



Government of North Sulawesi
Regional Planning and Development Board



Low-Carbon Model Town in North Sulawesi

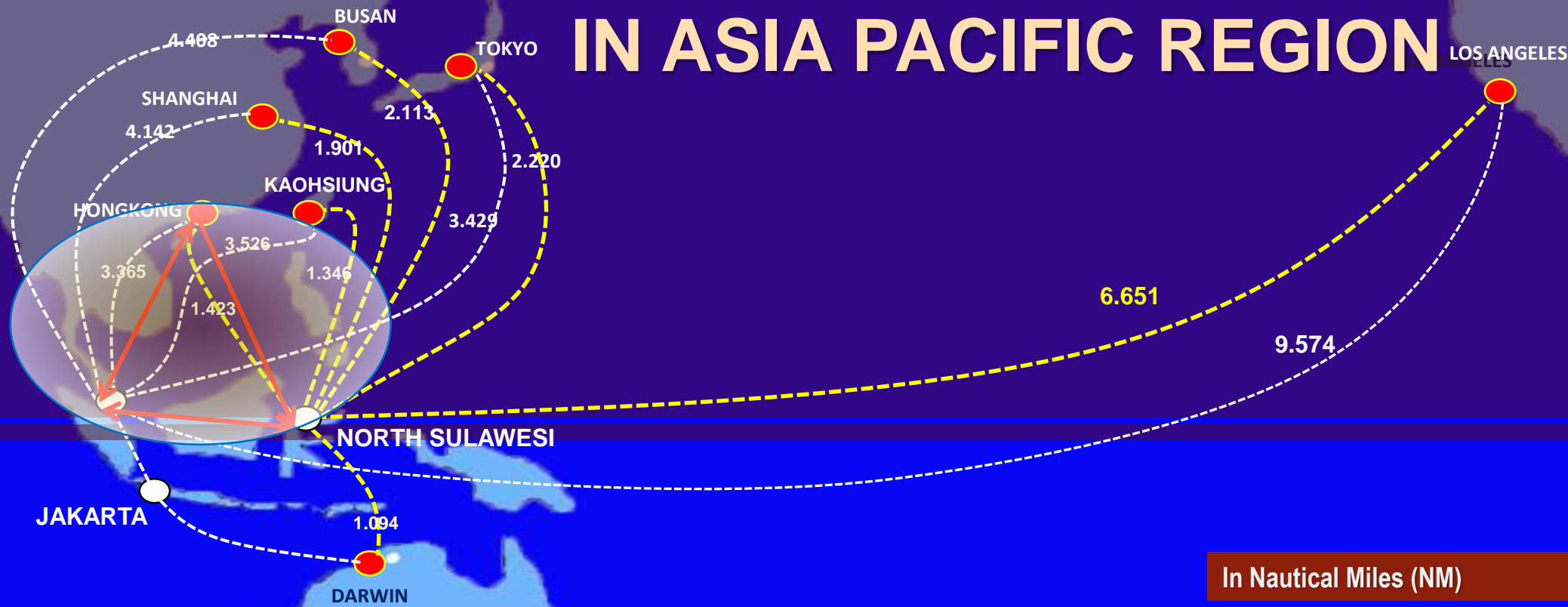
JENNY KAROUW

*Head of North Sulawesi
Regional Planning and
Development Board*

APEC Low-Carbon Model Town Project Wrap-up Symposium

10 September 2021

LOCATION OF NORTH SULAWESI IN ASIA PACIFIC REGION



DISTANCE

TO ASIA PACIFIC'S MAJOR CITIES



LOS ANGELES
6.651 NM



TOKYO
2.220 NM



BUSAN
2.113 NM



SHANGHAI
1.901 NM



HONGKONG
1.423 NM



KAOHSIUNG
1.423 NM

NORTH SULAWESI AND BEYOND



New Sam Ratulangi Int'l Airport



Located at strategic position, Heading Pacific Ocean, Adjacent to World's Central Economic Activities and situated at the world's cruise line

Have the best natural harbour in Indonesia (Bitung), serving the routes of shipping to East Asia and America.

Has a huge fishery potential, especially Tuna

Has an International Airport, serving direct flights to East Asia and Southeast Asia.

