暨展覽」

服務機關：台灣自來水公司

姓名職稱：吳振榮副總經理、何承嶧副處長

派赴國家/地區：印度

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主辦機關：經濟部台灣自來水公司

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出國人員：吳振榮、何承嶧

台灣自來水公司

出國類別：考察

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內容摘要：本案本公司係配合外貿協會推動新南向政策連袂多家國內優質廠商拜會印度浦內(Pune)多處官方單位及孟買民營企業尋求商機及技術交流，全方位發展與印度的關係，促進區域交流發展與合作，同時也打造臺灣經濟發展的新模式，重新定位我國與印度在各方面合作的可能性，共同創造未來價值。此行藉由與多單位多面向交流用以提供台灣自來水公司有關水源、淨水場、管網系統至用戶端之整體飲用水水質管理架構，並針對綠能、水質研究、供水調配及環境教育業務進行經驗分享，俾利提供安全、可靠及優質飲用水，促進人民健康及經濟發展。

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壹、目的

此行係配合政府「新南向政策推動計畫」，隨著全球供應鏈重整，東協及南亞國家等新興市場國家迅速崛起，而同為亞太地區的重要成員，臺灣的經濟發展與區域內許多國家具有高度關聯性，尤以近年來東協國家已穩居我國第二大出口市場與第二大對外投資目的地，我國與東協國家間之雙邊關係更已延伸至科技、觀光、教育、勞工、文化等多重領域。

面對區域經貿整合趨勢，以及整體對外經貿策略考量，行政院依據總統發布「新南向政策」政策綱領，提出「新南向政策推動計畫」，全方位發展與東協、南亞及紐澳等國家的關係，促進區域交流發展與合作，同時也打造臺灣經濟發展的新模式，並重新定位我國在亞洲發展的重要角色，創造未來價值。

據新南向政策發展特色係創造互利共贏的新合作模式，建立經濟共同體意識，改變過去以單向在東協及南亞國家成立生產基地為代工廠的政策作法，新南向政策推動計畫將擴大與東協、南亞及紐、澳等國進行包括人才、資金、技術、文化、教育等的互動交流，創造互利共贏的新合作模式，逐步達成建立「經濟共同體意識」的目標。

為達成上揭任務，外貿協會扮演居中協調、串聯及溝通聯繫的角色，從長期深耕、全方位發展的方向，協助國內產業向外尋求與東協 10 國、南亞 6 國及紐澳等 18 個目標國家，建立策略性夥伴關係，共創區域的發展和繁榮。在經貿合作方面，擴大與夥伴國產業供應鏈整合、內需市場連結及基建工程合作，建立新經貿夥伴關係。

針對當地產業能量與需求，由五大創新產業切入，輔導電子收費-ETC、智慧醫療、智慧校園等物聯網系統輸出；成立臺灣窗口(Taiwan Desk)，連結在地資源，協助臺商在地群聚布局，成立新南向經貿拓展單一窗口，扮演「尋找、開創、整合、促成」雙邊貿易機會之平臺。善用跨境電商搭配實體通路，拓銷優質平價消費商品，推動教育、健康、醫療、餐飲等新興服務產業輸出，並型塑臺灣產業品牌形象。成立基礎建設及整廠輸出之海外輸出協作平臺，籌組電廠、石化、環

保等基礎建設輸出旗艦團隊，尋求與第三國廠商策略聯盟。強調以「人」為核心，深化雙邊青年學者、學生、產業人力的交流與培育，促進與夥伴國人才資源的互補與共享。教育深耕：擴編臺灣獎學金，吸引東協及南亞學生；配合國內產業需求，建立「產學合作專班」、「外國青年技術訓練班」，並提供學成後媒合就業；鼓勵大學校院赴海外開設分校或專班，或開辦先修銜接教育課程；推動國中小新住民語文教學，鼓勵大學校院強化東南亞語言及區域貿易人才培育。針對來臺從事專門性或技術性工作的外籍移工，建立評點制度，合格者可延長居留年限，並鼓勵參與技職培訓與報考證照；強化雙向專業人力交流，並簡化來臺申辦程序，強化人才供需媒合，協助國內企業尋才。協助第一代新住民利用其語言及文化之優勢，取得相關證照與就業（如母語教學、觀光等）；鼓勵大專院校開設南向專業科系或學程，給予具南向語言優勢的學生加分錄取機會，培育第二代新住民為南向種籽。

運用文化、觀光、醫療、科技、農業、中小企業等軟實力，爭取雙邊及多邊合作機會，提升夥伴國生活品質，並拓展我國經貿發展縱深。促進與東協、南亞及紐澳國家醫藥雙邊認證、新藥及醫材開發合作；協助東協及南亞國家培育醫療衛生人才。藉由影視、廣播、線上遊戲，行銷臺灣文化品牌；鼓勵地方政府與東協、南亞及紐澳國家，進行城市交流與合作。放寬東協及南亞國家來臺觀光簽證；多元宣傳觀光，提高導遊質量，建立穆斯林旅遊之友善環境。建置科技交流平臺，強化科學園區及法人跨國鏈結，推動智慧災防等技術交流。成立「台灣國際農業開發(股)公司」，加強農產品及業業資材出口；提供農技協助，推廣生物性資材及農機具，提升夥伴國經營能力。

針對區域鏈結，擴大與夥伴國的多邊與雙邊制度化合作，加強協商及對話，同時善用民間團體、僑民網絡及第三國力量，共同促進區域的安定與繁榮。積極和東協主要貿易夥伴與印度洽簽 ECA 或個別經濟合作項目；更新及強化已簽訂的雙邊投資及租稅協定，並建立重大事件預警及應變機制，有效掌握可能風險。推動與東協、南亞及紐澳進行多層次、全方位的協定與對話，並於適當時機和對岸就相關議題及合作事項，展開對話及協商。調整援外資源配置，完善援外推動機制，擴大業者參與當地國經建計畫；強化臺日官方及非官方合作平臺功能，並

建立臺星經貿合作平臺，與第三國協力進軍東協、南亞及紐澳市場。建立僑民資料庫與交流平臺(包括：留臺畢業生、當地臺商、僑民)；善用在地僑商及臺商經貿網絡，強化與臺灣企業的連結。

新南向政策為我國對外經貿策略重要的一環。政府將秉持「長期深耕、多元開展、雙向互惠」核心理念，整合中央、地方政府、民間企業與團體以及友我第三國的資源與力量，藉由資源、人才、市場和技術面的共享跟鏈結，與東協、南亞及紐澳等國家協力，共創區域的發展與繁榮，也為臺灣打造經濟發展的新模式。

緣此，針對印度水資源管理，將利此行分享台水公司在自來水事業經營管理豐富經驗，以提供印度方面發展優質自來水的有利參照。

我國是島國型國家，雨量很豐沛，但地形坡度大，大部分水流入大海，又加上工廠廢水、生活污水對水源的污染，造成水資源相當匱乏，水源之開發是日漸困難，開發成本升高。然工商業持續發展，國民生活水準日益提昇，用水量是逐年提高，又近期全球氣候異常，更造成水質變動相當大，尤其是濁度，汛期時原水水質高達數千或數萬 NTU，而水庫藻類優養化衍生臭味、總有機碳偏高等，已遠遠超出淨水場之處理負荷，水質管理遭遇相當大挑戰，此外，台水公司所屬管線多已老舊，加上我國地震頻繁，致漏水嚴重，較其他已開發國家高。面對這些問題，本公司仍基於「品質、創新、信賴、專業」之經營理念，積極推動水源開發利用多元化規劃、水源聯合調配運及充實供水系統備援備載能量用，加強水質管理及水質處理相關研究以提升水質處理技術，並投入相當人力、成本強化防漏及水壓「智慧水管理」之管控工作，有效控制供水系統及管線之漏水復原。進而達成本公司「提供量足、質優自來水，以提升國民生活水準、促進經濟發展」使命。

近年來因氣候急遽變化，降雨量極不平均，常造成枯水期乾旱缺水或豪雨成災導致原水濁度過高的窘境；枯水期亦因流量短缺造成供水吃緊，台水公司總能解決問題，經多方評估擇選最佳方案。

因此面對未來水質挑戰，且因應環保署針對飲用水水源與水質中新興污染物對人體健康風險評估研究結果，未來水質法規將朝項目趨多及限值趨嚴方向發展。例如：(1) 清潔用品（三氯沙、二氧六圓）(2) 殺菌劑（貝芬替）(3) 新興消毒副產物（二氯乙腈、溴氯乙腈、二氯丙酮、三氯丙酮、水合氯醛）(4) 美容用品（佳樂麝香、吐納麝香）等項目。目前均無法於傳統淨水程序去除，未來將透過標準檢測方法進行必要之監測及規劃相關研究蒐集更多因應資訊。

本次拜會對象多為印度官方單位，有現行制度管理水資源，然因印度自來水多以水車載送至用戶端，相關水安全法規師法 WHO，尚未自行研訂，由普遍飲用瓶裝水現象可知距離實踐水安全計畫(Water Safety Plan, WSP)仍有很長的一段路要走，相對應台水公司已取 WHO 制訂(德國)波昂安全飲用水憲章(The Bonn Charter for Safe Drinking Water)的精神推動 WSP，用以強調自來水水源、淨水場、管網系統至用戶端之整體飲用水水質管理架構，顯然水事業發展足以做為爾後印度方面的參考。

