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Sustainable Energy Pathways in the South Caucasus: Opportunities for Development and Political Choices

Key Findings of
HBS SC`s Regional Energy Study

Reform Group Meeting 2015, Salzburg

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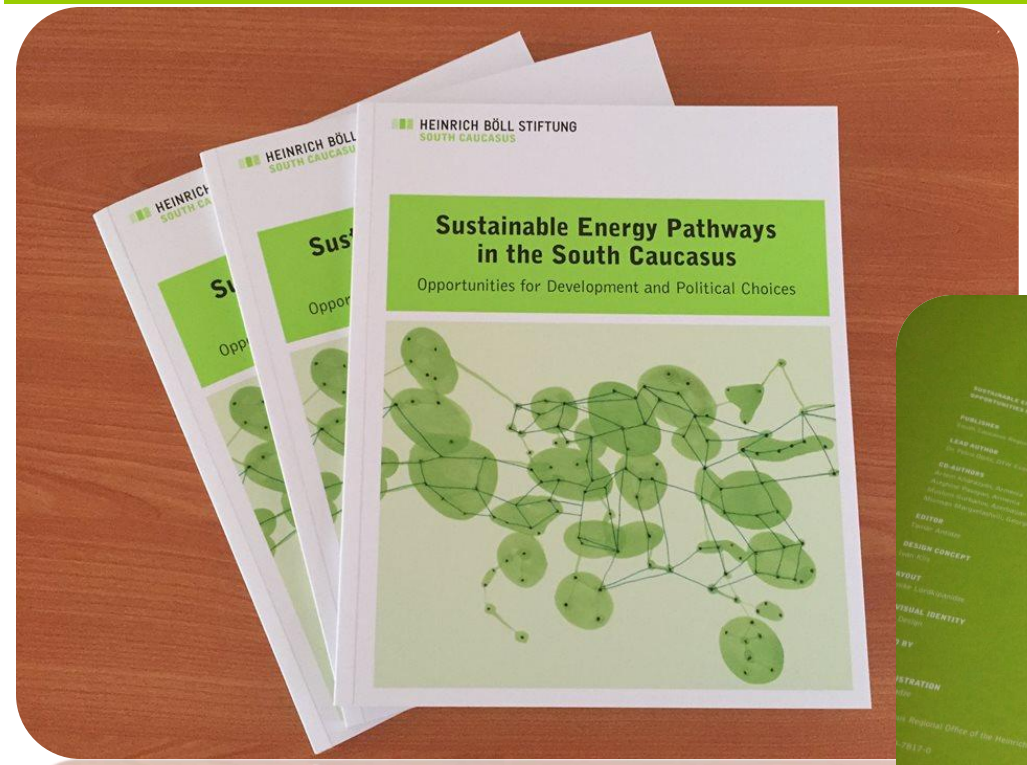
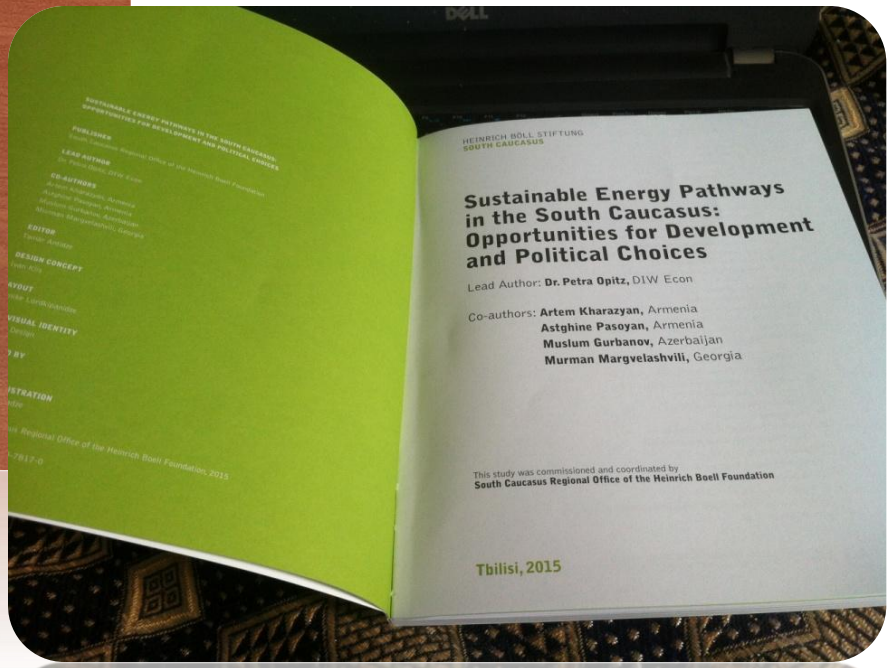




