APSEC Work Report in the EWG54
(*in the transition*)

Li Zhu
Professor, Tianjin University, China
President, APEC Sustainable Energy Center
Outline

Part 1. Five Year Work Plan Approved

Part 2. Work Progress Aligning the FY Work Plan

Part 3. Key Research Publications Progress

Part 4. Work Plan before the EWG55
b. APEC President’s Report

Dr Li Zhu, President of APEC, made a report on APEC’s progress in implementing the SPSS project, CCTs project and renewable energy project. Dr Zhu also reported the outcome of the 2nd APEC wo alongside with EWG53. Dr Zhu made a presentation of their five-year APEC Practical Cooperation Platform to strengthen the global collaboration, promote technology/product transfer and regional integration to provide supporting services. The work emphasis of APEC is technical systems. APEC’s Five-Year Work Plan was endorsed by EWG.

54th Meeting of the APEC Energy Working Group, 20-24 November 2017, New Zealand
• Cities as platform to realize energy low carbon transition, to achieve a sustainable energy future.
• TWO Pillar Programs: APEC Sustainable City Development Program (CNSC) & Asia-Pacific Clean Coal (Energy) Technology Transfer (CCT)
• Provide feasibility analysis and technology transfer roadmap for sustainable energy technology transfer. Through technical training, consulting services, thematic research to promote technical applications and industry demonstration. **Publish series of research reports and policy recommendations.** Gradually establish the energy technology and project-related information data platform.
Progress Outline

1. Produce core publications-CNSC

- APSEC continuously promotes the implementation of the pillar program APEC Cooperative Network of Sustainable Cities (CNSC).
- APSEC is going to set up a Beijing joint operational center with CHINA STATE CONSTRUCTION GROUP.
- Based on the theme of “Cities and Energy”, series research topics on APEC urban sustainable development model, energy planning, energy technology and city energy system low carbon transition will be carried out.
- Supported by technical training and experts discussion, the research results will be published as the core publications including reports, books and Journal papers.
Establishment of APEC Cooperative Network of Sustainable Cities Program Joint Operation Center

- After preliminary communication and efforts, APSEC held a preparatory meeting with China State Construction Co., Ltd. in Tianjin University in July 2017.
- Establishment Ceremony of APEC Cooperative Network of Sustainable Cities Program Joint Operation was held in September 2017.
## Publication on Sustainable Cities in APEC Region—Similarity Analysis

<table>
<thead>
<tr>
<th>Publications</th>
<th>Year</th>
<th>IOs</th>
</tr>
</thead>
<tbody>
<tr>
<td>The State of Asian Cities 2010/11</td>
<td>2010/11</td>
<td>UN ESCAP</td>
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<td>UN HABITAT</td>
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<tr>
<td>The State of Asian and Pacific Cities 2015</td>
<td>2015</td>
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<tr>
<td>STRATEGY PAPER Sustainable and Inclusive Urbanization in Asia Pacific</td>
<td>2013</td>
<td>UNDP</td>
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<tr>
<td>World Urbanization Prospects</td>
<td>2014</td>
<td>UN</td>
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<tr>
<td>Energy Outlook for Asia and the Pacific</td>
<td>2013</td>
<td>ADB</td>
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<td>World Energy Outlook 2016</td>
<td>2016</td>
<td></td>
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<tr>
<td>Energy Technology Perspectives 2016 Towards Sustainable Urban Energy Systems</td>
<td>2016</td>
<td>IEA</td>
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<tr>
<td>APEC Low-Carbon Model Town Development Model and Tool Kit Study</td>
<td>2015</td>
<td>APEC (series)</td>
</tr>
</tbody>
</table>
APEC Sustainable Cities Development Annual Report Series

54th Meeting of the APEC Energy Working Group, 20-24 November 2017, New Zealand
Progress Outline

2. Produce core publications-CCTs

- APSEC will continue to promote Clean Coal Technology (CCTs) Transfer Program.
- Establish CCTs Project Joint Operations Center at Beijing through cooperation with the Shenhua Group Corporation Ltd.
- Carry out research works on transfer and dissemination of CCTs. Start research on demonstration project of multi-energy complementary and integrated optimization for “clean coal-fired power generation & renewable energy” through cooperation with Electric Power Planning & Engineering Institute (EPPEI) of China. Discuss on the construction of intelligent energy data platform based on “Internet plus”.
- Supported by technical training and experts discussion, the research results will be published as the core publications including reports, books and Journal papers.
Priority Area for Clean Coal (Energy) Technology Transfer

Possible regional cooperation among APEC members, ASEAN and “ONE-BELT-ONE ROAD” countries
Progress Outline

3. Think-tank services

• **Statistic Analysis on APEC Energy Cooperation**

Based on APEC database for Energy Working Group, finalize the periodic Report for *APEC Energy Cooperation Current Status and Trend Analysis 2017 (APEC Projects)*, which provides reference for NEA to carry out energy cooperation on APEC region.
Progress Outline

3. Think-tank services

• APEC EWG News Letter Weekly

Focus on the APEC-related projects, activities and high-level meetings etc. by sorting out the e-mails sent from APEC and EWG secretariat to complete the News Letter Weekly to provide support for the partner network.

