JAYA CM	DATA UMUM	TANGGAL	17-Apr-23
DIVISI MARKETING	KETENAGALISTRIKAN	HALAMAN	1 / 1

	NAMA PROYEK	:	Project Implementation Consultant Masang-2 Hydro Electric Power Project in Indonesia (Masang-2 HEPP)
	PEMILIK	:	PT PLN (Persero)
	JENIS PROYEK	:	PLTA
	LOKASI	:	Kecamatan Palembayan, Kabupaten Agam, Sumatera Barat
	PERIODE	:	TBA

1	Lokasi	
		5 km sebelah utara Danau Maninjau, 30 km barat laut kota Bukit Tinggi, 90 km barat laut kota Padang,
		ibu kota Sumatera barat
2	Jumlah Unit Pembangkit	
	-	Unit
	-	Unit
	Total	Unit
3	Kapasitas per Unit Pembangkit	
	- Rencana	2 x 22 MW produksi energi sebesar 251 GWh
	-	MW
	Total	MW
4	Lingkup Pekerjaan	**Pengawasan**
		A.
		B.
5	Biaya Konstruksi	
	- Onshore	**TBA**
	- Offshore	**TBA**
	PAGU	**Rp** - incl PPN ….. % ; KSO - Jaya CM …..%
6	Konsultan Supervisi	
	- Project Management	**Tractebel Engineering GmbH (Lead Firm)**
		PT Wiratman
		PT Jaya CM
	- Supervisi Konstruksi	**TBA**
	- Design	**TBA**
7	Kontraktor	
	- Architect	**TBA**
	- Struktur	**TBA**
	- MEP	**TBA**
8	Main Equipment	
	- Boiler	**TBA**
	- Steam Turbine	**TBA**
	- Generator	**TBA**
	- GIS	**TBA**
	- Main Transformers	**TBA**
	- Electrical, I&C	**TBA**
	- Civil Work and BOP	**TBA**

5. PROJECT INFORMATION

5.1 Project Description

The Masang-2 Hydropower Plant project is planned to have a capacity of 2 x 22 MW and annual energy production of 251 GWh. To be able to generate energy in accordance with the planned then the maximum discharge design is 26 m^3/s with an average falling height of 177.75 m.

The following is a technical data of Masang-2 Hydropower activity plan:

- WEIR
  - Type : Gravity
  - Material : CVC and mass concrete
  - U/S slope : Vertical
  - D/S Slope : 0.80/1
  - Height : 20.5m
  - Length : 23.35m
  - Width : 56.5m
  - Ungated spillway length : 48m
  - Flushing sluice : 5.0m
  - No. Flushing sluice : 2
- INTAKE
  - Type : Open flow equipped by stoplogs grooves
  - Material : CVC
  - Number of openings : 2
  - Width : 4.5m
  - Height : 4.0m
- CONNECTION CULVERT
  - Type : Buried concrete box culvert
  - Material : CVC
  - Number of Structures : 1
  - Length : 878.11
  - Widht : 3.65m
  - Height : 3.65m
  - Concrete Thickness : 0.35m
  - Invert slope : 0.10%
- CONNECTION TUNNEL
  - Type : Horse shoe shape tunnel
  - Material : CVC
  - Number of Structures : 1
  - Length : 1,677.07m

- Base width : 2.67m
- Diameter : 3.65m
- Concrete Thickness : 0.30m
- Invert slope : 0.14%

❖ INTERMEDIATE POND

- Type : Embankment
- Material : Rockfill with clay core
- Dam height : 46.0 m
- Dam crest lenght : 210.0 m
- Dam crest width : 8.0 m
- Dam embankment volume : 483,840 m^3
- Dam foundation axcavation : 1,188,000 m^3
- Dam embankment US slope(H/V) : 3:1
- Dam embankment US slope(H/V) : 3:1

❖ HEADRACE TUNNEL

- Type : Circulate lined
- Material : CVC
- Number of Structures : 1
- Length : 4,491 m
- Diameter : 3.40 m
- Concrete thickness : 0.30 m
- Invert slope : 0.004 %

❖ SURGE TANK

- Type : Surge shaft with throttle orifice, no chamber
- Material : CVC
- Number of structure : 1
- Shaft height : 59 m
- Shaft diameter : 9.00 m
- Orifice throttle diameter : 1.80 m
- Orifice throttle lenght : 8.5 m

❖ PENSTOCK

- Type : Ground – trench type
- Material : Arc welded steel pipe
- Number of stucture : 1
- Penstock diameter : 2.80 m

- Penstock length : 681.19 m
- Concrete blocked length : 130 m
- Encased in thick concrete : 80 m
- Number of branches : 2
- Branch diameter : 2.0 m

❖ POWER HOUSE

- Type : Ground layout
- Number of stucture : 1
- Width : 18.0 m
- Length : 57.95 m
- Height at machine floor : 16.0 m
- Height at foundation level : 31.8 m

❖ SWITCHYARD AND TRANSMISSION LINE

- Switchyard type : Ground
- Length : 66 m
- Width : 40 m
- Transmission line 150 kV length : 46 kmr

