GEORGIAN POWER SECTOR REFORMS – Building over the past Looking into the future

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OUTLINE

- **Brief characteristics of the Georgian Energy Sector**
- **Soviet Era/history**
- **Crisis**
- **Reforms phase 1**
- **Reforms phase 2**
- **Results**
- **Current state**
- **Policy**
- **Challenges**
- **Future Directions**

ABOUT GEORGIA

- Located Between Europe and Asia in South Caucasus, east of Black Sea
- Neighbors - Russia, Turkey, Armenia and Azerbaijan
- Land area of 69,700 square km
- Population 4.4 million
- Capital – Tbilisi – 1.1 mln people
- Climate – mild: average max 31 °C in July average min -2 °C in January
- GDP/per capita $3215.4
- Electricity consumption per capita 2100 KWh
- Electricity market 9.9 ~ TWh/year

SRATEGIC LOCATION (source GIOGC)

ENERGY SECTOR

- Electricity generation: 10.1 billion kWh (2011est.)

country comparison to the world: 93

Generation mix - 90%-hydro,10%- thermal

- Electricity consumption: 9.256 billion kWh (2011 est.

country comparison to the world: 91

- Electricity export : 931 million kWh (2011 est.)
- Electricity import: 471 million kWh (2011 est.)
- Oil production: 984 bbl/day (2010 est.)

country comparison to the world: 105

- Oil consumption: 13,000 bbl/day (2010 est.)

country comparison to the world: 146

- Natural gas production: 10 million cu m (2009 est.)

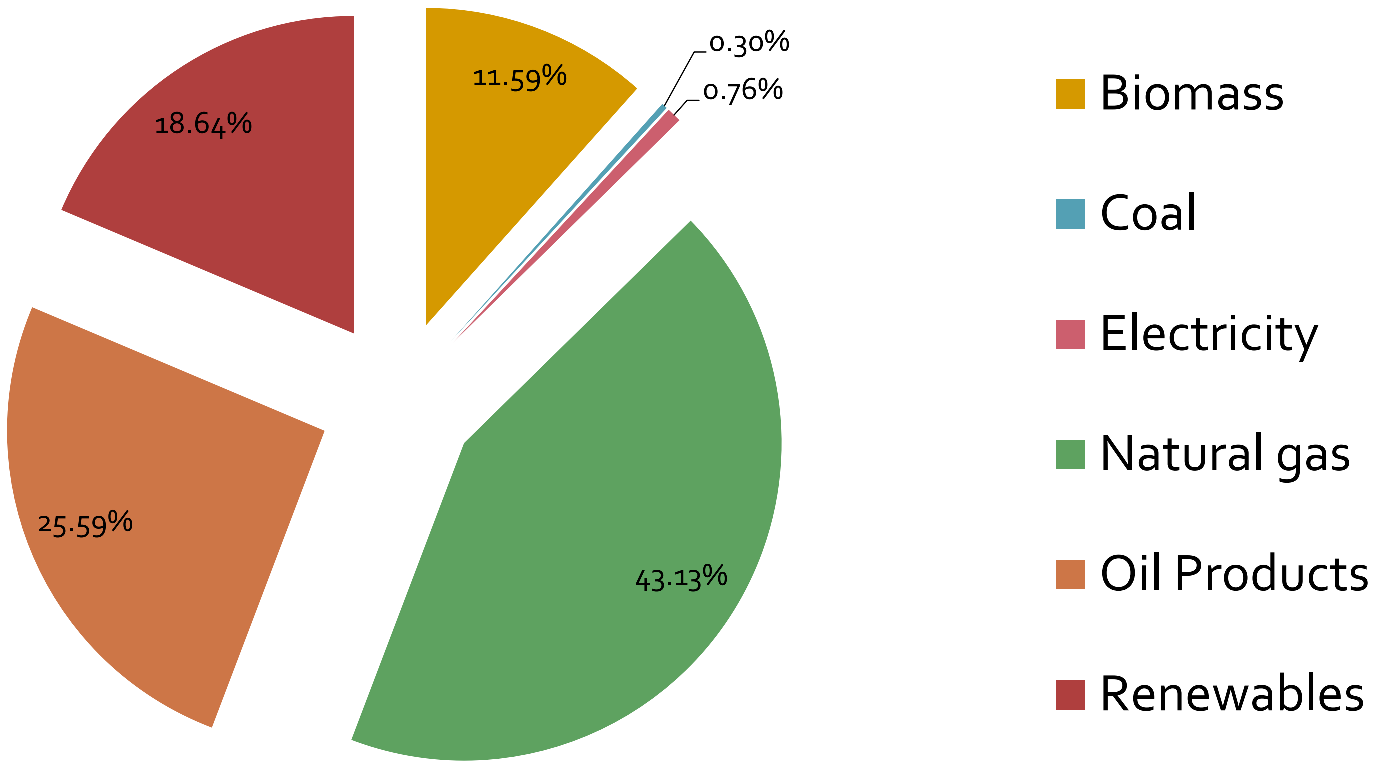
country comparison to the world: 90

- Natural gas consumption: 1.71 billion cu m (2009 est).

