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Economic Cooperation**

Policy Review for APEC  
Low-Carbon Model Town Phase 5  
Final Report  
Bitung, North Sulawesi,  
Indonesia

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APEC Low-Carbon Model Town (LCMT) Project Phase 5: EWG 06 2014A

Produced by

Asia Pacific Energy Research Centre

Inui Building, Kachidoki, 1-13-1, Kachidoki,

Chuo-ku, Tokyo, 104-0054, Japan

Phone: (81) 3-5144-8551

E-mail: [master@aperc.iecej.or.jp](mailto:master@aperc.iecej.or.jp)

Website: <http://aperc.iecej.or.jp/>

For

Asia-Pacific Economic Cooperation Secretariat

35 Heng Mui Keng Terrace

Singapore 119616

Tel: (65) 68919 600

Fax: (65) 68919 690

Email: [info@apec.org](mailto:info@apec.org)

Website: [www.apec.org](http://www.apec.org)

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## **PREFACE**

The APEC Low-Carbon Model Town (LCMT) project seeks to promote low-carbon technologies in city planning in order to manage rapidly growing energy consumption and greenhouse gas emissions in urban areas of the APEC region.

The key objectives of the project are:

- 1) To develop 'The Concept of the Low-Carbon Town in the APEC Region', which is a guidebook on the principles and implementation of low-carbon design;
- 2) To assist in implementing concepts in selected towns by providing feasibility studies and policy reviews of these planned urban development projects; and
- 3) To share best practices and real-world experiences of low-carbon design with planners and policymakers throughout the APEC

This report presents the findings of Policy Review for Bitung City, North Sulawesi Province, Indonesia.

The reviewed economy and the Review Team share the accountability for the policy review. A team of six experts conducted the Policy Review in Bitung City, North Sulawesi Province, Indonesia (see Appendix A). They visited Bitung City from 30 November to 2 December 2015.

During the visit, the Review Team held comprehensive discussions with representatives and experts from Bitung's Municipality, provincial government of North Sulawesi and other Indonesian government agencies (see Appendix B). The Review Team wishes to thank all the presenters and others that spent time with the team for discussions. We give special thanks to the team of the provincial government of North Sulawesi and Bitung's Municipality who organised the event.

## EXECUTIVE SUMMARY

Bitung City is a rapidly growing district in North Sulawesi Province and under the Government Regulation No. 32 of 2014 has been approved by the President of Indonesia as the Bitung Special Economic Zone (SEZ), as such, there is an imperative for it to address carbon emissions in parallel with its development. The city is in the process of developing local low-carbon targets whilst aiming to improve the quality of life for its residents and Bitung SEZ. Its low-carbon town plan addresses the building sector, urban function planning, energy planning, transportation, and environmental planning. Critically, the city has a capability to both address important metrics - such as, the cost effectiveness of actions to mitigate emissions associated with this growth - alongside the individual and collective leadership that inspires sustainability change.

To assist the city develop its plans, and become a model for other towns, Bitung City is the site of a two part APEC peer-review led by the Asia Pacific Energy Research Centre (APEREC). Part 1 of the review contains background information on Bitung City as well as Bitung SEZ and provides context to Part 2, – which is produced by the review team. The findings and 64 recommendations for implementation in this policy review are grouped by topic: legal framework, sustainable urban planning, low-carbon buildings, area energy management systems, renewable energy and untapped energy planning, transport, and environmental planning.

Implementing these recommendations requires considering multiple perspectives:

- Is the action cost effective? E.g. a simple analysis of the unit cost of carbon emissions mitigation.
- Is the action visible and engaging? E.g. to what extent will the action educate residents and visitors about the importance of sustainability.
- Does the action generate political and community support? E.g. does strong leadership exist to promote the action?
- Will community, businesses and other stakeholders engage to promote these changes?

There are quantifiable issues, such as costs and timing, and also less tangible considerations such as leadership and stakeholder enthusiasm and support.

The recommendations are graded by priority for implementation, 'immediate action', 'action in 2-3 years', and 'action in the longer term' so that policymakers have a base to determine the timeframes for each recommendation when drawing on the 'experts' review. An 'integrated framework' explains the rationale for the prioritisation. The Municipality is well placed to understand issues such as leadership and support and along with using an integrated framework Bitung SEZ can become a leading Low-Carbon Town (LCT) and implement the short-term recommendations. The immediate action recommendations are the higher priority, as they are both cost effective and likely to generate strong community support. Residents and visitors can embrace the low-carbon concept from the beginning and receive early benefits when travelling along the pathway to a low-carbon future.

★★★ Recommendation for immediate action; ★★ Recommendation for action in next 2-3 years; ★ Recommendation for action in the longer term.

## RECOMMENDATIONS

### PREAMBLE

The key recommendation of this report is for modern rail lines for both passengers and freight to be the main infrastructure development priority for the Bitung region and the Bitung SEZ. This major development project will successfully link the SEZ to the port, Bitung Central Business District (CBD), the airport and wider region. It will encourage agglomeration and will be the catalyst project that integrates the new SEZ into the future economic growth, development and planning of Bitung and it will help set the course to a low carbon future for the region.

Railways are central to the formation of modernity and ideas of progress. Railways contribute to social vibrancy and economic competitiveness by transporting multitudes of customers and workers to city centres and inner suburbs. Railways channel growth toward dense city agglomerations and along their arteries, as opposed to highway expansion, indicative of the U.S. transportation policy, which incents development of suburbs at the periphery, contributing to increased vehicle miles traveled, carbon emissions, development of greenfield spaces, and depletion of natural reserves.

Efficient rail passenger transport and new rail freight transport can help achieve a number of planning objectives in Bitung including integrating the SEZ with the CBD, energy conservation and emission reductions, assisting in traffic congestion reduction, road and parking facility cost savings, improved consumer affordability, improved mobility for non-drivers, crash reductions, support for strategic land use development objectives, and improved public health and fitness.

The development of a passenger rail line alongside the freight requirements would have a significant impact on the wider North Sulawesi economy and will encourage jobs and growth in the area. A freight train hauls cargo using freight cars specialised for the type of goods. Freight trains are very efficient, with economy of scale and high energy efficiency. The freight line with an inland port facility at the SEZ linking to the port will free up space at the Bitung Port facility and provide more efficient and reliable delivery of freight. It will reduce truck and vehicle movements and travel time in the CBD and provide for future growth of the port and increase the tourism potential of the facility. A passenger line from Bitung CBD to Manado would also have the ability to move workers from both Bitung and Manado to the SEZ and it would also assist in resolving wider regional issues such as the urban road congestion in central Manado. The location of an inland freight hub and the passenger stations at the SEZ are critical facilities that will impact on both the SEZ Master Plan and all future land use proposals and any existing planning work needs to be able to be updated and revised to take into account the proposed rail line and freight hub and passenger platform location. When rail is combined with road transport, a roadrailer will allow trailers to be driven onto the train, allowing for easy transition between road and rail. Bulk handling represents a key advantage for rail transport. Low or even zero transshipment costs combined with energy efficiency and low inventory costs allow trains to handle bulk much cheaper than by road.

## OVERARCHING

### ***Recommendations for immediate action***★★★

- Rec. 1:** Develop a freight strategy for SEZ/Bitung/Manado and determine when a freight line between Bitung SEZ and Manado is going to be constructed, whether this should also incorporate a passenger line and where in Bitung SEZ the rail corridor would be.
- Rec. 2:** Investigate and test whether local geothermal power is viable for Bitung SEZ.
- Rec. 3:** Establish if a new port in Bitung SEZ is required in the medium or long term, based on an environmental impact assessment, a transport impact assessment, a cost benefit analysis and evaluation against an alternative economic use such as a restaurant, mixed use development, and housing area supporting the SEZ.
- Rec. 4:** Continuously repeat in public relations campaigns the message that the transition to a low-carbon economy is the biggest opportunity for the region to realise long term sustainable growth.
- Rec. 5:** Implement a successful promotional campaign to attract internal and foreign direct investments to Bitung SEZ area.
- Rec. 6:** Ensure the Government's strategic objectives and immediate actions are consistent with an integrated approach that has concerted interactions of all stakeholders.
- Rec. 7:** Launch and undertake a large scale long term research project to make a detailed assessment of stakeholders' actions, develop baseline data to monitor annual progress, and keep a scientific record of the Bitung SEZ development.
- Rec. 8:** Launch and implement activities as soon as possible to strengthen education and training systems, and support skills development, at both industry and public sector levels.

### ***Recommendations for action in the next 2-3 years***★★

- Rec. 9:** Develop and mobilise the required scale of technology, finance and knowledge, along with new goods and services, as the keystone of the process to deploy energy efficiency and low-carbon technologies. (★★ and ★)
- Rec. 10:** Develop solutions that address the complex holistic approach at the high level and a systematic understanding of opportunities available at the very local level.

### ***Recommendations for action in the longer term***★

- Rec. 11:** Ensure project holders should see that their benefits fall into two categories: political and socio-economical.
- Rec. 12:** Introduce a local reward scheme and a programme of regular competitions to constantly increase low-carbon standards and make achievements of local businesses widely visible.

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## LEGAL FRAMEWORK

### ***Recommendations for immediate action ★★★***

- Rec. 13:** Maintain good governance, coordination, cooperation and strong leadership of the central government and local governments of both province and city, in order to realise low-carbon Bitung SEZ.
- Rec. 14:** Identify (in parallel) what kind of the low-carbon regulations, standards, and procedures needed to be prepared in North Sulawesi SEZ Management Council (SMC).
- Rec. 15:** Have a regular meeting between the central government, local governments and SMC to solve the obstacles that may rise during the implementation of the electricity infrastructure projects, in order to secure adequate electricity infrastructure in the SEZ.
- Rec. 16:** Encourage local governments to be involved in the electricity planning and development, in order to secure adequate electricity infrastructure in the SEZ.

### ***Recommendations for action in the next 2-3 years★★***

- Rec. 17:** Expand North Sulawesi SMC's authority to include oversight of implementation of the Low-Carbon Development Strategy (LCDS) and establish a Bitung SEZ Management Agency (SMA) by North Sulawesi SMC as soon as possible.
- Rec. 18:** Involve all stakeholders in the preparation of regulations, standards, and procedures related to low-carbon measures through transparent methods.

### ***Recommendations for action in the longer term★***

- Rec. 19:** Provide attractive incentives to support the regulations, standards, and procedures that raise awareness and encourage people in the SEZ to develop low-carbon measures.

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## SUSTAINABLE URBAN PLANNING

### ***Recommendations for immediate action★★★***

- Rec. 20:** Develop a design brief and policy settings for Bitung SEZ through an Enquiry by Design process, which genuinely engages the community and sets out the expectations and potential solutions for a low-carbon community precinct.
- Rec. 21:** Develop an assessment tool and data collection process, and then monitor and collect data from the project, to ensure the project meets its low-carbon goals and targets.
- Rec. 22:** Update the SEZ master plan to incorporate and integrate the recommendations of this report.

### ***Recommendations for action in the next 2-3 years★★***

- Rec. 23:** Deliver a demonstration precinct in stage 1, with a focus on how the factories, residences, offices, urban spaces, technology and landscaping interact to deliver a sustainable solution.



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## LOW-CARBON BUILDINGS

### **Recommendations for immediate action**★★★

**Rec. 24:** Increase the capacity of local government on low-carbon buildings by learning experiences from other low-carbon towns.

**Rec. 25:** Set a clear and more ambitious target for photovoltaic (PV) installation and prioritisation among relevant building sectors.

### **Recommendations for action in the next 2-3 years**★★

**Rec. 26:** Include Eco-Industrial Park (EIP), Green Procurement and Green Building Code into the SEZ tender process and make them reflected in the construction at the design stage.

**Rec. 27:** Include energy efficiency measures for thermal energy (steam) low-carbon measures for industry.

**Rec. 28:** Include and promote green Best Available Technologies (BATs) such as PV + Energy Storage System (ESS) and Building Energy Management System (BEMS).

**Rec. 29:** Include and promote green rooftops (solar panels, rooftop gardens) for all buildings, reducing cooling demands and generating green energy.

### **Recommendations for action in the longer term**★

**Rec. 30:** Raise green awareness among decision-makers, employees and the public.

**Rec. 31:** Adopt, adapt, or develop green building rating systems.

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## AREA ENERGY MANAGEMENT SYSTEMS

### **Recommendations for immediate action**★★★

**Rec. 32:** Establish an area management system for Bitung SEZ.

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## RENEWABLE ENERGY AND UNTAPPED ENERGY PLANNING

### **Recommendations for immediate action**★★★

**Rec. 33:** Further elaborate in both technical and economic aspects assessment of all four potential renewable energy sources.

**Rec. 34:** Align the four energy-related low-carbon measures with national and regional renewable energy policies, as well as a Sustainable Development (SD) target, especially on the special privilege and monetary incentive provided by SEZ.

### **Recommendations for action in the next 2-3 years**★★

**Rec. 35:** Implement an ambitious national biofuel policy, biofuel for both transportation and electricity generation within SEZ to help account for an Emission Reduction (ER) target.

**Rec. 36:** Initiate local renewable energy initiatives and activities formulated within Bitung to gain smooth public acceptance of renewable energy within SEZ.

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## TRANSPORT

### **Recommendations for immediate action ★★★**

- Rec. 37:** Undertake a feasibility/options analysis into the development of a rail and rapid transit network in Bitung and the surrounding region linking the port to the airport via Bitung and Manado.
- Rec. 38:** Develop a low-carbon transport strategy for SEZ and the public transport network to support this. (★★★ and ★).
- Rec. 39:** Develop immediately a Travel Demand Management (TDM) programme for the SEZ area to support all phases of the programme (short and medium term), to integrate with development and the wider Bitung area, and help encourage jobs, growth and tourism in the region.
- Rec. 40:** Develop a communications and education programme to improve the education of all citizens relating to low-carbon mobility systems in the short, medium and long term.

### **Recommendations for action in the next 2-3 years★★**

- Rec. 41:** Provide infrastructure, including rail, bus and rapid transit infrastructure, to support new transit oriented residential and business development within the SEZ and to link the port to Bitung and the airport. (★★ and ★)
- Rec. 42:** Develop walking and cycling infrastructure and a works programme for the SEZ area.
- Rec. 43:** Develop an Intelligent Mobility Strategy and an innovation/demonstration precinct for the SEZ. (★★ and ★)

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## ENVIRONMENTAL PLANNING

### **Recommendations for immediate action ★★★**

- Rec. 44:** Set up strict selection criteria from the projects initiation for potential investors. Large infrastructure development projects are a great commercial opportunity and provide jobs and sustainable growth to the local economy. The Bitung Nature Conservation Agency should develop this.
- Rec. 45:** Write rules at the initial stage to ensure conservation of biodiversity, consider the SEZ development impact on biodiversity and work to protect the Island's biological inheritance.
- Rec. 46:** Purposefully allocate a number of different designated sites, even if very small, which can bring additional economic revenue to the area from the tourists flow or national and international scientific research projects.
- Rec. 47:** Develop a special regulation as a guidance for the Bitung Local Development Plan, together with any Supplementary Guidance.
- Rec. 48:** Establish Local Nature Conservation Sites (LNCS) to highlight sites with important natural heritage to developers and the Council.
- Rec. 49:** Establish special Tree Preservation policies. This should be undertaken by Bitung Nature Conservation Agency at the Council.

**Rec. 50:** Develop and implement a marine planning policy document and investigate a regional sustainable fishing certification regime to assist to develop and grow exports.

***Recommendations for action in the next 2-3 years★★***

**Rec. 51:** Establish a Bitung Carbon Reduction Strategy that requires from the developers a carbon reduction and resource use explanation while applying for a planning permission.

***Recommendations for action in the longer term★***

**Rec. 52:** Implement significant activities to advance the low-carbon agenda of Bitung SEZ with the emphasis on mitigation and not on adaptation.

**Rec. 53:** Ensure that local communities are key stakeholders in the conservation of its natural reserves and the development of Sulawesi Island as a whole. This should be undertaken by the North Sulawesi SMC.

**Rec. 54:** Launch commercial carbon-offsetting forest restoration programmes. This should be undertaken by the Bitung Nature Conservation Agency.

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ENERGY EFFICIENCY

***Recommendations for immediate action★★★***

**Rec. 55:** Establish a local Energy Efficiency Strategy that identifies key strategic objectives and numerical energy efficiency targets put in together in a supplementary Action Plan with detailed priorities for investment.

**Rec. 56:** Ensure the energy efficiency strategy and Local Development planning process is flexible to a degree to be able to respond quickly and effectively to the new national and international policies.

**Rec. 57:** Use key technologies that enable Bitung SEZ to meet its specific targets on carbon reduction and low-carbon energy generation.

***Recommendations for action in the next 2-3 years★★***

**Rec. 58:** Adopt challenging targets for energy used and produced within the Bitung SEZ area from renewable or low & zero carbon sources to be able to set very high Low-Carbon Town standards in Indonesia.

**Rec. 59:** Launch an Energy Efficiency Grant Scheme for the local SMEs and encourage new local energy management companies to provide ESCO services.

**Rec. 60:** Replace and modernise a significant proportion of Bitung SEZ's current electricity generating capacity (coal, diesel and oil fired power generation).

**Rec. 61:** Explore tried and tested technologies that could be installed as fast as possible by experienced firms in this field as their commercial projects and insist on utilising as many local advantages as possible while introducing new to the location technologies.

**Rec. 62:** Implement an Energy Efficiency Action Plan.

***Recommendations for action in the longer term★***

**Rec. 63:** Deliver the production and construction in energy and resource efficient ways.

**Rec. 64:** The projects' planning applications should comply with: a) local government energy efficiency requirements and legal compliance rules; b) state projected financial savings through efficiencies in operation; and c) state environmental benefits through reduced resource use.

## **PART I: BACKGROUND INFORMATION**

*Data and information from the Directorate General of New, Renewable Energy and Energy Conservation, North Sulawesi Provincial Government, Bitung Municipal Government (kept the original text), and the Feasibility Study undertaken by South Pole Group in 2015 have contributed the background information contained in this report. This information provides some context to the Policy Review Team's recommendations*

# 1. OVERVIEW OF BITUNG CITY

## 1.1. History

According to dictionary of Sangirees – Nederland’s Woordenboek which was edited by Mr. K.G.F. Stellen and Drs. W. Aerbersold from the author was N. Adrian (1893), last published in 1959, the terminology of Bitung is the name of the tree, *Stevige Koroestige Boom* or in botany terminology was called *Hivia Hospital*.

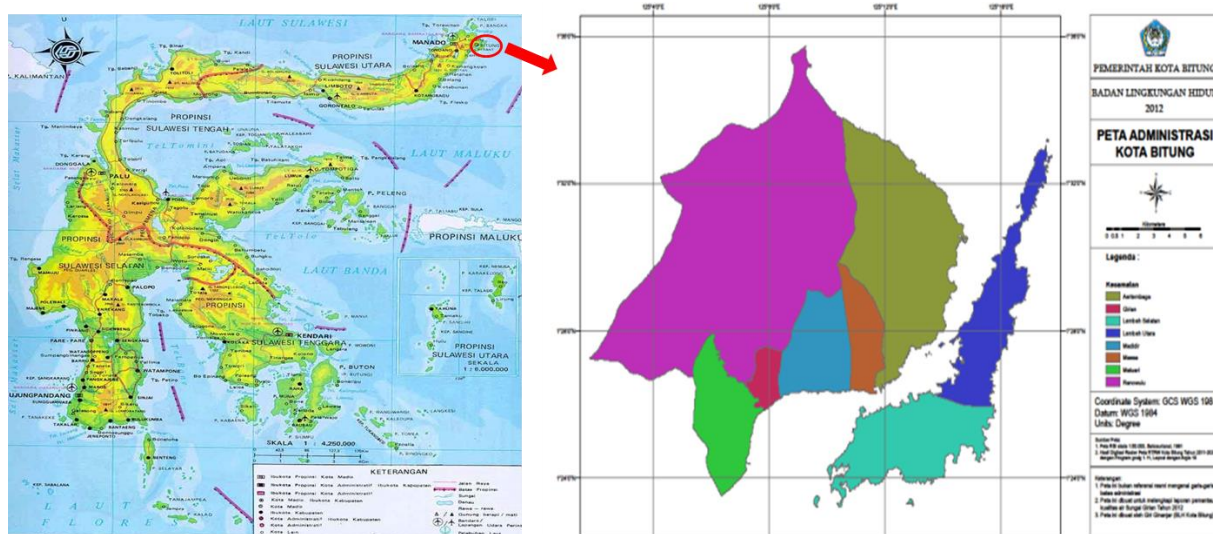
This area was found by Simon Tudus as a “Tunduang Wanua Bitung”, the first man who built a hut under the big tree, named “Bitung” that grew fertile on coastal area for farming. Later, his hut become a shelter for the fishermen, especially when the sea wave is high and not safe for sailing. Of many meeting with fishermen then the word “Bitung (Witung)” has turned the meaning from the tree to the place. Finally, this meaning evolved until now.

After the administrative status and/or the level had changed several times, Bitung became one of municipalities level II of North Sulawesi Province on 10 October 1990 based on Law No. 7 of 1990. After autonomy era, term of “Municipality” changed to be “City”. Currently, Bitung City consists of 8 (eight) districts and 69 (sixty nine) villages, led by the mayor who has 5 (five) years period to run government.

## 1.2. Geography

Bitung City is located strategically on the Minahasa Peninsula in the north-east of the Sulawesi Island. It is geographically located between 1°23'23” and 1°35'39” North latitude, 125°1'43” and 125°18'13” East longitude and covers a total land area of around 313.5 km<sup>2</sup> (31 350 ha), water area of around 439.8 km<sup>2</sup> (43 980 ha) and has a 143.2 km<sup>2</sup> coastline along the Maluku Sea. It is bordered on the north by Likupang district of North Minahasa Regency and the Maluku Sea, on the east by Maluku Sea, on the south by Maluku Sea and on the west by Kauditan district of North Minahasa Regency. This city is situated approximately 47 km from the provincial capital of Manado.

