



Clean
Energy
Group

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Clean Energy Group

From conception to completion of large hydro projects

The story of the 400 MW Adjaristsqali cascade

Clean Energy Group
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cleanenergygroup.no

Content

Section	Subject
1	Clean Energy Group– Company Overview
2	Georgia – a great place for hydro
3	Adjaristsqali Project
4	The relevance of Norwegian hydro competence

A small group of founders in 2010

Bard Mikkelsen

Executive Chairman



Former CEO in Statkraft, the largest renewable energy company in Europe with more than 50 TWh of hydro power resources

Mr. Mikkelsen has played a key role in developing SN Power into one of the leading emerging market hydro power companies worldwide with investments in India, the Philippines, Chile, and Peru

Chairman of the Board in Powel and various other Norwegian compaies

Ragnar Soegaard

CEO



Leading corporate executive in Norway with 20 years experience in the power sector as CFO in E-CO, the second largest power company in Norway with 10 TWh of hydro power generation

Professor in Finance and Accounting at the Asian Institute of Technology in Bangkok and Chairman of the Board in EB, a Norwegian utility company with approx. 2.5 TWh of hydro power production

Bjorn Brandtzaeg

COO



10 years of high level emerging market advisor experience.

Up to May 2010 a principal in Poyry Management Consulting, the largest energy management consulting firm in Europe

In the period 2008-10, he advised the Georgian government on the development of their hydro power resources

Mr. Brandtzaeg was the CEO for Adjristsqali hydro, the SPV for the Adjaristsqali project from 2011-15 and is currently the CEO in CEG

Jarand Felland

General Counsel ("GC")



15 years experience from corporate law and the Nordic energy sector with a particular focus on hydro power

Four years as senior legal advisor in the hydro power department in the Ministry of Petroleum and Energy

Former political advisor to the Norwegian Minister of Petroleum and Energy

Located in Batumi Georgia to lead work on land acquisition and permitting

Leiv Pedersen

CTO



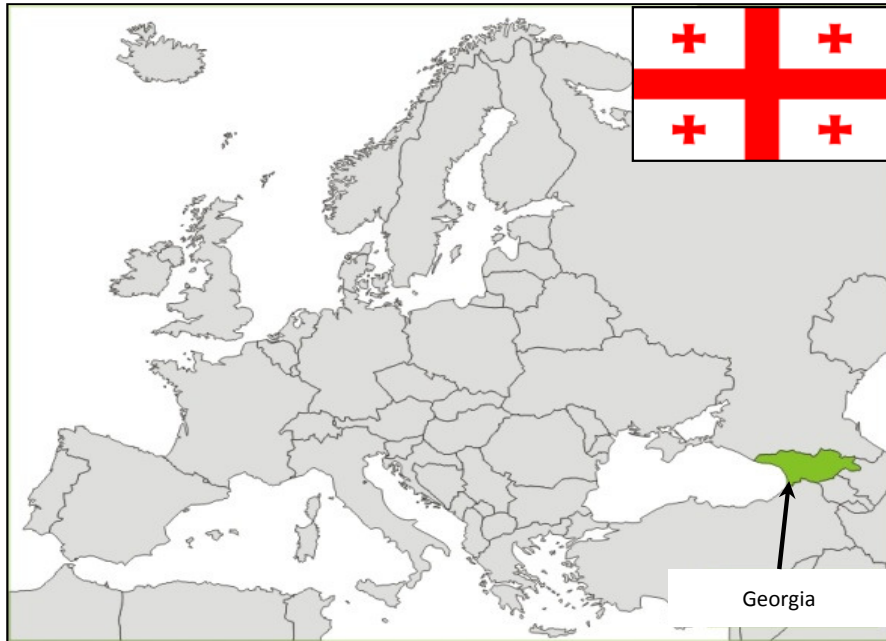
25 years extensive experience in technical engineering, construction and management of international projects including in one of Europe's largest civil construction firms, NCC as project manager, mainly on international projects in Latin-America

The last 5 years Mr. Pedersen has been a project director within the Norwegian international utility company SN Power, acting as, the company's civil construction expert and board member for projects in India

