**PROJECT DESIGN DOCUMENT FORM
FOR CDM PROJECT ACTIVITIES (F-CDM-PDD)
Version 04.0**

PROJECT DESIGN DOCUMENT (PDD)

Title of the project activity	Wind Farm Kladovo 1
Version number of the PDD	4
Completion date of the PDD	10/10/2012
Project participant(s)	Forestpeak-I d.o.o. Energy Changes Projektentwicklung GmbH
Host Party(ies)	Serbia
Sectoral scope and selected methodology(ies)	1 Energy industries (renewable - / non-renewable sources) ACM0002 Consolidated baseline methodology for grid-connected electricity generation from renewable sources Version 12.3.0
Estimated amount of annual average GHG emission reductions	130,538 t CO_2

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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The purpose of the project activity is the generation of green electricity through the construction and operation of up to 27 wind power turbines with a total capacity of up to 54 MW located in the municipality of Kladovo in the Republic of Serbia. The expected net annual electricity generation of the project activity is approximately 116,240 MWh once fully operational. By replacing fossil fuel based power generation of the national Serbian electricity grid approximately 130,538 tCO_2 will be reduced per year. The project activity is being developed by Forestpeak-I d.o.o. (the project proponent).

Situation existing prior to the starting date of the project
Same as baseline scenario, see paragraph below.

Baseline Scenario
According to applied CDM methodology *ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" Version 12.3.0* - If the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

Project Scenario
The project activity includes the construction and operation of a wind farm with a total capacity of up to 54MW. The electricity will be fed into the grid at a new 110/20kV substation which will be built by the project proponent.

The proposed project activity reduces greenhouse gas emissions by replacing fossil fuel based power generation of the national Serbian electricity grid. Approximately 130,538 tCO_2 will be reduced per year. The total GHG emission reductions over the crediting period are estimated to be 1,305,379 tCO_2.

The view of the project participants on the contribution of the project activity to sustainable development:

The proposed project activity will

- reduce greenhouse gas emissions in Serbia compared to a business-as-usual scenario;
- help to stimulate the growth of the wind power industry in Serbia;
- create local employment opportunity during the assembly and installation of the wind turbines, and during operation of the wind farm and
- reduce other pollutants resulting from the power generation industry, compared to a business as usual approach, such as SO_2, NOx and soot.

A.2. Location of project activity

A.2.1. Host Party(ies)

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Serbia

A.2.2. Region/State/Province etc.

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Kladovo Region

A.2.3. City/Town/Community etc.

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Kladovo

A.2.4. Physical/Geographical location

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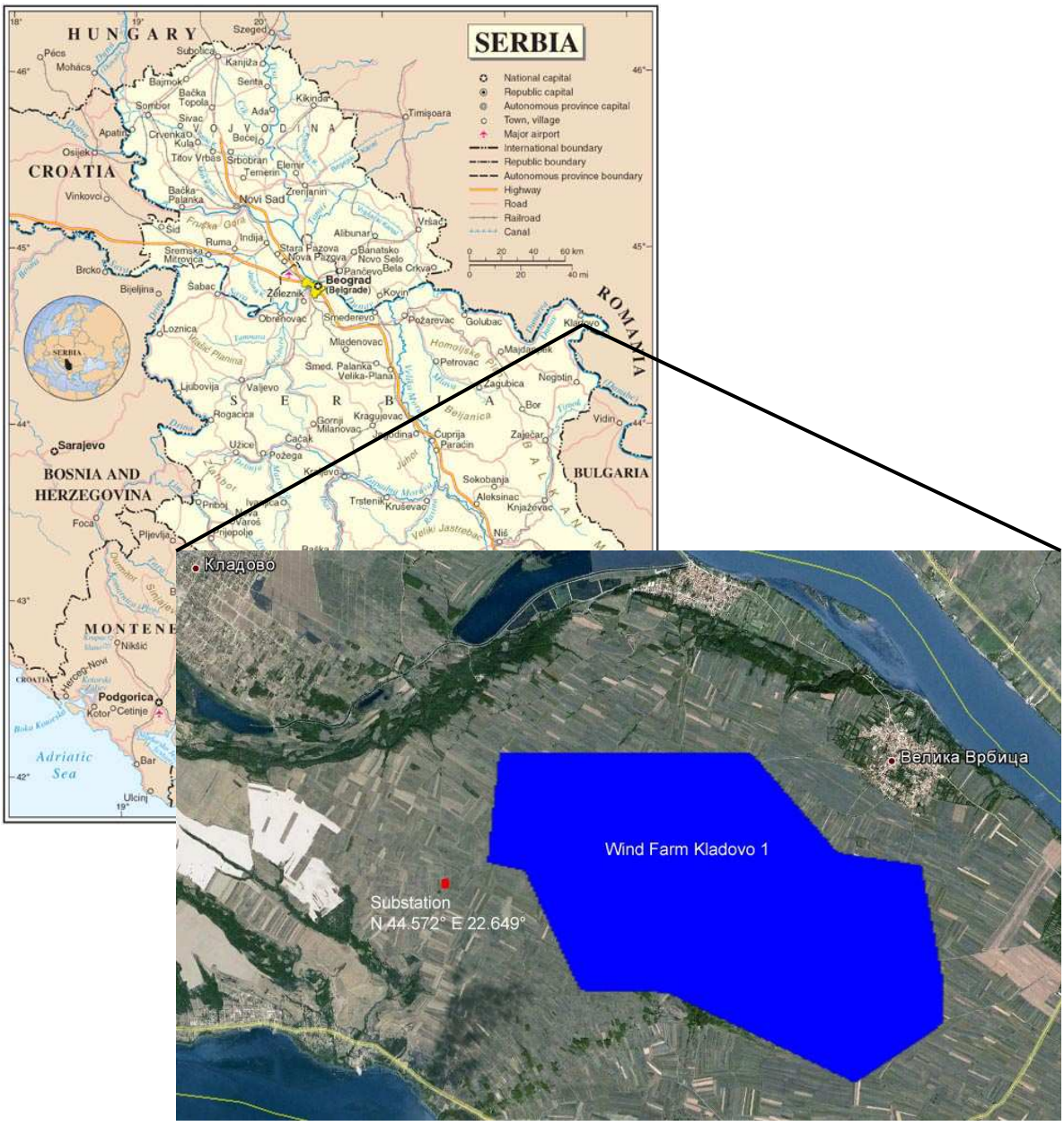
The geographical coordinates of the centre of the transformer station are N 44.572° and E 22.649°. The following map shows the exact location of the proposed project activity.



