Asia-Pacific
Economic Cooperation

Advancing Free Trade
for Asia-Pacific Prosperity

First APEC Low-Carbon Model Town (LCMT) Symposium
Summary Report - Annex

Jakarta, Indonesia, 14-15 September 2017

APEC Energy Working Group

February 2018

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APEC#218-RE-04.1

List of Symposium Presentations

(Presentation slides are also available for download at:
http://aperc.ieej.or.jp/publications/reports/lcmt_detail.php?article_info__id=288)

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1st APEC Low-Carbon Model Town Symposium
Jakarta, 14 September, 2017

APEC LOW-CARBON TOWN INDICATOR (LCT-I) SYSTEM

Yuko Tanaka, Researcher, APERC

APERC

Asia-Pacific Economic Cooperation

Key Activities of LCMT Project (Phase 1-6)

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**

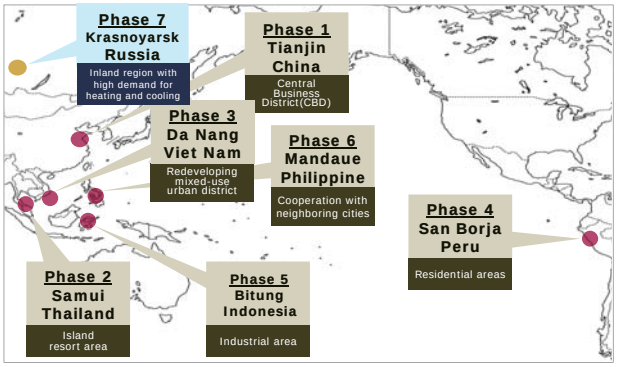
All the documents produced in the LCMT Projects are available here:
http://aperc.ieej.or.jp/publications/reports/lcmt.html

Preliminary Research

	Concept: Cities Surveyed in Phase 1- 6	Feasibility Study / Policy Review: Case Towns in Phase 1- 6
Phase 1	**Da Nang**, Viet Nam; **Surabaya**, Indonesia; **Cebu**, The Philippines; **Putrajaya**, Malaysia; and **Tianjin**, China	**Yujiapu, Tianjin**, China Greenfield development of central business districts (CBD) of a large city
Phase 2	**Samui Island**, Thailand; **Penghu Island**, Chinese Taipei; and **Da Nang**, Viet Nam	**Samui Island**, Thailand Development on an island resort
Phase 3	**Portland**, The US and **San Borja**, Peru	**Da Nang**, Viet Nam Redevelopment of an existing city
Phase 4	**Vancouver**, **Calgary**, and **Toronto** in Canada; and **Philadelphia**, The US	**San Borja**, Peru Residential area in a city
Phase 5	**Adelaide** and **Melbourne** in Australia; **Auckland** and **Palmerston North** in New Zealand; and **Santiago**, Chile	**Bitung**, Indonesia Industrial area in a city
Phase 6	**Yongin** and **Jincheon** in Korea; **Krasnoyarsk**, Russia; and **Yokohama** and **Kashiwa** in Japan	**Mandaue**, The Philippines Low-carbon development plans in cooperation with neighbouring cities

Development of LCT-I System

Case Towns of Feasibility Study and Policy Review



Characteristics of LCT-I System

- **A self-assessment tool to assess and monitor the progress of each LCT development project (not for comparison).**
- **It is supposed to be used by central and local government officials.**
- **Designed to be as simple as possible with user-friendliness in mind.**
- **Users can carry out an assessment with the attached LCT-I evaluation sheet.**
- **The assessment areas of the LCT-I System are comprehensive and uses a five point scale evaluation in principle.**
- **APEC's liaison officer has been attending meetings of ISO/TC268 on Sustainable Cities and Communities since February 2015 to maintain the LCT-I System relevant to global standards developed by ISO.**

Assessment Framework of LCT-I 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)

Indicators of LCT-I System: Demand

Tier 1	Tier 2	Tier 3
Demand	Town Structure	➢ Adjacent Workplace and Residence ➢ Land use ➢ Transit Oriented Development (TOD)
	Buildings	➢ Energy Saving Construction ➢ Green Construction
	Transportation	➢ Promotion of Public Transportation • Easy-to-Use Public Transportation • Comprehensive Transportation Measures ➢ Improvement in Traffic Flow • Transportation Demand Management (TDM) • Transportation Infrastructure Planning ➢ Introduction of low carbon vehicles ➢ Promotion of Efficient Use • Support for Eco-driving

Indicators of LCT-I System: Supply, Demand & Supply

Tier 1	Tier 2	Tier 3
Supply	Area Energy System	➢ Area Energy System
	Untapped Energy	➢ Untapped Energy
	Renewable Energy	➢ Renewable Energy
	Multi-Energy System	➢ Multi-Energy System
Demand & Supply	Energy Management System	➢ Energy Management of Buildings / Area • Energy Management System (EMS) • Area Energy Management System (AEMS) • Smart Micro-Grid

Indicators of LCT-I System: Environment & Resources

Tier 1	Tier 2	Tier 3
Environ-ment & Resources	Greenery	➢ Securing Green Space • Formation of Green Shade • Formation of Greening
	Water Management	➢ Water Resources • Water Usage • Water Reuse - Rainwater Use - Recycled Wastewater Use
	Waste Management	➢ Waste Products • Reduction of Waste Products • Reuse of Waste Products
	Pollution	➢ Air Pollution ➢ Water Pollution ➢ Soil Pollution

Indicators of LCT-I System: Governance

Tier 1	Tier 2	Tier 3
Gover-nance	Policy Framework	➢ Efforts toward a Low-Carbon Town • Policies/Business Plans to Create Low-Carbon Town • Budget for Policies/Business Plans to Create Low-Carbon Town ➢ Efforts toward sustainability • Business Continuity Plan (BCP)/Life Continuity Plan (LCP) • Developments with Less Impact on Natural Environment
	Education & Management	➢ Life Cycle Management ➢ Area Management toward Energy-Saving and Low-Carbon Town

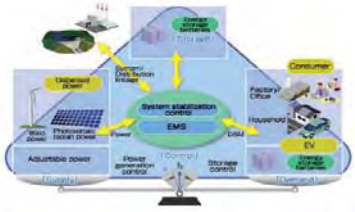
Sample of Qualitative Indicator

8. Energy Management
8.1. Energy Management of Buildings/Area
8.1.1. Energy Management of Buildings/Area

★★★★★	
★	There are no plans for introduction in place. However, a system for introduction has been established.
★★	There are no plans for introduction in place. However, a system for introduction has been established and prospects for their introduction are clear.
★★★	There are plans for introduction in place.
★★★★	There are introduction plans which have been implemented.
★★★★★	There are introduction plans which have been implemented. In addition, a subsidy system, etc. for expansion of implementation has been established.

Assess the presence or absence of EMS introduction plans.

EMS refers to systems or technologies that enable energy conservation through visualising energy consumption, controlling and monitoring of building and equipment operations, as well as optimising the use of renewable energy.



Sample of Quantitative Indicators

3. Transportation
3.1. Promotion of Public Transportation
3.1.1. Easy-to-Use Public Transportation

★★★★★	
★	30% or less of the target area is covered.
★★	30% to 50% of the target area is covered.
★★★	50% to 70% of the target area is covered.
★★★★	70% to 90% of the target area is covered.
★★★★★	90% or more of the target area is covered.

Assess the coverage ratio of the areas of walking distance from the train stations and bus stops to the target area.

Coverage ratio refers to the proportion of range (area of a circle) with a radius of 500m-1000m, centering on train stations and bus stops, to the entire range (assessment target area).

- Train station: radius of 1000m
- Bus stop: radius of 500m
- The range of walking distances (500m or1000m) were referenced from CASBEE(CASBEE for Urban Development –3.1.1.1 Development of traffic facilities)

Image of Evaluation Results

Output Sheet 1

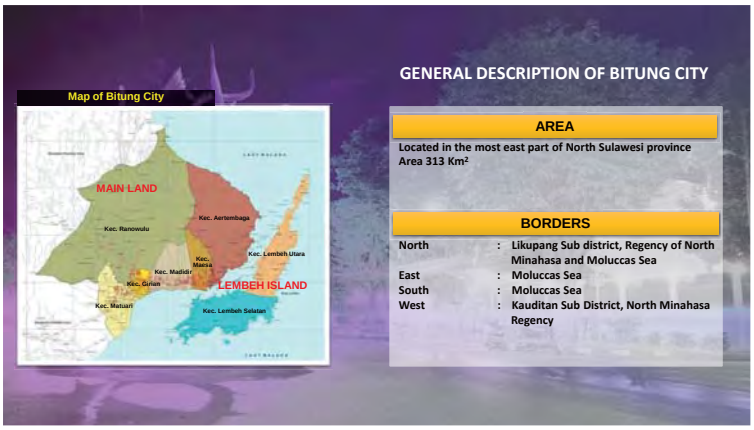
Output Sheet 2

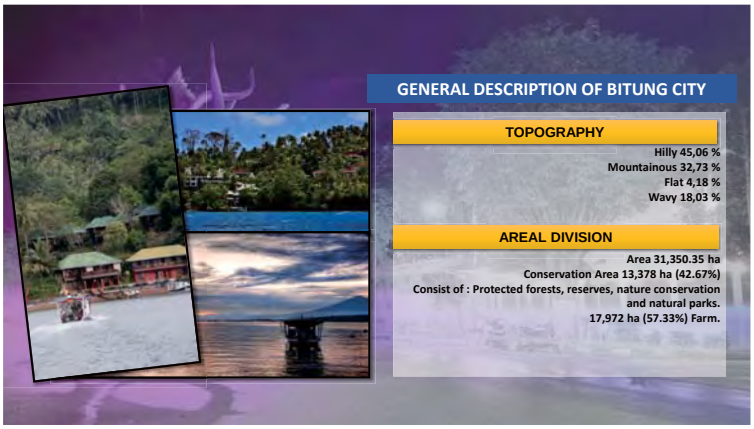
Thank you for your kind attention

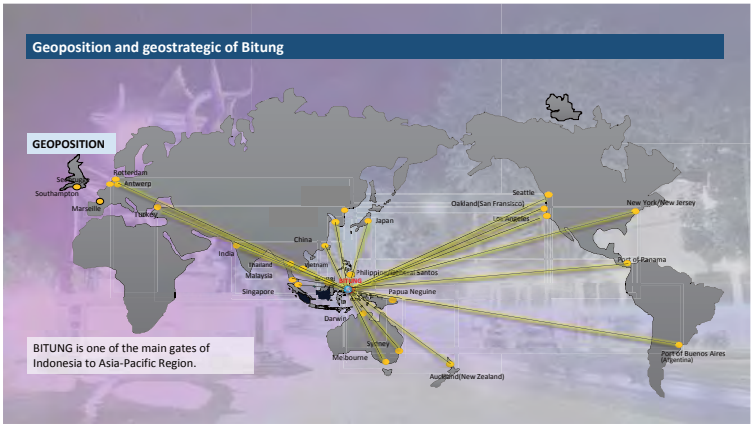
The First Edition of the LCT-I System Guideline:
http://aperc.ieej.or.jp/publications/reports/lcmt/LCT-I_System_Guideline.pdf

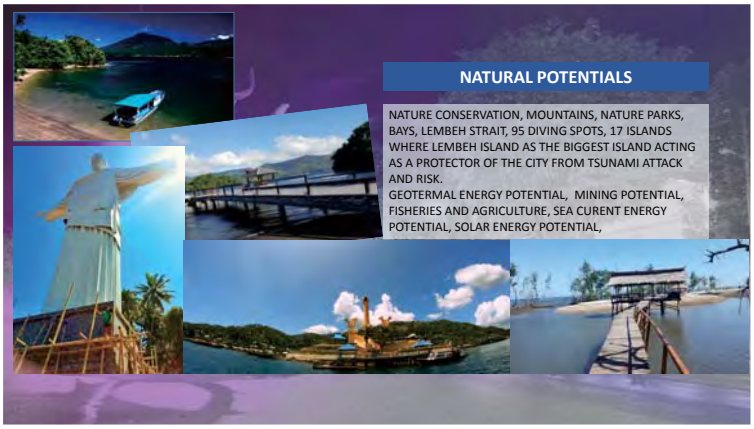
Evaluation Sheet:
http://aperc.ieej.or.jp/publications/reports/lcmt/LCT-I_Evaluation_sheet_first_edition_rev.xls

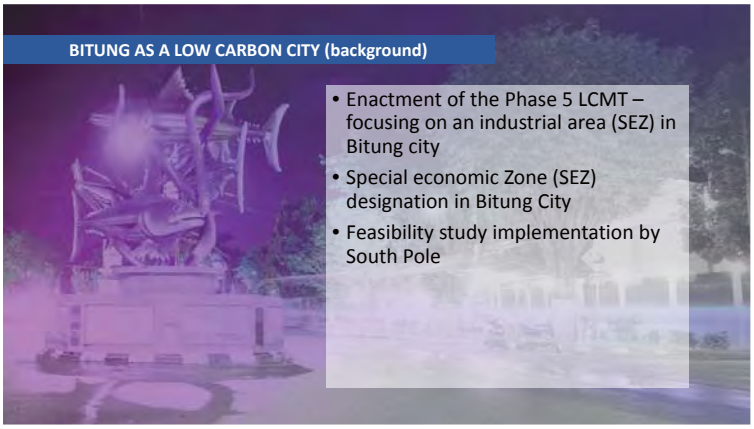
Presentation 2











LOW CARBON MEASURES IN BITUNG

Impact	Side	Aspects	Measurement/indicators	Average Score /Stars
Directly related	Demand	1. Town structure 2. Buildings 3. Transportation	Urban management system of the city Numbers of building with green design Measurement of road length & quality	60
	Supply	4. Area energy system 5. Untapped energy 6. Renewable Energy 7. Multi Energy System	Development of energy system Energy potentials Development of wind energy and solar	50
	Demand and supply	8. Energy management system		50
Indirectly related	Environment and resource	9. Greenery 10. Water Management 11. Waste Management	CO2 measurement, 12th Adipura award etc Water volume Sewage volume	80
	Governance	12. Policy Framework 13. Education and Management	An increase in budget Public education and go green campaign	80

THE ENVIRONMENTAL ASPECT - Greenery

Greenery : 12 times Adipura

Innovation in water management

Waste management : sanitation – public toilet provision, septic tank amnesty

RESOURCES ASPECT . Esp, Renewable energy

Wind, Solar, Geothermal, Sea Current, biogas

Esp. Wind Energy is developed in eight villages in two sub districts at the level of principal permit issued capacity 30W

CO2 MEASUREMENT IN IN SEVERAL LOCATIONS IN THE CITY for 1 hour (source: the Environmental agency

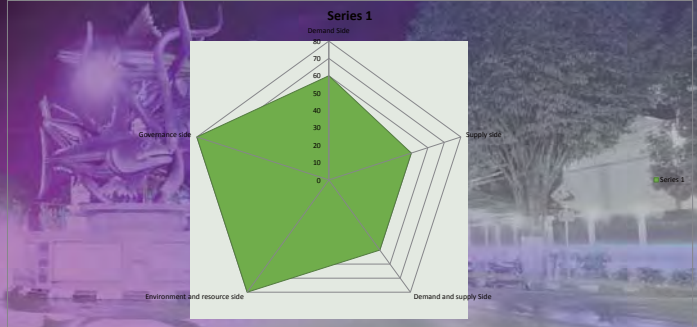
No	Locations	Results		
		2014	2015	2016
1	Tangkoko Terminal	<5000	2200	2100
2	Girian	<5000	320	315
3	Sari Cakalang Field	<5000	240	235
4	Mayor Office Complex	<5000	560	556
5	CBD	<5000	571	570
6	Pateten	<5000	112	115

GOVERNANCE

Policy framework: in increase in budgeting of the city related to LCMT : infrastructure and housing quality.

Education and management : Car Free Day: Go Green Campaign

SELF - EVALUATION RESULT OF BITUNG



FUTURE PLAN

FEEBACK ON LCTi System

- Simple but good and flexible self assessment system
- Without being judged
- Indirectly encouraging to improve the performance of LCMT host.

CONCLUSION (BITUNG)

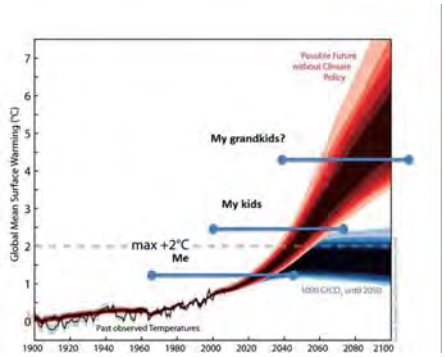
- People's awareness of green energy is relatively good
- Strong Leaders' commitment in relation to implementation of renewable energy (reject investments using fossil fuel energy)
- Has Renewable energy resources potential (Solar, wind, Hydro, Waste, Geothermal).
- Strong Policy Frameworks
- Collaboration with The Ministry of Energy and Mineral Resources in order to implementation of Low Carbon Model Town (LCMT)

Climate Change Actions in Palmerston North

Low Carbon Model Town Symposium
Jakarta – 14 & 15 Sept 2017

Councillor Brent Barrett
brent.barrett@pncc.govt.nz

Unprecedented Risk & Reward

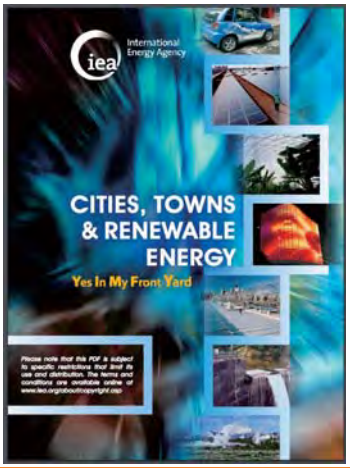


Paris Global Climate Accord and New Zealand options

Local Government New Zealand Climate Declaration 2017

"We ask that the Government make it a priority to develop and implement an ambitious transition plan for a low carbon and resilient New Zealand."

"We commit to develop and implement ambitious action plans that reduce greenhouse gas emissions and support resilience within our own councils and for our local communities."



2009 Study

Author: Prof. Ralph Sims

13 Global Case Studies

Mix of Targets, Incentives, Guidance, Voluntary Actions

City or town	Population	Policy classification																Comments
		Target		Stick				Carrot			Guidance		Voluntary -municipal operation		Voluntary -role model			
		Overall target	Sector specific target	Urban planning	Building codes / regulations	Taxes	Standards and mandates	Capital grants and rebate	Operating grants	Investment	Soft loans and guarantees	Tax credits	Information/promotion	Training	Procurement / purchase	Investment	Utility	Demonstration / land use	Voluntary agreements	
1) Tokyo	12 400 000	X	X		X		X						X		X	X				Wealthy mega-city
2) Capetown, S. Africa	3 400 000	X	X	X				X					X	X	X					Poor mega-city
3) Nagpur, India	2 100 000	X	X		X						X	X	X	X		X		X	X	Poor large city
4) Adelaide, Australia	1 160 000	X	X					X					X		X	X		X		Wealthy large city
5) Merton, London, UK	200 000	X	X	X	X		X						X							Mega-city leading district
6) Freiburg, Germany	200 000	X	X	X	X		X	X		X			X	X	X	X	X	X	X	Medium town
7) Växjo, Sweden	78 000	X	X		X			X					X		X		X	X	X	Small town
8) Palmerston North, NZ	75 000	X	X	X							X		X		X	X	X	X	X	Small town
9) Masdar City, UAE	40 000		X										X		X	X	X	X		Urban planning from new
10) El Hierro, Spain	10 000		X					X		X			X	X		X	X	X	X	One of Canary Islands
11) Samsø, Denmark	4 400		X					X		X			X	X		X		X		Island for comparison
12) Güssing, Austria	3 800		X				X						X	X	X	X	X	X		Small community -rural
13) Greensburg, USA	1 600		X	X	X					X			X	X			X	X		Rebuilding after tornado

Palmerston North by the Numbers

- 87,000 people & growing – 120 ethnic cultures
- 395 km^2 – mostly river (flood) plain
- Research & Development, Education, Health, Defence, Agri-Business, Renewable Energy
- Mayor and 15 Councillors and c. 600 staff
- Portfolios – Environment & Sustainability, Active & Public Transport

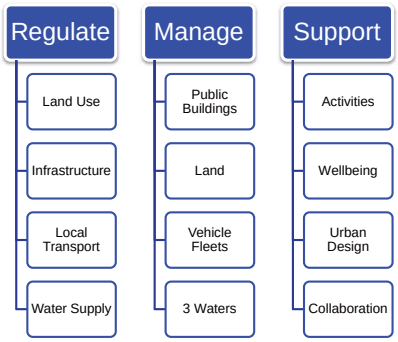
Our Heart – The Square

Cultural Diversity

Suburban Areas

Nature & Cultural Heritage

City Council's Role



Goal: Council is Carbon Neutral by 2050

Ranking Our Actions to Reduce Carbon Emissions

1 → 80

DRAWDOWN
THE MOST COMPREHENSIVE PLAN EVER PROPOSED TO REVERSE GLOBAL WARMING
EDITED BY PAUL HAWKEN

1 → 10

Rank	Solution	Sector	TOTAL ATMOSPHERIC CO2-EQ REDUCTION (GT)	NET COST (BILLIONS US $)	SAVINGS (BILLIONS US $)
1	Refrigerant Management	Materials	89.74	N/A	$-902.77
2	Wind Turbines (Onshore)	Energy	84.60	$1,225.37	$7,425.00
3	Reduced Food Waste	Food	70.53	N/A	N/A
4	Plant-Rich Diet	Food	66.11	N/A	N/A
5	Tropical Forests	Land Use	61.23	N/A	N/A
6	Educating Girls	Women and Girls	59.60	N/A	N/A
7	Family Planning	Women and Girls	59.60	N/A	N/A
8	Solar Farms	Energy	36.90	$-80.60	$5,023.84
9	Silvopasture	Food	31.19	$41.59	$699.37
10	Rooftop Solar	Energy	24.60	$453.14	$3,457.63

2 Wind Turbines (on shore)

3 Reduced Food Waste

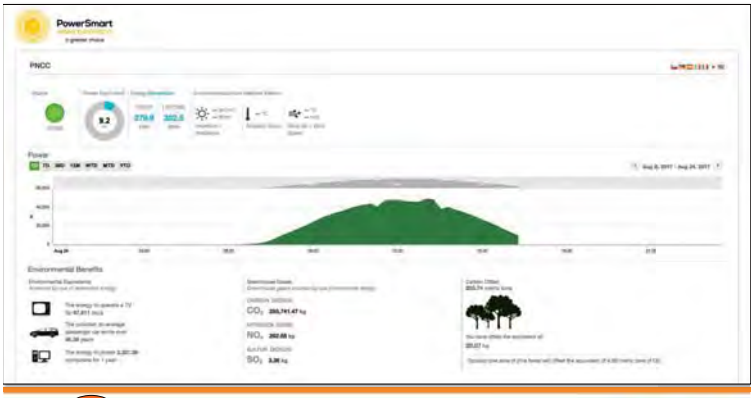
3 Reduced Food Waste

4 Plant-Rich Diet

4 Plant-Rich Diet

8 Solar Farms

Our Solar Energy Online



8 Solar Farms

10 Rooftop Solar

Green Corridors' success confirmed

JANINE RANKIN
Last updated 17:26, July 25 2017

Another Green Corridors planting day on the edge of Palmerston North in September 2016.

15 Afforestation

Palmerston North electric vehicle advocate Sue Pugmire nominated for national award

RICHARD MAYS
Last updated 12:20, September 4 2017

A gathering of Nissan Leaf electric car owners in The Square last year.

As electric vehicles become more viable and popular, Palmerston North finds itself up for two national commendations.

26 Electric Vehicles

Fast charge station now in The Square

Last Published: 25 January 2017 Print Email

Thursday December 22 2016

Council hopes a new electric vehicle charging station in The Square will encourage more visitors to the region as well as helping to drive a switch to a more sustainable mode of transport.

The fast charging station is a first for Palmerston North. Council parks and property manager John Brenkley says the idea stemmed from an electric vehicle rally that came through the city earlier this year, with lots of cars needing to recharge at the same time.

"Mayor Grant Smith thought it would be a smart idea if we had a fast charger in place. With the charging station in The Square, motorists can leave their cars to charge while they look around the city."

The fast charging station can recharge an electric car battery in less than 25 minutes.

26 Electric Vehicles

CITY COUNCIL

New electric trucks for Palmerston North

Last Published: 16 August 2017 Print Email

Council has been successful in its application to the Low Emission Vehicle Contestable Fund from the Energy Efficiency and Conservation Authority (EECA).

26 Electric Vehicles

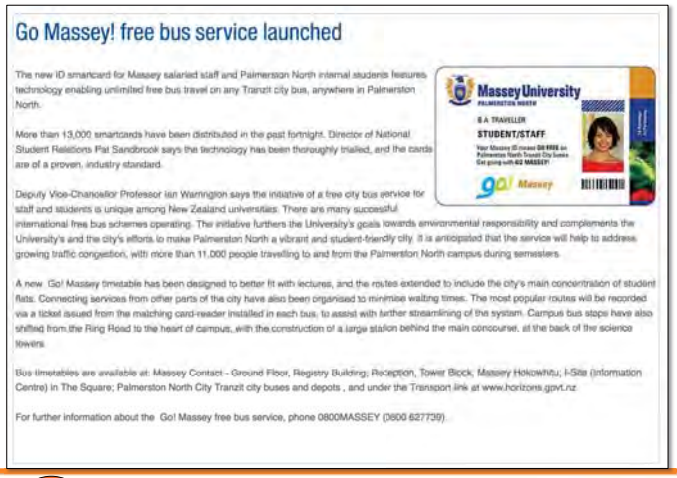
30 Methane Digesters

Palmerston North eco designer leads the way to warmer homes with free blinds offer

RICHARD MAYS
Last updated 11:41, November 18 2016

Palmerston North City Council's eco design advisor Nelson Lebo with an example of the roman blinds he hopes to fit in residents' kitchens.

31 Insulation



Go Massey! free bus service launched

The new ID smartcard for Massey salaried staff and Palmerston North internal students features technology enabling unlimited free bus travel on any Tranzit city bus, anywhere in Palmerston North.

More than 13,000 smartcards have been distributed in the past fortnight. Director of National Student Relations Pat Sandbrook says the technology has been thoroughly trialled, and the cards are of a proven, industry standard.

Deputy Vice-Chancellor Professor Ian Warrington says the initiative of a free city bus service for staff and students is unique among New Zealand universities. There are many successful international free bus schemes operating. The initiative furthers the University's goals towards environmental responsibility and complements the University's and the city's efforts to make Palmerston North a vibrant and student-friendly city. It is anticipated that the service will help to address growing traffic congestion, with more than 11,000 people travelling to and from the Palmerston North campus during semesters.