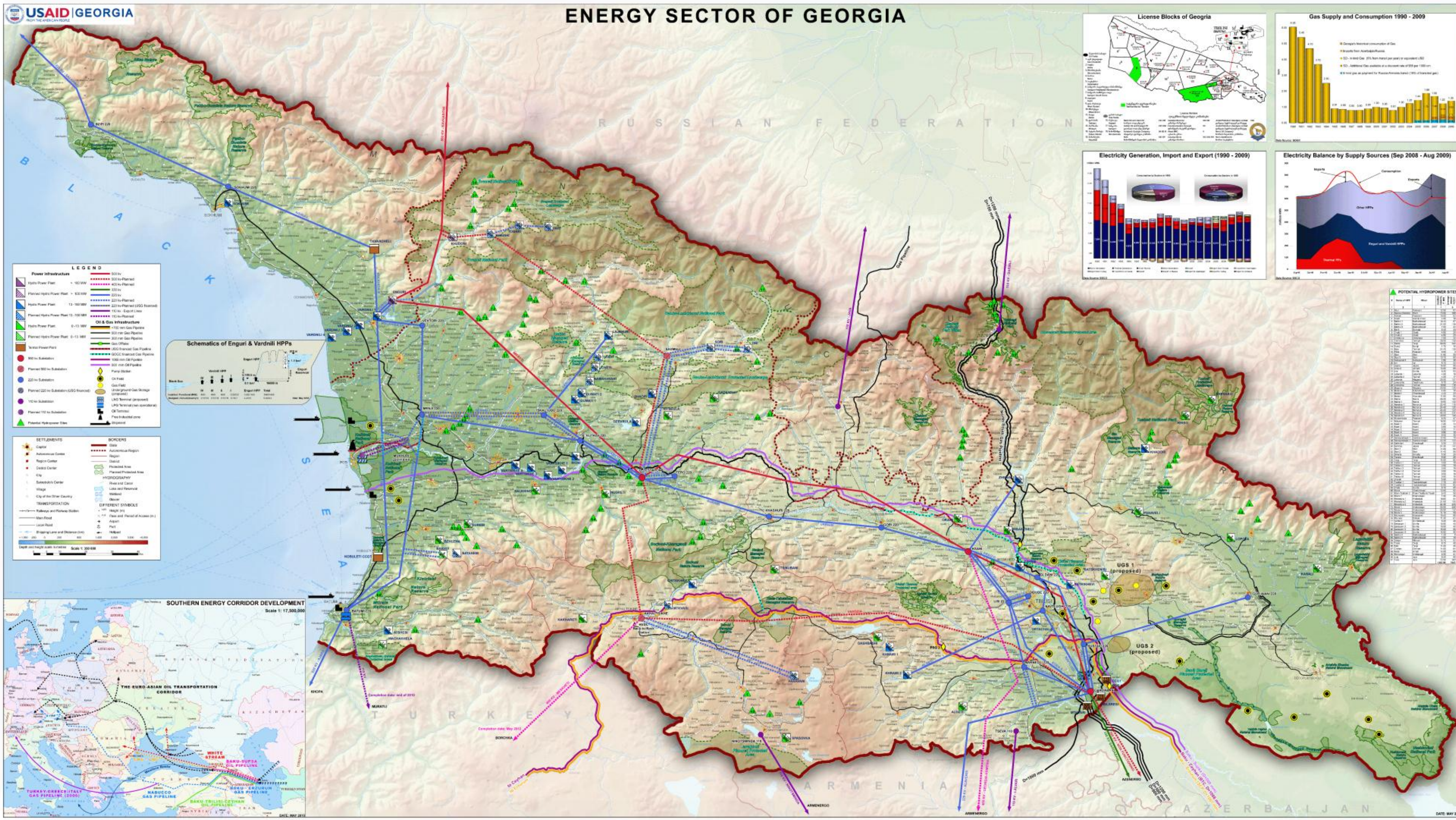
country comparison to the world: 81

(source CIA)

FUEL MIX



11.59%
0.30%
0.76%
18.64%
25.59%
43.13%
Biomass
Coal
Electricity
Natural gas
Oil Products
Renewables


USAID | GEORGIA
ENERGY SECTOR OF GEORGIA
License Blocks of Geogria
Gas Supply and Consumption 1990 - 2009
Electricity Generation, Import and Export (1990 - 2009)
Electricity Balance by Supply Sources (Sep 2008 - Aug 2009)
RUSSIAN FEDERATION
BLACK SEA
TURKEY
ARMENIA
AZERBAIJAN
LEGEND
Schematics of Enguri & Vardnili HPPs
SOUTHERN ENERGY CORRIDOR DEVELOPMENT
THE EURO-ASIAN OIL TRANSPORTATION CORRIDOR
WHITE STREAM
BAKU-SUPSA OIL PIPELINE
BAKU - ERZURUM GAS PIPELINE
NABUCCO GAS PIPELINE
BAKU-TBILISI-CEYHAN OIL PIPELINE
TURKEY-GREECE-ITALY GAS PIPELINE
POTENTIAL HYDROPOWER SITES
UGS 1 (proposed)
UGS 2 (proposed)
DATE: MAY 2010

BRIEF CHARACTERISTICS OF GEORGIAN POWER SECTOR PRIOR TO REFORMS

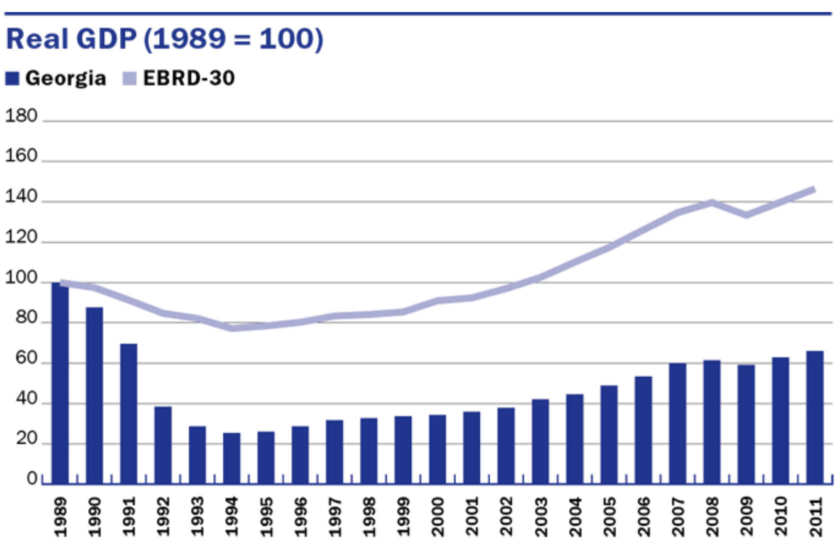
- Soviet Era - until 1989
  - Georgian power sector – integral part of the united energy system of the USSR
  - Well developed energy sector
  - Well developed transmission and distribution infrastructure
  - Hydro and thermal power plants with installed capacity of above 4400 MW, more than 20 medium and 30 small power plants
    - Enguri Hpp 1300 MW
    - Tbilsresi Tpp 1250 MW
  - Consumption – around 16 TWh
  - Sector planning and management from Moscow

CRISIS

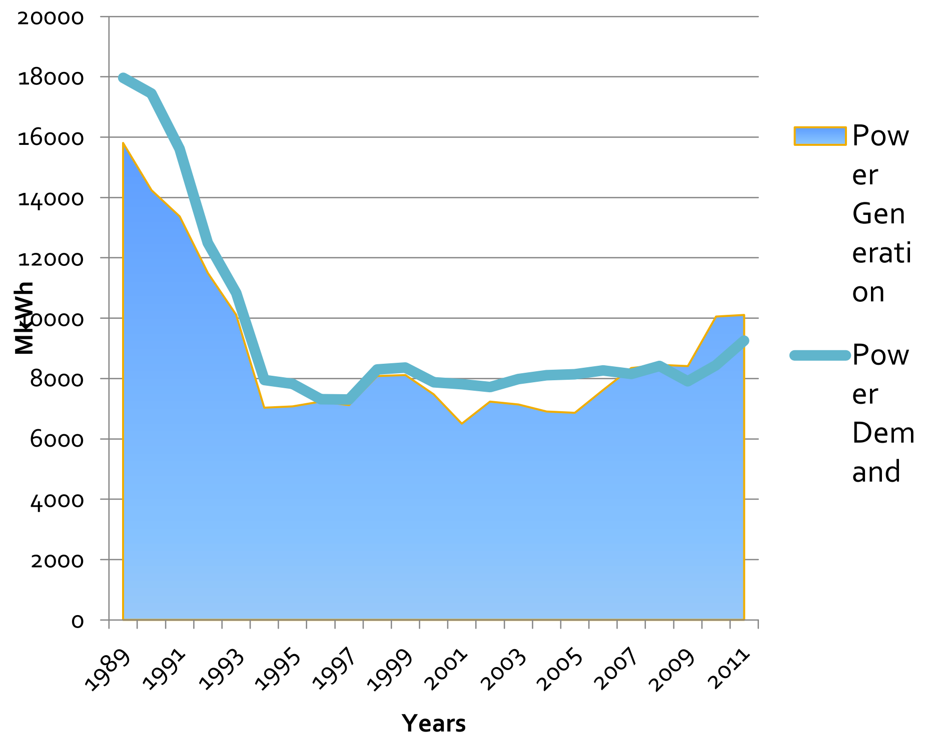
- General causes – political (civil war, unrest), economic (economic isolation, financial crisis), social, etc.
- Sector specific causes
  - State owned vertically integrated system
  - Ineffective management
  - Low subsidized tariffs
  - Low collection rates (10-20%) –> uncontrolled consumption
  - Lack of funding for fuel and imports
  - Corruption, theft, non payment
- Results
  - Severe power shortages, even for essential objects
  - Deterioration of assets
  - Financial crisis of the sector