A.3. Technologies and/or measures

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The project scenario is the implementation of the proposed project activity which will consist of the installation of up to 27 new, state of the art 2 MW wind turbines manufactured by a renowned technology supplier. The total capacity of the project activity will be up to 54 MW.

With an expected load factor of 24.6%, the supplied power is expected to be 116,240 MWh per year. The proposed project activity is expected to be operated for 25 years. As the Serbian national grid is dominated by the thermal power generation, the proposed project activity will achieve greenhouse gas (GHG) emission reductions by displacing the electricity from the Serbian national grid. The project activity transfers environmentally safe and sound technology and know-how to the host country since no such technology is currently in commercial operation in Serbia.

The characteristics of the turbines are expected to be:

Type: Variable speed horizontal axis wind turbine with 3-blade rotor, fully fed converter with permanent magnet synchronous generator and pitch control
Rated power: 2000 kW
Rotor diameter: 93m
Cut-in wind speed 3 m/s
Nominal wind speed 12.0 m/s
Shutdown wind speed 25 m/s
Power control via pitch control
Speed control via pitch control
Speed limitation via pitch control
Main braking system via pitch control

The baseline scenario (electricity generation by grid connected power plants) is the same as the situation existing prior to the starting date of the project.

The electricity will be fed into the grid at a new 110/20kV substation, which will be built by the project proponent at the project site. The monitoring equipment (electricity meter) will be installed in this substation. The substation will be connected to the existing transmission line (OHL 110kV number 1186 RP Djerdap 2 - TS Sip 1) by a new 10km 110kV overhead line (OHL) built by the project proponent.

A.4. Parties and project participants

Party involved (host) indicates a host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Serbia (host)	Forestpeak-I d.o.o. (private)	No
Liechtenstein	Energy Changes Projektentwicklung GmbH (private)	No

A.5. Public funding of project activity

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There is no public funding from Annex I Parties for the proposed project activity.

SECTION B. Application of selected approved baseline and monitoring methodology

B.1. Reference of methodology

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Approved consolidated baseline and monitoring methodology *ACM0002 Consolidated baseline methodology for grid-connected electricity generation from renewable sources Version 12.3.0*

Methodological Tool: *Tool to calculate the emission factor for an electricity system Version 02.1.0*

Methodological Tool: *Tool for the demonstration and assessment of additionality Version 06.0.0*

Methodological Tool: *Combined tool to identify the baseline scenario and demonstrate additionality; N.A.*

Methodological Tool: *Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion. N.A.*

B.2. Applicability of methodology

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The approved baseline methodology ACM0002 Version 12.3.0, applies to the proposed project activity, based on the following conditions:

Applicability conditions in Version 12.3.0 of ACM0002 related to wind power activities	**Characteristics of the project activity**	**Applicability criterion met?**
This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).	The proposed project activity is a new grid-connected wind farm project and no renewable power plant was operated prior to the implementation at the proposed project activity site (Documentation: see satellite image in A.4.1.4, to be confirmed by on site visit)	Yes
The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;	The proposed project activity is a new grid-connected wind farm project and no renewable power plant was operated prior to the implementation at the proposed project activity site (Documentation: see satellite image in A.4.1.4, to be confirmed by on site visit)	Yes
The methodology is not applicable to the following: • *Project activities that involve*	The proposed project activity does not involve switching from fossil fuels to renewable energy.	Yes

switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; • *Biomass fired power plants;* • *A hydro power plant that results in the creation of a new single reservoir or in the increase in an existing single reservoir where the power density of the reservoir is less than 4 W/m^2.*	It is neither a biomass fired power plant nor a hydro power plant. (Documentation: see satellite image in A.4.1.4, to be confirmed by on site visit)	

Additionally, the geographic and system boundaries for the respective electricity grid can be clearly identified and information on the characteristics of the grid is available.

Therefore, the methodology ACM0002 Version 12.3.0 is applicable to the project activity

B.3. Project boundary

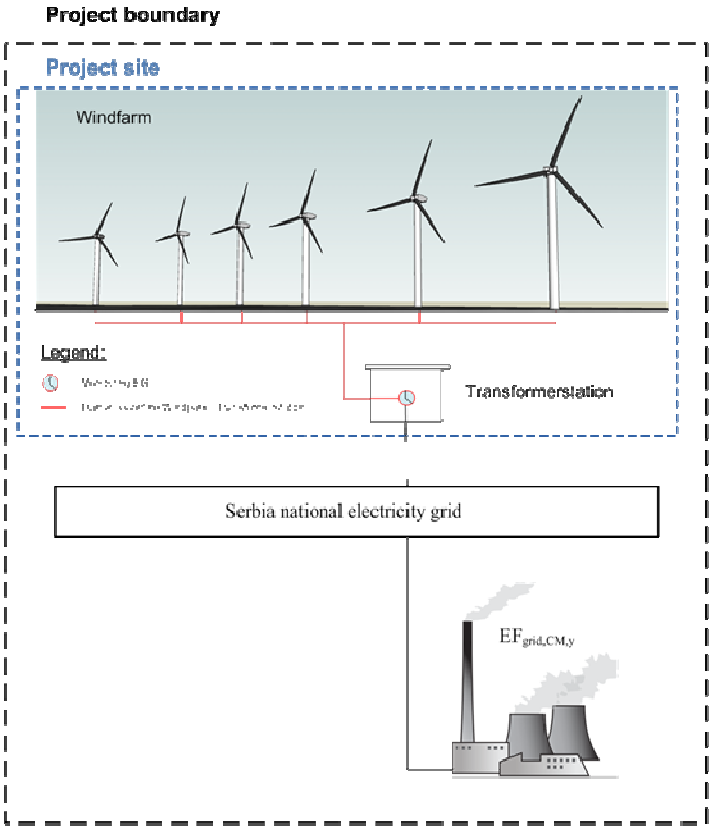
According to ACM0002 Version 12.3.0 the following greenhouse gases and emission sources must be considered to be included or excluded from the project boundary of the proposed project activity:

