

1.3 Action Plan for Wind Park

1.3.1 Description of the technology

Wind power is a proven and mature renewable energy technology that is being deployed globally on a mass scale. Wind turbines extract kinetic energy from moving air flow (wind) and convert it into electricity via an aerodynamic rotor, which is connected by a transmission system to an electric generator. Today's standard turbine has three blades rotating on a horizontal axis, upwind of the tower, with a synchronous or asynchronous generator connected to the grid. Two-blade and direct-drive (without a gearbox) turbines are also available.

The electricity output of a turbine is roughly proportional to the rotor area; therefore, fewer, larger rotors (on taller towers) can use the wind resource more efficiently than more numerous, smaller turbines. The largest wind turbines today are 5-6 MW units, with a rotor diameter of up to 126 metres. Typical commercial wind turbines have a capacity between 1.5 MW and 3 MW.

Turbines have doubled in size approximately every five years, but a slowdown in this rate is likely for onshore turbines, due to transport, weight and installation constraints.

Wind power is among the most cost-competitive renewable energy sources in areas where the wind resource is good.

The Construction of Wins Parks in Mongolia will give following economic, environmental, and social benefits:

- The electricity supply of Mongolia will improve;
- Coal consumption will be reduced;
- Air pollution will be reduced

1.3.2 Target for technology transfer and diffusion

In order to implement the target of the National Renewable Energy Program, the Energy Regulatory Committee has given licenses to 5 private companies for constructing wind parks with total capacity 354.4 MW (Table 65). The expected annual electricity generation of these wind parks will be 708 million kWh. The share of electricity generation from wind will reach 9.1 % if these projects are successfully implemented.

The preliminary target for technology transfer and diffusion of Wind Park is to construct wind parks with total capacity 354.4 MW in 2020 in order to implement renewable energy national action program by generating electricity 708 million kWh annually from wind parks.

Table 65: Wind Park projects to be implemented up to 2020

Company name	WP Capacity, MW	WP Location (aimag and soum)	Permission from energy ministry (Date and number)	License from Energy Regulatory Committee (Date and term)	Remark
"Glean Energy"	50	Tuv, Sergelen	2007-03-02, a/304	2007-03-27, 5 years 2012, 1 year	To be connect to central grid
"Glean tech"	250	Umnugovi, khanbogd	2008-10-13, a/82	2008-12-18, 5 years	102 MW to be connected to central grid, 148 Mw to export to China
"Sainshand wind park"	52	Dornogovi, Sainshand	2010-11-01, a/3418	2011-03-19, 5 years	To be connect to central grid
"AB solar and wind"	100	Dornogovi, Dalanjargalan	2008-10-13, a/81	2011-11-22, 5 years	To be connect to central grid
"Idiner global"	50.4	Govisumber, Sumber	2011-11-18 a/4059	2011-12-13, 5 years	To be connect to central grid

1.3.3 Barriers to the technology's diffusion

Table 66: Barriers to the technology's diffusion

Key barriers identified		Enabling measures
Category	Barriers	
Economic and financial	High Capital cost	More financial mechanisms other than foreign direct investment shall be made available to finance the upfront investment cost for wind parks such as public-private partnership (PPP), direct investment by government or financing through the national development bank.
	Inappropriate financial incentives	<p>One way to solve these issues is through a PPP. The concession law allows the State Property Committee to implement projects that are listed within the articles of the State Property Concession. Wind park projects should be included in this list of concessions.</p> <p>Another way to rise funding for investment in wind part project is to use funding from Development Bank of Mongolia. According to the Development Bank Law, the Development Bank shall provide loans to finance large scale development projects and programs approved by the Parliament.</p> <p>Financial support may be provided from the state budget to implement those projects and programs guaranteed by the Government.</p> <p>It is important to increase electricity tariffs and take measures to implement renewable energy technology. The Government should continue the planned efforts in energy pricing reform. The tariff should cover the level of electricity generation costs and the cross subsidies should be removed. The Government should continue to support the liberalisation of the energy market, at the same time encourage private investment in the energy sector. Also it is important to exempt the taxes on climate technologies.</p>
	High transaction cost	<p>The government should build capacity for wind park development projects by establishing an energy research institution under the Ministry of Energy. There is a need for training skilled local experts who could develop project study including Feasibility Studies.</p> <p>Government should issue regulation on the exemption of import duty of machinery, and goods and materials for wind parks.</p>
	Lack of inadequate access to financial resources	One way to solve these issues is through a PPP. The concession law allows the State Property Committee to implement projects that are listed within the articles of the State Property Concession. Wind park projects should be included in this list of concessions
Technical	System constrain	<p>Wind parks adversely affect the energy system stability as they only operate when there is wind and wind availability is irregular. Especially for countries like Mongolia where the energy system consists of a small number of coal-fired power plants with low total installed capacity, connecting many high capacity wind parks will destabilize the system.</p> <p>In order to reduce or overcome these technical difficulties, Mongolia needs to improve the energy generation mix. The government needs to increase the share of manageable or flexible sources for generation in the energy system. Especially if large hydropower plants are added to the current energy system, the system stability will increase, which will make it technically feasible for more wind parks to be connected to the system.</p>