Download the Electronic Version of the Study from: www.ge.boell.org

Content of the Study

- Current situation
- Challenges and bottlenecks
- Recommendations

Aim of the Study

- First attempt to compare energy sectors of South Caucasus Countries;
- To draw conclusions on the extent to which the vectors of energy development of the SC countries coincide
- To check whether there a common vision of development
- To check the situation in the countries in terms of RE and EE

Background Info

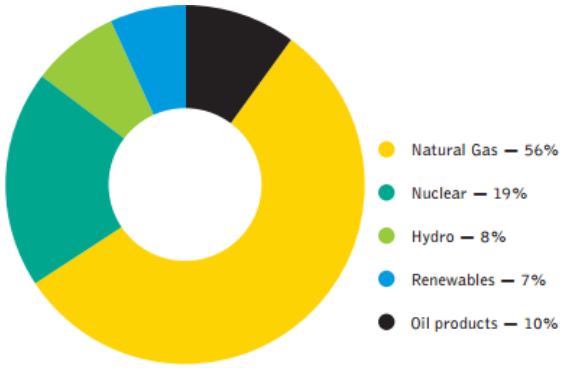
- Soviet Past
- From inherited energy systems designed for regional integration in the Soviet Union - to independence combined with national energy markets

- Different intensions and decisions on economic integration
  - Armenia – Eurasian Union
  - Azerbaijan – multi-vector policy
  - Georgia – EU candidate

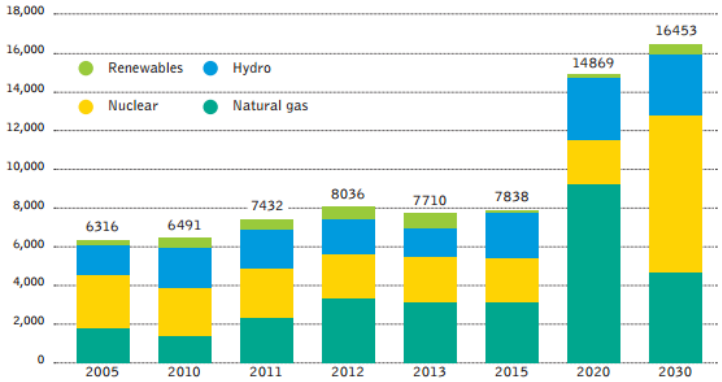
- Pending conflicts between Armenia and Azerbaijan and political tension between Armenia and Turkey

Few Facts about Armenia

- In conflict with Azerbaijan and Turkey, with closed Armenian-Turkish and Armenian-Azeri borders
- Has about 3 millions population and strong and influential Armenian diaspora
- Eurasia Costoms Union/strategic utilities controlled by Russian companies/ NPP/ existing infrastructure needs urgent rehabilitation/ increasing energy consumption



