



IUC ASIA COMPONENT 2: SUB-NATIONAL ACTION UNDER THE GLOBAL COVENANT OF MAYORS INITIATIVE

CLIMATE ACTION PLAN DEVELOPMENT IN INDONESIA, MALAYSIA, AND VIETNAM

FOREWORD



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This publication summarises the results of climate action planning provided by the EU and its partners in 12 pilot cities of Indonesia, Malaysia and Vietnam. These cities and their civil servants show that local action can identify the best approaches to address climate and urban challenges.

When signing the Paris Agreement, the European Union pledged to lead in tackling and curbing climate change globally, starting with the target of zero greenhouse gas emissions by 2050. This is also why the EU decided to take an active role in encouraging cities and institutions across the world to join the Global Covenant of Mayors for Energy and Climate (GCoM).

The EU would like to particularly thank the CCROM-SEAP in Indonesia, the *Low Carbon Asia Research Centre* (LCARC) at the UTM in Malaysia, *UNHABITAT* for Vietnam and *CDP* for their guidance, work and partnership. The EU is also thankful for the coordination provided by *UCLG ASPAC* as Regional Secretariat of the GCoM in South East Asia.

Finally, I would like to call out to all ambitious cities, national institutions, academia, experts wishing to take a stand on climate so that they join the GCoM. It is through shared vision and collective action that we can have a serious shot at climate mitigation and adaptation.



DR. BERNADIA TJANDRADEWI

Secretary General of United Cities and
Local Governments Asia Pacific (UCLG ASPAC)

On the behalf of the UCLG ASPAC as the Secretariat of GCoM in Southeast Asia, it gives me immense pleasure to present International Urban Cooperation (IUC) Asia's final publication on "Climate Action Plan Development in Indonesia, Malaysia, and Vietnam."

I commend all IUC Asia pilot cities for their relentless commitment to demonstrate local initiatives and build a comprehensive Climate Action Plan for a long-term and long-lasting change at the city level. Moving forward, the Climate Action Plan will be the foundation of other cities' efforts in strategising green and resilient recovery from the COVID-19 pandemic. I trust that this publication will become an important reference for future climate action planning in the Southeast Asia.

We believe that a better global future lies in cities' innovation and action. Therefore, UCLG ASPAC will continue to contribute to achieving urban climate resilience by promoting partnerships between cities and local governments and other key actors. Let us sustain this momentum to ensure that our climate goals are achieved.

EXECUTIVE SUMMARY

With the support from the European Union, International Urban Cooperation (IUC) Asia programme selects twelve cities to receive technical assistance as pilot cities to develop their own globally-recognised Climate Action Plans (CAPs), in compliance with GCoM's Common Reporting Framework (CRF). The pilot cities are located in three different countries: Indonesia (Palembang, Depok, Malang, Denpasar, and Makassar), Malaysia (Penampang, Tawau, Muar, and Hang Tuah Jaya), and Vietnam (Tam Ky, Da Nang, and Can Tho).

Key Findings:

In assisting the 12 pilot cities in the Southeast Asian region, IUC Asia collected varying amount of data from both the mitigation and adaptation planning. This leads to a number of findings which highlight patterns within the region.

In climate mitigation, it is found that the **energy sector** significantly dominates the source of emissions in all Indonesian, Malaysian and Vietnamese pilot cities, specifically the stationary energy - including both direct and indirect emissions on grid electricity consumption. Upon further inspection, the sources of these stationary energy emissions differ in each country. Both in Malaysian and Vietnamese pilot cities, the emissions are mostly produced by the industrial sectors and this fact is further supported by the data of each city's major economic activities which revolve around industrial production.

The HelpDesk, supported by its technical partners, assists the pilot cities in developing CAPs that show the cities' commitments to address climate change by reducing GHGs emissions, adapting to the impacts of climate change, and delivering wider social, environmental, and economic benefits. The technical assistance is comprised of step-by-step training and knowledge sharing on how to develop each essential component of a CAP, namely baseline GHG emissions inventory, target setting, risk and vulnerability assessment, monitoring/verification, and climate finance options/implementation. The CAPs are expected to become references for replication in other GCoM cities.

Meanwhile, in Indonesian pilot cities, with exception of Palembang, the largest shares of stationary energy emission are produced by the residential sectors which corresponds to its biggest portion of land use.

It is also interesting to highlight that per capita emission of all pilot cities is slightly higher or about the same with the national average emission. This supports the fact that cities significantly contribute environmental impact in the global level, further emphasizing the importance of local actions to meaningfully reduce emission.

In climate adaptation, we found that **flood** is the climate hazard found in all twelve IUC Asia's pilot cities across three countries. Additionally, it has become evident that the adaptation actions adopted in Indonesian pilot cities is substantially different than the ones adopted in Malaysia and Vietnam. Apparently, this is due to the fact that the characteristics of Indonesian pilot cities are contrasting to both the Malaysian and Vietnamese cities - the population density in Indonesia is ranging between 4,400 to 11,000 people/km², while the population density in both Malaysia and Vietnam fall between the number of 65 to 1,400 people/km². Therefore, the adaptation actions planned for Indonesian pilot cities are focused on the issue of high density and rapid urbanization which contributes to their low adaptive capacity.

WHAT IS THE IUC?

Cities contain more than half of the world's population and they consume more than two-thirds of the world's energy. As the areas in which most people live and work, cities are increasingly acknowledged as the arena in which solutions to major societal and environmental challenges must be developed and implemented.

The International Urban Cooperation (IUC) programme aims to enable cities in different global regions to link up and share solutions to common problems. It is part of a long-term strategy by the European Union to foster sustainable urban and regional development in cooperation with both the public and private sectors. Through engaging in the IUC, cities will have the chance to share and exchange knowledge with their international counterparts, building a greener, more prosperous future.

The IUC programme activities supports the achievement of bilateral policy objectives as well as major international agreements on urban development and climate change, such as the Urban Agenda, the Sustainable Development Goals, and the Paris Agreement.

The IUC programme itself consists of three components: one focused on addressing diverse urban challenges through city-to-city cooperation, **a second that supports cities in contributing to the Paris Agreement via the Global Covenant of Mayors for Climate and Energy (GCoM)**, and a final pillar that strengthens inter-regional innovation through region-to-region pairings.

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IUC ASIA COMPONENT 2: Sub-national action under the Global Covenant of Mayors Initiative

The Global Covenant of Mayors is a global alliance of cities and local governments voluntarily committed to fighting climate change, reducing its unavoidable impacts and facilitating access to sustainable and affordable energy for all.

As the Paris Agreement entered into force, its success rests with cities, businesses, communities and global citizens around the world. Through a voluntary commitment to reducing local greenhouse gas emissions, enhancing resilience to climate change, transitioning to a low-carbon economy and tracking their progress transparently, GCoM committed mayors and local officials all around the world are working towards sustainable solutions to climate-related threats and advancing global climate progress to get us further faster.

In partnership with GCoM Southeast Asia Secretariat, managed by the United Cities and Local Governments in Asia Pacific (UCLG ASPAC), IUC Asia encourages Southeast Asian cities to join the alliance and acquire capacity building opportunities for their overall Climate Action Plans (CAPs) development.

IUC Asia also selected **twelve cities** to receive **technical assistance as pilot cities to develop their own globally-recognized CAPs in compliance with GCoM's Common Reporting Framework (CRF)**. The pilot cities are comprised of Palembang, Depok, Malang, Denpasar and Makassar in Indonesia, Penampang, Tawau, Muar and Hang Tuah Jaya in Malaysia and Tam Ky, Da Nang and Can Tho in Vietnam.

CLIMATE ACTION PLAN: MITIGATION AND ADAPTATION BASED ON GLOBAL COVENANT OF MAYORS COMMON REPORTING FRAMEWORK GCoM CRF

1. WHAT IS CLIMATE ACTION PLAN?

It is a plan that defines the climate actions for/in the city which are defined and developed through sound and evidence-based process with the engagement of all relevant stakeholders. The resulting plan could either be a stand-alone document or for mainstreaming in existing development plans composed by the city that are consistent with and supportive of national policies.

2. CLIMATE ACTIONS

A. Mitigation: Avoiding the Unimaginable

Climate change mitigation involves actions that reduce the rate of climate change. Climate change mitigation is achieved by limiting or preventing greenhouse gas emissions and by enhancing activities that remove these gases from the atmosphere. Greenhouse gases can come from a range of sources and climate mitigation can be applied across all sectors and activities. These include energy, transport, buildings, industry, waste management, agriculture, forestry, and other forms of land management.

B. Adaptation: Managing the Unavoidable

Adaptation is adjustment in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. This term refers to changes in processes, practices, or structures to moderate or offset potential damages or to take advantage of opportunities associated with changes in climate. It involves adjustments to reduce the vulnerability of communities, regions, or activities to climatic change and variability. Adaptation is important in the climate change issue in two ways—one relating to the assessment of impacts and vulnerabilities, the other to the development and evaluation of response options (IPCC).

3. CITY CLIMATE ACTION PLAN: LOCALLY RELEVANT

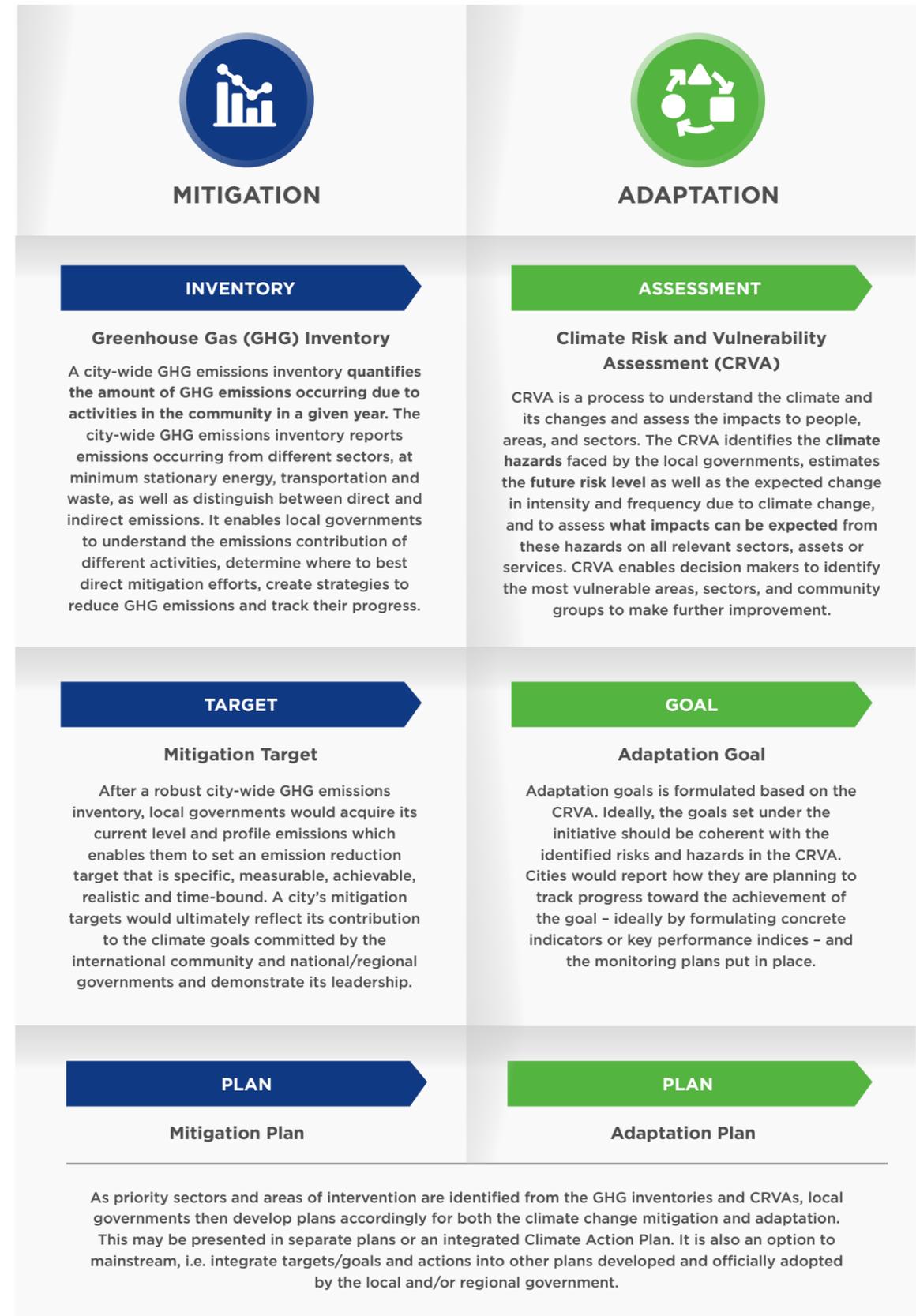
- A locally-relevant city Climate Action Plan puts emphasis on what's important to city and its people - both their interests and objectives, then determines how best to achieve these objectives through realistic options to address the most immediate as well mid to long-term needs.
- Considers: local knowledge, multiple perspectives, facts and values on the ground

4. GLOBAL COVENANT OF MAYORS FOR CLIMATE AND ENERGY COMMON REPORTING FRAMEWORK GCOM CRF

The Global Covenant of Mayors for Climate & Energy (GCoM) is the world's largest coalition of cities and local governments voluntarily committed to actively combatting climate change and with a shared long-term vision to moving to a low emission, climate resilient future.

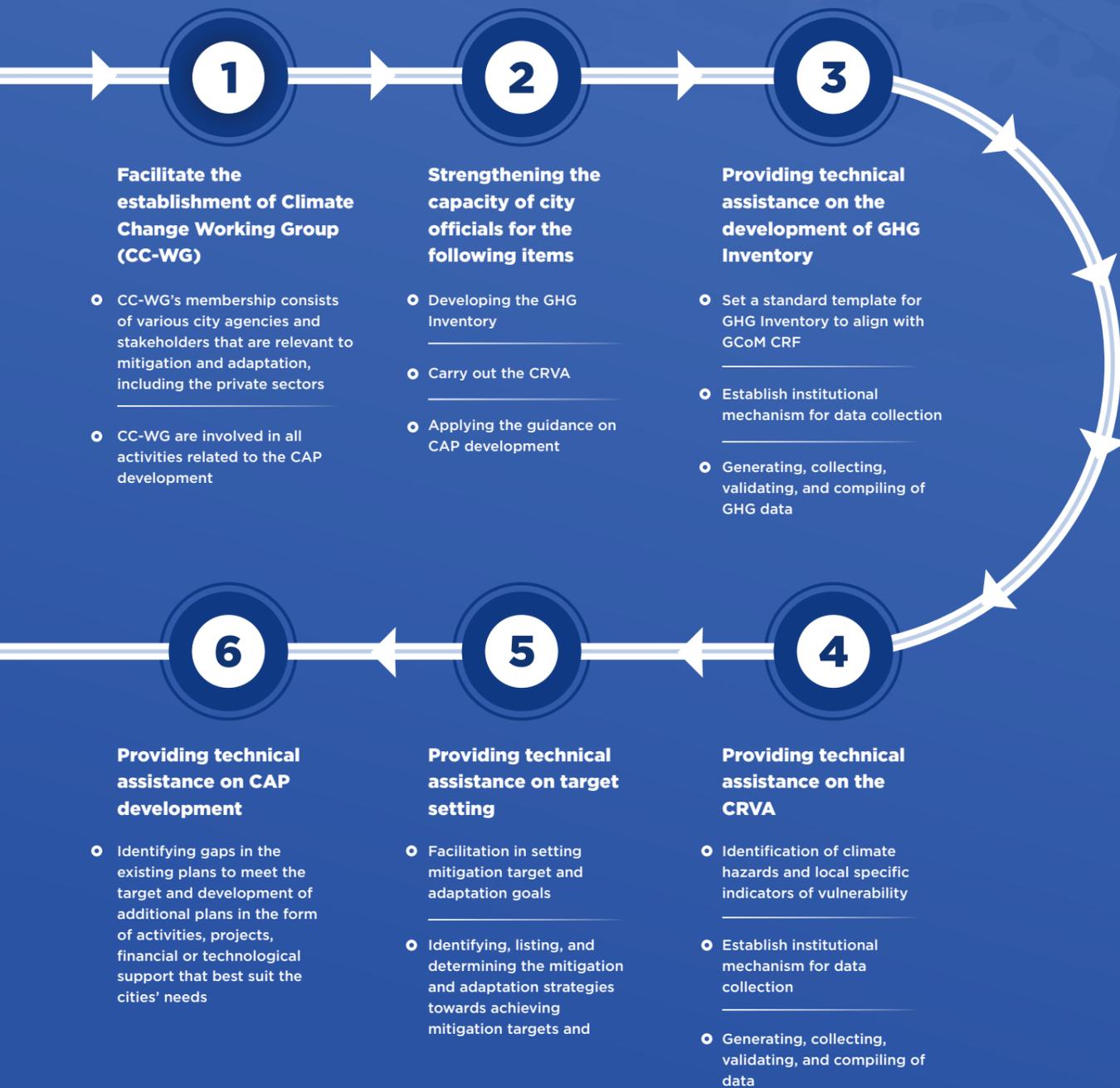
The newly established GCoM Common Reporting Framework (CRF), formally endorsed by the GCoM Board in September 2018, introduces the first global reporting framework that will allow for cities across the world to use one standardised approach to sharing information on their climate activities. It guides GCoM cities in assessing their greenhouse gas emissions, climate change risks and vulnerabilities, as well as planning and reporting in an integrated and coherent way. This means the CRF is the reference document for GCoM signatories throughout all phases of engagement with the initiative.

Steps of City Climate Action Planning based on GCoM CRF



5. STEPS OF IUC ASIA SUPPORT IN DEVELOPING THE CLIMATE ACTION PLAN

IUC Asia introduced the following stages in developing the CAPs for pilot cities:



INDONESIA

Palembang, Depok, Malang,
Denpasar, and Makassar



COUNTRY OVERVIEW

NDC:

- The Government of Indonesia pledged to reduce emissions by 29% (41% with international aid) against the business as usual (BAU) scenario by 2030.

NATIONAL STRATEGY/POLICIES:

- Regulation of the Minister of Home Affairs No. 86 in 2017 on Regional Development obliges all sub-national/local governments to report the result of the GHG inventory and the implementation of mitigation and adaptation action as an indicator of the regional development performance.
- Regulation of the Minister of Environment and Forestry No. 70-73 in 2017 regarding the procedures or guidelines for implementing emission reduction actions, registration of actions, Monitoring, Reporting and Verification (MRV), as well as the development of GHG inventories.
- Regulation of the Minister of Environment and Forestry No. 33 in 2016 on Guidelines for Developing Climate Change Adaptation Actions. This regulation gives a mandate to the sub-national/local governments to formulate climate change adaptation actions that involve relevant government agencies, universities, and representatives of local communities.

- Government Regulation No. 46 in 2016 on Procedures for Implementing Strategic Environmental Studies
- Government Regulation No. 46 in 2017 on Environmental Economic Instruments which includes development planning and economic activities, Environmental Funding, and Incentives and/or Disincentives.
- National Act No. 16 in 2016 on the Ratification of Paris Agreement to the United Nations Framework Convention On Climate Change.

