出國報告（出國類別：會議）

參加「2018 亞太環境技術交換虛擬中心（APEC-VC）」會議

服務機關：行政院環保署

姓名職稱：徐嘉欣分析師

派赴國家：越南會安

出國期間：107 年 10 月 24 日至 10 月 28 日

報告日期：108 年 1 月 15 日

目錄

參加「2018亞太環境技術交換虛擬中心（APEC-VC）」會議

出國報告

壹、 會議背景與目的

　　亞太環境技術交換虛擬中心(APEC-VC)為日本在西元1995年5月於亞太經合會(APEC)工業科技(IST)分組會議上首先提出，其宗旨在利用環境技術交換虛擬平臺分享，分享各經濟體於環保技術資訊，加速區域性環保技術合作，由韓國擔任秘書處，各經濟體成員一致同意計畫延續持續執行至2022年。

　　我國除辦理APEC-VC網站推廣工作，並於「環境技術交換虛擬平臺」提供至少200篇有關環境科技之研究、環保政策發展、環境科技或產品資訊等內容之英文環保月刊，增加本署於英文政策或法律修正之露出機會，另透過年度工作報告與重要議題討論，促進與各經濟體環境技術交流。

　　本次工作會議由越南經濟體主辦，於越南中部城市會安辦理實體討論，共計由韓國、越南、本國、菲律賓、馬來西亞、智利等6個國家參與此次會議，討論內容為各國線於開放課程（Massive Open Online Course，簡稱MOOC）的數位學習推展與，並針對APEC-VC發展的 RoadMap及MMOU(MEMORANDUM OF UNDERSTANDING FOR A MULTI-LATERAL COLLABORATION)之修改，討論後續推廣方向，各經濟體均對於韓國經濟體說明推展相關數位學習課程提升對於環境保護方向無意見，並討論希冀能強化各經濟體之間的技術、策略、方法等相關交流，並額外希望能有各國的專家參與，以期達到實際資訊交流效益，更討論各經濟體如何透過資訊科技提供對民眾服務，進而提升民眾對於環境保護的認知。

　　本國簡報主題，係以近來有鑑於民眾對於空氣品質重視為主要分享內容，以「The Air Quality Monitoring Data in Taiwan」英文簡報向各經濟體分享我國目前於空氣品質監測蒐集方式、種類、資料公開方式與應用等，並且如何應用物

聯網(Internet of Things, IoT)新興資通訊技術，提升環境治理及公眾服務品質，推動全方位發展環境品質物聯網的智慧化概念，終極目標希冀環境物聯網能成為智慧城市重要一部分，並強化空氣品質之時空監測。

貳、 會議過程

日　期	工 作 內 容 概 要
10 月 24 日(三)	（啟程）臺北到越南峴港，由峴港至會安。
10 月 25 日(四)	參加 2018 亞太環境技術交換虛擬中心(APEC-VC)工作組會議。 討論會議：包括開幕儀式、大合照，主要議程有三大項、Update from the VC Secretariat and member institutions、Panel discussions on "Exploring the demand and supply conditions for environmental e-learning in the APEC region"、Road Map for APEC Virtual Center Learning Platform。
10 月 26 日(五)	議程觀摩目前越南經濟體體，目前於廢污水及垃圾處理現況。
10 月 27 日(六)	自費參訪（不支領日支費）。
10 月 28 日(日)	（返程）自越南會安返回臺北。

「2018亞太環境技術交換虛擬中心(APEC-VC)會議」由越南經濟體主辦，於越南中部古城會安Hotel Royal Hoi An飯店舉行，本次我國參與人員為行政院環境保護署環境監測及資訊處徐嘉欣分析師。

一、 107 年 10 月 24 日工作會議：

工作小組會議地點在越南會安Hotel Royal Hoi An飯店會議室舉行，各經濟體參與會成員於上午10時前完成報到，依會議議程與會議資料進行實體會議討

論，會議議程與會議簡報詳如附錄。

（一）開幕儀式：

首先，由韓國KEITI主管代表韓國環境部致歡迎詞，並介紹各經濟體參與成員、拍攝會議合照。

（二）韓國秘書處簡報：

韓國代表Jaeyeon Choi介紹APEC-VC韓國秘書處的進度報告，簡報內容包括APEC-VC過去的活動以及未來規劃。

1、 韓國報告 PPSTI Center Guideline 說明於開放課程推展現況，以及目前已提供線上數位課程內容（包含 MOOC 課程內容、系統架構等），以及韓國環境數位學習的現況。

2、 2018-2022 年期間 APEC_VC Roadmap 擬定預計與各經濟體代表討論並進行討論之修改內容。

3、 說明 MMOU 預計討論範圍。

4、 各經濟體對於 APEC-VC 將 Gateway 網站轉變為大規模在線開放課程（MOOC）的策略轉換想法。

5、 詢問各經濟體後續擔任主辦國之意願，另外請各經濟體評估若規劃明年度於智利辦理會議之參與意願，以及預計希冀討論主軸內容。

（三）各經濟體簡報：

1、 我國：

我國代表徐嘉欣分析師以「The Air Quality Monitoring Data in Taiwan」英文簡報，簡報大綱針對本署空氣測站、系統、應用APP以、在IOT發展以及未來努力方向說明，說明空氣品質監測架構、目前分別可從「空氣品質監測網」、「環境資源資料開放平臺」、「環境資源資料庫」、「環境即時通App」和物聯網監測網路取得即時與歷史空氣品質資料。在臺灣空氣品質監測網站，最常被關注的資料為空氣品質指標：提供各測站每小時觀測空氣品質資料；次之為空氣品質預報：3日內空氣品質預報，「環境資源資料開放平臺」匯集46個機關及超過上千個環境資源資料，16個應用服務，提供即時更新、結構化JSON、XML、CSV檔

案格式及RESTful API服務，資料集以PM₂.₅空氣監測資料最常被應用，並且連續2年榮獲OKFN世界評比第1名。

除了「環境資源資料開放平臺」提供機器直讀之即時空氣品質資料服務外，在「環境資源資料庫」更綜整提供空氣品質歷史資料，以及應用「環境即時通APP」適地性提供所在區域之未來12小時的逐時預測空氣品質指標，透過單指滑動便可迅速查閱空氣品質過去、現在及未來狀況除了空氣品質小時預測趨勢圖，「環境即時通APP」也整合過去行動建議文字資訊，將建議資訊圖像化，以簡單直覺的分類圖示提醒民眾，針對不同狀態的空氣品質，採取對應的行動與防護措施。

2017年起應用物聯網(Internet of Things, IoT)新興資通訊技術，循序漸進建置物聯網系統，即時監控、分析環境數據，發展感測器研發進行國家級測站監測數據於廠商及研究單位自製感測器數據校正，以修正民間自訂發展的感測器因缺乏校正導致數據準確度問題，並進行「智慧環境治理：環境物聯網智慧執法應用」試驗，首波先驅測試計畫選定桃園觀音工業區，完成觀音工業區空氣品質感測物聯網設置，藉由密集感測、提供完整API機制於快速時間內與國家級測站，整合有持續性傳輸特性及資料傳輸方式多樣性數據匯流解析，人工智慧分析污染熱區標定與時點鎖定，啟動智慧稽查網格，布建每一臺感測器具備細懸浮微粒(PM₂.₅)、揮發性有機物(VOC)、溫度及濕度等項目之感測器，形成完整感測網。所布設感測網可提供高時空解析度之空氣品質數據，監測頻率可至分鐘等級，空間密度達街道等級，透過圖像化各感測點污染物濃度時序變化情形，經融合風速、風向數據分析，即可標定污染熱區及排放潛勢區，進一步經時空特徵分析，所得的資訊即可供稽查派遣作業運用，稽查作業前再將排放潛勢熱區內事業原料、製程等污染特性交叉勾稽，可讓稽查人員事半功倍有效率地查處污染。

導入群眾外包(Crowd Sourcing)，擴大資料蒐集層面，除布建環境感測器外，也將納入民間微環境即時空氣品質資訊，作為基礎資料來源，並於106年度大甲媽祖繞境期間辦理相關試驗。未來的目標是在四年內裝設10,500個空氣感測器，利用數據找出影響空氣污染的關鍵因子，預測未來空品走勢；藉由數據分析，

即時搜集各檢測站點的空品資訊，依據專家經驗和模型結果，建立正常和異常狀況判斷結果，即時警告，創造資料流動加值的正向回饋與公民參與。

2、 智利、越南、菲律賓、馬來西亞：

其他經濟體簡報內容多於因應數位學習所建置模組架構、應用軟體、課程管理功能與數位學習課程，在數位學習推展上自主數位學習成長率及所推動過程所遭遇困難，以及如何透過數位學習提升民眾對於環境保護的認知。

（四）討論與閉幕：

主要為Road Map未來5年調整及MOU的相關修訂，針對APEC-VC發展的Roadmap，討論後續推廣方向，各經濟體均對於韓國經濟體說明推展相關數位學習課程提升對於環境保護方向無意見，並討論希冀能強化各經濟體之間的技術、策略、方法等相關交流。

二、 107 年 10 月 25 日工作會議：

觀摩越南經濟體體，目前廢污水處理與廢棄物處理規劃相關機關，廢污水處理部分完成改善廢水排放與處理系統，以及加裝水質自動監測系統，以利廢污水處理。另外，透過垃圾廢棄物分類處理，部分回收的塑膠袋、醫療棉片及鐵碎等，因無法再生使用，目前規劃將其簡易填埋，因目前具有垃圾處理能力的業者較少，政府也積極推動相關鼓勵企業投入垃圾處理政策，以避免垃圾造成環境嚴峻污染、土地資源大量浪費。

參、心得與建議

一、 取用 APEC-VC 平臺上數位學習課程：

主辦單位（韓國）期望各經濟體能持續於APEC-VC平臺持續提供於環技資源資料推動政策資料，請各經濟體提供於環境保護數位學習重視議題內容，並建議各國經濟體可取用APEC-VC平臺上數位學習課程之MOOC課程內容。

二、 同意 Road Map 修改：

此次修改Road Map除集中於技術及專家的交流分享，亦同意於推展相關數位學習課程提升環境保護方向，並定期召開實體工作會議，以擴大多方交流與學習。

三、 邀請其他國家擔任主辦國：

主辦單位（韓國）詢問各經濟體後續擔任主辦國之意願，並請各經濟體評估若規劃明年度於智利辦理會議之參與意願，以及預計希冀討論主軸內容。

肆、會議照片

圖1　各國經濟體代表合照

圖2　韓國經濟體開場致詞

圖3 越南經濟體開場致詞

圖4 參訪越南經濟體廢污水處理

圖 5　越南經濟體廢污水處理

圖 5　越南經濟體廢棄物處理

2018 APEC - VC WORKSHOP

October 25 - 26, 2018 - Danang, Vietnam

2018 APEC VC WORKSHOP

October 25 – 26, 2018 – Da Nang, Viet Nam

PROGRAM

TIME	CONTENT
10:00 – 10:15	Welcoming Remarks *National Agency for Science and Technology Information* *Korea Environmental Industry and Technology Institute* Introduction of participants Group photo
10:15 – 10:30	*Coffee Break*
Session 1	**Update from the VC Secretariat and member institutions**
10:30 – 12:00	**Update from the VC Secretariat	KEITI** PPSTI APEC-VC as APEC Center Change of APEC-VC Operational Strategy **Update from member institutions** Vietnam	NASATI Chinese Taipei	EPA Chile	University of Chile Malaysia	University of Malaysia Philippines	ITDI DOST
12:00 – 13:30	*Lunch*
Session 2	**Panel discussions on** *"Exploring the demand and supply conditions for environmental e-learning in the APEC region"*
13:30 – 15:30	Vietnam – Demand and supply for environmental e-learning at the Vietnam research and education network Malaysia – Demand and supply for environmental e-learning in universities Chinese Taipei – Demand and supply for environmental e-learning for workplace KEITI – Providing national online learning services and prospects for international cooperation
15:30 – 16:00	*Coffee Break*
Session 3	**Road Map for APEC Virtual Center Learning Platform**
16:00 – 17:30	Establishment of blueprint and schedule
17:30 – 18:00	Closing Remarks
18:30 – 20:00	*Dinner*

