Progress of The APEC Low-Carbon Model Town (LCMT) Project

20 March 2019

Agency for Natural Resources and Energy
METI, Japan
Outline of the LCMT Project

LCMT Project Dissemination Phase 1
- Banda Aceh City, Indonesia
- Shah Alam City Center Section 14, Malaysia
- Hang Tuah Jaya City, Malaysia
- 2nd LCMT Symposium (Da Nang, Viet Nam, Sept. 2018)

LCMT Project Dissemination Phase 2
- Davao City, The Philippines
- Da Lat City, Viet Nam

LCMT Project Dissemination Phase 3
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LCMT Project Dissemination Phase 3
Establish a Task Force (LCMT-TF)

The LCMT-TF should
1. develop the concept of a Low Carbon Town,
2. conduct feasibility studies to encourage creation of low-carbon communities in urban development plans, and
3. share best practices for making such communities a reality.
1. Development and refinement of the “Concept of the Low-Carbon Town in the APEC Region (Concept)”
   ➢ The Concept shows a basic idea/principle of a low-carbon town and provide guidance.
   ➢ The APEC Low-Carbon Town Indicator (LCT-I) System has been developed based on the Concept.

2. Feasibility Study for a Case Town

3. Policy Review for a Case Town
The Concept and the LCT-I System

The Concept of the Low-Carbon Town in the APEC Region (Sixth Edition)

APEC Low-Carbon Town Indicator System Guideline (First Edition)
http://publications.apec.org/publication-detail.php?pub_id=1797
Assessment Framework of LCT-I System

Directly Related

<table>
<thead>
<tr>
<th>Tier 1</th>
<th>Tier 2 (No. of Tier 3 indicators)</th>
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<tbody>
<tr>
<td>Demand</td>
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<td>Supply</td>
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<td>Demand &amp; Supply</td>
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Indirectly Related

<table>
<thead>
<tr>
<th>Environment &amp; Resources</th>
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<td>Governance</td>
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</table>

1. Town Structure (3)
2. Buildings (4)
3. Transportation (6)
4. Area Energy System (1)
5. Untapped Energy (1)
6. Renewable Energy (1)
7. Multi Energy System (1)
8. Energy Management System (3)
9. Greenery (2)
10. Water Management (3)
11. Waste Management (2)
12. Pollution (3)
13. Policy Framework (4)
14. Education & Management (2)
1. Feasibility Study (F/S)
   - Develop low-carbon strategies for selected towns

2. Policy Review
   - Policy review to realize low-carbon town development conducted by experts
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Instructions from APEC Energy Ministers, the 12th APEC EMM (Cebu, Oct. 2015)

“We instruct the LCMT-TF to move the current LCMT Project into the next stage in order to disseminate Low-Carbon Towns in the Asia-Pacific region.”

Key Objective of Dissemination Phase

- To disseminate the basic ideas and effective approaches of the Concept through utilizing the LCT-I System, which helps evaluate the progress and status of low-carbon development of various area in the APEC region;

- To provide Feasibility Studies of a specified area of low-carbon development projects selected as the LCT-I volunteer towns in the LCMT Project and identify how to improve the low-carbon development plans through the Feasibility Studies; and

- To share best practices and real-world experiences of low-carbon town design with planners and policy makers throughout the APEC region.

**LCMT Phase 1 to 7**

- Perform FS in shallow and wide viewpoints, including grasping CO2 emissions in target areas.
- Objective only one city

**Study of method is comprehensive**

**LCMT Dissemination Phase**

- DISSEMINATION will examine realistic viability to realize a low-carbon town.
- Objective 3 cities with different characteristics.

Create Low-Carbon business plan and build a business model
CONTENTS

✓ LOW-CARBON MEASURES AND IMPLEMENTATION SCENARIOS
✓ LOW-CARBON MEASURES FOR ENERGY AND TRANSPORTATION
✓ BUSINESS SCHEME OF THE THREE VOLUNTEER TOWNS
✓ FUTURE STEP
ABOUT BANDA ACEH CITY, INDONESIA

- From Jakarta: 1,840km
- Area: 61.36km²
- Population: 254,904

- Sub district: 9
- GDP Per Capita: 4,712 USD
- Economic Growth: 5.01%

TARGET AREA

1. Ulee Lehue Port and Tourism District
2. Keudah Rental Flats and Peulanggahan City Forest
3. Gampong Jawa landfill and Surrounding Settlements
4. Alue Naga energy self-sufficient village

