THE REPUBLIC OF AZERBAIJAN

THE MINISTRY OF ECOLOGY AND NATURAL RESOURCES

Technological Action Plan (TAP)

FOR MITIGATION TECHNOLOGIES

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AIT Asian Institute of Technology

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LIST OF ABBREVIATIONS

AIT	Asian Institute of Technology
GEF	Global Environmental Facility
GCF	Green Climate Fund
HPS	Hydro-Power Stations
MEC	Ministry of Emergency Cases
MED	Ministry of Economic Development
MENR	Ministry of Ecology and Natural Resources
MIE	Ministry of Industry and Energy
MoE	Ministry of Education
NGO	Non-governmental Organization
RE	Renewable Energy
SCARES	State Company on Alternative and Renewable Energy Sources
SFSE	State Fund for Support to Entrepreneurship under MED
SOCAR	State Oil Company of Azerbaijan Republic
TAP	Technological Action Plan
TNA	Technological Needs Assessment
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
URC	UNEP Risoe Center

EXECUTIVE SUMMARY

This report is the next step of the TNA/TAP project in Azerbaijan and aims to outline technological action plans for technology application and diffusion.

For the organization of the TAP process, a sectoral/technology working group representing relevant stakeholders was formed. National consultants have applied a participatory approach during the stakeholder consultation process.

The government of Azerbaijan has strict policy and strategy for the development of renewable (alternative) energy sources. In this regard, the government has adopted the State Program on Utilization of Alternative Energy Sources (2005 – 2013) and the National Strategy on the Use of Alternative Energy for the period 2012-2020, and established the State Agency on Renewable Energy Sources (renamed the State Company on Alternative and Renewable Energy Sources by Presidential Decree on 01 June 2012). The most important measures have already been identified under these programs and strategies. The Demonstration Station in Gobustan region has been established in order to enhance research and capacity building activities in this field. Notwithstanding that, specific actions are necessary to overcome existing barriers to the implementation of prioritized technologies.

The commercial and residential sectors have been considered main sources of GHG emission, as emissions from these sectors have had an increasing tendency over the years.

Although the government has not defined the strategy for prioritized technologies in this sub-sector, there are some existing initiatives to promote use of high efficiency lighting systems. Biogas application has been supported by different local and international donors, however all initiatives were local.

Measures for overcoming existing barriers of prioritized technologies have been grouped as follows:

- Economic/financial
- Policy/regulatory
- Information/capacity building
- Other measures

Technological Action Plans have been prepared for each technology. During the preparation of TAP, measures have been assessed taking into account their priorities, time scale, related stakeholders, key indicators for measuring implementation and funding resources.

There are several cross-cutting issues that constitute common barriers for all prioritized technologies, such as need for fiscal support mechanisms, strengthening capacity of R & D institutions, stakeholder consultation and access to information at different levels. These issues result in insufficient development of climate change mitigation technologies in the country and create common barriers to their implementation.

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Chapter 1. Alternative energy sources sub-sector

1.1. Action at sectoral level

Azerbaijan Republic is a country with favorable opportunities for the use of alternative energy sources due to its geographical position and climate. Despite its rich oil and gas resources, which enable sufficient and affordable energy supply for the public and private sector, the country has developed a strict strategy for application and enhancing use of renewable energy sources.

In this regard, the government has adopted the State Program on Utilization of Alternative Energy Sources (2005 – 2013) and the National Strategy on the Use of Alternative Energy for the period 2012-2020, and established the State Agency on Renewable Energy Sources (recently renamed the State Company on Renewable Energy Sources). According to the State Program, Azerbaijan has set a target to have 20% share of renewable energy in electricity and 9.7% share of RE in total energy consumption by 2020. Brief information on existing policies is provided below.