CRISIS

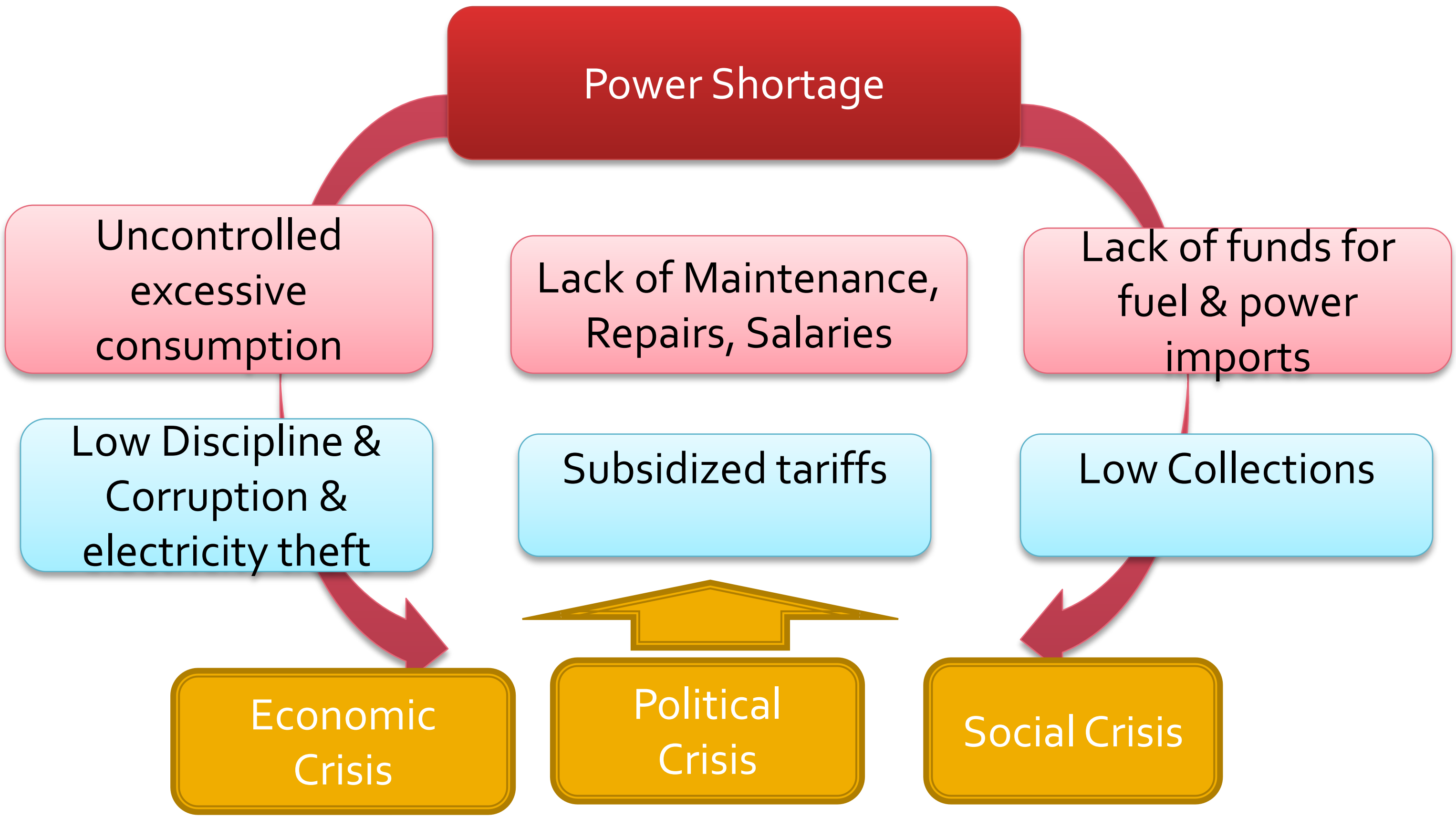
GDP: 1989-2011



POWER GENERATION& DEMAND 1989-2011



Vicious Cycle of Crisis



REFORMS – PHASE 1
1996-2004

- Institutional
- Reorganization/restructuring
- Privatization
- Private management
- Strong IFI and donor leadership & funding (WB, IFC, USAID, EBRD, etc.)

REFORMS - PHASE 1 POLICY

- Law on Energy - 22 September 1994
- Law on Electricity - June 27,1997
- Ministry of Energy Re-established in 1994
- Presidential Decree #437 of 04 July 1996 "On Restructuring of Energy Sector"
- Presidential Decree #828 of 19 December 1996 "On privatization of Electricity Sector" etc.

REFORMS - PHASE 1 RESTRUCTURING POLICY

- Presidential Decree “On Restructuring of Energy Sector”:
  - Energy sector recognized a priority sphere
  - Reorganization/unbundling of vertically integrated power company Sakenergo into 3 subsectors – generation, transmission/dispatch and distribution
  - Power regulatory commission established
  - Tariff methodology to be issued

REFORMS - PHASE 1
PRIVATIZATION STRATEGY

- Presidential Decree “On privatization of Electricity Sector”:
  - privatization plan of power sector;
  - Separation of sector regulation from commercial activity;
  - Separation of policy setting from management function;
  - Liquidation of state monopoly;
  - Introduction of different forms of ownership, including private ownership;
  - Introduction of competition within the sector;
  - Establishment of power market;
  - Attraction of investments, etc.

REFORMS - PHASE 1
INSTITUTIONAL REFORMS

- Ministry of Energy
  - Re-established in 1994
  - Energy policy
  - Sector development plan
  - Investor attraction
- Regulator (Georgian National Energy Regulatory Commission (GNERC)),
  - Established in 1996, independent authority from August 1997
  - Sector regulation
  - Market rules, licensing rules, tariff methodology, etc.
  - Issuing licenses, setting tariffs, resolving disputes
- Wholesale Electricity Market (GWEM)
  - Established in 1999
  - Single buyer - Pool
  - Clearinghouse for the wholesale trade

REFORMS PHASE 1
RESTRUCTURING/UNBUNDLING

vertically integrated power company Sakenergo

→

Generation
Joint Stock Companies

Transmission & Dispatch
Treasury company

Distribution
66 municipal distribution companies

REFORMS – PHASE 1
PRIVATIZATION

- International tenders
- Donor assistance
- Privatization advisor (Merril Lynch, IFC)
  - Privatization of Telasi (distribution company, serving capital of Georgia, consumption in 2010 – 1.95TWh)
  - Privatization of units 9 and 10 of Tbilsresi (300 MW each, thermal power plant)
  - Private management of Khrami 1 and 2 (112.8 and 110 MW hydro plants)
  - Privatization of Kakheti distribution company (regional distribution company, consumption in 2010 - 0.20 TWh)

REFORMS – PHASE 1 MANAGEMENT CONTRACTS

- Market (GWEM)
  - 5 year management contract with the international consortium headed by Iberdrola, sponsored by EBRD
- Transmission (GSE)
  - 5 year management contract with ESBI, sponsored by WB and KFW
- Distribution (UDC)
  - Municipal distribution companies merged into the United Distribution Company, after the unsuccessful attempt to privatize, transferred for management to the USAID contractor PA Consulting

REFORMS – PHASE 1
RESULTS

- International and local investors (AES Corporation)
- Modern management
- Significant investments
- Improved quality of service
- Tariff rise to cost recovery level
- Major improvement of power supply to Tbilisi
- Some improvement of power supply to regions
- Decreased, although still significant losses in networks
- Improved collection rate
- Additional problems in the power sector revealed

REFORMS – PHASE 2 2004-2011

- Change of market model
- Deregulation
- Farther privatization
- Import-export liberalization
- Cost recovery tariffs
- Introduction of wheeling charges
- Etc.