CONTENTS

THE REPUBLIC OF KOREA

Update from the Secretariat

APEC Virtual Center for Environmental Technology Exchange
Secretariat(Korea Environmental Industry and Technology Institute)
2018 APEC-VC Workshop, Vietnam
October 25-26th, 2018

APEC-VC as Specialized APEC Center

Asia Pacific Energy Research Center	APEC Sustainable Energy Center	Asia-Pacific Finance and Development Center	APEC (Pilot) Public-Private Partnership Center
EWG	EWG	FMP	FMP
APEC Learning Community Builders	APEC Higher Education Research Center	APEC Harmonization Center	Health Science Academy
HRDWG	HRDWG	LSIF	LSIF
APEC Biomedical Technology Commercialization Training Center	APEC Marine Sustainable Development Center	APEC Oceans and Fisheries Information Center	APEC Marine Environmental Training and Education Center
LSIF	OFWG	OFWG	OFWG
	APEC Center for Technology Foresight	APEC Climate Center	Asia Pacific Center for Theoretical Physics
	PPSTI	PPSTI & EPWG	PPSTI
APEC Cooperation for Earthquake Simulation	APEC Research Center for Typhoon & Society	APEC Research Center for Advanced Biohydrogen Technology	APEC Virtual Center for Environmental Technology Exchange
PPSTI	PPSTI	PPSTI	PPSTI
APEC Mentoring Center for the Gifted in Science	APEC SME Innovation Center	The SME Crisis Management Center	APEC International Center for Sustainable Tourism
PPSTI	SMEWG	SMEWG	TWG
APEC Green Supply Chain Center			
CTI			

PPSTI Center Guideline

Pursue PPSTI missions
- Terms of Reference
- Strategic Plan

Follow APEC Guidelines
- APEC Publications Guidelines
- APEC Logo Guidelines
- Guidelines for Hosting APEC Meetings
- APEC Sponsorship Policy and Guidelines
- Guidebook on APEC Projects

Cooperate with other centers
- PPSTI Centers Cooperation Conferences (once in 2 yrs)

Reporting Obligations
- Presentations at PPSTI meetings annually
- Review Report (every 5 yrs)

Change of Operational Strategy

- From environmental technology exchange to e-learning platform for environmental education
    - Providing free online courses for professionals and students on environmental technologies

- Before changing the strategy, the Secretariat sought opinions for participating organizations and the following agreed to participate in the new endeavor
    - Environmental Protection Administration (Chinese Taipei)
    - Department of Science and Technology (The Philippines)
    - Korea Environmental Industry and Technology Institute (Korea)
    - National Agency for Science & Technology Information (Vietnam)
    - University of Malaysia (Malaysia)
    - University of Chile (Chile)

PPSTI 12

▶ Reported about the change of operational strategy at the 12th APEC Policy Partnership on Science, Technology and Innovation (PPSTI) Meeting

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Change of Strategy approved as of October 15th, 2018

Embarking on a new phase of APEC Virtual Center

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Objective of this workshop

- To gather opinions on the change of operational strategy
  - *Written form distributed to all participants*
    - *Please complete it and submit it to the Secretariat at the end of today's meeting.*

- To know the current status and needs of online environmental learning courses of our participating organizations
- To survey the demand of environmental e-learning in participating economies as well as other APEC economies
- To come up with a roadmap to pursue this operational change
- To prepare for APEC 2019 in Chile

Thank you

ENVIRONMENTAL E-LEARNING IN KOREA

Korea Environmental Industry and Technology Institute (KEITI)
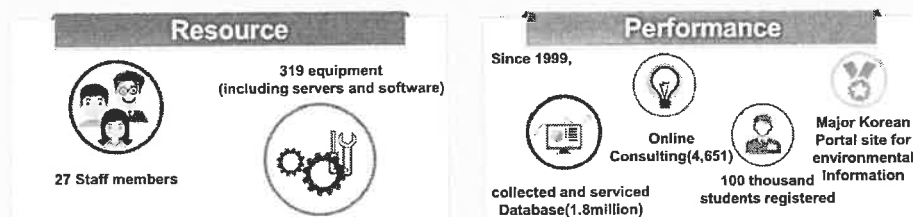Korea National Environmental Information Center (KONETIC)

KONETIC AND ENVIRONMENTAL INFORMATION

Overview

Korea National Environmental Technology and Industry Information Center

- Objective : To collect, process and distribute both domestic and overseas environmental information
- Goals : To support the growth of environmental technology and industry by sharing information
- History and Performance: Operation since 1999

Resource

27 Staff members

319 equipment
(including servers and software)

Performance

Since 1999,

Online Consulting(4,651)

collected and serviced Database(1.8million)

100 thousand students registered

Major Korean Portal site for environmental Information

KEITI

KONETIC websites

Operating 50 websites

- Eco-PLUS Research Management System
- R&D Card Management System
- Environmental R&D Research Information System
- Cyber Exhibition Center
- Soil Environment Technology Center

- Export Support Center
- Integrated Information Network for Overseas Environment
- Certified Environmental Impact Assessor Homepage
- ECOEXPO
- Environment Management of Information
- ECOTRADE
- ECOJOB
- Greencard Homepage
- Eco-label Homepage
- Green Product Information System
- Eco Venture Business Incubator Center

- Korea Environmental Industry & Technology Information Center
- Cyber Environment Education
- Loans Management System
- New Excellent Technology Information System
- New Excellent Technology Evaluation Management System
- Green Certification Homepage
- Green Certification Evaluation Information Sistem
- Human Resource Development for Environmental Technology
- Green Purchasing Voluntary Agreement
- Green Market
- ECO-EXPO KOREA
- Eco-labelling, LCI DB Homepage
- Green Company Designation System
- ENV-INFO SYSTEM
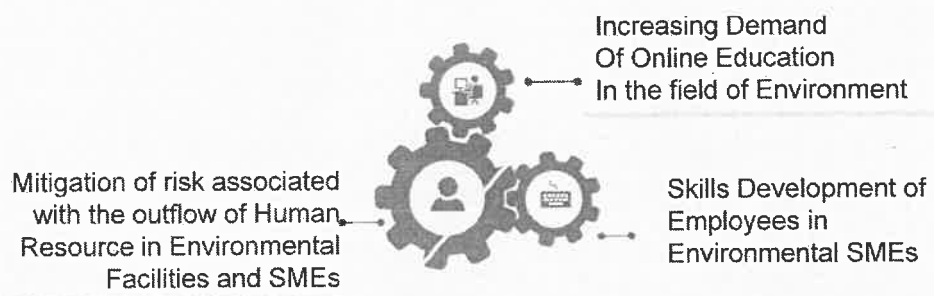- Eco-friendly Creative Economy

KEITI
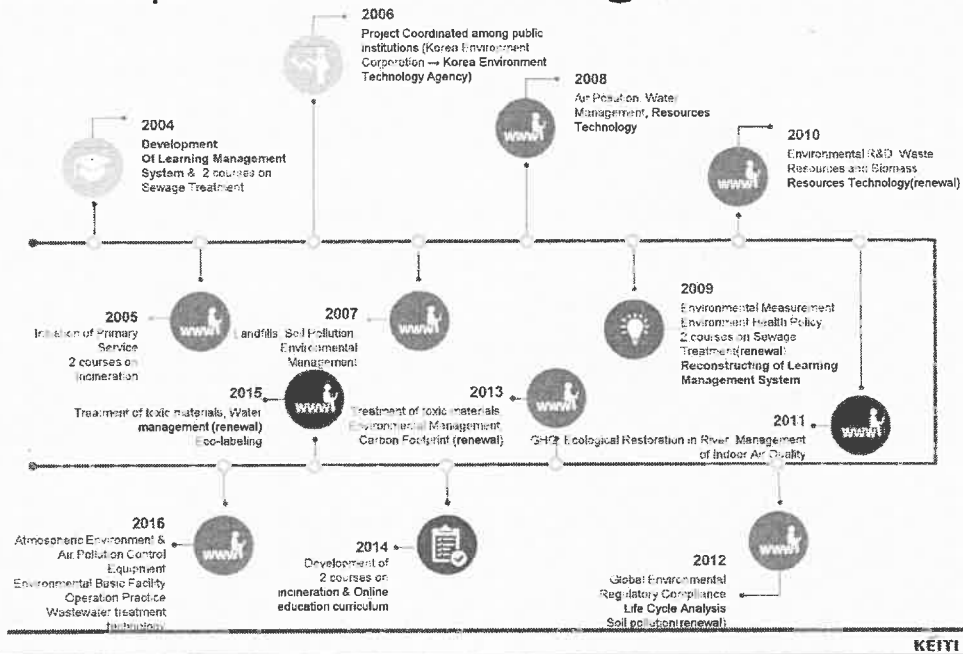
KEITI

ENVIRONMENTAL E-LEARNING IN KOREA

Overall Status

Objectives of the E-learning System

Increasing Demand
Of Online Education
In the field of Environment

Mitigation of risk associated
with the outflow of Human
Resource in Environmental
Facilities and SMEs

Skills Development of
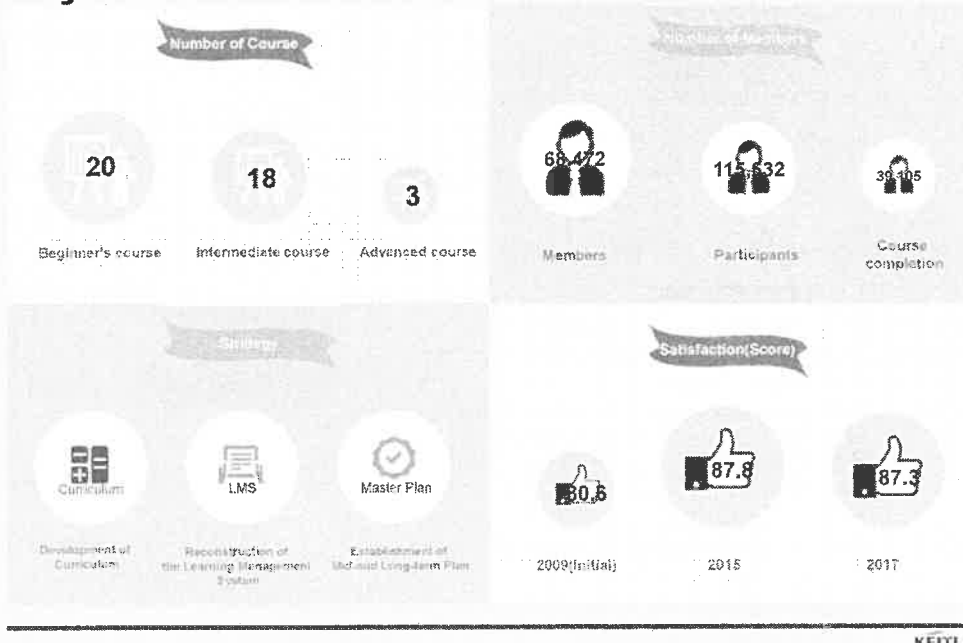Employees in
Environmental SMEs

Build an environmental knowledge distribution system to support the capacity building of environmental professionals

