

AZERBAIJAN: Alternative and Renewable Energy – A Business Perspective



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May 2013

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Introduction

Azerbaijan has been tentatively exploring avenues of alternative and renewable energy since 2004, which saw the announcement of a first ten-year plan aiming for a comprehensive energy and climate policy. The establishment of a dedicated State Agency (“SAARES” – **State Agency of Alternative and Renewable Energy Sources** – or “ABEMDA” in Azeri) followed in 2009.

In collaboration with the UN Development Programme, SAARES has already spent over \$90m piloting hydroelectric power plants and identifying suitable sites for biomass, wind and solar centres. In 2011, alternative energy sources accounted for 10% of the nation’s electricity (nearly all of it from hydro power plants) and 2.3% of all energy consumption.

It is a promising start in such a short period of time, but the country’s economy is still reliant on oil and natural gas – perhaps overly so, given the undesirable phenomenon of “Dutch disease” witnessed in other previously oil-rich nations – and until recently there have been no real legal and financial incentives to invest further in the renewable energy sector.

This paper will examine the myriad possibilities for investment in the alternative and renewable energy sector in Azerbaijan, in light of recent favourable developments and rewarding initiatives by both the Azeri government and private organisations.

Alternative energy sources

In a 2009 Country Profile of Azerbaijan, commissioned for investment purposes, the European Bank for Reconstruction and Development stated:

“The country has a large potential for renewable energy power generation in the areas of wind, hydro and biomass. Total wind power technical potential is estimated to be 1,500 MW. Biomass and hydro also have substantial potential for power production.”¹

¹ The European Bank for Reconstruction and Development, “Azerbaijan: Country Profile”, 2009

Azerbaijan is widely viewed as possessing a number of plentiful, and as yet under-exploited, sources of renewable and alternative energy. These include:

- **Wind power:** the development of this alternative energy source is prioritized by Azeri authorities due to its low cost, minimal environmental impact and unlimited availability. The possibilities for wind power development in Azerbaijan are considerable, with over 250 days of medium-to-strong wind per year, capable of generating up to 2.4bn kilowatt-hours (kWh) of electricity annually. Conditions in the Absheron peninsula, where wind strength ranges from 3 to 27 miles per second, are particularly suited to the efficient operation of wind turbines.

So far there have been few attempts to capitalize on the potential for wind power, and only three wind farms are currently operating in the country, in the areas of Khinzi, Sitalcaj and Yashama. However, interest has been growing and in 2009, USAID helped develop a preferential tariff to incentivise the development of wind power. Another wind farm is currently under construction in Guba – its 16 turbines will provide a total capacity of 4,800 kWh.

- **Solar power:** although it has a diverse and unpredictable climate, Azerbaijan is well suited for solar-powered electricity and heat generation processes, with 2,400-3,200 hours of sunshine per year. Due to its relatively high cost, adoption of solar energy has so far been slow, but Azerbaijan opened its first mass-production solar panel factory in April 2012.



- **Hydroelectric power:** currently Azerbaijan’s most developed alternative energy source, hydro power accounted for 9.8% of the country’s entire electricity production in 2011, compared to 0.2% for all other renewables. Its full potential remains underexploited, however: a 2010 report by the Ministry for Energy and Industry suggests that Azerbaijan’s rivers have the ability to generate 40 billion kWh of power, of which 16 billion kWh would be economically viable. Preferential tariffs are in place for the development of small hydro power plants. The mouths of rivers flowing into the salty Caspian Sea could also be harnessed to generate electricity by **osmosis** – an “avant-garde” alternative energy process which has gained increasing prominence and credibility in recent years.
- **Biomass power:** Azerbaijan has the capacity for significant biomass energy production, with 2 million tonnes of domestic and production waste sent to

treatment sites every year. With 55% of Azeri territory suitable for agricultural production, there is real potential for harnessing residues for biomass combustion or gasification, as well as waste products for biogas production from animal manure. The government has also included the **waste-to-energy** process among its renewable energy development plans, with public investments directed towards the construction of solid and municipal waste incineration plants near Baku.

