APERC
Asia Pacific Energy Research Centre

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APEC Low-Carbon Model Town Project Wrap-up Symposium

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Low-Carbon Model Towns Review

Hung-Wen LIN

Green Energy and Environment Research Laboratories

Industrial Technology Research Institute

Chinese Taipei

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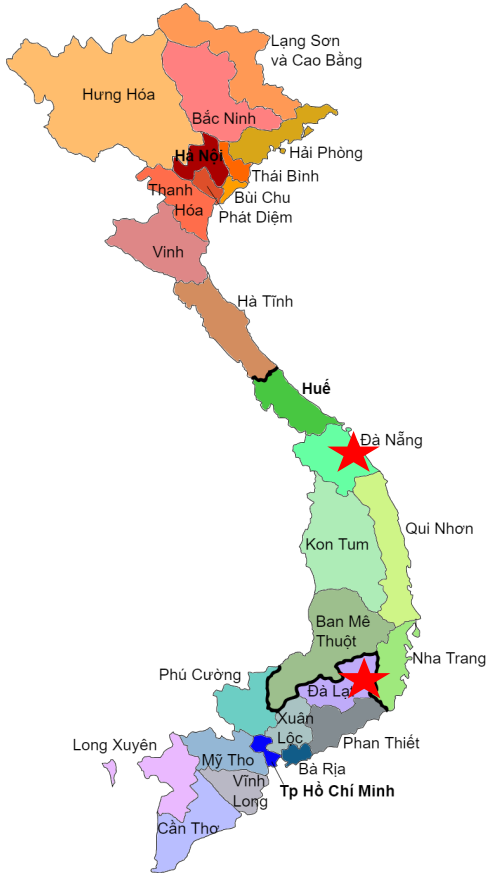
Low-Carbon Model Towns