Figure 1: Geographical Situation of Bitung City



Source: BLH Kota Bitung, 2015a

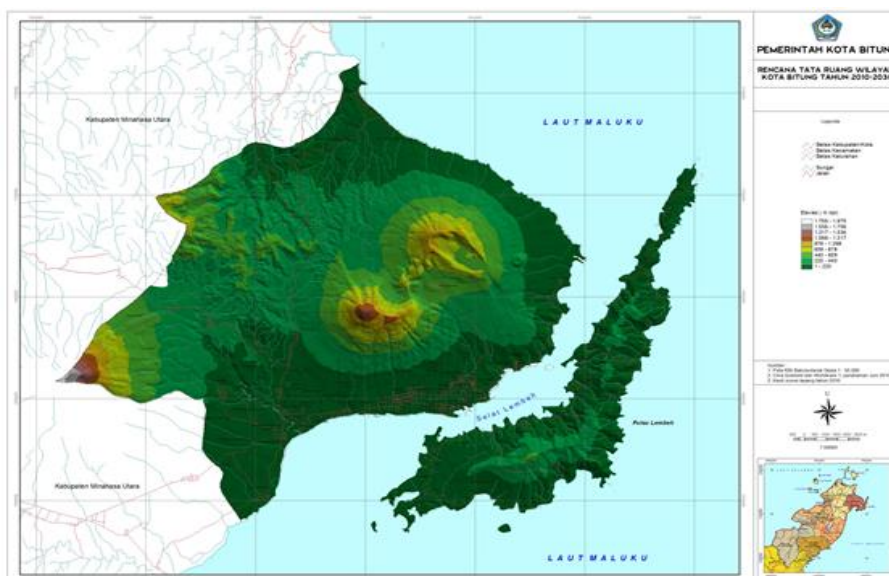
### 1.3. Topography

From topography aspect, most of Bitung City areas are hilly (45%), mountainous (33%), and undulate area (18%); only 4% constitutes sloping land. The slope approximately  $25^{\circ}$  to  $40^{\circ}$  dominates mostly in Bitung City (38%), while flat area (the slope  $\leq 8^{\circ}$ ) is only accounted for 8%.

The eastern part of Bitung, which stretches from the Aertembaga coast to the west at Tanjung Merah, is a relatively flat plain (slope  $<15^{\circ}$ ), and hence could be possibly developed as an urban area, for industry, business, or residential purposes. The northern part of the city has a hilly topography with agriculture, plantations, protected forests, wildlife parks and nature reserves. In southern part of Bitung, there is an island, called as Lembeh Island. The soil characteristic on this island is generally coarse and covered by coconut plants, horticultures and other crops. Lembeh Island has a beautiful coastline and has potential to be developed into a marine tourism area.

According to its geological mapping, the city is generally composed by volcanic rocks and volcano-clastic partially covered by surface sediments. The city has 8 (eight) mountains, namely Mt. Duasudara (1 350 m), Mt. Tangkoko (870 m), Mt. Batu Angus (1 189 m), Mt. Klabat (1 990 m), Mt. Woka (370 m), Mt. Lembeh (479 m), Mt. Temboan Sela (480 m), and Mt. Wiau (861 m); and has five small rivers that have their estuaries respectively in Selat Lembeh, Girian, Sagerat, Tanjung Merah, Tewa'an, and Rinondoran.

Figure 2: Topography Condition of Bitung City



Source: BLH Kota Bitung, 2015a

Bitung has large areas of protected forest (4 611 ha), tourism forest (1 271 ha) and reserve forest (7 495 ha). These forests make Bitung the most forested region in North Sulawesi Province. The topography, distribution of land and climate/hydrology make the city of Bitung relatively vulnerable to natural disasters such as landslides, land abrasions and floodings. The area designated as the SEZ comprises 534 ha of the second largest sub-district in the city, Matuari district (3 610 ha, 11% of the total area). The other districts of Bitung are Ranowulu district (17 117 ha, 51%), Madidir district (3 045 ha, 9%), Lembeh Utara district (3 061 ha, 9%), Aertembaga district (2 611 ha, 8%), Lembeh Selatan district (2 353 ha, 7%), Maesa district (965 ha, 3%) and Girian district (516 ha, 1.5%).

The Bitung SEZ is situated on relatively flat land and close to the coast, and therefore has easy access to the existing port. This port will be expanded for the SEZ in line with Indonesian Government plans for the area to be the centre of the fishery, distribution and logistics industries for the Sulawesi Economic Corridor.

The Lembah Strait that separates the island from the mainland city of Bitung, and connects Sulawesi Island and the Maluku Sea is part of the Coral Triangle Region, which is known as the highest marine biodiversity in the world. The area is geographically strategic, given that it is on track water mass exchange between the Pacific and Indian Oceans and is so rich in nutrients from upwelling processes that can sustain marine life. Coral reefs across the globe are currently declining due to many factors. The biggest threat is the anthropogenic factor which includes over-exploitation, increased sedimentation and nutrient level due to poor land management, and habitat destruction due to destructive fishing methods. Natural phenomena, such as tropical cyclones, coral predation, disease and coral bleaching, is also a major cause of habitat degradation. One of the main consequences of habitat degradation is the loss of reef-building corals and the subsequent reduction of physical complexity, so the long-term detrimental effects on ecosystems and their diversity.

Lembah Strait is also famous for the beauty of marine tourism. The beauty of corals and marine biodiversity make the place an excellent location for diving locations.

Development of sea ports, urban development of Bitung as a special economic zone as well as the construction of a port for industrial areas are obliged to consider legislation on the environment and marine biodiversity.

In addition, control at the initial stage to ensure conservation of biodiversity, considering the SEZ development impact on biodiversity and work to protect the Island's biological inheritance is needed.

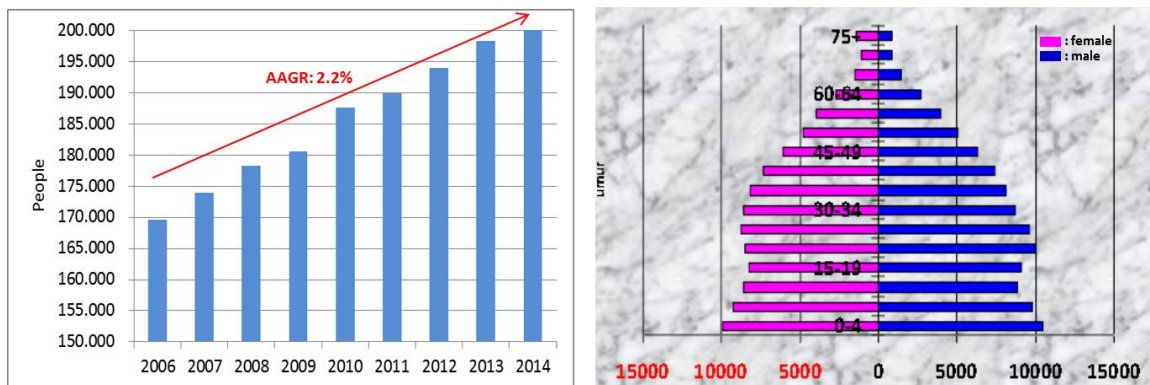
#### 1.4. Population

In 2014, Bitung's population was 202 204 people, showing an average annual growth rate (AAGR) of 2.2% from the 2006 population level of 169 562 people. Considering the city has area about 313.5 km<sup>2</sup>, the population density was 645 persons per km<sup>2</sup>. It can be considered pretty high like other cities in Indonesia.

Bitung City's population was dominated by young age/mature population. The city's population with young age (0-14 years old) was accounted for 28.1% and the productive age (15-64 years old) was 68.3%. As consequences of this population structure, the city government should provide not only enough education facilities but also enough employment. Meanwhile the group of 65 years and above of age was 3.6%. According to absolute number, the dependency ratio of Bitung City population is as much as 49.3. It means that every 100 persons of productive age must afford approximately 49-50 non-productive persons. Generally the number of male population is higher than female population. In 2014, the sex ratio was 104.4%, which means that for every 10 000 female population there were 10 438 male population.

*Figure 3: Population of Bitung City 2006-2014 and Population by Age Structure and Sex in 2014*



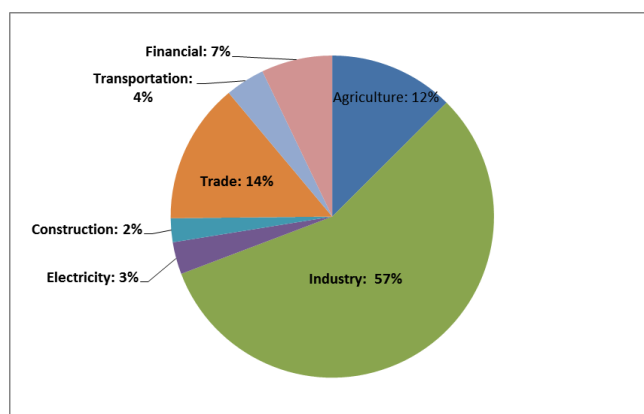


Source: BPS Kota Bitung, 2015a

### 1.5. Employment

From a total number of productive age (15 years old and higher), around 62.2% of Bitung City's population can be classified as potential labour market. The rate of participation in labour market was increased in 2014 compared to 2013's level of 61.6%. Employment opportunity in Bitung City can be considered pretty high since the percentage of productive age population who got jobs reaching 78.9% in 2014 and the rate of open unemployment was 13.2% in 2014. Industry sector is the biggest source of employment in the city (57%), followed by trade (14%) and agriculture (12%).

Figure 4. Employment by Sector in Bitung City



Source: BPS Kota Bitung, 2015a

### 1.6. Climate

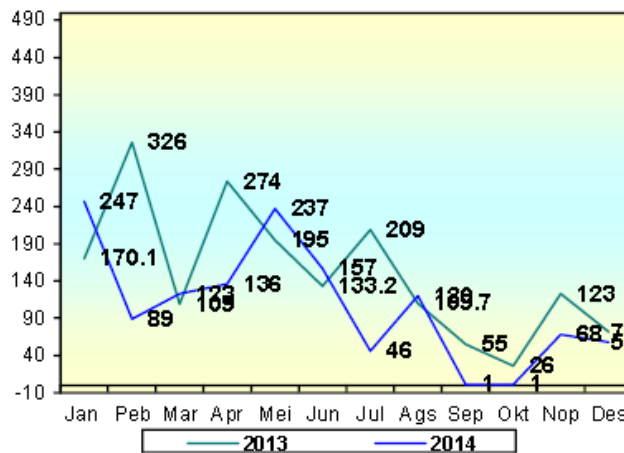
Bitung City has two pronounced seasons, which are influenced by the predominant wind direction, namely rain and dry. The rainy season occurs from October to April and is influenced by winds from the west and northwest that carries a high level of moisture; whereas from May to September the air is dry as a result of winds from the east that have less moisture. As with the rest of North Sulawesi Province, the wettest month is usually January.

According to Bitung Maritime Meteorological Station, the heaviest rainfall was accounted for 247 mm which occurred in January 2014. While the lightest rainfall with rainfall level of 1 mm occurred in September and October 2014.

As a tropical area, in general the temperature of Bitung City can be considered hot and the humidity is relatively high (around 71-81%). According to Bitung Maritime Meteorological Station, the lowest temperature was 21.7°C occurred in October 2014 and the highest temperature was 34.6°C in January 2014.

The SEZ is situated in a particularly well-sheltered area, given that the dominant winds are from the west, north-west or east and that it is further protected by Lembeh Island. An advantage of the location is that any potential air pollution emissions from industrial facilities at the SEZ are unlikely to be carried over Bitung.

Figure 5: The Comparison of Rainfall in Year 2013 and 2014 in Bitung City (mm)



Source: BPS Kota Bitung, 2015a

### 1.7. Air Quality

Based on the monitoring of air quality conducted by the Environment Agency of Bitung City (BLH) in 2015, the pollutant parameters of ambient air (SO<sub>2</sub>, O<sub>3</sub>, NO<sub>2</sub>, CO and TSP) of Bitung City still remain below the requisite quality standards under the air pollution control regulation. However, some pollutant parameters of ambient air in concentration, particularly SO<sub>2</sub> and TSP at 6 monitoring points which are located in Tangkoko terminal, Girian, Sari Cakalang field, Mayor’s office, Downtown, Pateten village, recorded an increase compared to 2014’s level. This is possible happen because of the increased number of vehicles in Bitung City as well as consumption of coal by industries.

Table 1: The NO<sub>2</sub> Pollutant Parameters of Ambient Air in Bitung City

Parameter Measurement Result of NO<sub>2</sub>

No.	LOCATION	DURATION OF MEASUREMENT	AMBIENT AIR QUALITY STANDARDS (µg/Nm <sup>3</sup> )	RESULT 2014 (µg/Nm <sup>3</sup> )	RESULT 2015 (µg/Nm <sup>3</sup> )
1.	Tangkoko Terminal	1 jam	400	< 20	46

2.	Girian	1 jam	400	< 20	38
3.	Sari Cakalang field	1 jam	400	< 20	34
4.	Mayor's office	1 jam	400	< 20	34
5.	Downtown	1 jam	400	< 20	34
6.	Pateten Village	1 jam	400	<20	22

Source: BLH Kota Bitung, 2015b

Table 2: The CO Pollutant Parameters of Ambient Air in Bitung City

Parameter Measurement Result of CO

No.	LOCATION	DURATION OF MEASUREMENT	AMBIENT AIR QUALITY STANDARDS ( $\mu\text{g}/\text{Nm}^3$ )	RESULT 2014 ( $\mu\text{g}/\text{Nm}^3$ )	RESULT 2015 ( $\mu\text{g}/\text{Nm}^3$ )
1.	Tangkoko Terminal	1 jam	30.000	< 5000	2200
2.	Girian	1 jam	30.000	< 5000	320
3.	Sari Cakalang field	1 jam	30.000	< 5000	240
4.	Mayor's office	1 jam	30.000	< 5000	560
5.	Downtown	1 jam	30.000	< 5000	571
6.	Pateten Village	1 jam	30.000	< 5000	112

Source: BLH Kota Bitung, 2015b

Table 3: The TSP Pollutant Parameters of Ambient Air in Bitung City

Parameter Measurement Result of Dust (TSP)

No.	LOCATION	DURATION OF MEASUREMENT	AMBIENT AIR QUALITY STANDARDS ( $\mu\text{g}/\text{Nm}^3$ )	RESULT 2014 ( $\mu\text{g}/\text{Nm}^3$ )	RESULT 2015 ( $\mu\text{g}/\text{Nm}^3$ )
1.	Tangkoko Terminal	1 jam	230	< 10	57
2.	Girian	1 jam	230	< 10	43
3.	Sari Cakalang field	1 jam	230	< 10	41
4.	Mayor's office	1 jam	230	< 10	43
5.	Downtown	1 jam	230	< 10	49
6.	Pateten Village	1 jam	230	< 10	47

Source: BLH Kota Bitung, 2015b

Table 4: The SO<sub>2</sub> Pollutant Parameters of Ambient Air in Bitung City

Parameter Measurement Result of SO<sub>2</sub>

No.	LOCATION	DURATION OF MEASUREMENT	AMBIENT AIR QUALITY STANDARDS (µg/Nm <sup>3</sup> )	RESULT 2014 (µg/Nm <sup>3</sup> )	RESULT 2015 (µg/Nm <sup>3</sup> )
1.	Tangkoko Terminal	1 jam	900	< 20	18
2.	Girian	1 jam	900	< 20	9
3.	Sari Cakalang field	1 jam	900	< 20	6
4.	Mayor's office	1 jam	900	< 20	8
5.	Downtown	1 jam	900	< 20	12
6.	Pateten Village	1 jam	900	< 20	13

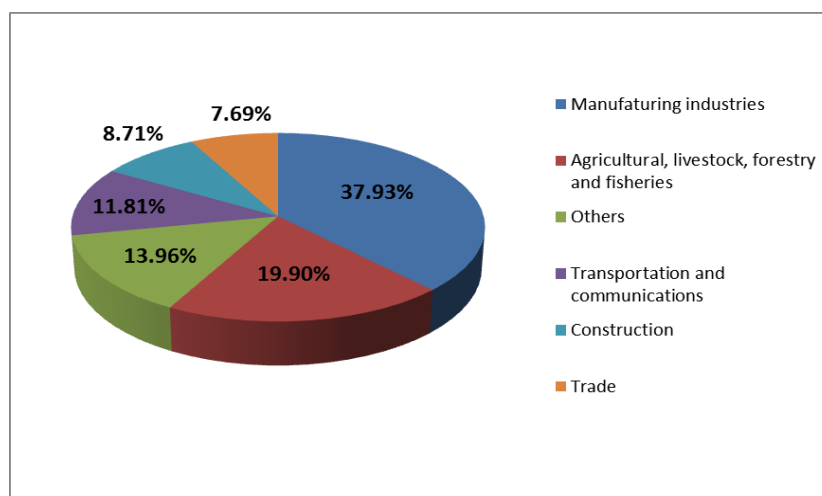
Source: BLH Kota Bitung, 2015b

## 2. BITUNG ECONOMIC CONDITIONS

### 2.1. Regional Gross Domestic Product

Bitung City had a regional gross domestic product (GDP) of around IDR 8.2 trillion at constant price of 2010 in 2013. Manufacturing industries accounted for the largest component of regional GDP in 2013 (37.9%), followed by agricultural, livestock, forestry and fisheries (19.9%), others (14.0%), transportation and communications (11.8%), construction (8.7%), and trade (7.7%). In 2013, Bitung City attained economic growth of 6.66%, an increase of 0.21% from 2012. The big contributions from manufacturing industries strengthen the status of Bitung City as an industry city with the types of main manufacturing industries is fisheries and coconut.

Figure 6: The Distribution of GDP Percentage of Bitung City by Sector, 2013

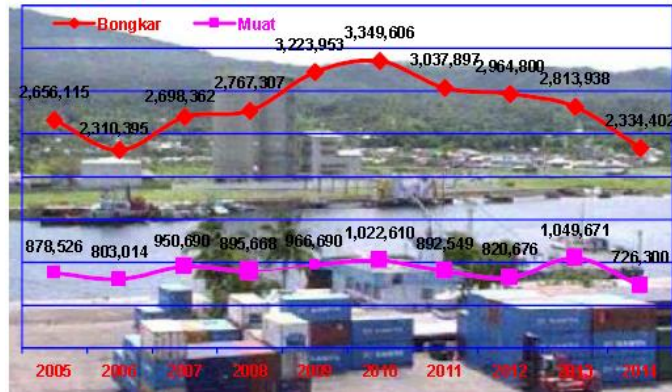


Source: BPS Kota Bitung, 2015b

### 2.2. Trade

Bitung City is one of the largest port city in Sulawesi island, and includes the leading port city in Indonesia. The multitude of sea transportation traffic can be seen from the export and import passing to the Bitung port. In general, total volume of export and import in Bitung City was increased from 383.3 thousand tons in 2013 to 394.2 thousand tons in 2014. Meanwhile, loading and unloading activities at Bitung port experienced a decline in cumulative at around of 21%, from 3.8 million tons in 2013 to 3.0 million tons in 2014.

Figure 7: Loading and Unloading Activities at Bitung Port in 2005-2014



Source: BPS Kota Bitung, 2015b

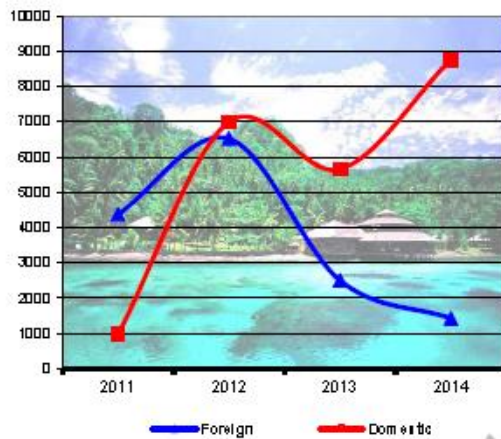
### 2.3. Tourism

Tourism and culture is a potential sector in supporting the implementation of development in Bitung City, because the tourism and culture function can contribute significantly to local economic activities, especially in increasing income sources of society and government. The implementation of tourism and cultural activities can influence the increase of economic activities and other effect in social life. For those reason, the development of tourism and cultural function should be based on community empowerment with focusing on job creation and increase in people’s income and realise the personality, dynamic, creative and resilient socio-cultural life to global influence.

Bitung City has an excellent tourism objects, such as beach tour, jungle tour or historical tour. Some of the famous tour objects are Tanjung Merah beach, Danowudu forest, Kungkungan bay, Laut Batu Kapal Park and Japan monument.

The number of foreign tourist who visit Bitung City was decreased around 43%, from 2 503 persons in 2013 to 1 427 persons in 2014, but the number of domestic tourist was increased substantial to 55%, from 5 650 persons in 2013 to 8 753 persons.

Figure 8: The Growth of Tourist Visit through Bitung Port 2011-2014



Source: BPS Kota Bitung, 2015a

### 3. INFRASTRUCTURE FACILITY

#### 3.1. Transportation System

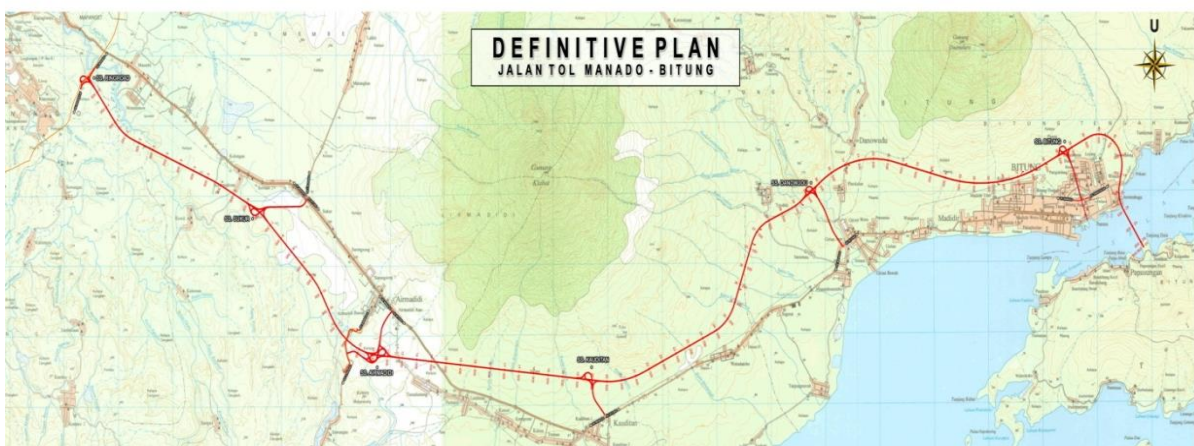
Transportation infrastructure development plan in Bitung City is set up in the Spatial Plan of Bitung City 2011-2031. Under this plan, the land transport network systems contain regulation concerning railway transportation system, marine transportation network system contains regulation concerning container terminal boxes as well as air transportation system contains regulation concerning feeder airport construction plan in Lembeh island. In addition, the Bitung spatial plan is also has the planned to build a bridge from the mainland to the lembeh island and toll road from Manado-Bitung. By implementing the plan, it is expected that the mobility of the people and distribution of goods as well as services from/to Bitung City to/from other areas could be facilitated to enhance economic development in Bitung City.

Development of transportation in Bitung City is expected to be implemented smoothly, orderly, safely and comfortable in traffic flow/urban and marine transportation. This can be achieved through various programs, such as:

- Improvement and development of traffic systems;
- Improvement and development of public transportation management;
- Improvement and development of the quality and quantity of urban transportation infrastructure; and
- Improvement and development of transportation and road networks.