REFORMS – PHASE 2 POLICY

- Parliament Resolution of June 07, 2006, “On Main Directions of State Policy in Energy Sector”
- Amendments to the “Law on Electricity and Natural Gas” of 27 December 2005 (in total 26 amendments after 2003)
- Government Resolution of April 18, 2008, On state program “Renewable Energy 2008”
- New Market Rules – Order #77 of August 30, 2006
- Energy Sector Action Plans

REFORMS – PHASE 2 STRATEGY

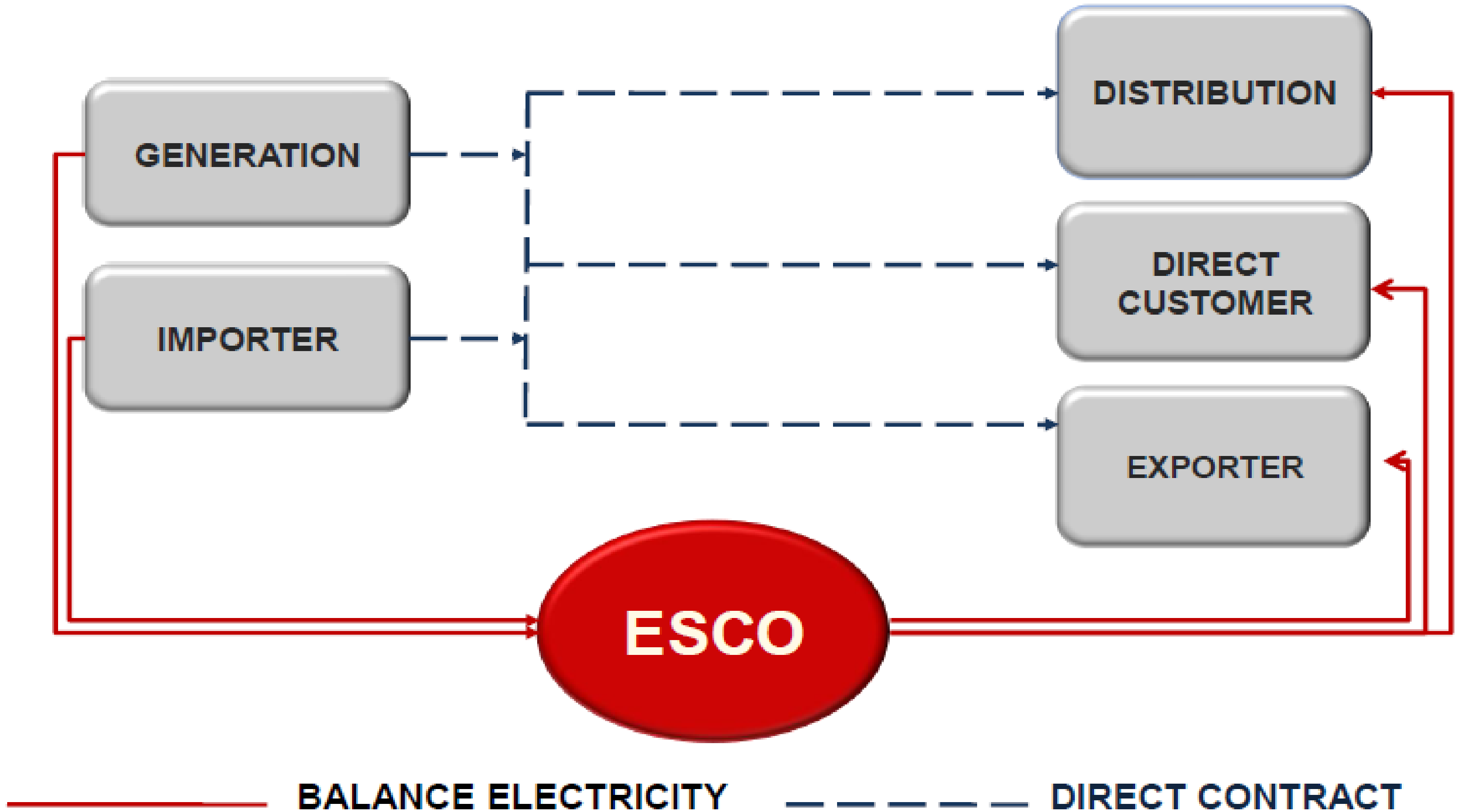
- Strong government leadership and funding
- Rehabilitation of hydro power plants
- State support to collections discipline (group metering)
- Accelerated privatization of bundled packages

REFORMS – PHASE 2 INSTITUTIONAL CHANGES

- Strengthening functions of the Ministry of Energy

- Abolishing of GWEM (single buyer)and establishing ESCO (balancing market)

REFORMS – PHASE 2
MARKET MODEL



REFORMS – PHASE 2
PRIVATIZATION

- Sale of remaining distribution assets to Czech company Energo-Pro
- Reprivatization of Kakheti Distco the Lithuanian Akhema Group
- Sale (privatization and re-selling on secondary market) of 9 medium sized hydro plants (437.5 MWt) to EnergoPro
- Sale of Vartsikhe and Jinvali HPP-s (medium to large size) to other investors

REFORMS – PHASE 2
DEREGULATION AND LIBERALIZATION

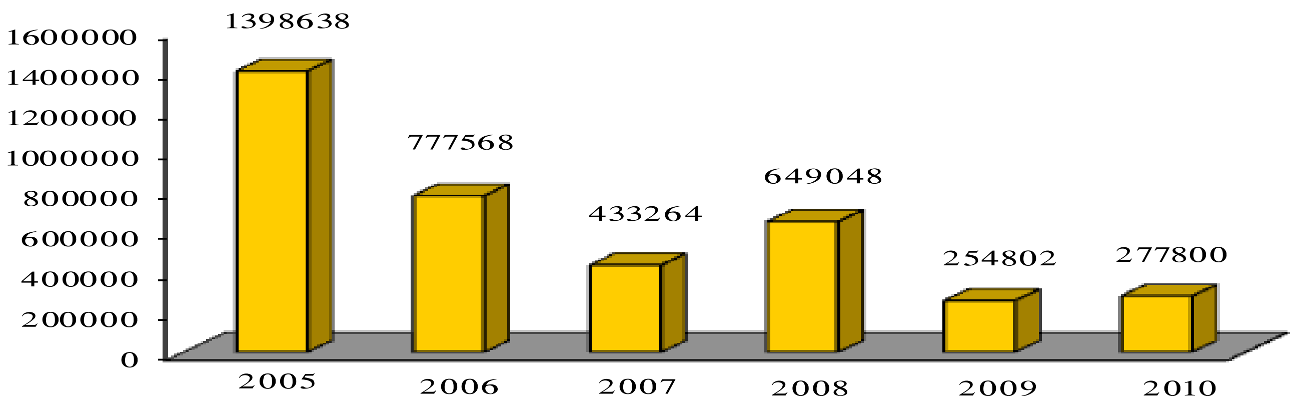
- PP-s up to 13 MWT deregulated
- All existing PP-s except for the regulatory PP-s partially deregulated (cap tariff)
- New PP-s (constructed after 2008) - tariffs not regulated, freely negotiated PPA-s except for 3 winter months
- Import – no license requirements, tariffs – cap formula
- Export - no license requirements, tariffs - not regulated