貳、研習內容與行程

印度莫迪政府推動「百座智慧城市」政策，投入政府資源於城市能源、環境、交通、建築、安全監控及基礎建設智慧化，預估商機高達 500 億美元，各國業者湧入一線城市卡位，二線城市如 120 萬人口普內(Pune)，都希望借由此次拜訪爭取更多案源機會。

本公司此行係配合政府推動「新南向政策」，參與外貿協會「爭取全球政府採購商機專案」(GP 專案)協助國內相關業者爭取更多國外商機，籌組「智慧城市解決方案團隊」，於 2019 年 10 月 17 日至 19 日參加孟買「亞洲智慧城市展覽暨論壇」，並於展前三天以「智慧城市解決方案團隊」拜訪普內(Pune)及孟買(Mumbai)各相關主管機關及大型系統整合商，俾尋求商機擴展暨經驗分享交流機會。

普內 (Pune) 拜訪對象包括 Pune Municipal Corporation(Smart City Projects)(Deputy Commission; Chief Engineer host, respectively)、Urban Development Corporation Pune 及 Pune Smart City Development Corporation Limited 等官方單位。至於孟買則是拜訪極富盛名的大型民營機構 RPG Smart Infra。

藉由與多單位多面向交流用以檢視台灣自來水公司有關水源、淨水場、管網系統至用戶端之整體飲用水水質管理架構，並針對水質研究業務進行研討，促進雙方提供安全、可靠及優質飲用水，促進人民健康及經濟發展。

此行參與研討及參訪獲益良多，並與外貿協會暨國內多家廠商(包括萬年清環境工程股份有限公司、弓銓企業股份有限公司、遠創智慧股份有限公司、鼎漢國際工程顧問股份有限公司、億光電子工業股份有限公司、創奕能源科技股份有限公司、精英電腦股份有限公司、鈺登科技股份有限公司及融程電訊股份有限公司)互動良好，相關行程詳參表 1 所示。

表 1 研習行程與內容

「Taiwan Smart City Business Mission to India」 schedule

2019/Oct/13th (Sunday) ~ 2019/Oct/19th (Saturday)

Date	time	schedule	note
10/13 (日)	07:20-16:35	啟程至印度浦那桃園到新德里	桃園至新德里 CI181(07:20-11:50) 新德里至浦那 UK997(17:35-19:45)
	20:00-21:00	外館接機新德里至浦那 UK997(17:35-19:45)	浦那機場 (Pune Airport, Lohgaon) 至下榻飯店 14 公里 50 分鐘車程
	21:00-22:00	浦那飯店 Check in	JW Marriott Hotel Pune 地址： Senapati Bapat Rd, Laxmi Society, Model Colony, Shivajinagar, Pune, Maharashtra 411053 電話：+91- 20 6683 3333
10/14 (一)	10:30	JW Marriott Hotel Pune (gathering)	
	11:30-12:30	Visit Pune Municipal Corporation – Smart City Projects	PMC Main Building, Congress House Road, Near Mangla Theatre, Shivajinagar, Shivajinagar, Pune, Maharashtra 411005 +91 20 2550 1000
	12:30-14:00	Lunch on own	
	14:00	JW Marriott Hotel Pune (gathering) (transportation about 30 minutes)	
	15:00-16:00	Visit Urban Development Corporation Pune	Maharaja Sayaji Gaikwad Udyog Bhawan, Ward No. 8 Survey Number 152-153, Aundh Gaon, Ward No. 8, Aundh Gaon, Aundh, Pune, Maharashtra 411067 +91 20 2593 3344
	16:00	Back to JW Marriott Hotel Pune	
10/15 (二)	10:30	JW Marriott Hotel Pune (gathering) (transportation about 40	

		minutes)	
	11:30-12:30	Visit Pune Smart City Development Corporation Limited	Sinhagad Road, 406, Navshya Maruti Mandir Ln, Dattawadi, Pune, Maharashtra 411030 +91 20 2525 2525
	12:30	Lunch on own	
	13:30-17:30	Transport to Mumbai by Bus	
	17:30-	Check in	The LaLiT Mumbai The LaLiT Mumbai Sahar Airport Road, Mumbai - 400059 India T: +91-22-66992222
10/16 (三)	8:50	The LaLiT Mumbai (gathering) (transportation about 2 hours)	
	11:30-12:30	Visit RPG Smart Infra	Dr Near Old Passport Office, Dr Annie Besant Rd, Hanuman Nagar, Worli, Mumbai, Maharashtra 400030 RPG Smart Infra is the Smart Infrastructure vertical of RPG Group (www.rpggroup.com), a \$3.5 billion conglomerate with diversified businesses in the space of infrastructure, renewable energy, information technology, power ancillary and transport, based in Mumbai, India. The company is one of India's oldest and largest companies with a global footprint in 100+ countries and workforce of 25,000+ employees.
	12:30	Back to hotel by bus	
	14:30-18:00	Smart Asia Decoration	孟買展覽中心 Mumbai Exhibition Centre(BEC), NESCO, Goregaon, Mumbai, Maharashtra 400063
	18:00-	Back to hotel by bus	The LaLiT Mumbai
	10/17 (四)	09:30	To Mumbai Exhibition Centre by bus
10:00-18:00		Smart Asia – Day 1	孟買展覽中心 Mumbai Exhibition Centre(BEC), NESCO, Goregaon, Mumbai, Maharashtra 400063

	11:00-12:30	Opening	
	18:00	Back to hotel by bus	The LaLiT Mumbai
10/18 (五)	09:30	To Mumbai Exhibition Centre by bus	The LaLiT Mumbai
	10:00-18:00	Smart Asia – Day 2	孟買展覽中心 Mumbai Exhibition Centre(BEC), NESCO, Goregaon, Mumbai, Maharashtra 400063
	18:00	Back to hotel by bus	The LaLiT Mumbai
10/19 (六)	09:30	To Mumbai Exhibition Centre by bus	The LaLiT Mumbai
	10:00-16:00	Smart Asia – Day 3	孟買展覽中心 Mumbai Exhibition Centre(BEC), NESCO, Goregaon, Mumbai, Maharashtra 400063
	16:00	Back to hotel by bus	The LaLiT Mumbai
	20:00	Head to Airport	No shuttle bus

參、互動與展示

本次印度參訪拜會行程，台水公司試與水安全計畫(Water Safety Plan, WSP)針對「水源管理、配水及用戶，不是僅有淨水廠而已」的論述對焦，然而除瞭解配水端採水車運送至用戶，與台灣地區不同外，其餘本次參訪惟行程未能全盤對應 WSP。本次參訪主題係由外貿領軍國內業者爭取印度商機，因此各企業無不卯足全力，以有限時間闡述各優良商品或技術服務，而台水公司則聚焦說明台灣地區供水現況：包括水資源、智慧水管理、供水調配、研究發展、循環經濟、綠能產電及環境教育，全面向介紹台水提供高品質飲用水，並且「以客為尊」的企業經營理念。以下則是至參訪單位進行的簡報內容。

經濟部  台灣自來水公司
TAIWAN WATER CORPORATION

Taiwan Water Corporation Current Issues & Visions

Speaker :
Vice President, Jenn-Rong, Wu
Deputy Director, Cheng-I, Ho

14th ~ 19th, Oct., 2019

QUICK 品質 創新 信賴 專業

Outline

Smart Water Network Necessity

TWC Smart Water Network

Water Supply Scheme

Research, Energy & Sustainability

Visit from Taiwan



Smart Water Network Necessity

Taiwan Water Crisis

Rainfall

2500mm =
2.6 times
than world average

World average

Taiwan Average



Water Shortage

Globally

TOP 19

Allocated Rainfall per person

4000 m³/year
= **20%** world average
(Less than Saudia Arabia)



Dam sedimentation, Leakage...

In year2030, water shortage
will be **1.43 M m³/day**
= **5.7 M** people face
water crisis



Source: Water Resource Agency, MOEA

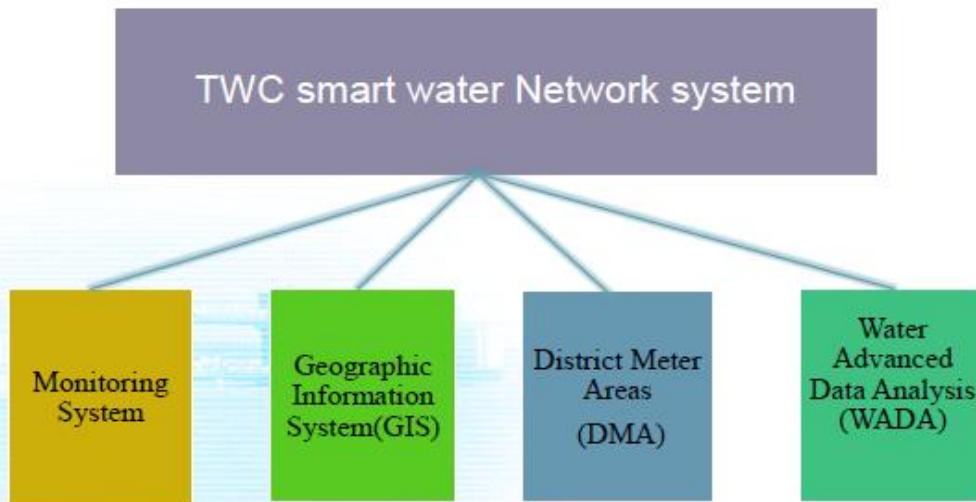
Smart Water Network Necessity

TWC: has the most water supply systems in the world
until the end of 2018

Water supply system	Supply capability	Ave. daily water supply	popularity
139	11.80 million CMD	8.8 million CMD	93.0%
User number	Pipeline length	Supply area	Ave. water bill
7.10 million	62,369 km	344 cities	10.96 NTD/m³ (the third lowest)

