Asia-Pacific Economic Cooperation

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

APEC Workshop on Smart DC Power Opportunity for Community

Chiang Mai World Green City
Chiang Mai, Thailand

10-11 November 2014

Worajit Setthapun

Asian Development Institute for Community Economy and Technology
Chiang Mai Rajabhat University, Thailand

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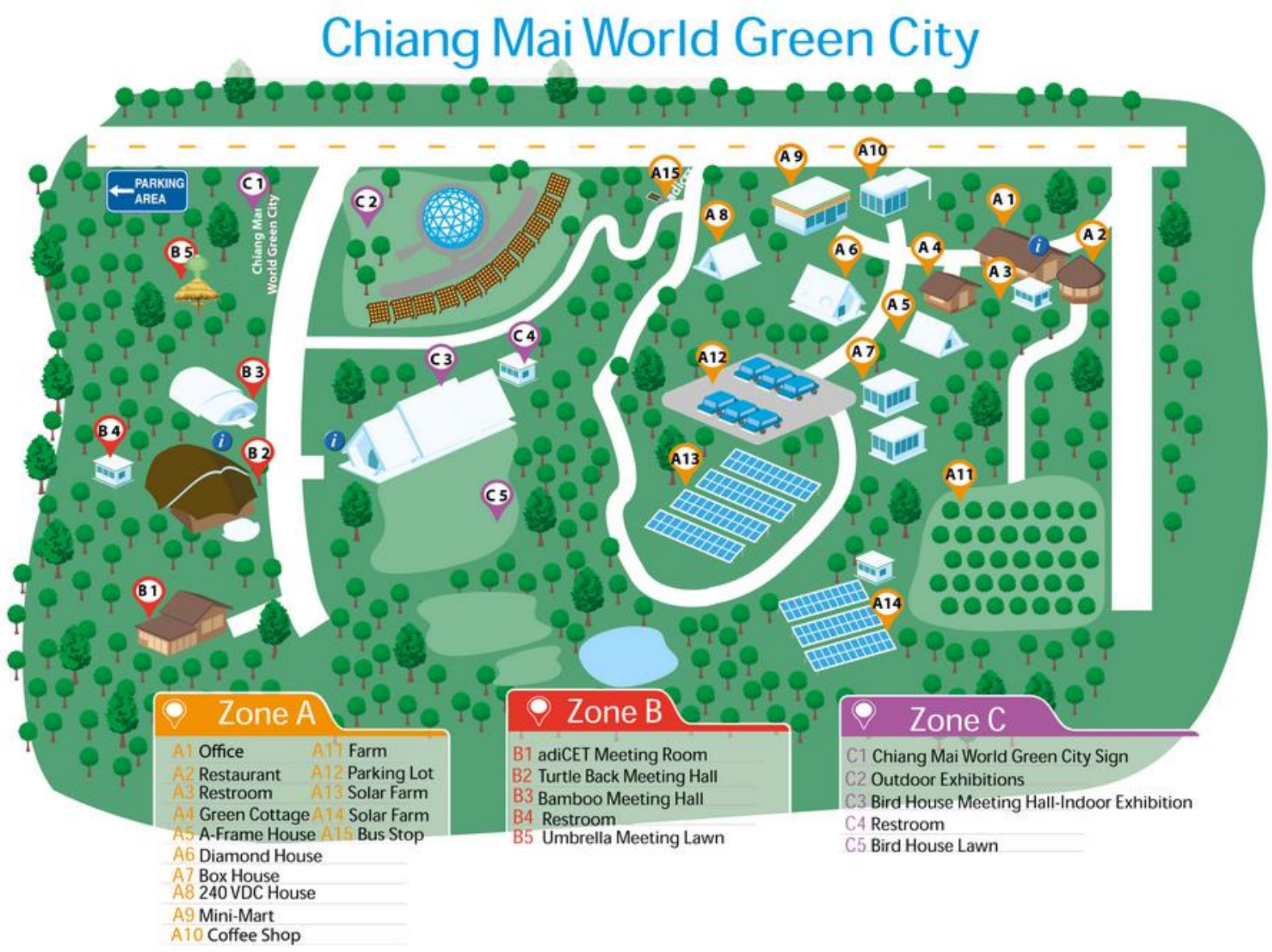

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Rational

- Smart DC power systems link together electricity produced from renewable energy systems
  - No power conversion loss from DC - AC - DC via inverters
  - More efficient with DC Appliance
- Smart DC community power systems have the capability to provide energy services at the community level
  - Suited for the rural areas of developing APEC member economies

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Objective

- To determine the opportunity for Smart DC Power in the APEC community
  - DC community power system roadmap
  - Best practices
  - Key barriers
  - Key R&D topics
  - Application and implementation recommendations

