Feasibility Report of the Caglayan Hydroelectric Power Plant

Subject of the Report: This report is about the feasibility of a hydroelectric power plant in Aybastı – Ordu / Turkiye.

No: 18.021

Executive Summary

Name of the Project:	Hydroelectric Power Plant
Owner:	Inwest International Consulting[1]
Coordinates of the Regulator:	45 00 400 / 3 63 000
Coordinates of the Power Station:	45 11 000 / 3 68 700
Province:	Ordu
District:	Aybastı
Region:	Eastern Black Sea Region
Region of Public Water Works:	7th Region
Name of the River:	Bolaman Stream / Uzundere
# of Stream Observation Center:	22-92 DSİ
Space of Falling Field:	163 km²
Average Flow:	3180 m³/s
Average Annual Total Flow:	100 hm³
Q25 Flood Flow:	-
Q100 Flood Flow:	277 m³/s
Q.. Spillway Flow of the Project:	-
Type of Regulator:	Reinforced Concrete Frame
Peak Elevation:	703,50 m
Maximum Water Elevation:	702,77 m
Minimum Water Elevation:	700 m
Water Course Elevation:	695 m
Tailwater Elevation of Plant	430 m
Type of Transmission Structure:	Closed Concrete Channel
Length of Transmission Structure:	15500 m
Grade of Transmission Structure:	0,0004
Caliber of Penstock:	1,40 m
Length of Penstock:	850 m
Thickness of Penstock:	12 mm

[1] Inwest IC represents the owner of the project towards foreign investors.

Type of Turbine:	Pelton Turbine
Quantity of Units:	2
Bar Tension:	34,5 kV
Cross Section of Energy Transmission Line:	477 MCM
Length of Energy Transmission Line:	15 km
Gross Fall:	293,80 m
Net Fall:	289 m
Flow of the Project:	7 m^3/s
Installed Power (MW):	16726 kW (16,726 MW)
Relliable Energy:	4,575 GWh (4575 MW)
Secondary Energy:	47,959 GWh (47959 MW)
Total Energy:	52,534 GWh (52534 MW)
Investment Cost:	52.303.998 YTL
Annual Income:	*6.304.080 YTL*
Annual Expenditure:	*5.899.195 YTL*
Annual Net Income:	*404.885 YTL*[2]
Profitability:	1.07
Construction Period:	3 Years
Exchange Rate (YTL/$):	1,3777

[2] The amount of net income and annual income would be higher than amount above. For detailed expression, owner of the project has information on the issue.

Summary of the Project:

1. Location

Caglayan Hydroelectric Power Plant is located in Aybastı district of Ordu province. Regulator of the project will be established near to Aliekin settlement area and power plant will be 15 km away from regulator. Access to project area is available through the road which passes from Aybastı.

2. Proposed Facilities:

1. Regulator; with a height of 8,5 m.
2. Sedimentation Tank; length: 70m, width: 10m.
3. Transmission Channel; with a length of 15500 m.
4. Load Tank; length: 42m, width: 10m.
5. Penstock; length: 850m, caliber: 1,40 m.
6. Hydroelectric Power Plant: 16726 kW.
7. Energy Transmission Line

3. Project Values

3.1 Hydrology

Regulator Fall Area:	163 km²
Average Flow for Regulator Area:	3180 m³/s
Average of Turbine Flow for Energy Production:	2484 m³/s
Q100 Flood Flow:	277 m³/s

3.2 Regulator

Type:	Reinforced Concrete Frame
Water Course Elevation:	695 m
Spillway Elevation:	700 m
Maximum Water Elevation:	702,77 m
Peak Elevation:	703,50 m
Height:	8,5 m
Spillway Size:	30 m

3.3 Transmission Channel

Type:	Rectangular and closed
Length:	15500 m
Grade:	0,004
Capacity (Qmax):	7 m³/s

3.4 Sedimentation Tank

Length:	42 m
Width:	10 m
Water Level:	693,83 m
Maximum Water Level:	694,11 m
Minimum Water Level:	690,83 m

3.5 Penstock

Caliber:	1,40 m
Length:	850 m
Thickness:	12 mm

3.6 Hydroelectric Power Plant

Type:	Pelton
Installed Power:	16726 kW
Electrical Power:	16895 kW
Mechanical Power:	17417 kW
Project Flow:	7 m^3/s
Quantity of Units:	2
Power of Unit:	8363 kW
Tailwater Elevation:	430 m
Gross Fall:	293,8 m
Revolutions Per Minute:	600

3.7 Generator

Type:	Horizontal Synchronous
Quantity of units:	2
Power Factor:	0,9
Generator Power:	9032
Voltage:	6,3 kV
Frequency:	50 Hz
Revolutions Per Minute:	600

3.8 Transformer

Type:	Open, greasy
Quantity of units:	2
Power:	9032 kVA

Nominal Voltage:	6,3 / 34,5 kV
Frequency:	50 Hz
Linkage Group:	Dyn 5
Cooling:	ONAN

3.9 Internal Transformer

Type:	Open, greasy
Quantity of units:	1
Power:	150 kVA
Nominal Voltage:	34,5 / 0,4 kV
Frequency:	50 Hz
Linkage Group:	Dyn 5
Cooling:	ONAN

3.10 Switch Mechanism

In the building, 34,5 kV cells.

3.11 Energy Transmission Line

Produced energy will be transmitted to TEDAS's or TEIAS's energy line through 477 MCM and 15 km line.

3.12 Produced Energy

Reliable Energy:	4,576 Gwh
Secondary Energy:	47,959 Gwh
Total Energy:	52,534 Gwh

3.13 Economics of the Project

Estimated Value:	40.373.668 YTL
Investment Cost:	52.303.998 YTL
Annual Expenditure:	5.899.195 YTL
Annual Income:	6.304.080 YTL
Net Income:	404.885 YTL
Profitability (Annual income-expenditure method):	1,07
Profitability (Net present value method):	1,09
Profitability (Public Water Works method):	0,44
Internal Rate of Return:	10,43 %
Cost of a Unit of Energy:	11,04 Ykr/kWh

NOTIFICATIONS

1. Cost of a unit of energy for producer could differentiates as of different prices
2. Price of electricity that state institutions purchase from producer could differentiates.
3. All info given in this report is summary of detailed feasibility report prepared in Turkish language.
4. All financial issues about project and partnership models are open to negotiation with owner of the project.

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