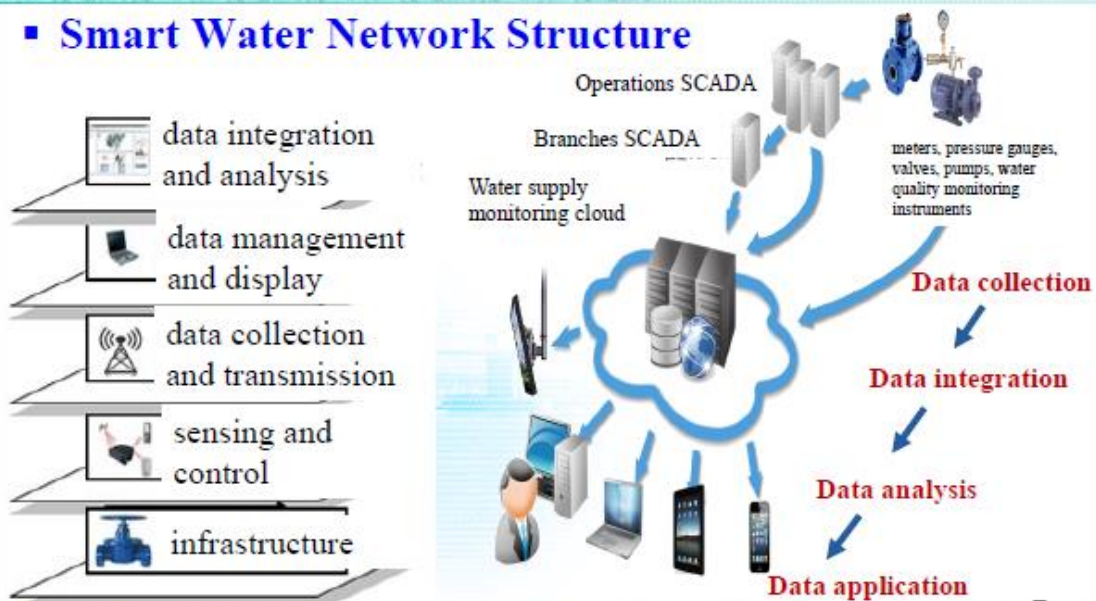
Smart water network management is the key to
efficiently operate the complex TWC water system

TWC Smart Water Network



TWC Smart Water Network

Smart Water Network Structure



Features : Decision assisting

■ real-time monitoring of 8 factors

Flow rate pressure Water quality (pH, turbidity, residual chlorine) Water level valve Multi-function power meter

Features : GIS

➢ Using GIS to present space information

Map overlay pipeline GI

Display GI attribute

Marking inquire GI

Supporting web page mobile version

Valves
pipelines
DMA
TGOS Map

Features : DMA

> DMA monitoring

Flow rate and pressure displayed by GIS

Area range and monitoring station

P_{in} -inlet pressure

P_{cr} -critical point pressure

P_{avg} -number of household ave. pressure

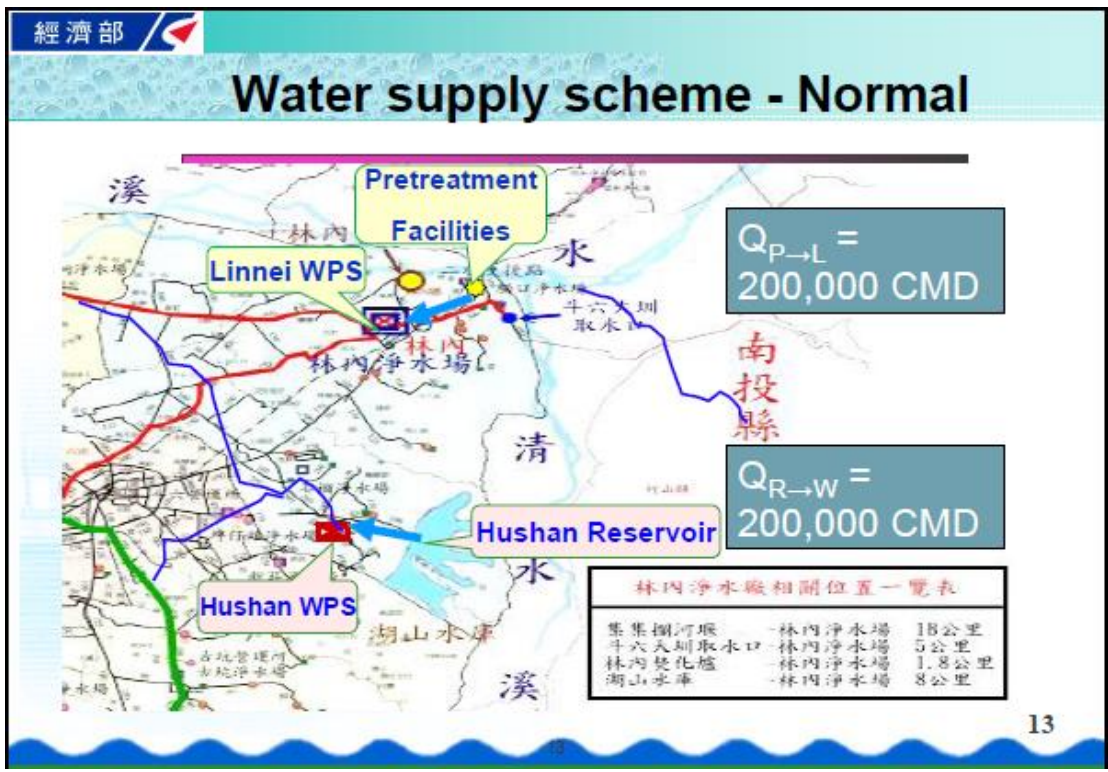
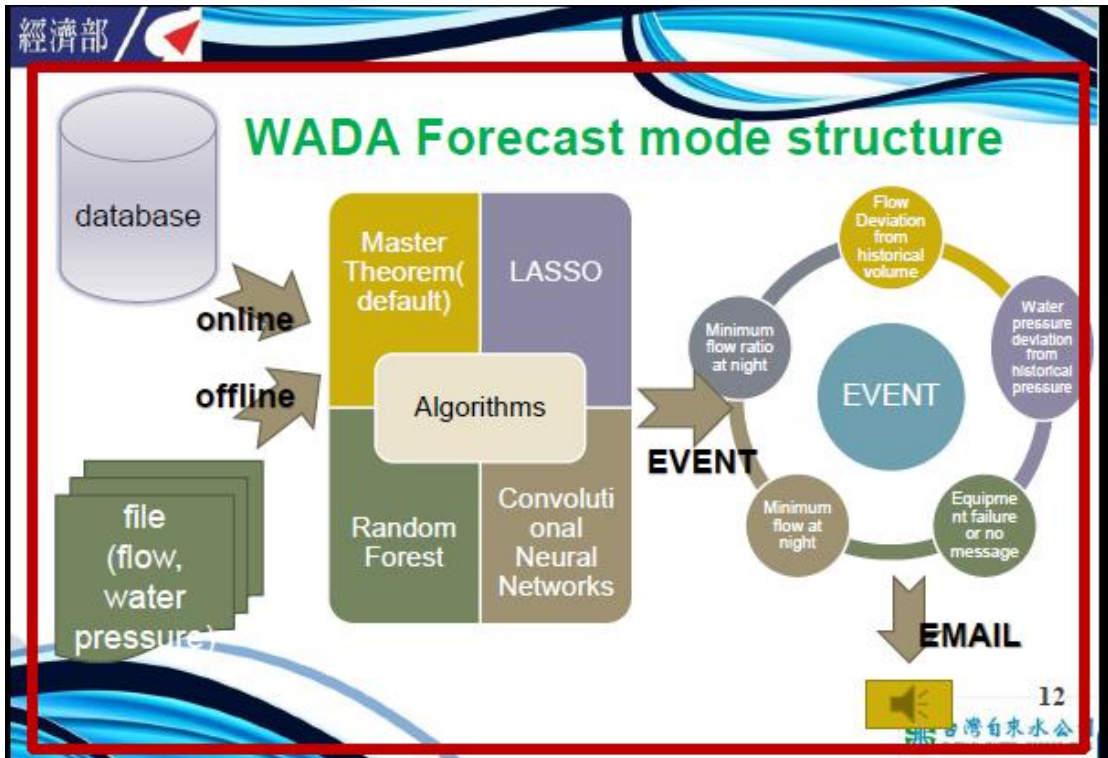
GIS-Map overlay
Water supply pipeline

Presenting population density by satellite images



Water Advanced Data Analysis (WADA)



