Review on the LCT Planning of
Khon Kaen - Thailand

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The 3rd APEC Low-Carbon Model Town Symposium
September 2019

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I. Overview of Khon Koen - LCMT

1. Characteristic of Khon Kaen

Climate data for Khon Kaen (1981–2010)													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	37.3 (99.1)	39.2 (102.6)	41.7 (107.1)	42.6 (108.7)	41.9 (107.4)	39.6 (103.3)	37.3 (99.1)	37.0 (98.6)	36.3 (97.3)	35.7 (96.3)	37.5 (99.5)	35.7 (96.3)	42.6 (108.7)
Average high °C (°F)	30.8 (87.4)	33.1 (91.6)	35.3 (95.5)	36.4 (97.5)	34.5 (94.1)	33.6 (92.5)	33.0 (91.4)	32.4 (90.3)	31.9 (89.4)	31.6 (88.9)	31.2 (88.2)	30.1 (86.2)	32.8 (91.0)
Daily mean °C (°F)	23.4 (74.1)	26.0 (78.8)	28.5 (83.3)	29.9 (85.8)	28.9 (84.0)	28.6 (83.5)	28.1 (82.6)	27.7 (81.9)	27.2 (81.0)	26.5 (79.7)	25.0 (77.0)	23.0 (73.4)	26.9 (80.4)
Average low °C (°F)	17.4 (63.3)	20.1 (68.2)	22.8 (73.0)	24.9 (76.8)	24.9 (76.8)	25.0 (77.0)	24.6 (76.3)	24.4 (75.9)	23.9 (75.0)	22.8 (73.0)	20.1 (68.2)	17.2 (63.0)	22.3 (72.1)
Record low °C (°F)	8.2 (46.8)	11.9 (53.4)	11.1 (52.0)	18.5 (65.3)	20.6 (69.1)	21.1 (70.0)	21.0 (69.8)	21.9 (71.4)	20.3 (68.5)	14.6 (58.3)	10.3 (50.5)	6.4 (43.5)	6.4 (43.5)
Average rainfall mm (inches)	4.0 (0.16)	21.4 (0.84)	42.1 (1.66)	89.6 (3.53)	168.7 (6.64)	161.6 (6.36)	173.3 (6.82)	216.4 (8.52)	232.0 (9.13)	117.7 (4.63)	15.9 (0.63)	4.1 (0.16)	1,246.8 (49.09)
Average rainy days	1.0	2.7	4.2	7.7	14.5	14.4	15.9	17.8	17.7	9.7	2.5	0.7	108.8
Average relative humidity (%)	65	63	61	64	74	77	78	81	83	78	70	65	72
Mean monthly sunshine hours	275.9	243.0	275.9	204.0	198.4	156.0	120.9	117.8	144.0	198.4	219.0	257.3	2,410.6
Mean daily sunshine hours	8.9	8.6	8.9	6.8	6.4	5.2	3.9	3.8	4.8	6.4	7.3	8.3	6.6
Source #1: Thai Meteorological Department[4]													
Source #2: Office of Water Management and Hydrology, Royal Irrigation Department (sun and humidity)[5]													

2. LCT – Index System evaluated by Khon Kaen.

Overall Assessment

Overall Rank
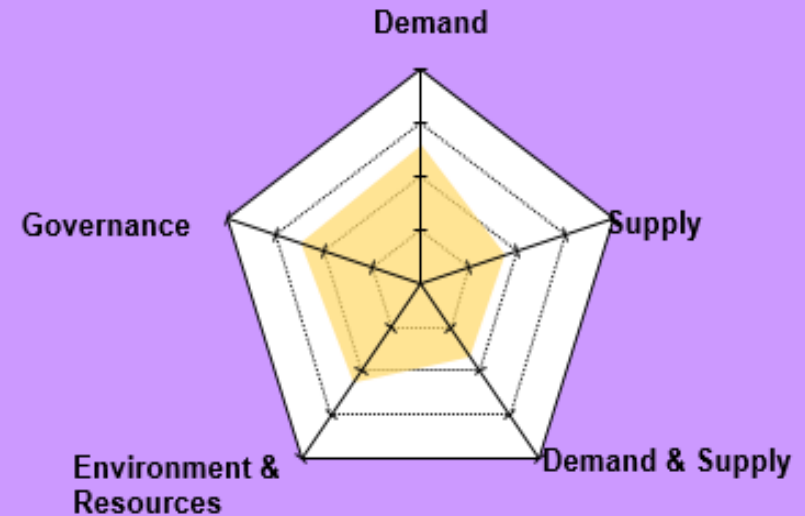
★★★★☆

Total Point
average of (1) to (14)   **3.2**

CO2 Reduction ▢

t-CO2/year

Please fill Co2 reduction in the above cell
and attach the source or evidence

Radar Chart

Demand
Supply
Demand & Supply
Environment & Resources
Governance

3. Who will join to LCMT of Khon Kaen.

1. Centre government:

+ Department of Alternative Energy Development and Efficiency, Ministry of Energy.