Currently, transportation sector in Bitung City is still dominated by road and marine transports. However, intercity highway is very narrow and is not able to accommodate the number of vehicles anymore. In order to address this issue, currently the highway (toll road) from Manado city to Bitung City is under construction supported by the Central and the Local Government. As of 2014, the length of the road in Bitung City was 48.71 km, which is good condition account 22.11 km and the rest needs to re-maintenance.

Figure 9: Toll Road between Manado City and Bitung City

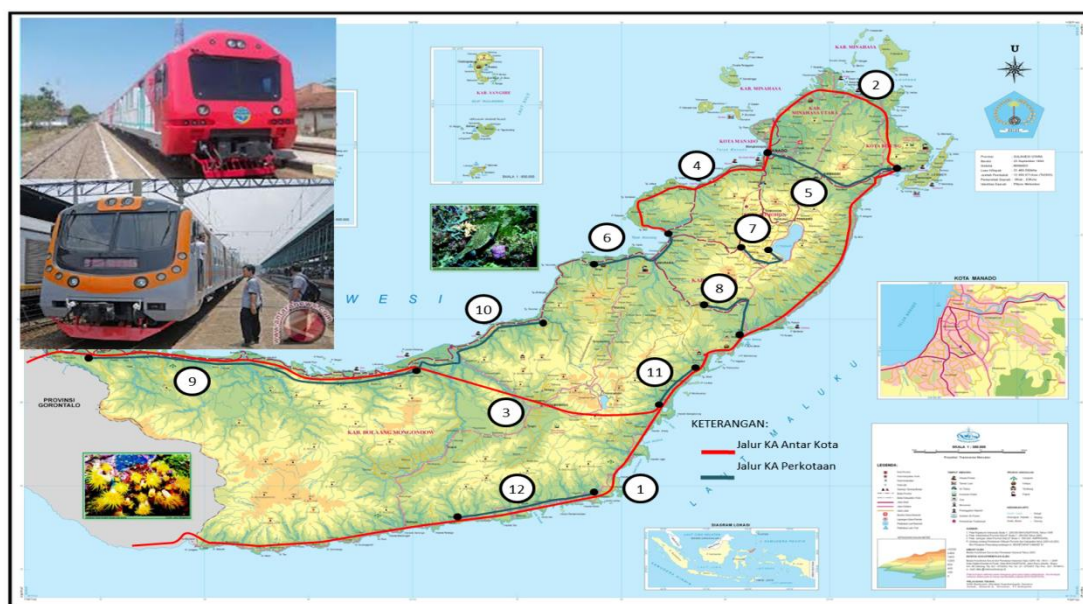


Source: Governor of North Sulawesi Province presentation, 2015

In 2014, there were 738 units of four wheel vehicles that were available for public transportation in Bitung City. The 528 out of 738 units of vehicles dedicated to serve for inner city transportation, 164 units for inter-city, and 50 units for rural transportation. In addition, there are hired motorcycles (Ojek) that serve the non-car routes. The number of the hired motorcycle transportation in operation was unknown, but in general the number of non-government motorcycles was 25 835 units in 2014.

Moreover, as an effort to increase mobility of the people and distribution of goods and services between regions, particularly from Bitung International Port to other areas and vice versa, the Central and Local Governments have a plan to develop train in the North Sulawesi Province as shown in Figure 10. The train project in the North Sulawesi Province is currently under discussion with related agencies and stakeholders.

Figure 10: Train Development Plan in the North Sulawesi Province



Source: Governor of North Sulawesi Province presentation, 2015

In addition, considering Indonesia as an archipelago economy and Bitung City is located near the Maluku Sea, marine transportation is one of important infrastructure facilities to be developed by the Bitung City government. Currently, Bitung City has an international port. In 2013, the number of in-coming and out-going ships in Bitung International Port was accounted for 3 630 units, consists of 2.59% of overseas ships, domestic ships (66.56%), special ships (5.29%), public ships (17.38%), and the remaining is the pioneer ships. The number of in-coming and out-going ships in Bitung International Port was decreased 35.11% compared to 2012. In the near future, there is a plan to expand the capacity of Bitung International Port as an International Hub Port.

The first phase of the expansion of the port is to expand the container yard facilities to 6.5 ha and to extend the jetty length to 500 m which are expected to be completed in 2017. The second phase which is planned in 2018 to 2022 will be focusing on extending the jetty length to 250 m, where the dock is designed to form a 90 degree angle and connected to the mainland. In addition, the container yard facilities will be expanded aggressively to 46.8 ha. The fishing harbour, port office, and housing which are located around the port will be relocated to other areas to support this second phase. Meanwhile, in the final phase which is estimated to be completed in the upcoming 2032, Indonesia Port Corporation IV (Pelindo IV) is targeting the additional extending of the container yard facilities and constructing the bulk terminal building right on in the container yard facilities. The



funding for this expansion plan of Bitung International Port will come mainly from the government budget through the state capital participation and the Pelindo IV budget.

Figure 11: Bitung International Port Expansion Plan



Source: Governor of North Sulawesi Province presentation, 2015

### 3.2. Electricity

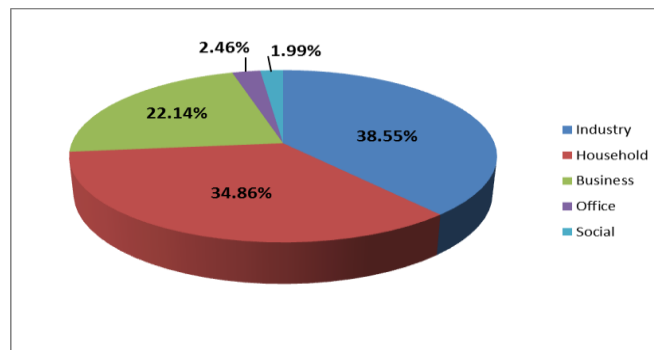
The electricity needs for Bitung City are supplied by PLN (state owned electricity company) using diesel power plants which are located in Bitung City. Furthermore, through transmission line of 70 kV, Bitung City are supplied by hydro power plant in Tonsea and geothermal power plant in Lahendong.

In 2014, the installed capacity of power plants developed by PLN had 102.7 MVA. The largest consumer of electricity in Bitung City in 2014 was industry sector (38.6%), followed by household (34.9%), business (22.0%), office (2.5%) and social (2.0%).

Though the electricity supply is still rely on PLN's power plants, the Mayor of Bitung City has formulated "Policy Directive" for developing electric power sector in Bitung City, as follows:

- Electricity supply should be environmentally friendly;
- Electricity infrastructures should be developed in order to increase its availability meets the demand;
- Public-private partnership between private companies and government should be encouraged to implement the large scale of electric power sector; and
- Empowering society to develop energy independently.

Figure 12: Electricity Distribution by Customer Type in Bitung City in 2014



Source: BPS Kota Bitung, 2015b

### 3.3. Telecommunication

Telecommunication constitutes a very important factor in supporting the economy of Bitung City. The number of telephone's customer of Bitung City was 5 400 units in 2014. From this number, the largest consumer of telephone was a residence group (household) which accounted for 86%, followed by business group (11%), and others 3%.

### 3.4. Water Supply

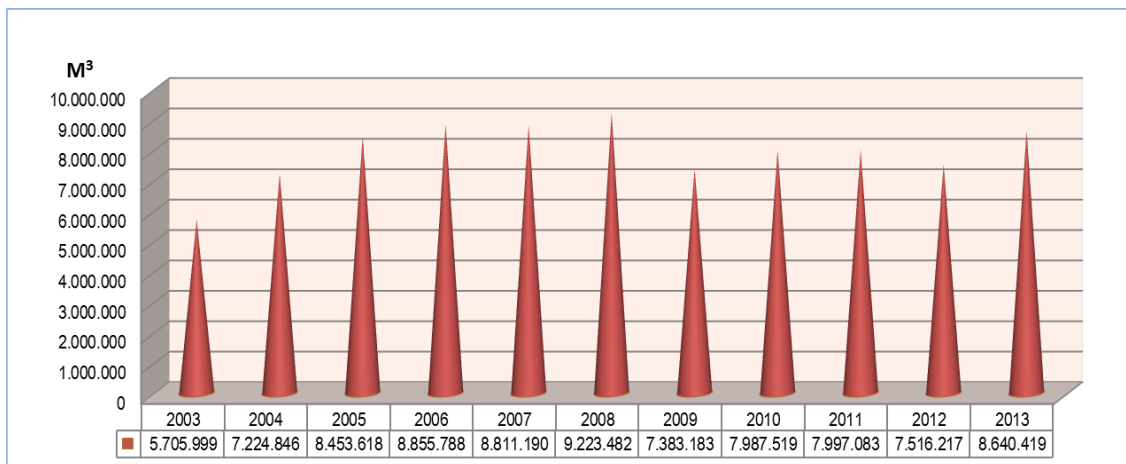
Bitung City is known as the city that has a very good quality for clean water. Therefore the ships coming and passing through Bitung City always take a time to stop by at the port for getting clean water supply. The clean water in Bitung City are supplied from 7 (seven) water sources which are installed at Danowudu I springs with the capacity of 135 litre per second (135 ltr/sec), Girian river (80 ltr/sec), Sagerat river (60 ltr/sec), Kumersot I and II springs (30 ltr/sec of each), Danowudu II springs (20 ltr/sec), Tendeki II springs (15 ltr/sec), Pateten springs (12 ltr/sec), Danowudu III springs (10 ltr/sec), and Tendeki I springs (3 ltr/sec).

In order to optimize the utilisation of clean water in respect to the social and economic function and balanced with the environment, the city government has set a target of water supply infrastructure development, as follows:

- the requirement of clean water for people, industry, and port;
- the realisation of a more equitable distribution pattern from spatial aspect; and
- optimising the management of water resources.

In 2013, the clean water production in Bitung City was increased to 14.96%, from 7.5 million m<sup>3</sup> in 2012 to 8.6 million m<sup>3</sup> in 2013. It means the distribution of water supply per capita was 37.80 m<sup>3</sup> per capita in 2013.

Figure 13: Clean Water Production in Bitung City in 2003-2013



Source: Albert, 2015

In November 2015, the Environment Agency of Bitung City (BLH) has had conducted monitoring of water supply quality in Girian river with the general objective of monitoring are environmental surveillance, establishing water – quality criteria, and appraisal of resource.

The influence of river water quality parameters as media disposal will be determined by a substance, material discharged into the river. Currently, the dominant source of pollutants that could potentially contaminate the Girian river such as domestic waste, sand, stone quarrying, animal farm, and tofu and tempe industries.

Test sampling of the Girian river water was conducted at seven monitoring points, starting from the upstream of the river which is located in Apela I village to the downstream of the river in Girian Bawah village. From the analysis of laboratory data on water samples of Girian river, it found that Girian Bawah, Girian Weru, Girian Atas and Pinokalan villages were not yet being polluted by organic substances from waste water disposal coming from the activity of tahu and tempe industry and household waste. However the contamination potential of organic substance can be increased thus waste water processing unit is necessary to lower concentration of organic substances which will be discharged into Girian river. In addition, the water of Girian river potentially contaminated by physical components due to the activity of sand and rock quarrying in the upstream of the river.

## 4. BITUNG SPECIAL ECONOMIC ZONE (SEZ)

### 4.1. Policy and Regulation on SEZ

Economic development with the government as development planning mobiliser is confronted with the challenges of globalisation and economic liberalisation. It encourages the economy or region to transform the economy in order to accelerate the achievement of its economic development. The challenges of globalisation and the economic liberalisation that is most felt are increasing competition in the industrial sector. Therefore increasing investment by preparing an industrial area which has the advantage of geo-strategic and geo-economic is necessary to be carried out by local government. This area is expected will not only optimize industrial activities but also other economic activities such as trade and tourism for jobs creation.

The government (i.e. the Ministry of Industry) has made the National Industrial Development Policy (NIDP) to realise the vision of the National Industrial Development, namely Indonesia has become a New Industrialised Countries in 2020. One of programmes that can realise the vision and answer almost all of the strategies mentioned above is the development of industrial zone. This is because the industrial zone can serve as:

- Accelerating development of regional industrial/distribution of industry;
- Stimulating industrial agglomeration;
- Providing of facilities with more secure for industrial activity means creating a conducive investment climate for investors; and
- Promoting of environmentally sustainable development.

The industrial zone established by the Ministry of Industry will be based on the core competence of the local area, so that each region has a unique industry to be developed in the zone in accordance with the resource potential of the industry in their respective areas.

According to Law No. 39 of 2009 on Special Economic Zone (Article 1), development of industrial areas that seeking optimisation of the economic activity is called Special Economic Zone (SEZ), is an area with a certain extent within the territory of the Republic of Indonesia which is set to perform the functions of the economy and acquire certain facilities. The zone is prepared to maximize industrial activity, exports, imports, and other economic activities that have a high economic value. The SEZ development aims to accelerate the development of the region and as a breakthrough model of zone development for economic growth, among others industry, tourism, and trade for jobs creation. However, there are several criteria requirements should be met if the local government would like propose their area to be a SEZ according to Law No. 39 of 2009, as follows:

- In accordance with the regional spatial plan and will not interfere with the protected area;
- The provincial government/district/city concerned supports SEZ;
- Located in a position close to the international trade lines or close to international shipping lanes in Indonesia or is located on the territory of the excellent resource potential; and
- Have clearly defined the boundaries of SEZ.

Bitung as industrial zone has a great potential in the development of the coconut and fisheries based industries from upstream to downstream. In view of position Bitung port to Pacific, it is strategic and advantageous. So

that when it is used as International Hub Port, then the export cost to the Destination Countries will be cheaper. In accordance with the first mission of the Government of Bitung City that will make Bitung as the Indonesian Gateway to Asia Pacific region with the city is characterised by Maritime city then the strategic position of Bitung City in the rim of Asia Pacific region and having very suitable natural condition to be an International standard of natural seaport makes very possible potential developed into an "Indonesia Gateway" for the Asia Pacific region.

Bitung SEZ was proposed by the Governor of North Sulawesi Province and supported by the Mayor of Bitung City to the Central Government through the National SEZ Management Council (SMC) aims to create a conducive environment for investment, export, and trade to accelerate the achievement of national and local economic development (both for North Sulawesi Province and Bitung City). After met several criteria, Bitung SEZ proposal has been approved by the President of Indonesia as one of SEZs to be developed under the Government Regulation No. 32 of 2014 regarding Bitung SEZ. According to this regulation, the area of Bitung SEZ covers 534 ha which is located in Matuari district, Bitung City, North Sulawesi Province.

After Bitung SEZ has been approved, the SMC for North Sulawesi Province was established in 2014 upon the President Decree No. 34 of 2014 regarding the North Sulawesi Special Economic Council. The main purpose of the North Sulawesi Province SMC is to oversee the development of Bitung SEZ. In this role, this institution will play a very important part in the planning and implementation of the low-carbon strategy developed. Currently, the Governor of North Sulawesi Province is the Head of the North Sulawesi Province SMC and the deputy is the Mayor of Bitung City. The member of the SMC consists of a) provincial officials who have responsibilities in the field of taxation, customs, land, and immigration; and b) provincial and municipality officials who have responsibilities in the field of local economy, planning, and development. As operational arm of the SMC of North Sulawesi Province in regard to the overall development of Bitung SEZ, Bitung SEZ Management Agency (SMA) The Bitung SMA is currently under development and is expected to start operations in 2017. The SMA is also planned to serve as a one-stop service institution.

In order to make Bitung SEZ in accordance with the regional spatial plan and will not interfere with the protected area, the Bitung City government has issued Local Regulation No. 22 of 2013 on Coastal Areas and Small Islands Zoning of Bitung City 2013-2033. Under this local regulation, the usage for each planning accompanied by the determination of the structure and spatial planning. In the planning area contains the activities that can be done and should not be done as well as the activities can be done after obtaining permission. Follow up this local regulation, Bitung Detailed City Planning for Bitung SEZ which is located in the Matuari district has been completed by the city government. A detailed spatial plan for each district and village in Bitung covers structural analysis for the area planning; area designation analysis for the block planning; transport infrastructure analysis; service facility analysis; public utility analysis; spatial envelope analysis; and institutional and community participation analysis. This detailed city planning has been adopted in the Bitung Spatial Planning designating Matuari district for industrial area development, and Ranowulu district for housing area development (to support Bitung SEZ).

The legal basis for the establishment of Bitung SEZ, among others:

- Law No. 39 of 2009 on Special Economic Zone;
- Government Regulation No. 2 of 2011 on Special Economic Zone Implementation;
- Government Regulation No. 32 of 2014 on Bitung Special Economic Zone;
- Presidential Regulation No. 33 of 2010 on the National and local SEZ Management Council (SMC);

- Presidential Decree No. 8 of 2010 on the National SEZ Management Council;
- Coordinating Ministry of Economic Affairs Regulation No. PER-07/M.EKON/10/2011 on Guidance for Proposing SEZ Establishment; and
- Local Regulation No. 22 of 2013 on Coastal Areas and Small Islands Zoning of Bitung City 2013-2033.

#### 4.2. Bitung SEZ Development Plan

In order to prepare a good planning for the development of Bitung SEZ, the Ministry of Industry (MoI) has provided support for Bitung SEZ Masterplan development from 2008 onwards. The Bitung SEZ master plan output is the conception of an integrated industrial park that is organised based on core competency areas, corresponding to spatial and environmental requirements. The work was completed in 2013/2014, for a total area of 534 ha. Currently, Bitung City government has designated a 92 ha area to proceed with for Stage 1 of the Bitung SEZ development.

Initially, planning in the industrial park is focussed on the development of three categories (heavy, medium, and light industry zones). In addition to the industrial zone, there are other areas for commercial and office buildings. A retail centre and ample green open space will also be provided.

The stages of Bitung SEZ development will be associated with land development include land acquisition and land clearing. Land for Bitung SEZ will be gradually acquired. In the early stages, the local government is utilising the existing readily available land area of 92 ha. Land acquisition from the local community will be required for remaining areas. The Bitung SEZ Masterplan 2008 is the only officially endorsed development plan for the SEZ area and represents the main reference for the Bitung low-carbon town development.

Figure 14: General Layout, Bitung SEZ Master Plan



Source: Bitung SEZ Master Plan Development

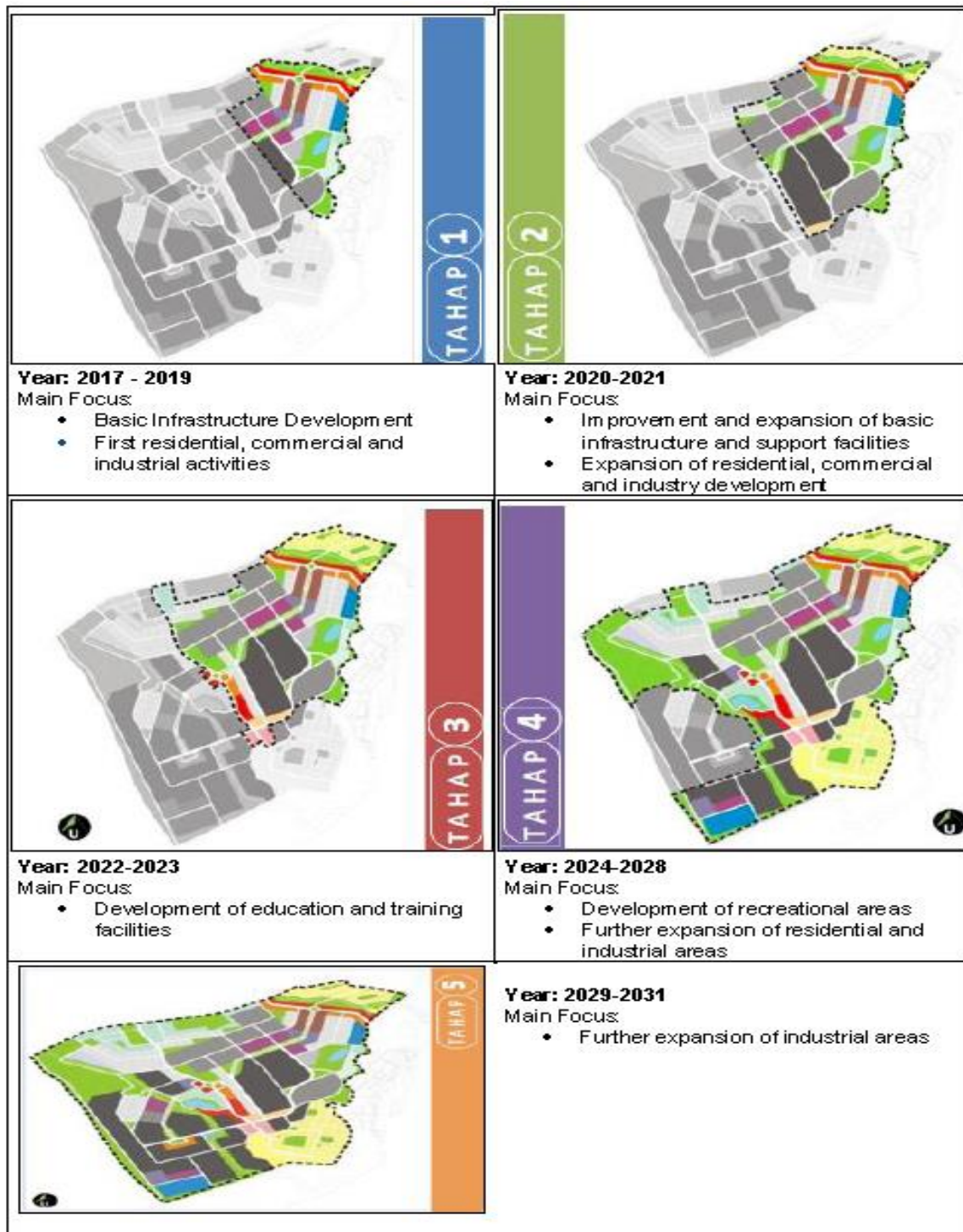
The development of Bitung SEZ will be carried out in five stages as follows:

- **Phase 1:** it will focus on the construction of the basic area infrastructure for a total land coverage of 114.96 ha. This includes the development of the main road infrastructure, basic support utilities such as water

access, electricity access to the PLN (state owned electricity company) power grid & basic waste management infrastructure, as well as land plot preparation for the industrial, commercial and residential sector. The first industrial and housing activities are expected to start during phase 1.

- **Phase 2:** it will focus on the expansion of industrial land plots, and improving and progressing commercial support facilities. Phase 2 will also mark the beginning of housing development and further expansion of roads, electricity and water connections to individual land plots. This SEZ development phase will cover a rather small area of 43 ha in total.
- **Phase 3:** it will focus on the further enhancement of commercial and support facilities such as education and training facilities. In addition, residential and commercial sector developments will continue. No further industry development is expected in this phase. This phase will focus on a total land area of 46 ha.
- **Phase 4:** it aims mainly to advance the construction and development of residential and recreation areas for Bitung SEZ. Furthermore, basic infrastructure and support facilities will be expanded in order to provide access to the additional development area of 216 ha. Additional industrial actors are expected to begin operations, enhancing the overall amount of industrial activities during this 5-year long development phase.
- **Phase 5:** as the last phase will focus on the completion of all infrastructure developments for the residential, commercial and industry sector as well as for all supporting facilities. Medium and large size industry expansion is expected to be at the core of this phase. The total land development area consists of 114.04 ha, finalising the development of the envisioned 534 ha Bitung SEZ area.