Table 1: Relevant policy documents on alternative energy sector

#	Sector	Date of issue, status	Name	Content
1	Alternative energy sources	21/10/2004, State Program	State Program on Utilization of Alternative Energy Sources	Program aims to promote application of renewable energy sources, such as solar, wind energy, small hydro-power, thermal and biogas by increasing awareness level and supporting local production
2	Alternative energy sources	14/02/2005, State Program	State Program on Development of Energy and Fuel Complex of Azerbaijan	Program aims to develop energy production, supply and enhance application of modern technologies, including promotion of renewable energy sources, such as solar, wind energy and biogas, by increasing awareness level and supporting local production
3	Alternative energy sources	16/11/2009, Presidential Decree	Provide additional studies in development of alternative energy sources, assess potential of renewable energy sources and promote application and local production	Main aim is to identify the country's current potential in renewable energy sources, especially in small hydro-power stations
4	Alternative energy sources	01/06/2012, Presidential Decree	Establishment of State Company on Alternative and Renewable Energy Sources	Main aim is to enhance activities in the field of alternative energy sources

The most important measures have been identified under these policy documents. Additionally, the Demonstration Station in Gobustan region has been established in order to enhance research and capacity building activities in this field.

Notwithstanding that, specific actions are necessary in order to overcome existing barriers to the implementation of prioritized technologies such as grid-connected wind power, passive solar and solar photovoltaic and small hydro-powers. According to provided estimates, as a result of the deployment of these technologies, total reduction in GHG emissions will be around 7.6 MT by 2030.

Major barriers to technology deployment could be categorized as economic/financial, capacity building/information, policy/regulatory, technology and social barriers. Unfavorable tariff mechanisms, high cost of investments/infrastructures, low level of awareness and capacities, and weak R & D activities could be mentioned as main barriers to technology application.

1.2. Action plan for grid-connected wind power technology

Wind power is a more preferable energy source than solar, hydro, geothermal and biomass due to its cost, environmental soundness and unlimited availability. Practice shows that many of the regions in Azerbaijan have great potential for application of wind power facilities. Therefore, certain measures need to be undertaken by respective organizations in order to accelerate the wide application of wind power technology.

The government has identified initial targets for application of alternative energy sources within the State Program on Utilization of Alternative Energy Sources (2005 – 2013).

An example of a successful project implementation is by “Caspian Technology” company, in the Yeni Yashma settlement. The company established wind power devices with 1.7 MVt power and generated energy that is transferred to the connected grid. Presently, construction of a new wind power station with 48 MVt power is underway near Shurabad settlement. Installed wind power technologies are imported from Germany and Denmark.

Application of grid-connected wind power technology lines with the country’s social, economic and environmental development priorities.

With regard to the country’s social development priorities, application of the above-mentioned technology will create new employment opportunities. Typically a capacity of 1 kW of wind energy creates work for 15-19 persons. The growth of wind energy will contribute to state energy security consolidation and will also have a positive influence on public opinion, which would realize the necessity to protect the environment and reduce consumption of energy resources.

Regarding the country’s economic development priorities, the technology will reduce energy production costs. Moreover, development of the national wind energy industry will decrease the initial capital investment as locally produced products will be relatively cheaper than imported ones.

With regard to the country’s environmental development priorities, the application of wind energy has zero emission of CO_2 and will lead to decrease of SO_2 and NO_x emissions, which have a negative impact on woods, crops, generally on vegetation and particularly on the endangered species.

According to rough estimates, for the year 2030, the amount of fuel economy will be around 2 mln tons of conditions fuel and total GHG emission reduction will be around 3.96 mln tons of CO_2.

Regarding the mechanisms and institutional arrangements for deployment of grid-connected wind technology, it should be mentioned that the key institution involved in the implementation of measures will be the State Company on Alternative and Renewable Energy Sources of Azerbaijan Republic. The Ministry of Industry and Energy and the Azerenergy Company under State Oil Company of Azerbaijan Republic will also be responsible for the coordination of measures indicated in TAP.

During the preparation of TAP for grid-connected wind power technology, measures have been assessed taking into account their priorities, time scale, related stakeholders, key indicators for measuring implementation and funding resources.

