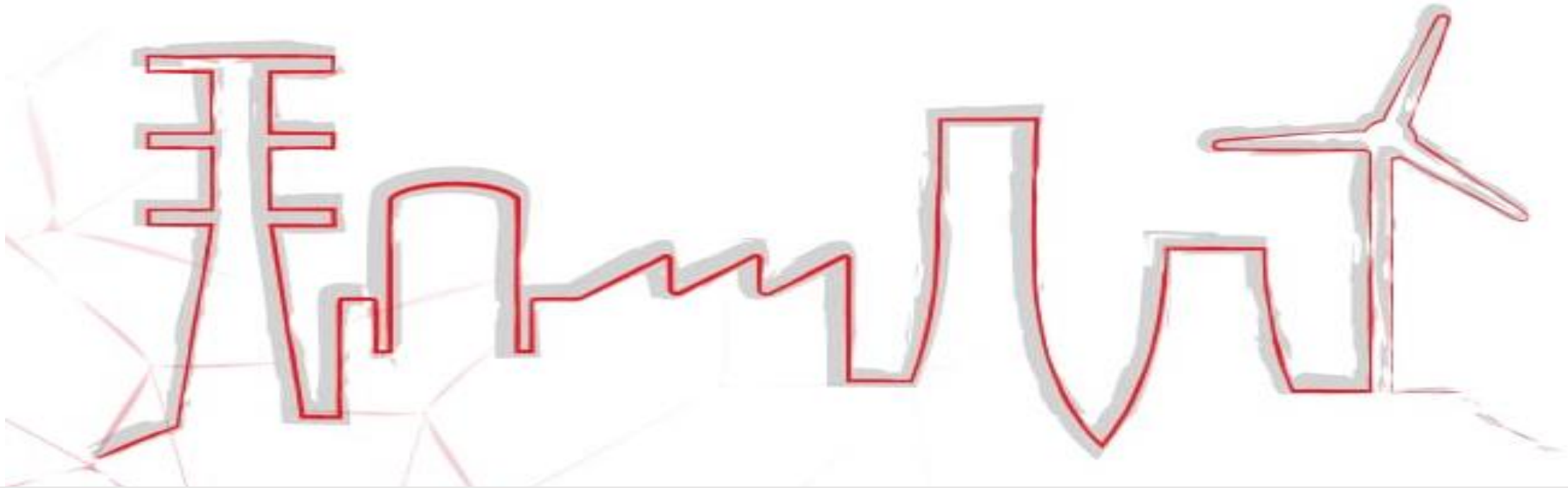


Perspectives and Obstacles for Coal Mine Methane in Georgia



Georgian Industrial Group



Georgian Industrial Group COMPANY PROFILE



Georgian Industrial Group

COMPANY PROFILE

GIG Group and Its Subsidiaries

With more than 4000 employed staff Georgian Industrial Group (GIG) is one of the largest industrial groups in Georgia

The business of GIG has been expanding quite steadily over the last years by means of acquisitions but also through organic growth e.g. by construction of new generation facilities such as power plants.



“One Team - Multiple Energies”

OUR ENERGY PORTFOLIO



Coal Mining

GIG owns and operates the only coal mine in Georgia with the 331 Mt coal extraction license. Tkibuli Coal mine envisages rising annual output up to 1 million tons by 2021.



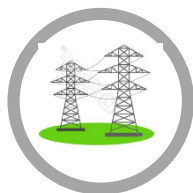
Thermal Power Plants

The group owns and operates thermal power plants with a total installed capacity of 600 MW. A 300 MW coal fired power plant with modern combustion technology is currently under development in cooperation with the Georgian Government.



Renewables

The company operates hydro power plants with a total installed capacity of 50MW. GIG furthermore has some 70 MW of hydro and wind energy facilities under planning and development.



