

# THE DEVELOPMENT OF LONG APUNG AIRPORT AS THE CENTRAL OF ECONOMIC IN THE BORDER REGION WITH THE SUPPORT OF REGIONAL RENEWABLE ENERGY

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**Abstract.** Long Apung Airport is the largest airport border between Indonesia (North Kalimantan) and Malaysia (Sarawak) in the village Long Ampung. The area is 60 ha. The runway will be the 1.600 meters and the width of 30 meters in 2017. It is as a place where distribution of goods at the border. It also can secure the border region by the military. It will be the central of economic of the border region. It can be built the passenger terminal, VIP terminal, cargo terminal, office of administration, office of airport, security office, goods market, office of operations, office of PKP - PK, tower, meteorological station, building of NDB, VOR, DME, power house, fuel station, building of aircraft maintenance, the hangar, housing, road access to airport, parking vehicles, drainage systems, and waste water systems. The availability of electricity was only 20 KW using Solar Cells. It took more than 1MWatt to support the development of Long Apung Airport as the central of economic of the border region. The capacity of power plants in Kalimantan was 1.999 MW (2015) with peak load 1.667 MW, but the electricity network only reached Melak to Long Bagun so it's still far from Long Bangun Airport. The solution was to increase the renewable energy construction by solar cells and PLT Micro Hydro (River Flow), with capacity to 144MW renewable energy (2019).

**Keywords:** Long Apung Airport, Economic of Border Region, Solar Cells, Micro Hydro

## I. INTRODUCTION

Long Apung Airport is the largest airport border between Indonesia (North Kalimantan) and Malaysia (Sarawak) in the village Long Ampung. The area is 60 ha. The runway will be 1.600 meters and the width of 30 meters in 2017. It is as a place where distribution of goods at the border. It also can secure the border region by the military. It will be the central of economic of the border region. It can be built the passenger terminal, VIP terminal, cargo terminal, office of administration, office of airport, security office, goods market, office of operations, office of PKP - PK, tower, meteorological station, building of NDB, VOR, DME, power house, fuel station, building of aircraft maintenance, the hangar, housing, road access to airport, parking vehicles, drainage systems, and waste water systems.

The airport development for the 2010-2014 related to the border region, include: (1) the development / rehabilitation of airport infrastructure, the extension of the runway, expansion of apron, widening taxiways, coating/increase the carrying capacity of the runway, apron, taxiway, procurement and installation of equipment landing, the fulfilment of the power supply airports, fenced area airports in 2010 as many as 80 airports, while in 2014 the total is 140 airports; (2) the accessibility improvement of the area and the regional economy during the years 2010-2014 built 28 new airports; (3) the pioneer of air transport services in 2010 as

many as 118 routes and 2014 as many as 164 route (*Renstra DJU 2015-2019, 2015*).

The target of Border area development in 2015-2019, include: development of 10 PKSN as the centre of economic growth, a major transportation node region, the international gateway / border controls border area, with 16 other PKSN as the preparation stage development; To accelerate the development of border areas, the development strategies include: (1). The development of economic growth centres border area based on its characteristics, the local potential, and consider market opportunities with neighbouring countries supported the development of transport infrastructure, energy, water resources, and telecommunications-information; (2) building a major transport hub node connectivity strategic national initiative with villages in the district and sub-district border priority sites in the vicinity, the central activity area (the district capital), the centre of national activities (the provincial capital), and connects with the neighbouring countries, as well as building connectivity through marine transportation services to improve the quality and intensity of marine services to the border region (3) open access in the villages in the district priority sites by land, river, sea, and air with road / modal / non-status and service dock pioneer; (4) improving the quality of regulation, fostering the use and supervision of spatial planning, including accelerate the drafting of legislation related to the National Air Space Management (prune) to strengthen the country's sovereignty

in the air as well as the preparation of detailed spatial plan border area (Renstra Kemenhub 2015-2019, 2015)

The growing era of airline Low Cost Carrier in the last decade, the growth of several new airlines had encourage growth number of airline companies in Indonesia. In 2000, the number of passenger transport modes of air transportation was only about less than 10 million passengers. Then, in 2015 the number of passengers' air transportation was expected to reach 100 million passengers. This was due to the increasing number of new growing commercial airline in Indonesia. Nowadays, there were approximately less than 15 scheduled and several commercial airline cargo carriers. The regulation of the Minister of Transportation number 87 in 2016, said the basic facilities Detailed Engineering Design Airport, was the basis for the implementation of airport construction, which included the land side facilities included the buildings: (1) the building of passenger terminal, cargo terminal, control tower, air traffic control (control tower), operations, flight operations, depot refuelling aircraft, administrative / offices, hangars, markers, signs in the area of land and processing facilities waste; (2) Access road; (3) Parking of vehicles (Kemenhub, 2015)

The passenger terminal building was provided to serve all activities undertaken by passengers ranging from departure to arrival. Type, area, and completeness of the passenger terminal building customized with a building area which represented the number of passengers served and complexity of functions and users. Land side facilities were determined by the number of passengers served by the airport, both at rush hour and throughout the years of operation. The area requirements were based on the number of passengers rush hour was an indicator that a major concern. The number of passengers per year was important for planning an aerodrome and the number of passenger's busy time will determine the size of the facility. The rush hour or peak hour would determine the design parameters of an aerodrome.