Table 2: TAP for grid-connected wind power technology

#	Measures	Priority	Why it is important	Time scale	Related stakeholders, implementers	Key indicators	Risks	Funding sources	Costs
Policy and regulatory									
1	Develop a package of recommendations for improvement of enabling environment, including subsidy mechanism and tax regulations, in order to stimulate private sector investment	High	- Create enabling environment for private sector initiatives	0-5 years	MIE, SCARES, NGOs, private sector	- New tax regulations related to sector	- Lengthy state procedures and bureaucracy leading to slow endorsements of proposed recommendations	State, International	$ 300,000
2	Develop a package of recommendations on tariff regulations for Tariff Council	High	- Set favorable tariff rates	0-5 years	MIE, SCARES, NGOs, private sector	- New package to stimulate private sector	- Lengthy state procedures and bureaucracy leading to slow endorsements of proposed recommendations	State, International	$ 200,000
3	Develop standards and certification process	High	- Put in place standards and certification procedures	0-5 years	MIE, SCARES, Standardization and Patent Agency under MED	- Standards and certification procedures in place	- Lengthy state procedures and bureaucracy leading to slow endorsements of proposed measures	State	$ 100,000

#	Measures	Priority	Why it is important	Time scale	Related stakeholders, implementers	Key indicators	Risks	Funding sources	Costs
Economic/financial									
4	Develop mechanism for provision of long-term and low-interest loans, as well as grants through state, private and international funds	High	- Create easy access to affordable loans	0-5 years	MED	- Easy access to funds created	- Low interest of financial institutions - Insufficient state funds	State, International	$ 100,000
Information/capacity building									
5	Technical support to R & D institutions	High	- Weak capacity of R & D institutions	5-10 years	SCARES, MED	- Improved capacity of R & D institutions	- No major risk	State, International	$ 500,000
6	Strengthen international research network programmes	Medium	- Lack of knowledge on best international practice	5-10 years	SCARES	- National R & D institutions actively participate in international research network	- No major risk	State, International	$ 250,000
7	Organize specific capacity building programmes for private sector, local authorities and local communities	Medium	- Increase capacities on technology deployment	5-10 years	MoE, SCARES	- Increased capacity	- Weak collaboration of local authorities and local communities	State, International, private	$ 800,000
8	Develop and conduct information campaigns on the advantages of applied technology	High	- Increase awareness level on economic/environmental advantages of technology	0-5 years	SCARES	- Awareness level of consumers on renewable energy increase by 50%	- No major risks	State, International	$ 400,000
9	Organize study tours to Gobustan Demonstration Station	Medium	- Demonstrate practical application	0-5 years	SCARES	- Practical knowledge increased	- Weak coordination by SCARES	State, International	$ 500,000

#	Measures	Priority	Why it is important	Time scale	Related stakeholders, implementers	Key indicators	Risks	Funding sources	Costs
Other measures									
10	Donor coordination in order to enhance support to pilot project initiatives in the field of wind power energy	Medium	- Coordinate various donor initiatives - Demonstrate practical application of the technology	0-10 years	MED, SCARES	- Donor coordination meetings organized at least once a year	- Weak collaboration of related organizations	State, Internatio nal	$ 950,000
11	Develop wind atlas	High	- Identify exact potential of wind energy	0-5 years	SCARES, National Academy of Sciences, MENR	- Wind atlas developed	- Weak collaboration between respective organizations	State, Internatio nal	$ 750,000

1.3. Action plan for passive solar energy (hot water) and solar photovoltaic (electricity) technology

The government has identified initial targets for application of alternative energy sources within the State Program on Utilization of Alternative Energy Sources (2005 – 2013). Under this Program, the Demonstration Station in Gobustan region has been established in order to enhance research and capacity building activities in this field. Notwithstanding that, specific actions are necessary in order to overcome existing barriers to the implementation of prioritized technologies.

On 29 December 2011, the President of Azerbaijan Republic issued an order on preparation of National Strategy on the use of Alternative energy for the period 2012-2020. The main objectives of the strategy are to identify main directions of electricity from RE sources and legal framework for usage of RE sources.

Application of passive solar energy and solar photovoltaic technology lines with the country's social, economic and environmental development priorities.

With regard to the country's social development priorities, application of the above-mentioned technology will create new employment opportunities and will also have a positive influence on public opinion, which would realize the necessity to protect the environment and reduce consumption of energy resources.

Regarding the country's economic development priorities, the technology will reduce energy production costs. With regard to the country's environmental development priorities, the application of an environmentally sound technology that has zero emission will help create a better environment.

According to rough estimates, for the year 2030, total GHG emission reduction will be 417 thousand tons of CO_2.

Regarding the mechanisms and institutional arrangements for deployment of passive solar and solar photovoltaic technology, it should be mentioned that the key institution involved in the implementation of measures will be the State Company on Alternative and Renewable Energy Sources of Azerbaijan Republic. The Ministry of Industry and Energy and the Azerenergy Company under State Oil Company of Azerbaijan Republic will also be responsible for the coordination of measures indicated in TAP.