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project scenario	For geothermal power plants fugitive emissions of CH_4 and CO_2 from non-condensable gases contained in geothermal steam	CO_2	No	Not applicable to the project activity
		CH_4	No	Not applicable to the project activity
		N_2O	No	Minor emission source
	CO_2 emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants	CO_2	No	Not applicable to the project activity
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
	For hydro power plants, emissions of CH_4 from the reservoir	CO_2	No	Minor emission source
		CH_4	No	Not applicable to the project activity
		N_2O	No	Minor emission source

Baseline emissions to be included in the boundary of the proposed project activity are CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.

Since the proposed project activity is neither a geothermal nor a hydro power plant nor does it consume fossil fuels no project emissions occur within the project boundary.

The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the Serbian national electricity grid where project power plant activity is connected to. There is only one electricity grid in Serbia, operated by EMS. Power plants connected to the grid are mostly thermal power plants and some hydro power plants.



B.4. Establishment and description of baseline scenario

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Since the proposed project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

According to:
ACM0002 Consolidated baseline methodology for grid-connected electricity generation from renewable sources Version 12.3.0

If the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

B.5. Demonstration of additionality

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Ad starting date of the proposed project activity (prior consideration of CDM):
The CDM Glossary of Terms, Version 06.0 defines the start date as follows:

In the context of a CDM project activity or PoA, the earliest date at which either the implementation or construction or real action of a CDM project activity or PoA begins.

The start of the proposed project activity is the investment decision made by shareholder resolution on 25/06/2012. This resolution constitutes a clear commitment to the expenditures related to the project.

Ad explanation of how and why this project activity is additional
Methodological Tool *Tool for the demonstration and assessment of additionality* Version 06.0.0

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

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

The CDM Validation and Verification Standard (v 02.0) states:

6. Baseline scenario identification and description

89. The DOE shall determine whether any procedure contained in the methodology to identify the most reasonable baseline scenario has been correctly applied. If the selected methodology requires the use of tools (such as the .Tool for the demonstration and assessment of additionality. and the .Combined tool to identify the baseline scenario and demonstrate additionality.) to establish the baseline scenario, the DOE shall consult the methodology on the application of these tools. In such cases, the specific guidance in the methodology shall supersede the corresponding requirements of the tool.

ACM0002 v.12.3.0 (page 4) prescribes the baseline scenario as follows:

If the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

> *Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the Tool to calculate the emission factor for an electricity system.*

Therefore two alternatives are considered for further discussion:

Alternative 1: The proposed project activity undertaken without being registered as a CDM project activity.
Alternative 2: Continuation of the current situation (no project activity undertaken).

Sub-step 1b: Consistency with mandatory laws and regulations:

All above mentioned alternatives are in compliance with all mandatory applicable legal and regulatory requirements of Serbia.

Step 2: Investment analysis

Investment analysis is not applied.

Step 3: Barrier analysis

Sub-step 3a: Identify barriers that would prevent the implementation of the proposed CDM project activity:
The *Tool for the demonstration and assessment of additionality* Version 06.0.0 states:

2. Barriers due to prevailing practice, inter alia:
The project activity is the "first of its kind".
(a) For the measures identified under paragraph 6, a proposed project activity is the First-of-its-kind in the applicable geographical area if :
(ii) The project is the first in the applicable geographical area that applies a technology that is different from any other technologies able to deliver the same output and that have started commercial operation in the applicable geographical area before the start date of the project; and
(iii) Project participants selected a crediting period for the project activity that is "a maximum of 10 years with no option of renewal";

The project activity is of measure type 6b "*Switch of technology with or without change of energy source (including energy efficiency improvement as well as use of renewable energies*".

For over 20 years no major investment has taken place in Serbia´s new power generation capacity. The latest major power plant which went online in 1991 was the Thermal Power Plant Kostolac B2. In relation to wind power the only existing first single wind turbine was installed in April 2011. It is a used 500 kW wind turbine of type Enercon E-40 which was implemented by the municipality of Tutin for demonstration purposes (as demonstrated by a confirmation from the Municipality of Tutin). This has led to the situation that at the time of the investment decision (project start) there is no wind power plant in commercial operation in Serbia (as demonstrated by a confirmation from the Serbian Ministry of Infrastructure and Energy).

Project participants selected a crediting period of 10 years with no option of renewal.

Therefore the project activity classifies as the "first-of-its-kind".

Sub-step 3 b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity):
The *Tool for the demonstration and assessment of additionality* Version 06.0.0 states:

(b) For the measures identified under paragraph 6, a proposed project activity that was identified as the First-of-its-kind project activity is additional and Sub-step 3 b does not apply.

Sub step 3 b does not apply.

