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For Ministry of Energy, Mongolia

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Asian Development Bank


Updating Energy Sector Development Plan

Project Number: TA No. 7619-MON

FINAL REPORT

PART A: Volume - I of X

ENERGY SECTOR POLICY REVIEW



Prepared for
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and

The Mongolian Ministry of Mineral Resources and Energy

Prepared by



e.Gen Consultants Ltd.

in association with



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ABBREVIATIONS

ADB	–	Asian Development Bank
AuES	–	Altai-Uliastai Energy System
CES	–	Central Energy System
CHP	–	Combined Heat Power
CO ₂	–	Carbon Dioxide
CPI	–	Consumer Price Index
ERES	–	Eastern Energy System
EUR	–	European currency unit EURO
GHG	–	Greenhouse Gases
HOB	–	Heat Only Boilers
IDC	–	Interest during construction
LCOE	–	Levelized Cost of Energy
MoE	–	Ministry of Energy
MNT	–	Mongolian Tugrik
NO _x	–	Nitrogen Oxides
O&M	–	Operation and Maintenance
PPA	–	Power Purchase Agreement
PV	–	Photovoltaic
SO _x	–	Sulfur Oxides
USD	–	United States Dollars
VAT	–	Value Added Tax
WACC	–	Weighted Average Cost of Capital
WRES	–	Western Energy System

UNITS OF MEASURE

GCal	-	Gigacalorie (one million kilocalories)
GJ	-	Gigajoule (one thousand megajoules)
kJ	-	Kilojoule
kWh	-	Kilowatt-hour
MWh	-	Megawatt-hour
MWel	-	Megawatt electric
MWth	-	Megawatt thermal

WEIGHTS AND MEASURES

GW (giga watt)	–	1,000,000,000 calories
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GJ (giga joules)	–	1,000,000,000 joules
GW (giga watt)	–	1,000,000,000 watts
kVA (kilovolt-ampere)	–	1,000 volt-amperes
kW (kilowatt)	–	1,000 watts
kWh (kilowatt-hour)	–	1,000 watts-hour
MW (megawatt)	–	1,000,000 watts
W (watt)	–	unit of active power

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I. Introduction

1. This report examines the energy sector policy of the Government of Mongolia in the context of international energy policy and practices. The specific issues addressed are as follows:-

(i) Review the Government of Mongolia's present and proposed energy sector policy, strategies, laws, regulations, and sector organizations. Identify gaps between achievements and goals in the sector policy and strategy.

(ii) Review progress of single-buyer model development and sector privatization. Identify policy actions to be required for functioning single-buyer model and promoting sector privatization.

(iii) Review the progress, achievement, and prospect of energy sector investment (including external assistance, ongoing projects, and proposed projects) planned in the energy sector master plan of 2001.

(iv) Prepare a policy note specifying gaps and issues in the energy sector, priority agenda and actions for energy sector reform and development including performance benchmarks and size of energy sector investment and its fund sources up to 2020.

(v) Develop quantitative and qualitative indicators in terms of energy security, environment improvement (air pollution control and greenhouse gas [GHG] abatement), energy diversification, energy efficiency, and improving access to electricity and heat, for selecting candidate projects in investment long list.

2. Issues (iv) and (v) in particular inform the scenarios that have been investigated during the expansion planning phase. The priority actions arise from the expansion plan selected according to prioritization criterion, and the performance measures selected from a policy perspective are calculated as a projection for all expansion plan scenarios considered.

II. Review of Government of Mongolia's Energy Policy

- (i) *Review the Government of Mongolia's present and proposed energy sector policy, strategies, laws, regulations, and sector organizations. Identify gaps between achievements and goals in the sector policy and strategy.*

3. A useful point of reference providing clear statements of the energy policy of the Government of Mongolia is the documented Program on Integrated Power Energy System of Mongolia (PIPES) ratified by the Parliament in late 2007. The PIPES program included a set of energy strategies as follows:-

- i. To create in Mongolia an independent and reliable power system and to create an efficient energy generation complex with energy losses as low as possible;
- ii. Export power to be generated by sources properly located throughout the country;
- iii. Restructure energy generation sources and make power supply in urban and settled areas reliable by defining the Energy Economic Policy, introducing new and efficient technology and equipment and utilizing renewable energy sources;
- iv. Secure power supply reliability in regional areas by constructing hydropower plants and high voltage transmission lines to connect these plants, to strengthen the energy system in the Western Region in order to produce further effective regime and work and form IPSM through connecting thereof to the Central Energy System; and
- v. Develop laws and legal basis and management system in the market economy principles and increase participation of the private sector in the fuel and energy sectors.

4. These statements fell under three main energy policy streams 1) Energy & Economic Growth Policy, 2) Environmental Policy, and 3) Energy Independence Policy. It is useful to examine these statements separately and in the context of international practices in energy policy.

To create in Mongolia an independent and reliable power system and to create an efficient energy generation complex with energy losses as low as possible;

5. The underlying policy is to become largely independent as an energy producer, without compromising the reliability of the energy system or unduly increasing energy losses.

6. The policy has not been implemented effectively. Since 2007, Mongolia's dependence on Russia has been increasing steadily. The Mongolian electricity System Reserve Margin has been declining to a point where dependence on Russian is at a high level. It is clear from the operations statistics that the reserve margin has been managed to maintain an adequate security of supply but this has been done by increasing dependence on Russia for needed capacity. Whilst the cost of imported Russian energy acts as a signal to invest in Mongolian capacity it seems clear that the signal has not provided the stimulus necessary to maintain energy independence.

7. The historical performance of the CES has been modelled to determine the Loss of Load Probability (LOLP), Expected Energy Not Served, and Reserve Margin of the CES for the years 2004 to 2011.

8. The simulation results show the deterioration in the Reserve Margin since 2004.

Figure II-1: Historical Reliability Performance

Year	LOLP %	RM %	EENS MWh	Russia MW
2004	1.07	20.0	9,120	120
2005	1.10	20.0	9,230	160
2006	1.07	19.7	10,000	160
2007	1.71	12.7	15,180	160
2008	3.43	4.5	18,850	120
2009	2.80	2.9	15,550	160
2010	2.30	3.1	20,050	180
2011	5.37	-4.3	41,000	200

Sources: Consultants' analysis

Export power to be generated by sources properly located throughout the country.

9. The underlying policy appears to support a regional development strategy. It addresses a concern that power plants built for export to China should be located in the southern half of the country or closer to the border of China, and in the case of export to Russia in the northern half of the country.

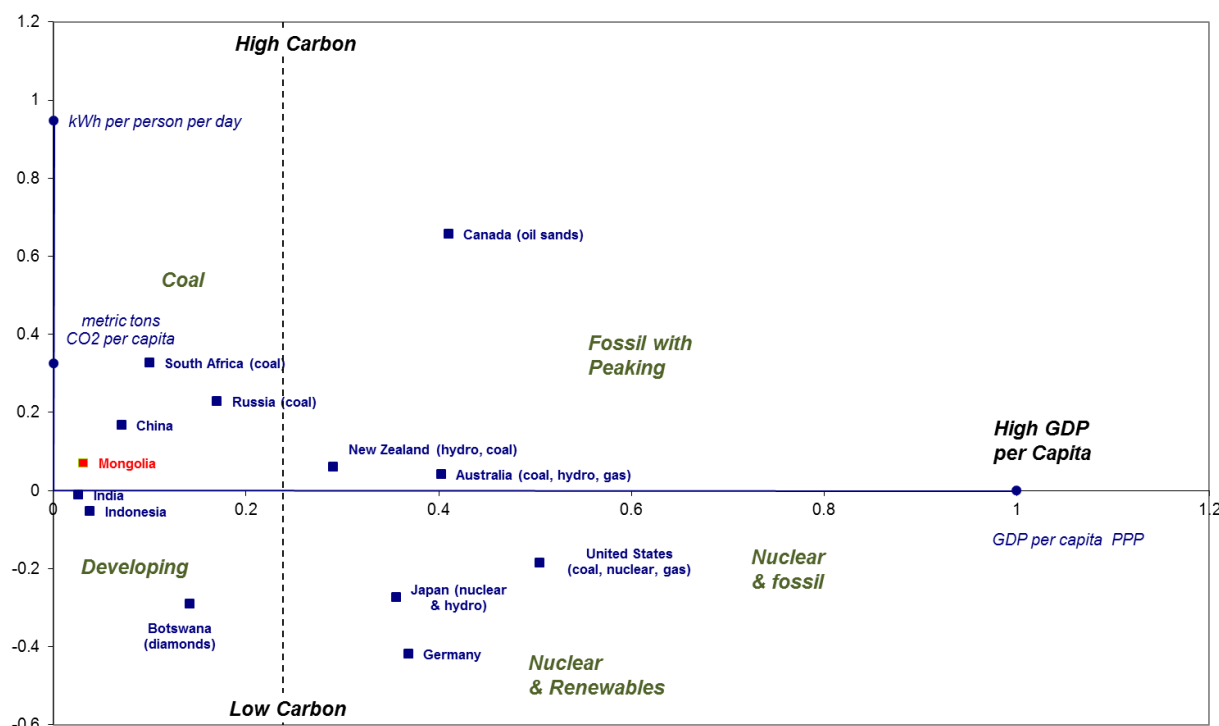
10. As no export has taken place since 2007 this policy is not operative.

Restructure energy generation sources and make power supply in urban and settled areas reliable by defining the Energy Economic Policy, introducing new and efficient technology and equipment and utilizing renewable energy sources;

11. The underlying policy is to support renewable energy production using new technology. Clearly the Mongolian Renewable Energy Law supports this policy and policy targets have been set under the law

12. The use of renewable energy in a developing country with abundant, low cost coal is likely to be constrained by affordability. As can be seen by the following chart, the countries that have targeted and achieved a very high penetration of renewables are also countries with a high GDP.