Figure 15: General Layout, Bitung SEZ Master Plan



Source: South Pole Group, et.al, 2015b



### 4.3. Facilities Provided in Bitung SEZ

#### 4.3.1. Taxation

As mentioned in the Law No. 39 of 2009 on SEZ, the economy activities which are doing inside SEZ will acquire certain facilities such as fiscal and non-fiscal incentives provided by the central and local governments. To attract the investors to come to Bitung SEZ, some incentives to be provided among others:

- Similar with non-fiscal incentives such as easing the processing of land, immigration, employment, one-stop-service on permitting, and exception from limited business line;
- Income tax facilities such as tax allowance, and/or tax holidays, and/or in accordance with the Government Regulation No. 1 of 2007 (tax allowance, tax holidays, accelerated amortisation, compensation for losses, dividend tax);
- Additional income tax can be given in accordance with the characteristics of zone;
- Land and building tax reduction, caused by the increased sale value due to changes in the environment and the positive impact of development; and
- Customs and tax facilities, such as:
  - import duties and excise duty exemption, VAT and luxury sales tax free for goods import to SEZ;
  - delivery of goods from other Indonesian Customs Area (DPIL) to SEZ may include VAT and luxury sales tax facilities; and
  - Import goods from SEZ to DPIL are subject to import duties, excise, VAT, and luxury sales tax; except when the goods are dedicated to the party who obtained exemption/deferral facilities.

#### 4.3.2. One-Stop Service on Permitting

As an effort to improve investment climate in Bitung City, particularly in Bitung SEZ, the city government has established "One-Stop Service on Permitting" (OSSP) to enabling a reasonable time limit in which a decision or permit is to be made or issued. Currently, there are 33 type of licenses in Bitung City can be issued in OSSP office. OSSP office will be moved to the office of the Bitung SMA - since this agency will serve as a one-stop service institution - to provide convenience to potential investors who will invest in the SEZ.

Table 5: Term of Time in Issuing Permit at Bitung OSSP

No.	Type of Permit	Maximum Time for Issuing Permit	Fees
1.	Principle permit of investment	3	
2.	Principle permit of investment expansion	3	
3.	Principle permit of investment change	5	
4.	Principle permit of investment merger	10	

5.	Business permit of investment	7	In accordance with Bitung Regulation No. 6 of 2011
6.	Business permit of investment expansion	7	
7.	Business permit of investment change	5	
8.	Business permit of investment merger	7	
9.	Open branch office permit	3	
10.	Building permit (IMB)	7	
11.	Disturbance permit (HO)	2	
12.	Sales place permit of alcoholic beverages (IPTMB)	1	

Source: BAPPEDA Kota Bitung, 2015

## 5. LOW-CARBON TOWN DEVELOPMENT IN BITUNG SEZ

### 5.1. Policy Frameworks Related to Low Carbon Town Development.

The government both in the central and local governments have been aware that many activities will be running in Bitung SEZ (i.e. activity related to industry, transportation, electricity) which may become a sources of increasing CO<sub>2</sub> emission. Therefore the government is very keen to seek the appropriate measures to establish a sound development of urbanisation with controlling the increasing of CO<sub>2</sub> emission.

Currently, there are several government policy frameworks (at the national, provincial, and city level) which are mostly relevant to the development of an urban low-carbon strategy for Bitung SEZ, such as RPJPN and RPJMN, MP3EI, RAN-GRK, NEP, RAD-GRK and High level vision statement for Bitung SEZ.

#### 5.1.1. Indonesia's National Development Strategy (RPJPN & RPJMN)

Sustainable development has been stated as one objective of the Long-Term Development Plan and is mainstreamed into all aspects of development through the current Medium-Term Development Plan (2015-2019). One of ten challenges to national development identified in the RPJMN 2015-2019 focusses on how economic growth can avoid damaging the natural environment, since environmental damage will ultimately lead to unsustainable economic growth. The Government has acknowledged that ineffective management of natural resources will result in the rapid depletion of resources and could easily lead to the recurrence of a food and energy crisis which will result in a drastic increase in the cost of living and a severe reduction in the quality of life.

Indonesia's national development strategy sets the framework for the development of Bitung SEZ as a centre of economic growth in North Sulawesi while integrating sustainable development principles.

#### 5.1.2. Masterplan for Acceleration and Expansion of Indonesia's Economic Development (MP3EI)

Six economic corridors have been identified as growth-centres in Indonesia with their specific economic conditions set as economic drivers. The Sulawesi island has as a centre for production and processing of agricultural produce, plantations, fisheries, oil & gas, and mining is included in one of those economic corridors and supports the establishment of SEZs, including Bitung SEZ. In addition, MP3EI is also formulated in consideration of the National Action Plan for GHG Emission Reduction, recognising global climate change mitigation as a national commitment.

#### 5.1.3. Indonesia's National Action Plan for GHG Mitigation (RAN-GRK)

The RAN-GRK is a working document that provides the foundation for various ministries, institutions and local governments to implement mitigation action. The purpose of RAN-GRK is twofold: providing an overview of the national potential for mitigation actions, and initiating the design of programmes and actions to reduce emissions. All mitigation activities conducted under the APEC LCMT Bitung will support the implementation of the RAN-GRK and will contribute to achieving Indonesian's national emission reduction target.

#### 5.1.4. National Energy Policy

The National Energy Policy stipulates Indonesia Energy Mix target with increasing share of New and Renewable Energy up to 23% by 2025 and 31% by 2050 of total primary energy resources utilisation. In addition, the policy is also targeted that energy elasticity should be less than 1 by 2025 and electrification ratio should be reached nearly 100% by 2020. The use of renewable energy sources, the improvement of energy efficient in different sectors and the electricity outreach are all sustainability principles that can be applied for low-carbon strategy development in Bitung SEZ and the implementation of low-carbon strategy development will contribute to reach national energy targets and the energy development plan of Indonesia.

To support the use of New, Renewable Energy (NRE) Government through the Ministry of Energy and Mineral Resources e.g Directorate General of New, Renewable Energy and Energy Conservation has issued regulations feed-in tariff, including: EMR Ministerial Decree Number 17 Year 2013 for Solar Photovoltaic Power Plant, EMR Ministerial Decree Number 27 Year 2014 for biogas and biomass power plant, EMR Ministerial Decree Number 44 Year 2015 on municipal waste power plant, EMR Ministerial Decree Number 19 Year 2015 for Hydro Power Plant, EMR Ministerial Decree Number 17 Year 2014 for geothermal.

In addition to support the energy sector for strengthening especially on demand part, the Government of Indonesia (GoI) has been issued the Government Regulation Number 70 of 2009 about energy conservation that required industry with the consumption above 6000 toe to perform mandatory energy management, followed by the EMR Ministerial Decree Number 14 year 2012 on the management of energy that provide the technical guidance to perform energy management.

Indonesia has adopted the ISO 50001: Energy Management System to be Indonesia National Standard since 2012 and has promoted the certification of the ISO 50001 by various capacity building programs. The implementation of ISO 50001 by industry can be recognized as energy management implementation of Government Regulation 70/2009. As one of the industrial estate, Bitung SEZ will be eligible for the national program to support ISO 50001 certification.

Other regulations in building and waste management, such as Government regulation number 81/2012 on domestic waste management and Minister of Public Works and Housing Decree Number 02/2015 on green building should also be considered for the developing low carbon town in Bitung SEZ.

Directorate General of New, Renewable Energy and Energy Conservation has other programs to support the planning and development of renewable energy and energy efficiency in Bitung SEZ and Bitung City, such as Smart Street Lighting, Solar Photovoltaic Power Plant, free energy audit for government building, biogas development, etc.

#### 5.1.5. North Sulawesi Province Action Plan for GHG Emissions Reduction (RAD-GRK)

The RAD-GRK is to be used in conjunction with the RAN-GRK to improve coherence between the sub-national and national levels, especially with regards to data relevant to GHG inventories and emissions scenarios. Government Regulation No 323 of 2012 on RAD-GRK North Sulawesi Province put the responsibility for RAD-GRK Monitoring, Reporting & Evaluation. Since low-carbon development in Bitung SEZ is targeting the energy management, transport and traffic management, solid waste and wastewater management, industrial process and land use sectors which align with RAD-GRK and expected GHG emissions reduction, then the initial impacts of the long-term plan can be demonstrated, contributing to the North Sulawesi GHG emission reduction target.

### 5.1.6. High Level Vision Statement for Bitung SEZ

The special economic zone of Bitung will become a national and global model for sustainable, low-carbon urban and industrial planning, and will contribute to the national goal of reducing GHG emissions up to a 26% by 2020 compared to the business-as-usual scenario. This vision will be implemented by developing the low-carbon model town strategy along the following four axes:

- Ensure alignment with existing local and national development policies, regulatory frameworks and institutional set-ups;
- Reduce energy consumption through the use of clean, green energy generation and more energy efficient technologies and practices;
- Ensure an efficient and environmentally balanced management of resources through the utilisation of the best available low-carbon technologies for industry, commercial and residential areas, for solid waste and wastewater management, for forestry and land use, and for transportation; and
- Apply an accurate, transparent and functional monitoring, reporting and verification (MRV) system of the GHG emissions and the related sustainable development impacts.

### 5.2. Bitung SEZ Feasibility Study

The main goal of Low-Carbon Model Town Project (LCMT) Phase 5, Feasibility Study for Bitung City, North Sulawesi Province, Indonesia (the Feasibility Study) was to provide valuable advice to the central and local Indonesian government officials, as well as the developers of the Bitung SEZ Masterplan on how to design an appealing and innovative low-carbon development plan by including an integral Low-Carbon Development Strategy (LCDS) that incorporates a selection of high potential Low-Carbon Measures (LCMs) in the energy, industrial, commercial, residential, transportation, waste, land use change & forestry sectors. The key results of this feasibility study are:

- Low-Carbon Development Strategy (LCDS) for Bitung SEZ;
- Detailed Impact and Cost Report on selected Low-Carbon Measures (LCMs); and
- Implementation Roadmap.

The expected results in the Feasibility Study under the BAU scenario and the mitigation scenario which includes GHG emissions levels with the additional implementation of the LCMs are summarised in the Table 3.

Table 6: BAU and Mitigation Scenario Result in 2031

Sector	2031 (BAU)	2031 (Mitigation Scenario)	tCO <sub>2</sub> e Reduction	Percentage Contribution 2031 (%)
Industry	2 315 474	1 805 577	509 897	22
Commercial	140 742	89 728	51 014	36
Residential	117 364	77 573	39 791	34

<b>Transport</b>	239 819	230 586	9 233	4
<b>Waste</b>	146 459	109 597	36 862	25
<b>AFOLU (Agriculture, Forestry, and Other Land Use)</b>	2 555	848	1 707	67
<b>Total</b>	<b>2 962 414</b>	<b>2 313 910</b>	<b>648 504</b>	<b>22</b>

Source: South Pole Group, et.al, 2015.

The BAU scenario assumes that the development of Bitung SEZ as planned and no additional mitigation efforts and policies are introduced and implemented in Bitung SEZ. On the other hand, the mitigation scenario is already assuming that the development of Bitung SEZ will be together with the implementation of selected GHG mitigation activities or LCMs.

The results of the application of the LCMs and policies under the mitigation scenario represents a reduction in 22% of total CO<sub>2</sub> emissions by the 2031, with highest reductions from AFOLU sector (67%), followed by commercial sector (36%). However, to achieve a reduction in 22% of total CO<sub>2</sub> emissions by 2031, there are 10 (ten) LCMs need to be carried out and implemented by the central and local government through an integrated and holistic LCDS for Bitung SEZ during the development period of 2017 to 2031.

Table 7: Low-Carbon Measures (LCMs) Assessment

<b>LCMT Target Sectors</b>	<b>Sub Sector</b>	<b>Type/Technology of LCM</b>	<b>Specific LCM</b>
<b>Energy</b>	<b>Energy Generation</b>	Utilisation of Clean Energy	1. Utilisation of Geothermal Energy
		Grid Solar Energy Generation	2. Use of Photo Voltaic (PV) panels on buildings
		Waste-to-Energy Generation	3. Methane capture and anaerobic digestion (AD) system for Solid Waste and Wastewater
		Biomass Thermal Energy Generation	4. Thermal energy generation from agricultural waste
	<b>Industry</b>	EE in Equipment and Appliances, Building Design and Industry Processes and Product Use (IPPU)	5. Comprehensive EE Program for the Industry Buildings, Appliances and IPPU

	Commercial	EE in Equipment and Appliances & Building Design	6. Comprehensive EE Program for the Residential and Commercial Buildings, and Appliances
	Residential		
<b>Transportation</b>	Shift and avoid	7. Bus Rapid Transit (BRT) 8. Non-Motorised Transport (NMT) and Transit-Oriented-Development (TOD)	
<b>AFOLU</b>	Land use and Urban Greening	9. Urban Forestry and Urban Greening	
<b>Waste</b>	Solid Waste and Wastewater	Solid Waste Management	10. Integrated Solid Waste Management System and 3R strategies

Source: South Pole Group, et.al, 2015.

The Feasibility Study concludes by looking the scores resulting from the impact and cost assessment of the selected LCMs, the sectors that should be prioritised by order of importance are the following:

1. Energy;
2. Waste;
3. Transportation; and
4. AFOLU.

Noting that implementing these measures will require technology transfer as well as technical and financial support from other economies and institutions with experience and background in low-carbon development.

## **PART II: POLICY REVIEW TEAM REPORT**

This part of the report presents the Policy Review Team's conclusions and recommendations for low-carbon town development in Bitung, North Sulawesi, Indonesia.

The Feasibility Study focused on the Bitung City, however the findings and recommendations could have wider application to other municipalities in Manado for developing low-carbon policies and programs.

The Policy Review Team evaluated the recommendations using an 'integrated framework' to help determine the priority recommendations.



# 1. OVERARCHING

## FINDINGS

The transition to a low-carbon economy is the biggest opportunity for the region to realise long term sustainable growth, but to achieve a Low Carbon Model Town in Bitung, North Sulawesi, Indonesia, an approach needs to be adopted that addresses and balances social, environmental and economic considerations at the same time.

An important component of this process is to engage the community to create the design brief. This can be achieved through an Enquiry by Design process (also known as a Charrette). The relevant government bodies then need to embrace the outcomes of this community engagement process and demonstrate that they will progress the suggestions that come from the community planning sessions. Undertaking this process will reduce project delays and save money during the planning and development stages by providing local ideas and solutions, and deliver alternative solutions that may have not yet been considered. Local Sulawesi practices combined with examples of successful international experience will give the best long-term results.

Engaging the local community and key stakeholders in an Enquiry by Design process can assist participants in understanding some of the more detailed processes such as the required legal and regulatory framework, transport issues, area energy management systems and energy efficiency and renewable energy expectations and aspirations. A committed authority that undertakes this process will be surprised by the existing expertise in the surrounding community and the new ideas that will emerge.

As part of this engagement process, the proposed additional infrastructure components of the project need to be resolved before any further actions are taken. Development of a regional transport and a freight strategy for SEZ/Bitung/Manado and determining when a freight line between Bitung SEZ and Manado is going to be constructed, along with determining whether this should also incorporate a passenger line, will create the framework and skeleton upon which buildings and other infrastructure can be designed around. This 'Transit Oriented Development' process is the most efficient manner in which to achieve a low-carbon town.

For the Bitung SEZ to be realised as an exemplar practical demonstration of low carbon sustainable development and as the new centre of the fishing, distribution and logistics industries for the Sulawesi Economic Corridor, a long term consistent political commitment and a clear vision will need to be maintained and the authority charged with progressing the development will need both the finances and human resources to communicate and promote the vision and actively engage the community in shaping the SEZ and Bitung's future growth.

The proposed passenger and freight rail link to Bitung port facility, Bitung CBD and through to Manado has the potential to be the catalyst to integrate the SEZ with the existing town structure and the wider region. If this project is delayed or not supported then an alternate strategy will be needed to fully integrate the developments at the SEZ with the CBD and surrounding areas.

The relevant Indonesian agencies and SEZ representatives need to engage with other nations that have demonstrated both marine and fisheries management experience and have expertise in sustainable economic growth to see what they have to offer in capacity-building to help guide the development of the SEZ.

The role of regional and international co-operation also needs to be considered, for example, for Bitung to maintain and grow a robust and sustainable fishing and fish processing industry, co-operation will be needed with both neighbouring and regional states to develop a pathway to sustainable harvesting. A multinational agreement on managing fish stocks and respecting national boundaries is as important as developing local responses to environmental management and regional strategies for food security. A regional sustainable fishing certification regime would assist to develop and grow further export potential.

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## RECOMMENDATIONS

★★★Recommendation for immediate action; ★★Recommendation for action in next 2-3 years; ★ Recommendation for action in the longer term.

**Rec. 1. Develop a freight strategy for SEZ/Bitung/Manado and determine when a freight line between Bitung SEZ and Manado is going to be constructed, whether this should also incorporate a passenger line and where in Bitung SEZ the rail corridor would be. ★★★**

Investigate the development of the Port and the road and rail network that will be required to support the Port, the growth in the SEZ and increased tourism and goods and services in the region. This will include the development of a strategic freight network for the north Sulawesi region which will complement and not conflict with the other modal networks that have been developed and will highlight any other infrastructure that needs to be developed. It will include a communication/education programme and phased construction management and servicing management plans to support the movement of freight and goods and services in the SEZ and to encourage jobs and sustainable growth in the region.

.....

It is recommended that a freight feasibility study is completed for the region. It would have a focus on Reduce, Re-time, Re-route and Re-mode of freight trips to improve travel time and reduce congestion and emissions. It will identify issues and options for freight and will provide more evidence for the expansion of Port facilities in the northern Sulawesi. This will look at the opportunities for Inland Ports and freight consolidation, night time deliveries in the region and other options for reducing carbon transport emissions created by freight.

To ease traffic in the Bitung central business district (CBD) and to increase space at the existing port facility, all freight could come off the port and be transferred by train to two new inland ports that are outside the main towns and then distributed by truck to the rest of the economy, pending further construction stages around the island of the freight line. One inland port could be located in the Bitung SEZ and the other near Manado at the intersection of the new toll road and the new ring road.

To assist with easing traffic and providing alternative transport options to the community, the freight train line should also be a passenger train line. Stage 1 of the freight and passenger train line should be between Bitung and Manado, with a series of 'destinations' at the Manado end including the airport, CBD and the University.

**Rec. 2. Investigate and test whether local geothermal power is viable for Bitung SEZ. ★★★**

The potential for increased geothermal power should be investigated and tested as soon as possible to establish if geothermal is viable. Depending on the outcomes of this investigation, wind and solar should also be considered to provide for the full amount of energy required for the SEZ.

Previous feasibility studies for nearby geothermal power need to be reviewed and expanded, if required, to determine if power exists in commercial quantities and in a suitable location or not.

**Rec. 3. Establish if a new port in Bitung SEZ is required in the medium or long term, based on an environmental impact assessment, a transport impact assessment, a cost benefit analysis and evaluation against an alternative economic use such as a restaurant, mixed use development, and housing area supporting the SEZ. ★★★**

If after the current upgrade of the existing port at Bitung City it is still estimated that additional space is required to meet medium and long term demand, then the potential to develop a low key off-shore fuel and cooking oil loading facility at the SEZ that has low or no impact on the existing shoreline other than a jetty with pumping facilities should be evaluated, with an environmental impact assessment, a transport impact assessment and a cost benefit analysis to confirm its future potential.

Any storage facilities at the SEZ should be inland from the coast with the coastline area retained in its natural form for leisure and recreation purposes. Any jetty should be designed to maintain public access to the area and to be resilient from natural disasters and sea water inundation.

The assessment and evaluation process needs to compare the cost benefits of a port with an alternate use of the area such as for a restaurant, shopping and housing strip at a suitable distance from the water to maintain access but be safe from inundation.

**Rec. 4. Continuously repeat in public relations campaigns the message that the transition to a low-carbon economy is the biggest opportunity for the region to realise long term sustainable growth. ★★ ★**

One of the most important messages for the Bitung local government, which should be continuously repeated and brought to the attention of local community in its PR campaign that the transition to a low-carbon economy is the biggest opportunity for the region to realise long term sustainable growth. Bitung SEZ development is their chance to become Indonesia's champions in creating sustainable regional and local human-environment systems as well as an example of how to initiate and sustain economic and social development whilst protecting environment and rich biodiversity.

**Rec. 5. Implement a successful promotional campaign to attract internal and foreign direct investments to Bitung SEZ area. ★★★**

A successful campaign to attract internal and foreign direct investments will need Bitung SEZ area to be promoted as:

- The town prepared for climate change and insulated against high energy prices (explain how);
- Secure, low-carbon energy supply and services available for business, public and domestic sector (when, demonstrate the evidence);
- The town leading on growth in low-carbon jobs, industries, services and training (identify project holders from the initial stage and what support will be provided for business environment and equity preservation, inform whether or how learning, skills and continuous professional development will be subsidised);

- The town exemplar of integrated low-carbon heat/steam, power and transport and an exemplar of neighbourhood community energy solutions (demonstrate a step-by-step several years energy sector development plan); and
- A smart town where energy flows are planned, mapped and monitored (a Bitung energy portal connected to the local council should be developed).
- Design and develop an “Investor’s Briefing Program” to manage expectations and to send a clear message on Bitung SEZ low-carbon goals. This briefing program allows investors to comment and facilitates better understanding of their needs which can lead to a more responsive governance of Bitung SEZ.
- Provide an online sharing platform to efficiently inform investors on the low-carbon plans and programs of Bitung SEZ and supplement capability building programs for regulators. Any forthcoming regulations, as they are being developed may also be posted in this medium. Advance information for investors allows them to prepare accordingly as they firm up their plans for their investment in Bitung SEZ. A central online source of information ensures clarity of message and promotes transparency.

In addition, this online sharing platform may also include sources for low-carbon building materials and technologies, renewable energy technology vendors, and local information for green building strategies for professionals.

- Develop an incentives scheme to stimulate investments in Bitung SEZ that support the use of green and low-carbon technologies and strategies. The provision of incentives must focus on the adoption of cutting-edge energy efficient technologies and the increased use of renewable energy sources. A verification scheme on the adoption of cutting-edge energy efficient technologies and the increased use of renewable energy sources must also be in place. Use of green building rating tools may also facilitate this.

Incentives may be financial, such as tax incentives or rebates. It may also be non-financial such as the providing investors with density bonuses or additional floor-to-area ratios (FARs).

