

## **POWER SYSTEM SITUATION AUTUMN-WINTER 2002-2003 AND SOME ASPECTS OF ENERGY SECURITY IN GEORGIA**

John W A Coker  
*BP-StatOil*

Abstract:

Key words:

### **1. INTRODUCTION TO THE GEORGIAN ELECTRICAL POWER SYSTEM**

During the last 10 years a serious situation has developed in the fuel and energy sector in Georgia and it is worsening due to the number of various reasons .

The first one is related to a chronic deficiency of the in-country energy resources, and secondly the slow pace of economic reform of the electrical power supply system .

This has led to lack of an electrical power to the population especially in the winter period . The lack of confidence in the power supplies coupled to a generally bad economical situation in the country has led to serious non-payment of electricity bills .

This in turn has resulted in lack of in country generating capacity through under investment in this sector, which makes the system more reliant on imported power, with the associated risk of the power being cutoff .

In addition the lack of investment has also meant that essential maintenance and repairs have not been carried out, and the parts of the system that are still in operation are on the point of total collapse.

The situation is spiraling downwards with acute cash flow problems in the early part of the winter, which will accelerate the collapse of the system.

However if the necessary funds are found to finance the cash shortfalls it is believed the downward spiral could be halted and the system could start to recover.

Without the financing the prospect for the energy sector, the population and industry is dismal this and the following winters, and the effect on the social structure of the country should not be underestimated.

This lack of financing this winter will also have a serious negative effect on the last few years' efforts of the Georgian government and donor organizations to restructure the economic bases of the power system.

In addition to the funds it will be necessary to implement radically different management of any funds to ensure the financing is focused where it will give the best effect on improving the cash flow situation this winter.

The changes in management structure must cover all areas of the power sector from government supervision through generation and transmission, to the wholesale market and power distribution companies.

It is believed that with the correct focus the start of the recovery of the power sector can be achieved, however this can only be realized with the strongest influence of the highest levels of the Georgian government.

## 2. ESTIMATES OF THE POSSIBLE SITUATION WINTER 2002 –2003

To plan the power supplies for winter 2002 –2003 a group was set up by the energy ministry with a mandate to indicate the probable situation and which actions were necessary to migrate the power crisis. The figures below indicate the estimates developed by this group.

Figure 1 shows the possible sources of generated and imported power to balance the system and provide 24 hours of power to the capital Tbilisi and 8 hours to districts outside Tbilisi. To achieve this the thermo – plants needed to be refurbished, which was never achieved before the winter period.

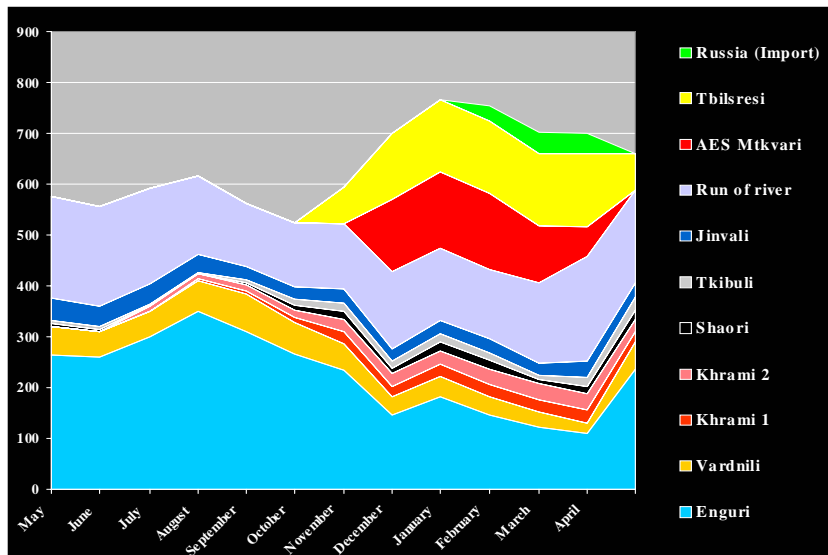


Figure 1

Figure 2 indicates more simply the importance of the thermo-plants to meet the peak loads and also to function as a backup to imported power if the main transmission line is out of operation.