Figure II-2: Carbon Economy & GDP per Capita



Sources: Consultant's analysis

13. The chart suggests that to improve CO2 performance, Mongolia would first need to transition from a coal user to a coal / hydropower country as GDP increases, eventually to a nuclear and renewables platform. This process will take time, the history of the OECD countries suggests 30 years.

Secure power supply reliability in regional areas by constructing hydropower plants and high voltage transmission lines to connect these plants, to strengthen the energy system in the Western Region in order to produce further effective regime and work and form IPSM through connecting thereof to the Central Energy System; and

14. There are two dimensions to this policy statement. One is to develop an integrated energy system supporting the sharing of energy resources with Russia across time zone difference.

15. Such a policy creates a long term direction for development of an East-West transmission grid and for participation in a Russian – Mongolian electricity market. The distance involved is great and the load to the West at Uliastai and surrounding areas is very small, and expected to remain so until at least 2025. It was established during consultation workshops that a very significant majority of energy industry specialists consider that there is no near to medium-term demand in Russia and it appears that the benefits of a power pool would be one-sided. Overall the value of this policy is doubtful. At best it is a visionary policy.

16. The second dimension to the policy statement involves hydropower development. Screening curve analyses show that in Mongolia the most efficient electricity system in the CES should include a large hydropower plant operating at a relatively high load factor. Outside of the CES the cost of smaller hydropower plants appear to be prohibitive, particularly while coal prices remain at low levels.

Develop laws and legal basis and management system in the market economy principles and increase participation of the private sector in the fuel and energy sectors.

17. The underlying policy is to make sure that there is a suitable legal basis for the private sector to participate in the energy markets thereby fostering efficiency. Private sector participation requires enabling legislation, including regulations and codes of practice.

18. In Mongolia the basic reforms needed to support private sector participation have been largely undertaken.

19. In 2001, an Energy Law was passed to establish a legal basis for restructuring the energy sector, including the electricity industry. Subsequently, in the same year, the power sector was unbundled, establishing 18 companies from the generation, transmission, load dispatch, and distribution assets.

20. In 2002, the Government approved the Mongolia Sustainable Energy Sector Development Strategy Plan (2002-2010), a set of guiding principles for reforming the power sector. The main goals of the strategy were (i) to improve the financial performance of the power sector, (ii) to increase people's access to electricity in the rural areas and ensure an affordable minimum level of electricity consumption, and (iii) to promote private sector participation in the power sector.

21. In 2002, the Central Electricity System—the largest of the three grids and serving 50 percent of the population—was restructured into a single-buyer, monopsony arrangement based on the use of bilateral contracts as a competitive force. At that time the Central Electricity System comprised five power plants, one transmission company, and seven distribution companies. The transmission company purchased electricity from generators and onsold to the distribution companies at prices set by ERA. In a short time the bilateral contracts market was rescinded. Low collection rates, and possibly other financial irregularities meant that the Genco's were being paid as little as 60% of the dues owed to them. A single-buyer market, operating a zero balance account designed to fairly distribute revenue to the Genco's, was put in place in 2001. To date the market continues to operate in this manner.

22. In spite of the difficulties in the wholesale market, one of the distribution companies was privatized in 2003 and another in 2004. An Energy Regulatory Authority (ERA) was established that separated regulation from operations. ERA was given responsibility for setting electricity tariffs and regulated the 18 power sector companies. The Energy Regulatory Commission was created with the power to enter into power purchase agreements.

23. Furthermore Mongolia has taken many steps, legal, regulatory and institutional, towards the restructuring of the power and heat sectors with the expectation that these sectors would support Mongolia's growth.

24. The use of Public Private Partnership and BOT is under consideration for CHP5, promising to provide a useful modality for future energy supply developments.

25. A review of the current laws and regulations governing the energy sector of Mongolia can be found in Section VIII.

III. Single-Buyer Model & Sector Privatization

- (ii) *Review progress of single-buyer model development and sector privatization. Identify policy actions to be required for functioning single-buyer model and promoting sector privatization.*

26. An electricity market was introduced in 2001, as a bilateral contracts market accompanied by a small spot settlement market. Unfortunately the market failed, reportedly due to cash collection problems at the distribution level, and revenue shortfalls experienced by the Gencos. The market reverted to a single-buyer approach and has reportedly been functioning without incident since that time.

27. The single-buyer approach is not a single-buyer market model in the strict sense of this description. The transmission company does not take title to the energy produced by generation companies, and is not legally responsible for paying the generating companies. The function of the transmission company is to allocate the revenue collected to the Genco's. The system is more representative of the operation of a vertically- integrated utility which is functionally unbundled into business units that receive a portion of retail revenues in accordance with the pre-approved formula administered by one of the business units, in this case, the transmission company.

28. A study of the electricity market function was undertaken by USAID in 2006¹, and Economic Consulting Associates of London commented on the market in its strategic review of the energy sector². In both cases it was considered that a fresh attempt should be made to re-introduce a bilateral contracts market.

29. In 2008 Chemonics International³ stated that the disadvantage of the current market model in Mongolia is that it does not foster competition.

30. These recommendations suggest that these advisors did not fully appreciate the nature of a CHP dominated power system.

31. CHPs are efficient when producing electricity at maximum heat output (cogeneration). In Mongolia, heat production does not take place in summer, and so the overall efficiency of CHP generated electricity is low. This is not only a function of technology or operating practices, rather a function of the temperature variation throughout the year. However, the reported low efficiency has mistakenly led to a belief that an electricity market is needed to drive out inefficiency.

32. It must also be understood that when a CHP plant produces heat, electricity is also produced as a 'must-run' by-product. This cogenerated electricity must be dispatched. It means that only the condensing power output of a CHP plant is available to compete, or in other words only a fraction of the energy produced. In Mongolia at present this fraction is around 55%. Furthermore while the price of coal is regulated at a low price for the power stations, the operational costs savings arising from competition will be small. This issue can be more clearly understood from dispatch charts.

33. The following dispatch charts show the production of cogenerated power and condensing power for the CES system for a typical daily profile in January 2012.

¹ Evaluation of the functioning of current "single buyer" wholesale electricity market in Mongolia, USAID, Jan 2006

² Mongolia: Strategic Development of Energy Sector, September 2006

³ Proposed Competitive Electricity Market Design for Mongolia's Central Electricity System, November 14, 2008

Figure III-1: Cogenerated Power

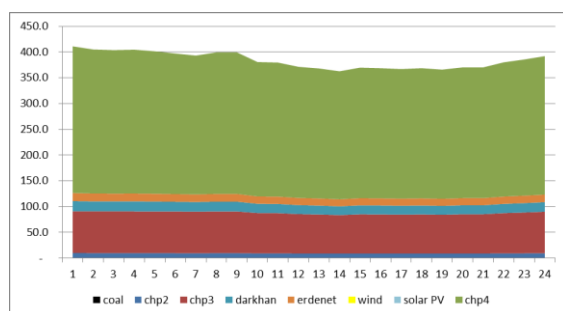
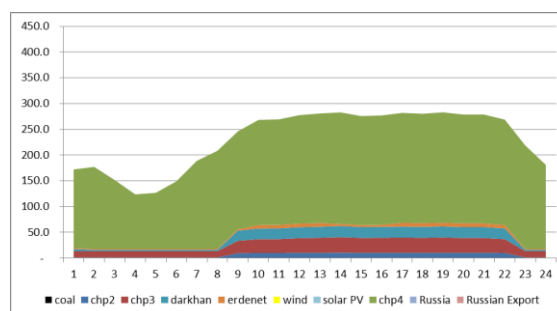


Figure III-2: Condensing Power



34. The 'must-run' power production associated with heat production, shown in Figure III-1 is near to double the condensing mode power. Since January is the mid-winter month, the co-generated power is close to continuous in magnitude, reflecting constant heat production.

35. A further consideration is market power. In Ulaanbaatar, PP#4 is very large compared to the other plants. When CHP5 is established, it will be a modern, highly efficient plant and will always be first to be dispatched. As a result the merit order will never be in doubt and the minimum overall operating cost readily determined from the turbine curves.

36. The author of the Chemonics International report stated that the current market model has the advantages and disadvantages of a market characterized by a vertically integrated utility. The primary advantages of the current market include: • Relative simplicity; • Allows simple balancing of supply and demand and settlement of deviations through the spot market settlement process; • Reduces misappropriation of retail revenue; • Provides reasonable financial stability to power sector entities; • Enables direct pass-through of costs of Government social initiatives to consumers; and • Contributes to reliable power system operation under difficult conditions. The primary disadvantages are: • It does not foster competition and the resulting discipline imposed on power sector entities to improve performance and efficiency, and increase service offerings to consumers; • It does not promote commercial relationships, particularly between distribution and generation entities; • It leads to government intervention and potential hidden subsidies; • It results in an inappropriate allocation of risk between power companies and consumers; • It requires that the public sector (i.e. the GoM) raise all capital requirements, or alternatively, commit to inefficient long-term contracts for services; and • It does not provide distribution companies with sufficient incentives to improve performance in collection of retail revenue.

37. Given the characteristics of the energy market in Mongolia, it is considered that the advantages of the existing model currently outweigh the disadvantages. As the supply mix becomes more diversified and the contribution of non-CHP sources becomes large in comparison to the total CHP capacity, and once there are of the order of 8 to 10 comparable energy suppliers, it will then be time to reconsider the benefits of an energy market and reform of the existing market system.

38. In the meantime a capacity-driven market model based on capacity auctions offers the performance and efficiency gains of the kind envisaged by Chemonics International. This issue is discussed in further detail in Section 5.

