



# Overview of Energy Sector in Ajara

Ministry of Finance and Economy of Ajara A.R.

2012

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Energy Snapshot

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Projects Underway

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# ENERGY SNAPSHOT



- **Georgia - Reliable transit country and regional energy hub**
  - Baku-Tbilisi-Ceyhan (BTC) oil pipeline
  - Baku-Supsa oil pipeline
  - South-Caucasus gas pipeline (SCP) from Shah-Deniz
  - North-South Gas pipeline
  - Georgia-Azerbaijan Southern Gas (GASP)
- Gas supply contracts with Azerbaijan for 10 years and with Shah Deniz for 20 years
- Transit role for oil & gas – pipelines and railway
  - Circa 1.6% of world oil production
- LNG across Black Sea – Azerbaijan-Georgia-Romania Interconnection (AGRI) project initiated by three states together with NABUCCO/White Stream – huge potential to transport gas from the Caspian to Europe;
- **The only country in the region (which doesn't have its own gas resource) that was not effected by gas crises in January 2009;**
- Georgia/Romania MoU for transportation carbon recourses from Caspian via Black Sea



Source: Ministry of Energy of Georgia

# ENERGY SNAPSHOT



- Georgia - Net electricity exporter in all four neighboring countries
- Construction of 500 and 154 KV power transmission line to Turkey
- Additional new 500 KV interconnection to Turkey is negotiated
- 5 new HPP projects under Construction with installed capacity of around 170 MW (7MW, 46 MW, 78 MW, 5 MW and 36 MW)
- Huge untapped hydro resources
- Only 18% of the country's hydro potential has been utilized
- Huge, rapidly growing consumption rate and high tariffs on the Turkish electricity market expandable to Iraq, Syria and EU countries
- Once all three electricity lines are operational, total transmission capacity to Turkey will reach more than 2000 MW - 15 times more than current capacity

## Transmission Capacity

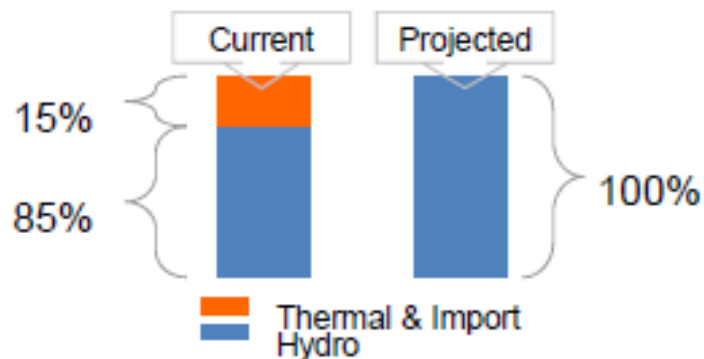


Source: Ministry of Energy of Georgia

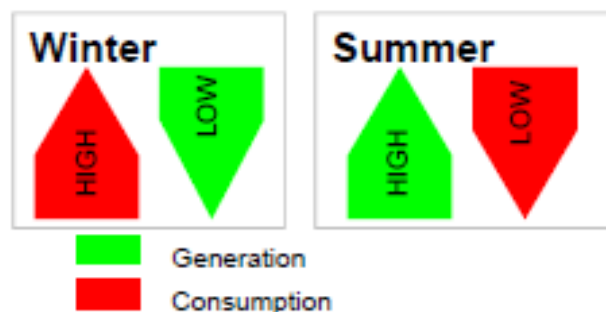
[www.menr.gov.ge](http://www.menr.gov.ge)

# ENERGY SNAPSHOT -

## Electricity Balance



Seasonal Asymmetry of Generation and Consumption



Tw/h	2004	2005	2006	2007	2008	2009	2010
Generation	6.9	7.1	7.6	8.3	8.6	8.9	9.4
Hydro	6.0	6.0	5.4	6.9	7.3	7.7	8.4
Thermal	0.9	1.0	2.2	1.5	1.3	1.2	1.0
<b>Net Import / Export</b>	<b>-1.2</b>	<b>-1.3</b>	<b>-0.7</b>	<b>0.2</b>	<b>0.3</b>	<b>0.5</b>	<b>1.3</b>
Consumption	8.1	8.3	8.3	8.1	8.3	8.4	8.1
Distribution	5.7	5.9	5.9	5.9	6.0	6.1	6.0
Direct Customers	1.7	1.9	2.0	2.0	2.1	2.1	2.1
Transmission Losses	0.7	0.5	0.4	0.2	0.2	0.2	0.4
Consumption per capita	1.8	1.8	1.84	1.9	1.9	1.95	1.87

