



Small Hydroelectric Power Plant Project on irrigation channel Upper Karabakh (Fizuli Region)

- **Project Developer :** **AZERENERGY JSC**
 CPEE CENTRE

- **Presented by** **Prof. Nariman Rahmanov**



Small Hydro Potential

- **Annual Hydro Power Production in Azerbaijan is 18% from total generation;**
- **More than 120 rivers there SHPP could be installed at first turn are determined;**
- **The total hydropower potential in the country is 16 TeraWh, from which 5 TeraWh can be produced by SHPP ;**



Small Hydroelectric Power Plant Project on irrigation channel Upper Karabakh

- **Objective of the project :**
- **generate renewable energy by run-of-river channel type small hydro power plant;**
- **increase the share of renewable energy in the electricity production of the AzerEnergy power grid**



Project description and proposed activities

- **The Small Hydroelectric Power Plant on irrigation channel Upper Karabakh (SHPP) is a run-of-river-channel type ;**
- **The generated electrical power would supply AzerEnergy power grid;**
- **Upper Karabakh SHPP does not need a reservoir, because it has used the stream of irrigation channel**



LOCATION

- It is located at 50 km from district center of Fizuly , at South West region of Azerbaijan
- It has 6 generators with total installed power 24MW; 6300V; $\cos \varphi = 0.8$, Wye connection, 50Hz, 150 rev/min