NOTES ON INDONESIAN CLIMATE ACTION PLANNING

Indonesia's structured policy for the integration of cities in the national framework for implementation of NDCs is linked to two reporting platforms managed by The Ministry of Environment and Forestry (MoEF) of Indonesia:



The National GHG Inventory System (SIGN SMART)



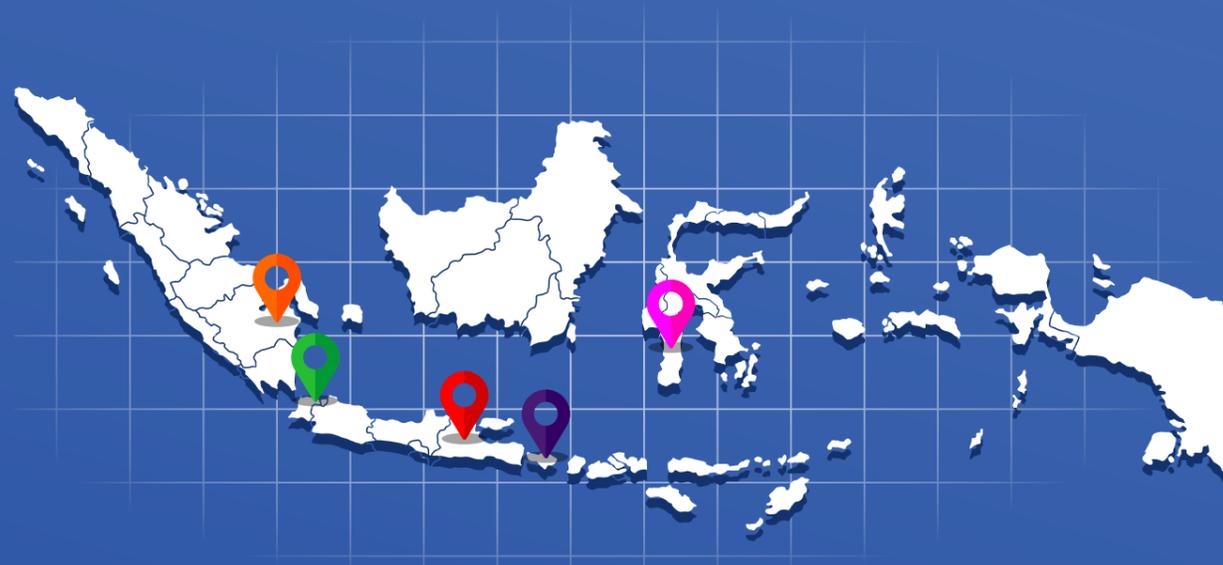
Vulnerability Index Data Information System (SIDIK) assesses the vulnerability and climate risk of villages - the smallest unit of a city - in Indonesia. Therefore, Climate Risk and Vulnerability Assessment (CRVA) in Indonesia analyses vulnerability profile of each village. This equips city officials to prioritize which locations/particular villages need immediate actions. CRVA in IUC Asia's Indonesian pilot cities has resulted in a list of priority locations for adaptation actions, which ranks villages from the ones with the highest climate risk to the lowest and the highest frequency of climate hazard occurrence.

Climate Action Plans are formulated at provincial level and submitted to the **Ministry of Planning of Indonesia (BAPPENAS)**.



SUMMARY OF INDONESIA

Selection of the 5 Indonesia pilot cities are indicated by Ministry of Environment and Forestry (MoEF) of Indonesia, that formally endorsed the process. The pilot cities are approved after discussion and some changes, in the light of a wider coordination of support to cities on climate reporting and planning involving further bilateral cooperation.



Basic Profile

● Palembang

Population : 1.8 Million
 Land Area : 400.61 km²
 Density : 4,493 people/km²
 Economy : Manufacturing, construction, and wholesale and retail trade; repair of motor vehicles and motorcycles

● Malang

Population : 927,285
 Land Area : 110.06 km²
 Density : 8,425 people/km²
 Economy : Trade sector and the repairation of motor vehicles, manufacturing, construction

● Makassar

Population : 1,526,677
 Land Area : 175.77 km²
 Density : 8,686 people/km²
 Economy : Wholesale and retail trade; repair of motor vehicles and motorcycle, manufacturing, and construction.

● Denpasar

Population : 947,100
 Land Area : 124.9 km²
 Density : 7,577 people/km²
 Economy : Accommodation and drinking water provider, education, construction, large and small retailers, vehicle repairation workshop and agriculture, fishery and forestry.

● Depok

Population : 2.4 Million
 Land Area : 200.29 km²
 Density : 11,983 people/km²
 Economy : manufacturing, wholesale and retail trade, and construction

Mitigation

	Palembang	Malang	Makassar	Denpasar	Depok
GHG emission	5,049,469 tCO ₂	1,343,913 tCO ₂	3,447,032 tCO ₂	2,624,663 tCO ₂	4,078,742 tCO ₂
GHG emission per capita	3.02 tCO ₂	1.54 tCO ₂	2.26 tCO ₂	2.81 tCO ₂	1.69 tCO ₂
Target	15% emission reduction against the above 2030 BAU scenario	12% emission reduction against the above 2030 BAU scenario	Makassar City have not determined the GHG mitigation target yet by 2030.	8% emission reduction against the above 2030 BAU scenario	11% emission reduction against the above 2030 BAU scenario
Actions	<ul style="list-style-type: none"> Stationary energy: energy efficiency in residential and commercial area Transportation: Sustainable national urban transportation program (SUTI), usage of biodiesel B30 Waste: Composting organic waste, Construction and operation of recycling centre and waste bank, Utilization of methane gas (LFG) at landfill 				

Adaptation

	Palembang	Malang	Makassar	Denpasar	Depok
Climate Hazard	Flood Land fire Storm	Flood Storms Landslide	Flood Drought Storm Landslide	Floods Storm Landslide	Flood Land fire Storm
Actions	<ul style="list-style-type: none"> Improvement of basic service facilities e.g. public health, sanitation, waste disposal facilities Improvement of institutional capacity of local communities (e.g. farmer and fisherman). Development and maintenance of city's green space Rehabilitation and normalization of irrigation and drainage canals 				

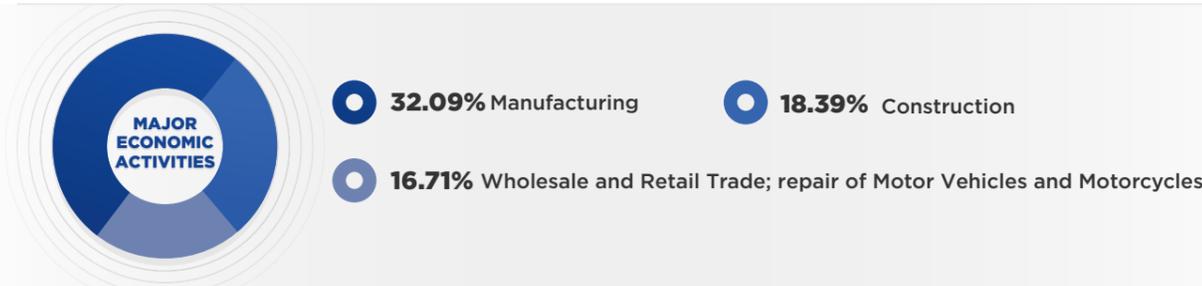


PALEMBANG

General Information

Palembang is the capital city of the Indonesian province of South Sumatra, located in Sumatra Island.

- Population:** 1.8 million (2019)
- Population Density:** 4,493/km²
- Land Area:** 400.61 km²
- Consisting of:** 107 villages



Land Use Area

- 49% Developed Area
- 24% Swamps
- 12% Shrub
- 15% Other

Climate



Palembang is in the tropical rainforest climate with significant rainfall even in its dry season so that in the rainy season, many areas on the city are inundated by the river's tide. However, in its driest months, many peatlands around the city dried, making them more vulnerable to wildfires, causing prolonged haze in the city.

Palembang's Highlights

Palembang is one of the oldest cities in Southeast Asia; once was the capital city of Srivijaya, a Buddhist maritime Indonesian empire that governed a great part of the western Indonesian Archipelago and controlled numerous oceanic shipping lanes, including the Strait of Malacca. Now acting as the capital city of South Sumatra province, Palembang hosted the 18th Asian Games in 2018.



PALEMBANG'S CLIMATE ACTION PROFILE

CLIMATE MITIGATION

GHG Inventory/Status

- The total GHG emissions of Palembang identified from the year 2019 baseline emissions inventory to be 5,049,469 tCO₂e. The proportion of total emissions contributed by each of the three sectors is depicted in Figure 1. Emission intensity per capita for Palembang is 3.02 tons CO₂e.
- The stationary energy sector, detailed in Figure 2, continued to be the dominant source of Palembang's GHG emissions, accounting for 72% of net emissions; while the transportation sector contributed 17% of the net emission, and both the waste and IPPU sector contributed 6% and 3%, respectively.

Figure 1. GHG Emission Profile of Palembang 2019

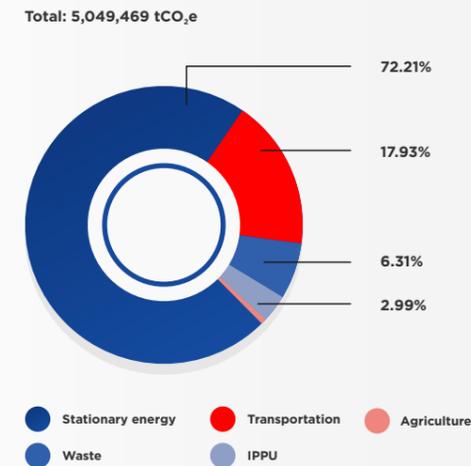
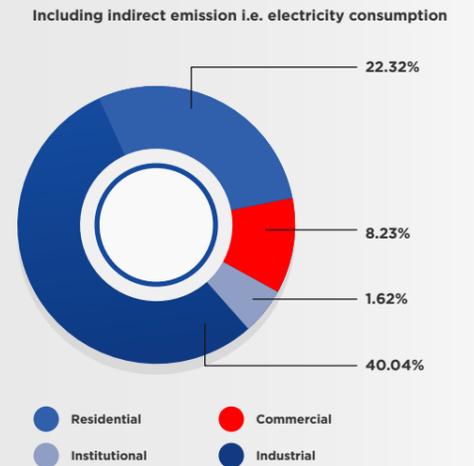


Figure 2. Palembang - Stationary Energy 2019



- A large share of Palembang's GHG emissions is sourced from the industrial sector, accounting for 40.04% of the total emission. This finding is correlated with the fact that the most dominant economic activity in Palembang is in the manufacturing sector (for more details see the General Information section).

Mitigation Target

- If there is no intervention, it is expected that the emissions will increase to 7,059,485 tCO₂e in the year of 2030 (= 3.64 tons CO₂e/capita) with COVID-19 consideration.
- 15% emission reduction against the 2030 BAU scenario



PALEMBANG'S CLIMATE ACTION PROFILE

CLIMATE ADAPTATION

Climate Risk and Vulnerability Assessment Result

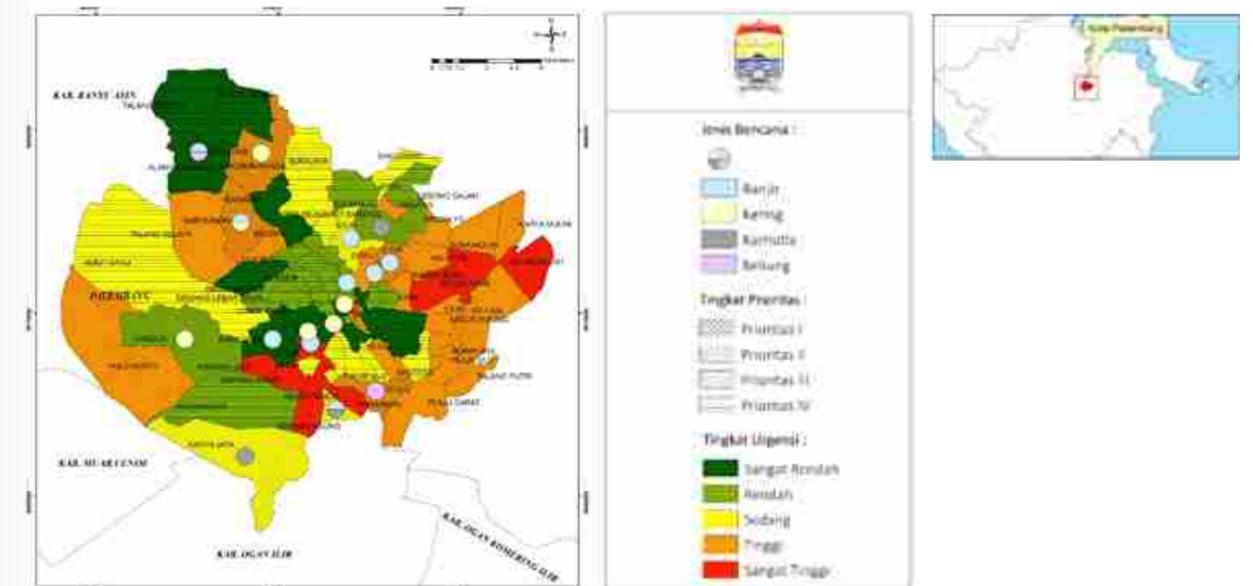
Current Hazard Assessment of Palembang

Climate Hazard	Probability of Hazard	Impact of Hazard
Flood	Low	High
Landfire	Moderate	High
Storm	Low	Moderate

From the CRVA, the villages in Palembang City has been categorized into 4 priority level:

Priority Level	Descriptions
Priority I	Climate hazard has occurred in the area with high to very high level of urgency
Priority II	Climate hazard has occurred in the area with very low to moderate level of urgency
Priority III	Climate hazard has not occurred for the last decade in the area with high to very high level of urgency
Priority IV	Climate hazard has not occurred for the last decade in the area with very low to moderate level of urgency

The distribution of villages based on the priority level:



Mitigation Actions

Corresponding to the sectors of emissions sources in Palembang, some of the mitigation actions are:

SECTORS OF EMISSIONS SOURCES	MITIGATION ACTIONS
Stationary Energy Sector	Increasing efficiency of electricity consumption in residential areas
	Involving industry sector: <ul style="list-style-type: none"> Application of energy roadmap in Pertamina Refinery Unit III Plaju (Crude oil refinery unit) Efficient use of gas nature at PT. PUSR (a urea fertilizer producer)
Transportation Sector	Efficiency of electricity consumption in commercial areas
	Sustainable national urban transportation program (SUTI), usage of biodiesel B30
Waste (Organic) Management	Land Fill Gas (LFG) Recovery at solid waste disposal site, organic waste composting, 3R program (Reuse, Reduce Recycle)

Based on the prioritization above, the focus of Palembang's climate adaptation would be on the villages in Priority I and Priority II level.

Priority Level	Number of Village	Vulnerable Sectors	Vulnerable Group	Lowest Adaptive Capacity Factors
Priority I	8	Water, Energy, Land Use Planning, Buildings	Persons with low income: 10.9% of total population in Priority I area	Education, Health, Socio-Economic, Physical and Environmental, Governmental and Institutional
Priority II	9	Financial, Waste, Buildings, Agriculture and Forestry, Energy, Land Use Planning	Persons with low income: 9.4% of total population in Priority II area	Socio-Economic, Physical and Environmental, Education, Health, Governmental and Institutional

Adaptation Goal

Decrease the number of vulnerable villages (villages with moderate to very high level of vulnerability) in the Priority I and II by 50 % (from 17 to 8 villages) in 2030

Adaptation Actions

Addressing the vulnerable sectors by enhancing the adaptive capacity factors of Palembang's village in Priority I and II level, some of the adaptation actions are:

Adaptive Capacity Factors Addressed	Adaptation Actions
Socio-Economic	Activities in the Entrepreneurship Development Program and Small and Medium Enterprises Competitive Advantages
	Improvement of farmer's institutional capacity
	Agricultural Technology Improvement Program: utilization of biogas technology
	Improvement of Food Security Program
Governmental /Institutional	Disaster-resilient village
	Integration of Climate Action Plan to the urban spatial plan
Education	Improvement of Basic education
	Increasing community participation in environmental management
Infrastructure	Improvement of basic Public Health
	Improvement, flood management program
	Rehabilitation/Maintenance of irrigation network
	Provision of infrastructure and facilities for solid waste management



MALANG



General Information

Malang is a city in the Indonesian province of East Java

Population: **927,285 (2019)**
 Population Density: **8,425/km²**
 Land Area: **110.06 km²**
 Consisting of **57 villages**



Climate



Malang City is a highland area. The mountains that surround Malang City affect the climatic conditions in the city. The rain pattern in Malang City includes the monsoonal rain pattern with a dry period occurring in June-August. Malang city temperature ranges from 20-34 °C with an annual average range from 26-28°C.

Malang's Highlights

Malang is known as a city for education. This city has one of the best universities in Indonesia such as Brawijaya University and Malang State University. The city is also well known for its mild climate and therefore, it is a popular destination for tourists, both nationally and internationally.

MALANG'S CLIMATE ACTION PROFILE

CLIMATE MITIGATION

GHG Inventory/Status

- The total gross emissions level (direct and indirect) has been calculated to be around 1,343,913 tonnes of CO₂e in 2019. The proportion of total emissions contributed by each of the three sectors is depicted in Figure 3. Emission intensity per capita for Malang is 1.54 tons CO₂e.
- The stationary energy sector is the dominant source of Malang's GHG emissions, accounting for 70% of net emissions; while the transportation sector contributed 13% of the net emission, and waste sector contributed 14%.

Figure 3. GHG Emission Profile of Malang 2019

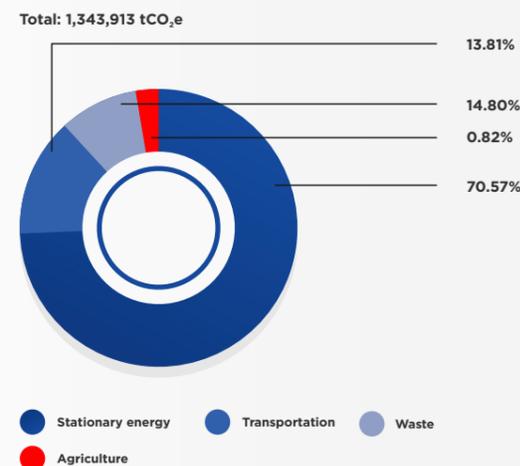
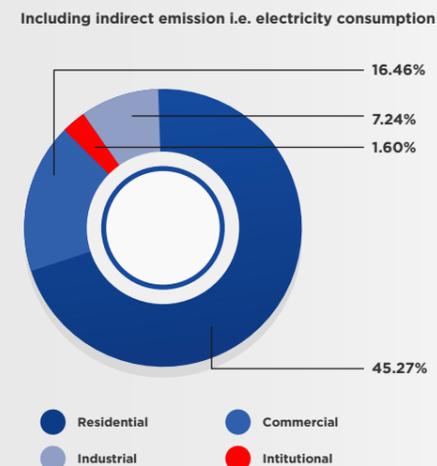


Figure 4. Malang - Stationary Energy 2019



- Settlement and commercial area have been identified as the main emissions source in the City of Malang, matching up with most of its land use for residential areas.

