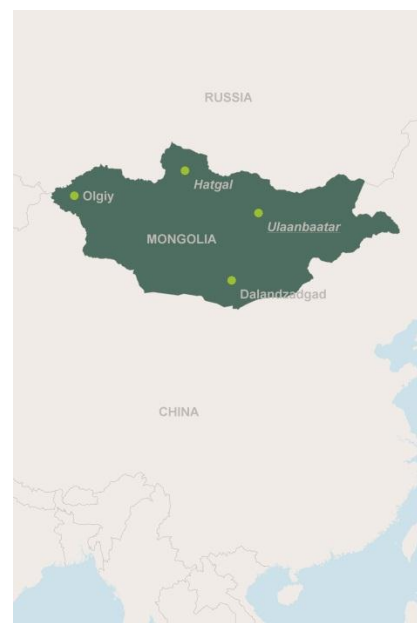


Ex post evaluation – Mongolia

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Sector: Electricity transmission & distribution (23040)
Project: A) Sectoral programme Energy I (No. 2000 66 183)*,
 B) Accompanying measure (No. 2000 70 250)
Programme executing agency: Ministry of Energy (MoE)



Ex post evaluation report: 2014

		Project A (Planned)	Project A (Actual)	Project B (AM- Planned)	Project B (AM-Actual)
Investment costs (total)	EUR million	22.29	27.31	0.26	0.26
Own contribution	EUR million	3.62	3.73	0.00	0.00
Funding	EUR million	18.67	23.58	0.26	0.26
of which BMZ budget funds	EUR million	7.67	12.58**	0.26	0.26

*) Projects in 2014 random sample

***) EUR 12.625 million pledged, less residual funds of EUR 0.043 million

Description: Immediate support measures to strengthen the central interconnected grid, cofinanced by Sweden's SIDA (11 million EUR) with the following FC components: a) construction of a load dispatch centre as well as remote control equipment with a data transmission system; b) replacement of circuit breakers (110kV) in power plants in the capital city; c) major overhaul of the Darkhan power plant's 110kV switchboard; d) rehabilitation of the DC supply in 21 substations; e) replacement of automatic meter recording at central transmission points; f) expansion of the Ministry of Energy's training centre as part of the accompanying measure and in coordination with GIZ/GTZ.

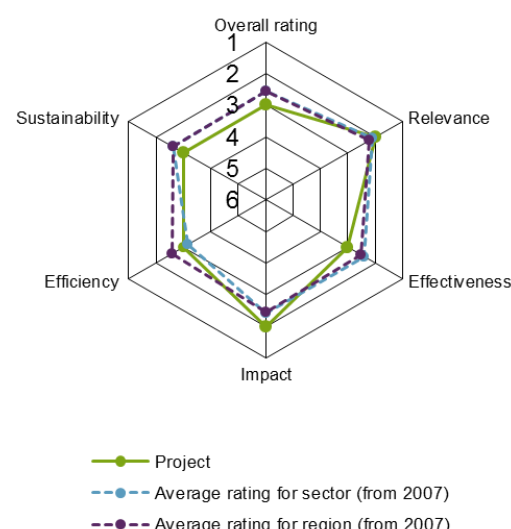
Objectives: The intended impacts of the project were a) improved living conditions for the growing population by virtue of a secure electricity supply ("access" dimension) and b) boosting the economic development of the country ("growth" dimension). The programme objective (outcome) was to improve power plant utilisation, energy and load management as well as network operation.

Target group: All electricity consumers in the country (private households, businesses, public facilities)

Overall rating: 3

Rationale: The project achieved satisfactory overall impacts under difficult general conditions in the energy sector. Without any significant expansion of the national power plant capacity since 2000, this helped raise the population's connection rate from 65 to roughly 90 % and cover a three-fold increase in power demand from households and companies. That said bottlenecks, particularly with view to sector financing and cost-covering tariffs, which yet have to materialise, are hampering long-term investment planning as well as the necessary modernisation and expansion measures in the sector.

Highlights: With the help of the project, more than 1.5 TWh of additional energy can be supplied. Alternatively, from an economic perspective, a much more costly expansion of the power plant capacity by at least 200 MW would have been required (approximately) to provide for the same amount of energy.



Rating according to DAC criteria

Overall rating: 3

Despite a clear shortcomings in the overall conditions (especially sectoral financing and insufficient cost recovery ratios due to the current pricing structure) the project itself still demonstrates satisfactory results. On the one hand, this is due to positive evaluations of relevance, effectiveness and overall developmental impacts, and to the operational staff's high commitment and professionalism on the other. The project has had remarkable effects on the population and the dynamically growing economy so far, but almost all of the capacities established through the project have now reached their performance limits.