IV. Energy Sector Investment

(iii) *Review the progress, achievement, and prospect of energy sector investment (including external assistance, ongoing projects, and proposed projects) planned in the energy sector master plan of 2001.*

A. PIPES 2007

39. The Energy Masterplan of 2001 (EMP2001) is now very much out of date. It is of questionable value to review achievement against this plan. The first serious attempt to implement at least some of the findings of the EMP2001 began in 2007 with the gazetting of the PIPES program. The PIPES program was arranged starting with a 5 year block of specific investments and extending to medium and long term outlook.

40. There is merit to examine the program in terms of achievement of project proposals since 2007.

Figure IV-1: PIPES 5 Year Plan: 2007 - 2012

2007 to 2012	Achievement to end 2012	Consultants View
1 Construct a hydropower plant on the Egiin River with capacity of 220MW and connect it to the CES with the transmission line of 220kV	Not achieved	FS based on peaking plant (capacity); better justification for energy plant
2 Construct first the 220kV transmission line from UB to Oyu Tolgoi via Mandalgovi in order to provide reliable supply to Oyu Tolgoi, Tsagaan Suvarga and other mineral deposits in the Gobi region; build the Tavan Tolgoi coking coal mine mouth power plant with a minimum capacity of 300MW with consequent connection to the CES	220kV line built between Choir - Mandalgovi - Tavan Tolgoi; Tavan Tolgoi FS approved for 300MW mine mouth power plant	Modelling shows that no appreciable power transfer is possible between Tavan Tolgoi and Ulaanbaatar at 220kV due to the length of the line and distance from UB; stability of the power system is low when faults occur on the line
3 Meet an increased heat demand in UB by constructing a CHP with the capacity not less than 100MW	Not achieved	Ulaanbaatar required an increase of capacity of around 150GCal/h in 2012; this can be provided economically by the expansion of PP#4 by 180GCal/h, however this must be followed by further capacity expansion
4 Make a decision to construct a water pump storage plant with capacity up to 50MW in the central region	Decision not to proceed - appears to be referring to Tuul River PS hydro scheme	The cost of energy delivered from the Tuul River PS scheme is uneconomic
5 Modernize and expand capacities of the Darhan and Erdenet CHPs	Not achieved	Darhan and Erdenet CHPs have been investigating expansion - this will be considered for heat and power needs

	2007 to 2012	Achievement to end 2012	Consultants View
6	Build an energy complex near lignite deposits in the Choir Nyalga basin for power export	Not achieved	This is likely to be a private sector venture - of unknown scope and timing
7	After construction of the 15-20MW power plant near the Bayanteeg coal mine in Ovorhangai province, construct a line of 110kV connecting the Taishir hydropower plant and the Bayanhongor substation of 110kV	Not achieved	Required to better utilize the Taishir HPP, however the maximum output of Taishir has not achieved the design rating
8	Build the Chargait hydropower plant in the Delger River and the Mogoin gol coal mine mouth power plant and connect them with Ulistai by constructing 110kV lines in order to make power supply in Zavkhan and Govi-Altai provincial towns sustainable and reliable	Not achieved	The Chargait HPP is too small and therefore too expensive
9	Carry out a FS on constructing the Achit Nuur thermal power plant near the Nuurst Hotgor coal deposits	Not achieved	Likely to be a viable proposal
10	Construct the 110kV transmission line to Altantsogts and Asgat deposits	Not achieved	These mineral deposits were given very low attractiveness scores by the Worley Parsons study into industrialization - appears to be a questionable investment
11	Connect the Dalanzadgad to Tavan Tolgoi CHPs	Not achieved	The Dalanzadgad TPP should be replaced with a HOB, and power to be provided from the Tavan Tolgoi mine mouth power plant
12	Develop a FS on constructing the Erdeneburen hydropower plant in the Hovd river	Achieved	The Erdeneburen HPP is too small and therefore very expensive
13	Carry out a complete study for using geothermal power	Achieved	Commendable if study sponsored by grant
14	Construct wind parks using wind power and connect them to the CES	Newcom 50MW windfarm completed	

41. In general the achievement against the PIPES program of 2007 – 2012 has been average with little to show in terms of newly constructed power plants.

Figure IV-2: PIPES 5 Year Plan: 2013 – 2022

	2013 -2022	Consultants View
1	Construct the Erdeneburen hydropower plant on the Hovd River	The Erdeneburen HPP is too small and therefore very expensive
2	Build a 62km transmission line at 220kV connecting the Erdeneburen hydropower plant and the Myangad 110kV substation	The Erdeneburen HPP is too small and therefore very expensive
3	Construct a hydropower plant with a capacity of 100MW on the Orkhon River and connect to the CES via a 220kV line	The TA team is investigating whether the optimal design load factors for Egiin and Orkhon HPP's - investigation expected to be completed end Feb 2013
4	Construct a 450km transmission line at 220kV from Baganuur through Ondorhaan to Choibalsan (Eastern Region)	Too be considered
5	Construct a 360km transmission line at 220kV between the Durgun hydropower plant and Uliastai, establish Western integrated energy system and form Integrated Energy System connecting five western regions	Load in the WRES is very small
6	Study and make a decision on constructing the Buren and Sheuren hydropower plants on the Selenge River	WB FS for Sheuren on hold
7	Build a 10-15MW heat plant that will use geothermal heat source	Commendable if by grant
8	Construct and connect to the CES a large capacity solar power generator in the Gobi region	Commendable if by grant
9	Study and make a decision on constructing a nuclear power plant and large capacity solar power generators in Gobi provinces	Nuclear power not feasible before 2025

42. Again in this future-oriented program there are elements of a balanced plan scenario but it is clear that the initiatives have not been subject to a rigorous economic scrutiny.

Figure IV-3: PIPES 5 Year Plan: 2022 – 2040

2022 - 2040	Consultants View
<p>1 Construct a large capacity transmission line with 400kV between UB and Uliastai connecting the WRES with the CES and commence the IPSM</p>	<p>It is yet to be seen if a demand for power will develop on the Russia side, and whether an electricity market would provide a benefit to Mongolia</p>
<p>2 When consumption of the Western Energy System reaches 80MW, the transmission line shall serve as the axis line forming the integrated system and shall improve energy supply to consumers by shifting the excessive energy from one of the regions to the needed areas</p>	<p>A 400kV transmission line to serve an 80MW load with adequate security provision is not economic</p>

43. Expansion of the EHV transmission network along an East-West corridor is not viable before 2030.

44. Overall the achievement against the PIPES program demonstrates the value of an Energy Masterplan founded on rigorous technical and economic evaluation, and the need for regular updating.

V. Energy Policy & Reform

- (iv) *Prepare a policy note specifying gaps and issues in the energy sector, priority agenda and actions for energy sector reform and development including performance benchmarks and size of energy sector investment and its fund sources up to 2020.*

B. Policy & Planning

45. A policy note is included as part of the Executive Summary. However, a discussion of energy reform and specifically the use of capacity auctions is detailed in this section, recognizing Mongolia is in a transitional phase when there is a need to carefully combine planning and policy to achieve the objective of maintaining adequate reliability in energy supply while meeting environmental, energy independence and other ambitious goals and in the context of constraints imposed by the need to attract capital and maintain tariffs within the reach of energy consumers.

46. This task is not unique to Mongolia and most developing countries have confronted similar objectives and constraints in the last two or three decades. In many cases these international experiences provide useful lessons but one must be prudent in drawing strong conclusions based on foreign experiences. Every country has a particular context and what may have worked well in one place may go wrong in another.

47. Perhaps the most useful lesson of the energy reforms of the last two decades is that energy planning is necessary, regardless of the general policy to be adopted for the sector. This may seem to the casual reader as an obvious statement but only 15 years ago many countries thought that planning could be replaced by adequate market rules that would drive energy investments toward the desired goals. This view worked well in some places and it was disastrous in others and the opinion of this note is that such an approach brings with it risks that are not worth taking.

48. The advantages of a strictly market driven sector, and there are many, are offset by the enormous cost of market failure, which is neither rare nor solely dependent on the quality of the market rules.

49. The challenge is to combine planning with the ability to finance the sector. Countries that are rich in capital resources, either industrialized countries or countries with high value exports, do not face that challenge. They can plan what they need and they can finance its implementation. However, most developing countries, including Mongolia, do not fall in that category and they need to carefully balance three forces: 1. The need to achieve objectives of reliability of supply, energy independence, environmental protection and others, 2. The need to finance the systems that will meet those objectives and, 3. The need to make the financing affordable to the beneficiaries of the supply.

50. Finance is a very broad term that covers both components of capital, equity and debt. These components are normally both essential to the implementation of energy plans and they can be further classified into several subcategories based on their source such as public or private and domestic or foreign. Each subcategory has its peculiar needs. For example, a private foreign debt holder such as a commercial investment bank will have a very different set of requirements than those of a development organization or a national commercial bank. There is however a key distinction between all equity holders and all debt holders, the former are driven by the balance between risk and reward while the latter generally do not accept any avoidable risk. This is a crucial difference that must be clearly understood if conditions are to be put in place to attract energy sector finance.

C. Policy & Objectives

51. It is often that one finds that energy policy and energy objectives are used interchangeably and, aside from semantic considerations, it must be very clear that these are different concepts. Energy objectives are not energy policy objectives are the expected results of following a policy.

52. Thus, specific objectives such as “achieving energy independence”, “meeting environmental protection targets” or “adopting affordable tariffs” do not, by themselves, constitute policy unless there is a clear statement of priorities and trade-offs (i.e. the extent to which one objective may be sacrificed in order to achieve another that may be in conflict).