Mitigation Target

- If there is no intervention, it is expected that the emissions will increase to 1,799,996 tons CO₂e in the year of 2030 (= 1.92 tons CO₂e/capita) with COVID-19 consideration. Under 2030 BAU scenario the GHG emissions are expected to increase by 31%, or ± 3% per year.
- 12% emission reduction against a 2030 BAU scenario



Mitigation Actions

Corresponding to the sectors of emissions sources in Malang, some of the mitigation actions are:

SECTORS OF EMISSIONS SOURCES	MITIGATION ACTIONS
Stationary Energy Sector	Increasing efficiency of electricity consumption in residential areas, commercial area and government office
	Rooftop solar power plant (PLTS) in schools and offices
	Retrofitting lamps and installing solar cells in public street lighting (PJU)
Transportation Sector	Sustainable national urban transportation program (SUTI), usage of biodiesel B30
Waste (Organic) Management	Composting organic waste
	Construction and operation of recycling centre and waste bank
	Utilization of methane gas (LFG) at landfill, biogas utilization for small and medium scale industries

MALANG'S CLIMATE ACTION PROFILE

CLIMATE ADAPTATION

Climate Risk and Vulnerability Assessment Result

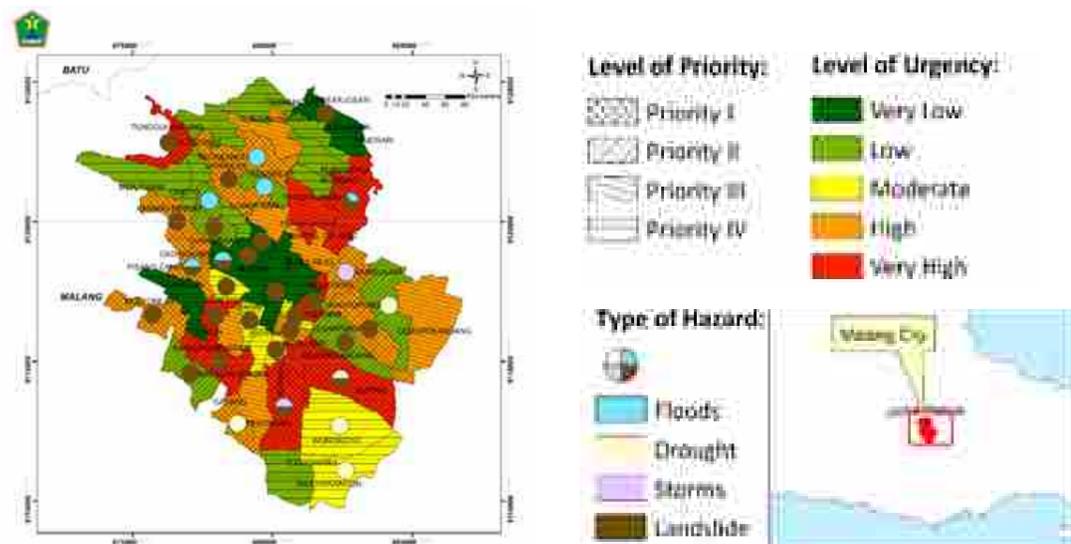
Current Hazard Assessment of Malang

Climate Hazard	Probability of Hazard	Impact of Hazard
Flood	Moderate	Moderate
Storms	Moderate	Moderate
Landslide	Moderate	High

From the CRVA, the villages in Malang City has been categorized into 4 priority level:

Priority Level	Descriptions
Priority I	Climate hazard has occurred in the area with high level of urgency
Priority II	Climate hazard has occurred in the area with low-moderate level of urgency
Priority III	Climate hazard has not occurred for the last decade in the area with high level of urgency
Priority IV	Climate hazard has not occurred for the last decade in the area with low-moderate level of urgency

The distribution of villages based on the priority level:



Based on the prioritization above, the focus of Malang's climate adaptation would be on the villages in Priority I and Priority II level.

Priority Level	Number of Village	Vulnerable Sectors	Vulnerable Group
Priority I	16 28% of total Malang's villages	Water, building, Society, Community and Culture, Agriculture	Persons living in sub-standard house, Persons living in sub-standard condition
Priority II	11 19% of total Malang's villages		

Adaptation Goal

Malang City has yet to defined the goal adaptation because it is still under the consultation process with the stakeholders. Nevertheless, the local government has committed to reach an adaptation goal to reduce the number of highly vulnerable villages particularly in the priority I area.

Adaptation Actions

Addressing the vulnerable sectors by enhancing the adaptive capacity factors of Malang's villages in Priority I level, some of the adaptation actions are:

Adaptive Capacity Factors Addressed	Adaptation Actions
Socio-Economic	The improvement of food security through flood and drought-tolerant crops
Environment	Provision of clean water through water well drilling, Socialization of waste reduction through 3R activity
Infrastructure	Management of slum area
	Development of public green space Development of drainage/water tunnel system



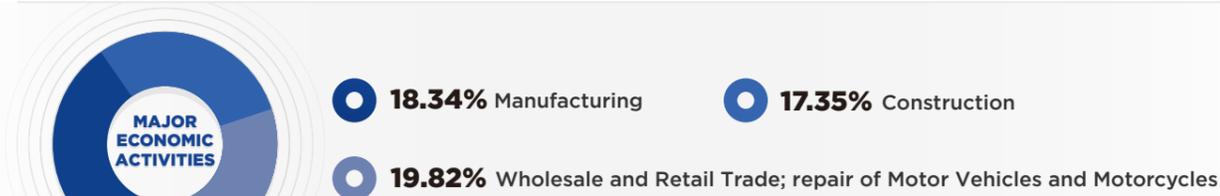
MAKASSAR



General Information

Makassar is the largest city in the region of Eastern Indonesia and the country's fifth-largest urban centre after Jakarta, Surabaya, Bandung, and Medan. It is located in Sulawesi Island of Indonesia

- Population: **1,526,677 (2019)**
- Population Density: **8,686/km²**
- Land Area: **175.77 km²**
- comprising of **153 villages**



Climate



Makassar City is a lowland area which is directly adjacent to the sea. Unique characteristics of this area are high temperature condition and the air temperature difference between day night is relatively small. The average air temperature in Makassar City ranges from 28 to 30 °C, the daily maximum temperature can reach up to 36 °C. Although the rainfall in Makassar City is relatively high, the dynamics of seasonal changes are very high which may cause drought event in the dry season.

Makassar's Highlights

- Makassar, or previously known as Ujung Pandang (1971-1999) is one of the major coastal cities in Indonesia. Being a coastal city, Makassar allocates a large percentage of its land use for fishponds. Meanwhile, rice fields are generally located along the boundaries of the city.
- Throughout its history, Makassar has been an important trading port, hosting the centre of the Gowa Sultanate and a Portuguese naval base before its conquest by the Dutch East India Company in the 17th century. For a brief period after Indonesian independence, Makassar became the capital of the State of East Indonesia, during which an uprising occurred.

MAKASSAR'S CLIMATE ACTION PROFILE

CLIMATE MITIGATION

GHG Inventory/Status

- The total GHG emissions of Makassar identified from the year 2019 baseline emissions inventory to be 3,447,032 tCO₂e. The proportion of total emissions contributed by each of the three sectors is depicted in Figure 5. Emission intensity per capita for Makassar is 2.26 tons CO₂e.

Figure 5. GHG Emission Profile of Makassar 2019

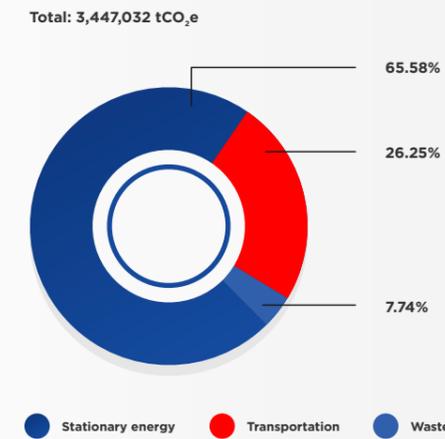
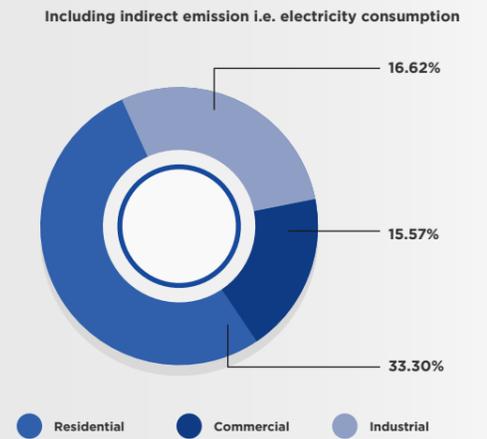


Figure 6. Makassar - Stationary Energy 2019



- The stationary energy sector (Figure 6) contributes the largest emissions in Makassar City, with residential sector accounting for 33.30% of total emissions. This corresponds with Makassar's major proportion of land use for residential area. Next major emissions contributors are the industrial sector accounting for 16.62% of total emissions, and commercial for 15.57%.

Mitigation Target

Makassar City has not determined the GHG mitigation target yet by 2030. In addition, Makassar City has not set a base year for mitigation actions to be carried out. Therefore, in this report, the base year chosen is in 2010 and the target for GHG mitigation have been prepared - assuming that the intensity of energy consumption decreased 1% per year - therefore, the energy consumption in 2030 is expected to decrease by 20% based on the baseline.



MAKASSAR'S CLIMATE ACTION PROFILE

CLIMATE ADAPTATION

Climate Risk and Vulnerability Assessment Result

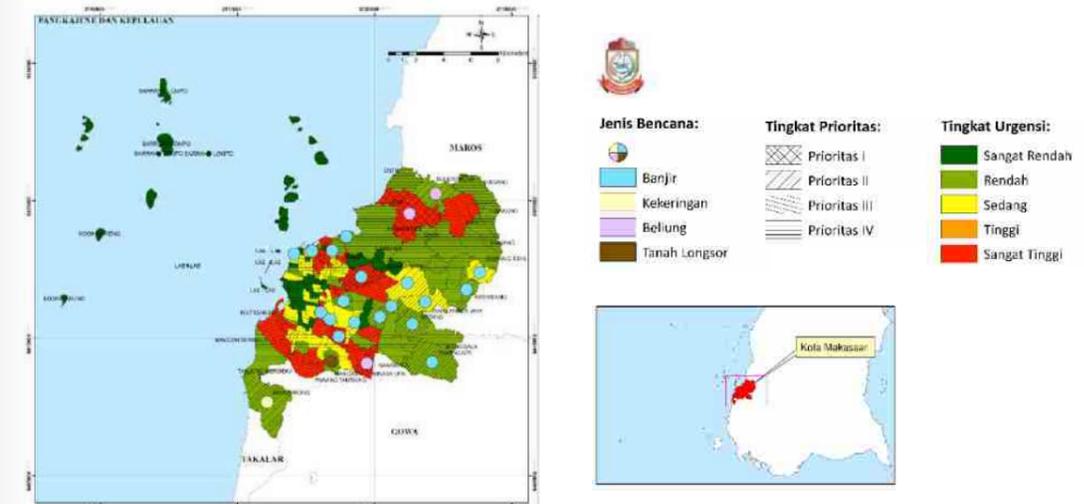
Current Hazard Assessment of Makassar

Climate Hazard	Probability of Hazard	Impact of Hazard
Flood	High	High
Drought	High	Low
Storm	High	Moderate
Landslide	High	Moderate

From the CRVA, the villages in Makassar City has been categorized into 4 priority level:

Priority Level	Descriptions
Priority I	Climate hazard has occurred in the area with high to very high level of urgency
Priority II	Climate hazard has occurred in the area with very low to moderate level of urgency
Priority III	Climate hazard has not occurred for the last decade in the area with high to very high level of urgency
Priority IV	Climate hazard has not occurred for the last decade in the area with very low-moderate level of urgency

The distribution of villages based on the priority level:



Mitigation Actions

SECTORS OF EMISSIONS SOURCES	MITIGATION ACTIONS
Stationary Energy Sector	Installation of street smart-lighting
	Conservation of energy in industry and buildings as well as energy efficiency in residential and commercial area
	Solar rooftop
Transportation Sector	Bus rapid transit (BRT), smart driving, electric vehicles, biodiesel utilization
Waste (Organic) Management	Utilization of methane gas in landfill

Based on the prioritization above, the focus of Makassar's climate adaptation would be on the villages in Priority I level.

Priority Level	Number of Village	Vulnerable Sectors	Vulnerable Group	Lowest Adaptive Capacity Factors
Priority I	21 14% of total Makassar's villages	Buildings, Land Use Planning, Tourism, Energy, Agriculture & Forestry, Financial, Land Use Planning, Waste	Persons Living in Sub-Standard Condition 18.36%	Education, Health, Socio-Economic, Physical & Environmental, Society, Community & Culture

Adaptation Goal

The goal of adaptation has not been defined since it is still under the consultation process with the stakeholders. However, the local government roughly plans that the adaptation goal would be to reduce the number of highly vulnerable villages, particularly in the Priority I area.

Adaptation Actions

Addressing the vulnerable sectors by enhancing the adaptive capacity factors of Makassar's villages in Priority I level, some of the adaptation actions are:

Adaptive Capacity Factors Addressed	Adaptation Actions
Governance	Disaster prevention and preparedness
	Training of psychologic recovery and damaged infrastructure post-disaster
	Increase prevention and preparedness of fire disaster threat
Health	Improvement of health service particularly for low income household
Environment	Protection and conservation of natural resources
	Monitoring of the watershed management
	Provision of waste bank infrastructure
Infrastructure	Improvement of sanitation facilities
	Development of drainage system or water tunnel
	Development and maintenance of city's green space
	Increasing waste management capacity



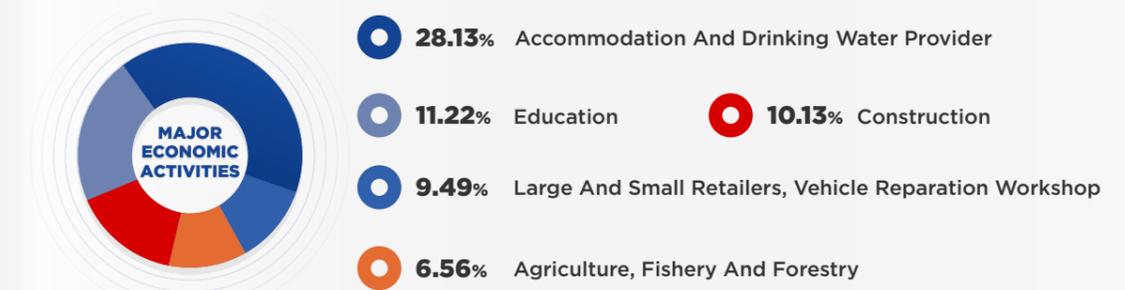
DENPASAR



General Information

Denpasar is the capital city of the Indonesian province of Bali and the main gateway to the island.

Population: **947,100 (2019)**
 Population Density: **7,577 people/km²**
 Land Area: **124.999 km²**
 comprising of **43 villages**



Climate



The city lies on the southern part of the equator, so it has a tropical climate with hot and humid weather all year round. Denpasar is located at a low coastal zone. One of the climate characteristics for such a geographic location is the high temperature during the day, with the slight difference in temperature between day and night.

Denpasar Highlights

Denpasar's traditional values are strongly influenced by Hindu religious rituals. Due to its rich and unique culture, the city became a popular destination among tourists. The development of tourism has had a strong impact on Denpasar's economy.

DENPASAR'S CLIMATE ACTION PROFILE

CLIMATE MITIGATION

GHG Inventory/Status

- The total GHG emissions of Denpasar identified from the year 2018 baseline emissions inventory to be 2,624,663 tCO₂eq. The proportion of total emissions contributed by each of the three sectors is depicted in Figure 7. Emission intensity per capita for Denpasar is 2.81 tons CO₂e.

Figure 7. GHG Emission Profile of Denpasar 2018

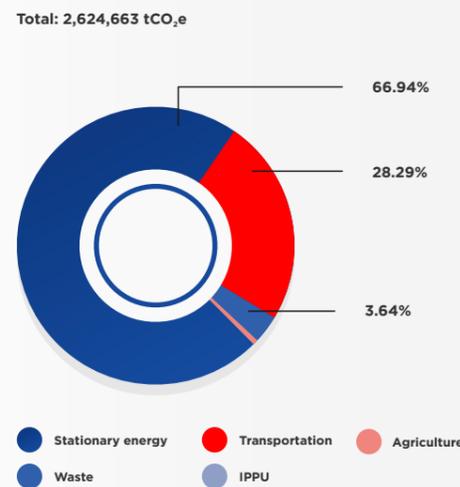
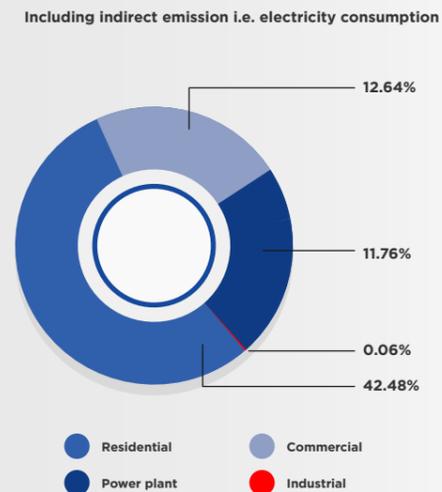


Figure 8. Denpasar - Stationary Energy 2018



- The main source of Denpasar City's emission is from the stationary energy sector. As detailed in Figure 8, the residential sector contributes 42.48% of the total emissions. The next major main source of emission is from commercial (12.64%), then followed by the power plant (11.76%).

Mitigation Target

It is estimated that Denpasar City could reduce around 230 thousand tonnes of CO₂ emissions in 2030, or around 8% of the 2030's BAU emissions.

Mitigation Actions

Corresponding to the sectors of emissions sources in Denpasar, some of the mitigation actions are:

SECTORS OF EMISSIONS SOURCES	MITIGATION ACTIONS
Stationary Energy Sector	Energy efficiency measures in municipal building
	Energy efficiency in hotels through the initiatives such as the Green Hotel program
	National government-initiated renewable energy power generation which will reduce emission factor in grid electricity gradually (estimated 1%/year reduction starting in 2021)
Transportation Sector	National government-initiated Biodiesel program, which could contribute to lower emission factor for fuel oils (30% reduction)
Waste (Organic) Management	The improvement in the Suwung Municipal Waste Management Site through development of sanitary landfill system
	Reduction of organic waste transported into Suwung, as a part of the implementation of the National Policy and Strategy (JAKSTRANAS) on waste reduction
	The improvement in the wastewater management system through the conversion of household septic tanks to communal septic tanks and the reduction in the number of households dependent on river/sea discharge system

DENPASAR'S CLIMATE ACTION PROFILE

CLIMATE ADAPTATION

Climate Risk and Vulnerability Assessment Result

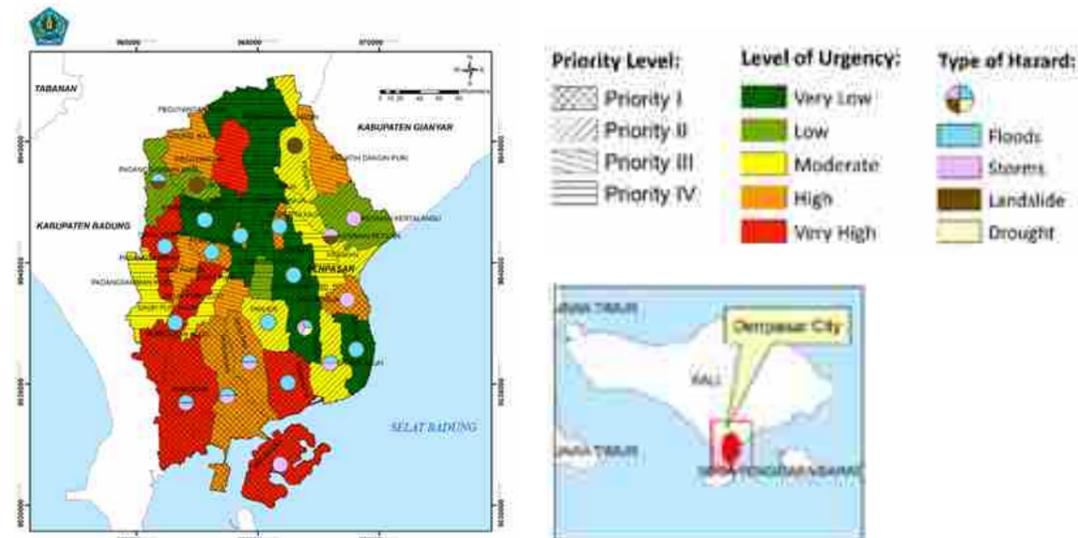
Current Hazard Assessment of Denpasar

Climate Hazard	Probability of Hazard	Impact of Hazard
Flood	Moderate	High
Storms	Moderate	Moderate
Landslide	Moderate	Low

From the CRVA, the villages in Denpasar City has been categorized into 4 priority level:

Priority Level	Descriptions
Priority I	Climate hazard has occurred in the area with high to very high level of urgency
Priority II	Climate hazard has occurred in the area with very low to moderate level of urgency
Priority III	Climate hazard has not occurred for the last decade in the area with high to very high level of urgency
Priority IV	Climate hazard has not occurred for the last decade in the area with very low to moderate level of urgency

The distribution of villages based on the priority level:



Based on the prioritization above, the focus of Denpasar's climate adaptation would be on the villages in Priority I and Priority II level.