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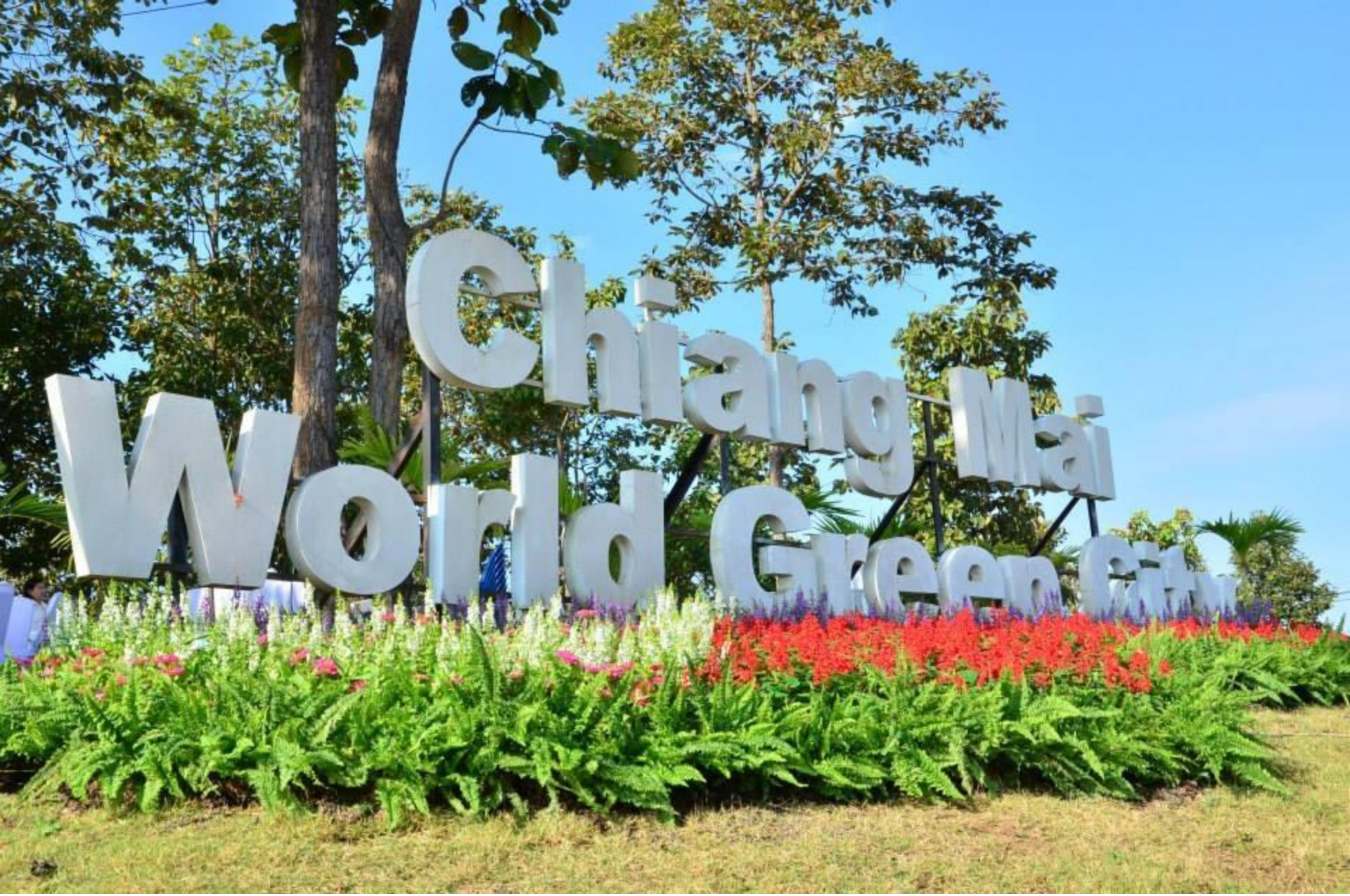
