



Uraveli 1 HPP



Ministry of Energy of Georgia

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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

Spillway		
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 ³ /sec	26.90
Water intake		
Sill elevation	masl	1697.60
Stop log type and number		Flat surface
Quantity	unit	1
Sluice or bottom spillway		
Type and number		Unnecessary
Quantity	unit	Unnecessary
Dimensions (w x h) or (d)	m	Unnecessary
Diversion		
Type of diversion		Conduit
Dimensions (w; l) or (d; l)	m	0.8, 2700; 1,0; 2500
Stilling basin or shaft		
Dimensions (w x l) or (d)	m	1.6
Powerhouse		
Type		Above-ground
Dimensions (w x h x l)	m	9,5x16x24
Elevation of tailrace outlet sill	masl	1400.00
Tailrace		
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 ³ /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

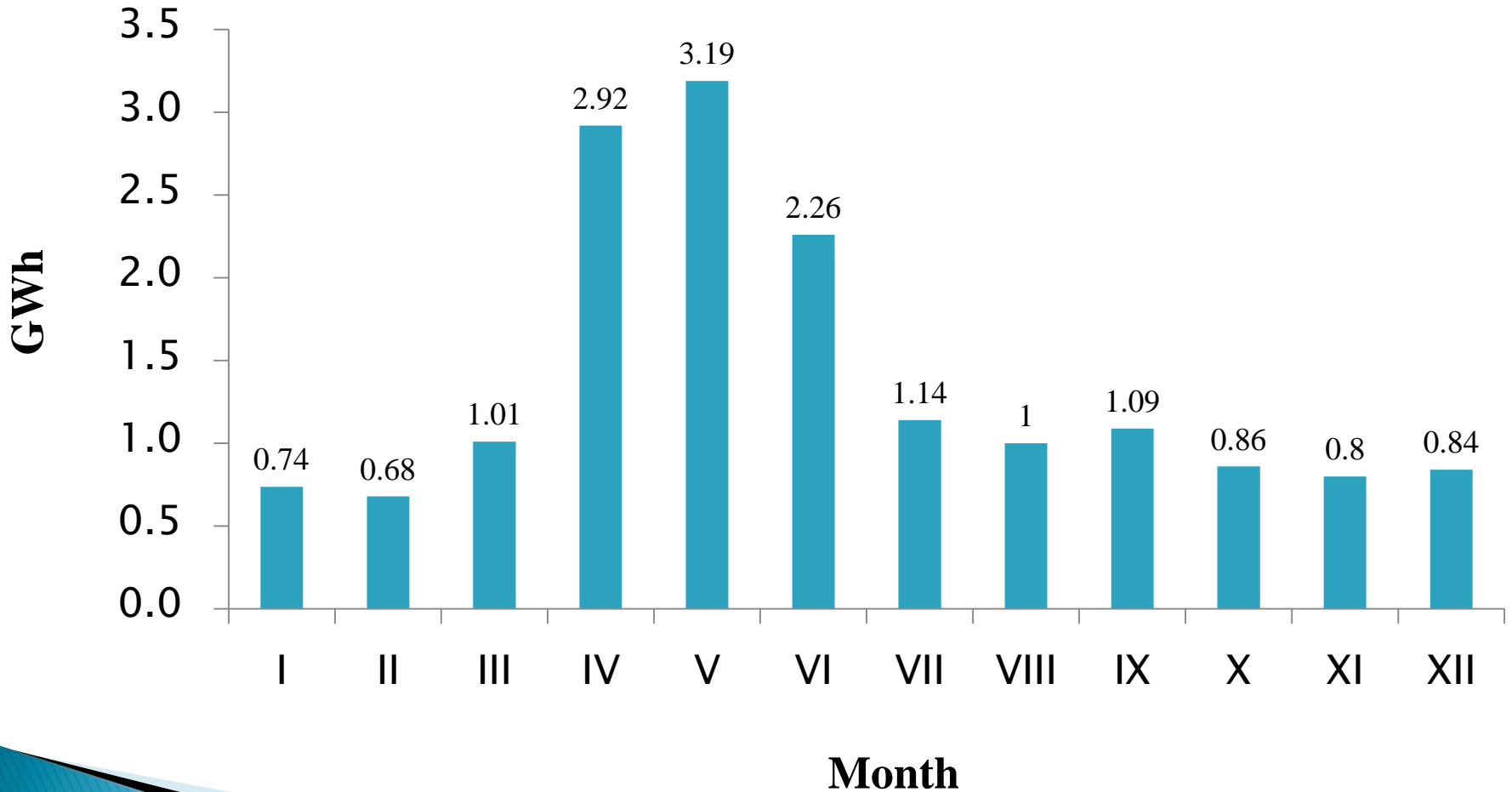
Number of Observed Years - 35 Chosen Year - 1953

