

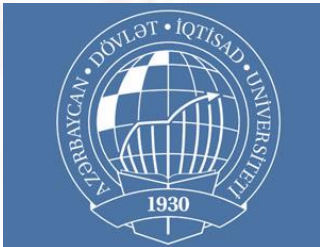


“EU-EaP STI cooperation in addressing Energy”

**Renewable energy and energy efficiency
in Azerbaijan**

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/Technology Transfer Center/
State Agency on Alternative and Renewable
Energy Sources

Minsk, Belarus, October 12-13, 2015



Main Stakeholders / Players in Renewable Energy Sector of Azerbaijan Republic

- *General overview of renewable energy potential*
- *Research Teams*
- *State and Private Organizations & Manufacturers*
- *Development strategy*
- *International projects*



*General overview
of renewable energy
potential*

Wind energy development

- *Absheron peninsula and Caspian sea coast - annual 250 medium-to-strong (range 5.8-8.0 m/sec) wind days per year, capable of generating up to 2.4 billion kWh of electricity per year.*



Solar energy development

Azerbaijan is well suited for solar-powered electricity and heat generation processes, with 2 400 – 3 200 hours of sunshine per year.



Hydro energy development

*Small hydroplants
potential (1100-1200 rivers)
- 5 billion KW*



Small Hydro Electric Projects disposition over the Azerbaijan Republic

- 1 Streams Directly Falling into Caspian*
- 2 Major Caucasus Southern Slope Stream*
- 3 Shirvan Canal System*
- 4 Karabakh and Mughan canal system*
- 5 Nakhchivan Autonomous Republic*

State Agency on Alternative and Renewable Energy Sources of the Republic of Azerbaijan

State Program on Use of Alternative and Renewable Energy Sources
(October 24, 2004)



The establishment of State Agency on Alternative and Renewable Energy Sources under the Ministry of Industry and Energy (July 16, 2009)



The establishment of State Company on Alternative and Renewable Energy Sources (June 1, 2012)



“Azalternativenerji” LLC
(February 1, 2013)

State Agency on Alternative and Renewable Energy Sources (February 1, 2013)

Background of the Agency

Activity areas

- Formation of state policy and its implementation;
- Creation of relevant infrastructure;
- Implementation of alternative and renewable energy in economic sectors;
- Efficient use of energy;
- State registration and cadastre;
- Activity on setting up relevant standards.

Business event



*20th International Caspian Oil & Gaz Exhibition and Conference 4-7 June 2013
Director of Agency Mr. Akim Badalov demonstrates the achievements of SAARES*



Research & Development

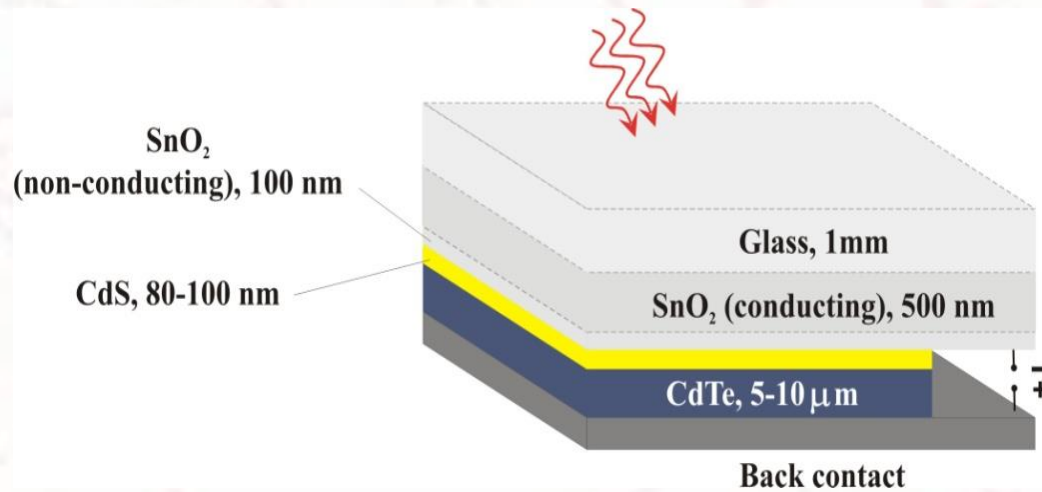
*Academy of Science, Institute of
Physics*