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Georgia – overview

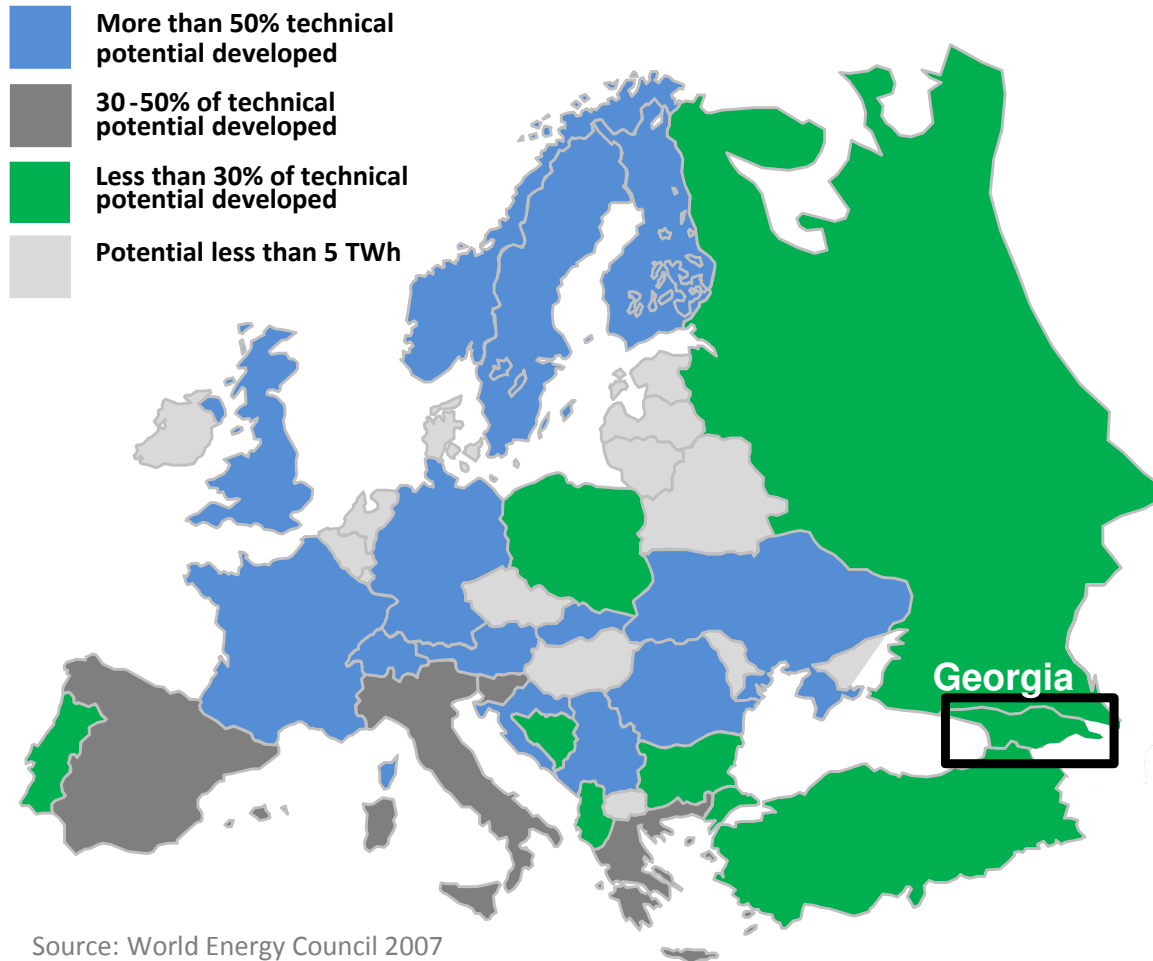


- Population 4.4m
- Positive development since Rose revolution in 2004
 - Democratic transition of power in 2012
 - Georgian Dream won parliamentary elections 2012 and has strong majority in Parliament
- Pro reform government and population
 - Member of WTO, signatory to Energy Charter Treaty and free trade agreement with EU
 - One of the least corrupt countries in the world according to Transparency International
 - Worlds nr 1 economic reformer over the last five years according to the Ease of Doing Business survey of the World Bank and Easiest Place to do business in Central and Eastern Europe.
- GDP per capita (PPP) more than USD 5 000
 - GDP growth of 5% in 2014
 - Strong FDI inflow of 10% of GDP in 2014

Country	Ease of Doing Business 2014	Transparency Int. % of people who had paid bribe for services 2013
Norway	6	3
US	7	7
Georgia	15	4
Estonia	17	6
Turkey	55	21

Large unexploited hydro power potential

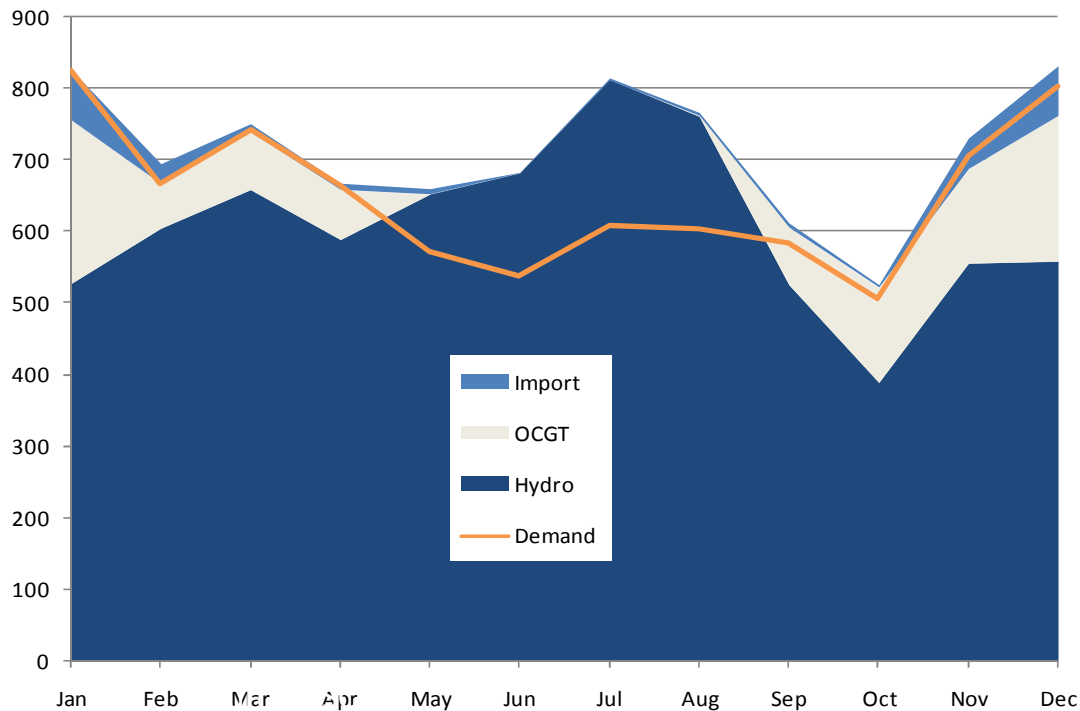
Third largest undeveloped technical hydro potential in Europe