Priority Level	Number of Village	Vulnerable Sectors	Vulnerable Group	Lowest Adaptive Capacity Factors
Priority I	11	Financial, Energy, Water, Buildings	Persons living in sub-standard condition (44,66%)	Education, Health, Socio-Economic, Governmental & Institutional, Physical & Environmental, Transport
Priority II	11	Financial, Water	Persons with low income (37,25%)	Socio-Economic

Adaptation Goals

The determination of adaptation goal in Denpasar City is still being discussed within the stakeholders.

Adaptation Actions

Addressing the vulnerable sectors by enhancing the adaptive capacity factors of Denpasar's villages in Priority I level, some of the adaptation actions are:

Adaptive Capacity Factors Addressed	Adaptation Actions
Socio-Economic	Fishery cultivation business development
	Development of business support systems for empowerment of Small and Medium Enterprises
	Increasing the application of agricultural/plantation technology (utilization of biogas as an alternative source for cooking, utilization of used cooking oil for biodiesel)
Environment	Conservation of water resources and control of damage to water source
	Management and rehabilitation of coral, mangrove, seagrass, estuaries, and bay
	Forest and land rehabilitation activities
Infrastructure	Improvement irrigation system
	Construction and maintenance of drainage channels
	Improved river cleaning and dredging

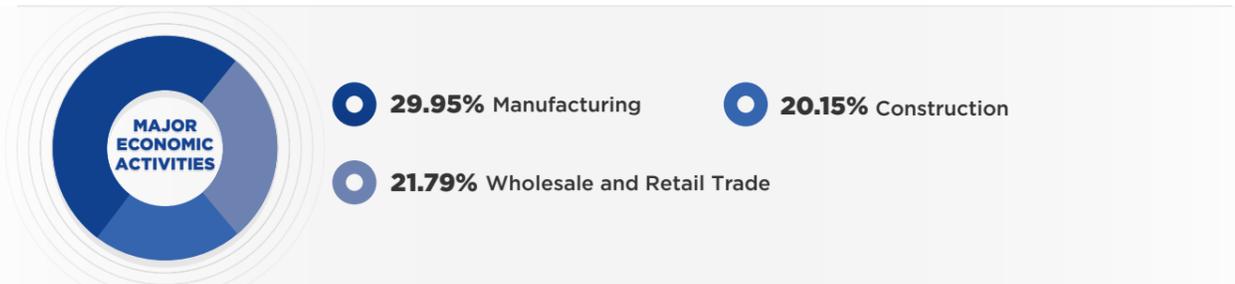


DEPOK

General Information

Depok City is one of major urban areas in the West Java province, located near Jakarta Great Capital

- Population:** 2.4 million (2019)
- Population Density:** 11,983/km²
- Land Area:** 200.29 km²
- comprising of** 63 villages



Climate



Depok City is a low-lying area with an average temperature is around 22-34°C. Rainy season falls in the month of: January, February, March and December, while the driest month is August.

Depok's Highlights

The land use in Depok City is largely dominated by residential area that covers almost 80% of the city, followed by the cropland and paddy field. As a satellite city, Depok has become a popular place to live for people who work in the cities within the Greater Jakarta area. It is one of the reasons behind the change of land use in Depok observed in recent decades, especially the conversion from cropland/paddy field to settlements.



DEPOK'S CLIMATE ACTION PROFILE

CLIMATE MITIGATION

GHG Inventory/Status

- The total GHG emissions of Depok identified from the year 2019 baseline emissions inventory to be 4,078,742 tCO₂e. The proportion of total emissions contributed by each of the three sectors is depicted in Figure 9. Emission intensity per capita for Depok is 1.69 tons CO₂e

Figure 9. GHG Emission Profile of Depok 2019

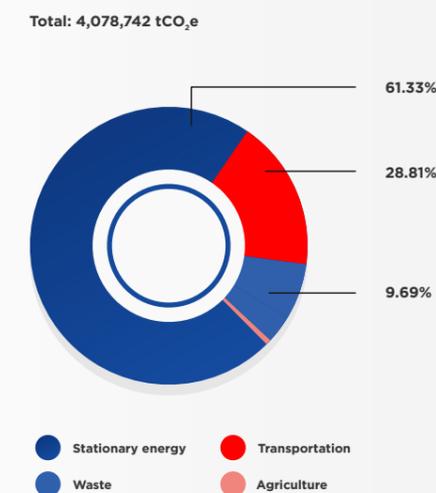
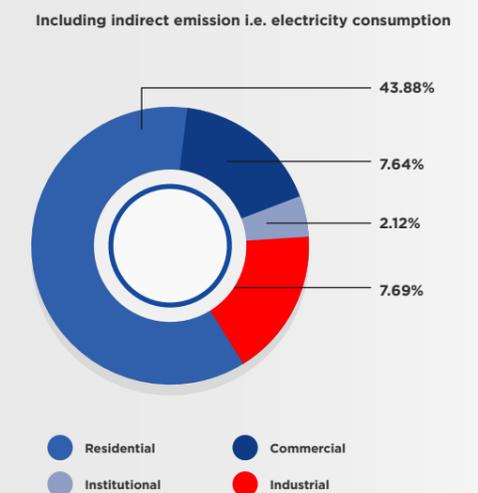


Figure 10. Depok - Stationary Energy 2019



- Settlements (residential buildings) is the main source of stationary energy emission which contributed to 43.88% of total emission. The second main source is emissions from fossil fuels combustion in the road transportation and followed by waste. These three emission sources already contribute to more than 90% of the city emissions.

Mitigation Target

- Under the BAU scenario, GHG emissions of Depok City are projected to reach 6,209,926 tonnes of CO₂e in 2030. In comparison to emissions level in 2019, it increases by about 54% (growth rate of about 4% per year).
- 11% emission reduction against a 2030 BAU scenario

Mitigation Actions

Corresponding to the sectors of emissions sources in Depok, some of the mitigation actions are:

SECTORS OF EMISSIONS SOURCES	MITIGATION ACTIONS
Stationary Energy Sector	Energy efficiency in residential area, commercial and government offices
	Depok City gas network development
	Rooftop Solar Power Plant (PLTS) in schools and government offices
	The retrofitting of lamps and installation of solar cells in public street lighting
Transportation Sector	Improvement of public mass transport
	The expansion and improvement of bike and pedestrian path
	Automatic traffic control system (ATCS)
	Transit oriented development; usage of biodiesel B30
Waste (Organic) Management	Construction and operation of organic waste processing units (UPS)
	Construction and operation of a recycling centre and waste bank
	Refuse derived fuel (RDF) and the utilization of methane gas (LFG) at Cipayung landfill
	Education and cooperation in zero waste activities (waste reduction, sorting and processing) involving public members and local communities
	The establishment of centralized aerobic treatment of domestic wastewater
	Methane utilization from anaerobic wastewater treatment unit

DEPOK'S CLIMATE ACTION PROFILE

CLIMATE ADAPTATION

Climate Risk and Vulnerability Assessment Result

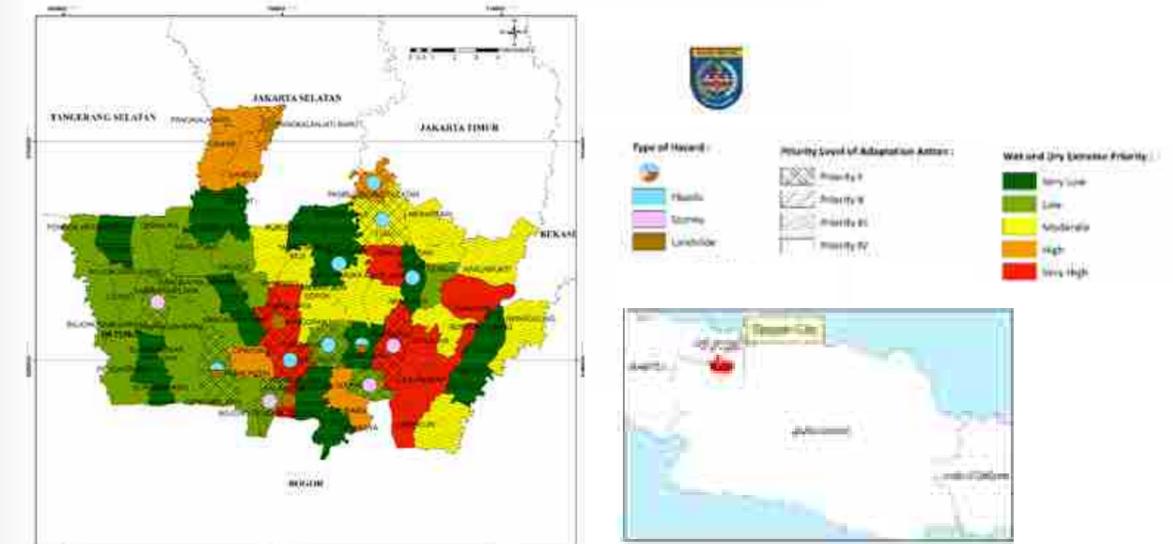
Current Hazard Assessment of Depok

Climate Hazard	Probability of Hazard	Impact of Hazard
Flood	Moderate	Low
Drought	Moderate	Moderate
Storm	Moderate	High

From the CRVA, the villages in Depok City has been categorized into 4 priority level:

Priority Level	Descriptions
Priority I	Climate hazard has occurred in the area with high to very high level of urgency
Priority II	Climate hazard has occurred in the area with very low to moderate level of urgency
Priority III	Climate hazard has not occurred for the last decade in the area with high to very high level of urgency
Priority IV	Climate hazard has not occurred for the last decade in the area with very low to moderate level of urgency

The distribution of villages based on the priority level:



Based on the prioritization above, the focus of Depok's climate adaptation would be on the villages in Priority I level.

Priority Level	Number of Village	Vulnerable Sectors	Vulnerable Group	Lowest Adaptive Capacity Factors
Priority I	7	Water, Land Use Planning, Building, Health, Education	People with low income: 0.86%	Education, health, socio-economic, Physical & Environmental
Priority II	12	Water, Land Use Planning, Building, Education	People with low income: 1.76%	Health, social-economic, Physical & Environmental, Governmental & Institutional

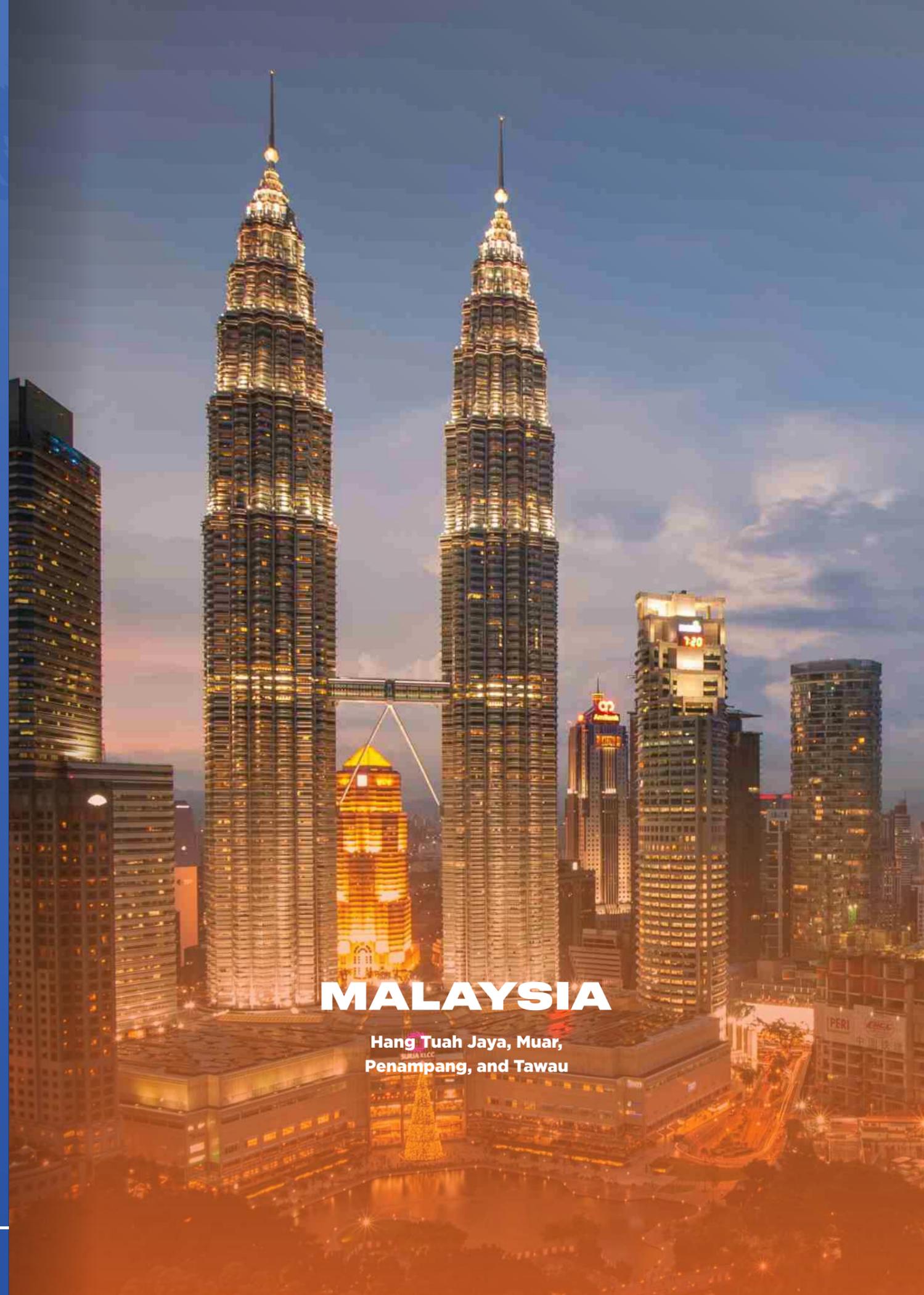
Adaptation Goal

The determination of adaptation goal in Depok City is still being discussed within the stakeholders.

Adaptation Actions

Addressing the vulnerable sectors by enhancing the adaptive capacity factors of Depok's villages in Priority I and II level, some of the adaptation actions are:

Adaptive Capacity Factors Addressed	Adaptation Actions
Socio-Economic	Increasing the quality of social protection and security services during and after natural and social disasters
Environmental	Improvement of clean water management and services
	Conservation of biological and water resources
Education	Development of member and environmental communities (green camp)
Infrastructure	Integrated Green Open Space (RTH) Management of City and Village Parks
	Rehabilitation and normalization of irrigation and drainage canals by involving the community
Governance	Extension/Mitigation of firefighters and disaster management
	Improve Post-Natural and Social Disaster Services



MALAYSIA

Hang Tuah Jaya, Muar, Penampang, and Tawau

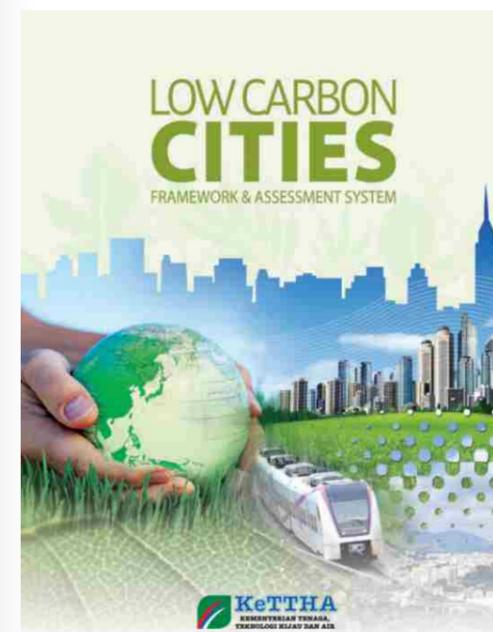
COUNTRY OVERVIEW

NDC:

- Malaysia has committed an unconditional reduction of emission intensity of 35% by 2030 from its 2005 baseline, with a further 10% conditional reduction upon receipt of climate finance, technology transfer, and capacity building from developed countries.

NATIONAL STRATEGY/POLICIES:

- National Policy on Climate Change** (Dasar Perubahan Iklim Negara), formulated in 2009.
- Initiatives to increase the share of use of **non-fossil fuel energy** is expressed in the **9th Malaysia Plan (2006-2010)**.
- The **National Biofuel Policy 2006** laid the groundwork for the development and use of biofuels.
- In 2010, there was an introduction of a feed-in-tariff (FiT) mechanism in conjunction with the **National Renewable Energy Policy and Action Plan (2010)**.
- Green Technology Financing Scheme (GTFS)** is initiated in 2010.
- The **10th Malaysia Plan (2011-2015)** focused on sustainable growth and introducing mitigation strategies to reduce GHG emissions.
- The **National Physical Plan 3 (2016)** begins the incorporation of climate change into the countrywide spatial planning framework.
- Climate change priorities under **11th Malaysia Plan (2016-2020)**: Pillar V: Enhancing Environmental Sustainability through Green Growth (intensifying climate change mitigation, augmenting climate change adaptation, strengthening disaster risk management)



NOTES ON MALAYSIAN CLIMATE ACTION PLANNING

Low Carbon Cities Framework (LCCF) is an initiative by the Ministry of Environment and Water (KASA), formerly known as MESTECC (Ministry of Energy, Science, Technology, Environment and Climate Change), to help Malaysian cities shift towards a low carbon future. Powered by GreenTech Malaysia, a government agency promoting sustainable technological solutions, the LCCF is an information portal providing guidance for local authorities, universities, and other small-scale entities on how to reduce greenhouse gas emissions. The development of the Malaysian pilot cities' CAP closely follows LCCF guidance.