*Institute of Physics Laboratory # 11
Head of department Ayaz Bayramov*

E-mail: bayramov@physics.ab.az

***Laboratory profile: Semiconductor physics, optoelectronics.
Creation of thin film solar cells and investigation of their
photoelectric properties.***



CdTe thin film solar cell

Academy of Science, Institute of Radiation Problems



*Institute of Radiation Problems, Laboratory of
“Transformation of Renewable Energy Sources”
Head of laboratory Parviz Rzayev*

E-mail: rzayev-pf@yahoo.com

Laboratory profile: Implementation of solar and wind energy in different technological processes

- Parabolic-cylindrical solar energy concentrator was used for the initial processing of crude oil*
- Use of solar and wind energies for the rural house supply with hot water (the experimental research with the optimal mode selected)*



Azerenergy: Power Engineering Institute



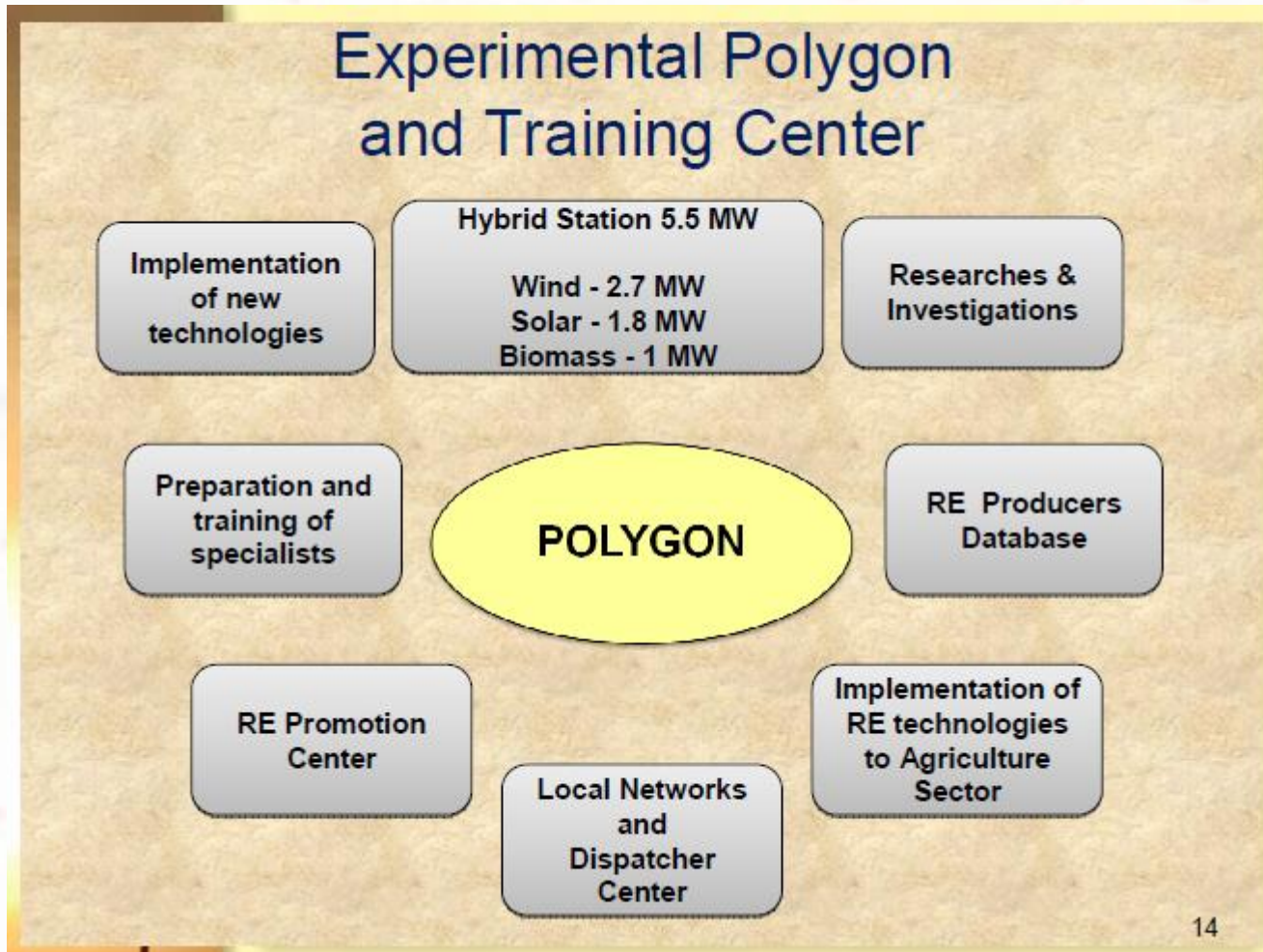
Department “Future developments of the electric power systems”