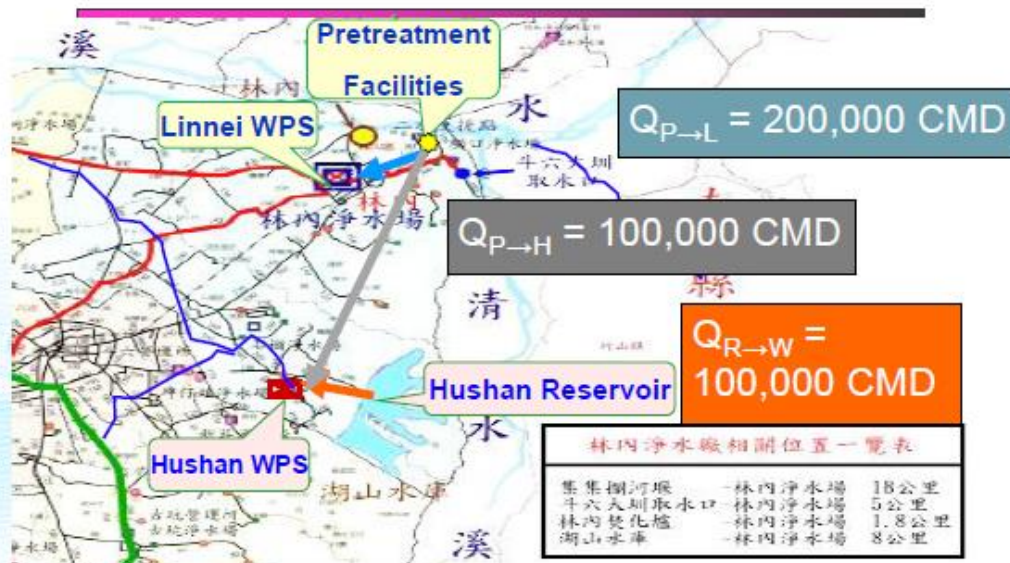


Water supply scheme - flood season



14

Water supply scheme - nonflood season



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Research

Self research or alliances with academic institution (e. g. NCKU, Yunlin university of science and technology; SA Water, Australia)



➤ Extreme climate

○ High turbidity (up to 50,000~100,000NTU)

□ Title: *The optimizing treatment of high turbidity raw water (2007)*

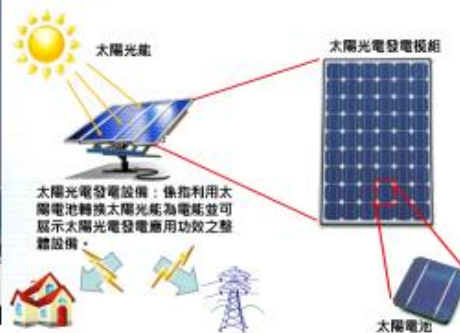
□ Phenomenon: High turbidity of raw water resulted in heavy rain or typhoon

□ Result

- ✓ To avoid high turbidity raw water flows into Water Purification Station to decrease the sediment of facilities
- ✓ Adjusting water supply system

Solar panel

Electricity will be produced **7.65M kw-hr/yr** by solar panels that located on the top of sludge pond and sludge temporary stock yard in Pretreatment Facilities. ($A = 30,418 \text{ m}^2$)



Circular Economy

- ◆ Sediment: pure nature, no chemical added
- ◆ Production rate: 1,000 ton/d (Hushan Pretreatment Plant)
- ◆ Bricks, road pavement, cement material, refilled sand, and soil modifier can be totally made NT\$11M/yr benefit.



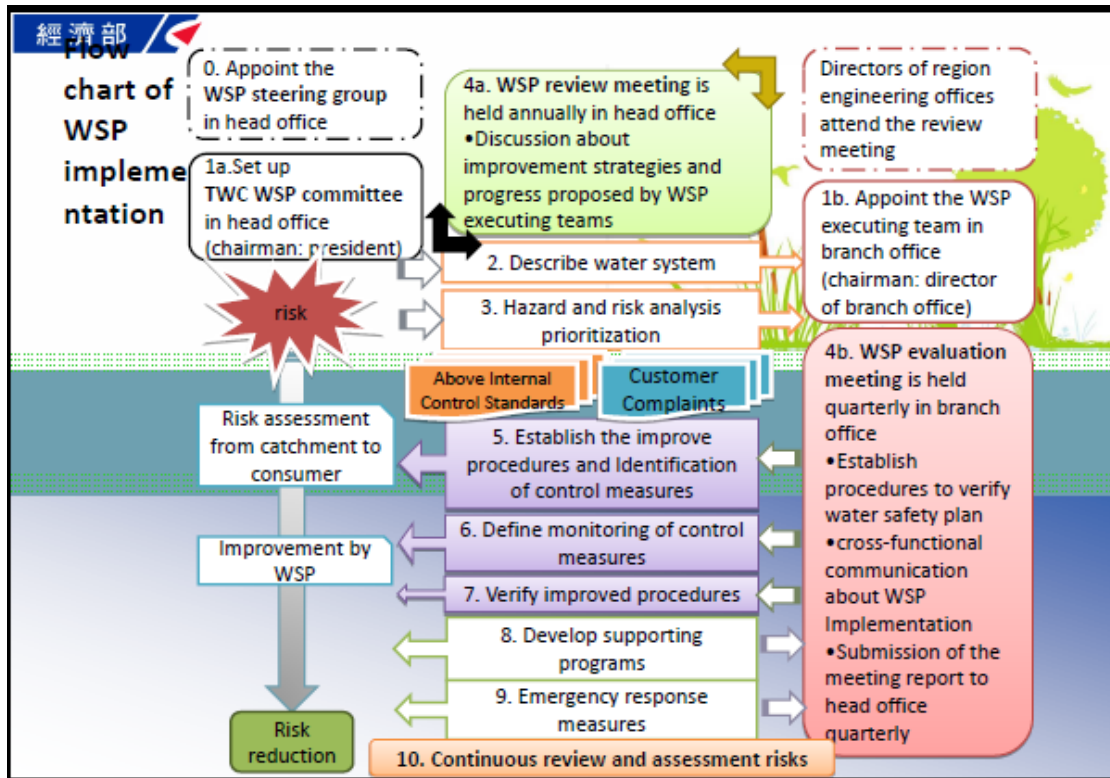
18

Vision & Sustainability

- Environmental education center set up in 3yrs for EIA promise from 2017.
- ISO14001 led in to fulfill green policy in 2017.



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一、拜會 Pune Municipal Corporation – Smart City Projects

浦那市政公司(PMC)是管理第二大城市馬哈拉施特拉邦浦那中央的公民團體，負責 340 萬市民需求和基礎設施，其面積為 331.26 平方公里。Pune 目前是印度人口第四大城市，且是生技產業重鎮，並於 2019 獲選為印度最適人居城市 (Most Livable City in India)。



圖 1 台水公司吳副總與印度普內(Pune)副市長相見歡



圖 2 智慧城市案源開發團與印度普內(Pune)副市長合影

二、拜會 Urban Development Corporation Pune

浦那市政城市發展局係 PMC 轄下的部門，職掌市政建設，類同台灣各縣市政府的都發局。對於各項智慧城市的基礎設施建設需求(例如：自來水普及、家庭廢水處理、交通建設及智慧管理)相當迫切。



圖 3 台水公司吳副總致贈宣導品予印度普內(Pune)城市發展局代表



圖 4 智慧城市案源開發團與印度普內(Pune)城市發展局代表合影

三、拜會 Pune Smart City Development Corporation Limited

PSCDCL 是隸屬 PMC 智慧城市專案的臨編單位，主要目標係為滿足市民四大願望：體制、物質、社會和經濟等基礎設施。考量自身條件，刻正依下列子計畫執行印度獨特的智慧城市計畫。