- Undeveloped technical hydro potential at 70 TWh
- One of the least developed resources in Europe
 - Only 10% of technical potential developed
 - 50-70% in many Western European countries
- A renewable energy corridor from Georgia is under development to supply the rapidly growing Turkish electricity market

Georgia with a well functioning electricity sector...

Hydro is dominating the Georgian energy supply mix

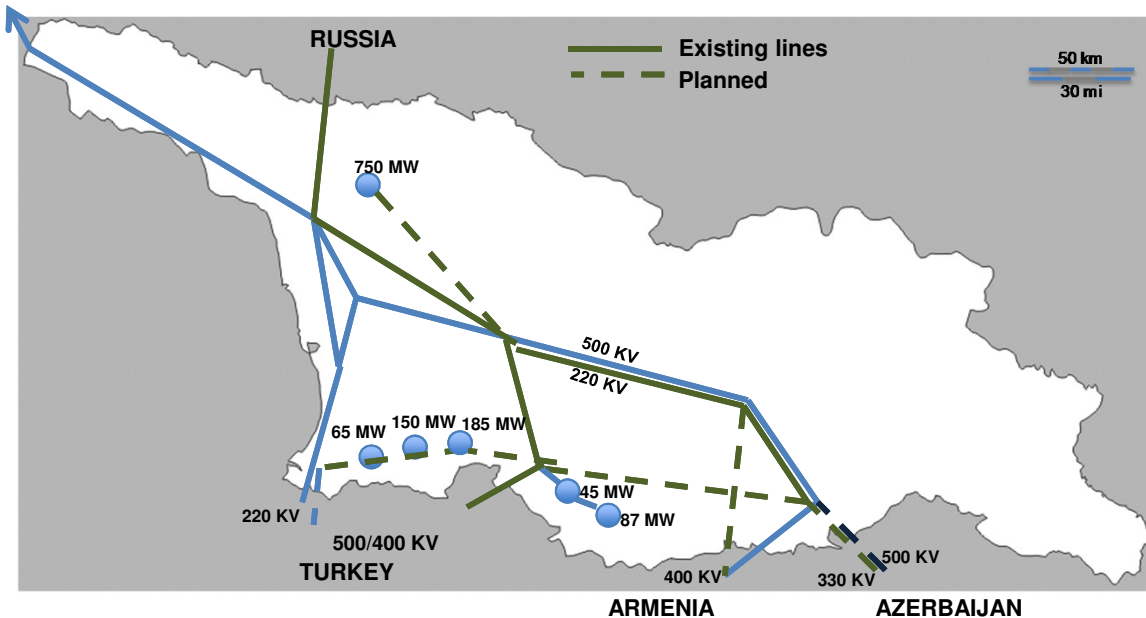


Source: ESCO

- Mix of thermal (gas) and hydro power. Imports to meet demand in the winter months
 - Thermal electricity approx. 12% of total electricity generation in 2009
- Hydro power to meet electricity demand during the summer and a net exporter of electricity
 - Exporting approximately 494 GWh in May-October 2009
- Impressive restructuring of the electricity sector since 2004
 - Deregulated electricity system with privatised distribution sector (Czech, Russian and Baltic ownership of distribution companies)
 - Dramatically reduced transmission (2-3%) and distribution losses (20%)
- Cost covering tariffs (8 US c/kWh retail)
 - The whole value chain (generation, transmission and distribution) makes money

Grid access to the Turkish market

Integrating markets – key for further development



- The Georgian/Turkish government is currently integrating their electricity grids
 - 500/400 kV transmission line and back to back station with capacity of 700 MW under construction. First 350 MW will be operational in September 2012
 - Increase to 1000 MW on demand
 - USD 500m investment
 - Financed by EBRD*, EIB** and KfW***
- New renewable energy projects in Georgia will have priority access to the 500/400 kV transmission line
- Key principal for allocation of capacity is that Georgia will allocate export capacity to Turkey
- New hydro projects have guaranteed access for 20 years per project in the transmission line to Turkey

