ADB

Knowledge Sharing Seminars

July 5-6, 2018

Asian Development Bank, Manila

Chinese Institute of Engineers (CIE)

CONTENTS

Preface

The Chinese Institute of Engineers (CIE) is the most historic and largest engineering professional organization in Taiwan. CIE is the sole body representing for Taiwan's participation in major international engineering organizations, including the World Federation of Engineering Organizations (WFEO), Federation of Engineering Institutions of Asia and Pacific (FEIAP), Asia-Pacific Economic Cooperation (APEC) Engineers and International Professional Engineer (IntPE) Agreement, etc., to encourage communications among engineers in different disciplines and to promote engineer's mobility worldwide.

As a member of international society of professional engineers, CIE devotes itself as its duty and obligation in sharing with other countries and economies with similar nature, of its knowledge and past experiences gained along the development of Taiwan. Our engineering industries are also ready to participate in the potential markets of these developing countries. To develop such opportunity, CIE's delegate visited ADB on Nov. 21, 2016. Through the dialog meetings with ADB specialists and consultants, the consensus was reached that CIE to provide lectures focusing on "Water Resource Engineering".

On June 17, 2017, ADB and CIE jointly administered the seminar, viz., "Improving Water Security through Intelligent Water Management-Taiwan's Success Stories", specially focused on two topics -"Renovation of the Shihmen Reservoir for Sustainability", and "Integrated Hydrological Analysis Platform for Flood Prevention Design and Water Resource Development" . The lectures, based on the feedback survey conducted, were well rated and the contents are deemed acceptable. Therefore, similar lectures and presentation with wider scopes, such as transportation, environment, etc., were recommended to continue by both ends.

At the end of December 2017, by taking the opportunity to attend the "Philippines-Taiwan Joint Economic Conference" in Manila, CIE's delegates visited ADB again and confirmed that the water resources development and smart transportation and mobility will be the main topics of next seminar that CIE may contribute.

Upon various exchanges on emails and telecommunications between ADB's officials and CIE's secretariat, the "Knowledge Sharing Seminars" is to be conducted on July 5-6, 2018 in ADB, with the themes on,

Theme I: Development of Smart City and Smart Mobility

Theme II: Water Resources Development and Management

CIE is pleased to jointly organize technical seminar again with ADB to introduce the strengths and effectiveness, and share the experiences of engineering sector of Taiwan. We are certain that these contributions will be conducive to other member countries for their economic development in the near future.

Theme I

Development of Smart City and Smart Mobility

ADB

Knowledge Sharing Seminars

Theme I
Development of Smart City and Smart Mobility

2018

» July 5, 2018

Asian Development Bank, Manila

— Room 71018NW —

Time	Topic / Speaker
10:00 - 10:10	Opening Remarks
10:10 - 10:25	*ITS Development in Taipei* ▪ S. K. Jason CHANG Professor, National Taiwan University Senior Advisor, Taipei City Government
10:25 - 10:40	*Experience on Smart Bus Operation in Taiwan* ▪ Jih-Yao HUANG Vice President, Sales Dept., Baoruh Electronic Co., Ltd.
10:40 - 11:10	Discussion

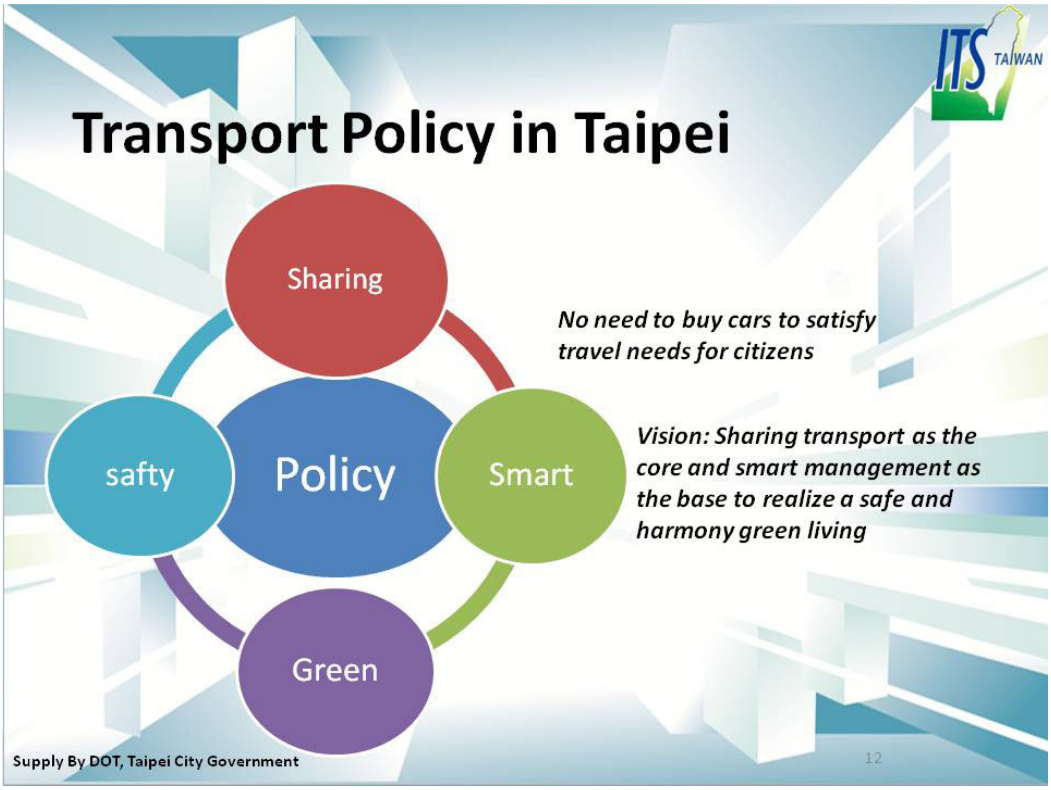
— Room 41018NW —

Time	Topic / Speaker
14:00 - 14:30	*A successful PFI & PPP Model of Smart Street Light Implementation* ▪ David YEH GM, LEOTEK SBU, LITE-ON Group
14:30 - 15:00	Discussion

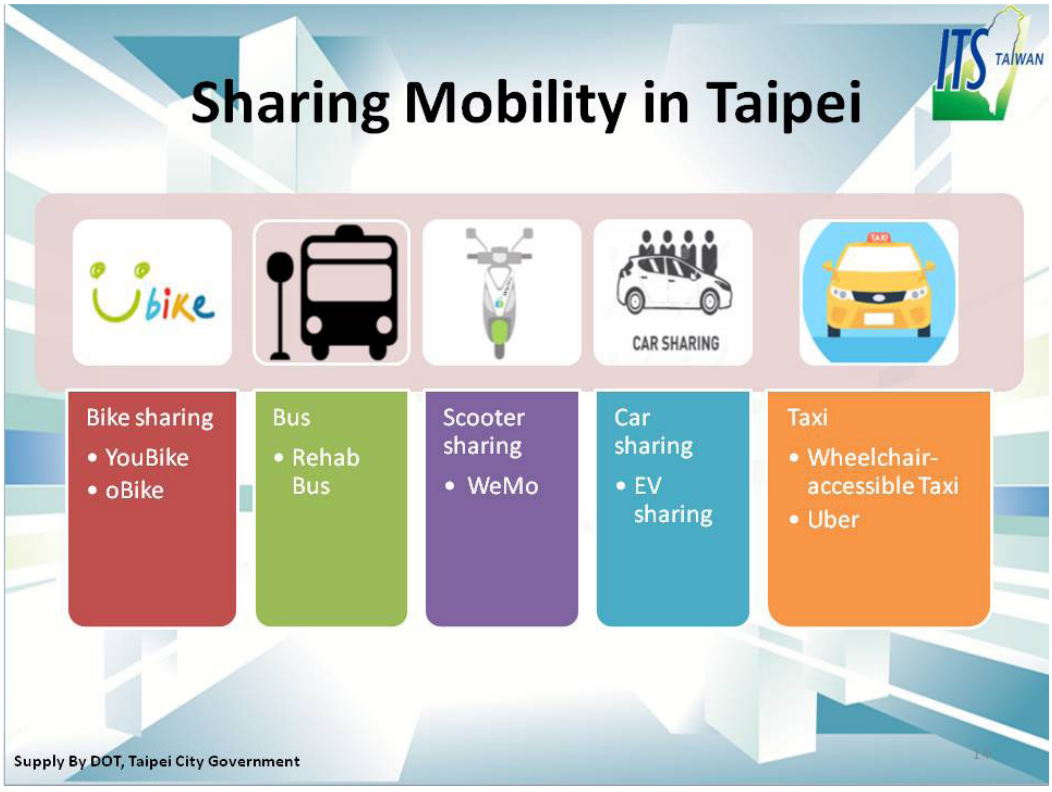
Chinese Institute of Engineers (CIE), Taipei