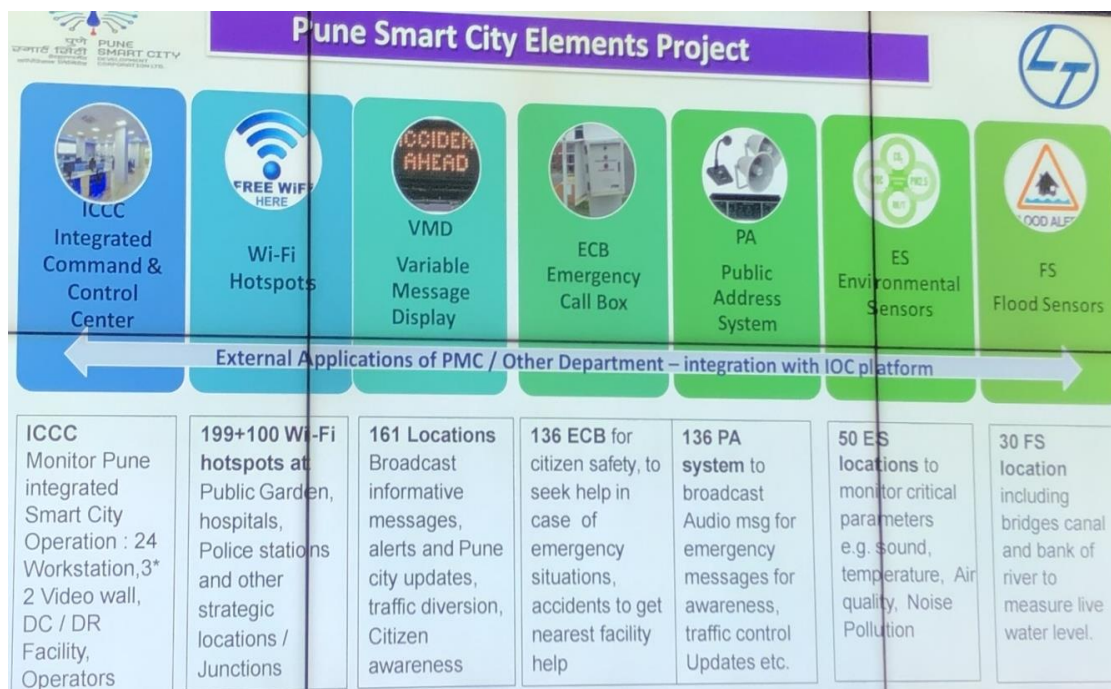


圖 5 印度普內(Pune) 智慧城市發展分項計畫表



圖 6 智慧城市案源開發團與印度普內(Pune) 智慧城市發展局代表熱烈討論

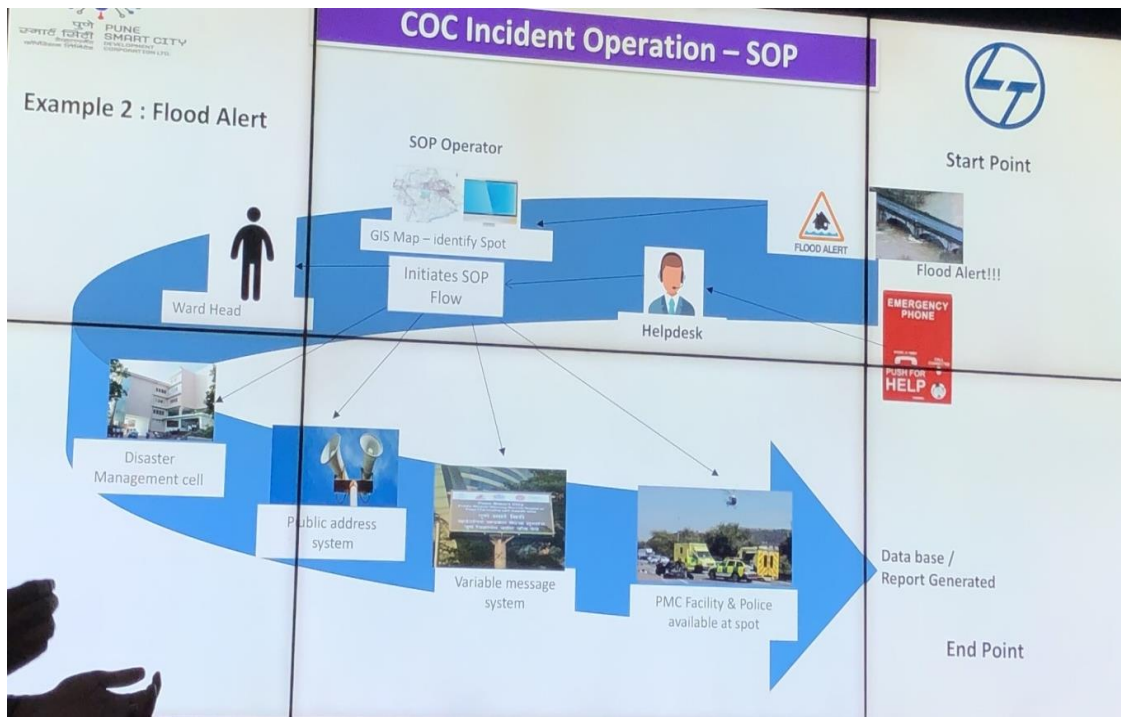


圖 7 印度普內(Pune) 智慧城市發展洪水警報標準作業流程



圖 8 台水公司吳副總致贈宣導品予印度普內(Pune) 智慧城市發展局代表

四、拜會 RPG Smart Infra

RPG Smart Infra 是 KEC International Ltd. 子公司，主要業務係執行都市基礎設施，以及對其進行操作和維護，並負責培訓管理人員進行後續管理業務基礎設施。KEC 擁有數十年在公用事業、鐵路、太陽能 and 民生用基礎設施執行經驗，擁有雄厚的財務基礎和爭取商機的熱情。

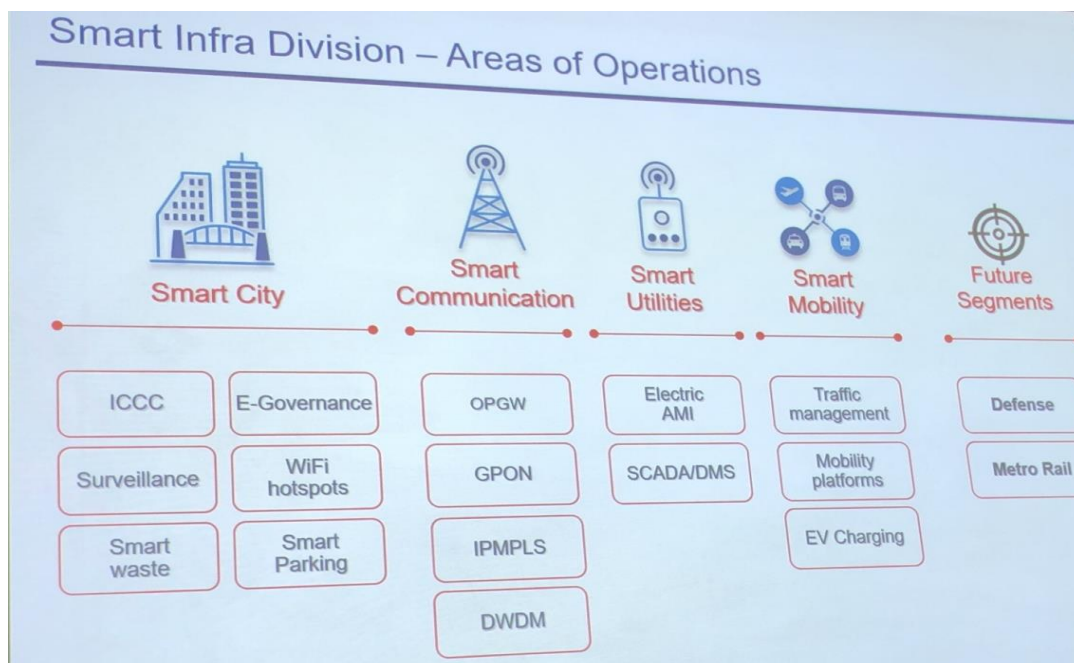


圖 9 RPG Smart Infra 簡介

Smart Infra

- Launched the Smart Infra vertical in FY 2018-19
- Focus on Smart Cities & Communication, Smart Mobility and Smart Utilities
- Solutions provided integrate technology with the facilities provided to citizens, to increase efficiency and quality, reduce waste and ensure sustainability
- Smart Infra division to work with central & state governments, municipal bodies, state & private utilities and public transport services to provide these services

The slide also features a small logo in the top right corner and a decorative graphic at the bottom showing a city street with smart infrastructure elements like traffic lights and data screens.

圖 10 RPG Smart Infra 細部內容



圖 11 台水公司吳副總致贈宣導品予 RPG Infra 代表



圖 12 智慧城市案源開發團與 RPG Infra 接待人員合影

五、參訪 Smart Asia

「2019 亞洲智慧城市展覽和論壇-印度 SMART ASIA India-Expo & Summit」10/17 在印度展場盛大開幕，我國駐印度代表田中光及外貿協會處長施玉霞在台貿中心駐孟買辦事處主任彭皓治陪同下，與國內及國際多家廠商互動，本展場係行政院協助國內廠商在國際展場上積極搶單，台水公司此行雖未參展，但亦於國內展商攤位上為台水發聲，具體宣傳台灣供應量足質優服務好的自來水業務。

本公司副總經理吳振榮介紹了台水公司採用弓銓公司大口徑的智慧電子水表，應用在自來水管網，搭配自動壓力監測，在提供精準計量和蒐集即時數據資料等方面，對於台水公司確實掌握管網水量、水壓、水質，並且進行小區管網(Districted Metered Area, DMA)漏水防治，架構即時監測系統，自動監測管網，發現有異常能夠即時因應調配供水，發現漏水區域可及時修復。(詳圖 14~15)

印度因擁有 13 餘億人口，在自來水供應上首重確保水源取得，惟天然水源富含自然有機物成分，導致偶有臭味引發疑慮，另存有化學需氧量(Cheical Oxygen Demand, COD)及總有機碳(Total Organic Carbon, TOC)，可能在淨水程序終端加氯消毒後產生鹵乙酸(Haloacetic Acids, HAA_s)及三鹵甲烷(Trihalomethanes, THM_s)的潛勢。目前因 HAA 及 THM 均已被國際列為致癌物質，此議題深受印度研究單位所重視。本次參與展場過程中於國內廠商萬年青攤位，就有印度當地學者針對此議題與本公司進行討論，台水公司則介紹現行作法提供印方參考。

上揭分享内容主要向度包括如下：降低水源端的污染源進入(如劃設保護區、建置污水下水道系統、降低農業畜牧及人類活動、減少使用有機及化學肥料及加強取締水源污染行為... 等)；淨水端則著重調整最適加氯量及評估增設活性碳設備移除有機物可行性，而管網及用戶則以定期檢驗數據回饋水源和淨水處理使操控最佳化，以全時確保供水符合飲用水水質標準，為民眾健康層層把關。

三天展覽過程中，台水公司代表全程參與並參觀全部展場攤位，對於未來如何檢視現有設備及將智慧化工具導入自來水供應服務系統初具心得，同時也適時與印方分享台水優質水質管理、與國際齊步研究量能及為環境永續的環境教育。