KEITI

Development of E-learning Platform

2006
Project Coordinated among public institutions (Korea Environment Corporation → Korea Environment Technology Agency)

2004
Development Of Learning Management System & 2 courses on Sewage Treatment

2008
Air Pollution, Water Management, Resources Technology

2010
Environmental R&D, Waste Resources and Biomass Resources Technology(renewal)

2005
Initiation of Primary Service 2 courses on Incineration

2007
Landfills, Soil Pollution Environmental Management

2009
Environmental Measurement, Environmental Health Policy, 2 courses on Sewage Treatment(renewal), Reconstructing of Learning Management System

2015
Treatment of toxic materials, Water management (renewal) Eco-labeling

2013
Treatment of toxic materials, Environmental Management, Carbon Footprint (renewal)

2011
GHG, Ecological Restoration in River, Management of Indoor Air Quality

2016
Atmospheric Environment & Air Pollution Control Equipment, Environmental Basic Facility Operation Practice, Wastewater treatment technology

2014
Development of 2 courses on incineration & Online education curriculum

2012
Global Environmental Regulatory Compliance, Life Cycle Analysis, Soil pollution(renewal)

Major Achievements

Number of Course

20	18	3
Beginner's course	Intermediate course	Advanced course

Number of Members

68,472	115,532	39,105
Members	Participants	Course completion

Strategy

Curriculum	LMS	Master Plan
Development of Curriculum	Reconstruction of the Learning Management System	Establishment of Mid-and Long-term Plan

Satisfaction(Score)

80.6	87.8	87.3
2009(Initial)	2015	2017

List of 41 courses

Beginning

- Management of Sewage Treatment Facilities
- Management of Livestock Manure Treatment Facilities
- Management of Incinerator Facilities
- Management of Landfill Facilities
- Soil Contamination Investigation and Remediation
- Environmental Management
- Air Pollution Treatment Technology
- Water Treatment Technology I
- Water Treatment Technology II
- Environmental Measure and Analysis
- Environmental Health Policy
- Climate Change Response
- Technology for Energization of Waste Resource and Biomass
- Environmental Research & Development for Beginner
- Environmental Infrastructure Operation
- Discharging Store Investigation and Licensing
- Waste Reduction and Recycling Technology
- Environmental Dispute Mediation
- Toxic Chemicals Management
- Eco Labelling

Intermediate

- Sewage Treatment Technology
- Incinerator Treatment Technology
- Wastewater Treatment Technology
- River Ecological Restoration Technology
- Indoor Air Quality Manager
- International Environmental Regulation Correspondence Consulting
- Life cycle Assessment Theory and Practice
- Safety Management of Asbestos Containing Building
- Environmental Spatial Information Theory
- Drinking Water Quality Analysis
- Environmental Impact Assessment
- Environmental Infrastructure Installation
- Noise and Vibration Measuring and Control Facility
- Atmospheric Environment and Air Pollution Control Facility Management I

Advanced

- Carbon Footprint
- Greenhouse Gas Practitioner
- Greenhouse Gas Practitioner Intensive

KEITI

ENVIRONMENTAL E LEARNING IN KOREA

Operations

Course Operations

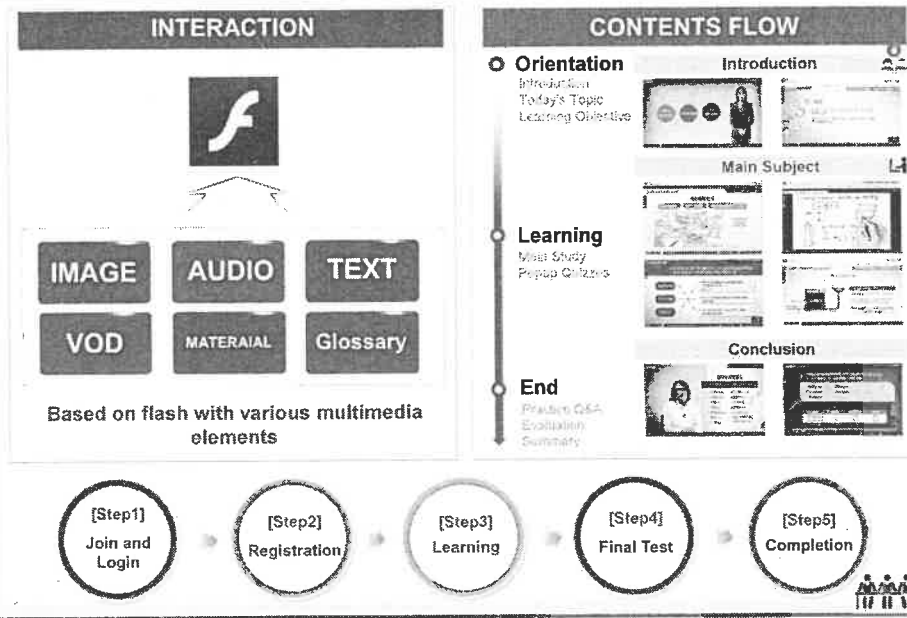| Pilot Courses	Regular Courses	Open Courses	Group Training
• Testing for errors • 1~2 courses per year	• 41 courses(beginner, intermediate, advanced) • Tests and discussions • 10,000~15,000 students registered per year	• 20 courses of top demand • Without tests or discussions • 5,000 students per year	• On-demand courses for group training

KEITI

Student Management

Learning Management
- E-Teacher
  - For 23 courses
  - 13 professionals
- Frequent Communication
  - Newsletters
  - Text messages

Student Motivation
- Events
  - Course evaluations
- Learning mileage
  - Points awarded for course completion and outstanding performance

Follow-up
- Satisfaction Survey
  - Improvements based on the VOC(Voice of Customers)

KEITI

10

Operational Techniques

INTERACTION

IMAGE AUDIO TEXT

VOD MATERAIAL Glossary

Based on flash with various multimedia elements

CONTENTS FLOW

○ Orientation — Introduction
  Introduction
  Today's Topic
  Learning Objective

○ Learning — Main Subject
  Main Study
  Popup Quizzes

○ End — Conclusion
  Product Q&A
  Evaluation
  Summary

[Step1] Join and Login → [Step2] Registration → [Step3] Learning → [Step4] Final Test → [Step5] Completion

KEITI

Sample Contents

Opening

Atmospheric Environment & Air Pollution Control Equipment

Main Contents

대기의 조성

공기
(살랑박)

INTERNATIONAL COOPERATION

On Environmental E-Learning

Cooperation with the World Bank Group

Raising awareness of environmental issues and strengthening the capacity of experts in the field of environment by distributing online courses

World Bank OLC — Open Learning Campus — THE WORLD BANK
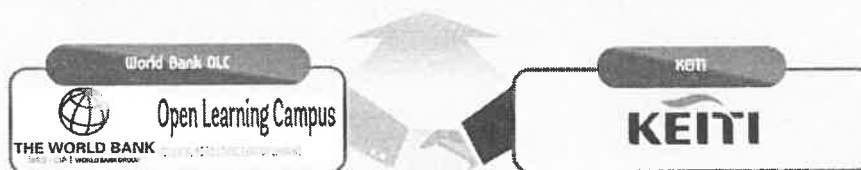
KEITI

- KEITI and World Bank co-developing 2 modules of online courses
  - "Introduction to Water Quality Management"
  - Prevention and Remediation of Water Quality Contamination
- The course materials are from both the KEITI e-learning platform and the US EPA
- Expected to contribute to raising awareness and building capacity of decision makers and professionals in the field of water quality management in World Bank client countries

KEITI

APEC-VC as the environmental e-learning hub in the APEC region

∨

- Possibilities of Cooperation
  - *Survey the demand of the APEC-VC members on environmental e-learning to provide the most demanded courses*
  - *APEC-VC members to provide courses of their advanced environmental contents*
  - *Create an open learning platform for anyone to join and take the courses*

Thank you.

VIETNAM

Roadmap for APEC-VC

Objectives and Focus areas

- Who are the target audience?

* What should be the focus area of the first phase?

  - APEC-VC Secretariat suggests putting forth an *online survey* to academia, public & private sector of our member economies

    - Sample questions :
      - What would you like to learn?
      - What kind of information do you need?
      - What method of teaching do you prefer?

Action Plans

- Steps
- Applying for funds
- Preparation for APEC Chile 2019
- Offline Meetings
- Actual Development of courses contents and system

Draft Roadmap

Timeline/ Actions	2018 Fall	2018 Winter	2019 Spring	2019 Summer	2019 Fall	2019 Winter	2020	2021	2022	2023
APEC-VC Workshop	Vietnam		Next host for 2019				Annual			
APEC-PPSTI Meeting				PPSTI 13 (Chile)	PPSTI 14 (Chile)					
Survey Demand (*online)			Online survey through APEC-VC							
Procurement of Funds			APEC PPSTI fund (Chile)		Other efforts?					
Contents Development										
System Development										
Launching Service										
Offline Network events										

2018 APEC-VC WORKSHOP
Danang, October 25-26

Nguyen Manh Quan
Director of Center for S&T Information And Statistics
National Agency for Science & Technology Information

Changing the operational strategy

- Development of internet in member economies
- Vast information on environmental technology on the World Wide Web

Problems:

- Sharing/Exchanging information
- No experience of servicing e-learning courses on environmental technology
- Etc..
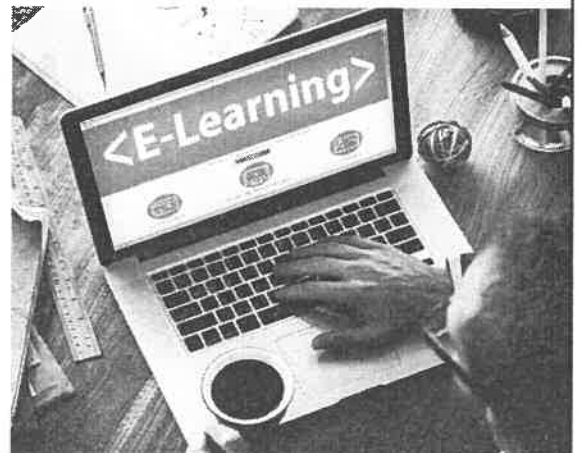
Operational Plans:

- Survey the demand
- List of organization for environmental industries (R&D, services, manufacturers...)
- Workshop
- Promoting campaign
- Case studies on development of environmental technology and industry

Status

JAN 2018 VIETNAM A SNAPSHOT OF THE COUNTRY'S KEY DIGITAL STATISTICAL INDICATORS dammio.com

TOTAL POPULATION	INTERNET USERS	ACTIVE SOCIAL MEDIA USERS	MOBILE SUBSCRIPTIONS	ACTIVE MOBILE SOCIAL USERS
96.02 MILLION	64.00 MILLION	55.00 MILLION	146.53 MILLION	50.00 MILLION
URBANISATION 35%	PENETRATION 67%	PENETRATION 57%	PENETRATION 153%	PENETRATION 52%

VinaREN
www.vinaren.vn

Vietnam Research and Education Network

TO:

- ✓ share science and technology information;
- ✓ promote the application activities;
- ✓ collaborate on research and education

Growth rates in self-paced e-learning in Vietnam, 2011-2016

2011-2016 Top Ten Growth Rates by Country

ASIA
$7.1B
2013 Revenues

17.3%
Annual growth rate

$11.5B
Revenues by 2016

Source: docebo, E-learning Market Trends & Forecast 2014-2016 Report

Environment status in Vietnam

Sources of Polution:

- 283 industrial zones,
- 615 industrial clusters,
- > 500,000 manufacturers,
- > 3,500 mining, construction materials enterprises,
- > 5,000 traditional craft villages,
- > 13,500 medical establishments,
- 2 million cars, 40 million motorbikes,
- > 36 million livestock and poultry,
- > 1 million hectares of aquaculture...