Electricity Trading

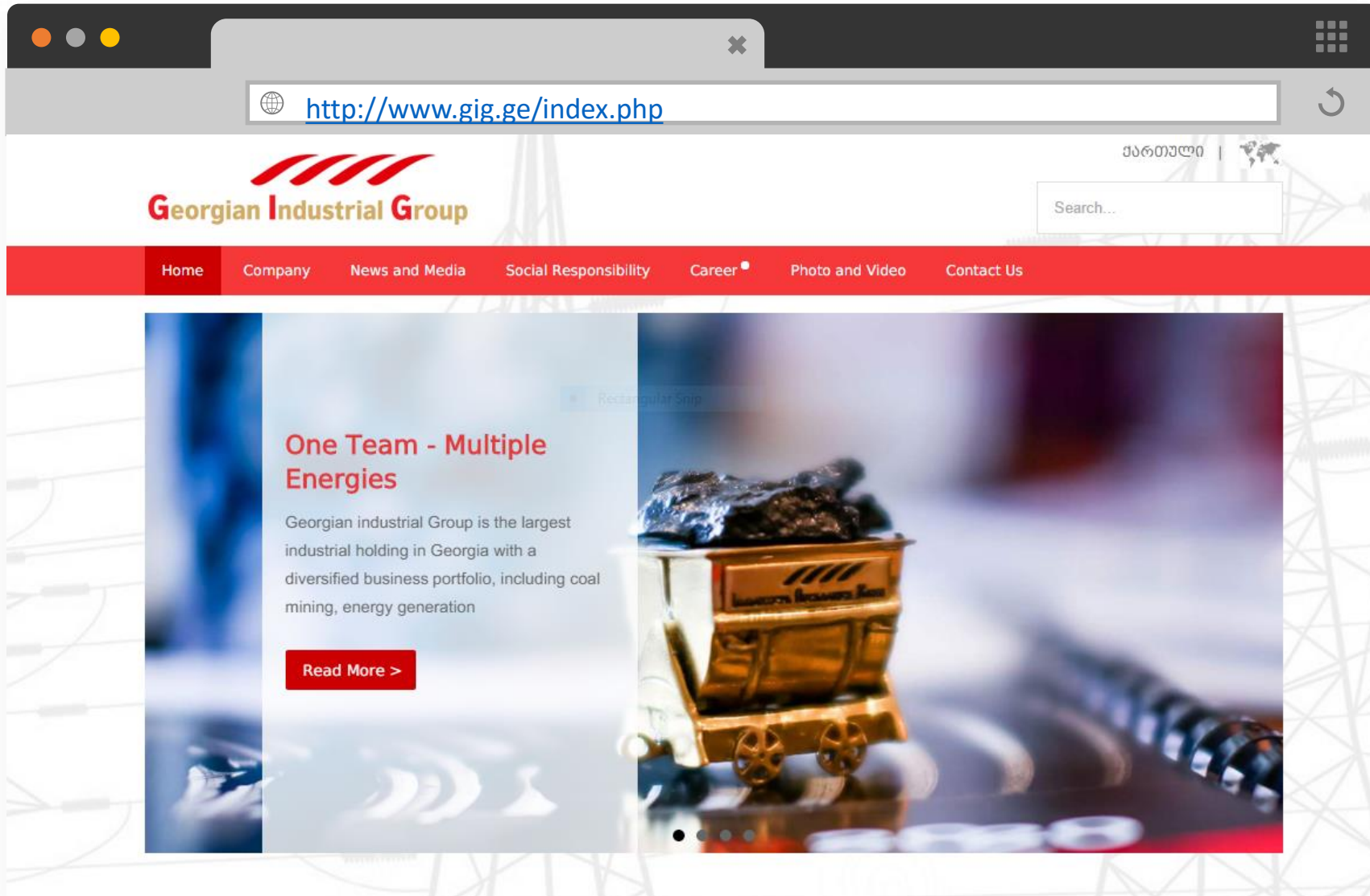
GIG and its subsidiaries are the largest electricity trader in Georgia handling export/import, transit and swap transactions with all of its neighboring countries.