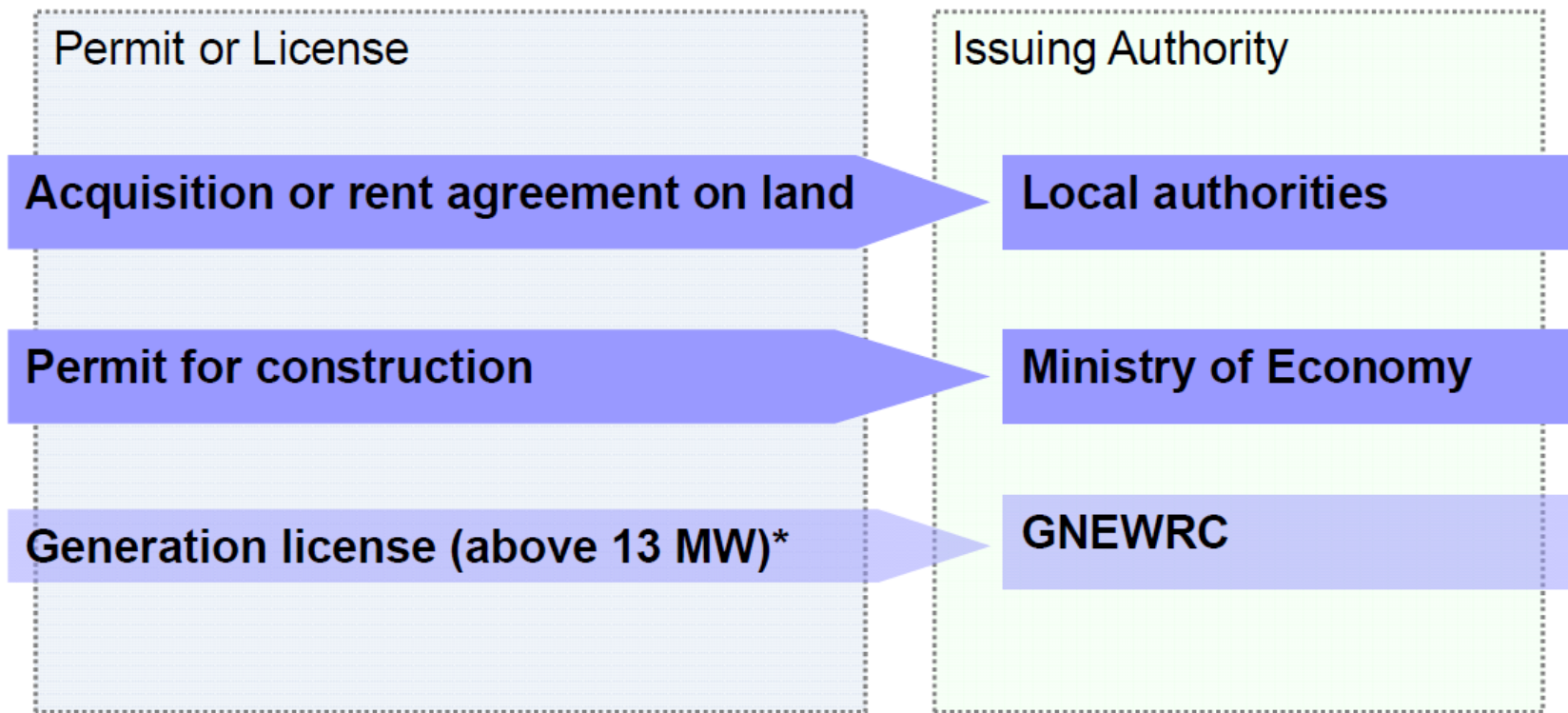


- Greenfield projects based on **Build-Own-Operate (BOO)** principle
- All new constructions are totally deregulated
  - No tariff set for the newly built HPPs - investor is free to choose the market and the price
  - There is no special fee for the connection to the grid
  - Free third-party access to the grid
  - No license is required to export and no tariff set
  - GoG can offer a guaranteed purchase only for three months in winter
  - Profit increases from selling carbon credits
  - New HPPs has priority access for transmission to Turkey (Long term contract with TSO)



# ENERGY SNAPSHOT -

## Necessary Permits, Licenses and Rights



*\* Hydro Power Stations less than 13 MW do not need generation license*

Source: Ministry of Energy of Georgia

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

# ENERGY SNAPSHOT -

## Structure



- **Generation**

- 46 power plants under private ownership (Inter-RAO (Russia);
- Energo-pro (Czech Republic); EPC (China); German, Ukrainian
- and other foreign and Georgian companies)

- **Distribution**

- 3 private companies
- owned by Inter-RAO (Russia), Energo-pro (Czech Republic),
- Akhema Group (Lithuania)



- **Transmission - HV grid**

- 2 companies
- One owned by the State and another 50-50 State/Inter-RAO (Russia)



# ENERGY SNAPSHOT -

## WHY the Energy Sector of Georgia



- Large economic HPP Greenfield potential at 32 TWh
- Deregulated power sector with very impressive turnaround since 2004
- Distribution companies privatized and operating at a profit
- Significant existing private investment in generation assets
- Strong government support for developing hydropower resources
- Increased simplification of procedures
- Increasing export markets

Source: Ministry of Energy of Georgia

# ENERGY VARIETIES -

## Hydro Energy Resources



- Ajara - one of the richest region by its hydro energy resources
- Index of Ajara is higher than 244 kWh/km<sup>2</sup>
- The most powerful rivers of the region are: Tchorokhi, Adjaristskali, Chirukhistskali, and Kintrishi
- The most abound river is Tchorokhi
- According to expert calculations, potential capacity of rivers in Ajara is 1000 Megawatt that can generate 8760 million KWh a year. For the last 20 years, 50-92 million kWh power has been generated, which is 1% of its potential.