Most actions for diffusion of passive solar energy (hot water) and solar photovoltaic (electricity) technology are similar to those of grid-connected wind power technology.

During the preparation of TAP for passive solar and solar photovoltaic technology, measures have been assessed taking into account their priorities, time scale, related stakeholders, key indicators for measuring implementation and funding resources.

TAP for the technology is provided in table 3.

Table 3: TAP for passive solar energy (hot water) and solar photovoltaic technology

#	Measures	Priority	Why it is important	Time scale	Related stakeholders, implementers	Key indicators	Risks	Funding sources	Costs
Policy and regulatory									
1	Develop a package of recommendations for improvement of enabling environment, including subsidy mechanisms and tax regulations, in order to stimulate private sector investment	High	- Create enabling environment for private sector initiatives	0-5 years	MIE, SCARES, NGOs, private sector	- New tax regulations related to sector	- Lengthy state procedures and bureaucracy leading to slow endorsements of proposed recommendations	State, International	$ 300,000
2	Develop a package of recommendations on tariff regulations for Tariff Council	High	- Set favorable tariff rates	0-5 years	MIE, SCARES, NGOs, private sector	- New package to stimulate private sector	- Lengthy state procedures and bureaucracy leading to slow endorsements of proposed recommendations	State, International	$ 200,000
Economic/financial									
3	Develop mechanism for provision of long-term and low-interest loans, as well as grants through state, private and international funds	High	- Create easy access to affordable loans	0-5 years	MED	- Easy access to funds created	- Low interest of financial institutions - Insufficient state funds	State, International	$ 100,000

#	Measures	Priority	Why it is important	Time scale	Related stakeholders, implementers	Key indicators	Risks	Funding sources	Costs
Information/capacity building									
4	Technical support to R & D institutions	High	- Weak capacity of R & D institutions	5-10 years	SCARES, MED	- Improved capacity of R & D institutions	- No major risk	State, International	$ 500,000
5	Organize specific capacity building programmes for private sector, local authorities and local communities	Medium	- Increase capacities on technology deployment	5-10 years	MoE, SCARES	- Increased capacity	- Weak collaboration of local authorities and local communities	State, International, private	$ 800,000
6	Develop and conduct information campaigns on the advantages of applied technology	High	- Increase awareness level on economic/environmental advantages of technology	0-5 years	SCARES	- Awareness level of consumers on renewable energy increase by 50%	- No major risks	State, International	$ 400,000
7	Organize study tours to Gobustan Demonstration Station	Medium	- Demonstrate practical application	0-5 years	SCARES	- Practical knowledge increased	- Weak coordination by SCARES	State, International	$ 500,000
Other measures									
8	Donor coordination in order to enhance support to pilot project initiatives in the field of solar energy	Medium	- Coordinate various donor initiatives - Demonstrate practical application of the technology	0-10 years	MED, SCARES	- Donor coordination meetings organized at least once a year	- Weak collaboration of related organizations	State, International	$ 950,000

1.4. Action plan for small hydro-powers on mountain rivers technology

There are no specific governmental programmes related to the development of hydro energy sources in Azerbaijan. The government has identified initial targets for application of alternative energy sources within the State Program on Utilization of Alternative Energy Sources (2005 – 2013), including small hydro-power stations at mountain rivers.

In 2010, the Azerenergy Company, which is responsible for energy production and supply in Azerbaijan, conducted a feasibility study on construction of small hydro-power stations at mountain rivers. Based on the results of the assessments there is a potential for construction of 280 small hydro-power stations at mountain rivers and various water sources. Total power of those stations is estimated to be 700 MW. Construction of 25 small hydro-power stations is planned for 2013, 3 of which are already under construction. Groundbreaking ceremonies have been organized for the construction of the 3 small hydro-power stations in Goychay, Balaken and Gusar districts of Azerbaijan. Revised feasibility studies for construction of 7 more small hydro-power stations have been finalized and construction work will begin soon.

Application of small hydro-powers on mountain rivers technology lines with the country's social, economic and environmental development priorities.