14 Issues submitted already.

APEC EWG News Letter Weekly

(Issue 12, 20-26 October, 2017)

<table>
<thead>
<tr>
<th>Date</th>
<th>Keyword</th>
<th>Content</th>
<th>Sender</th>
<th>Remarks</th>
<th>Suggest from APEC</th>
<th>Reply from NEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017.10.20</td>
<td>Nomination</td>
<td>2017年12月13日至14日将在泰国曼谷召开关于APEC高生物柴油混合柴油(B20)规范的研讨会。该研讨会将提供一个讨论机会。</td>
<td>APEC秘书处PD</td>
<td>专家及参会者报告</td>
<td>已转转EGBEP对口单位负责人，请其转发（11月3日转交）</td>
<td></td>
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<tr>
<td>2017.10.20</td>
<td>APEC项目</td>
<td>项目手册第12版已在APEC官方网站www.apec.org发布。</td>
<td>APEC秘书处PD</td>
<td>/</td>
<td>转发（11月2日）</td>
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<td>2017.10.20</td>
<td>EWG54</td>
<td>提交经济体代表及专家组代表按照附件中模板提交EWG54相关会议的文件。</td>
<td>APEC秘书处PD</td>
<td>请于2017年11月9日之前提交至秘书处</td>
<td>请留意关注。</td>
<td></td>
</tr>
<tr>
<td>2017.10.23</td>
<td>EWG54更新日程</td>
<td>提交经济体代表及专家组代表按照附件中模板提交EWG54相关会议的文件。</td>
<td>ERG秘书处</td>
<td>/</td>
<td>组建中方代表跟踪微信群，并发布最新日程。</td>
<td></td>
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<tr>
<td>2017.10.25</td>
<td>For Approval</td>
<td>2016-2016A亚太经合会能源效率评估（PREE）第6版，报告《废品回收再利用》</td>
<td>APEC秘书处PD</td>
<td>建议反馈截止日期为2017年11月8日</td>
<td>请其予以关注。</td>
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</tbody>
</table>
Progress Outline

3. Think-tank services

• *Monthly Work Progress Report*

Summarize monthly work progress of APSEC including every aspects required in the Five Year Work Plan, reported to NEA, and released in the Wechat Public Number of APSEC.

6 Issues submitted already.
Enrich the research team

Adjust and improve the APSEC Advisory Board, including Australia, China, Hong Kong, Indonesia, New Zealand, Singapore, U.S.. New members were appointed during 3rd Anniversary.
Administrative managements

- Compile The Special Remuneration Management of Visiting Researchers from APEC Economies. The recruitment document of APEC Visiting Researcher has already report to representative of APEC-EWG, waiting for feedback and connecting with researcher in U.S., Singapore, Hong Kong and Indonesia.

- APSEC International temporary and contract researcher(above 3 month) has invited Swiss and Australia researcher. The recruitment of Swiss researcher is in process.

- Hire young people with international vision and high level of comprehensive ability. Recruit 2 full time employees and build reliable intern team.
Financial managements

- The Guidelines of Expense and Reimbursement in APEC Funded Project
- The Regulation of APSEC Conference Expenses in China
- The Regulation of APSEC Travel Expenses
- The Rules for Financial Reimbursement of APSEC
- The Implementation Process of APSEC Employees' Reimbursement Abroad

<table>
<thead>
<tr>
<th>Financial Managements</th>
<th>2016</th>
<th>2017</th>
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<tbody>
<tr>
<td><strong>Revenue from:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tianjin University</td>
<td>103.94</td>
<td>109.42</td>
</tr>
<tr>
<td>National Energy</td>
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<tr>
<td>Administration</td>
<td></td>
<td>165.26</td>
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<tr>
<td><strong>Total</strong></td>
<td>103.94</td>
<td>274.68</td>
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<tr>
<td><strong>Expenses:</strong></td>
<td></td>
<td></td>
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<tr>
<td>Daily Operation</td>
<td>11.7</td>
<td>23.42</td>
</tr>
<tr>
<td>Labor Cost</td>
<td>51.77</td>
<td>86</td>
</tr>
<tr>
<td>Research Fund</td>
<td>39.43</td>
<td>165.26</td>
</tr>
</tbody>
</table>
Progress Outline

4. Flagship Events

The 3rd Asia-Pacific Energy Sustainable Development Forum was held in September 2017 in St. Regis Tianjin Hotel, which includes the Plenary Speeches and 5 Parallel Sessions.
3rd steering Committee Meeting & 2nd Advisory Board Meeting

APEC Project Workshop

APEC Training

“The Belt and Road” Symposium

Symposium on Chinese Participation in APEC Energy Cooperation
Progress Outline

5. Training arrangements

• Supporting the research work, to organize technical training twice per year considering the need in “The Belt and Road” and also the energy cooperation of ASEAN economies, achieve the implementation of technology transfer, local re-development of technology and real projects.