Has a lot of tourism potential

Has a huge number of renewable energy resources, such as hydro, photovoltaic and geothermal

Has lots of Agriculture potential, such as coconut, nutmeg, cloves etc.

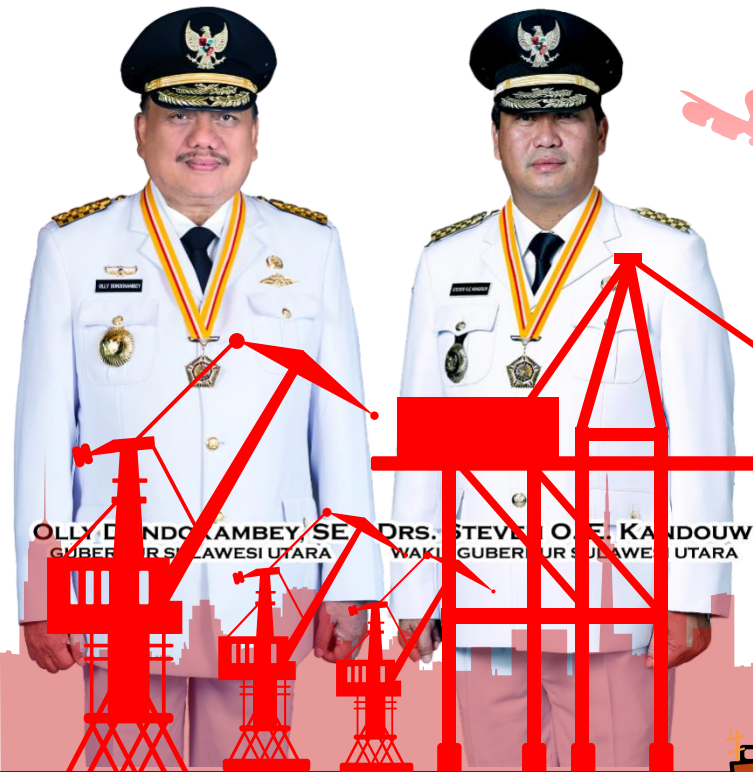


Lahendong Geothermal Power Plant

Mid-Term Development Planning of North Sulawesi, 2021 - 2026

VISION:

“Advanced and Prosperous North Sulawesi as Indonesia's Gateway to Asia Pacific”



MISION:

- 1 IMPROVEMENT IN THE QUALITY OF NORTH SULAWESI'S HUMAN RESOURCES
- 2 STRENGTHENING THE ECONOMY RELIES ON THE AGRICULTURAL, FISHERIES, TOURISM AND SERVICE INDUSTRIES
- 3 DEVELOPMENT OF INFRASTRUCTURE AND EXPANSION OF CONNECTIVITY
- 4 SUSTAINABLE REGIONAL DEVELOPMENT
- 5 GOOD AND CLEAN GOVERNMENT SUPPORTED BY SYNERGY AMONG REGIONS



PURPOSES

Realising the mainstreaming of Sustainable Development



GOALS

Increasing Sustainable Development



INDICATORS

- Space Utilization Conformity Index
- Environmental Quality Index
- Percentage of People Accessing in Proper Drinking Water and Sanitation

MISION #4

SUSTAINABLE
REGIONAL
DEVELOPMENT



MISION #4

SUSTAINABLE REGIONAL DEVELOPMENT

ACHIEVEMENT STRATEGIES

- Improving the quality of residential environments;
- Encouraging the achievement of the target of access to proper drinking water and sanitation;
- Increasing the use of renewable energy;
- Enhancing the effort of disaster mitigation and climate change adaptation;
- Improving the management and conservation of natural resources, biodiversity and its ecosystems.



PRIORITY PROGRAMS

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



Low-Carbon Model Development in North Sulawesi

- ▶ *The existence of Photovoltaic Power Plant (21 MW), Geothermal Power Plant (120 MW), and Hydroelectric Power Plant dispersed throughout the region (61,98 MW)*
- ▶ *Some North Sulawesi Gov't Buildings use Photovoltaic Panel as energy resources*

