



Low-Carbon Model Town in Koh Samui Municipality

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APEC Low-Carbon Model Town Project Wrap-up Symposium

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Low Carbon Model Town: Samui Island

Introduction of Koh Samui

Koh Samui is in the Gulf of Thailand, east coast, and is the third largest Island in Thailand. This Island is one of the tourism destination in Thailand.

Name of City: Koh Samui

Status: City Municipality

Province: Surat Thani

Total Area: 227 km²

Population: 68,894 of registered (2018)
300,000 of non-registered

Reaching to Samui:

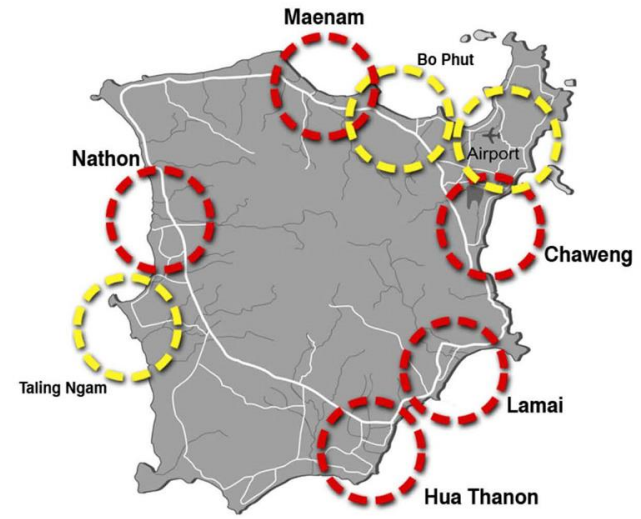
- By bus to mainland of Surat Thani and connecting to Samui via public ferry.
- By airplane (direct flight to Samui Airport).
- By personal cars and connecting to Samui via ferry.





Introduction of Koh Samui

Administrative:



5 Sub-districts (Tambon)

3 Potential Areas

Climate:

Tropical weather

Average temperature is 29°C with

- The highest temp. at 37°C between Apr. and May
- The lowest temp. at 21°C between Dec. and Jan.

Economic:

Rely on agriculture, tourism, commercial, and industry.

Environmental:

Waste generated is around 140 tons/day

- 29.36% is Plastic
- 27.35% is Organic Waste

Low-Carbon Model Development in Koh Samui

SAMUI Acton Plan, DEDE

Extending from LCMT Project, DEDE intended to put the measures into action to identify short / medium / long term. The results has been successfully brought to stakeholder consultation to disseminate and seek agreement.



2012



2012

2021



Asia-Pacific
Economic Cooperation



Low Carbon Model Town: Samui Island



APEC Low Carbon Model Town Project (LCMT) Phase 2

Proposing some low carbon measures e.g., energy efficiency and renewable energy, low-carbon building, eco-lifestyle, and conceptualize and disseminated to involving stakeholders.

The Achieving Low Carbon Growth in Cities through Sustainable Urban Systems Management in Thailand

The project funded by gef commits to collaborate with TGO and UNDP. The project is to evaluate the CCF and LEDS; also, develop the pilot low carbon implementation projects as guidance for the city.

Low-Carbon Model Development in Koh Samui



Low Carbon Model Town: Samui Island

Recap for APEC Low Carbon Model Town Project (LCMT) Phase 2

Town: Koh Samui

Funded by: APEC

Year of Project: 2012

Objective of Project:

To plan, develop, and implement the concrete roadmap in order to lower the carbon emission from selected town while the natural resources are effectively utilized, and the economic growth still remains.

