JOINT IMPLEMENTATION PROJECT DESIGN DOCUMENT FORM
Version 01 - in effect as of: 15 June 2006

CONTENTS

SECTION A. General description of the project

A.1. Title of the project:

>>
Wind Power Projects in Slovak Republic
Version number of the document: 1
Date of the document: 05/03/2007

A.2. Description of the project:

>>
This whole project does the wind power generation of total 90.75MW in the west of The Slovak Republic. The wind parks of the project are located at two local spots.

A.3. Project participants:

>>

Party involved	Legal entity project participant	Please indicate if the Party involved wishes to be considered as project participant (Yes/No)
Slovakia		No
Japan		

A.4. Technical description of the project:

A.4.1. Location of the project:

>>

A.4.1.1. Host Party(ies):

>>
The Slovak Republic

A.4.1.2. Region/State/Province etc.:

>>

A.4.1.3. City/Town/Community etc.:

>>
Village A and B

A.4.1.4. Detail of physical location, including information allowing the unique identification of the project (maximum one page):

>>

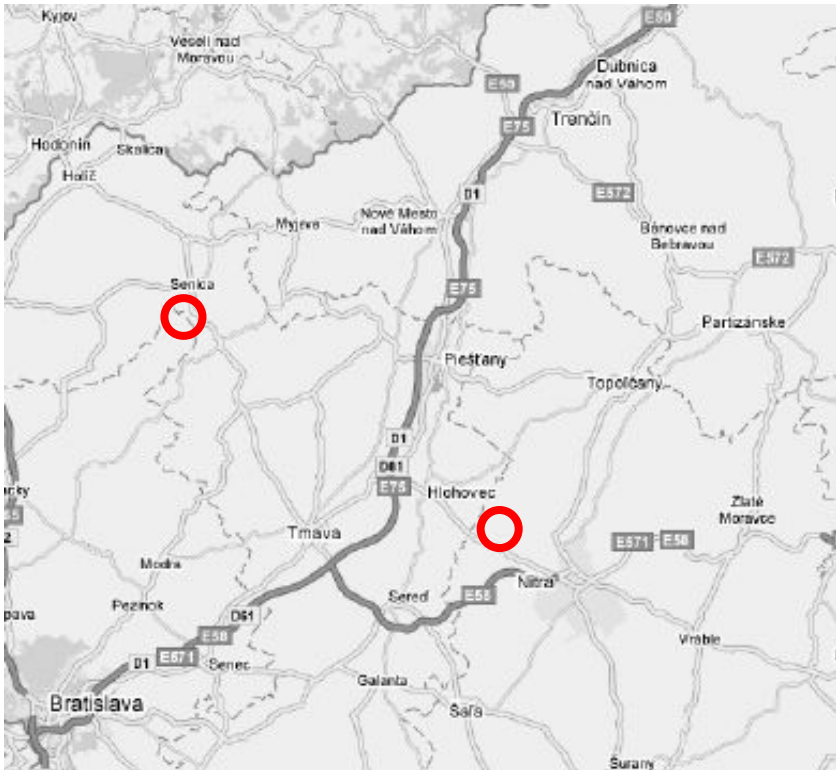

Figure 1. Site locations for 2 wind power projects.

A.4.2. Technology(ies) to be employed, or measures, operations or actions to be implemented by the project:

>>

V100 series 2.75MW, a new product from Vestas, will be introduced to this project. The V100-2.75MW is capable to generate electricity with every wind direction . The rated speed of rotor can be changed within the range of 60% based on the OptiSpeed technology that Vestas Co. has developed. As a result, it can even harness the force of wind gust, then the potential of annual power generation has been improved comparing to Vestas' previous products. Moreover, a low peak load contributes to reduce mechanical wear and cracks on the gear, the wings, and the tower. In addition, its lower rotational speed leads noise-reduction respectably.