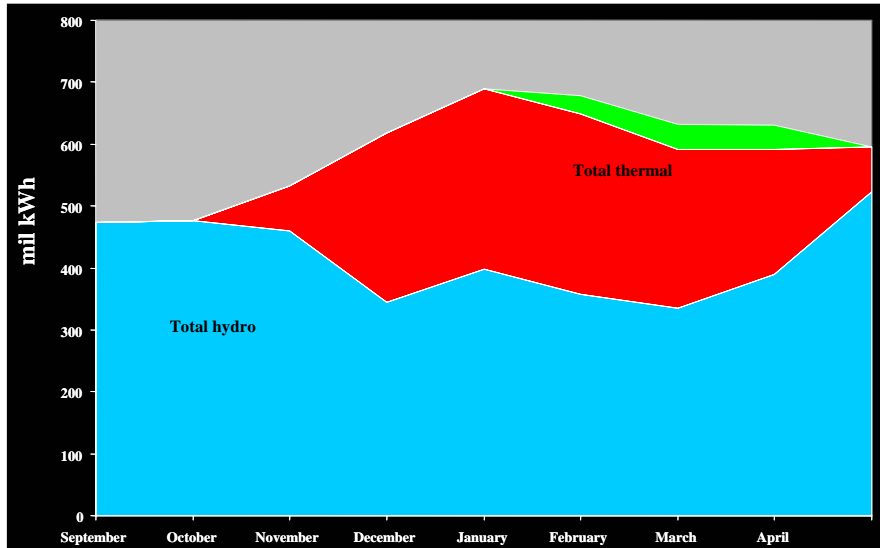


Figure 2

Figure 3 indicates the probable consumers if the power was available, however as was the case this was never achieved and the consumers only received fewer than 50% of the planned power especially in the peak periods of Jan/Feb and March.

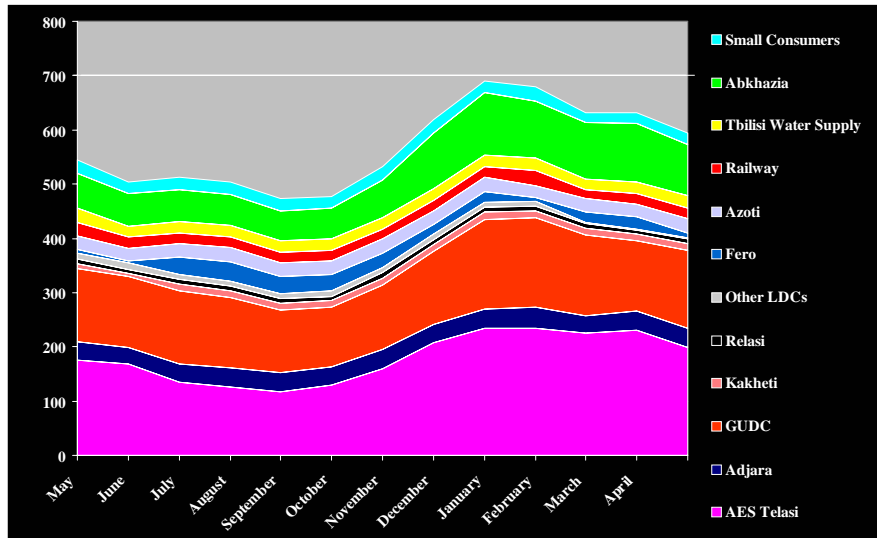


Figure 3

Figure 4 indicates the actual situation over the winter period, as can be seen the situation was considerably different to planned situation shown in Figs 1 and 2. .

The state thermo-plants were not repaired and did not operate and the remaining private operative unit only briefly operated, due to the lack of funds to purchase the fuel gas. The imports from Russia and Armenia were at a maximum, which built up considerable energy debts, which need to be paid in the summer 2003.