Environment status in Vietnam

Wastes:
- > 23 million tons of household waste
- > 7 million tons of industrial solid waste,
- > 630,000 tons of hazardous industrial waste,
- > 17,000 tons of hazardous medical waste.
- > 100,000 tons of plant protection chemicals are used, of which 80% are used incorrectly,

50% -70% of these chemicals are not absorbed or disposed of by the plants:

- 76 million tons of straw,
- 85-90 million tons of animal waste,
- 80 million tons of air emissions ...
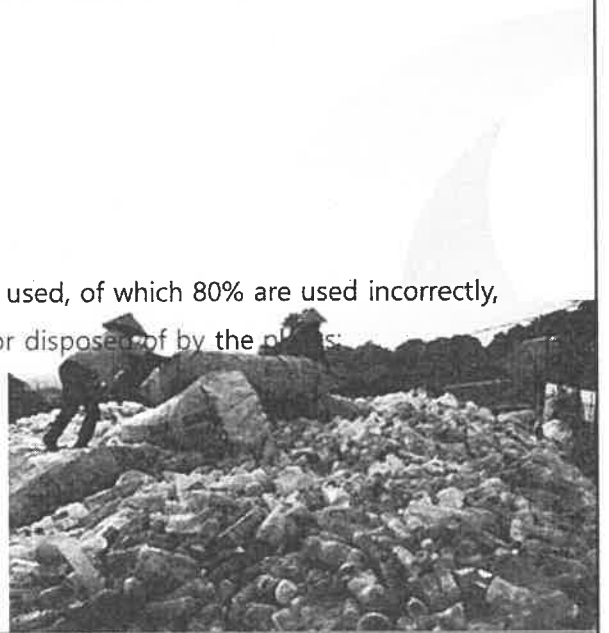
Environmental Industries

Vietnam has more than 900 enterprises operating in Environmental Industry

- Manufaturing:
Ordinary, industrial, medical and hazardous solid waste incinerators;
Dust collection system, waste sorting line and specialized waste transportation equipment

- Services:
➢ 100 enterprises operating in the field of drainage and waste water treatment;
➢ 473 enterprises provide solid waste treatment services;
➢ ~ 90 enterprises operating in the field of hazardous waste treatment.

The capacity of the environmental industry:
- between 2% and 3% of the demand for urban waste water treatment;
- 15% of the demand for solid waste treatment;
- about 14% of hazardous waste treatment;
- Many areas of recycling such as waste oil, waste plastic, electronics waste, ... are almost undeveloped

National Environmental Protection Strategy to 2020, vision to 2030

4 orientations to protect the environment:

- To prevent and control sources of environmental pollution;
- To renovate and restore the environment of polluted and degraded areas,
  step up the supply of clean water and environmental sanitation services;
- Effective and sustainable exploitation and use of natural resources,
  nature conservation and biodiversity;
- Building capacity to cope with climate change, mitigating greenhouse gas emissions

Thank you for your attention!

E-learning – one of advance training methods

Nguyen Hong Van
PhD. in Computer and Systems Science
Director of Center for National Database on
Science and Technology

Hoian – 10/2018

CONTENS

- ❖ E-learning introduction
- ❖ E-learning model.
- ❖ E-learning Software
- ❖ E-learning Development at Vietnam,
- ❖ E-learning Development at VNU-HCM
- ❖ E-learning Development at HUST
- ❖ Asi@connect introduction
- ❖ E-learning Development at NRENs
- ❖ VinaREN
- ❖ VinaREN with E-Learning

2

E-LEARNING INTRODUCTION

❖ E-learning definitions
  ❑ E-Learning is a term used to describe the learning and training based on information technology and communications (**Compare Infobase Inc**)
❖ The type of information exchange in e-Learning
  ❑ One – One
  ❑ One – Many
  ❑ Many - Many
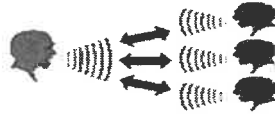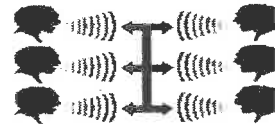
E-LEARNING INTRODUCTION

❖ Features of the e-Learning
  ❑ Advantages of the e-learning

❖ Features of the e-Learning
  ❑ e-learning implementation challenges
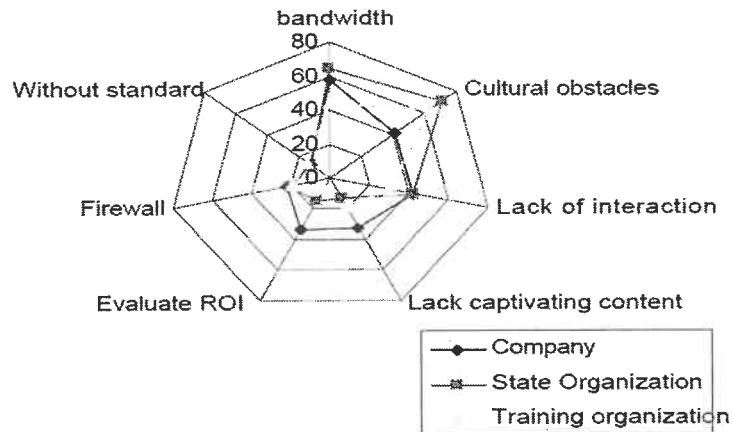
❖ General Model of an e-Learning System
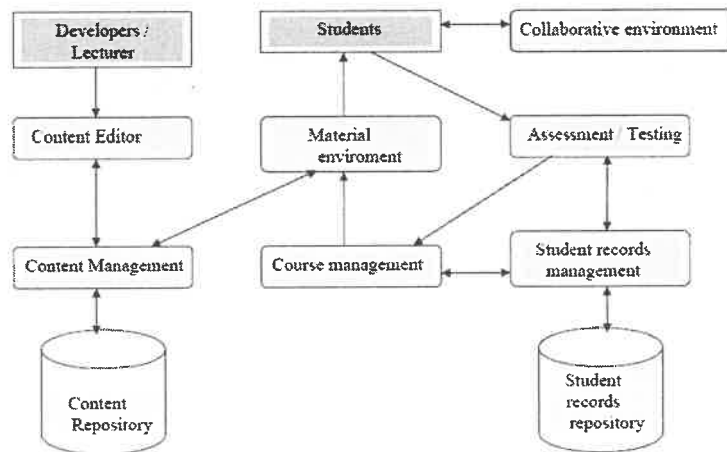
E-LEARNING SOFTWARE

❖ Generally, a typical e-Learning system includes the following modules:
  - Distant Learning System
  - Business Management System
  - Student Management System
  - Student Information Service System
  - Groupware System
  - Content Building Area
  - Digital Library System
❖ Currently there is a lot of both commercial and open-source e-Learning software.
  - Commercial e-learning software: Cisco, HP, OutStart Evolution® 2005, Plateau LMS, etc.
  - Open-source e-leaning software: Moodle, Atutor, etc.

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E-LEARNING SOFTWARE

❖ Open Source e-leaning software: Moodle (Modular Object Oriented Dynamic Learning Enviroment)
❖ Moodle Software Architecture

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E-LEARNING SOFTWARE

❖ Open Source e-leaning software: Moodle
- o Moodle Software Architecture

Moodle (Core, Add-ons)		
Programming Language (PHP)	Database System (MySQL, MS SQL Server, Oracle PostgreSQL, Others)	Web Server (Apache, IIS)
Operating System (Linux, Window, Mac OS, Others)		

E-LEARNING SOFTWARE

❖ Open Source e-leaning software: Moodle
- o Typical University Systems Architecture
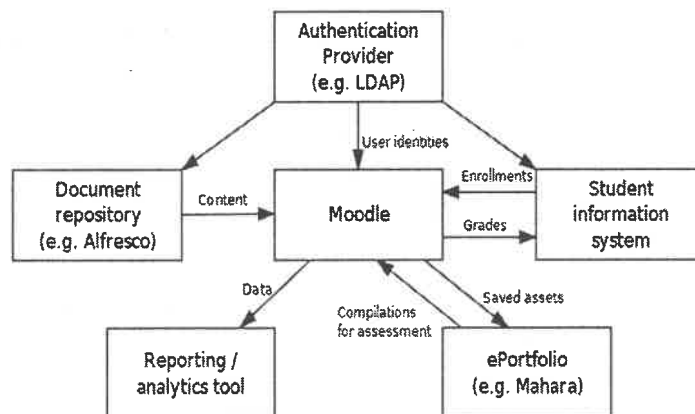
E-LEARNING DEVELOPMENT IN VIETNAM

❖ The VietNam Ministry of Education and Training aims to build a learning society in which our citizens (pupils, students, workers ...) can have an opportunity to study at any time, any where and life long learning. For achieving this goal, E-Learning is a key technology to create a virtual learning environment.

❖ Vietnam has joined the Asia E-learning Network (AEN), with the participation of the Ministry of Education&Training, the Ministry of Science &Technology, and the Ministry of Post & Telecommunications.

❖ In VietNam, many universities and colleges have been equipped with IT infrastructure, modern teaching equipments. They begin to gradually deploy e-Learning for their institution. Some online courses, online training opened.

❖ E-learning is one type of interested training in Vietnam. However, comparing to other countries in the world, E-learning in Vietnam is only at an early stage and many remaining works need to be done in order to catch up with other countries.

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E-LEARNING DEVELOPMENT AT UIT, VNU-HCM

❖ IT university is one of the universities in Vietnam using the online learning (or distant learning) for teaching.

❖ IT university has been working on the project **"The online advanced undergraduate program"** since 2009 for training but has yet to be implemented due to various reasons. The fund for the first phase of the project is around 800.000 USD.

❖ IT university already had trips to the e-learning center of other universities such as University of Oklahama, University of Arkansas, University UHCL (USA) ...

❖ Currently, IT university uses Moodle software as a communication channel between students and teachers. It also supports online training for students at the IT University. Website: http://courses.uit.edu.vn

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## E-LEARNING DEVELOPMENT AT UIT, VNU-HCM

❖ Website: http://courses.uit.edu.vn

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E-LEARNING DEVELOPMENT AT HUST

❖ HUST is one member of Asean Cyber University
❖ CLMV= Cambodia, Lao, Myamar, Vietnam
❖ E-Learning Centers are in ACU's institution member:
   o Seoul Cyber University (Korea), Myanmar University of technology (Myanmar), Cambodia ITC (Cambodia), Laos NUOL (Laos), HUST (Vietnam)
❖ Connectivity via commercial line is difficult and non efficient
❖ Connect based on TEIN network to exchange:
   o Video, audio, course, direct interaction