• Promote the ESCI practice awards in China and other member economies. To promote China's energy international cooperation and the go-out of domestic energy companies.
ESCI Best Practices Awards Promotion in China

• ESCI Best Practices Award, as a way to encourage best practices, facilitate knowledge-sharing within the APEC region, ESCI-KSP hosts an “ESCI Best Practices Awards Program”.

• As the second largest member economy in APEC, the quantity of ESCI-KSP practices from China is not correspond to its economies status and NO PRACTICE had won ESCI Best Practice Awards.

Reason for “No Award” of Chinese ESCI practices
• Lack of promotion in China;
• Lack of communication with ESCI winners;
• All practices are not offered by practices, nor written under Criteria;
• Final Round competitors didn’t submit Self-assessment statements timely;
• A series of domestic criteria and procedures have not been established.

ESCI China’s Practices Statistics

- Smart Transport: 25 practices out of 11% total
- Smart Job: 1 practice (3% of total)
- Smart Grid: 8 practices (8% of total)
- Smart Building: 8 practices (6% of total)
- LCMT: 7 practices (27% of total)
- Industry: 12 practices (23% of total)
1st training-Learn about APEC sustainable cities and ESCI

On 13rd July, the 1st training-Learn about APEC sustainable cities and ESCI was held in Tianjin, Penn IUR (USA), Richmond Group (Thailand, ESCI Golden Award), Alliance to Save Energy (USA, ESCI Sliver Award) assigned lecturers.
2nd training-Best Practices Sharing

On 21-22 Sept, APEC Training was held in Tianjin (Parallel Meeting of 3rd Anniversary of APSEC), LBNL(USA), NUS(Singapore), Shenzhen International Low-Carbon City(China), Chinese Academy of Sciences and so on assigned lecturers. Over 50 trainees attended the training.
Progress Outline

6. Resources Expansion and Integration
Network of Chinese Participation in APEC Energy Cooperation

APSEC’s Responsibilities

- APEC Sustainable Energy Center (APSEC) is entrusted by National Energy Administration to undertake the Secretariat work for the Network of Chinese Participation in APEC Energy Cooperation;
- APSEC is responsible for the daily management of partner networks;
- Coordinate the work, establish partner network information liaison platform.

Diagram:

- National Energy Administration
  - Secretariat (APSEC)
    - EGs’ Counterparts
      - Energy Research Institute
        - National Development and Reform Commission
      - Electric Power Planning & Engineering Institute
      - Tianjin University;
      - Petro China Planning and Engineering Institute
      - China National Institute of Standardization
    - TFs’ Counterparts
      - Tianjin University
      - China Renewable Energy Engineering Institute
Cooperation Efforts in APEC

Cross-fora Cooperation between PPSTI-EWG

Tianjin University Signed a MoU with Lawrence Berkeley National Laboratory (LBNL)

Strategic Partner

Prof. Li Zhu, the president of APSEC attend SIEW2017

Singapore Energy Market Authority visit APSEC

“The Belt and Road” Symposium (clean energy technology transfer)
Information Platform

• APSEC Website Upgrade
Outline

Part 1. Five Year Work Plan Approved

Part 2. Work Progress Aligning the FY Work Plan

Part 3. Key Research Publications Progress

Part 4. Work Plan before the EWG55
CNSC Annual Report

During EWG 53, the five years working plan of APSEC had been endorsed by all the member economies. APSEC will establish the Cooperative Network of Sustainable Cities (CNSC) pillar program report, **“APEC Sustainable Cities Development Annual Report”** as the flagship publication.

The research work for five years:

- **2017-2019**
  - “APEC Sustainable Cities Development - Mode and Concept”

- **2018-2020**
  - “APEC Sustainable Cities Development - Low-carbon Energy Planning and Advanced Technology Analysis”

- **2019-2021**
  - “APEC Sustainable Cities Development - Low-carbon Energy Transition Path”
Chapter 1: Present Situation and Problems of APEC Urbanization

Chapter 2: Work and Achievements
- FRIENDS OF THE CHAIR (FOTC) ON URBANIZATION
- Energy Smart Communities Initiative (ESCI)
- Low Carbon Model Towns (LCMT)
- APEC Cooperative Network of Sustainable Cities (CNSC)
- Low Carbon Cities/Towns Development in China

Chapter 3: Dimensions and Case Analysis
- Sustainable City Planning
- Sustainable Building
- Sustainable Cities Green Finance

Chapter 4: Mode Discussion and Indicator System

Chapter 5: Intelligence Collection and Concept Debate
Chapter 1: Present Situation and Problems

Urban Population Growth and GDP Growth

• Proportion of Urban Population Growth in APEC

  The proportion of urban population in APEC Economies can show the standard of urbanization to some extent. In APEC region the proportion varies a lot but is mostly on the rise.