Viet Nam

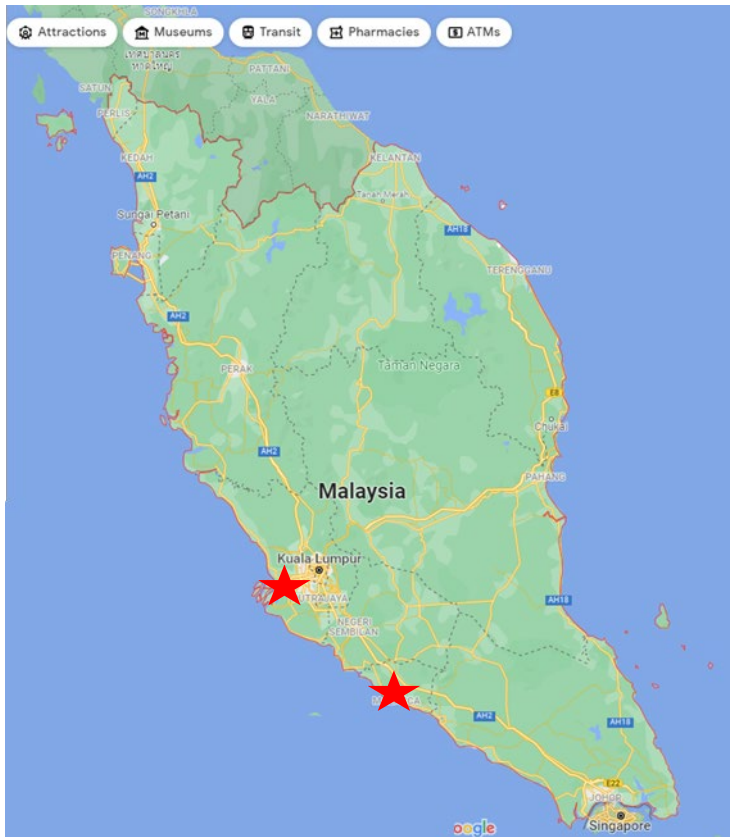
- Da Lat
- Da Nang



https://zh.wikipedia.org/wiki/File:Vietnam_catholic_dioceses_map.svg

Malaysia

- Hang Tuah Jaya
- Shah Alam



https://www.google.com/maps/

Peru

- La Molina

https://www.familysearch.org/wiki/en/Peru_Genealogy

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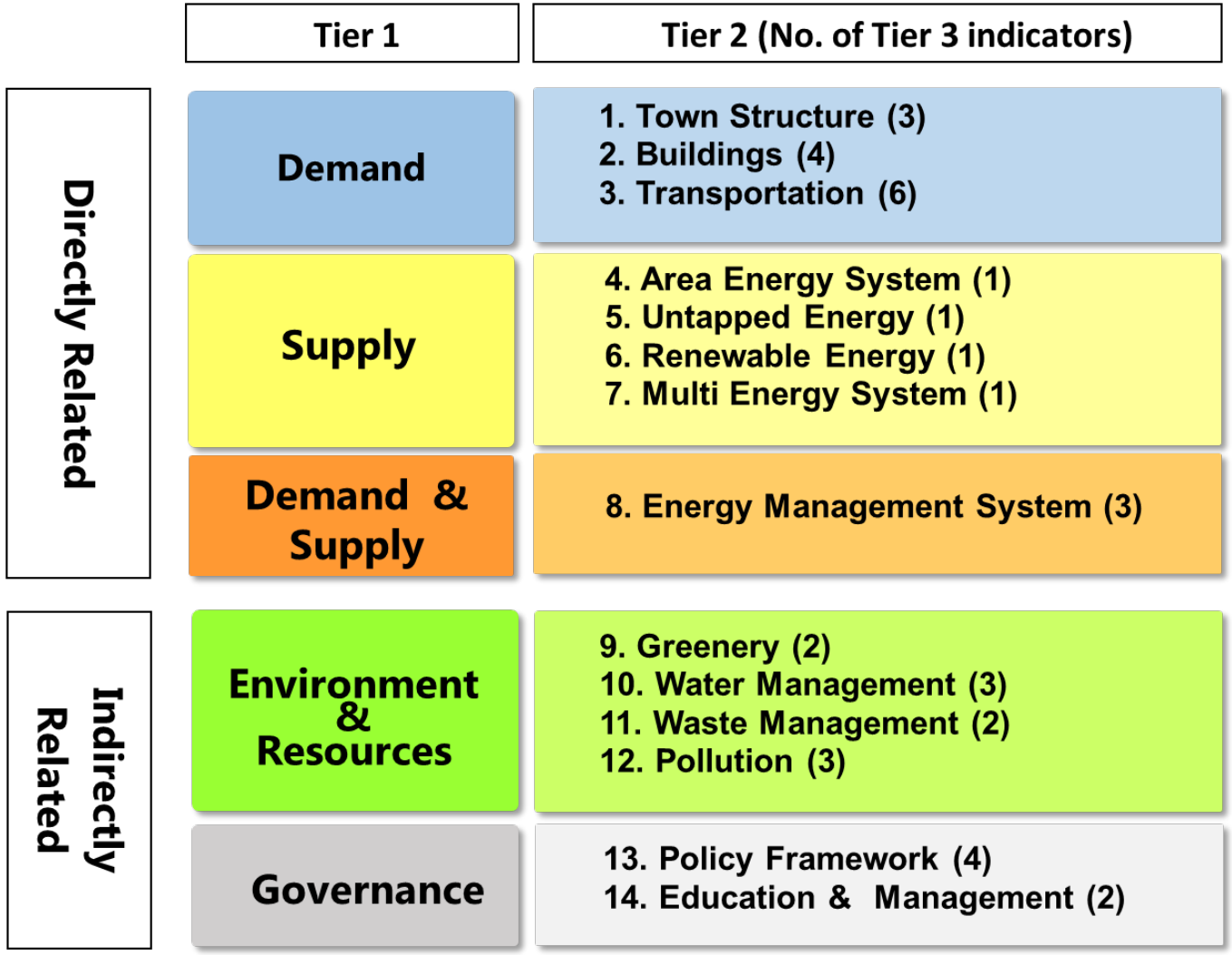
Assessment framework of the LCT-I System