REFORMS – PHASE 2 RESULTS

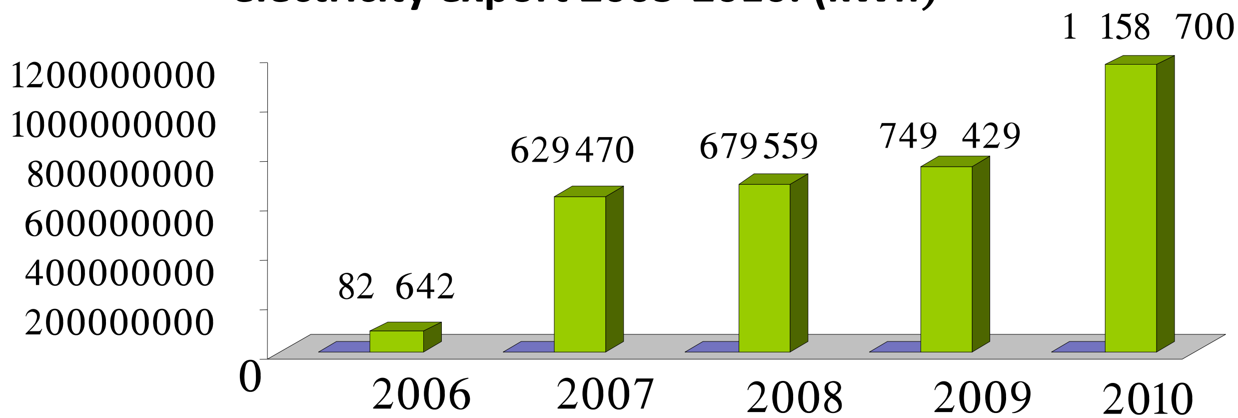
- 24 hour power supply to Tbilisi
- 24 hour power supply to the most part of Georgia
- Significant rehabilitation works conducted on number of HPPs and in transmission and distribution networks
- Georgia - net importer of electricity became net exporter
- Tenders for the construction of new HPP-s announced
- Construction of several new HPP-s began
- Under SCADA project, modern-technologies-based control panel installed at “Georgian State Electrosystem, etc.

REFORMS – PHASE 2 RESULTS continued

electricity import in 2005-2010 . (kWh)

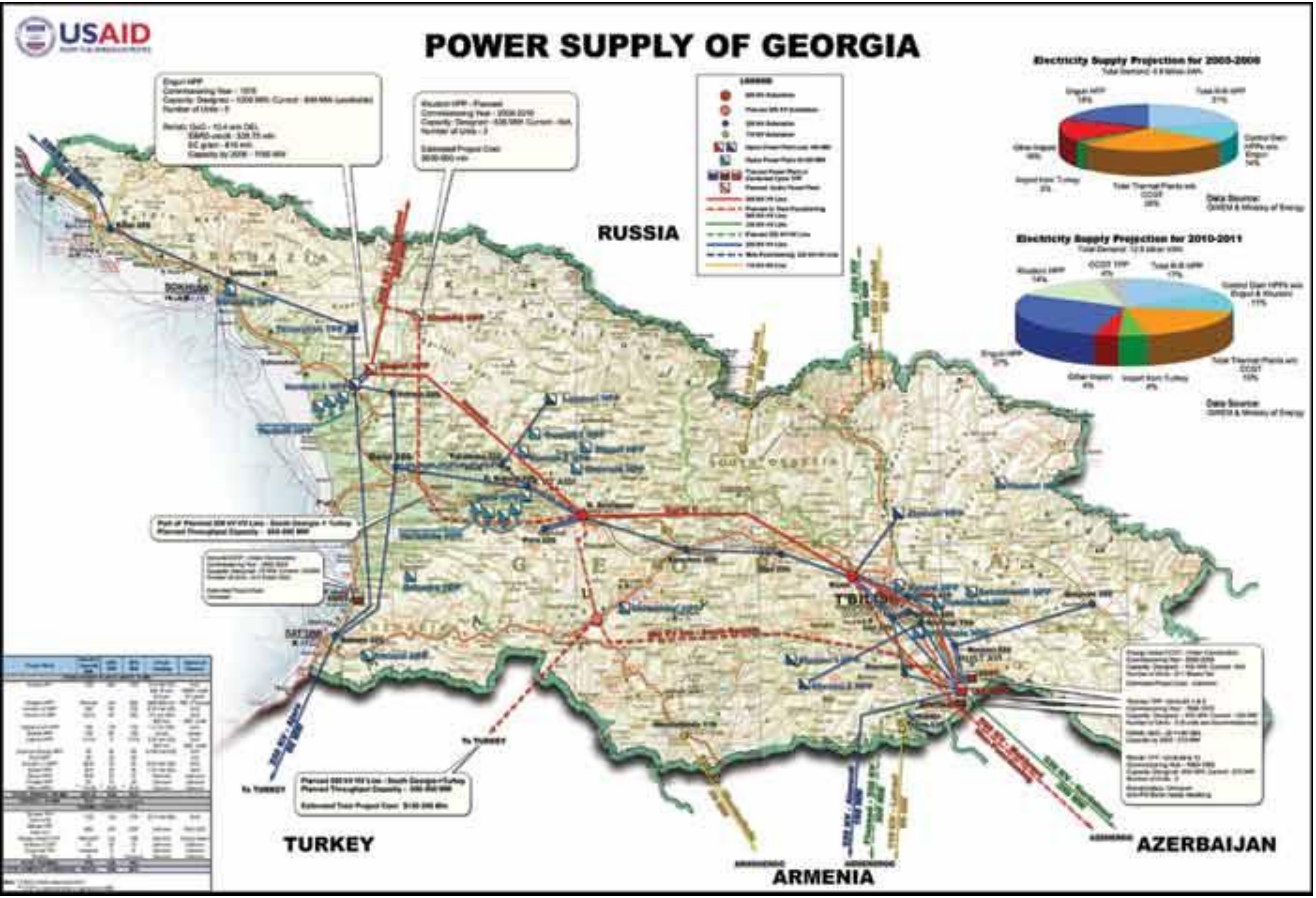


electricity export 2005-2010. (kWh)



POWER SECTOR – CURRENT STATE

- Policy maker – Ministry of Energy
- Regulator – Georgian national Energy and Water Supply regulatory Commission
- Transmission – Sakrusenergo, GSE, Transenergy
- Dispatch – GSE
- Distribution – Energo Pro, Telasi (Inter RAO), Kakheti (Akhema)
- Generation – Regulatory plants, medium to large HPPs and TPPs, small HPP-s
- Wholesale trade - ESCO



USAID
POWER SUPPLY OF GEORGIA
RUSSIA
TURKEY
ARMENIA
AZERBAIJAN

SECTOR GOVERNANCE AND REGULATION

- Ministry of Energy
  - Elaborates energy policy, development strategy and priorities
  - Facilitates competition, restructuring and privatization
  - Approves electricity (power) balance, market rules, technical rules and norms for the organization and exploitation of energy objects and equipment
  - Makes decisions regarding deregulation and partial deregulation, etc.
- Regulator
  - Issues licensing rules, tariff methodologies, power supply and consumption rules
  - Issues generation, transmission, dispatch and distribution licenses and supervises their fulfillment
  - Sets generation, transmission, distribution, wheeling, import, end user and ESCO service tariffs, also fees for guaranteed power and generation tariffs of guaranteed power
  - Solves disputes between the licensees and licensees and consumers, etc.