• GDP Per Capita Growth in APEC

  GDP has close relationship with urbanization, influencing the degree of citizens’ life and social environment. In 2016, GDP per capita has obviously shown as two groups: in 11 economies it’s below 10000$, of the others are over 20000$.

Source: DataBank World Development Indicators
Urban population density reflects the city’s load situation and citizen’s approach to social welfare and energy. In order to achieve a sustainable goal, the city must consider humanity and ecology during development.

Source: DataBank World Development Indicators
Chapter 2: Work and Achievements

Low Carbon Cities/Towns Development in China

- China Urbanization and Energy Consumption

By 2016, the urbanization rate of China’s resident population has reached 56.1%, by the end of 2016, the number of cities in China reached 657, the total energy consumption increase rapidly with the proportion of urban population.

Source: The website of the National Bureau of Statistics 2016

![Total Energy Consumption Along With Urbanization](image-url)
• **Status of China APEC Low Carbon Model Town**

With the support of Ministry of Foreign Affairs and National Energy Administration of China, APSEC upgraded the original “low-carbon model town promotional activities” to “APEC Cooperative Network of Sustainable Cities”, as one pillar program, for continuous implementation.

At present, more low carbon model town projects in China have participated in the international cooperation of “Belt and Road”, such as Turpan (Xinjiang), Xu Wei (Jiangsu), and play a significant role in the target of reducing energy intensity.

By April 2014, NEA had received 31 projects of applying APEC low carbon model town. In that project database, these 31 APEC low carbon model town projects are classified according to six types: business, tourism, vacation, industrial, residential, agricultural industry and comprehensive type.
**Policy and implementation**

<table>
<thead>
<tr>
<th>Year</th>
<th>Departments</th>
<th>Key areas of policy</th>
<th>Implementations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>NDRC</td>
<td>Low-carbon provinces, autonomous regions, and low-carbon cities pilot projects</td>
<td>5 provinces and 8 cities as the first batch of pilot projects</td>
</tr>
<tr>
<td></td>
<td>NEA, Ministry of Finance, Ministry of Agriculture</td>
<td>National green energy demonstration county</td>
<td>108 counties, such as Yanqing (Beijing), Rudong (Jiangsu)</td>
</tr>
<tr>
<td>2011</td>
<td>State Council</td>
<td>“Government Working Report”, proposing the promotion of LCT demonstrations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MOHURD</td>
<td>Green low-carbon small towns pilot demonstration</td>
<td>evaluation index</td>
</tr>
<tr>
<td>2012</td>
<td>NDRC</td>
<td>Low-carbon provinces, autonomous regions, and low-carbon cities pilot projects</td>
<td>29 cities as the second batch of pilot projects, such as Beijing, Shanghai, Hainan and Shijiazhuang</td>
</tr>
<tr>
<td></td>
<td>NEA</td>
<td>New energy demonstration cities and industrial parks</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>NEA</td>
<td>New energy demonstration cities and industrial parks</td>
<td>81 cities and 8 industrial parks as the first batch</td>
</tr>
<tr>
<td>2016</td>
<td>MOHURD, NDRC, Ministry of Finance</td>
<td>Characteristic Small Town</td>
<td>127 small towns as the first batch</td>
</tr>
<tr>
<td></td>
<td>Ministry of Finance</td>
<td>Pastoral complex</td>
<td>8 provinces as the first batch of pilot projects</td>
</tr>
<tr>
<td>2017</td>
<td>MOHURD, NDRC, Ministry of Finance</td>
<td>Characteristic Small Town</td>
<td>276 small towns as the second batch</td>
</tr>
</tbody>
</table>
Chapter 3: Dimensions and Case Analysis

Concept Design of ECO Community

Concept 1: dividing automobile and non-automobile traffic

Concept 2: conducting the model of TOD

Concept 3: conducting the model of P&R

Concept 4: vehicle speed gradient system

Concept 5: blue, green, gray checkerboard pattern

Concept 6: multi-finger green wedge penetration

Source: The design concept of eco community, Sino-Singapore Eco-city, Tianjin, China
Small Town Construction

As an important supplement to urban development, small towns* are obviously different from the city on society, economy and environment. Small town is mainly due to the specific agglomeration of production and consumption, which promotes the upgrading and updating of production and living space. Different APEC economies has made their own exploration and efforts during the construction of small towns.