SUMMARY OF MALAYSIA

Selection of the 4 Malaysian pilot cities are based on the following criteria, as approved by MESTECC:

- > Different urban typology
- > Previous/existing cooperation background
- > Different territorial and climate zones
- > Capacity and motivation



Basic Profile

Muar	Hang Tuah Jaya	Penampang	Tawau
Population : 281,500 (2018)	Population : 124,000 (2010)	Population : 121,934 (2010)	Population : 397,763 (2010)
Land Area : 1,354 km ²	Land Area : 144.61 km ²	Land Area : 425 Km ²	Land Area : 6,125 km ²
Density : 208 people/km ²	Density : 857 people/km ²	Density : 287 people/km ²	Density : 65 people/km ²
Economy : Tourism, Industry	Economy : Service, Tourism, Industry	Economy : Service, Agriculture	Economy : Agriculture and Fisheries, Tourism, Industry

Overview of the GHG Emissions and Climate Hazards

	Hang Tuah Jaya	Muar	Penampang	Tawau
GHG Emissions	1,030 ktCO ₂ e (2018)	1,620 ktCO ₂ e (2017)	455 ktCO ₂ e (2017)	1,562 ktCO ₂ e (2017)
GHG Emissions per capita	5.4	5.8	3.1	3.1
GHG Emissions per unit land area (km ²)	7,105	1,164	1,072	255
Climate Hazard	Monsoon Drought Flood (Flash) Vector-Borne Disease	Monsoon Forest Fire Flood (Flash, River, Coastal) Salt Water Intrusion Vector-borne disease	Rainstorm Tropical Storm Flood (Flash, River) Landslide	Tropical Storm Storm Surge Flood (Flash, River) Vector-borne disease

Mitigation Targets and Adaptation Goals

Target and Goals

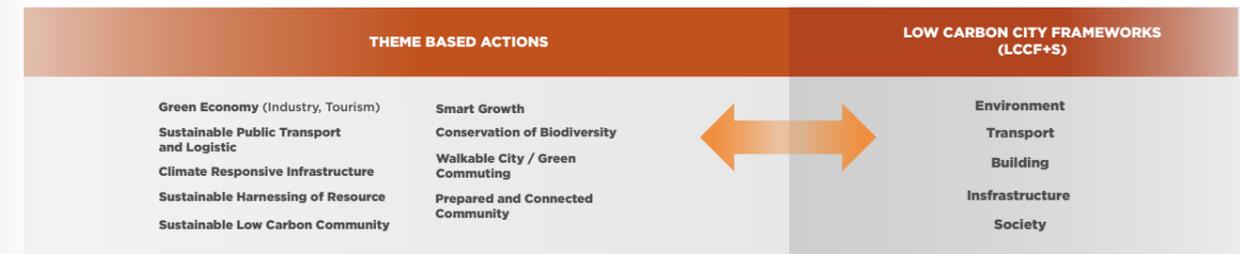
Hang Tuah Jaya	Muar	Penampang	Tawau
MITIGATION TARGET 45% emission intensity reduction of GDP by 2030 relative to the base year 2010 emissions level	MITIGATION TARGET 63% emission intensity reduction of GDP by 2030 relative to the base year 2010 emissions level	MITIGATION TARGET 45% emission intensity reduction of GDP by 2030 relative to the base year 2010 emissions level	MITIGATION TARGET 45% emission intensity reduction of GDP by 2030 relative to the base year 2010 emissions level
ADAPTATION GOALS Goal 1 Reduce property damage due to monsoon and flooding by 50% by 2030 compared to 2010 levels Goal 2 Reduce number of days of water rationing caused by drought by 50% by 2030 compared to 2017 Goal 3 Reduce the number of dengue cases by 50% by 2030 compared to 2017 levels	ADAPTATION GOALS Goal 1 Reduce property damage due to monsoon and flooding by 50% by 2030 compared to 2017 levels Goal 2 Reduce the occurrence of human-induced forest fire by 30% by 2030 compared to 2017 levels Goal 3 Cut the number of dengue cases by 50% by 2030 compared to 2017 levels	ADAPTATION GOALS Goal 1 Reduce property damage due to rain storm and flooding by 50% by 2030 compared to 2017 levels Goal 2 Eliminate unregulated hill cutting and deforestation completely by 2030 Goal 3 Reduce downtime of utilities caused by tropical storms by 30% by 2030 compared to 2017 levels	ADAPTATION GOALS Goal 1 Reduce property damage due to rainstorm and flooding by 50% by 2030 compared to 2010 levels Goal 2 Reduce the number of dengue cases by 50% by 2030 compared to 2017 levels Goal 3 Reduce downtime of utilities caused by tropical storms by 30% by 2030 compared to 2017 levels

Planned Mitigation and Adaptation Actions

The planned actions for mitigating and adapting to the impacts of climate change takes into account the geo-physiological, institutional, social and development contexts of the specific city/districts.

As an attempt to align the planned climate actions with the LCCF, the theme-based climate actions outlined herein have been coded to suit the LCCF's four main components of Environment, Transportation, Infrastructure and Building. As the people and community are central to the development of a sustainable, low carbon society, these climate action plans also feature actions that are society-based, thus necessitating the addition of the Society (S) component to the LCCF. In consequence, each of the determined actions in the CAPs corresponds to one of the aspects in the LCCF+S framework. Further reference below.

Theme Based Cross Sectoral Approach



Hang Tuah Jaya	Muar	Penampang	Tawau
Planned Actions			
39 Planned Actions I. Green Economy (14) II. Sustainable Public Transport and Logistic (10) III. Climate Responsive Infrastructure (8) IV. Sustainable Community (7)	38 Planned Actions I. Sustainable Energy and Green Industry (10) II. Smart Growth (12) III. Conservation of Biodiversity (7) IV. Iresilient Low Carbon Community (9)	43 Planned Actions I. Sustainable Harnessing of Resource (14) II. Green Commuting (11) III. Resilient Infrastructure (8) IV. Community Based Climate Response (10)	35 Planned Actions I. Low Carbon Economy (17) II. Walkable City - Pedestrian First (8) III. Green and Resilient Infrastructure (3) IV. Prepared and Connected Community (7)



HANG TUAH JAYA

General Information

Hang Tuah Jaya is a municipality in the State of Melaka. Melaka is located in the southern Peninsular of Malaysia

-  Population: **124,000 (2018)**
-  Population Density: **857 People per km²**
-  Land Area: **144.6 km²**
-  Divided into **3 Districts**

MAJOR ECONOMIC ACTIVITIES Service • Industry • Tourism

Climate



Similarly, to other parts of Malaysia, Hang Tuah Jaya is located in a tropical climate

Hang Tuah Jaya's Highlights

- Hang Tuah Jaya is home to the Melaka State Government Complex. It is a new developed area established in 2010 that is designed to be the new state government centre. While it is one of the country's smallest states by area, it is among the most popularly visited due to its steep history, rich heritage architecture and unique mix of cultures.
- Hang Tuah Jaya Municipal Council has set up the city's shift towards green development through the vision: "Hang Tuah Jaya makes world class intelligent city concept of green technology." This has led Hang Tuah Jaya to be the pioneer project for the development of green city in Melacca through the implementation of LCCF since 2012.



"As City Manager, we committed to support national vision to reduce carbon emission intensity by 45% per GDP per capita by year 2030. GCoM Southeast Asia has definitely helped us to advance this plan."

Shadan Othman,
President of Hang Tuah Jaya Municipal Council
Malaysia

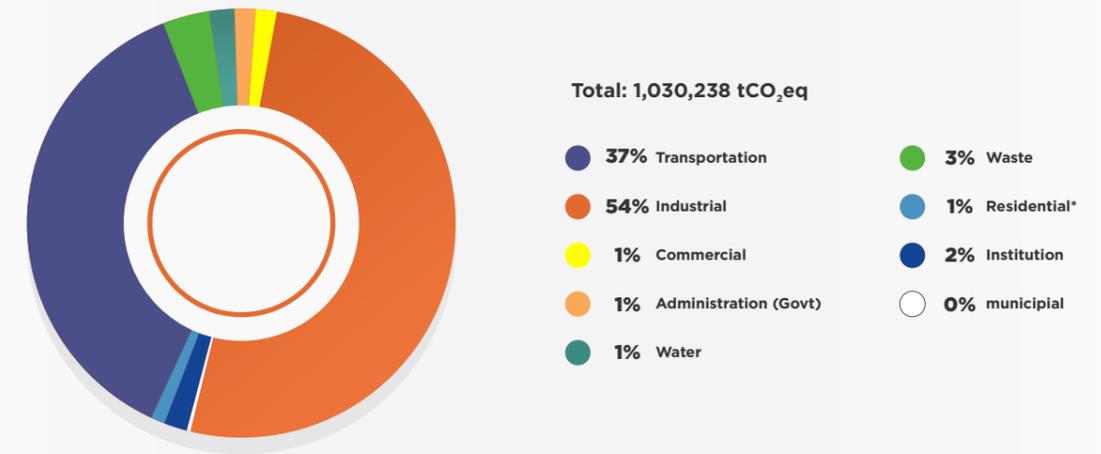


HANG TUAH JAYA'S CLIMATE ACTION PROFILE

CLIMATE MITIGATION

GHG Inventory/Status

- The total GHG emissions of Hang Tuah Jaya identified from the year 2018 baseline emissions inventory to be **1,030,238 tCO₂eq**. The proportion of total emissions contributed by each of the three sectors is depicted below. Based on the emission profile, the emission intensity per capita for Hang Tuah Jaya is 5.4 tCO₂eq.



- Industrial sector makes up the largest portion of the GHG emissions for Hang Tuah Jaya District (54%), followed by transportation (37%). The industrial sector primarily comes from emissions associated with the grid electricity that industrial operations consume.

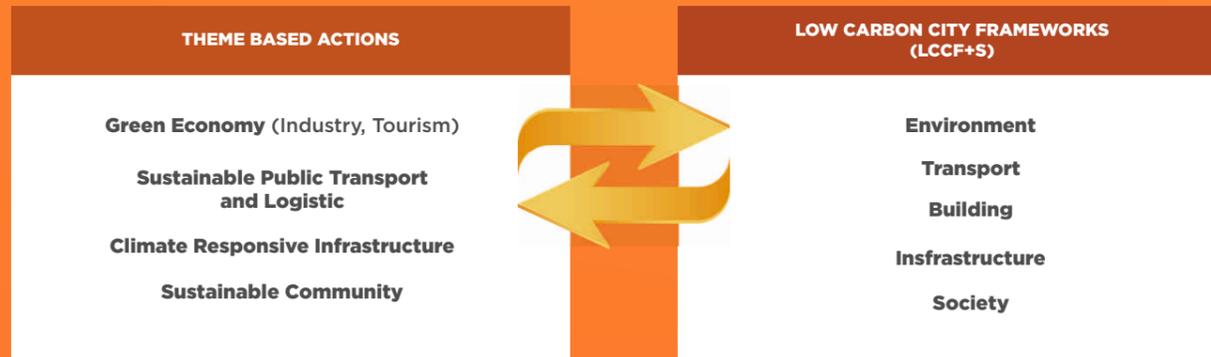
Mitigation Target

- 45% emission intensity reduction of GDP by 2030 relative to the base year 2010 emissions level

Mitigation Actions

- In total, Hang Tuah Jaya has designed **39 action plans** - both for mitigation and adaptation - that align with LCCF+S Framework to reach the agreed target and goals in the CAP. These actions are divided into **4 themed-based actions** (see below). Here are some of the mitigation actions, separated based on its theme, that Hang Tuah Jaya has included in its CAP:

The Alignment of Hang Tuah Jaya Municipality's Climate Actions with the National Low Carbon Cities Framework + Society (LCCF+S)



Emission Sector	Mitigation Actions
Stationary energy	<ul style="list-style-type: none"> Conduct feasibility study on industrial symbiosis (including Waste-to-Wealth) for existing industrial area Promote low carbon tourism products and services to reduce environmental impacts Install energy efficiency (EE) equipment and smart meters on commercial buildings as an energy saving initiative Promote Photovoltaic (PV) technology for various applications: new buildings, water heaters, and street lights
Transportation	<ul style="list-style-type: none"> Implement Transit Oriented Development (TOD) Convert district vehicle fleet to hybrid and electric Run district buses on recycled oil from food courts
Waste	<ul style="list-style-type: none"> Promote community recycling of used cooking Establish decentralized and community-oriented composting sites Implement a 'pay-as-you-throw' waste system

HANG TUAH JAYA'S CLIMATE ACTION PROFILE

CLIMATE ADAPTATION

Climate Risk and Vulnerability Assessment Result

CLIMATE HAZARDS	RISK LEVEL	MOST RELEVANT ASSETS / SERVICES AFFECTED OVERALL	VULNERABLE POPULATIONS AFFECTED
Extreme Precipitation > Monsoon	Medium	Transportation; Food and agriculture	Low-income households
Water Scarcity > Drought	Medium	Water supply and sanitation; Food and agriculture; Environment, biodiversity, forestry; Industrial; Tourism	Elderly; Persons with disabilities; Low-income households
Flood and sea level rise > Flash / surface flood	Medium	Transportation; Commercial; Emergency services.	Low-income households
Biological hazards > Vector-borne disease	Medium	Residential; Public Health	Children and youth; Elderly; Persons with chronic diseases

Adaptation Goals

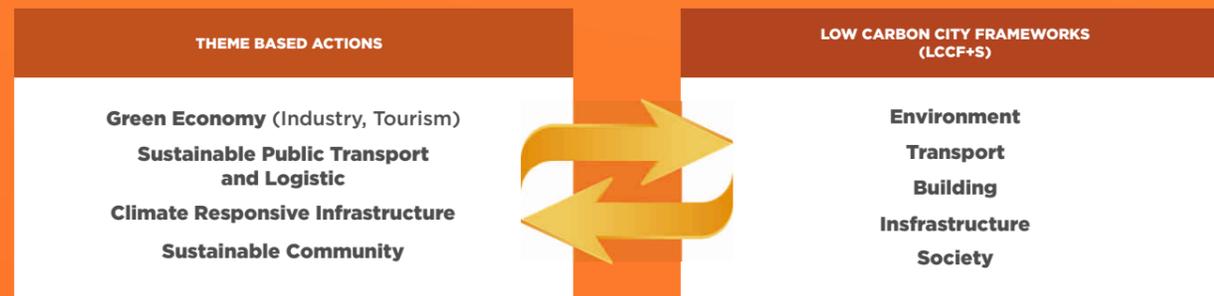
- GOAL 1** Reduce property damage due to monsoon and flooding by 50% by 2030 compared to 2010 levels
- GOAL 2** Reduce number of days of water rationing caused by drought by 50% by 2030 compared to 2017
- GOAL 3** Reduce the number of dengue cases by 50% by 2030 compared to 2017 levels



Adaptation Actions

- In total, Hang Tuah Jaya has designed **39 action plans** - both for mitigation and adaptation - that align with LCCF+S Framework to reach the agreed target and goals in the CAP. These actions are divided into **4 themed-based actions** (see below). Here are some of the adaptation actions, separated based on its theme, that Hang Tuah Jaya has included in its CAP:

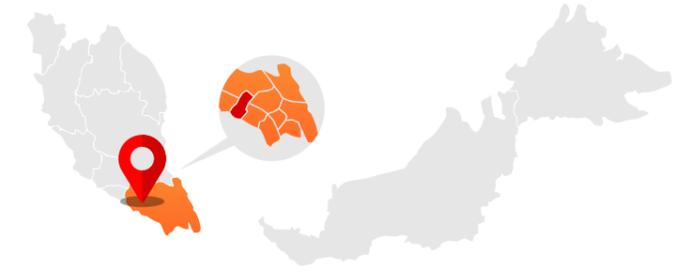
The Alignment of Hang Tuah Jaya Municipality's Climate Actions with the National Low Carbon Cities Framework + Society (LCCF+S)



Climate Hazard	Adaptation Actions
Monsoon	<ul style="list-style-type: none"> Provide comprehensive public transport network, including real-time online information about bus locations and arrivals Provide user friendly pathways for pedestrians and cyclists
Monsoon	<ul style="list-style-type: none"> Ensure new developments are integrated with rainwater harvesting systems and grey water recycling for non-potable usage Encourage industry to use grey water for non-potable purposes
Flash / surface flood	<ul style="list-style-type: none"> Provide comprehensive public transport network, including real-time online information about bus locations and arrivals Increase potential activity centres for pedestrian zone
Vector-borne disease	To raise community awareness on prevention of dengue



MUAR



General Information

Muar, also known as Bandar Maharani, is a district located in the northwest of Johor, Malaysia's southernmost state.



Population: **281,500 (2017)**



Population Density: **208 People per km²**



Land Area: **1,354 km²**

MAJOR ECONOMIC ACTIVITIES

Industry • Tourism

The economy in Muar primarily consists of secondary industries such as construction and manufacturing, with the wholesale, retail and the service industry coming in second.

Climate



Muar is located in a tropical climate. Rainfall is significant throughout the year, with an average temperature of 27°C annually. Precipitation is lowest in February and highest in October.

Muar's Highlights

- Muar is a Royal Town and one of the biggest cities in Johor, a popular tourist site for its colourfully painted streets, historical attractions, coffee shops and unique local cuisine. Muar was declared as the royal town of Johor in 2012 and was voted the cleanest tourist city in the ASEAN region in 2018. It is often considered to be the second-most important city administratively in Johor State, following the State Capital of Johor Bahru.
- A lot of people work in manufacturing sector as Muar is internationally notable as the hub of the furniture industry in Malaysia (the city is also home to the major producer of Malaysian made furniture).
- Muar was once declared as the town with the most bicycles, as the flat terrain of its areas has enabled extensive use of bicycle. In addition, the town council issued the requirement of valid license to own and use a bicycle.



MUAR'S CLIMATE ACTION PROFILE

CLIMATE MITIGATION

GHG Inventory/Status

- The total GHG emissions of Muar identified from the year 2017 baseline emissions inventory to be 1,620 ktCO₂eq. The proportion of total emissions contributed by each of the three sectors is depicted in Figure 11. Based on the emission profile, the emission intensity per capita for Muar is 5.8 tCO₂eq.

Figure 11. GHG EMISSION PROFILE OF MUAR - 2017

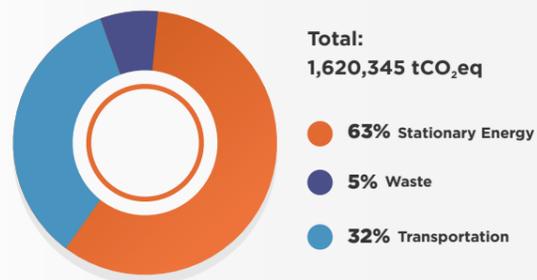
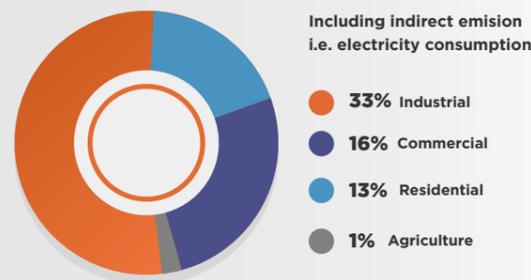


Figure 12. MUAR - STATIONARY ENERGY SECTOR IN 2017



- Stationary energy, detailed in Figure 12, makes up the largest portion of the GHG emissions for Muar District (63%), followed by transportation (32%) then waste (5%).
- Figure 12 breaks down the emissions further by stationary energy subsector. The industrial (manufacturing/construction) subsector constitutes the largest portion of the total emissions, primarily from direct emissions in the form of fuel combustion. Other significant subsectors within stationary energy are residential and commercial, both consisting primarily of indirect emissions, i.e. electricity consumption.