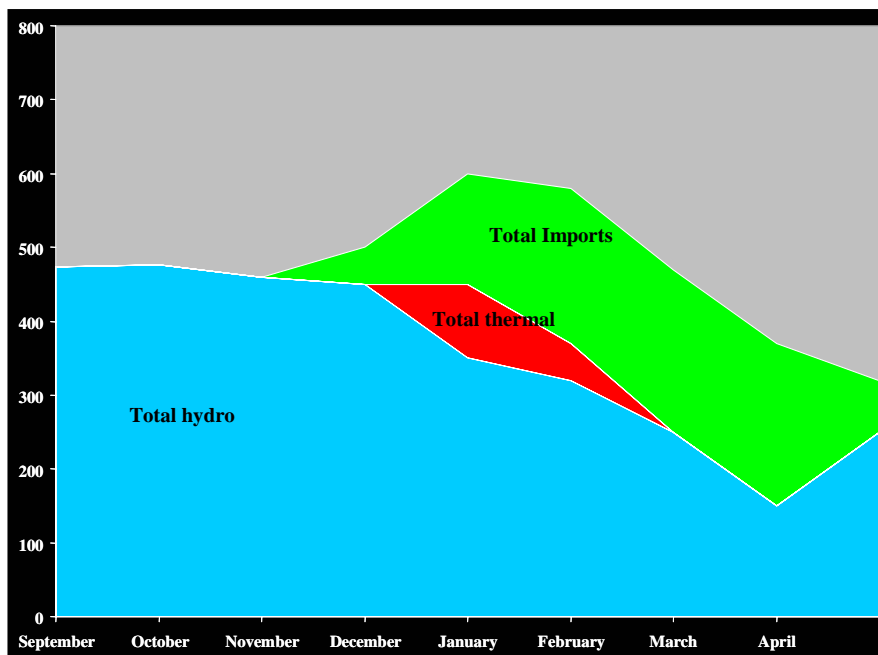


Figure 4

Figure 5 indicates the estimates of the cash flows that were necessary to fund the power system and achieve the results estimated in Figures 1,2 and 3. Due to lack of correct planning and implementation the plans were never realized , monies were never allocated to perform the necessary repairs ,the total cash flows never met the estimates and significant debts were built up.