Step 4: Common practice analysis

43. Unless the proposed project type has demonstrated to be first-of-its kind (according to Sub-step 3a), and for measures different from those listed in paragraph 6 the above generic additionality tests shall be complemented with an analysis of the extent to which the proposed project type (e.g. technology or practice) has already diffused in the relevant sector and region.

The proposed project type has demonstrated to be first-of-its kind (according to Sub-step 3a), therefore the above generic additionality tests do not have to be complemented with an analysis of the extent to which the proposed project type (e.g. technology or practice) has already diffused in the relevant sector and region.

Not applicable.

Sub-step 4a: Analyze other activities similar to the proposed project activity:

Sub-step 4b: Discuss any similar Options that are occurring:

As all applicable steps of the tool are satisfied, the project is additional.

B.6. Emission reductions
B.6.1. Explanation of methodological choices
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According to:
ACM0002 Consolidated baseline methodology for grid-connected electricity generation from renewable sources Version 12.3.0

Project emissions
ACM0002 Version 12.3.0 states that *"For most renewable power generation project activities, PEy = 0"*.The only exceptions to this rule are project activities involving energy generation based on geothermal, solar thermal and hydro power.

The project activity does not involve any of the above mentioned technologies. Thus according to *ACM0002 Version 12.3.0*:

$PE_y = 0$

Baseline emissions
Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y} \quad \textbf{(1)}$$

Where:

BE_y	=	*Baseline emissions in year y (tCO_2)*
$EG_{PJ,y}$	=	*Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)*

$EF_{grid,CM,y}$ = *Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO_2/MWh)*

Calculation of $EG_{PJ,y}$
The calculation of $EG_{PJ,y}$ is different for (a) greenfield plants, (b) retrofits and replacements, and (c) capacity additions.

The proposed project activity is a greenfield wind power plant therefore (a) applies.

(a) Greenfield renewable energy power plants

If the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, then:

$$EG_{PJ,y} = EG_{facility,y} \quad \textbf{(2)}$$

Where:

$EG_{PJ,y}$ = *Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)*

$EG_{facility,y}$ = *Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh)*

Calculation of $EF_{grid,CM,y}$
The combined margin CO_2 emission factor for grid connected power generation in year y $EF_{grid,CM,y}$ is calculated applying the *Tool to calculate the emission factor for an electricity system, Version 02.1.0* according to the following steps:

STEP 1: Identify the relevant electricity systems
For the purpose of determining the electricity emission factor, a project electricity system is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity and that can be dispatched without significant transmission constraints. In the case of the proposed project activity, the connected grid is the Serbian national grid and all connected power plants are included in the project boundary.

STEP 2: Choose whether to include off-grid power plants in the project electricity system (optional)
Only grid power plants are included in the calculation, Option I.

STEP 3: Select a method to determine the operating margin (OM)
The Simple Operating Margin method is applied.

Justification:
Low-cost/must-run resources, namely hydro power, constitute less than 50% of total grid generation in average of the five most recent years. Years 2006-2010 have been used as the five most recent years (see Appendix 4 for further details).

The emission factor is fixed with *ex ante* option.

STEP 4: Calculate the operating margin emission factor according to the selected method
The simple OM is calculated applying option A resp. A1 except for the district heating plants (Combined Heat and Power plants, CHPs) delivering also electricity to the Serbian grid, for which option A2 is chosen.

Justification for all power plants except the above mentioned CHPs:
Fuel consumption and net electricity generation is available per power unit m.

$$EF_{grid,OMsimple,y} = \frac{\sum_m EG_{m,y} \cdot EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad \textbf{(3)}$$

Where:

$EF_{grid,OMsimple,y}$	=	*Simple operating margin CO_2 emission factor in year y (tCO_2/MWh)*
$EG_{m,y}$	=	*Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)*
$EF_{EL,m,y}$	=	*CO_2 emission factor of power unit m in year y (tCO_2/MWh)*
m	=	*All power units serving the grid in year y except low-cost / must-run power units*
y	=	*The relevant year as per the data vintage chosen in Step 3*

The emission factor of each power unit *m* is determined as follows

$$EF_{EL,m,y} = \frac{\sum_i FC \cdot NCV_{i,y} \cdot EF_{CO2,i,y}}{EG_{m,y}} \quad \textbf{(4)}$$

Where:

$EF_{EL,m,y}$	=	*CO_2 emission factor of power unit m in year y (tCO_2/MWh)*
$FC_{i,m,y}$	=	*Amount of fossil fuel type i consumed by power unit m in year y (Mass or volume unit)*
$NCV_{i,y}$	=	*Net calorific value (energy content) of fossil fuel type i in year y (GJ/mass or volume unit)*
$EF_{CO2,i,y}$	=	*CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)*
$EG_{m,y}$	=	*Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)*
m	=	*All power units serving the grid in year y except low-cost/must-run power units*
i	=	*All fossil fuel types combusted in power unit m in year y*
y	=	*The relevant year as per the data vintage chosen in Step 3*

Net calorific value (energy content) of the fossil fuel types have been provided by the DNA Serbia.

The emission factors of heavy fuel oil, oil and natural gas have been sourced from IPCC default values: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2 /Energy; page 1.24 Table 1.4 (CONTINUED) DEFAULT CO2 EMISSION FACTORS FOR COMBUSTION
http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

The CO_2 emission factors of coal have been calculated based on the specified calorific values of the fuels, according the equation from the Initial National Communication of the Republic of Serbia, 10. Annexes, pg. 149, as follows:
EF [tC/TJ] =34.407-0.5891*Hd [MJ/kg]
Hd [MJ/kg] = net calorific value
EF_{CO2} in year y is then calculated as:
$EF_{CO2,y} = EF_{tC/TJ} * 44/12 * 10^{-3}$ [tCO2/GJ]

Justification for the above mentioned CHPs:

No information is available for the fuel consumption that can be attributed to the electricity generation only. Therefore Option A2 for the calculation of $EF_{EL,m,i,y}$ is used. The default efficiency factor for combined cycle plants in the table in Annex 1 of the *Tool to calculate the emission factor for an electricity system, Version 02.1.0* is used as a source for the energy conversion efficiency $\eta_{m,y}$.