### Hydro-Electric Power Stations in Ajara

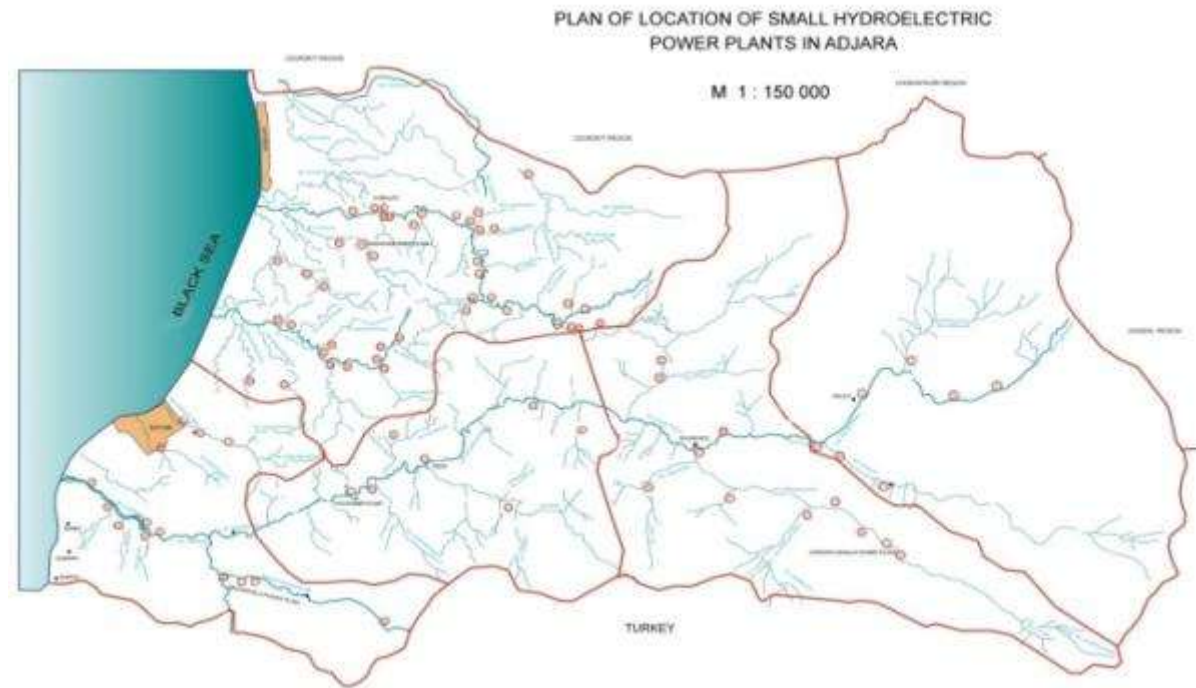
Name of Power Plant	Power of Power Plant (t <sup>2</sup> )	Manufacture of Electricity (million kW/tons)	Property
Power plant Atshesi	16.00	4.00	Private
Power plant Machaxela	1.43	7.09	Private
Power plant Kinkisha	0.74	2.27	State
Power plant Sanalia	3.00	13.00	Private
Power plant Atchi	1.03	2.14	State
<b>Total</b>	<b>22.20</b>	<b>28.50</b>	

# ENERGY VARIETIES -

## Hydro Energy Resources



- Electricity is supplied to the region by Central Energy System of Georgia;
- In Georgia mostly electricity is produced by Tbilis and Engur power plants. Importantly, Tbilis power plant is not able to use all its capacity and Engur power plant does not have enough supply to work all year round;
- Hydroelectric power plants located in Ajara: Ats, Machakhela, Kinkisha, Achi and Sanalia, do not produce enough electricity, just 9% for the region. Accordingly, small-size hydroelectric power plants are going to be built.



# ENERGY VARIETIES -

## Wind Energy Resources



- At present wind energy resources in Ajara is unutilized, whereas it has a huge potential
- According to the meteorological stations which are located in the cognitive regions and researches made on meteorological facts, usage of working speed of wind energy is following in Ajara:  $v=3$  meter/second ( $v$ - describes speed of wind)
- Duration of wind working speed is nearly from 3327 to 6243 hours, during this time the longest wind was marked in the line of black sea bay.