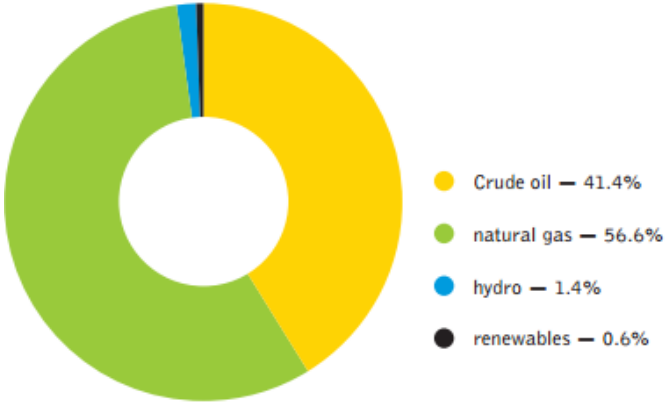
Armenia`s primary energy supply (2012)
Source:USAID,2012



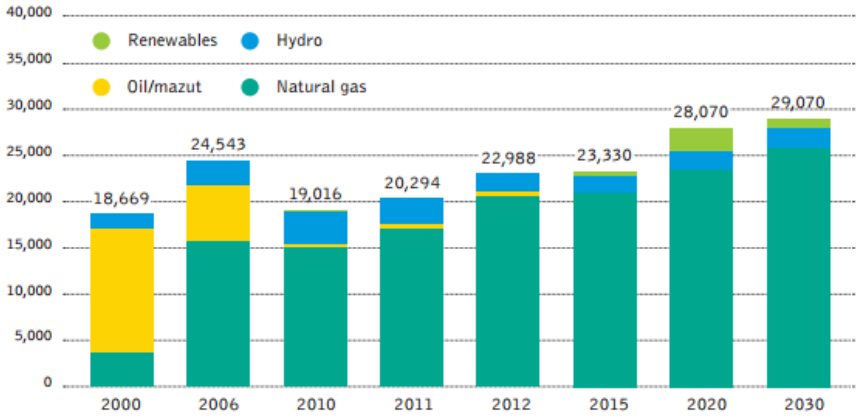
Electricity Generation by fuel (Gwh)

Few Facts about Azerbaijan

- Currently oversupply of 2 billion m^3 of natural gas, which is estimated to grow up to 10 bl extra m^3 by 2017
- Stage 2 of Shah Deniz has started
- oil and gas export contribute up to 50% of GDP that is problematic for long-term economic stability
- authoritarian regime of the current government, violation of the key principles of human rights



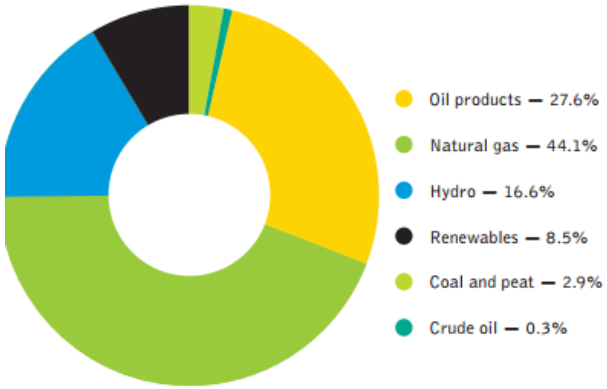
Azerbaijan`s primary energy supply, 2011



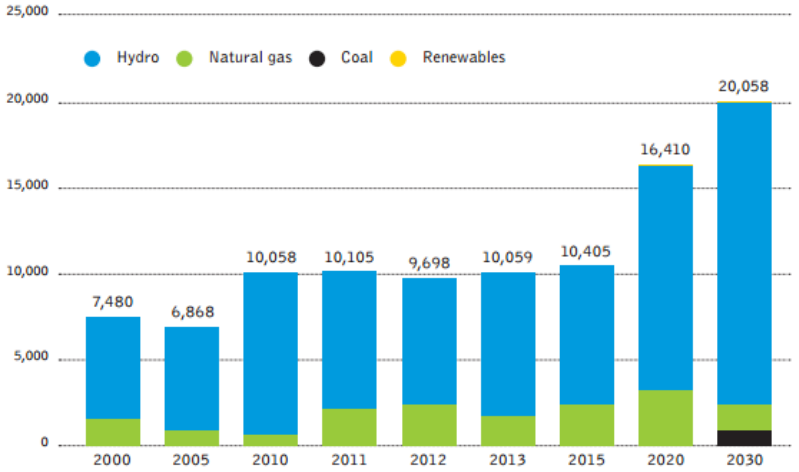
Electricity Generation by fuel (Gwh), EIA 2014