**Rec. 6. Ensure the Government’s strategic objectives and immediate actions are consistent with an integrated approach that has concerted interactions of all stakeholders. ★★★ and ★★**

Government’s strategic objectives and immediate actions should be consistent with an integrated approach, requiring concerted interactions of all stakeholders involved in the project development, comprising of the island population, regional administration and services, interested investors, education and research institutions. In turn, the government should guarantee its holistic approach to administration sensitive of the individual and collective needs of stakeholders. The strategy is to establish strong policy direction around the key immediate low-carbon economic opportunities and seek to strengthen business confidence in exploiting these initially and then continue to upgrade the policy as layers of projects complexity will grow.

Successful and faster delivery of projects will require engagement with a range of stakeholders at the varying stages in the development process. To timely avoid cases, such as the conflict in railway construction, the Bitung local government might consider gathering regular committee meetings of Bitung SEZ development stakeholders or demand several working groups’ proposals, including:

- a) Internal city departments and leaders: economic development, finance, buildings, transport;

- b) Users: commercial building occupants, residential communities, local businesses;
- c) Industry groups and supply chain partners; and
- d) Investors: international development institutions, banks, private sector investors.

During these gatherings/committee meetings, the benefits of a collaborative and coordinated approach should be stated and stakeholders should understand that the government expects an appropriately cooperative response. Transparency and participation in government should be demonstrated so that lobbying groups will see that they must consider not only their own immediate interests but long term interests of all civil society groups.

**Rec. 7. Launch and undertake a large scale long term research project to make a detailed assessment of stakeholders' actions, develop baseline data to monitor annual progress, and keep a scientific record of the Bitung SEZ development. ★★★**

Already now, at the very initial stage, launch large scale long term research projects to make a detailed assessment of stakeholders actions and keep scientific record of Bitung SEZ development, highlighting opportunities for green growth, more efficient use of energy and opportunities to lower carbon emissions as they appear. The outputs of the research programme will help to identify specific project characteristics and trends, help to prioritise actions with a clearly defined business and social case for future projects investment and unlock large-scale flows of investment-grade finance into green growth and low-carbon development in the bigger scale Bitung projects and later in the whole Indonesia economy.

**Rec. 8. Launch and implement activities as soon as possible to strengthen education and training systems, and support skills development, at both industry and public sector levels. ★★★**

Local SMEs lack the internal training strength of large firms and first of all may meet difficulties working with new technologies. For infrastructure-oriented donor funding to be effective, it needs to embed measures for skills development. Therefore, activities to strengthen education and training systems and support skills development at both industry and public sector levels should be launched as soon as possible. This could be supported by an apprenticeship scheme and centre, sponsored by the public and private sector and international companies to train local people. Moreover, in this field efforts to engage the private sector are more likely to be successful, both locally and internationally. SMEs capacity building to implement low-carbon technologies might be an easiest route and the first step to attract international donors. Partnerships with the regional universities should be encouraged.

**Rec. 9. Develop and mobilise the required scale of technology, finance and knowledge, along with new goods and services, as the keystone of the process to deploy energy efficiency and low-carbon technologies. ★★ and ★**

There is unprecedented scale of planned projects in Bitung to deploy energy efficiency and low-carbon technologies, develop new goods and services as well as infrastructure. Mobilising the required scale of technology, finance, and knowledge will be the keystone of the process, and will require great effort. The initiative will demand new cost-effective approaches to stimulate investment and accelerate the process. The programme of several regular international conferences running from 2016 to 2017 should be launched to discuss latest and innovative funding schemes for infrastructure projects in Asia and in particular the real cases of Bitung SEZ should be presented as exercise models at workshops.

**Rec. 10. Develop solutions that address the complex holistic approach at the high level and a systematic understanding of opportunities available at the very local level. ★★**

The danger is that the High Level Strategy even with the actions Road Map is too extensive and does not always make the clear intertwining of large projects at the lower, grassroots, level. As of now, each identified big project looks as if it is independent, however at lower levels they are interconnected, each bringing their own degree of damage to the nature. Therefore, a complex holistic approach at the high level and a systematic understanding of opportunities available at the very local level must be properly developed. It might be sensible to develop a market framework for smaller electricity grid modernisation projects and gradually develop a model that stimulates and scales up low-carbon technology investment.

**Rec. 11. Ensure project holders should see that their benefits fall into two categories: political and socio economical: ★**

a) political: positive relationship development with the local, regional and central government; the government promises to maintain community and stakeholder engagement and will try hard to align stakeholders' goals rather than make them directly compete; align large programmes with skills and training and by doing this get recognition on a state level; and

b) socio-economical: the government will support projects scale to drive supply chain growth, support investor confidence, control development of coherent and connected infrastructure, work on the development of innovative financing mechanisms, encourage and facilitate shared learning and expertise, shared resources, e.g. efficient procurement.

**Rec. 12. Introduce a local reward scheme and a programme of regular competitions to constantly increase low-carbon standards and make achievements of local businesses widely visible. ★**

## 2. LEGAL FRAMEWORK

### FINDINGS

The Indonesian Government has proposed Bitung City, particularly Bitung SEZ in the North Sulawesi Province to be the candidate city for case study for the APEC Low-Carbon Model Town (LCMT) Phase 5 Project. During the energy Working Group (EWG) 48 in Port Moresby, Papua New Guinea in November 2014, the Agency for Natural Resources on Energy (ANRE), the Ministry of Economic, Trade and Industry (METI) of Japan as the Project Overseer of LCMT Task Force announced that Bitung City, Indonesia to be the case study for APEC LCMT Phase 5 project.

Low-carbon town development in Bitung City, North Sulawesi Province, Indonesia is unique as the target area is Bitung SEZ. According to Special Economic Zone Law No. 39 of 2009, the development of industrial areas that seek to optimize the economic activity is called SEZ, is an area with a certain extent within the territory of the Republic of Indonesia is set to perform the functions of the economy and acquired certain facilities. Therefore in order to introduce low-carbon town development in Bitung SEZ, not only Indonesia's economy policy and regional development policy should work together but also Indonesia's energy policy and regional development policy as well.

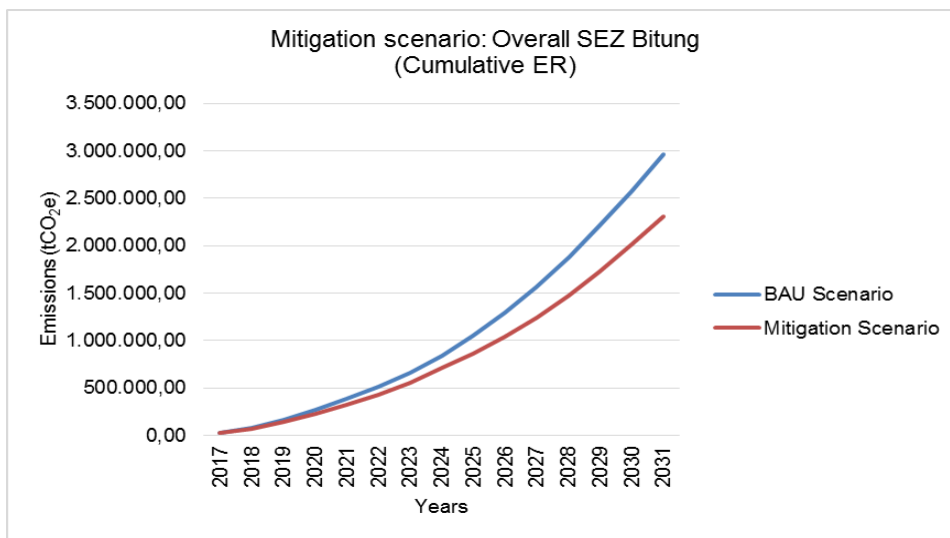
Law No. 39 of 2009 on Special Economic Zone is also emphasised that in order to implement the development of SEZ, the Indonesian government should establish the National and local SEZ Management Council (SMC). The National SMC is chaired by the Coordinating Ministry for Economic Affairs and the member of the council consists of ministries and head of non-ministry agencies (i.e. Minister of Interior, Minister of Finance, Minister of Industry, Minister of Public Work, Minister of Trade, Minister of Transportation, Minister of Manpower, State Minister of National Development Planning/Bappenas, and Head of Indonesia's Investment Coordinating Board/BKPM). While in the Local SMC, the Governor serves as the Head of Council and Mayor/Regent becomes the Deputy Head. The member of the Local SMC consists of a) provincial officials who have a responsibility in the field of taxation, customs, land, and immigration; and b) provincial and municipality officials who have a responsibility in the field of local economy, planning, and development. In general, the relationship between the Central Government of Indonesia and two-tier local governments (North Sulawesi Provincial Government and Bitung City Government) is so far well-coordinated. As can be seen in some Bitung SEZ infrastructures development (i.e. toll road, Bitung SEZ Management Agency office, and expansion of Bitung port), the funding is come from state budget and regional budget. In addition, there is also obligation for the Local SMC to report its duty and functions to the National SMC as part of consultation and/or coordination periodically at least once every 6 (six) months or if necessary.

Bitung SEZ was proposed by the Governor of North Sulawesi Province and supported by the Mayor of Bitung City to the Central Government through the National SMC aims to create a conducive environment for investment, export, and trade to accelerate the achievement of national and local economic development (both for North Sulawesi Province and Bitung City). After meets several criteria, among others comply with the spatial planning (RTRW) of the province and the city and no potential harmful to the protected area, and there is support from local government - Bitung SEZ proposal has been approved by the President of Indonesia as one of SEZs to be developed under the Government Regulation No. 32 of 2014 regarding Bitung Special Economic

Zone. According to this regulation, the area of Bitung SEZ covers 534 ha which is located in Matuari district, Bitung City, North Sulawesi Province.

The government both in the central and local governments have been aware that many activities related to business will be running in Bitung SEZ (i.e. activity related to industry, transportation, electricity) which may become a source of increasing CO<sub>2</sub> emission. Based on the assessment of the Feasibility Study (FS) report, energy sector will be the main emitter with 87% of total GHG emissions under the BAU scenario, followed by transportation sector (8%), waste sector (5%), and almost negligible AFOLU (Agriculture, Forestry and Land Use) sector (0.07%). Considering this situation, the government is very keen to seek the appropriate measures to establish a sound development of urbanisation with controlling the increase of CO<sub>2</sub> emission. According to the FS report, overall greenhouse gas (GHG) emission in Bitung SEZ can be reduced by 22% (0.65 m tCO<sub>2</sub>e) by 2031 compared to the BAU scenario if LCMs are implemented in Bitung SEZ from approximately 2.9 m tCO<sub>2</sub>e to 2.25 m tCO<sub>2</sub>e (see Figure 16 below).

Figure 16: GHG emission Estimates in Bitung SEZ 2017-2031



Source: South Pole Group, 2015

As part of implementing the appropriate measures to establish a sound development of urbanisation with controlling the increase of CO<sub>2</sub> emission, “High Level Vision Statement for Bitung SEZ” has been identified that Bitung SEZ is expected to become a role model for sustainable, low-carbon urban and industrial planning for Indonesia, and will contribute to Indonesia’s goal of reducing 26% of GHG Emissions by 2020 compared to the BAU Scenario. This vision will be implemented by developing the low-carbon model town strategy along the following four axes:

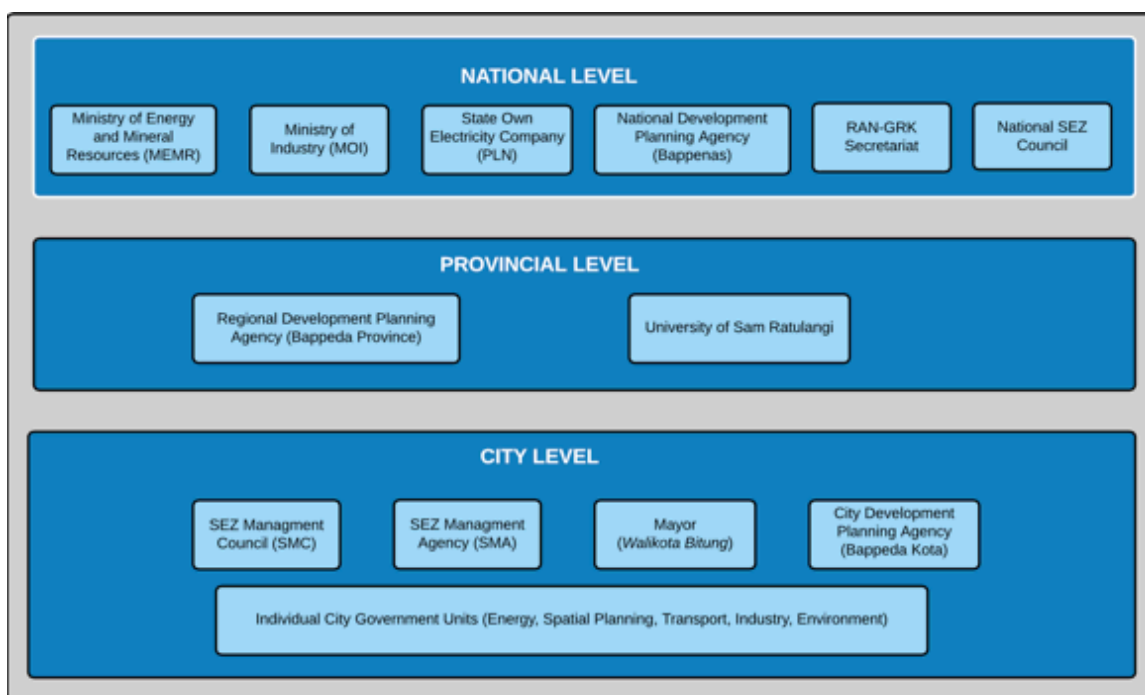
- Ensure alignment with existing local and national development policies, regulatory frameworks and institutional set-ups;
- Reduce energy consumption through the use of clean, green energy generation and more energy efficient technologies and practices;
- Ensure an efficient and environmentally balanced management of resources through the utilisation of the best available low-carbon technologies for industry, commercial and residential areas, for solid waste and wastewater management, for forestry and land use, and for transportation; and



- Apply an accurate, transparent and functional monitoring, reporting and verification system of the GHG emissions and the related sustainable development impacts (*South Pole Group, 2015*).

In the process of developing Bitung SEZ as well as planning implementation of LCMs in the zone, many institutions (national, provincial, and municipal/city levels) are involved. Each institution has its own policies and regulations that should be followed and referred by North Sulawesi SMC and Bitung SMA. After Bitung SEZ has been approved, the SMC for North Sulawesi Province was established in 2014 upon the President Decree No. 34 of 2014 regarding the North Sulawesi Special Economic Council. The main purpose of the North Sulawesi Province SMC is to oversee the development of Bitung SEZ. In this role, this institution will play a very important part in the planning and implementation of the low-carbon strategy developed (*South Pole Group, 2015*). Currently, the Governor of North Sulawesi Province is the Head of SMC. As operational arm of the SMC of North Sulawesi Province in regard to the overall development of Bitung SEZ, Bitung SMA needs to be established by the North Sulawesi Province SMC. The SMA is also planned to serve as a one-stop service institution (*South Pole Group, 2015*). However, Bitung SMA has not been yet established by the North Sulawesi Province’s SMC.

*The Key Institutional Actors relevant to the LCMT in Bitung SEZ*



Source: *South Pole Group, 2015*

As part of support from the Central Government (through the Ministry of Industry) to the initiative of the local government to propose Bitung City as one of SEZ candidates in Indonesia, the Bitung SEZ Master Plan 2008-2031 has been provided. The Bitung SEZ master plan output is the conception of an integrated industrial park that is organised based on core competency areas, corresponding to spatial and environmental requirements. The work was completed in 2013/2014, for a total area of 534 ha (*South Pole Group, 2015*). However, since APEC LCMT Phase 5 project in Bitung City just officially announced in November 2014 - then LCDS, LCMs and associated budget are not yet considered in the Bitung SEZ Master Plan 2008-2031. After the FS report on low-carbon town development in Bitung SEZ has been completed, there is a plan from the local government (North

Sulawesi Province and Bitung City) to integrate LCDS, LCMs and associated budget in the new Master Plan of Bitung SEZ.

One-Stop Permitting (OSP) enabling with a reasonable time limit in which a decision is to be made has been established in the city of Bitung. Currently, there are 33 (thirty-three) type of licenses in Bitung City can be issued in OSP office. OSP office will be moved to the office of the Bitung SMA - since this agency will serve as a one-stop service institution - to provide convenience to potential investors who will invest in the SEZ.

Electricity infrastructure development to secure adequate electricity supply in the SEZ is still perceived as one of the obstacles since the planning of electricity development is still mostly in the hand of the central government.

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## RECOMMENDATIONS

★★★Recommendation for immediate action; ★★Recommendation for action in next 2-3 years; ★Recommendation for action in the longer term.

### **Rec. 13. Maintain good governance, coordination, cooperation and strong leadership of the central government and local governments of both province and city, in order to realise low-carbon Bitung SEZ. ★★★**

Many institutions will involve in the process of developing low-carbon town in Bitung SEZ. In order to make effective and efficient planning, budgeting, and monitoring of implementation low-carbon Bitung SEZ, good coordination, cooperation, and strong leadership among agencies and actors should be continued carried out. However, good coordination, cooperation and strong leadership among agencies and actors can be only conducted if they have same vision, mission and understanding on how low-carbon town development will be implemented in Bitung SEZ.

In this regards, to obtain support and commitment from the National SMC, related agencies, and actors, the Governor of North Sulawesi and the Mayor of Bitung City as Head and Deputy Head of SMC for North Sulawesi Province with support from the Ministry of Energy and Mineral Resources should open dialogue, transparently inform, and closely discuss about the process, plan, and result of the local governments' idea to implement low-carbon town development in Bitung SEZ. "Road show" to inform the benefits of implementation of low-carbon town development in Bitung SEZ and what kind supports are needed from related agencies and actors may be considered to be carried out. Good coordination and cooperation between agencies in the national, provincial, and municipal level should avoid uncoordinated development scenarios for Bitung SEZ which can be resulted to duplication and/or overlapping planning and development program from each agency.

### **Rec. 14. Identify (in parallel) what kind of the low-carbon regulations, standards, and procedures needed to be prepared in North Sulawesi SEZ Management Council (SMC). ★★★**

As part of activities to coordinate and cooperate with related agencies and actors, North Sulawesi Province SMC can start to identify what kind of the low-carbon regulations, standards, and procedures need to be prepared. Step for identifying the low-carbon regulations, standards, and procedures can be started as follows:

- Review current and planned regulations, standards, and procedures from each regulator agency, related agencies, and actors as well as the levels (national, provincial, municipal);

- Examine the implementation of those current and planned regulations, standards, and procedures whether its meet the implementation of similar urban low-carbon initiatives and/or international best practices around the World or not;
- Identify the implementation of those current and planned regulations, standards, and procedures whether those regulations, standards, and procedures are well implemented or not (e.g. having weaknesses, gaps, conflicting with other regulations, vague procedures or standards);
- Provide a list of regulations, standards, and procedures that need to be revised, streamline, or made a new one based on the findings of steps above. Try to explain the reason why regulations, standards, and procedures need to be revised, streamline or made for clarity.

**Rec. 15. Have a regular meeting between the central government, local governments and SMC to solve the obstacles that may rise during the implementation of the electricity infrastructure projects, in order to secure adequate electricity infrastructure in the SEZ. ★★★**

Even though in the President Regulation No. 33 of 2010 and the President Decree No. 34 of 2014, the Minister of Energy and Mineral Resources and Head of Energy and Mineral Resources Division of North Sulawesi Province are not members of National and local SMC, however SMC could seek advice and/or assistance from government agencies or experts if necessary. Following these regulations and as part to secure adequate electricity infrastructure in the SEZ, the National or local SMC may consider forming "electricity team" where the member of the team consists of official from related ministries or agencies such as Directorate General of Electricity, Directorate General of New, Renewable Energy and Energy Conservation, local agency who has responsibility in electricity, and/or PLN. The main task of the "electricity team" among others are to identify the necessary electricity infrastructures needs to be developed; determine electricity infrastructure business scheme (to be developed by PLN, Independent Power Producer (IPP), Public Private Partnership (PPP), or Private Power Utility (PPU)); identify supports are needed from the government; monitor and solve the obstacles that may rise during the implementation of the electricity infrastructure projects. The team should meet regularly and report to the National or local SMC. The budget for the team may come from the central government and/or the local government.

**Rec. 16. Encourage local governments to be involved in the electricity planning and development, in order to secure adequate electricity infrastructure in the SEZ. ★★★**

In order to fulfil electricity needs for local area, the central government should give priority to the local government in the planning and development of electricity infrastructures. If the local government could not have capability and capacity, then cooperation with other parties should also be encouraged. When the electricity infrastructure will be planned and developed by the central government, as much as possible the central government should involve the participation of local government in the planning and development as early as possible.

**Rec. 17. Expand North Sulawesi SMC's authority to include oversight of implementation of the Low-Carbon Development Strategy (LCDS) and establish a Bitung SEZ Management Agency (SMA) by North Sulawesi SMC as soon as possible. ★★**

As identified in the FS report, North Sulawesi Province SMC and Bitung SMA are the essential institutions that need to be established in order to ensure the successful implementation of the LCDS and later these two institutions will be involved in all of the proposed LCMs. Currently, based on the Law No. 39 of 2009 and the President Decree No. 34 of 2014, the main purpose of the SMC for North Sulawesi Province is to oversee the development of Bitung SEZ. Since there is a plan from the Central Government

through the Ministry of Energy and Mineral Resources and the Local Government (Provincial and Municipal level) to develop low-carbon town in Bitung SEZ then the Indonesian Government should consider expanding the SMC's authority to include oversight of implementation of the LCDS and involve this institution in all of the proposed LCMs.

In addition, following the instruction from Law No. 39 of 2009 the North Sulawesi Province SMC should also establish the Bitung SMA as soon as possible. This institution is needed as the on-the-ground coordinator and main implementation manager of Bitung SEZ. When the authority of the SMC has been expanded to include oversight of implementation of the LCDS and involve this institution in all of the proposed LCMs, the Bitung SMA will be the only one institution having authority to monitor the compliance of the people in Bitung SEZ with the low-carbon regulation developed by the SMC as well as law enforcement.

**Rec. 18. Involve all stakeholders in the preparation of regulations, standards, and procedures related to low-carbon measures through transparent methods. ★★**

Participation of stakeholders through public hearing should be accommodated at the beginning. During the preparation of those regulations, standards, and procedures, North Sulawesi Province SMC should provide enough time for participation of stakeholders to involve in the formulating of the regulations, standards, and procedures and provide feedback and comments before it finalised. All the process of drafting until finishing of the regulations, standards, and procedures should be easily accessed by public. There is also enough time for dissemination to the people before the regulations, standards, and procedures start to be enforced.