ITS Development in Taipei

In recent years, the Intelligent Transportation System (ITS) has become the mainstream of the transportation related infrastructure development. Along with the rapid economic growth, the transportation demand in Taiwan has been growing by leaps and bounds. Also, as one of the R&D, as well as manufacturing centers of IT industry, Taiwan has demonstrated its strengths to develop, integrate and apply the ITS system on all means of transportation in both metropolitan and major cities.



The introduction of ITS development in Taipei focuses on the following areas: smart bus, e-payment, shared mobility and smart terminal. Framework and advantages of applying Public Private Partnership Approach for development of these systems are presented. It is summarized by presenting future ITS plans on motorcycle safety, Mobility as a Service demonstrations, connected/ automated vehicle deployments, and rural area applications.



Experience on Smart Bus Operation in Taiwan

The market share of public transport in Taiwan is 16.3% in 2010 and 18.3% in 2016. The national policy has set up a goal of 30% by 2025 with the concerns of environment, energy and road safety issues. Therefore, how to apply ITS technologies for enhancing service quality and operation efficiency of bus transit systems is crucial for achieving this national goal of public transportation market share.

▪ In Taiwan, there are 15,000 buses, 8,000 routes, and 13,000 stations.

Indicators	Numbers
Area (Km²)	36,193
Population ('000)	23,430
Population Density (p/Km²)	649.92
GDP('000), US$(2015)	523,009,000
GDP per capita, US$ (2015)	22,294
PC Penetration	88.4%
Internet Connectivity (4G)	84.8%
Mobile Phones (4G)	130.2%
Vehicle ownership(1000P)	910 (328car+582 motocycle)
Road density(m/Km²)	1,165
Intercity BUS Copmpany	55(5300 buses)
City Bus company	22((10000 buses)
Total route number	8,000
Total Station number	13,000

Source : World bank, WEF, UN 2015; MOTC Taiwan, 2016

▲ *Basic Information in Taiwan*

▼ *Public Transportation Share in Taipei and Other Cities in Taiwan*

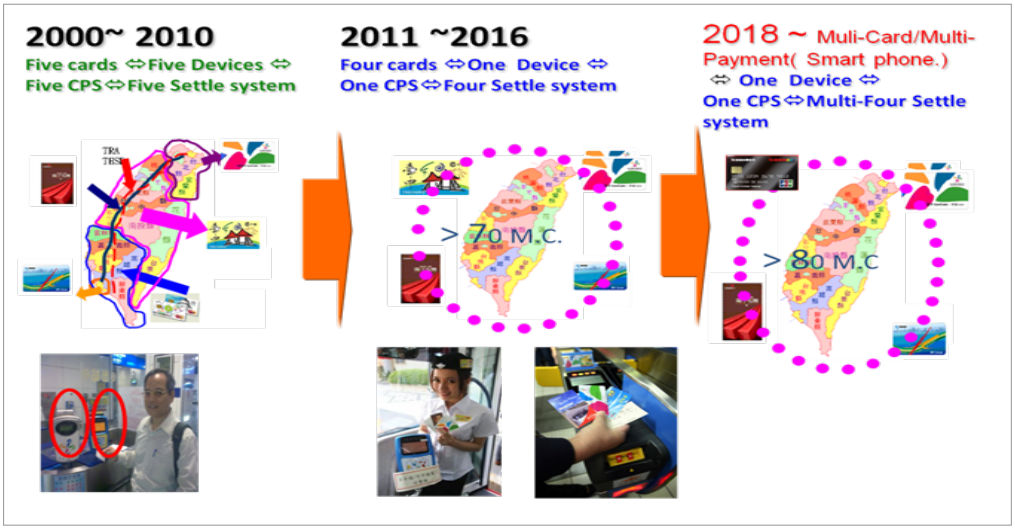
unit : %

Area	2009	2010	2011	2012	2013	2014	2015	2016
Taiwan	16.3	16.6	17.5	17.5	17.8	17.9	18.0	18.2
Taipei	39.5	43.4	43.5	42.5	42.6	41.3	41.5	42.8
N-city1	36.9	38.1	38.5	39.0	40.6	38.0	40.6	39.8
N-city2	29.0	29.8	31.8	31.0	32.7	33.2	33.6	33.8
N-city3	13.8	13.7	14.0	13.9	14.2	15.6	14.7	15.0
Taichung	9.1	9.2	9.9	10.5	10.8	11.9	12.3	12.2
N-city5	8.3	8.0	7.7	8.6	9.4	8.4	9.6	10.3
N-city6	8.4	8.6	9.6	9.5	9.8	9.0	8.5	10.0
Kaohsiung	9.1	8.0	8.7	8.8	8.7	9.4	9.1	9.3
N-city7	6.9	7.9	8.6	8.8	8.4	8.2	6.8	8.8
N-city8	6.7	7.0	7.0	8.3	8.2	8.6	8.7	8.3
Island1	5.0	6.9	8.7	8.6	7.4	7.5	7.0	7.0
S-city1	6.5	5.8	5.7	5.9	5.9	6.5	6.5	6.7
S-city2	5.2	5.8	6.4	6.4	6.4	5.8	5.2	6.2
E-city1	5.8	5.1	4.3	5.9	5.0	5.1	5.6	6.1
E-city2	6.2	5.4	6.1	6.3	6.7	6.6	6.0	6.1
M-city1	6.2	5.3	6.2	5.8	5.9	5.4	4.7	5.9
M-city2	6.0	4.9	5.3	5.5	4.9	5.7	6.5	5.5
M-city1	5.4	4.5	4.8	5.2	4.5	4.9	5.3	5.3
S-city3	5.3	5.7	5.6	5.6	5.8	6.2	6.0	5.2
S-city4	4.1	4.6	3.9	4.0	4.5	4.4	4.1	4.9
Island2	–	12.0	10.7	11.4	10.6	12.9	11.3	12.1
Island3	–	12.7	13.1	12.8	13.0	9.7	10.0	10.2