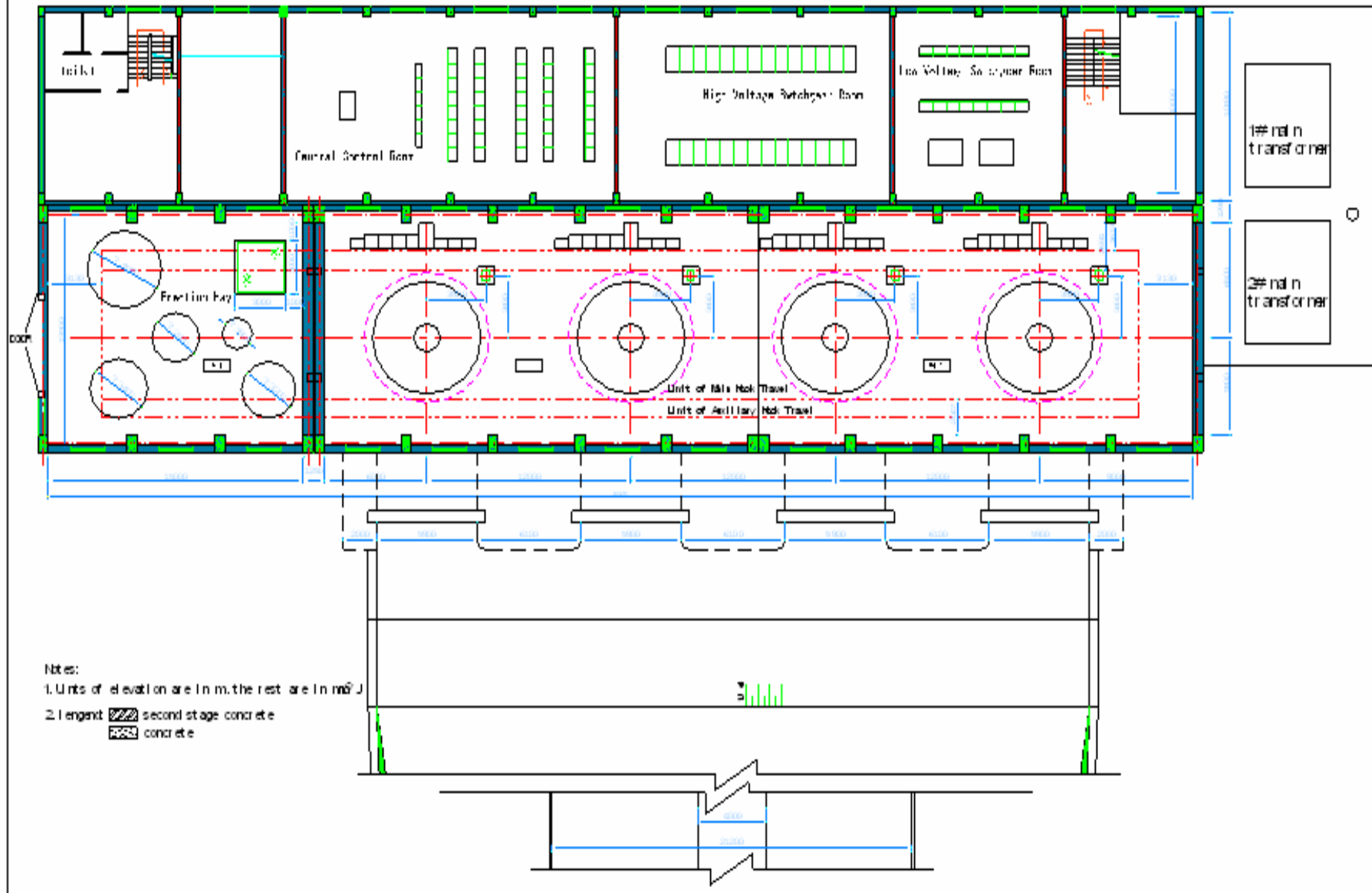
Project developer

- **AzerEnergy Joint Stock Company**

Has a big experience in design, construction and operation of different kind of hydro power projects in Azerbaijan, Iran and some other countries. AzerEnergy had constructed Mingechevir , Shamkir , Yenikend and other HPP but has an experience in SHPP from 1928.

- **CPEE Centre**

GENERATOR FLOOR LAYOUT PLAN



- Notes:
1. Units of elevation are in m, the rest are in mm
 2. Legend: second stage concrete
 concrete



Expected environmental and social benefits

- **Estimate of Greenhouse Gases abated / CO₂**
Annual 61 200 tCO₂e/yr
Up to and including 2012 : 244 800t-CO₂e (4 years)
- **Up to a period of 10 years: 612 000t-CO₂e**
- **Up to a period of 7 years : 428 400 t-CO₂e**
- **Up to a period of 14 years: 856 800 t-CO₂e**



Baseline scenario

- The project would displace the energy obtained from combustion of fossil fuel by renewable energy produced by a plant that is GHG free;
- Without project activity, CO₂ emission produced by fossil fuel combusted power generation will not go down ;
- The SHPP will produce electric power about 72 000 MWh, annually (working period about 3000 hours). Small-scale methodology AMSI.D "Electricity generation for the grid" can be used to calculate the emission reduction;
- The emission factor is 0.85t-CO₂ eq/MWh for the AzerEnergy power grid system ;
- The baseline emission in this case is $72\ 000 \times 0.85 = 61200\text{t-CO}_2\text{e/yr}$



ADDITIONALITY

- **Construction of this SHPP is not higher priority for Azerenergy because:**

Installed capacity of this SHPP is negligible relative to Azerenergy power system

High rate of installed cost for 1kW power

Low current tariff for natural gas



Benefits of the Project

- **Local benefits :**

It may contribute to the national energy supply through the application of renewable energy sources.

It may reduce GHG emission from oil fuelled power plants.

- **Global benefits :**

It will reduce GHG emission by using renewable energy source;

So after construction and commissioning of Upper Karabakh SHPP the emission reduction for Kyoto protocol time period would be

244 800t-CO₂.



Estimation of Emission Factor for all TPP of Azerenergy

Fuel	Net Generation, GWh	Consumed Fuel(10 ³ ton) (A)	Net calorific Value, (Tj/10 ³ ton) (B)	Carbon emission factor, (IPCC; tc/Tj) (C)	Emission tCO ₂ (D)=A*B*C *44/12
Gas	15551,4	5736102	43,33	15,3	13669986
Mazut	4565,9	1788035	40,19	21,1	5559655
Hydro	2505,51	-	-	0	0
Total	22 622,8	7524137	-	-	19 229 641
Baseline emission factor, (tCO ₂ /GWh)					850,01



Thank You For Listening