North Sulawesi Target in Renewable Energy

- ▶ National 22.500 MW in 2025
- ▶ North Sulawesi 832 MW in 2025, Consist of:
 1. PLTU SULUT I (BINJEITA) 2 X 25 MW
 2. PLTG MINAHASA PEAKER (LIKUPANG) 150 MW
 3. PLTG SULBAGUT PEAKER (LIKUPANG) 150 MW
 4. PLTA SAWANGAN 12 MW
 5. PLTU SULUT III (KEMA) 2 X 50 MW
 6. PLTU SULBAGUT II (UNALLOCATED) 2 X 100 MW
 7. PLTMG MPP AMURANG 120 MW
 8. PLTP LAHENDONG V & VI 2 X 20 MW
 9. PLTA POIGAR II 30 MW
 10. PLTP KOTAMOBAGU 80 MW



Electrical Condition of North Sulawesi

Existing Geothermal Power Plant

No	Name of Power Plant	Capacity (MW)	Year	Managed by	Location
1	Lahendong 1	20	2002	PLN	North Sulawesi
2	Lahendong 2	20	2007	PLN	North Sulawesi
3	Lahendong 3	20	2009	PLN	North Sulawesi
4	Lahendong 4	20	2011	PLN	North Sulawesi
5	Lahendong 5	20	2017	IPP	North Sulawesi
6	Lahendong 6	20	2017	IPP	North Sulawesi
TOTAL		120			



Electrical Condition of North Sulawesi

Existing Hydroelectric Power Plant

Power Plant PLN	Capacity (MW)	Power Max (MW)	Power Plant IPP	Capacit y (MW)	Power Max (MW)
PLTA Tonsealama	14.38	11.00	PLTM Mobuya	3.00	3.00
PLTA Tanggari I	18.00	17.60			
PLTA Tanggari II	19.00	19.00			
PLTM Poigar	2.40	2.40			
PLTM Lobong	1.60	1.40			
PLTM Kolondom	1.60	0.80			
PLTM Tomini	2.00	1.90			
TOTAL PLN	58,98	54,10	TOTAL IPP	3.00	3.00
TOTAL PLN + IPP	61,98	57,10			

Electrical Condition of North Sulawesi

Existing Solar Power Plant

NO	LOCATION	PEAK LOAD CAPACITY (kW)	INFORMATION	MANAGED BY
1	Bunaken	335	Operated	PLN
2	Miargas	85	Operated	PLN
3	Marampit	125	Operated	PLN
4	Marore	120	Operated	PLN
5	Makalehi	260	Operated	PLN
6	Rooftop Tahuna	50	Operated	PLN
7	Likupang	15,000	Operated	IPP
TOTAL		15,975		



TOTAL ENERGY CONSUMPTION of NORTH SULAWESI

- In 2014, Total Energy Consumption in North Sulawesi Has Reached 345 MW (Peak Load)
- In 2021, The Peak Load reaches 386 MW from installed capacity of 495 MW.
- It Supplied by both 70 kV and 150 kV interconnection systems



Recapitulations of Emission Reduction and Mitigate Action in North Sulawesi

<i>No.</i>	<i>Year</i>	<i>CO2 Reduction</i>
1.	2020	0.35 M CO₂ eq
2.	2019	0.34 M CO₂ eq
3.	2018	0.29 M CO₂ eq
4.	2017	0.24 M CO₂ eq
5.	2016	0.18 M CO₂ eq
6.	2015	0.03 M CO₂ eq
7.	2014	0.01 M CO₂ eq

Source: <https://pprk.bappenas.go.id>

PREVIEW OF BITUNG CITY

- *The Bitung City has an area of 33.008,60 Ha. Geographically, Bitung City located at 12501'43" – 125018'18" E and 1023'23" – 1035'39" S.*
- *Bitung is bounded by the North: Likupang District (North Minahasa Regency) and Sulawesi Sea; East by Molucca Sea and Pacific Ocean; South by North Minahasa and West by North Minahasa as well.*
- *Total Population of 225.134 inhabitants, with 115.531 Male and 109.603 Female.*
- *Bitung SEZ was established on May 2nd, 2014 by Government Ordinance (Peraturan Pemerintah) No. 32/14*
- *Being Inaugurated on April 1st, 2019 by Indonesian President Mr. Joko Widodo*
- *Total area of Bitung SEZ of 534 Ha, with 92,79 Ha in phase I Development.*



Bitung Special Economic Zone (SEZ)