❖ QUARRY

- Surface : 29.03 ha
- Q1
- Long : 20 m
- Width : > 5m
- Height : 3 m
- Q2
- Long : 23 m
- Width : > 6 m
- Height : 2 m
- Q3
- Long : 100 m
- Width : > 6 m
- Height : 6 m

❖ ACCESS ROAD :

- Type : A
- Pavement : Asphalt paved surface without filling

➢ Carriage way width	:	5
➢ Formation width	:	7
➢ Length	:	15.7 km
➢ Type	:	A
➢ Pavement	:	Asphalt paved surface with filling
➢ Carriage way width	:	5
➢ Formation width	:	7
➢ Length	:	9.5 km

More detail on the project are given in the feasibility study sent with the present Terms of Reference.

5.2 Masang-2 HEPP Feasibility Study

a) Full feasibility study feasibility was carried out by AFC Switzerland and completed in November 2017. The study identified the potential of developing:

i. Weir. Main dimensions are height 20.5 m, width 56.5 m and length 23.35 m;

ii. Connection culvert. 3.65 m box culvert with length 878.11 m;

iii. Connection tunnel. Horse shaped diameter 3.65m with length of 1677.07 m;

iv. Dam embankment. Rockfill with clay core with height 46 m and crest length 210 m;

v. Headrace tunnel. 3.40 m diameter with length 4491.48 m;

vi. Surge shaft. Diameter 9.0 m and height 59 m;

vii. Powerhouse. Surface layout 18m width and 58 m length;

viii. Access roads. Asphalt paved with 25.2 km length.

ix. Transmission line 150 kV. Length 46 kmr.

b) Additional site investigations have been carried within the purposes and aims of the feasibility study. Main features, outcomes and suggestions are listed below.

i. Morphology of project area consist of hill and valley with subparallel and dendritic drainage pattern.

ii. Regional Geology of project area consist of Permian Limestone, Greenstone, Andesite Basalt, Andesite of Danau Maninjau Caldera, and Pumiceous Tuff

iii. Stratigraphy of project area divided into two-unit rock that are Pre-Tertiary Metamorphic Polimic Fragment (BIM rock) unit rock and Quaternary Pumiceous Tuff. Geological structure at project area is joints at Metamorphic Polimic Fragment unit rock.

iv. There are 15 (fifteen) locations of core drilling and in-situ testing has been done and seismic refraction, the result is stratigraphy of subsurface is basement (phyllite), melange deposits, and top soil.

v. The peak ground acceleration (PGA) value at the investigation site for power house building (x= 100.185924, y= -0.094425) about 0.74g and at the location can be classified as soil type. Power house imply to the power plant center on the national grid so the seismic risk belongs to category IV which shall give a seismic important factor of 1.5.

vi. The peak ground acceleration (PGA) value at the investigation site (weir and intermediate pond) for basic earthquake acceleration (ac) is assumed by 100 years return period (OBE) about 0.3291- and 1000-year return period (MDE) that is allowed to be damaged but no collapse occurs about 0.4538.

vii. Masang HEPP location lies Sianok Segmen which is part of Sumatra Fault. It given that the distance of the location from the fault approximately around 1.5 km.

viii. Generally, excavation methods at investigation site from weir connecting culvert, connecting tunnel, intermediate pond, headrace tunnel, penstock and power house location about rippable – blasting

c) For next stage of design and implementation of the project, it is recommended as follows

i. Core drilling is recommended at:

- Weir
- Penstock
- Intermediate Pond
- Locations which possibility of water accumulation / water trap
- Pressure Inlet Tunnel.
- Quarry

ii. Geo-electrical prospecting survey 2D for weir connecting culvert, connecting tunnel, intermediate pond, headrace tunnel, penstock and power house location.

iii. Detail Seismicity Analysis is needed for next study

iv. Adit Excavation Trial with In-situ test on mélange rock formation

6. OBJECTIVES FOR THE CONSULTING SERVICES

The objective of the consultancy services is to assist and support PLN in all relevant fields for the realisation and implementation of the Masang-2 HEPP including but not limited to design and procurement and supervision of the construction of the project. The Consultant is requested to submit Technical and Financial proposals to undertake the services in accordance with the proposed Conditions of Service Agreement and this TOR. The Consultant shall take note that the project information given in this TOR is not necessarily the final configuration and shall be treated as indicative only. Upon commencement of the Services, the Consultant shall evaluate the project information and make necessary changes to the configuration based on updated data, information, new technology etcetera.

7. SCOPE OF WORK

7.1 General

The Consultant shall assist and co-operate with other consultants or advisors appointed by the Client throughout all phases of the Project implementation.

The Consultant's roles, responsibilities and accountability during construction phase shall be that of the Engineer as defined in the FIDIC's General Conditions of Contract for Construction (Pink Book), General Conditions of Contract for Plant and Design – Build (Yellow Book) and the accompanying Particular Conditions of Contract from the Client.