



# Uraveli 1 HPP



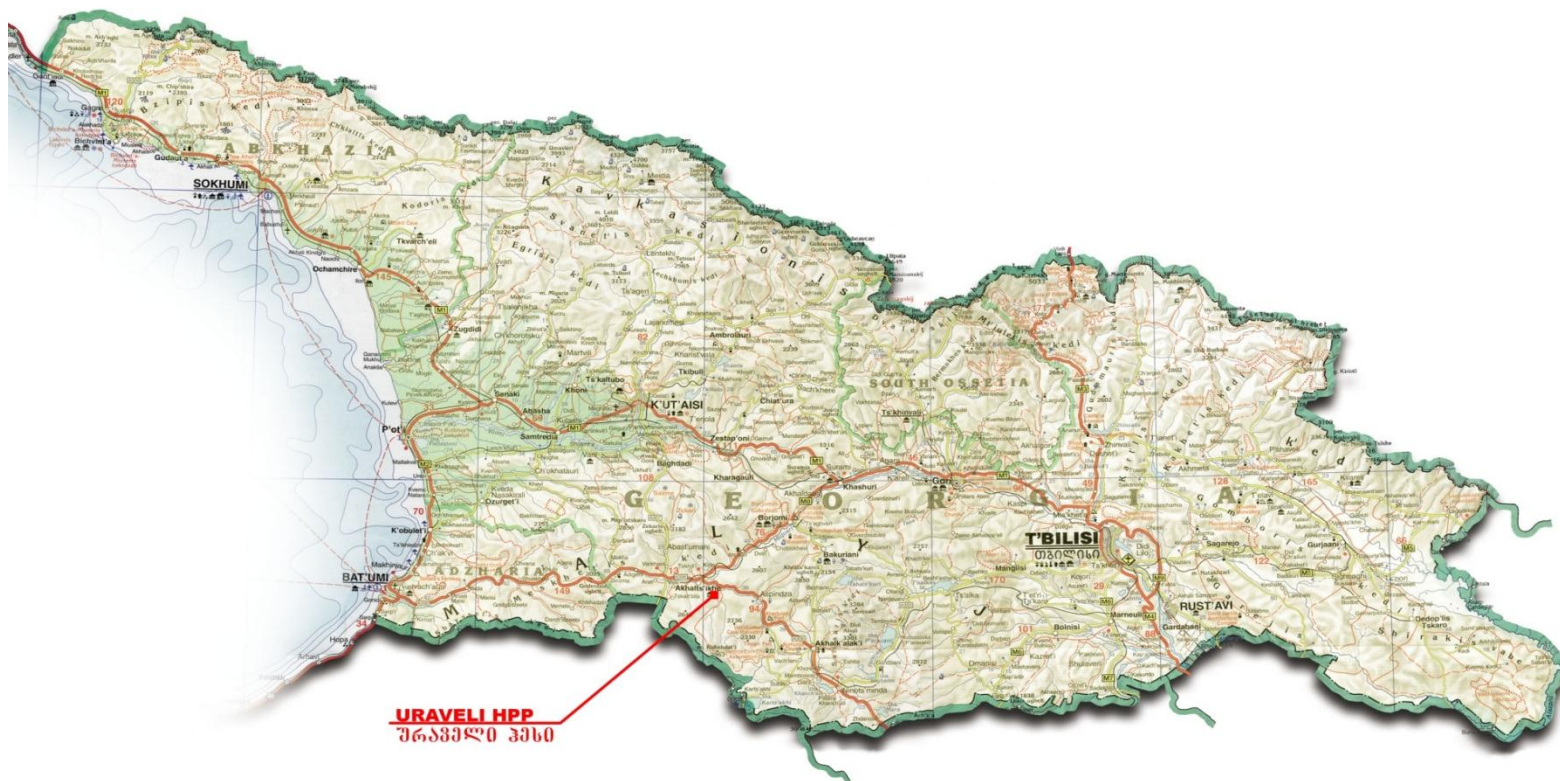
Ministry of Energy of Georgia

[www.energy.gov.ge](http://www.energy.gov.ge)



# General Information

Uraveli 1 HPP is located in Samtskhe-Javakheti region, Akhaltsikhe district, village Minadze on the river Uraveli.