Few Facts about Georgia

- In June 2014 Georgia and EU signed an Association Agreement which includes a Deep and comprehensive Free Trade Area
- Transit Country
- Official Energy Strategy or Policy don`t exist until now
- Doesn`t have much fossil fuel resources, but RE potential is substentional/stronaly relied on imported energy supply

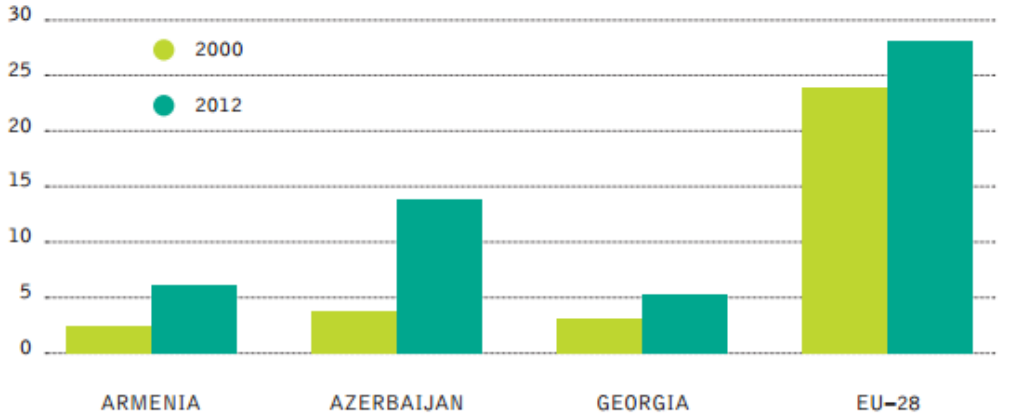


Georgia`s primary energy supply, 2012, IEA