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E-LEARNING DEVELOPMENT AT HUST
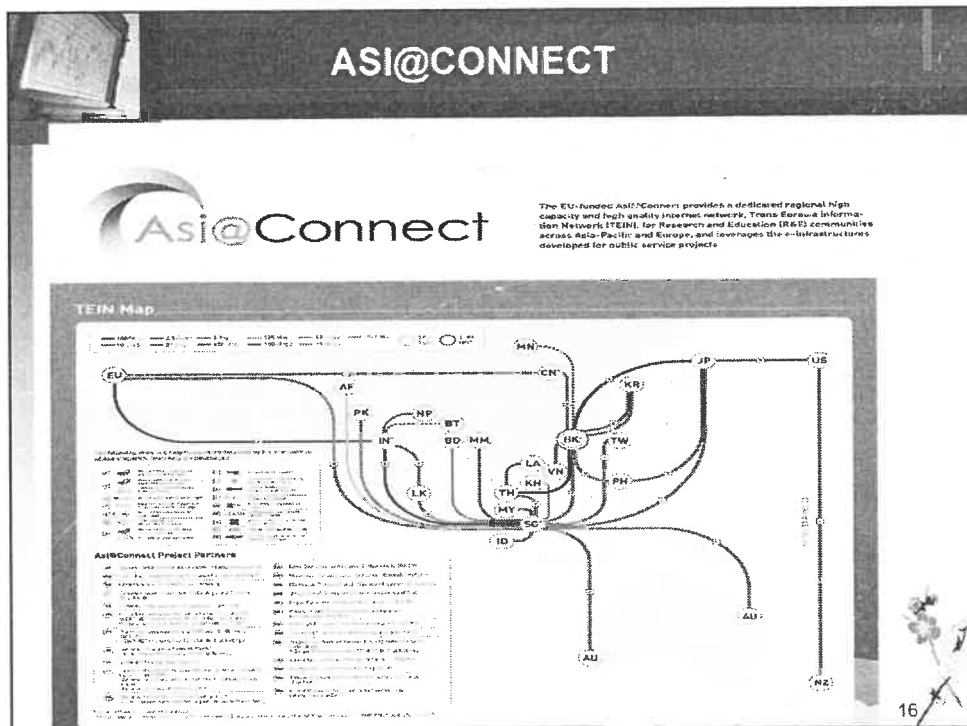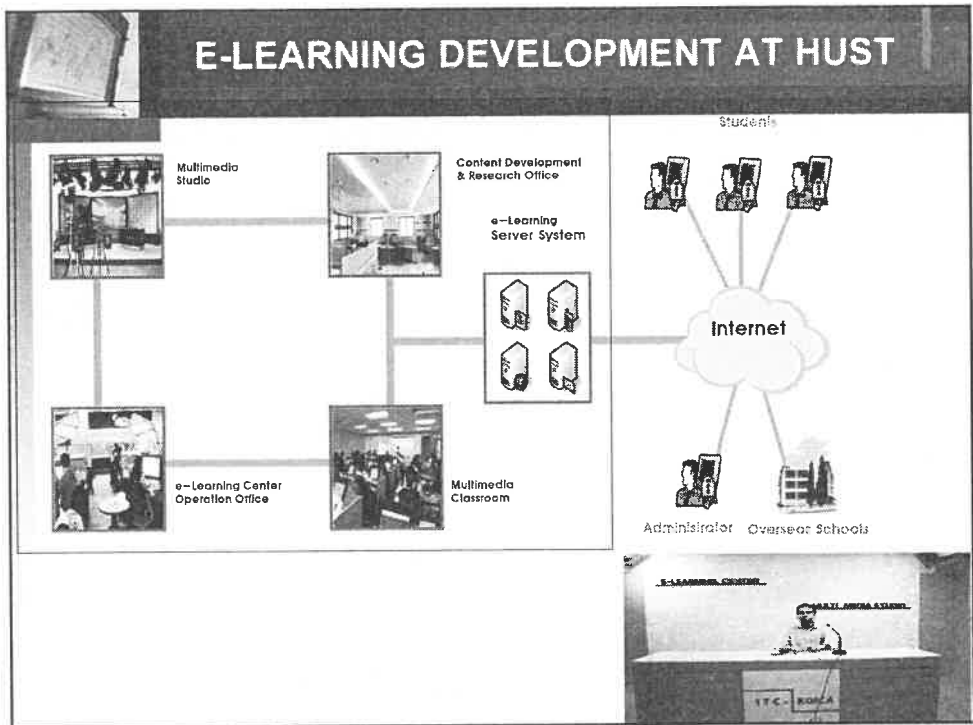
ASI@CONNECT

ASI@CONNECT

❖ The Trans-Eurasia Information Network (TEIN) has been funded by the EU in 4 phases in 2000, 2003, 2008 and 2010-2016. The project Asi@Connect is the fifth phase of TEIN. The implementing partner is TEIN Co-operation Center Foundation (TEIN*CC). Asi@Connect lasts 60 months starting from September 1, 2016.

❖ Asi@Connect is connected with GÉANT (EU) which is connected with other global e-infrastructures in Central Asia (CAREN), China (ORIENTplus), the Eastern Mediterranean rim (EUMEDCONNECT), Africa (AfricaConnect), Latin America (ALICE2 now RedCLARA) and the Caribbean (C@ribNET). These e-infrastructures are only for R&E purposes, suitable for the fast and reliable exchange of big packages of data. They are connecting research and higher education institutes to each other.

❖ Asi@Connect has more than 55 million users and is reaching out to more than 60% of the world's population.

❖ The key stakeholders are the national governments of 24 participating countries and territories, including

❖ Afghanistan, Bangladesh, Bhutan, Cambodia, Laos, Myanmar, Nepal,India, Indonesia, Mongolia, Pakistan, Philippines, Sri Lanka, Vietnam, China, Malaysia, Thailand, Australia, Hong Kong, Japan, Singapore, South-Korea, Chinese Taipei, New Zealand

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E-LEARNING DEVELOPMENT IN NRENs

❖ Bangladesh – Collaboration/regional partnership with other NRENs for education (Course Exchange, E-learning, and Local Tutorial) are planned for December 2015. The introduction of distance learning management system (LMS) using virtual classroom is planned for December 2016.

❖ Myanmar – In 2005, an E-learning system was established among 23 Computer Universities using iPStar Broadband Satellite (V-SAT). This system is no longer functional because of low bandwidth/slow internet connectivity. However, University of Technology at Yatanaporn, a planned city for ICT Hub has been running e-courses with financial and technical support of Republic of Korea since 2012.

❖ Mongolia – Mongolia has adopted the "ICT in Education Policy", the "Action Plan for 2012–2016" and is implementing a "New Millennium Education" project with high level of ICT   (Information & Communication Technology) content. An Education sector Data Centre has been established with the main purpose of developing content for e-learning courses.

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E-LEARNING DEVELOPMENT IN NRENs

- ❖ Pakistan – Under the "Virtual Education Project Pakistan (VEPP)" lectures via video-conferencing are delivered within Pakistan to 85 universities.
- ❖ Indonesia – E-learning is fast growing as a means to educate a geographically disperse student population. SEAMEO Regional Open Learning Centre in Indonesia has been running a variety of training programmes and e-course development to improve the quality of teaching and learning in schools since 1997.
- ❖ Thailand – E-learning is taking place with courses from universities in Japan, Korea and the USA. Thai Cyber University Project, implemented by the Office of Higher Education Commission has been implementing as a hub of open course wares, contributed by Thai universities in conjunction with Uni-Net.
- ❖ Korea – Seoul Cyber University (SCU) was established as the first on-line higher education institution in November 2000. From 2011 SCU has been selected as the implementing partner of the ASEAN Cyber University Project supported by Government of the Republic of Korea, that contribute the development of Asia e-learning.

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VINAREN
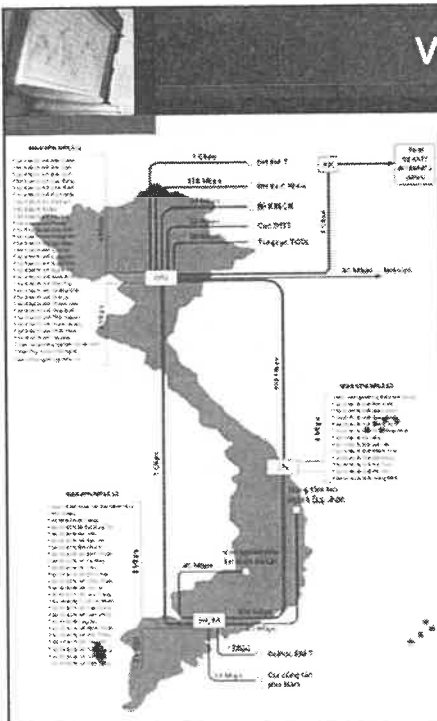
VinaREN

- ❖ Vietnam Research and Education Network (VinaREN) is the primary member of
  - APAN (the *Asia Pacific Advanced Network*)
  - TEIN 2/3/4 and Asi@connect.
- ❖ VinaREN connects Vietnam R&E community with R&E community in the world to:
  - share science and technology information;
  - promote the application activities;
  - collaborate on research and education.

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VINAREN

❖ **Number of member institutions(connected to your REN) :**
  ❖ 75 members including institutes, universities, Science and Technology Information centers, research institutions, learning resource centers

❖ **Backbone :**
  ❖ VinaREN national backbone is formed from the connection of three network operation centers (NOCs) located in HanoiDanang, Ho Chi Minh City.
  ❖ The members in 63 provinces and cities in Vietnam are connected with VinaREN via NOCs based on MPLS VPN layer 2 of service provider (Netnam - Viettel)
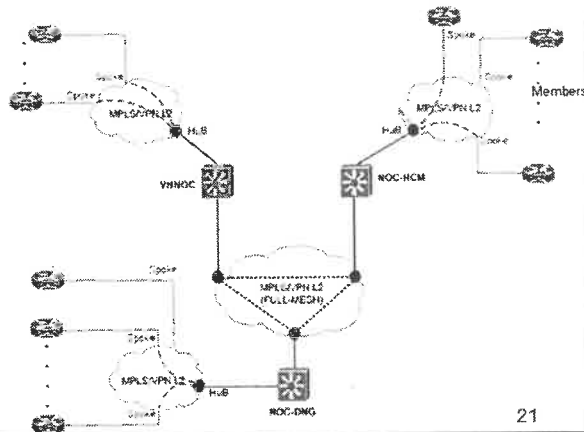
VINAREN WITH E-LEARNING

Support SOI-AI3 project:

Institutions join SOI-AI3 project (School of Internet và Asean Internet Interconnection Innitiatives Project) are:

  ❖ Đại học Bách khoa Hà Nội;
  ❖ Viện Hàn lâm Khoa học và Công nghệ Việt Nam;
  ❖ Đại học Quốc gia Hà Nội.

Defend the outline and dissertation through VinaREN:

In recent years, many students have successfully defended their master's theses online or won valuable scholarships from overseas universities or international organizations. The following units have carried out this activity regularly:

  ❖ Hanoi University of Technology
  ❖ Can Tho University;
  ❖ Hue University;
  ❖ Ha Noi national university;
  ❖ Vietnam National University. Ho Chi Minh.

VINAREN WITH E-LEARNING

Support TEIN3/APAN E-learning project

The universities of Vietnam and the world participating in E-learning project were connected, including:

- ❖ University of Tokyo, connected via SINET
- ❖ Seoul National University, connected via KISDI
- ❖ Peking University, connected via CERNET
- ❖ Vietnam National University, connecting to VinaREN

Support the International Cooperation Program

Hanoi University of Technology connects with 11 universities in Germany, Japan, Russia, France, New Zealand, Austria, the United States, the Czech Republic via VinaREN:

- ❖ Leibniz Hannover University
- ❖ Otto-von-Guericke Magdeburg University;
- ❖ Nagaoka University of Technology;
- ❖ Petersburg Electric Power University
- ❖ Pierre Mendes France University;
- ❖ Victoria Wellington University;
- ❖ Grenoble INP institute
- ❖ La Trove University;
- ❖ Troy University;
- ❖ Northcentral University;
- ❖ Liberec Technical University

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VINAREN WITH Eduroam project

Progress update – eduroam

Title	TEIN eduroam 2017 (WP4)
PI/ORG	John Batchelder / AARNet(AU)
Budget/Period	349K Euro / FEB18~JUN19(17M)
Activity summary in 1/2Q	- Participating countries have been identified: Afghanistan, Bangladesh, Bhutan, Cambodia, Indonesia, Laos, Nepal, Vietnam (Project Partners : Australia, New Zealand, Singapore, Korea) - Four video training sessions have been held covering eduroam introduction and basic information. - Hardware procurement process has commenced for servers and wireless access points.
Activity plan in 3/4Q	- Hands on training workshop to be held at APAN45 New Zealand - Hardware will be delivered to the participating countries - Software configuration, eduroam deployment and testing will then commence
Lesson or ideas for share	- General eduroam info and software developed during the project will be shared. - Email john.batchelder@aarnet.edu.au for more information.