圖 13 台水公司吳副總與駐印度田中光大使相見歡

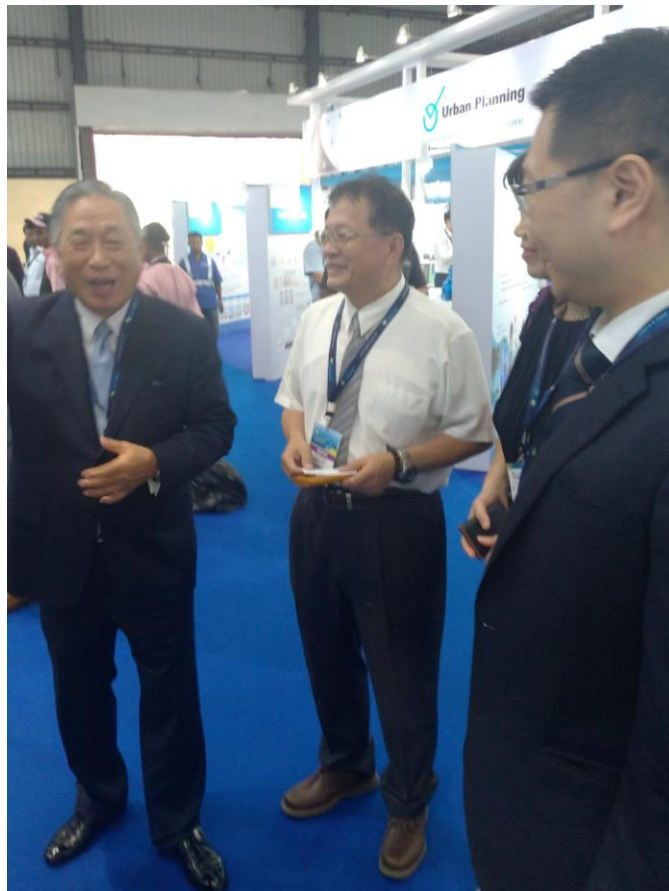


圖 14 台水公司吳副總向駐印度田中光大使、外貿協會處長施玉霞及台貿中心駐孟買辦事處主任彭皓治介紹台灣使用智慧水表現況



圖 15 台水公司吳副總參訪 2019 Smart Asia, India

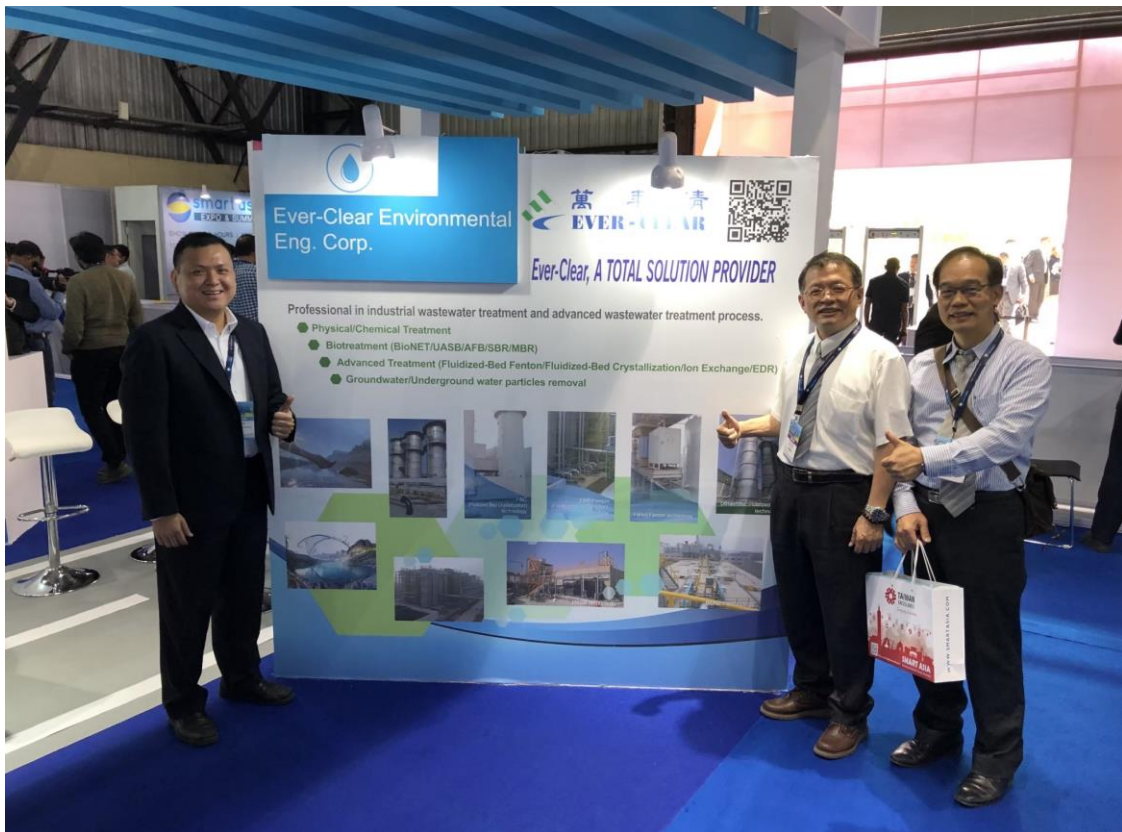


圖 16 台水公司吳副總參訪國內優質循環經濟廠商(萬年青)

肆、心得與建議

1. 孟買(Mumbai)及普內(Pune)多以水車運送至家戶注入蓄水設備再行使用，在水安全計畫的第三面向配水端，取代理設管線及後續維護機制，與台灣及多數國家之自來水配水管網設計不同，因此在確保水安全作業上考量自然不同。根據觀察及親身體驗，此行停留期間除用餐部分尚未能確認用水來源外，其餘有關自行飲用部分均採用瓶裝水，可想見外來人士對於當地自來水較沒有信心。
2. 此行同行單位除台水公司為公營機構外，其餘均為台灣民間中小型企業，所提供服務範疇包括管末處理顧問、智慧水表、智慧大眾運輸管理系統、公車運行最佳化規劃、LED 智慧照明系統、微電腦處理器及物聯網系統 IoT(Internet of Things)等，除展現台灣軟硬體實力，亦充份展現「立足台灣，放眼世界」的雄心與抱負。惟印度公眾基礎設施(如交通、飲用水)未能與人口成長速度相稱，雖有導入智慧管理的迫切需求，然而面對單位面積人口遠高於城市規劃可容納人口的現實狀況，印度官方需加快腳步，以裕民生。
3. 在水庫集水區範圍內設立水源保護區；強化淨水處理；建置配水管網；而後再進行完善的客戶服務。以上事項，在印度應全面檢視及規劃執行，因此就市場開發角度，對台灣具實力廠商確實具有相當吸引力，可據以評估後續參與對策。
4. 據瞭解印度的水質規範係依參照 WHO 建議各水質項目管制，但以慣常使用瓶裝水現況，相關用水標的（例如區分：飲用水，工業用水，公共區域用水）之水質檢測標準、適飲及口感的層次，似乎尋求供量的穩定或許才是印度官方當務之急。
5. 此行最大的不便在於印度官方的拜訪行程總是要到現場才能確定是否可如預定計畫達成會面研商的目的。仍感謝外貿協會總是努力到最後，並且不放棄任何一個機會。如此可以想見所有在國外打拼的台商，是否如同在印度一樣的情況，困難重重。但仍看見他們的生命力，努力尋找商機，努力落地生根，努力地使台灣讓世界看見，看見我們有不放棄的韌性和彈性。

6. 與世界接軌達成水質安全目標：未來水質問題可能會來的既快又猛，如淨水場遭遇原水低濁度難處理案件(濁度 250 NTU 以下)、新興污染物 (Contaminants of Emerging Concerns, CECs)及鉛管議題等狀況，除建立平時各淨水場對緊急水質事件的應變機制外，常態聯結外部諮詢管道(包括國內外專精水處理之學者及業界)，輔以蒐集先進國家或組織規定、作法或科學性論證資料及方法，並參酌環保主管機關水質標準等法令規定，亦同等重要，未來仍將持續蒐集資料並提高緊急事件應變能力，持續確保民眾用水安全。