# Basic Parameters

- ▶ Installed Capacity – 4.30 MW
- ▶ Average Annual Generation – 16.5 GW/h
- ▶ Regulation Type – Run-of-the-river
- ▶ Capacity Usage Ratio – 43.72%



# Assumptions and Financial Indicators

- ▶ Construction Cost – 7.2 million USD
- ▶ Construction Period – 1.50 years
- ▶ Domestic Tariff – 4.8 USc/kWh
- ▶ Export Tariff – 8 USc/kWh
- ▶ Project IRR – 10%
- ▶ Project NPV – 0.57 million USD
- ▶ Equity IRR – 14%
- ▶ Equity NPV – 0.81 million USD
- ▶ Payback Period – 12 years

*Note: All the calculations are based on preliminary assumptions. Therefore any clarifications will cause appropriate changes in the final results.*





# Site Description

## ▶ **Site Location:**

- Samtskhe-Javakheti region, Akhaltsikhe district, village Minadze
- Name of the River: Uraveli
- GPS Coordinates: X=333950 Y=4597500

## ▶ **HPP Type:**

Diversion, Run-off-the-river

## ▶ **Site Description:**

Two head units, diversion pressure metal pipe, surge tank, turbine conduit, power house, tailrace channel. Head unit on the river Charkhaleti and river Rikosi conveys Tyrolean weir, height - 4.5m, which ensures maximum water discharge, reinforced concrete water intake and silt basin with sluice. diversion pressure metal pipe, diameter - 0.8m, length - 1.4 km and 1.3 km. At the end of the diversion there is a reinforced concrete surge tank, dimensions - 3.5mx16m, from where water through pressure metal pipe leads to the power house, pipe diameter - 1.0m, length - 2.5km. At the end of the diversion there is a metal surge tank, diameter - 1.6m. Turbine conduit is represented by 0.8m diameter, metal pipe. Power house dimensions - 9.5x24.0m, height - 16.0m. Tailrace channel is rectangular reinforced concrete construction, dimensions - 1.5x1.5m, length - 80.0m.

# Project Data

## Technical Parameters

Installed Capacity	MW	4.30
Average Annual output	GWh	16.5
Autumn-winter (Oct-March) generation	GWh	4.90
Capacity usage ratio/Efficiency	%	43.72
Type of regulation		Run-off-the-river
Scheme of energetic usage potential		Full

## Hydrology

Hydrological Data (number of years)	Year	35
Year of the average multi annual discharge	Year	1953
Catchment area	km2	73.00
High water flow	m3/sec	1.38
Average water flow	m3/sec	0.87
Low water flow	m3/sec	0.57
PMF (1%)	m3/sec	26.90
Rated water discharge	m3/sec	1.70
Maximum gross head	m	299.50
Minimum gross head	m	287.00

## Reservoir

Full supply level (FSL)	masl	1700.00
Minimum Operation level (MOL)	masl	Unnecessary
Total volume at FSL	mln. m3	Unnecessary
Active reservoir level	mln. m3	Unnecessary

## Dam

Type		Tyrol
Crest Elevation	masl	1699.60

# Project Data

<b>Spillway</b>		
Type		Unnecessary
Crest Elevation	masl	Unnecessary
Length of spillway crest	m	Unnecessary
Reservoir elevation during PMF	masl	1701.20
Spillway capacity at reservoir level PMF	m <sup>3</sup> /sec	26.90
<b>Water intake</b>		
Sill elevation	masl	1697.60
Stop log type and number		Flat surface
Quantity	unit	1
<b>Sluice or bottom spillway</b>		
Type and number		Unnecessary
Quantity	unit	Unnecessary
Dimensions (w x h) or (d)	m	Unnecessary
<b>Diversion</b>		
Type of diversion		Conduit
Dimensions (w; l) or (d; l)	m	0.8, 2700; 1,0; 2500
<b>Stilling basin or shaft</b>		
Dimensions (w x l) or (d )	m	1.6
<b>Powerhouse</b>		
Type		Above-ground
Dimensions (w x h x l)	m	9,5x16x24
Elevation of tailrace outlet sill	masl	1400.00
<b>Tailrace</b>		
Type		Covered channel
Dimensions (w x h)	m	1,5x1,5
Elevation of outlet sill	masl	1397.80