12 out of 17 Beneficiary countries will have setup the foundations of eduroam

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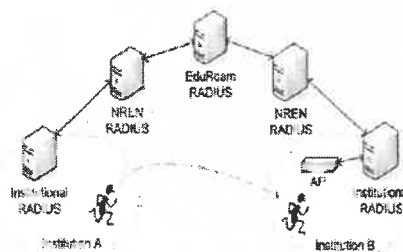
VINAREN WITH Eduroam project

❖ Eduroam (education roaming) is the secure, world-wide roaming access service developed for the international research and education community.
❖ Eduroam is available in thousands of locations across over 89 countries worldwide
❖ Eduroam allows students, researchers and staff from participating institutions to obtain Internet connectivity across campus and when visiting other participating institutions by using their laptop, smartphone,Ipad.
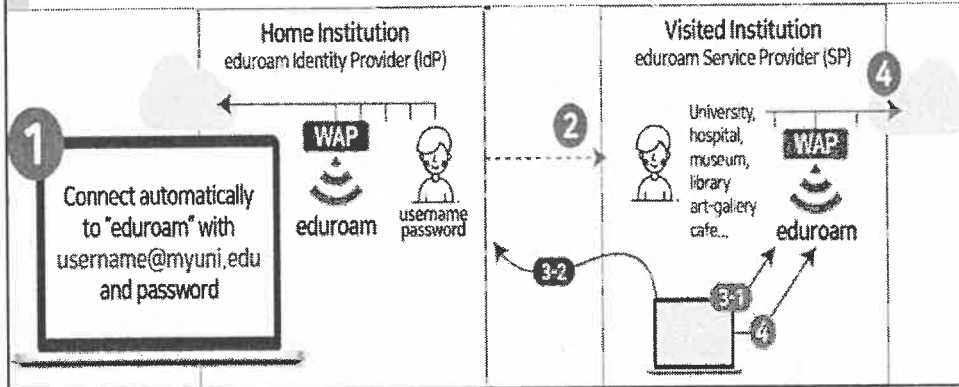
CHINESE TAIPEI

E-Learning in EPA

- https://elearn.epa.gov.tw/DigitalLearning/Default.aspx

- The EPA currently has no online open course (MOOC) promotion strategy.

- We provide an environmental education lifelong learning network on the youtube channel.

行政院環境保護署
Environmental Protection Administration
Executive Yuan, R.O.C. (Taiwan)

2018 APEC-VC Vietnam Workshop

The Air Quality Monitoring Data in Taiwan
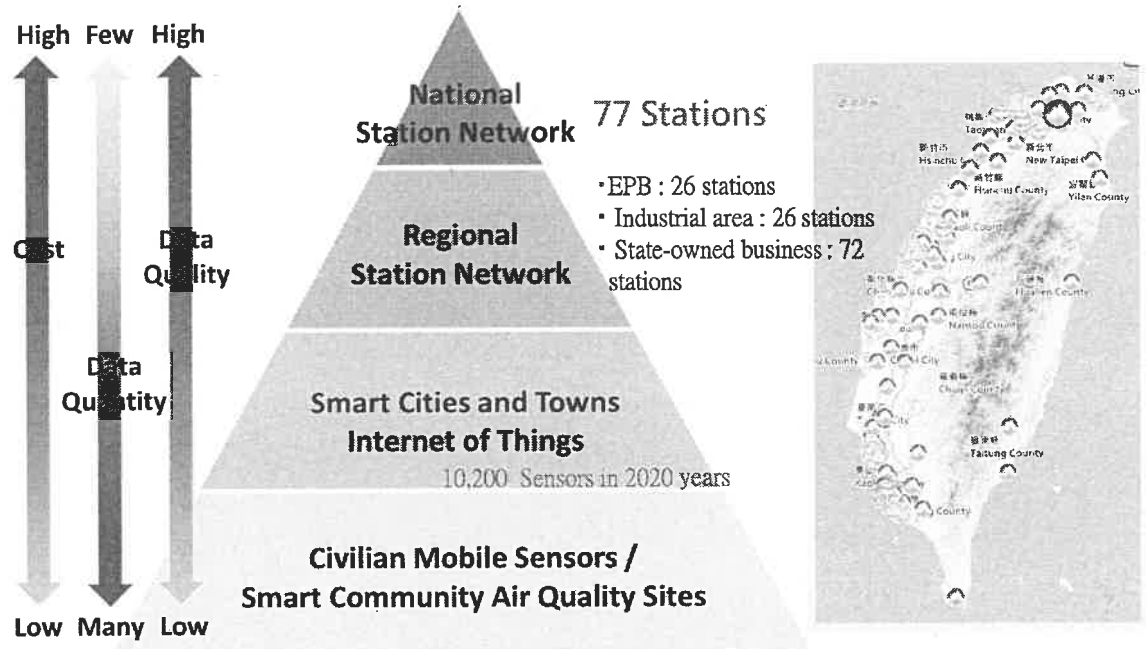
Chia-Hsin Hsu
Environmental Protection Administration Taiwan Oct. 2018

Introduction

- Multi-Class Air Quality Monitoring Network
- About Taiwan Air Quality
- Air Quality Monitoring Network
- Open Data Platform
- Air Quality in Environment Resource Database
- Environment Info Push App
- IOT Monitoring
- Future Issues

行政院環境保護署
Environmental Protection Administration
Executive Yuan, R.O.C. (Taiwan)

Multi-Class Air Quality Monitoring Network

High Few High

Cost   Data
                Quality

Data
Quality

Low Many Low

National Station Network

Regional Station Network

Smart Cities and Towns Internet of Things

10,200 Sensors in 2020 years

Civilian Mobile Sensors / Smart Community Air Quality Sites

77 Stations

· EPB : 26 stations
· Industrial area : 26 stations
· State-owned business : 72 stations

行政院環境保護署
Environmental Protection Administration
Executive Yuan, R.O.C. (Taiwan)

3

About Taiwan Air Quality

Taiwan Air Quality Monitoring

Environment Resource Database

Open Data Platform

Environment Iot Sensor Network

AQI
Air Quality Index

Environment Info Push App

4

Monitoring Data

Transmit

Database Server

Primary
analysis
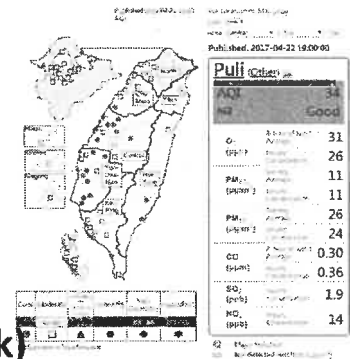
- **TAQMN(Taiwan Air Quality Monitoring Network)**
  - **Hourly data**
  - **Historical data**
- **Environmental Instant Messages APP**
- **Data Open Platform**

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Taiwan Air Quality Monitoring

- https://taqm.epa.gov.tw/taqm/en/AqiMap.aspx

Air Quality Index (AQI)

Air quality forecast

行政院環境保護署
Environmental Protection Administration
Executive Yuan R.O.C. (Taiwan)

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Open Data Platform

- https://opendata.epa.gov.tw/Home/

Taiwan ranks No. 1 in global open data survey

1,313 Data sets

46 Departments

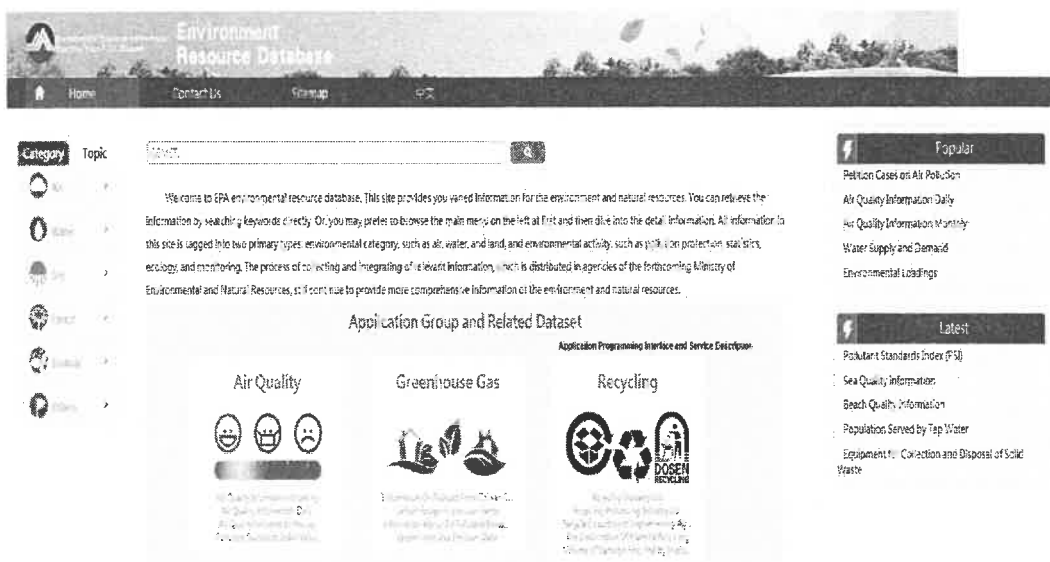**16** Application services

116.71
Million cited records

OKFN Global Open Data Index
(2016 、 2017)

PM2.5
- ✓ JSON
- ✓ XML
- ✓ CSV
- ✓ RESTful API

7

Air Quality in Environment Resource Database

- https://opendata.epa.gov.tw/Home/

Application Group and Related Dataset

Air Quality   Greenhouse Gas   Recycling

行政院環境保護署
Environmental Protection Administration
Executive Yuan R.O.C. (Taiwan)

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Environment Info Push App

Slide Finger, Get Information So Easy

Air Quality Index(AQI)

Hourly Data

Activity Guidance

AQI Forecast (12hrs)

Update AQI forecast data twice per hour

行政院環境保護署
Environmental Protection Administration
Executive Yuan, R.O.C. (Taiwan)

Environment Iot Sensor Network

Smart Application
-Portable Data
-Air Forecast
-Pollution Audit
-Smart Management

Number of Deploy Sensors
Air-Quality: 10,200,
Water Quality: 1,000

Integration of
Environmental
Sensor
Network

Integration of
Data
Analytics

Environmental IoT
Project Kickoff

Wisdom

Born   Growth   Stronger   Smart

Other Mission - Mazu Pilgrimage

crane

Environmental Protection Administration
Executive Yuan, R.O.C. (Taiwan)