A.4.3. Brief explanation of how the anthropogenic emissions of greenhouse gases by sources are to be reduced by the proposed JI project, including why the emission reductions would not occur in the absence of the proposed project, taking into account national and/or sectoral policies and circumstances:

>>

A.4.3.1. Estimated amount of emission reductions over the crediting period:

>>

	Years
Length of the crediting period	4
Year	Estimated of annual emission reductions in tonnes of CO2 equivalent
2009	76,241
2010	152,625

2011	152,768
2012	152,911
Total estimated emission reductions over the crediting period (tonnes of CO2 equivalent)	534,545
Annual average of estimated emission reductions over the crediting period (tonnes of CO2 equivalent)	133,636

A.5. Project approval by the Parties involved:

>>

SECTION B. Baseline

B.1. Description and justification of the baseline chosen:

>>

This project is a wind power generation project, and brings out neither immediate GHG emissions nor the reductions from the project itself. On the other hand, the electric power generated by the project will be connected and transmitted through the power grid, thereafter; it comes to reduce certain emissions from other fossil fuel power plants over the grid in the country.

Concretely, the average emission factor at baseline scenario is calculated by the following process;

1) To calculate the average emission factor A of natural gas and oil thermal power plants
2) To calculate the average emission factor B of other fossil fuel thermal power plants (i.e. coal, etc.)

However, when power generation by CHP is included in above 1) and 2), the average emission factor will be calculated, evaluating the remaining amount after all energy inputs to CHP minus the estimated energy amount spend for heat generation as the energy used for power generation. The estimated energy amount for heat generation is calculated as the produced heat energy divided by 0.9.

3) To calculate the ratio C of thermal power generation with natural gas and oil to the total power generation with all types of fossil fuel
4) To calculate the ratio D of other power generation, excluding those with natural gas and oil, to the total power generation with all types of fossil fuel
5) To calculate Ccorrected (= 1.5×C) for weighting as marginal power supply
6) To calculate Dcorrected (= D－0.5×C) for weighting as marginal power supply
7) To calculate baseline emission factor X （X＝A×Ccorrected＋B×Dcorrected） by applying the above relevant values.
8) To forecast a future baseline emission factor Z, applying a method of least squares on the past factor X in a particular year.

B.2. Description of how the anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the JI project:

>>

The electric power generated by the project will be connected and transmitted through the power grid, thereafter; it comes to reduce certain emissions from other fossil fuel power plants over the grid in the country.

B.3. Description of how the definition of the project boundary is applied to the project:

>>

The project boundary of this project is shown in the following figure.

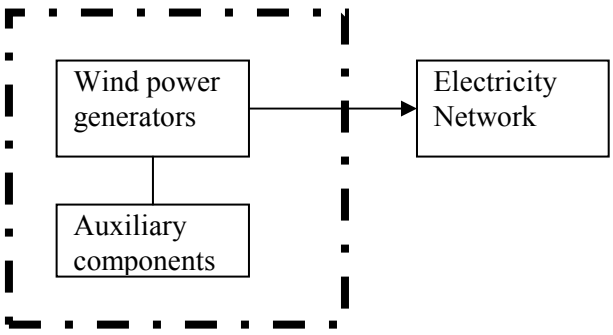

Figure 2. The project boundary.

B.4. Further baseline information, including the date of baseline setting and the name(s) of the person(s)/entity(ies) setting the baseline:

>>

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

>>

01/01/2009

C.2. Expected operational lifetime of the project:

>>

20 years and 0 months.

C.3. Length of the crediting period:

>>

4 years and 0 months.

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

>>

D.1.1. Option 1 – Monitoring of the emissions in the project scenario and the baseline scenario:

D.1.1.1. Data to be collected in order to monitor emissions from the project, and how these data will be archived:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

This table is not applicable.

D.1.1.2. Description of formulae used to estimate project emissions (for each gas, source etc.; emissions in units of CO_2 equivalent):

>>

This is not applicable.

D.1.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions of greenhouse gases by sources within the project boundary, and how such data will be collected and archived:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

1. EGy	*Electricity quantity*	*Electricity supplied to the grid by the project*	*GWh*	*m*	*Hourly measurement.*	*100%*	*Electronic*	*Double check by receipt of sales*

D.1.1.4. Description of formulae used to estimate baseline emissions (for each gas, source etc.; emissions in units of CO_2 equivalent):

>>

D. 1.2. Option 2 – Direct monitoring of emission reductions from the project (values should be consistent with those in section E.):

This sub-section is not applicable.