Project Developer:

DEDE
EEC Engineering Network
and Bright Management Consulting

Item. No.	Categories	Carbon Emissions Reduction (ton CO ₂ /yr)		Life Cycle Carbon Emissions Reduction (ton CO ₂)	% Reduction		Total Life Cycle Cost Savings (USD)	Marginal Cost* (USD)	Life Cycle Carbon Unit Cost (USD/ton CO ₂)
		2020	2030		compared with 2020	compared with 2030			
1	C1 : Town Structure Planning	86,795.00	236,096.04	4,714,540.40	17.04%	29.29%	-	20,143,555.58	4.27
2	C2 : Transportation	-	50,348.00	352,436.00	-	6.25%	-209,435,483.87	-82,983,870.97	-235.46
3	C3 : Area Energy Planning	28,390.82	28,390.82	567,816.48	5.58%	3.52%	-112,668,387.10	-48,152,258.06	-84.80
4	C4 : Area Energy Management **	-	-	-	-	-	-	-	-
5	C5 : Renewable Energy	26,765.20	26,765.20	535,303.93	5.26%	3.32%	-106,217,119.35	312,186,106.45	583.19
6	C6 : Untapped Energy	16,326.02	16,326.02	244,890.32	3.21%	2.03%	-48,592,103.23	-12,785,651.61	-52.21
7	C7 : Low Carbon Building	11,537.00	21,717.00	325,755.00	2.27%	2.69%	-64,650,193.55	66,934,906.45	205.48
8	C8 : Eco-Life Style	12,730.73	20,154.82	223,146.89	2.50%	2.50%	-	12,219,898.04	54.76
9	C9 : Environment ***	-	-	-	-	-	-	-	-
Total		182,544.77	399,797.90	6,963,889.02	35.85%	49.59%	-541,563,287.10	267,562,685.88	-
Averaged									38.42

Remark :

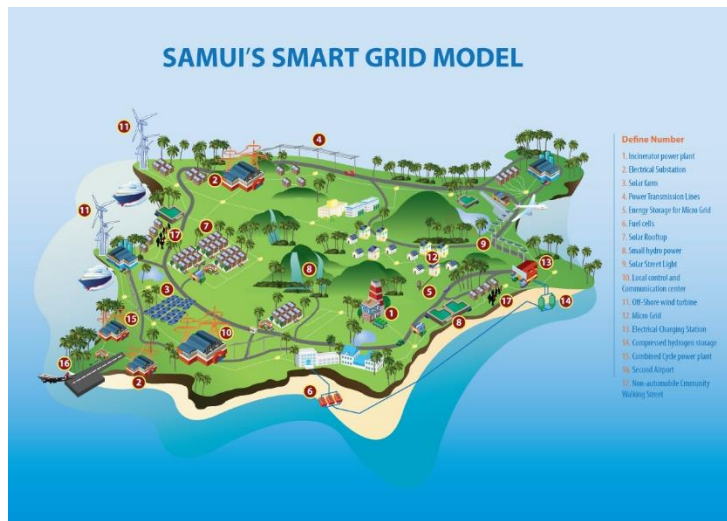
* Marginal Cost = Investment + Total Life Cycle Cost Savings; Negative sign indicate energy savings and cost savings

** Carbon emission is calculated within renewable and untapped energy

*** No evaluation of direct emission reduction

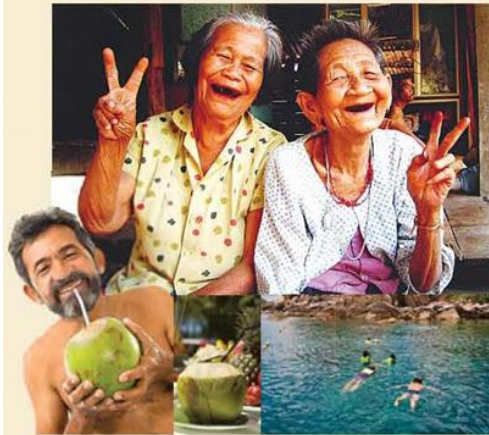
Low-Carbon Model Development in Koh Samui