Relevance

At programme appraisal, shortages in electricity supply were - and continue to be - an obstacle to the country's economic development. The project addressed one of the largest developmental constraints by aiming to improve power plant usage and network operation in the central Mongolian distribution network. The installed power plant capacity has not significantly increased since programme appraisal (880 MW in 2000), while electricity sales over the same period almost tripled from roughly 1.6 to now 4.3 TWh, with electricity imports from Russia making up roughly 30 %. The increased demand can be explained primarily by the sustained economic growth at an annual rate of approximately 8 %, and an increase in the connection rate of the population from about 65 % in 2000 to the current figure of about 90%.

The project concept comprised necessary but not sufficient interventions in the electricity sector at a very significant point. Together with parallel financing from the Swedish SIDA it was designed – with a limited budget – as a set of immediate measures, which were far from being able to cover all the requirements in the field of electricity transmission.

The energy sector has been a top priority of German-Mongolian cooperation since the 1990s. At programme appraisal the project complied with the developmental priorities of German development cooperation (DC) and the Mongolian government. The project is still coherent with the development plans of Mongolia and the Mongolian-German sectoral strategy papers of 2010. Overall, its relevance can be considered good.

Relevance rating: 2

Effectiveness

The achievement of the project objectives was to be assessed against uninterrupted operation of the renewed circuit breakers over a period of ten years. With an eight year's operation period without disruptions or breakdowns, this indicator can be plausibly expected to be fulfilled. However, it only reflects the programme results in part. The following indicators determined ex-post are used as complementary assessment benchmarks for this evaluation (output and outcome level):

- Power plant utilisation has increased by 60 % since the appraisal. This and the decreasing amount of non-delivered energy amounting to about 1.5 TWh per year cannot be entirely attributed to the programme measures (including load distribution), but significantly so.
- Despite the considerable expansion, losses in the central transmission network were reduced by approximately 40%.
- While the number of larger, unexpected disruptions or shutdowns before the load dispatch centre's commissioning ranged between five and over twenty per year, this figure is now no more than one major disruption per annum.
- According to indications, the DC voltage replacement in 21 switchboard plants has significantly reduced the number of black-outs in the respective control and protection systems. However, this cannot be exclusively attributed to the programme measures.

- The practice laboratories installed for the Ministry of Energy's training centres, contributed and still contribute to the development of the necessary expertise within the Mongolian energy sector and benefit the public utility companies as well as their customers.

Since 2000, the project measures have helped improve the quantity of supply to households and companies (network expansion, increase in connection rate) as well as quality (esp. supply security) without any significant expansion of power plant capacity.

It should be noted here that the positive effects cannot be attributed to the programme alone, as they are also the consequence of a parallel immediate sectoral aid programme implemented by the Swedish SIDA - which was closely coordinated closely with this project.

One drawback, however, is that - as a result of increased network load - some positive effects of the programme (such as the decline in losses and incidents) are being offset, at least partly, with no remedial action in sight as yet. Essential elements that were facilitated by the project have now reached their capacity limits. In particular, a further – now urgently necessary – extension of the existing load dispatch centre (comprising only the 13 most important switchboard plants out of 64) is no longer possible due to the original design, which was appropriate back then.

Summing up, the effectiveness of the project can be rated satisfactory.

Effectiveness rating: 3

Efficiency

The load dispatch centre and switchyards started operating with a delay of eighteen and six months, respectively; DC supply and automatic meter reading components were delayed for up to six years. This was due mainly to the late arrival of the consulting engineer as well as major coordination problems concerning the detailed design of the load dispatch centre and the switchyards. Establishment of the fibre-glass-based communication systems expansion around Ulan Bator as well as the training centre went according to plan. The costs for all components are consistent with international standards. Considering favourable unit costs on the one hand and significant implementation delays on the other, production efficiency can be assessed as satisfactory.

From an economic perspective, a summarised assessment is not straightforward: Firstly, efficiency gains derived from improved power plant utilisation and the decrease in non-delivered electricity (more than 1.5 TWh/a - see above) should be highlighted as a positive result. In order to make such an amount of energy available, it would alternatively have required to build an additional power plant of more than 200 MW (approximately) costing four times as much as the amount invested in the current project. Secondly, however, there are limitations because of insufficient cost recovery ratios in the overall system. At best, operating expenses can be covered at the current average tariff of approximately 0.03 EUR/kWh; however, there is no leeway for replacement or similar investments. The current practice, whereby debt relief is granted to operators by the state at short notice or loans are provided at reduced interest rates (normally on an ad hoc basis) does not allow for long-term investment planning. However, that is exactly what is urgently required - given the investment backlog coupled with the parallel increase in demand for power by approximately 10 % p.a.

Altogether, we assess the project's efficiency as just satisfactory.

Efficiency rating: 3

Impact

The overall objective was to contribute to economic development as well as to improved living standards in central Mongolia via a more efficient electricity supply, without specific indicators having been set.