A new Go! Massey timetable has been designed to better fit with lectures, and the routes extended to include the city's main concentration of student flats. Connecting services from other parts of the city have also been organised to minimise waiting times. The most popular routes will be recorded via a ticket issued from the matching card-reader installed in each bus, to assist with further streamlining of the system. Campus bus stops have also shifted from the Ring Road to the heart of campus, with the construction of a large station behind the main concourse, at the back of the science towers.

Bus timetables are available at: Massey Contact - Ground Floor, Registry Building; Reception, Tower Block, Massey Hokowhitu; I-Site (Information Centre) in The Square; Palmerston North City Tranzit city buses and depots , and under the Transport link at www.horizons.govt.nz

For further information about the Go! Massey free bus service, phone 0800MASSEY (0800 627739).

37 Mass Transit

41 Solar Water Heating

44 LED Lighting - Commercial

Making it easier to do the right thing with recycling

JANINE RANKIN
Last updated 13:54, August 22 2017

Sam Battman is woking inside and outside the Palmerston North City Council building to make recycling easier for people.

55 Household Recycling

55 Household Recycling

56 Industrial Recycling

59 Bike Infrastructure

60 Composting

63 Telepresence

69 Electric Bikes

10 + 26 + 69 = Integration!

Looking Ahead: New Goals & New Actions

- Draft Goal: City-wide 25% reduction in carbon emissions by 2028.
- Sustainability an imperative across all areas of Council activity.
- Council will take a systematic approach, make pragmatic choices, build in monitoring, build in deliverables, measure our success and strive for excellence

Policy practices for low-carbon towns in OECD countries

Tadashi Matsumoto, Ph.D.

Project Manager, Urban Green Growth / Knowledge Sharing
Regional Development Policy Division, OECD

Presentation at the 1st APEC Low Carbon Model Town Symposium
14 September 2017 – Jakarta, Indonesia

Framing today's presentation

1| Key policy consideration for low-carbon towns
- Role of cities
- Policy complementarities and synergies
- Governance and financing arrangement

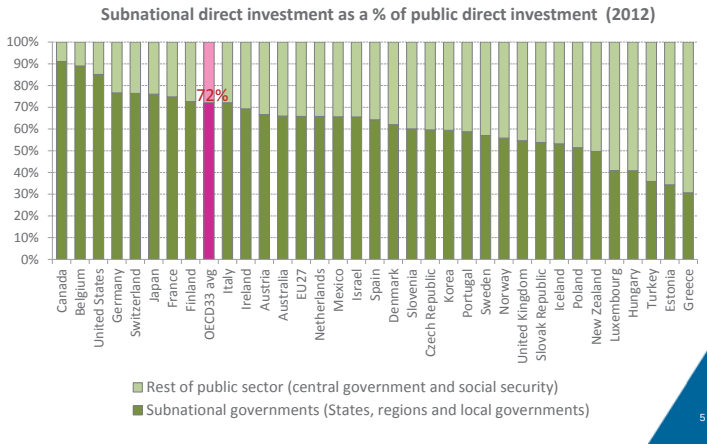
2| Policy practices in OECD (and some non-OECD) countries, based on OECD's green cities / urban green growth work

1. Key policy consideration for low-carbon towns

Cities are part of the problem, but central to the solution

Key facts:
- 2% of OECD regions generate roughly 1/3 of all GDP growth in the OECD
- By 2100, urban population will account for 85% of the estimated global population
- Cities account for an estimated 67% of global energy use and 71% of global energy-related CO_2
- Cities are closer to citizens' needs, have better knowledge of local conditions, and can test innovative ideas locally

Cities are key economic actors



Policy complementarities and synergies can be generated more in cities

For example, compact city policies can generate synergistic impacts:

Characteristics	Environmental impacts	Social impacts	Economic impacts
Shorter intra-urban distances	Fewer CO2 emissions, less pollution	Higher mobility for all households, lower travel costs	Higher productivity due to shorter travel time for workers
Better access to diversity of local services and jobs	-	Higher quality of life due to access to local services (shops, hospitals, etc.)	Skilled labour force attracted by high quality of life; Greater productivity due to diversity, vitality, innovation and creativity
More efficient public service delivery	-	Public service level for social welfare maintained by improved efficiency	Lower infrastructure investments and cost of maintenance

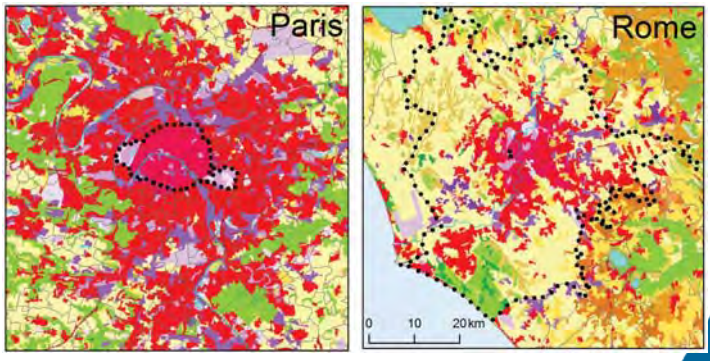
Source: OECD (2012), *Compact City Policies: A Comparative Assessment*

Linking multiple policy objectives to drive low-carbon growth

Policy objectives	Effective low-carbon growth policies
Jobs	• Energy-efficiency building retrofits • Public transport • Waste management / recycling
Urban attractiveness	• Public transport • Public service delivery (e.g. waste)
Green products and services	• Green products and service specialisation • Green technology R&D and innovation activities
Urban land values	• Infill and mixed use redevelopment • Reducing incentives for green-field development

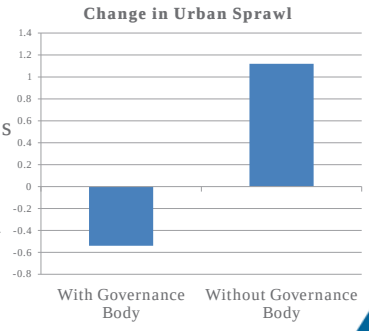
Source: OECD (2013) Green Growth in Cities

Administrative boundaries are not the answer



Metropolitan governance bodies can reduce sprawl

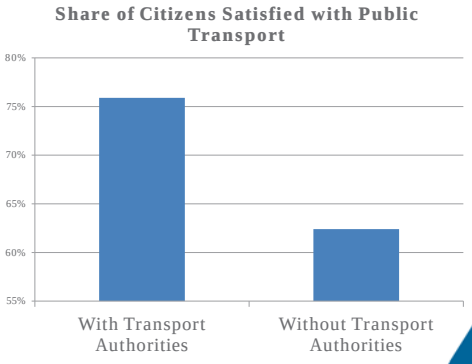
- Urban sprawl creates negative externalities in Metropolitan areas (MAs)
- Cooperation is a way to internalise the externalities when making policy decisions
- **-> Sprawl decreased in MAs with governance body, but increased in those without!**



Difference significant at the 99%-level after controlling for log-population levels and country specific trends.

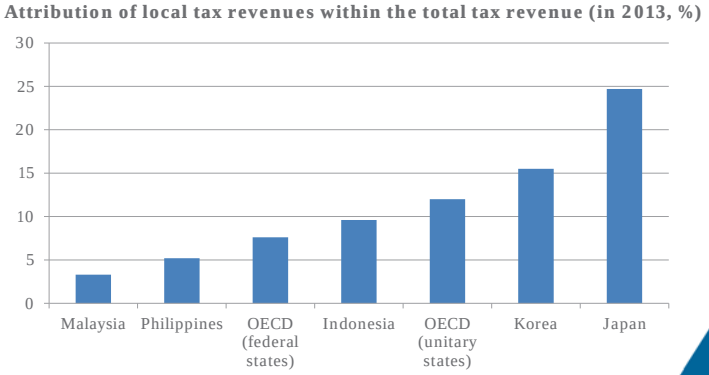
Metropolitan governance bodies can increase well-being

- **Citizens are more satisfied in MAs that have sectoral authorities for public transport**
- **Those MAs have also lower pollution levels (PM)**



Based on European Urban Audit perception survey. Difference significant at 95% level.

Cities need to increase their own revenues and develop diverse financing tools



Source: OECD (2015), *Revenue Statistics in Asian Countries 2015: Trends in Indonesia, Malaysia and the Philippines*

2. Policy practices for low-carbon towns in OECD countries

Policy practices in 11 categories

1. Facilitate in-fill redevelopment
2. Promote low-carbon neighbourhoods
3. Charge private car use to finance public transport
4. Develop shared mobility and non-motorised transport
5. Reduce energy intensity in industry
6. Reduce energy consumption and waste from buildings
7. Reduce municipal waste and promote recycling and waste-to-energy
8. Increase distributed renewable energy in cities
9. Supply skilled workforce for the green economy
10. Facilitate connections to spur green-tech innovation
11. Increase demand for low-carbon products and services

Incentivise in-fill redevelopment

Opportunities / challenges

- Reducing green-field development, while increasing the asset value of the surrounding area.
- Complexity, costs

Practices in place

- Financial incentives for brownfield development
- Preferential property tax rate for multiple dwellings: Greater Copenhagen (Denmark), Sweden
- Two-rate property tax / tax on under-utilised land: Sydney (Australia), Denmark, Finland
- Special area tax / Development fees
- Refill rate: Portland (US)

Promote low-carbon neighbourhoods

Opportunities / challenges

- High-density, mixed-use neighbourhoods linked by public transit can make travel distance shorter and increase accessibility of urban services for all.
- Scaling up / inclusiveness

Practices in place

- High-dense, mixed use redevelopment: Hamburg (Germany), Stockholm (Sweden)
- Eco-quartier / eco-neighbourhood : France, Malmö (Sweden), Beddington (UK)
- Transit-oriented development: Arlington (US)

Charge private car use to finance public transport

Opportunities / challenges

- Reducing auto use requires attractive public transit alternatives.
- Financing tools to discourage auto use can also accelerate public transit projects.
- ICT (dynamic pricing / fee collection)
- Political will and sectoral silos

Practices in place

- Value capture tax from public transport investment: Hong Kong (China), Miami (US), Milan (Italy)
- Congestion charges: Singapore, London (UK), Stockholm (Sweden)
- High-occupancy toll lanes / parking charges and fees

Develop shared mobility and non-motorised transport

Opportunities / challenges

- Car sharing can drastically reduce the number of travel and thus reduce carbon emissions.
- Integrating various transport modes can facilitate the use of public transport and non-motorised transport.
- Legal framework and sectoral silos

Practices in place

- Car sharing / Bicycle sharing
- Integrated fee system: Paris (France)

Reduce energy intensity in industry

Opportunities / challenges

- Circular economy practices can reduce energy intensity in industry and increase competitiveness.
- Industry can be located near urban centres, thus increasing accessibility to jobs.

Practices in place

- Eco-industrial park: Kalundborg (Denmark), Kitakyushu (Japan), Guigang (China), Rotterdam (Netherlands)
- Support for energy efficiency consulting for SMEs

Reducing energy consumption and waste from buildings

Opportunities / challenges

- Low-interest loans and innovative financing mechanisms can lower the barriers for property owners to invest in energy efficiency and renewable energy technologies.
- Building retrofits create local employment.

Practices in place

- Green building standards/incentives
- Energy efficiency retrofits for public buildings: Paris (France)
- ESCOs: Berlin (Germany)
- Local Emission Trading System: EU, Tokyo (Japan)

Reduce municipal waste and promote recycling and waste-to-energy

Opportunities / challenges

- Recycling, food composting, material re-use can minimise landfilled waste.
- Waste-to-energy technology can reduce fossil fuel based energy production.
- Separation at source / community engagement

Practices in place

- 'Zero Waste' ordinance (San Francisco, US)
- Comprehensive recycling strategy: Horsholm (Denmark), Stockholm (Sweden)
- Waste-to-energy: Amsterdam (Netherlands)
- Smart bin: Bristol (UK)
- Capture landfill methane gas: Sao Paolo (Brazil)

Increase distributed renewable energy in cities

Opportunities / challenges

- Green building standards for new buildings increase the provision of renewable energy for commercial and residential buildings

Practices in place

- Solar Thermal Ordinance: Barcelona (Spain)
- Requirement for the use of renewable energy for new buildings (Merton Rule): London (UK)

Supplying skilled workforce for the green economy

Opportunities / challenges

- Green human capital development is an effective means to adapt skills to the emerging needs of the green economy.

Practices in place

- Multi-stakeholder coordination committee for solar energy: Mitteldeutschland (Germany)
- Workforce development programme for clean energy: Massachusetts (US)

Facilitate connections to spur green-tech innovation

Opportunities / challenges

- Facilitating connections between university research and private sector R&D for green technologies spurs green tech innovation.

Practices in place

- Tax incentives and funding for green tech industrial zones and incubators
- Regional forum between businesses, universities and local governments : Øresund (Denmark / Sweden), Mitteldeutschland (Germany)
- Platform to support local SMEs to facilitate R&D: Paris (France)
- Business cluster to offer expert assistance: Lahti (Finland)

Increase demand for low-carbon products and services

Opportunities / challenges

- City governments can purchase low-carbon products and services by themselves, or promote green purchasing, so they can increase demand for low-carbon products and services.

Practices in place

- Procurement centre: Helsinki (Finland)
- Hydrogen fuel buses: Barcelona (Spain), Cologne (Germany), Hamburg (Germany), London (UK)
- Renewable energy purchasing: Calgary (Canada)

Conclusions

- Cities play a crucial role in fostering low-carbon growth, as they are major economic investors and have many policy instruments to engage at hand.
- Low-carbon targets can be best achieved when they are adressed together with economic and social targets.
- Rulemaking, regulatory oversight and financing structure for low-carbon growth will require effective coordination with national government (national price signals and standards are crucial).
- Metropolitan governance should be urgently established, as urban activities extend beyond administrative boundaries and interact strongly with periphery and rural areas.

FIND OUT MORE …

OECD's expertise on urban policy

1. Reviews of metro-regions and national urban policy to identify opportunities to address competitiveness, sustainability and governance challenges
2. Horizontal analyses targeting, for example, urban competitiveness, climate change, port cities and green growth in cities
3. Policy dialogue on urban issues to facilitate knowledge exchange and best practices to inform policymakers' agendas (Roundtable)
4. Statistical indicators on urban and metro-regions – the fundamental tools for enhancing cross-country comparison and improving policy evaluation

Policy reviews of metro-regions and national urban policy

1. Metropolitan reviews: tailored studies assessing how a given metro-area can boost competitiveness and foster sustainability

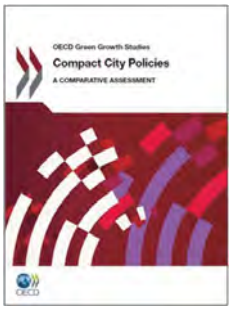
   e.g. Chicago, Guangzhou, Rotterdam-Hague, Mexico City, Venice, ...

2. National urban policy reviews: tailored studies assessing national level policies which impact urban development in a country

   e.g. Poland, Korea, Chile, China, Mexico, Kazakhstan, Viet Nam, ...

Thematic work related to low-carbon growth

- OECD (2010), Cities and Climate Change
- OECD (2012), Compact City Policies: A Comparative Assessment
- OECD (2012) Redefining Urban: a new way to measure metropolitan areas
- OECD (2013), Linking Rural Development with Renewable Energy
- OECD (2013), Urban and rural linkages
- OECD (2013) Green Growth in Cities
- OECD (2015) The Metropolitan Century: Understanding Urbanisation and its Consequences
- OECD (2015) Governing the City
- OECD (2016) Urban Green Growth in Dynamic Asia
- OECD (2016), OECD Regional Outlook 2016
- OECD (2017), The Governance of Land Use
- OECD (2016), Making Cities Work for All



Policy Dialogues at OECD

- *OECD Regional Development Policy Committee / Working Party on Urban Policy*
  - *OECD's official meeting (twice a year) to discuss and exchange policies on regional development and urban issues among 35 member countries*
- *OECD Roundtable of Mayors and Ministers (2007-)*
  - *Unique global forum for mayors and ministers to exchange best urban policy practices*

OECD Metropolitan Database

Interactive maps and data on OECD metro areas
http://measuringurban.oecd.org/

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LOW CARBON MODEL TOWN POLICY IN NORTH SULAWESI PROVINCE

BY
REGIONAL PLANNING AND DEVELOPMENT AGENCY
NORTH SULAWESI PROVINCE
DR. Ir. RICKY S. TOEMANDOEK, MM

Jakarta, September 2017

Middle Term Development Planning of North Sulawesi Province for 2016–2021 (regional regulation No. 3 year 2016)

NORTH SULAWESI's VISION FOR 2016-2021

NORTH SULAWESI AS THE PROVINCE WITH *ECONOMIC* SELF-SUFFICIENT, POLITICAL SOVEREIGNTY, AND CULTURAL IDENTITY

NORTH SULAWESI's MISSION 2016-2021

1. INTEGRATED ECONOMY BY STRENGTHENING AGRICULTURAL SECTOR, MARITIME RESOURCES , AND PROMOTING INDUSTRIAL SECTORS AND SERVICES
2. STRENGTHENING COMPETITIVE HUMAN RESOURCES
3. NORTH SULAWESI AS TOURISM AND INVESTMENT DESTINATION; ENVIRONMENTALLY SOUND
4. PROSPEROUS AND SELF SUFFICIENT COMMUNITY
5. SUSTAINABLE INFRASTRUCTURE DEVELOPMENT
6. NORTH SULAWESI AS INDONESIAN'S GATEWAY IN EAST INDONESIA
7. GOOD GOVERNANCE

MISSION 5 : TARGET OF DEVELOPMENT

GOALS: - APPLYING RENEWABLE ENERGY
-EXISTING OF ELECTRICITY, FUEL AND GAS

TARGET : UTILIZATION OF RENEWABLE ENERGY

REGIONAL PRIORITY PROGRAMS

REGIONAL PLANNING DEVELOPMENT AGENCY	ENVIRONMENTAL BOARD	TRANSPORTATION BOARD	FORESTRY BOARD	ENERGY DAN MINERALS AGENCY	INDUSTRIAL AND TRADE AGENCY
INFRASTRUCTURE AND SPATIAL DEVELOPMENT PLANNING BIODIBERSITY EVALUATION AND REPORT -REVIEW ON GREENHOUSE-GAS EMISSIONS ACTION PLAN	- MONITORING AND EVALUATION THE ENVIRONMETAL POLLUTION AND DEGRADATION -ENVIROMENT CONSERVATION AND PROTECTION	-PARKING MANAGEMENT AND CONTROL -EMISSION TEST FOR VEHICLES AND HEAVY EUIPMENT -ECO-SMART DRIVING COURSES	- MAINTENANCE THE UTILIZATION OF FORESTRY RESOURCES FOREST MANAGEMENT PROGRAM -FOREST PROTECTION AND CONSERVATION	-ENERGY PLANNING, MANAGEMENT AND DEVELOPMENT -ENERGY CONSERVATION AND PROTECTION	THE DEVELOPMENT OF SPECIAL ECONOMIC ZONE BITUNG

ELECTRICITY DEVELOPMENT PLAN

Background of SEZ Bitung

- The Special Economic Zone (SEZ) Bitung is located in southeast of Bitung city. It also situated near Bitung's Subcenter and City Center, as well as Port of Bitung. The SEZ occupies area of 534 Ha.

Phase 1: 2017 – 2019
- Basic Infrastructure Development
- First residential, commercial and industrial activities

Phase 2: 2020-2021
- Improvement and expansion of basic infrastructure and support facilities
- Expansion of residential, commercial and industry development

Phase 3: 2022-2023
- Development of education and training facilities

Phase 4: 2024-2028
- Development of recreational areas
- Further expansion of residential and industrial areas

Phase 5: 2029-2031
- Further expansion of industrial areas

Low-Carbon Measures in SEZ Bitung

•The North Sulawesi's Regional Planning and Development Board (BAPPEDA) identifies the low-carbon measures in SEZ Bitung. Even though SEZ Bitung is under development, BAPPEDA tries to evaluate the low-carbon measures based on several planning documents, such as Masterplan of SEZ Bitung made by South Korean's MOLIT (Minister of Land, Infrastructure and Transport).

Demand Total Point **2.92**	1. Town Structure	Total Point **3.0**
	2. Buildings	Total Point **3.0**
	3. Transportation	Total Point **2.75**

Low-Carbon Measures in SEZ Bitung

Supply Total Point **3.50**	4. Area Energy System	Total Point **1.0**
	5. Untapped Energy	Total Point **5.0**
	6. Renewable Energy	Total Point **4.0**
	7. Multi Energy System	Total Point **4.0**
Demand & Supply Total Point **3.00**	8. Energy Management System	Total Point **3.0**
Environment & Resources Total Point 2.**25**	9. Greenery	Total Point **3.0**
	10. Water Management	Total Point **2.0**
	11. Waste Management	Total Point **2.0**
	12. Pollution	Total Point **2.0**

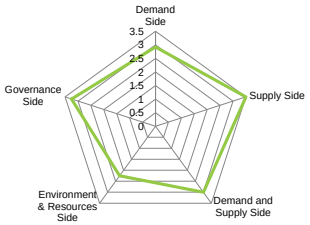
Low-Carbon Measures in SEZ Bitung

Governance Total Point **3.25**	13. Policy Framework	Total Point **4.5**
	14. Education & Management	Total Point **2.0**

Self-evaluation Results

•AVERAGE POINT: **2.98**.

•This Chart shows the low carbon town development of SEZ Bitung, Indonesia. It is clearly stated that improving the environment and resources side in relation to support the low carbon town development in SEZ Bitung needs the cooperation among related stakeholders.



Self-evaluation Results

•DEMAND SIDE

- SEZ Bitung offers a number of the various types of housing, shaping the north-south linkage on site.
- Residential zones are equipped with lots of supporting facilities in walking distance.
- Deploy Big Valley Corridor (BVC) in the middle of nodal area of the central axis and metropolitan railway station

Self-evaluation Results

•SUPPLY SIDE

- Power demand is identified for industrial, logistics and other support facilities separately.
- 70% for industrial and logistic facilities
- 30% for other facilities
- There is a plan for using renewable energy, mainly used geothermal and Gas energy
- Total power demand is 56 – 75 MWA

Self-evaluation Results

•SUPPLY SIDE

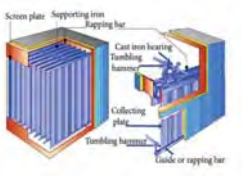
- SEZ Bitung plans to accommodate multiply energy resources as describe below

Order	Descriptions	Target capacity
1	Pariki Electricity Substation Development	60 MW (ext) in 2018
2	PLTU Sulut 3 – Tanjung Merah Electricity Substation	T/L 150 KV, 20 kms in 2019
3	Pariki – TanjungMerah/Kema Electricity Substation connectivity	T/L 150 KV, 27,152 kmr in 2015
4	Tanjung Merah Electricity Substation	30 MW in 2015
5	Tanjung Merah/ Kema Electricity Substation	60 MW in 2019
6	Likupang Electricity Substation	60 MW in 2016
7	Likupang Bitung Electricity Substation connectivity	T/L 20 kv, 32 kms in 2015
8	Minahasa Peaker (PLTG/GU/MG)	150 MW in 2017

Self-evaluation Results

•SUPPLY SIDE

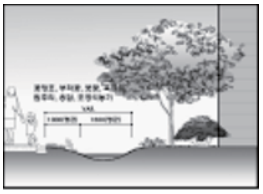
- SEZ Bitung accommodates the Multi-Energy System, which can minimise heat loss through the installation of collecting plates and building afforestation
- Reuse recyclable waste segregated from the construction waste generated from the complex including the industrial site as construction materials
- Recycle waste as materials to pave the ground and install facilities and sculptures in the complex using waste
- Install a topsoil stockyard to recycle the topsoil and rock generated at the time of civil work and develop a park or artificial hill using such materials
- Use plant resources which are cut down as pavement materials for trails and auxiliary materials for the installation of structures



Self-evaluation Results

•DEMAND AND SUPPLY SIDE

- SEZ Bitung determines the block scale, block layout and block unit in consideration of the continuity of green axis, formation of walking route, flexibility of individual construction, energy saving and limitation of unnecessary traffic volume.
- Promote the energy saving, cost reduction and minimization of damage to ecosystem through the layout that preserves the natural terrain to the maximum extent



Self-evaluation Results

•ENVIRONMENT AND RESOURCES

•SEZ Bitung proposes the eco-friendly plan which consist of:

- Construct a natural ecology complex in which the natural environment can co-exist by associating natural resources with the ecological circulation
- Secure sufficient green areas in the district to minimize the adverse environmental impact, including minimizing pollution causing facilities and excluding environmental pollution sources

Self-evaluation Results

•GOVERNANCE

•The Government of North Sulawesi has established some rules related to low-carbon initiative such as:

•RPJMD 2016-2021 (North Sulawesi Rule No. 3/2016)

•RTRW 2014-2034 (North Sulawesi Rule No. 1/2014)

•RAD-GRK (Governor Rule No. 56/2012)

•LCMT team work at SamRat Univ. Rule No. 39/UN12.10/LL/2017

•These rules contain global indication program related to Low Carbon Initiative in North Sulawesi and the task force LCMT SEZ Bitung team at the University.

Future Plan of SEZ Bitung

- ***The Special Economic Zone of Bitung will become a national and global model for sustainable, low carbon urban and industrial planning, and will contribute to the national goal of reducing GHG emissions by 26% by 2020 (29% by 2030) compared to a Business-as-Usual Scenario. This vision will be implemented developing the Low Carbon Model Town strategy along the following four axes:***
- ***Ensure alignment with existing local and national development policies, regulatory frameworks and institutional set-ups;***
- ***Reduce energy consumption through the use of clean, green energy generation and more energy efficient technologies and practices;***
- ***Ensure an efficient and environmentally balanced management of resources through the utilisation of the best available low carbon technologies for industry, commercial and residential areas, for solid waste and wastewater management, for forestry and land use, and for transportation;***
- ***Apply an accurate, transparent and functional monitoring, reporting and verification system (MRV) of the GHG emissions and additional sustainable development impacts.***
- ***Promote the low-carbon vehicles to reduce fuel consumption***
- ***Reducing the fossil fuel energy usage by promoting eco-driving contributes to the low-carbon town development in SEZ Bitung.***

PROBLEMS

- THE ABSENCE OF ENERGY PLANNING DOCUMENTS FOR NORTH SULAWESI PROVINCE , SEZ AREA AND BITUNG CITY
- CAPACITY BUILDING FOR GOVERNMENT OFFICIALS, INDUSTRIAL SECTORS, SCHOLARS
- THE DEVELOPMENT OF RENEWABLE ENERGY NEEDS A LOT OF FUNDS (VERY EXPENSIVE)
- ADVANCED TECHNOLOGY TO EXPLORE THE RENEWABLE ENERGY POTENTIAL

Implemented projects

No	PROGRAMS	Bitung Gov't	North Sulawesi Gov't	Ministry of Energy and Mineral Resources	Donor Countries Via IEA
1	CAPACITY BUILDING		Conducting Socialisation of the Masterplan of Regional Energy	Conducting Training on Implementation of Energy Audit in Government buildings in Bitung City, Manado City and North Sulawesi Province	Conducting the field trip to Bitung City, in collaboration with the Ministry of Energy and Mineral Resources conducting workshop with the stakeholders.
				Conducting the Training on Formulation of the Masterplan of Regional Energy	Proposed Projects to APEC in relation to Capacity Building via Autralia-Indonesia Center

Implemented projects....continued

No	PROGRAMS	Bitung Gov't	North Sulawesi Gov't	Ministry of Energy and Mineral Resources	Donor Countries Via IEA
2	Preparation of land-use administration	Providing the land and data of land ownership in SEZ's area. Preparing general administrative management personnel in SEZ's Bitung	Preparing and proposing the land management right to the central gov't	Supporting the ongoing processes in collaboration with National SEZ Board	
3	Development of Basic Infrastructure	Land clearing from squatters	Developing Entrance access to SEZ, and Administrative office (collaboration with Ministry of Industry)		

CONCLUSION

- Bitung SEZ development should be continously encouraged in order to provide economic and social impacts for people.
- The development of SEZ Bitung is expected to absorb as musch as possible local workforce.
- Need a breakthrough in relation to SEZ's land acquisition
- As an industrial area, SEZ Bitung requires a large amount of energy. Therefore, the utilisation of renewable energy resources is absolutely neccesary.
- The implementation of renewable energy use requires technological as well as financial support
- North Sulawesi has renewable energy potential (solar, hydro, wind and geothermal). It needs advanced technologies and funds to explore.