**Small Town Construction Experience**

- **Policy & Regulation**
  - Attach importance to infrastructure construction
  - Basic planning principles
  - Stakeholder participation

- **Industry & Economy**
  - Tamp the foundation of economic development
  - Take advantage of resource
  - Maintain economic vitality

- **Society & Ecology**
  - Meet the basic needs of residents
  - Macro control balance
  - Environmental friendly

*The area of the planning area is generally controlled at about 3 km² (the tourism characteristic town can be relaxed appropriately), the scale of construction land is generally controlled at about 1 km², in principle not more than 50% of the planned area.
Green Building have been widely valued among the APEC economies and there are over 18 economies have established their Green Building associations or related organizations. In the APEC region, over seven certification systems or rating systems are spread and applied in different ways.
Chapter 4: Mode Discussion and Indicator System

- **Sustainable Cities Mode**
  - Economy
  - Built environment
  - Education, culture, science & innovation
  - Well-being, health & safety
  - Governance & citizen engagement
  - ICT

- People-orientation

- **Sustainable City**
  - ECO City
  - Cultural City
  - Livable City
  - Healthy City
  - Smart City
  - Low Carbon City
  - Green City
  - Sustainable City
  - Economic sustainability
  - Social sustainability
  - Environmental sustainability

- Natural environment
- Built environment
- Water & waste management
- Transport
- Energy
Chapter 5: Intelligence Collection and Concept Debate

Interviews of Experts and Feedback from Delegates

Jyuung-Shiauu Chern
Lead Shepherd of APEC EWG

Jian Zuo
Associate Professor, The University of Adelaide, Australia

Khee Poh Lam
Provost's Chair Professor of Architecture and Building and Dean of the School of Design and Environment, the National University of Singapore.

Nan Zhou
Staff Scientist in the Lawrence Berkeley National Laboratory, Director of China Energy Group.

Jun Ren
Chief Architect, Tianjin TENIO Architectural Design Co. Ltd, China

Henriette Jacoba Roeroe
Governor Advisor on Sustainable Development, Bitung Special Economic Zone North Sulawesi-Indonesia, Indonesia

James Prest
Doctor, ANU Energy Change Institute, Australia

Chung-Hsien Chen
Chair of EGNRET; Director of Energy Technology Division, Bureau of Energy, Ministry of Economic Affairs, Chinese Taipei

Keng-Tung Wu
Associate Professor, Chung Hsing University, Chinese Taipei

P. Marc LaFrance
Windows Technology Manager, Department of Environment, United States

ZhiQiang Guo
Director, Quality management CECEP Consulting Co., Ltd China

Hui Zhou
Deputy Director, Green Building Research Center, China State Construction Energy, CORP. Technical Center, China
Chapter 5: Intelligence Collection and Concept Debate

Interviews of Experts and Feedback from Delegates

<table>
<thead>
<tr>
<th>Name</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jian Zuo</td>
<td>The development of sustainable city include transportation, construction, energy and other aspects, governments and other parties are required to work hard together to achieve the goal.</td>
</tr>
<tr>
<td>Jun Ren</td>
<td>The point of sustainable city is not about how to develop the city, but to let people there have a sustainable lifestyle.</td>
</tr>
<tr>
<td>Hui Zhou</td>
<td>When we talk about sustainable city, we talk more about the culture. To be specific, when it comes to architecture, it should accomplish the harmony between man and nature, at the same time, it also includes resource conservation, comfort and environmental protection.</td>
</tr>
<tr>
<td>Keng-Tung Wu</td>
<td>We need to extend the point of green architecture to line, then to plane, and to make sustainable city as a whole system.</td>
</tr>
<tr>
<td>Zhiqiang Guo</td>
<td>Sustainable city involves resources, environment, space, culture and so on. It can maintain a certain development trend in the process of development. Sustainable city is not a static concept but a dynamic one, which must reflect the process of construction and development.</td>
</tr>
<tr>
<td>Jyuung-Shiaau Chern</td>
<td>The APSEC needs to focus on a more broad concept of low-carbon city, then pass these ideas to developing economies faster and let them learn from it. Then seize the chance of economic develop to integrate energy consumption and renewable energy as a whole system.</td>
</tr>
<tr>
<td>Chung-Hsien Chen</td>
<td>We selected some cities in APEC area as models, and through this way to let different types of cities to provide different references, then by copy these models to promote widely spread.</td>
</tr>
<tr>
<td>Nan Zhou</td>
<td>The increase of population, urbanization rate has increased, the improvement of living comfort, in the traditional energy and renewable energy utilization technology development and application of energy consumption under the background of natural growth, low carbon cities need to construction, industry, transportation, and other departments work together.</td>
</tr>
</tbody>
</table>
During the EWG 53 meeting, the five years working plan of APSEC had been endorsed by all the member economies. APSEC will establish the Clean Coal (Energy) Technology Transfer pillar program report, Series Reports on “Clean Energy Technology Transfer along the ‘Belt & Road’ in APEC Region” as the flagship publication.