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Da Lat, Viet Nam

Tier 1	Tier 2	Achievements
Demand	• Town Structure • Buildings • Transportation	• Energy Simulation to estimate energy savings achieved by implementing Green Building Code • Reduce vehicular (Transit Oriented Development) & increase carbon sequestration (Green Redevelopment) for new area • Increase public transport ridership；Penetration of low emission fuel；Non-motorized vehicle and pedestrian Infrastructure；Personal vehicles sharing
Supply	• Area Energy Sys. • Untapped Energy • Renewable Energy • Multi Energy Sys.	• Aggregated heating/cooling supply units • Waste to Energy - Power generation through incineration of solid waste. • Ground source heat pump - heating purpose in commercial and residential buildings • Rooftop Solar Power Generation in residential and commercial buildings • Cogen or CHP plants produce electricity along with heating which can be used for heating system
Demand & Supply	• Energy Management System	• Integrated BEMS for monitoring and controlling energy-related building plant and equipment
Environment & Resources	• Greenery • Water & Waste Management • Pollutions	• Assist in waste management & provide alternate means of power generation. • Increases green spaces within cities - increasing carbon sequestration
Governance	• Policy Framework • Education & Management	• Multi-lateral funding agencies • Government Funding • Private sector entrepreneurs

Data Source: Presentation file of Da Lat

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Da Nang, Viet Nam

Tier 1	Tier 2	Achievements
Demand	• Town Structure • Buildings • Transportation	• Public lighting
Supply	• Area Energy Sys. • Untapped Energy • Renewable Energy • Multi Energy Sys.	• Rooftop solar power
Demand & Supply	• Energy Management System	
Environment & Resources	• Greenery • Water Management • Waste Management • Pollutions	• The air pollution index (API) in urban areas was maintained at less than 100 • Average urban green area at 6 – 8 m^2/ person • Percentage of households with access to clean water in city center and rural area were 97.83% and 76.81% respectively • 100% of industrial wastewater met discharge requirements • >95% of domestic solid waste collected in urban areas, in rural areas >70%; • In 2020, over 83% of domestic wastewater was collected, over 50% was properly treated in accordance with standards.
Governance	• Policy Framework • Education & Management	• Develop new and renewable energy • National program on economical and efficient use of energy • Develop rooftop solar power • Construct electric car charging stations • Specify the interest rate support policy

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Data Source: Presentation file of Danang

Hang Tuah Jaya, Malaysia

Tier 1	Tier 2	Achievements
Demand	• Town Structure • Buildings • Transportation	• All new development within the area to apply Green Building Rating (volunteer basis) • Adoption of Malaysia Standard (MS) 1525:2019 (Mac 2020) • Green incentive on green construction & development • Apps for Smart Parking Hang Tuah Jaya (2018) • Introduction 'Green Bus Network Corridor' (under study – GFCP) • Incentive and parking rebate for EV (2018) • Mobility as a Service (MaaS) – e-hailing
Supply	• Area Energy Sys. • Untapped Energy • Renewable Energy • Multi Energy Sys.	• District Cooling System (DCS) project in MITC area (preliminary stage) • Decarbonized Community program. To encourage community to apply solar panel installation through Net Energy Metering Program (on going project) • Completion of 2 solar farm project (private initiatives) with total capacity 58 MW (2019) • Policy on investment and developing solar farm
Demand & Supply	• Energy Management System	• Smart Grid program (2019) • Building Energy Online Data Monitoring System • Energy Audit Report Implementation
Environment & Resources	• Greenery • Water & Waste Management • Pollutions	• Carbon sequestration • Rainwater Harvesting Project for Schools in Hang Tuah Jaya
Governance	• Policy Framework • Education & Management	• High level commitment on achieving Low Carbon City Status by 2030 and Net Zero Carbon City by 2050 • Integration and link-up with National commitment on GHG reduction and environmental protection • Community awareness on mitigation and adaptation • Special program on Low Carbon Eco-Schools and Green Ambassador • Climate financing and Budgeting

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Data Source: Presentation file of Hang Tuah Jaya

