Annex G

Guidance on Demonstration of Additionality

In this Annex several examples are given for the demonstration of additionality. It follows the steps of the Combined tool to identify the baseline scenario and demonstrate additionality by the UNFCCC.

Step: Barrier analysis
Below you can find an example of barriers that can be considered acceptable. However sometimes project features are claimed to be barriers when it is rather unclear why they are barriers or how they could impede the project implementation, including, for example :

1. "Different financial factors may change in the future
2. "The project exceeds current regulations";
3. "It is hard to calculate the IRR";
4. "The region is undeveloped and needs high investments".
5. "Unwillingness of the management to invest"
6. "Project would go bankrupt without CERs" This type of barriers is not acceptable for the demonstration of additionality.

Figure G-1: Example: Sayalar wind farm project

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a. Define alternatives to the project activity

In the situation where the proposed project activity would not be implemented, the shareholders of Doğal Enerji Üretim Anonim Şirketi (Demirer Holding and Polat Enerji A.Ş.) do not have alternative investment options which generate a similar amount of electricity production as the proposed CDM project activity. An alternative to the project activity therefore would be "no action" from the project participants.

Considering the above, the following alternatives have been identified, for the generation of the amount of electricity generated by the project activity:

Alternative A	Sayalar wind farm without VER credits
Alternative B	Same amount of electricity produced by other facilities not under the control of project participant (No action from the investors)

Sub-step 1b. Enforcement of applicable laws and regulations

All the alternatives to the project outlined in Step 1a above are in compliance with applicable laws and regulations, including:

1) Electricity Market Law. [Law Number: 4628 Ratification Date: 20.02.2001 Enactment Date: 03.03.2001]
2) Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electricity Energy [Law Number: 5346 Ratification Date: 10.05.2005 Enactment Date: 18.05.2005]
3) Law on Energy Efficiency [Law Number: 5627 Enactment Date: 02/05/2007][18]
4) Environment Law [Law Number: 2827 Ratification Date: 09.08.1983 Enactment Date: 11.08.1983]

Figure G-2: Example: Shri Chamundi 16 MW low-density biomass residue cogeneration plant

Sub-step a: Identify barriers that would prevent the implementation of type of the proposed project activity

Investment barriers:

Due to the pioneering aspect of the project in respect to technological innovations in handling low density crop residues as fuel for a captive power plant, it has been impossible to attract equity investors other than investors with an interest in CERs. JK Industries was not willing to take all the risks and invest in a biomass based power plant. Instead, JKI was assessing the option of implementing a coal based cogeneration plant, which would be more cost effective and less risky than a biomass based plant. For the purpose of installing a coal based cogeneration plant, JKI had already received the required coal linkage from the Government owned collieries in 2003. Later, MPPL and JK created a special purpose vehicle (74% owned by MPPL and 26% by JKI) with the purpose to build a biomass based cogeneration plant based on CDM revenues and investors. Therefore, the project would not be possible without CDM.

Technological barriers:

The biomass residues used as primary fuel for the project activity are not typical biomass fuels normally used for energy purposes. The proposed project activity will fire low density crop residues, which lead to technological challenges related to the combustion process (mainly due to increased slagging/corrosion problems). These technological issues require a special boiler design and special operation and maintenance procedures. The proposed project activity has significant technological risks which make it impossible to raise conventional equity without the support of CDM funds.

Barriers due to prevailing practice:

The project activity is the first of its kind in India. It is not known to the project participants that any boiler in India in such dimensions (16MWel) fires such a high percentage of low density crop residues.

Conclusion:

The project activity faces severe investment and technology barriers. In addition, barriers due to prevailing practice have been identified. These barriers prevent the project activity from being implemented without the CDM.

Sub-step b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the project activity)

All barriers listed above do not apply to the existing situation (EBL1) or conventional coal fired plants (EBL2), which is the most common technology in India for captive cogeneration plants None of the alternatives identified in step 1a have to be excluded due to the barrier test.