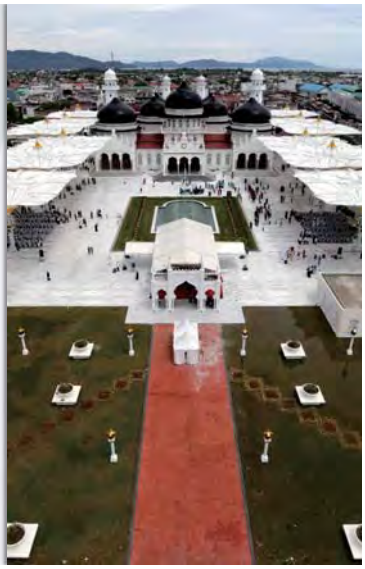
SELF EVALUATION OF LCT-I SYSTEM OF BANDA ACEH CITY

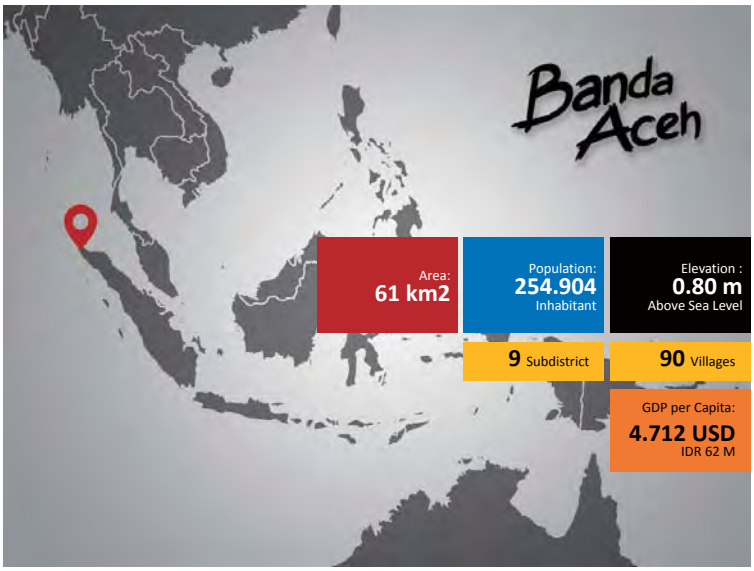
1st APEC LCMT SYMPOSIUM
Low Carbon Model Town (LCMT) Project Phase 7
14-15 September 2017
Shangrilla Hotel-Jakarta

By:
The City Director of Banda Aceh City

STRUCTURE

- City Profile
- Carbon Emission in Banda Aceh City
- Self Evaluation Result
- Future Plan of Low Carbon Development





ECONOMY

Post tsunami Banda Aceh undergoes rapid urban and economic development

PARAMETER	2004	2012	2015
Economic Growth (%)	4.81	6.02	5.01
Inflation (%)	6.97	3.32	1.27
Local Own Revenue (million IDR)	9.561	99.022	209.914
GDP per Capita	IDR 7,6 M	IDR 39,3 M	IDR 58,9 M
Population (person)	239,146	228,562	250,303
Poverty rate (%)	8.89	9.08	7.78
Unemployment rate (%)	10.10	7.17	12.00

CARBON EMISSION IN BANDA ACEH CITY

CARBON EMISSION

- Banda Aceh produce 448.171 ton CO2 eq/ year or 1,8 ton CO2 eq/ capita/ year
- The main contributor is transportation sector, that contributes 67% of total emission.
- It shows that huge efforts must be taken in transportation sector to reduce carbon emission significantly.
- Target to reduce 12% carbon emission
- The emission reduction is mostly contributed by BRT Transkutaraja

To support Green City vision

CARBON EMISSION

LABI-LABI

Mostly from transportation sector

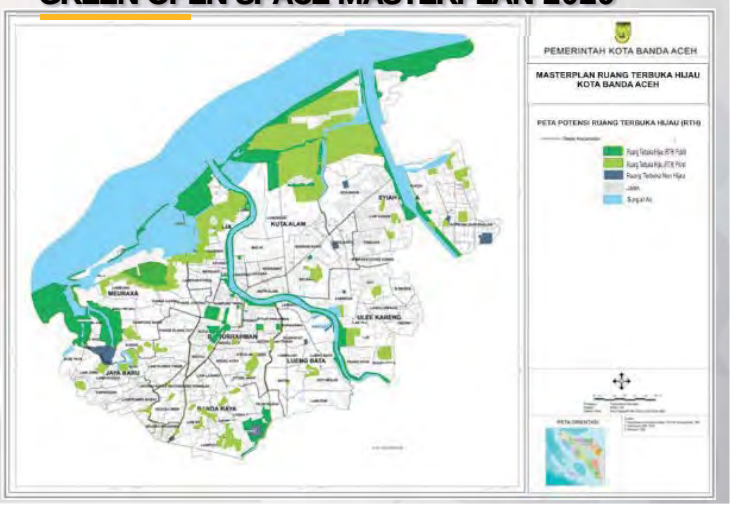
REGULATION TO SUPPORT ENVIRONMENT FRIENDLY DEVELOPMENT

Banda Aceh's regulation to support LCT :

- Spatial master plan 2014-2034
- Sanitation White Book
- Mayor decree about waste reduction team
- The action plan for greenhouse gasses reduction 2013-2018
- The action plan for greenhouse gasses reduction for Trikarsa Bogor 2015-2020
- The Master plan for Compact and Smart City of Banda Aceh 2016-2021
- Green open space master plan

To support Green City vision

GREEN OPEN SPACE MASTERPLAN 2029



MAIN STRATEGY

Banda Aceh's main strategy to achieve low carbon town:

- Establishing quality public transportation by developing bus rapid transit system Transkutaraja
- Increasing the use of renewable energy
- Energy use management
- Better waste management and the utilization of methane for green energy
- Extending green space
- Regulation to support green building and green waste management
- Disaster mitigation based planning

To support low carbon town

LCT-I EVALUATION OF BANDA ACEH

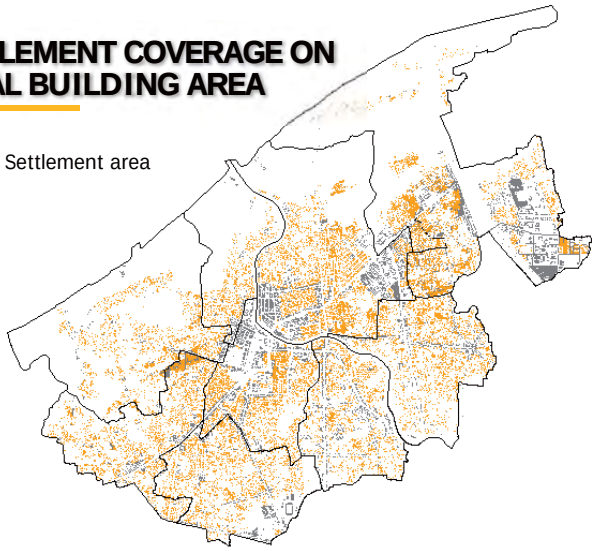
LCTI-I SHEET 1. DEMAND

1. Town Structure

- Building covers around 16% of total area
- Residential area covers around more than 60% of total building
- Most building are in used
- Bus rapid transit Transkutaraja has been established. But it has not influenced the land use yet
- BRT is not integrated with vertical development currently

SETTLEMENT COVERAGE ON TOTAL BUILDING AREA

Settlement area



LCTI-I SHEET 1. DEMAND

2. Buildings

- Banda Aceh has not established system or criteria for thermal performance and energy saving equipment performance yet.
- The use of natural energy has not commenced yet. But, the planning for such policy has been introduced in planning document such as Regional Action Plan for Greenhouse Gasses Reduction (RAD GRK) 2013-2018 and Compilation of Action Plan for Greenhouse Gasses Reduction-Trikarsa Bogor, and Master plan for Smart compact City 2016-2021.
- There is already effort to formulate green construction guideline

LCTI-I SHEET 1. DEMAND

3. Transportation

- BRT already operating
- The coverage area of public transportation is limited because only two corridors are operating
- Bicycle lane exists but does not work properly
- The development of new bridge, flyover and underpass
- Banda Aceh has not formulated subsidy system for low carbon vehicle yet
- Eco driving has been implemented but in limited scale
- Traffic congestion in peak hour

LCTI-I SHEET 1. DEMAND

3. Transportation

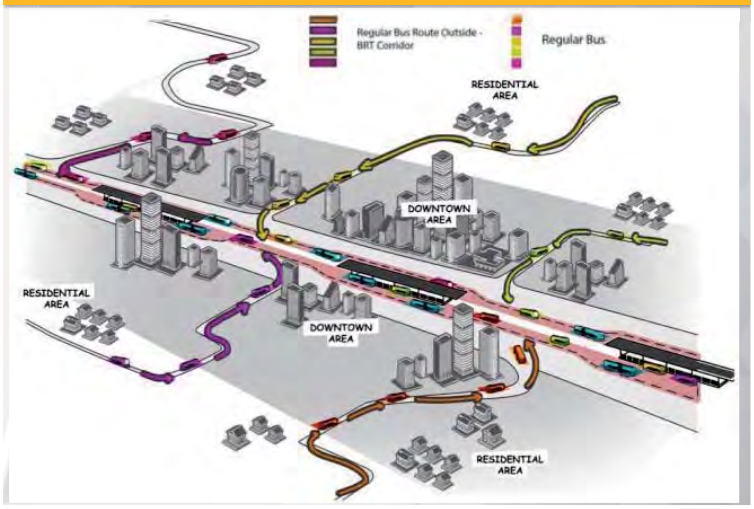
LCTI-I SHEET 1. DEMAND

3. Transportation

BRT Transkutaraja Corridor Plan

BRT TRANSKUTARAJA IMPROVEMENT PLAN: SEPARATED LANE

BRT TRANSKUTARAJA IMPROVEMENT RECOMMENDATION: DIRECT SERVICES SYSTEM



LCTI-I SHEET 1. DEMAND

3. Transportation

LCTI-I SHEET 2. SUPPLY

4. Area Energy System

- The city has not establish plan for area energy system yet.

5. Untapped Energy

- There are several efforts to introduce untapped energy in small scale for example the utilization of methane from black water treatment plant and landfill to produce energy for surrounding households.

Methane collector pipe

LCTI-I SHEET 2. SUPPLY

6. Renewable Energy

- The utilization of solar panel and LED lamp for street lighting and in government building to introduce solar energy and LED
- Small proportion of electricity and thermal energy cost has been already covered by renewable energy

7. Multi-Energy System

- The government has not introduced multi-energy system yet

LCTI-I SHEET 3. DEMAND & SUPPLY

8. Energy Management System

- The government still has not introduced energy management of buildings/ area and AEMS (Area energy management system)
- Smart micro grid has not been introduced yet

LCTI-I SHEET 4. ENVIRONMENT AND RESOURCES

9. Greenery

- The green space covers 23% of total area
- 13,2% is public green space
- 20% public green space required
- Urban forest
- Green corridor

10. Water Management

- Water usage concept has not been developed yet
- Recycled waste water is used in some facilities
- Recycled waste water from black water treatment plant is used for watering green corridor

LCTI-I SHEET 4. ENVIRONMENT AND RECOURCES

11. Waste Management

- 200 ton solid waste per day
- 0,75 kg/ capita/ day
- Waste reduction target in waste master plan
- Government regulation for waste reduction
- Waste bank at school and other public facilities to separate plastic waste
- Full waste separation has not been implemented yet
- Plastic waste separation by scavenger for waste recycling

LCTI-I SHEET 4. ENVIRONMENT AND RECOURCES

12. Polution

- Effort to reduce air pollution has been implemented in small scale by the utilization of emission control facility which control emission from public transportation and freight vehicle
- The city government has established sanitation regulation to reduce soil contamination

LCTI-I SHEET 4. ENVIRONMENT AND RECOURCES

12. Polution

- Reduce water pollution by developing waste water treatment plant. 5 WWTP's are functional currently.
- Ongoing development WWTP in Gp Jawa for 5000 households

LCTI-I SHEET 5. GOVERNANCE

13. Policy Framework

- Efforts towards low carbon town are integrated into planning document. In doing so, the city also establish cooperation with CDIA, UCLG, CityNet etc
- The city government assigns regular budget to extend green space
- The city has not yet established Business/ Life Cycle Plan (B/ LCP)
- DRR is integrated into planning document.
- The conservation of coastal area
- Sanitation master plan as guideline to counter flood and developing drainage infrastructure

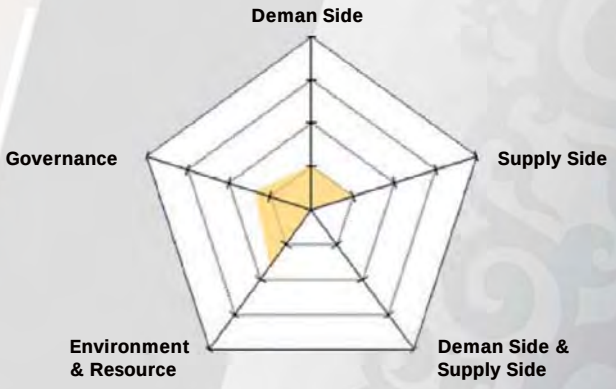
LCTI-I SHEET 5. GOVERNANCE

14. Education and Management

- Cooperation with green community
- Community participation program is planned in documents such as Smart-Compact City Masterplan and The Action Plan of Greenhouse Gas Emission Reduction
- Community association for green planning called P2KH (Green City Development Program) consist of city official, green community and academician to support green city. But the community does not function well in the last few year. It is necessary to empower the community.

LCTI-I SELF EVALUATION RESULT

Current radar chart



FUTURE PLAN OF LOW CARBON DEVELOPMENT

FUTURE PLAN OF LOW CARBON DEVELOPMENT

Assessment Items

- Bus Rapid Transit Transkutaraja separated lane
- Improving the coverage area of BRT Transkutaraja
- Transit Oriented Development (TOD) along the BRT line
- Establishing system for energy saving construction, including in measuring thermal performance, energy saving equipment performance and natural.
- Establishing green construction guidelines
- Promoting low carbon vehicle and eco driving
- Introducing area energy
- Increasing the utilization of renewable energy

FUTURE PLAN OF LOW CARBON DEVELOPMENT

Assessment Items

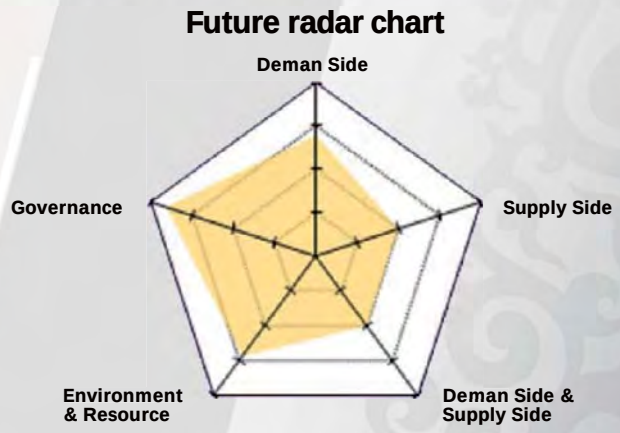
- Introducing multi energy system
- Introducing energy management, area energy management system, and smart micro grid
- Extending greenery
- Improving the effort to reduce water usage and increase water reuse
- Optimizing waste reduction effort
- Increasing waste reuse and recycling
- Improving emission measurement and monitoring facilities
- Regular check of water pollution
- Increasing the effort to reduce soil contamination

FUTURE PLAN OF LOW CARBON DEVELOPMENT

Assessment Items

- Establishing the goals for low carbon town and carry actual effort
- Secure budget for low carbon town
- Establishing Business /Life Contingency Plan in pilot area
- Implementing development based on spatial master plan
- Carrying education for low carbon town
- Increasing the role of community association

LCTI-I SELF EVALUATION RESULT



Review on the LCT Planning of **Banda Aceh**

Michinaga Kohno, President
Michi Creative City Designers Inc.

The 1st APEC Low-Carbon Model Town Symposium
14 September 2017

Findings on the LCT Planning of Banda Aceh (1)

Characteristics of the town:

- ✓ *The target area of the town is a mixed use community of residential, commercial and educational , with the residential being the broadest.*
- ✓ *Population: 249,499 (2014)*
  - ➢ *Expected growth of population is 3-4% in 5 years*
- ✓ *Size of town: 61,359 ha*
- ✓ *On December 26, 2004, the city was hit by a "tsunami" caused by the 9.2 Richter scale earthquake in the Indonesian Ocean, which caused casualties of hundreds of thousands of people and destroyed over 60% of city's buildings.*

[Source: Nomination Sheet and Wikipedia]

2

Findings on the LCT Planning of Banda Aceh (2)

On-going projects related to "low-carbon town":

- ✓ *"Rencana Tata Kota dan Wilayah (RTKW)" (City and Regional Spatial Plan) for 2009-2029*
- ✓ *BRT Transkutaraja*
- ✓ *Consolidated Urban Development Plan(CUDP) for Krueng Aceh River*
- ✓ *"Green City"*

[Source: Nomination Sheet]

3

Findings on the LCT Planning of Banda Aceh (3)

Itemized efforts towards "low-carbon town" by the city

- ✓ *The recovery of methane from solid waste landfill*
- ✓ *The conversion of organic waste into fertilizer*
- ✓ *The introduction of PV for street lighting and traffic lights*
- ✓ *The development of BRT network*
- ✓ *Green building regulations*
- ✓ *Green waste management*
- ✓ *Monitoring and management of energy use in government buildings and public service facilities*

[Source: Nomination Sheet]

4

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		✓			

5

Feedback on the Self-Evaluation (1)

Tier 1	Tier 2	Tier 3	Comments
Demand	Town Structure	1. Adjacent Workplace 2. Land Use 3. TOD	All of the indicators in this section have been misunderstood. Other indicators should be selected, and could be discussed during the Symposium.
	Buildings	1. Energy Saving Construction 2. Green Construction	While the scores in this section are low, efforts towards green building are described in the nomination sheets, and the execution of the plans are expected.
	Transpor-tation	1. Promotion of Public Transportation	The development of BRT is notable. Further development of public transportation network on the top of BRT is expected.
		2. Improvement in Traffic Flow	The efforts of grade separation of roads are also remarkable.
		3. Promotion of Efficient Use	The "smart driving concept" is valuable among developing economies, and its deployment is highly expected.

6

Feedback on the Self-Evaluation (2)

Tier 1	Tier 2	Tier 3	Comments
Supply	Area Energy System	Area Energy	Area energy systems should be planned along with the urban development and infrastructure plans in high-density areas.
	Untapped Energy	Untapped Energy	The collection of methane from solid waste landfill is remarkable and advanced among developing economies. This should be expanded to other areas of the economy.
	Renewable Energy	Renewable Energy	PVs have been introduced to traffic lights and street lighting. Further introduction of PV to public buildings and houses is encouraged. The possibility of other RE such as wind, sea tide, and compact hydraulic should be examined.
	Multi-Energy System	Multi-Energy	The combined supply of electricity and heat does not necessarily create benefits in tropical areas.

Feedback on the Self-Evaluation (3)

Tier 1	Tier 2	Tier 3	Comments
Demand and Supply	Energy Manage-ment	Energy Management of Building / Areas	Energy management systems, such as area energy management systems and smart grids, are needed only when the use of unstable renewable energy becomes remarkable and the fluctuation of energy demand becomes significant. The fluctuation of energy demand should be carefully monitored including the future forecast.
Environ-ment and Resources	Greenery	Securing Green Space	The efforts to expand greenery including mangrove area in the coastal areas should be maintained for both purposes of shading and disaster risk mitigation.
	Water Manage-ment	Water Resources	The model of blackwater treatment in Gampong Jawa should be extended to other areas.

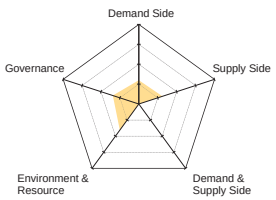
Feedback on the Self-Evaluation (4)

Tier 1	Tier 2	Tier 3	Comments
Environ-ment and Resources	Waste Manage-ment	Waste Products	Regardless of current status, the efforts to reduce and reuse solid waste and to collect waste in the separated ways are under way, and are expected to be accelerated and expanded.
	Pollution	1. Air 2. Water Quality 3. Soil	Plans have already been made and efforts of executions are under way. The efforts are expected to be continued and expanded towards upper grade of quality.
Govern-ance	Policy Frame-work	1. Efforts toward a Low-Carbon Town	As indicated in the nomination sheet, plans on higher levels such as greenhouse gas reduction 2013-2018 and "Green City" program have been enacted and the low-carbon efforts are in line with these plans.
		2. Efforts toward Sustainability	For Banda Aceh, which experienced the tsunami disaster, the focus of sustainability should be on the resilience and disaster risk mitigation, as well as adaptation to the climate change.

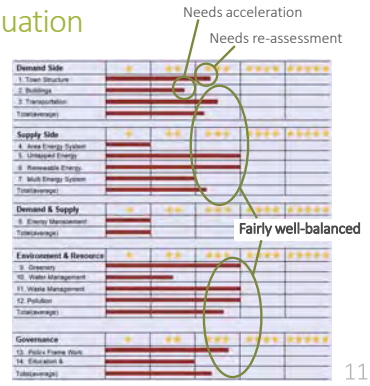
Feedback on the Self-Evaluation (5)

Tier 1	Tier 2	Tier 3	Comments
Govern-ance	Education & Manage-ment	Life Cycle Management	The cooperation between the city government and communities of residents is recognized, but dormant activities are also found, which should be revived for further activities.

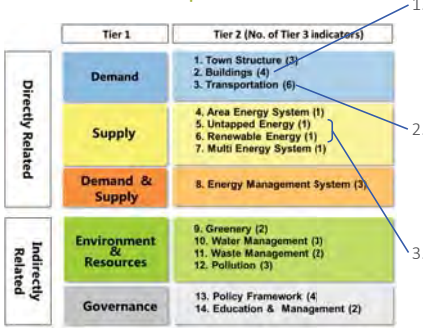
Feedback on the Self-Evaluation



The scores at Tier 1 shows fairly well-balanced pattern except "Demand & Supply Side", which is represented by energy management systems and smart grids, which are applicable to areas with advanced energy sources and demand fluctuations.



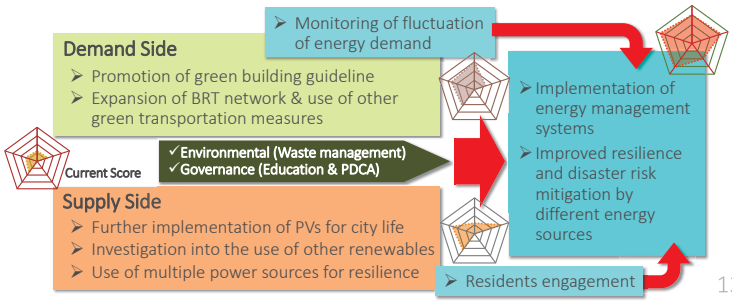
For the Improvement



1. Since green building guideline has been established at the national level, it should be applied to the town, and expand the applications from public buildings to private sector.
2. BRT has been employed, but its coverage is limited, and acceleration of BRT network development and introduction of other low-carbon transportation measures is needed.
3. Untapped energy (methane from landfill) and PV are being employed, and other renewable energy should be studied the resilience of the city.

Ideas for the LCT Development

Proposed roadmap of LCT development



Comments for the Improvement of LCT-I System (1)

◆ Structural problems of LCT-I System:

1. Tier 1 categories have different number of Tier 2 items, which creates **unintended weighting** on Tier 2 scores onto Tier 1 result, and same problems exist between Tier 2 and Tier 3.
2. In some indicators, **qualitative** evaluation and **quantitative** evaluation are placed in line on the same 1-5 star scale.
3. Some indicators can be applied only in advanced economies, where urban development and administration regulations are mature.

◆ Proposals of LCT-I Improvement:

1. To increase indicators of Tier 2 and 3 to make them equally affect to Tier 1 and 2 respectively, as well as to enable economy to select indicator to fit their data sets.
2. Employ generally accepted **maturity model** of 5 steps to 1-5 star scale, and separate qualitative and quantitative indicators.