CNG Refueling, Natural Gas Trading

Through its subsidiary NEOGAS, GIG owns and/or operates 20 CNG refueling stations across Georgia. Besides, GIG is involved in regional gas trading as well as wholesale trading in Georgia.

FURTHER INFORMATION: WWW.GIG.GE





TKIBULI-SHAORI CMM



Georgian Industrial Group

HISTORY OF METHANE

Timeline

Tkibuli-Shaori coal is a sort of volatile bituminous coal known as gaseous coal which contains considerable amounts of Methane



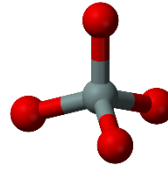
1961

The first gas flew to the surface as a result of drilling of the borehole for research purposes.

From the year 1961 up to the late 1980s

34 bore holes were drilled and tested in order to determine methane content.





1961-1998

Studies revealed the significant content of methane in coal which varies from **15 m³/tone** up to **200 m³/tone** in some deeper seams

1990

According to UNFCCC, **approximately 13 gigagrams of CMM (332 KtCO₂eq)** are estimated to have been emitted in 1990, while coal annual production was **1 million tons**



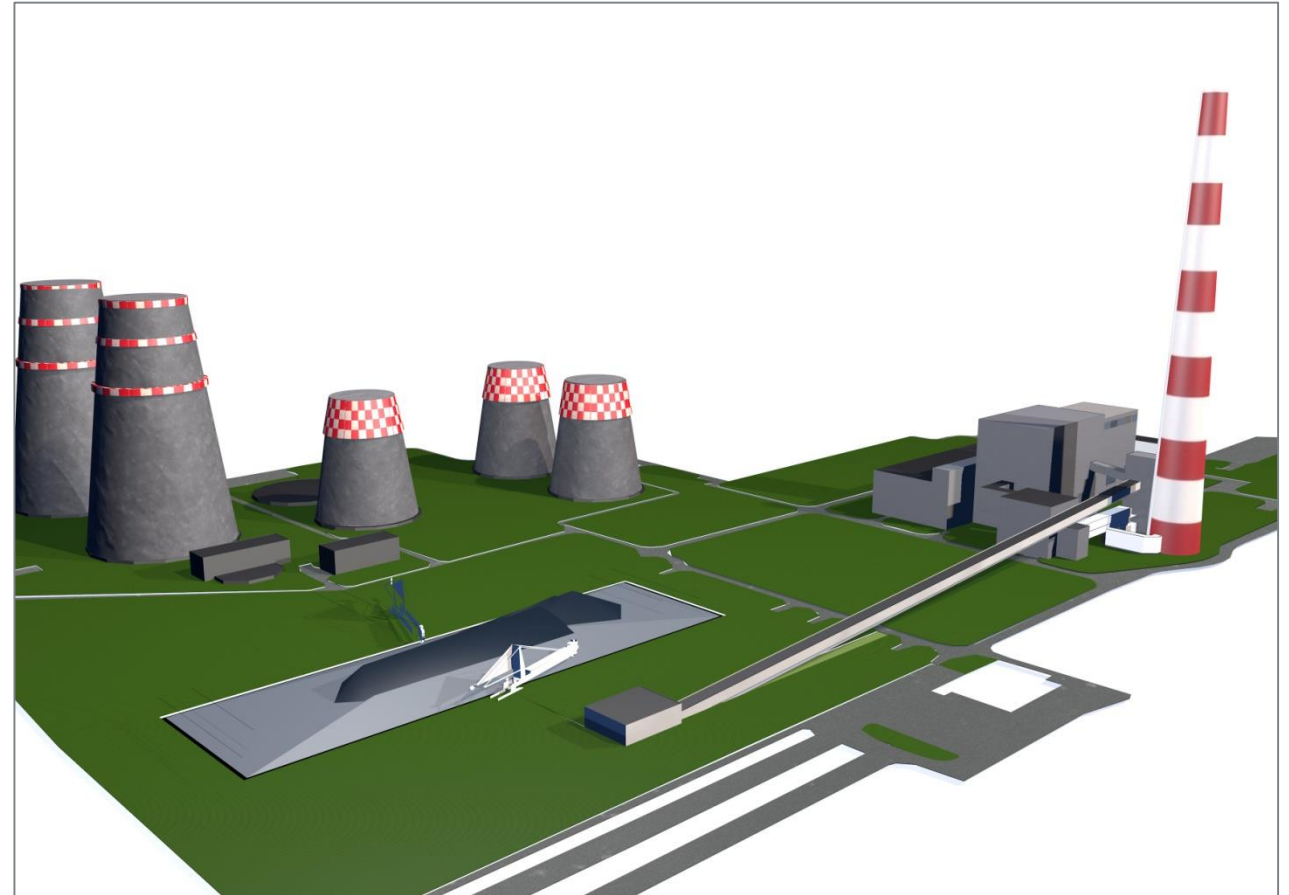
CMM is not currently drained from the mine, either by in-seam boreholes or via gob drainage. **Methane is diluted in ventilation air and carried to the surface where it is emitted to the atmosphere.**