Recap for APEC Low Carbon Model Town Project (LCMT) Phase 2



Social & Human Value

- Local culture and life-style well mixed with modern life-style
- Improve quality of life with eco-lifestyle
- Tourists satisfaction with low carbon lifestyle



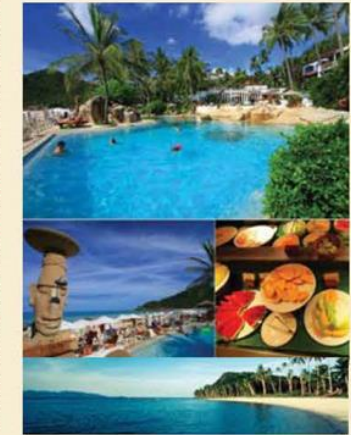
Environment and Resources Value

- Natural resources well preserved and undamaged
- Green environment enhancement (green products)
- Low carbon emission for
 - : Hotels, Resorts, Schools, Houses etc.
 - : Transports etc.



Economic Value

- High value of land and economy
- Investment attraction



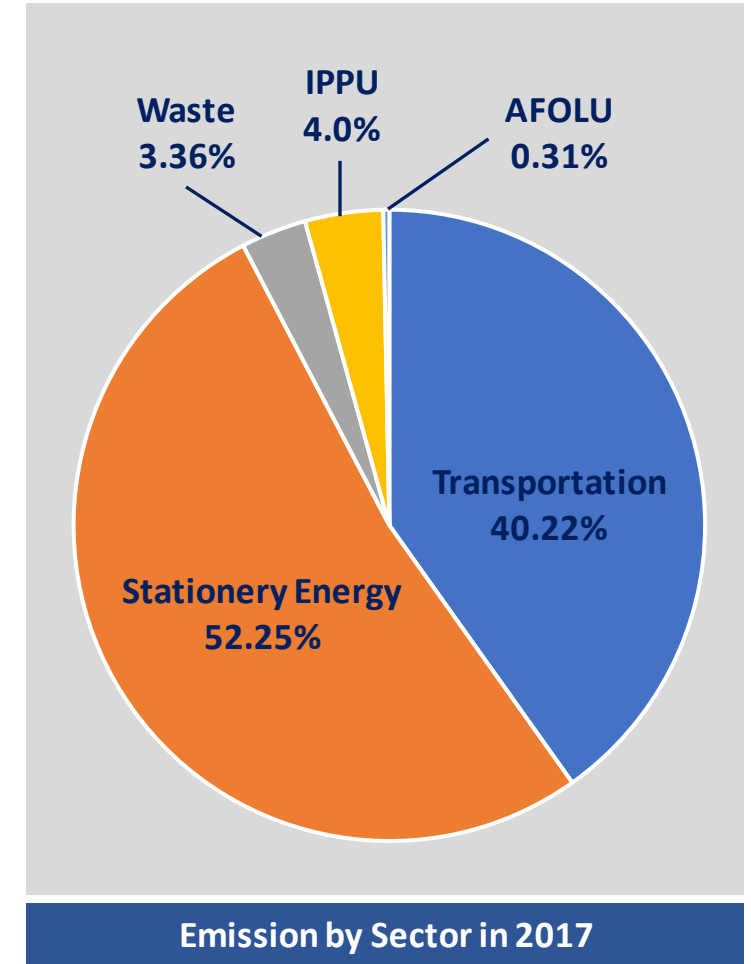
CO₂ Reduction Results and Roadmap

City Carbon Footprint (CCF)* between 2013 and 2017 by using *GPC Standard* and reporting the results with BASIC+ level