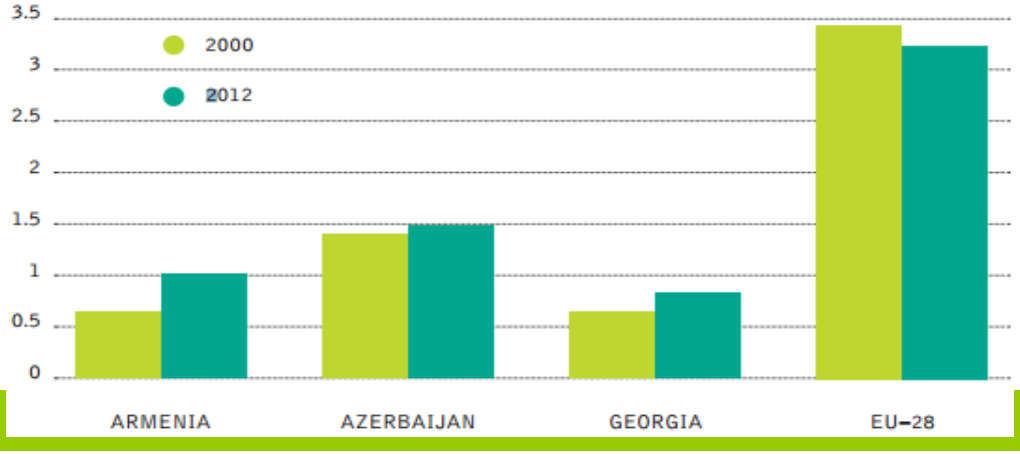


Electricity Generation by fuel (Gwh), EIA2014, WEG 2014

Key Development Indicators

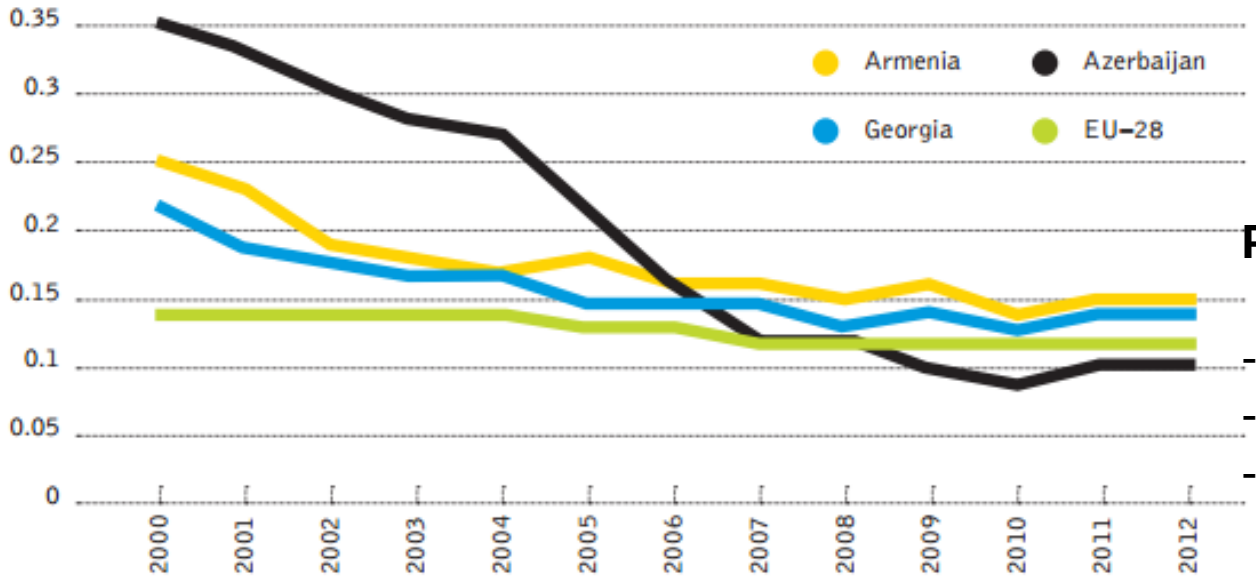


GDP (in purchase power parities) in billion 2005 USD/capita, IEA, 2014



Total primary energy supply per capita, IEA 2014

Key Development Indicators



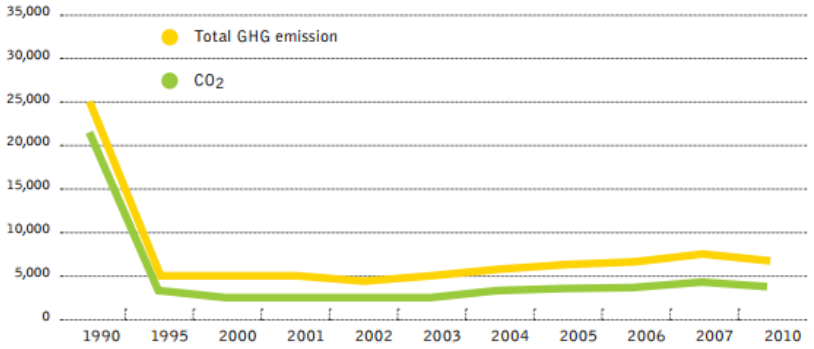
Population (million)