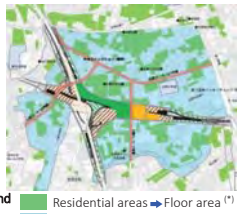
[Indicators users might misunderstand]

Comments for the Improvement of LCT-I System (2)

◆"Residential Use and Non-residential Use"

Tier 1	Tier 2
Demand	Town Structure
Tier 3	
Adjacent Workplace and Residence	

[An example]



✓ This indicator evaluates how close the residential areas and non-residential areas are located in the town (the area to be studied).
✓ The closeness of these areas reflects less travel of residents to their workplaces, which reduces the use of vehicles for commuting.

$$\text{Indicator value} = \frac{\text{[Total floor area of residential areas]}}{\text{[Total floor area of non-residential areas]}} \times 100\ (\%)$$

Numerator / Denominator

Legend
Residential areas ➡ Floor area (*)
Non-residential areas (Commercial, Industrial) ➡ Floor Area (*)

(*) Floor area: Total floor areas in case of multi-story buildings

Alternatives:
➢ Percentage of residents in working age, who commute to and from their workplaces on foot or by bicycles
➢ The ratio of the number of employees to the population of residents in working age

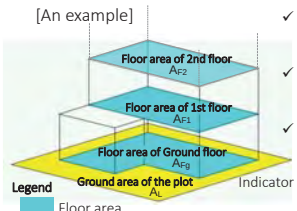
[Indicators users might misunderstand]

Comments for the Improvement of LCT-I System (3)

◆"Floor Area Ratio"

Tier 1	Tier 2	Tier 3
Demand	Town Structure	Land Use

[An example]



Legend
Floor area
Land area

✓ The "Floor Area Ratio" is the ratio of the total floor area of a building to the total ground area of the plot, where the building stands.
✓ The "Floor Area Ratio" is generally regulated by local governments based on the intended use of land, which is regarded as "standard (authorized) floor area ratio" in LCT-I.
✓ The indicator evaluates how much of the "standard floor area ratio" has already been filled by actual construction.

$$\text{Indicator value} = \frac{\text{[Actual floor area ratio in current situation]}}{\text{["Standard" floor area ration planned for the area] } \textit{(Authorized)}} \times 100\ (\%)$$

(*) In the emerging economies, the "standard floor area ratio" tends to be held down to eliminate overdevelopment beyond the capacity of infrastructure.

$$\text{Floor Area Ratio} = \frac{A_{Fg} + A_{F1} + A_{F2} + \cdots}{A_L} \times 100\ (\%)$$

Alternatives proposed:
➢ Remove this indicator from LCT-I

Contact Information

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HANG TUAH JAYA CITY
MELAKA . MALAYSIA

HON. YB DATUK AR. HJ ISMAIL BIN HJ. OTHMAN
CHAIRMAN OF THE STATE COMMITTEE FOR HOUSING, LOCAL GOVERNMENT AND ENVIRONMENT, MELAKA

The 1st APEC Low-Carbon Model Town Symposium
14 September 2017

MALAYSIA

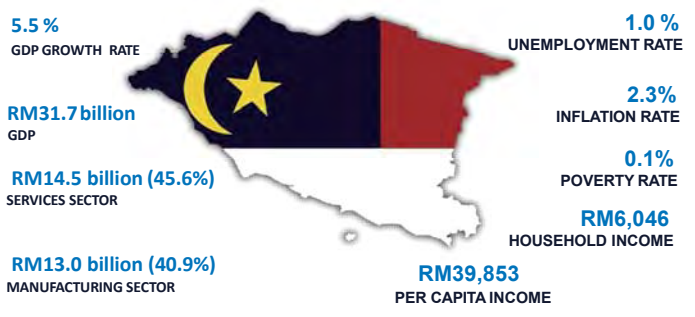
Malaysia (Country) – Melaka (State) – Hang Tuah Jaya (City)

MELAKA Green Technology City State

Melaka supports Malaysia's Vision 2020 to be a high income low carbon developed nation with a minimum GDP Per Capita of USD15,000 by the year 2020. Melaka is leveraging on three (3) strategic objectives:

- maintaining status as a DEVELOPED STATE;
- achieving status as a CITY STATE;
- achieving status as a GREEN CITY

Melaka set a vision to become A Green Technology City State By The Year 2020



Background of Melaka – Economic Scenario

Source: Melaka State Economic Planning Unit

Melaka Green City Action Plan (M-GCAP)

Melaka Green City Action Plan (M-GCAP) & 6 Sectoral

INDONESIA-MALAYSIA-THAILAND GROWTH TRIANGLE(IMT-GT)
Melaka was selected under 'IMT-GT Green Cities Initiative' with Medan (Indonesia) and Songkhla (Thailand) – 27 September 2012

Key Projects under IMT-GT Green Cities Initiative:

- Melaka Green City Action Plan (M-GCAP)
- Green City Benchmarking and Baseline Indexing by ADB – ICLEI
- GHG Carbon Inventory (using HEATPlus software) by ICLEI
- Energy Efficiency (EE) State Owned Government Building by Danish Energy Management

MELAKA IS THE CHAIRMAN OF THE IMT-GT GREEN CITY COUNCIL MEETING SINCE 1 MARCH 2016 IN CONJUCTION WITH THE 2ND RESILIENT CITIES ASIA PACIFIC FORUM IN MELAKA.


1ST IMTGT Green Council Meeting (1st March 2016)

IMT-GT Green City Initiatives

Melaka GHG Inventory Report was published during the UNFCCC Conference Of Parties (COP) 21 In Paris, France (November 2015)

GHG Inventory Report 2013 for Melaka State

GREEN DOCUMENT:

Blueprint Melaka Maju Negeriku Sayang
Negeri Bandar Teknologi Hijau, 2011-2020

STATE OF MELAKA

Three (3) main Objective:
- **Developed State**
- **City State**
- **Green Technology State**

HANG TUAH JAYA CITY

"Support and agreed to Hang Tuah Jaya City to become the first green cities in Melaka"
- Page 87, Blueprint Melaka Maju

Blueprint Melaka Maju 2011-2020: *"Hang Tuah Jaya City as first green city"*

HANG TUAH JAYA CITY

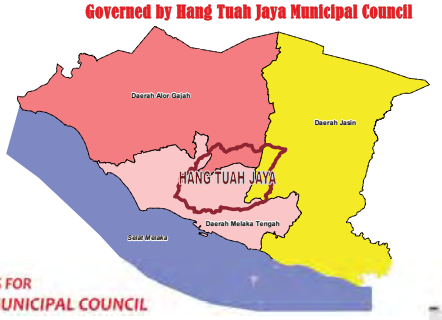
Governed by Hang Tuah Jaya Municipal Council

Started
1 JANUARI 2010

Rank
ONE OF 4 LOCAL COUNCIL IN MELAKA

Area
35,733.04 ACRE / 144.6 KM SQUARE

Population
161,290 PEOPLE



FACTS FOR
HANG TUAH JAYA MUNICIPAL COUNCIL

Background for Hang Tuah Jaya City

Study Area: State of Melaka Administrative Centre (1,956.57 acre)


MELAKA INTERNATIONAL TRADE CENTER (MITC) AREA
- GOVERNMENT BUILDING AREA -

Image of Study Area


SERI NEGERI COMPLEX
- STATE GOVERNMENT BUILDING -

Image of Study Area


GREEN DEVELOPMENT / BUILDING
- SOLAR FARM 8MW & REHABILITATION CENTRE PERKESO -

Image of Study Area

"As City Manager, we committed to support national vision to reduce carbon emission intensity by 45% per GDP per capita by year 2030 "

Datuk Murad Husin
Mayor,
Hang Tuah Jaya Municipal Council

1 MAYOR

24 COUNCILLORS

308 OFFICERS

161,290 RESIDENTS

Our Commitment

MPHTJ Majlis Perbandaran Hang Tuah Jaya – Bandaraya Pintar

I.C.L.E.I Local Governments for Sustainability

ICMA Leaders at the Core of Better Communities

YSEALI Young Southeast Asian Leaders Initiative

SHRDC Seoul Human Resource Development Center

APERC Asia Pacific Energy Research Centre

UNDP

CATAPULT Future Cities

THE GREEN ORGANISATION

International Networking

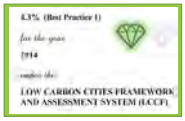
GREAT MOMENT

Low Carbon City Framework Project

"Carbon emission baselines were successfully collected from year 2012 until today. In fact the carbon emission baseline data collection is still in progress since it is an ongoing process. In 2014, carbon emission baselines show positive results. It was found that there was a decrease in carbon emission to **434.26 tCO2** as compared to 2013. This indicates a **4.30%** reduction in carbon emission. This was due to the **awareness programs** and **green practices within the organization** which encourages energy conservation from the usage of electricity, water and other sources.

The Ministry of Energy, Green Technology and Water Malaysia (KeTTHA) has presented MPHTJ with a diamond award that indicates Best Practice 1 (1% - 9% carbon reduction level)"

Hang Tuah Jaya Low Carbon City Great Moment

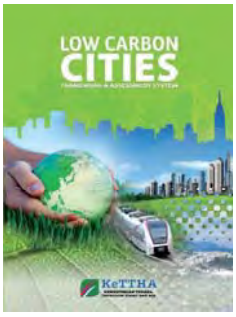


@ HANG TUAH JAYA CITY

Our Recognition Towards Low Carbon City

Newspaper Coverage

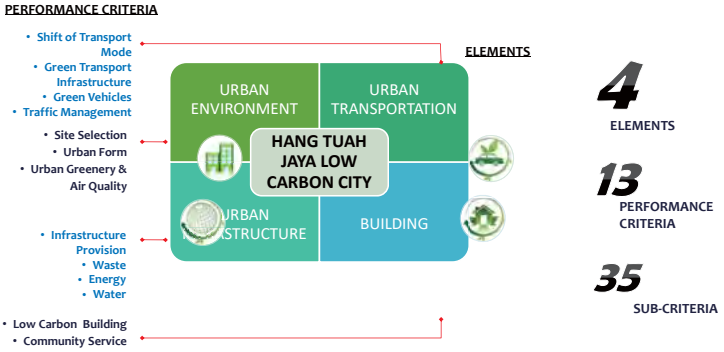
Objective of Low Carbon Cities Framework (LCCF) & Assessment system	• To encourage & promote the concept of low carbon cities and townships in Malaysia. • To increase the compatibility of cities/townships with their local natural system. • To guide cities in making choice/decisions towards greener solutions.
Users	• All Cities & Townships in Malaysia
Targets	• To reduce carbon emission intensity by 45% per GDP per capita by the year of 2030



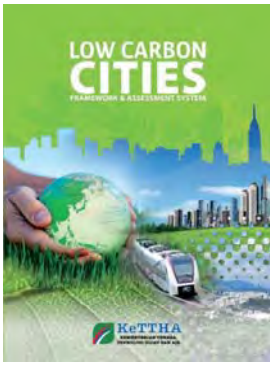
"Hang Tuah Jaya City become the pioneer for this project through MOU signing on Jun 2012 and get the status of "pilot partner". There just only two (2) cities in Malaysia involved at the early stage of this project"

This document is to *assist local authorities, township developers, planners and individuals* in assessing whether developments carried out within the city contributes towards the reduction or decrease in GHG

Implementation of Low Carbon Cities Framework & Assessment System (LCCF)



Criteria for Low Carbon Cities Framework & Assessment System (LCCF)



MOU Signing : 28 JUN 2012

PILOT PROJECT (PP)

I) MAJLIS PERBANDARAN HANG TUAH JAYA
II) MAJLIS BANDARAYA MIRI
III) UNIVERSITI MALAYA (UM)
IV) UNIVERSITI TEKNOLOGI MALAYSIA (UTM)
V) UNIVERSITI ISLAM ANTARABANGSA, MALAYSIA

APPROACH : " 1 SYSTEM APPROACH"

NAME OF PROGRAM:
"LOW CARBON CITIES @ HANG TUAH JAYA 2014"

PHASE 1: 2012 – 2016 (AREA = 1957.56 ACRE)
BASELINE YEAR = 2013
ASSESSTMENT YEAR = 2014, 2016

PHASE 2: 2017 – 2030 (AREA = 16117.18 ACRE)
BASELINE YEAR = 2017

Background Project

Total Carbon Emissions 2013
10,088.87 tCO2

Total Carbon Emissions 2014
9,654.60 tCO2

Total Reduction Carbon Emissions for 2014 compared to 2013
434.26 tCO2

Reduction Carbon Emissions for Energy (Electricity) for 2014 compared to 2013
446.76 tCO2

Final Result. Baseline Year: 2013. Assessment Year: 2014

Hang Tuah Jaya City Low Carbon Initiative

Initiated Solar Farm Project in Melaka

Total 3 project in Melaka (2 project in Hang Tuah Jaya City):

Complete Project

1. Gading Kencana Solar Farm (capacity – 8 MW)
2. KMB Solar Farm (capacity – 5 MW)

Under Construction (Expected 2018)

1. Green Plus Solar Farm (capacity – 50 MW)


8 MW Solar Farm, Hang Tuah Jaya Green

Energy Efficiency & Renewal Energy – Solar Farm Project

Initiated the pilot project by installing Smart Meters to 400 household residents in Melaka

Monitor energy usage online via apps

Tenaga Nasional Berhad (TNB) plan to expand the usage of Smart Meter to whole Melaka in next 2 years


Nation

85 houses installed with TNB smart meters under pilot project

Melaka Smart Grid Pilot Project – Smart Meter

- First fully operated electric bus in Malaysia.
- Successfully completed 3 month trial in March 2014.
- Travel in Melaka World Heritage City and Low Carbon City (Hang Tuah Jaya).
- Can travel up to 280 km fully charged.
- Planning for 40 electric bus operating in Melaka.

Melaka Electric Bus

- First launched on 11 October 2013
- Two (2) charging station available. (Melaka City & Hang Tuah Jaya City)
- To establish Melaka as the center of the electric car connectivity between Kuala Lumpur and Singapore


Seri Negeri, Ayer Keroh

Melaka Electric Car Charging Station

- Bike Share – Located in Heritage Area (Melaka City)
- OFO Bike – Serve area Melaka City & Hang Tuah Jaya City
- O Bike – Area Hang Tuah Jaya City (MITC, Melaka Mall, MMU, UTEM)

melakaBikeShare

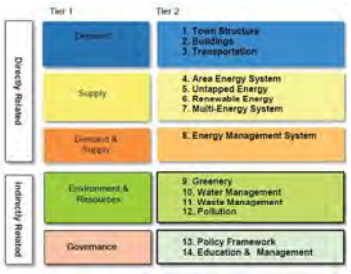

Bike Share


O Bike


OFO Bike

Melaka Bike Rental

Low-Carbon Measures in Hang Tuah Jaya City



LCT-I, Japan

4 elements, 13 performance criteria, 35 sub-criteria

LCCF, Malaysia

Low-Carbon Measures in Hang Tuah Jaya City

Demand	1. Town Structure	<u>Adjacent Workplace and Residence / Land Use / Transit Oriented Development (TOD)</u> • Hang Tuah Jaya City was develop at early 2000. The development of master plan consider element of integration and interaction between land use. • CBD area concentration by Government Office Building • Surrounding (less than 1 kilometer) by housing / residential scheme namely Taman Tasik Utama, Melaka Perdana, Ozana dan etc. • Plot Ratio for this area: 1:4 with the density about 60 unit / acres. • Implementation of Transit Oriented Development. New project: My High Speed Rail Integrated Development. Expected complete on 2026. The radius for TOD average 750 meter from the station.

Low-Carbon Measures in Hang Tuah Jaya City

Demand	2. Building	<u>Energy Saving Construction / Green Construction</u> • All new development in this area must have green building rating (Green Building Index (GBI), Melaka Green Seal (MGS), Mycrest (CIBD) and etc) • Through this compliance green building rating, its covers: i. Orientation of building ii. Ventilation and natural lighting iii. Construction material iv. Façade and design v. and, others • In progress to apply MS1525 – Malaysia Standard: Energy Efficiency and use of renewal energy • Apply for passive design in all construction such as site planning and orientation, daylighting, façade design, natural ventilation, thermal insulation, strategic landscaping, renewable energy

Low-Carbon Measures in Hang Tuah Jaya City

Demand	3. Transportation	<u>Promotion of Public Transportation, Improvement in Traffic Flow, Introduction of Low-Carbon vehicles, Promotion of Effective Use</u> • Hang Tuah Jaya City served by public transport mainly public bus and taxi. The My High Speed Rail Project will introduce the feeder service from the station to the city (expected 2026). • City also have rental bicycle system known as 'O Bike, OFO Bike & Bike Sharing' • 1 undergoing study relate to green transport by local University (expected completion on November 2017) • Program "rebate / discount parking for EV". Through this program all EV owner can get discount at half from the normal rate • City also provide a charging station for a free • Introduce 40 electric buses to serve Melaka City

Low-Carbon Measures in Hang Tuah Jaya City

Supply	4. Area Energy System	<u>introduction of area energy system</u> • District Cooling System – Introduce in development of 800 acres Hang Tuah Jaya Green City (New Project) on 2011. Facing problem at implementation stage related to the capital cost and investment matter. • Success DC project in Malaysia – Putrajaya
	5. Untapped Energy	<u>introduction of untapped energy</u> Not yet implemented. Looking for the advice and recommendation
	6. Renewable Energy	<u>introduction of renewable energy</u> • Currently have 2 Solar Farm project (1 complete and 1 in progress) • Complete project : Gading Kencana Solar Farm (8MW) • In Progress : Capacity 50MW

Low-Carbon Measures in Hang Tuah Jaya City

Supply	7. Multi Energy System	<u>introduction of multi energy system</u> Not yet implemented. Looking for the advice and recommendation
Demand & Supply	8. Energy Management System	<u>measures on energy management of buildings, area energy management system and smart micro grid</u> • "Building Consumption Input System (BCIS) project" – Currently monitoring and analyzing the usage of energy (electricity & water) in 14 building under the criteria of Low Carbon Building, LCCF Assessment • Introduction of Energy Audit for building – Currently 1 complete project for Melaka Mall Complex • In progress to implement Malaysia Standard (MS) 1525 – focusing energy management in new construction building / project.

Low-Carbon Measures in Hang Tuah Jaya City

Environment & Resources	9. Greenery	measures on securing green space and formation of greening • requirement 10% from each development must provide green space. • taken into consideration the shading aspect for minimize UHI • Formation of greening: >40%. Contribute by Urban Forest@Botanical Garden, Melaka
	10. Water Management	measures on water usage • Implementation of Rain Water Harvesting for all new project in Hang Tuah Jaya starting 2015 • Use Building Consumption Input System (BCIS) to monitor the usage of water in 14 buildings (LCCF Assessment Project) • Non Revenue Water (NRW) Melaka Level : 2016 – 18% compared to 2008 – 30.1%

Low-Carbon Measures in Hang Tuah Jaya City

Environment & Resources	11. Waste Management	measures on waste reduction Program: • Separation at sources • 2+1 Collection System = 2 (food and organic waste), 1 (recyclable materials and garden waste) • No plastic bag in Melaka • Food Composting program • Eco-school program – as a part of awareness and education
	12. Pollution	measures on air/water/soil pollution prevention Monitoring by Department of Environment (DOE). Regulating Document: Malaysia's Environmental Quality Act of 1974

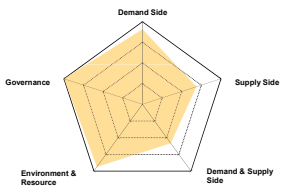
Low-Carbon Measures in Hang Tuah Jaya City

Governance	13. Policy Framework	Efforts toward a low-carbon town, budget for policies/business plans to create a low-carbon town, business/life continuity plan and development with less influence, etc. • Melaka as forefront / leading state in term of application of green technology and fighting climate change • Melaka Green City Action Plan & "Blueprint Melaka Maju" was the main document support for green sector in Melaka. • Melaka committed towards green cities as Hon. Chief Minister of Melaka as a Chairman for Green Growth Asia

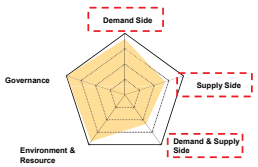
Low-Carbon Measures in Hang Tuah Jaya City

Governance	14. Education & Management	Education for energy saving and low-carbon town, area management (community associations, stakeholder involvement), etc. • 300 housing owner in Hang Tuah Jaya has been selected for pilot project Smart Metering. Through this project, residents have some program related to awareness and energy saving action • Melaka has launch program namely "Melaka Eco-School" to give awareness and education at early aged to support next generation for green agenda. Hang Tuah Jaya Municipal is one of the key players in this program • We also have local university to play important role in term of research related to green development and low carbon

Self-evaluation Results of Hang Tuah Jaya City



2016 (Existing)



To improve the 3 aspect which is 'Demand Side', 'Supply Side' and 'Demand & Supply Side" and at the same time to strengthen the another 2 aspect; 'Governance' and 'Environment & Resource'

2030 (Future Plan)

Feedback for LCT-I System

Please describe any comments on the LCT-I System.

- What were the difficulties in the evaluation process?
  - Some aspect need more explanation in term of definition, application and measurement
  - The scoring system was subjective
- How are you going to utilize the evaluation results?
  - From the results, we can know the strongest and weakness aspects.
  - The result will become as a baseline or benchmark for further planning
- How do you think the LCT-I System can be improved?
  - Make it available online
  - provide with the supports and assistant function
- Any expectations for the LCMT Secretariat to further develop the LCT-I System?
  - Yes

THANK YOU

HANG TUAH JAYA CITY . MELAKA . MALAYSIA

Address | Hang Tuah Jaya Municipal Council, Level 2, Melaka Mall Complex, Jalan Tun Abdul Razak Lebuh Ayer Keroh, Hang Tuah Jaya, 75450 Ayer Keroh, Melaka

Tel | +606-2322775
+606-2322776

Facebook | https://www.facebook.com/mphtj/

Email | teknologi@hjaya.mphtj.gov.my

Website | http://www.mphtj.gov.my/

Review on the LCT Planning of HANG TUAH JAYA CITY, MELAKA

Hung-Wen Lin, Project Manager
Green Energy and Environmental Labs
Industrial Technology Research Institute

The 1st APEC Low-Carbon Model Town Symposium
14 September 2017

About Hung-Wen Lin

Experiences

- Project Manager, Green Energy and Environmental Labs, ITRI (2014 -)
- Project Deputy Leader, Bureau of Energy, Ministry of Economic Affairs (2011 -)
- Chairman, Chapter Technology Transfer(CTTC) of American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), Taiwan Chapter (2016 -)
- Member, Zero Energy Building Technology Alliance (ZEBTA) (2014 -)
- Visiting Researcher, Lawrence Berkeley National Laboratory, USA (2010-2012)

Honors

- ASHRAE CTTC, The Presidential Award of Excellence, 2017
- Outstanding Young Engineer of Chinese Society of Mechanical Engineers, 2016

Specialties and research interests

- Energy management and analysis system
- Smart AC controller and thermal comfort
- Thermodynamics and fluid dynamics

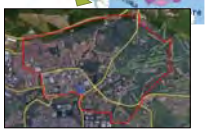
Findings on the LCT Planning of Hang Tuah Jaya City

- **Basic Information**
  - **Malacca**
    - Population of 900,000
    - More than 14 million tourists per year
    - Aimed to achieve "green" status by 2020
  - **Hang Tuah Jaya City**
    - A township and state capital in Ayer Keroh, Malacca
    - Sustainable Development Green City
    - Development area of 5153 acres (= 20.85 km^2)
      - ◆ 8 MW Solar Farm Project (Completed Dec 2014)
    - All buildings and development shall comply with building rating certifications i.e. GBI, LEED, Green Star, Green Mark and Melaka Green Seal.


City Center


Rehabilitation Center


8 MW Solar Farm

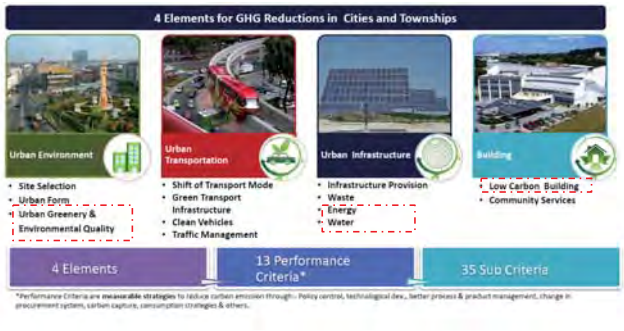


Chronology of Implementation of LCCF in Hang Tuah Jaya Municipal Council

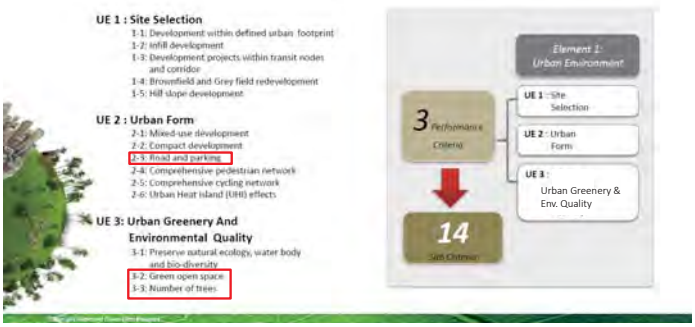
Timeline	Event
28th Jun 2012	Signing of Memorandum of Understanding (MoU)
December 2012	Brief project report
March-July 2013	Data collection for year 2012
July-August 2013	Data analysis and baseline report
July-November 2013	Implementation of action plan
11th October 2013	Provisional Certificate award
August-November 2013	Data collection for year 2013
December 2013	Data analysis and full report for 2013
2014	Reduction of carbon competition 2014
December 2014	Data collection for year 2014
2015	Data analysis and full report for 2014
2016	LCCF and Diamond Rating award

The First Local Council to Receive Diamond Rating

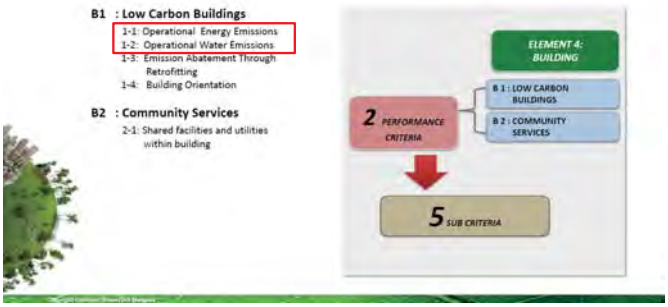
LCCF Performance Criteria: Based on Carbon Footprint



Performance Criteria for Urban Environment(UE)



Performance Criteria for Building (B)

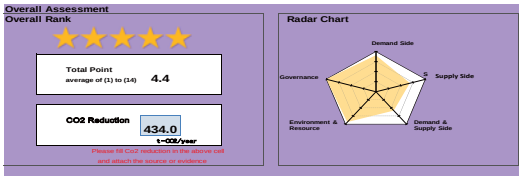


Findings on the LCT Planning of Hang Tuah Jaya City

Short Term	Long Term
Carry out a program to save the energy and water consumption up to 10% (without cost) (Energy management; Water management)	Plantation of tress with high absorption of carbon dioxide Eg. Local bamboo and Eucalyptus (Greenery)
Standardize air-conditioning temperature in every building involved at 24°C (Buildings; Energy management)	Using renewable energy which is Photovoltaic Solar Energy (Renewable energy)
Carry out Rain Water Collecting System (SPAH) for landscape, toilet and general cleaning (Water management)	Using energy saving equipment in every building (LED/T5 lamp, notebook, inverter air-conditioner) (Buildings; Energy management)
Using sunlight as light source in a building (reduce energy usage) (Buildings; Renewable energy)	Having at least 10% or more green open area than the total amount of buildings (Greenery)

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 CO_2 emissions		✓			



Feedback on the Self-Evaluation

Tier 1	Tier 2	Tier 3	Comments
Demand	• Town Structure • Buildings	• Land use • Energy Saving Construction	• Integrate the green area at the east side to the urban area at the west side will conduct good land use efficiency. • Several buildings has complied the green rating bldg. under Green Building Index (GBI) and Melaka Green Seal (MGS)
Demand	Transportation	All items	• Special parking rate for the low carbon vehicle. • Good green transportation(Electric Bus) can reduce carbon emission, set up intra city bike or bike share system in the future
Supply	Renewable Energy	Renewable Energy	8 MW Solar Farm(Completed Dec 2014)
Demand & Supply	Energy Management System	Energy Management of Buildings/Area	14 buildings in this area used a system that called "Building Consumption Input System"
Environment & Resources	• Greenery • Water & Waste Management • Pollutions	All items	• No data at evaluation sheet, need to describe more information to evidence effort in the part. • Enforce the Water & Waste Management plan • Reduce 434.26 tones of CO_2 emission (4.3%) from 2013 to 2014
Governance	• Policy Framework • Education & Management	All items	• No data at evaluation sheet, need to describe more information to evidence effort in the part. • Set up energy saving and carbon reduction target. • Declare food's carbon footprint

For the Improvement

Tier 1	Tier 2	Suggest
Supply	• Renewable Energy	• Accomplish the framework for solar power plant, biomass energy • Encourage people to set up solar panel on the building roof • Replace BIPV glass of regular glass to earn more power
Demand & Supply	• Energy Management System	• Establish a city or regional size Energy management System, for energy monitoring, prediction and smart control • Set up smart grid system to connect supply side and demand side
Governance	• Policy Framework • Education & Management	• Setup energy saving and carbon reduction target. • make performance measure standard and execute the performance verification regularly are good methods to maintain the low carbon city • Declare food's carbon footprint

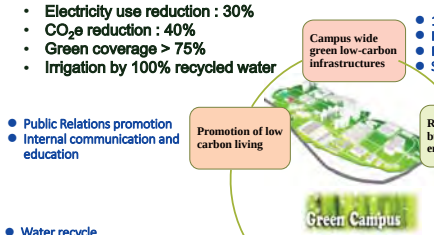
Smart Energy Management System

ITRI IPOWER Platform

ITRI Green Campus Program

➢ **Goals (based on 2010)**

- **Electricity use reduction : 30%**
- **CO_2e reduction : 40%**
- **Green coverage > 75%**
- **Irrigation by 100% recycled water**



- 100% solar thermal water heater for dormitory
- Integrating heat pumps in central cooling systems
- Recycling gray water for grass field irrigation
- Street lamp using 100% LED lighting
- Public Relations promotion
- Internal communication and education
- Renovating 84 buildings
- iBEMS control system
- District cooling/heating plant in certain districts
- Water recycle
- Waste recycle
- Ecological built environment
- Green transportation
- Green procurement
- Carbon foot-print labeling restaurant
- iPower web management system
- iPad App software

ITRI Green Campus Program- 1. Low-Carbon Infrastructure

- Hot water: solar heaters, HPs for dorm and offices
- Efficient lighting: LED street lights, T5 fixtures, IR triggers
- Others: power system upgrade, storm water mgnt system, waste recycling, and water recycling, etc.