**Rec. 19. Provide attractive incentives to support the regulations, standards, and procedures that raise awareness and encourage people in the SEZ to develop low-carbon measures. ★**

The development of low-carbon town in Bitung SEZ is the first project and program for Indonesia where optimisation of local economy activity through development of industrial area will be alignment with controlling the increase of CO<sub>2</sub> emission. As effort to attract investors to come to Bitung SEZ, the government provides some facilities and incentives. This approach should be applied as well for encourage awareness of people in ZES to develop low-carbon measures instead of applying punishment that can make deterrent of investors to come to SEZ. "Low-carbon instrument" (e.g. subsidy, pricing, incentive, ease of license) should be well prepared and introduced by North Sulawesi Province SMC; and it should be easy to be used and implemented without complicated procedure for investors who are willing to invest in SEZ.

### 3. SUSTAINABLE URBAN PLANNING

#### FINDINGS

In order to encourage good planning for the development of the Bitung SEZ, the Ministry of Industry (MoI) has provided support for the Bitung SEZ Masterplan development from 2008 onwards. The Bitung SEZ master plan output is the conception of an integrated industrial park that is organised based on core competency areas, corresponding to spatial and environmental requirements. The work was completed in 2013/2014, for a total area of 534 ha. Currently, Bitung City government has designated a 92 ha area to proceed with for Stage 1 of the Bitung SEZ development.

Although construction work has commenced on Stage 1 it is not too late to update and revise the master plan to incorporate and integrate the recommendations of this report and for the plan to champion and explain low carbon economic growth principles.

The location of the site with its distance from both the port facilities and the existing central business district present challenges and opportunities in integrating the site into an improved connected city able to adapt to future changes in both economic activity and public and private transport options.

Decisions that are being made now will have a significant impact on the sustainability of the new precinct and the wider Bitung and North Sulawesi region. Genuine on-going community engagement in the future of the development needs to be commenced and simple and repeatable ways to measure the SEZ's environmental progress need to be put in place. Demonstration projects that showcase best practice need to be supported and made accessible to new factory owners, workers and residents so they can experience and view the benefits of the low carbon techniques across the development.

Alongside decisions that will have a long-term impact, such as the rail transport links to the port, the future economic value of a restaurant, shopping and housing strip along the SEZ's waterfront needs to be evaluated carefully against this option being lost if a port facility is put in this location. These long-term planning matters need to be part of the community engagement process that is recommended to commence as soon as possible.

Bitung with its strategic location and varied forestry and marine resources is ideally placed to benefit from the growth in tourist cruise-ship visits. Along with day trips to forest and dive sites consideration needs to be given to a future visitor 'destination' within the SEZ.

#### RECOMMENDATIONS

★★★Recommendation for immediate action; ★★Recommendation for action in next 2-3 years; ★ Recommendation for action in the longer term.

**Rec. 20. Develop a design brief and policy settings for Bitung SEZ through an Enquiry by Design process, which genuinely engages the community and sets out the expectations and potential solutions for a low-carbon community precinct. ★★★**

A design brief should be established for the new development zone that engages the community through an Enquiry by Design process (also known as a Charrette). The relevant government bodies

need to embrace the outcomes of the community engagement and demonstrate that they will progress the suggestions that come from the community planning sessions. Undertaking this process will reduce project delays and save money during the planning and development stages by providing local ideas and solutions, and deliver alternative solutions that may have not yet been considered.

An Enquiry by Design process gets different people in the community engaged in a process to draw their ideas and solutions onto a physical large scale map of the area. A skilled facilitator experienced in doing this type of process is needed, along with choosing times and locations that encourage community participation. For example: offering a free barbeque on a weekend, engaging with school students at their school on a weekday, etc.

The Enquiry by Design process should engage the community in a number of separate sessions over a 3-5 day period to do a design for the new town in an informed conversation. Participants would include SEZ neighbours, local shop owners and school children as well as non-government organisations and all relevant government and local officials.

- Creative solutions need to be used to encourage members of the community unused to having their voice heard, to fully participate and to feel like they are genuinely being listened to and their ideas taken seriously.
- The steps for doing this Enquiry by Design process would be:
  - Update and engage the community on the project's low-carbon goals and considerations for the new development and where the process for the staged development is up to.
  - Questions should then be posed to the community who attend, asking them to come up with solutions and locating their solutions on a large map. These questions may include:
    - How would you design the precinct to have as minimal impact as possible on the environment? Could you use permeable paving in carparks and green roofs to assist with reducing storm water runoff? How would you orient the buildings to encourage minimal energy use? What materials would you use around the site that have less impact on the environment?
    - Where would you locate community spaces, parks and schools? How many of these facilities would you need and what other facilities are needed?
    - If a passenger train line will cross the precinct, where would you locate passenger station stops on the train line based on destinations, and what options would be needed to encourage people onto a passenger train (for example free wi-fi)? What other destinations in addition to Manado Airport, CBD and Manado University would be worth including on the train line?
    - If there was an inland port in the new economic zone where freight was transferred from train to trucks, where should it be located?
    - Where would you locate houses, roads and factories, and how would you design them to withstand the monsoonal rains and to be cool and comfortable for people who work or live in the buildings?
    - What types of housing and what housing densities should be included?
    - Where would you locate the network of streets and cycle ways to encourage people to walk and cycle to work and shops?
    - Where would you locate services like markets, shops and medical services?
    - Where would you locate chilled filtered re-fill water stations in community and work areas to save the community having to buy bottled water? Who could support or sponsor these water stations?

- What jobs target should be set for the SEZ?

For an example of a 'design brief' in the form of a practice guide for areas considering Transit Orientated Development see <http://bit.ly/TOD-Guide-for-Practioners>.

**Rec. 21. Develop an assessment tool and data collection process, and then monitor and collect data from the project, to ensure the project meets its low-carbon goals and targets. ★★★**

Engage the Indonesian Green Building Council to adapt an existing tool to suit what is required to be measured in the SEZ.

Set up a process to monitor and collect data required by the rating tool to determine 'as built' performance and to monitor energy usage.

If a target is being set for a percentage of factories to meet a 'bronze', 'silver' or 'gold' target, be clear and consistent as to what the long-term policy 'rules' are to allow industry to invest and deliver better flexible outcomes.

- For example: clear targets and non-negotiable high performance building regulations allow industry to determine their own solutions.
- It is not always about financial incentives, it is about setting strong reliable and enforceable guidelines for the SEZ that allow industry to set and develop their own ideas to meet the targets.

Determine the residential numbers and plan the infrastructure for the final population from Stage1.

Mandate minimum building standards in the SEZ. For example white roofs, ceiling and wall insulation levels, minimum energy performance standards (MEPS) for industrial ceiling fans, air-conditioners and chillers.

Investigate alternatives to concrete use and monitor progress in 'carbon negative cement' technologies to see if they could be incorporated into the SEZ at a future stage.

Encourage recycling at the SEZ, particularly plastic, and look at setting a target for the reduction in the amount of plastic used in the SEZ.

**Rec. 22. Update the SEZ master plan to incorporate and integrate the recommendations of this report. ★★★**

The SEZ master plan needs to be updated to reflect the findings of this report and to champion and explain low carbon economic growth principles.

**Rec. 23. Deliver a demonstration precinct in stage 1, with a focus on how the factories, residences, offices, urban spaces, technology and landscaping interact to deliver a sustainable solution. ★★**

Tourist cruise-ship passengers look for a range of day and half day trips during shore excursions, local knowledge can be used to investigate the possibility of a unique 'food' or 'sustainability in action' type of attraction developed at the SEZ. The SEZ master plan needs to be updated to reflect the findings of this report and to champion and explain low carbon economic growth principles.

## 4. LOW-CARBON BUILDINGS

### FINDINGS

Indonesian economy is forecast to grow at an annual rate of 6.1% from 2,177 trillion IDR (2009) to 3,943 trillion IDR (2019), coupled with an annual population growth of 1.1%. Accordingly, energy demand will grow at an annual rate of 7.1%. Indonesian government set up its National Energy Conservation Master Plan (RIKEN, Rencana Induk Konservasi Energi Nasional) in 2005. RIKEN set the national energy efficiency goal as decreasing the energy intensity by an average of 1% per year to 2025 through energy efficiency and conservation measures. The sectoral energy saving potential is as table 8 below.

*Table 8: Sectoral Energy Saving Potential*

Sector	Energy Consumption (million BOE, 2012)	Energy Saving Potential	Energy Conservation Target (2025)
Industry	305 (39.7%)	10-30%	17%
Transportation	311 (40.4%)	10-35%	20%
Household	92 (12%)	10-30%	15%
Commercial	34 (4.4%)	10-30%	15%
Others	26 (3.4%)	25%	-

*Source: Draft National Energy Conservation Master Plan (RIKEN) 2011*

Unlike the information on national energy policies, the information on local energy policies and measures such as building energy code, green procurement and energy efficiency standard and labelling is not accessible. The provision of the information would have been helpful to assess the current status of city-wide green building policies. In that context, the awareness and capacity of local government on low-carbon building seems to be limited. But considering the fact that national building energy efficiency programs are in progress, they will be reflected and implemented in the later stages of Bitung SEZ development.

Currently national energy efficiency programs are covering only electricity. Minimum Energy Performance Standards (MEPS) is applied for selected residential and commercial appliances such as lighting, air conditioners, refrigerators, clothes washers, electric irons and vacuum cleaners. According to government regulation No. 36/2005, all buildings need to comply with four building energy standards: (1) building envelope; (2) air conditioning; (3) lighting; (4) building energy auditing.

The port City of Bitung is expected to be an international hub port as it sits at a strategic geographical location in international trade routes. The plan is supported by central government with the designation of Bitung SEZ. Bitung SEZ will entail significant amount of energy. Currently Bitung City is dependent on diesel generators and hydro power plants for most of its energy demand. To meet the increasing energy demand in a sustainable way, Bitung City is planning to introduce low-carbon programs such as LED lighting, Building Energy Management System (BEMS), low emission glasses, natural lighting system, efficient home appliances and low emissivity glasses. It is noted that ambitious photovoltaic (PV) panel installation in all types of buildings is in place in Bitung SEZ.



## RECOMMENDATIONS

★★★Recommendation for immediate action; ★★Recommendation for action in next 2-3 years; ★ Recommendation for action in the longer term.

**Rec. 24. Increase the capacity of local government on low-carbon buildings by learning experiences from other low-carbon towns. ★★★**

The capacity of local government officials who are in charge of implementing low-carbon measures is vital to the success of Bitung LCMT. The well-organized plan by capable and learned officials will shorten the overall duration of the SEZ development and expedite the implementation of LCMT and ensure the good quality of low-carbon measures. It is advised that the LCMT-related officials attend the capacity building programs provided by various international organisations such as Asian Development Bank (ADB), ASEAN Centre for Energy (ACE) and Asia Pacific Energy Research Centre (APEREC). The capacity building program needs to include policies, technologies with case studies and site visits of other green cities.

**Rec. 25. Set a clear and more ambitious target for photovoltaic (PV) installation and prioritisation among relevant building sectors. ★★★**

Currently 2 MW is planned for PV installation for Bitung SEZ. In addition for commercial and residential building, industrial buildings are good sites for PV installation with their comparatively bigger space for PV installation. Simply put, industry buildings have the cost-effectiveness by the economy of scale. In the context, PV installation on factory rooftops can be priority sector with its cost-effectiveness. An ambitious notch-up of PV target will be possible through the mobilisation of all available spaces of industry, commercial and residential sector. A technical feasibility study on each building type and detailed installation plan for each sector will be helpful to achieve the overall PV installation target.

**Rec. 26. Include Eco-Industrial Park (EIP), Green Procurement and Green Building Code into the SEZ tender process and make them reflected in the construction at the design stage. ★★**

EIP is an industrial park in which businesses cooperate in reducing waste and pollution and sharing resources such as energy, water and materials to increase economic profitability and environmental benefits. For example, waste steam of factory A might be recycled as energy resource of adjacent factory B with connecting steam pipelines. With this scheme, factory A can earn revenue by selling waste heat which would have been dumped otherwise, while factory B can save cost by using cheap and easily accessible energy. Inclusion of EIP concept in the SEZ development at the design stage will be one of fundamental energy saving solutions and will make Bitung SEZ more economically sound and environmentally friendly project.

Purchasing and installing low-carbon energy-efficient equipment and appliances in the construction stage will be another fundamental energy saving solution. In that context, Green Procurement and Green Building Code need to be in place at SEZ tender process. Mandatory purchase of low-emissivity windows, premium motors, efficient air-conditioners, LEDs and other green devices and materials will contribute to meeting the target of energy saving and GHG emissions reduction

**Rec. 27. Include energy efficiency measures for thermal energy (steam) low-carbon measures for industry. ★★**

Thermal energy is also important resource of energy in building. It is used for heating, cooking and producing steam, an important source of energy in industry. Industry takes 57.45% of Bitung SEZ in land use distribution. Boilers and pressure vessels are one of big energy users in most industries. In

that sense, the measures for saving the thermal energy in industries and buildings should not be neglected and be included in LCMs in addition to electric energy.

**Rec. 28. Include and promote green Best Available Technologies (BATs) such as PV + Energy Storage System (ESS) and Building Energy Management System (BEMS). ★★**

Even though PV is the representative and prevalent renewable energy technology, it has the limit in providing reliable power for 24 hours. The generation of PV system stops during night time and rainy days, which is called 'intermittency' problem. As such, the generating efficiency of PV system is highly dependent on the weather conditions, blocking PV as a reliable source of power. To solve the intermittency problem and secure reliability of PV, Energy Storage System (ESS) needs to be combined with PV system. The solar roof program of Bitung needs to adopt best available technology of hybrid system of PV and ESS.

BEMS is an integrated and systematic approach of saving energy in buildings. It has technical features of monitoring and controlling the building energy use from heating, ventilation and air-conditioning (HVAC) to lighting, security and maintenance with electronic sensors and soft-wares in a holistic way.

**Rec. 29. Include and promote green rooftops (solar panels, rooftop gardens) for all buildings, reducing cooling demands and generating green energy. ★★**

Besides being the sites for installing solar panels, rooftops are great places for reducing cooling demands with the introduction of rooftop gardens. Rooftop gardens have many benefits. The planting of trees and vegetation has decorative effects, provides food and provide rest areas for residents. More than anything else, it can cool down the building temperature, resulting in saved energy and cost with reduced cooling demands.

**Rec. 30. Raise green awareness among decision-makers, employees and the public. ★**

Green awareness of decision-makers on low-carbon sustainable development is a strong driver of low-carbon measures and a starting point of the successful implementation of the measures. And decision-makers awareness will get greater momentum when it is shared with working-level government officials and employees and the public, thus removing various sorts of barriers in social system and in mind. For the purpose, two practical measures are proposed:

- Establish and support Best Green Practice sharing forum among industries;

Best Green Practice sharing forum is a knowledge-sharing meeting among the same industry, where workers can share their energy saving practices, technologies and innovative ideas. This type of forum is highly recommended since it will function as a networking place of energy managers, resulting in spreading best practices and a birth place of productive and innovative collaboration among businesses. Outside experts can be invited to provide up-to-date energy efficiency technologies and insight into the industry. Local government can help its establishment and support the activities with financial and technical assistance.

- Build flagship Low-Carbon Building in SEZ and apply for awards (e.g. ASEAN Energy Award) and internationally notable certification/rating (e.g. Leadership in Energy and Environmental Design - LEED);

A well-designed flagship low-carbon building will be an excellent awareness-raising tool since it will be a tourist spot of Bitung as a landmark building. When it comes to awareness, award is also a great PR tool. It is recommended that Bitung City apply for ASEAN Energy Award in building

sector with its flagship low-carbon building. And the application for internationally notable green building certification such as LEED is highly recommendable since it will boost the reputational image of Bitung as low-carbon city. The process of application itself will also enhance the green awareness of the whole community of Bitung. In the process of applying for awards and certification, Bitung City officials will acquire capacity for low-carbon building and the citizens of Bitung will be better knowledgeable about the low-carbon building and its benefits.

**Rec. 31. Adopt, adapt, or develop green building rating systems. ★**

Adoption, adaption or development of “green building” or low-carbon rating systems with particular focus on increasing the energy efficiency performance of buildings “beyond code” are popular tools in promoting low-carbon development. Bitung SEZ may align their incentives programs to rating tools and provide incentives to projects with higher ratings. All over the world, there is increased interest in the use of green building rating tools as policy tools and its use is very popular to investors and regulators alike.

Green Building Council Indonesia has a green building rating tool called GreenShip. It may be readily adopted for use or may be referenced (adapted). It must be noted, however that not all green building rating systems are alike and its adoption or adaption requires careful review of its applicability, appropriateness and fitness to current building, energy and environmental regulations in Bitung SEZ.

Development of a Bitung SEZ green building rating tool is also an option, however it must be noted that development of a green building tool requires significant research and development investment and may take a significant amount of time. Maintenance of a bespoke rating tool for Bitung SEZ also has significant costs. Other green building rating tools that may be used includes: LEED, a system developed by the US Green Building Council; and Comprehensive Assessment System for Built Environment Efficiency (CASBEE), a popular green building rating system developed in Japan.

Currently, there is no clear policy that formally require the use of green building rating systems. Its use is still very much in the early stages and is largely *ad hoc* in Indonesia. Investors recognize green building rating systems’ marketing value for the commercial sector and remains largely the driver for its use. The residential sector perceives green building as an added cost and local information regarding green building benefits for the residential sector do not exist. A contributing factor to the property sector’s low and slow acceptance of existing green building rating systems may be attributed to the apparent incompatibility of it to building and environmental regulations and the perceived additional costs.

## 5. AREA ENERGY MANAGEMENT SYSTEMS

### FINDINGS

Bitung SEZ is still very much in the early stages of development. Current development is largely government-driven with very minor participation of the private sector.

Sound general policy framework, plans and programs to support low-carbon development is in place at the national, provincial, and city level. However, a clear set of mandatory minimum level of energy efficiency compliance or onsite renewable energy technology mobilisation for prospective locators in Bitung SEZ is not present or is unclear.

A specific entity, duly appointed by central government or a qualified authority, to directly adopt and implement an Area Energy Management System (AEMS) is not present or unclear. Without this entity, decision-making for necessary development and revision of plans and programs to support an AEMS in Bitung SEZ may be challenging.

Adoption of internationally-recognized green building rating systems that support implementation of energy efficiency and conservation “beyond code” through the use of green building strategies and technologies is not present or unclear.

Financial incentives and guarantee mechanisms to support the private sector in mobilising renewable energy and energy efficient technologies does not exist.

### RECOMMENDATIONS

★★★Recommendation for immediate action; ★★Recommendation for action in next 2-3 years; ★Recommendation for action in the longer term.

#### **Rec. 32. Establish an area management system for Bitung SEZ. ★★★**

Clear Governance Structure - A specific entity, duly appointed and authorized by central government or a qualified authority, to directly adopt and implement an AEMS is not present or unclear. There is a need to delegate to a central authority the implementation of plans and programs. This entity needs to be established with clear set of roles and responsibilities to ensure proper management, implementation, monitoring and evaluation of low-carbon strategies to ensure continuous improvement.

Without a clear governance structure, decision-making for necessary development and revision of plans and programs as the development of Bitung SEZ progress may be challenging. In addition, an established governance structure enables investors understand the roles and responsibilities of the various actors who will be governing and managing the AEMS.

A policy, plan or program specific to the adoption and implementation of an AEMS for Bitung SEZ is not present. A well-documented and easily accessible AEMS should be developed to enable investors to easily understand and navigate regulations that may impact their investment. This management system effectively communicates the intent and commitment of Bitung SEZ to be a low-carbon town. The AEMS should have information on the following:

- Energy Efficiency and Conservation Plans and Programs - General policies to support the development of an LCMT is present. However, plans and programs specific to Bitung SEZ does not exist. Specific plans and programs to support low-carbon development may include: mobilisation of onsite renewable energy technologies of both the economic zone and its locators; use of automated building energy management systems; and the adoption of internationally accepted building energy standards. Charrettes, attended by Bitung SEZ stakeholders, both from the public and private sector may be conducted to support crafting of implementation strategies. Charrettes due to its participatory nature, facilitate investor confidence and “buy-in”.
- Clarify benchmarks, targets and indicators for investors. Adoption of internationally-accepted product and management system standards which are generally accepted by international investors is not part of current plans and programs to support low-carbon development.
- International companies prefer to invest in economies where internationally-accepted product and management standards are adopted. Moreover, majority of international companies have, as part of their mandates, documented support to the use of internationally-accepted standards as they conduct business in different parts of the world as these provide predictability and certainty in compliance and are easier to navigate.
- Audit Framework - Design and develop an audit framework with a central authority complemented by robust monitoring and evaluation procedures. This audit framework ensures compliance of investors on Bitung SEZ plans and programs. Audit outcomes may support monitoring and evaluation which is needed to better understand the effectiveness of plans and strategies implemented. On an annual basis, decision makers can fine-tune plans to better achieve targets and desired outcomes.
- Pathways to Continuous Improvement – It must be recognized that Bitung SEZ may need to continuously develop regulations, standards to support low-carbon goals. Investors should have a mechanism to propose of recommendations for consideration of public decision-makers that facilitate continuous improvement of the AEMS. Recommendations may include the use of progressive and aspirational energy standards and provision of incentives for it. Design and develop capability building programs for regulators to support Bitung SEZ plans and programs.

## 6. RENEWABLE ENERGY AND UNTAPPED ENERGY PLANNING

### FINDINGS

By promoting the city of Bitung to be under SEZ, one of the primary concerns would be the stable supply and cost competitiveness of electricity provided in SEZ. However, the framework of LCMT would even make it more challenging to carefully implement Bitung SEZ as it is conventionally known that renewable, and hence low-carbon, energy is more expensive than heavy-carbon fossil energy. Four out of ten LCMs from feasibility study are addressed on energy-related issues: utilisation of clean energy (geothermal energy), anaerobic digestion on solid waste and wastewater, PV panels on buildings and thermal energy generation from agricultural waste.

### RECOMMENDATIONS

★★★Recommendation for immediate action; ★★Recommendation for action in next 2-3 years; ★Recommendation for action in the longer term.

**Rec. 33. Further elaborate in both technical and economic aspects assessment of all four potential renewable energy sources. ★★★**

Planning of 120 MW geothermal power plant (GPP) should show technical data on potential location and how far it is from SEZ. Any prior exploration has been assessed for geothermal potential? Would the investment on GPP be considered under SEZ benefit?

Planning of anaerobic digestion from 150 tons per day of municipal solid waste (MSW) should show some forecast of industrial and residential area development within SEZ so that solid waste and wastewater can be estimated in order to justify enough methane generated for electricity generation. Without detailed plan of SEZ development, it is difficult to rely on this source of renewable energy.