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} \cdot 3.6}{\eta_{m,y}} \quad \textbf{(5)}$$

Where:

$EF_{EL,m,y}$ = *CO_2 emission factor of power unit m in year y (tCO_2/MWh)*
$EF_{CO2,m,i,y}$ = *CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)*
$\eta_{m,y}$ = *Average net energy conversion efficiency of power unit m in year y (ratio)*
m = *All power units serving the grid in year y except low-cost/must-run power units*
y = *The relevant year as per the data vintage chosen in Step 3*

Imports
Imports are considered with an emission factor of 0 tCO_2/MWh, according to the provisions of the *Tool to calculate the emission factor for an electricity system, Version 02.1.0*.

The operating margin emission factor is calculated as average of the latest three years for which data is available. These years are 2008, 2009 and 2010.
All relevant parameters to carry out the calculations are provided under B6.2 and Appendix 4.

STEP 5: Identify the group of power units to be included in the build margin (BM)
The sample group of power units *m* used to calculate the build margin consists of:

- the set of five power units that have been built most recently;

Justification
This set of power units comprises the larger annual generation (see Appendix 4 for details)

For the CHPP Zrenjanin, which is part of the sample group, the two power units A1 and A2 have been considered as one unit as data for electricity generation and emission factor is only available as aggregation for the whole plant. This is conservative, as the consequence is that a HPP is now included in the sample group, thus reducing the total (baseline) grid emission factor.

In terms of vintage of data Option 1 is chosen.

STEP 6: Calculate the build margin emission factor
The build margin emission factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad \textbf{(6)}$$

Where

$EF_{grid,BM,y}$ = *Build margin CO_2 emission factor in year y (tCO_2/MWh)*
$EG_{m,y}$ = *Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)*
$EF_{EL,m,y}$ = *CO_2 emission factor of power unit m in year y (tCO_2/MWh)*
m = *Power units included in the build margin*

y = *Most recent historical year for which power generation data is available*

The BM has been calculated with data of the year 2010.

STEP 7: Calculate the combined margin (CM) emissions factor.

The combined margin emission factor was calculated as the weighted average of the Operating Margin emission factor ($EF_{grid,OM,y}$) and the Build Margin emission factor ($EF_{grid,BM,y}$):

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad (7)$$

$EF_{grid,BM,y}$ = *Build margin CO_2 emission factor in year y (tCO_2/MWh)*
$EF_{grid,OM,y}$ = *Operating margin CO_2 emission factor in year y (tCO_2/MWh)*
$w_{OM,}$ = *Weighting of operating margin emissions factor (%)*
$w_{BM,}$ = *Weighting of build margin emissions factor (%)*

For $w_{OM,}$ *and* w_{BM} *0.75 and 0.25 is used*

Justification

These default values are prescribed for wind and solar generation project activities.

According to:
ACM0002 Consolidated baseline methodology for grid-connected electricity generation from renewable sources Version 12.3.0

Leakage emissions

No leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport). These emissions sources are neglected.

No leakage emissions are considered in the proposed project activity.

B.6.2. Data and parameters fixed ex ante

(Copy this table for each piece of data and parameter.)

Data / Parameter	$FC_{i,m,y}$, $FC_{i,y}$, $FC_{i,k,y}$
Unit	Mass or volume unit
Description	Amount of fossil fuel type *i* consumed by power plant / unit *m*, *k* (or in the project electricity system in case of $FC_{i,y}$) in year y.
Source of data	Power Generation Data provided by DNA
Value(s) applied	See details in Appendix 4
Choice of data or Measurement methods and procedures	Officially (DNA) provided data
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$\eta_{m,y}$
Unit	ratio
Description	Average net energy conversion efficiency of power unit *m* in year *y*
Source of data	The default values provided in the table in Annex 1 of the *Tool to calculate the emission factor*
Value(s) applied	See details in Appendix 4
Choice of data or Measurement methods and procedures	The default efficiency factor for combined cycle plants in the table in Annex 1 of the *Tool to calculate the emission factor for an electricity system, Version 02.1.0* is used, as no information is available for the fuel consumption that can be attributed to the electricity generation only
Purpose of data	Calculation of baseline emissions
Additional comment	Used only for the calculation of $EF_{CO2,m,i,y}$ for the Combined Heat and Power plants delivering electricity to the grid.

Data / Parameter	$NCV_{i,y}$
Unit	GJ/mass or volume unit
Description	Net calorific value (energy content) of fossil fuel type *i* in year *y*
Source of data	Power Generation Data provided by DNA
Value(s) applied	See details in Appendix 4
Choice of data or Measurement methods and procedures	Officially (DNA) provided data
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$EF_{CO2,i,y}$ and $EF_{CO2,m,i,y}$
Unit	tCO_2/GJ
Description	CO_2 emission factor of fossil fuel type *i* used in power unit *m* in year *y*
Source of data	Power Generation Data provided by DNA
Value(s) applied	See details in Appendix 4
Choice of data or Measurement methods and procedures	Officially (DNA) provided data
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$EG_{m,y,}$ EG_y, $EG_{k,y}$
Unit	MWh
Description	Net electricity generated by power plant/unit *m*, *k* or *n* (or in the project electricity system in case of EG_y) in year *y* or hour *h*
Source of data	Power Generation Data provided by DNA
Value(s) applied	See details in Appendix 4
Choice of data or Measurement methods and procedures	Officially (DNA) provided data
Purpose of data	Calculation of baseline emissions
Additional comment	-

B.6.3. Ex ante calculation of emission reductions

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The plant load factor is defined according to the *Guidelines for the Reporting and Validation of Plant Load Factors Version 01.0*

Option (b) was chosen, the plant load factor was determined by a third party.