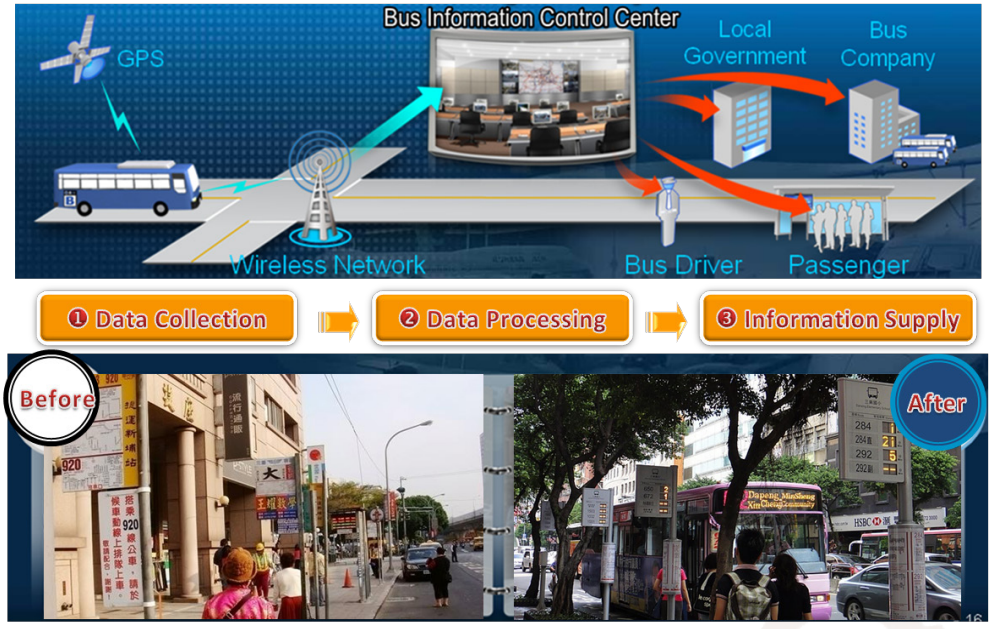
Source : MOTC Taiwan, 2017

Taipei has implemented smart card ticketing system for bus, metro and public parking facilities since 2002. Beginning in 2011, this system together with other four smart cards have been integrated and implemented for all public transportation systems in whole Taiwan. By the end of 2017, more than 70 million smart cards have been issues with the e-purse function while a multimedia payment system is under development.

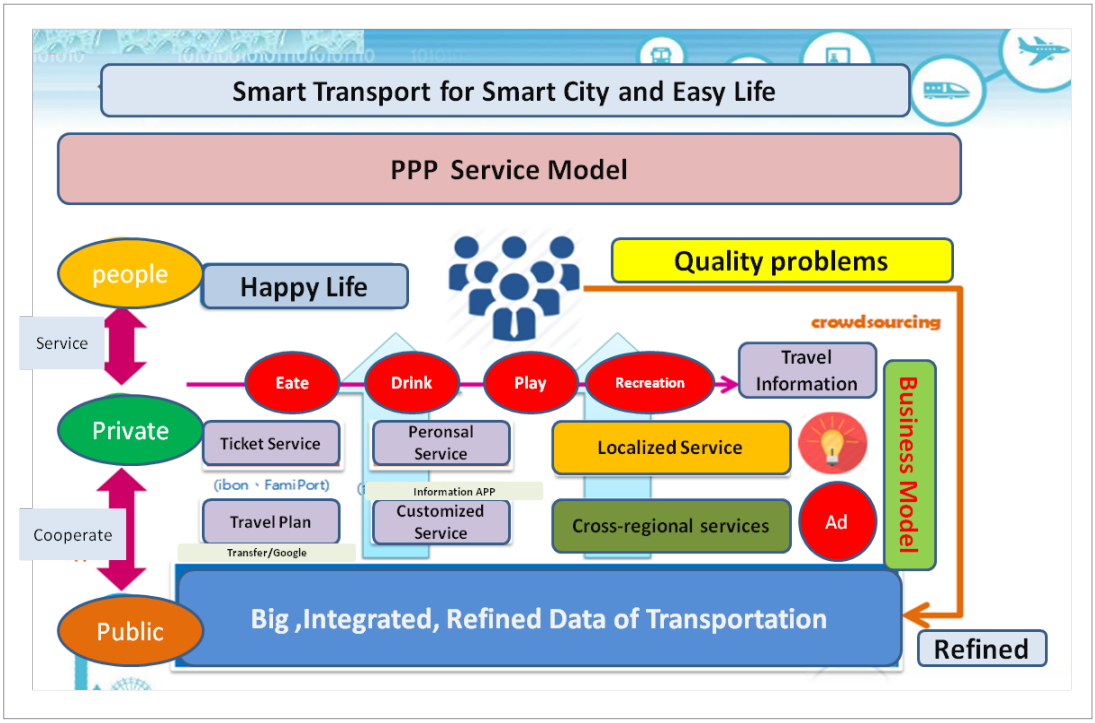
▼ *Road Map of Smart Card Ticketing System Development*



Another part of Smart Bus Plan is Bus Information and Management System (BIMS). One of main benefits of BIMS is the arrival time estimation in which the accuracy rate in Taipei City has increased from 86.87% in 2009 to 95.01% in early 2018.



Taiwan has conducted planning and initiated trials of the MaaS (Mobility as a service) program in which bus, metro, shared mobility and other modes providing the first and last mile services will be integrated together.



A successful PFI & PPP Model of Smart Street Light Implementation

Upholding over 4 decades of unremitting innovation, LITE-ON has been a transnational corporation, which was founded in 1975. It got USD 8 billion revenue and had over 600 thousand employees in 2017. LITE-ON group has many business units so that it could integrate resources to serve the smart city solution, such as Leotek, Video Surveillance, Industrial Automation, Networking, Internet Communication Module, etc.

As a leading brand in the LEDs market, Leotek was founded in 1992, and merged into LITE-ON on June, 2014 as one of the business units. Leotek has installed the LED streetlight over 2,000,000 units in the market of Europe, America, Middle East, China and Southeast Asia. It was also the Taiwan excellent brand of LED streetlight, which has installed more than 400,000 units.

Leotek has installed the LED streetlight over 120,000 units in New Taipei City, which was the biggest Private Finance Initiative (PFI) project since 2014. The project has reduced NTD 140 million of annual electricity cost and saved 75% average energy. The government and the company cooperate the PFI project to build the infrastructure of the city. The company delivers the certain public service and the government buys it. A firm relationship has been built up from both sides.

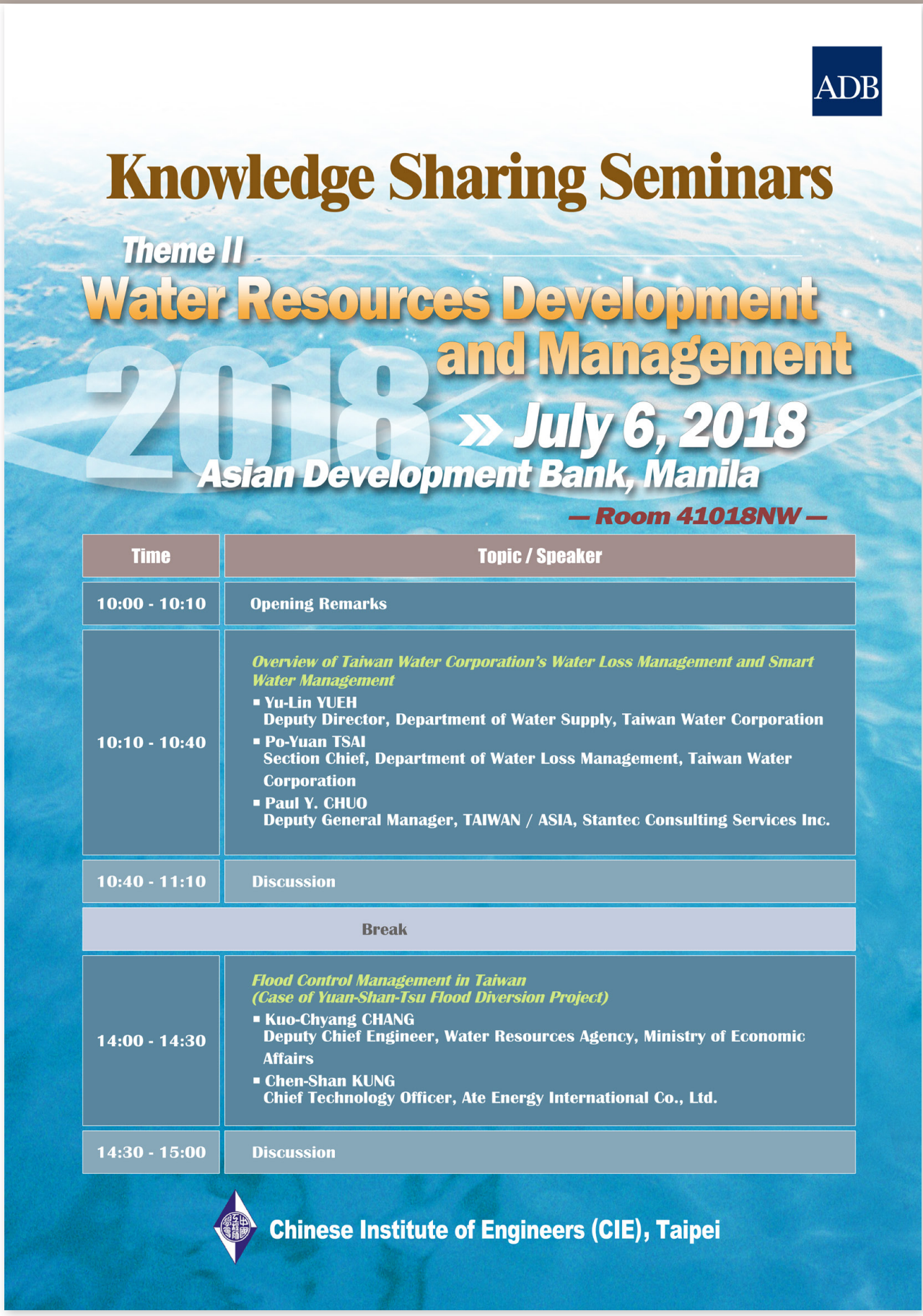
As the first time in China, the government of Yan-Cheng City had built the smart city with Leotek, under the Public, Private Participation (PPP) model in 2015. Leotek offered the smart city solution to solve the problems such as streetlight control, flood monitoring, and littering.