- **Geothermal power:** the exploitation of geothermal waters could partially cover Azeri heat energy needs, especially in the Guba region where water temperatures can reach 90 degrees. Thermal extraction techniques have already been used as part of an experimental heating policy in the north-western town of Ganja.^{2,3}

New developments

Increasingly in recent years, the exploitation of renewable and alternative energy sources has been on the agenda of the Azeri government, as well as national and private companies operating in Azerbaijan.



The former are anxious to avoid over-dependence on fossil fuels for both internal energy supplies and outward investment, while the latter believe that the reduction of energy consumption for heating and cooling, which today represents more than 50% of total domestic consumption, is another major challenge that could be partially resolved by the introduction of efficient alternative technology.

In December 2011, President Aliyev called for a second long-term government strategy on alternative and renewable energy sources for the years 2012-2020, in line with the EU's 2006 Climate and Energy Policy on worldwide 20/20/20 targets. These targets are as follows:

- a reduction in greenhouse gas emissions of at least 20% below 1990 levels;
- 20% of energy consumption to come from renewable resources;
- an increase in energy efficiency by 20% by 2020.

² East Invest, "Azerbaijan Alternative Energy", 2012

³ Inogate, "Azerbaijan: Energy Sector Review", 2010

The Presidential order called for the creation of a truly sustainable energy system for Azerbaijan, including a practical and legal framework optimally conducive to the development of renewable energy.

Following a drop in oil and natural gas output in 2012, the Ministry of Energy and Industry announced in January 2013 that Azerbaijan hopes to raise over \$7bn in alternative energy investments by 2020, and increase total renewables capacity to 2,000 MW - 20% of the nation's overall power needs⁴.

The government has demonstrated its commitment to improving the use of renewable resources by increasing the budget of SAARES from \$1m in 2010 to \$14m in 2011⁵. In February 2013 the Agency was officially acknowledged as an independent entity from the Ministry of Energy and Industry, and received a \$31m subsidy from the Azeri government⁶.



There are also plans to create a government Agency for Energy Efficiency, while the state-founded Azerbaijan Investment Company has prioritised the development of renewable energy in the upcoming years.

Alternative energy initiatives

In recent years there has been a sharp increase in the number of internal alternative energy projects in Azerbaijan.

- In 2011, SAARES, in cooperation with the United Nations Development Program (UNDP), launched a new project on “Promoting the Development of Sustainable Energy in Azerbaijan”, backed by €500,000 from the European Commission and \$790,000 provided by the Norwegian government.
- The SAARES Experimental Polygon and Training Centre opened in September 2011 in Gobustan, providing specialist training to Azeri workers

⁴ Bloomberg, “Azerbaijan Plans \$7 Billion Boost for Renewable Energy by 2020”, 2013

⁵ The Business Year, “Azerbaijan: On The Rise”, 2012

⁶ ABC.az, “State Agency for Alternative & Renewable Energy in Azerbaijan restored”, 2013

on the implementation of alternative energy technologies, and incorporating a 5.5MW hybrid wind and solar station⁷.

- Construction is underway on Sumgayit Technologies Park (pictured), a technopark north of Baku dedicated to alternative energy and Information & Communication Technologies (ICT). One of the Park's main components, the Azguntech solar power plant, was officially opened by President Aliyev in April 2012, and is expected to produce 120,000 panels a year, rising to double that figure⁸.



- Azerenerji, the nation's largest electrical power producer, has made alternative energy - and particularly hydroelectric power engineering - a top priority. The construction of small hydroelectric plants with a capacity of 16 MW is currently underway, with initial estimates showing that 280 small power plants could be built country-wide, providing 28 billion kWh of power. There has also been a less marked proliferation of wind turbines, biomass and solar energy centres nationwide⁹.
- The Caspian Technology Company was the first Azeri company to engage with alternative energy: so far it has launched a dedicated Training Centre as well as several wind and solar power pilot projects, and has started manufacturing wind turbines and solar panels¹⁰.