53. Energy planning is essential to establish such trade-offs among objectives because planning involves anticipating needs and assessing impacts of different scenarios of energy supply.

D. Private Participation

54. When equity holdings in the energy sector are limited to government then the determination of an energy policy consistent with a set of objectives is simply a question of allocation of government capital, securing debt and adopting a tariff regime or other suitable sources of revenue to cover the debt service. If, on the other hand, it is expected that the private sector holds some or all of the equity then the policy must provide clear incentives for this to happen.

55. There are several forms of attracting private capital but these can be divided into two large categories. One is based on specific agreements and the other is based on general rules. The first type is easy to understand and can result in a harmonious coexistence of planning and private finance since the government will only enter agreements on the facilities that its planning deem necessary. The second type is more complex, it is based on general pricing rules and while the interested private party still needs to seek permits in compliance with local regulations, it is understood that any investor can enter the energy supply industry and earn a revenue based on the stated rules.

56. Mongolia has chosen the first type and within it the modality of concessions in which a private party can reach a specific agreement for the development of an energy asset against compensation terms defined in the agreement. There is nothing wrong with this general arrangement but the mechanisms in place to implement the concessionary approach are not ideal.

E. Mongolian Concession System

57. The primary defect of the modality of concessions adopted in Mongolia is that the system relies entirely on individual negotiations between an interested private parties and the government. This modality, very prevalent in Asia but not in widespread use in other parts of the world, has two serious disadvantages as follows:-

1. The interested party cannot seriously plan a financial structure until a tentative agreement on potential revenue is reached, therefore any negotiations are made by the party using very conservative revenue requirements so that the party can be reasonable certain that it will be able to secure the necessary debt.
2. Negotiations are conducted with one party at a time and therefore the government cannot very well judge how much return on investment is a reasonable compensation for the given risk.

58. In addition, it is obvious that such a system is much more susceptible to lack of transparency which could invite corrupt practices and even subvert the planning targets in favor of

more profitable assets.

F. Concession By Auctions

59. A more effective way of implementing concessions is by the modality of public auctions. This system works quite well and has been the driver of considerable energy investments in both single buyer and multiple buyer systems. The key features of the system are as follows:-

1. Limited Objective

60. The government sets a limited objective for each auction. Example of objectives could be:

- Development of a particular hydroelectric site
- Development of a given capacity of a certain generation technology for delivery to a specific Mongolian system
- Development of a given capacity of CHP or HOB facilities.

2. Single Evaluation Indicator

61. The auction has to have a clear and simple evaluation indicator, usually the base price of the primary product or service rendered by the facility. For example:

62. Price of electric energy delivered

- Price of heat delivered
- Charge per unit of energy transported

3. Multiple Awards

63. In cases when the auction is about a given capacity of certain technologies but without a specific site in mind, the auction may award to more than one bidding party until the desired capacity is reached.

4. Risk Reduction Features

64. When part of the cost of the product or service to be rendered is subject to fluctuations beyond the control of the future concessionaire, specific price adjustment clauses to the base price can be inserted so as to share risks and therefore achieve lower base price offers.

5. Clear Auction Process

65. The auction process must be completely clear and may include a round of prequalification of bidders before the actual bidding is invited.

6. Bid Limits

66. The government may set a limit on the value of the bids that are acceptable and may declare this value or keep it secret to be disclosed only if the minimum bid received exceeds that value.

7. Data Room

67. The auction must ensure that all bidders have the same opportunity to access all the

information available to the government that is relevant to the preparation of offers.

8. Offer Preparation Time

68. The auction process must give plenty of time for bidders to fully analyze the opportunity, prepare their projections and discuss financial terms with potential lenders

9. Proforma Concession Agreement

69. The bidding documents must include a draft of the agreement that will be signed with the awarded party or parties

VI. Energy Performance Indicators

- (v) *Develop quantitative and qualitative indicators in terms of energy security, environment improvement (air pollution control and greenhouse gas [GHG] abatement), energy diversification, energy efficiency, and improving access to electricity and heat, for selecting candidate projects in investment long list.*

70. The policy objectives of the Government of Mongolia can be measured as a set of performance measures largely drawn from a set of measures in common use internationally. The following measures have been used for selecting candidate projects:-

Figure VI-1: Energy Performance Measures

Priority	Strategic Objective	Performance Measure(s)
1	Least Cost and Cost Premium of preferred plan	▪ Present Value of the preferred and endorsed expansion plan
2	Energy Security	▪ Electricity System Reserve Margin (full capacity) ▪ Electricity System Reliable Capacity Reserve Capacity (risk adjusted capacity)
3	Energy Independence	▪ % Energy and Capacity dependence on Russia
4	Environmental Performance	▪ A weighted measure comprising total CO ₂ emissions in Mtpa, and water consumption
5	Renewable portfolio commitment	▪ % Renewable Energy on total production
6	Energy Diversification (minimize)	▪ % Coal energy production on total production

VII. Energy Tariff Design and Regulation In Mongolia

G. Current Tariff Regulation Procedures

71. The main principles of heat and electricity tariff design are specified in the Law on Energy of Mongolia. According to this Law, tariffs shall be determined for each licensed activity, namely generation, transmission, distribution, dispatching and supply of electricity and heat. The tariffs shall be based on real costs of operation and the least-costs approach, and they have to secure operating safety requirements. The tariffs should enable energy demand management and shall be determined for each customer category, ensure price stability, as well as sufficiency of the revenue to maintain financial viability of the licenses.

72. Energy tariffs in Mongolia can be regulated or unregulated. Consumers pay for regulated supply in accordance with the published tariffs, unregulated supply is based on contracts and contract prices. Based on the heat and electricity load, the Energy Regulation Commission (ERC) is entitled to define customers eligible for unregulated tariffs. These customers can choose between regulated or unregulated supply.

73. According to the Law on Energy and the Proceedings for Tariff Review (approved in 2005), licensees apply to the ERC for a tariff review and submit own proposals of required revenue. The licensees shall prepare tariff calculations in accordance with a special Methodology for Determining Prices and Tariffs based on the actual costs during the last 3 years and on the current market prices, and submit them to the ERC for further consideration and approval. The ERC is entitled to make changes to the proposed estimates (usually such components as fuel costs, salaries and depreciations are downgraded).

74. Licensees can apply for change of tariffs twice per year (January and July), the ERC needs about 60-90 days for consideration of the applications. As per information available in March 2013, in practice, the last tariff review for majority of the main licensees had been done in spring 2011.

75. Based on the previous year financial results and the estimated required revenue, the ERC calculates the needed subsidy level as difference between estimated sales revenues (based on existing or new tariffs) and the revenue requirement. After the subsidies have been defined, the ERC submits this information to the Ministry of Energy, which reviews it and submits the proposal to the Ministry of Finance for final approval. The Ministry of Finance has the right to reduce amount of the proposed subsidies.

76. In addition to the Energy Regulation Commission who handles major power and heat companies, there are also local energy regulators which are responsible for regulatory issues related to small local energy companies (e.g. rural heat-only boilers, etc.).

77. Mongolia's Permanent Methodology for Determining Prices and Tariffs of Licensees (the Methodology) was approved in 2004. It sets principles for prices and tariffs for licensees at the first stage of commercialization of the energy sector.

78. The Methodology defines the following principles for the tariff calculations:

- The costs shall not include depreciation of future CAPEX and reform expenses.
- Subsidies approved by the authorised government authority should be included in tariff estimations by deducting them from the required revenue.
- Production and service costs should not include expenditures not related to the licensed activities (rewards, allowances and other types of donations, gifts), or other non-production service costs.

- The tariff shall be calculated per unit of product or service and include operating costs and return on investments.

79. The Methodology specifies that:

- Total costs shall include total operating costs and short-term loan interest. CHP licensees also include cross-subsidy of heat production on CHP plants.
- Return on investments (ROI) is defined as

$$\text{ROI} = \text{Rate Base} \times \text{Rate of Return},$$

where

Rate Base = (Initial Cost Of Fixed Assets Used For Licensed Activities - Accumulated Depreciation) + Net Working Capital

Rate of Return is the weighted average of returns on investment sources

Net Working Capital = Current Assets Related to Licensed Activities – Short-Term Payables

80. Straight-line depreciation method is applied to the Rate Base, lives of the individual assets depend on the asset type and may range from 5 to 60 years. In order to determine the asset life, the Regulator uses financial accounting methods. Disposal of assets is deducted from the Regulatory Asset Base (RAB). The asset valuation methodology applied by the Regulator uses historic cost, and assets are re-valued every three years.

81. Certain provisions are applicable only to the CHP plants:

- Fuel costs for electricity and heat shall be allocated in accordance with standard fuel consumption rate.
- Fixed costs of CHP plants shall be split between heat and electricity as 30% and 70% respectively.
- Financial losses of heat generation shall be included in the electricity price.
- Return on Investment shall be included only in the electricity tariff

82. From the above principles, it can be noticed that the regulatory approach in Mongolia is a combination of “return-on-invested-capital” and “costs-plus” methods. Assets in construction are not included in the RAB, new or future investments are included in the RAB once the expenditure has been incurred (i.e. ex-post). New capital investments are supposed to be covered with depreciation, and long-term interest payments should be served through application of a reasonable return on investments.

83. Starting from 2014, there is a plan to introduce a so-called “indexation” method for tariff setting which would take into account inflation of cost components. According to the Parliament Regulation N 72 approved in 2010, Mongolia’s energy sector will start to operate under market prices starting from 2014.

84. At the moment, the only affordability criterion applied by the Regulator seems to be the level of electricity and heat expenses for households which shall not exceed 10% of the total household’s income.