### Type of wind's average annual speed variation

Meteo-stations	V M/second	Cv
Kobuleti	2.8	0.20
Batumi	4.6	0.09

- On the territory of Batumi, speed of wind is  $v > 3$  meter/second and lasts 5220-6240 hours a year, that is 60-70% in/of a year. **Respectively, this gives us an opportunity of building both low and high speed wind generators**
- Duration of wind working speed ( $>3$  meter/second) on the coastline is 60-70%, following speed of  $>5$  meter/second is 20-40 %,  $v > 3$  meter /second is 9-14% and  $v > 10$  meter/second is 3-8 %

# ENERGY VARIETIES -

## Wind Energy Resources



- Maximum of wind monthly speed comes in winter and minimum in summer period
- Average nonstop wind duration in abovementioned line,  $v > 3$  meter / second, is definitely spread on the territory of Ureki-Batumi
- In Ajara, namely in Kakhaberi area, exist such conditions that give us opportunity of installing both low and high speed wind generators. There, working speed reaches up to 6200 hours, which surpasses annual data (hours) and is 70%, from which 40 % comes from wind speed of  $v > 5$  meter / second

### Duration of Wind's Working Speed (Hours, M/second, Year)

Meteostations	Speed of Wind ( $v$ M/seconds)				
	$>3$	$>5$	$>6$	$>7$	$>10$
Kobuleti	3327	1427	1109	540	220
Batumi	6243	3593	2053	1244	738

### Average annual fact of wind in Ajara

Meteostations	Non-stop Duration, Hours						
	$>6$	$>12$	$>24$	$>48$	$>72$	$>96$	$>120$
Kobuleti	99	56	19	4	1	-	-
Batumi	99	76	28	6	4	2	1

# ENERGY VARIETIES -

## Solar Energy Resources



- Georgia is one of the richest countries with its solar energy resources (250-280 sunny days a year) which is nearly 1900-2000 hours in total

### Monthly Distribution of Solar Radiation (Kilowatt/Hour/M<sup>2</sup>)

Months of the Year											
I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
55	57	88	102	112	145	175	190	180	112	52	40



# ENERGY VARIETIES -

## Solar Energy Resources



Solar Water heating Systems, that transform solar radiation energy into the thermal energy and warm up the water in the collectors, has been recently introduced in Ajara. These systems include 2 main parts: solar collectors and boilers (hot water tank).

Utilization of solar energy systems has been introduced:

- At the visitor center of Kintrishi Protected Territory, that is equipped with helio systems for power supply and water heating system
- At the rangers house of Mtirala National Park, that is also equipped with helio system for power supply
- At the family hotel in the subsidiary zone of Mtirala National Park that is equipped with helio system for power supply

P.S. For the effective use of solar energy systems, employees at the administration of Kintrishi and Mtirala National Parks were trained how to use helio systems



# ENERGY VARIETIES -

## Thermal Waters



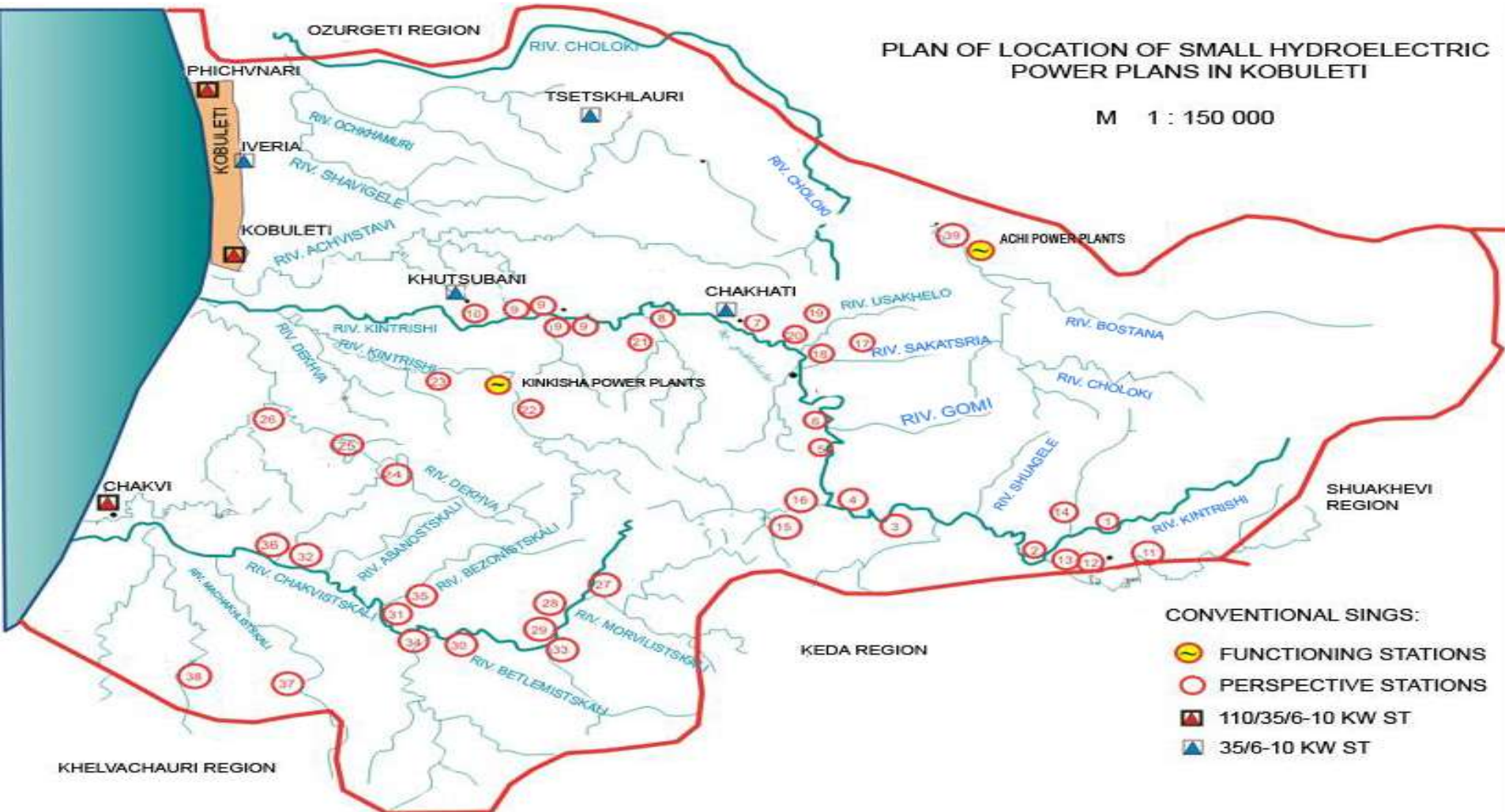
- In region exists only low debit thermal water (Bugauri, Shuakhevi, Shubani, Tomasheti, Makhinjauri), which temperature is between 22C-31C.
- This kind of temperature and debit thermal water in day and night debit is useful neither for water supply nor in heating system.