Solar heaters


HPs


Power system upgrade


LED Lighting


T5 fixtures


IR triggers

ITRI Green Campus Program-2. Building Renovation

- Totally 84 buildings in the campus will be renovated in 6 years (2012~2017)
- B10: the very first model that has successfully saved 33% energy by deploying ITRI's own technologies.
- B64: currently the 2nd highest performance bldg and undergoing several new techs demo.
- DHC: remodel B15, 17, 23 and a new green house to become a DHC system.


Human factors design (@ B64)


Piping (@ B15 + B17)


Piping (@ B17)

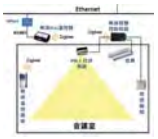

VFD Centrifugal Chiller

ITRI Green Campus Program-3. Power Monitoring and Management

- iPOWER: campus wide power monitoring system
  - A 6-tier metric structure covering each campus buildings
- iBEMS: individual bldg. energy management system
- Office and conference room automation
- iExpert: water loop VFD control


iBEMS

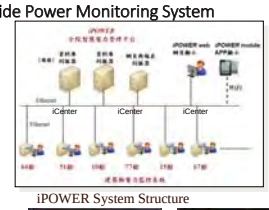

iPOWER


Office mngt system


iExpert

ITRI Green Campus Program-3. Power Monitoring and Management

Campus Wide Power Monitoring System



iPOWER System Structure


Power use SQL database


iPOWER iPAD APP


iPOWER Web

Mobile energy information service is used to increase user awareness.

ITRI Green Campus Program-4. Eco-environment

- Landscaping: eco-pond, external shading, etc.
- Green IT: Conf.-call system (Lync) has saved at least 20% of commuting time for meetings and 600 thousand pieces of papers a year
- Off-time alert system for computers: idle rate drops from 16.3% to 3.4% during non-office hours
- Low carbon transportation system
- Carbon footprint meals


U-bike, e-scooters, coach btw ITRI to THSR station


Eco-pond (@ B64)


External shading (@ B51)


Carbon footprint meals

ITRI Green Campus Program-4. Eco-environment

Low-Carbon Transit and Food Services

ITRI Green Campus Program-5. Promotion

Conclusions

- LCT-I System indicators is a good system to diagnose the performance of the selected town.
- For Hang Tuah Jaya City, more effect data or evidence would be better to estimate the energy saving benefit for low carbon city.
- ITRI's Green Campus Program has exemplified a paradigm of green low-carbon campus.
- This program offers test-beds for ITRI developing technologies to improve the levels of technology readiness and acceptance by industries
- With intensive collaboration among laboratories in ITRI, it also facilitates the technology innovation and integration.

Dr. Hung-Wen Lin
E-mail: hw@itri.org.tw

NOMINATION FOR The Apec low-carbon model town project 2017

SHAH ALAM CITY

1st Apec lcmt symposium Jakarta, Indonesia 2017

Low carbon pilot project

Shah alam city centre - (section 14)

1.0 Introduction

1.1 THE SITING OF MALAYSIA, SELANGOR & SHAH ALAM

SOUTH EAST ASIA

Kuala Lumpur is centrally positioned within South East Asia and is equidistant between India and China, and between Australia and mainland Asia, making it a natural hub for trade and commerce.

MALAYSIA KUALA LUMPUR,

Kuala Lumpur officially the Federal Territory of Kuala Lumpur, is the national capital of Malaysia as well as its largest city. The city covers an area of 243 km2 (94 sq mi) and has an estimated population of 1.7 million as of 2015 (Source: Department of Statistics, Malaysia 2010).
Greater Kuala Lumpur, also known as the Klang Valley.

SELANGOR

Selangor located at the west coast of Peninsular Malaysia and is bordered by Perak to the north, Pahang to the east, Negeri Sembilan to the south and the Strait of Malacca to the west. It surrounds the federal territories of Kuala Lumpur and Putrajaya, both of which were once under Selangor's territorial sovereignty. The state capital is Shah Alam. Selangor has the largest city in Malaysia and it is growing rapidly due to modernisation in the Klang Valley.

PETALING, SHAH ALAM

1.2 BACKGROUND OF SHAH ALAM, SELANGOR

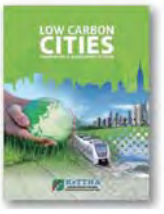
AREA: 290.3 SQKM *(29030 Ha)*	OFFICIAL FLOWER : Orchid – RENANTANDA SHAH ALAM
DISTRICT : Petaling District and Part of Klang	RECREATION AREA / GREEN: 84,673 Hectar
POPULATION: 635,550 People (2016)	NUMBER OF RIVER 9
NUMBER OF PROPERTY OWNERS: 218,079 (2015)	NUMBER OF VILLAGE 17
TAX INCOME : RM434,406,160 (2016)	BRANCH OFFICE 3 Branches
SECTION: 56 Seksyen	

1.3 LOW CARBON PILOT PROJECT, SECTION 14, SHAH ALAM

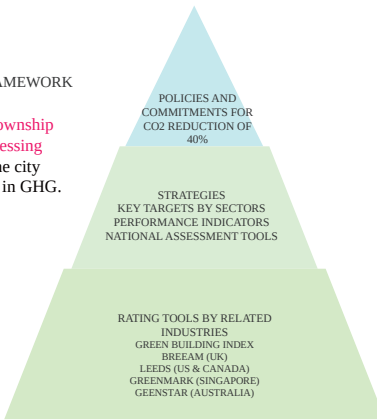
GREEN CONSTRUCTION GUIDELINES

REGIONAL CONTEXT-
MALAYSIA LOW CARBON CITY FRAMEWORK

This document is to assist local authorities, township developers, planners and individuals in assessing whether developments carried out within the city contributes towards the reduction or decrease in GHG.



Launched on 8 Sept 2011



PURPOSE OF LCCF &
ASSESSMENT SYSTEM

TO GUIDE STAKEHOLDERS TO LEAD BY EXAMPLE & IMPLEMENT LOW CARBON CITIES EFFORT

Objective
(Main Purpose)

LCCF

- To encourage & promote the concept of low carbon cities and townships in Malaysia.
- To increase the compatibility of cities/townships with their local natural system.
- To guide cities in making choice/decisions towards greener solutions.

User
(Implementation)

CITIES/TOWN

- All cities & Township in Malaysia (Municipalities, Developers, Universities)

Target
(Carbon Emission)

CO2

- To reduce carbon emission intensity by 45% per GDP per capita by the year of 2030

LOCAL CONTEXT-
SHAH ALAM LOW CARBON ACTION PLAN 2030

GREEN TECHNOLOGY ACTION PLAN SELANGOR STATE 2016-201

- Low Carbon Framework Measurement **2020** — 12 Local Authority are using LCCF
- Increase City Sustainability **2030** — 4 main city to be the Green City
- Green Turnover **5%** a year
- Public Transportation **69%** Fuel cost reduction and maintenance
- Green Building (Green Assessment) **30%-50%** Electricity power reduction
- **&70%** Power saving due to LED

Note :
This target are based on Green Technology Action Plan Selangor State 2016-2018.

1.4 LOCAL CONTEXT-
SHAH ALAM GREEN BUDGET

FEDERAL

Federal Level
- Green Audit: RM 55,000 (2017) MBSA Building — *(USD 13,000)*
- Green Server Room: RM 60,000 (2017) — *(USD 14,000)*

STATE

State Level
- Capacity Building Program: RM 120,000 SPAH, Solar (2016) — *(USD 28,000)*
- LCCF Program: RM 120,000 Capacity Building (2017) — *(USD 28,000)*

MBSA

MBSA Level
- MBSA: RM 7,234,300 (2016) — *(USD 1,700,000)*
- MBSA: RM 9,480,785 (2017) — *(USD 2,200,000)*

1.5 LCCF

4 ELEMENTS FOR GHG REDUCTIONS IN CITIES AND TOWNSHIPS

CODE : UE — URBAN ENVIRONMENT
1. Site Selection
2. Urban Form
3. Urban Greenery & Air Quality

CODE : UT — URBAN TRANSPORTATION
1. Shift of Transport Mode
2. Green Transport Infrastructure
3. Green Vehicles
4. Traffic Management

CODE : UI — URBAN INFRASTRUCTURE
1. Infrastructure Provision
2. Waste
3. Energy
4. Water

CODE : B — BUILDINGS
1. Low Carbon Building
2. Community Service

4	Elements Contribute to GHG Emission	13	Performance Criteria*	35	Sub-Criteria

Performance Criteria are **measurable strategies to reduce carbon emission through:-**
Policy control, technological dev., better process & product management, change in procurement system, carbon capture, consumption strategies & others.

2.0 SHAH ALAM CITY CENTRE
PERFORMANCE CRITERIA SELECTED

PERFORMANCE CRITERIA SELECTED

CODE : UE — URBAN ENVIRONMENT

Site Selection	**1-1, 1-2**
Urban Form	2-1, 2-2, 2-3, 3-4, 2-5, 2-6
Urban Greenery & Air Quality	3-1, 3-2, 3-3

CODE : UT — URBAN TRANSPORTATION

Shift of Transport Mode	
Green Transport Infrastructure	2-1, 2-2
Green Vehicles	3-1, 3-2
Traffic Management	4-1, 4-2

CODE : UI — URBAN INFRASTRUCTURE

Infrastructure Provision	
Waste	2-2
Energy	
Water	

CODE : B — BUILDINGS

Low Carbon Building	**1-1, 1-2, 1-3, 1-4**
Community Service	2-1

CITY BASED APPROACH

MBSA LCCF APPROACH

4/4	Elements Contribute to GHG Emission	9/13	Performance Criteria*	30/35	Sub-Criteria

SHAH ALAM CITY CENTRE
BASELINE YEAR ASSESSMENT :
RESULT

MBSA has selected the following year as the baseline year and final year :-

Interim Year
2017

Ongoing Data Collection

(Target min 3% yearly)

Final Year
2017

Ongoing Data Collection

= Total reduction
-ve
Percentage reduction
zero

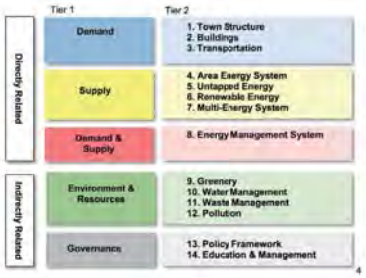
Total overall recorded carbon emission based on data collection by MBSA is :-

Baseline Year
2015
= 35,219 tonne CO2

Targeted Baseline

LCTI System (APEC) VS LCCF (Malaysia)

LCTI SYSTEM



LCCF

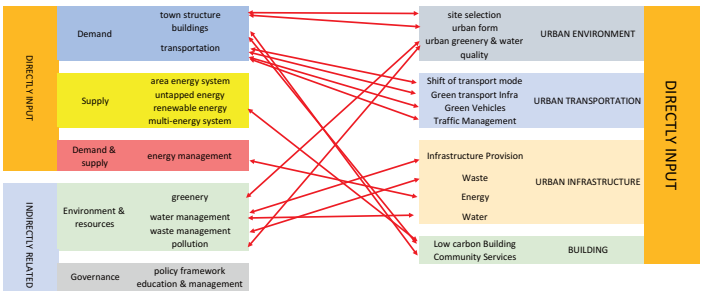
1 URBAN ENVIRONMENT
- 1 Site Selection
- 2 Urban Form
- 3 Urban Greenery & Air Quality

2 URBAN TRANSPORTATION
- 1 Shift of Transport Mode
- 2 Green Transport Infrastructure
- 3 Green Vehicles
- 4 Traffic Management

3 URBAN INFRASTRUCTURE
- 1 Infrastructure Provision
- 2 Waste
- 3 Energy
- 4 Water

4 BUILDING
- 1 Low Carbon Building
- 2 Community Service

LCTI SYSTEM VS LCCF



SHAH ALAM SECTION 14 CITY CENTRE
APPLICATION OF THE LCCF TOOLS

Application of the LCCF Tools

ELEMENTS
MBSA applied
4 out of 4 LCCF elements (100%)

PERFORMANCE CRITERIA
MBSA applied
9 out of 13 LCCF Performance Criteria (69%)

SUB CRITERIA
MBSA applied
30 out of 35 LCCF Sub Criteria (86%)

2.1 LOW CARBON PILOT PROJECT, SECTION 14, SHAH ALAM

TOWN STRUCTURE

BUILDING

Overall = 29 buildings
- Measurement in 2015 12buildings
- Measurement in 2016 25 units buildings

Water : all according to categories: residences, industrial, Government and House of worship

SECTION 14, SHAH ALAM

- MBSA has embarked on LCCF process and implementation for Section 14, Shah Alam based on the selected LCCF elements and criteria's in 2015. Total Landuse = 335,702.70m²
- The area has been selected as the pilot implementation area for the pioneering LCCF application located at MBSA
- Ratio Residential use Residential (SOHO) = 148,675.78
  Commercial Building = 252,182.54
  59%

Legend:
- Institution
- Commercial
- Open Space
- Pond
- Transport Hub
- Future Development

TRANSIT ORIENTED DEVELOPMENT

30% using public transport

10 electric buses + 3 Park & ride by 2020

50% provided with bicycle + pedestrian

1 Bus terminal In City Centre

10 central parking facilities provided outside town centre to give better facilities for movement into the town centre

3.0 SHAH ALAM CITY CENTRE

BUILDING MEASUREMENT LCCF FOR SHAH ALAM CITY CENTRE

MEASUREMENT LCCF FOR SHAH ALAM CITY CENTRE Year of 2015

Total Number of Building
12 units (41.4%) OUT OF 29

Government Building
1. Wisma MBSA
2. Muzium Sultan Alam Shah
3. Wisma PKPS
4. Jabatan Audit Negara, Negeri Selangor
5. Bangunan UMNO Selangor

Commercial Building
1. Bangunan Affin Bank
2. Plaza Perangsang
3. Kompleks PKNS
4. SACC Mall

Public Facilities
1. Sekolah Antarabangsa Dwi Emas
2. Hentian Pusat Bandar
3. Masjid Sultan Salahuddin Abdul Aziz Shah

SHAH ALAM CITY CENTRE

BUILDING MEASUREMENT LCCF FOR SHAH ALAM CITY CENTRE

MEASUREMENT LCCF FOR SHAH ALAM CITY CENTRE Year of 2016

Total Number of Building
25 units (86.2%) OUT OF 29

Government Building
1. Wisma MBSA
2. Muzium Sultan Alam Shah
3. Wisma PKPS
4. Jabatan Audit Negara, Negeri Selangor
5. UMNO Selangor
6. Galeri Shah Alam
7. Laman Budaya
8. Bangunan Darul Ehsan
9. Pejabat Pos Shah Alam
10. Teater Shah Alam

Commercial Building
1. Affin Bank
2. Plaza Perangsang
3. Kompleks PKNS
4. SACC Mall
5. SACC Convention Centre
6. MRCB
7. Hotel Bluewave Shah Alam
8. Anggerik Mall
9. Plaza Alam Sentral
10. Plaza Perabot
11. Maybank

Public Facilities
1. Sekolah Antarabangsa Dwi Emas
2. Hentian Pusat Bandar
3. Masjid Sultan Salahuddin Abdul Aziz Shah
4. DEMC

WAY FORWARD

SHAH ALAM SECTION14 CITY CENTRE
LOW CARBON BUILDING ASSESSMENT

Increase in Voluntary Participation in Low Carbon Building Assessment

2015 — Commercial Buildings participated 12 OUT OF 29 (41%)

2016 — Commercial Buildings participated 25 OUT OF 29 (86%)

2017 — Target Participation 29 OUT OF 29 (100%)

WAY FORWARD
SHAH ALAM CITY CENTRE
LOW CARBON BUILDING AWARDS

GOVERNMENT CATEGORY

First Place Prize : RM 3K
Second Place Prize : RM 2 K
Third Place Prize : RM 1K

COMMERCIAL CATEGORY

First Place Prize : RM 3K
Second Place Prize : RM 2 K
Third Place Prize : RM 1K

INDUSTRIAL CATEGORY

First Place Prize : RM 3K
Second Place Prize : RM 2 K
Third Place Prize : RM 1K

...Encourage Participation of Building Owners in Low Carbon Building Assessments are through ...

LOW CARBON BUILDING AWARDS

3.1 LOW CARBON PILOT PROJECT, SECTION 14, SHAH ALAM

AREA ENERGY SYSTEM

1. AREA ENERGY

MBSA BUILDING AUDIT

Total gross floor area (GFA)
101,988.11 sqm

Total net floor area (NFA)
64,161.85 sqm

PRELIMINARY ENERGY AUDIT

- On-site survey and data collection Within 3 weeks duration (from week-2 to week-4) – Jan 2017
- Objective:

i.To analyse energy performance

ii.To identify potential of no cost and low cost saving measures

BUILDING LOCATION

- GPS Coordinates:

Decimal degrees (DD)
Latitude : 3.07369
Longitude : 101.51945999999998

Degrees, minutes, seconds (DMS)
Latitude : N 3° 4' 25.284"
Longitude : E 101° 31' 10.055"

MBSA BUILDING AUDIT
CRITERIA

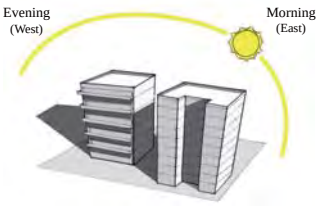
BUILDING ORIENTATION

- Sun Path Study:

•Wisma MBSA facing South
•(Front and rear) not expose to the direct sunlight

- Benefit:

Minimise building cooling demand



BUILDING DESIGN

- GPS Coordinates:

Decimal degrees (DD)
Latitude : 3.07369
Longitude : 101.51945999999998

Degrees, minutes, seconds (DMS)
Latitude : N 3° 4' 25.284"
Longitude : E 101° 31' 10.055"

BUILDING DESIGN

- Block direct sunlight goes into the building
- Reduce heat penetration into the building
- Benefit:
Minimise building cooling demand

BUILDING DESIGN

- UNDERGROUND CAR PARK WITH OPENING OUTLET
•Allow natural air ventilation
•Minimise car park ventilation system usage

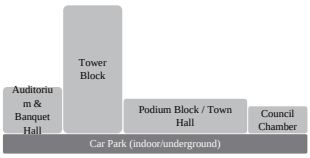
Benefit:
- Minimise building cooling demand

SCOPE AND BOUNDARIES

- Scope

i.Electricity

ii.Electricity for thermal energy (for chilled water supply by TNEC)



FINDINGS FOR IMPROVEMENT

- Electrical distribution system – (6)
- Air conditioning, mechanical,
- Ventilation (ACMV) system – (3)
- Lighting system – (5)
- Building conditions – (1)

15
Findings

IMPORTANT FOR EFFECTIVE ENERGY MANAGEMENT

OUR TARGET

31
TNB energy bills received every months

Match then reduce the numbers…
MBSA need to collaborate with TNB

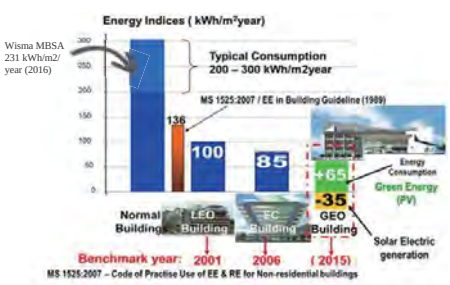
SEVERAL
TNB energy meters (individual) in Tower block & Podium block

2. UNTAPED ENERGY

BUILDING CONDITION

- Energy waste

BUILDING ENERGY INDEX (BEI)



MBSA BUILDING AUDIT
CONCLUSION OF THE FINDINGS

Current BEI (2016)
231 kWh/ m2/year

Total Energy Used
14,827,639 kWh

Target Reduction
41.13%

Total Energy Savings:
6,097,947 kWh

Future Target BEI
136 kWh/m2/year

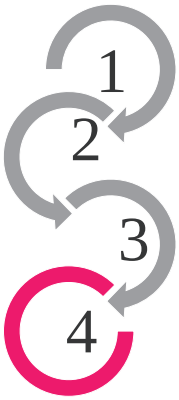
Target Energy Use
8,729,692 kWh

MBSA BUILDING AUDIT
ENERGY CONSERVATION MEASURES SAVINGS TARGET

NO COST AND LOW COST ENERGY CONSERVATION MEASURES...

Savings Target
5% - 15%

MBSA BUILDING AUDIT
PROPOSED ENERGY CONSERVATION MEASURES

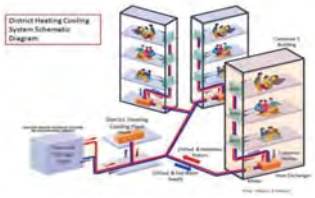


- ENERGY TRAINING AND AWARENESS CAMPAIGN
  Continuous program for behaviour change process
- LIGHTING CONTROL
  - Using motion sensors - for emergency staircase
  - Awareness - Turn OFF the light when not in use
  - Re-lamping - based on recommendation lux in MS1525
- BUILDING COOLING DEMAND
  - Install thermometer - awareness 24°C room temperature
  - Improve setting and condition of AHUs
- BUILDING CONDITION
  - Inspection and improve- building windows condition
  - Reduce energy waste (leakage) - for cooling demand

4. MULTI ENERGY SYSTEM

DISTRICT COOLING SYSTEM (DCS)

- Chilled water supply
- Thermal energy meter (Energy-3)
- Outsource: operate and maintain by TNEC
- Including AHUs and FCUs



- Usage of centralized cooling energy to MBSA Building, Banquet Hall and Auditorium MBSA, Shah Alam Theater and State Museum.
- Chilled water that will be distributed by underground insulated pipeline to all related buildings.

CHILLED WATER SUPPLY DATA

DESCRIPTION	REQUIRE TEMPERATURE
Supply chilled water	6 - 7 °C
Return chilled water	14 °C
Delta T	7 – 8 °C

ROOM COMFORT SURVEY FINDING

- UTM Researcher found the right temperature for office buildings
- The study suggested the thermal comfort zone is between 240C to 250C with relative humidity of 50% to 65%.

- Finding : Some of the office are cold or too cold

HOW TO ENSURE ROOM TEMPERATURE AT 24°C

- Seeing is believing – encourage for behaviour change
- Install thermometer in the office room

LIGHTING FOR EMERGENCY STAIRCASE

- The best energy savings strategy for lighting
- Proposed using MOTION SENSOR for emergency staircase lighting due to the safety and security reasons

FUTURE PROJECT

5. ENERGY MANAGEMENT SYSTEM

WAY FORWARD

SMART SENSOR CLOUD FOR MAJILIS BANDARAYA SHAH ALAM
ENABLING SMARTER CITY DATA ACQUISITION AND ANALYSIS MANAGEMENT

Issues And Challenges With Current Municipal Data Acquisition And Gathering

1. Manual data gathering process
2. Accuracy, reliability and integrity of data is dependent on human effort at the point of data gathering exercise
3. Ad–hoc data gathering and dependent on availability of personnel
4. Data acquisition and gathering is in silos and lack the ability to get across board data based on time certain parameters such as time / duration etc.
5. Unable to gather data at smaller time intervals to ensure meaning full interpretation and analysis can be made

SMART SENSOR CLOUD FOR MAJILIS BANDARAYA SHAH ALAM
BATUTA™ CLOUD VALUE PROPOSITION

LONG RANGE
- Greater than cellular
- Deep indoor coverage
- Star topology

MAX LIFETIME
- Low power optimized
- 10-20 year lifetime
- >10x vs cellular m2m

MULTI-USAGE
- High capacity
- Multi-tenant
- Public network

LOW COST
- Minimal infrastructure
- Low cost end-node
- Open SW

OTHER LOW CARBON CITY PROJECTS
MBSA BUILDING MAINTENANCE

BUILDING ENERGY INDEX (BEI)

- BEI is used to make comparison of energy used by a certain building
- "Malaysia rating system and standard BEI" :-
  a) 135 kWh/m2/year (commercial building)
  b) 200-300 kWh/m2/year (normal building)
- The outcome from energy audit conducted through Kettha Grant from SEDA, MBSA Building is categorise as "normal building rating in term of building energy performance" with the total of 231 kWh/m2/year.
- The department proposed to safe energy up to 40%
  Current energy used = 14,827,639 kWh (231 kWh/m2/year)
  Target energy used = 8,729,692 kWh (136 kWh/m2/year)

OTHER LOW CARBON CITY PROJECTS
MBSA BUILDING MAINTENANCE

Implemented Projects - Energy Saving Proposal Through (No Cost and Low Cost Saving)

- Training and Awareness Campaign
- Centralized Lighting Control (timer)
- Air condition with minimum temperature of 24°c.
- Reduce heat on building through building orientation that received less direct sunlight
- The air ventilation in parking area is through natural ventilation

Energy Saving Proposal

- Using motion sensor & timer to control lighting at lift lobby and toilet
- Recycling rain water through Rain Water Harvesting
- Air condition with controlled minimum temperature
- The usage of LED light

3. RENEWABLE ENERGY

OTHER LOW CARBON CITY PROJECTS
MBSA BUILDING MAINTENANCE

Rainwater Harvesting (SPAH) at Dewan Rafflesia Seksyen U16, Shah Alam

- The collected water is used for cleaning by the contractor

OTHER LOW CARBON CITY PROJECTS
MBSA BUILDING MAINTENANCE

Rainwater Harvesting (SPAH) at Dewan Tania Seksyen 31, Shah Alam

- The collected water is used for cleaning by the contractor

OTHER LOW CARBON CITY PROJECTS
MBSA BUILDING MAINTENANCE

Rainwater Harvesting (SPAH) and Solar Panel at Level 3 MBSA Building (Contribution from State Government)

- The collected water is used for watering plants

- Solar is used to distribute electric energy to the pump for the watering

Timer System
(Level 3, 8, 14, 15 , 16, 20, 22, 24, 25, 27 and 28)

- Timer on the following floor are set at 11pm, if there is still staff in the following floor during that hour, a button need to be pressed to extend the light to next 1 hour.