85. Currently, the following features of heat payments and tariffs are applicable in Mongolia:

- Generally, heating is metered. If no meters are installed, space heating payment for households is calculated based on apartment area and the tariff per square meter, whereas for companies and state organizations it is based on volume of the building or office occupied and the tariff per cubic meter.
- Tariffs for heating of hot water are either based on meters or on a number of

persons (in such case the tariff either depends on season (heating or non-heating) or on hot water system (closed or open))

- Steam tariffs usually depend on steam pressure

86. The following features of electricity payments and tariffs are currently applicable:

- Energy generating companies have separate charges for electricity (MNT/kWh) and capacity (1,000 MNT / month)
- Retail electricity tariff structure is rather complex. The commercial users are split to two groups: mining, extracting and processing industries (with higher tariffs) and other industries, enterprises and organisations. These consumers can have one-rate tariff, or three-rate tariff depending on the time of the day, with the highest rate applied to the time between 5 pm and 10 pm, and the lowest rate between 10 pm and 6 am. Public lighting companies have two-rate tariffs (maximum from 6 am to 7 pm).
- Households are subject of either one-rate tariff (for this group, the tariff depends on maximum amount of electricity consumption (currently 3 consumption groups are in use)), or two-rate tariff approach. These groups are charged against metered electricity per each kWh consumed.
- In some areas, end-users without meters are charged according to the availability of plug-switches or bulb capacity. They have fixed monthly charges.
- Special tariffs are applied to vulnerable groups. They are charged according to the consumed electricity (MNT/kWh), and the tariff level depends on the amount of electricity consumed during a month. They are split to two groups, and the grouping threshold depends on a region. There are also fixed monthly charges for vulnerable consumers without meters.
- Quite often consumers without meters have different consumption thresholds and / or tariffs depending whether they live in apartments, or in ger districts.

87. There is also capacity connection fee charged by electricity distribution companies. According to interviewees, it has been recently 1,000 MNT/month. This fee is not regulated and quite often is applied only for re-connecting customers who were disconnected earlier for not paying for the services and electricity provided.

H. General Conclusions & Recommendations

88. Regulated tariffs can be economically oriented or affordability led. Economically oriented tariffs can be set by the enterprise itself or by a local authority (city or municipality) with strict observance of instructions and based on regulatory norms. Affordability led tariffs are set by federal, regional or local government authority uniformly for the entire territory (region, city etc.) on a "socially acceptable level". The unpaid heat supply cost is usually covered by the municipal or federal budget.

89. Although regulation is considered to be the key method of the customer's protection, poorly designed tariffs without inclusion of incentives for costs reduction may result in high tariffs for customers. If competition cannot be introduced, it shall be induced by regulation by introduction of incentives for reduction of costs.

90. When return-on-invested-capital approach (usually referred to as Regulatory Asset Base or RAB) is used, it should take into account the following principles:-

- i. Stable energy supply to the customers at least costs and efficient utilization of production capacities;

- ii. Full recovery of costs, which are strictly necessary for regulated activity, technical safety of the system and environmental protection;
 - iii. Efficient and profitable investments into development, modernization and reconstruction of facilities of energy systems.
91. The tariff calculation methodology should provide with detailed guidelines for evaluation of the regulated costs and the rate of return.
92. The rate of return should be defined using Weighted Average Cost of Capital (WACC) method, with clear guidance for its calculation and input data sources (such as for risk-free rate of return). The WACC calculation should take into account at least the country-specific risk, market premium, allowed structure of capital (equity vs. borrowings, etc.), and market beta coefficients used in the CAPM model. The values of these parameters should be specifically defined in the methodology. Under conditions of the emerging market economy, it may be practical to define also costs of borrowed capital used in the WACC calculations. All the above parameters should be reviewed and updated on a regular basis (usually, annually) and according to transparent rules.
93. Since application of a pure RAB methodology may be more expensive option from the end-consumers point of view, several tariff design methods may be officially allowed. For example, an adequate “costs plus” method could be used for existing generation facilities. In this case:
- A. The tariff should allow full cost recovery and inclusion of an adequate investment component
 - B. There should be stimulating measures for cost-efficiency, e.g. through
 - i. allowing the utilities to keep the achieved savings in their “costs” when applying for a new tariff during a certain period of time thus improving their general profitability and availability of financial resources
 - ii. set a tariff common for e.g. all power producers to be equal to the minimal acceptable level for the most expensive utility thus allowing more cost-efficient utilities to get the “efficiency premium” and use it for their investment activities and operating needs
94. The RAB method could be used for financing greenfield generation, transmission and distribution facilities.

VIII. ENERGY POLICY, LAWS AND REGULATIONS

I. Introduction

95. Since April 1997, Mongolia has been a signatory of the Energy Charter. The Country has also ratified the Energy Charter Treaty, PEEREA and the Trade Agreement. The major laws of Mongolia related to the energy sector include Law on Energy, Law on Renewable Energy, Law On Amendment and Alteration to the Law on Energy, Law on Radiation Protection and Safety, Petroleum Law, and Regulation for Implementing the Petroleum Law.

96. Some general laws affecting activities in the energy sector include of Law on Licensing, Law on Concessions, Foreign Investments Law and Law on Regulation of Foreign Investment in Entities Operating in Strategic Sector.

97. In addition to the major laws regulating the energy sector activities, the country developed special energy rules such as Rules of Electricity Consumption, the Grid Code, connection rules to transmission and electricity and heat distribution networks, Heat Consumption Rules, Business Rule Between the Licensees, and rules for resolution of disputes and complaints by the energy regulator.

98. The Government of Mongolia is responsible for development of special documents and policies related to the energy sector of the country, such as master plans, national programs, and state policies. Some examples of such documents are Mongolian Energy Sector Master plan 2000-2020, National Program of Renewable Energy 2005-2020, Mongolian Integrated Power System program 2007- 2040 and State Policy on Fuel and Energy for 2008 to 2015.

J. Review of Energy Sector Legislation

1. Energy Law

99. The Energy Law came into force on April the 15th, 2001 and amended in 2007 and 2011. It regulates production and sales of energy, construction of energy generation and transmission facilities, and supply of energy to consumers.

100. According to the Law, the State Parliament defines state policy on energy and decides on construction of nuclear power plants. The Government is responsible for supervision of energy legislation and state policy execution; establishment of the energy regulator and approval of its charter; determination of the transmission networks boundaries, approval of heating and electricity consumption, and protection of power lines and networks.

101. The Energy Regulatory Commission (hereinafter the ERC or the Regulator) has the authority to regulate activities of providing, distributing, transferring, and producing energy. The Regulator has the following main powers: setting terms and conditions for licencing, issuing, voiding, dismissing, amending and changing licenses; establishing conditions and requirements for attaining a license and the activities of licensees; controlling licensees' performance; elaborating tariff design methods; settling disputes arising between consumers and licensees.

102. A legal entity may conduct the following activities under license granted by the relevant state agency: electricity generation; heat generation; electricity transmission; heat transmission; dispatching; electricity distribution; heat distribution; regulated supply of energy; unregulated supply of energy; import and export of electricity; and construction of energy facilities. The validity of a license for producing and transmitting energy is 5-25 years, for construction of energy facilities 5 years; licenses for other undertakings are valid for 10 years. If the licensor considers that the licensee has been properly meeting conditions and requirements of the license and that its normal operations can be sustained further in terms of technical and technological requirements, the

licensor shall extend the license for up to 25 years.

103. Licenses can be void due to the following reasons: expiration of license validity; bankruptcy and liquidation of the license holder; illegal obtaining of license. There is no remedy for violation of the license during the period for which it was revoked.

104. Licenses are not required for construction and operation of power plants with capacity 1.5 MW and lower, and for construction of its transmission and distribution lines if they do not have any adverse impact on the environment and normal living conditions of people and are designed for own use.

105. A license shall be granted to a financially capable legal entity, which possesses experience or is able to operate in the given field. In case several legal entities submit applications for the same type of license, the license shall be granted on the basis of competitive tendering.

106. Tariff setting principles are specified in Chapter Four of the Law on Energy. Tariffs shall be determined separately for each licensed activity, including generation, transmission, distribution, dispatching and supply of electricity and heat. Tariffs shall be based on actual costs of operation, and least-cost principle shall be followed without jeopardising technical and technological safety in energy generation, transmission, distribution, supply and dispatching. Costs shall be allocated to different customer categories; tariffs shall enable regulation of energy consumption and be sufficient to support financial viability of licensees. The Regulator is responsible for assessing, justification and accuracy of licensees cost estimations and for developing and publishing the tariff calculation methodology.

107. Tariffs shall be reviewed annually by the ERC, Regulatory Boards of Aimags (provinces) and the capital city. On licensees request the tariffs can be reviewed semi-annually. Customers shall pay in accordance with published tariffs for regulated energy supply, in accordance with contract prices for unregulated supply. Energy prices can be regulated and unregulated. The Regulator can define customers eligible for unregulated supply.

108. Chapter Five of the Law on Energy regulates relations between suppliers and consumers and covers general principles of energy supply contracts, rights and obligations of suppliers and customers, payment for energy and imposition of penalties, suspension of energy supply and consumption.

109. Chapter Six of the Law on Energy sets forth principles for control and liabilities. Technical control of compliance with legislation is carried out by the state energy inspection authority. This inspection controls compliance of the licensees and consumers with safety requirements for energy facilities and equipment, consumption of energy, and network protection. The inspection maintains records of boilers and pressurised vessels, tests them according to relevant norms, grants permits for operation of steam pipes with the pressure above 0.07 mPa and water pipes with the temperature above 115oC, and issues quality certificates for repair and assembly works. This inspection is also in charge of investigation of incidents on the energy infrastructure facilities.