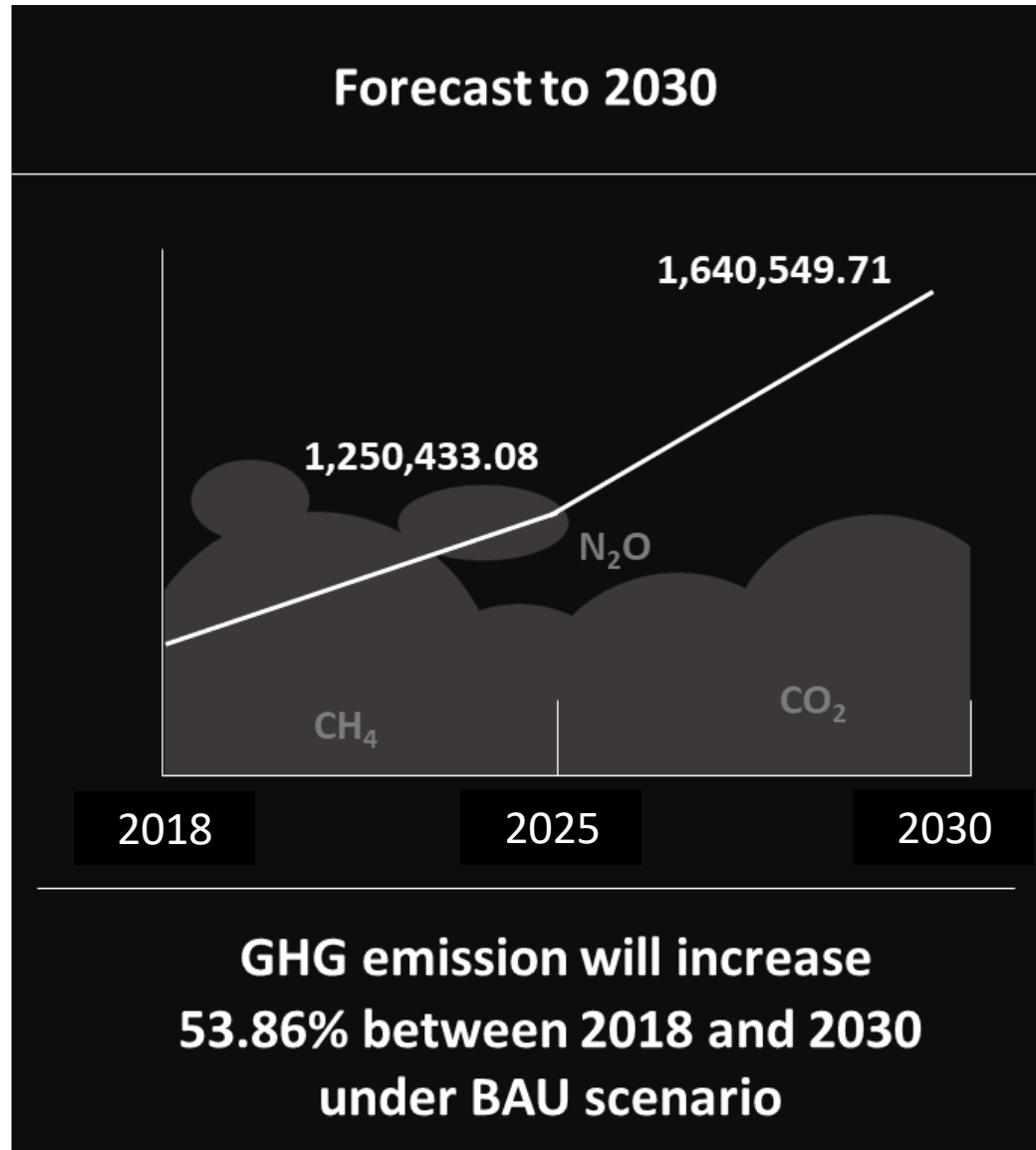
Year	Emission by Scope (Unit: tCO ₂ e)			
	Scope 1	Scope 2	Scope 3**	Total
2013	278,805.05	313,761.76	112,790.28	705,357.79
2014	268,737.28	328,670.08	112,790.28	710,197.64
2015	292,458.21	357,904.78	112,790.28	763,153.27
2016	323,347.37	367,569.00	112,790.28	803,706.65
2017	347,168.55	360,558.57	112,790.28	820,517.40

Remark * The CCF was evaluated under the project of “Achieving Low Carbon Growth in Cities through Sustainable Urban Systems Management in Thailand”; funded by gef which commits to collaborate with TGO and UNDP. The project timeline is between 2016 and 2021.