The benefits of Leotek smart city solution are security, connectivity, swiftness and scalability. The economical way to set up the infrastructure of the smart city is using the Leotek gateway on the streetlight to transform data. The government could manage the city through the Customer Management System (CMS), which could detect the abnormal message from the roads and summarize the information from sensors.

Leotek is the only one company that had joined the PFI and PPP projects of smart street light system all over the world. With its successful experience in construction and operation, it has won unanimous trust of its clients and partners. These success models could be very much beneficial to other cities in the Region.

Theme II

Water Resources Development and Management


ADB
Knowledge Sharing Seminars
Theme II
Water Resources Development and Management
2018
» July 6, 2018
Asian Development Bank, Manila
— Room 41018NW —
Time
Topic / Speaker
10:00 - 10:10
Opening Remarks
10:10 - 10:40
Overview of Taiwan Water Corporation's Water Loss Management and Smart Water Management
▪ Yu-Lin YUEH
Deputy Director, Department of Water Supply, Taiwan Water Corporation
▪ Po-Yuan TSAI
Section Chief, Department of Water Loss Management, Taiwan Water Corporation
▪ Paul Y. CHUO
Deputy General Manager, TAIWAN / ASIA, Stantec Consulting Services Inc.
10:40 - 11:10
Discussion
Break
14:00 - 14:30
Flood Control Management in Taiwan
(Case of Yuan-Shan-Tsu Flood Diversion Project)
▪ Kuo-Chyang CHANG
Deputy Chief Engineer, Water Resources Agency, Ministry of Economic Affairs
▪ Chen-Shan KUNG
Chief Technology Officer, Ate Energy International Co., Ltd.
14:30 - 15:00
Discussion
Chinese Institute of Engineers (CIE), Taipei

Overview of Taiwan Water Corporation's Water Loss Management and Smart Water Management

Taiwan Water Corporation (TWC) is a state-owned enterprise which was set up by merging 128 water treatment plants in 1974. It is also a large water utility with 144 water supply systems, 8.79 million CMD of Average Daily Water Supply, 6.98 million customers, and 61,458 kilometers of pipe length.

Due to water shortage, frequent earthquakes, and climate change, water loss management has become an important issue in Taiwan. Since 2004, TWC has been implementing the Water Loss Reduction Plans. The leakage rate (real losses) has come down from 24.58% (2004) to 15.49% (2017). According to the Water Loss Reduction Plan (2013~2022), TWC is spending 79.6 billion NTD (around 2.65 billion USD) to reduce leakage rate to 14.25%. Successful implementation of the Water Loss Reduction Plan (2013~2022) can result in around 477,000 CMD of water saving.

To achieve the goal, TWC adopts International Water Association's (IWA) best practice in the Water Loss Reduction Plan. In terms of pressure management, TWC installs many water pressure management devices in water treatment plants, pumping stations, and pipe networks. They can reduce water loss, and also meet customers' need. In terms of active leakage control, TWC establishes and maintains large numbers of district metered areas (DMAs) every year, and makes leakage detection plan for DMAs management. TWC also conducts some pilot projects to adopt advanced leakage detection technology for water loss control. In terms of speed and quality of repairs, TWC develops a leakage repair management information system, and also adopts new technology to increase speed and quality of repairs. In terms of pipeline and assets management, TWC

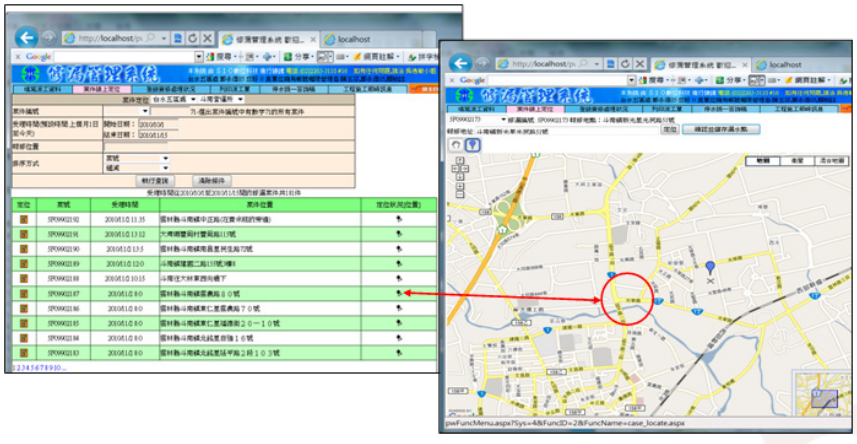
establishes a Geographic Information System (GIS) to manage pipeline and assets, and draws pipeline replacement plans by overlaying different map layers. TWC also adopts aseismatic design pipe in pipeline replacement.

Taiwan's average water tariff is the 3rd lowest in the world. Thus, besides construction, TWC has to enhance its water management ability for increasing efficiency of water loss reduction and reducing budget expenditure. Smart Water Management Systems are the powerful tools. When the infrastructures, including GIS, sensors, communication systems, and SCADA systems, are implemented, we can integrate different data from different systems to enhance our abilities of analysis and decision-making.

TWC has developed smart water systems for several years. TWC's smart water management systems consist of GIS, Supervisory Control and Data Acquisition (SCADA) System, Water Quality Alarm System, Customer Service Center (CSC) System, District Metered Area (DMA) System, Automatic Meter Reading (AMR) System, Water Outage Announcement System, Water Supply Monitoring Information System, Water Advanced Data Analysis (WADA) System, and so on. With the advance of science and technology, most of the systems have become more automatic and mobile. There is also a shift towards increased use of mobile technology to provide information wherever and whenever needed.

Providing high standard service and high quality drinking water has been a goal that TWC has persistently pursued. TWC hopes to become a leader among domestic water utilities and keep pace with the best international water utilities.


第一區管理處供水狀況即時告示板



Flood Control Management in Taiwan (Case of Yuan-Shan-Tsu Flood Diversion Project)

Keelung river basin is located at East of New Taipei and Taipei cities which has 491 Km2 areas. The downstream area of river is very flat river valley with clouds of people lives along the river bank. The serious flood often attacked this area due to huge rainfall and very narrow river channel. The original dike system was designed for 50 years flood.

In order to reduce the damages from flood on this highly urban development area, the 200 years flood defense policy has been decided by center government after a series of flood from 1998 to 2001.