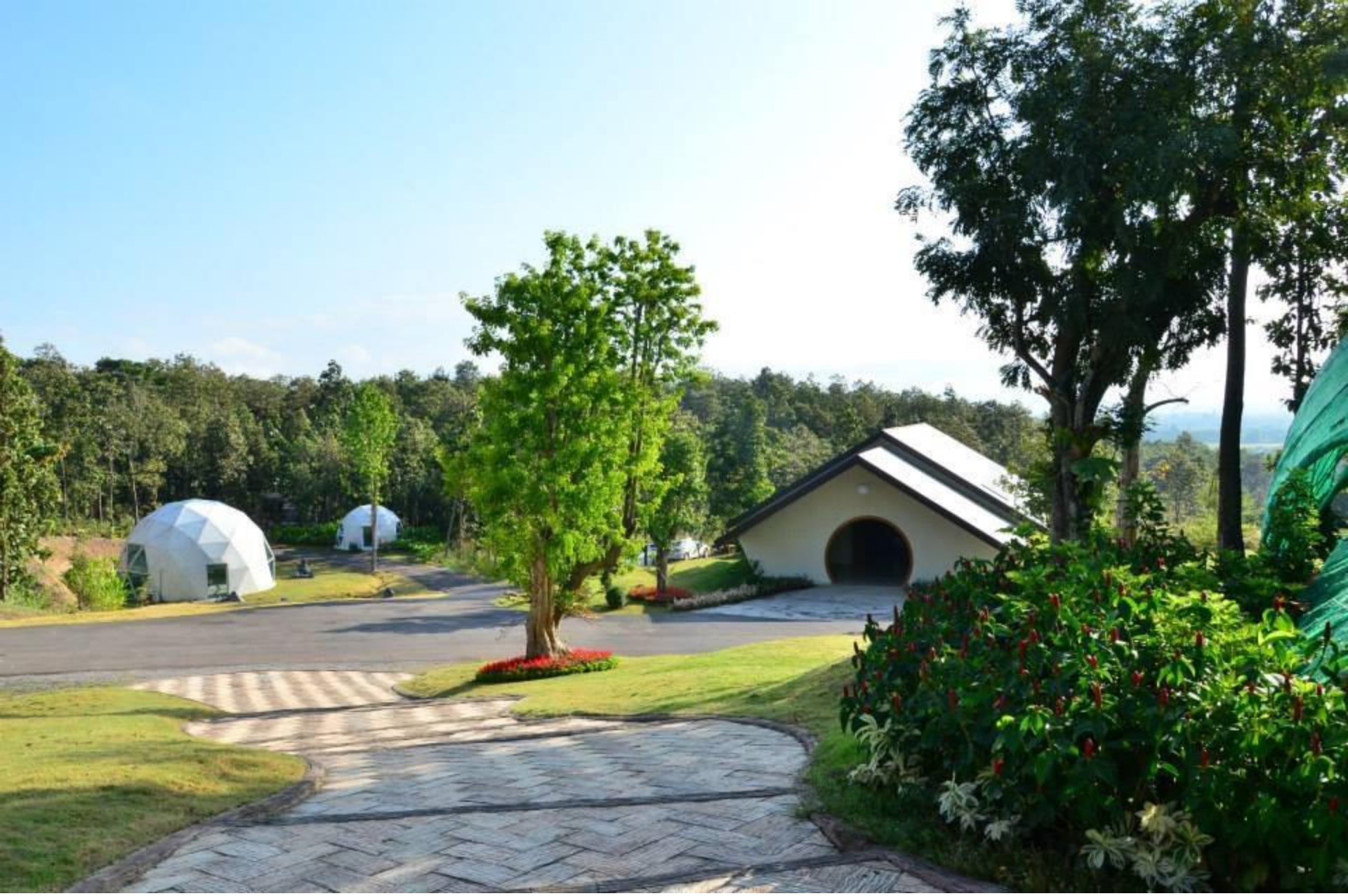
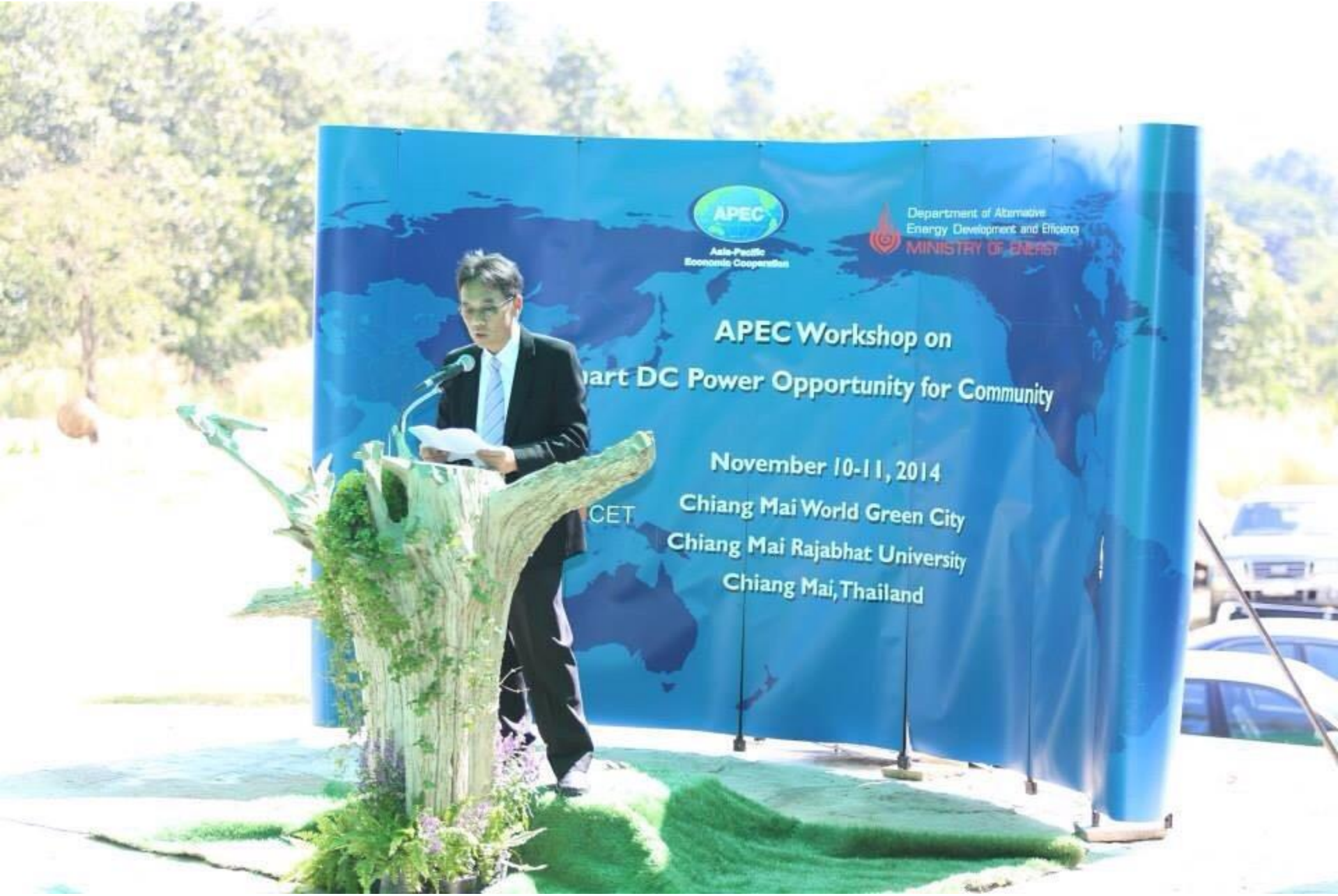
Agenda