# INVESTMENT PERSPECTIVES

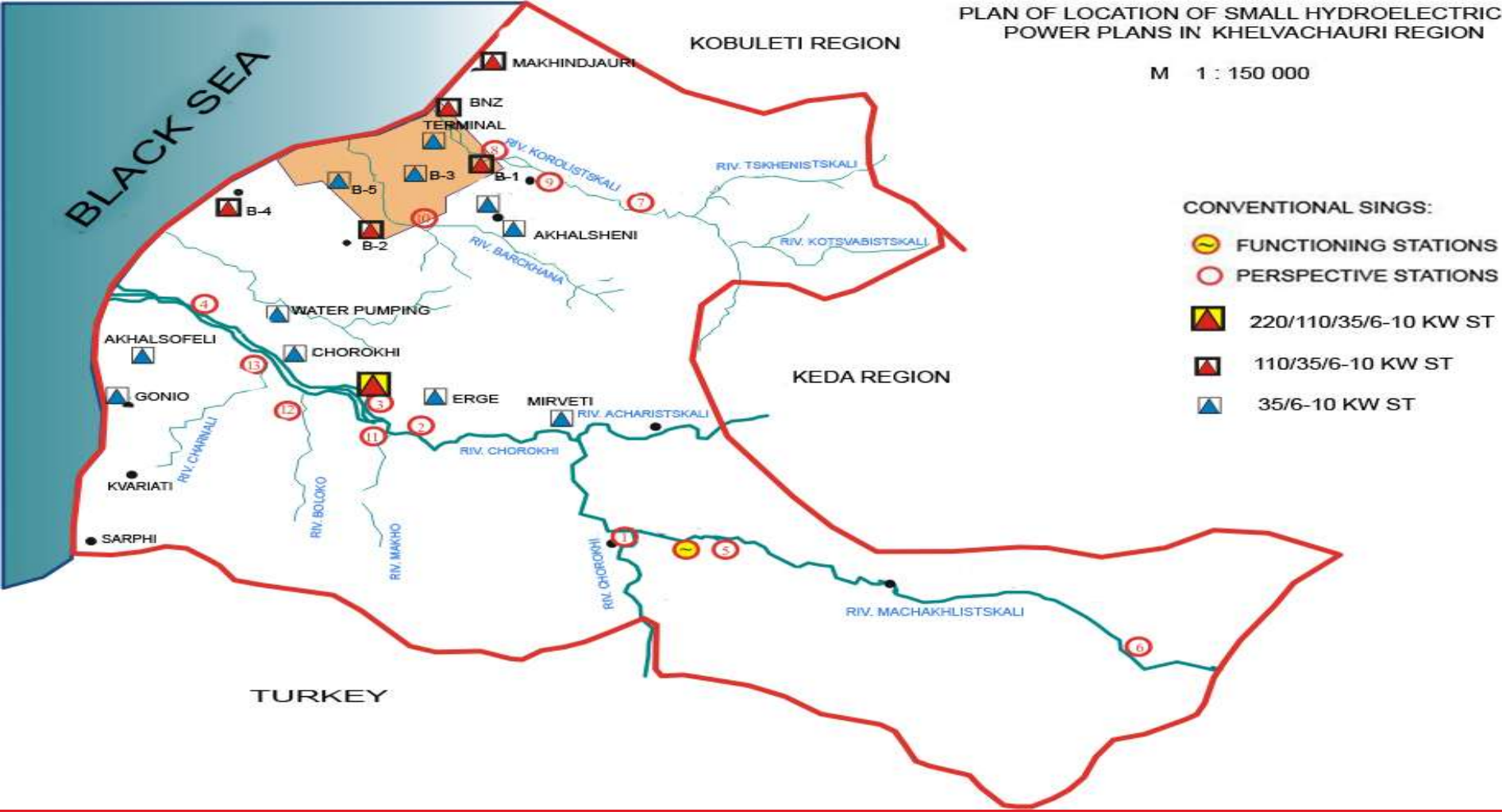


PLAN OF LOCATION OF SMALL HYDROELECTRIC POWER PLANS IN KOBULETI

M 1 : 150 000



# INVESTMENT PERSPECTIVES



PLAN OF LOCATION OF SMALL HYDROELECTRIC POWER PLANS IN KHELVACHAURI REGION

M 1 : 150 000

- CONVENTIONAL SIGNS:
- FUNCTIONING STATIONS
  - PERSPECTIVE STATIONS
  - 220/110/35/6-10 KW ST
  - 110/35/6-10 KW ST
  - 35/6-10 KW ST