D.1.2.1. Data to be collected in order to monitor emission reductions from the project, and how these data will be archived:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

D.1.2.2. Description of formulae used to calculate emission reductions from the project (for each gas, source etc.; emissions/emission reductions in units of CO_2 equivalent):

>>

D.1.3. Treatment of leakage in the monitoring plan:

This sub-section is not applicable.

D.1.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

D.1.3.2. Description of formulae used to estimate leakage (for each gas, source etc.; emissions in units of CO_2 equivalent):

>>

D.1.4. Description of formulae used to estimate emission reductions for the project (for each gas, source etc.; emissions/emission reductions in units of CO_2 equivalent):

>>

Detailed in section B of the PDD.

D.1.5. Where applicable, in accordance with procedures as required by the host Party, information on the collection and archiving of information on the environmental impacts of the project:

>>

D.2. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored:		
Data *(Indicate table and ID number)*	Uncertainty level of data (high/medium/low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
1.	*low*	*Sales records to the grid are used to ensure the consistency with official statistics*

D.3. Please describe the operational and management structure that the project operator will apply in implementing the monitoring plan:

>>

See Annex 3.

D.4. Name of person(s)/entity(ies) establishing the monitoring plan:

>>

Company A, Project developer, contact information is shown in Annex 1.

SECTION E. Estimation of greenhouse gas emission reductions

E.1. Estimated project emissions:

>>

There is no GHG emissions within the project boundary.

E.2. Estimated leakage:

>>

There is no leakage within the project boundary.

E.3. The sum of E.1. and E.2.:

>>

The sum of E.1. and E.2. is zero.

E.4. Estimated baseline emissions:

>>

Key elements for calculation are show in Annex 2.

Baseline emissions for project A is the following:

	5 years total	2008	2009	2010	2011	2012
Emission Factor (t-CO2/MWh)		0.85	0.86	0.86	0.86	0.86
Electricity generation (MWh)	314,874	0	44,982	89,964	89,964	89,964
Emission reductions (t-CO2)	269,681	0	38,464	77,000	77,072	77,144

On the other hands, baseline emissions for project B is the following:

	5 years total	2008	2009	2010	2011	2012
Emission Factor (t-CO2/MWh)		0.85	0.86	0.86	0.86	0.86
Electricity generation (MWh)	309,251	0	44,179	88,358	88,358	88,358
Emission reductions (t-CO2)	264,865	0	37,777	75,625	75,696	75,767

Total baseline emissions:

	5 years total	2008	2009	2010	2011	2012
Baseline emissions (t-CO2)	534,545	0	76,241	152,625	152,768	152,911

E.5. Difference between E.4. and E.3. representing the emission reductions of the project:

>>

Emissions reductions = E4 – E3 as follows:

	5 years total	2008	2009	2010	2011	2012
Baseline emissions (t-CO2)	534,545	0	76,241	152,625	152,768	152,911
Project emissions (t-CO2)	0	0	0	0	0	0
Emission reductions (t-CO2)	534,545	0	76,241	152,625	152,768	152,911

E.6. Table providing values obtained when applying formulae above:

>>

Year	Estimated project emissions (tonnes of CO2 equivalent)	Estimated leakage (tonnes of CO2 equivalent)	Estimated baseline emissions (tonnes of CO2 equivalent)	Estimated emission reductions (tonnes of CO2 equivalent)
2008	0	0	0	0
2009	0	0	76,241	76,241
2010	0	0	152,625	152,625
2011	0	0	152,768	152,768
2012	0	0	152,911	152,911
Total (tonnes of CO2 equivalent)	0	0	534,545	534,545

SECTION F. Environmental impacts

F.1. Documentation on the analysis of the environmental impacts of the project, including transboundary impacts, in accordance with procedures as determined by the host Party:

>>

F.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to supporting documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

Environmental assessment has been performed by the Company A since the beginning of 2006, and as soon as completed as a report, a next process will be undertaken for final approval by the signature of the director of a bureau which specializes in environmental assessment in Ministry of the Environment. "Noise", "Impact on scenery", and "Impact on birds" are the three important issues in the environmental assessment which requires the approval regarding wind power generation business. In the present circumstances, it is understood that it has gone extremely well the explanation to the public meetings, local governments, etc. General reactions are positive due to the potential increase of job opportunities of the power generation sites.
The current progress on the mentioned important issues is described as following;

(1) Noise
Practically noise does not cause any problems because of enough distance between private residences in each village and each planned power generation site under the current situation.

