

## Analysis

# South Caucasus Countries Can Benefit from Alternative Energy Development

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## Abstract

The three South Caucasus countries have extensive alternative energy potential that they are not currently utilizing. Instead, outside powers have reinforced a focus on traditional sources of energy, particularly oil and gas. Current obstacles to developing the region's renewable energy potential include a lack of coherent policies and legislation, insufficient financing mechanisms, and the public's poor understanding of the benefits of renewable sources. Focusing on developing decentralized, environmentally-sustainable sources of energy could help alleviate poverty in rural areas and promote greater energy security.

## Moving Away from Fossil Fuels

For the last decade, the Caucasus region has been associated with the US and EU search for oil and gas resources against a background of political turmoil, rapid economic growth and a search for increased welfare. One consequence of the political and economic turmoil has been that approximately 50 percent of the South Caucasus population continues to live below the poverty line, earning less than two dollars a day.

The extraction, use, and transportation of conventional fossil fuels, such as oil and gas, continues to have a devastating impact on the environment and on the peoples living in the region. While fossil fuels take their toll on Azerbaijan and Georgia, Armenia also suffers from the careless use of nuclear energy and the associated pollution.

Incentives from the EU's Neighborhood policy and the EU's drive to diversify its energy supply away from the use of fossil fuel could, at least in theory, positively impact the development of renewable energy and stimulate efficiency in the South Caucasus. In practice, however, as long the governments and oil companies remain focused on the oil and gas sector, which has been generating huge profits, renewables and energy efficiency will continue to play a negligible role. Along these lines, the EU Commission openly stated that the construction of new international pipelines to deliver oil from the Caspian region and Central Asia directly to the EU is vital. Likewise, the Europeans have emphasized upgrading the existing energy infrastructure in the Black Sea Region and building new connectors, the key project here being the Nabucco pipeline. Making Nabucco functional requires an underwater pipeline from Turkmenistan to Azerbaijan, which could pose serious problems for the Caspian Sea environment.

## South Caucasus – Rich Potential in Alternative Sources of Energy

In spite of all the attention given to the oil and gas sector, the countries of the South Caucasus are rich in specific types of renewable energy sources. These resources have the potential to mitigate fuel poverty and support economic development, as well as to increase employment opportunities. Although each country is distinct in terms of its energy use and potential for renewable energy, we may distinguish two common characteristics regarding the development of alternative energy sources in the region:

First, none of the three countries exploit renewables to their fullest potential. Rather, they rely heavily on the use of oil and gas and nuclear (in Armenia). In 2006, Armenia derived 6 percent of its total energy from renewables (hydro), Azerbaijan's figure was 1.5 percent (hydro), and Georgia's was a more impressive 33.8 percent (hydro and renewables), according to the International Energy Agency. Historically oil and gas have been available at below market prices, reducing incentives for consumers to switch to alternatives. More recently, the high oil prices of 2003–08 placed a heavy load on the countries' economies, making the development of alternative sources more attractive.

Second, the Caucasus countries have done the most to exploit hydropower. At the same time, the massive growth in wind power seen globally is beginning to make itself felt in the region as well.

The case studies below describe the specific country situations in order to highlight the diversity of renewable energy development trends, while noting the common features as well.

## Armenia

Armenia, with almost no fossil fuel resources of its own and currently under heavy pressure from the US

and the EU to close the Soviet-area Medzamor nuclear station, which currently supplies some 40 percent of the country's electricity, is strongly interested in the development of alternative energy supplies. Its legislation emphasizes the importance of energy saving and developing renewable sources to reinforce Armenia's energy independence and security in the future, as well as to ensure a reliable and affordable power supply.

Armenia has extensive potential for developing renewable resources. The country's theoretical wind power potential measures 4,900 MW in 4 zones with a total area of 979 km<sup>2</sup>. Solar energy potential is significant, with 2,500 sunny hours per year and an average annual solar radiation on horizontal surfaces of about 1,720 kWh/m<sup>2</sup>. Hydro capacity at an estimated 3.92 billion kWh annually could cover 60–65 percent of electricity demand in the country. Implementing the new 200 MW Small Hydropower Plants (SHPP) scheme will make it possible to cut reliance on imported gas and oil supplies. Additionally, there is a strong interest in Armenia in biogas generation from farm-based anaerobic digesters, as well as from landfills.

Armenian legislation requires that utilities purchase renewable energy through 2016 at high prices through a feed-in tariff scheme. This program is the only one existing in the region. International financial institutions and organizations have allocated some investment funding for the development of renewable energy, particularly small and mini-hydropower plants. Unfortunately, however, there is no major initiative to develop existing renewable resources due to artificially low electricity rates and a lack of finance capital. Armenia continues to provide energy subsidies, which reduce the price consumers must pay for electricity.