- 2.97 Armenia ↘
- 9.42 Azerbaijan ↗
- 4.47 Georgia ↘

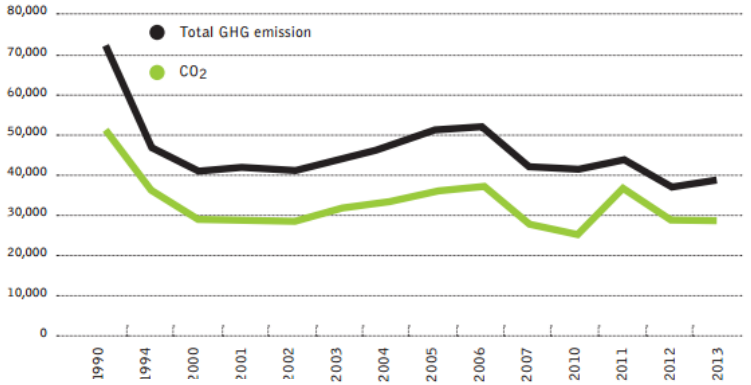
Energy intensity of GDP PPP (in toe per thousand 2005 USD)

GHG Emissions

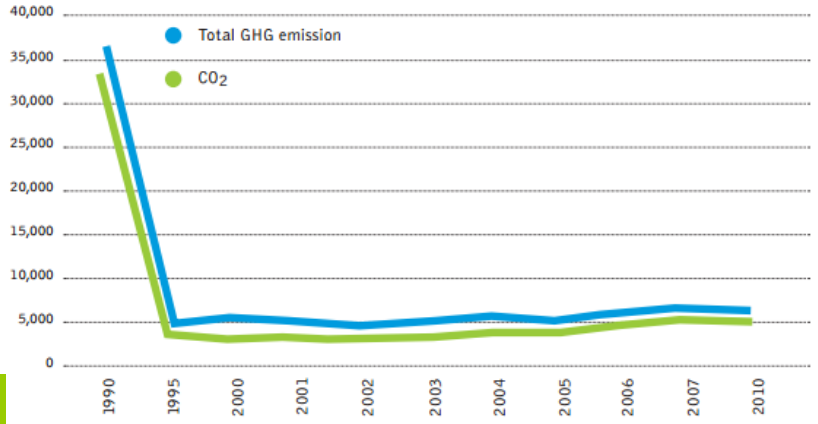
Armenia



Azerbaijan



Georgia



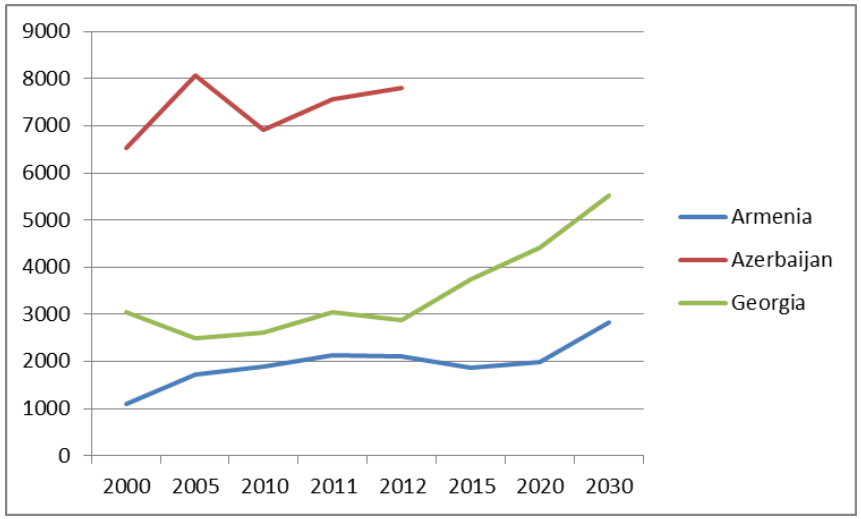
Sources: *2nd National Communications 2010 and national sources*.