Even though power supply is still beset by considerable shortages, the project clearly supports supply security – through improvements that are necessary but far from sufficient. Therefore, positive effects on the country's economic development can be plausibly claimed. The supported measures improve the availability of electrical energy and allow the more efficient management of the sector, thereby helping to eliminate economic bottlenecks. Otherwise the supply situation would be far more precarious.

Due to limited power plant capacities and external challenges (see above) the project has been prevented from exercising its full potential, and increasingly so. Extensive investment in the modernisation and development of the system is urgently needed (including the renewal of the load dispatch centre, standardisation of the automatic meter recording by standardising the meter types and the communication protocols, rehabilitation of all switchyards, compensation of reactive power, network-wide fibreglass communication).

If the aforementioned stabilisation effects (see section on “Effectiveness”) are compared to the trend for electricity demand, the contribution to economic development can be quantified to a certain extent. Demand nearly tripled from 1.6 TWh in 2000 to 4.3 TWh (2013), without significant expansion of power plant capacity.

The project has contributed to improved standards by expanding the network and therefore allowing for increase in the population's connection rate from approximately 65% currently about figure 90%. Power generation in Mongolia is predominantly accompanied by heating supply; thus, the increased availability and more reliable operation of power plants has led to improved heating services for the urban population living around the power plants. -This is of particular importance, given the extreme climatic conditions in the country.

Overall we assess the project's developmental impacts as good.

Impact rating: 2

Sustainability

The transmission utilities have qualified and – as far as could be stated during the mission - motivated staff, which is also reflected by the low staff turnover (< 5 % p.a.). Due to the prevailing operational challenges (especially in financial terms), crisis management frequently remains the only option; according to information received, this approach sufficiently smooth operations. The recent network expansion also led to an increase in complexity and operational management requirements for power generation and transmission.

In order to guarantee the sustainability of the project's positive effects, the utilities' financial situation has to be improved in a way that enables regular maintenance and repair of the facilities as well as timely rehabilitation of more vulnerable system components. Targeted price increases are inevitable in our opinion, which will appropriately have to take into account the different customer groups' ability to pay.

According to previous experience, the political importance of the sector is so high that a financial “dehydration” of the utilities appears unlikely. However, selective support measures by the government tend to be delivered ad hoc and on short notice; the price of this is inadequate planning security on the utilities' side. The plants supported through the project have at least been operated properly so far. For instance, a tele service and maintenance agreement with a supplier specifically for the maintenance of hardware and software in the load dispatch centre was financed from own funds.

Overall, the sustainability of the project can be rated satisfactory.

Sustainability rating: 3

Notes on the methods used to evaluate project success (project rating)

Projects (and programmes) are evaluated on a six-point scale, the criteria being **relevance, effectiveness, efficiency** and **overarching developmental impact**. The ratings are also used to arrive at a **final assessment** of a project's overall developmental efficacy. The scale is as follows:

Level 1	Very good result that clearly exceeds expectations
Level 2	Good result, fully in line with expectations and without any significant shortcomings
Level 3	Satisfactory result – project falls short of expectations but the positive results dominate
Level 4	Unsatisfactory result – significantly below expectations, with negative results dominating despite discernible positive results
Level 5	Clearly inadequate result – despite some positive partial results, the negative results clearly dominate
Level 6	The project has no impact or the situation has actually deteriorated

Ratings level 1-3 denote a positive assessment or successful project while ratings level 4-6 denote a negative assessment.

Sustainability is evaluated according to the following four-point scale:

Sustainability level 1 (very good sustainability): The developmental efficacy of the project (positive to date) is very likely to continue undiminished or even increase.

Sustainability level 2 (good sustainability): The developmental efficacy of the project (positive to date) is very likely to decline only minimally but remain positive overall. (This is what can normally be expected).

Sustainability level 3 (satisfactory sustainability): The developmental efficacy of the project (positive to date) is very likely to decline significantly but remain positive overall. This rating is also assigned if the sustainability of a project is considered inadequate up to the time of the ex post evaluation but is very likely to evolve positively so that the project will ultimately achieve positive developmental efficacy.

Sustainability level 4 (inadequate sustainability): The developmental efficacy of the project is inadequate up to the time of the ex post evaluation and is very unlikely to improve. This rating is also assigned if the sustainability that has been positively evaluated to date is very likely to deteriorate severely and no longer meet the level 3 criteria.

The **overall rating** on the six-point scale is compiled from a weighting of all five individual criteria as appropriate to the project in question. Ratings 1-3 of the overall rating denote a "successful" project while ratings 4-6 denote an "unsuccessful" project. It should be noted that a project can generally be considered developmentally "successful" only if the achievement of the project objective ("effectiveness"), the impact on the overall objective ("overarching developmental impact") and the sustainability are rated at least "satisfactory" (rating 3).