110. In case of a dispute settlement between licensees and consumers, the parties shall complain to the ERC, Regulatory Boards of Aimags or of the capital city. If the parties disagree with the decision made, they may appeal to the court. The Law sets compensation principles for damages and liabilities for violation of the energy legislation.

111. The most important amendments introduced in December 2011 included the following:

1. In case of contradiction between national legislation and provisions of an international treaty signed by Mongolia, provisions of the international treaty shall prevail.
2. The Cabinet of Ministers is authorised to establish and approve security reserves and to draft development documents, strategic papers and standards on energy matters and approve rules on financing expenditures related to energy resources on

national level

3. The State Administrative Authority has powers to collect energy related statistic data, to prepare national energy balance, to approve and implement energy resources evaluation rules
4. Governors of Aimags, the Capital City, Soums and districts are entrusted to prepare emergency action plans and preventive measures;
5. The Energy Regulatory Commission is entrusted
 - a. to approve tariff calculation methodology for fuels used for energy generation and revise the calculations;
 - b. to review long-term investment plans of electricity and heat transmission and distribution licensees and resolve issues related to the reimbursement of investments through tariff regulation:
 - c. to approve rules for adjusting energy prices and tariffs according to actual cost fluctuation (so-called "indexation");
 - d. to approve energy-related service fees and charges.
6. Under a contract, a regulated electricity supply licensee may transfer to other physical and legal entities its rights to sell electricity to some consumers. Contracted retailers shall negotiate on selling price. Electricity shall be sold to the consumers under the tariffs approved by the ERC.
7. The amount and price for fuel supplied to electricity and heat generators may be regulated by long-term or permanent agreements.
8. On licensee request, tariff review by the ERC and the regulatory boards of aimags and the Capital City shall be done monthly.

2. Renewable Energy Law

112. The Renewable Energy Law was approved by the Parliament on the 11th of January, 2007. The purpose of this Law is to regulate generation and distribution of energy based on renewable sources, this law is applicable to legal entities generating and delivering heat and electricity. In case of contradiction of national legislation with the international treaties signed by Mongolia, the Law sets forth prevailing regime of the international treaties.

113. The Law specifies the following full powers of State Authorities with regard to renewable energy:

- i. The State Parliament shall define state policies on renewable energy and make decisions on construction of power generating facilities to be financed from the state budget
- ii. The Cabinet shall ensure implementation of the Law and define Soums where consumers are eligible for power supply from stand-alone renewable sources.
- iii. The State Administrative Authority in charge of energy is empowered to develop state policies on renewable energy, to carry out feasibility studies, to draft standards on operation, safety and maintenance of the renewable energy equipment, to develop and approve rules and procedures on implementation of the Renewable Energy Law
- iv. Governors of Aimags, The Capital City, Soums and Districts are authorised to include renewable energy facilities in land development plans, and to allocate land plots for construction of the said facilities.
- v. The ERC shall review tariff applications of generation license holders, and approve a template for agreements between generation and transmission

companies.

114. Any entity intending to generate energy from renewable sources shall apply for a license as specified in the Law. The Law also specifies duties and rights of entities generating and transmitting energy produced from the renewable sources, and main provisions of power purchase/sale agreements to be concluded between them.

115. The Law sets specific ranges of tariffs and prices for energy generated from the renewable energy sources (wind, hydro, solar) and for its delivery. Tariff differences for energy produced from renewable and conventional sources shall be included in tariffs of other licensees connected to the grid.

116. The authority to set tariffs for renewable power is split between the ERC and the regulatory boards of Aimags and the Capital City, and is based on capacity of renewable energy power plants. The prices and tariffs for power produced from renewable sources shall be effective and stable during at least 10 years since the approval of the Law.

117. Charter Five of the Law stipulates establishment of a special Renewable Energy Fund which shall be established and regulated by provisions of the Law on Government Special Funds. Fifty per cent of the Renewable Energy Fund shall be financed through proceeds assigned to the state and local property entities and institutions from selling of certified emission reduction units (CERs) in compliance with the Kyoto Protocol.

3. Law On Licensing

118. In accordance with the Law on Energy, all entities intending to generate, transmit, dispatch, or distribute energy shall apply for licenses. Legislation on licenses consists of the Law on Licensing and the Civil Code. The Law on Licensing entered into force in January 2002 (with the original text dated from February 2001). The objective of the Law is to regulate activities related to issuing, suspending and revoking of licenses required for business activities which can cause adverse effect of public interests, human health, environment and national security. The Law specifies other national laws requirements of which shall be fulfilled when licenses are required for land and natural resources use. In case of contradiction with national legislation, the Law sets forth prevailing regime for international treaties signed by Mongolia.

119. The Law on Licensing:

- i. Regulates contents, scope and expiry date of license and its extension (it shall be issued for three years and can be extended unless otherwise stated by laws), procedure for issuing a license;
- ii. Defines principles to be observed by bodies authorised for license issuing;
- iii. Specifies list of documents to be submitted when applying for license;
- iv. Defines that a license shall be issued within 21 business days after submission of the application; if the application is rejected, the reasoning shall be explained to the applicant in writing;
- v. Defines conditions for suspending and revoking of licenses.

120. The Law defines business activities which require licensing, including construction of energy generation facilities and energy transportation infrastructure; production and transportation of energy; dispatching, and energy distribution and sales.

4. Licenses For Energy Related Businesses

121. The Energy Regulation Commission developed special guidelines for license application including list of documents to be submitted. The Commission is responsible for issuing licenses for the following activities: dispatch, electricity transmission, electricity export

and import, regulated supply of electricity and heat, distribution of electricity and heat, generation of electricity and heat. Below are examples of requested documents when applying for electricity and heat generation, and distribution of electricity and heat.

- i. An application for power and heat generation license shall include the following documents: state registration of the applicant's company, technical and economical reasoning (technical and economic feasibility to perform energy generation with certain equipment; costs, profit and loss calculations); quantity and quality of energy to be generated including reliability and transmission and distribution bottlenecks; main characteristics of equipment to be used; scope of services, ownership boundaries, energy generation, supply and consumption balance; environmental impact assessment and action plan for environmental protection; financial capabilities including sources of financing; description of skills and experience of the technical personnel.
- ii. An application for power and heat distribution license shall include the following documents: state registration of the applicant's company, technical and economical reasoning (technical and other feasibility to perform energy distribution; costs, profit and loss calculations); type, quantity and quality of electricity to be distributed including reliability and distribution bottlenecks; main characteristics of equipment to be used; scope of services, ownership boundaries, energy generation, supply and consumption balances; environmental impact assessment, environmental action plan; financial capabilities including sources of financing; description of skills and experience of technical personnel.

122. The decision on licensing shall be done within 60 days after receiving the application. Energy generation and transmission licenses are valid between 5 and 25 years, license for construction of energy facilities can be valid during up to 5 years; other licenses are valid up to 10 years. Licenses can be awarded as the result of a competitive tender procedure.

5. Regulation of Business Relations Between Licensees

123. Business relations between the energy sector licensees in the Central Energy System (CES) are regulated by the Business Rules between the Licensees approved in 2003. These rules were developed to enable the Single Buyer Model (SBM) introduced within the CES in 2002 and the related automatic cash flow settlement mechanisms. The Single Buyer purchases electricity produced by five power plants operating in the CES and imported from Russia, and sells it to the ten electricity distribution companies.

124. In compliance with the Law on Energy, these Rules regulate business relations among electricity generation, purchase, import, transmission, distribution, supply and dispatching licensees, define the terms and conditions of agreements to be made between the parties, level and quality of services, service fee payment conditions, and rights and obligations of the licensees.

125. The following agreements shall be concluded:

- i. Power Purchase Agreement (PPA) between the generation and transmission licensees,
- ii. Power Sale Agreement (PSA) between the transmission and distribution/supply licensees,
- iii. Prompt Regulation Agreement between the dispatching and transmission Licensees

126. The Rules define principles of the SBM market in Mongolia and specify content and attachments to PPAs and PSAs, and deadlines for informing the dispatching and transmission licensees on the annual amounts of energy ordered by distribution/supply licensees. Annual energy purchase orders of distribution and supply licensees shall be submitted to the transmission and dispatching licensees by the 1st of August, and can be adjusted on request of the distribution and supply licensees by the 1st of November.

127. Based on an electricity purchase order of the transmission licensee and a heat purchase

order of heat distribution and supply licensees, the dispatching licensee shall estimate initial parameters of the operational regime of generators and deliver the estimates to generators. The ERC shall inform the licensees about the tariff change at least by 15 days beforehand, and these changes shall be reflected in PPAs and PSAs within 15 days after the notification has been received by the agreement parties.

128. The Rules define rights and obligations of the licensees, as well as requirements for service, electricity and heat qualities. The Rules set principles of energy payment and settlements, regulation of cash flows generated by energy payments, and evaluation of damages caused by misconduct of the licensees, and address operational principles in force-majeure and emergency situations.

129. If the annual amount of purchased power deviates for more than 2% from the purchase order, and if such deviation causes losses for the seller, the buyer shall compensate the losses directly to the seller.

130. If the distribution / supply licensee fails to implement the dispatching regulation and distributes less electricity, the penalty equal to the price of imported electricity shall be applied to every unit of undistributed electricity.

131. If a generator produces more power than requested by the dispatching licensee, this excess shall not be regarded as sold electricity.

132. The heat sales agreement with a heat generator shall include conditions on compensation of licensees if heat does not meet quality standards, and if amounts of feed water and norms of lost condensate are different from the agreed.

133. A licensee purchasing energy in unregulated mode (i.e. without having special purpose settlement accounts defined in the Article 9 of the Rules), is obliged to obtain a bank guarantee securing the full payment in accordance with the payment conditions agreed upon.