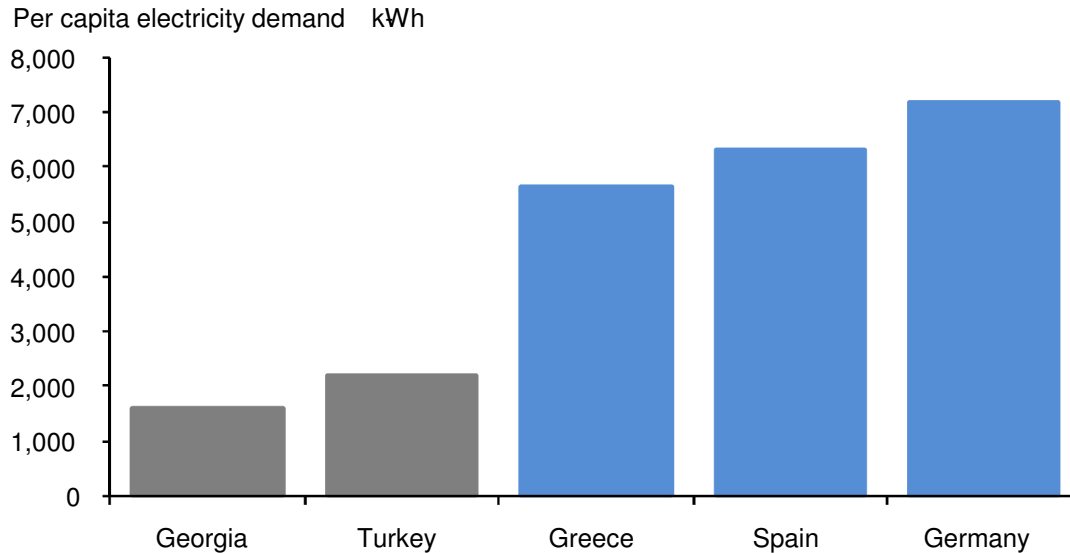
*EBRD - European Bank for Reconstruction and Development

**EIB – European Investment Bank

*** Kreditanstalt für Wiederaufbau

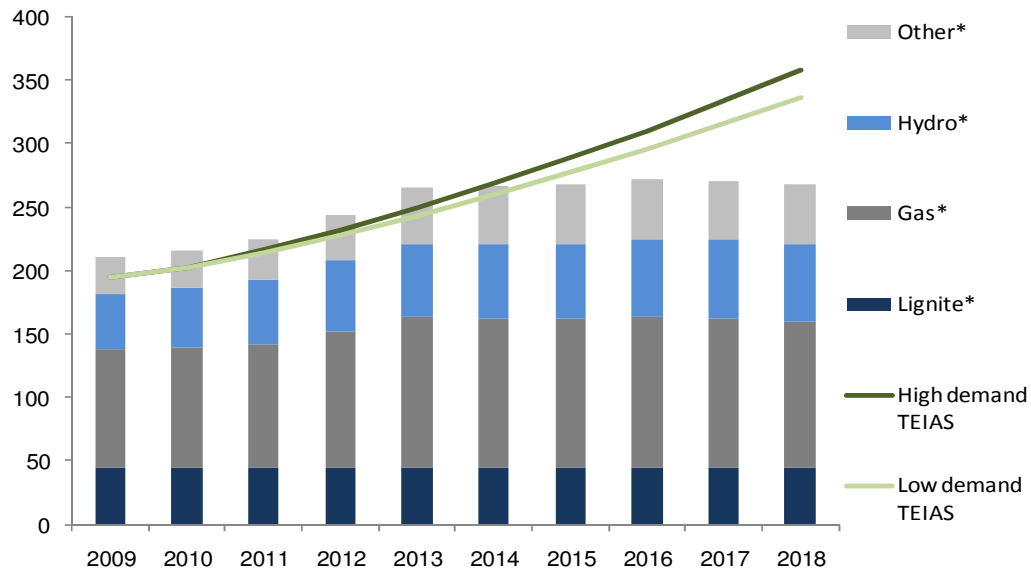
Turkey and Georgia need more electricity in the coming decade

Low electricity consumption in Turkey and Georgia



- Turkey consumes approx. 2,000 kWh of electricity per capita compared to 5,500-7,000 kWh in many EU countries
- TEIAS, the Turkish system planner, estimates electricity demand growth of 6-8% per annum in the next decade
 - Doubling the demand for electricity to 400 TWh in 2020
- Nuclear and coal generation uncertain
 - Long lead time (10+ years) for nuclear and difficult to finance coal assets in Turkey
- Turkish government with ambition to develop all available economically feasible hydro power resources in Turkey by 2023
- High water usage taxes on hydro in Turkey (up to approx. 4 USc/kWh) versus favorable tax and depreciation rules in Georgia