# Project Data

## Turbines/Generators

Turbine Type and number		P. CJ22-W-110/1x11; 2
Rated discharge	m <sup>3</sup> /sec	0.85
Rated output	MW	2.23
Maximum output	MW	2.48
Generator Type		SFW 2500-8/1430-1730
Generator nominal output	MW	2.15
Generator nominal output	rpm	500

## Transformers

Type		Three-phase
Number	unit	2
Nominal power	MVA	3.0
Transformer dimensions (1 x w x h)	m	5,8x3,5x5,3

## Seismic background of the construction site

Richter scale	Magnitude	6..8
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## Economic and Financial Parameters

Costing	mln. USD	7.20
Duration of the construction	Year	1.50
Investment per 1 kV	Thousand USD	1.67
Investment per 1 kV/h	USD	0.44
Revenue per USD spent (Average price new HPP - 4,8 cents)	USD	0.12
Estimated carbon credit generation	T.	5.7

## Social and Environmental Parameters

### Special environmental requirements

Social Impact	Additional workplace; Development of infrastructure	
Ecological risks		Low

## Transmission lines

Parameters	kV	110
Distance to inter connection point	km	8.00

## Infrastructure

Existing roads		Gravel
Roads to be constructed	km	2.50





# Hydrology

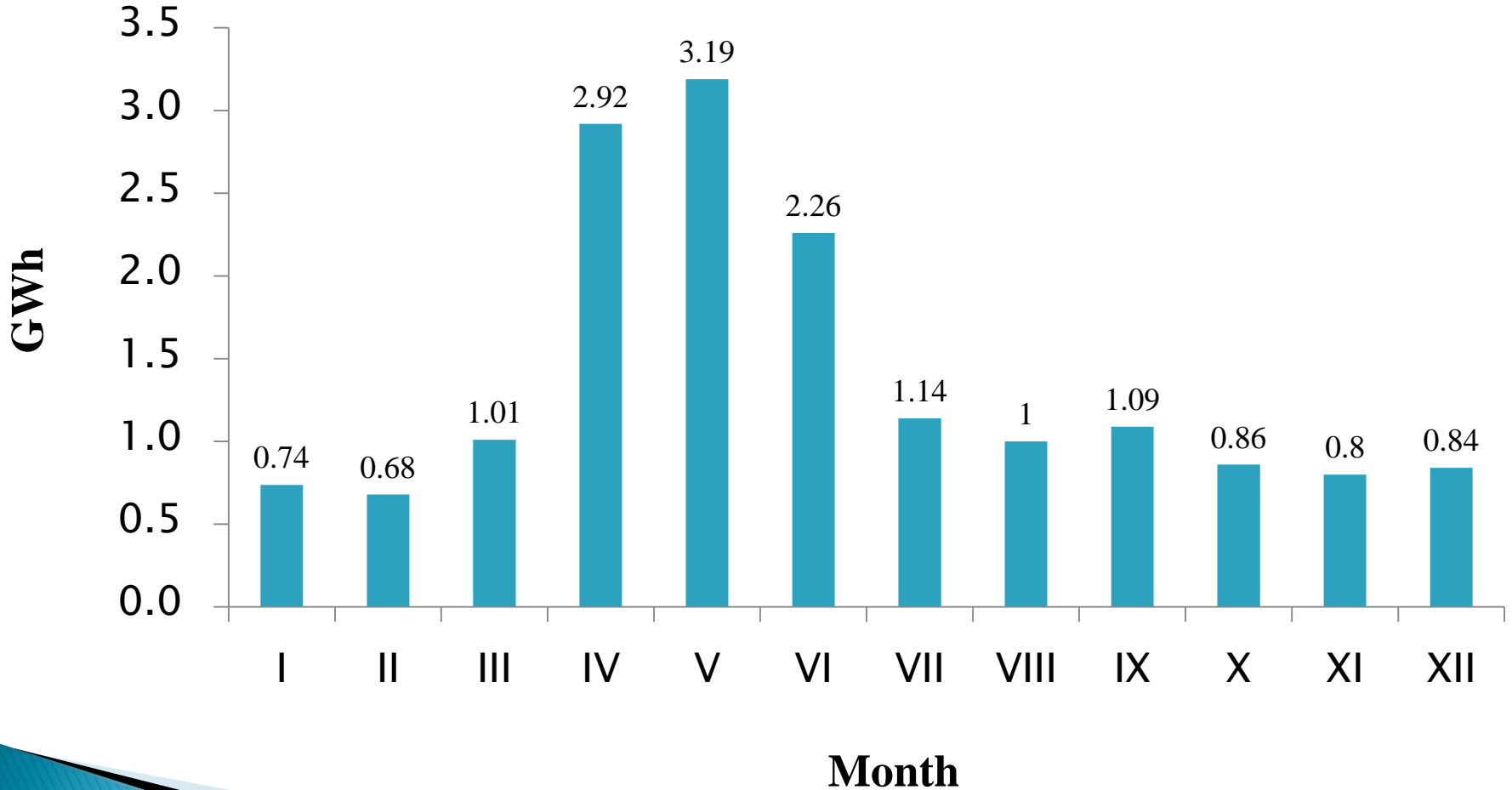
## Number of Observed Years - 35 Chosen Year - 1953