Planning of PV panels on buildings should first show estimate of buildings from forecast of industrial and commercial area development within SEZ above mentioned in order to check if there is enough surface for electricity generation. Second, financial feasibility study should be assessed on two scenarios: IPP renting out building surface for electricity generation under monetary incentive or building owner generating solar electricity for own reduced consumption.

Planning of thermal energy generation from agricultural waste should first show estimate of industrial area development within SEZ, especially those energy-intensive industries so that conventional boilers using coal or fuel oil could be replaced by biomass boiler. Feasibility study mentioned coconut shells as potential main agricultural resource so estimate of coconut industry already existing and forecasted to be in SEZ should be considered as well.

**Rec. 34. Align the four energy-related low-carbon measures with national and regional renewable energy policies, as well as a Sustainable Development (SD) target, especially on the special privilege and monetary incentive provided by SEZ. ★★★**

This information will attract potential investors to ensure enough energy infrastructure is available for SEZ promotion. Perhaps a single window person or office from SMC or SMA should be a focal point on this.

SEZ Master Plan is encouraged to reach national renewable energy policy. For electricity infrastructure, role of PLN, IPP and PPU should be identified for further expansion of electricity generation in SEZ. For those LCM measures without national or regional monetary incentive, local government may need to introduce additional incentives. This information should be included in SEZ Master Plan and should be publicly accessible from internet in many languages to help attract more investors. Detailed implementation of SEZ Master Plan on renewable energy with annual review process should be established. Encourage incoming industry into SEZ to adopt SEZ Master Plan on renewable energy.

**Rec. 35. Implement an ambitious national biofuel policy, biofuel for both transportation and electricity generation within SEZ to help account for an Emission Reduction (ER) target. ★★**

Various explicit policies on development and implementation of biofuel have been established

- Law No. 20 of 2007 concerning the Energy, with priority on supply and utilisation of New and Renewable Energy (NRE) including biofuel.
- Government Regulation No. 79 of 2014 concerning National Energy Policy, with a target of NRE in 2025 at 23% of National Energy Mix.
- President Instruction No. 1 of 2006, with instruct to several Ministries, Governors, Mayor/Regent for actions to accelerate supply and utilisation of biofuel.
- Ministry of Energy and Mineral Resources
  - Regulation No. 32 of 2008 with mandatory phase for utilisation of biofuel in transportation, industries, commercials and power plants sectors, which has been accelerated and increased over time
  - Regulation No. 25 of 2013, No. 20 of 2014, and No. 12 of 2015 with amendment of mandatory Biofuel at 30% for biodiesel blend by 2025.
  - Decree No. 2185K/12/MEM of 2014, with determination of Market Index Price (HIP) for Biofuel blended to fossil fuel (Public Service Oil/Non Public Service Oil).

**Rec. 36. Initiate local renewable energy initiatives and activities formulated within Bitung to gain smooth public acceptance of renewable energy within SEZ. ★★**

For smooth LCMT SEZ implementation in Bitung, neighbouring residents should at least be aware of general renewable energy initiatives and activities.

Perhaps municipal education programs or renewable energy subjects in primary/secondary schools and higher education could be made available with linkage for technical visit to Bitung SEZ.

Local campaign with small incentives or prizes could help bringing residents to realise and support environmentally friendly SEZ.

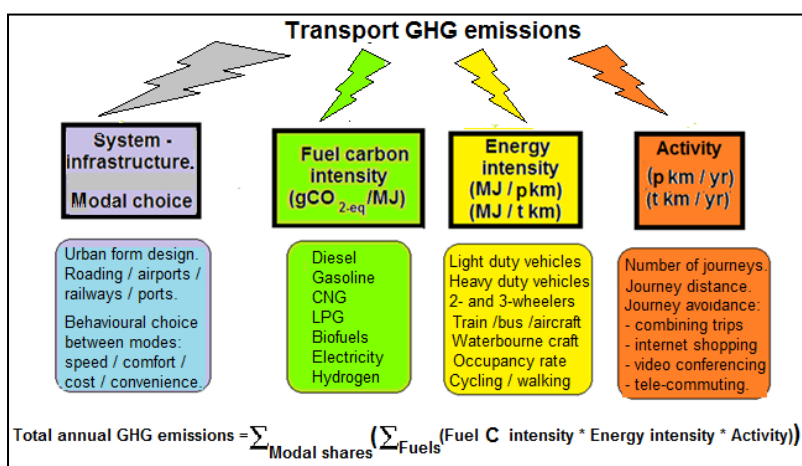
## 7. TRANSPORT

### FINDINGS

Reducing transport GHG emissions reductions can be achieved by the uptake of:

- infrastructure development and urban planning to encourage shorter journeys; cycling and walking; the use of low-carbon mass transit systems, including dedicated bus lanes, bus rapid transit (BRT); light rail; rail; and avoiding traffic congestion in various ways such as introducing congestion charges, time-of-road-use charges; provision of public transit etc.;
- encouraging a shift to lower carbon transport modes, including the non-motorised, “active travel” options of walking and cycling, public transit and, where feasible, changing freight movements from road to rail or coastal shipping;
- lower carbon-intensity fuels (gCO<sub>2</sub>/MJ) such as biofuels, hydrogen and electricity, but this is only effective when these energy carriers are produced from low-carbon sources;
- selecting and operating vehicles and engines with relatively low energy intensity (MJ/passenger km or MJ/tonne-km) as achieved by design and material improvements by the manufacturers;
- no engine idling
- eco-driving to gain improved fuel consumption for a vehicle journey (and hence reduce the consumption in terms of I/100km); and
- reducing the number and length of journeys (total p-km/yr and t-km/yr).

Figure 17: GHG emissions reductions from the transport sector through adopting policies and actions relating to system infrastructure investment, modal choice, fuel selection, vehicle and engine design, and influencing journey activities.



Source: Sims, R. E. H., et al., 2014.<sup>1</sup>

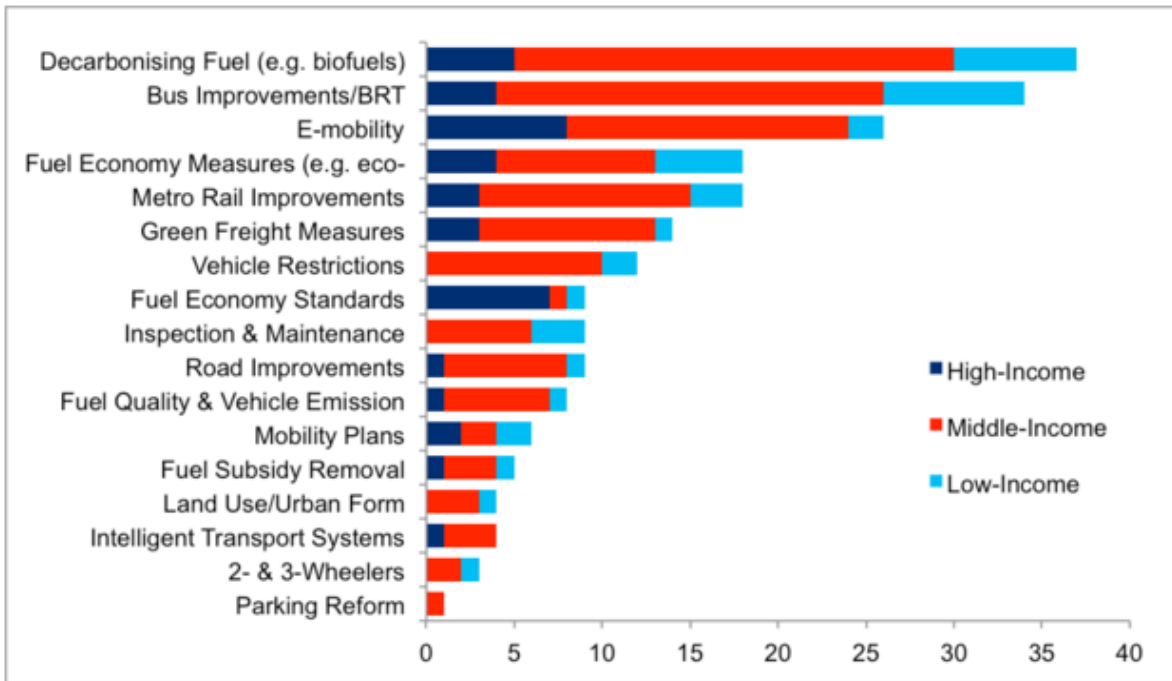
<sup>1</sup> A full analysis of the potential and costs of reducing transport GHG emissions can be found at:

Sims R E H et al., 2014: *Transport*. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.



Decarbonising transport is a key initiative for many economies with many intending to significantly reduce their emissions by 2025. The recent Paris Climate Change Conference (COP21) in December 2015, resulted in a new global agreement on climate change, which will shape climate policy in the years to come at a global, regional and national level. It was recognized that the following measures in Figure 18 below are critical to reducing carbon emissions from transport. These measures are being adopted by High, Middle and Low-Income economies. It could be applied to Indonesia and the Bitung SEZ to reduce transport emissions as part of the Bitung low-carbon town project.

Figure 18: Measures to Reduce Carbon Emissions from Transport



Decarbonising transport should be a key initiative for the SEZ, Bitung and Indonesia. This can be partly achieved by improving vehicle technologies, using low-carbon fuels such as certain biofuels, electricity or hydrogen, and encouraging behavioural shifts in the mode of transport chosen. For many people, selecting whether to travel by bus, ferry, train or car or bicycle for a trip depends on a combination of cost, comfort, convenience, speed and safety.

In Indonesia the transport sector has continually increased its annual emissions – but there is good potential to reduce transport emissions if it was supported by policy. Aiming to decarbonise the transport sector is often thought to be the most challenging mitigation measure. Yet the abundance of successful policies by local governments, supported by national policies in many economies, can provide the solutions.

Bitung City is the largest port city in the Sulawesi Island, and is the leading port city in Indonesia for exports and imports. It is a big attractor for tourism, particularly in relation to diving, which is reliant on the local environment being managed sustainably.

The Bitung SEZ is situated on relatively flat land and close to the coast, and therefore has easy access to the existing port. This port will be expanded for the SEZ in line with Indonesian Government plans for the area to be the centre of the fishery, distribution and logistics industries for the Sulawesi Economic Corridor. The future growth of the Port and the SEZ will have big implications to the road network and the way people, goods and

services are moved. Indonesia is aware that low-carbon transport measures must be prioritised in order to promote sustainable development in Bitung.

Future demand for passenger transport and freight movement is increasing in Bitung as is the case virtually everywhere in the world. Therefore, having a vision for what this growing demand might look like and how it will be managed for the SEZ between now and 2030 is imperative when developing a transport plan today. Urban planning and investing in transport infrastructure now will lock-in sustainable transport modes of choice and influence GHG emissions for the next few decades. Accordingly, long term projections are critical.

Moving freight into and out of the SEZ, Bitung City and the wider region is conducted mainly by road transport. Traffic congestion in Bitung and Manado is a significant source of greenhouse gas emissions and a cause of ill health due to air and noise pollution. The traffic congestion created by and uncontrolled and unsustainable transport systems may be responsible for significant economic and productivity costs for commuters and transporters of goods and services.

Currently transport in Bitung City is dominated by road and water transport. Travelling between cities and towns is challenging as the intercity highway is very narrow and it is not able to accommodate the growing number of vehicles. There is traffic congestion throughout the day and night and it is increasing. Parking does not appear to be managed and so this a real opportunity to reduce congestion and emissions from vehicle use.

Gasoline is cheap and diesel prices are subsidised in Bitung encouraging vehicle use. There is no rail network and limited public transport. Light duty vehicles (cars, motor cycles and vans) continue to dominate the number of passenger and freight delivery journeys. Traffic congestion happens throughout the day and night in Bitung and in Manado. Transport emissions of greenhouse gases (GHGs) are responsible for around one third of total GHG emissions from the municipality. The average age of a light vehicle in Indonesia is over 25 years old which makes increasing the uptake of low emission vehicles in Bitung and the SEZ slow and challenging.

There is not a lot of public transport in Manado and Bitung. Each town boasts its own form of public transport known as Mikrolets or Bis Kota.

*Figure 19: Public Transportation (mikrolet) in Bitung*



Mikrolet provide the majority of Manado and Bitung's Public Transport system. They move large numbers of people 'on demand' cheaply and efficiently without timetables, tickets or set stops, although they don't always run at night, a lot don't have lights and many don't operate on a Sunday. However these vehicles are not regulated and are increasing in large numbers. This has been leading to further traffic congestion, air pollution and GHG emissions.

Supporting the Mikrolet service there are a few other bus, boat, taxi, horse and cart and 'on demand' motor cycle services serving Bitung and Manado for destinations in and around town. Bus Rapid Transit (BRT) has been proposed as a low-carbon transport solution for the SEZ by the South Pole Group in 2015. This needs to be further investigated, and hybrid and electric buses recommended, before it can be endorsed. BRT services have been historically trialled in Manado but were not successful.

Mikrolet service and drivers will need to be included and incorporated into any new public transport proposals, including rail. The Mikrolet bus service appears somewhat chaotic but, since it is privately owned, could only be better regulated and managed if working in close association with local, regional and national authorities. Similarly the taxi service is unregulated.

Rail and a toll road have been proposed for North Sulawesi. However, the exact details of the proposed rail service and the toll road are yet to be confirmed. If the passenger and freight rail service was to be located through the middle of the SEZ it could encourage transit oriented development, agglomeration, encourage walking and cycling and reduce congestion and emissions. A new rail service could help take freight off the road and reduce congestion and emissions. A toll road around the outside of the SEZ could discourage single occupancy car use and reduce congestion and emissions.

There is a real opportunity to bring a change in travel behaviour and to manage road space and vehicle movements in the proposed SEZ. There are very few cyclists and pedestrians as there appears to be safety, information and infrastructure challenges.

Most people have an HP (Hand Phone) which is a great opportunity for promoting smart and intelligent transport on demand in the SEZ and wider Bitung and Manado. Electricity provision in the area is challenging especially if low emission vehicles like electric are to be promoted. The expansion of the Port will provide big transport challenges to moving people, goods and services and may lead to congestion in the area.

The proposed rail network, the new toll road are going to provide opportunity for integration with BRT and to reduce carbon emissions. An efficient passenger transport system involves moving people expediently between the airport, the Port, residential suburbs and their work places, between hotels and tourist attractions, to neighbouring suburbs and Bitung and Manado. In addition, for the efficient movements of goods and materials between ports, manufacturers, growers and consumers, well-designed logistics are needed.

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## RECOMMENDATIONS

★★★Recommendation for immediate action; ★★Recommendation for action in next 2-3 years; ★Recommendation for action in the longer term.

**Rec. 37. Undertake a feasibility/options analysis into the development of a rail and rapid transit network in Bitung and the surrounding region linking the port to the airport via Bitung and Manado. ★★**

**Rec. 38. Develop a low-carbon transport strategy for SEZ and the public transport network to support this. ★★★ and ★**

This will include short, medium and long term actions for delivery, as well as a regional public transport strategy and a road strategy. This will be able to provide the justification and business case for investment from the national government and the private sector in transport infrastructure. Consider providing BRT (Bus Rapid Transit) and rail in the SEZ, linking Bitung with Manado, the Port/s and the international airport and capturing regeneration and agglomeration benefits.

Any public transport services need to be quick, cheap, convenient, and safe supported by a good transport network, integrated ticketing and signage and a political champion who can 'normalise' the use of public transport and make it more publicly acceptable. All existing transport services, such as the Mikrolet, motor cycles, walking and cycling and taxis need to be integrated into any new public transport provision and infrastructure and published in a Bitung/Manado low-carbon regional public transport strategy. BRT could provide the spine of public transport services that is served by regulated Mikrolet and Ojek (on demand motor cycle) services and walking and cycling. Public Transport vehicles will ideally be electric, hybrid or fuelled by a low-carbon fuel like bio-methane or hydrogen. This could be supported by park and ride services on the edge of the SEZ, where people can park motor cycles and cars and take BRT, walk or cycle to travel into the SEZ.

Due to the nature of many of the Bitung roads, the Mikrolet (ideally hybrid or electric) could be more suitable than standard buses and have much lower carbon emissions. Ideally they would be capped in number and regulated and scheduled for arriving at a stop every 10-15 minutes to encourage their use and avoid the need for a fixed timetable. Whether the service would be provided free, or relatively low fares charged, would need a cost-benefit analysis to be undertaken. The number of buses needed would depend on the demand and also vary during the day to match peak travel demands. As demand grows, more buses could be added. Liaison with the city and regional authority to encourage improved regulations such as the imposition of bus licences, bus number caps and operating rules needs to be investigated further.

The SEZ should be designed and infrastructure delivered to encourage shorter journeys to enable cycling and walking around the SEZ. This could be supported by integrating walking and cycling with low-carbon mass transit systems, including dedicated bus lanes, bus rapid transit (BRT) and light rail.

**Rec. 39. Develop immediately a Travel Demand Management (TDM) programme for the SEZ area to support all phases of the programme (short and medium term), to integrate with development and the wider Bitung area, and help encourage jobs, growth and tourism in the region. ★★★**

This will include short, medium and long term actions for delivery. This will need to set a baseline and then set targets, actions and an annual monitoring programme. This could include targets such as:

- Increases in walking, cycling, public transport use, car-pooling, and car sharing
- Reduction in single car ownership and motorbike reduction targets
- where feasible, changing freight movements from road to rail or coastal shipping

Macro-level monitoring and understanding of origin-destination information is critical. The TDM SEZ programme could include:

- Integration of spatial development and transport
- Achieving the most efficient use of the transport system including smart traffic management
- Providing further transport capacity
- Managing demand for transport

The feasibility of tolling, road pricing and emissions based pricing should be investigated around the periphery of the SEZ so that only low emission vehicles can go into the SEZ and people walking, cycling or using PT/transit. The success of road pricing on reducing carbon emissions can be seen when

looking at the London congestion charge zone that was introduced in 2003. Carbon emissions from transport were reduced over 3 years in the zone by 20%.

The entire SEZ area could have a Transport Management Association (TMA) developed for it. It is an area wide travel plan and more detail can be found here [www.vtpti.org/tdm/tdm44.htm](http://www.vtpti.org/tdm/tdm44.htm). Within the TMA there could be individual organisation Travel Plans to reduce congestion for all schools and businesses in the SEZ. Pilot/ blueprint Travel Demand Management projects could be undertaken within 2016 e.g. travel plan for the new administration building in the SEZ. A TMA is a good method to secure or harness third party/private sector funding for transport initiatives and infrastructure.

**Rec. 40. Develop a communications and education programme to improve the education of all citizens relating to low-carbon mobility systems in the short, medium and long term. ★★★**

A highly respected person from the local Bitung community needs to be identified to be the high profile low-carbon transport champion to raise the profile of the Bitung SEZ low-carbon town project and to secure further funding for infrastructure.

A short and medium term low-carbon transport communication plan needs to be developed. Some of the actions that could be included in the plan include: no engine idling and eco training for the community to reduce emissions. Education of all road users is necessary when cars, trucks, buses, mikrolets, cycles, motor cycles and pedestrians all use the same road. Schools could be encouraged to teach cycling and traffic skills, possibly having a number of small cycles for the children to learn to ride in the school playgrounds. Where safe to do so, schools could also support cycling and walking to school. A driver safety programme, linked with achieving a driving license, could be developed for freight, taxis, including Mikrolets, transit and car drivers to drive safely around pedestrians and cyclists and motorcyclists. A communications plan can also enable third party funding/sponsors to be captured or partners to be highlighted.

**Rec. 41. Provide infrastructure, including rail, bus and rapid transit infrastructure, to support new transit oriented residential and business development within the SEZ and to link the port to Bitung and the airport. ★★ and ★**

This will include new rail stations, rail, toll roads, pedestrian and cycling paths, signage, lighting, and a new integrated local road, cycling, walking, low emission vehicles, freight and public transport network. Developing strong urban planning policy tools, including developer guidance, and a parking strategy, will be required to ensure the success of this recommendation including minimum parking standards and car sharing and car pooling provisions.

Low emission vehicle infrastructure could be installed or 'future proofed' as part of any approved parking for new developments within the SEZ. A low emission vehicle infrastructure location strategy could be developed for the SEZ and Bitung areas for publicly accessible recharging stations for electric- or hydrogen vehicles. Emissions based parking could also be looked at in the long term for the SEZ.

Developing a sustainable infrastructure assessment tool, data collection and monitoring process will be critical for measuring success and whether the Bitung SEZ is meeting its carbon targets. A good example of this type of tool that could be applied can be found at [www.isca.org.au/is-rating-scheme/is-overview/is-rating-tool](http://www.isca.org.au/is-rating-scheme/is-overview/is-rating-tool).

**Rec. 42. Develop walking and cycling infrastructure and a works programme for the SEZ area. ★★**

The walking and cycling programme for the SEZ should be developed with a mixture of infrastructure, information and promotional measures that can be implemented over the short, medium and long

term. It is important to develop and deliver a walking and cycling network with signage, maps and information campaigns in Bitung and the SEZ as soon as possible. This will help raise the profile of walking and cycling and to set a baseline to measure changes in walking and cycling mode share. Demonstration schemes, like a cycle hire scheme could also encourage local people to start cycling by having the ability to 'try' a bicycle or enjoy a 'car free' day every month.

In Bitung and the SEZ, conditions for cycling and walking are ideal with virtually no rainfall, little wind and relatively flat terrain. However, safety for cyclists and pedestrians need to be improved to increase the uptake of walking and cycling in Bitung. A cycling and pedestrian safety programme, including training days and building safe and where possible segregated cycling facilities with good wayfinding and greater priority for cyclists at many intersections is another way to improve safe bicycle use. Managing traffic flows with higher priority for cyclists as well as pedestrians encourages low-carbon transport modal shift.

Ideally there would be a Bitung, a regional and national political champions to promote walking and cycling in the SEZ. This could be used to raise the profile of walking and cycling in the local and regional community and to secure further funding for infrastructure. A good example of the power of a cycling champion is the Mayor of London, Boris Johnson, who is a champion for cycling in London. Mr Johnson, through his cycling leadership increased cycling by 400% over 3 years and funding for cycling in London from \$300M USD to \$1.2B USD.

**Rec. 43. Develop an Intelligent Mobility Strategy and an innovation/demonstration precinct for the SEZ.**

**★★ and ★**

New low-carbon transport technologies are developing fast, such as the use of Intelligent Transport Systems, emerging technologies (such as autonomous vehicles) and personal mobility to plan journeys (such as car sharing and car-pooling). The success of the blue mikrolets/Bis Kota, and the advent of car sharing, and electric vehicles shows Bitung and Indonesia are innovative and open to change. To enable low-carbon transport change to happen even more quickly it is advised that an Intelligent Mobility strategy is developed setting out how low-carbon mobility might best be provided for Bitung's residents and the SEZ in the near- to mid-term. This strategy will help support the development of an innovation/demonstration precinct in the SEZ to trial emerging low-carbon transport technologies. This complements the recommendation in the urban planning section to deliver a demonstration precinct with a focus on how the factories, schools, residences, offices, urban spaces, landscaping and transport interact. This is a good way to harness further third party funding or resources from companies, such as Google, wanting to test/trial different products/programmes in a controlled and regulated environment and to encourage on demand low-carbon personal mobility. For example, Google is looking to trial its new technologies around the world and is already trialling its 'Loon' project in Indonesia. They may be a good partner for the low-carbon town innovation precinct and may wish to trial their electric autonomous vehicles in the SEZ.