## II. METHODOLOGY

The authors used the method as follows: (1) The case study approach referred to a method that emphasized qualitative analysis (Yin, 2009); (2) Research approach used qualitative research approaches (Denzin and Lincoln in Lexy Moleong, 2005); (3) The research location was in Long Apung Airport, the largest airport border between Indonesia (North Kalimantan) and Malaysia (Sarawak); (4) Primary data was from the direct or first hand, especially Airport technical-economical aspect, master plan for the development of infrastructure of regional economy; (5) Secondary data could be online-offline information, reports, results of previous studies and the other publications; (6) The interview was conducted in-depth interviews, the method of collecting data through in-depth interviews conducted to the data source (W. Gulo, 2003)



Fig. 1 Long Apung Airport

Table.1. *Baggage Cargo and Mail Departure Domestic Flight Services By Origin And Destination 2014*

Asal dan Tujuan/ Origin and Destination	Penumpang Passenger (Person)	Bagasi Baggage (Kg)	Barang Cargo (Kg)
<b>Samarinda (Temindung)</b>	<b>44 043</b>	<b>269 733</b>	<b>166 762</b>
Balikpapan	13 535	76 997	71 320
Berau	8 322	43 179	27 086
Datoh Dawai	1 407	13 701	1 104
Long Apung	1 693	18 138	1 459
Malinau	524	4 543	0
Melak	6 425	34 425	16 231
Tanjung Selor	7 395	48 765	34 086
Toraja	41	281	0
Lainnya	4 781	29 704	15 476
<b>Paser (Tanjung Harapan)</b>	<b>14 750</b>	<b>93 127</b>	<b>47 155</b>
Long Bawan	8	114	0
Long Apung	1 779	23 650	4 935
Malinau	240	1 414	49
Nunukan	7	10	0
Samarinda	6 579	42 935	14 409
Tarakan	6 137	25 004	27 762

Table.2. List of Airport Used by Civil Aviation

Provinsi Province	Bandar Udara Airport	Kab/Kota Regency/ Municipality	Penggunaan/ Function	Hirarki <sup>1)</sup> Hierarchy
(1)	(2)	(3)	(4)	(5)
Kalimantan Timur	Nunukan	Nunukan	Domestik	Pengumpul Skala Terper (I/5)
	Long Bawan	Nunukan		
	Badak Bontang	Bontang	Domestik	Pengumpul Skala Terper (I/5)
	Long Apung	Malinau	Domestik	Pengumpun
	Selawing	Malinau	Domestik	Pengumpun
	Tengah Grogot	Paser	Domestik	Pengumpun
	Tanjung Santan	Kutai Kartanegara		
	Muera Badak	Kutai Kartanegara		
	Sanjeh	Kutai Kartanegara		
	Kotabangun	Kutai Kartanegara	Domestik	Pengumpun
	Tanjung Bara	Kutai Timur		
	Bunyu	Bulungan		
	Samarinda Baru	Samarinda	Domestik	Pengumpul Skala Sekunder (II/4)

Table.3. *Keberangkatan Penumpang Bagasi Barang dan Pos/Paket untuk Penerbangan Dalam Negeri Menurut Asal dan Tujuan/ Passenger Baggage Cargo and Mail Departure Domestic Flight Services By Origin And Destination 2014*

Asal dan Tujuan/ Origin and Destination	Penumpang Passenger (Person)	Bagasi Baggage (Kg)	Barang Cargo (Kg)
(1)	(2)	(3)	(4)
Lokal	7 012	54 570	201
Long Apung	217	5 356	5 652
Malinau	21	0	0
Melak	6 904	35 062	4 422
Muara Teweh	3 306	22 293	3 213
Palangkaraya	2 462	17 594	3 263
Parameswara	406	3 576	0
Pontianak	7 523	42 374	11 083
Samarinda	4 021	22 254	6 974

### III. CONCLUSIONS

The availability of electricity was only 20 KW using Solar Cells. It took more than 1MWatt to support the development of Long Apung Airport as the central of economic of the border region. The capacity of power plants in Kalimantan was 1.999 MW (2015) with peak load 1.667 MW, but the electricity network only reached Melakto Long Bagun so it's still far from Long Bangun Airport. The solution was to increase the renewable energy construction by solar cells and PLT Micro Hydro (River Flow), with capacity to 144MW renewable energy (2019).

### REFERENCES

- [1] Aschauer, David A, *Back of the G-7 pack: public investment and productivity growth in the Group of Seven*, Working Paper Series, Macroeconomic Issues 89-13, Federal Reserve Bank of Chicago, 1989
- [2] BPS, *StatistikTransportasiUdara*, Jakarta, 2014
- [3] Gulo, W, *MetodologiPenelitian*, Jakarta, PT GramediaWidiasarana Indonesia, 2003
- [4] Kemenhub, *RencanaStrategisDirjenPerhubunganUdaraKementerianPerhubungan 2015-2019*, Jakarta, 2015
- [5] Kemenhub, *RencanaStrategisKementerianPerhubungan 2015-2019*, Jakarta, 2015
- [6] Marzuki, *MetodologiRiset*, Yogyakarta, BPFE-UII, 2002
- [7] Moleong, Lexy J, *MetodologiPenelitianKualitatif*, Bandung, PT RemajaRosdakarya, 2005,
- [8] Todaro, M.P, *Pembangunan Ekonomi di DuniaKetiga*, Ghalia, Jakarta, 1997
- [9] UU no.22 tahun 1999 & UU no.34 tahun 2004 *Otonomi Daerah*
- [10] Yin, R.K, *Case study research. Design and methods*, 4. Ed, Thousand Oaks, California, 2009