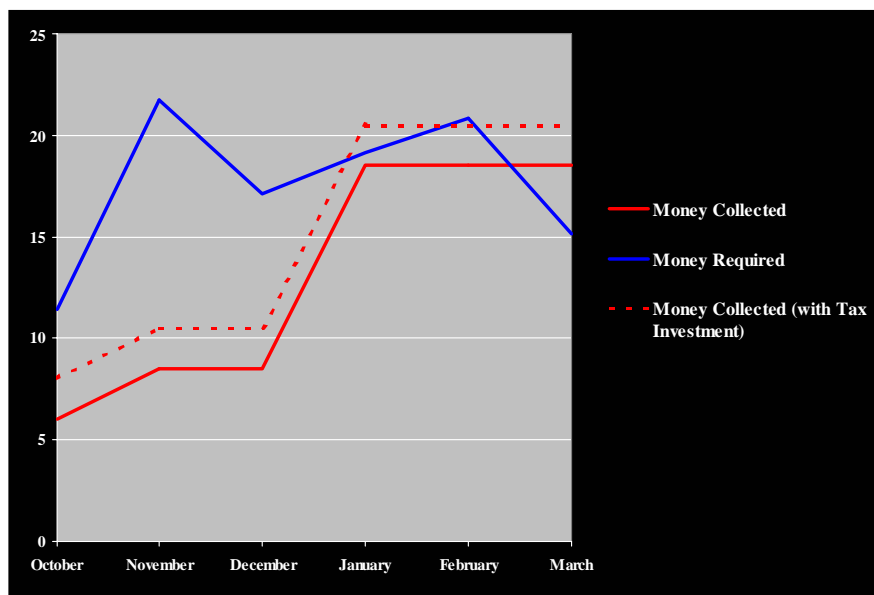


Figure 5

### **3. CONCLUSIONS**

#### **3.1 General**

- Due to large cash deficient in the electrical energy sector a critical situation for the supply of electrical energy to industry and the general population this and following winters was predicated.
- The estimated yearly deficient is between approx 20 – 40 mil GEL depending on the financial situation regarding payment for electricity supplied.
- Due to the urgent repairs necessary to the system and the other expenses an acute cash flow problem exists in system, which as it was not solved resulted in a serious effect on the power generating capacity.
- Because of the anticipated payment shortfalls, large sums of money needed to be transferred from the State budget or other sources of financing to subsidize the power generating, transmission and distribution system.
- Without Government or other sources of financing there was a considerable lack of generated power, which will result in power cuts and rationing.
- Large imports of electricity from Russia and other countries was necessary as the generating problems are not addressed urgently
- The potential lack of generating capacity further reduced all the predictions for consumption and had a significant negative effect on the potential revenues.
- The energy balance that was developed as the basis for this report assumes a full wholesale supply to Tbilisi, an eight hour per day supply (approximately) to the Georgian regions. It was not expected that 100 percent payment for wholesale electricity deliveries could be achieved during the forecast period.

#### **3.2 Technical**

- The Hydropower, Gardabani state thermal power station (Tbilsresi ) and transmission systems urgently need finance to perform the minimum of repair work to be capable to generate and transmit enough electrical power for the peak load in the winter.
- The financing for the repairs was and still is critical, and the work must start in the summer months to be completed before winter when the demand is high.



- As these repairs were not completed then the amount of electrical power available was reduced by 20 % and without replacement electricity the consequences were severe for Georgian industry and public.
- Without this capital investment the reliability of the total transmission system was very low which resulted in partial or total failures of electrical supplies to Tbilisi and the regions. The failure of the transmission system this summer ( 2003 ) is an example of further deterioration of the system and the reliability is expected to be worse this coming winter .

#### **4. ANALYSIS OF WINTER 2002/2003**

- Funds were not allocated to repair thermo- power plants
- This resulted in serious losses of power in the country when imported power was disrupted
- Funds were not allocated to purchase heavy oil
- This resulted in total loss of thermo-plants when imported gas supplies were disrupted
- Repairs were not performed on transmission system
- This resulted in considerable power outages due to failure of system
- Thermo-plants were not started as planned
- The Hydro reservoirs were depleted approx 2 months early than planned
- The power system was out of balance which resulted in transmission voltages and frequencies about 10% under the design which in turn made the system unreliable
- Due to the lack of power supplies, the expected income was not achieved
- Due to large imports of power, debts were built up which could reduce the funding of essential repairs necessary for next winter
- Without exceptional efforts this summer the situation next winter could be worse

## **5. RECOMMENDATIONS FOR IMPROVEMENT**

- As energy supplies to the population and industry is vital for the security of the country it is essential that the financing programme for energy assistance is reviewed by the highest levels of Government
- Financing of the deficit of Georgian Energy system should be considered to be included in the State Budget.
- Essential repairs must be performed
- An energy-monitoring group must be established to oversee financing of the sector with reporting to a high level in the government.
- A rigorous policy of maximum collection of funds from consumers and disconnection of non-payers must be implemented that has the full backing of all Georgian laws.
- The Hydro-reservoirs management must be rigorously continued to maximize the stored energy
- A source of funding must be found for the consumption of Abkhazia, which is over 14% of Georgia's total consumption

## **6. ACKNOWLEDGEMENTS**

The results, conclusions and recommendations in this paper are based on the information received from

- The Georgian Ministry of Fuel and Energy
- The Georgian Wholesale Energy Market (GWEM)
- AES companies
- United Distribution Company
- Hydropower stations
- Tbilisresi