Ex Post-Evaluation Brief
PR China: Wind Farm Programme, Phase III

Programme/Client	Wind Farm Programme, Phase III (Hebei and Inner Mongolia) - BMZ No 199865205	
Programme executing agency	Zhangjiakou Great Wall Wind Power Co. Ltd. (ZWPC)	
Year of sample/ex post evaluation report: 2011*/2011		
	Appraisal (planned)	Ex post-evaluation (actual)
Investment costs (total)	EUR 27.10 million	EUR 6.65 million (for adjusted capacity)
Counterpart contribution (company)	EUR 11.80 million	EUR 1.20 million
Funding, of which budget funds (BMZ)	EUR 15.30 million EUR 7.65 million	EUR 3.50 million EUR 1.75 million

* random sample

Project description: The project originally encompassed the construction of two wind farms, each with up to 11 MW installed capacity, at locations in Zhangbei (Hebei Province) and Huitengxile (Inner Mongolia) with connections to the local grid. Construction was on a much smaller scale than originally conceived, because the local authorities did not grant permission for the project as planned. The wind farm at Zhangbei was not built and permission was only granted for 5.4 MW (9 x 600 kW) at Huitengxile. The financing contribution was reduced correspondingly. The Huitengxile site sits on a high plateau with an area of 300 km², which is intended solely for electricity generation from wind. Originally, total costs of EUR 27.09 million were scheduled for the project. This comprised funds by German Financial Cooperation to the tune of EUR 15.33 million and a counterpart contribution of EUR 11.75 million. However, in view of the cancellation of one location, only a small share of these FC funds (EUR 3.49 million) was used to finance investment costs. The counterpart contribution from the Chinese partner came to EUR 1.21 million.

Objective: The overall objective, which was modified during the ex-post evaluation, was to make a contribution to global climate protection and to the economic development of the project region. The indicator employed is the quantity of CO_2 emissions avoided, as well as the achievement of the project objective below. The project objective was to provide 5.4 MW of installed capacity and generate 15 GWh/a of electricity from wind turbines and their efficient use by the targeted electricity consumers. The project objective indicators adopted were an installed capacity of 5.4 MW and the generation of 15 GWh/a four years after commissioning, transmission and distribution losses of <20 % and full cost recovery from the tariffs charged.

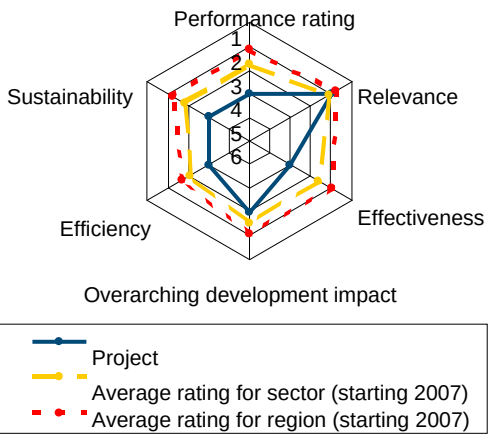
Overall rating: 3

Largely because its effectiveness and developmental impact (in a field of technology which is already well-developed) were merely satisfactory, the project was rated 'satisfactory' overall.

Of note:

Conclusions reached across other projects suggest that, in principle, wind measurements are well understood at KFW. In this case, due to incorrect measurement data from the project executing agency, too high an energy output was assumed. Moreover, wherever possible permissions for planned building works ought to be already in place at project appraisal.

Rating by DAC criteria



EVALUATION SUMMARY

Overall rating: This project, which was consistent with the strategies of the German Federal Ministry for Economic Cooperation and Development (BMZ) and its partner country, was realised in a field of technology with high relevance for the Chinese electricity-producing sector. Due to its considerable reduction in scale, however, the contribution made by the project to climate-friendly electricity supply in China was much less than had been planned at project appraisal. Its sustainable developmental impact was, nonetheless, satisfactory because the wind farm's installed capacity still amounts to 7.5% of the total installed capacity of the northern grid. The project was largely implemented in an efficient manner, and project objectives were achieved alongside a good overall level of sustainability and satisfactory effectiveness. Taken altogether, the project was rated 'satisfactory'. **Rating: 3**

Relevance: With its aim of providing reliable, efficient and environmentally friendly electricity, the project addressed a major constraint to development in China. High economic growth has been associated with a marked increase in electricity demand, which was met in particular by an expansion in coal-powered energy generation. By 2010 the country had become the largest emitter of CO_2 internationally, which may have a considerable impact on both the regional and global climate. The government is aware of the situation and considers it very important to find a solution to the problem. Against this background, the expansion of wind power and other renewable sources of energy assumes an important role. As a consequence, at the time of project appraisal, the project conformed with the developmental priorities of German development cooperation (DC) and those of the Chinese government. Even though DC with China has been recalibrated and energy now no longer constitutes a priority area, the project is still consistent today with the BMZ sectoral concept of 'Sustainable Energy for Development'.

Despite this prioritisation, there was insufficient support from the Chinese government and the executing agency during implementation. The project design was not able, in every aspect, to keep up with recent developments in the Chinese electricity sector. At the turn of the century, investment levels were so high that a programme conceived on such a small scale was obviously accorded a lower priority by the Chinese counterparts. Furthermore, high levels of investment from other donors have led to wind shading effects, caused by other wind farms built in the vicinity of the project location. These adverse effects might have been avoided through closer coordination between donors, or at least should have led to a more realistic assessment of energy output at the project appraisal or during implementation. Interest in the previous wind programmes, Phases I and II, appeared to be much greater, although these projects were overseen by another executing agency.