Figure G-3: Example: Ningxia Yinyi 49.50MW Wind-farm Project

Step: Investment Analysis
The investment analysis was conducted in the following steps:

Sub-step a. Determine appropriate analysis method
Tools for the demonstration and assessment of additionality (Version 03) suggest three analysis methods are simple cost analysis (option I), investment comparison analysis (option II) and benchmark analysis (option III).

Since the proposed project will earn the revenues not only the CDM but also electricity sales, the simple cost analysis method (option I) is not appropriate.

Investment comparison analysis method (option II) is applicable to projects whose alternatives are similar investment projects. Only on such basis, comparison analysis can be conducted. The alternative baseline scenario of the proposed project is the Northwest China Power Grid rather than new investment projects. Therefore investment comparison analysis method (option II) is not an appropriate method.

The proposed project will use benchmark analysis method (option III) based on the consideration that benchmark *IRR* and equity *IRR* of the power sector are both available.

Sub-step b. - Option III. Apply benchmark analysis
According to the "*The Interim Measures for Economical Assessment of Electrical Technological Transformation Project* "(China Electric Power Press 2003), the financial benchmark IRR of Chinese power industry is 8% the total investment, which has been used widely for Feasibility Studies of the power project investments, including wind power projects in China.

Based on above benchmark, the sub-step 2c of calculation and comparison of financial indicators is conducted.
Sub-step c. Calculation and comparison of financial indicators
(1) Basic parameters for calculation of financial indicators
Based on the feasibility study report of the proposed project, basic parameters for calculation of financial indicators are shown in the following Table:

Table B5-1: Basic parameters of the feasibility study report

No.	Name of the proposed project	Indicators parameters
1	Installed capacity	49.50MW
2	Estimated annual output	104,891MWh
3	Project lifetime	21
4	Total investment	394.02 million RMB
5	Prospective bus-bar tariff	0.533RMB/kWh
6	Tax	
	VAT	8.5%
	Income tax	33%
7	Annual average O&M cost	14.98 million RMB
8	Bank loan (accounting for 80% of the total capital) Interest rate of bank loan	315.22 million RMB 6.12%

Crediting period: 7*3 yrs (Renewable)
CERs price assumption: US$10.0/tCO2e (the exchange rate of US: RMB is 1:8)

2) Comparison of IRR and NPV for the proposed project and the financial benchmark

In accordance with benchmark analysis (Option III), if the financial indicators (such as IRR and NPV) of the proposed project are lower than the benchmark, the proposed project is not considered as financially attractive.

Table B5-2: Financial indicators of the proposed project

	NPV(total investment) (10^4 RMB)	IRR(total investment) Benchmark=8%
Without CDM	-3,023.04	7.09%
With CDM	3,906.66	9.45%

Table B5-2 shows the IRR and NPV of the proposed project, with and without CDM revenues. Without CDM, the IRR of total investment is lower than the benchmark 8%. Thus, the proposed project is not financially attractive. With CDM (CERs price is US$10.0/tCO2e and crediting period is 7*3 yrs), CERs revenue will significantly improve IRR of total investment, which increases above 2 percentage point. Therefore, the proposed project, with CDM revenue, is commercially feasible and can be considered as financially attractive to investors.

The proposed project feasibility study report shows that the feasibility of CDM development is taken into consideration by the proposed project owner during the proposed project feasibility study. The approval for the proposed project issued by Ningxia Development and Reform Committee specified "The proposed project is developed as a CDM project" (Document of Ningxia Development and Reform Committee (No.[2006]404)

Sub-step d. Sensitivity analysis

For the proposed project, the following financial parameters were taken as uncertain factors for sensitive analysis of financial attractiveness:

·Construction investment

·Power sales revenue

When the above two financial indicators fluctuate within the range of –10% to +10%, the IRR of total investment of the proposed project varies to different extent. The impacts to IRR of total investment by above parameters fluctuation (not considering CERs income) are shown as Table B5-3 and Figure B5.1:

Table B5-3 Sensitivity analysis of the proposed project IRR (total investment)

Fluctuation range of indicator	-10%	-5%	0	5%	10%
Construction investment	8.47%	7.75%	7.09%	6.47%	5.91%
Power sales revenue	5.05%	6.09%	7.09%	8.03%	8.94%