The Medzamor nuclear facility was shut down following the massive 1988 earthquake. However, due to the Karabakh conflict, Azerbaijan cut off oil and gas supplies, leading to severe energy shortages and the reopening of one of the two nuclear units at Medzamor in 1993. Under intense pressure from the EU and US, the Armenian authorities signed an agreement with the EU in Brussels in September 1999 on decommissioning the Metsamor Nuclear Plant by 2004 because the Soviet-type reactor does not meet Western safety standards. However, in 2006 the Armenian government announced that it could safely operate the plant ten more years, until 2016. Proposed investments for developing renewables are far from sufficient to replace the energy that will be lost with the closure of Medzamor. Armenia currently is discussing the possibility of constructing a new nuclear power plant with either 1,000

or 1,200 MW capacity, with a projected cost of \$4 billion and \$5.2–7.2 billion, respectively.

### Azerbaijan

Azerbaijan is well known for its vast reserves of oil and gas. Azerbaijan's proven reserves totaled 7.0 billion barrels of oil and 1.28 trillion m<sup>3</sup> of gas at the end of 2007, according to the BP Statistical Review. However, it is less known that the country has a large renewable energy potential in the areas of wind, hydro, and biomass. Climatic conditions are favorable for exploiting wind power, with a technical potential of an estimated 1,500 MW, as well as solar energy. The potential of hydropower resources is estimated at up to 16 billions kw/hour in a year, of which only 10 percent is currently being used, according to the EBRD.

With an economy based largely on the export of oil and gas, the state has little incentive to invest in the development of renewables or increased energy efficiency, and so far has allocated very little money to these projects. Despite the formal recognition of the fact that oil and gas resources will be exhausted within the next 20–30 years, and despite the fact that the government even formulated a State Program on the use of alternative and renewable energy for 2005–2013 (with the objective of developing wind and small hydro power), the introduction of legislation to support this goal has been delayed. If Azerbaijan would strive to comply with EU standards, the country might become eligible for investment from the EU. The international financial institutions are already highlighting the huge potential of the sector in order to reduce the level of poverty throughout the country, especially in rural areas, where high prices for energy impacts the impoverished population directly.

Meanwhile, in June 2008, the International Atomic Energy Agency (IAEA) issued a preliminary agreement for the construction of a \$119-million 10–15 megawatt nuclear reactor outside Baku for research purposes. IAEA officials believe that Azerbaijan can use the expertise acquired in the coming years to develop a nuclear power-generating capacity.

### Georgia

Georgia, a country that survived the economic crisis of the nineties thanks to its existing hydropower resources, until recently associated the development of renewables with "environmental schemes" rather than as an integral part of an effective energy security policy. Meanwhile, the energy crisis had a disastrous impact both on the environment (degradation of forests, erosion, etc) and

the health of the population (for example, via the use of low quality oil products and indoor pollution).

Analysis performed by World Experience For Georgia, Core International, and the OECD, among others, shows that the country possesses adequate resources to establish a sustainable energy system. Georgia is rich in renewable energy resources, specifically small hydro, wind, geothermal and solar power. However, only a very small part of the potential is being used. Currently the amount of electricity generated from renewables is approximately three percent of the total amount of electricity produced (excluding generation from large hydro of over 10 MW).

At the end of 2007, the Georgian government formally declared an increased interest in renewables, and especially the creation of small hydro power plants and wind farms. However, due to the lack of a clear state strategy and action plan for renewable energy development, the activities carried out have been chaotic and raise doubts that the development of such sources will really take off.

Georgia's State Policy in the Energy Sector, adopted by the parliament in 2006, declares that the country's main long-term objective is to satisfy the demand for electricity on the basis of its own hydro resources. Unfortunately, it advocates large hydro schemes, while underlining the importance of equal treatment for traditional and alternative sources of energy that in principle limits the opportunity for the wide-spread development of renewable energy, contradicting the EU's principles for alternative energy development. Up to now, no strategic vision exists in Georgia when it comes to renewable energy development, and there is a complete legislative vacuum in this regard. Since 2006, the only positive legislative changes have addressed efforts to connect small hydro to the grid.

In such circumstances, it should not be surprising that since 2005 the government has approved the construction of nine Large Hydro Power Plants, like the Namakhvani Cascade (installed capacity of 700 MW), Khudonhesi (Khudoni hydropower plant with installed capacity of 638 MW), Oni Cascade (installed capacity 272 MW) and another six hydro power plants with a total capacity of 1,747 MW.

In addition, the Georgian government actions directly contradict the Policy's officially declared goals and priorities, which did not foresee construction of nuclear power plants. In 2007 a governmental commission was set up to study the rationality of building a nuclear power plant in Georgia. Moreover, according to some press reports, the government has had some pre-

liminary negotiations with the French Company Areva, that constructs nuclear facilities.

### Developing Green Energy

The South Caucasus desperately needs to develop renewables to tackle its energy problems because, despite some progress achieved in recent years, the state of the energy sector still remains unsustainable.

Why has interest in renewables lagged? The low level of state support, a focus on other priorities – such as the urgent need to upgrade infrastructure – and an almost complete lack of public debate and understanding of the role that renewables could play are all important factors.

All three South Caucasus countries need to address the barriers to developing renewables. Everywhere, there is a lack of clear plans (financial and legislative) for the development of renewable energy and using financial resources allocated as incentives for alternative energy sources.