GARDABANI COAL TPP: The Future Driver of Coal Production in Georgia

Why **TPP**? Coal is the only Fossil Fuel in Georgia. Currently, Georgia imports 100% of Natural Gas (Azerbaijan, Russia). It is the issue of **ENERGY SECURITY**.

COAL CONSUMPTION (per annum): Under 150MW operation (“PPA load”) – approximately **560 thousand** tons design coal; Full load operation – approximately **890 thousand** tons of design coal

COMMISSIONING: According to the PPA signed between Electricity Market Commercial Operator and CPOWER (Subsidiary of GIG) , the commissioning of the Coal TPP is projected in **2020**



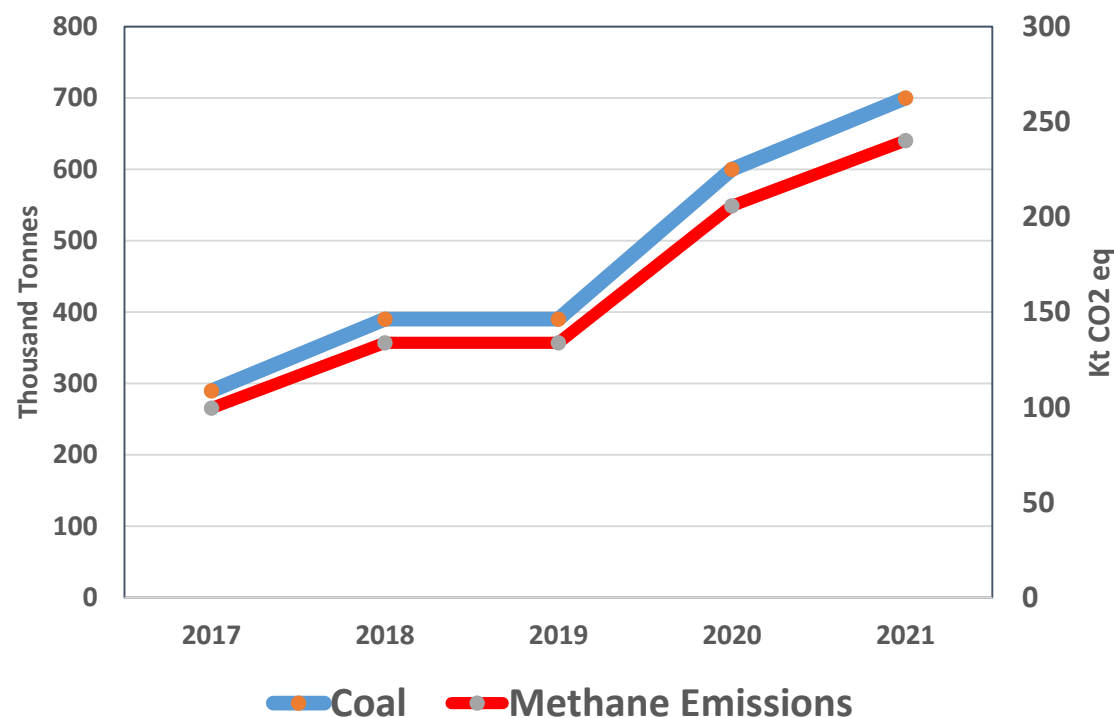
TKIBULI-SHAORI COALFIELD

5 Year Development Plan

Projected Methane emissions data extrapolated from the Georgia's Second National Communication to the UNFCCC where around **19 million m^3 CMM – 332.5 Kt CO₂ equivalent** - are estimated to have been emitted in 1990, at which time coal annual production was **960k tones**.

According to Tkibuli Coal Mine medium term development plan, the production of coal should reach **700k** tones. Hence, the envisaged emissions could surpass **12 million m^3** methane. If it is converted into CO₂ equivalent, this figure increases by a factor of 25(GWP of Methane for 100 Years) overall emissions can be anticipated in the range **230-240 Kt CO₂ equivalent**.

Projected Coal Production and Methane Emissions





Coal Mine Methane Legal and Institutional Framework



Georgian Industrial Group

CMM Regulatory Framework

- Currently CMM exploration and production are based on petroleum leasing legislation, in particular, it is regulated by the Oil and Gas law which means that the CMM exploration and production are assigned to oil and gas operations which does not defines CMM/CBM/AMM/VAM;
- Hence, lessee pays for an up-front lease bonus payments - signature and discovery bonuses - as well as for the general license for oil and gas operations;
- Finally, instead of royalty percentage, lessee is obliged to sign a product sharing agreement.

Production Sharing:

- **Before cost recovery:** maximum 50% of produced oil and gas for cost recovery, remained 50% shall be divided in proportion - 50 % investor / 50% state;
- **After cost recovery:** 50% investor / 50% state.



CMM Institutional Framework and Economic Incentives

- Obviously, institutional framework should be based on a strong institutional support. In particular, designated CMM authorities and regulatory agencies could help identify policy options, technical barriers and reduce transaction costs for CMM
- Currently, there is **NO** designated authority for CMM in Georgia.
- Correspondingly, economic incentives for CMM **DOES NOT EXIST** in Georgia



FINAL OVERVIEW

Regulatory Provisions	Institutional Framework	Economic and Financial Incentives	Technologies for CMM Utilization	Market for CMM
Petroleum Product, Assigned to conventional natural gas, Requires the general license for oil and gas operations	Regulated by Oil and Gas Agency under MoE, NO designated authority for CMM	No	No	Increased demand on Natural gas, including CNG

Poorly defined ownership and leasing rights creates conflicts and obstacles of utilization of CMM. Obviously, clear rights reduce uncertainty, risks and costs. Moreover, a lack of clear incentives for methane capture and utilization hampers CMM development in Georgia because clear policies should “define the playground for CMM projects and create a tipping point for project feasibility”.

BEST PRACTICE GUIDELINES: Regulatory Boundaries, Institutional Framework, Economic Incentives

- In countries like Australia, Germany, Poland, UK, China introduction of policies supporting CMM led to more implemented projects.
- Taking into account the experience of the countries above, the group of experts on CMM could recommend national governments to establish clear ownership rights, regulatory and institutional framework as well as reasonable incentives in order to create economically viable and attractive investment options for CMM projects.
- Best practice guidelines could cover not only some general recommendation but it might also include some model framework elaborated by the group of experts on CMM.



Thank You!