ANDAMAN SEA
# PROPOSALS TECHNICAL SUMMARY

<table>
<thead>
<tr>
<th>Target Area</th>
<th>Low-Carbon Technology</th>
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<tbody>
<tr>
<td></td>
<td>Town Structure</td>
</tr>
<tr>
<td></td>
<td>Accessibility</td>
</tr>
<tr>
<td>1. Ulee Lehue</td>
<td>△</td>
</tr>
<tr>
<td>2-1. Keudah Social Housing (Rusunawa) and BNI Trembesi City Forest – Peulangghan</td>
<td>○</td>
</tr>
<tr>
<td>3. Alue Naga, Kecamatan Siyah Kuala</td>
<td>○</td>
</tr>
<tr>
<td>4. Gampong Jawa, Juta Raja District</td>
<td>○</td>
</tr>
<tr>
<td>Whole City</td>
<td>○</td>
</tr>
</tbody>
</table>
NSRI measured two-story house in Banda Aceh. Air temperature of the hall (living room) on the first floor is always lower than the corridor on the 2nd floor but it was always over 29 degree.
Low-Carbon Measures and Implementation Scenarios - Shah Alam City -

- From Kuala Lumpur: 20km
- Area: 290.3km²
- Population: 740,750
- Section: 56

LOW-CARBONIZATION PLAN

ICT Platform for AEMS, MaaS, etc.
EV Circulation Bus
TOD
CGS
Green & Water
Shopping
Office & Hotel
Mosque

Low Carbonization of Buildings
Roof top PV
Floating PV

LOW-CARBONIZATION PLAN
Low-Carbon Measures and Implementation Scenarios -Hang Tuah Jaya City-

- From Kuala Lumpur: 120km
- Area: 144.61 km²
- Population: 197,405

LOW-CARBONIZATION PLAN

- Energy Saving
- Low Carbonization of Buildings
- Roof top PV
- Wind Power System
- Office & Commercial
- Residential
- Green
- Green & Golf
- R&D, Public
- TOD
- EV Circulation Bus
- ICT Platform
LOW-CARBONIZATION PLAN

Upgrading business functions of MITC, it will form a new core in Melaka state. By moderating the traffic volume concentrating on Melaka, NSRI will encourage sustainable development of the World Heritage Area and aim to realize Innovative Tourism.
1. BANDA ACHE CITY, INDONESIA

Low-Carbon Effect of Energy and Transportation

NSRI estimated the CO2 emissions in 2018 (BAU) to be 3,061 t-CO2 as follows. Although it will be 172,998 t-CO2 considering the urban development by 2040, it can be expected to be reduced to 83,910 t-CO2 (48% reduction) by promoting the use of public transportation and Electric vehicle.
Low-Carbon Measures for Energy and Transportation

2. SHAH ALAM CITY CENTER SECTION 14, MALAYSIA

Low-Carbon Effect of Energy and Transportation

Although BAU is expected to increase as GDP increases, by executing our proposed method, it is possible to reduce 57% of CO2 by 2040.

NSRI estimated the CO2 emissions in 2018 (BAU) to be 108,701 t-CO2 as follows. Although it will be 190,852 t-CO2 considering the urban development by 2040, it can be expected to be reduced to 130,428 t-CO2 (31% reduction) by promoting the use of public transportation and Electric vehicle.
3. CITY OF HANG TUAH JAYA, MALAYSIA

Low-Carbon Effect of Energy and Transportation

Although BAU is expected to increase as population increases, by thorough energy saving of the building and installation of PV, it is possible to reduce 43% of CO2 by 2040.