- Opening Ceremony
  - Director General of DEDE, Ministry of Energy
  - Governor of PEA
- MOU – Collaboration between PEA & UP
- Invited Presentations
- Group Breakout
  - Technology & Standards
  - Policy & Financing
  - R&D, Deployment Strategies
- Summary Session


Chiang Mai
World Green City

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November 10-11, 2014
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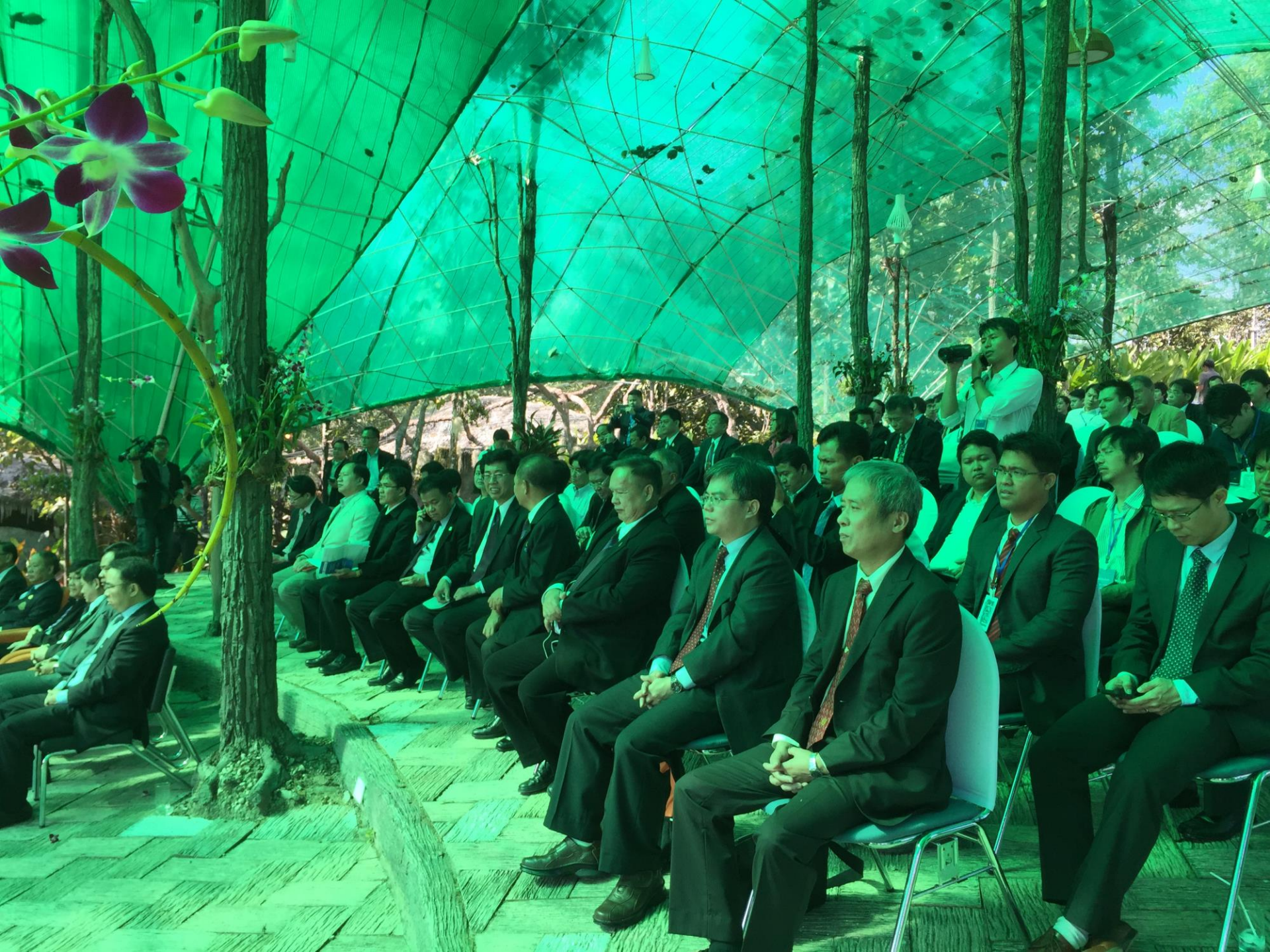
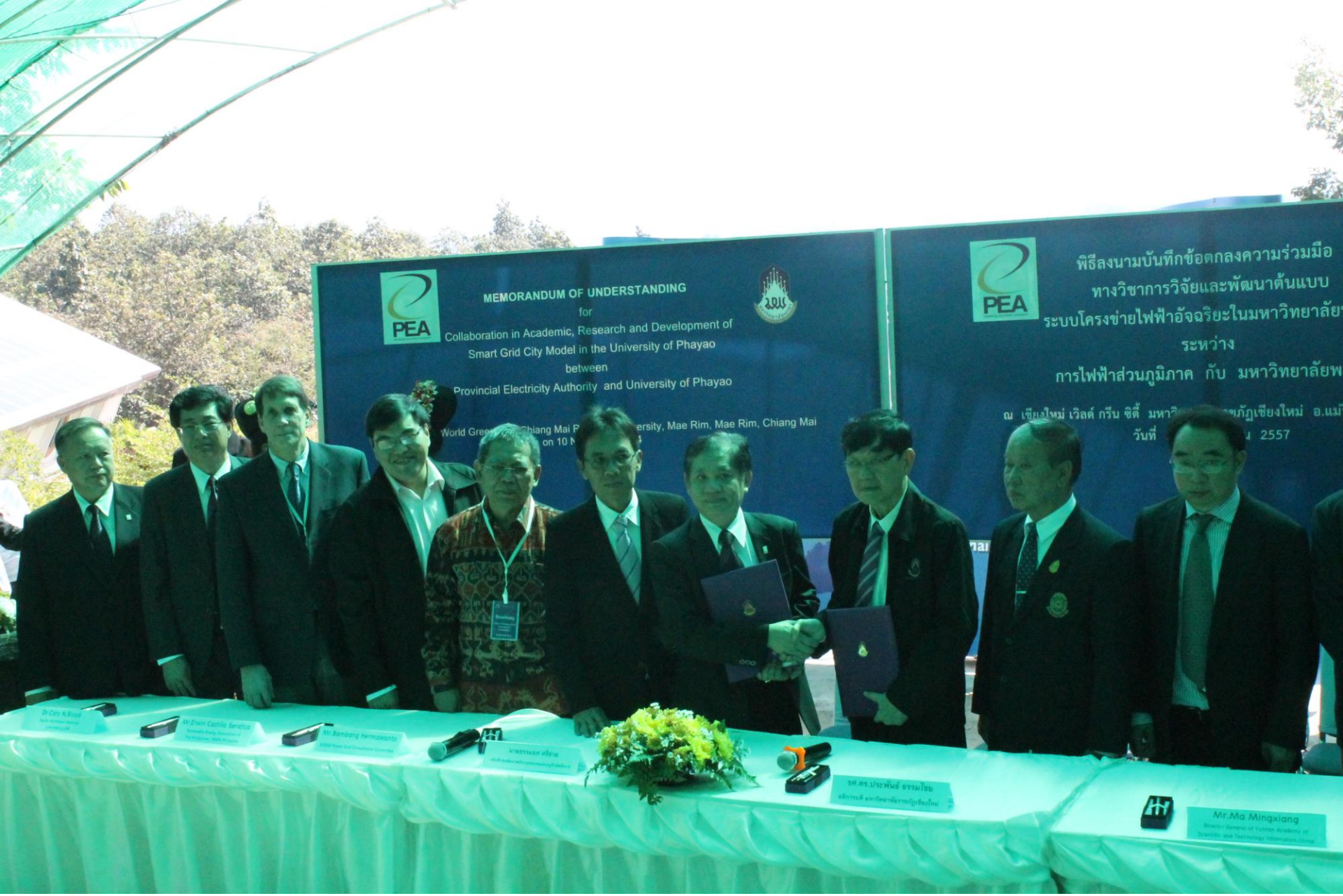
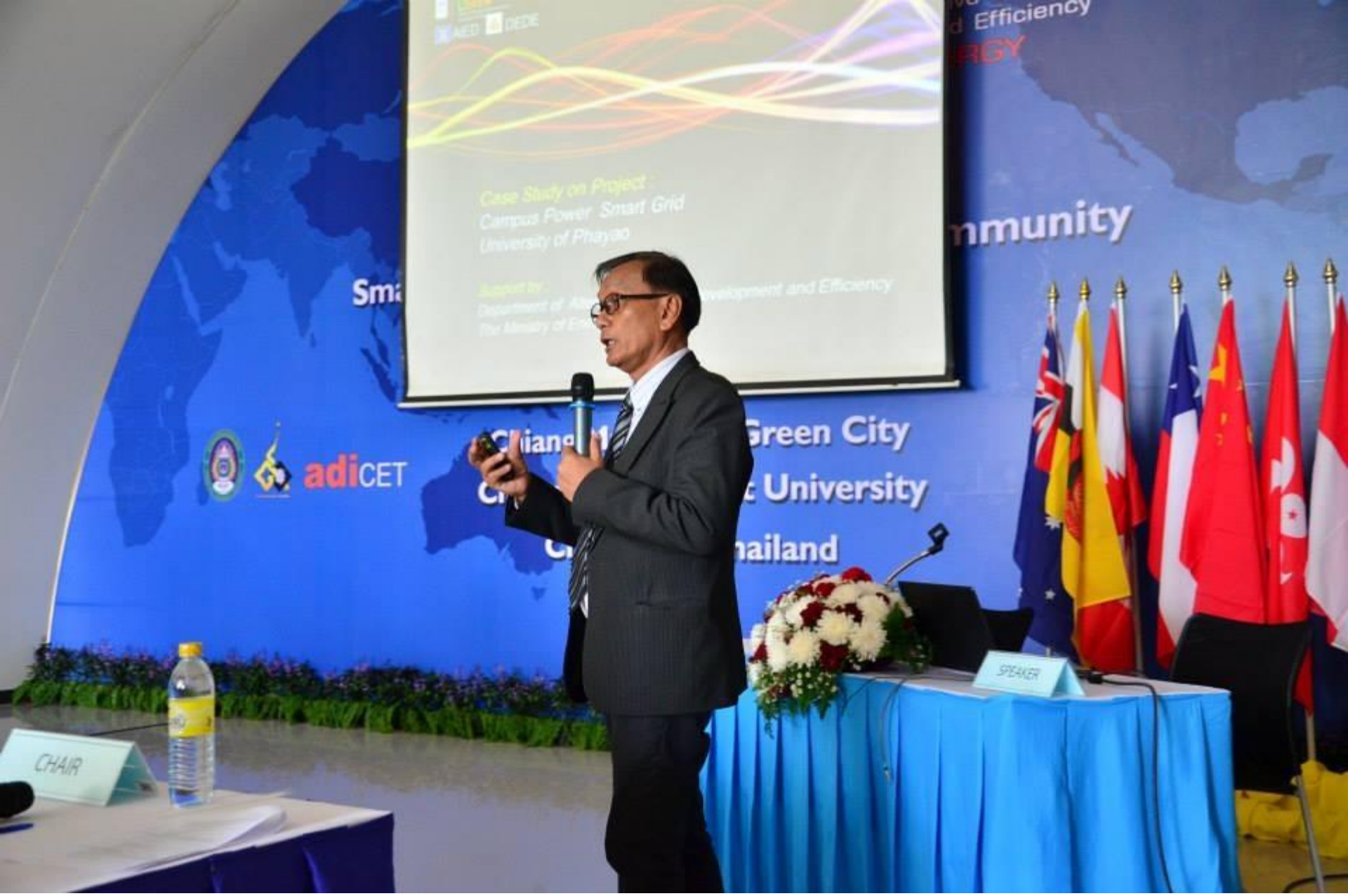
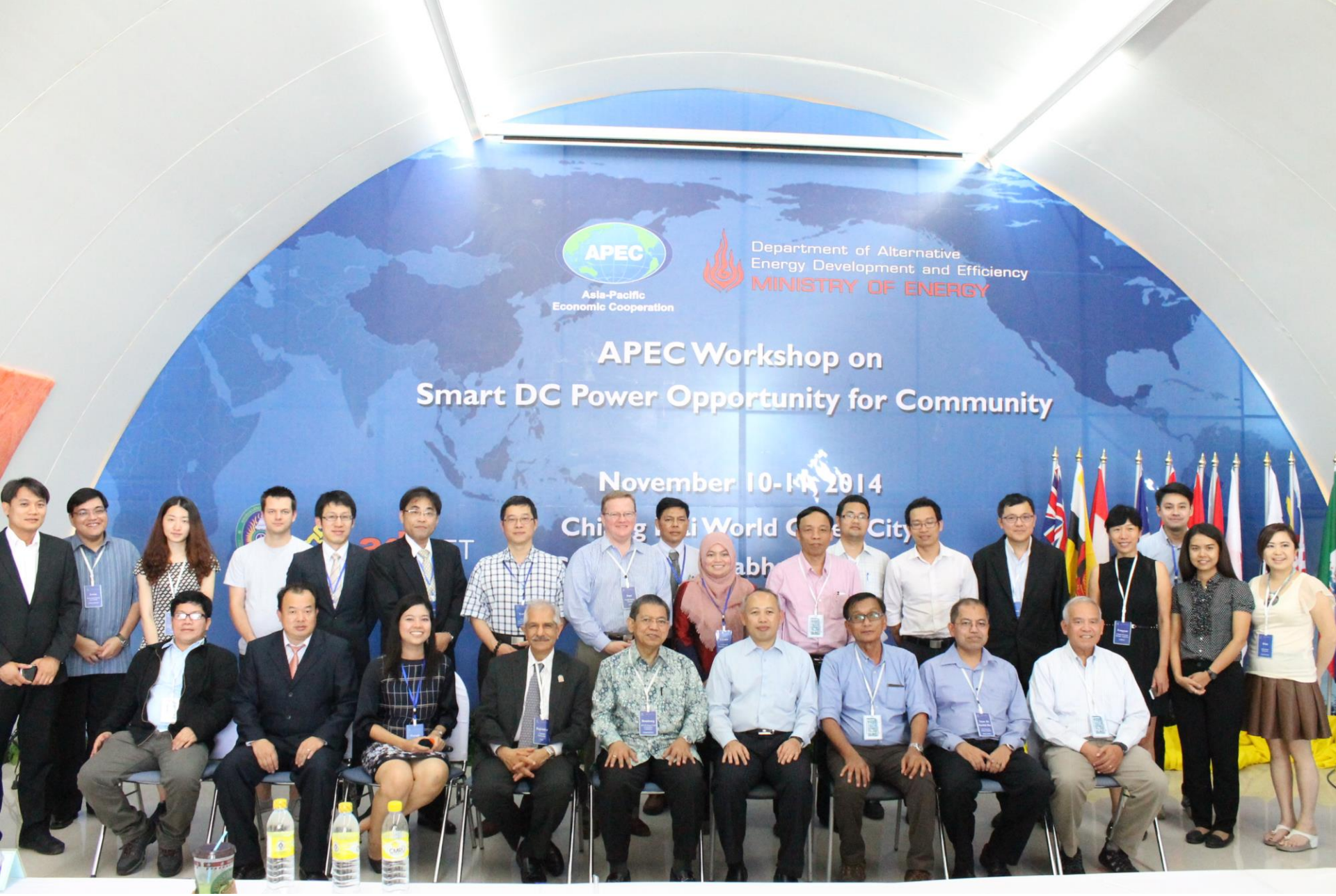