OTHER LOW CARBON CITY PROJECTS
MBSA BUILDING MAINTENANCE

Motion Sensor
(Level 3, 8, 14, 15 , 16, 20, 22, 24, 25, 27 and 28)

- LED light (down Light) with motion sensor were placed in the following floor, where the light will be automatically switch on if movement is detected.

OTHER LOW CARBON CITY PROJECTS
MBSA BUILDING MAINTENANCE

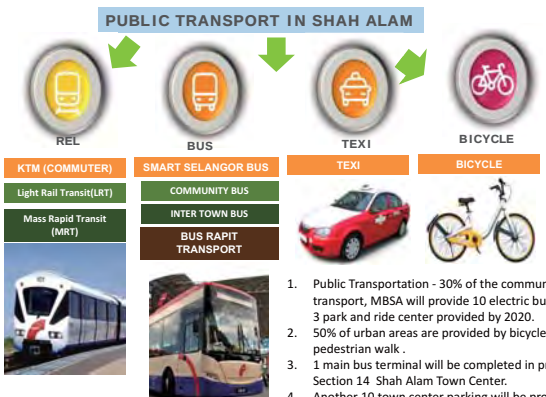
FUTURE PROJECT

Solar Panel at Open Parking of MBSA Building. (Upcoming and Planning)

4.0 LOW CARBON PILOT PROJECT, SECTION 14, SHAH ALAM

TRANSPORTATION

1. PROMOTION OF PUBLIC TRANSPORTATION



1. Public Transportation - 30% of the community use public transport, MBSA will provide 10 electric buses provided with 3 park and ride center provided by 2020.
2. 50% of urban areas are provided by bicycle lanes and pedestrian walk .
3. 1 main bus terminal will be completed in project area, Section 14 Shah Alam Town Center.
4. Another 10 town center parking will be provided outside the town center to allowed public to use public transport or walking in the town center area.

WAY FORWARD
SHAH ALAM TRANSPORTATION IN FUTURE

LRT 3

TOTAL STATION	10
TOTAL NETWORK TRANSPORTATION	15.15 KM
PARK AND RIDE	3
INTEGRASION NETWORK TRANSPORTATION	LRT2 KELANA LINE

WAY FORWARD

SHAH ALAM TRANSPORTATION IN FUTURE

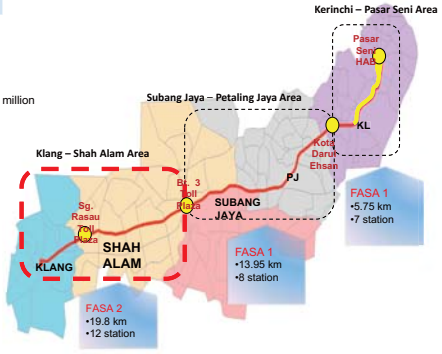
KL-KLANG BRT CORRIDOR

BUS

BRT
(BUS RAPID TRANSIT)

Construction Period
Phase 1: Nov 2014- Apr 2016
Phase 2: July 2015 – Dec 2016

Distant : 33.5 km x 3km radius
Area Cover : 256 km2 Populasi : 1.58 million



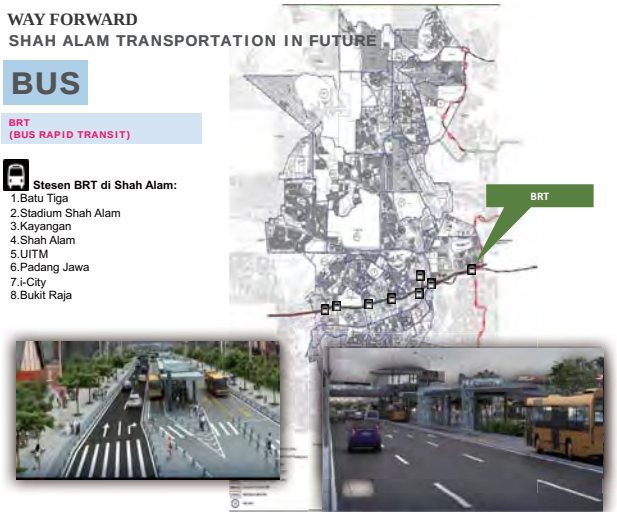
WAY FORWARD

SHAH ALAM TRANSPORTATION IN FUTURE

BUS

BRT
(BUS RAPID TRANSIT)

Stesen BRT di Shah Alam:
1.Batu Tiga
2.Stadium Shah Alam
3.Kayangan
4.Shah Alam
5.UITM
6.Padang Jawa
7.i-City
8.Bukit Raja



PROVIDING EFFICIENT TRANSPORTATION AND MOBILITY SERVICES

To encourage city residents to use the eco-friendly public transport facilities - Selangor smart buses and electric buses.
1. Provide free services
2. 2 electric buses units (reducing carbon dioxide emissions (CO2)) by 0.822KG / KM
3. 1 bus can replace the minimum of 30 cars unit. Buses are green transport modes. Reduce of

CO2 emissions - 7.8 kg / km.
-Park & ride provision
- Green vehicles

GREEN INISITIVE
SMART SELANGOR BUS

2. PROMOTE GREEN MOBILITY THROUGH PROVIDING BICYCLE TRACK

BICYCLE

BICYCLE TRACK

SHAH ALAM URBAN TRACK

SHAH ALAM CITY

WAY FORWARD

SHAH ALAM TRANSPORTATION IN FUTURE

IMPROVEMENT ON TRAFFIC FLOW

Promote hybrid cars and bicycle use to offices.
1. Installation of electric vehicles.
2. Bicycle path
3. 1 private vehicle unit releases 0.26kg / km carbon dioxide.

GREEN INISIATIVE
BICYCLE TRACK

TOTAL
75.55 KM

- ADDITIONAL 15KM BALANCES
- CONNECTING THE MAIN AREA IN THE CITY
- AIMS TO ENCOURAGES USING BIKES AND REDUCING VEHICLE VEHICLES IN THE TOWN CENTER
- 1 PERSONALIZED VEHICLE UNDER CONSTRUCTION 0.26KG / KM CARBON DIOKSIDA CO2

PROVIDE EFFICIENT TRANSPORT AND CARE SERVICES

Effective and Systematic Traffic Management
-Pedestrian Walk
-bicycle rental
-Car Free Day

GREEN INITIATIVE
PEDESTRIAN WALK

GREEN INITIATIVE
BICYCLE RENTAL

GREEN INITIATIVE
CAR-FREE DAY

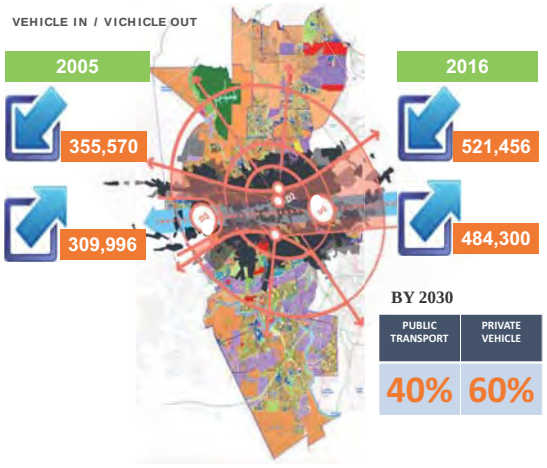
RENTAL
RM1.00 / 15 MINUTE

3. PROMOTE GREEN MOBILITY THROUGH PROVIDING CHARGING STATION FOR ELECTRIC CAR

PROMOTING ELECTRIC VEHICLES

GREEN INITIATIVE
ELECTRIC VEHICLES

WAY FORWARD
SHAH ALAM TRANSPORTATION IN FUTURE



5.0 OTHER LOW CARBON CITY PROJECTS
GREEN TECHNOLOGY PARK

5.1 GREEN TECHNOLOGY PARK

i. Grasscrete Car Park
ii. Environmentally friendly Carbon Core Premix Pavement

Proposed upgrading work for Existing Car Park (Infront of Wet World) to Grasscrete Car Park and related work on Persiaran Dato' Menteri, Seksyen 2 Shah Alam.

SH359/2013
Nz Binar Resources

Cost:
Rm179,900.00

Before

After

ROAD PAVING USING CARBON CORE (PREMIX SEJUK)

WAY FORWARD
OTHER LOW CARBON CITY PROJECTS
GREEN TECHNOLOGY PARK

- Repairing Rainfall System (SPAH)
- Disabled car park
- Installation of Sound Signal Sounds for disable people
- Installation of "Tactile" On Pedestrian Route
- Installation Reminder Signage "Turn Off Your Engine "

WAY FORWARD
OTHER LOW CARBON CITY PROJECTS
GREEN TECHNOLOGY PARK

- Planting Low Carbon Trees
- Landscape Maintenance Works

5.2 LED STREET LIGHTING

- In a Proposal Process to change HPSV street light to LED street light through Privatization Project.
- Involving all street light under the jurisdiction of Majlis Bandaraya Shah Alam (MBSA)
  - Total Street Light Pole = 56,392 units
  - Total Light Bulb = 64,498 units
  - Conversion and Installation Cost to LED RM 2,500 x 64,498 units = RM 161,245,000.00
- ***Estimated cost reduction from energy consumption is by 50%***
- ***Estimated carbon reduction of 244,612,700 Kg Carbon by 2030***

OTHER LOW CARBON CITY PROJECTS
LED STREET LIGHTING

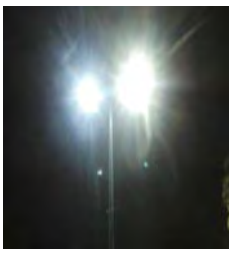
GREENHOUSE GAS (GHG)
Total Light Bulb (70W/150W/250W/400W) = 64,498 units
Anggaran purata untuk kiraan = 200Watt

•HPSV (SON)
Greenhouse Gas (GHG) = Energy Consumption (kWH) X GHG Coefficient
= 668,715,264 X 0.73159 (Malaysia)
= 489,225,400 kg Carbon

•LED (Save by 50%)
Greenhouse Gas (GHG) = Energy Consumption (kWH) X GHG Coefficient
= 334,357,632 X 0.73159 (Malaysia)
= 244,612,700 kg Carbon

HPSV (SON)	kWH	Bil TNB Kod G RM 0.123/kWH
1 Day (12 hours)	154,795	19,039.81
1 Month (x 30 days)	4,643,856	571,194.29
1 Year (x 12 month)	55,726,272	6,854,331.46
12 Year (2030)	668,715,264	82,251,977.47

OTHER LOW CARBON CITY PROJECTS
LED STREET LIGHTING



- Installation of LED Street Light (implemented)
- Location: Main thoroughfare at city centre
- Contract Price: RM 975,000 (390 Units)

OTHER LOW CARBON CITY PROJECTS
SOLAR LIGHT

5.3 SOLAR LIGHT

- Installation of solar light with motion sensor
- Location: Seksyen 4 Park

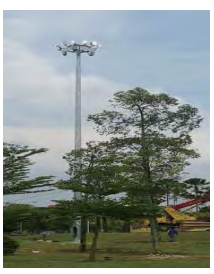
OTHER LOW CARBON CITY PROJECTS
LED TRAFFIC LIGHT

5.4 LED TRAFFIC LIGHT

- LED Traffic Light Installation
- Location: Persiaran Kayangan (Hotel Concorde intersection)
- Contract Price: RM 286,440.00

OTHER LOW CARBON CITY PROJECTS
HIGHMAST LED

5.5 HIGHMAST LED



- Highmast LED Light Installation
- Contract Price: RM 372,886.00

Tree Planting Programme Collaboration With Other Stakeholders, Ie Developers, Ngo, Community Partners

Shah alam orchid show – Awareness Program to get communities exposed of other species of trees.

BACK LANE GREENING INITIATIVE
Collaboration with Residents. Introduce Green lane + urban Farming.

GREENING THE CITIES.
-Along the road sides.
-Monitor data

BULAN	PENANAMAN								JUMLAH BESAR
	POKOK		PALMA		RENEK		JUMLAH		
	PEMAJU	MAJLIS	PEMAJU	MAJLIS	PEMAJU	MAJLIS	PEMAJU	MAJLIS	
JAN	340	164	13	30	9,210	10,156	9,564	10,343	19,907
FEB	1,389	1	24	24	905	7,892	2,317	7,915	10,273
MAC	2,188	127	8	0	675	20,804	3,072	20,931	23,703
APRIL	946	916	62	40	1,603	14,692	2,608	15,648	18,256
MEI	1,072	239	6	388	5,727	5,483	6,805	6,027	12,832
JUN	359	209	49	59	2,579	1,420	2,985	1,684	4,669
JUMLAH	6,272	1,945	164	454	20,915	60,190	27,351	62,509	89,640
JUMLAH JAN-JUN	7,917		618		81,105		89,640		
JUMLAH JUN	567		104		3,998		4,669		

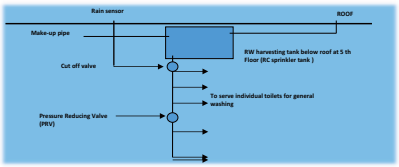
GREENING THE CITIES

6.0 LOW CARBON PILOT PROJECT, SECTION 14, SHAH ALAM
WATER RESOURCES

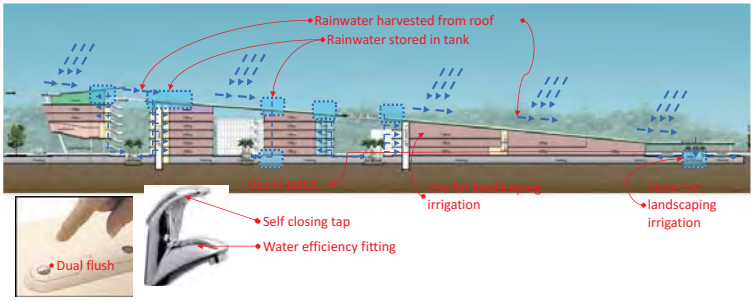
POINTS	GBI RATING	INFERENCE
50 to 65	GBI CERTIFIED	Good Practice
66 to 75	GBI [illegible]	Excellent Practice
76 to 85	GBI GOLD	National Excellence
86 +	GBI PLATINUM	Global Excellence

95/100

- Rainwater Harvesting initiatives



PKNS BUILDING
- managing the Grey water



7.0 LOW CARBON PILOT PROJECT, SECTION 14, SHAH ALAM
WASTE MANAGEMENT

WASTE MANAGEMENT PROGRAMME BY MBSA

- **Use your own container campaign**
- **Reduce plastic use at all retails/shops**
- **7 days/week no plastic bags at all supermarkets**
- **Re-cycle waste programmes**
- **Separation at source programme involvinh 4,849 residents**
- **E- waste program**
- **Other promotion through pampletes and electronic board**

7.0 LOW CARBON PILOT PROJECT, SECTION 14, SHAH ALAM
WASTE MANAGEMENT

WASTE MANAGEMENT PROGRAMME BY MBSA

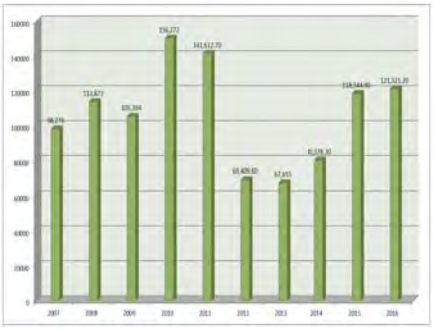
- **Yearly Recycling program with schools**
- Providing 6 Recycling Centres through out the city to give facilities to communities
- Cooking oil recycle programme
- 7 composting machines located at City Centre and adjacent areas for the leftover food to recycle for fertilizers
- Composting Centres for dried leaves and other related garden leftovers

NO POLISTERENE CAMPAIGN

CONTINUOS AWARENESS PROGRAMME ADVERTISED THROUGH OUT FOR INFORMATION

RECYCLING PROGRAM AT SCHOOL LEVEL SINCE 2007 WITH PRIVATE ORGANISATION

RECYLING RATE IN SCHOOLS 2007 - 2017



MORE SCHOOLS AND MORE STUDENTS RECYCLE ITEMS FROM HOME AND SCHOOL

RECYCLE OF USED COOKING OIL

TAHUN	JUMLAH (kg)
2009	720
2010	900
2011	1,000
2012	1,200
2013	5,648
2014	7,878
2015	74,276
2016	88,342
TOTAL OVERALL	179,964

DATA FOR RECYCLED OF COOKING OIL FOR 2009 - 2016

INCRESING QUANTITY OF RECYCLED USED COOKING OIL

RECYCLE PROGRAMME

Started since 2010

Prizes include cash and certificate

KEDUDUKAN	KATEGORI MPP (RM)
Pertama	1,000.00
Ke-dua	800.00
Ke-tiga	600.00
Ke-empat	400.00
Ke-lima	300.00
Ke-enam	200.00
Ke-tujuh	200.00
JUMLAH	RM 3,500.00

Overall Total Recycle for 2016 : 13,213.90 kg

Composting centre AT WET MARKET

COLLECTION OF WASTE FROM WET MARKET FOR COMPOSTING 2016

MONTH	WASTE FROM MARKET	FERTILIZER COMPOST
Jan	6,063.00	1,897.50
Feb	3,790.00	1,265.20
Mar	5,020.50	1,389.00
Apr	3,724.00	1,159.50
Mei	3,947.00	1,202.00
Jun	4,634.00	1,607.00
Julai	768.00	196.00
Ogos	954.00	423.00
Sept	3,077.00	1,405.00
Okt	1,891.00	895.00
Nov	1370.00	569.00
Dis	1,120.00	553.00
TOTAL	36,358.50	12,561.20

Composting Centre For garden waste

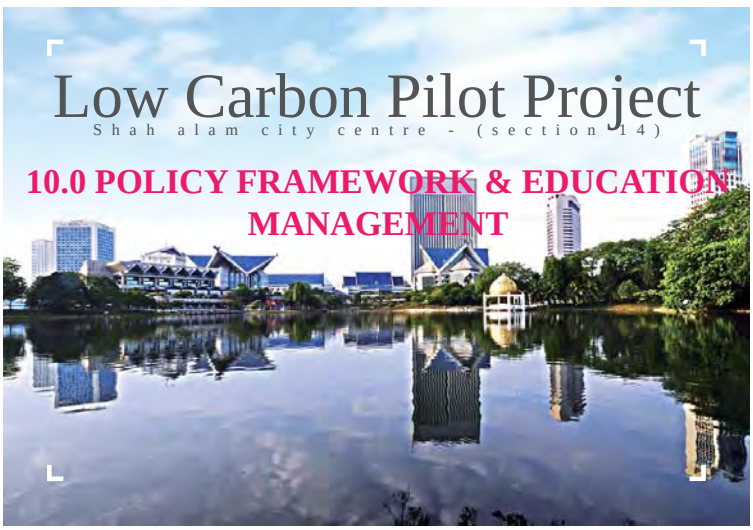
WAY FORWARD
WASTE MANAGEMENT

- To provide Recycle centres at all neighbourhod areas
- Increase more recycling centres throughout the Municipality
- To Provide compost centre for waste cleaning
- Develop Collection and Processing E-waste through collaboration with private company Syarikat Jaring Metal Sdn Bhd
- To use the biodegradable garbage bag for the residents and garbage contractor
- To develop recycling policy for Shah Alam
- To improve recycling procedures and standards for industry and manufacturing.
- To develop recycling and processing services for construction material
- To reduce and ultimately eliminate the illegal waste dump area.
- Increase percentage of recycling to 20% by 2020
- To achieve 100% separation at source by 2018
- Target to reduce waste by 40% by 2020

Rehabilitation of Shah Alam Lake Water Quality

Penaburan "FunctionaL Microbe" dan "Eko-Klean Flocculant"

Warna air yang kekuningan dan hijau disebabkan oleh wujudnya planktonic algae

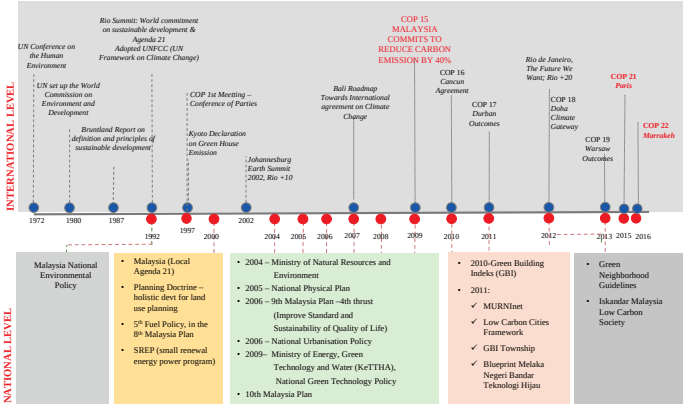


8.0 LOW CARBON PILOT PROJECT, SECTION 14, SHAH ALAM

GOVERNANCE

REGIONAL CONTEXT-
MALAYSIA SUSTAINABLE AGENDA

"Malaysia started to address environmental issues and achieving the sustainable development since 1972 after joining The United Nations Conference on the Human Environment"



REGIONAL CONTEXT-
MALAYSIA COMMITMENT TOWARDS LOW CARBON CITIES

UNITED NATIONS CLIMATE SUMMIT 2014
23 September 2014, New York, USA

> **Malaysia will continue to act on climate change. We have new policies to promote energy efficient vehicles, a new corporate greenhouse gas reporting programme, a building sector energy efficiency project and a LOW CARBON CITY FRAMEWORK**
>
> *YAB Dato' Sri Mohd Najib Tun Abdul Razak*
> *Prime Minister of Malaysia*

33%

Malaysia had already reduced the emissions intensity of its GDP by more than 33% despite facing difficulties in fulfilling the pledge made in Copenhagen 6 years ago

26TH ASEAN SUMMIT, APRIL 2015
Pushing Ahead the Green Agenda

As next year's ASEAN chair, Malaysia will be the advocate for sustainable growth and climate action.

YAB Dato' Sri Mohd Najib Tun Abdul Razak
Prime Minister of Malaysia

Datuk Seri Dr Wan Junaidi Tuanku Jaafar - The Natural Resources and Environment Minister

"Malaysia is the fourth largest emitter of greenhouse gases in ASEAN, behind Indonesia, Vietnam and Thailand, contributing to 0.52% of the world's carbon emissions"

"Malaysia is saying that when we ratify, we are going to give some kind of assurance to the UN that we can perform it.
"But we are now in position to ratify the Paris agreement. I believe we will be one of the 55 countries. Not this trip, but the Prime Minister has already agreed and we can commit before December 2016," Wan Junaidi said.

(Source: http://www.thestar.com.my)

UNITED NATIONS CONFERENCE ON CLIMATE CHANGE 2015 (COP21/CMP11)
2nd DECEMBER 2015 , PRIME MINISTER OFFICE

> Malaysia intends to reduce reduce its greenhouse gas (GHG) emissions intensity of Gross Domestic Product (GDP) by 45 percent by 2030 relative to the emissions intensity of GDP in 2005.
>
> This consists of
> i.35 percent on an unconditional basis and
> ii.10 percent is condition upon receipt of climate finance, technology transfer and capacity building from developed countries.
>
> *YAB Dato' Sri Mohd Najib Tun Abdul Razak*
> *Prime Minister of Malaysia*

Malaysia ranked **26th** worldwide in **2012** carbon dioxide (CO_2) emissions from fuel combustion. (United Nation)

Malaysia's total GHG emissions represent about 0.6% of global emissions in 2011. The emission intensity per GDP was 0.41 tCO2eq/RM1000 for that year.

Malaysia remained steadfast and committed in its mission to reduce Malaysia's carbon footprint and under the 11th Malaysia Plan (2016-2020), policies that will further focus on pursuing green growth for sustainability and resilience will be carried out."

REGIONAL CONTEXT- MALAYSIA REAFFIRM ITS COMMITMENT

Malaysia's Key Significant Commitment to Carbon Reduction
The 11th Malaysia Plan marks another new milestone for efforts towards carbon reduction

ELEVENTH MALAYSIA PLAN 2016-2020
ANCHORING GROWTH ON PEOPLE

Green Governance
Government Green Procurement (GGP)

MALAYSIA TARGETS 20% OF GOVERNMENT PROCUREMENT TO BE FOR GREEN PRODUCTS AND GREEN SERVICES BY 2020.

- **Government as catalyst to create green markets in products and services as well as buildings.**
- **Encourage industries to raise the standard and quality of their products to meet green requirements.**
- **Encourage SME to develop green products and services, eventually leading to further greening the supply chain.**

Green Environment
Low Carbon

MALAYSIA TARGETS 45% GHG REDUCTION BASE ON 2005 LEVELS BY 2030.