However, the South Caucasus governments are greatly dependent on external support for developing renewable energy sources. Organizations like the OECD, World Bank, USAID, EBRD and KfW already support some interesting initiatives in the field: including feasibility studies, the rehabilitation and construction of a number of small/mini hydro plants, the development of wind and geothermal resources, and facilitating the removal of key barriers to renewable energy development in the legislative and regulatory fields.

However, the absence of a sound and reliable legal framework for renewables, a coherent overall state and financial strategy, and the numerous missed political opportunities undermine the efforts of different international organizations in the region and significantly delay the implementation of projects in the field of renewable energy.

What steps should be taken to change the situation in favor of renewables in the South Caucasus energy sector? One answer could be via the Action Plans developed under the Neighborhood Policy between the EU and the individual countries. In all cases, the plans require “energy policy convergence towards EU energy policy objectives”. Thus it will be important for the South Caucasus to take the right steps to ensure security of supply that conforms with EU policy (energy efficiency, development of renewable energy, reduction of emissions, etc.).

But the governments involved seem to lack political will. In accordance with the EU European Neighborhood and Partnership Instrument strategy paper for

2007–2013 for the East neighborhood region, there are contradictory strategic objectives. The first of these is sustainable development and environmental protection, which underpins all EU legislation and policies. However, both sides seem to care more about the second priority that includes “the need to ensure the diversification and security of energy supplies to the EU”, which emphasizes the need for further extraction and transportation of the Caspian Sea’s oil and gas resources from the South Caucasus to Europe over development of an environmentally-friendly energy sector within the region.

So it should not be surprising that the governments of the South Caucasus countries are more focused on opportunities to develop unsustainable and environmentally-unfriendly mega projects, that could present more opportunities for international trade, than to focus

on the development of renewables which would serve a smaller number of communities within the countries.

The international community and governments need to put more effort into the promotion of renewables. Ultimately, the development of renewables in the South Caucasus has the potential to support decentralized energy supply and to operate in isolated networks that can directly address the needs of local industry and communities. Bearing in mind the slow tempo of development for the non-oil and gas economies, the extremely inefficient use of energy, and the population’s decreased consumption of energy due to rising prices, a decentralised energy system based on renewable sources can be developed step-by-step to respond to the needs of local communities and industry, while bringing energy to the market more quickly than traditional energy sources.

#### *About the author*

Manana Kochladze is CEE Bankwatch Network Regional Coordinator for the Caucasus.

#### *Further reading*

- EBRD Renewables Development Initiative, [www.ebrdrenewables.com](http://www.ebrdrenewables.com) (The strategic assessment of the status of renewable energy in the EBRD countries, including the South Caucasus)
- Caucasus Environmental Outlook (CEO) 2002, <http://www.grid.unep.ch/product/publication/CEO-for-Internet/CEO/annex1.htm>

#### Armenia

- EU-Armenia Renewable energy portal, <http://www.renewableenergyarmenia.am/>
- National Program on Energy Saving and Renewable Energy of the Republic of Armenia, 2007, <http://www.minenergy.am>
- Armenia – Renewable Energy Project, [www.worldbank.org](http://www.worldbank.org)
- Renewable energy in Armenia: Reality and perspectives, Conference Materials (2003), <http://www.nature-ic.am/ccarmenia/en/?nid=177>
- Energy for the Future, Conference Proceedings (2005), <http://www.nature-ic.am/ccarmenia/en/?nid=177>

#### Azerbaijan

- ADB Azerbaijan Renewable Energy Project 2006–2007, [www.adb.org](http://www.adb.org)
- The State Program on the Use of Alternative and Renewable Energy Sources in Azerbaijan Republic, 2005, [http://www.inogate.org/energy\\_themes/azerbaijan-new/regulatory-framework/national-energy-policies-strategies/energy-efficiency-renewables/Program\\_Renewable.pdf](http://www.inogate.org/energy_themes/azerbaijan-new/regulatory-framework/national-energy-policies-strategies/energy-efficiency-renewables/Program_Renewable.pdf)
- The use of alternative energy sources – the best approach to improving the environmental situation in Azerbaijan, F. G. Aliyev, H. Kh. Khalilova and F. F. Aliyev, [www.cder.dz/A2H2/Medias/Download/Proc%20PDF/PARALLEL%20SESSIONS/.../15-06-06/676.pdf](http://www.cder.dz/A2H2/Medias/Download/Proc%20PDF/PARALLEL%20SESSIONS/.../15-06-06/676.pdf)

#### Georgia

- Potential of Renewables in Georgia, World Experience for Georgia, [www.weg.ge](http://www.weg.ge)
- Debt-for-Environment Swap in Georgia: Potential Project Pipelines for the Expenditure Programme, part two, OECD, 2006
- “A Natural Gas Strategy For Georgia”, 2006, CORE International’s advisory assistance to the Ministry of Energy, financed by USAID, [www.minenergy.gov.ge](http://www.minenergy.gov.ge)
- Georgia in the context of EU energy policy, Teimuraz Gochitashvili, Professor, Mindaugas Krakauskas, GEPLAC expert on energy issues, George Abulashvili, GEPLAC expert on energy issues, Georgia Economic Trends, June 2006, [www.geplac.org](http://www.geplac.org)