Usually the dike system is adopted for flood defense in Taiwan. However, in view of the constraints of difficulty to find land for upgrading large amount of bridges when raising the existing dike and the associated high costs and long construction period, for this project, the new concept was selected. Under the Great Taipei Area Flood Control Master Plan, apart from other facilities for flood control, the diversion tunnel system was considered and finally

▲ *Intake of Yuan-shan-tzu Diversion Channel*

selected to divert the flood from upstream of river for reducing flood at downstream river valley. This diversion scheme is much economical solution to compare with high dike system and more environments friendly to the nature of river valley.

The 200 years flood is 1620 cms of Keelung River basin. The basic flow of 310 cms was designed for the downstream of nature river system. The 1310 cms diversion system with 12 m diameter and 2480 m long concrete tunnel from the main river to East Sea was built at the location of Yuan-shan-tsu from 2002 to 2005. The budget of this diversion scheme is 200 million USD.

Upon completion of this Project, the water level has been reduced for 3 to 3.5 m under flood period, and 1 to 2 m lower at further downstream area. The Yuan-shan-tsu flood diversion system has been proved very successful after experiencing numerous floods. The possible flood damages were eliminated and the real estate prices highly increased. The 10th River Management Office of the Water Resources Agency was responsible for the implementation of the project as well as the operation and maintenance of the Diversion Channel.

▲*Outlet located on Shoreline*

Delegation List

Name : S. K. Jason CHANG

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Phone : +886-935178543

E-mail : skchang@ntu.edu.tw

Education :

- Ph.D., Department of Civil and Environmental Engineering, University of Maryland at College Park, Maryland, USA, May 1990.
- MSCE, Department of Civil Engineering, National Taiwan University, Taipei, Taiwan, June 1983.
- BS, National Chiao-Tung University, Hsin-chu, Taiwan, June 1981

Affiliation or Company Name : Department of Civil Engineering in National Taiwan University / Advanced Public Transport Research Center in NTU

Present Position : Professor / Director

- Visiting Professor in Shanghai Tongji University (2003), Nanjing South East University (2015) and Tokyo Tech (2017).

Specialty :

- Urban Mobility and Sustainability
- Transport Economics and Policy
- Intelligent Transport Systems (Public Transport and e-payment)

Experience :

- Advisor, Taipei City Government (Feb 1994~).
- Committee Member, Urban Design and Land development Committee, Taipei City Government (Jan 1995 ~Dec 2002).
- Director General, Advisory Office of Science and Technology, Ministry of Transport and Communications, Taiwan (July 2002~ August 2003).
- Advisor, China Urban Sustainable Transport Research Center (Excellence Center of Volvo Education and Research Foundations), China Academy of Transport Sciences, MoT (July 2006 ~)

- Invited Advisor, Low Carbon Travel in China Program, Ministry of Transportation, China, Sponsored by Global Environment Facility and collaborated by the World Bank (Feb 2015~ Sept 2017).
- Invited Advisor, China Sustainable Urban Transport Partner Program, National Development and Reform Commission, China, Sponsored by Global Environment Facility (June 2011~ Sept 2014).
- Invited Advisor on Urban Mobility, Ministry of Urban development, India (June 2006~ Nov 2012).

Consultancy :

- Taoyuan Mass Rapid Transit Ridership Evaluation and Development Strategies (Taoyuan Metro Corp.) PI for assessing ridership and performance in Taoyuan MRT and proposing strategies of promoting MRT services based on field surveys and mobile information.
- Low Carbon Travel Policy (Ministry of Transport, China; GEF and the World Bank): Advisor to the study on the policy development of active mobility and eco-mobility in China. It is also consisted of assessment on demonstrations of low carbon mobility services in selected Chinese cities.
- Driverless Bus Trials (Taoyuan City Government, Taiwan) Co-PI for conducting a trial of driverless shuttle bus in Agriculture Expo while potential market and business model are also explored in this study.
- Leaders of Sustainable Transport (CEPT University, India): Project Director for conducting training workshops for senior officers and leaders from Cities and India Ministry of Urban Development who are in charge of policy, planning, design and operation of urban transport systems.
- Top 10 Classic Cycling Routes in Taiwan (Executive Yuan, Taiwan): PI for conducting the campaign of selecting the Top 10 cycling routes in Taiwan. It also includes conducting a survey on more than 5,000 km bike tracks in whole Island and completed digitalization of 3,200 km bike tracks in 2015. Strategies for promoting the Cycling Routes together with low carbon tourism were also proposed.
- Public Transport Data Base Development (China Urban Sustainable Transport Research Centre of Excellence in China Academy of Transport Sciences, MOT; Volvo Research and Education Foundations): Advisor and Chair of reviewing

committee to China Urban Sustainable Transport Research Center conducting public transport data base in demonstrations in Beijing, Henan Province and Zhejiang Province. The demonstration project is an initiative for national public transport big data project.

- Design of Public Bike System (Yi-Lan County, Taiwan): PI for conducting the planning and design of public bike sharing system in which potential users, locations of rental stations and business models were proposed. Integration of public bike and public transport was also included in the project.
- Policy Planning of Livable City (Hsin-Ju City Government, Taiwan): PI for conducting the planning of policy and action plan for achieving goal of livable environment for Hsin-Ju City. Strategies for development of Walkable City Center were included in the planning while action plan for Public Bike System development is also proposed.
- Train the Trainer on Sustainable Transport Development in Asia (GIZ and ADB): Advisor and Lecturer for conducting training programs for selected trainers in Asian countries. Design training courses for trainees on active mobility, public transport and transit-oriented development.
- The Macau Light Rail System Feasibility Study (Macau Transport Bureau): Project advisor for providing advisory suggestions on system planning and integration policy. Also help of reviewing study results as well as participating in public hearing on LRT design in Macau.
- India Sustainable Urban Transport Program (Global Environment Facility; the World Bank; Ministry of Urban Development, India): Specialist for reviewing projects proposed by local city governments in development of various sustainable mobility programs, including cycling, BRT, intermodal stations and ITS applications.
- China Sustainable Urban Transport Partnership Program (Global Environment Facility; the World Bank; National Development and Reform Commission, China): Specialist for reviewing projects proposed by local city governments in development of various sustainable mobility programs, including pedestrian mall, cycling environment, BRT, intermodal stations and ITS applications.
- Public Transport Information Sharing Platform (Ministry of Transport and Communications, Taiwan): Co-PI in this national project in which all public transport modes, including high speed rail, conventional rail, freeway bus, regional bus, urban bus, taxi and ferry, etc.

- Eco-Mobility Festival Advisor (Kaohsiung City Government and ICLEI): Advisor for planning of related activities of cycling environment, multimodality, integration and advanced technology application in 2017 Eco-Mobility Festival co-organized by Kaohsiung City Government and Eco-Mobility Alliance of ICLEI Global.

Selected Publications and Patents :

1. Chang, S.K. and Narupiti, S., Collaboration of Electronic Toll Collection Systems in Taiwan and Thailand, Technical Report, May 2018.
2. Chang, S.K., Mobility as a Service Development in Taiwan, Invited Speech in Board of Directors Meeting of ITS World Congress, Singapore, May 16, 2018.
3. Chang, S.K., Planning of Mobility as a Service, Magazine of Institute of Civil and Hydraulic Engineering, 45(2), April 2018.
4. Chang, S.K., ITS for Safety and Sustainability, Invited Speech in the International Conference on Road Performance of Administration, Co-organized by the World Road Association and China Academy of Transport Sciences, April 24~26, 2018.
5. Chang, S.K., Chen, H. and Chen, Y.W., Willingness to Pay for Mobility as a Service, Presented in Annual Conference of Chinese Institute of Transportation, Dec 8~9, 2017.
6. Chang, S.K., Public Transport Information Sharing System, Invited Speech in Summit of Big Transportation Data, World Transport Convention, Beijing, China, June 5~8, 2017.
7. Chang, S.K. et al., Reform of Public Transport Network in Yilan County, Technical Report submitted for the Institute of Transportation, MOTC, Nov. 2017. (Best Technical Report Award)
8. Chang, S.K., Active Mobility in Taiwan, Invited Speech in Scientists for Cycling Colloquium, Co-organized by University of Aveiro and European Cyclists' Federation, Nov 18~20, 2016.
9. Chang, S.K., Chen, J. and Chen, Y.W., Motorcycle Management in Taiwan, Published and presented in WCTRC, Shanghai, China, July 11-14, 2016. (Best Paper Award)

10. Chang, S.K. and Hsieh, W.H., Applications of EasyCard Big Data for Public Transportation Management, Presented and Published in the Annual Conference of Institute of Transportation, Taiwan, Dec 2~3, 2015.