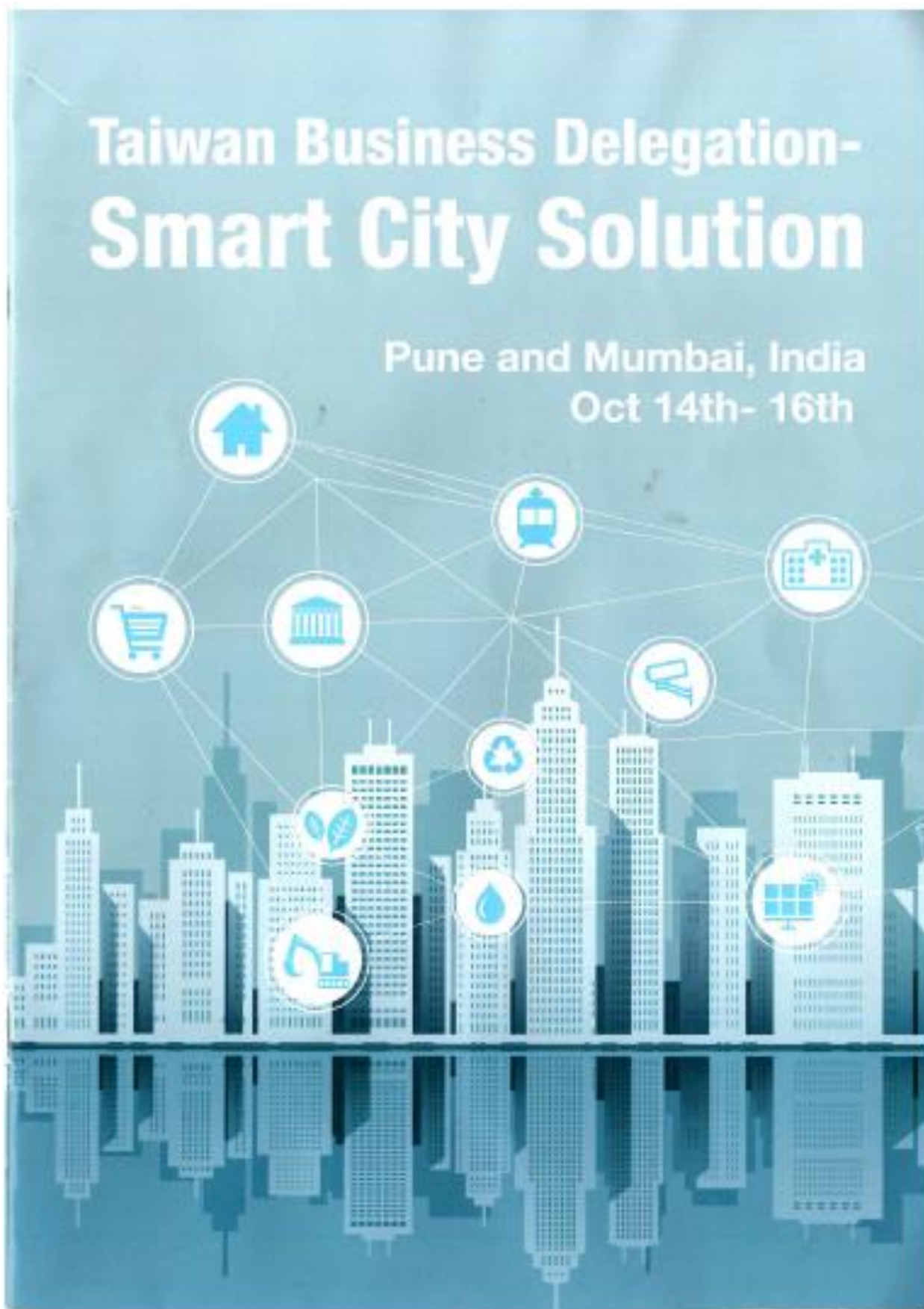
伍、謝誌

感謝外貿協會暨各參展廠商於此次研習參訪過程無數熱心指導及協助，讓整體行程運作順暢，收獲豐碩，謹代表台水公司向大家一一致謝：

外貿協會駐孟買辦事處彭皓治主任、謝統文專員、萬年清環境工程股份有限公司黃郁仁經理、弓銓企業股份有限公司蘇政賢副總、林志勳專員、Prabhu Chaithanya Gundra、Vasudhar Reddy、遠創智慧股份有限公司 Allen Su Vice President、鼎漢國際工程顧問股份有限公司蘇志哲副總、億光電子工業股份有限公司黃國義特助、創奕能源科技股份有限公司李登燦副總、精英電腦股份有限公司 Rajshekhar Bhatt Country Manager、鈺登科技股份有限公司 Virat Buch IgniteNet Country Manager、融程電訊股份有限公司 Pandit Ambre Sales Manager 及本公司魏明谷董事長。

Thank you so much

*附註：代表手冊



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About TAITRA



Founded in 1970 to help promote foreign trade, the Taiwan External Trade Development Council (TAITRA) is the foremost non-profit trade promotion organization in Taiwan. Jointly sponsored by the government, industry associations, and several commercial organizations, TAITRA assists Taiwan businesses and manufacturers with reinforcing their international competitiveness and in coping with the challenges they face in foreign markets.

Since its establishment, TAITRA has developed a well-coordinated trade promotion and information network composed of over 1,300 trained specialists stationed at its headquarters in Taipei, in five local branch offices in Taoyuan, Hsinchu, Taichung, Tainan, and Keelung, as well as in over 63 representative offices around the world.

In association with its sister organizations, the Taiwan Trade Center, Inc. (TTC) and the Taipei World Trade Center (TWTC), TAITRA continues to do everything possible to adapt its trade promotion strategies to the changing international trends and conditions. TAITRA's major functions include Market Development, Strategic Marketing, Trade Information Services, Exhibitions, Convention Services, Trade Education, and TaiwanTrade (an e-Trading Hub service).

Tremendous business opportunities can be found in Taiwan's dynamic economy. Taiwan's strategic location, infrastructure and capital make the island an ideal springboard for business operations throughout Asia and the Pacific Rim. TAITRA, together with its experienced trade specialists, all stand ready to help you do business with Taiwan.



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<http://www.taiwantrade.com.tw>

TAIWAN WATER CORPORATION

台灣自來水公司

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Tel: +886-4-2224-4194 (總機代表號)

Fax: +886-4-2223-4774 (水質處)

Email: ccho@mail.water.gov.tw

<https://www.water.gov.tw>



Delegate

吳振榮 副總經理

Wu, Jenn-Rong

Vice-President

e_jhan@mail.water.gov.tw



何承輝 副處長

Ho, Cheng-I

Deputy Director

ccho@mail.water.gov.tw

Products

- Customer service (Call Center)
- Cloud Architecture Information Platform
- High Quality Tap Water

Company Profile

We provide a sufficient supply of high quality tap-water, with clean and competent management, in order to achieve corporate social responsibility, sustainable development and the promotion of economic development.

Actively strengthen corporate governance, corporate social responsibility so as to enhance our company's competitiveness, and reach the vision of a world-class water industry.

- 139 water supply systems
- Water production capacity of 13,880,000 CMD
- Average water supply of 8,810,000 CMD
- 21 self-owned reservoirs
- 37 water treatment plants with treatment capacity of 50,000 CMD or more
- Serving more than 7,090,000 water houses
- Supplying water for 18,160,000 people
- 62,389km of water pipelines
- On average, serving 1,248 customers per employee

Note: Document statistics until June 2018.



02

EVER CLEAR ENVIRONMENTAL ENGINEERING CORPORATION

萬年清環境工程股份有限公司

No. 281, Sec. 5, Longlu Rd., Xitun Dist., Taichung City 407, Taiwan

Tel: +886-4-2255-0168

Fax: +886-4-2255-0178

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<http://www.ever-clear.com.tw>



Delegate

黃郁仁 研發部經理

Yu-Jen Huang

R&D Dept. Manager

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Products

1. Wastewater treatment plant turnkey/ design/construction/ supervision/ commissioning
2. Patent wastewater treatment equipment
 - (1) Refractory/High COD WW Treatment: Fered Fenton
 - (2) Anaerobic Biotreatment: UASB (Up-Flow Anaerobic Sludge Bed)
 - (3) Tertiary Treatment: FBR-Fenton (Fluidized-Bed Fenton Reactor)
 - (4) Nitrification/Bio-polishing Unit: BioNET
 - (5) Denitrification: AFB (Anaerobic Fluidized-Bed)
 - (6) Ion Recovery: FBC (Fluidized-Bed Crystallizer)

Company Profile

Ever-Clear, as a water treatment total solution provider, offers customers the service of water treatment evaluation / design/construction/ commissioning. Ever-Clear is specialized in wastewater treatment and develops several patent wastewater treatment reactors. Ever-Clear is willing to provide its service globally and at present its references are mainly in China, Southeast Asia and middle East, and even as far as Africa and Latin America.



03

ENERGY MANAGEMENT SYSTEM CO., LTD.

弓鋒企業股份有限公司

No.8, Dai 3rd Rd., STSP, Shenhua Dist., Tainan City

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Delegate

林志勳 外貿專員

Eric Lin

Sales Rep.

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Company Profile

EMS (Energy Management System) Co., Ltd., has 28 years of experiences in designing & manufacturing smart metering technology and complete AMR (automated meter reading) solution including Wired/Wireless IoT technology. EMS has acquired both ISO and WRAS certificates, innovative patents, and developed ISO-approved test rigs to serve the clients from commercial, industry and water utility sectors.



04

FETC INTERNATIONAL CO, LTD.

遠創智慧股份有限公司

15F., No.16, Xinzhen Rd., Banqiao Dist., New Taipei City 220, Taiwan

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Delegate

Cooperation with Allen Su
(THI consultant)
Vice president

Products

RFID tolling total solution provider

Company Profile

FETC International is Taiwan Government awarded enterprise of ETC system and service for nationwide freeways and smart city since 2004. With RFID Tag and vehicle license plate, the so called Digital Vehicle Identity integrates with FETCI's Smart Edge products to provide further Smart Transportation and Smart City applications (such as Smart Parking...) via FETC's Digital Vehicle Services Platform to build the AioT-Based Digital Vehicle Economy.



05

THI CONSULTANTS INC.

鼎漢國際工程顧問股份有限公司

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Delegate

蘇志偉 副總經理

Allen Su

Vice President

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Products

- ITS Planning
- Transportation Planning
- Big Data Technology

Company Profile

THI Consultants Inc., established in 1989, provides professional services in the planning, engineering, operations and management of transportation as well as ITS (Intelligent Transportation System) and land development projects.

THI developed working relationships with reputable international consultants in Asia, North America and Europe, creating a complete network of resources to enhance the quality of its services.

THI is the only transportation consulting company who received the National Award of Outstanding Small and Medium Enterprises in 2011. Today THI has become the most reputable transportation and planning consulting firms in Taiwan serving both public and private sector clients.



06

EVERLIGHT ELECTRONICS

億光電子工業股份有限公司

No. 6-8 Zhonghua Rd., Shulin Dist., New Taipei City 23860, Taiwan.