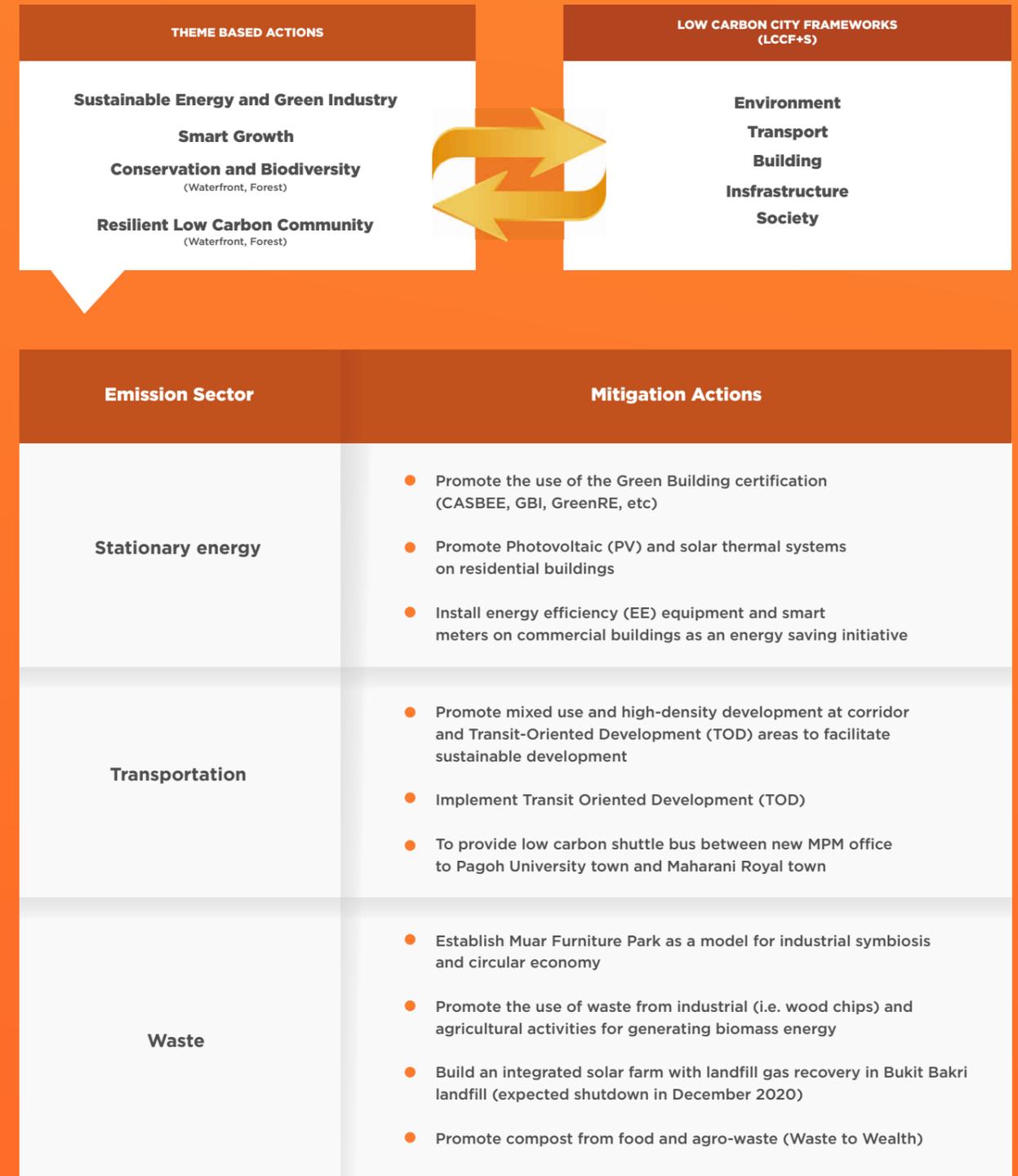
Mitigation Target

- 63% emission intensity reduction of GDP by 2030 relative to the base year 2010 emissions level

Mitigation Actions

- In total, Muar has designed 38 action plans - both for mitigation and adaptation - that align with LCCF+S Framework to reach the agreed target and goals in the CAP. These actions are divided into 4 themed-based actions (see below). Here are some of the mitigation actions, separated based on its theme, that Muar has included in its CAP:

The Alignment of Muar District's Climate Actions with the National Low Carbon Cities Framework + Society (LCCF+S)



MUAR'S CLIMATE ACTION PROFILE

CLIMATE ADAPTATION

Climate Risk and Vulnerability Assessment Result

CLIMATE HAZARDS	RISK LEVEL	MOST RELEVANT ASSETS / SERVICES AFFECTED OVERALL	VULNERABLE POPULATIONS AFFECTED
Extreme Precipitation > Monsoon	Medium High	Food and agriculture; Tourism	Low-income households
Flood and sea level rise > Flash / surface flood	Medium High	Water supply & sanitation; Waste Management; Transportation; Emergency services	Children & youth; Elderly; Low-income households
Chemical change > Salt water intrusion	Medium High	Water supply & sanitation; Food and agriculture; Environment, biodiversity, forestry	Low-income households; Others - (e.g. farmer, fisherman)
Wild fire > Forest fire	Medium	Food and agriculture; Environment, biodiversity, forestry; Tourism; Emergency services	Children & youth; Elderly; Indigenous population
Flood and sea level rise > River flood	Medium	Water supply and sanitation; Food and agriculture; Waste management; Environment, biodiversity, forestry; Emergency services; Land use planning	Persons with disabilities; Low-income households
Biological hazards > Vector-borne disease	Medium	Industrial; Commercial; Residential; Public Health	Children and youth; Elderly; Persons with chronic diseases; Low-income households
Flood and sea level rise > Coastal flood	Low	Water supply and sanitation; Food and agriculture; Environment, biodiversity, forestry; Land use planning	Low-income households; Persons living in sub-standard housing

Adaptation Goals

- GOAL 1** Reduce property damage due to monsoon and flooding by 50% by 2030 compared to 2017 levels
- GOAL 2** Goal 2 Reduce the occurrence of human-induced forest fire by 30% by 2030 compared to 2017 levels
- GOAL 3** Goal 3 Cut the number of dengue cases by 50% by 2030 compared to 2017 levels

Adaptation Actions

- In total, Muar has designed 38 action plans - both for mitigation and adaptation - that align with LCCF+S Framework to reach the agreed target and goals in the CAP. These actions are divided into 4 themed-based actions (see below). Here are some of the adaptation actions, separated based on its theme, that Muar has included in its CAP:

The Alignment of Climate Actions with the National Low Carbon Cities Framework + Society (LCCF+S)



Climate Hazard	Adaptation Actions
Flood	<ul style="list-style-type: none"> Promote urban growth boundary (UGB) to avoid urban sprawl Encourage affordable housing in local centres and TOD areas Permit higher plot ratios or densities within TOD and corridor development areas
Monsoon	<ul style="list-style-type: none"> Establish a special action plan for Muar River Improve river basin management Gazette mangrove forest especially along Muar River and coastal area of Straits of Malacca
Forest Fire	<ul style="list-style-type: none"> Control development around forest reserves and provide 20m buffer zones Promote "Stop Open Burning" especially in area near permanent forest campaign to prevent forest fire and pollution
Salt Water Intrusion	<ul style="list-style-type: none"> Provide access to alternative water supplies such as underground water Build water treatment plant in Pagoh, upgrade the Panchor water treatment plant, and construct Meda Dam to ensure sufficient water supply
Salt Water Intrusion	<ul style="list-style-type: none"> Promote 'adaptive reuse' of dilapidated commercial buildings in CBD and other grey field sites To raise community awareness on prevention of dengue



PENAMPANG

General Information

Penampang District is located in Sabah's West Coast Division, with Donggongon Town as its capital and main town, where it functions essentially as a suburb of Kota Kinabalu. Sabah, located in the north of the island of Borneo, is one of Malaysia's 13 states.

Population: **121,934 (2010)**
 Population Density: **287 People per km²**
 Land Area: **425 km²**

MAJOR ECONOMIC ACTIVITIES Agriculture • Service

Climate



The climate in Penampang is consistently hot and humid, with an average annual temperature of approximately 27°C and few deviations throughout the year. The largest monthly precipitation usually occurs in October, during the Northeast Monsoon season, and the smallest in February and March.

Penampang's Highlights

- Sabah has a rich cultural history. The state is home to a wide diversity of indigenous groups, and has been influenced by China, peninsular Malaysia, Indonesia, India, and other cultures over the centuries. Penampang is the cultural center of the Kadazandusun, one of the largest indigenous groups in Sabah. The name Penampang comes from the title of one of the earliest villages in the area.
- While Penampang District covers only 425 km², making it one of the smallest districts in the state, it is one of the primary industrial, cultural and commercial centers of the region, and is the fourth largest commercial area in Sabah.



PENAMPANG'S CLIMATE ACTION PROFILE

CLIMATE MITIGATION

GHG Inventory/Status

- The total GHG emissions of Penampang identified from the year 2017 baseline emissions inventory to be **455 ktCO₂eq**. The proportion of total emissions contributed by each of the three sectors is in Figure 13. Based on the emission profile, the emission intensity per capita for Penampang is 3.1 tCO₂eq.

Figure 13. GHG EMISSION PROFILE OF PENAMPANG - 2017

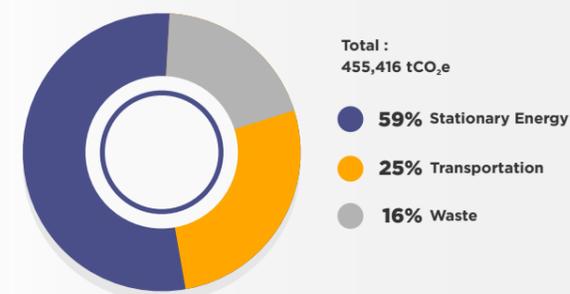
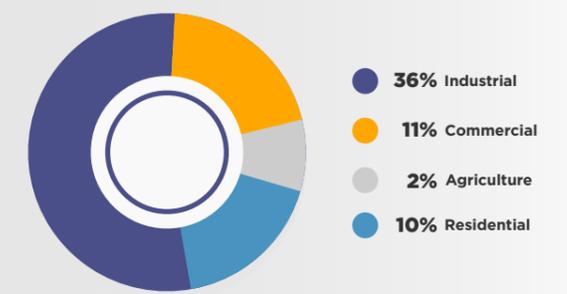


Figure 14. PENAMPANG - STATIONARY ENERGY IN 2017



- Stationary energy makes up the largest portion of the GHG emissions for Penampang District (59%), followed by transportation (25%) then waste (16%).
- Figure 14 breaks down the emissions further by stationary energy subsector. The industrial (manufacturing/construction) subsector constitutes the largest portion of the total emissions, primarily from direct emissions in the form of fuel combustion. Other significant subsectors within stationary energy are residential and commercial, both consisting primarily of indirect emissions, i.e. electricity consumption.

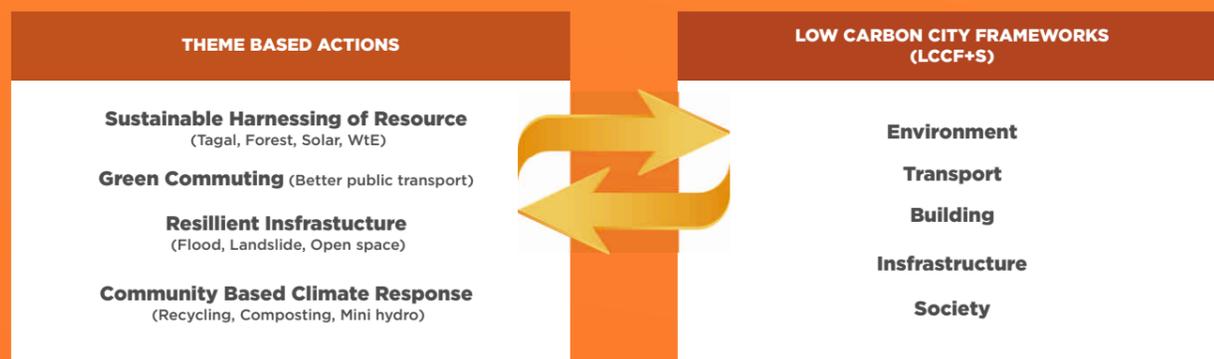
Mitigation Target

- 45% emission intensity reduction of GDP by 2030 relative to the base year 2010 emissions level

Mitigation Actions

- In total, Penampang has designed 43 action plans - both for mitigation and adaptation - that align with LCCF+S Framework to reach the agreed target and goals in the CAP. These actions are divided into 4 themed-based actions (see below). Here are some of the mitigation actions, separated based on its theme, that Penampang has included in its CAP:

The Alignment of Penampang District's Climate Actions with the National Low Carbon Cities Framework + Society (LCCF+S)



Emission Sector	Mitigation Actions
Stationary energy	<ul style="list-style-type: none"> Promote development of solar farm Install solar-powered street lights throughout the District Improve energy efficiency of Penampang District Council's asset-owned buildings Promote the use of the Green Building certification (CASBEE, GBI, GreenRE, etc)
Transportation	<ul style="list-style-type: none"> Run District buses on recycled oil from food courts / low carbon energy source Convert District vehicle fleet to B5 biofuel hybrid and electric (e.g. electric scooter) Establish unlimited free parking for low-carbon vehicles
Waste	<ul style="list-style-type: none"> Establish a Reuse and Repair hub Partner with private sector to construct waste-to-energy plant Require city-wide waste separation with relevant incentives and penalties and distribute bins to residential areas



PENAMPANG'S CLIMATE ACTION PROFILE

CLIMATE ADAPTATION

Climate Risk and Vulnerability Assessment Result

CLIMATE HAZARDS	RISK LEVEL	MOST RELEVANT ASSETS / SERVICES AFFECTED OVERALL	VULNERABLE POPULATIONS AFFECTED
Flood and sea level rise > Flash / surface flood	High	Water supply and sanitation; Transportation; Food and agriculture; Emergency services	Marginalised groups; Low-income households; Persons living in sub-standard housing
Flood and sea level rise > River flood	High	Water supply and sanitation; Transportation; Food and agriculture; Emergency services; Land use planning	Marginalised groups; Low-income households; Persons living in sub-standard housing
Extreme Precipitation > Rain storm	Medium High	Transportation; Food and agriculture; Emergency services	Low-income households; Persons living in sub-standard housing
Mass movement > Landslide	Medium	Transportation; Environment, biodiversity, forestry; Residential; Emergency; Land Use Planning	Low-income households; Persons living in sub-standard housing
Storm and wind > Tropical storm	Medium Low	Food and agriculture; Residential; Emergency services	Marginalised groups; Low-income households; Persons living in sub-standard housing

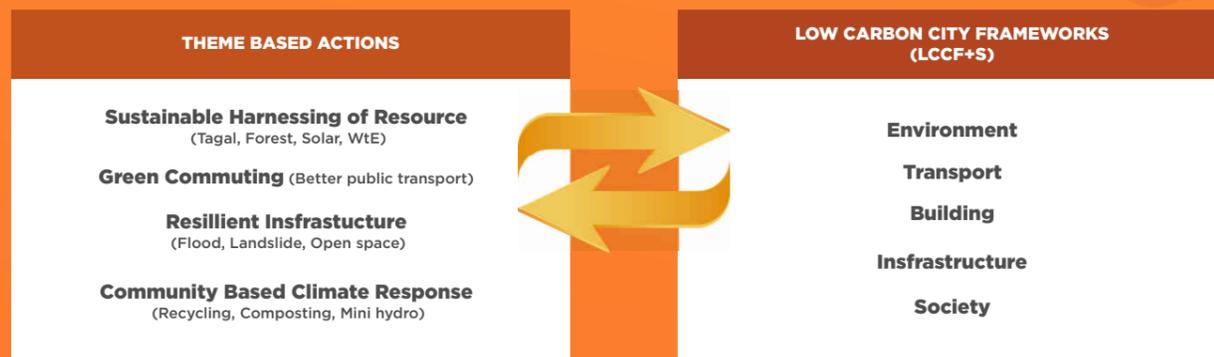
Adaptation Goals

- GOAL 1** Reduce property damage due to rain storm and flooding by 50% by 2030 compared to 2017 levels
- GOAL 2** Eliminate unregulated hill cutting and deforestation completely by 2030
- GOAL 3** Reduce downtime of utilities caused by tropical storms by 30% by 2030 compared to 2017 levels

Adaptation Actions

- In total, Penampang has designed **43 action plans** - both for mitigation and adaptation - that align with LCCF+S Framework to reach the agreed target and goals in the CAP. These actions are divided into **4 themed-based actions** (see below). Here are **some of the adaptation actions**, separated based on its theme, that Penampang has included in its CAP:

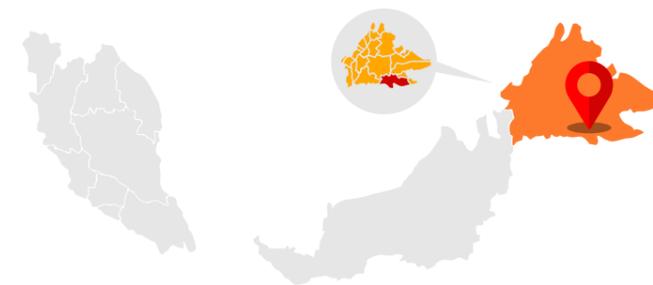
The Alignment of Penampang District's Climate Actions with the National Low Carbon Cities Framework + Society (LCCF+S)



Climate Hazard	Adaptation Actions
Tropical storm	<ul style="list-style-type: none"> Prepare disaster response plans for communities in disaster prone areas Promote educational campaign on flood and storm readiness
Rainstorm	<ul style="list-style-type: none"> 1.Complete a comprehensive hydrology study of the Moyog River area and develop and execute a drainage plan Implement new policies to incentivize construction of green roofs, vertical landscape and promote their use
Flood	<ul style="list-style-type: none"> Protect existing Paddy Conservation Area zones Protect all existing green spaces and establish new multi-purpose green spaces that cannot be developed Organize "One Resident, One Tree" program
Landslide	<ul style="list-style-type: none"> Promote rainwater harvesting End all unlicensed hill cutting and deforestation, especially along the Moyog River Prepare disaster response plans for communities in disaster prone areas



TAWAU



General Information

Sabah, located in the north of the island of Borneo, is one of Malaysia's 13 states. The state contains five administrative divisions: West Coast, Kudat, Interior, Sandakan and Tawau. Tawau District is located in the Tawau Division.

Population: **397,673 (2010)**

Population Density: **65 People per km²**

Land Area: **6,125 km²**

MAJOR ECONOMIC ACTIVITIES Agriculture • Fisheries • Timber

Climate



Like the rest of Malaysia, Tawau is located in a hot, humid tropical climate. Average daily minimum temperatures per month is 23.4°C, and the highest is 32.6°C. Temperatures are highest in the April-September time period, with precipitation highest November-February.

Tawau's Highlights

- Tawau town, the third largest city in the state, is the capital of Tawau District, and one of the primary economic hubs of East Sabah.
- In the 1930s, Tawau's rubber, manila hemp and coconut plantations flourished, boosting the region economically. The city was bombed and largely destroyed in World War II, however, and also suffered from a devastating fire in 1953. The area managed to recover relatively quickly from these calamities, and was able to prosper without much conflict in the years after, except for the mid-1960s, when it was a point of conflict in confrontations between Indonesia and Malaysia.



TAWAU'S CLIMATE ACTION PROFILE

CLIMATE MITIGATION

GHG Inventory/Status

- The total GHG emissions of Tawau identified from the year 2017 baseline emissions inventory to be 1,561 ktCO₂eq. The proportion of total emissions contributed by each of the three sectors is depicted in Figure 15. Based on the emission profile, the emission intensity per capita for Tawau is 3.1 tCO₂eq.

Figure 15. GHG emission profile of Tawau in 2017

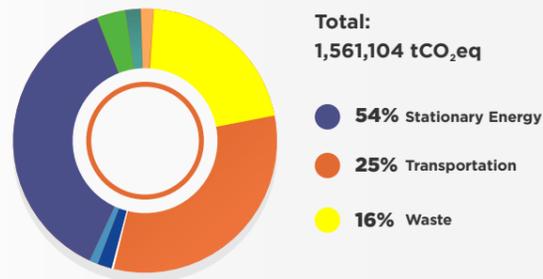
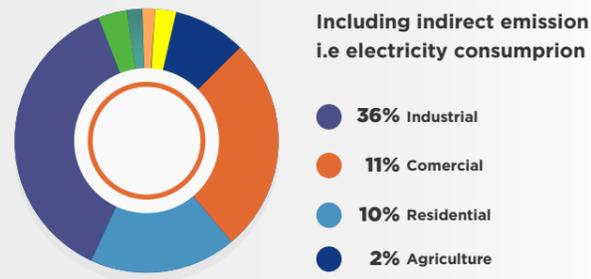


Figure 16. TAWAU - Stationary Energy in 2017



- Stationary energy makes up the largest portion of the GHG emissions for Tawau District (59%), followed by transportation (25%) then waste (16%).
- Figure 16 breaks down the emissions further by stationary energy subsector. The industrial (manufacturing/construction) subsector constitutes the largest portion of the total emissions, primarily from direct emissions in the form of fuel combustion. Other significant subsectors within stationary energy are residential and commercial, both consisting primarily of indirect emissions, i.e. electricity consumption.