11. Chang, S.K., Public Private Partnership Approach for Taiwan High Speed Rail System, Invited Speech in Symposium on High Speed Rail Development, National Economic Commission, India, April 10~12, 2015.

12. Chang, S.K. et al., Performance Evaluation on Electric Buses, Technical Report submitted for Institute of Transportation, Ministry of Transportation and Communications, Taiwan, Nov. 2014.

13. Chang, S.K. and C.H. Wu, GPS Taxi Development, Presented and published in the 20th World Congress on ITS, Tokyo, Japan, Oct 14~18, 2013. (Best Paper Award)

14. Chang, S.K. and Sun, T.S., Optimization of Stop Pattern and Schedule of High Speed Rail, Journal of Transport Planning, 42(1), March 2013. (Best Technical Paper Award)

15. (Prof Chang has 140 academic papers, 160 conference papers, 200 technical reports and 5 patents.)

Social Activities and Honors :

1. Board of Directors Member, ITS World Congress

2. Vice President of ITS Taiwan

3. Executive Director of Chinese Road Federation

4. Int'l Program Committee Member, ITS Asia Pacific Forum

5. Board of Directors Member, East Asia Society for Transport Studies (EASTS)

6. Vice Chair, Int'l Scientific Committee of EASTS

7. Advisory Board Member, Scientists for Cycling, European Cyclists' Federation

8. Excellent Achievement Award on BRT Development, Sub-committee of Public Transportation, China Institute of Civil Engineering. (2015)

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Education :

- Master degree in Institute of Information and Electronic Engineering, Taiwan National Central University (1986)

Affiliation or Company Name : Baoruh Electronic Co., Ltd.

Present Position : Sales Dept. Vice President

Experience :

- Plan host of The Taiwan's first "Contactless IC card commercial system in Jinmen island's bus" (1999~2000)
- Moderator of Construction Program for "Taiwan Railway's Automatic Ticket Vending Machine System" (1996-)
- Project Management of "Taiwan Bus Smart Card Ticket Pilot program" (1999~2001)
- Project Management of "Southern Taiwan's Bus Contactless IC Card System" (2001~2003)
- Program Coordinator of "formulated Plan of Smart Card Standard Format in Public Transportation"
- Program Coordinator of "The IC card taxi meter and safety management system" (2002~2006)
- Program Moderator of "Smart Card System in Eastern Taiwan's Bus" (2008)
- Project Moderator of "Efficiency Technology Development for Multiple Smart Ticket Cards" (2007)

- Participated in the "Spec. of industrial standards for Smart Bus on-board equipment in Taiwan" (2009).
- Project Moderator of "The first set of national railway's multi-card auto-gate system" (2010~)
- Consultant of bus system construction plan in Taiwan, For more than 10,000 sets of "multi-card ticketing payment system" (2011~).
- Consultant of Taipei MRT for more than 1000 sets of "Multi-card payment equipment construction project" (2011~)
- Consultant of bus system construction plan in Taiwan, For more than 5,000 sets of "Bus Passengers information and Bus management system" (2011~)
- Program Coordinator of Formulated "Taiwan's Specifications and verification standards for the new generation of taxi meter" (2016)

Specialty :

- E-Ticketing product and system development
- Telematics product and system development
- Smart-Bus product and system development
- E-payment product and system development

Selected Publications and Patents :

- Taxicab New Billing Specification and Implementation Plan in Taiwan (2015)
- Multiple electronic ticket verification method based on dynamic priority (2012)
- Planning and Demonstration Plan for Public Transportation Security Management System (2006)

- Taiwan's First Contactless IC Smart Card Ticket System - Jinmen Transportation Card (1999)

Social Activities and Honors :

- Supervisor of TTIA (Taiwan Telematics Industry Association, 2016~)
- Director of TTIA (Taiwan Telematics Industry Association,2010 ~2016)

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Education :

- Tulane University USA, MBA

Affiliation or Company Name : LITE-ON Group

Present Position : General Manager, LEOTEK SBU

Experience :

- General Manager, LEOTEK
- Factory Director, HOENIXTEC Ltd. / Eaton Corporation plc
- Senior Manager, Foxlink Group
- Vice General Manager, ST Engineering Ltd.

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Education :

- Bachelor, Department of Electronic Engineering, National Taiwan Ocean University

Affiliation or Company Name : Taiwan Water Corporation

Present Position : Deputy Director, Department of Water Supply

Experience :

- Section Chief, Department of Water Supply, Taiwan Water Corporation
- Chief , Changhua Water Treatment Plant, Taiwan Water Corporation

Specialty :

- Water Treatment
- Water Supply Management

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Education :

- Master of Science in Urban Planning, NCKU, Taiwan
- Bachelor of Science in Urban Planning, NCKU, Taiwan

Affiliation or Company Name : Taiwan Water Corporation

Present Position : Section Chief, Department of Water Loss Management

Experience :

- Engineer, Department of Water Loss Management, Taiwan Water Corporation
- Engineer, Department of Water Supply, Taiwan Water Corporation
- Associate Technical Specialist, Transportation Bureau, Taichung City Government
- Engineer, Department of Intelligent Transportation System, THI Consultants Inc.
- Engineer, Department of Hydraulic and Water Resources Engineering, CECI Engineering Consultants, Inc.

Specialty :

- District Metered Area (DMA) planning
- Geographic Information System (GIS) planning
- Intelligent Transportation System (ITS) planning
- Urban Planning

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Education :

- Ph.D., University of Pittsburgh (USA)

Affiliation or Company Name : Water Resources Agency, Ministry of Economic Affairs (MOEA), Taiwan (R.O.C.)

Present Position : Deputy Chief Engineer

Experience :

- Director of 10th River Management Office, Water Resources Agency, Ministry of Economic Affairs (MOEA), Taiwan(R.O.C.)
- Water Resources Agency, Ministry of Economic Affairs (MOEA), Taiwan (R.O.C.)

Specialty :

Water Resources Management, Flood and Drought Mitigation, River Environment Improvement, Water Policy, Water Infrastructure

Selected Publications and Patents :

- Dong-Sin Shih1, Tai-Wen Hsu, Kuo-Chyang Chang, and Hsiang-Lan Juan, 2012: Implementing Coastal Inundation Data with an Integrated Wind Wave Model and Hydrological Watershed Simulations. Terr. Atmos. Ocean. Sci., Vol. 23, No. 5, 513-525. DOI: 10.3319/TAO.2012.05.03.01(WMH).
- Shao-Yang Huang, Jet : Chau Wen, Tian-Chyi J. Yeh, Wenxi Lu, Hsiang-Lan Juan, Chung-Min Tseng, Ju -Huang Lee, Kuo-Chyang Chang, 2011: Robustness of joint interpretation of sequential pumping tests: Numerical and field experiments. Water Resources Research. Vol. 47, Issue10. DOI: 10.1029/2011WR010698.

- Tai-Wen Hsu, Chyan-Deng Jan, Kuo-Chyang Chang, Swun-Kwang Wang, 2010: Analysis and prediction of riverbed changes using empirical orthogonal functions. Journal of Hydraulic Research. Vol. 44, Issue 4, 488-496. DOI: 10.1080/00221686.2006.9521700.

Social Activities and Honors :

- The Member of the Phi Tau Phi Scholastic Honor Society of the Republic of China.

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Education :

- March, 1988, Graduated with a Doctor of Philosophy in Hydraulics Engineering from the Royal Institute of Technology, Stockholm, Sweden
- September 1981, Diploma in Hydraulic Engineering with distinction from the International Institute for Hydraulic and Environment Engineering (IHE), delft, The Netherlands
- June 1976, Graduated with a Bachelor of Engineering in Hydraulic Engineering from National Cheng Kung University, Tainan, Taiwan

Affiliation or Company Name : ATE Energy International Ltd.