MEMORANDUM OF UNDERSTANDING
for
Collaboration in Academic, Research and Development of
Smart Grid City Model in the University of Phayao
between
Provincial Electricity Authority and University of Phayao
PEA
พิธีลงนามบันทึกข้อตกลงความร่วมมือ
ทางวิชาการวิจัยและพัฒนาต้นแบบ
ระบบโครงข่ายไฟฟ้าอัจฉริยะในมหาวิทยาลัย
ระหว่าง
การไฟฟ้าส่วนภูมิภาค กับ มหาวิทยาลัย
PEA
Mr.Ma Mingxiang


Case Study on Project
Campus Power Smart Grid
University of Phayao
adiCET
Green City
University
CHAIR
SPEAKER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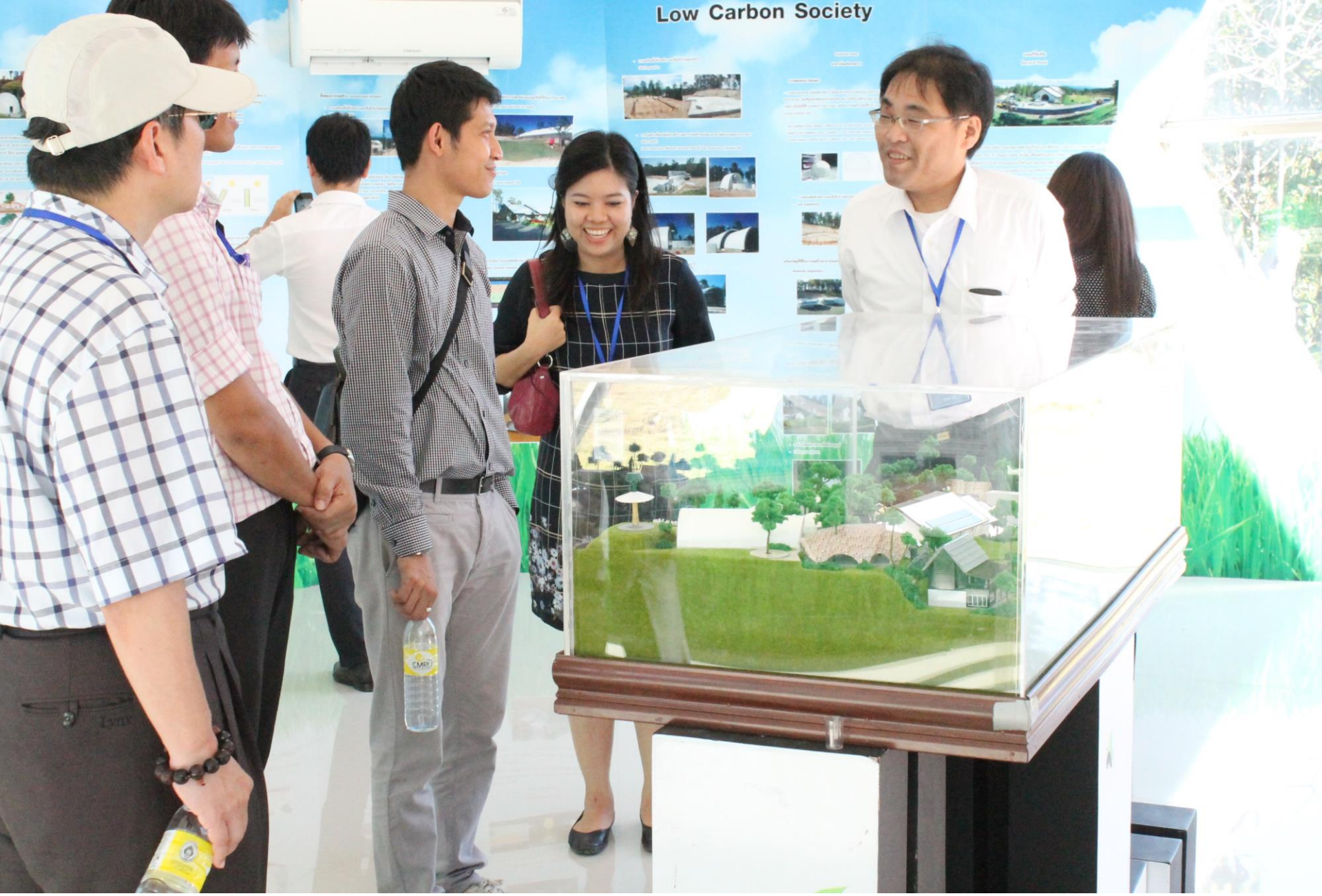
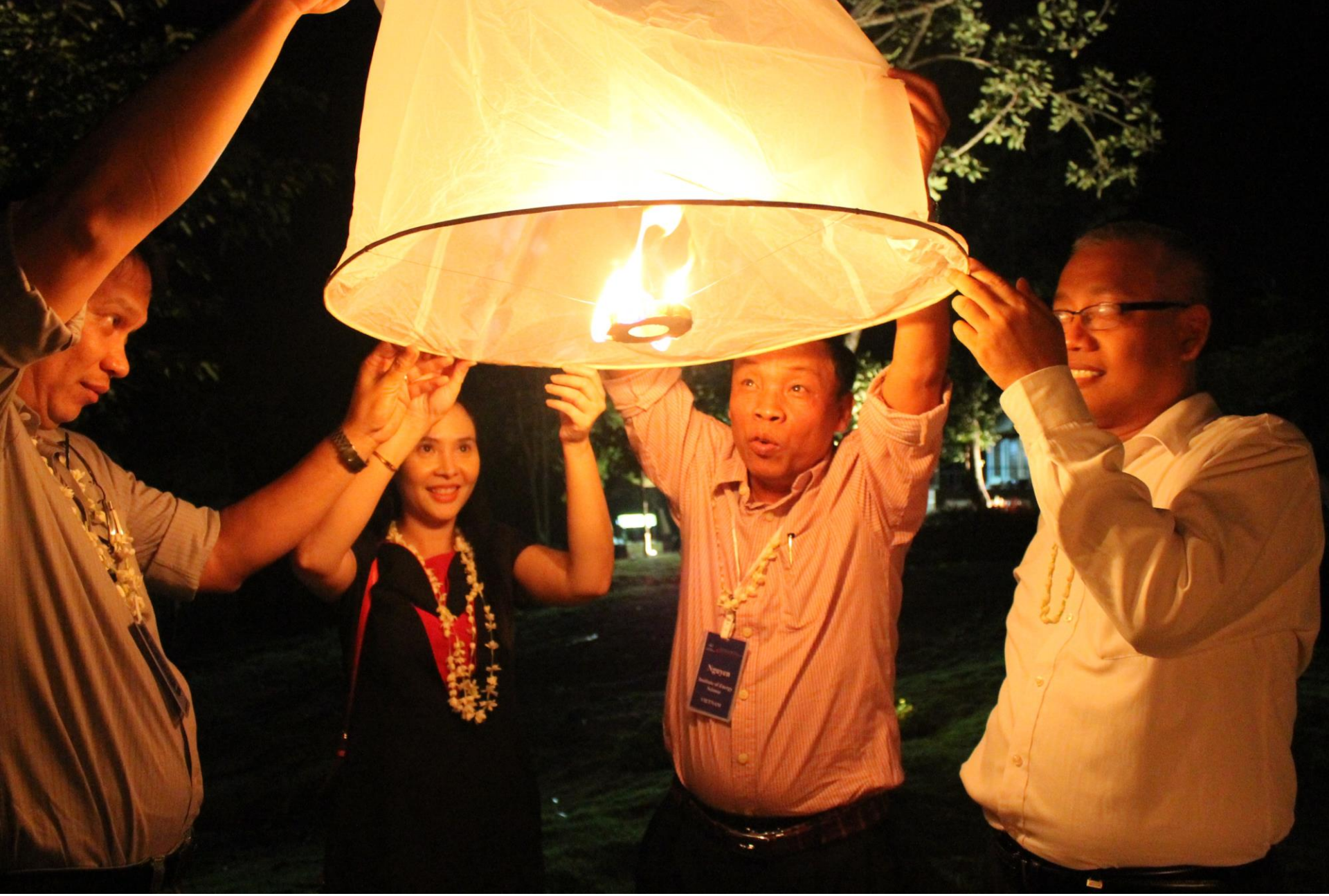