It is recommended the local and regional authority leads by example and develops a transport emissions road map for the area to encourage the uptake of low emission vehicles, such as electric, biofuels and hydrogen for all vehicles. This will also include setting an example in City and Regional Government's own fleet and provision of some incentives and other demonstration fleets (e.g. trialling electric fleet council cars). If successful this model could be rolled out across Indonesia.

## 8. ENVIRONMENTAL PLANNING

### FINDINGS

Indonesia has rich and varied natural heritage, being home to many important species of animal and plants as well as internationally recognised habitats. The Island of Sulawesi belongs to the most outstanding and representative areas of biodiversity. The geography of Sulawesi is most complex and varied, adding to the richness of the natural background. Of the 104 mammal species in the eco region, 29 are endemic (with numerous species found nowhere else in the world) or near endemic<sup>2</sup> and there are about 500 plant endemic species and nearly 70 known fish species, about three-quarters of which are endemic on Sulawesi. Despite deforestation overall clearing around half of the original forested areas, large blocks of untouched woodland remain.

Special Economic Zones (SEZ) of Indonesia are to be developed in areas, which have geo-economic and geo-strategic advantages and serving to accommodate manufacturing, export, import, and other economic activities with high economic value and international competitiveness, e.g. maritime and pharmaceutical industries.

Bitung SEZ will become the first in Indonesia Low-Carbon Model project and should set a "best practice" example for the whole economy.

Bitung SEZ is managed by the provincial government of North Sulawesi. The area is designated by the government as the centre of fishery, distribution, and logistics in Sulawesi Economic Corridor. The level of coordination between the central government, provincial and local Bitung governments (Regional development and planning Agency) is quite high and well developed. All actors involved demonstrate and deliver support to the project; area economic development policy is harmonised on all levels from national to local<sup>3</sup>.

Government is committed to support Bitung SEZ infrastructure development projects, including development of Manado – Bitung Toll Road and upgrade of the National Highway; an expansion of Bitung Sea Port as International Hub Port Bitung Designation; development of water treatment plant, transmission & distribution water pipeline and multipurpose reservoir Kuwil Sawangan in Minahasa Utara; electricity grid capacity upgrade to include main substation and transmission & distribution networks and building new generation facilities based on fossil fuels and renewable energy resources; Sam Ratulangi Airport Runway Extension<sup>4</sup>.

Local government and local community demonstrate simultaneously their concern and willingness in regards to integrating the natural environment in SEZ urban planning and efficient area management.

Local community has a clear voice in Manado and Bitung as was demonstrated by the operators of the Mikrolets, the most popular mode of public transportation in Manado, who objected to the railway construction proposals.

<sup>2</sup> <http://www.worldwildlife.org/ecoregions/aa0123>

<sup>3</sup> [http://www.kemlu.go.id/kuwaitcity/Documents/PPP%20Infrastructure%20projects%20and%20Special%20Economic%20Zones%20in%20Indonesia%20\(BKPM%202015\).pdf](http://www.kemlu.go.id/kuwaitcity/Documents/PPP%20Infrastructure%20projects%20and%20Special%20Economic%20Zones%20in%20Indonesia%20(BKPM%202015).pdf)

<sup>4</sup> PPP Infrastructure Projects and Special Economic Zones in Indonesia (BKPM2015).pdf

## RECOMMENDATIONS

★★★Recommendation for immediate action; ★★Recommendation for action in next 2-3 years; ★ Recommendation for action in the longer term.

**Rec. 44. Set up strict selection criteria from the projects initiation for potential investors. Large infrastructure development projects are a great commercial opportunity and provide jobs and sustainable growth to the local economy. The Bitung Nature Conservation Agency should develop this. ★★★**

Each project should bring national and international attention to the unique nature as a living testament to Sulawesi's rich and wonderful biodiversity and improve the development of local people and communities.

**Rec. 45. Write rules at the initial stage to ensure conservation of biodiversity, consider the SEZ development impact on biodiversity and work to protect the Island's biological inheritance. ★★**

The Biodiversity Duty applies to Council's activities and operations, plans and policies.

**Rec. 46. Purposefully allocate a number of different designated sites, even if very small, which can bring additional economic revenue to the area from the tourists flow or national and international scientific research projects, ★★★**

such as for example: National Nature Reserves, Sites of Special Scientific Interest, Bitung Scenic Areas, etc.

**Rec. 47. Develop a special regulation as a guidance for the Bitung Local Development Plan, together with any Supplementary Guidance, ★★★**

which sets out the policies and criteria against which any planning application submitted in Bitung will be considered. This Supplementary Guidance sets out detailed policy advice to help future developers/project owners meet the requirements of the Plan. It is therefore recommended that it be read in conjunction with the policies in the Plan and any other Supplementary Guidance relevant to the type of development proposed. The purpose of this Supplementary Guidance is to expand on the Planning Policy with regard to any designated Local Nature Conservation Sites (LNCS), and provide further information and maps of the Bitung SEZ areas.

**Rec. 48. Establish Local Nature Conservation Sites (LNCS) to highlight sites with important natural heritage to developers and the Council. ★★★**

In identifying LNCS the Council does not seek to prohibit development; they provide more information to ensure that development takes into account the important and sensitive features of these sites.

The introduction of an LNCS system will help to protect Sulawesi's natural heritage and contribute to other important objectives, such as those of the tourism sector.

This guidance is intended as a tool in helping an applicant navigate their way through the requirements of policies, with regard to LNCS. The important considerations in the Planning Policy document which have to be stressed that it is the responsibility of an applicant to demonstrate that all proposed development fulfils the requirements of relevant policies in the Local Development Plan and an applicant must determine whether a proposal potentially affects an LNCS.



LNCS Statements are material considerations in the determination of planning applications. Both the applicant and the Council must consider the contents of these at an early stage in the application process. Applicants should discuss their proposal with relevant organisations to highlight the effect on the integrity of the LNCS. The results of these discussions and the predicted effects of the proposal on how the potential damage can be avoided, minimised, mitigated or compensated for should be presented with the planning application

LNCS Statements are material considerations in the determination of planning applications. Both the applicant and the Council must consider the contents of these at an early stage in the application process. Applicants should discuss their proposal with relevant organisations to highlight the effect on the integrity of the LNCS. The results of these discussions and the predicted effects of the proposal on how the potential damage can be avoided, minimised, mitigated or compensated for should be presented with the planning application.

It is important to consider scale and how this relates to the benefits of the proposed development. Applicants should demonstrate how the development provides social, environmental and economic benefits that override the nature conservation value of the LNCS in case these issues arise.

**Rec. 49. Establish special Tree Preservation policies. This should be undertaken by Bitung Nature Conservation Agency at the Council ★★★**

to protect individual and groups of trees considered important for amenity or for their cultural or historic interest. The consent of the Council is required to undertake any works to trees protected by the rules. The policies rules are to ensure effective enforcement of spatial plans that promote sustainable forest management.

**Rec. 50. Develop and implement a marine planning policy document and investigate a regional sustainable fishing certification regime to assist to develop and grow exports ★★★**

to cover aquaculture and coastal land developments; a coral reefs preservation document drafted stressing that they are useful in the preservation of the area's marine biodiversity and fishery production as well as vital tourism resource.

**Rec. 51. Establish a Bitung Carbon Reduction Strategy that requires from the developers a carbon reduction and resource use explanation while applying for a planning permission. ★★**

**Rec. 52. Implement significant activities to advance the low-carbon agenda of Bitung SEZ with the emphasis on mitigation and not on adaptation. ★**

The SEZ Spatial Plan should not damage the identified conservation areas.

**Rec. 53. Ensure that local communities are key stakeholders in the conservation of its natural reserves and the development of Sulawesi Island as a whole. This should be undertaken by the North Sulawesi SMC. ★**

Natural heritage: the key will be finding a balance in how to maintain rich biological diversity with the traditional way of local communities' life and allow sustainable development with an improved access to advanced health care, education, and transport. Bitung SMC should make sure that local communities are key stakeholders in the conservation of its natural reserves and the development of Sulawesi Island as a whole. The varied natural heritage requires varied management or conservation, with important input from both the public and private sector, including vital input from land owners and managers.

In fact, rich natural heritage should work in a wonderful tandem with improvements in energy efficiency and infrastructure. Furthermore, in term of public diplomacy for the government, the resulting case study of a high-tech economy in symbiosis with a magnificent natural background is a gold mine for attracting international attention and thereby investment. Many companies can be incentivised to invest their corporate responsibility funds here.

**Rec. 54. Launch commercial carbon-offsetting forest restoration programmes. This should be undertaken by the Bitung Nature Conservation Agency. ★**

Carbon offsetting is an internationally recognised way to take responsibility for unavoidable carbon footprint by businesses. The Bitung Nature Conservation Agency might consider launching commercial carbon-offsetting forest restoration programmes on behalf of global corporations to create and sustain local council revenue and jobs in Bitung.

## 9. ENERGY EFFICIENCY

### FINDINGS

Indonesia is the largest economy in ASEAN, an active member of APEC and plays a significant role as a major producer and consumer of energy in regional and international markets. The first Master Plan of National Energy Conservation was approved in 1995, since then the government of Indonesia continues to enhance its energy policy and address global and domestic challenges. Indonesia's international collaborations include carbon capture and storage, energy efficiency initiatives, renewable energy and electricity generation and the economy is actively engaged in ongoing policy research and capacity-building projects.

Energy Efficiency and Conservation Policy in Indonesia is led by the Directorate General of New, Renewable Energy and Energy Conservation, Ministry of Energy and Mineral Resources. The government has recognised that promotion of energy efficiency carries with it distinct economic and environmental benefits. The Indonesian central government has so far put effort into strengthening its energy policy, including energy efficiency, in particular in the informational sphere, for example, the Data and Information Centre (PUSDATIN) works on enhancing Indonesia's energy data and statistics in cooperation with IEA<sup>5</sup>.

*Table 9: Energy Efficiency and Conservation Policy in Indonesia*

<b>Year</b>	<b>Regulation</b>
1995	Master Plan of National Energy Conservation
2002	Law No. 28 / 2002 - Buildings
2006	President's directive No. 5/2006 - National Energy Policy
2007	Law No. 30/2007 - Energy
2008	President's directive No. 2/2008 - Energy and Water Saving
2009	Government Regulation No.70/2009 - Energy Conservation
2011	Presidential Decree No. 13/2011 - Energy and Water Saving
2012-2013	Ministry of Energy and Mineral Resources Regulations <ul style="list-style-type: none"> <li>• No. 13/2012 - Electricity saving</li> <li>• No. 14/2012 - Energy Management</li> <li>• No. 01/2013 - Fuel Oil Saving</li> </ul>
2014-2015	Ministry of Energy and Mineral Resources Regulations <ul style="list-style-type: none"> <li>• No. 18/2014 - Energy saving bulbs labelling</li> <li>• No. 19/2014 - Electricity Tariff</li> <li>• No. 7/2015 - Implementation of MEPS and Energy Efficiency labelling system for Air Conditioning</li> <li>• No. 80/2015 - Implementation of National Competency Standard for Energy Managers in Industry and Buildings</li> </ul> Government Regulation <ul style="list-style-type: none"> <li>• No. 79/2014 - National Energy Policy</li> </ul>

Indonesia is aware that energy efficiency measures must be prioritised in order to promote sustainable energy development. The economy has changed its paradigm from supply-side management to demand-side management, and has implemented various energy efficiency and conservation programs. Energy

<sup>5</sup> [https://www.iea.org/publications/freepublications/publication/statistics\\_manual\\_indonesian.pdf](https://www.iea.org/publications/freepublications/publication/statistics_manual_indonesian.pdf)

conservation vision 2025: reduce energy intensity 1% annually and energy elasticity to less than 1%. Currently there is low level of energy efficiency and high primary energy intensity (as stated in the National Renewable Energy Master Plan (RIKEN) 2011)<sup>6</sup>.

National commitment to reduce GHG emissions 26% with its own efforts and 41% (26%+15%) with the international help by 2025 through the development of new renewable energy and implementing energy conservation measures in all sectors: forestry, peat land, agriculture, energy, transportation, industry, waste<sup>7</sup>.

Indonesian law places responsibility for the improvement of energy efficiency on the central government, regional governments and private sector.

Energy consumers, which consume 6000TOE and more are obliged to implement energy management initiatives, in particular by setting up in house energy conservation programmes, appointing an energy manager and carrying out energy audits.

Regional and municipal governments are obliged to facilitate and provide incentives for energy consumers (introduce energy saving rate as a guide) and energy saving technology manufacturers; set up and encourage compliance with Standards and Labelling system (Logo: More Stars, more efficient).

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## RECOMMENDATIONS

★★★ Recommendation for immediate action; ★★ Recommendation for action in next 2-3 years; ★ Recommendation for action in the longer term.

**Rec. 55. Establish a local Energy Efficiency Strategy that identifies key strategic objectives and numerical energy efficiency targets put in together in a supplementary Action Plan with detailed priorities for investment. ★★★**

Funding for the major energy generation, supply chain and energy efficiency programmes will be the greatest challenge as the region is noticeably under investing in innovation systems that can catalyse domestic capacity to distribute beneficial technology and business models. A local Energy Efficiency Strategy should identify key strategic objectives and numerical energy efficiency targets put together in a supplementary Action Plan with detailed priorities for investment.

**Rec. 56. Ensure the energy efficiency strategy and Local Development planning process is flexible to a degree to be able to respond quickly and effectively to the new national and international policies, ★★★**

setting Bitung SEZ on the path to first meeting, and later exceeding, its responsibilities to take a national lead and be a true Low-Carbon Town.

**Rec. 57. Use key technologies that enable Bitung SEZ to meet its specific targets on carbon reduction and low-carbon energy generation ★★★**

to make its development as the Indonesia's leading area in low-carbon energy security. Therefore, the strict requirement should be stated for planning applications that technologies to be applied in

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<sup>6</sup>[http://www.lites.asia/files/otherfiles/0000/0210/Day\\_1\\_Session\\_3.1\\_Indonesia\\_policy\\_on\\_standards\\_and\\_labelling\\_Maritje\\_Hutapea.pdf](http://www.lites.asia/files/otherfiles/0000/0210/Day_1_Session_3.1_Indonesia_policy_on_standards_and_labelling_Maritje_Hutapea.pdf)

<sup>7</sup> [www.greenchillers-indonesia.org](http://www.greenchillers-indonesia.org)

projects should be energy and resource efficient to as higher level as possible in order to be future proof and not to become obsolete in some 5 years after the project will be completed. As a project, the Bitung SEZ development must focus on technology innovations, which will stay advanced for over the next 10 years as minimum. In addition to that, effective low-carbon innovations need to bring to the region not only the hardware of technology but also the software of knowledge management.

**Rec. 58. Adopt challenging targets for energy used and produced within the Bitung SEZ area from renewable or low & zero carbon sources to be able to set very high Low-Carbon Town standards in Indonesia. ★★**

**Rec. 59. Launch an Energy Efficiency Grant Scheme for the local SMEs and encourage new local energy management companies to provide ESCO services. ★★**

The purpose of the scheme is to enable and encourage local businesses to install renewable energy technologies and/or energy efficiency measures into their business premises/operations at their own responsibility and costs. The scheme should provide assistance with the capital costs associated with the installation of renewable energy technologies along with energy efficiency measures to reduce energy consumption and with related skills development.

**Rec. 60. Replace and modernise a significant proportion of Bitung SEZ's current electricity generating capacity (coal, diesel and oil fired power generation). ★★**

The Bitung SEZ area is also facing a potential electricity generation gap. This is a potential for Public Private Partnership (PPP) and appropriate funding could be raised from the international infrastructure development institutions as grants or very long term loan schemes combined with private investment.

**Rec. 61. Explore tried and tested technologies that could be installed as fast as possible by experienced firms in this field as their commercial projects and insist on utilising as many local advantages as possible while introducing new to the location technologies, ★★**

for example, sea water air conditioning from available deep cold water of the ocean and local rivers or lakes to replace conventional AC systems; local geothermal resources and local biomass utilised in electricity generation projects.

**Rec. 62. Implement an Energy Efficiency Action Plan. ★★**

- Set a 2016/2017 energy consumption baseline to compare Bitung SEZ's progress year on year.
- Introduce an obligatory Energy Performance Certificate for buildings and require from all buildings in Bitung, including existing commercial and residential, to improve their energy efficiency rating and obtain Energy Performance Certificate. This should attract potential investors to new build projects.
- Require mandatory electricity meter instalment and reporting of electricity consumption by all organisations in Bitung and encourage workforce involvement in the identification of opportunities for electricity saving.
- Require energy consumption reporting attached to mobility, fuel used for transport (ferries, tugs, diesel vehicles).
- Require water consumption data and reporting and information on water saving measures within project development. At the moment there is a mix of unmetered and metered sites and there is

no method for estimating emissions from unmetered sites. There should be a regulation on obligatory instalment of water meter in all new buildings.

**Rec. 63. Deliver the production and construction in energy and resource efficient ways. ★**

The Bitung SEZ project will require an increasing amount of resources and this will have an impact on the surrounding sensitive ecosystems, such as sea, land, forest, mountains. Project stakeholders must recognise (and this message should be constantly stressed by North Sulawesi SMC that their decisions and actions need to move the Bitung community towards more sustainable patterns of consumption starting from the very early construction stage.

**Rec. 64. The projects' planning applications should comply with: a) local government energy efficiency requirements and legal compliance rules; b) state projected financial savings through efficiencies in operation; and c) state environmental benefits through reduced resource use. ★**

## **APPENDIX A: MEMBERS OF THE LCMT POLICY REVIEW TEAM**

Mr. Takato Ojimi, Policy Review Team Leader, President, Asia Pacific Energy Research Centre (APERC).

Mr. Paul Nagle, Assistant Director Resident Buildings Energy Division, Department of Industry and Science, Australia.

Mr. Inchul Hwang, Team Leader, International Cooperation, Team Global Strategy Department, Korea Energy Agency, Republic of Korea.

Ms. Elizabeth Halsted, Policy Plans and Sustainability Manager, Auckland Transport, New Zealand.

Mr. Christopher Cruz de la Cruz, Chief Executive Officer, Philippine Green Building Council, Philippines.

Dr. Nailia Segizova, Leading Expert, Regional Studies Economic Development & Smart Cities Team, Institute of Regional Studies and Urban Planning, Higher School of Economics, Moscow, Russia.

Dr. Nuwong Chollacoop, Lab. Head, Renewable Energy Laboratory, National Metal and Materials Technology Center (MTEC), Thailand.

Dr. Kazutomo Irie, General Manager, Asia Pacific Energy Research Centre (APERC).

Mr. Chrisnawan Andityia, Senior Researcher, Asia Pacific Energy Research Centre (APERC).

Mr. Wanhar, Senior Researcher, Asia Pacific Energy Research Centre (APERC).

Ms. Yuko Tanaka, Research Department Staff, Asia Pacific Energy Research Centre (APERC).

## **APPENDIX B: ORGANISATIONS AND OFFICIALS CONSULTED**

Ms. Farida Zed, Director of Energy Conservation, Directorate General of New, Renewable Energy and Energy Conservation, Ministry of Energy and Mineral Resources.

Ms. Maritje Hutapea, Director of Various New and Renewable Energy, Directorate General of New, Renewable Energy and Energy Conservation, Ministry of Energy and Mineral Resources.

Dr. Soni Sumarsono, Governor of North Sulawesi Province

Mr. Hanny Sondakh, Mayor, city of Bitung.

Mr. Edi Sartono, Deputy Director of Clean and Efficient Energy Technology Application, Directorate General of New, Renewable Energy and Energy Conservation, Ministry of Energy and Mineral Resources.

Ms. Gita Lestari, Head of Section for Clean Energy Technology Application, Directorate General of New, Renewable Energy and Energy Conservation, Ministry of Energy and Mineral Resources.

Mr. Wisnu Adipurwoko, Staff of Sub-Directorate of Clean and Efficient Energy Technology Application Directorate General of New, Renewable Efficiency and Conservation, Ministry of Energy and Mineral Resources.

Mr. Royke O. Roring, Head of Agency, Regional Development Planning Board, Government of North Sulawesi Province.

Mr. Desmar Laih, Head, Division of Regional Development Planning Agency, Government of North Sulawesi Province.

Ms. H. Jacoba Roeroe, Researcher on Sustainability Development, Research and Development Unit, Planning and Development Board, Government of North Sulawesi Province

Mr. Benny Aipidely, Staff of Environmental Agency, North Sulawesi Province.

Mr. Franky Watulingas, Staff of Forestry Division, Government of North Sulawesi Province.

Mr. Noldy Sulu, Staff of Transportation Division, Government of North Sulawesi Province.

Ms. Sandy Gumolili, Staff of Energy and Mineral Resources Division, Government of North Sulawesi Province.

Mr. Noldy Tuerah, CEO of Special Economy Zone of Bitung and Manado, North Sulawesi Province.

Mr. Toar Malingkas, Lecture of University of Samratulangi Manado, North Sulawesi Province.

Mr. Albert Sarese, Head of Regional Development Planning Agency, Government of Bitung City.

Mr. Vicky DS, Head of Transportation Division, Government of Bitung City.

Mr. Edy Tarigan, Staff of Energy and Mineral Resources Division, Government of Bitung City.

Mr. Benny Lontoh, Chief of Industrial office, Government of Bitung City.

Mr. Sardi, Manager of Bitung Port, Government of Bitung City.

Ms. Shelley Sondakh, Executive Secretary of Bitung Special Economy Zone, Government of Bitung City.

Ms. Jenny Karouw, Secretary, Secretariat of Special Economic Zone Council, Government of Bitung City.

Mr. Paul Butarbutar, Country Director Indonesia, South Pole Group

Mr. Arrie Tjahyo Setiawan, Head of Operations, South Pole Group



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Asia Pacific Energy Research Centre

Inui Building, Kachidoki, 1-13-1, Kachidoki,

Chuo-ku, Tokyo, 104-0054, Japan

Phone: (81) 3-5144-8551

E-mail: [master@aperc.iecej.or.jp](mailto:master@aperc.iecej.or.jp)

Website: <http://aperc.iecej.or.jp/>

For

Asia-Pacific Economic Cooperation Secretariat

35 Heng Mui Keng Terrace

Singapore 119616

Tel: (65) 68919 600

Fax: (65) 68919 690

Email: [info@appec.org](mailto:info@appec.org)

Website: [www.appec.org](http://www.appec.org)

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