Direction: The use of alternative energy sources

Main Results:

- A. Iso-dynamic map of the winds in Azerbaijan
- B. Simulation of Quasi–Stationary Speed Characteristics of Wind – a Power Carrier of Wind Power Plants.

SAARES “State of the art” Training Center in Gobustan



JSC “Baku Electricity Grid” Training Center

Teaching courses includes renewable energy topics



Examination process

Training Center



Trainees certification



*State and Private Organizations &
Manufacturers*

***Programs & Projects
with Azerbaijan Government***

Name of Project	Amount of energy produced (MW)	Budget	Investors
Pirakushkul Wind Park	110	165 million Euros	Azerbaijan Gov. KFW Bank
Hovsan Gas station	50	75 million Euros	Azerbaijan Gov. POSCO
Absheron Solar Park	25	87,5 million Euros	Azerbaijan Gov. JLCA
Sea Wind Park	100	250 million Euros	Azerbaijan Gov. Private investor
1000House/1000 power plant	50	80 million Euros	Azerbaijan Gov. Private Investor

Gobustan Hybrid Type Power Plant



Was put into operation : September 13, 2011

Total capacity - 5,5 MW

Wind Power Plants - 2,7 MW

Solar Power Plants - 1,8 MW

Biogas Plants - 1,1 MW

The use of heat pumps

“AzAlternativEnerji” LLC

2. Samukh Agro-Energy Residential Complex

- **Implementation of alternative and renewable energy sources in economic sectors**

Total capacity:

- **31 MW electric,**
- **48 MW thermal**

- **Installation of solar component (2.8 MW) has already began**
- **Project period: 2014-2018**



Samir Rahimov, 15-17 September, 2015



Samukh Agricultural, Residential and Energy Complex



- Residential – 500 apartments
- Greenhouse– 30 ha
- Gardening– 1000 ha
- Poultry Farming– 100 tonnes poultry
- Juice Factory
- Cattle breeding farm– 1500 heads of cattles
- Food Processing Factory
- Fruit drying station
- Fish farm– 1 mln fish/year

Caspian Technology Company

- *The Pilot Project was done which consists of two Vestas V52 wind turbines*

Place -55th km of Baku-Guba highway

Power - $2 \times 850 \text{kW} = 1.7 \text{MW}$

- *Pilot Project of 35 KV grid connection which provides transfer of green energy.*



Caspian Management Systems LLC

- *Wind Power Station*

Place – Khizi (Surabad), Power - 25MW

Year – 2011

- *Wind Power Station*

Place – Khizi (Sitalchay), Power - 25MW

Year – 2013

Alten-Group Company LLC (last projects)