Demand vs. production (TWh)

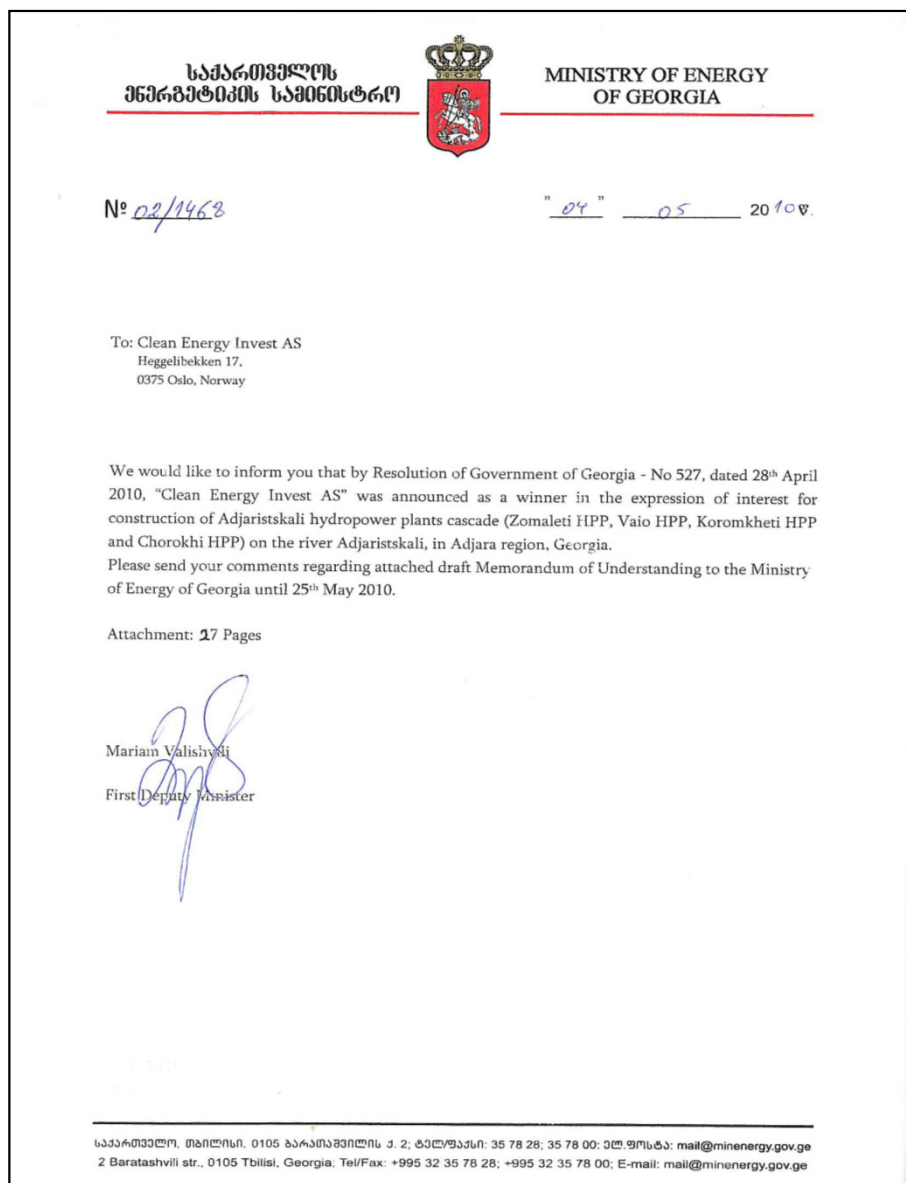


* Estimated to be around 85% of actual capacity available

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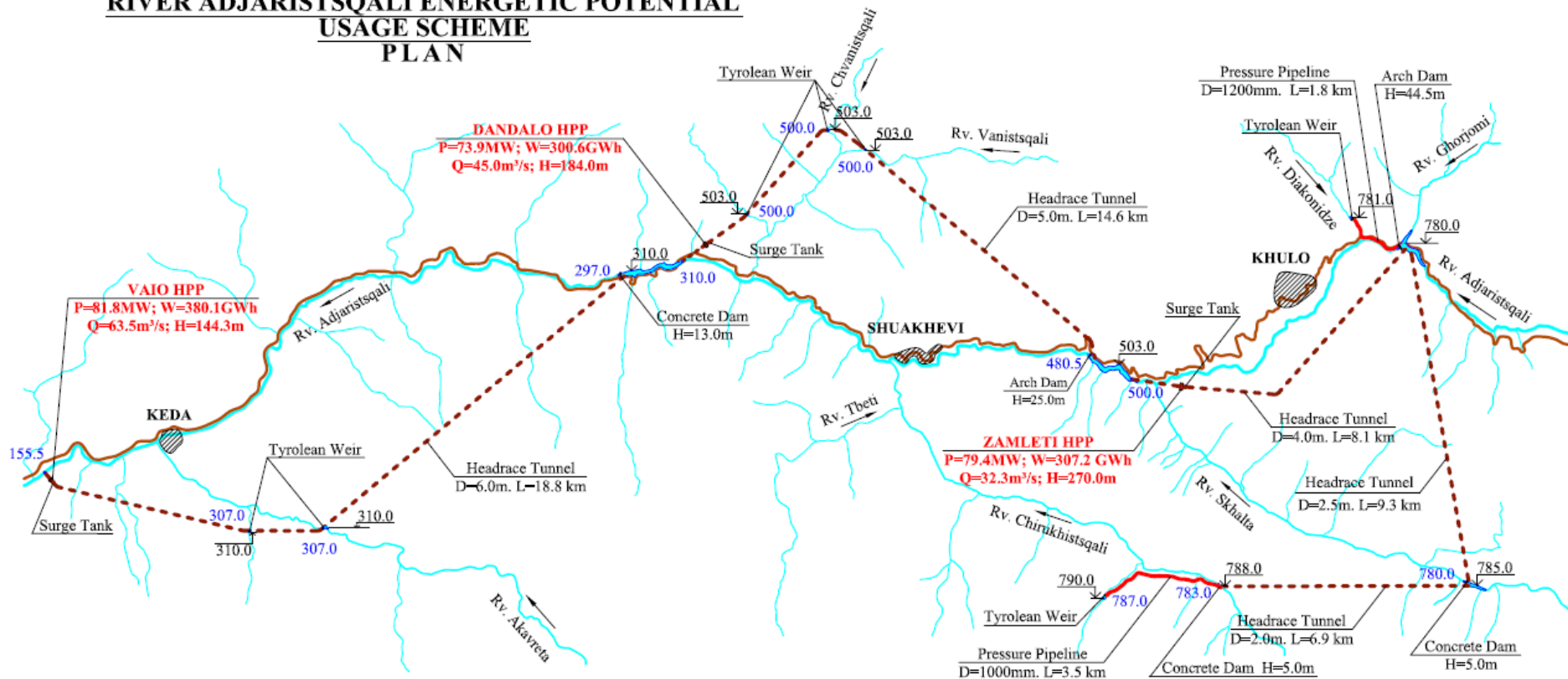
How the Adjaristsqali cascade license was obtained



- Ministry of Energy in Georgia announced expression of interest for the Adjaristsqali cascade on 22 March 2010 with background in letter of interest from Clean Energy Invest AS
- 30 days were given for other companies to express interest for the same license
- Three companies expressed interest for the project, Clean Energy Invest, Limak Holding (Turkey) and Kolin Construction (Turkey)
- Mr. Alexander Khetaguri announced on 28 April 2010 that Clean Energy Invest had submitted the best bid of the Adjaristsqali project and had been selected as the preferred bidder for the cascade
 - Best offer regarding both criteria; construction time and bank guarantee
- The implementation contract for the development of the project was approved by the Cabinet of Ministers in Georgia on 11th April 2011