+ Thailand Greenhouse Gas Management Organization (TGO).

2. Local government:

+ Regional Environment Office 10, Khon Kaen Provincial Offices for Natural Resource and Environment and Municipality School.

+ Khon Kaen Municipality.

3. Investor/Implementer

+ Khon Kaen Transit System Co., Ltd. (KKTS).

+ Khon Kaen Think Tank (KKTT).

+ Alliance Clean Power Co. Ltd.

4. Other partners:

+ UNDP.

+ Khon Kaen University.

Project of LCMT Phase 2
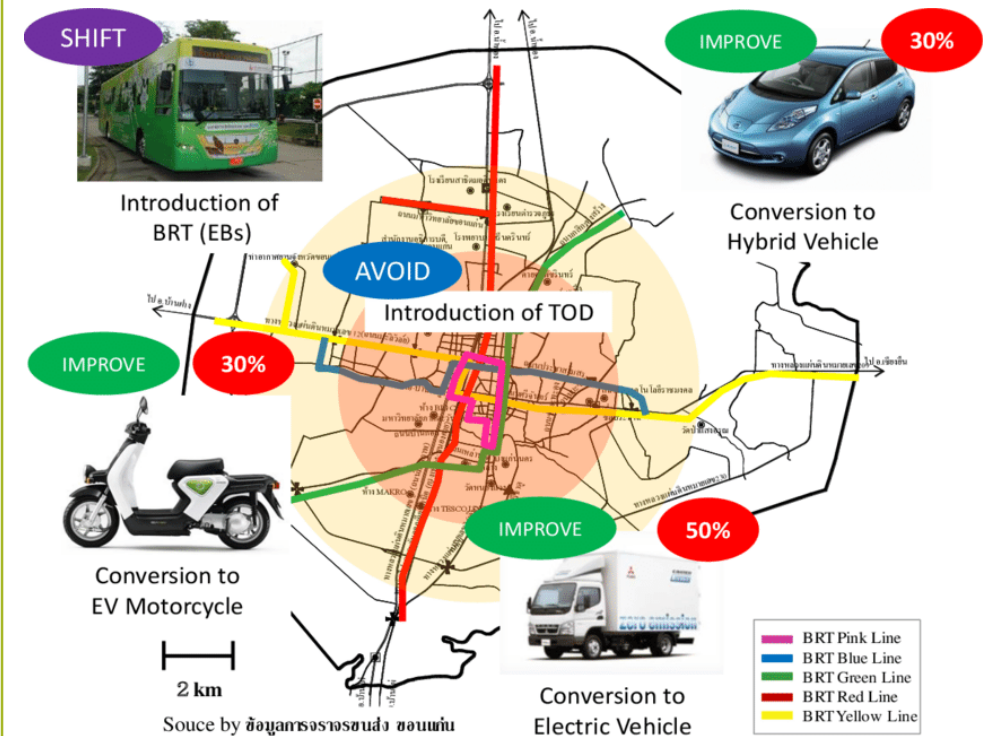(APEC / METI / APERC / Experts)

4. Orient to LCMT.

1. Low carbon City Project (2013 – 2021).

- Has strong collaboration between local business body, local administration, local government offices, schools, communities, and people in Khon Kaen.

- Has 5 strategies: 1) Society Trees; 2) No Pollution Society; 3) Energy Saving Society; 4) Sustainable Development Society; 5) Young Generation's Green at Health.

- Reduce 30.000 ton of CO_2e in 2018.

2. Other projects on studying

- Sustainable urban system management.

- Low carbon development in public transport of LRT.

- Expected reduce 100.000 ton of CO_2e yearly.

SHIFT — Introduction of BRT (EBs)

IMPROVE — 30% — Conversion to Hybrid Vehicle

AVOID — Introduction of TOD

IMPROVE — 30% — Conversion to EV Motorcycle

IMPROVE — 50% — Conversion to Electric Vehicle

2 km

Souce by ข้อมูลการจราจรขนส่ง ขอนแก่น

BRT Pink Line
BRT Blue Line
BRT Green Line
BRT Red Line
BRT Yellow Line

II. Evaluation of the LCT- I System

1. Evaluation on the Application of the LCT- I System

Question	Excellent	Good	Average	Below Average	Poor
Information of the LCT-I Volunteer Town		✓			
Understanding of each LCT-I System indicators			✓		
Explanation (evidence) provided for the self-evaluation			✓		
Collection of data necessary for the evaluation				✓	
Calculation of CO2 emissions					✓

2. Feedback on the Self-Evaluation

Tier 1	Tier 2	Tier 3	Comments
Demand	1. Town Structure	1.1. Adjacent Workplace and Residence (5 ★)	- Misunderstand on ratio residential use with ratio of land used. No information on this..
		1.2. Land Use (3 ★)	- It's clear.
		1.3. TOD (Transit Oriented Development) (3 ★)	- It's clear.
	2. Buildings	2.1. Energy Saving Construction (4 ★)	- There is no information on this. - Misunderstand on indicators.
		2.2. Green Construction (3 ★)	- It's seem good. 4 ★ is better.
	3. Transportation	3.1. Promotion of Public Transportation (2.5 ★)	- It's clear.
		3.2. Improvement in Traffic Flow (3 ★)	- It's clear.
		3.3. Introduction of Low-Carbon Vehicles (4 ★)	- It's clear.
		3.4. Promotion of Efficient Use (5 ★)	- It's clear.