Shah Alam, Malaysia

Tier 1	Tier 2	Achievements
Demand	• Town Structure • Buildings • Transportation	• Natural Lighting & Building Orientation；District Cooling with Thermal Storage • Replacing CFL & Fluorescent with LED bulbs
Supply	• Area Energy Sys. • Untapped Energy • Renewable Energy • Multi Energy Sys.	• Solar PV
Demand & Supply	• Energy Management System	• Integrate building monitoring system for data collection
Environment & Resources	• Greenery • Water & Waste Management • Pollutions	• Roof Garden • Natural ventilation car park • Promote reduction on waste program；Promote recycle program；Energy & Water Saving Pump System
Governance	• Policy Framework • Education & Management	• LCCF program that anchored from four GHG Reduction element. MBSA aimed to reduced GHG with minimum 3% yearly target from 2015 to 2019. While, MBSA final mission to fulfill National Carbon Reduction of 45% by 2030 • Shah Alam Low Carbon Action Plan 2017

Data Source: Presentation file of Shah Alam

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La Molina, Peru

Tier 1	Tier 2	Achievements
Demand	• Town Structure • Buildings • Transportation	• Promotion of use of the Bicycle, 15km of bike lines, 9 stations. • Green roofs • The municipality promotes car sharing for neighbors to use fewer private cars. • The municipality promotes the use of mass transportation to use fewer private cars.
Supply	• Area Energy Sys. • Untapped Energy • Renewable Energy • Multi Energy Sys.	• Solar energy • West heat Recovery
Demand & Supply	• Energy Management System	
Environment & Resources	• Greenery • Water & Waste Management • Pollutions	• Technified irrigation systems to reduce the amount of water used in the irrigation of parks and avenue. • Urban trees in streets and avenues. • Creation of small urban forests distributed all over the district. • Green roofs to reduce air pollution, noise and grow food. • The ecological park：Forest, Tree nursey, Residual Water treatment plant • 700 trees was planted in coordination with neighbors and volunteers. • Eco Recycle, Green Waste Management
Governance	• Policy Framework • Education & Management	• National Environmental Policy • Framework law (Law 30754) on climate change • Develop awareness workshops to reduce greenhouse gas emissions in schools, neighborhoods and the general public