134. If the licensees fail to settle disputes, they shall transfer them to the ERC. The ERC approved special rules which are used for resolving complaints and disputes arising between the licensees, as well as between the licensees and consumers. If the licensees disagree on decision of the ERC, they can appeal to the court.

6. Law On Concessions

135. The Law on Concessions was approved in 2010. The objective of this Law is to regulate matters related to the organization of tenders for granting investors concessions over state and local property, conclusion, revision and termination of concession agreements, and settlement of disputes. Prior to the approval of this Law, Mongolia had approved the state policy on PPPs in October 2009. The Law on Concessions defines a concession as “an exclusive right to possess, operate, create and renovate state and local property assets for purposes of rendering basic social and infrastructure services to the public on the basis of an agreement on conditions and terms specified by this Law”.

136. The Law, defines the following concession types:

- i. Build-Operate-Transfer;
- ii. Build-Transfer;
- iii. Build-Own-Operate;
- iv. Build-Own-Operate-Transfer;
- v. Build-Lease-Transfer;
- vi. Design-Build-Finance-Operate;

vii. Renovate-Operate-Transfer.

137. In accordance with the Law the concession agreement shall specify issues related to the ownership of the concession item. The state or local authority shall own the concession item renovated, or tangible assets and intellectual property created under the concession agreement unless otherwise is provided.

138. The government is in charge of approving and revising the list of concession items for state-owned property, deciding of granting a concession agreement and authorising the state to enter into a concession agreement. The state administrative authority in charge of the state property shall prepare and submit to the government a draft list of concession items for state-owned property, inform the public on the list of concession items, establish and maintain the national centralised registry and database on concessions and exercise other powers specified by the legislation. The governments of the Aimags and the Capital City shall prepare and submit to the Citizens' Representative Assemblies draft lists of concession items for locally-owned property. The Law specifies a procedure for preparation of the list of concession items and its content. The list of concession items for state-owned property shall be approved by the government, and for locally owned property – by Citizens' Representative Assemblies.

139. Concessions shall be granted by selecting the project through a tender. The two stage tender procedure can be applied. The Law stipulates requirements for preparation of a tender, its organization and announcement, selection of participants, submission of proposals, and their evaluation. The procedure of submitting project bids and their evaluation shall be open to the public and shall be published in daily newspapers.

140. Under specific circumstances, a concession agreement can be negotiated directly. The circumstances include national security and intellectual property concerns, unavailability of eligible proposals, or when a concession is transferred to other entities due to failure or non-performance by the concessionaire to properly perform under the concession agreement, or if it is bankrupt or liquidated. In the latter case, the transfer is initiated by the concession financier.

141. The Law defines the parties to a concession agreement, its contents, duration and extension, its revision, expiring and termination, as well as rights and obligations of a concession financier and a concessionaire among which a provision allowing a shareholder of the concessionaire to pledge its shares to finance the concession.

142. Guarantees for the implementation of the concession are set forth by Chapter Seven. It is explicitly stated there that “the fact that a participant in the concession tender does not have a license required for the particular works and services as specified in the relevant laws shall not serve as a ground for excluding the participant from the tender”. If the license is required for implementation of works by the concessionaire, it shall be granted as soon as possible upon conclusion of the concession agreement. The state may provide support to the concessionaire such as issuing of a loan guarantee, participation in financing, tax exemptions, provision of insurance, or issuing a guarantee for the minimum amount of the concessionaire's revenue under the concession agreement.

143. If the parties set the payments and tariffs for the works and services to be rendered under the concession agreement below their actual costs, the parties may agree to reimburse the difference from the state or local budget. The reimbursement shall be provided to the concessionaire until the concessionaire operates without financial losses taking into account the nature of the concession item and of the industry in question.

144. The Law regulates risk allocation of concession. Unless the concession agreement provides otherwise, the concessionaire shall fully bear the business risks associated with the implementation of the concession. The concessionaire shall be fully responsible for losses and damages caused to others and liabilities to third parties that result from its own wrongful actions during the possession and operation of the concession item.

145. Unless the law and the concession agreement provide otherwise, rights and obligations

of the concessionaire cannot be assigned to third parties without the consent of the authorized entity. The concession agreement shall provide with conditions for the authorized entity for such consent. If the concessionaire has seriously and/or repeatedly breached the concession agreement and failed to meet the demand to rectify the breach, the authorized entity may temporarily take over the concession item subject to the terms of the concession agreement to ensure the uninterrupted delivery of the works and services to be rendered by the concession agreement.

146. The Law stipulates transparency requirements (the list of concession items and its revisions, publicity of each concession agreement, its content), settlements of disputes, and penalties imposed for violation of the legislation on concession.

7. Foreign Investments Law

147. Foreign Investment Law entered into force on July 1st, 1993 as part of a legislative reform package which included an overhaul of the Tax Law. While similar in many respects to the old Foreign Investments Law of 1990, the new Law was drafted because of appeals by foreigners and included more specific regulations on labour regulation for foreign employers. The law was amended in February, 2008. Pursuant to this Law, foreigners are permitted to invest in any branch of the economy unless laws or regulations stipulate otherwise. The most notable prohibition is provided by Constitution of 1992, which forbids foreign ownership of land.

148. In case of inconsistencies of the Foreign Investments Law with international treaties to which Mongolia is a signatory, the international treaties shall prevail.

149. According to the Law, foreign investment can have the following forms:

- i. establishment of legal entity which is wholly owned by foreign investor;
- ii. establishment of a joint venture with Mongolian partners
- iii. direct investment by purchase of securities of Mongolian business entities;
- iv. acquiring rights by law, concession, or contract to exploit and process natural resources;

150. A business entity incorporated under the laws of Mongolia with foreign contribution to its statutory not less than 20% is regarded as Foreign Invested Company.

151. Establishment of a business entity with foreign participation is done based on application of investors and is subject of approval by the Ministry of Trade and Industry.

152. Foreign investments are subject for exemption from custom duties in the following cases:

- i. Technological equipment and machinery which forms part of the registered capital of a business entity with foreign investment shall not be subject to customs duties and sales effective from the date of approval of the establishment of that business entity by the Ministry of Trade and Industry
- ii. All business entities with foreign investment, except those in trading and catering, shall not be subject to customs duties for 5 years when importing raw materials, components, spare parts, and materials for production effective from the date of registration by the General Department of State Taxation.

153. Tax preferences are granted to some industries including power and thermal plants and their transmission networks. They will receive 10 years tax exemption and 50% tax relief during the following 5 years period.

154. If a foreign investor reinvests income in the same business entity in Mongolia, the taxable income of the concerned business shall be subject to a deduction equal to the amount of such reinvestment.

155. Land used by a business entity with foreign participation is leased according to conditions and procedures set forth in the land laws of Mongolia. The duration of any lease shall be determined according to the duration of the business operations. The initial term of a lease shall not exceed 60 years, and can be extended once for a period of up to 40 years under the initial conditions.

156. Leasehold land may be substituted or taken back for a specific state purpose. Decisions concerning this matter shall rest exclusively with the Government of Mongolia. The amount of compensation for losses suffered by a foreign investor shall be determined on the basis of value at the time of such substitution or transfer.

157. Foreign investments within the territory of Mongolia must enjoy legal protection guaranteed by the Constitution, the Foreign Investments Law and other legislation which is consistent with those laws and as guaranteed by international treaties to which Mongolia is a party. Foreign investments must not be unlawfully expropriated. The government may expropriate foreign investments only where such action is in accordance with due process of law and is performed on a non-discriminatory basis. The value of such compensation is determined according to value of expropriated investments as measured from the date of expropriation. Foreign investors are guaranteed equal treatment under the law for losses caused by force majeure.

158. Foreign investors also have the following additional rights: (1) To possess, use, and dispose of property invested, including right to repatriate investments made for formation of registered capital; (2) to participate in management of an entity in which it has invested; (3) to promptly remit abroad its share of profits, dividends and proceeds from sale assets; (4) to transfer rights and obligations to other persons in accordance with the law.

159. In May, 2012, the Parliament of Mongolia adopted the Strategic Entities Foreign Investment Law (SEFIL). This Law concerns three sectors (mining; banking and finance; media, information and communication). The Law is applied to the following companies:

- i. foreign state-owned entities wishing to invest in an entity operating in Mongolia
- ii. foreign entities wishing to operate in a strategic sector, or to make a transaction with a strategic entity

160. In the above cases, the foreign investors should obtain permit from the Government of Mongolia. According to the initial version of the Law, if the foreign investor's share in the company operating in the strategic sector exceeds 49% and investment is more than 100 billion MNT (ca. 71 MUSD), the State Parliament decides on the submission of the permit.

161. In March 2013 the Government submitted a revised draft of the SEFIL to the Parliament, aiming to ease conditions and so encourage foreign investors. The amendments were approved in April 2013.

162. The amendment will exempt privately-owned foreign companies from the scope of the Law. However, the amendments also tightened the restrictions on foreign state-owned entities (SOEs), removing the 100-billion MNT threshold triggering government intervention. That means all foreign SOEs will need the approval of Mongolia's cabinet in order to buy into a Mongolian firm, regardless of the size of the stake. For purchases of stakes of more than 49%, the approval of parliament will also be required.

8. Rules of Electricity Consumption

163. The objective of the Rules of Electricity consumption, approved by the Government of Mongolia in 2001, is to regulate interactions between consumers and electricity transmission, distribution and supply licensees (hereinafter "Transmitter", "Distributor", "Supplier") to enable implementation of the Energy Law. In order to get connected to the electricity system, the customers shall apply to a Transmitter or a Distributor for technical terms. The Rules specify

requirements for the customer electrical equipment, duration of the application consideration, content of the technical terms, validity of issued technical terms, and other provisions. The supplier who issued technical terms shall be liable for damages occurred due to inadequate and unjustified technical estimations.