Carbon intensity per capita (tCO_2/capita)

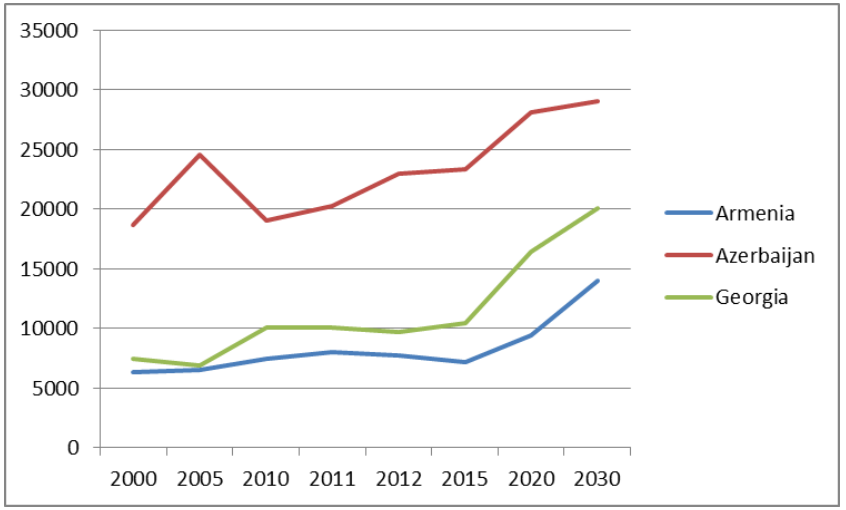
	2002	2012	
Armenia	1,11	1,83	+64%
Azerbaijan	3,24	3,15	-3%
Georgia	0,67	1,52	+126%

Source: *IEA*

Future Forecasts



Total final energy consumption (ktoe)



Electricity generation (GWh)

Renewable Energy (I)

- Huge technical potential
- At present - mainly hydropower (large, medium and small)

  HPPs constitute 82% of power generation in Georgia, 29% in Armenia and 8% in Azerbaijan
- Still considerable potential for additional hydro – but poor quality of Environmental Impact Assessment and poor technology standards are major issues!
- Other type of RE are not in place

Renewable Energy (II)

Armenia: the only SC country having legal and economic framework for RE

- RE target set until 2025
- Feed-in tariffs in place for wind and small HPPs, net-metering for solar PV
- Financial support provided by R2E2 Fund

Azerbaijan: target set but it is unclear how it will be achieved

Georgia: neither target nor support framework;
purchase on average wholesale market price;
major impetus for construction of power capacities-Export
RE other than hydro - neglected!

Energy Efficiency (I)

- Overall potential poorly developed in all three countries
- Focus mainly on EE in energy generation (supply side) - rehabilitation of power plants and grids etc.
- Main barriers to **EE on demand (consumption) side**
  - EE is not really understood as source of energy supply
  - Potential not sufficiently estimated (mainly Azerbaijan, Georgia)
  - Low electricity and heat prices (tariffs) – low economic incentives

EE Potential&Cost (Example from Armenia)

Investments in EE can save Armenia roughly (according to WB)

- 1 TWH of Electricity
- 600 million m3 of natural gas

  equal to
- 17% of total electricity generation
- 32% of total natural gas consumed in 2007

AMD 124 bl investment need, of which 99% is economically and 97% financially viable

Energy Efficiency (II)

Armenia - most advanced concerning legal framework and financial support. Donor driven activities in public sector and new rule for EE in new public buildings.

Azerbaijan – very general political target but incentives and legal framework lacking

Georgia – neither targets nor framework

Heating sector (having incredibly high EE potential) is forgotten.

Electricity Export and Regional Cooperation

Export * -Major impetus for the construction of power generation and can contribute to sustainable energy supply and economic growth

but

Current plans lack sound sustainability analysis and are not coordinated between the countries