Early plan for development of cascade

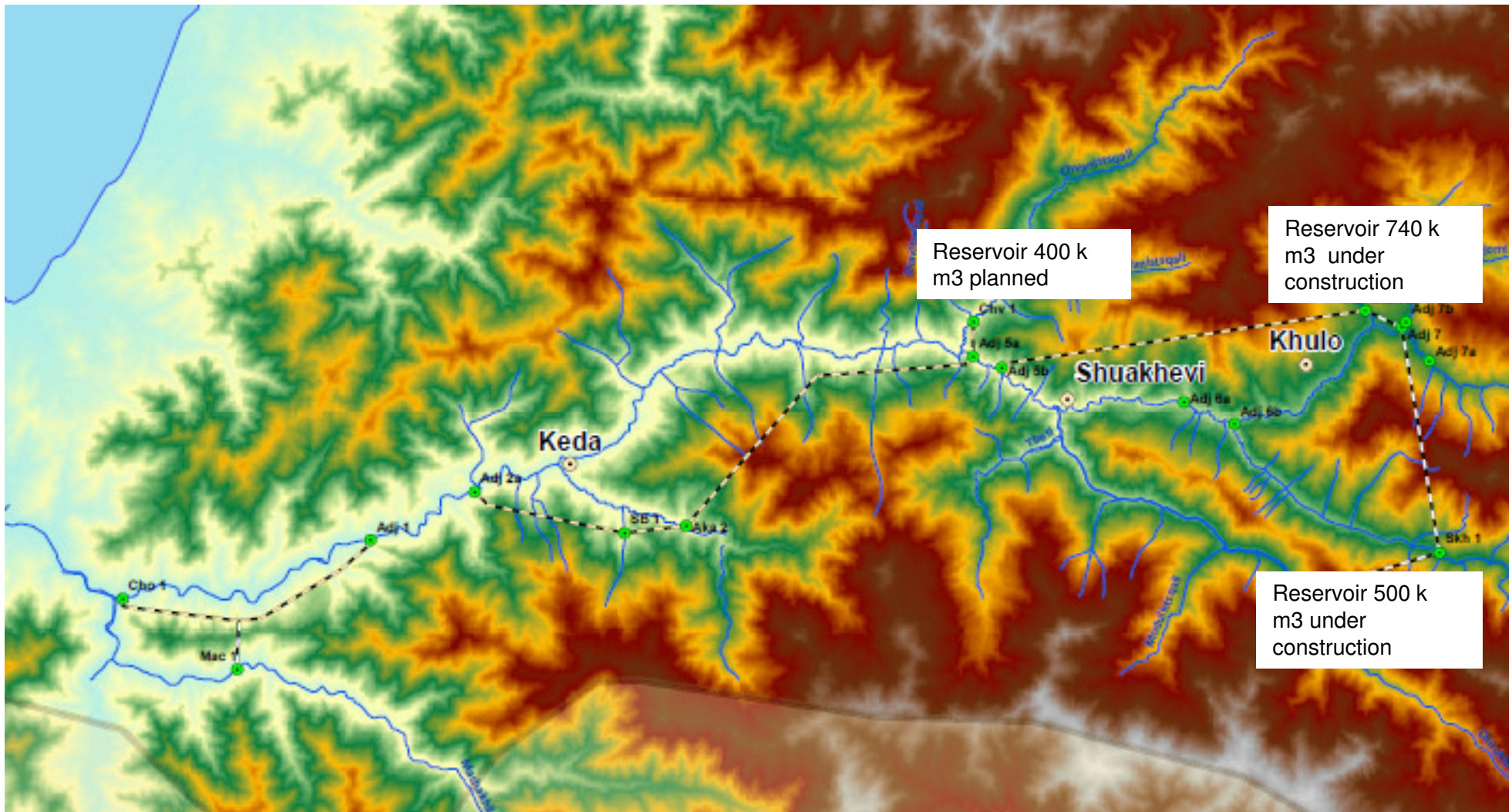
RIVER ADJARISTSQALI ENERGETIC POTENTIAL USAGE SCHEME PLAN



ENVISIONED HYRO POWER STATIONS ON THE RIVER ADJARISTSQALI									
#	Site	Name of the River	Diversion, m	Headwater, m	Tail-water, m	Head race, m	Design Discharge, m³/s	Established Capacity, MW	Average annual production, GWh
1	Zamleti HPP	Adjariestsqali, Skhalta, Diakonidze, Chirukhistsqali	8100; 9300; 6900; 3500; 1800	780.00	500.00	270.0	32.3	79.4	307.2
2	Dandalo HPP	Adjariestsqali, Chvanistsqali, Vanistsqali, Shavitretsqali	14600	503.00	310.00	184.0	45.0	73.9	300.6
3	Vaio HPP	Adjariestsqali, Akavreta	18800	310.00	155.50	144.3	63.5	81.8	380.1
TOTAL								235.1	987.9

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River Adjaristsqali optimised design



Source: Mott MacDonald Ltd

First project 187 MW Shuakhevi project financed



Power plant	GWh	Installed capacity	Est. const. start*	Est. prod. start
Shuakhevi	483	187 MW	2013	2016
Koromkheti	483	150 MW	2017	2020
Khertvisi	249	65 MW	2020	2023

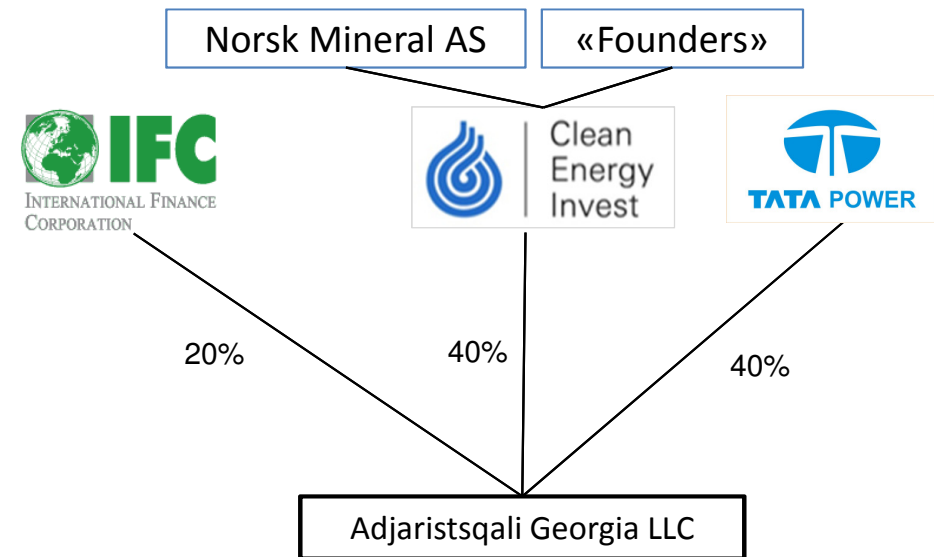
- Project license awarded after competitive tender
- Approximately 90% of electricity will be sold to Turkey (March-November production)
- Run of river project with diurnal storage for peak power
- No physical resettlements planned and limited negative environmental impacts
- Connection through a 75 km 220 double circuit kV line to Akhalsikhe with direct access to Turkish grid and a second 220 kV connection to Batumi.