Assigned :
Government Regulation
No 32/2014
Inaugurated:
April 1st, 2019

Location:
45 Km from Manado
40 Km from Sam Ratulangi Airport
7 Km from Bitung Container Terminal

Proposer:
Gov't of North Sulawesi

Core Business:

1. Fishery Industry
2. Coconut processing and its derivatives
3. Logistic
4. Pharmaceutical industry

Area:

- Total Area: 534 Ha
- Phase I Development: 92,79 Ha
- Occupied Area: 92,79 Ha
- Status (Building Rights/Other Use Rights): 92,79 Ha

Investment Plan (Until 2025) :

- Area Development: Rp 2,3 Trillion
- Investment value: Rp 32,89 Trillion

Investment Plan (Phase I until 2019) :

- Area Development : Rp 79,62 Billion
- Investment value : Rp 3,796 Trillion

Labor Needs:

- Projected 2025 = 34.710 people
- Realisation until 2018 = 70 people

Economic Impact Projected:

Increasing output Rp 8-11 Trillion toward national economy (2025)



KEGIATAN UTAMA



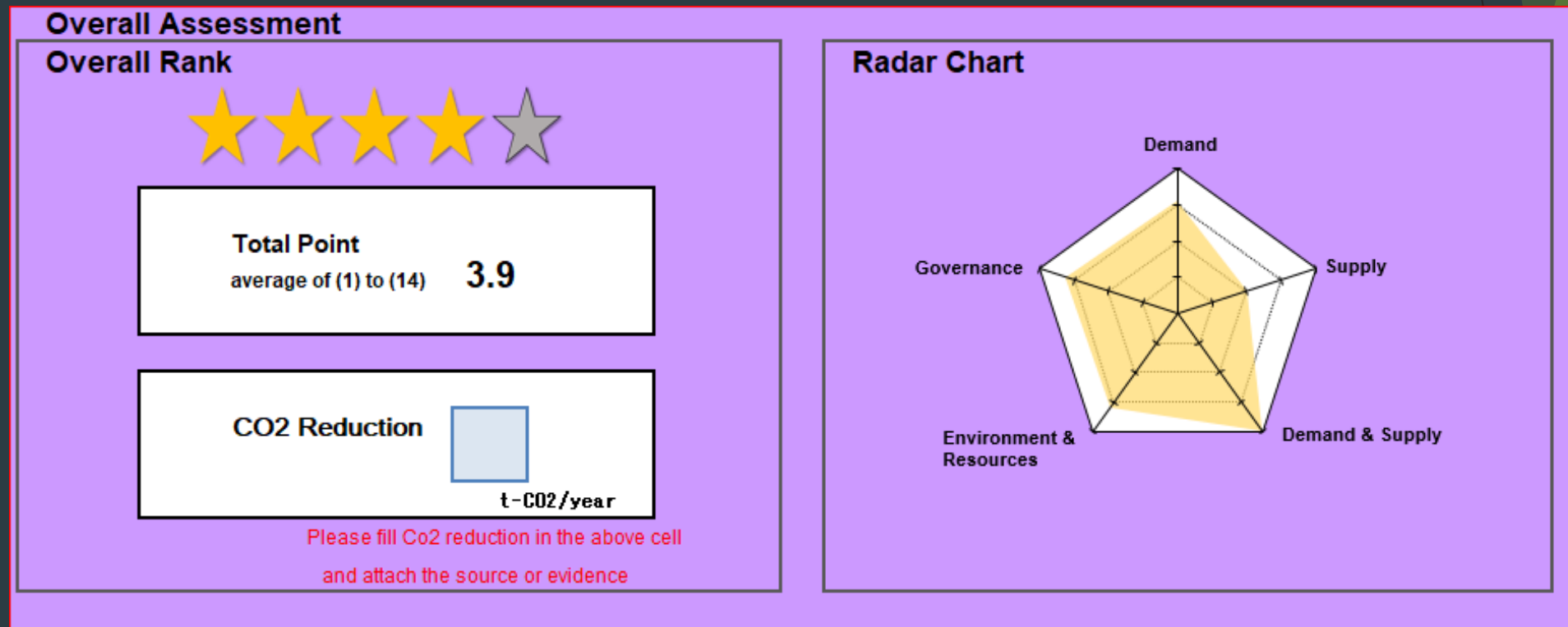
Masterplan KEK Bitung



Low-Carbon Measures in SEZ Bitung

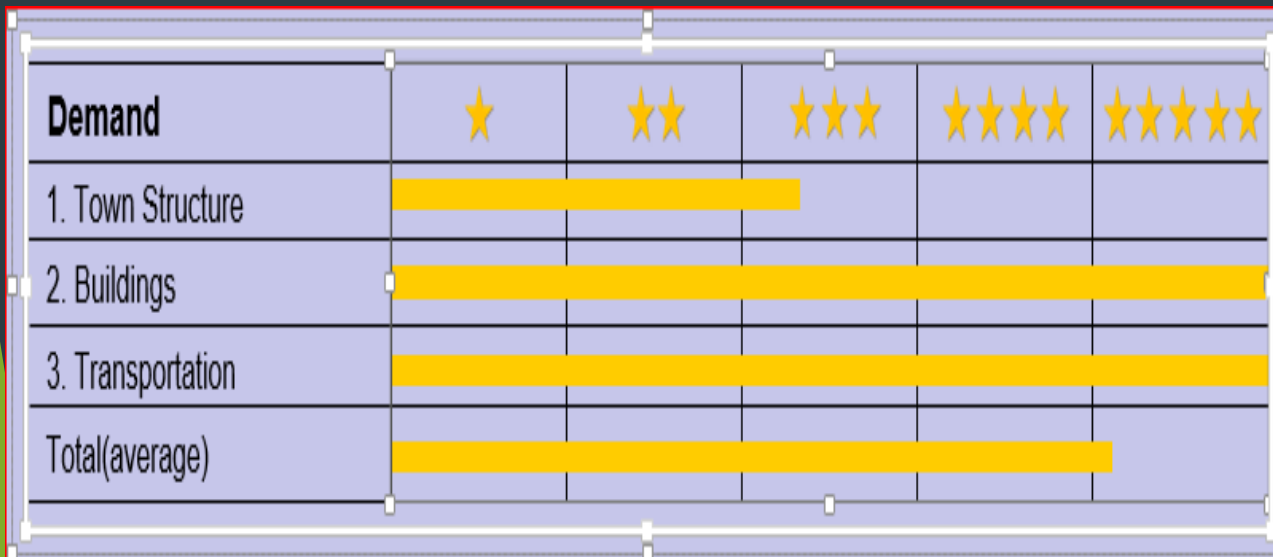
Self-assessment results by LCT-I system

By using LCT-I system, there are Overall Low-Carbon Measures in Bitung SEZ:



Low-Carbon Measures in SEZ Bitung - Demand