(2)Impact on landscape
It is not simple to assess the impact on scenery because how to feel about the scenery depends on the individual. The tower of the wind turbine is 90 meters high, and it must be accepted and understood as to unboundedly blend with the surroundings. To develop such a mutual understanding for scenery, following procedures are taken through town meetings;

- The business operator explains their business description to the Heads of the local governments, councils, etc.
- Then, the operator also explains it to the land owners.

(3) Impact on birds
To check the impact on birds, the specialists for bird observation have been already occupied, and they are now in the operation of one-year research started at January, 2006. This type of research takes a full year in general, and this case should complete within 2006. Impact on birds is considered as the biggest environmental issue, and the result of the research may cause rescheduling of the project. For this reason, the issue has to be addressed with the sensitive manner. The bird observation research itself has been proceeded well by this point, however, the business operator made a comment that project B site located in the middle of duck's path and this might be moderately questionable. This point must be confirmed upon the final result of the research.

SECTION G. Stakeholders' comments

G.1. Information on stakeholders' comments on the project, as appropriate:

>>

Company A the business operator is making a collection of stakeholders' opinions and responding to them regarding to its wind power generation business itself. At this stage, mostly favorable opinions are received from each stakeholder.

(1) Local distribution company
The local distribution company, ZSE, provided comments as listed below during the field study. The person in charge in ZSE expresses that they recognizes wind power generation as an important and necessary way. It is also described that buying system has been already established, no need for individually specific negotiation for transferring electricity to them.

(2) Ministry of Economy of the Slovak Republic
Remarks from the interview with the person in charge in Ministry of Economy of the Slovak Republic under the field study are listed below. Based on these comments, the power generation expected to increase to the most is the wind power generation, in the renewable energy strategy currently in process by Ministry of Economy. Because of this background, Ministry of Economy has expressed that they will support the introduction of wind power generation in policy matters.

(3) Financial institutions
At an interview with the person in charge of development in Company A under the field study, there are some sorts of problems with the perspective of financial institutions to wind power generation. The price to local distribution companies; means buying price at these distribution companies, is treated as a preferential price, and however changed by year (7.5skk/kWh at present). For this reason, financial institutions tend to worry about the price risk at Off-Taker's side. As mentioned before, for the government also questions the annual price-update for purchasing electricity comes from wind power, and Slovakia needs to introduce renewable energies rapidly to achieve the EU target, it is thought that this problem at financial institutions will be solved in the near future.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

Organisation:	
Street/P.O.Box:	
Building:	
City:	
State/Region:	
Postal code:	
Country:	
Phone:	
Fax:	
E-mail:	
URL:	
Represented by:	
Title:	
Salutation:	
Last name:	
Middle name:	
First name:	
Department:	
Phone (direct):	
Fax (direct):	
Mobile:	
Personal e-mail:	

Annex 2

BASELINE INFORMATION

Energy supply data utilized for the above calculation of baseline emission factor is presented in Table 1 -Table 4. Those tables respectively content annual data during 2001-2004.

Table 1. Energy supply, Power Generation and Heat Generation (2001).

Energy				
Supply(MTOE)	Coal	Crude Oil	Petroleum	Gas
to Electricity Plants	0.54		0.00	0.08
to CHP	1.38		0.09	0.86
in which to Electricity	1.21		0.07	0.79
Total	1.92		0.09	0.94
Total for only Electricity	1.75		0.07	0.87
Electricity Generation(TWh)	Coal	Crude Oil	Petroleum	Gas
from Electricity Plants	1.91		0.00	0.33
from CHP	4.31		0.69	2.37
Total	6.22		0.69	2.70
Share	65%		7%	28%
Heat Generation (PJ)	Coal	Crude Oil	Petroleum	Gas
from CHP	15.87		0.12	14.62
(in Unit of MTOE)	0.379		0.003	0.349

Source : IEA

Table 2. Energy supply, Power Generation and Heat Generation (2002).