LEGAL BASIS

- Legislation
  - Energy Policy
  - Law on Electricity and Natural Gas
  - Law on Independent Regulatory Authorities
  - Law on Licensing
  - On State Support of Investments, etc.
- Secondary legislation
  - Electricity Market Rules
  - Licensing Rules
  - Tariff Methodology
  - Supply and Consumption Rules
  - Network Connection Rules
  - Service Quality Regulations
  - Reporting requirements, etc.

ELECTRICITY SYSTEM COMMERCIAL OPERATOR (ESCO)

- Sale and Purchase of balancing electricity (capacity) (inter alia through forming medium and long-term contracts on import and export).
- Trade with Guaranteed Capacity in accordance to the Law of Georgia on “Electric Energy and Natural Gas” and the Electricity (Capacity) Market Rules.
- Set up and operate unified database on the wholesale trade including unified metering register
- Submission of relevant information to the Dispatch licensee in order to plan electricity and capacity supply-demand for the whole electric energy system of Georgia
- Inspection of meters used in the wholesale metering
- Support construction of the new hydro power plants

TRANSMISSION

SAKRUSENERGO

- 50% - state property, 50% - “Russian Electricity System
- assets:
  - 500kv transmission lines – 871 km
  - 330kv transmission lines – 21 km
  - 220kv transmission lines – 12 km

  Total transmission lines– 904 km

ENERGO TRANS

- Public company established for construction of 500/400kV transmission link to Turkey with DC interconnection

GSE

- 100% state property
- Assets:
  - 220kv transmission lines - 1609 km
  - 110kv transmission lines - 863.4 km
  - 35kv transmission lines - 537,4 km
  - 500kv substations -3
  - - 330kv substations -1
  - 220kv substations -17
  - 110kv substations -24
  - 35 kv substations -44

Total transmission lines– 3009,8 km
Total substations - 89

INTERCONNECTORS

Georgia has interconnectors with all neighboring countries

500 KV trasnm. Line “Kavkasioni”

330 KV trasnm. Line “Gardabani”

220 KV trasnm. Line “Alaverdi”

220 KV trasnm. Line “Adjara”

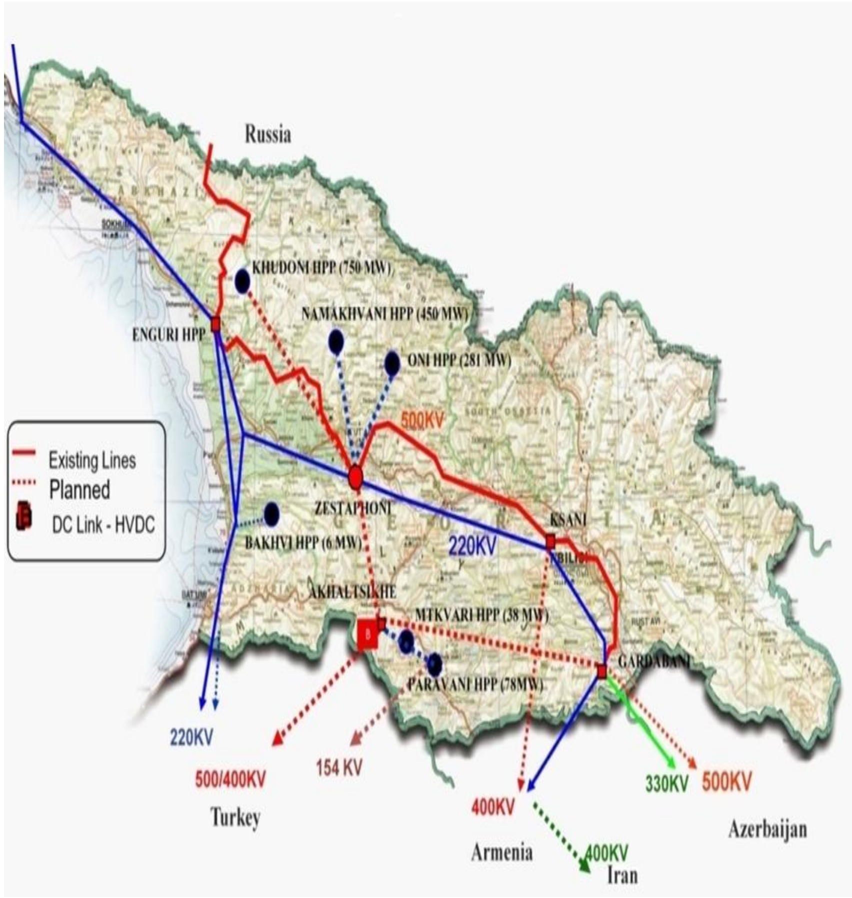
220 KV trasnm. Line “Salkhino”

110 KV trasnm. Line “Dariali”

110 KV trasnm. Line “Djava”

110 KV trasnm. Line “Lalvari”

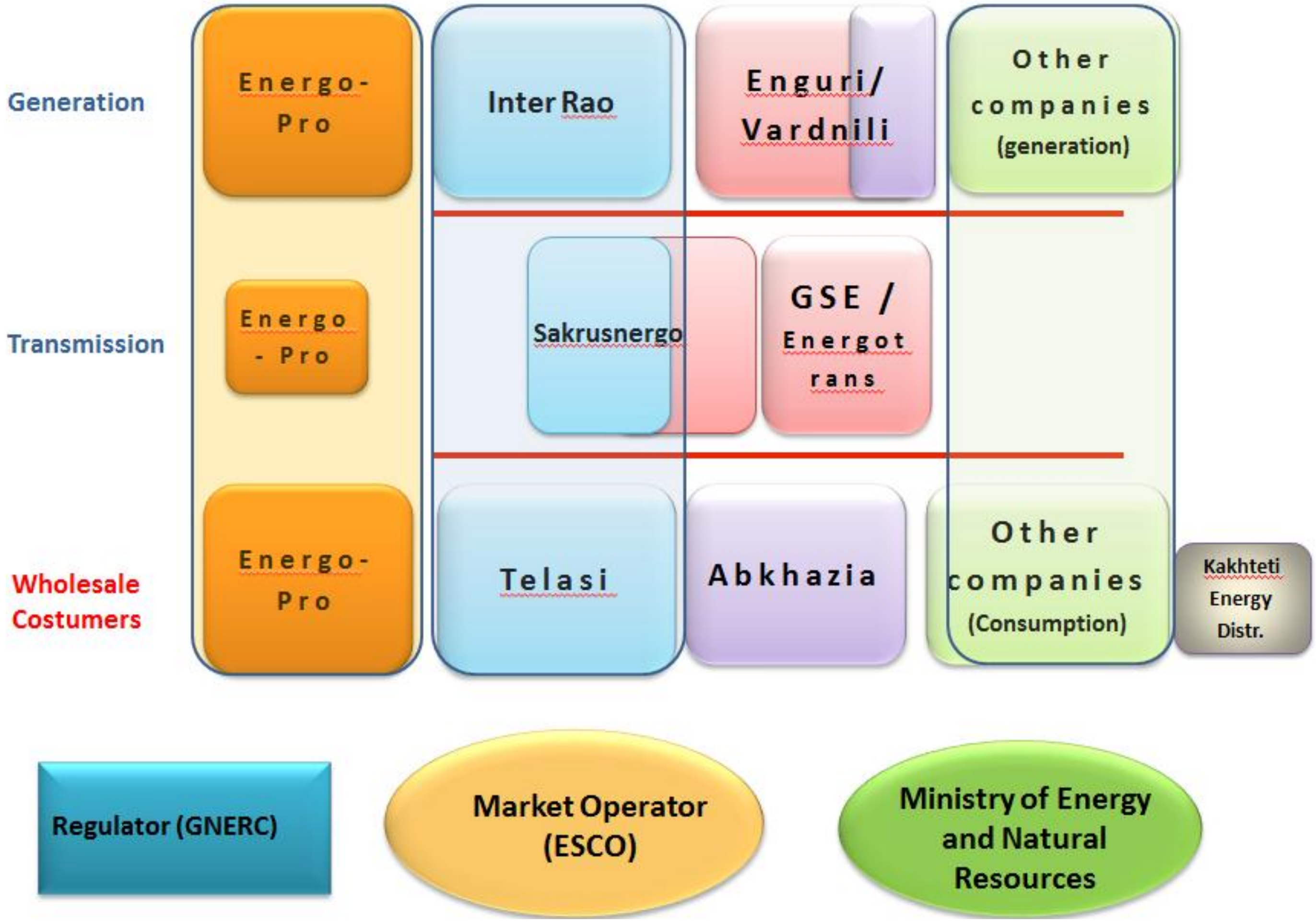
110 KV trasnm. Line “Ninotsminda”