Date	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1	0.75	0.81	0.81	0.86	2.12	2.04	1.93	0.52	0.52	0.70	0.70	0.70
2	0.75	0.51	0.86	0.86	3.05	2.04	1.82	0.52	0.61	0.70	0.70	0.70
3	0.75	0.51	0.81	0.93	3.26	2.47	1.44	0.52	0.52	0.61	0.78	0.70
4	0.75	0.65	0.81	1.09	2.73	2.26	1.15	0.52	0.52	0.61	0.70	0.70
5	0.75	0.81	0.81	1.09	2.63	2.36	1.06	0.78	0.52	0.61	0.70	0.70
6	0.75	0.75	0.70	1.09	2.42	2.04	2.47	0.70	0.43	0.61	0.70	0.70
7	0.75	0.75	0.81	1.09	3.26	2.26	2.80	0.52	0.87	0.61	0.61	0.70
8	0.75	0.81	0.82	1.09	3.05	2.26	1.82	0.52	0.78	0.70	0.61	0.78
9	0.75	0.81	0.75	1.09	2.63	2.47	1.82	0.52	0.78	0.70	0.61	0.70
10	0.75	0.81	0.81	1.25	2.53	2.47	1.63	0.43	0.70	0.70	0.61	0.61
11	0.75	0.81	0.86	1.25	3.15	2.58	1.72	0.43	0.78	0.61	0.61	0.63
12	0.75	0.81	0.86	1.43	3.05	2.47	1.63	0.61	0.70	0.61	0.61	0.66
13	0.75	0.75	0.86	2.22	2.94	2.58	1.63	0.52	0.70	0.61	0.61	0.69
14	0.75	0.81	0.70	2.53	3.05	2.26	1.34	0.87	0.70	0.61	0.61	0.72
15	0.75	0.75	0.81	2.42	3.35	3.15	1.15	0.61	0.70	0.70	0.61	0.74
16	0.75	0.81	0.86	2.53	3.48	3.15	1.06	0.52	0.61	0.70	0.61	0.77
17	0.75	0.81	0.81	2.42	3.71	2.26	0.87	1.06	0.61	0.61	0.61	0.80
18	0.75	0.81	0.81	2.63	4.34	2.69	0.87	0.87	0.70	0.70	0.61	0.82
19	0.75	0.86	0.86	3.15	5.43	2.69	0.78	0.70	0.61	0.70	0.70	0.85
20	0.75	0.81	0.94	3.15	4.54	2.69	0.87	0.70	0.61	0.70	0.78	0.88
21	0.75	0.81	0.86	2.73	3.90	2.15	0.78	0.78	0.61	0.70	0.70	0.90
22	0.75	0.81	0.86	1.81	3.64	2.26	0.78	0.70	0.61	0.70	0.70	0.89
23	0.75	0.81	0.81	1.62	2.91	2.91	0.70	0.70	0.61	0.61	0.70	0.88
24	0.75	0.81	0.81	1.62	2.91	2.37	0.70	0.87	0.61	0.61	0.70	0.88
25	0.75	0.75	0.81	1.52	3.15	2.47	0.61	0.70	0.52	0.61	0.78	0.87
26	0.75	0.75	0.81	1.43	3.26	2.26	0.52	0.52	0.61	0.61	0.78	0.86
27	0.75	0.81	0.81	1.62	3.15	2.04	0.52	0.52	0.70	0.61	0.70	0.85
28	0.75	0.81	0.86	1.81	2.69	2.58	0.87	0.52	0.52	0.61	0.61	0.84
29	0.75		0.86	1.91	2.26	2.58	0.70	0.52	0.61	0.70	0.70	0.83
30	0.75		0.86	1.91	2.26	2.15	0.87	0.52	0.70	0.70	0.70	0.82
31	0.75		0.81		2.26		0.70	0.61		0.70		0.81
average	0.75	0.77	0.82	1.74	3.13	2.43	1.21	0.63	0.63	0.65	0.67	0.77