Energy				
Supply(MTOE)	Coal	Crude Oil	Petroleum	Gas
to Electricity Plants	0.46		0	0
to CHP	1.07		0.09	0.78
in which to Electricity	0.92		0.07	0.71
Total	1.53		0.09	0.78
Total for only Electricity	1.38		0.07	0.71
Electricity Generation(TWh)	Coal	Crude Oil	Petroleum	Gas
from Electricity Plants	1.63		0.01	
from CHP	3.95		0.69	2.51
Total	5.58		0.70	2.51
Share	63%		8%	29%
Heat Generation (PJ)	Coal	Crude Oil	Petroleum	Gas
from CHP	8.47		0.12	15.95
(in Unit of MTOE)	0.202		0.003	0.381

Source : IEA

Table 3. Energy supply, Power Generation and Heat Generation (2003).

Energy				
Supply(MTOE)	Coal	Crude Oil	Petroleum	Gas
to Electricity Plants	0.31		0	0
to CHP	1.65		0.11	0.74
in which to Electricity	1.64		0.11	0.73
Total	1.96		0.11	0.74
Total for only Electricity	1.95		0.11	0.73
Electricity Generation(TWh)	Coal	Crude Oil	Petroleum	Gas
from Electricity Plants	0.90		0.01	
from CHP	5.49		0.70	2.40
Total	6.39		0.71	2.40
Share	67%		7%	25%
Heat Generation (PJ)	Coal	Crude Oil	Petroleum	Gas
from CHP	11.26		0.67	15.70
(in Unit of MTOE)	0.269		0.016	0.375

Source : IEA

Table 4. Energy supply, Power Generation and Heat Generation (2004).

Energy				
Supply(MTOE)	Coal	Crude Oil	Petroleum	Gas
to Electricity Plants	0.31		0.00	0.00
to CHP	1.51		0.10	0.72
in which to Electricity	1.50		0.10	0.71
Total	1.82		0.10	0.72
Total for only Electricity	1.81		0.10	0.71
Electricity Generation(TWh)	Coal	Crude Oil	Petroleum	Gas
from Electricity Plants	0.86		0.00	
from CHP	5.24		0.74	2.42
Total	6.10		0.74	2.42
Share	66%		8%	26%
Heat Generation (PJ)	Coal	Crude Oil	Petroleum	Gas
from CHP	10.71		0.35	14.27
(in Unit of MTOE)	0.256		0.008	0.341

Source : IEA

Derived from the above data, Table 5-Table 8 presents the calculated CO2 emissions from annual power generation during 2001-2004.

Table 5. Amount of CO2 Emissions from power generation (2001)

CO2 emissions (t-CO2)						
	Coal	Crude Oil	Petroleum	Gas		Oil&Gas
from Electricity Plants	2,138,785	0	0	187,904		187,904
from CHP	5,465,784	0	286,754	2,019,964		2,306,717
in which to Electricity	4,811,993	0	228,411	1,851,664		2,080,074
Total	7,604,569	0	286,754	2,207,867		2,494,621
Total for only Electricity	6,950,777	0	228,411	2,039,567		2,267,978

Table 6. Amount of CO2 Emissions from power generation (2002)

CO2 emissions (t-CO2)						
	Coal	Crude Oil	Petroleum	Gas		Oil&Gas
from Electricity Plants	1,821,928	0	0	0		0
from CHP	4,237,963	0	286,754	1,832,060		2,118,814
in which to Electricity	3,651,443	0	227,565	1,675,603		1,903,168
Total	6,059,891	0	286,754	1,832,060		2,118,814
Total for only Electricity	5,473,371	0	227,565	1,675,603		1,903,168

Table 7. Amount of CO2 Emissions from power generation (2003)

CO2 emissions (t-CO2)						
	Coal	Crude Oil	Petroleum	Gas		Oil&Gas
from Electricity Plants	1,227,821	0	0	0		0
from CHP	6,535,176	0	350,477	1,738,108		2,088,585
in which to Electricity	6,506,907	0	349,124	1,714,734		2,063,858
Total	7,762,997	0	350,477	1,738,108		2,088,585
Total for only Electricity	7,734,728	0	349,124	1,714,734		2,063,858

Table 8. Amount of CO2 Emissions from power generation (2004)

CO2 emissions (t-CO2)						
	Coal	Crude Oil	Petroleum	Gas		Oil&Gas
from Electricity Plants	1,227,821	0	0	0		0
from CHP	5,980,676	0	318,615	1,691,132		2,009,748
in which to Electricity	5,953,788	0	317,909	1,669,887		1,987,796
Total	7,208,497	0	318,615	1,691,132		2,009,748
Total for only Electricity	7,181,609	0	317,909	1,669,887		1,987,796

Moreover, Table 12. – Table 15 presents the calculated baseline emission factors derived from above annual power generation and CO_2 emission.