The North Sulawesi's Regional Planning and Development Board (BAPPEDA) identifies the low-carbon measures in SEZ Bitung. The ongoing development processs of SEZ Bitung, BAPPEDA evaluates the low-carbon measurement based on several planning documents, such as Masterplan of SEZ Bitung made by South Korean's MOLIT (Minister of Land, Infrastructure and Transport).



Demand		★★★★		4.1
1. Town Structure	-	★★		
1.1. Adjacent Workplace and Residence	-			
1.1.1. Residential Use and Non-residential Use	★		1	2.3
1.2. Land Use	-			
1.2.1. Efficient Land Use	★★★		3	
1.3. TOD (Transit Oriented Development)	-			
1.3.1. City Development Centered on Public Transportation	★★★		3	
2. Buildings	-			
2.1. Energy-Saving Construction	-			
2.1.1. Thermal-Insulation Performance	★★★★★	★★★★★	5	5.0
2.1.2. Energy-Saving Equipment Performance	★★★★★		5	
2.1.3. Natural Energy	★★★★★		5	
2.2. Green Construction	-			
2.2.1. Green Construction Guidelines	★★★★★		5	
3. Transportation	-			
3.1. Promotion of Public Transportation	-			
3.1.1. Easy-to-Use Public Transportation	★★★★★		5	
3.1.2. Comprehensive Transportation Measures	★★★★★		5	
3.2. Improvement in Traffic Flow	-			
3.2.1. TDM(Transportation Demand Management)	★★★★★	★★★★★	5	5.0
3.2.2. Transportation Infrastructure Planning	★★★★★		5	
3.3. Introduction of Low Carbon Vehicles	-			
3.3.1. Introduction of Low Carbon Vehicles	★★★★★		5	
3.4. Promotion of Efficient Use	-			
3.4.1. Support for Eco-driving	★★★★★		5	