The research work for five years:

**2017-2019**  
《Strategy Research for Clean Energy Technology Transfer along the ‘Belt & Road’ in APEC Region”》

**2018-2020**  
《Results reports on demonstration project of multi-energy complementary and integrated optimization for ‘clean coal-fired power generation & renewable energy’》  
《Progress reports on clean and efficient coal-fired power generation technology in APEC Region (China)》

**2019-2021**  
Summary the previous research results, and deepen research on clean and efficient coal-fired power generation technologies and renewable energy technologies based on concept of ‘Internet Plus’ smart energy (Energy Internet)
• When Chinese President Xi Jinping visited Central Asia and Southeast Asia in September and October of 2013, he raised the initiative of jointly building the Silk Road Economic Belt and the 21st-Century Maritime Silk Road.

• In March 2015,《Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road》was issued by the National Development and Reform Commission of China, with state council authorization.

• In May 2017,《Vision and Actions on Energy Cooperation in Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road》was issued by the National Development and Reform Commission and NEA.
Contents

Part I - Background & Significance of CET Transfer
• Energy Development & Trend Along the 'Belt and Road' in APEC Region and China's Energy Development Strategies

Part II - Potential Analysis for CET Transfer
• Current Development Status & Trends of Clean Energy Technologies in China
• Current development Status & Trends of Clean Energy Technologies along the ‘Belt and Road’ in APEC Region
• Overview on Advanced Clean Coal Technologies
• Overview on Advanced New and Renewable Energy Technologies

Part III - Recommendations for CET Transfer
• Clean Energy Technologies ‘Go Out’, Achieving Win-Win Cooperation
• Forward Looking of Clean Energy Technologies Transfer
• Recommendations on Clean Energy Technologies Transfer
Chapter 1. Potential Transfer member economies’ economic status, energy status and development trend were studied, and China’s strategic distribution of energy in ‘13th’ Five-Year was also introduced.

<table>
<thead>
<tr>
<th>Economy</th>
<th>Economic Status</th>
<th>Energy Status and Trend</th>
<th>Strategic Destitution of Energy in ’13th Five-Year’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunei Darussalam</td>
<td>Total Population; GDP;</td>
<td>Coal, include reserves, resource, production, consumption, export and import of hard coal and lignite;</td>
<td>Clean Coal Field</td>
</tr>
<tr>
<td>Cambodia</td>
<td>Trade in Goods; Foreign Direct Investment (FDI);</td>
<td></td>
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<tr>
<td>Indonesia</td>
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<td>Lao PDR</td>
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<td>Malaysia</td>
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<td>Singapore</td>
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<td>Vietnam</td>
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<tr>
<td>China</td>
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</tbody>
</table>

Possible Regional Cooperation Among APEC Members, ASEAN and “ONE-BELT-ONE-ROAD” Economies

Notes: “--” denotes “not studied”
In 2014, research data indicated that subcritical technologies represented most of the installed and planned capacity of ASEAN. However, current research suggests that 48% of coal stations are expected to make use of advanced clean coal technologies (2016).
Chapter 2-3. Clean Energy Technologies’ Development along the ‘Belt and Road’

2. For ASEAN’s RE technologies (Solar PV)

Solar PV installation of ASEAN has been experiencing a rapid increase recently. In 2016, ASEAN’s total installed PV capacity has reached nearly 3500 MW.
Chapter 4-5. Advanced Clean Energy Technologies and Big Companies (China)

1. For China’s Clean Coal
   - China’s advanced clean coal technologies include IGCC, USC, CCUS and SYNGAS, etc. For example, China’s coal consumption rate has achieved 312 g/kWh in 2016.
   - Well-known enterprises of clean coal of China including Shenhua Group, Huaneng Group and EPPEI, etc.

2. For China’s Solar PV
   - Statistics data from Bloomberg shows that nine of the world’s largest solar-module manufacturers are solely or largely based on China (2015).

World's 10 Largest Solar-Module Manufacturers, 2015 (Source: Bloomberg)
Chapter 6-7. Potential Transfer routes for Clean Energy Technologies along the ‘Belt and Road’ in APEC region.