Mitigation Target

- 45% emission intensity reduction of GDP by 2030 relative to the base year 2010 emissions level

Mitigation Actions

- In total, Tawau has designed 35 action plans - both for mitigation and adaptation - that align with LCCF+S Framework to reach the agreed target and goals in the CAP. These actions are divided into 4 themed-based actions (see below). Here are some of the mitigation actions, separated based on its theme, that Tawau has included in its CAP:

The Alignment of Tawau District's Climate Actions with the National Low Carbon Cities Framework + Society (LCCF+S)



Emission Sector	Mitigation Actions
Stationary energy	<ul style="list-style-type: none"> Promote low-carbon farming practices Install solar-powered street lights throughout the town area and new development Improve energy efficiency of MPT-owned buildings Promotion of Green Building (sustainable construction material, natural ventilation, passive architecture)
Transportation	<ul style="list-style-type: none"> Create dedicated bike lanes and establish pedestrian zones in downtown area Convert MPT's vehicle fleet to low carbon vehicles (Bio fuel, NGS, hybrid or electric)
Waste	<ul style="list-style-type: none"> Promote oil palm companies in using their waste to generate energy Require city-wide waste separation with relevant incentives and penalties and distribute bins to residential areas Partner with private sector to construct waste-to-energy plant /Incinerator



TAWAU'S CLIMATE ACTION PROFILE

CLIMATE ADAPTATION

Climate Risk and Vulnerability Assessment Result

CLIMATE HAZARDS	RISK LEVEL	MOST RELEVANT ASSETS / SERVICES AFFECTED OVERALL	VULNERABLE POPULATIONS AFFECTED
Flood and sea level rise > Flash / surface flood	Medium High	Transportation; Emergency services	Low-income households
Storm and wind > Tropical storm	Medium	Transportation; Food and agriculture; Tourism; Emergency Services;	Marginalised group; Low-income households; Persons living in sub-standard housing
Storm and wind > Storm Surge	Medium	Food and agriculture; Environment, biodiversity, forestry; Commercial	Low-income households
Flood and sea level rise > River flood	Medium	Water supply & sanitation; Food and agriculture; Waste management; Residential; Emergency services; Land use planning	Low-income households; Persons living in sub-standard housing
Biological hazards > Vector-borne disease	Medium	Residential; Public health	Children & youth; Elderly; Persons with chronic diseases; Low-income households; Person living in sub-standard housing

Adaptation Goals

- GOAL 1** Reduce property damage due to rainstorm and flooding by 50% by 2030 compared to 2010 levels
- GOAL 2** Reduce the number of dengue cases by 50% by 2030 compared to 2017 levels
- GOAL 3** Reduce downtime of utilities caused by tropical storms by 30% by 2030 compared to 2017 levels

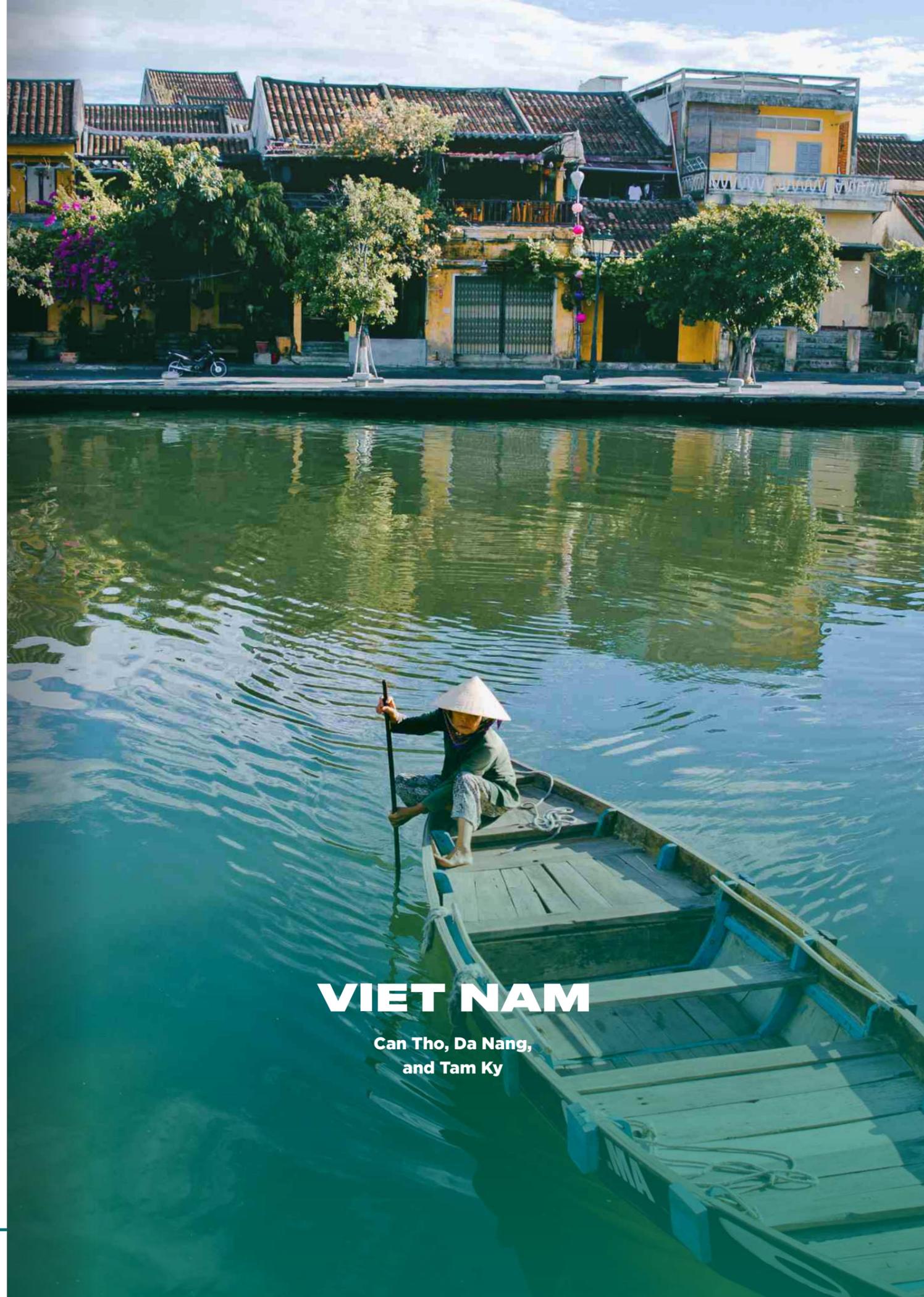
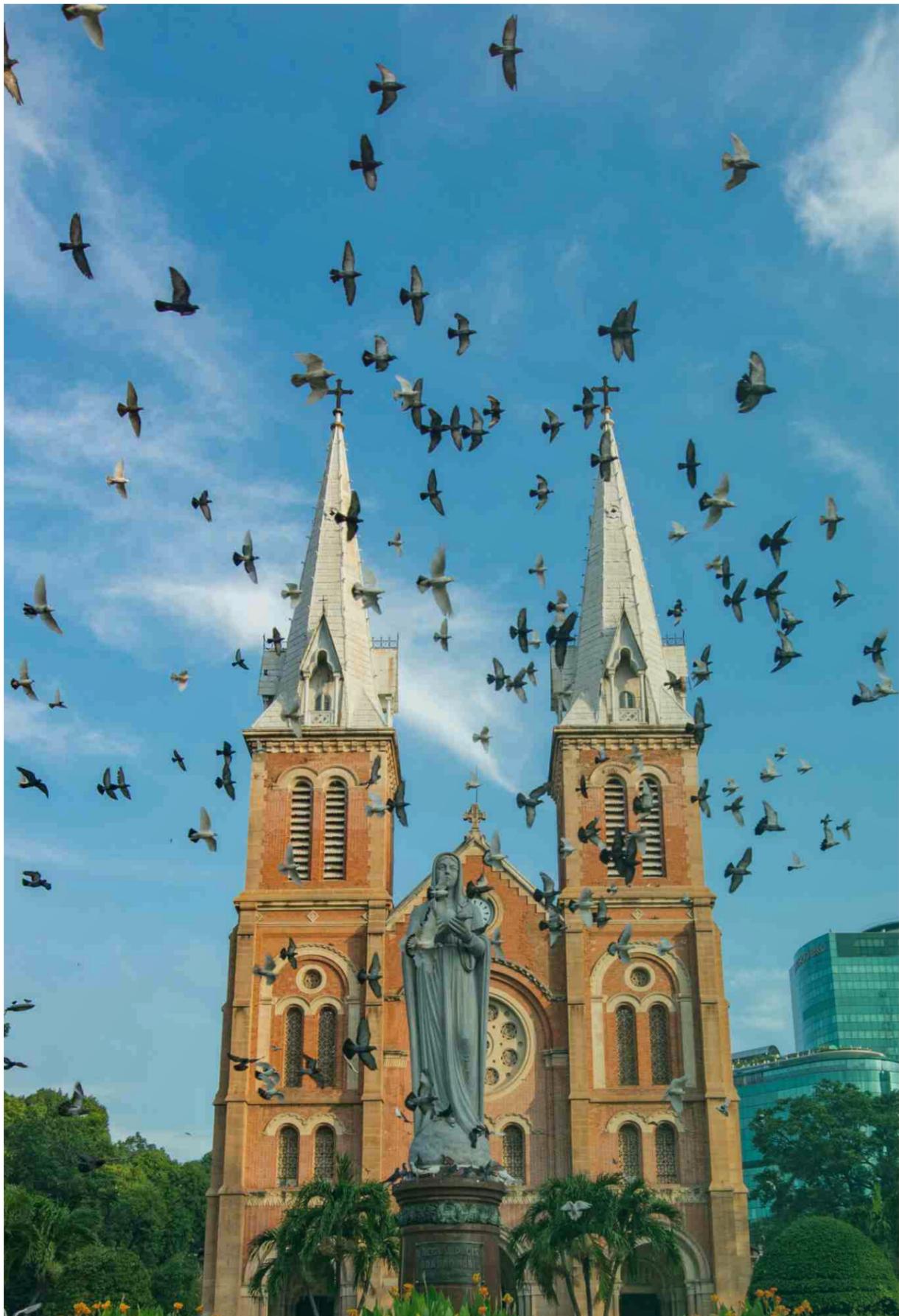
Adaptation Actions

- In total, Tawau has designed **35 action plans** - both for mitigation and adaptation - that align with LCCF+S Framework to reach the agreed target and goals in the CAP. These actions are divided into **4 themed-based actions** (see below). Here are **some of the adaptation actions**, separated based on its theme, that Tawau has included in its CAP:

The Alignment of Climate Actions with the National Low Carbon Cities Framework + Society (LCCF+S)



Climate Hazard	Adaptation Actions
Flood	<ul style="list-style-type: none"> Promote rainwater harvesting Affected premises businesses and industries to create plans for flash flooding End all illegal rock quarrying and logging Identify links between existing green spaces for future land acquisition Organize 'One Resident, One Tree' program
Tropical storm	Promote educational campaign on flood and storm readiness
Storm surge	<ul style="list-style-type: none"> Protect existing conservation zones (river buffer and coastal reserve) by gazette Promote educational campaign on flood and storm readiness
Vector borne disease	Promote educational campaign on flood and storm readiness



VIET NAM

Can Tho, Da Nang,
and Tam Ky



COUNTRY OVERVIEW

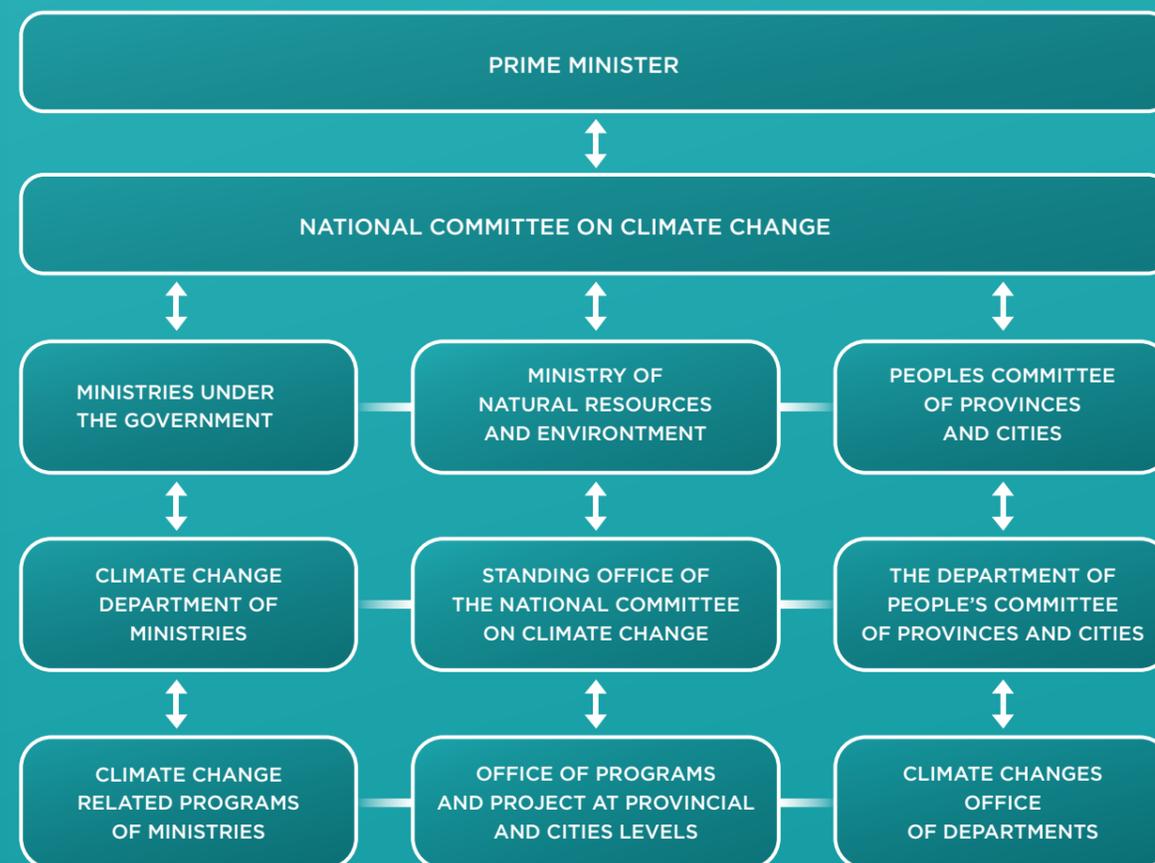
NDC:

- Vietnam submitted its updated nationally determined contribution (NDC) on 11 September 2020, becoming the 12th country do so in 2020.
- Viet Nam will reduce its GHG emissions by 9% compared to the BAU scenario by 2030 from its 2014 baseline. International support could increase this contribution to 27% by 2030, equivalent to 250.8 million tCO₂eq.

NATIONAL STRATEGY/POLICIES:

- National Climate Change Strategy/2011
- National Green Growth Strategy National Climate Change Action Plan Decision 1775/QD-TTG
- Resolution No 55NQ/TW on the orientation of the National Energy Development Strategy of Vietnam to 2030

ORGANIZATIONAL STRUCTURE:



https://www.researchgate.net/figure/Organizational-Structure-of-State-Management-on-Climate-Change-in-Viet-Nam_fig4_317929596

SUMMARY OF VIET NAM

Selection of the 3 Vietnam pilot cities are based on the following criteria*

- Different urban typology
- Different territorial and climate zones
- Previous/existing cooperation background
- Capacity and motivation
- More accent previous experience on cooperation

*Ministry of Natural Resources and Environment (MoNRE) of Vietnam is informed and supports the process



Basic Profile

Can Tho

Population : 1,235, 954 (2019)
 Land Area : 1,439 km²
 Density : 859 people/km²
 Economy : Textiles/garment, wood processing, mechanics, electrical machines with 2 industrial zones and 4 industrial clusters

Da Nang

Population : 1,134,310 (2019)
 Land Area : 1285 km² (in which the island district of Hoang Sa is 30,500 ha)
 Density : 883 people/km²
 Economy : Textiles/garment, wood processing, mechanics, electrical machines with 2 industrial zones and 4 industrial clusters

Tam Ky

Population : 122,374 (2019)
 Land Area : 92,63 km²
 Density : 1,321 people/km²
 Economy : Textiles/garment, wood processing, mechanics, electrical machines with 2 industrial zones and 4 industrial clusters

Mitigation

	Can Tho	Da Nang	Tam Ky
GHG emission	4,016,783 tCO ₂	3,432,483 tCO ₂	341,639 tCO ₂
GHG emission per capita	3.25 ton tCO ₂	3.03 ton tCO ₂	2.79 tCO ₂
Target	Will be based on the PIPA and consistent with the Viet Nam updated NDC which targets about 9% reduction compared to BAU by 2030 with domestic resources, and 27% with international support		
Actions	Stationary energy : Energy saving and energy efficiency Transportation : Improve public transportation (infrastructure, service, operation) and introduce the fuel conversion Waste : Deploying projects to recover, recycle and treat waste plants ; composting program and deploying waste separation at source		

Adaptation

Element at Risk	Adaptation Goals and Adaptation Actions		
	Can Tho	Da Nang	Tam Ky
Population	Effective adaptation to flood risk and enhance adaptive capacity for the governmental agencies and the local communities	Strengthening the adaptive capacity of communities and households in Cam Le and Hoa Vang Districts to minimize flood risks	Strengthening the adaptive capacity of communities and households (especially infants and elderly people and street workers), particularly in flood-prone areas: Tam Thang commune, Tan Thanh, Phuoc Hoa, Hoa Huong ward
Infrastructure	1. Development of blue-green infrastructure 2. Early warning systems for natural disaster reduction	Improve road and drainage and water supply infrastructures to address the impacts of climate hazards particularly flooding and changing precipitation patterns	Roads; power supply stations and electricity lines; water supply systems and fresh water reservoirs
Land Use	Effective land use planning and management approved land-use plan by a competent state agency	Review and improve land use management in rural and open spaces to address impacts from river and coastal erosion and sea-level rise	Land for urban agriculture with climate resilience, particularly in flood-prone areas; increase green areas in the city
Economy and Urban Investments		Improve the knowledge and overall capacity to mitigate risks for the agriculture, tourism, construction and urban management at the district and ward levels	



CAN THO

General Information

- Population:** 1,235,954 (2019)
- Population Density:** 859 People per km²
- Total Area:** 1,439 km²
- Consisting of:** 9 Districts



KEY ECONOMIC SECTORS

Textiles/garment, wood processing, mechanics, electrical machines with 2 industrial zones and 4 industrial clusters

Climate



Can Tho has a tropical wet and dry climate. Can Tho's climate features two seasons: rainy (from May to November) and dry (from December to April)

Can Tho's Highlights

- Can Tho is noted for its floating markets, rice paper-making village, and picturesque rural canals.
- The city is nicknamed the "western capital" (Vietnamese is Tây Đô), and is located 169 kilometres (105 miles) from Ho Chi Minh City.
- After 120 years of development, the city now is the delta's most important centre of economics, culture, science, and technology. It has a large freshwater port and two industrial parks.

“ Negative impacts of climate change have been acknowledged in the early days and in spite of many difficulties and limitations in resources, Can Tho City determines this as one of the most important tasks. Can Tho City realises that it is necessary and important to participate in the GCoM, especially in the current period when the city is in the process of implementing the Paris Agreement.