****** Scope 3 emission was evaluated from fuel used by air and marine transportation which is constant rate of fuel use between 2013 and 2017.



CO₂ Reduction Results and Roadmap



Base Year:

2017

Year of Consideration:

between 2018 and 2030

Condition:

BAU Scenario

Assumption Applied for Forecast:



Stationery Energy sector applied the assumption of energy growth rate at provincial level.



Transportation sector applied the assumption of energy growth rate at provincial level.



Waste sector applied the assumption of registered and non-registered population growth rate; then, multiply with waste emission per capita at base year.



IPPU sector applied the assumption of registered and non-registered population growth rate; then, multiply with IPPU emission per capita at base year.



AFOLU sector applied the assumption of annual change in land use; then, multiply with AFOLU emission per area at base year.

Low-Carbon Model Development in Koh Samui

	Low Emission Measures	Sector where the measures applied	Current Status	Duration of Measures (Year)	Expect of CO ₂ Reduction (tCO ₂ e)	Annual CO ₂ Reduction
Short-Term Measures: 9 Measures (to be implemented within 2022)						
1	Replace with LED bulbs to increase lighting efficiency	Energy Efficiency	Integrated with city's development plan	17	184,832.55	10,872.50
2	Install LED bulbs for public roads	Energy Efficiency		12	14,727.87	1,227.32
3	Promote public EV mini-buses (whole-island route) 5 buses	Transportation	Tentative	10	2,537.67	253.77
4	Promote public EV mini-buses (Airport – Chaweng route) 5 buses	Transportation	Tentative	10	991.06	99.11
5	Install organic waste compost bins in households	Waste Management	Integrated with city's development plan	5	14,614.50	2,922.90
6	Establish waste management stations to produce compost	Waste Management		20	11,443.99	572.20
7	Forest restoration / rehabilitation	Agriculture and Forestry		20	11,514.00	575.70
8	Mangrove forest plantation	Agriculture and Forestry		20	96,470.00	4,823.50
9	Increase city green areas	Agriculture and Forestry		20	33,323.40	1,666.17
Medium-Term Measures: 6 Measures (to be implemented between 2023 and 2025)						
10	Replace split type AC with inverter type (100%)	Energy Efficiency	Tentative	10	149,417.20	14,941.72
11	Promote solar power generation system	Energy Efficiency	Tentative	20	200,496.06	10,024.80
12	Promote solar hot water generation system	Energy Efficiency	Tentative	20	425,210.75	21,260.54
13	Install solar floating power generation system	Energy Efficiency	Tentative	20	446,859.72	22,342.99
14	Promote the use of EV motorcycles (10%)	Transportation	Tentative	10	25,904.41	2,590.44
15	Increase efficiency of waste treatment and conversion of RDF	Waste Management	Tentative	20	509,813.33	25,490.67
Long-Term Measures: 1 Measures (unable to be implemented immediately but need time to be completed within 2030)						
16	Increase energy efficiency by using a chiller system	Energy Efficiency	Tentative	20	86,678.62	4,333.91
Total Expect CO₂ Reduction (tCO₂e)					2,214,835.15	123,998.3

Notable Achievements



2.) The creation of new coordination framework among local stakeholders (ex. people sector, private, and public sector) to tackle with climate change challenge.



4.) Expansion to other studying of RE development projects ex. solar floating at reservoirs.

1.) Expansion this initiative to additional CO₂ reduction projects ex. Low Carbon City Project by gef, UNDP, and TGO.