# Average Monthly Generation

## Generation, 50% Provision





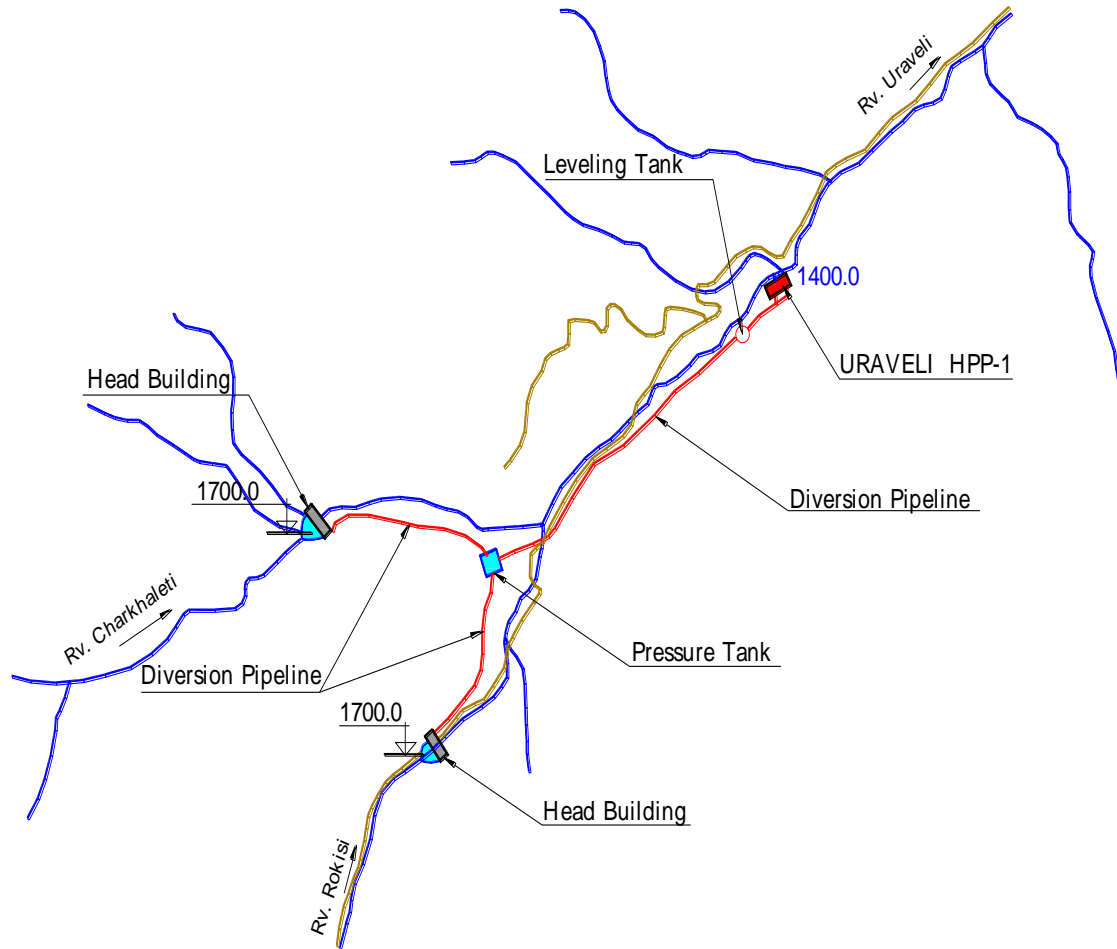
# Aerial Photo