With regard to the country's social development priorities, application of the above-mentioned technology will create new employment opportunities and will have a positive influence on public opinion, which would realize the necessity to protect the environment and reduce consumption of energy resources.

Regarding the country's economic development priorities, the technology will reduce energy production costs.

With regard to the country's environmental development priorities, the application of an environmentally sound technology that has zero emission will create a better environment.

According to rough estimates, for the year 2030, total GHG emission reduction will be 3.24 million tons of CO_2.

Regarding the mechanisms and institutional arrangements for deployment of small hydro-power technology, it should be mentioned that the key institution involved in the implementation of measures will be the Azerenergy Company under State Oil Company of Azerbaijan Republic. The State Company on Alternative and Renewable Energy Sources of Azerbaijan Republic and the Ministry of Industry and Energy will also be responsible for the coordination of measures indicated in TAP. The Ministry of Ecology and Natural Resources will be responsible for providing environmental impact assessments for small hydro-power stations and the Ministry of Emergency Cases will be responsible for disaster risk assessments of proposed constructions.

During the preparation of TAP for small hydro-powers technology, measures have been assessed taking into account their priorities, time scale, related stakeholders, key indicators for measuring implementation and funding resources.

TAP for the technology is provided in table 4.

Table 4: TAP for small hydro-powers on mountain rivers technology

#	Measures	Priority	Why it is important	Time scale	Related stakeholders, implementers	Key indicators	Risks	Funding sources	Costs
Policy/regulatory									
1	Develop specific regulations for simplifying permission mechanism	High	- Simplify permission mechanism in order to promote private sector initiatives	0-5 years	Azerenergy, SOCAR, MENR, Cabinet of Ministers	- Easy permission mechanism	- Lengthy state procedures and bureaucracy leading to slow endorsements of proposed recommendations	State	$ 100,000
Economic/financial									
2	Develop mechanism for provision of long-term and low-interest loans, as well as grants through state, private and international funds	High	- Create easy access to affordable loans for private sector	0-5 years	MED	- Easy access to funds created	- Low interest of financial institutions - Insufficient state funds	State, International	$ 100,000
Information/capacity building									
3	Enhance research/observation activities in order to identify the potential of mountain rivers and prepare electronic atlas	High	- Weak R & D activities	0-5 years	National Academy of Sciences, Azerenergy, SCARES	- Enhanced research/observation activities	- Weak capacity of R & D institutions	State, International	$ 200,000
4	Capacity building trainings for respective governmental bodies responsible for research/observation activities in the field of small hydro-power	Medium	- Weak skills and capacity of R & D institutions	0-5 years	National Academy of Sciences, Azerenergy, SCARES, NGOs	- Increased capacity and skills	- No major risk	State, International	$ 350,000
Other measures									

#	Measures	Priority	Why it is important	Time scale	Related stakeholders, implementers	Key indicators	Risks	Funding sources	Costs
5	Conduct detailed environmental impact assessments at potential construction areas	Medium	- Reduce negative impact to environment and environmental risks	0-10 years	MENR, NGO	- Detailed environmental impact assessments conducted	- Poor coordination between respective state bodies during assessment process	State, International	$ 500,000
6	Donor coordination in order to enhance support to pilot project initiatives in the field of small hydro-powers technology	Medium	- Coordinate various donor initiatives - Demonstrate practical application of the technology	0-10 years	MED, SCARES	- Donor coordination meetings organized at least once a year	- Weak collaboration of related organizations	State, International	$ 1,250,000

Chapter 2. Commercial and residential sub-sector

2.1. Action at sectoral level

The commercial and residential sectors have been considered main sources of GHG emission, as emissions from these sectors have had an increasing tendency over the years.

Issues related to energy efficiency have been indicated in “the law on use of energy resources”, adopted in 1996. Although the government has not defined the strategy for prioritized technologies in this sub-sector, there are some existing initiatives to promote use of high efficiency lighting systems.

Biogas application has been supported by different local and international donors, however all initiatives were local. It should be mentioned that those initiatives were not sustainable, as project activities were not followed by appropriate awareness-raising and financial components. With regard to heating pumps, there are no specific policies or programmes related to this technology.

Major barriers to technology deployment could be categorized as economic/financial, capacity building/information, policy/regulatory, technology, environmental and social barriers. High cost of investments/infrastructures, low level of awareness and capacities, and social barriers could be mentioned as main barriers to technology application.