Department of Natural Resources and Environment (DONRE) of Can Tho People's Committee

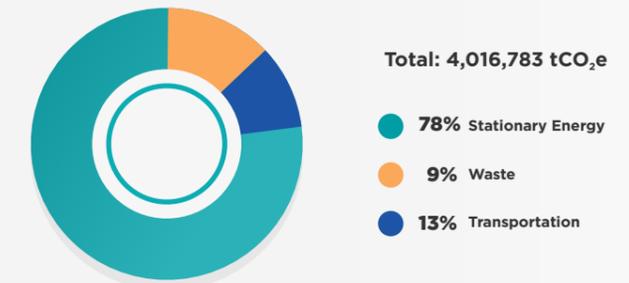
CAN THO'S CLIMATE ACTION PROFILE

CLIMATE MITIGATION

GHG Inventory/Status

- The total GHG emissions of Can Tho identified from the year 2017 baseline emissions inventory to be 4,016 kilo tCO₂e. The proportion of total emissions contributed by each of the three sectors is depicted below. Based on the emission profile, the emission intensity per capita for Can Tho is 3.25 tCO₂e.

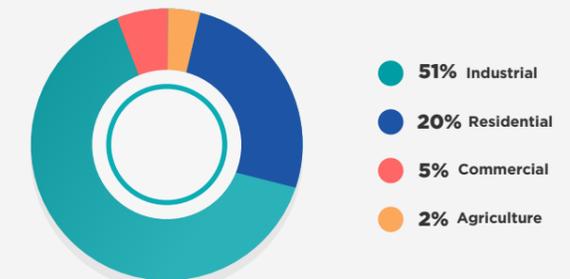
GHG Emissions Profile of Can Tho - 2017



- Stationary energy sector makes up the largest portion of the GHG emissions for Can Tho by contrast, contributing 78% of total emissions.

Can Tho - Stationary Energy Sector in 2017

Including indirect emission i.e. electricity consumption



- The figure above breaks down the emissions further by stationary energy subsector. The **industrial subsector** constitutes the largest portion of the total emissions. Other significant contributor within stationary energy is the residential sector.

Mitigation Target

Can Tho Mitigation Target will be based on the PIPA and consistent with the Vietnam updated NDC which targets about 9% compared to BAU by 2030 with domestic resources, and 27% with international support.

CLIMATE ADAPTATION

Climate Risk and Vulnerability Assessment Results

CLIMATE HAZARDS



Flood



River bank erosion



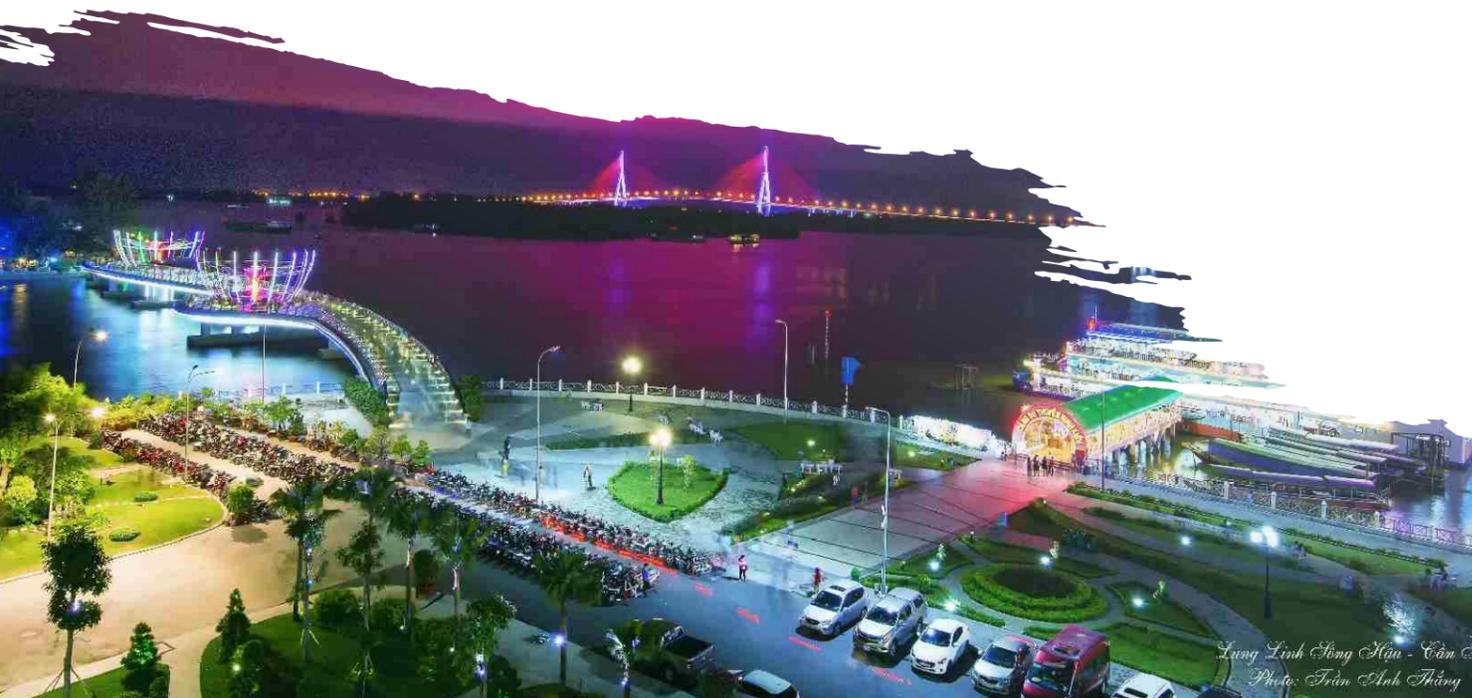
Salinity intrusion



High tide

Adaptation Goals

Elements at Risk	Adaptation Goals/Objectives
Population	Effective adaptation to flood risk and Enhance adaptive capacity for the governmental agencies and the local communities
Infrastructure	<ul style="list-style-type: none"> ● Development of blue-green infrastructure ● Early warning systems for natural disaster reduction
Land Use	Effective land use planning and management approved land-use plan by a competent state agency



Lung Linh Sông Hậu - Cần Thơ
 Photo: Trần Anh Thành

Adaptation Actions

CVRA Findings/Issues	Proposed Actions		
	Short term	Mid-term	Long-term
Flood	<ul style="list-style-type: none"> ● Building capacity to adapt with flood. ● Protection the natural canals within core area of the city ● Strengthen land use plan implementation 	<ul style="list-style-type: none"> ● Completing the constructions for flood prevention from the World Bank project. ● Planning flood prevention for others sub-urban ● Development on Blue-Green infrastructure constructions ● Research and design synchronized plan 	<ul style="list-style-type: none"> ● Implement the general measures at the delta scale ● Improve water drainage network ● Change house design ● Integrated regional development
River bank erosion	<ul style="list-style-type: none"> ● Building capacity for emergency response ● Resettle vulnerable communities ● Strengthen embankment construction supervision, management and maintenance 	<ul style="list-style-type: none"> ● Invest dyke construction at the vulnerable locations ● Construct river embankment ● Plant native trees and shrubs along the banks 	<ul style="list-style-type: none"> ● Inter-provincial coordination against sand exploitation ● Alternative materials without sand.
Salinity intrusion	<ul style="list-style-type: none"> ● Enhance management agencies and community respond to salinity ● Enhance the existing monitoring and warning ● Prepare a plan for water supply security in urgent case 	<ul style="list-style-type: none"> ● Invest for a complete salinity monitoring and early warning system ● Develop a adaptive agriculture production (adaptive varieties, cultivation...). ● Adaptive water supply security. ● Take research result into account 	<ul style="list-style-type: none"> ● Use desalination technology ● Change water source locations to mitigate salt ● Internationally water cooperation
High tide	<ul style="list-style-type: none"> ● Building an early warning for high tide to reduce its consequences ● Improve water drainage conduits 	<ul style="list-style-type: none"> ● Improve the transportation system adapting with high-tide ● Raise community awareness 	<ul style="list-style-type: none"> ● Consider for the measure at the delta scale ● Invest for a dyke system



DA NANG

General Information

- 

Population:
1,134,310 (2019)
- 

Population Density:
883 People per km²
- 

Total Area:
1,285 km²
- 

Consisting of
8 Districts

KEY ECONOMIC SECTORS Textiles/garment, wood processing, mechanics, electrical machines with 2 industrial zones and 4 industrial clusters

Climate



Da Nang has a tropical monsoon climate with two seasons: a typhoon and wet season from September to December and a dry season from January to August.

Da Nang's Highlights

- Da Nang is one of Vietnam's most important port cities. It has a well-sheltered, easily accessible port, and its location on National Route 1A and the North-South Railway makes it a transport hub.
- Da Nang marks the halfway point between the capital in the north, Hanoi, and Ho Chi Minh City in the south. Da Nang is the commercial and educational centre of Central Vietnam and is the largest city in the region.
- It is within 100 km (62 mil) of several UNESCO World Heritage Sites, including the Imperial City of Hue, the Old Town of Hoi An, and the My Son ruins.



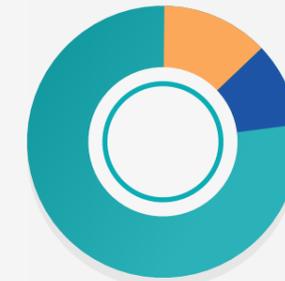
DA NANG'S CLIMATE ACTION PROFILE

CLIMATE MITIGATION

GHG Inventory/Status

- The total GHG emissions of Da Nang identified from the year 2017 baseline emissions inventory to be 3,432 kilo tCO₂eq. The proportion of total emissions contributed by each of the three sectors is depicted below. Based on the emission profile, the emission intensity per capita for Da Nang is 3.03 tCO₂eq.

GHG Emmissions Profile of Da Nang 2017

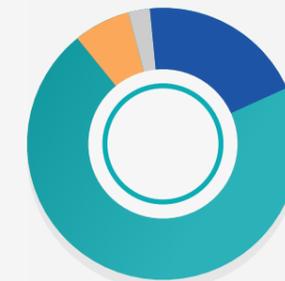


Total: 3,432,483 tCO₂e

- 76% Stationary Energy
- 11% Waste
- 13% Transportation

- Stationary energy makes up the largest portion of the GHG emissions for Da Nang City (76%), followed by transportation (13%) then waste (11%).

Da Nang Stationary Energy Sector in 2017



Including indirect emission i.e electricity consumption

- 50% Industrial
- 5% Comercial
- 2% Agriculture
- 20% Residential

- The figure above breaks down the emissions further by stationary energy subsector. The industrial subsector constitutes the largest portion of the total emissions. Other significant contributor within stationary energy is the residential sector.



Mitigation Target

Consistent with the Viet Nam NDC, 9% reduction in total greenhouse gas emissions compared to the BAU scenario

Mitigation Actions

Elements at Risk	Adaptation Goals/Objectives
Stationary Energy	<ul style="list-style-type: none"> Propagating and guiding energy efficiency in daily-life activities, households, and city service establishments Building projects, support businesses to convert and replace outdated energy-consuming equipment with energy-saving ones Developing and implementing typical models of energy saving and using renewable energy for industries to replicate into large energy consuming business establishments Deploy ecological industrial model towards model of sustainable industrial zone
Transportation	<ul style="list-style-type: none"> Investment and support to convert public vehicles powered by electric motors Investment for changing existing buses to new ones that meet Euro emission standards
Waste	Effective land use planning and management approved land-use plan by a competent state agency

CLIMATE ADAPTATION

Climate Risk and Vulnerability Assessment Results

CLIMATE HAZARDS



Flooding



River bank erosion



Salinity



Sea level rise

Adaptation Goals

Elements at Risk	Adaptation Goals
Population	Strengthening the adaptive capacity of communities and households in Cam Le and Hoa Vang Districts to minimize flood risks
Economy and Urban Investments	Improve the knowledge and overall capacity to mitigate risks for the agriculture, tourism, construction and urban management at the district and ward levels
Infrastructure	Improve road and drainage and water supply infrastructures to address the impacts of climate hazards particularly flooding and changing precipitation patterns and other extreme events like Typhoons
Land Use	Review and improve land use management in rural and open spaces to address impacts from river and coastal erosion and sea-level rise

Adaptation Actions

- Disseminate knowledge and skills on natural disaster prevention and control in schools
- Investment in construction and consolidation of dikes and embankments to prevent riverbank and coastal erosion; ensure safety of water reservoirs and irrigation lakes
- Installing and building a specialized monitoring and monitoring system for disaster prevention (automatic monitoring of rain, water level, monitoring and warning equipment in frequently flooded areas)
- Review, developing plans and solutions to support relocation and stabilize the lives of people in areas prone to natural disasters
- To convert plant varieties and animals, apply science and technology in agricultural production in line with natural disasters; planting, protecting and restoring protective forests

TAM KY

General Information

Population: **122,374 (2019)**
 Population Density: **1,321 People per km²**
 Total Area: **92,63 km²**
 Consisting of **13 Subdistricts**

KEY ECONOMIC SECTORS Textiles/garment, wood processing, mechanics, electrical machines with 2 industrial zones and 4 industrial clusters

Climate



The climate in Tam Ky is tropical. Most months of the year are marked by significant rainfall. A lot of rain (rainy season) falls in the month of September to December. The short dry season has little impact. On average, the temperatures are always high. The warmest month is July with an average maximum temperature of 34°C.

Tam Ky's Highlights

- Tam Ky currently is urban area Grade II, the provincial center of administration, economic, social, political, education, science and technology
- Tam Ky City is 60km southwest of Hoi An Ancient Town. The city itself owns numerous cultural and historical relics.
- Tam Ky is developing itself towards the east to fully deploy the beauty of Tam Thanh Beach, which is on the coastline from Hoi An Ancient Town to Tam Hai Island in Nui Thanh District.



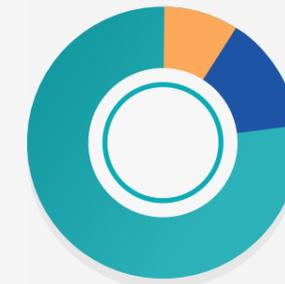
TAM KY'S CLIMATE ACTION PROFILE

CLIMATE MITIGATION

GHG Inventory/Status

- The total GHG emissions of Tam Ky identified from the year 2017 baseline emissions inventory to be 341,639 tCO₂eq. The proportion of total emissions contributed by each of the three sectors is depicted below. Based on the emission profile, the emission intensity per capita for Tam Ky is 2.79 tCO₂eq.

GHG Emissions Profile of Tam Ky 2017



Total: 341,639 tCO₂e

- 79% Stationary Energy
- 8% Waste
- 13% Transportation

Mitigation Target

Consistent with the Viet Nam NDC, 9% reduction in total greenhouse gas emissions compared to the BAU scenario.

Mitigation Actions

Emission Sector	Mitigation Actions
Stationary energy	<ul style="list-style-type: none"> Energy saving program Introduce solar panel and mini wind power station in suitable communities
Transportation	<ul style="list-style-type: none"> Public transportation program Improve bus infrastructure, services, and operations Create a better facility for people using public transportation and bikes, for example setup bike parking station for free and bike rental Improve fuel economy and reduce CO₂ from bus and/or light rail
Water	<ul style="list-style-type: none"> Clean water supply Water pricing and water conservation schemes introduced Water recycling and reclamation
Waste	<ul style="list-style-type: none"> Recycling or composting collections and/or facilities Waste prevention policies and programs Improve the efficiency of waste collection Recyclables and organics separation from other waste



CLIMATE ADAPTATION

Climate Risk and Vulnerability Assessment Results

CLIMATE HAZARDS



Flood



Heatwave



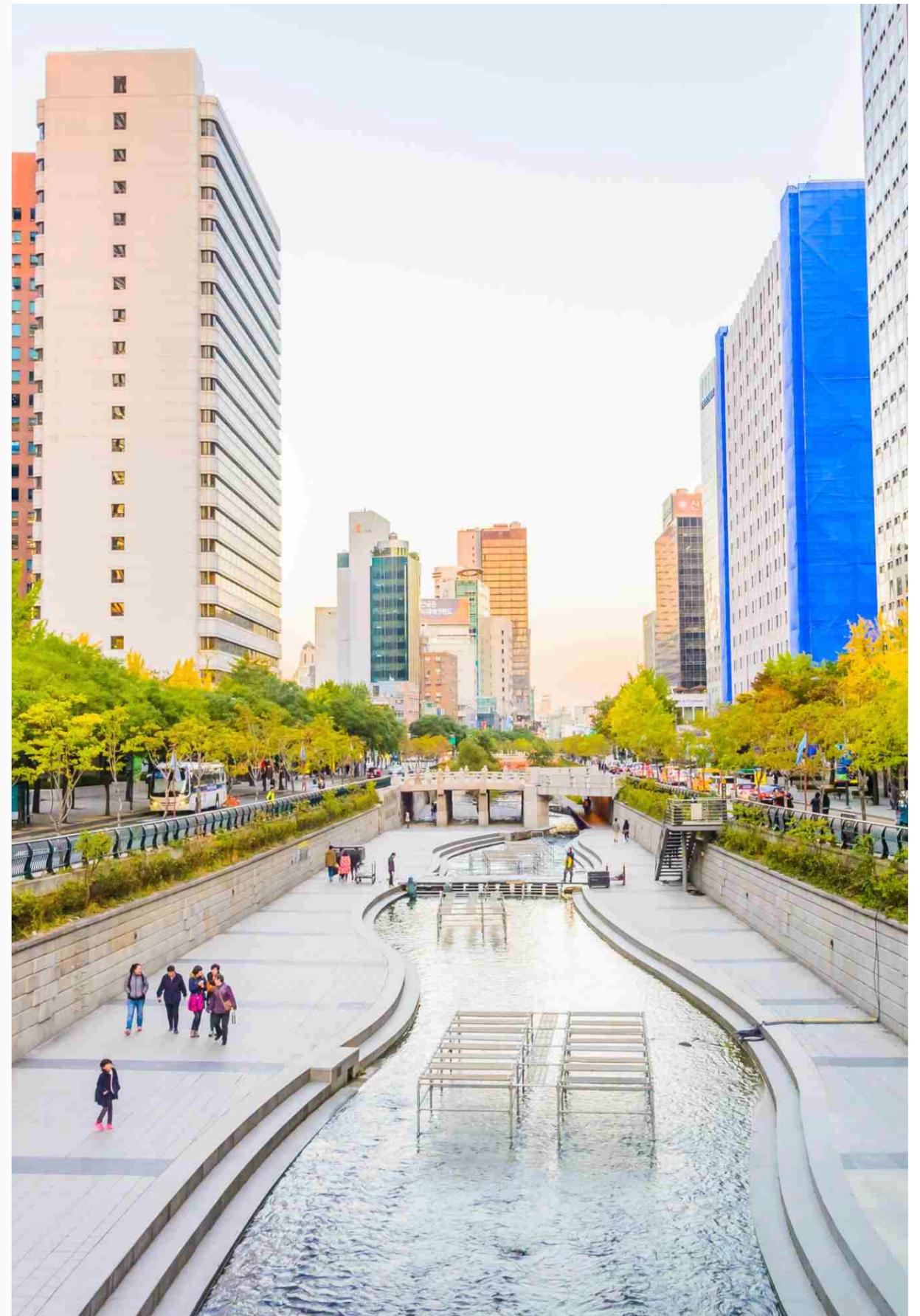
Rising temperature

Adaptation Goals

Elements at Risk	Adaptation Goals
Population	Strengthening the adaptive capacity of communities and households (esp infants and elderly people and street workers), particularly in flood-prone areas: Tam Thang commune, Tan Thanh, Phuoc Hoa, Hoa Huong ward
Infrastructure	Roads; power supply stations and electricity lines; water supply systems and fresh water reservoirs
Land Use	Land for urban agriculture with climate resilience, particularly in flood-prone areas; increase green areas in the city

Adaptation Actions

- Social housing and healthcare centres
- Children protection programme
- Awareness raising on disaster risk reduction measures
- Early warning system
- Training to use modern communication devices for fisherman
- Upgrading the drainage system
- Regular and on-event based maintenance programme and integrate climate risks into designing and constructing process
- Undergrounding the electricity line system for the city





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