3.) The CO₂ reduction as the result of LCMT project and others project related.



5.) Being an initiative point and/or inspiration and/or best practice for other sectors in terms of CO₂ reduction.



6.) The creation of new voluntary group to address organic waste issue at household level and leads to the reduction of waste to municipal landfills.

Self-assessment results by LCT-I system

Overall Assessment

Overall Rank

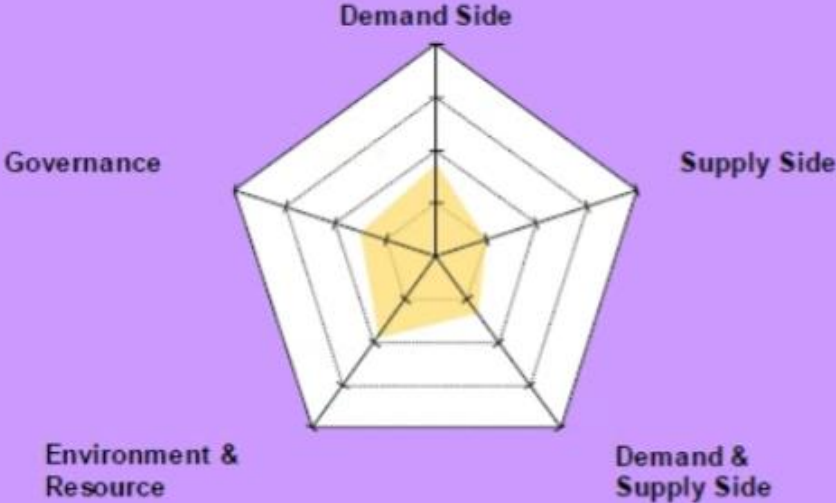


Total Point
average of (1) to (14) **2.5**

CO2 Reduction
t-CO2/year

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

Radar Chart



Future Plan

The Future Plan of Samui Development Strategy

Strategy 1: Economic Recovery, Creating Career, Market, Income

Strategy 2: Developing of City, and Tourism

Strategy 3: Sanitary and Well-being

Strategy 4: Social and Welfare

Strategy 5: Environmental and Sustainability

Strategy 6: Empowering Youth and Local People

Strategy 7: Samui Smart City



1. Promote and Coordinate with Community for Sustainability Environmental Preservation and Rehabilitation

2. Coordinate with Community for Mangrove Preservation and Rehabilitation

3. Promote and Encourage the Marine Center, and Fish Breeding to enhance Sustainability Coastal Marine Ecosystem

4. Build on the Waste Management Program with Private and Community Sector

5. Build on the Wastewater Management and Provide Knowledge for Private and Community Sector

6. Promote the Coordination Framework for “Samui Green Economy” Program

7. Low Carbon City Development

Low-Carbon Model Town in Images

Energy Efficiency Implementation



Install LED bulbs for public roads

(Source: <https://www.adslthailand.com/post/7168>)



Install EV charging station

(Source: www.kohsamuicity.go.th)



Biomass from agricultural waste

(Source: LCC Project gef, TGO, and UNDP)

Agriculture and Forestry Implementation



Forest restoration / rehabilitation

(Source: www.kohsamuicity.go.th)



Preservation of Mangrove

(Source: www.kohsamuicity.go.th)

Low-Carbon Model Town in Images

Waste Management Implementation



Creation of Voluntary Group

(Source: LCC Project gef, TGO, and UNDP)



Install organic waste compost bins in households

(Source: LCC Project gef, TGO, and UNDP)



Coconut waste management

(Source: LCC Project gef, TGO, and UNDP)



Expand to Youth Sector

(Source: LCC Project gef, TGO, and UNDP)



Establish waste management stations

(Source: LCC Project gef, TGO, and UNDP)



Waste management by warping and sending to mainland for appropriate management

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and

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Thank you for your attention !