According to rough estimates, deployment of prioritized technologies, such as high efficiency lighting systems, heating pumps and biogas for heating/cooking and efficient stoves, will lead to a total of 32.7 MT GHG emission reductions by the year 2030.

2.2. Action plan for high efficiency lighting systems technology

Despite the fact that there are no specific policies or regulations related to high efficiency lighting systems, energy efficiency is always a priority issue for the government. Presently, there are no subsidy or grant mechanisms for private initiatives related to application of high efficiency lighting systems in the commercial and residential sector.

Application of high efficiency lighting systems technology lines with the country’s social, economic and environmental development priorities. With regard to the country’s social development priorities, it improves livelihood of the population by reducing energy costs.

Regarding the country’s economic development priorities, the technology contributes to security of energy supply and generates new manufacturing sectors, leading to the reviving of that economic sector.

With regard to the country’s environmental development priorities, application of the technology contributes to the government’s strategy to provide more environmentally sound energy supply.

According to rough estimates, for the year 2030, total GHG emission reduction will be 23 million tons of CO_2.

Regarding the mechanisms and institutional arrangements for deployment of high efficiency lighting systems technology, it should be mentioned that the key institution involved in the implementation of measures will be the Azerenergy Company under State Oil Company of Azerbaijan Republic.

During the preparation of TAP for high efficiency lighting systems technology, measures have been assessed taking into account their priorities, time scale, related stakeholders, key indicators for measuring implementation and funding resources.

TAP for the technology is provided in table 5.

Table 5: TAP for high efficiency lighting systems technology

#	Measures	Priority	Why it is important	Time scale	Related stakeholders, implementers	Key indicators	Risks	Funding sources	Costs
Policy and regulatory									
1	Develop a package of recommendations for improvement of enabling environment, including subsidy mechanism and tax regulations, in order to stimulate private sector initiatives	Medium	- Create enabling environment for private sector initiatives	0-5 years	SOCAR, MIE, MED, National Parliament, NGOs	- New subsidy mechanism and tax regulations related to sector	- Lengthy state procedures and bureaucracy leading to slow endorsements of proposed recommendations	State	$ 300,000
2	Develop standards and certification process	High	- Put in place standards and certification procedures	0-5 years	MIE, Standardization and Patent Agency under MED	- Standards and certification procedures in place	- Lengthy state procedures and bureaucracy leading to slow endorsements of proposed measures	State	$ 100,000
Economic/financial									
3	Develop mechanism for provision of long-term and low-interest loans, as well as grants through state, private and international funds	High	- Create easy access to affordable loans	0-5 years	MED	- Easy access to funds created	- Low interest of financial institutions - Insufficient state funds	State, International	$ 100,000
Information/capacity building									
4	Capacity building programs for local authorities, communal units, private sector and residents	High	- Increase capacity on technology deployment	0-5 years	SOCAR, MIE, NGOs	- Improved capacity in energy efficiency	- Low interest of local authorities, communal units, private sector and residents	State, International	$ 400,000
5	Information campaigns on the advantages of applied technology	High	- Raise awareness on advantages	0-5 years	SOCAR, MIE, NGOs	- Increased awareness in energy	- No major risk	State, International	$ 250,000

#	Measures	Priority	Why it is important	Time scale	Related stakeholders, implementers	Key indicators	Risks	Funding sources	Costs
						efficiency			
Other measures									
6	Develop mechanism for waste management of used bulbs	Medium	- Decrease environmental risks from hazardous wastes	0-10 years	Azerenergy, SOCAR, local executive committees and local authorities	- Specific mechanism for waste management of used bulbs in place	- Poor coordination among respective organizations	State, International	$ 350,000
7	Implementation of pilot projects at municipal or community level to demonstrate advantages of the technology	Medium	- Demonstrate practical application	5-10 years	MIE, SOCAR, MED, NGOs	- Increased level of awareness	- Weak collaboration of related organizations	State, International	$ 750,000

2.3. Action plan for heating pumps technology

Heat pumps can improve security of energy supply by reducing energy demand, and the small amount of electricity used can also be supplied by renewable energy generation. There are large savings in operating costs compared to conventional heating or cooling systems, although the up front capital costs are higher.