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Other Mission - Mazu Pilgrimage
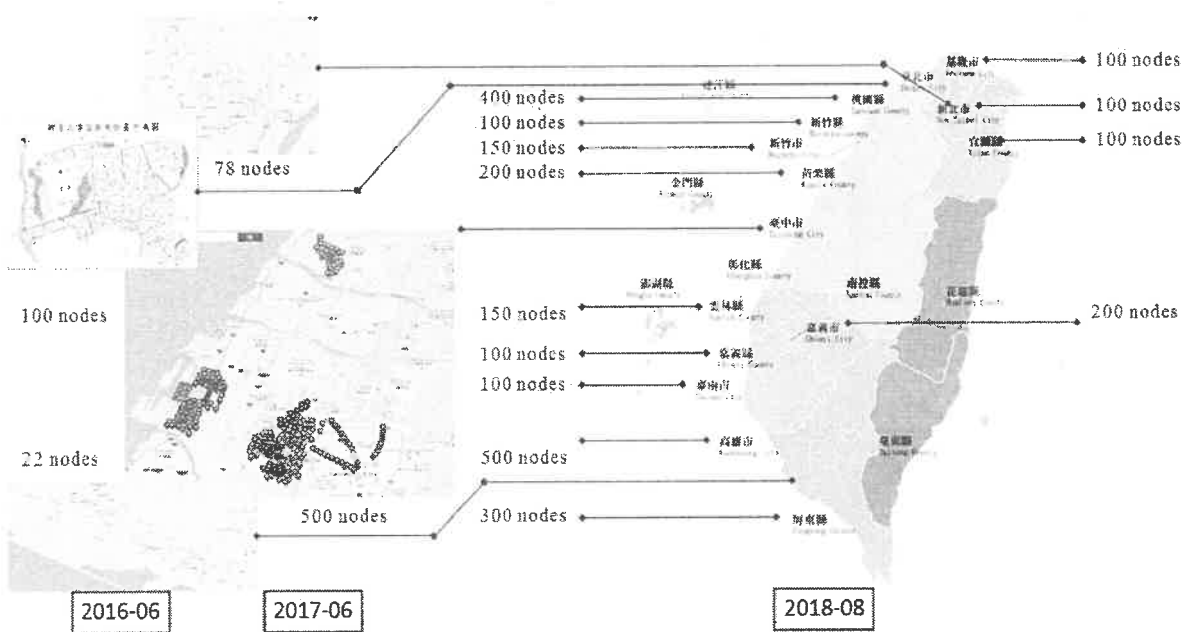

愛媽祖 免放炮
健康財富一傳倒

No Firecracker

不燒金保健康
勿燃炮永安康
一炷香新平安

Mobile Sensors

>55 Unhealthy

PM$_{2.5}$ (µg/m^3)	2016	2017
Avg. value	112	88
Max. value	4188	2307

12

41

Total Solution

Design and Manufacturing

Deployment Plan

Lab Evaluation

Field Evaluation

EPA IoT Platform

Data Quality Management

Maintenance System

Regular Inspection

Repair

Fail Detection

行政院環境保護署
Environmental Protection Administration
Executive Yuan R.O.C. (Taiwan)

Current Status

78 nodes

400 nodes
100 nodes
150 nodes
200 nodes

100 nodes

22 nodes

500 nodes

150 nodes
100 nodes
100 nodes

500 nodes

300 nodes

100 nodes
100 nodes
100 nodes

200 nodes

2016-06

2017-06

2018-08

行政院環境保護署
Environmental Protection Administration
Executive Yuan R.O.C. (Taiwan)

Strategic Deployment Plan

Industrial Park
- Dense deployment
- 300 ~ 500 meters
- 150 ~ 300 meters for current projects

Industrial Park Neighbor Hood
- Middle dense
- 500 ~ 700 meters

Towns
- Sparse deployment
- 1 ~ 1.5 km

City Traffic
- Middle dense
- 500 ~ 700 meters

行政院環境保護署
Environmental Protection Administration
Executive Yuan, R.O.C. (Taiwan)

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Future Issues_During 2017~2020

TAiWAN, Taiwan Air Wide Array Networks

NAQMN
RAQMN
Smart City Nodes
Citizen Science Sensors

TAiWAN projects

77 national-level standard sensing stations

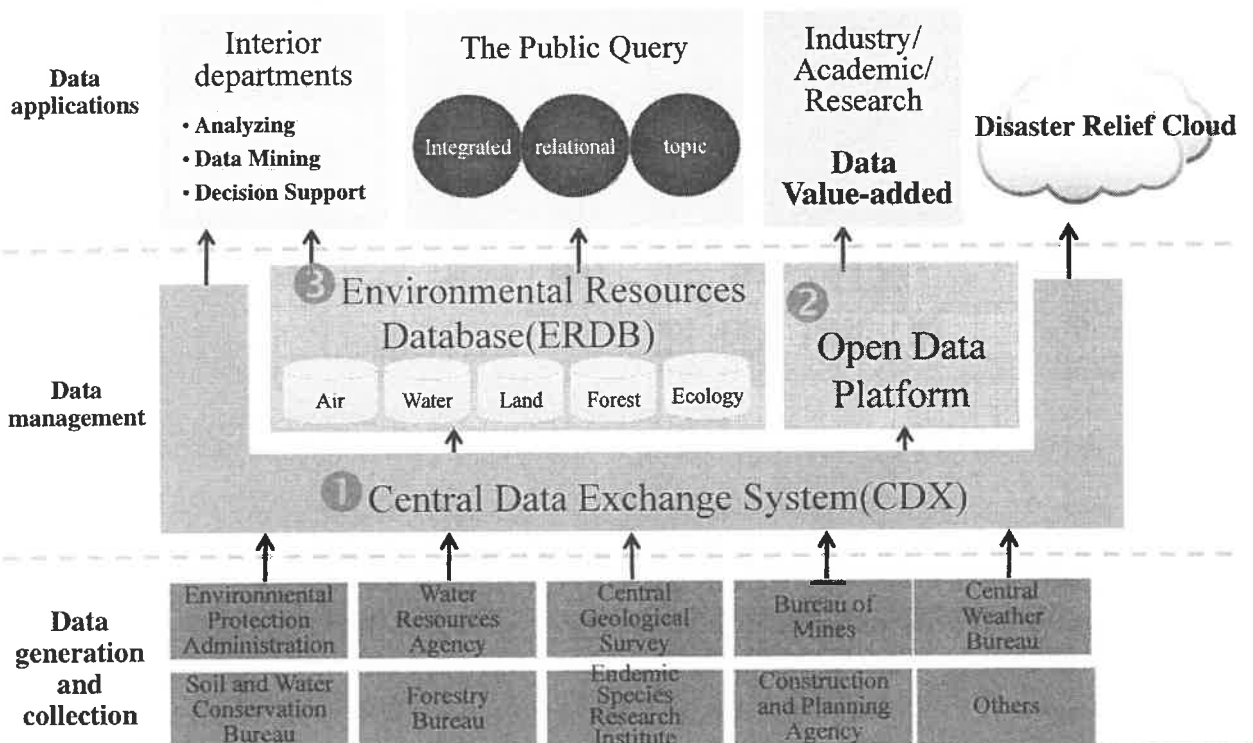**143** regional conventional sensing stations

10,000 smart urban & rural sensing points

10,000+ citizens' scientific sensing points

Taiwan, as an IoT site, provides guidance on innovation and R&D
Deploying a wide air quality network to control pollution and protect the environment
Duplicating and exporting our services and experiences in software and hardware
Improving our products and services for a sustainable

TAiWAN

行政院環境保護署
Environmental Protection Administration
Executive Yuan, R.O.C. (Taiwan)

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Thank you for your attention!

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The Architecture of EnviroCloud

Data applications

Interior departments
- Analyzing
- Data Mining
- Decision Support

The Public Query
Integrated | relational | topic

Industry/ Academic/ Research

Data Value-added

Disaster Relief Cloud

Data management

❸ Environmental Resources Database(ERDB)
Air | Water | Land | Forest | Ecology

❷ Open Data Platform

❶ Central Data Exchange System(CDX)

Data generation and collection

| Environmental Protection Administration | Water Resources Agency | Central Geological Survey | Bureau of Mines | Central Weather Bureau |
| Soil and Water Conservation Bureau | Forestry Bureau | Endemic Species Research Institute | Construction and Planning Agency | Others |

Monitoring Items

- Automatic

Criteria Pollutants	Meteorological Parameters	Others
• PM_{10} , $PM_{2.5}$ • CO • SO_2 • NO_2 • O_3 , $O_{3\text{-}8hr}$	• Wind Speed • Wind Direction • Temperature • Humidity • Rainfall	• Acid rain • THC Total hydrocarbons • CH_4 methane • NMHC • UVB UVA • BTEX • CO_2

- Manual

$PM_{2.5}$
$PM_{2.5}$ Chemical composition analysis

5 priority areas of focus as country level

- We focused about the following five areas

- Environmental monitoring and analysis (Beginner)

- Theory on environmental geographic information (Intermediate)

- Air quality management planning and maintenance of prevention facilityI (Intermediate)

- Air quality management planning and maintenance of prevention facilityII (Intermediate)

- NEW air pollution treatment technology

CHILE

APEC-VC 2018 WORKSHOP VIETNAM
25-26 october 2018 Da Nang, Vietnam

APEC VC CHILE. Dr LIONEL GIL , MARTA ADONIS, JOSE DIAZ
Dani Fochesato - Ricardo Sanhueza – Raul Vallejos
FACULTY OF MEDICINE, UNIVERSITY OF CHILE

PRESENTATION REQUIREMENTS FOR SSESSION 1
Opinions on the Change of APEC. VC Operational Strategy

1.-APEC Virtual Center for Environmental Technology Exchange. Document presented as an official APEC-PPSTI Document 12 August 12, 2018

➤ APEC-VC KEITI SECRETARIAT will offer e learning platform for massive on line open courses on environmental technology . KEITI has the experience since 2004 is serving e learning courses on environmental technology for Korean public and cooperating with International Organizations for developing courses for international audiences.

➤ APEC-VC Secretariat will focus on environmental technologies for protecting the global environment. For Chile a developing country with very low investment in science and technology, this is an excellent idea, to have access on line to courses very well organized and developed as those described in the 42 courses proposed. However, most of the courses are in the area of Enviromental Engineering . Thus, we considered that the offer of courses should be wider including more courses on environmental effects on human health.

2. Status and cases of online education in your country and how they are facilitated at higher education and working place.

► In Chile we do not have initiatives like these at the level offered by this project. The 42 courses might be used in different environmental areas. This initiative would be very relevant for education in traditional and technical universities. The knowledge obtained with this training could be applied to industrial and public institutions.

PRESENTATION REQUIREMENTS FOR SSESSION 1
Opinions on the Change of APEC. VC Operational Strategy

3. Five priority areas of environmental E. Learning

We propose the following priorities:

► 1. Environmental Management
► 2. Environmental Impact Asessment
► 3. Environmental Health Assesment

- · All this priority are listed in the 42 courses proposed in this initiative
- · We suggest other 3 priorities not listed

3. Five priority areas of environmental E. Learning

We propose the following priorities:

▶ **4 Environmental education, addressed to children.** Children learn very fast and if they learn at small age. Those well educated will have all their life good habits to protect the environment. Even they can also teach their family to avoid bad habits. Courses in this area would be very useful to disseminate in private or in public schools as well to the general public including parents.

▶ **5 Environmental Toxicology.** This is an important area to understand the mechanism of toxicity of many environmental pollutants wide spread in the world

3. Five priority areas of environmental E. Learning

We propose the following priorities:

▶ **6.- Environmental Medicine.** Usually this type of courses are not included in the regular courses of Medicine in Chilean Universities. Except at the Postgraduate level. This is an important area to learn not only about the effects of pollution in human health, but also very important to generate human resources like professionals uncharged to evaluate and discuss law, decrees and norms to protect the population.

For priorities 4 , 5, and 6 we propose that would be nice to sign agreements to strength dual efforts with institutions specialized in health as for example: USA Environmental Protection Agency (EPA), and the World Health Organization (WHO).

4). Information about APEC-VC CHILE

APEC-VC CHILEAN WEBSITE.

▶ Although Chile participated in APEC-VC since 1997, the Chilean APEC-VC WEBSITE was created in only 2003 by invitation of APEC-VC JAPAN . Between 2003 and 2007, the Chilean web site accomplished the following objectives:

▶ Promote business opportunities and information exchange between the products of the Chilean environmental industry and the other participants economies.