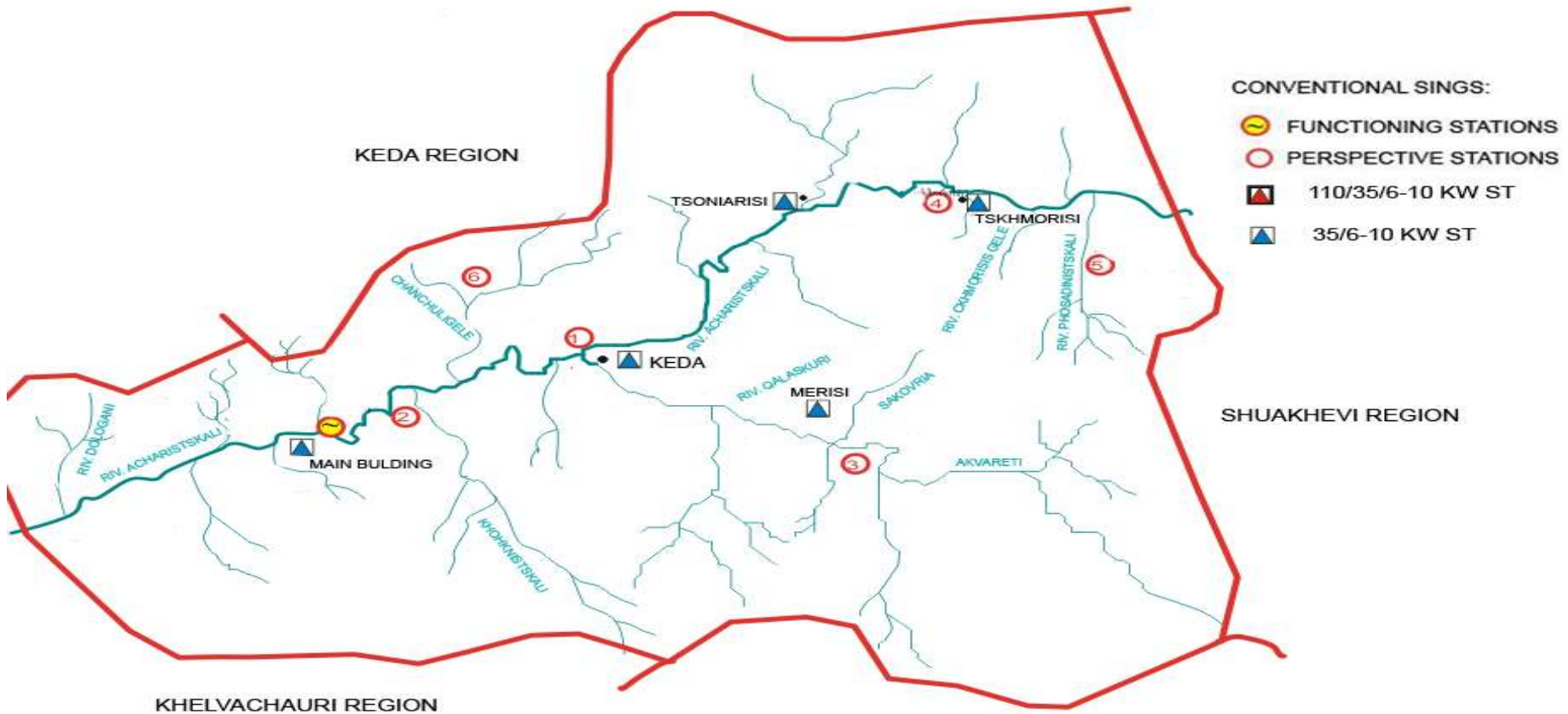


# INVESTMENT PERSPECTIVES



PLAN OF LOCATION OF SMALL HYDROELECTRIC POWER PLANS IN KEDA REGION

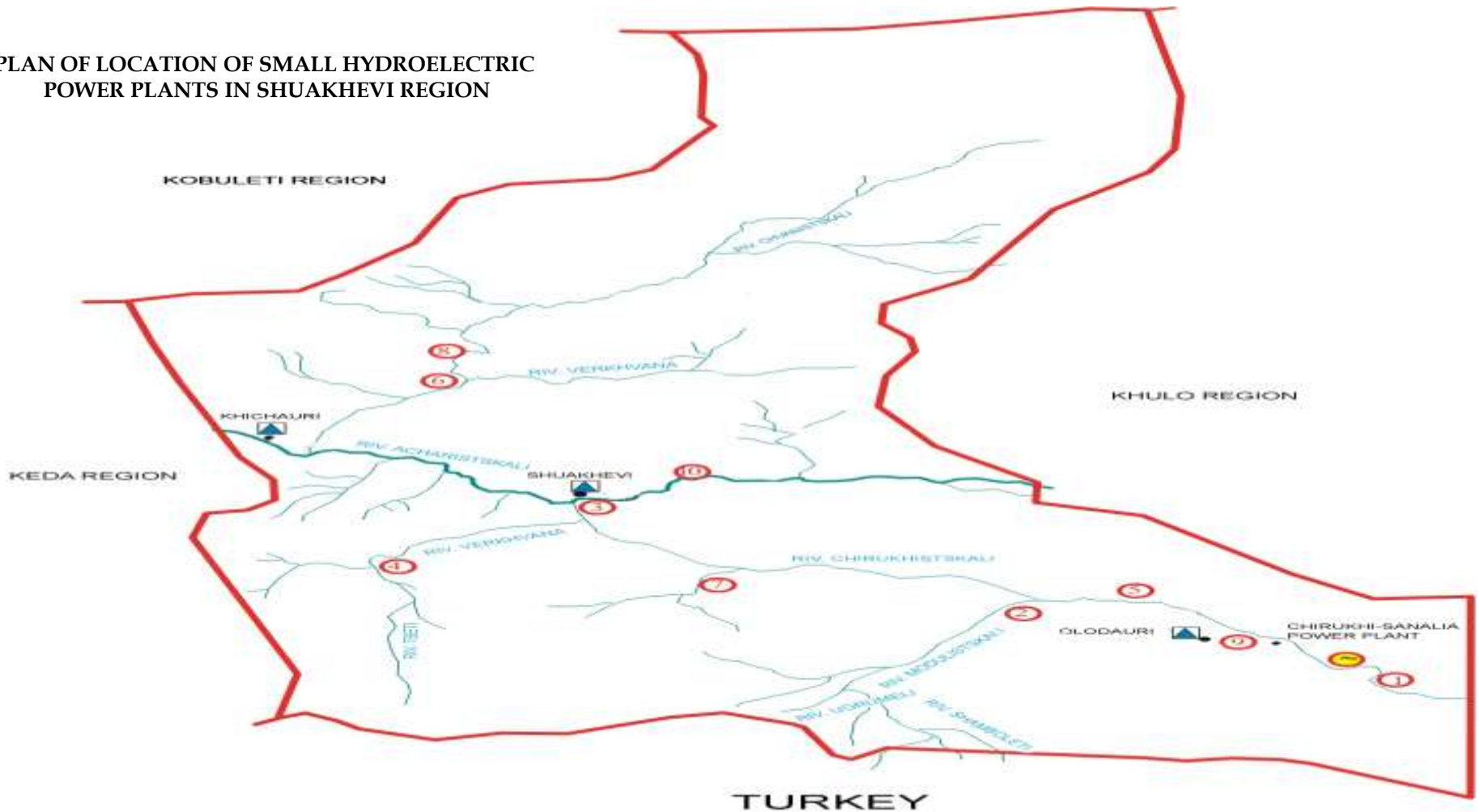
M 1 : 150 000



# INVESTMENT PERSPECTIVES



PLAN OF LOCATION OF SMALL HYDROELECTRIC POWER PLANTS IN SHUAKHEVI REGION





# INVESTMENT PERSPECTIVES



PLAN OF LOCATION OF SMALL HYDROELECTRIC POWER PLANS IN KHULO REGION

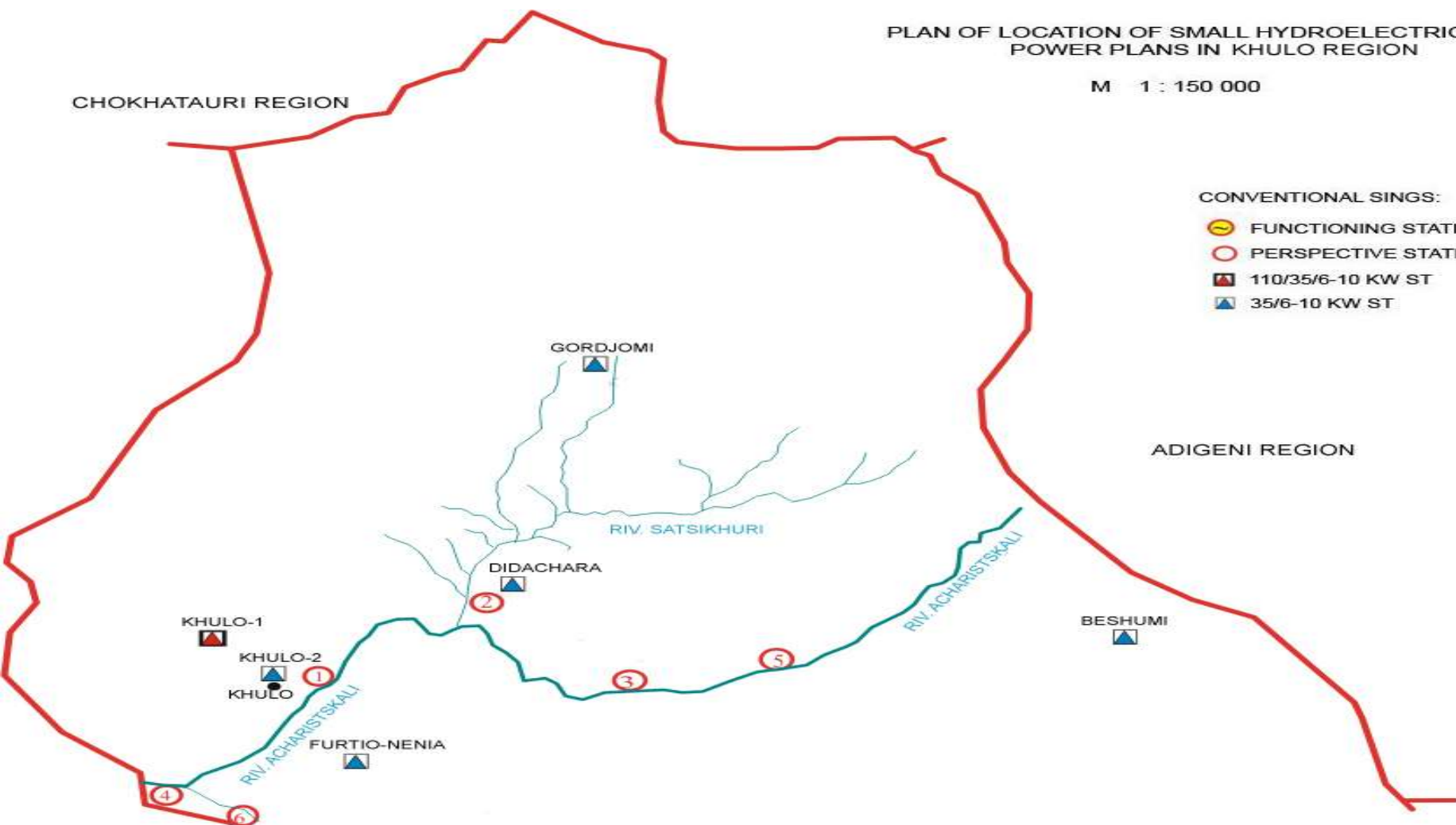
M 1 : 150 000

CHOKHATAURI REGION

CONVENTIONAL SIGNS:

-  FUNCTIONING STATIONS
-  PERSPECTIVE STATIONS
-  110/35/6-10 KW ST
-  35/6-10 KW ST

ADIGENI REGION



## Perspectives of constructing small hydroelectric power plants in Ajara

Region	Capacity (megawatt)	Conductivity of Electric energy per year Million Kilowatt/hour	Required Investment (Million USD)
Kobuleti	88.2	586.3	176.4
Khelvachauri	23.3	150.6	46.6
Keda	18.7	96.8	37.4
Shuakhevi	70.4	363.7	140.8
Khulo	43.3	227.4	86.6