- **Conserve 17% terrestrial and inland water areas.**
- **Conserve 10% of coastal and marine areas as protected areas.**
- **Formulate a comprehensive national disaster risk management policy and related legislation as well as relevant standard operating procedures.**
- **Set up a National Crisis and Management Centre – as a training centre as well as a platform for engagement with stakeholders.**
- **Upgrade flood forecasting and warning system to allow longer lead time to reduce damage during floods.**

LOCAL CONTEXT-
SHAH ALAM SUSTAINABLE AGENDA

MBSA STRATEGIC PLAN 2016-2020

STRATEGIC-1 | STRATEGIC-2 | STRATEGIC-3 | STRATEGIC-4 | STRATEGIC-5 | STRATEGIC-6

SHAH ALAM LOW CARBON ACTION PLAN 2030

1. Efficient & Effective Mass Public Transport
2. Energy Efficient / Low Carbon Buildings
3. Eco-friendly Solid Waste Management
4. Electric / Energy Efficient Management
5. City Management with Green Technology

SHAH ALAM GREEN INITIATIVE 2017

MBSA | DEVELOPER | PEOPLE

LOCAL CONTEXT-
SELANGOR STATE SUSTAINABLE AGENDA

LEVEL		DOCUMENT/POLICY IMPLEMENTATION
INTERNATIONAL	SUSTAINABLE DEVELOPMENT GOALS #GLOBALGOALS	= New Agenda is an agenda of political statement not legally binding for United Nations member countries to achieve the human capital development and human development goals by 2036 In New Agenda 17 sustainable development goals are formed by Sustainable Development Goals (SDG). This declaration is a commitment and action to be taken by Malaysia to ensure sustainable development can be achieved by 2036. It encompasses some elements of sustainability such as poverty, lack of hunger, health and well-being of the city, quality education, gender equality, clean water systems and clean water, Clean energy sources and other sustainability issues
NATIONAL	EPU ECONOMIC PLANNING UNIT PRIME MINISTER'S DEPARTMENT MALAYSIA	= National Physical Plan Green Technology Policy Low Carbon Cities Framework (LCCF) MURNInets Green Neighborhood Guielines
STATE	SELANGOR	= State Structure Plan Smart Selangor State Green Technology Action Plan

MOU signing between, MBSA, Malaysia Greentech Corporation (MGTC) and Malaysian Institute Planners (MIP) - 8hb Jun 2016

NEWS PAPER ARTICLES RELATED TO LOW CARBON INITIATIVES

Bandar raya rendah karbon 2030

Bandar konsep bandar raya rendah karbon

Shah Alam rendah karbon menjelang 2030

LAUNCHING OF SHAH ALAM LOW CARBON ACTION PLAN 2030

LOW CARBON CITY INCENTIVES
PROJECT STATUS REPORT FOR 'LOW CARBON CITY FRAMEWORK' SHAH ALAM 2017

NO	PROJECT	STATUS
1.	Shah Alam's Sustainable Development Proposal through the Carbon Low Carbon Action Plan By 2030. The Shah Alam Carbon Low Carbon Action Plan 2030 is agreed to be adopted in MBSA's Strategic Development Plans and subsequently a Blueprint to the development of Shah Alam.	a. "Blueprint" Shah Alam Carbon Low Carbon Action Plan 2030 Will Be Launched In A Townhall Session to be held on the 11th. July 2017
2.	Proposed Shah Alam Carbon Low City Award 2017. The proposed awards are: - a.Low Carbon Building Competition (By category Government/ Commercial / Industry) b.Low Carbon Scenario Competition (By category of IPTA / IPTS / Primary School / Secondary School) c.Low Carbon Innovation Competitio (By category Government / Commercial / Industry / IPTA / IPTS / School / Population / MPP) d.Low Carbon Icon Award (Adolescent / Youth / Population / Trade / Industry) The Shah Alam Low Carbon City Award presented at this Meeting has been approved for its relevance.	a. Low Carbon Award Briefing Session to Primary Schools, Secondary Schools, Factories In Shah Alam Was Held On 18th. May 2017. b. Poster competition will be distributed to every Primary School, Secondary School, Public Higher Learning Institute (IPTA), Private Higher Learning Institute (IPTS), Factory and Commercial In Shah Alam. c. Competition will be advertised on the Billboard to inform local residents. d. Closing date is on 15th. September 2017.

NO	PROJECT	STATUS
3.	PROJECT OF LOW CARBON DEVELOPMENT AND GREEN TECHNOLOGY SHAH ALAM CITY COUNCIL Volleyball Hall Section 4	a. The proposed energy audit was approved by the management of the council management meeting. No.5 year 2017 which has been convened on the 5th. April 2017. b. Memo Appointment Instructions Issued by Planning Department On 27th. April 2017. c. These works will use budget from engineering department VOT PROTECTED: Hall (Hall Section 4 - Towards Green Building).
4.	Laman Teknologi Hijau Phase 1, Section 2	a. Proposed installation for LED Solar Lights was presented at the stage of Infra Committee Meeting and approved at the Council Meeting on 29th. March 2017. b. Job offer will be advertised in early June 2017. Proposal this project will use allowance Code 56105 (Lamp).
5	**Presentation of the preliminary report on the achievement of energy audits for buildings Wisma MBSA for energy audit program conditional by using existing grant allocation for commercial building sector under the 11th Malaysia Plan** Preliminary report energy audit achivement at Wisam MBSA as follows :	**22nd. May 2017** a.Meeting regarding *"Kick-Off"* to dicuss Energy Audit at MBSA b.Meeting with MBSA, TNec Dan Locarbon Solutions c.Installation 3 Units *Power Logger* in 2weeks (14 hours, 24 hours data collection) **28nd. May 2017** a.Consultant installed 1 Unit *"Flow Meter"* in one week to collect *Chilled Water* **5th. – 12th. Jun 2017** (Except holiday) a.Record the data on each floor of Wisma MBSA

WAY FORWARD
LCCF SITE COVERAGE –
1. EXPANSION OF LOW CARBON BOUNDARY

In 2017, seven more city centre projects will implement the LCCF as outlined in the MBSA Strategic Plan 2015-2020 under Core 2. 7

The City Centre listed below are as follows: -

- Town Centre Section 14 — 323.26 ac
- Setia Eco Park Section U13 — 612.01 ac
- Alam Impian Section U35 — 1,235 ac
- Sime Darby Elmina Section U16 — 1,041 ac
- Kwasa Land Section U4 — 632.32 ac
- Eco Ardence U12 & u13 — 533.91 ac
- DEMC Building Section 14 — 1.78 ac

Area expansion to
4,379.28 acre
LCCF Area Ratio by 2018
6%

WAY FORWARD
LCCF SITE COVERAGE –
OTHER LOW CARBON CITY PROJECTS

1. GREEN TECHNOLOGY PARK
2. MBSA BUILDING AUDIT
3. LED STREET LIGHTING
4. SOLAR LIGHTING
5. LED TRAFFIC LIGHT
6. HIGHMAST LED
7. ROAD MAINTENANCE
8. MULTIPURPOSE HALL AUDIT

LOW CARBON CITY INCENTIVES
2. PROPOSED SCHEME ASESSMENT TAX REBATE

- MBSA data centre renovation costs are incurred by the Malaysian Green Technology Corporation (MGTC) and does not involve the council spending

FINANCIAL IMPLICATION

VOT 53406
PROGRAM SHAH ALAM TOWARDS LOW CARBON CITY 2030
RM 50,000.00

LOW CARBON CITY INCENTIVES
INCENTIVE OF ASESSMENT TAX REBATE LOW CARBON SHAH ALAM

A. Energy

- Installation of Solar Heater 25%
- Power Generation with Solar Panel or Other Renewable Energy Resources 25%
- The usage of equipment/ 5 star power-saving equipment 20%

B. Water

- Installation of Rainwater Harvesting Systems to save at least 30% of tap water – 25%
- Waste recycling system 25%
- "Wet Land Pond" in the house 25%

C. Waste

- Composting of food waste where only less than 60% of waste will be disposed to be transported by the contractor 30%
- Recycle waste by proving at least 100kg of recycle material every month 30%

D. Transportation

- Using a hybrid / electric motorcycle / NGV car to work / work 25%
- Taking public transport / walking / public cycling / walking / bike rides for work and leisure purposes 30%

E. Biological diversity

- More than 50% of the area are covered by softscape / green 25%
- Soft green landscape in front of the house or perimeter planting at least 2m and above 30%

MBSA BUILDING AUDIT
3. FUTURE WORKS AND NEXT STEP

FUTURE WORKS AND NEXT STEP

DETAIL ENERGY AUDIT	ESTABLISH ENERGY COMMITTEE	INSTALL ENERGY SUB-METER	DEVELOP ENERGY MANAGEMENT
Immediate	Concurrent	After detail energy audit	Concurrent
Plan to start: April 2017	Focus group on energy	For strategic energy monitoring and analysis	EnMS model
Apply for audit grant with SEDA	Establish energy policy		ISO 50001 standard
	Develop energy management program		

LOW CARBON CITY INCENTIVES

- Proposed incentive scheme offered in tax rebate to all home owners for those practicing the green concepts in Shah Alam area
- Green road map
  Low carbon city action plan
  Strategic partner strengthening

Goal

CARBON REDUCTION by 2030 45%

Measurement of Low Carbon Project Implementation with **7 DEVELOPERS** In Shah Alam

- MOU between MGTC and MIP 8th June 2015

Malaysia Institute of Planners

9.0 LOW CARBON PILOT PROJECT, SECTION 14, SHAH ALAM

EDUCATION MANAGEMENT

MINIZEEBEE PROGRAMME

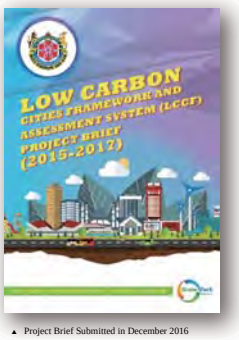
1)Competition for Green neighbourhood Award – Mini Clean Zone MBSA
2)Competition for all resident's Association
3)Objective to inculcate neighbourhood cleanliness as way of life & promote green lifestyle
4)To create the clean agenda as foundation of community safety and integration

SHAH ALAM CITY CENTRE
RATING SYSTEM

OBJECTIVES

- To determine the baseline carbon emission of the selected MBSA area based on year 2015 (which will be compared with the final year carbon assessment in 2017 for Diamond Recognition by the Federal Government).
- To recommend **LCCF Provisional Certificate** to potential Projects :-
  ▶**Section 14, Shah Alam, Selangor.**

100%	Carbon Neutral
70-99%	Best Practice 5 (BP5)
50-69%	Best Practice 4 (BP4)
30-49%	Best Practice 3 (BP3)
10-29%	Best Practice 2 (BP2)
1-9%	Best Practice 1 (BP1)



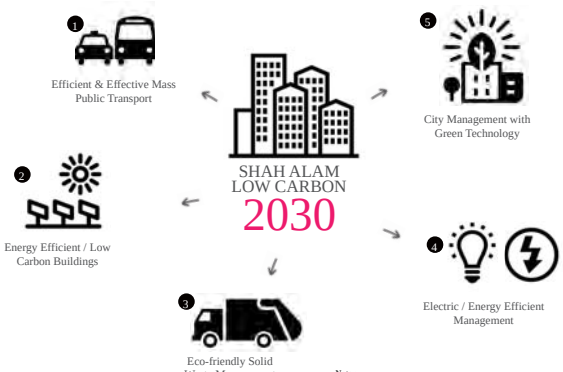
▲ Project Brief Submitted in December 2016

11.0 FUTURE PLAN OF SHAH ALAM 2030

2016

2030

SHAH ALAM LOW CARBON ACTION PLAN 2030



Note :
The above action plan is the result of theWorkshop in Bangi on 18 June 2015 organized by KeTTHA, Green Tech and MIP and was brought to the Management Meeting on September 9, 2015 and has been adopted since then.

MBSA2030 GOALS


THE END
Shah alam city centre - (section 14)

Review on the LCT Planning of Shah Alam City, Selangor

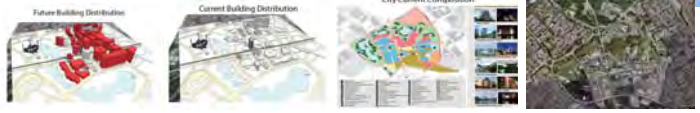
Hung-Wen Lin, Project Manager
Green Energy and Environmental Labs
Industrial Technology Research Institute

The 1st APEC Low-Carbon Model Town Symposium
14 September 2017

Findings on the LCT Planning of Shah Alam City

➢ **Basic Information**
- ➢ **Selangor**
  - Population of 7,004,762
  - The largest population in Malaysia, with a high standard of living and the state's poverty rate is the lowest in the country.
- ➢ **Shah Alam City**
  - Completely Low Carbon City action plan by 2030
  - Since 2000 has implementation on planning of land use, environment, environment and social management and related activities.

standard building coverage ratio	9.3%
standard floor area ratio	40.2%
whole area	159.9Ha
building area	335,703m^2



Findings on the LCT Planning of Shah Alam City

➢ **Shah Alam Low Carbon 2030 Action Plan**

1. Provides Transportation Services & Efficient Mobility.
2. Integrate Nature in the Built Environment
3. Environmentally Friendly System for Solid Waste Management.
4. Effective Use and management of Energy and Water resource.
5. City Administration and Management Based on Green Technology

Short Term(2015~2020)	Long Term(2015~2030)
1. CO_2 reduction - 7 more satellite cities will be included for the calculation. Targeted GHG CO_2 reduction is 303,188.13 Ton CO_2 in 2016 while 139,466.54 Ton in 2030 2. Green Procurement – 5 % per year 3. Transportation – 69% Fuel Cost Savings 4. Low carbon building – 30-50% energy saving, 70% of using LED Lighting.	1. To reduce CO_2 emissions **60% in 2030**. The yearly 4% reduction as implied of Malaysia target 45% in 2030.

Findings on the LCT Planning of Shah Alam City

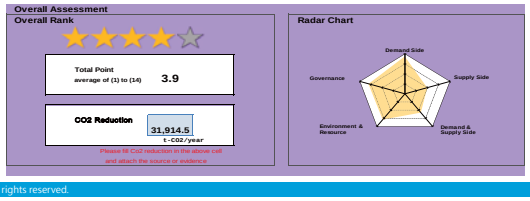
➢ **Estimated energy consumption before and after the completion of the project:**

- Section 14, Shah Alam – 1,082.69 GJ/ year (2016) to **498.04 GJ/year (2030)**

Activity/Sector	Potential Source	Estimated cost savings
Transportation	BRT Electric Vehicle Electric Bus	RM6,000/person/year
Infrastructure	LED Street Lighting	RM35/lantern/year
Waste	Waster Sorting Polices Recycling programs	RM360/house unit/year
Building	Cooling system • District cooling • Thermal storage air conditioning system	RM 420,000/Bldg./year
	Rain Harvesting	RM 7,200/Bldg./year
	Low Emission Building • High Performance Façade • Double Skin Façade • Roof Greening	RM 63,000/Bldg./year
	LED/inverter lighting	RM 10,497/Bldg./year

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		✓			



Feedback on the Self-Evaluation

Tier 1	Tier 2	Tier 3	Comments
Demand	Buildings	Energy Saving Construction	• The target area is a compact central business district (CBD) with high-rise buildings to be added. • The comprehensive and integrated management of energy consumption of these buildings will be a model of such CBDs in the APEC economies.
Demand	Transportation	All items	• This city is in the phase 1 of the LCMT Project, good green transportation plan can attract people to use and reduce carbon emission • The arrangement of transportation including pedestrian pavement and bicycle roads should also be focused for the vitalization of the area, which seems to be split into several neighborhood by major streets, the wind flow between high-rise buildings to cool the air, and trees to shade the streets would make the target area more comfortable, beyond mere low-carbon.
Supply	All items	All items	This city is in the phase 1 of the LCMT Project, most of items are being planned, need to estimate total energy demand and how many energy can be generated by supply side.
Demand & Supply	Energy Management	Smart Micro-Grid	• District Cooling System only be implemented in this portion so far. The system is actively use in non peak hours duration for freezing cold water. The cold water will be defrost during peak hour for chilling purposes. • Micro smart grid can expand to whole city and connect supply side to demand side for energy management and control.

Feedback on the Self-Evaluation

Tier 1	Tier 2	Tier 3	Comments
Environment & Resources	• Greenery • Water & Waste Management • Pollutions	All items	• No data at evaluation sheet, need to describe more information to evidence effort in the part. • Enforce the Water & Waste Management plan • Enforce water reuse plan, **Recycling storm water and gray water for plant irrigation** • Enforce Air pollution plan
Governance	• Policy Framework • Education & Management	All items	• No data at evaluation sheet, need to describe more information to evidence effort in the part. • Setup energy saving and carbon reduction target. • Declare food's carbon footprint • Prepare more environment protection film to school for education

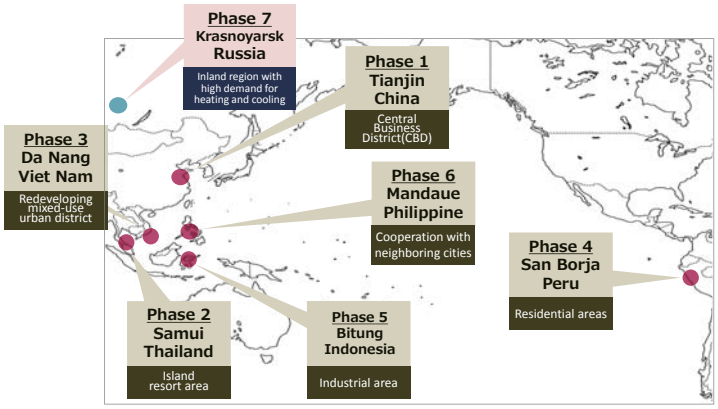
Conclusions

- Shah Alam city has completely Low Carbon City action plan by 2030 and this city is in the phase 1 of the LCMT Project, shall put more effort do achieve this plan.
- The target area is a compact central business district (CBD) with high-rise buildings to be added, ventilation and heat island issue will be the impacting factor for low carbon city.
- Green transportation plan can attract people to use and reduce carbon emission
- Performance measure standard making and execute the performance verification regularly are good methods to maintain the low carbon city

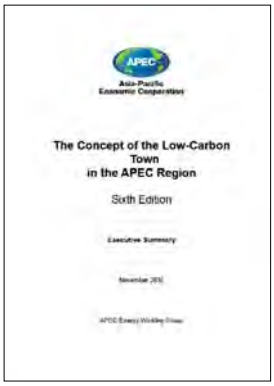
The dissemination phase of the APEC LCMT Project

Agency for Natural Resources and Energy
METI, Japan

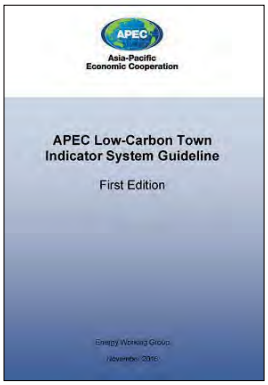
Case Towns of Feasibility Study and Policy Review



The Concept and the LCT-Indicator System

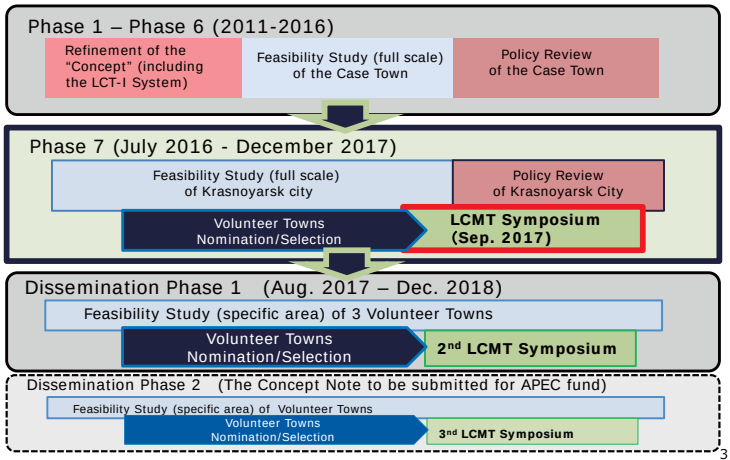


The Concept of the Low-Carbon Town in the APEC Region (Sixth Edition)
http://publications.apec.org/publication-detail.php?pub_id=1796



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

Transition of LCMT Project



Key Objectives 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.

Thank you for your kind attention!

SENER | MÉXICO | FIDE

Asia-Pacific Economic Cooperation

1st APEC LOW CARBON MODEL TOWNS (LCMT) SYMPOSIUM

EFFICIENCY AND ENERGY SUSTAINABILITY IN MUNICIPALITIES PROGRAM PRESEM

Jakarta, Indonesia
September 14th, 2017

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Supporting Programs to Efficiency Energy in Cities

THE WORLD BANK IBRD • IDA → ESMAP Energy Sector Management Assistance Program

TRACE
(Tool of Rapid Assessment City Energy)

Identifies sectors with the most opportunities for energy efficiency

2

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Tool of Rapid Assessment City Energy

TRACE

- Key Performance Indicators (KPI)
- Information Concentration (28 KPIs)
- Results Peer comparison
- Sector Prioritization
- Priority Sector Results
- Sector and Consumption Evaluation
- Selection of Priority Sectors for Investments in Energy Efficiency

3

SENER | FIDE

Tool of Rapid Assessment City Energy TRACE

Mexico: Sectors with more potential for Energy Savings

Selected Sectors for the Mexican Program

4

SENER | FIDE

México: Ministry of Energy (SENER): Efficiency and Energy Sustainability in Municipalities Program PRESEM

- Energy Efficiency
- Environmental Protection
- Social Participation

→ Sustainable Development Cities

5

SENER | FIDE

Efficiency and Energy Sustainability in Municipalities Program PRESEM

Ministry of Finance - SENER: World Bank

Scope: One City per State (31 States)

Metodology: TRACE

SENER | FIDE

SENER | CFE | BANCO MUNDIAL | FIDE

Components of the Program

I. Policy Development and Institutional Strenghting
II. Municipal Investment in Energy Efficiency

Actions on Energy Efficiency in:

Public Lighting
Drinking Water Pumping
Municipal Buildings

Initial Investment

World Bank	100 Million USD
SENER	16 Million USD

SENER | FIDE

Project Component I: Policy Development and Institutional Strenghting

THE WORLD BANK → Funds → SENER → CONUEE → Benefited Municipalities

8

SENER | FIDE

Project Component II: Municipal Investment in Energy Efficiency

THE WORLD BANK → Funds → SENER → FIDE (Operates) → Suppliers of Goods and Services → Benefited Municipalities

CFE → Charges → FIDE

9

SENER | FIDE

Program Component II: Municipal Investment in Energy Efficiency

- Feasibility studies,
- Executive Projects,
- Document and procurement process,
- Purchase and installation of efficient equipment
- Supervision of works
- MRV Protocol

10

11

SENER | FIDE

First Stage Program PRESEM

Executive Projects Development and Procurement Document
Purchase and Installation of the Equipment

Public Lighting

GOBIERNO MUNICIPAL PUEBLA

Municipal Buildings

CAPAM HUAMANTLA, TLAXCALA

Water Pumping

SENER | FIDE

Public Lighting Project León, Guanajuato

Concept	Technology
Light Points	LED

Replacement of 8,025 high preasure sodium steam light for high efficiency LED lights in 52 main roads.

Investment: 7.2 Million USD

Water Pumping Project Huamantla, Tlaxcala

The set up of 6 underwater motor pumps high efficiency machines for the drinking water service supply.

Investment: 0.61 Million USD

13

Municipal Buildings Project Puebla, Puebla

5 Energy Efficiency Actions:

Municipal Buildings	Technologies
CityHall	➢ Photovoltaic System
Municipal Attention Center	➢ Photovoltaic System
Infrastructure and Public Services Office	➢ Photovoltaic System
Administration Office	➢ LED Lighting ➢ Air Contitioning ➢ Photovoltaic System
City Food Central Supply	➢ Refrigeration ➢ Compressed Air ➢ Power Factor ➢ Photovoltaic System

Investment: 0.55 Million USD

15

Possible Colaboration Areas

PRESEM Project ⟷ **APEC Low-Carbon Model Town (LCMT) Project**

- Change the mindset of Energy Efficiency: migrate from technology analysis to location analysis
- Design Policies and Methodology to plan low carbon cities
- Create capacities of Energy Efficiency in municipalities
- Promote the production of electricity from clean and renewable sources.

16

Possible Colaboration Areas

PRESEM Project ⟷ **APEC Low-Carbon Model Town (LCMT) Project**

- Develop Energy Management Systems.
- Monitoring systems to evaluate benefits of Energy Efficiency.
- Join forces to contribute to the mitigation on the effects of climate change
- Exchange success stories of sustainable cities to show social and economic benefits.

THANK YOU

www.fide.org.mx

Smart Community Projects

September 14, 2017

Mr. Kazuo YOKOTA
Director General
Smart Community Department
New Energy and Industrial Technology Development Organization (NEDO)
Secretariat of
Japan Smart Community Alliance (JSCA)

1

- Introduction (NEDO, JSCA and GSGF)
- About NEDO
  - ・NEDO's Smart Community Demonstration Projects
  - ・NEDO's Joint Crediting Mechanism (JMC) Demonstration Projects
- About JSCA
  - ・JSCA's Activity (International, GSGF)
  - ・JSCA's Activity (Standardization)

2

Introduction (Institutions)

Public Framework	Private Framework	Standardization Framework
経済産業省 Ministry of Economy, Trade and Industry	JSCA Japan Smart Community Alliance	Smart Electric Power Alliance
NEDO	GSGF Global Smart Grid Federation	ISO IEC
ISGAN International Smart Grid Action Network		

3

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  - ・JSCA's Activity (Standardization)

4

About NEDO

Japan's largest public R&D funding agency

Coordination with Policymaking Authorities

Combining Efforts of Industry and Academia

Ministry of Economy, Trade and Industry — NEDO — Industry, Universities

Promotion of national projects

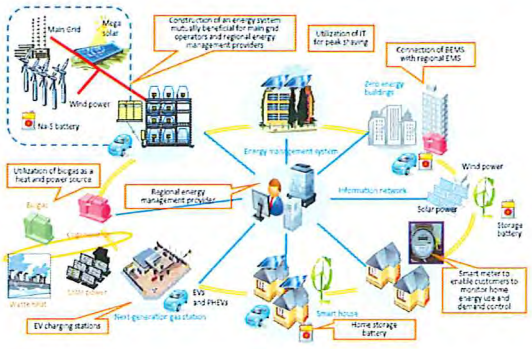
Autonomous and advanced project management
Promotion of technology development based on a flexible and agile project management scheme

- Addressing Energy and Global Environmental Issues through International Collaborative Demonstration Projects
- Enhancement of Cutting-Edge Industrial Technologies

- Year Established : 1980
- Chairman : Mr. Kazuo Furukawa
- Employees : About 900
- Budget : US$ 1.5 Billion

5

Smart Community



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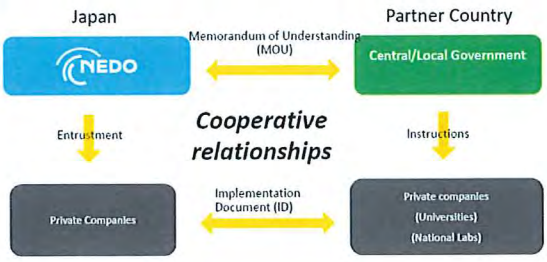
Demonstration projects in the World

Framework



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Demonstration Project in Indonesia I

◆Purpose

Establishment of "Smart and Ecological industrial park model"

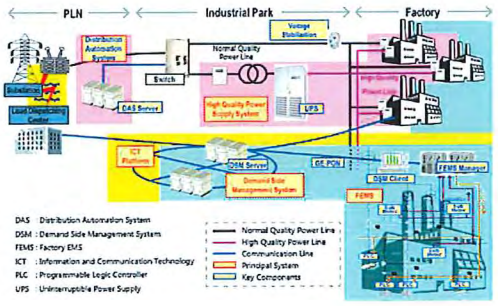
1. High quality power supply without interruptions and voltage variation
2. Energy saving through the introduction of Demand Side Management System

Contribution to balance

"high growth rate of economic development" with "energy conservation"

9

Demonstration Project in Indonesia II



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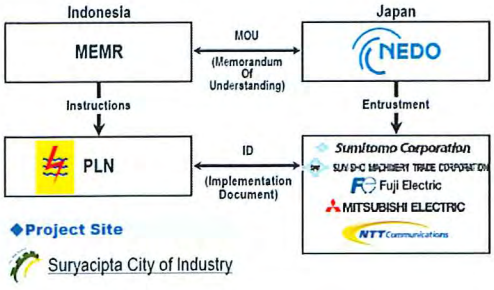
Demonstration Project in Indonesia III



◆Project Site

Suryacipta City of Industry

11

Demonstration Project in Malaysia

<Participants>

NEDO, Toshiba Infrastructure Systems & Solutions Corporation, PUES Corporation, HASETEC Corporation, and Oriental Consultants Global Co., Ltd.,

<Contents>

・Large EV bus system driving 30 km with ten-minute charge

<aim>

・to realize a smart urban transportation system, and to deploy it across a wide area.