Currently, there are no specific policies or regulations related to the application of heating pumps technology.

Application of heating pumps technology lines with the country's social, economic and environmental development priorities.

With regard to the country's social development priorities, application of the technology improves livelihood of the population by reducing energy costs.

Regarding the country's economic development priorities, the technology contributes to security of energy supply. With regard to the country's environmental development priorities, application of the technology contributes to the government's strategy to provide more environmentally sound energy supply.

According to rough estimates, for the year 2030, total GHG emission reduction will be 8 million tons of CO_2.

Regarding the mechanisms and institutional arrangements for deployment of heating pumps technology, it should be mentioned that the key institutions involved in the implementation of measures will be the Azerenergy Company under State Oil Company of Azerbaijan Republic, local authorities and communal offices (units).

During the preparation of TAP for heating pumps technology, measures have been assessed taking into account their priorities, time scale, related stakeholders, key indicators for measuring implementation and funding resources.

TAP for the technology is provided in table 6.

Table 6: TAP for heating pumps technology

#	Measures	Priority	Why it is important	Time scale	Related stakeholders, implementers	Key indicators	Risks	Funding sources	Costs
Policy and regulatory									
1	Develop a package of recommendations for improvement of enabling environment, including subsidy mechanism and tax regulations, in order to stimulate private sector initiatives	Medium	- Create enabling environment for private sector initiatives	0-5 years	National Parliament, NGOs	- New subsidy mechanism and tax regulations related to sector	- Lengthy state procedures and bureaucracy leading to slow endorsements of proposed recommendations	State	$ 250,000
Economic/financial									
2	Develop mechanism for provision of long-term and low-interest loans, as well as grants through state, private and international funds	High	- Create easy access to affordable loans	0-5 years	MED, MIE	- Easy access to funds created	- Low interest of financial institutions - Insufficient state funds	State, International	$ 100,000
Information/capacity building									
3	Capacity building programs for local authorities, communal units, private sector and residents	High	- Increase capacity on technology deployment	0-5 years	MIE, NGOs	- Improved capacity in energy efficiency	- Low interest of local authorities, communal units, private sector and residents	State, International	$ 300,000
4	Strengthen international research network programmes	Medium	- Lack of knowledge on best international practice	5-10 years	NGOs, R & D institutions	- National R & D institutions actively participate in international research network	- No major risk	State, International	$ 250,000
5	Information campaigns on the advantages of applied technology	High	- Raise awareness on advantages	0-5 years	MIE, NGOs	- Increased awareness on energy efficiency	- No major risks	State, International	$ 250,000

#	Measures	Priority	Why it is important	Time scale	Related stakeholders, implementers	Key indicators	Risks	Funding sources	Costs
Other measures									
6	Implementation of pilot projects at municipal or community level to demonstrate advantages of the technology	Medium	- Demonstrate practical application	5-10 years	MIE, MED, NGOs	- Increased level of awareness	- Weak collaboration of related organizations	State, International	$ 550,000

2.4. Action plan for biogas for heating/cooking and efficient stoves technology

Biogas for heating/cooking and use of efficient stoves is mainly suitable for application in rural areas--mostly remote areas with no gas supply, dependent on wood resources. It will lead to less harm to forest resources and reduce subsequent GHG emissions.

There are no specific governmental programmes related to development of biogas for heating/cooking and efficient stoves technology in Azerbaijan. The government has identified initial targets for application of alternative energy sources within the State Program on Utilization of Alternative Energy Sources (2005 – 2013), including application of biogas technology.

There are different initiatives for the demonstration of advantages and best practices of biogas technology under various international projects funded by donor organizations. The government of Azerbaijan, through the Ministry of Industry and Energy, also plans to construct combined biogas devices at sizable livestock farms in the Siyasen district. The main goal of this initiative is to demonstrate effective results and advantages of the proposed technology.

There are no specific programs or policies related to technology deployment, however socio-economic development and provision of sustainable energy supply to rural regions are priority issues for the government.

According to rough estimates, for the year 2030, total GHG emission reduction will be 1.7 million tons of CO_2.

Regarding the mechanisms and institutional arrangements for deployment of the technology, it should be mentioned that the key institution involved in the implementation of measures will be the Ministry of Ecology and Natural Resources.