The proposed project activity will approximately generate 116,240 MWh electricity to the Serbian grid annually. The emission reduction ER_y by the project activity during a giving year y is calculated as follows:

$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} = 116{,}240\ MWh \times 1.123 tCO_2/MWh = 130{,}538\ tCO_2$

$ER_y = BE_y - PE_y - LE_y = 130{,}538\ tCO_2 - 0 = 130{,}538\ tCO_2$

The emission reductions ER_y by the project activity during a given year *y* are 130,538 tCO_2 and the total emission reductions in the crediting period are 1,305,379 tCO_2.

B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
2013	32,634	0	0	32,634
2014	130,538	0	0	130,538
2015	130,538	0	0	130,538
2016	130,538	0	0	130,538
2017	130,538	0	0	130,538
2018	130,538	0	0	130,538
2019	130,538	0	0	130,538
2020	130,538	0	0	130,538
2021	130,538	0	0	130,538
2022	130,538	0	0	130,538
2023	97,903	0	0	97,903
Total	1,305,379	0	0	1,305,379
Total number of crediting years	10			
Annual average over the crediting period	130,538	0	0	130,538

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

(Copy this table for each piece of data and parameter.)

Data / Parameter	$EG_{facility,y}$
Unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Source of data	Electricity meter(s) in the substation situated at the high voltage side of the transformer
Value(s) applied	116,240
Measurement methods and procedures	Continuous measurement and at least monthly recording. There will be monthly manual reading of the meter. The reading protocol will be stored electronically and as paper backup for 2 years following the end of the last crediting period . The precision of the meter is no lower than 0.5s.
Monitoring frequency	Continuous measurement and at least monthly recording
QA/QC procedures	The calibration frequency is according to national standards (Grid Code of the national transmission grid operator EMS). The owner of the meters (grid operator) is responsible for the calibration. In order to ensure plausibility of the data, cross checks with electricity invoices will be made.
Purpose of data	Calculation of baseline emissions
Additional comment	This data will be used to calculate direct emission reductions.

Data / Parameter	$EG_{export\text{-}facility,y}$
Unit	MWh
Description	Quantity of gross electricity generation supplied by the project plant/unit to the grid in year y
Source of data	Electricity meter(s) in the substation situated at the high voltage side of the transformer
Value(s) applied	116,240
Measurement methods and procedures	Continuous measurement and at least monthly recording. There will be monthly manual reading of the meter. The reading protocol will be stored electronically and as paper backup for 2 years following the end of the last crediting period . The precision of the meter is no lower than 0.5s.
Monitoring frequency	Continuous measurement and at least monthly recording
QA/QC procedures	The calibration frequency is according to national standards (Grid Code of the national transmission grid operator EMS). The owner of the meters (grid operator) is responsible for the calibration.
Purpose of data	Calculation of baseline emissions
Additional comment	This data will be used to calculate direct emission reductions.

Data / Parameter	$EG_{import\text{-}facility,y}$
Unit	MWh
Description	Quantity of electricity consumed by the project plant/unit from the grid in year y
Source of data	Electricity meter(s) in the substation situated at the high voltage side of the transformer
Value(s) applied	0
Measurement methods and procedures	Continuous measurement and at least monthly recording. There will be monthly manual reading of the meter. The reading protocol will be stored electronically and as paper backup for 2 years following the end of the last crediting period . The precision of the meter is no lower than 0.5s.
Monitoring frequency	Continuous measurement and at least monthly recording
QA/QC procedures	The calibration frequency is according to national standards (Grid Code of the national transmission grid operator EMS). The owner of the meters (grid operator) is responsible for the calibration.
Purpose of data	Calculation of baseline emissions
Additional comment	This data will be used to calculate direct emission reductions.

Data / Parameter	$EG_{export\text{-}total,y}$
Unit	MWh
Description	Quantity of total gross electricity generation supplied to the grid metered by a joint main meter at the substation in year y
Source of data	Electricity meter(s) in the substation situated at the high voltage side of the transformer
Value(s) applied	n/a
Measurement methods and procedures	Continuous measurement and at least monthly recording. There will be monthly manual reading of the meter. The reading protocol will be stored electronically and as paper backup for 2 years following the end of the last crediting period . The precision of the meter is no lower than 0.5s.
Monitoring frequency	Continuous measurement and at least monthly recording
QA/QC procedures	The calibration frequency is according to national standards (Grid Code of the national transmission grid operator EMS). The owner of the meters (grid operator) is responsible for the calibration.
Purpose of data	Calculation of baseline emissions
Additional comment	This parameter will be used for the calculation of the net generated electricity only in case also additional wind farms feed electricity into the grid at the specified substation.

Data / Parameter	$EG_{project,y}$
Unit	MWh
Description	Quantity of gross electricity generated by the project plant/unit metered by individual meters at the point of feed into the substation at the site of the project plant in year y
Source of data	Electricity meter(s) in the substation situated at the low voltage side of the transformer
Value(s) applied	n/a
Measurement methods and procedures	Continuous measurement and at least monthly recording by the SCADA system. Data will be archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The precision of the meter is no lower than 0.5s.
Monitoring frequency	Continuous measurement and at least monthly recording
QA/QC procedures	The calibration frequency is according to national standards (Grid Code of the national transmission grid operator EMS)
Purpose of data	Calculation of baseline emissions
Additional comment	This parameter will be used for the calculation of the net generated electricity only in case also additional wind farms feed electricity into the grid at the specified substation.