Advantages/Disadvantages of Different Potential Transfer Routes

<table>
<thead>
<tr>
<th>Pathways</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Factors Affecting Choice of Pathway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licensing agreement</td>
<td>-Relatively easy access to target markets</td>
<td>–Need for quality control</td>
<td>–Acceptable financial risk</td>
</tr>
<tr>
<td></td>
<td>-Profitability with little investment</td>
<td>–Risks of creating future competitors</td>
<td>–Intellectual property protection</td>
</tr>
<tr>
<td>Exporting</td>
<td>-Minimizes risk and investment</td>
<td>–Limited access to local information</td>
<td>–After-sales service and training</td>
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<tr>
<td></td>
<td>–Speed entry process</td>
<td>–Trade barriers &amp; tariffs add to costs</td>
<td>–Product compatibility</td>
</tr>
<tr>
<td>Foreign Direct Investment</td>
<td>-Full control</td>
<td>–Costly</td>
<td>–Acceptable financial risks</td>
</tr>
<tr>
<td></td>
<td>–Less competition</td>
<td>–High risk</td>
<td>–Expected size of domestic market</td>
</tr>
<tr>
<td>Joint ventures</td>
<td>–Risk sharing</td>
<td>–Risk of conflicts with partner(s)</td>
<td>–Acceptable financial risks</td>
</tr>
<tr>
<td></td>
<td>–Less demanding on resources (compared to direct investment)</td>
<td>–Risk of creating competitor</td>
<td>–Ensuring protection of intellectual property</td>
</tr>
</tbody>
</table>

From Vision to Action

Turn Challenge into Opportunity
### Chapter 6-7. Clean Energy Support Policies Research along the ‘Belt and Road’ in APEC Region

<table>
<thead>
<tr>
<th>Economy</th>
<th>Renewable energy Targets</th>
<th>Feed-in Tariff/ Premium Payment</th>
<th>Electric Utility Quota</th>
<th>Obligation/RPS</th>
<th>Net Metering/Net Billing</th>
<th>Transport Obligation/Mandate</th>
<th>Heat Obligation/Mandate</th>
<th>Tradable REC</th>
<th>Tendering</th>
<th>Capital Subsidy, Grant, or Rebate</th>
<th>Investment or Production Tax Credits</th>
<th>Reductions in Sales, Energy, VAT or Other Taxes</th>
<th>Energy Production</th>
<th>Public Investment, Loans, or Grants</th>
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<td>China</td>
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</tbody>
</table>

(Source, REN 21)

‘●’ denotes ‘existing (national or subnational)’; ‘R’ denotes ‘revised’; ‘ ’ denotes ‘not found’

Statistic data from REN21 show that most of the economies along the ‘Belt and Road’ in APEC region have built or put forward their own clean energy promoting policies.
Part III. Recommendations for Clean Energy Technologies Transfer

Interviews of Experts and Feedback from Delegates

Xiaowei Wei
Director of Division, Dept. of International Cooperation, National Energy Administration, China

Munlika Sompranon
Director of Energy Cooperation Section Dept. of Alternative Energy Development & Efficiency (DEDE), Thailand

James Prest
Director ANU Energy Change Institute, Australia

Vince Gowan
General Secretary Indonesia R&D international IRDI, Indonesia

Xiaodong Xu
Vice President (Prof.) Electric Power Planning & Engineering Institute (EPPEI), China

Clem Arlidge
Senior Advisor Energy Efficiency & Conservation Authority (EECA), New Zealand

Roc Shi
Principal Research Fellow, University of Technology Sydney, Australia

Keyu Liu
Former Vice President (Prof.) CNPC Economics & Technology Research Institute, China

Zhufeng Yu
Deputy General Manager (Dr.) Shenhua Science and Technology Research Institute, China
### Interviews of Experts and Feedback from Delegates

<table>
<thead>
<tr>
<th>Name</th>
<th>Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>James Prest</td>
<td>The relatively high price of Clean energy remains one of the biggest obstacles to clean energy transfer along the ‘Belt and Road’. So mutual cooperation between stakeholders and policy developing in APEC region are important for technology transfer of clean energy.</td>
</tr>
<tr>
<td>Clem Arlidge</td>
<td>We need to see the clean energy transfer from a long prospective. It has considerable potential for the clean energy technology transfer in APEC region under the background of global climate change and environment pollution. Creation of a competitive platforms is important for promoting the clean energy technologies transfer in APEC region.</td>
</tr>
<tr>
<td>Vince Gowan</td>
<td>To achieve the RE target of Indonesia, Indonesia look forward to cooperate on clean energy technology communication, training and improving cooperation level during technology transfer process.</td>
</tr>
<tr>
<td>Munlika Sompranon</td>
<td>Learning and understanding each APEC member economies’ clean energy policy is helpful to carry out clean energy transfer.</td>
</tr>
<tr>
<td>Keyu Liu</td>
<td>Clean energy stakeholders in APEC region should seize opportunities created by the ‘Belt and Road’ initiative, and strengthening the consciousness of opportunity during the technology transfer process.</td>
</tr>
<tr>
<td>Zhufeng Yu</td>
<td>Compared with technical problems, local policies and laws are more difficult to cope with during clean energy technology transfer process. Thus, clean energy stakeholders in APEC region should pay attention to cooperation risk identification and analysis.</td>
</tr>
<tr>
<td>Xiaowei Wei</td>
<td>During the transfer process, we need to make full use of bilateral and multilateral international energy cooperation platform, promoting energy cooperation, information exchange and policy exchange.</td>
</tr>
</tbody>
</table>
Part III. Recommendations for Clean Energy Technologies Transfer