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Delegate

黃國義 特助

Cooke Huang

Special Assistant to GM

Email: cookehuang@everlight.com

Products

1. Outdoor lighting
2. Interior lighting
3. Retrofits

Company Profile

EVERLIGHT Electronics Co., Ltd. was founded in 1983 in Taipei, Taiwan. Led by Chairman Robert Yeh, EVERLIGHT has over 36 years of R&D experience for reliable capability. With global operations for customer service and an excellent brand reputation, EVERLIGHT has been ranked in the top six LED manufacturers in this competitive LED market. Our products are manufactured in-house to guarantee maximum quality and service. Today, EVERLIGHT is a global company with over 6,400 employees based throughout China, Hong Kong, Japan, Korea, Singapore, Malaysia, India, Germany and U.S.A.



07

TRON ENERGY TECHNOLOGY CORPORATION

創奕能源科技股份有限公司

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<https://www.tronetek.com>



Delegate

李登傑 印度專案副總經理

Allen Lao

Project Assistant Vice President

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Company Profile

Founded in 2011, Tron-e provides high specific Energy Green Products, that are environmentally friendly and with excellent safety performance. We focus on innovative research of Electric Bus, Autonomous Vehicle, Cathode Materials, Battery Pack for Electric Vehicle and Battery System of RESS (Rechargeable Energy Storage System). Tron-e was founded by a team of professionals from green high-technology industry and have more than 10 years experienced in material/battery Research & Development. Tron Energy supplies over 50% of the market share for electric buses across Taiwan in 2018.



ELITEGROUP COMPUTER SYSTEMS CO., LTD.

精英電腦股份有限公司

No. 239, Sec., 2, Ti Ding Blvd., Taipei, Taiwan

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Delegate

Rajshekher Bhatt

Country Manager

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Products

Pocket-Size Mini PC with endless possibilities

- Tiny in size , Big in Performance
- The Best 4K Visual Experience
- Stay cool and reliable
- Online Anywhere with LAN/WIFI Options
- Micro SD Slot for Extend Storage
- System On/Off via TV/Monitor Remote
- Explore endless computing possibilities

Quiet, energy-efficient, multi-functional

- Palm-size PC
- Quiet Operation with Fanless Design
- Energy Efficient for power saving
- For All Your Devices with Type-C Connect
- Easily connect to a wide variety of devices
- GPIO For Maker , For you
- One size fits all
- Easy to upgrade your RAM and Hard Drive
- The Best 4K Visuals

Company Profile

Founded in 1987, ECS, the Elitegroup Computer Systems, is a top-notch manufacturer and supplier of several families of computer products in the industry. With almost 30 years of experience, ECS not only produces high-quality products such as motherboards, desktops, notebook computers, graphics cards and other mobile products, but also provides customized computer programming and hardware/ software design service for a wide variety of customers.

The headquarters of ECS is located in Taipei Neihu Technology Park. We have offices in major cities around the world. We are committed to product development and expanding the scale of our business. With our branches all over the Americas, Europe, and Asia, ECS localizes sales and retail in order to provide immediate and convenient service for our customers.

-Taipei, Taiwan

-Tokyo, Japan

-Seoul, Korea

-Wijchen, Netherlands

-Fremont, USA

-Moscow, Russia

-Sao Paulo, Brazil

Manufacturing Sites

ECS adopts a vertical integration structure of design, component manufacturing, and system assembly. At present, ECS has established two manufacturing locations; well-developed supply chain capabilities, and well-monitored production links; and the capacity to adapt to the needs of the ever-changing market.

- Golden Elite Technology (Shenzhen), China

- Elitegroup Technology (Thailand) CO., LTD.

EDGECORE NETWORKS CORPORATION

鈺登科技股份有限公司

No. 1 Creation Rd. II, Hsinchu, Taiwan

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Delegate

Virat Buch

IgniteNet Country Manager

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Company Profile

Edgecore Networks Corporation is a wholly owned subsidiary of Accton Technology Corporation, the leading network ODM. Edgecore Networks delivers wired and wireless networking products and solutions through channel partners and system integrators worldwide for Data Center, Service Provider, Enterprise and SMB customers. Edgecore Networks is the leader in open networking, providing a full line of open Wi-Fi access points, packet transponders, virtual PON OLTs, cell site gateways, and 1G, 10G, 25G, 40G, 100G and 400G OCP Accepted switches that offer choice of commercial and open source NOS and SDN software.

IgniteNet delivers telecommunication products under Broadband Access, WiFi Access, and Network Switches category. Our global wireless portfolio covers delivering of products under 60GHz, 5 GHz and 2.4GHz. IgniteNet is the first to introduce the 60GHz PTMP solution worldwide. The advantage with IgniteNet is its cloud controller offering which is smart, easy and a secure solution. The IgniteNet Cloud controller features not only localized failover and backups but also geographic failover and backups as well.



WINMATE INC.**融程電訊股份有限公司**

9F, No.111-6, Shing-De Rd., San-Chung Dist., New Taipei City 24158, Taiwan, R.O.C.

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<http://www.winmate.com>

**Delegate**

Pandit Ambre

Sales Manager

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Company Profile

Winmate Inc. was founded in 1996 in Taipei, Taiwan, where its headquarters, research and development facility, and production lines are located. Today the company has offices worldwide.

Winmate Inc. began manufacturing industrial displays and touch screens, and later expanded to digital signage, embedded panel PC, rugged tablets, and handheld devices for industries ranging from transportation and logistics, to marine and military, railway, oil and gas, medical, smart grid, healthcare, and field service.

Today Winmate creates intelligent systems that advance the Internet of Everything (IOE) and communications throughout enterprise around the globe. Winmate not only supplies a very wide and deep range of standard products, but also provides professional services in customizing products and project management to satisfy all customer requirements.



2020 TAIWAN TRADE SHOWS

Where Opportunities Get Activated



TAIPEI CYCLE = Taipei Int'l Cycle Show	March 4-7
TaiSPO = Taipei Int'l Sporting Goods Show	March 5-7
Taiwan Int'l Boat Show	March 12-15
TAIPEI AMPA = Taipei Int'l Auto Parts & Accessories Show	April 15-19
AutoTronics Taipei = Taipei Int'l Automobile Electronics Show	April 15-19
MOTORCYCLE TAIWAN = Taiwan Int'l Motorcycle Industry Show	April 15-19
ASEAN Senior Care And Wellness Expo Rada Lungor Convention Center	April 16-18
Fastener Taiwan = Taiwan Int'l Fastener Show	April 21-23
Giftinery & Creation Taipei = Taipei Int'l Gift, Stationery and Creative Show	April 22-26
IMTdao = Taipei Intelligent Machinery & Manufacturing Technology Show	May 6-8
COMPUTEX TAIPEI	June 2-6
InnoVEX at COMPUTEX	June 3-5
TAIWAN BEAUTY = Taiwan Int'l Beauty Show	June 11-13
MEDICAL TAIWAN = Taiwan Int'l Medical & Healthcare Expo	June 11-14
MICNEX = Taiwan Medical Components & Manufacturing Expo	June 11-14
FOOD TAIPEI = Taipei Int'l Food Show	June 17-20
FOODTECH TAIPEI = Taipei International Food Processing Machinery Show	June 17-20
BIO/PHARMATECH TAIWAN = Taiwan International BioPharm. Machinery Show	June 17-20
TAIPEI PACK = Taipei Int'l Packaging Industry Show	June 17-20
Taiwan HORECA = Taiwan Int'l Hotel, Restaurant and Catering Show	June 17-20
HALAL TAIWAN = Taiwan Int'l HALAL Expo	June 17-20
TCPB = Taichung Int'l Tea, Coffee, and Bakery Show	July 17-20

TWSF = Taichung Wine & Spirits Festival	July 17-24
TAIPEI PLAS = Taipei Int'l Plastics & Rubber Industry Show	September 9-11
ShoeTech Taipei = Taipei Int'l Shoe Making Technology Show	September 9-11
TIWW = Taiwan Int'l Water Week	September 20-24
Taiwan Innotech Expo	September 24-26
Taiwan Fishery = Taiwan Int'l Fisheries & Seafood Show	September 24-26
AMPA MYANMAR Myanmar Int'l Auto Parts, Accessories & Motor Show Yangon Convention Center	September 24-27
POWER EXPO MYANMAR Myanmar Int'l Electrical, Electronics & Electric Power Equipment Fair Yangon Convention Center	September 24-27
DATE = Discover Advanced Trends in E-commerce	October 14-16
TAITRONICS = Taipei Int'l Electronics Show	October 14-16
AIoT Taiwan = Taiwan Int'l AIoT Show	October 14-16
Circular Economy Taiwan	October 14-16
Energy Taiwan	October 14-16
TILS = Taiwan Int'l Lighting Show	October 14-16
Kaohsiung Food Show	October 22-25
Kaohsiung HORECA = Kaohsiung Int'l Hotel, Restaurant, Baking and Catering Show	October 22-25
Kaohsiung HALAL = Kaohsiung Int'l HALAL Expo	October 22-25
TAIPEI 2020 - 38th Asian International Stamp Exhibition	October 23-27

www.TaiwanTradeShows.com.tw

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Taipei Hwangshui Exhibition Center, Hall 1
1, Hwangshui Rd., Taipei, Taiwan
Taipei Hwangshui Exhibition Center, Hall 2
1, Hwangshui Rd., Taipei, Taiwan

Tsai Ing-wei International Convention Center
1, Sec. 4, Roosevelt Rd., Taipei, Taiwan
Taichung International Exhibition Center
No. 1, Sec. 4, Hsinshui Rd., Taichung, Taiwan
Kaohsiung Exhibition Center
26, Chuanqing Rd., Kaohsiung, Taiwan





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