NSRI estimated the CO2 emissions in 2018 (BAU) to be 13,205 t-CO2 per year as follows. Although it will be 99,067 t-CO2 considering the increase rate of automobile by 2040, it can be expected to be reduced to 72,175 t-CO2 (39% reduction) by promoting the use of public transportation.
## Business Scheme of the Three Volunteer Towns

<table>
<thead>
<tr>
<th>Potential business scheme</th>
<th>Banda Aceh</th>
<th>Section 14</th>
<th>Hang Tuah Jaya</th>
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<tbody>
<tr>
<td>Energy</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Area-based Green Lease</td>
<td>-</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>(few apartment, office)</td>
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<tr>
<td>Neighborhood Solar Farm</td>
<td>●</td>
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<td>●</td>
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<tr>
<td>Transportation</td>
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<tr>
<td>EV Circulation Bus Service</td>
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<td>●</td>
</tr>
<tr>
<td>Area-based MaaS</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Capacity Building</td>
<td>●</td>
<td>●</td>
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</tbody>
</table>
Energy: Area-based Green Lease

- If building owner and tenants sign a contract of “Green Lease” inside of the designated area, public sector (local municipality, etc.) provide subsidy to building owner as a part of additional cost for low carbonization.
- After building owner improves building equipment, reduction of utility costs caused by the above improvement, is divided by tenants and owner as an incentive of low carbonization for both sides.
Energy: Neighborhood Solar Farm

- Local municipality or area management body installs solar panels by utilization of rooftop of building and unused land/open space within the designated area, and gain an income by selling electricity through the FIT system.
- In case the FIT system is terminated, Virtual PPA should be considered as an alternative scheme.
Transportation: EV Circulation Bus Service

- Public sector or area management body leases EV bus from the company and manages circulation bus service inside of the designated area.
- Management body gains basic service fee from building owners who benefit from the service, and advertisement fee caused by ads put at the bus body and bus station.

Because of proximity to LRT, etc.
CAPACITY BUILDING

Capacity building occurs through the mediums of skills, knowledge, tools, equipment or other resources required to complete the task at hand to a high standard and further impact. Although training is an essential part of achieving this, capacity building extends far beyond just this activity:

- **Human resource development**, the process of equipping individuals with the understanding, skills and access to information, knowledge and training that enables them to perform effectively;

- **Organizational development**, the elaboration of management structures, processes and procedures, not only within organizations but also the management of relationships between the different organizations and sectors (public, private and community);

- **Institutional and legal framework development**, making legal and regulatory changes to enable organizations, institutions and agencies at all levels and in all sectors to enhance their capacities.

Business Scheme of the Three Volunteer Towns
This study is considered as the first step in aiming for Low Carbon Model Town. In the future, in order to implement these plans, it is necessary for local governments to proceed more concrete actions.

In Banda Aceh, since development of coastal target areas has not been undertaken, first of all, development of traffic infrastructure will be necessary. After that, measures to induce low carbonization are prepared in advance as a low carbon guideline for urban development.

In Shah Alam, since they have already made efforts to reduce the carbon emission to some extent, it is a challenge how to set incentives for low carbonization, including private enterprises and citizens in the area. Legal institutionalization will take much time, so it is necessary to improve public-private collaboration-type low carbonization while taking deregulation etc.

In Hang Tuah Jaya, it is necessary to prepare measures to induce low carbonization beforehand, as urban development including the surrounding areas will be promoted in the future.

From the viewpoint of economic support, the possibility of diversified financing through international organizations and social media, etc. based on the concept of SDGs, by appealing low-carbonization with the area through those measures and ecosystem. At the same time, capacity building of municipal officials is also a necessary element. It is necessary for municipalities to lead the way toward lowering the carbon emission, and incorporate companies / citizens accordingly through various dissemination enlightenment, workshops, etc.
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The 2nd LCMT Symposium

- The Symposium was held in September, 2018 in Da Nang, Viet Nam.
- The main purpose is to disseminate LCT in the APEC region through the utilization of the LCT-Indicator system, sharing information on advanced LCT projects in the world.
- 31 participants from 7 APEC economies, 2 volunteer towns, 4 review experts, ADB, International Council for Local Environment Initiative (ICLEI), APERC.
Dissemination Phase 2 and 3

(Phase 2)
- Carry out the 2\textsuperscript{nd} in-depth feasibility study for the 2 volunteer towns, Davao City, The Philippines and Da Lat City, Viet Nam.
- Invite the 3\textsuperscript{rd} nomination for the LCT-I volunteer town & select 3 towns
- Hold the 3\textsuperscript{rd} symposium

(When necessary budget is approved in Phase 3)
- Carry out the 3\textsuperscript{rd} in-depth feasibility study for the 3 volunteer towns
- Hold the wrap-up symposium