164. Consumer and supplier shall conclude an energy supply contract pursuant to Article 28 of the Law on Energy. The energy consumers eligible to unregulated supply have the right to choose between regulated and unregulated supply. The Rules define the main items of supply contracts with individuals (households) and legal entities, procedure of connecting the customers to the electricity transmission networks, the rights and obligations of customers and suppliers.

165. All consumed electricity shall be metered, the meters shall be installed by consumers. The Rules specify requirements to switchboards used by consumers, and frequency of meter checks. Repair and replacement of the meters shall be subject to consent of supplier.

166. Electricity shall be paid based of the meter readings. If electricity meters do not meet requirements set forth in the Rules, the payment shall be based on the average electricity consumption within the last three years.

167. The Rules stipulate principles for regulation of reactive power applicable to large industrial consumers (with connected capacity more than 250 kVA and reactive power not less than 10% of the connected capacity) and for estimation and compensation of damages.

168. The state energy organization, state inspectors and authorised supplier officials shall control fulfilment of provisions of the Rules. Public Inspections shall be implemented by the Consumer protection authority

9. Heat Consumption Rules

169. The purpose of the Heat Consumption Rules approved by the Government of Mongolia in 2001 is to regulate interactions between consumers and heat generation, transmission, distribution and supply licensees, and to determine their rights and responsibilities for enabling implementation of the Energy Law. These rules are compulsory for all parties involved into the heat supply chain. Transmitter, distributor, supplier and consumer are fully responsible for their equipment and networks, for arrangement and paying for all necessary inspections, maintenance and renovation works. The state energy organization and a person authorised by the transmitter, distributor and supplier shall control operation and safety of heat network pipes and equipment.

170. In case of a new construction, change of loads or modernisation of equipment, in order to be connected to a heat network, the customer shall request technical terms from the distributor and supplier. The application shall be considered within 15 days. The Rules specify issues to be addressed in the technical terms. Validity of technical terms can vary from 1 to 3 years, and can be extended.

171. The Rules stipulate signing procedure of a heat contract with individuals and industrial/commercial customers, specify issues to be addressed, set requirements for connection of customers to the heating network, and define rights and obligations of consumers and suppliers.

172. Heating network and equipment of transmitter, distributor and customer shall be equipped with meters, payment controlling and automatic adjustment means.

173. Payment shall be based on meter readings and approved tariffs. If the meter is broken, the payment shall be calculated by using open tariff (blueprint). The Rules define payment procedure and incentives/penalties related to heat payments.

174. The Rules define reasons for suspension of heat consumption and the persons responsible for decision-making. Such decision shall be well justified and the reasons shall be conveyed to the customer.

175. The Rules define estimation and compensation for damages. The customer shall immediately notify the supplier on heat supply interruption and it shall be jointly documented. This document shall be a ground for any damage estimate. If the parties fail to resolve the dispute by negotiations, they can appeal to the court.

10. Grid Code

176. The Grid Code (adopted in 2001) regulates technical activities of licensees involved in power and heat generation and supply. It shall be followed by the Central Region grid, Western Region grid, Eastern Region grid and all other licensed entities operating as components of these grids.

177. The Code addresses the following issues:-

- i. **Quality assurance.** All licensees “operating as a component part of the Grid” shall monitor frequency, voltage and continuity of electricity supply during their operation. Frequency deviation in the Grid shall be not more than ± 0.2 Hz from the Grid’s average frequency within 10 minutes. Voltage at the control point shall be within a range specific for each level (6 kV, 10 kV, 35 kV, 110 kV, 220 kV). Power supply shall be without interruption. The consumers shall be informed about power interruptions lasting more than 4 hours.
- ii. **Role of the National Dispatching Centre (NDC)** and the System planning. NDC functions are specified as permanent control, operative coordination and regulation of the grid’s voltage, temperature and pressure of industrial steam and water distribution lines. The NDC shall receive orders for monthly, quarterly and annual estimated energy demand and balance the grid
- iii. Detailed instructions for connection to the Central Regional Grid
- iv. Purpose and services of dispatcher communication system
- v. Principles and procedures of system operation
- vi. Balance regulation and network loss estimation
- vii. Planning and regulation of daily operation
- viii. Rules for cross-border parallel operation of the energy systems
- ix. Reporting and collection of information and data
- x. Specific operating procedures

178. The grid companies extend the networks at the expense of the municipal and state budgets. The payment for the connection is set by the grid enterprise. The transmission company and the Ministry are responsible for electricity transmission planning.

11. Connection Rules

179. Connection Rules include specific rules regarding connection to the Central Electricity Transmission System, Ulaanbaatar electricity distribution network, and Ulaanbaatar district heating system. These rules regulate connection of equipment and facilities, and receiving of energy by individuals and business entities.

180. The structure of these documents is fairly similar and addresses the following main topics: financial conditions, procedure for application and issuing of technical terms, technical terms validity and introduction of changes, content of the technical terms.

12. Conclusions

181. Mongolia is attracting great interest due to its reserves of minerals and its rapid economic development. The Country's economic transformation brings with it a critical need to modernize its aging energy infrastructure and expand its power and heat distribution systems.

182. Realising this challenge, the country has made significant efforts in developing legal environment which would improve business rules in power and heat sector, encourage development of environmentally friendly technologies, and help to improve financial state of energy licensees.

183. The Energy Law of Mongolia provides the legal framework for restructuring the energy sector from centrally planned to market-based. The Law aims to create competition and increase private participation and investment and authorises creation of an independent energy regulator, as well as gives powers and responsibilities to key institutions involved in managing and operating the energy sector.

184. Heat and power generation, transmission, distribution, supply, export and import are subjects for licensing. The rules for licensing are stipulated in the Energy Law and the Law on Licensing. Small power plants (1.5. MW max) are not subject for licensing which eases possibilities for establishing small-scale power facilities for local needs. According to the Energy Law, a license is granted to a financially healthy entity with needed experience in the area of the licensed business activities. Competitive tendering is applied in case of several candidates. However, while the current licensing procedure is concerned with such important aspects as security and reliability of the power and heat supply, it lacks incentives for competition in the sector, especially because of non-competitive extension of existing licenses and partly due to overwhelming state ownership over the major energy licensees.

185. The Renewable Energy Law should encourage alternatives to the development of coal-fired large-scale power plants and is doing so by promoting wind, solar and hydro energy. It offers tariffs for renewable energy power projects including stand-alone generating assets. In addition, the Law creates incentives for using the Kyoto Protocol mechanisms through establishment of the special Renewable Energy Fund.

186. The Grid Code regulates functional and operational relations of the power plants and grid companies. The Code explicitly specifies that the Central Region Electricity Transmission Company shall not use its advantageous position to impose unjustified requirements for private and legal persons applying for grid connection. There is a certain ambiguity whether the same rule is applied to other distribution companies, and it should be removed by clearly obliging all licensees to follow this rule. It shall be noted that the Mongolian energy legislation does not use the term "third party access" and there is no direct statement on non-discriminatory access of new market players to the grid except the above statement from the Grid Code.

187. The Business Rules between the Licensees enable implementation of the Single Buyer Model (SBM) which helped to resolve urgent payment collection and liquidity problems earlier faced by the energy sector licensees. Despite of certain general controversy around the Single Buyer approach, it has been a successful solution for the time of its implementation. A well-functioning SMB with dispatch order based on technically verified variable costs could still serve the power and heat needs of the country until the moment is right to introduce a more liberalised power market.

188. The Law on Concessions opened new opportunities to get private business involved in implementation of projects in the energy sector of Mongolia via mechanism of public-private-partnership (PPP). The Law provides a complete framework for concessions in Mongolia including provisions for approving projects to be developed using specific concession model, recognizing a variety of concession structures, and putting in place a tender process managed by the State Property Committee for state assets or by local governors or Aimags for local assets.

189. In the EBRD's opinion, the Law on Concessions explicitly provides for a full range of PPP deal as well as for all sort of security instruments, and for the possibility of Government support and guarantees together with specific chapter on lenders rights providing for the possibility of direct agreement as well as step-in right in accordance with lenders expectation to ensure the bankability of project finance deals.

190. At the same time, despite a general approval of the concept in principle, foreign and domestic investors criticize the operative legislation. Potential investors see few incentives in the design of the PPPs. As currently envisioned, most Mongolian PPPs seem to allow for recovery of costs and a very limited horizon for operation (and profit generation) before the asset must be returned to the Government of Mongolia (GOM). In essence, investors argue that the GOM wants them to act like fee-for-service contractors but declines to compensate as they would be such a contractor. Until the GOM amends these unattractive features, investors will likely pass on Mongolia's PPP opportunities.

191. Protection of Foreign investments in Mongolia is guaranteed by the Foreign Investments Law which stipulates that foreign investment shall enjoy legal protection as guaranteed by the current Mongolian legislation and the international treaties to which Mongolia is a signatory. The law guarantees non-discriminatory treatment of foreign investors regarding to possession, use, and disposal of their investments.

192. However, according to information of the Bank of Mongolia, foreign direct investment dropped by 17% in 2012. This drop followed the introduction of certain legislative measures, among which is the Strategic Entities Foreign Investment Law (SEFIL), which was adopted in May 2012. The Law concerns mining, banking and finance, and media, information and communication sectors.

193. Despite the SEFIL is not applicable directly to the energy sector, it can adversely influence its development. As forecasted by the Ministry of Energy of Mongolia, the share of the mining industry in power consumption is expected to increase from 24% in 2014 to 43% by 2020. Thus limitations related to the foreign participation in mining sector may directly influence power sector expansion plans through slow-down of development in mining, lower energy demand and decreased participation of foreign investors in building new power generation capacities for mining industry