Present Position : Chief Technology Officer

Experience :

- Jan 2017, Chief of Technology Office, ATE Energy International Ltd.
- Feb 1992~ Oct 2016, President of SINOTECH Engineering Consultants, Ltd.

Specialty :

- Dam and Hydraulic Engineering
- Water Resources Planning
- Hydropower Engineering
- Coastal Engineering
- Groundwater Resources and Groundwater Hydraulics
- Industrial Zone Planning and Development
- Hydroinformatics

Selected Publications and Patents :

- Design of Yuan-Shan-Zi flood diversion Tunnel, Agency of water resources, Taiwan 2003.
- Design of Nan-His Dam for Bi-Hai Hydropower Scheme, Taipower Company, Taiwan, 1997-2001
- Design of Li-His Dam for Sun-Moon Lake Hydropower Scheme, Taiwan, Taipower Company, 1996-2001
- Emergent Safety Evaluation for Der-Ji Dam (180 m), Ku-Guan Dam (80m), Wu-Sher Dam (130 m), after Chi-Chi Earthquake(Mw=7.6), Taipower, Taiwan, 2000-2001
- Design of Intake Structure of Bao-Shan Reservoir, Taiwan,1999-2001
- Environment Flow regulation Study for Rivers of Taiwan, WRB, Taiwan, 2000-2001
- Rehabilitation of Shi-Kang Dam Damaged due to Fault activity of Chi-Chi Earthquake (Mw=7.6), CWRB, WRD, Taiwan, 1999-2001
- Safety Evaluation of Land Slide Dam at Tsao-Ling due to Chi-Chi Earthquake, WRD, Taiwan, 1999-2000
- Design of operation system for Fei-Chuei Reservoir (Vol=400 million M3), Taipei Government, Taiwan, 1999-2000
- Design of Flood Forecasting and Warning System of Cho-Shui River Basin, Taiwan, CWRB, WRD, 2000-2001
- Planning of operation system for Water distribution of Southern region of Taiwan, SWRB, WRD, 2000-2002 Design of Yuan-Shan-Zi flood diversion Tunnel, Agency of water resources, Taiwan 2003.
- Planning of Flood Forecasting and Warning System of North Java Flood Protection Project, Indonesia, 1997-2001
- Coastal Morphological Study of Yunling Coast, IDB, Taiwan, 1992-1999
- Larsen, I. & Kung, C-S, “Wave Forces induced instability of pipe resting on a sea bed - a laboratory experiment”, 1986, Royal Institute of Technology, Stockholm, Sweden

- Kung, C-S, “DAMMBROTT:Beraingar av resulterande flod och vattenstan dsvariationer”, presented at Seminarium om dammar och betong, 13 April, 1988 Stockholm, Sweden
- Kung, C-S, “Uncertainty in dam break flow simulation”, Nordic Hydrology, 20, 1989, pp. 249-256.
- Kung, C-S, “Uncertainty analysis in dam break flow simulation”, presented at seventh Congress of APD-IAHR (Asia Pacific Division-International Association of Hydraulic Research), 13-16 November, 1990, Beijing, China
- Kung, C-S & Wen, X-H, “The effect of conditioning locations on the uncertainty of mass transport simulation”, presented at Sixth IAHR International Symposium on Stochastic Hydraulics, 18-20 May 1992, Taipei, Taiwan, R.O.C.
- Yang, X-L & Kung, C-S, “Large-amplitude oscillation in closed surge chamber”, Journal of Hydraulic Research, Vol. 30, 1992, No.3, pp.311-325.
- Yang, X-L & Kung, C-S., “Research on surge-control facilities for hydropower plants in Sweden”, Proceeding of Hydropower ’92, 16-18 June, 1992, Lillehammer, Norway
- Yang, X-L & Kung, C-S., “Throttled type of air-cushion surge chamber”, presented at International Conference on Unsteady flow and fluid transients, 29 September - 1 October, 1992, Durham, UK
- Yang, X-L & Kung, C-S, “Stability behavior of air cushion surge tanks with throttling effect”, Journal of Hydraulic Research, Vol.30, No.6, 1992
- Harlem, J. & Kung, C-S., “Effect of parameter uncertainty on extreme flood simulation in Sweden”, Journal of Hydrology, 1992
- Kung, C-S & Yang, X-L, “Nonlinear stability of differential surge tank”, Journal of Hydraulic Engineering, ASCE, Vol. 118, No.11, November, 1992
- Kung, C-S & Yang, X-L, “Energy interpretation of hydraulic transients in power plant with surge tank”, Journal of Hydraulic Research, No. 6, 1993
- Wen, X-H & Kung, C-S, “Stochastic Simulation of Solute Transport in Heterogeneous Formations: A Comparison of Parametric and Non-Parametric Geostatistics Approaches”, Ground Water 31, pp. 953~965, 1993

- Kung, C-S, M.J.F, Stive & G. Toms, "Geomorphological Analysis of a Beach and Sandbar System", Proceeding of the twenty-fourth international conference of Coastal Engineering, October 23-28, 1994, vol. 2, pp. 1837-1848, Kobe, Japan
- Wen, X-H & Kung, C-S, "Implementation of the Constant Displacement Scheme in Random Walk", Computer & Geosciences, 22, pp. 369~377, 1996
- Kung, C-S and Shieh, C-K, "Geomorphological Analysis of Yunlin Coast", Proceeding of Second International Conference on Hydrodynamics, December 16-19, 1996, Hong Kong
- Kung, C-S, Ni, W-P & Chiang, Y-J, "Damage and Rehabilitation Work of Shih-Kang Dam", Proceeding of Seismic Fault Induced Failures, pp. 33~48, January, 2001, Tokyo, Japan
- Kung, C-S, Wu, S-J, Tsai, W-H & Tao F-C, "Groundwater and Surface Water Conjunctive Use Plan of Chuoshui Alluvial Fan in Taiwan", Proceeding of XXIX IAHR Congress, September 16-21, 2001, Beijing
- Kung, C-S, "Two-dimensional modeling of nearly horizontal flow with circulation", Design Report, 1982, The International Institute for Hydraulic and Environment Engineering (IHE), Delft, The Netherlands
- Kung, C-S, "Numerical simulation of free surface flow in two dimensions", Ph.D. Dissertation, March, 1988, Royal Institute of Technology, Stockholm, Sweden
- Kung, C-S, "Computer program TVDDAM user's manual", Royal Institute of Technology, March, 1990, Stockholm, Sweden
- Kung, C-S & Wen, X-H, "SKB-91:Stochastic continuum modeling of mass arrival at Finnsjo - Parametric and Non-parametric approaches", Swedish Nuclear Fuel and waste Management Company (SKB) Progress Report AR 90-40, November, 1990, Stockholm, Sweden
- Kung, C-S, Tao, F-C, & Tsai, W-H, "Planning for Surface Water and Groundwater Conjunctive Use in Chuoshui Basin", TPWCB, Taichung, 1998. (In Chinese)
- Kung, C-S, Wu, S-J, Yang, Q-Z, & Wen, Z-H, "Master Plan of Water Resources Development of Southern Region of Taiwan", Water Resources Bureau, Taipei, 1998. (In Chinese)

- Kung, C-S, Liao, Y-J & Yang, W-H, “Risk Assessment on Tsao-Ling Landslide Lake”, Water Conservancy Agency, 2000. (In Chinese)

Social Activities and Honors :

- Invite Speaker on Workshop of “Seismic Fault Induce Damage and Possible Remediation”, Tokyo University, Jan, 2001
- Research grant from J. Gust. Richert Fund for “Dam break flow simulation”, April, 1989, Stockholm, Sweden

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Education :

- Master

Affiliation or Company Name : Taipei City Government

Present Position : Section Chief, Taipei City Parking Management and Development Office

Experience :

- Engineer, Taipei City Parking Management and Development Office, Taipei City Government
- Sub-Section Chief ,Taipei City Parking Management and Development Office, Taipei City Government

Specialty :

- Information Management

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Education :

- Ph.D., Civil Engineering, UNSW, Australia
- B.E. (Hon), Environmental Engineering, UNSW, Australia

Affiliation or Company Name : Stantec Consulting Services Inc.
(formerly MWH Global)

Present Position : Deputy General Manager, TAIWAN / ASIA

Experience :

Over 18 years of professional experiences working throughout many parts of Asia Pacific region. Expertise include business and investment strategies on water and wastewater infrastructure, Public-Private-Partnership (PPP) or Private Sector Participation (PSP) projects, Project and program management, Water supply and quality management, Hydrodynamic modelling, and Business development and strategies.