Chapter 8. Recommendations Summary for CET Transfer Stakeholders in APEC Region

• Clean Energy Stakeholders in APEC Region Should Seize the Cooperation Opportunities Created by the ‘Belt and Road’ Initiative, and Strengthening the Consciousness of Opportunity during the Technology Transfer Process.

• Clean Energy Stakeholders in APEC Region Should Focus on Continuous Technological Innovation and Accumulation, and Enhancing Cooperation Level During Technology Transfer Process.

• Clean Energy Stakeholders in APEC Region Should Pay Attention to Cooperation Risk Identification and Analysis.

• Clean Energy Stakeholders in APEC Region Should More Actively Participate in Bilateral and Multilateral International Energy Cooperation Mechanism.
Work Plan before the EWG55

1. Institution Building Continues

2. Milestones for Key Research Publications

3. The 3rd APEC Workshop on Sustainable Cities

4. Training and others
Learn more about APEC

• **Statistic Analysis on APEC Energy Cooperation**

In order to further strengthen Chinese participants in energy cooperation in APEC region, APSEC still concentrate on collecting and analysis the activities and meetings held under the 4 expert groups and 2 task forces to prepare periodic Report for the APEC Energy Cooperation Current Status and Trend Analysis 2017 (APEC Activities).
Milestones for Key Research Publications

- CNSC Annual Report
- CCT Annual Report
- EWG54, NZ
- Chinese Full Version
- 2017 Year End
- Chinese Final Version
- EWG55, HKC
- English Full Version
- EWG55, HKC

54th Meeting of the APEC Energy Working Group, 20-24 November 2017, New Zealand
Flagship Event - The 3rd APEC workshop on Sustainable Cities

EWG 55 Programme

<table>
<thead>
<tr>
<th>Day</th>
<th>AM Session</th>
<th>PM Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 1</td>
<td>EWG Expert Groups &amp; Taskforce Chairs Meeting; APERC Workshop</td>
<td>Energy Resiliency Task Force Meeting; Low Carbon Model Town Task Force</td>
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<tr>
<td>14 May 2018 (Mon)</td>
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<tr>
<td>DAY 2</td>
<td>Workshop (Theme to be confirmed)</td>
<td>APSEC Workshop</td>
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<tr>
<td>15 May 2018 (Tue)</td>
<td></td>
<td>(Low Carbon Energy &amp; Green Finance)</td>
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<tr>
<td>DAY 3</td>
<td>EWG 55 Meeting</td>
<td>EWG 55 Meeting</td>
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<tr>
<td>16 May 2018 (Wed)</td>
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<tr>
<td>DAY 4</td>
<td>EWG 55 Meeting</td>
<td>EWG 55 Meeting</td>
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<tr>
<td>17 May 2018 (Thu)</td>
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<tr>
<td>DAY 5</td>
<td>Technical Site Visit</td>
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<tr>
<td>18 May 2018 (Fri)</td>
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<td>Free time for sightseeing!</td>
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</tbody>
</table>
**Training and Resources expansion**

With the support of Tianjin local government, we launched project collection for ESCI Best Practice Awards. To promote Chinese practices to ESCI Awards, improve impact and popularity of Chinese stakeholders. We will hold training courses on ESCI Best Practices Awards and provide consultation service.

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<tbody>
<tr>
<td>• Issue <em>Chinese Practices Collecting Guide</em></td>
<td>• Technical Tour to ESCI former winners</td>
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<tr>
<td>• Establish Chinese Jury for ESCI Domestic Scoring</td>
<td>• Chinese Best Practices Sharing Workshop</td>
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<tr>
<td>• Collecting Chinese Practices</td>
<td></td>
<td>• Chinese Qualified Practices Sharing Workshop</td>
</tr>
</tbody>
</table>

By 2018, the two Sustainable City Networks members will continue to grow, including but not limited to Zhangjiakou and Lianyungang City in China, Tianjin Innovative Finance Investment Co. Ltd., Shenhua Group, Suez Environment and China Energy Conservation and Environmental Protection Group etc.
Thanks for your attention!

“Joining Hands Toward Sustainable Energy Development in the Asia-Pacific Region.”