Data / Parameter	$EG_{other\text{-}windfarms,y}$
Unit	MWh
Description	Quantity of gross electricity generated by other windfarms that share the transmissions facilities with the project plant metered by individual meters at the point of feed into the substation in year y
Source of data	Electricity meter(s) in the substation situated at the low voltage side of the transformer
Value(s) applied	n/a
Measurement methods and procedures	Separate meter(s) in the substation measuring the electricity generation of the other wind farms connected to the same substation as the project activity.
Monitoring frequency	Continuous measurement and at least monthly recording
QA/QC procedures	The responsibility for the calibration of the meter(s) lays with the project owners of the other windfarms. The meter(s) will be calibrated at least every 3 years according to manufacturer's specifications.
Purpose of data	Calculation of baseline emissions
Additional comment	This parameter will be used for the calculation of the net generated electricity only in case also additional wind farms feed electricity into the grid at the specified substation.

Data / Parameter	$EG_{import\text{-}total,y}$
Unit	MWh
Description	Quantity of electricity imported from the grid metered by a joint main meter at the substation year y
Source of data	Electricity meter(s) in the substation situated at the high voltage side of the transformer
Value(s) applied	n/a
Measurement methods and procedures	Continuous measurement and at least monthly recording. There will be monthly manual reading of the meter. The reading protocol will be stored electronically and as paper backup for 2 years following the end of the last crediting period . The precision of the meter is no lower than 0.5s.
Monitoring frequency	Continuous measurement and at least monthly recording
QA/QC procedures	The calibration frequency is according to national standards (Grid Code of the national transmission grid operator EMS). The owner of the meters (grid operator) is responsible for the calibration.
Purpose of data	Calculation of baseline emissions
Additional comment	This parameter will be used for the calculation of the net generated electricity only in case also additional wind farms feed electricity into the grid at the specified substation.

B.7.2. Sampling plan

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Not applicable, as no monitored data is to be determined by a sampling approach.

B.7.3. Other elements of monitoring plan

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Management structure and responsibility

Overall responsibility for daily operating and reporting lies with the project proponent. A staff will be defined within the company to carry out the monitoring work (data recording and archiving, quality assurance and quality control of the data, equipment´s calibration, scheduled and unscheduled maintenances and adoption of corrective actions, if needed)

Management structure

The manager of the proposed project activity will hold the overall responsibility for the monitoring process, including the follow up of daily operations, definition of personnel involved with the monitoring work, revision of the monitored results/data, and quality assurance of measurements and the process of training new staff.

Responsibility of the personnel directly involved

The personnel involved with monitoring will be responsible for carrying out the following tasks:

- Supervise and verify metering and recording: the staff will coordinate internally with other departments to ensure and verify adequate metering and recording of data, including power delivered to the grid;

- Collection of additional data, sales/invoices: the staff will collect sales receipts and relevant data for monitoring of the proposed project activity;

- Calibration: the staff will coordinate with the responsible organizations to ensure that calibration of the metering instruments is carried out in accordance with national standards (Grid Code of the Serbian Transmission Grid Operator Elektromreža Serbia).

- Data archives: the staff will be responsible for keeping all monitoring data and making it available to the DOE for the verification of emission reductions

Support and third parties participation
The staff will receive support from the CDM experts (internal and/or external) in its responsibilities through the following actions:

- Provide the staff with a calculation template in electronic form for calculation of annual emission reductions;
- Provide specific CDM monitoring instructions to the personnel involved in the project activity´s operation;
- Follow-up of the monitoring plan and continuous on demand advice to the staff;
- Compilation of the monitored data and preparation of the monitoring report;
- Coordination with DOEs for the preparation of periodical verifications;

Monitoring equipment and installation:
The quantity of annual electricity delivered to the grid by the proposed project activity ($EG_{export,y}$) and the electricity consumed from the grid by the proposed project activity ($EG_{import,y}$) will be monitored through the bidirectional main meter in the new substation. Any error resulting from the meter shall not exceed 0.5%. All equipment will be in compliance with the national regulations.

If the proposed project activity has to share the same substation or transmission line with some other wind farms, appropriate additional meters will be installed at the project site so that the electricity generation can be monitored for each wind farm separately so as to determine the share of this wind farm of the net supply to the grid.

The net electricity supplied by the project activity will be measured as follows:

$$EG_{facility,y} = EG_{export-facility,y} - EG_{import-facility,y} \quad \textbf{(8)}$$

Where:

$EG_{facility,y}$ = *Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh)*

$EG_{export-facility,y}$ = *Quantity of gross electricity generation supplied by the project plant/unit to the grid in year y (MWh)*

$EG_{import-facility,y}$ = *Quantity of electricity consumed by the project plant/unit from the grid in year y (MWh)*

In case in the future other wind farms supply electricity to the grid at the same substation as the project activity and their electricity generation will be measured by the same meter as it is used for the monitoring of electricity generation of the current project activity, additional existing meters will be utilized to separate the amounts of electricity generated by the different wind farms. In this case the parameters $EG_{export-facility,y}$ and $EG_{import-facility,y}$ will be calculated as follows:

$$EG_{export-facility,y} = EG_{export-total,y} \times \frac{EG_{project,y}}{(EG_{project,y}+EG_{other-windfarms,y})} \quad (9)$$

Where:

$EG_{export-facility,y}$ = *Quantity of gross electricity generation supplied by the project plant/unit to the grid in year y (MWh)*

$EG_{export-total,y}$ = *Quantity of total gross electricity generation supplied to the grid metered by a joint main meter at the substation in year y (MWh)*

$EG_{project,y}$ = *Quantity of gross electricity generated by the project plant/unit metered by individual meters at the site of the project plant in year y (MWh)*

$EG_{other-windfarms,y}$ = *Quantity of gross electricity generated by other windfarms that share the transmissions facilities with the project plant metered by individual meters in year y (MWh)*

$$EG_{import-facility,y} = EG_{import-total,y} \quad (10)$$

Where:

$EG_{import-facility,y}$ = *Quantity of electricity consumed by the project plant/unit from the grid in year y (MWh)*

$EG_{import-total,y}$ = *Quantity of electricity imported from the grid in metered by a joint main meter at the substation year y (MWh)*

This approach is flexible to accommodate potential future installations which also share transmission facilities with the proposed project activity.