Selected projects include :

- Consultancy Services on NRW (leakage) Reduction for Keelung, Taichung, and Kaohsiung Cities, Taiwan
- Condition Assessment for 800mm+ Water Supply Mains, Taiwan
- Wastewater Reuse Study for a data facility, Taiwan
- Water Consultancy Services for Jurong Island 2.0 Study, Singapore
- Penghu Ma-Kung 4,000 CMD Seawater Desalination Plant PM/CM project, Taiwan
- Water Reuse Planning for Hsinchu County, Taiwan

- Reliability Analysis for Taiwan's Regional Water Resources to Support Future Economic Growths, Taiwan
- Wet Utilities and Wetland Design for JiaXing Alliance Project, China
- Consultancy Services on Developing Environmental and Energy Data Management System for Wastewater Treatment Plants in 6 Industrial Parks, Taiwan
- Technical Due Diligence for Two Water Treatment Plants in North-Eastern China, China
- Water Park and Life-Support System (LSS) Design on Fosun's Atlantis Resort on Hainan Island, China
- Southern Ping-tung DMA Planning, Taiwan
- Jia-yi County DMA Planning, Taiwan
- Prospectus for water resources recovery business in a Middle East country
- Market analysis and strategic consultancy services for a Middle East government's representative office in Taiwan
- Private Sector Participation in the rehabilitation-operation-transfer (ROT) of Ping Ding WTP, Taiwan
- Thornleigh reservoir mixing and water quality modelling, Australia
- 3D Hydrodynamic modelling of Centennial Park reservoir, Australia

Selected Publications and Patents :

- Fisher I, Sathasivan A, Chuo PY, Kastl G, (2009), "Effects of stratification on chloramine decay in distribution system service reservoirs", Water Research, Vol.43, No.5, pp1403-1413.
- Chuo PY, Ball JE, Fisher I, (2003), "Thermal stratification in drinking water service reservoirs", Australian Journal of Water Resources, Vol.6, No.2, pp159-167.
- Wang YC, Fisher I, Chuo PY, Sathasivan A, Kastl G, (2003), "Modelling of mixing for a large drinking water service reservoir", Proceedings of NZWWA 45th Annual Conference, New Zealand, 15-18 September, 2003.

- Chuo PY, Ball JE, Fisher I, (2001), "Factors influencing water quality in service reservoirs", Proceedings of AWA 19th Federal Convention, 1-5 April, Canberra, Australia, Paper 118 on CD.
- Chuo PY, Ball JE, Fisher I, (2001), "Thermal stratification in drinking water service reservoirs", Proceedings of 6th Conference on Hydraulics in Civil Engineering, IEAust, pp159-167.
- Chuo PY, Ball JE, Fisher I, (2001), "Modelling water quality in drinking water service reservoirs", Proceedings of 6th Conference on Hydraulics in Civil Engineering, IEAust, pp185-193.Design of Flood Forecasting and Warning System of Cho-Shui River Basin, Taiwan, CWRB, WRD, 2000-2001

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Education :

- Ph.D., (2011), University of California at Los Angeles (Los Angeles, USA)
- M.S., (2001), National Cheng Kung University (Tainan, Taiwan)
- B.S., (1999), National Cheng Kung University (Tainan, Taiwan)

Affiliation or Company Name : Southern Region Water Resources Office, Water Resources Agency (WRA), Ministry of Economic Affairs (MOEA), Taiwan (R.O.C.)
Present Position : Junior Engineer

Experience :

- Junior Engineer, Southern Region Water Resources Office, WRA, MOEA (2011-Present)
- Engineer, Sinotech Engineering Consultants, Ltd. (2011)

Specialty :

- Hydrology, Hydrometeorology, Embedded sensor/Remote sensing, Data assimilation

Selected Publications and Patents :

- Wu, C.-C., and S. Margulis, 2013: Real-Time Soil Moisture and Salinity Profile Estimation Using Assimilation of Embedded Sensor Datastreams, Vadose Zone Journal, 12(1), doi: 10.2136/vzj2011.0176
- Wu, C.-C., and S. Margulis, 2011: Feasibility of Real-Time Soil State and Flux Characterization for Wastewater Reuse Using an Embedded Sensor Network Data Assimilation Approach, Journal of Hydrology, 399(3-4), 313-325, doi:10.1016/j.jhydrol.2011.01.011.

- Yu, P.-S., S.-T. Chen, C.-C. Wu, and S.-C. Lin, 2004: Comparison of grey and phase-space rainfall forecasting models using fuzzy decision method, Hydrological Sciences Journal, 49(4), 655-672.

Social Activities and Honors :

- Certificate of Procurement Personnel (2012)
- Certificate of Hydraulic Engineer (2003)

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Education :

- National Taiwan University (Master degree)

Affiliation or Company Name : Public Construction Commission Executive Yuan, Taipei, Taiwan

Present Position : Associate Technical Specialist

Specialty :

- Structural design
- Structural test technology

Selected Publications and Patents :

- Designing the Response Spectrum to Match Artificial Earthquake Records
- Research on Optimization of Design Parameters of Nonlinear Tuned Mass Damper

Social Activities and Honors :

- Professional Engineers Certificate (Structural engineering.)

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Education :

- Master of Business Administration, National University of Singapore, 1999
- Graduate, Civil Engineering Dept., National Taipei University of Technology (formerly, National Taipei Institute of Technology), 1973

Affiliation or Company Name : Chinese Institute of Engineers

Present Position : Deputy Secretary General

Experience :

- Senior Vice President, Sinotech Engineering Consultants Ltd.
- Consultant' Team Leader/ Advisor for a number of Urban and Rural Development, Environmental Engineering projects, financed by international financing agencies, such as IBRD, ADB, ICDF of Taiwan, etc.

Specialty :

- Management on Infrastructure Development Project
- Contract Management of Engineering projects
- Planning, Design and construction management of Water and Sewerage Systems
- Urban and Rural Infrastructure Development Planning

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Education :

- Master of International Business, California State University, 1999
- BA, General Business, University of Central Oklahoma, 1997

Affiliation or Company Name : Chinese Institute of Engineers

Present Position : Secretary

Experience :

- Specialist, Chinese International Economic Cooperation Association

MEMO

MEMO

The Chinese Institute of Engineers (CIE) is the most-historical and largest multi-disciplinary professional organization in Taiwan. Established in Guangzhou, China 1912, the CIE was temporarily suspended during World War II, and resumed its operation in 1951 in Taipei, Taiwan. Over the years, CIE has played a major role in national development and promoting the prosperity of Taiwan's economy and society. To date, CIE has more than 19,000 individual members and 86 organizational members. Regarding international engagement, CIE has gained members, such as, National Member to the World Federation of Engineering Organization (WFEO) since 1968, Member Economy to APEC Engineer in 2005, Member Economy to Federation of Engineering Institutions of Asia and the Pacific (FEIAP) in 2008, and Member Economy to the International Professional Engineers Agreement, IPEA (formally the Engineers Mobility Forum Agreement) in2009.

【CIE's Mission】

- To strengthen close ties and interactions with members and professional institutes worldwide.
- To advance the technology, expertise and professionalism in engineering.
- To enhance the welfare of people and society by introducing applied engineering

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