In conclusion, the project is still in a highly relevant sector. However, the markedly smaller scope of the programme has led to a discrepancy between the programme design and the requirements of the market (Sub-rating: 3).

Effectiveness: The project objective defined at the project appraisal stage was updated as part of the ex-post evaluation and modified to reflect the actual capacity installed at Huitengxile (Inner Mongolia). In line with this, the project objective was to provide 5.4 MW of installed capacity and generate 15 GWh/a of electricity from wind turbines and their efficient deployment by the operator. Four years after commissioning this target has not been achieved. Whilst the installed capacity corresponded to 5.4 MW, electricity generated, at only 9.66 GWh/a (2007) fell considerably below the level set. Reasons for this include incorrect wind measurements and the shading effects caused by other wind farms in the vicinity. In the context of this ex-post evaluation it has not possible to find out why permissions were not granted for the 11 MW capacity originally planned. However, in the end, wind turbines were erected in the area that had been envisaged a development funded from other sources was built.

Further project indicators could likewise only be achieved in part. Whilst grid losses are markedly below the benchmark of 20% set in 'OPK' (operational criteria threshold values), cost recovery via the tariff charges is not assured. Tariffs continue to be subsidised by the Chinese government. The degree to which the objectives were met, despite their adjustment during the course of implementation and at the EPE stage, was correspondingly low. Nevertheless, it should be noted that due to incorrect measurements, expectations were unrealistically high; and at the time of the project appraisal report, the extent to which this project and the other wind farms would affect each other was not as well known as it is today (Sub-Rating: 3)

Efficiency: In terms of the impact achieved in relation to the funds deployed, the project is seen as efficient. In terms of production efficiency at the project level, the costs per installed MW came in at EUR 0.87 million below the costs envisaged at project appraisal. Specific investment costs for the project were thus considerably below the average for wind energy. The quality of the facilities delivered was rated as appropriate at the final review stage. However, on a critical note, it should be mentioned that, with regard to actual costs, the markedly lower load factor[1] of 24.4 % had a negative financial impact on the power station and grid operators.

At the sectoral level, the availability of Chinese generation capacity could be increased through the upgrading of obsolete power stations. Transmission and distribution losses are at 13.2%. CO_2 abatement costs are approximately EUR 13 / t CO_2 due to reduced measures in relation to the infrastructure, according to the GEF method[2]. Following the KfW methodology, which is used at the project appraisal stage, CO_2 avoidance costs are approx. EUR 27 / t CO_2, which represents a marked increase compared to the value in the

[1] Load factor: actual electricity generated as a proportion of theoretical maximum output, if the facility were to run at its nominal capacity for the entire 8766 hours in a year. Whilst it is true that load factors of between 20-30% represent good value, for instance, at wind energy facilities in Germany, this is generally under conditions of lower wind speeds.

[2] Contrary to the KfW method, GEF does not discount CO_2 emissions over the lifetime of the power station.

project appraisal report (DM 38 / EUR 19.42). Despite this, current benchmarks in respect of the operational appraisal criteria (OPK) for nationwide production efficiency in the electricity sector in China are maintained. The good wind regime on site has a fundamentally positive impact on these values.

With regard to allocative efficiency, the criterion relating to productive electricity utilisation was met. The degree of economic cost recovery has improved in comparison with the project appraisal stage due to increases in average tariffs over the years. However, full cost recovery has not yet been achieved, and state subsidies in the sector continue to be high. Government plans for substantial expansion will also present electricity operators with financial challenges in the future (Sub-rating: 3).

Overarching developmental impact: In terms of overarching developmental impact, the project's key effects lie in the contribution it was supposed to have on climate change mitigation and on the economic development of the region. In terms of climate change mitigation, the relevant ongoing and increasing role played by wind power in China's energy generation mix is noteworthy. The figure for CO_2 emissions avoided is below the value adopted at project appraisal of 3,068 t CO_2/year per installed MW. This can be attributed, amongst other things, to the increasing efficiency of coal-fired power stations.

An impact on economic development due to the high proportion of productive consumers of electricity linked to the local grid is plausible. In view of the markedly lower output of 5.4 MW, only a limited contribution can be made to the electricity supply of the People's Republic of China or to the northern grid. This in turn results in a very limited contribution to the achievement of the overall objective. One should mention, nonetheless, that in 2009 the wind farm was still providing 7.5 % of the entire installed capacity (71.4 MW) of the northern grid. Due to the notable experience China had already gained in the arena of wind energy and the small scale of the project, one cannot assume that the project has had any significant impact on the establishment or development of this field of technology in China (Sub-rating: 3).

Sustainability: Despite the considerably smaller scale of the wind farm and the lack of support from the Chinese side in respect of building permissions, the facilities are operated diligently by the executing agency. Service and maintenance measures are taking place, according to available information given at the final review, to an adequate degree. Consequently, the planned 20-year life expectancy of the site should be achievable. The load factor for these facilities, which has declined further since 2008, may be attributed to shading effects from the other facilities recently constructed nearby. Aside from the age-related reduction in the load factor, no further adverse effects are expected to occur, since in the meantime the area around the wind farm is utilised to a large extent. No adverse effects caused by the operation of the power station on the local population or animal life (particularly birds) have been registered to date (Sub-rating: 2).

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:

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

Ratings 1-3 denote a positive or successful assessment while ratings 4-6 denote a not positive or unsuccessful 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).