2. Feedback on the Self-Evaluation

Tier 1	Tier 2	Tier 3	Comments
Supply	4. Area Energy System	4.1. Area Energy (2 ★)	That's seem clear. However, information about the system of DHC, DH or DC is not mentioned.
	5. Untapped Energy	5.1. Untapped Energy (3 ★)	- That's seem clear.
	6. Renewable Energy	6.1. Renewable Energy (3 ★)	- That's seem clear.
	7. Multi-Energy System	7.1. Multi-Energy (3 ★)	- Need to provide the evidences or some information.
Supply & Demand	8. Energy Management	8.1. Energy Management of Buildings/Area (2-3-2 ★)	- That's seem clear.

2. Feedback on the Self-Evaluation

Tier 1	Tier 2	Tier 3	Comments
Environment & resources	9. Greenery	9.1. Securing Green Space (3-3 ★)	There is no information refer.
	10. Water Management	10.1. Water Resources (4-3 ★)	- That's seem clear.
	11. Waste Management	11.1. Waste Products (3-5 ★)	- That's seem clear.
	12. Pollution	12.1. Air (4 ★)	- Need to provide the evidences or some information.
		12.2. Water Quality (5 ★)	- That's seem clear.
		12.3. Soil (3 ★)	- That's seem clear.
Governance	13. Policy Framework	13.1. Efforts toward a Low-carbon Town (5-1 ★)	- That's seem clear.
		13.2. Efforts toward Sustainability (5-3 ★)	- That's seem clear.
	14. Education & Management	14.1. Life Cycle Management (3-4 ★)	- That's seem clear.

3. For the Improvement (*Direct related*)

Tier 1	Tier 2	Tier 3	Comments
Demand	1. Town Structure	1.2. Land Use (3 ★)	
		1.3. TOD (Transit Oriented Development) (3 ★)	
	2. Buildings	2.1. Energy Saving Construction (4 ★)	Re- assessment.
		2.2. Green Construction (3 ★)	
	3. Transportation	3.1. Promotion of Public Transportation (2.5 ★)	
		3.2. Improvement in Traffic Flow (3 ★)	
Supply	4. Area Energy System	4.1. Area Energy (2 ★)	
	5. Untapped Energy	5.1. Untapped Energy (3 ★)	
	6. Renewable Energy	6.1. Renewable Energy (3 ★)	
	7. Multi-Energy System	7.1. Multi-Energy (3 ★)	
Supply & Demand	8. Energy Management	8.1. Energy Management of Buildings/Area (2-3-2 ★)	

3. For the Improvement (*Indirect related*)

Tier 1	Tier 2	Tier 3	Comments
Environment & resources	9. Greenery	9.1. Securing Green Space (3-3 ★)	
Governance	13. Policy Framework	13.1. Efforts toward a LCT (1 ★)	Budget for Policies/Business Plans to Create a Low-carbon Town should be available.
		13.2. Efforts toward Sustainability (3 ★)	Maybe there a regulation for low carbon development is planned or enforced in upper level?
	14. Education & Management	14.1. Life Cycle Management (3-4 ★)	

III. Ideas for New LCMT of Khon Kaen

1. Develop the renewable energy like Solar or Wind. Special to construct the station to charge the battery for Electric Vehicle from solar.

2. Use the advance of IoT, IA to management the solid waste, orient to circular economy.

3. Setup a Campaign of Communication for LCMT.

4. Setup the MRV system and legalization to have the data for monitoring the LCT-I System in the new Khon Kaen's LCMT.

IV. Other suggestions

I. METI and APERC

1. Establish a Network of LCMT Members under APEC, members should be a focal technical agency to develop LCMT from each economy and local government of towns or cities (Had applied LCMT). Yearly, the network should has some activities on updating, sharing the experience on develop LCMT from all the countries and towns or cities.

2. More guidance for economies, which has selected town join in this project, in special for the role, responsibility, participation for each parties (APEC/ METI/ EPERC/ Countries/ Town/ and Experts).

3. Process to implement project: After this Symposium, METI and APERC should request all the economies and towns to send the confirm the needs and ready plan to cooperate with the Project (METI, Experts) to research the F/S. This is platform for bidding document and implementing in the future.

II. Countries and selected Cities/Town in this Project

1. Discuss to define the most priorities areas need to has F/S to improving LCT-I System and setup a plan to support and receive this technical support (like PMU) by resources from theirs (if available).

Thank you for your attention!