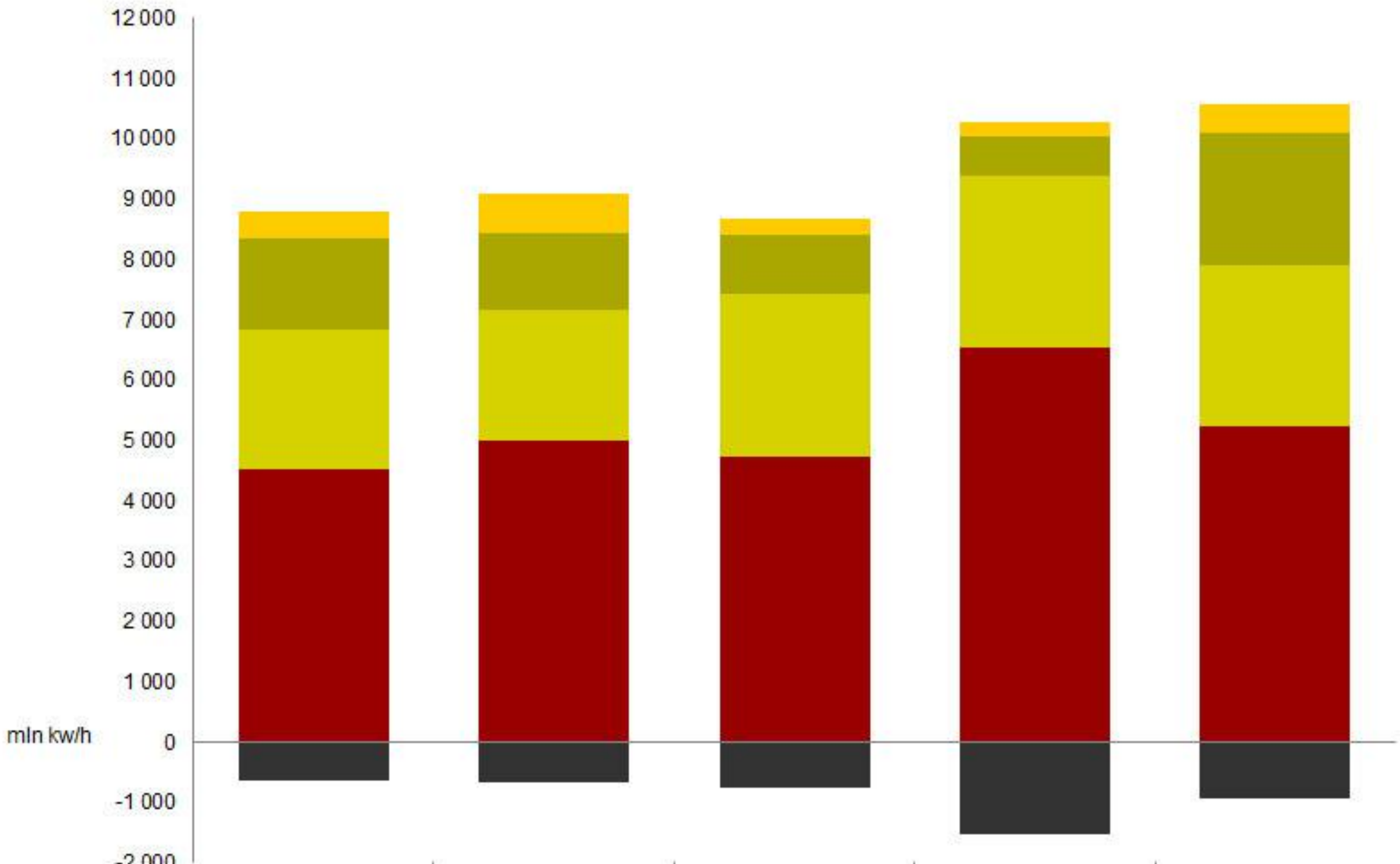
GENERATION AND DISTRIBUTION

- Generation
  - Nominal capacity – 3333.2 MW
    Hydro – 2631.2, Thermal – 702 M
  - More than 20 medium to large PP-s, more than 30 small HPP-s
  - Private ownership (except for Enguri and Vardnili)
  - Construction of new HPP-s
- Distribution
  - 3 distribution companies serving 1 383 558 customers (not including Abkhazia)
  - Private ownership

SECTOR OWNERSHIP STRUCTURE



Factual Electricity Balance for 2007-2011y



	2007y	2008y	2009y	2010y	2011y
Import	433.5	649.2	255.0	222.1	471.0
Thermal Power Plants	1 514.6	1 279.3	990.7	678.6	2 215.9
Seasonal Plants	2 321.8	2 164.2	2 674.3	2 842.3	2 673.8
Base Load Plants	4 510.0	4 997.6	4 737.3	6 525.4	5 216.4
Export	- 633.9	- 679.4	- 749.4	-1 524.3	- 930.6