Data monitoring and management

The quantity of annual electricity delivered to the grid by the proposed project activity ($EG_{export-facility,y}$) and the electricity purchased from the grid by the proposed project activity ($EG_{import-facility,y}$) will be monitored. The net electricity generation is electricity delivered to the grid minus electricity purchased from the grid.

All monitoring data and records will be archived in electronic format as well as on paper. The electronic documents will be backed up on compact disc or hard disc. The project proponent will also keep copies of sales receipts and prepare a periodic monitoring report, which includes the net electricity generation, the monitoring data summary, the calibration records and the emission reductions calculation.

Quality control

Calibration

All metering equipment will be properly calibrated according to the relevant national calibration standard, the Grid Code of the Serbian Transmission Grid Operator Elektromreža Serbia (EMS). Currently the frequency specified in this Grid Code is annual calibration. The main commercial meter on the 110kV side of the transformer will be in ownership of EMS, thus EMS will also be responsible for the calibration of this meter.

Emergency treatment

When the main meter has a break down, the net electricity supplied to the grid will be determined according to the provisions given for such cases in the Power Purchase Agreement. In case other meters than the ones mentioned above will be involved in these procedures, the same requirements for calibration and metering error shall apply.

SECTION C. Duration and crediting period

C.1. Duration of project activity

C.1.1. Start date of project activity

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The start date of the project activity is the decision of the shareholders on the start of the project, which is dated with 25/06/2012.

C.1.2. Expected operational lifetime of project activity

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25y-0m.

C.2. Crediting period of project activity

C.2.1. Type of crediting period

>>

Fixed crediting period

C.2.2. Start date of crediting period

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01/10/2013 or the date of registration, whichever is later.

C.2.3. Length of crediting period

10y-0m

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

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The requirements of environmental impact assessments for projects is regulated in the *Law on Environmental Impact Assessment ("OJ RS", No 135/04, 36/09)* and the Decree on *Establishing the List of Projects that May Require Environmental Impact Assessment ("OJ RS", No 114/08*).

D.2. Environmental impact assessment

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The area of the project activity is situated in a zone that was specified as area for wind energy generation in a local master plan. Environmental impacts were assessed already during the elaboration of this master plan. In addition to this, one full year of birds and bats monitoring has been conducted for the total project area of Wind Farm Kladovo 1 from March 2011 until February 2012. The results confirm that the project will have no significant impact on the fauna.

An EIA was carried out and approved by the Serbian Ministry of Energy, Development and Natural Environment Protection on 19/09/2012. This approval was published on 22/09/2012.

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

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The public consultation was carried out in March 2012 in the Municipality of Kladovo as part of the Urban Project approval procedure. The project activity was announced on March 15th 2012 on the municipality's website http://www.kladovo.org.rs/ and on the official municipality notice board.

The period for comments was from 16/03/2012 until 21/03/2012. All interested stakeholders were invited to the municipality's office to review the planning documents for the wind farm and leave comments or questions.

E.2. Summary of comments received

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No comments from local stakeholders were received.

E.3. Report on consideration of comments received

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No comments from local stakeholders were received.

SECTION F. Approval and authorization

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At the time of submitting the PDD to the validating DOE no letters of approval from the Parties for the project activity are available.

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Appendix 1: Contact information of project participants

Organization name	Forestpeak-I d.o.o.
Street/P.O. Box	Karataski put bb
Building	
City	Kladovo
State/Region	
Postcode	19320
Country	Serbia
Telephone	
Fax	
E-mail	
Website	
Contact person	Mr. Veljko Jankovic
Title	Mr
Salutation	
Last name	Jankovic
Middle name	
First name	Veljko
Department	
Mobile	
Direct fax	
Direct tel.	+ 381 63 1 14 14 14
Personal e-mail	veljko.jankovic@globalenergypartners.at

Organization name	Energy Changes Projektentwicklung GmbH
Street/P.O. Box	Obere Donaustraße 12-28
Building	
City	Vienna
State/Region	
Postcode	1020
Country	Austria
Telephone	
Fax	
E-mail	
Website	www.energy-changes.com
Contact person	Mr. Clemens Plöchl
Title	Managing Partner
Salutation	Mr.
Last name	Plöchl
Middle name	
First name	Clemens
Department	
Mobile	+43-676-847133-100
Direct fax	+43-1-9684529
Direct tel.	
Personal e-mail	clemens.ploechl@energy-changes.com

Appendix 2: Affirmation regarding public funding

There is no public funding from Annex I Parties for the proposed project activity.

Appendix 3: Applicability of selected methodology

All information has been provided in section B.2.

Appendix 4: Further background information on ex ante calculation of emission reductions

The detailed calculations and input assumptions of the parameter $EF_{grid,CM,y}$ according to the *Tool to calculate the emission factor for an electricity system* Version 02.1.0 are provided in a separate excel sheet *WFKladovo1_PDD_GEF Serbia_V1_20120410.xls*.

Appendix 5: Further background information on monitoring plan

The monitoring details for the project activity have been mentioned in section B.7 of this PDD.

Appendix 6: Summary of post registration changes

Not applicable

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History of the document

Version	Date	Nature of revision
04.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the project design document form for CDM project activities" (EB 66, Annex 8).
03	EB 25, Annex 15 26 July 2006	
02	EB 14, Annex 06 14 June 2004	
01	EB 05, Paragraph 12 03 August 2002	Initial adoption.
Decision Class: Regulatory **Document Type:** Form **Business Function:** Registration		