Total Point on Demand: 4.1

Low-Carbon Measures in SEZ Bitung - Supply

Total Point on Supply: 3.0

Supply	★	★★	★★★	★★★★	★★★★★
4. Area Energy System	██████████				
5. Untapped Energy	██████████				
6. Renewable Energy	██████████				
7. Multi Energy System	████████████████████				
Total(average)	██████████				

Supply		★★★		3.0
4. Area Energy System	-	★★		
4.1. Area Energy	-			2.0
1. Introduction of Area Energy	★★			2
5. Untapped Energy	-	★★★		
5.1. Untapped Energy	-			3.0
1. Introduction of Untapped Energy	★★★			3
6. Renewable Energy	-	★★		
6.1. Renewable Energy	-			2.0
1. Introduction of Renewable Energy	★★			2
7. Multi-Energy System	-	★★★★★		
7.1. Multi-Energy	-			5.0
1. Introduction of a Multi-Energy system	★★★★★			5

Low-Carbon Measures in SEZ Bitung - Supply & Demand

Supply & Demand	★	★★	★★★	★★★★	★★★★★
8. Energy Management	████████████████████				
Total(average)	████████████████████				

Demand & Supply		★★★★★		5.0
8. Energy Management	-			
8.1. Energy Management of Buildings/Area	-			
1. Energy Management of Buildings/Area	★★★★★	★★★★★		5.0
2. AEMS (Area Energy Management System)	★★★★★			5
3. Smart Micro-Grid	★★★★★			5

Total Point on Supply & Demand: 5.0

Page 1

Low-Carbon Measures in SEZ Bitung - Environment & Resources

Environment & Resources	★	★★	★★★	★★★★	★★★★★
9. Greenery	★★★★★				
10. Water Management	★★★★				
11. Waste Management	★★★★★				
12. Pollution	★★★★				
Total(average)	★★★★★				

Environment & Resources		★★★★		4.2
9. Greenery	-			
9.1. Securing Green Space	-	★★★★★	★★★★★	
1. Formation of Green Shade	★★★★★			5.0
2. Formation of Greening	★★★★★			5
10. Water Management	-			
10.1. Water Resources	-	★★★		
1. Water Usage	★★★★★			3.0
2. Water Reuse	★			1
11. Waste Management	-			
11.1. Waste products	-	★★★★★	★★★★★	
1. Reduction of Waste Products	★★★★★			5.0
2. Reuse of Waste Products	★★★★★			5
12. Pollution	-			
12.1. Air	-			
1. Air Pollution	★			1
12.2. Water Quality	-	★★★		
1. Water Pollution	★★★★★			3.7
12.3. Soil	-			
1. Soil Contamination	★★★★★			5