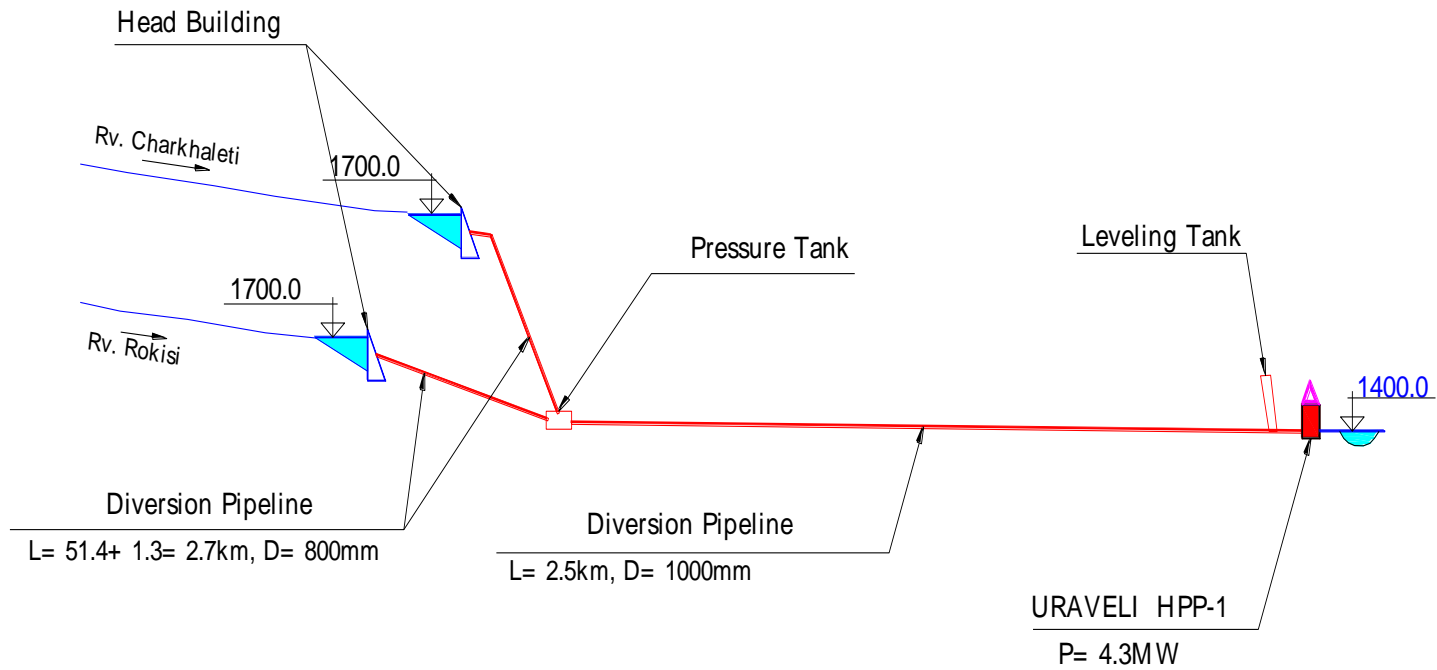


# Project Plan





# Longitudinal Section



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