External investors have followed suit, with a number of major foreign companies opting to explore the country's alternative energy possibilities:

- In 2006, the Asian Development Bank (ADB) signed a grant agreement for \$900,000 - of which \$200,000 came from the Finnish government - to assess the potential for renewable energy development in the country. In addition to this, the European Bank of Reconstruction and Development (EBRD) provided a \$200 million loan to modernize the AzDRES Thermal

⁷ News.az, "President stresses importance of modern technology", 2011

⁸ President of Azerbaijan official website, "Ilham Aliyev attended the opening of the 'Azguntech' plant in Sumgayit", 2012

⁹ US-Azerbaijan Chamber of Commerce, "Azenerji Looks Toward Alternative, Renewable Energy Sources", 2012

¹⁰ Caspian Technology Company, "Renewable Energy: International Best-Practice and Prospects for the Development in Azerbaijan", 2009

Power Plant, the largest natural gas, dual- and heavy-oil fueled thermal power station in Azerbaijan.

- IIAN Tech Co., a South Korean solar power provider, has invested \$2.25m in a hybrid solar power project in the Neftchala region, an ideal location with a maximum solar radiation of 4.08 kWh¹¹.
- In 2008 CNIM, a leading French provider of turnkey solutions for the energy and environment sectors, negotiated a €346m contract for the design, construction and 20-year operation of a waste-to-energy plant in Baku. The plant is considered to be the largest in Eastern Europe, with a capacity of 500,000 tons of municipal solid waste per year.
- Other notable external investors in alternative energy projects in Azerbaijan include KfW Bankengruppe, POSCO and the Japan International Cooperation Agency¹².
- In 2009, Azeri property company Avrositi and Danish architects BIG unveiled their vision for the luxurious Zira Island, Azerbaijan's and Asia's first carbon-neutral offshore colony (rendered below). The development is set to include integrated solar heat panels and photovoltaic panels, while solid waste will be composted to fertilise vegetation on the island. Plans for the island also include an offshore wind farm¹³.



Investment opportunities

Azerbaijan offers numerous opportunities for companies interested in investing in alternative energy, preferably in collaboration with a local partner. Potential avenues of investment include:

¹¹ abc.az, "IIAN Tech Co presents a project of hybrid solar power plant in Azerbaijan", 2011

¹² SAARES, "Renewable Energy Strategy of the Republic of Azerbaijan", 2012

¹³ BD Online, "BIG's Azerbaijan Carbon Neutral Masterplan", 2009

- Construction of wind power plants in the Absheron Peninsula, Ganja and the Caspian shore, and the commissioning of a national Wind Velocity Map to identify optimal areas for the installation of wind turbines;
- Production of electricity and heat from solar radiation;
- Construction of small hydro power plants, particularly in the Nakhchevan Autonomous Republic, whose long-running power deficit makes it a prime location for renewable energy projects;
- Recycling of solid waste and development of waste combustion plants around Baku and other large industrial cities, to supply residential settlements with electricity and heat;
- Production of domestic heat energy from thermal waters in the Absheron Peninsula, the Talish mountains and the Kur and Guba regions;
- Development and production of renewable energy technology – including photovoltaic panels and wind turbines, among others - in Baku or at the Sumgayit Technologies Park, taking advantage of the financial incentives, tax exemption and infrastructure offered by the State;
- Provision of modern technology and expertise for improving energy efficiency in the industrial and residential sectors.

With new legal and financial incentives in place for those looking to invest in alternative energy, and a renewed government drive to promote Azerbaijan's considerable renewables potential, there has never been a more opportune time to invest in the sector.



The Caspian Information Centre was founded in 2003 as a forum for study, discussion and debate about the remarkable countries of the Caspian region.

CIC is served by a small but dedicated team of senior academic writers, contributing editors and volunteers.

Launched in London in the presence of HRH Prince Michael of Kent, the Centre initially embarked on an ambitious programme focused exclusively on **Kazakhstan**. During its first four years, it hosted a number of high-level events and seminars in London and Brussels, published a wide-ranging and informative catalogue of Occasional Papers, and led a delegation of senior European politicians and academics to observe the 2005 presidential elections in Astana. For those who are interested in CIC's work on Kazakhstan, the archive may be found at www.caspianinfo.com.

Starting in September 2011, CIC focused its research resources on **Azerbaijan**, a country that shares with Botswana and Qatar the reputation for being the "fastest-growing economy in the world" and is quickly taking centre-stage in Europe's unfolding energy security drama. According to The Independent newspaper, "This small country of nine million people finds itself one of the most important places on Earth".

The Caspian Information Centre finances its activities through Individual and Corporate subscriptions and occasional sponsorship of its events by leading international corporations operating in the Caspian region.

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