Low Carbon Society



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Workshop Summary

Smart DC Power Opportunity

	Technology & Standards	Appropriate Policy & Financing	R&D - Deployment
Road Map – Way forward	• Promote Information Exchange/ Public Relations • Stake Holders – user, utility, building owner, device manufacturer • Platform of existing demonstration sites and features • Issuance of possible resolution to promote DC technology as cost-effective & efficient technology	• Education • Power Development Plan • Send Message to financial sources • Develop appropriate financing mechanism for DC smart grid development and local manufacturing capability • Financing for low income household and small community to adopt the smart grid technology • Carbon Credits • Job creator	• Develop education awareness - get attention, grants • Introduce regulation & requirement for new building code to include dual system • Promote on the remote island • Promote the microgrid for RE & Energy Conservation • Deliver Financial Analysis of DC • Promote devices/application using DC (demand side design)
Best practices	• Industry association developing standards leading to the rapid adoption of DC power distribution	• Establish fiscal and non-fiscal incentive to encourage investments	• Pilot projects/ Demonstration sites • Collaborative projects between APEC economies – shared data & best practices
Key barriers	• Lack of Global Standards DC Power • Lack of DC application understanding	• Lack Leadership in policy to promote community power • Lack of appreciation of the benefit and advantage of local DC smart grid • Mind set issues	• Understanding • Reduce barrier in DC transmission systems and DC fluctuation problems
Key R&D topics	• Technology-Complete solution & Device Interoperability • Develop energy storage system	• Tariff/Subsidies Policy • Comprehensive assessment between AC and DC power	• Standardization and regulation for hybrid system • Techno-economic research about DC power

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Conclusion

- Lack Understanding of DC power advantages
  - Promote information exchange – all parties
  - Promote demonstration sites in APEC economies
- Lack Standards → undefined user, market demand
  - Global standard
  - Support device manufacture – Local content
  - Policy support & Financial Mechanism
- Focus on household, buildings, local community, island
- Promote DC Power advantages for
  - Efficient way to integrate Renewable Energy sources
  - Energy Efficiency in system and device