- *Energy production through heat pumps in the Azerbaijan Diplomatic Academy*

Place –Baku, Power - 1.3 MW Year – 2011

- *Wind Power Plant*

Place - Mushviq settlement near Baku

Power - 9MW Year – 2012-2013



Development strategy

Azerbaijan Renewable Energy Strategy for 2012-2020



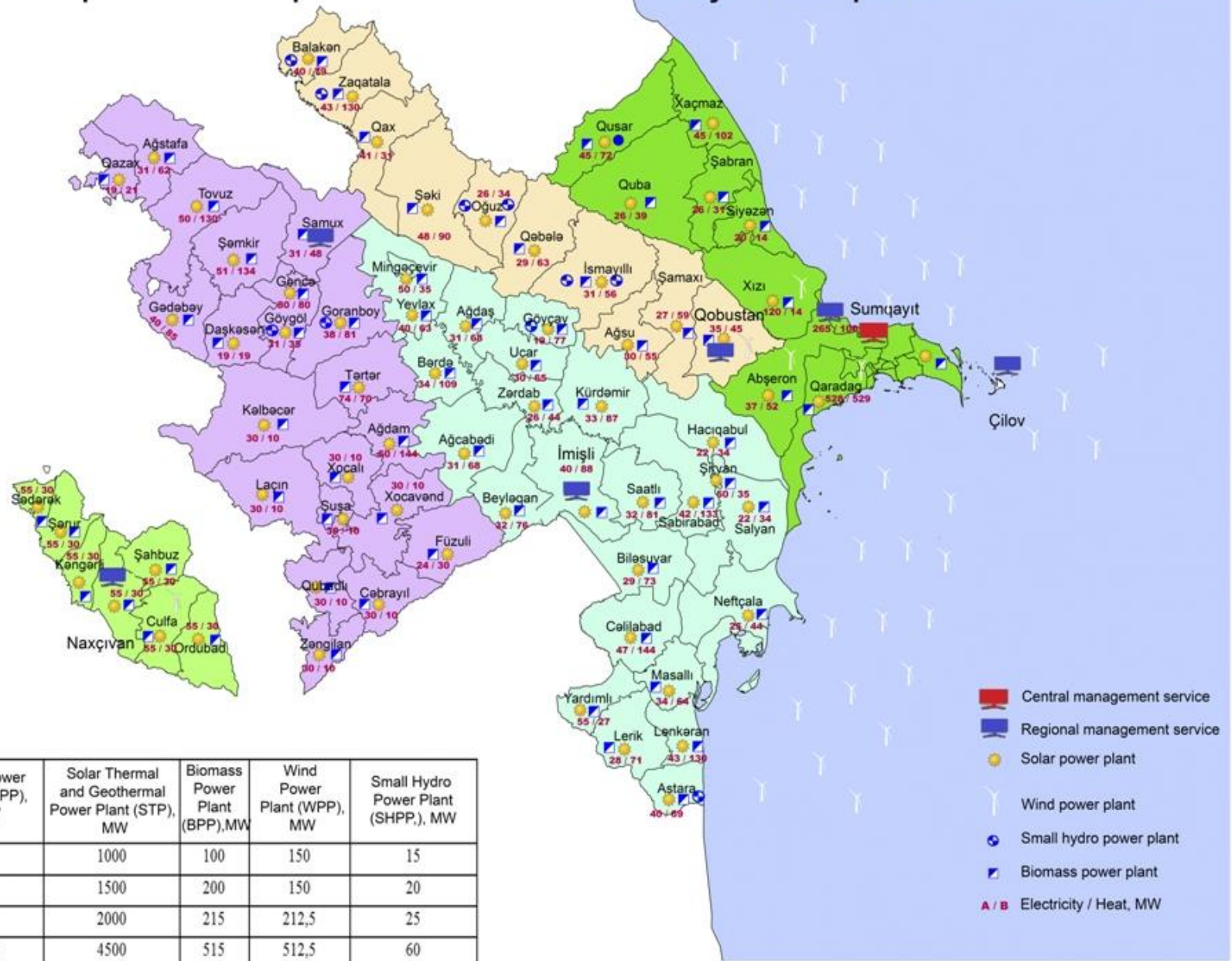
*Opening of new factory
- Sumgait, "Azguntech"
solar panel factory*



*"Gobustan testing
ground"*



Development map of RES in Azerbaijan Republic on 2020



Years	Solar Power Plant (SPP), MW	Solar Thermal and Geothermal Power Plant (STP), MW	Biomass Power Plant (BPP), MW	Wind Power Plant (WPP), MW	Small Hydro Power Plant (SHPP), MW
2013-2016	790	1000	100	150	15
2017-2018	685	1500	200	150	20
2019-2020	730	2000	215	212,5	25
Total	2065	4500	515	512,5	60