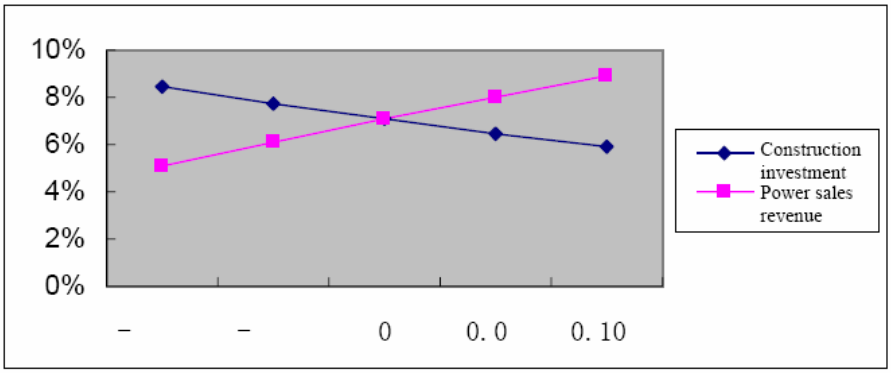

Figure B5.1 The impacts to IRR (total investment) by uncertain factors fluctuation (not considering CERs income)

When the above uncertain factors fluctuate within the range of –10% to +10% (not considering CERs income), the IRR of total investment of the proposed project varies to different extent. The fluctuation is shown as Figure B5.1.

If the construction investment decreases by 7% the IRR will reach the benchmark. However, given that the project is already commissioned, these costs can not decrease.

The fluctuation of power sales revenue has a great impact on IRR and the power sales revenue is considered to be the most sensitive factor to impact the proposed project. The annual power sales revenue is decided by the annual output and tariff. The tariff was fixed through tender and bidding and it won't be changed once determined. The output of power generation is subject to two factors, namely, the total installed capacity and the annual operating hours. After the project is put into operation, the total installed capacity of the project will not be changed. Therefore the output of power generation only lies in annual operating hours. In the
Feasibility Study Report, it is said that "According to the statistic from 1953 to 2005, the average wind velocity is 3.01m/s, while the average wind velocity from 1971 to 2005 is 3.16%. The latter wind velocity is adopted in the Feasibility Study Report of Ningxia Yinyi 49.5 Wind farm project which means a higher wind velocity is used to calculate the annual power generation. Thus, the chances for power generation exceeding 5% are extremely small.

Based on above analyses, it is safe to conclude that without support of CER income, the proposed project is not economically attractive.

Figure G-4: Example: Sayalar wind farm project

Step:. Common practice analysis

Sub-step a. Analyze other activities similar to the proposed project activity:

There are currently few wind farms in Turkey. The total installed capacity adds up to 131 MW (Table 12).

Table 12: Most recent wind farms installed in Turkey[24]

Location	Company	Installed Capacity (MW)	Developed as	Year
İzmir - Çeşme	Alize A.Ş.	1.5	BOT	1998
İzmir - Çeşme	Güçbirliği A.Ş.	7.2	BOT	1998
Çanakkale – Bozcaada	Bores A.Ş.	10.2	BOT	2000
Istanbul – Hadımkoy	Sunjüt A.Ş.	1.2	BOT	2003
Balıkesir - Bandırma	Bares A.Ş.	30	VER	2006
Istanbul – Silivri	Ertürk A.Ş.	0.85	BO	2006
İzmir - Çeşme	Mare A.Ş.	39.2	VER	2007
Manisa - Akhisar	Deniz A.Ş.	10.8	VER	2007
Çanekkale - Intepe	Anemon A.Ş.	30.4	VER	2007
TOTAL		**131.35**		

Note: BOT = Build Operate Transfer; BO = Build Operate, VER = developed with income from the sale of carbon credits. All older wind farms have been developed as BOT project.

Sub-step b. Discuss any similar options that are occurring:

The most recent wind farms of comparable size to the project activity based on installed capacity were developed as VER project. These are BARES II, Anemon, Karakurt and Mare Projects (see Table 12).