Total Point on Environment & Resources: 4.2

Low-Carbon Measures in SEZ Bitung - Governance

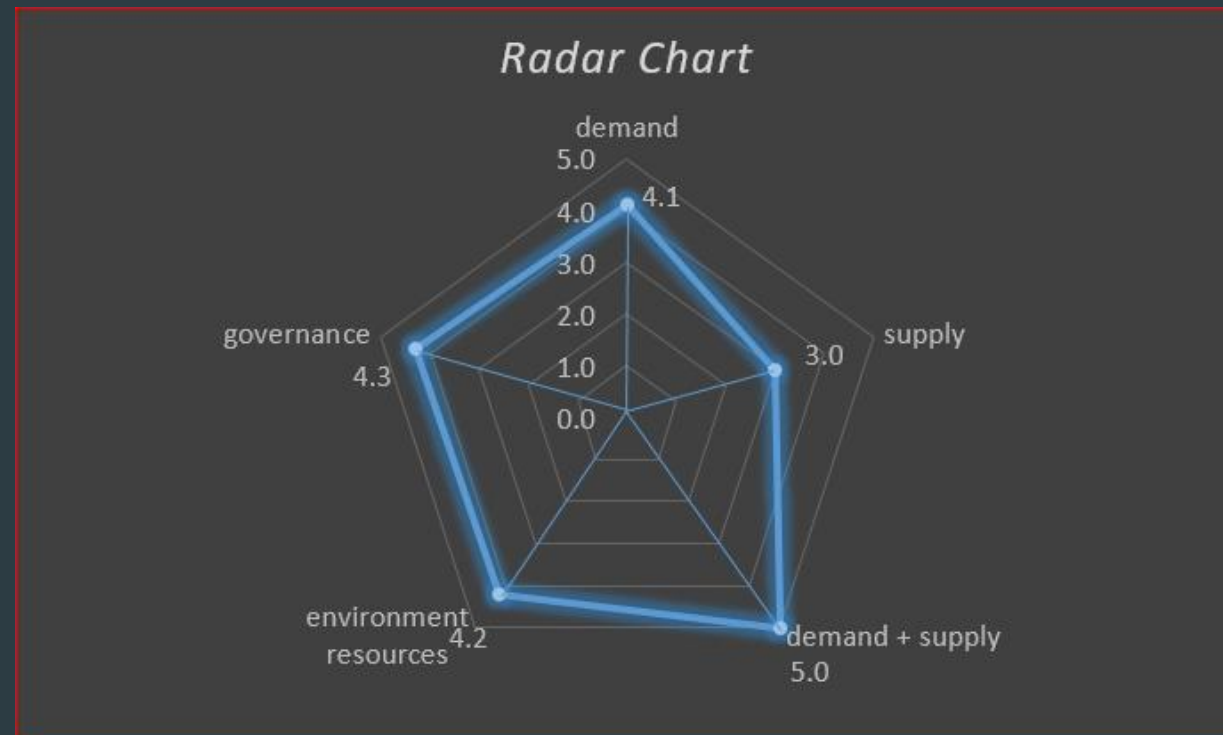
Governance	★	★★	★★★	★★★★	★★★★★
13. Policy Framework	★★★★★				
14. Education & Management	★★★★				
Total(average)	★★★★★				

Governance		★★★★		4.3
13. Policy Framework	-			
13.1. Efforts toward a Low-carbon Town	-			
1. Efforts toward a Low-carbon Town	★★★★★	★★★★★		5.0
2. Budget for Policies/Business Plans to Create a Low-Carbon Town	★★★★★			5
13.2. Efforts toward Sustainability	-			
1. B/LCP Plan	★★★★★			5
2. Developments with Less Influence	★★★★★			5
14. Education & Management	-			
14.1. Life Cycle Management	-	★★★		
1. Enlightenment and Education for Energy-savings and a Low-carbon Town	★★			3.5
2. Area Management toward an Energy-saving and Low-carbon Town	★★★★★			5