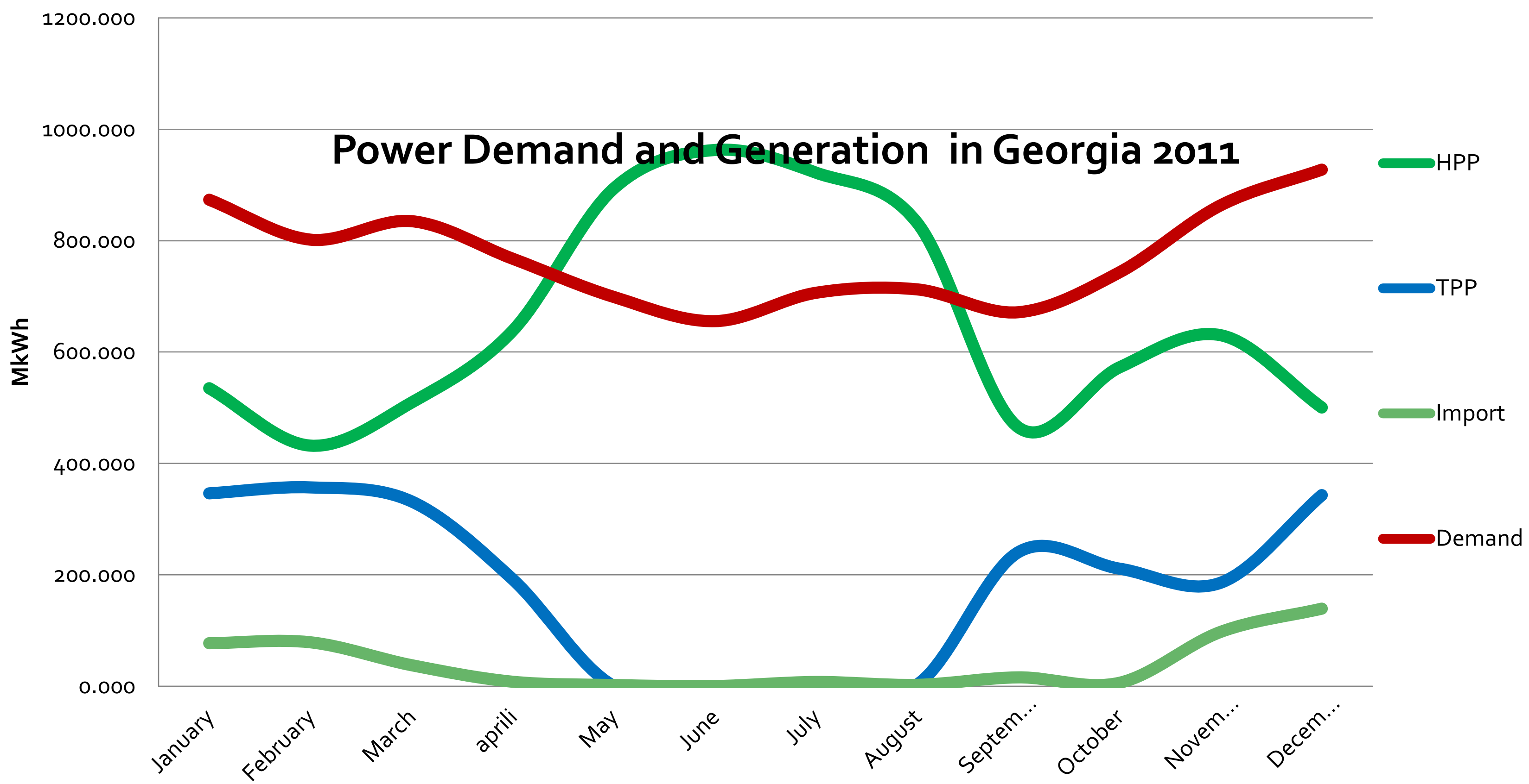
POLICY

- Energy efficiency
- Energy security
- Third party access
    - 2006-2009 – above 30 mln KWh
    - 2010-2012 – above 7 mln KWh
    - 2013-2015 – above 3 mln KWh
    - 2016-2017 – above 1 mln KWh
    - 2017 above – above 1 KWh
- Metering
- Investment attraction and privatization
- Economic sustainability
- Tariff policy
    - Seasonal, peak, step, long term and cap tariffs
- Bilateral and regional cooperation

CHALLENGES

- Finalization of construction of new 500 KV transmission line connecting Georgia and Turkey
- Transborder trade
- Construction of new HPP-s
- Metering
- Market opening
- Introducing wholesale and retail competition
-
- Resolving seasonality of generation and consumption
- Improving efficiency of electricity use
- Attraction of additional investments
- Consumer protection, etc.

CHALLENGES - SEASONALITY OF GENERATION AND CONSUMPTION

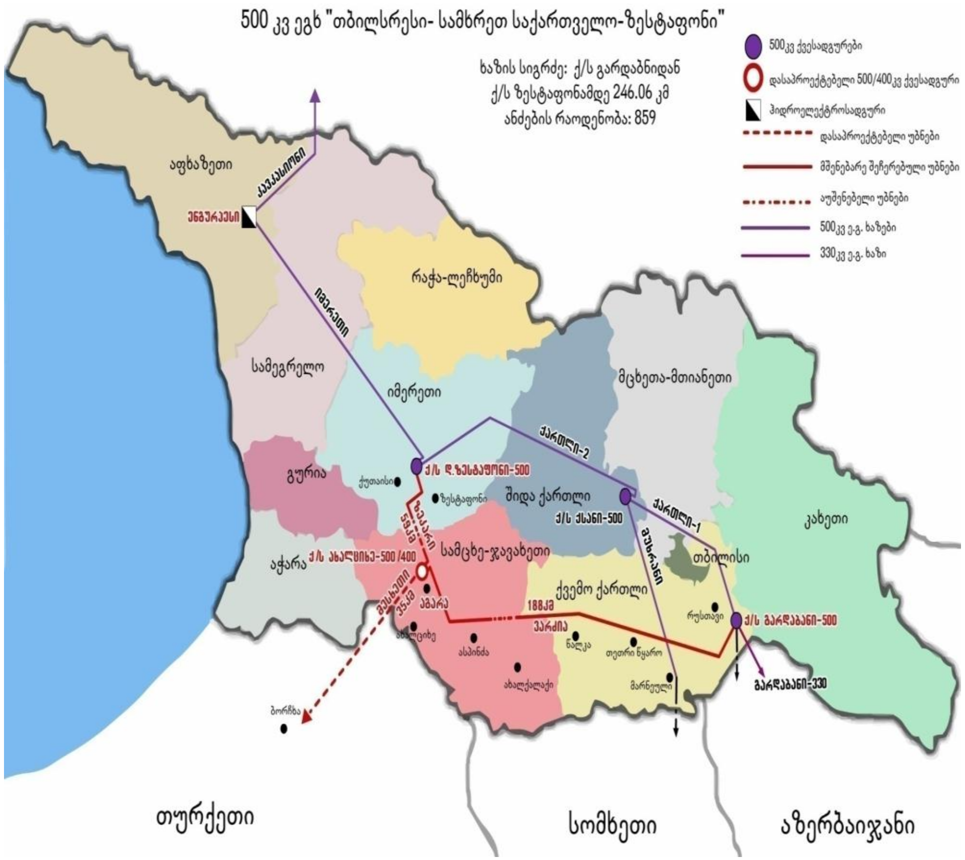


NEW 500 KV TRANSMISSION LINE

- Goals
  - Strengthening of Georgian 500 kv transmission system
  - Ensuring proper export infrastructure for extra electricity produced in Georgia
  - Ensuring necessary infrastructure for energy trading in Caucasus Region
- Expected results
  - Progress of stabilization of Georgian Transmission Grid
  - Support of Georgian energy security
  - stimulating local production of clean energy
  - Export Georgian extra hydro power to the high value markets
  - Ability of neighboring countries to transit electricity through Georgia

NEW 500 KV TRANSMISSION LINE CONSTRUCTION

- Construction of 400 kv (34 km) transmission line "Meskheti" from Akhaltsikhe to the border of Turkey
- Completion of constructing of 500 kv (188km)transmission line "Vardzia" from substation "Gardabani-500"
- Completion of construction of 500 kv transmission line "Zekari" (59km) from substation "Zestaphoni-500"
- 500/400/220 kv substation Akhaltsikhe
- Construction of 400 kV DC line and the back-to-back converter station



POLICIES AND STRATEGIES FOR FUTURE

- Realization of hydro potential
  - 300 rivers significant in terms of energy production
  - total annual potential capacity equivalent to 15000 MW, average annual production equals to 50 bln. KWh
- Transit & Export of electricity, regional cooperation
- Farther reforms of power market
- Finalization of metering of distribution customers
- Farther improvement of service quality
- Renewable energy and energy efficiency legislation
- Harmonization with the EU Directives


THANK YOU