▶ -Provide environmental information in areas such as : water , air and land pollution , public policies, environmental laws regulations , research projects, contributions to environmental protection in the country.

PRESENTATION REQUIREMENTS FOR SSESSION 1
Opinions on the Change of APEC. VC Operational Strategy

4). Information about APEC-VC CHILE

APEC-VC CHILEAN WEBSITE.

▶ The web site was located in the National Commission for Science and Technology with their corresponding informatics support . This website had a high number of visits since Chile was the only economy to provide the environmental information in Spanish, with high number of visits from many Latin-American countries, Spain and USA.

▶ In 2013 the Chilean website moved to the Faculty of Medicine of the University of Chile, this website contain information about other websites of the project, scientific news related to environment from Chile and world wide information.

4). Information about APEC-VC CHILE

APEC-VC CHILEAN WEBSITE.

► It also include the Annual Chilean Report presentations in the APEC-VC Annual meetings in KOREA 2013, Malaysia, 2014, KOREA 2015 and KOREA 2016. Also included information of international courses in environmental medicine, environmental pollution, indoor air quality, Lung Cancer Early Detection, and Genomics,   which were organized and dictated in our laboratory with participation of professors from Canada Europe and Chile and graduate students from different Latino- American countries.

4). Information about APEC-VC CHILE

APEC-VC CHILEAN WEBSITE.

► In our laboratory in the Faculty of Medicine we work since 1987 on research on environmental pollution and health supported by national and international institutions. Our research area is air pollution outdoor and indoor, lung cancer early detection ad genomics. We also teach at the graduate level ENVIRONMENTAL TOXICOLOGY. Many Ph. D and Master Degree thesis have been done in our laboratory.

4). Information about APEC-VC CHILE

▶ We have good experiences in **ENVIRONMENTAL EDUCATION** since we have published, educational books for children, explaining scientifically the effects of pollutans in human health.

▶ In addition we have published a book in Spanish on Indoor Air Quality. Pollutants and effects in Human Health. This book was financed by the **PAN AMERICAN HEALTH ORGANIZATION** which distributed the book in all Latin American countries. Furthermore, we have done research projects in areas of extreme poverty about levels of indoor pollutants and their effects on human health as well as studies in public children schools in areas of highly industrial pollution. Some of these studies have been taken in account to invest in industrial decisions to improve mitigation technologies.

MOST RECENT WHO REPORT ABOUT THE EFFECTS OF AIR POLLUTION IN PUBLIC HEALTH WORLD WIDE - 2016

CALIDAD DE AIRE
DE INTERIORES

▶ About 18.000 persons death a day and 6.5 millions death a year, may be related world wide to the effects of air pollutions.

▶ The same publication claims that Chile as a rate of 22/100.000 inhabitants related to indoor and outdoor pollutions.

GRADUATE INTERNATIONAL COURSES IN ENVIRONMENTAL MEDICINE

CeTeCáncer
Centro de Tecnologías para el Cáncer
Facultad de Medicina U████████d de Chile

International Theorical Course:
Advanced Complementary Technologies for Cancer Detection
Attendance: 85

International Practical Course:
Advanced Complementary Technologies for Cancer Detection
Students selected: 15

APEC-VC CHILE

Dr. Lionel Gil Hormazabal

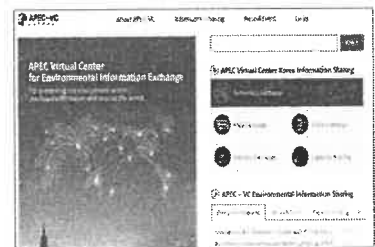Dra. Marta Adonis Parraguez

MSC. José Pedro Díaz Garrote

TECHNICAL SUPPORT

Sr. Dani Fochesato

Sr. Ricardo Sanhueza

Sr. Raul Vallejos

http://apec-vcchile.med.uchile.cl/news.html

END

THE PHILIPPINES
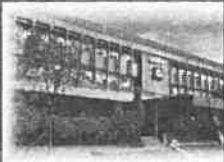
Environmental Technology Verification

Dante C. Vergara
Senior Science Research Specialist
Environment and Biotechnology Division
Industrial Technology Development Institute
Department of Science and Technology

REPUBLIC OF THE PHILIPPINES

DEPARTMENT OF SCIENCE AND TECHNOLOGY

Has the twin mandate to provide central direction, leadership and coordination of scientific and technological efforts and formulation and implementation of policies, plans, programs and projects to support National development.

Its function is to undertake policy research, feasibility and technical studies and technology assessment

Industrial Technology Development Institute

- Undertake applied R&D to develop technologies and technological innovations in the field of industrial manufacturing, mineral processing and energy
- Undertake transfer of research results directly to end-users or preferably via linkage units of other government agencies

Industrial Technology Development Institute

- Undertake technical services, such as but not limited to, standards, analytical and calibration services mandated by law or as needed by industry
- Conduct training and provide technical advisory and consultancy services to industry clientele and end-users
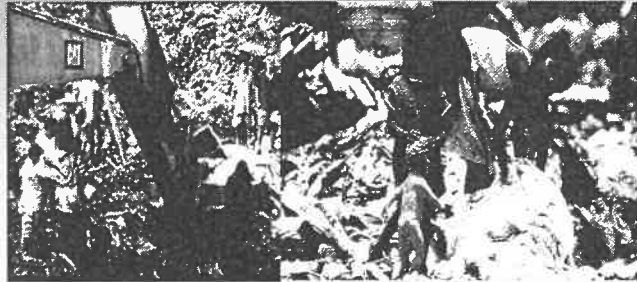
ENVIRONMENTAL PROBLEMS

Water Pollution

Air Pollution

Solid Waste Disposal Problem

National Regulations

- RA 8749 (Clean Air Act)
- RA 9275 (Clean Water Act)
- RA 9003 (Ecological Solid Waste Management Act)

☐ Recognizes the role of EST in environmental management and the use of cleaner production technologies

Environmentally Sound Technologies

"Those technologies that improve the efficiency or performance of a manufacturer or processor, measured either in reduced input consumption per unit output (product) or in reduced waste generated per unit output (product)."

What is Environmental Technology Verification (ETV)?

An objective technical performance evaluation that includes design and conduct of formal testing and documentation governed by **technical protocols**

Why ETV?
From User Perspective

- Available information on technical and economic performance is often missing or is only available from supplier or manufacturer
- Little actual data exists from real-world demonstration or unbiased, independent testing
- Typically unable or unwilling to take risks associated with being one of the first implementers of a new technology

Why ETV?
From Supplier Perspective

- May not be able to afford costs of demonstration and testing for potential users
- Developed in one country and marketed in another country

Legal Basis of ETV

- EO 292, Book IV, Title XVIII, Chapter 1, Section 3
- RA 9003- Ecological Solid Waste Management Act
- RA 9275- Philippine Clean Water Act
- DOST and DENR Joint AO No. 01 series of 2006

EO 292 Book IV Title XVIII Chapter 1 Section 3

- DOST is mandated to promote, assist and where appropriate, undertake scientific and technological R&D, promote the development of indigenous technology and adaptation of suitable imported technology, and in this regard, undertake technology development and undertake policy research, technology assessment, among others

IRR of RA 9003 (Ecological Solid Waste Management Act) Part VI, Rule XXI, Section 1c

- The DOST, in coordination with the concerned agencies and institutions shall:

Develop an ETV program in the evaluation of technologies prior to its introduction locally. ETV will serve as basis for verifying the performance of technology under local conditions

RA 9275: Philippine Clean Water Act, Chapter 3, Section 22e

- DOST, in coordination with the Department and other concerned agencies, shall prepare a program for the evaluation, verification, development and public dissemination of pollution prevention and cleaner production technologies

DENR – DOST Joint AO 001, Series of 2006

- All applications for technology approval and review shall be subject to the Technology Protocol on Environmental Technology Verification of the DOST thru its ITDI

Guidelines for the Implementation and Institutionalization of the ETV Protocol

Purpose

These guidelines are issued to prescribe the standards procedure in the management and operation of the ETV Protocol for its proper implementation and institutionalization

Technology Coverage

- Waste Treatment and Safe Disposal technologies
- Cleaner Production (CP)/Pollution Prevention (P2) technologies
- Environmental monitoring and analytical systems
- Best environmental technologies
- Drinking Water systems

Environmental Technology
Stakeholders

- Technology users
- Technology suppliers
- Regulatory agencies
- **Scientific community**
- **Policy makers**
- **Organizations with concern on:**
  - Public health
  - Environmental protection

Environmental Technology
Verification System

| Submission of application form | Eligible applicants are required to read the operating policies and fill up the application form completely and accurately |

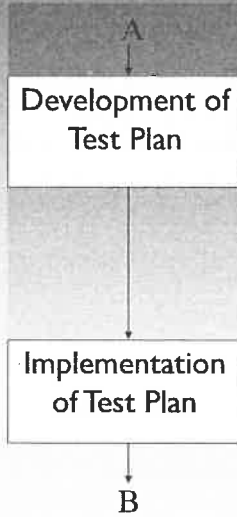| Formation of Experts Panel | An Experts Panel is organized to oversee the verification process, from the development of the test plan to final reporting. |

| ETV Panel Meeting |

A

Verification System

Development of Test Plan

The technical panel formulates a Test plan tailored specifically for the technology or product addressing these criteria:

- functional performance
- environmental benefits
- implementability
- regulatory aspects
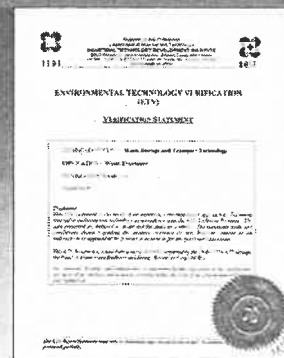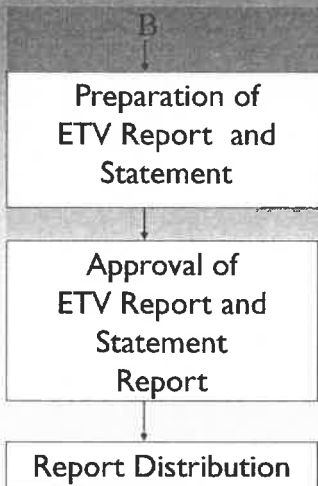- maintenance requirements

Implementation of Test Plan

- Field tests and sampling
- Laboratory tests
- Demonstration projects

Verification System

Preparation of ETV Report and Statement

Approval of ETV Report and Statement Report

Report Distribution

- DOST Publications
- DOST website
- Other distribution networks

Fee Schedule

I. Personnel Services		
Honoraria		
2 Technical Panel Members (@ PhP 1000/mtg x 2 meetings)		4,000.00
Task Coordinator		1,650.00
II. MOOE		
Meeting Expenses (PhP 250/mtg)		500.00
Communication & Transportation Expenses		100.00
Supplies and Materials		300.00
Utilities		250.00
III. Administrative Cost		1,700.00
TOTAL	PhP	8,500.00

Issues Addressed by ETV

- Lack of information
- Lack of technical capacity to evaluate technology
- Counter dissemination of bad information
- **Reduce risk for market entry**

Philippine ETV Milestones

	2006-2008	2009-2013	2014	2015	2016	2017	2018	TOTAL
Applications received	55	124	10	13	7	17	24	250
Test protocols developed	48	66	7	8	3	7	13	152
Technologies verified	37	45	6	2	8	3	8	109

Issues and Problems

- Testing facilities
- Technologies for verification not yet available locally
- Availability of experts
- Limited resources

etvphilippines.ph

Thank You!

Contact:
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