Total Point on Governance: 4.3

Self-evaluation Results

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

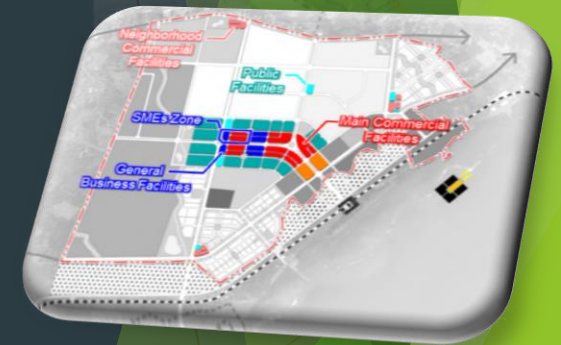


Total Average Point: 3.9

Self-evaluation Results

DEMAND SIDE

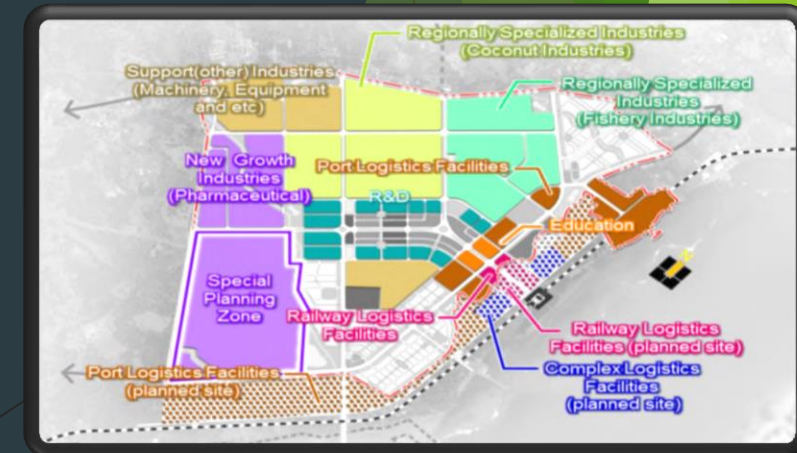
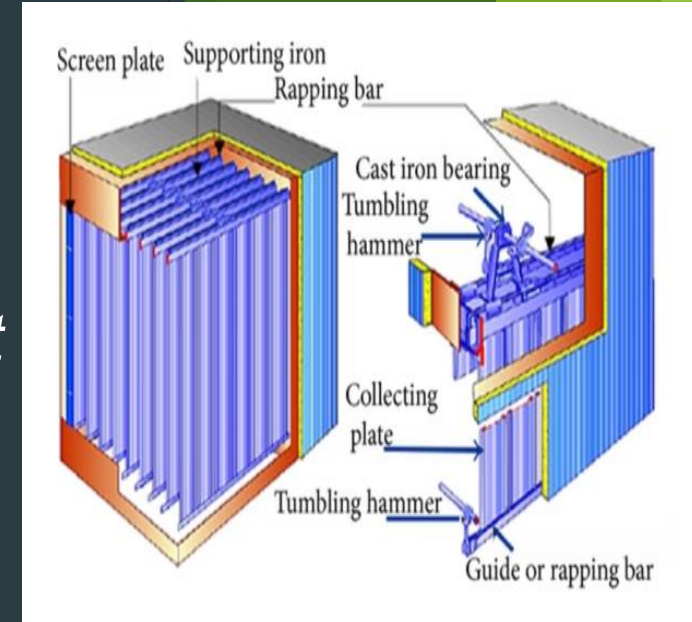
- ▶ *SEZ Bitung offers a number of the various types of housing, shaping the north-south linkage on site.*
- ▶ *Residential zones are equipped with lots of supporting facilities in walking distance.*
- ▶ *The TOD's is also included in our mid-term planning as part of Super-Hub*



Self-evaluation Results

SUPPLY SIDE

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



Self-evaluation Results

DEMAND AND SUPPLY SIDE

- ▶ *SEZ Bitung implements a proportional building layout arrangement, smart micro-grid and providing supporting facilities in walkable distance.*
- ▶ *Promote the energy saving, cost reduction and minimization of damage to ecosystem through the layout, preserving the natural terrain to the maximum extent*



Self-evaluation Results

ENVIRONMENT AND RESOURCES

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

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



Self-evaluation Results

GOVERNANCE

- ▶ *The Government of North Sulawesi has established some rules related to low-carbon initiative such as:*
- ▶ *Mid-Term Development Planning 2021-2026 (TBA)*
- ▶ *Spatial Planning 2014-2034 (North Sulawesi Rule No. 1/2014)*
- ▶ *Reducing GHG Action Plan (Governor Rule No. 56/2012)*
- ▶ *LCMT team work at SamRat Univ. Rule No. 39/UN12.10/LL/2017*



Future of SEZ Bitung

The Special Economic Zone of Bitung will become a national and global model for sustainable, low carbon urban and industrial planning, and will contribute to the national goal of reducing GHG emissions by 26% by 2020 (29% by 2030) compared to a Business-as-Usual Scenario. This vision will be implemented developing the Low Carbon Model Town strategy along the following four axes:

- Ensure alignment with existing local and national development policies, regulatory frameworks and institutional set-ups;*
- Reduce energy consumption through the use of clean, green energy generation and more energy efficient technologies and practices;*
- Ensure an efficient and environmentally balanced management of resources through the utilisation of the best available low carbon technologies for industry, commercial and residential areas, for solid waste and wastewater management, for forestry and land use, and for transportation;*
- Apply an accurate, transparent and functional monitoring, reporting and verification system (MRV) of the GHG emissions and additional sustainable development impacts.*
- Promote the low-carbon vehicles to reduce fuel consumption*
- Reducing the fossil fuel energy usage by promoting eco-driving contributes to the low-carbon town development in SEZ Bitung.*



PROBLEMS

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

Implemented projects

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

Implemented projects....continued

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

CONCLUSION

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



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Thank You