12

JCM Demonstration Projects

Country	Project Title
Indonesia	Energy Saving By Optimum Operation At Oil Refinery In Indonesia
Indonesia	Utility Facility Operation Optimization Technology In Indonesia
Indonesia	Application of Tribrid System to Base Transceiver Stations in Indonesia
Mongolia	The Demonstration and Verification Project for a High Efficiency and Low Loss Power Transmission and Distribution System in Mongolia
Vietnam	Promotion of "Green Hospitals" by improving efficiency/environment in national hospitals in Vietnam
Vietnam	Low Carbon Hotel-a New Energy Management System for Vietnam (V-BEMS) In Vietnam
Vietnam	Energy Saving and Work Efficiency Improvement by Introducing a New Chip-on-Board LED System in Vietnam
Laos	Lao PDR Energy Efficient Datacenter (LEED)

・The Joint Crediting Mechanism (JCM) facilitates diffusion of leading low carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions, and contributes to sustainable development of developing countries.
・The JCM contributes to the ultimate objective of the UNFCCC (United Nations Framework Convention on Climate Change) by facilitating global actions for GHG emission reductions or removals, complementing the CDM (Clean Development Mechanism).

See more details: http://www.nedo.go.jp/english/other_20161111.html

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  - ・NEDO's Joint Crediting Mechanism (JCM) Demonstration Projects
- About JSCA
  - ・JSCA's Activity (International, GSGF)
  - ・JSCA's Activity (Standardization)

About JSCA

As of September 2017, Members 257 companies
Electric power, gas, automobile, information and communications, electric machinery, construction and trading industries as well as the public sector and academia

What is JSCA? http://www.smart-japan.org/english
JSCA is public-private organization supported by government, Ministry of Economy, Trade and Industry (METI) and New Energy and Industrial Technology Development Organization (NEDO).

What is JSCA's mission?
OJSCA's mission is to aggressively promote business development into energy sector by utilizing our cutting-age technologies.
OAnd also JSCA contribute to the growth of industry and society all over the world.

Who are main members?
Chairman; Mitsubishi Electric Board; Hitachi, Itochu, Kansai Electric Power, NTT, Panasonic, Shimizu, Tokyo Gas, Toshiba, TOYOTA
Secretariat; NEDO

Global Smart Grid Federation I

Purpose of Activities

- Facilitate the collaboration of national and international Smart Grid organizations to conduct and foster research in the application of Smart Grid technologies
- Support implementation of Smart Grid technologies by establishing itself as the global center of competency
- Foster international exchange of ideas and best practices on energy issues
- Facilitate dialogue and cooperation between the public and private sectors in countries around the world



http://www.globalsmartgridfederation.org/

Global Smart Grid Federation II

Standardization

International Standardization WG

<Activities>

- Several Study Groups
  - ・Smart Grid Security
  - ・Smart Energy Architecture
  - ・Energy conversion between power and hydrogen etc.
- Participation for ISO TC268/SC1 as a member
  - ・Contribution for ISO TC268/SC1/WG1 PRF37153
- Dissemination Activities
  - ・Seminar, Workshop, Forum etc.
  - ・Collaboration with NEDO's demonstration projects

Outline of ISO/TC 268/SC 1 (1/2)

Background

- A technical solution to the social issue is often referred to as "Smart". However, there was no definition agreed globally on at present.
- To make commonness and the indicated criterion to evaluate the smartness of the city infrastructure, ISO/TC 268/SC 1 is established.

Scope

- Standardization in the field of smart community infrastructures, including basic concepts to define and describe smartness of community infrastructures as scalable and integrable systems, harmonized metrics for benchmarking, usage of the metrics for application to the diverse types of communities, and specifications for measurement, reporting and verification, ensuring avoidance of overlaps and contradictions with ISO/TC 268 deliverables.

Outline of ISO/TC 268/SC 1 (2/2)

Organizational chart

Organization	Name	Published Standards
ISO/TC/268	Sustainable cities and Communities	8 documents in total
SC1	Smart Community Infrastructures	The following 4 documents
SC 1/WG 1	Infrastructure Metrics	ISO/TR 37150:2014 ISO/TS 37151:2015 ISO/PRF 37153 (*coming soon*)
SC 1/WG 2	Integration and interaction framework for smart community infrastructures	ISO/TR 7152:2016
SC 1/WG 3	Best practice guidelines for transportation	ISO 37154:2017
SC 1/WG 4	Data exchange and sharing for smart community infrastructures	
SC 1/TG 1	Roadmap	
SC 1/TG 2	Smart Community Infrastructure - Pilot Testing	

Outline of ISO/PRF 37153 (1/2)

Scope

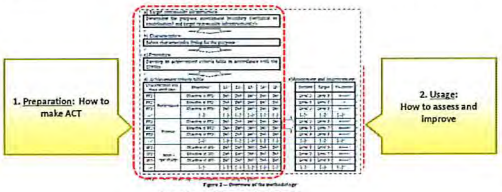
- The basis, requirements and guidance for a maturity model for the assessment of technical performance, process and interoperability of community infrastructure(s) as well as its contribution to the community, and guidance for future improvements.

- Applicable to:
  a) all types of community infrastructures, including but not limited to energy, water, transportation, waste and ICT;
  b) single types of community infrastructure and/or multiple types of community infrastructures; and
  c) all types of communities, regardless of geographical locations, size, economic structure, stage of economic development, and to all applicable stages of infrastructure life cycle (e.g. planning/design, construction, operation, decommission)

Outline of ISO/PRF 37153 (2/2)

Methodology

1. Preparation: How to make Achievement Criteria Table (ACT)
   ACT: a table populated with pre-defined requirements for characteristics to be achieved at the levels, which consists of sets of characteristics and their maturity levels derived from CIMM
   CIMM: maturity model applied to (a) community infrastructure(s), which provides common maturity level definitions to assess the community infrastructure(s)
2. Usage: How to assess and improve the target infrastructure(s) using ACT



Overview of the methodology

For more details about NEDO Smart Community project

Case Study of completed projects
http://www.nedo.go.jp/english/reports_20130222.html
- New Mexico (U.S.) Project
- Malaga (Spain) Project
- Hawaii (U.S.) Project
- Lyon (France) Project * coming soon

Media releases
- Oshawa Ontario Residential PV system Demonstration(2015-2017)
  http://www.nedo.go.jp/english/news/AASen_100025.html
- Lyon Smart City Project (2011-2017)
  http://www.nedo.go.jp/english/whatsnew_20111226_index.html
- Heat Pump Demand Response Project in Manchester (2014-2017)
  http://www.nedo.go.jp/content/100788809.pdf
- HEMS Managing System Demonstration Project in Speyer (2015-2017)
  http://www.nedo.go.jp/content/100788808.pdf

Website
http://www.nedo.go.jp/english/index.html

For more details about JSCA and GSGF

Japan Smart Community Alliance
https://www.smart-japan.org/english/index.html
- Members
  https://www.smart-japan.org/english/memberslist/index.html
- Working Groups
  https://www.smart-japan.org/english/activity/wg/index.html

Global Smart Grid Federation

Working Groups
http://www.globalsmartgridfederation.org/about-gsgf/working-groups/
- Microgrids Working Group
- Flexibility Working Group
- Cyber Security Working Group

Newsletter
http://www.globalsmartgridfederation.org/about-gsgf/newsletter/

Terima kasih

Thank you very much for your attention!

Reducing the cost of clean energy through integrated energy planning and policy

Low Carbon Model Towns

Louise Vickery, Energy Efficiency Renewable Energy, IEA

Low Carbon Model Town Symposium, September 2017

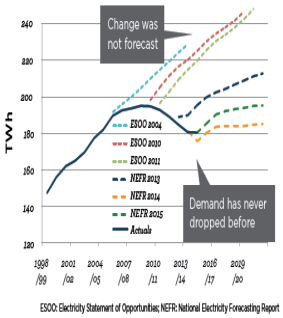
IEA

Background to IEA engagement

- Three Pillars of Modernisation
  - Engagement with emerging economies
  - Clean Energy Hub
  - Broaden Energy Security – Oil, Electricity, Gas
- Energy Efficiency in Emerging Economies
  - Practical policy support based on where countries are at
  - Developing networks of policy makers through Training Weeks – Paris, Singapore, Georgia
  - Indonesia, South Africa, Brazil, China, India, Mexico
- Ministry of Energy and Mineral Resources invites IEA practical support for integrated approach to meet growing demand while reducing carbon.

Rationale

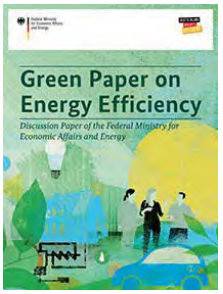
- Growing evidence many countries and projects have over-estimated energy demand growth
- Underestimated the impact of energy efficiency and distributed renewables
- Overinvestment or sub-optimal investment in energy infrastructure
- Lack of analysis of a communities' ability to pay for energy services – energy economy
- A more holistic and sequenced approach could be applied to national, sectoral, and local energy planning and policymaking to lower the cost.



Proposed Approach

1. Take an "Energy Efficiency First" approach, look to where demand can be reduced cost effectively
   - Understand current energy demand and future trends, the services required and customer's ability to pay
2. Look at local clean energy resources to meet energy demand with tailored geo-spatial approaches.
3. Least-cost mix of energy efficiency, local renewables, central generation and grid

Inform and develop policy to stimulate investment in **least cost low carbon energy services**.



Low Carbon Economic Developments

- Low Carbon Developments :
  - APEC's Low Carbon Model Towns
  - C40 Cities Climate Leadership Group
  - ICLEI Cities for Climate Protection
- Low carbon developments could be a model for how to weigh up what is most affordable for local area planning.
- Develop processes, tools and policy that can be implemented on local, provincial and national level.

Low Carbon Model Towns, C40, Mayors Covenant

- Comprehensive and informative approach – links to practical examples √
  - Further examples and on web ?
- Peer to peer exchange √
- Feasibility studies high quality √
- How to weigh up what is most cost effective approach for my town ?
- How to provide practical information
- To move forward.

Proposal to develop tools and energy services (pending funding)

- **Tools** to better map and understand demand and supply
    - Costs and Performance of renewables and energy efficiency
    - Weigh up what is the most cost effective pathway to low carbon energy

To inform

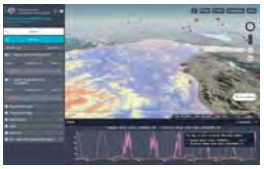
- **Low carbon energy services** that match income and growth of the community
- **Green Climate Finance**

- **Collaborative Open Approach** (local national international) peer to peer learning

Some Examples if we have time

Australian Renewable Energy Mapping Infrastructure

- Accessible online map - 650 layers of information about:
    - Energy resources – solar, wind, marine, biomass, geothermal
    - Grid & Substation Infrastructure - Constraints and Capacity
    - Generation performance – real time
    - Environmental information, land tenure, topography
    - Demographics and Household Energy Demand
    - In future - ARENA projects – LCOE and performance
    - In future - Heat maps of large energy users energy demand
- Supported by ARENA funding and available at: www.nationalmap.gov.au/renewables
- Part of Australian Government national policy commitment to Open Data – as source of business and policy innovation



Thinking about energy as a service

London-based BBOXX delivers energy systems to remote off-grid African locations.

- The system is designed not to provide a certain quantity of energy, but to deliver the required services.
- The package includes super-efficient lights, TV, radio and phone chargers supplied by a solar panel with battery storage.
- The system is charged on a monthly service fee basis through mobile phone.

Similar service models are also emerging in established energy markets.

- Start-ups in North America, Australia and Europe are selling households and businesses, a greater sense of control over their energy costs and carbon, through solar, storage and smart energy management systems.
- Other technology companies are piloting the delivery of smart, clean, reliable, energy services for urban developments in places like Lyon in France, Japan and Korea.

India's Energy Conservation Building Code includes renewables

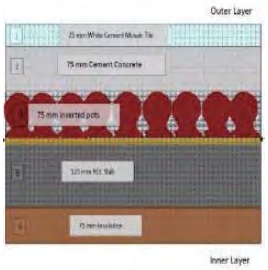
- Unprecedented construction boom in India
- Demand expected to increase 8% annually
- Passive design, energy efficiency & renewables
- Applies to buildings using +100kW
- 3 performance levels encourage progress
- Adoption integral for widespread use
- Responsive to provincial government incentives and requirements to install rooftop solar.
- Flexible - Provincial governments decide how to implement depending local RE resources

Malaviya National Institute of Technology Jaipur in Rajasthan

Horizontal and vertical shading

Staircase provides buffer to sun

Malaviya National Institute of Technology Jaipur in Rajasthan



Six-layer roof prevents heat penetration

Inverted clay garden pots

Integrated renewable generation

New York's Reforming the Energy Vision (REV)

- Hurricane Sandy greatly damaged New York's energy infrastructure in 2012
- Already aging infrastructure and recurring blackouts
- Governor Cuomo's overhaul of the NY energy system

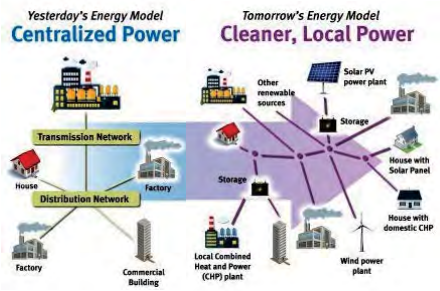
- Comprehensive plan incorporating efficiency measures and renewable energy
- Policy measures include financial incentives, innovation R&D, technical guidance from ESCOs

Brooklyn-Queens Demand Management

- Brooklyn Queens Demand Management aimed to **defer a $1.2 billion substation** upgrade.
- Instead ConEdison is investing **$200 million in alternatives** to meet the addition 69 MW of demand in 2018
- Policy takes into consideration both EE & RE
  - 52 MW of demand reductions
  - 17 MW of DER investments by late 2018
  - Free LED lights in lower income neighborhoods
  - Rebates for residential smart-metering
  - Incentives for thermal energy storage & CHP systems
  - Demand response auction to provide compensation

New York's Reforming the Energy Vision (REV)

- Targets for 2030 include
  - 50% powered by renewables
  - 23% buildings energy savings
  - 40% less GHG emissions
- Qualitative goals
  - Consumer efficiency education
  - Resilient energy infrastructure
  - Clean energy innovation
  - Reduce generation costs



Brooklyn-Queens Demand Management

- Solar + storage microgrid project at public housing division, Marcus Garvey Apartments, recently finished construction in June 2017
- First use of storage at multifamily building in NYC
- Powers 32 buildings, 625 units
- 400kW PV array
- 1.2 megawatt-hour battery
- 400 kW fuel cell system

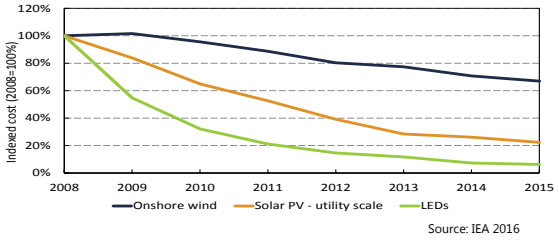
PG&E's Plan to replace nuclear with EERE

- California mandates 50% of power generation must come from renewable energy by 2030
- PG&E to close Diablo Canyon, the last nuclear plant in California
- Leaving a 4,000 gWh hole, worth 6% of the state's total electricity mix
- PG&E intends on replacing 50% of capacity through energy efficiency procurement , the other 50% will be replaced with flexible sources of generation and DERs

www.iea.org

IEA

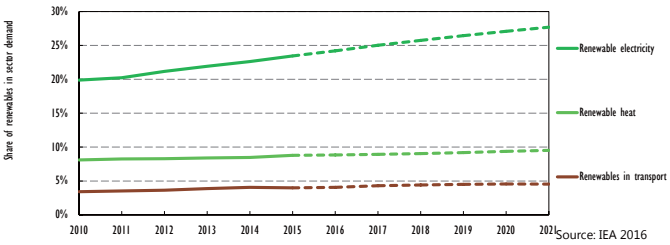
Policies and scale are reducing clean energy costs in key technologies:



Source: IEA 2016

The share of renewable electricity is growing

The share of renewable electricity is growing - 20% to 28% of global electricity from 2010-21 , 8% to 12% for renewable heat and 3.5% – 4.5% of road transport

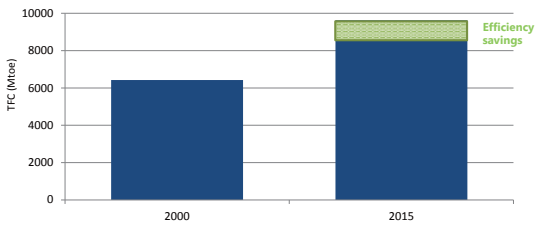


Source: IEA 2016

Note : Renewables in road transport and heat do not factor in renewable electricity. The IEA's Renewable Energy Market Report and World Energy Outlook, 2017 will factor in the impact of renewable electricity in heat and transport; however renewable electricity is not expected to significantly impact on the proportions of energy coming from renewables for heat and road transport, until post 2021.

Efficiency is now significantly impacting the world's energy system

Global final energy consumption and savings from energy efficiency

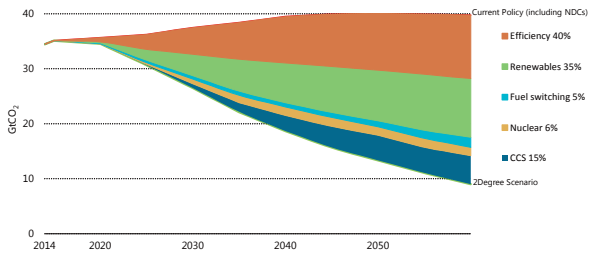


Without efficiency gains, global energy demand would have been 12% higher in 2015, equivalent to adding another European Union to the world's energy system.

Figures to be updated to 2016

Efficiency and Renewables are key to future energy systems

The IEA projects that energy efficiency and renewables will contribute 75% of the reductions in emissions needed over and above current announced policy to reach 450ppm or 2 degrees scenario



"Reduction efforts are needed on both supply and end use sides; focusing on only one does not deliver 2 degrees" Energy Technology Perspectives 2017

MODELING TOOLS FOR LOW-CARBON DEVELOPMENT

FRANCESCO FUSO NERINI, PhD
Assistant Professor
KTH – Royal Institute of Technology
Division of Energy Systems Analysis
LCMT Symposium, Jakarta, Indonesia

CONTENT

1. KTH-dESA INTRODUCTION
2. MODELING TOOLS FOR ENERGY PLANNING
3. WAY FORWARD

KTH - DIVISION OF ENERGY SYSTEMS ANALYSIS INTRODUCTION

- Ca. 20 researchers
- Outward facing division (International partnerships and capacity building)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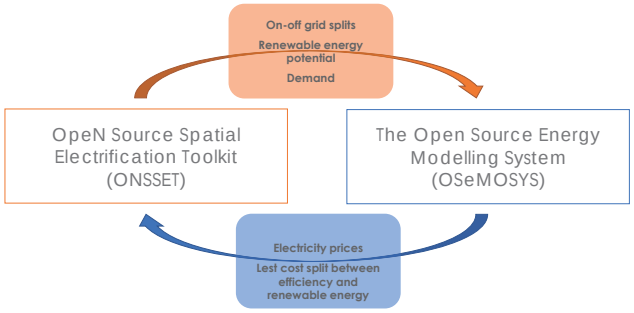
Morgan Bazilian
Affiliate Professor


Holger Rogner
Affiliate Professor

MODELLING TOOLS FOR ENERGY PLANNING



COMPARING ON- AND OFF- GRID, RENEWABLE AND NOT OPEN SOURCE SPATIAL ELECTRIFICATION TOOLKIT - ONSSET

DEMAND IN ONSSET THE MULTI-TIER FRAMEWORK

Service-oriented framework **characterized by the appliances** that can be powered with a certain tier of energy services

Scope for representation of efficient appliances

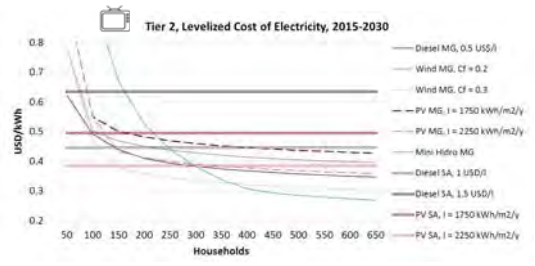
TIER	Tier-0	Tier-1	Tier-2	Tier-3	Tier-4	Tier-5
Indicative electricity services	-	*Task lighting + Phone charging or Radio*	*Tier 1 + Fan + Television*	*Tier 2 + light appliances*	*Tier 3 + Medium or continuous appliances*	*Tier 4 + heavy appliances*
Consumption (kWh) per household per year	*<3*	*3–66*	*67–321*	*322–1,318*	*1,319–2,121*	*>2,121*

Simplified multitier matric for measuring access to household electricity services, (IEA and the World Bank, 2015)

PARAMETRIZATION OF THE COST OF ELECTRICITY: LOCAL ENERGY RESOURCES AVAILABILITY

Influence of:

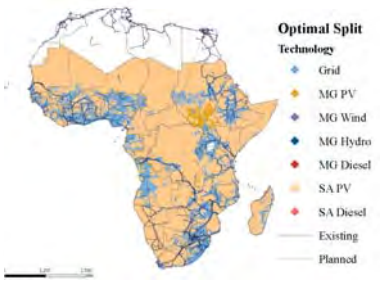
- Solar irradiation
- Wind availability
- Local diesel cost
- Availability of other sources: hydro or biomass residuals



Cost comparison of selected stand-alone and mini-grid technologies with Tier 2 of energy access target

ONSSET – GIS APPLICATION, SUB SAHARAN AFRICA

- Administrative boundaries
- Road network
- Nighttime light
- Power plants
- Mines
- Existing Grid Network
- Current population
- Projected population and Grid Network
- Wind power capacity factor
- Global Horizontal Irrandiance
- Mini and small hydropower potential
- Spatial cost of Diesel gensets
- Least cost Electrification option

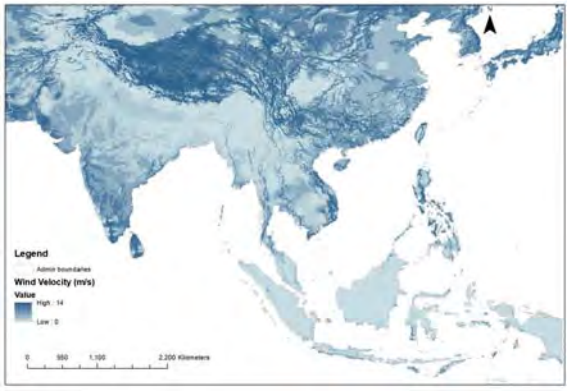


Source: Mentis, D. KTH, 2017

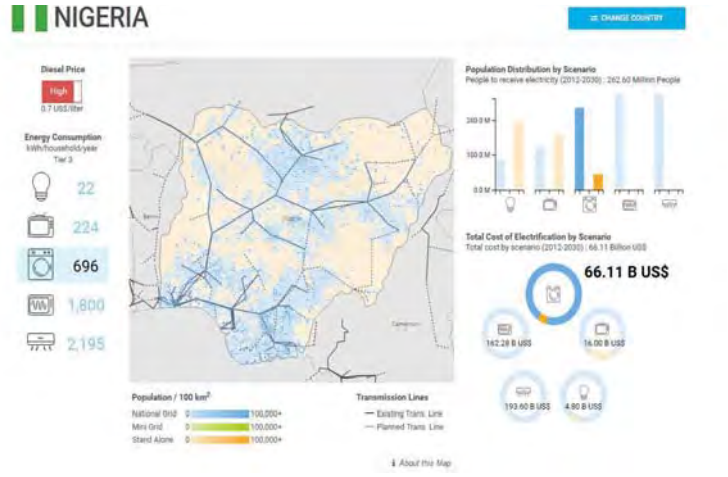
ONSSET – GIS APPLICATION, ASIA

Available maps:

1. Population density
2. Existing Grid Network
3. Travelling times
4. Wind power capacity factor
5. Mini and small hydropower
6. Global Horizontal Irrandiance
7. Least cost Electrification option
8. LCOEs



ONSSET WEB INTERFACE



THE OPEN SOURCE ENERGY MODELLING SYSTEM: OSEMOSYS

Least-cost, perfect foresight optimization energy model

Can be used at different scales, from towns to continents, for supply-demand modelling

Example results: Evaluation of the role of **electricity trade** across African countries

Sample results: cross-country electricity trade in Africa in 2040, enhanced trade scenario (Taliotis et. al., 2016)

WAY FORWARD

All our tools are **open source** and available for use

We are expanding analyses to several **Asian countries**

We can support the **contact with development banks and international organizations** for training and projects

Possible partnerships on:

- Tools application
- Tools transmission

SOURCES / FURTHER READING

- Fuso Nerini, F. et al., A Cost Comparison Of Technology Approaches for Improving Access to Electricity Services. Energy, 2016
- Mentis, D. Spatially explicit electrification Modelling Insights. PhD thesis, KTH, 2017
- KTH-UNDESA ONSSET online model at: http://un-desa-modelling.github.io/electrification-paths-presentation/
- Taliotis, C. et al., An indicative analysis of investment opportunities in the African electricity supply sector using TEMBA (The Electricity Model Base for Africa). Energy for Sustainable Development, 2016