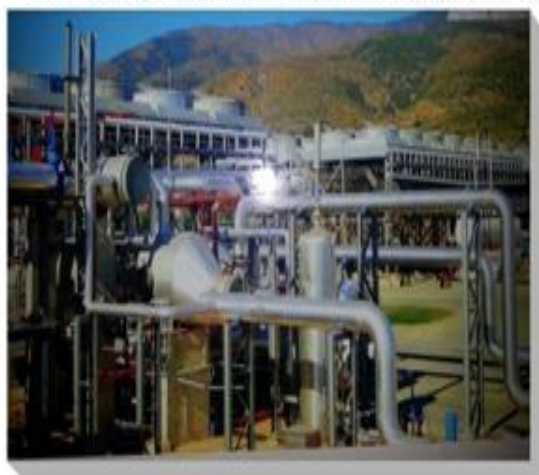
Development projects of RES - 2015 (300 MW)



The solar power station related to road junction and district - 105 MW



KhiziWind Power Station - 170 MW (2015 year - 66 MW)



Xachmaz Geothermal Heat Power Plant- 45 MW



SHPP in Sheki economic zone - 24 MW

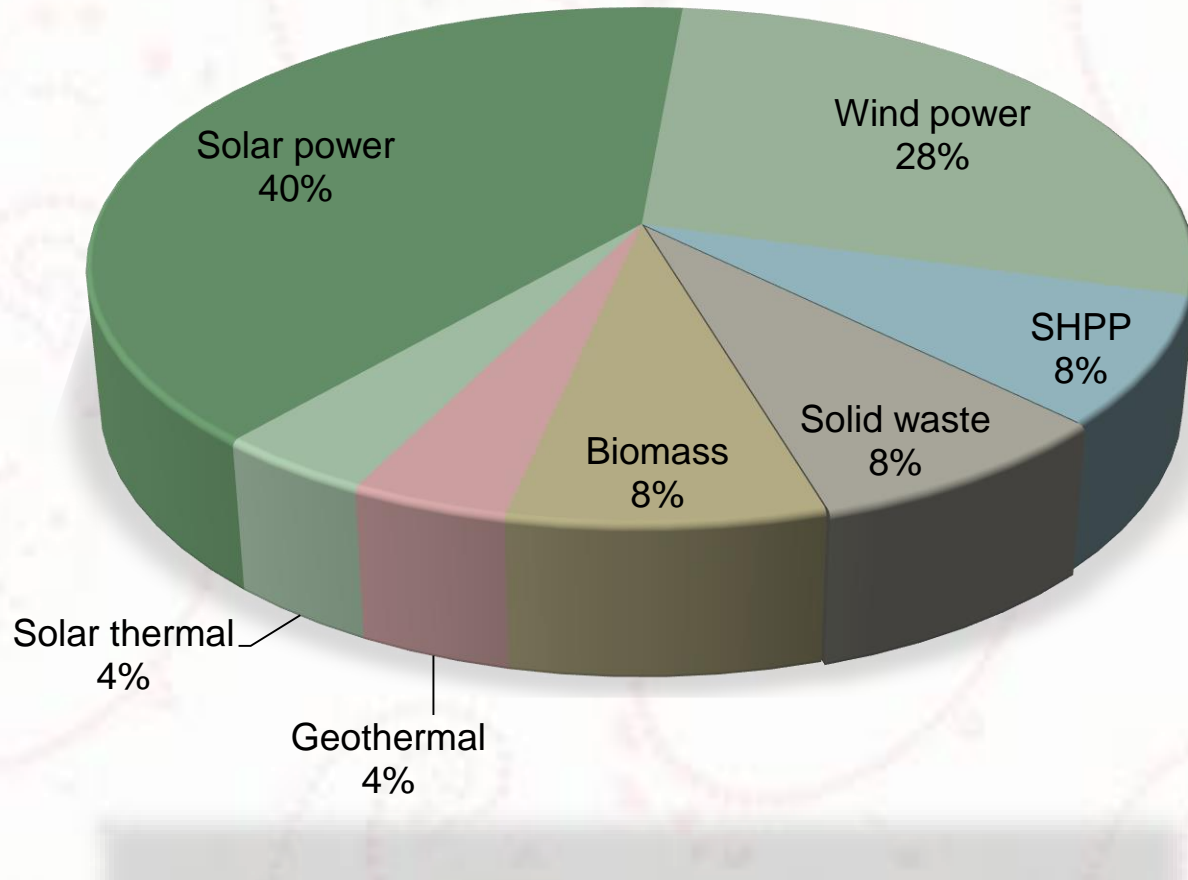


Biomass Heat Power Station in
Siyezen, Sheki and Oguz - 60 MW

Projects on use of RES

№	Projects	Installed capacity	Note
1	Gobustan Experimental Polygon and Training Center (Hybrid Type Power Plant)	5,5 MW	Being operated
2	Surakhany SPP	2,8 MW	Being operated
3	Pirallahy SPP	2,8 MW	Being operated
4	Sumqayit SPP	2,8 MW	Being installed
5	Samukh Agro Energy Residential Complex	79 MW	Planned
6	Installation of heat pumps and solar panels (PV modules) for electricity and heating supply at schools and medical centers in Baku city	410 KW	Being operated
7	“Azerenerji” SHPP (12 plants)	62,154 MW	Being operated
8	Sports complexes	320 KW	Being operated
9	Wind Parks	50 MW	Being installed
10	Caspian Sea WPP	1000 MW	Planned
11	Balakhany Waste-to-Energy Plant	37 MW	Being operated

Share of renewable energy (electric) types in 2020



Solar power projects

Surakhany Solar Power Plants

Installed capacity: 2.8 MW



Pirallahy Solar Power Plants

Installed capacity: 2.8 MW



Solar power and energy efficiency projects implemented in social buildings



Pediatric Polyclinic
(25 KW electric, 40 KW heating)



Secondary school № 149
(60 KW heating)



Secondary school № 235
(25KW electric, 40KW heating)



Boarding school in Turkan
(25 KW electric)



Hovsan Medical Center
(10 KW electric, 20 KW heating)



Sports Complex in Masally district
(70 KW electric, 90 KW heating)

BUZOVNA ECO - VILLAGE



Caspian Sea

Plan



Perspective view



Night view



Perspective view



GƏNCLƏRİN ELMI-TƏDQIQI YARADICILIQ MƏRKƏZİ



THE SUSTAINABLE CITY