<b>Total</b>	<b>243.9</b>	<b>1424.8</b>	<b>487.8</b>

# PROJECTS UNDERWAY



- ❖ Clean Energy Group (CEG) is a Norwegian based hydropower company.
- ❖ CEG develops greenfield projects in countries with a functioning electricity sector and untapped hydro power potential.
- ❖ The Ajaristsqali hydro project is developed in cooperation between Clean Energy Group and IFC a member of the World Bank Group.
- ❖ It is expected to supply the Georgian and Turkish power systems with clean renewable energy.
- ❖ It is planned to be constructed up to 3 hydropower stations (Shuakhevi HPP, Koromkheti HPP, Khertvisi HPP) with average annual production of 500-1200 GWh.
- ❖ The project is expected to have an installed capacity of 175-400 MW.
- ❖ The estimated construction cost is between \$300-700 million.
- ❖ If developed as planned, the Ajaristsqali project will be one of the largest foreign direct investment projects in Georgia to date, and a main contributor to export earnings for the country.

# PROJECTS UNDERWAY



- ❖ “Ajar Energy 2007” Ltd, a daughter company of EKSIM YATIRIM HOLDING, was established in Batumi in 2007.
- ❖ The company plans to construct two hydropower stations on the river Chorokhi (Kirnati HPP, Khelvachauri HPP).
- ❖ The project is expected to have an installed capacity of 74 MW.
- ❖ Estimate cost of project is more than 125 million USD.
- ❖ Construction works will start in early 2012 and will be completed by 2016.
- ❖ Currently, 45 people are employed at the company.

❖ **Hydro Development Company** (Georgia) plans to construct hydropower station on river Kintrishi

- ❖ The project is expected to have an installed capacity of 5 MW with average annual production of 30 GWh.
- ❖ Estimate cost of project is more than 8 million USD.
- ❖ Construction works will start in March, 2012 and will be completed by July, 2014.



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