During the preparation of TAP for biogas for heating/cooking and efficient stoves technology, measures have been assessed taking into account their priorities, time scale, related stakeholders, key indicators for measuring implementation and funding resources.

TAP for the technology is provided in table 7.

Table 7: TAP for biogas for heating/cooking and efficient stoves technology

#	Measures	Priority	Why it is important	Time scale	Related stakeholders, implementers	Key indicators	Risks	Funding sources	Costs
Policy and regulatory									
1	Develop a package of recommendations for improvement of enabling environment, including subsidy mechanism and tax regulations, in order to stimulate private sector initiatives	Medium	- Create enabling environment for private sector initiatives to launch local production	0-5 years	National Parliament, MENR, NGOs	- New subsidy mechanism and tax regulations related to sector	- Lengthy state procedures and bureaucracy leading to slow endorsements of proposed recommendations	State	$ 250,000
Economic/financial									
2	Develop mechanism for provision of long-term and low-interest loans, as well as grants through state, private and international funds	High	- Create easy access to affordable loans for private initiatives/local residents	0-5 years	MED, Agency on Agricultural Credits	- Easy access to funds created	- Low interest of financial institutions - Insufficient state funds	State, International	$ 100,000
Information/capacity building									
3	Specific capacity building programs to increase technical capacity of service providers	Medium	- Increase capacity on technology deployment	0-5 years	MED, MENR, NGOs	- Improved capacity on technology deployment	- Low interest of private sector and technical service providers	State, International	$ 250,000
4	Information campaigns on the advantages of applied technology	High	- Raise awareness on advantages	0-5 years	MENR, NGOs	- Increased awareness of technology application	- No major risks	State, International	$ 250,000
Other measures									
5	Implementation of pilot projects at municipal or community level to demonstrate advantages of the technology in order to promote its production and use	Medium	- Demonstrate practical application	5-10 years	MENR, MED, NGOs	- Increased level of awareness - Local production launched	- Weak collaboration of related organizations	State, International	$ 850,000

Chapter 3. Cross-Cutting Issues

There are several cross-cutting issues that constitute common barriers for all prioritized technologies. These issues result in insufficient development of climate change mitigation technologies in the country and create common barriers to their implementation.

Need for fiscal Support Mechanisms

There are no effective fiscal mechanisms for tax and customs regulations, state subsidies or grants involved in supporting the deployment and dissemination of mitigation technologies, although there are examples of VAT exemptions during import of wind power technology. Introduction of such support mechanisms are necessary in understanding the environmental, economic, social and political priorities of the country. Private initiatives must be supported through different subsidy and grant mechanisms using funding from the State Investment Fund and the State Fund for Support Entrepreneurship.

Strengthening capacity of R & D institutions

Improved capacity of R & D institutions with targeted programs and effective coordination with ongoing programs is significant for the successful deployment and dissemination of high priority technologies. The National Academy of Sciences and relevant R & D institutions must be strengthened in order to address the needs of measurement, testing, design adaptation, and other innovations. Expert support for grid-connected wind power, passive solar and solar photovoltaic, small hydro-power and heating pumps technologies should include information provision, skills and capacity building training. A unique center should be formed for better coordination of all R & D activities, as well as the creation of effective linkages with international institutions active in R & D activities.

There is a general lack of practical information about the selected technologies including their principles of operation, costs and benefits, operation and maintenance guidelines and selection criteria. Strengthening of R & D institutions could partly address this problem, through the dedicated data repositories and websites, as well as more knowledgeable experts. International cooperation needs to be strengthened for obtaining adequate information and learning material.

Stakeholder Coordination

Better coordination between the donor agencies, private sector initiatives and NGOs is needed for application of technologies. This is an opportunity for improving the quality of the projects and achieving better joint results. It will also help to avoid replicated activities and measures in technology deployment. The quality of pilot projects can be significantly improved with stronger coordination and emphasizing of information and outreach components. This will help to collect, analyze and disseminate the practical information, thereby increasing general awareness of the population and the decision makers who would be willing to take the necessary policy measures.

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Annex I. List of stakeholders involved and their contacts

Institutions	Representative	Contacts
State organizations		
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Ministry of Industry and Energy	F.Muradov	feyzulla.muradov@gmail.com
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Public and private companies		
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