Data Source: Presentation file of La Molina

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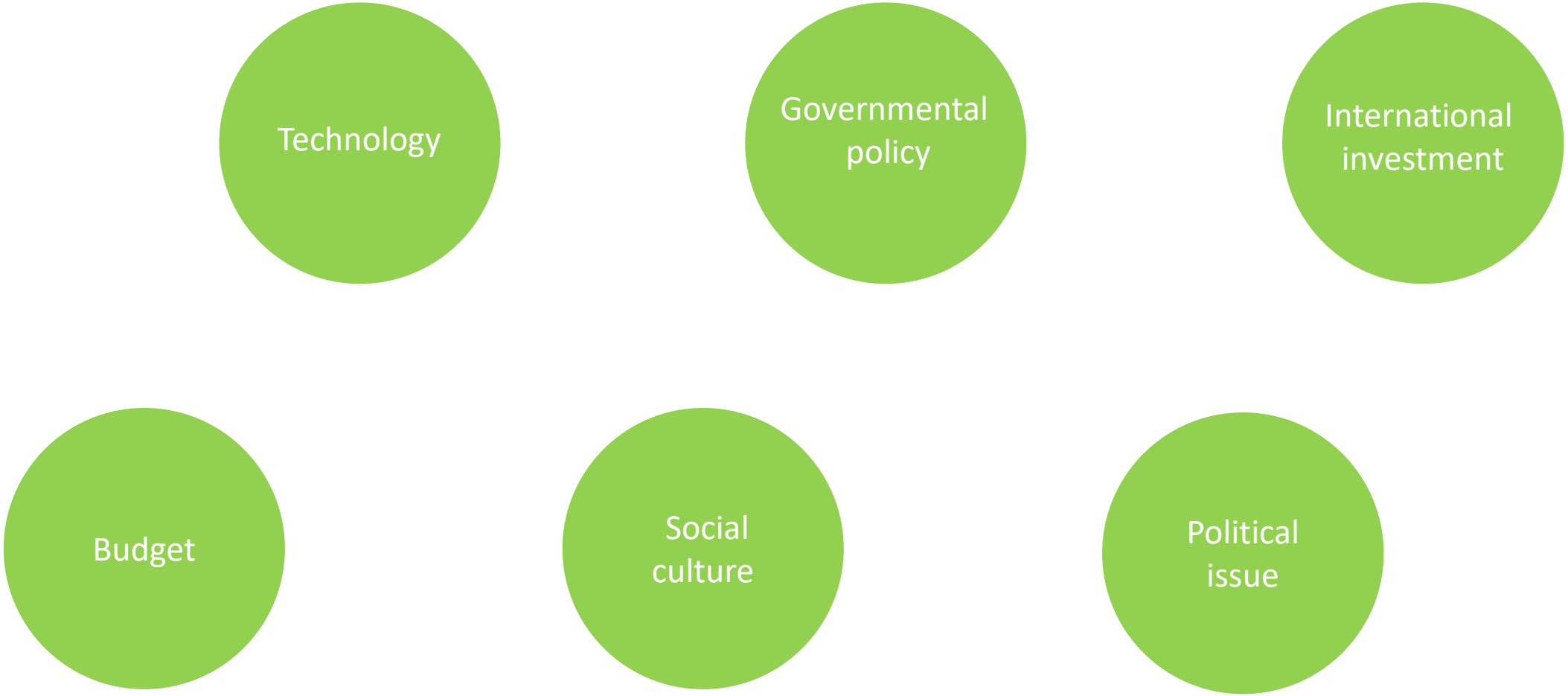
Main Obstacles for Achieve The Low Carbon Town



Data Source: Pre Survey of Low-Carbon Model Towns

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Ideas for the LCT Development

Low Carbon Energy
- Renewable Energy
- Energy Conservation
- Low Burden

Low Carbon Transportation
- Transportation Device
- Smart Mass-Transportation System

Green Energy Industry
- Rising Green Energy Industry Program
- Green EICT
- Employment in Green Energy Industry

IoT

Bio-Environemnt
- Ecological Environment
- Recyling

Low Carbon Tour
- Low Carbon Traveling
- Low Carbon Scene

Low Carbon Consumption
- New Consumption Environment
- Low Carbon Culture

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Idea for the LCT-I System

- An integral part of comprehensive approaches towards sustainable urbanization
- Technology, spatial, regulatory, financial, legal, social and economic perspectives are included
- Interaction and integration between buildings, the users and the regional energy, mobility and ICT system.

	Tier 1	Tier 2 (No. of Tier 3 indicators)
Directly Related	Demand	1. Town Structure (3) 2. Buildings (4) 3. Transportation (6)
	Supply	4. Area Energy System (1) 5. Untapped Energy (1) 6. Renewable Energy (1) 7. Multi Energy System (1)
	Demand & Supply	8. Energy Management System (3)
Indirectly Related	Environment & Resources	9. Greenery (2) 10. Water Management (3) 11. Waste Management (2) 12. Pollution (3)
	Governance	13. Policy Framework (4) 14. Education & Management (2)

Suggestion for New Elements

Green Building System

Positive Energy District(PED)

- Energy efficiency for devices and buildings
- Flexibility for energy consumption with districts
- Regional supply of renewable energy
- H_2 Energy or new energy infrastructure design and construction

GHGs Emission in Industry

- Waste gas emissions control & management
- Waste water control & management

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Thank you for your attention !

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Conclusions

- Net zero carbon emission is the global target in 2050
- To achieving net-zero in the future, need to break in familiar or habitual thinking, and make significant progress in the innovation of clean, energy conservation & system integration technology.
- Low carbon model towns are important demonstration sites to achieve the target of net zero carbon emission.
- Performance measure standard making and execute the performance verification regularly are good methods to maintain the low carbon city.

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