Table 9 Emission factors on the power grid (2001)

Emission Factor (kg-CO2/kWh)	Coal	Crude Oil	Petroleum	Gas		Oil&Gas
for Electricity Plants	1.120			0.569		0.569
for Elec. Of CHP	1.268		0.416	0.852		0.754
for Total	1.117		0.331	0.755		0.669

Table 10 Emission factors on the power grid (2002)

Emission Factor (kg-CO2/kWh)	Coal	Crude Oil	Petroleum	Gas		Oil&Gas
for Electricity Plants	1.118					0.000
for Elec. Of CHP	0.924		0.330	0.668		0.595
for Total	0.981		0.325	0.668		0.593

Table 11 Emission factors on the power grid (2003)

Emission Factor (kg-CO2/kWh)	Coal	Crude Oil	Petroleum	Gas		Oil&Gas
for Electricity Plants	1.364					0.000
for Elec. Of CHP	1.185		0.499	0.714		0.666
for Total	1.210		0.492	0.714		0.664

Table 12 Emission factors on the power grid (2004)

Emission Factor (kg-CO2/kWh)	Coal	Crude Oil	Petroleum	Gas		Oil&Gas
for Electricity Plants	1.428					
for Elec. Of CHP	1.136		0.430	0.690		0.629
for Total	1.177		0.430	0.690		0.629

Table 16 is presented as a summary of all specific factors derived through the calculation process and the resultant baseline emission factors on the power grid. The conclusive emission factors on the power grid are shown at the bottom of the table as values for 2008-2012.

Table 13 Results of baseline emission factors on the grid

	2008	2009	2010	2011	2012
Emission Factor (kg-CO2/kWh)	0.8543	0.8551	0.8559	0.8567	0.8575

Annex 3

MONITORING PLAN

In this project, power generation by wind turbines and the necessary data for calculation of emission factor on the grid will be monitored.

(1)Monitoring the amount of power generation

To prove the accuracy of calculated power generation, monitoring process should be conducted by the responsible person of the project. In practice of selling some generated power to a local distribution company, the amount of electricity transmission for concerned period is determined after when two meters, placed by each of the project operator and the distribution company at a grid connection point (a substation), are verified with the same metered records.

For the monitoring of this project, as same, a meter at a substation will be used. The meter is readable with a remote operation through telecommunication lines. Monthly data from meter is processed to be documentations and stored ensuring verifier's convenient access, and all metered records have to be maintained for further demands of an inspection organization.

(2) Monitoring necessary data for calculation of emission factor on the power grid

Data for calculation of baseline emission factor on the power grid in Slovakia will be monitoring. As described in "Baseline scenario", power generation and fossil fuel consumption on the entire grid is calculated referring IEA statistics of ENERGY BALANCES OF OECD COUNTRIES and ENERGY STATISTICS OF OECD COUNTRIES. For this reason, above two statistical resources are positioned as the basic data for monitoring.

(3) Data management system

The data management system provides information for continuous data collecting and recording during the monitoring period. The relevant and successive data recording is the most fundamental among all monitoring works. If the successive data cannot be archived in the precise and effective ways, there will be no appropriate validation for emission reductions by implementing a project. Hereafter describes the way of data management for records related to the project.

Company A has complete responsibility for monitoring GHG emission reductions. Procedures of tracing the information from primary data sources towards the calculation of final data should be explained in the written documents.

To realize enough accessibility for verifier(s) to any data related this wind power generation projects, project-related documents and monitoring results are formatted as indexes, all hardcopies are stored by engineering division at the responsible body of the project (the operating company of wind power generation) and their copies are also stored as backup.

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