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



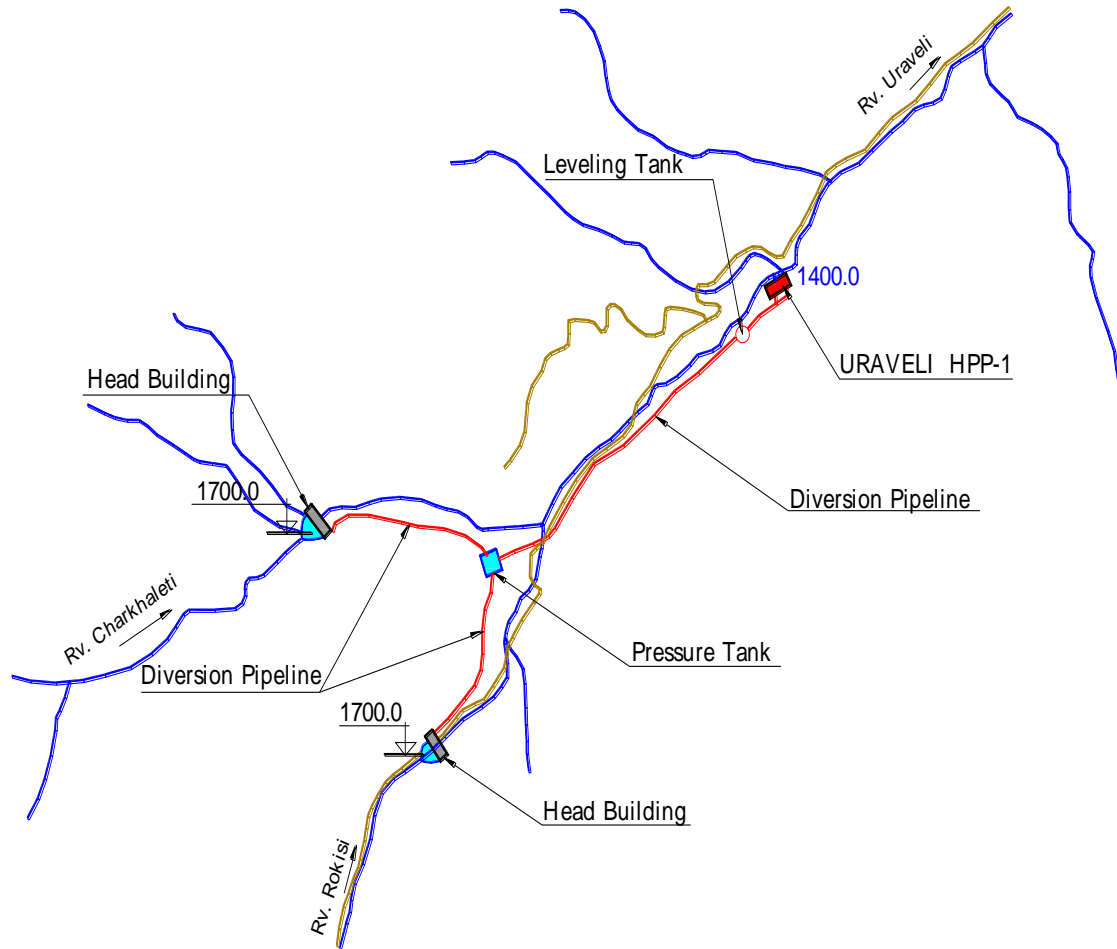


Aerial Photo



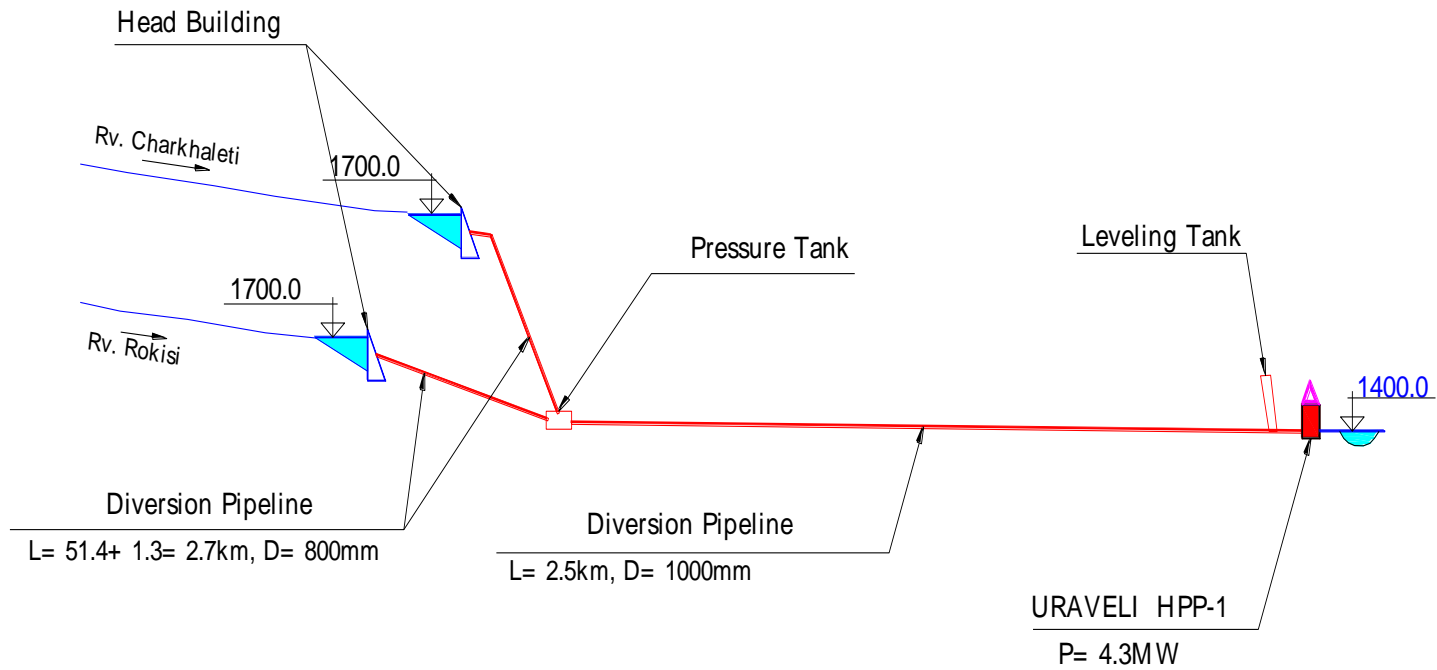


Project Plan





Longitudinal Section



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