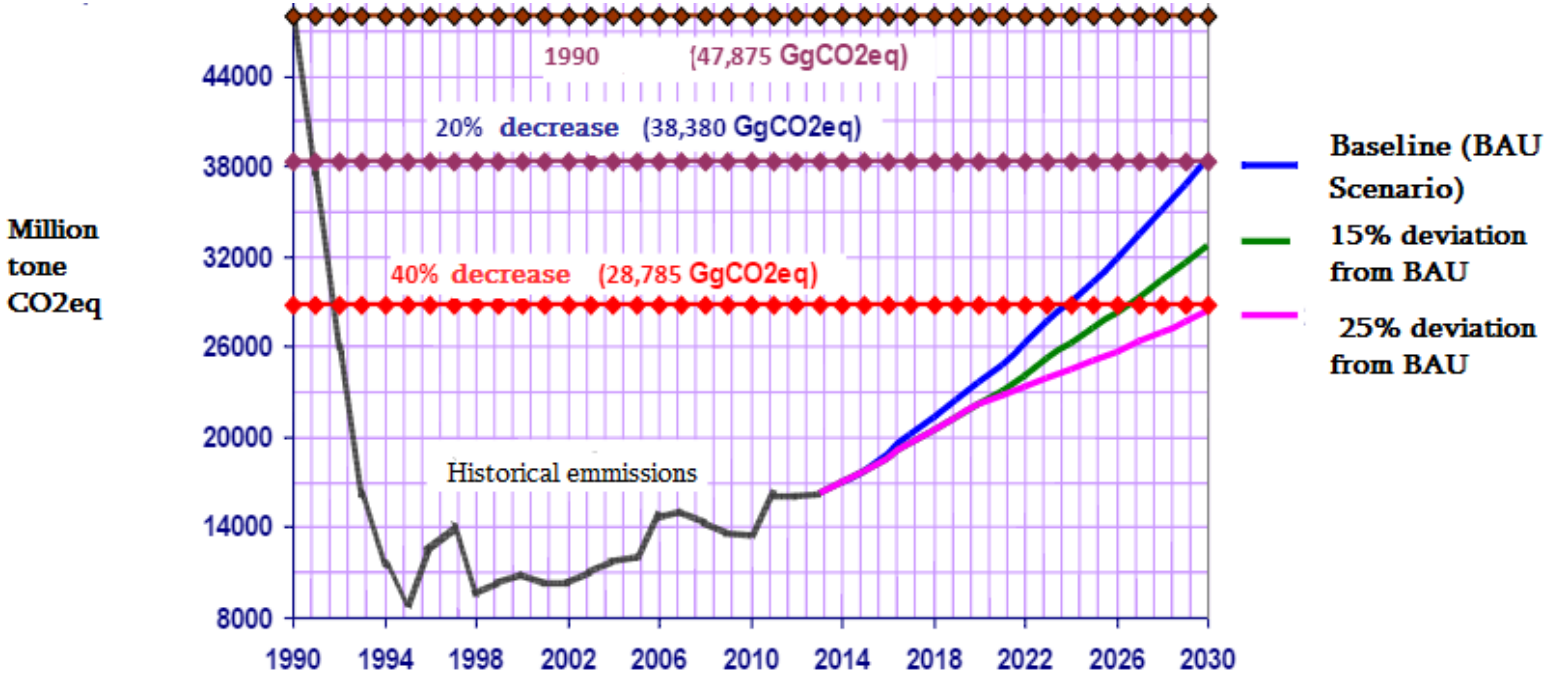
*Improved **regional energy cooperation** and competitive electricity and gas market, might be beneficial for all parties*

* *Each SC country is electricity exporter (e.g Net electricity exports in 2012: Armenia- 19.79%, Azerbaijan- 2.3 %, Georgia-0.8%)*

Climate Change Politics

- Non-adequate linkages between climate change related processes and economic and social development
- The currently elaborated low-emission development strategies are a first step
- EU directives may be impetus for Georgia

Optimistic Scenario (Georgia)



Source: Ministry of Environment and Natural Resources Protection of Georgia, 2015

** Not in the Study*

Key Recommendations Identified in the Study

- Development of a regional electricity market
- Develop appropriate legal and economic framework for development of EE potential on the demand side
- Don`t forget heat supply
- Transparent and equal electricity markets
- Use COP 21 for seeking additional international financial support for a low carbon emission path

Thank You for Your Attantion!

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