Network	Weak connectivity between actors favoring the new technology	The main assignment for the high level decision makers are to organize a knowledge base by compiling information regarding renewable energy projects, including lessons learned. This could assist the Government in developing a strategy and prioritising of Wind Park projects.
	Lack of involvement of stakeholders in decision-making	Another assignment of the high level decision makers is to clearly define the responsibilities and roles of different ministries and other stakeholders regarding the selection and implementation of renewable energy projects. Cooperation between the Ministry for Energy and other relevant Governmental institutions should be enhanced. Cooperation with other actors such as NGOs, donor organisations, and private actors should also be improved.
Policy, legal and regulatory	Policy intermittency and uncertainty	In order to encourage the development of wind parks in Mongolia, the government needs to have long term political commitment. It is important to have clear government policies to reduce political risks for investors. The government needs to more effectively control the enforcement and implementation of laws and regulations.
	Highly controlled energy sector Measure:	In order to develop market competition and remove utility monopoly in the energy sector, the government should continue to support the liberalization of the energy market, at the same time supporting private investment in the energy sector
	Lack of professional institutions	The government should establish an energy research institute under the Ministry of Energy for research and development activities to support the policy makers for making long-term sustainable energy development policies

1.3.4 Proposed action plans for wind park technology

Table 67: Proposed action plans for wind park technology

Measures	Actions	Why the actions need	Responsible organization	Time frame	Expected budget, 1000USD	How can be fund
Economic and financial measures						
To get financial source for investment of WPs from Development Bank of Mongolia.	To approve by the Parliament the construction of WP and include in list of projects to be financed by Development Bank of Mongolia	According to the Development Bank Law, the Development Bank shall provide loans to finance large scale development projects and programs approved by the Parliament	The government and the Ministry of Energy	(5-10) years	450000 (Sainshand WP) 219000 (Choir WWP)	Development Bank of Mongolia
Introduction of PPP model for implementation of HPP projects	In accordance with the Law on Concessions, implement the biggest HPP project, using public and private partnership (PPP)	Wind park projects require big initial investment	The government and the Ministry of Energy	(5-10) years	313600 (Egiin HPP)	Private investment
Exemption of import duty of machinery, and goods and materials for wind parks.	To make law on exemption of import duty of machinery, and goods and materials for WPs.	In order to decrease the initial investment of wind parks, import tax exemption or softening should be applied	The government and the Ministry of Energy	(5-10) years	No need	-
Prepare skilled local experts who could develop project development study including Feasibility Studies	Strengthen national capacities ensuring available specialists trained from national and foreign universities and train highly qualified technicians and engineers in developed countries	Due to the lack of specialists who will implement a project of wind park project, the national specialists should be educated and trained in developed countries	The Government, the Ministry of Education, Culture and Sports, and the Ministry of Energy	5-10 years	20000	State budget
Policy, legal and regulatory						
Long term political commitment.	Design and adopt long-term policy documents of energy sector development up to 2030	There are two major documents: the Central Energy System and National Program of Renewable Energy. However these two documents have very weak consistency and offer no strong background for the development. Based on Updated Master Plan for the Energy Sector, an ADB-funded project, these documents shall be designed and adopted by the Parliament and the Government.	The Ministry of Energy is in charge with relevant ministries and agencies.	1 year	100.0	State budget

Clear government policies with no political risks for investors.	During the election period, The Parliament should issue a decree to develop the Government manifesto by synchronizing it with long-term objectives of developing the energy sector until 2030	The Government is obliged to implement long-term policies that were adopted by the Government and the Parliament.	The Government and the Ministry of Energy	1 year	No need	-
Establish renewable energy fund according to the Renewable energy law which was adopted in 2007	Establish the foundation of renewable energy	It is stated in the Law on Renewable Energy, which was approved by January 2007, the Law on special foundation of the Government shall regulate the establishment of the renewable energy foundation and its expenditure, and performance reporting. The Law on special foundation of the Government includes regulation of legal framework of establishing renewable energy foundation. However, the Ministry of Energy, who is in charge of this matter, is not performing.	The Ministry of Energy	1 year	10	State budget
Support the liberalization of the energy market and private energy investment.	Implement policy to support private sector investment in energy sector	There is good practice for implementation of 50 MW WP by private sector investment	The Ministry of Energy	1 year		
<i>Network</i>						
Clearly define the responsibilities and roles for different ministries and other stakeholders regarding selection and implementation of large-scale HPP projects.	It should be applied that issuing the Government decree that distinguishes duties and responsibilities of stakeholders that implements large-scale HPP project	In order to implement a large-scale HPP project, many stakeholders such as many professional ministries, agencies, private companies, NGOs and international organizations should be involved	The Government and the Ministry of Energy	1-2 year	-	-