A PROJECT BY DIAMOND DEVELOPERS

“Azguntex” PV modules plant



Was put into operation : 24.04.2012

Polycrystalline modules:

The number of PV cells - 60

Capacity - 36 V 250 W

Size –997mm/1663mm

Weight – 20 kg

Production capacity of the first line:

120 000 modules/year (30 MW)

Production capacity of the second line:

250 000 modules/year (62.5 MW)



International projects

International cooperation projects with

- European Union;
- UN Development Program;
- International Renewable Energy Agency (IRENA);
- The World Bank;
- Asian Development Bank;
- KfW of Germany;
- Organization of the Black Sea Economic Cooperation;
- JICA;
- KOICA;
- INOGATE;
- GUAM and etc.

EU Projects in Azerbaijan

- *EU-funded INOGATE project supporting the development of energy efficiency and RE*
- *EBRD Renewable Energy Initiative – 20 projects on RE are under implementation*
- *KFW Renewable Energy Projects – Loan amount: EUR 61 mln*
- *Projects on Wind, Solar and biomass, financed by EU and Norwegian Government – total budget*
\$ 3.2

***Projects with KWF
(German State Owned Bank)***

Help to Energy sector

- 1. Credit: 61 million Euros***
- 2. Future Expectations: 130 million Euros***
- 3. Cooperation with state agency***
- 4. Cooperation on future projects in
sector of renewable energy***

Promoting Development of Sustainable Energy in Azerbaijan

Joint Project (Azerbaijan Government, Government of Norway, European Commission, UNDP)

Project components and reports:

- *Increasing the awareness about renewable energy in Azerbaijan*
- *Economic and Financial Analysis of Renewable Energy Projects in Azerbaijan*
- *Legal and Regulatory Analysis of Sustainable Energy in Azerbaijan*
- *Pilot Project Plans for Wind, Solar and Biomass Sources of Energy*

Thank you for your attention

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<http://unec.edu.az/en/texnologiya-transfer-merkezi/>