Social and environmental issues are a key focus in the project



- Land acquisition is undertaken according to Georgian legislation and IFC standards based on willing seller, willing buyer principal
- Biodiversity and environmental flow considerations in ESIA developed in cooperation with IFC experts
- Environmental and Social Management Plan (ESMP) developed for the project
- More than 3000 people in the Adjaristsqali valley surveyed in a comprehensive skills mapping programme undertaken in the autumn of 2011
- Vocational training from spring 2013 to equip local qualified labour to take part in the construction of projects. 600 people to be trained for 6 months
- Project will double municipal budgets through payment of property tax in the most affected municipalities
- CSR budget of 3 m USD to provide assistance in livelihood improvements and basic infrastructure
- Improvements in regional infrastructure and long term job prospects

Building strong partnerships along the way



- Clean Energy Invest was awarded the license to develop the Adjaristsqali project in May 2010 after a competitive tender where three companies participated
- A joint development agreement for the Adjaristsqali project was signed by CEI and International Finance Corporation (IFC) in April 2011
- Norsk Mineral purchased 50% of the shares in Clean Energy Invest AS the same month
- Tata Power joined as a 40% shareholder in June 2013
- Financing documents signed in May 2014 with three lenders as the first cross border project financed deal in Georgia
- Shareholders agreement signed for the development of the 150 MW Koromkheti project with the same shareholding structure
- Financed by the three multilateral banks IFC, European Bank for Restructuring and Development (EBRD) and Asian Development Bank (ADB)

Project development Adjaristsqali hydro



- **License award, feasibility and ESIA study, tender design (16 months)**
 - Signing Joint Development Agreement with IFC doing business through IFC InfraVentures (April 2011)
 - License award and signature of Implementation Agreement with Georgian government (June 2011)
 - Feasibility study (February 2012)
 - ESIA study (ESIA study for public consultation February 2012)
 - Land acquisition (process initiated autumn 2011 and substantially completed)
 - Tender of engineering, civil and electromechanical contract (tender launch 1 August 2012)
 - Preparatory works access roads etc (start September 2011)
 - Registration of project as CDM project with UNFCCC (November 2012)
 - Contract for booking of transmission capacity in HVDC link to Turkey (February 2013)
- **Step two: Procurement, Financial close (4 months)**
 - Construction permit (obtained July 2013)
 - ESIA permit (obtained July 2013)
 - Batumi-Akhalsikhe transmission line construction agreement
 - Award of contracts for engineering, civil and electromechanical package
- **Step three: Construction and Financial close (3-7 years)**
 - Construction (construction start July 2013)
 - Award of contracts for electromechanical package
 - Commissioning of plants (first 187 MW Q4 2016)
 - Loan document signature May 2014
 - First draw of debt financing March 2015
- **Step four: Operation (50 years +)**
 - Management of the plant and will also have the supervisory control of the operations

Financial close March 2015



- First project financed cross border deal Georgia Turkey in the hydro sector
- Largest hydropower project to be built in Georgia since independence
- Largest foreign direct investment to date in Georgia apart from BTC pipeline
- First greenfield hydro project to get accredited with CDM credits from UNFCCC
- Largest construction site in the region with almost 1500 people working on project implementation

And rapidly advancing construction site



- AGE Turkey, civil contractor and Alstom delivering turbines, Mott MacDonald, the engineer
- 13 km of 37 km of tunnels completed in first ten months of construction. Tunnels ahead of programme and on budget
- Start of commissioning scheduled for Q4 2016

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Why has Clean Energy succeeded?

- Strong understanding of business case before company started
- Core team with relevant complementary competence
- Key relationship with IFC for project realisation
- Long term supportive owner in Norsk Mineral AS
- Strong focus on building Georgian government support for project
- Good selection of contractor and right assessment of rock quality in tunnel

The relevance of Norwegian hydro competence

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- Norwegian project management skills important for the realisation of the project
- Norwegian capital also essential – without a strong long term private Norwegian industrial backer in Norsk Mineral, this project would most likely not have been realised
- Strong political support for the realisation of the project from Norwegian government
- Attractive GIEK financing if Norwegian equipment used but otherwise of little value

-

- Norwegian equipment struggling to be cost competitive with large players with Asian manufacturing base
- Norwegian engineering involved initially but did not have the delivery capacity to be a credible partner for the project and also too expensive at the time
- Structural issues in ownership of Norwegian hydro assets with municipal ownership with limited risk appetite outside local area limits participation of Norwegian utilities with hydro background

How to make this type of investments more attractive

- Improve access to long term capital including allowing the Norwegian Petroleum Fund and Folketrygdfondet to invest in non stock exchange listed infrastructure projects
- Fix the carbon market, especially CDM. This project is UNFCCC accredited but is not given the right signals from a disfunctional CDM market
- Create a bigger universe of industrial risk capital in Norway prepared to back this type of ventures



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