



**Monitoring report form for CDM project activity  
(Version 06.0)**

*Complete this form in accordance with the instructions attached at the end of this form.*

**MONITORING REPORT**

<b>Title of the project activity</b>	Liaoning Guoli Fuxin Wangsiyingzi Wind Power Project	
<b>UNFCCC reference number of the project activity</b>	9062	
<b>Version number of the PDD applicable to this monitoring report</b>	Version 03	
<b>Version number of this monitoring report</b>	01	
<b>Completion date of this monitoring report</b>	21/08/2018	
<b>Monitoring period number</b>	First monitoring period	
<b>Duration of this monitoring period</b>	01/04/2013 – 31/07/2018	
<b>Monitoring report number for this monitoring report</b>	N/A	
<b>Project participants</b>	Liaoning Guoli Renewable Energy Co. Ltd.	
<b>Host Party</b>	People's Republic of China	
<b>Sectoral scopes</b>	1: Energy industries (renewable sources)	
<b>Applied methodologies and standardized baselines</b>	ACM0002 (version 13.0.0) –“Consolidated methodology for grid-connected electricity generation from renewable sources”.	
<b>Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period</b>	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	0	273,021
<b>Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD</b>	496,612	

## **SECTION A. Description of project activity**

### **A.1. General description of project activity**

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Liaoning Guoli Fuxin Wangsiyingzi Wind Power Project (hereafter referred to as the Project) is invested and operated by Liaoning Guoli Renewable Energy Co. Ltd. (hereafter referred to as the project owner). The purpose of the Proposed Project is to utilize the wind energy for generating electricity which were delivered to the Northeast Power Grid (hereafter referred to as the NEPG) through Liaoning Power Grid. The delivered electricity can replace equivalent electricity in the Northeast Power Grid which is generated by fossil fuel.

The Project is located in Furong Town, Fuxin City, Liaoning Province, P. R. China. The total installed capability is 48MW, consisting of 24 sets of 2 MW wind turbines, where the annual electricity delivered to the grid is 96,576 MWh. The Project activity is expected to reduce Greenhouse Gas (GHG) emissions of 93,051 tCO<sub>2</sub>e annually. The annual operating hours of the Proposed Project are 2,012 hours in full load, and the plant load factor was calculated to be 22.97%. The corresponding power supplied to the grid is estimated to be 96,576 MWh annually.

The total emission reductions achieved in the current monitoring period from 01/04/2013 to 31/07/2018 are 273,021 tCO<sub>2</sub>e.

### **A.2. Location of project activity**

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The Project is located in Furong Town, Fuxin City, Liaoning Province, P. R. China. The geographical coordinates of the wind farm are around 120.9833°E ~ 122.1167°E, 41.95°N ~ 42.05°N.

The centre geographical coordinate of the wind farm is N41.9922°, E122.0563°.



Figure A-1: Location of Liaoning Province in China

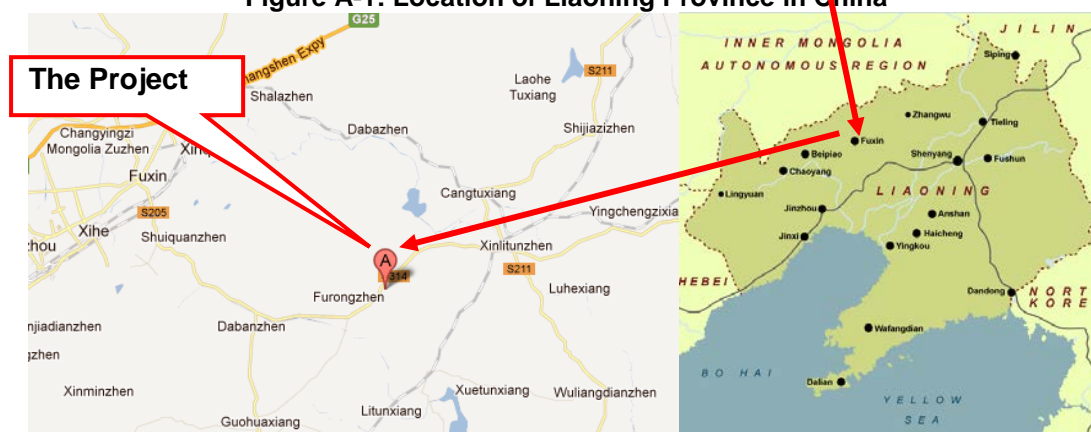


Figure A-2: Location of the Proposed Project in Liaoning Province

### A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
People's Republic of China (host Party)	Liaoning Guoli Renewable Energy Co. Ltd.	No

### A.4. Reference to applied methodologies and standardized baselines

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Based on methodology ACM0002 (Version 13.0.0) and the delineation of grid boundaries provided by the DNA in China, the Northeast Power Grid, including Heilongjiang Power Grid, Jilin Power Grid, Liaoning Power Grid, is a project electricity system.

<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf>

Baseline methodology and monitoring methodology applied for the project: ACM0002 (Consolidated baseline methodology for grid-connected electricity generation from renewable sources 4 --- Version 13.0.0, EB 67, 11 May 2012).

<http://cdm.unfccc.int/UserManagement/FileStorage/DYPFI935XBG274NWH6O8CM1KEZR0VU>

The methodology also refers to the latest approved versions of the following tools:

- Tool to calculate the emission factor for an electricity system (Version 2.2.1, EB63, 29 September, 2011)5;  
<http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v2.2.1.pdf>
- Tool for the demonstration and assessment of additionality (Version 6.1.0, EB69, 13 September, 2012)6.  
<http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v6.1.0.pdf>

The Project is a new grid-connected wind power generation project and the approved consolidated baseline and monitoring methodology ACM0002 (Version 13.0.0) and the “Tool to calculate the emission factor for an electricity system” are applicable to the Proposed Project.

#### A.5. Crediting period type and duration

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Crediting period	Renewable crediting period (7 years x3)
Starting date of crediting period	01/04/2013
End date of crediting period	31/03/2020

### SECTION B. Implementation of project activity

#### B.1. Description of implemented project activity

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The project activity was put into operation on 04/09/2016; all the turbines were well operated during this monitoring period.

During this monitoring period, the wind farm has a good running, smooth data transfer and grid connection, and no special events happened.

No events or situations occurred during the monitoring period, which may impact the applicability of the methodology.

The main technical specifications of the wind turbine are provided in the following table.

**Table B-1 Key Technical specifications of wind turbine**

Items	Proposed Wind turbine	Unit
Installed capacity (each wind turbine)	2	MW
Rotor diameter	102	m
Cut in speed	3	m/s
Rated wind speed	10.2	m/s
Cut out speed	25	m/s
Hub height	80	m
Rated voltage of generator	690	V
Rotational direction	Clockwise (front view)	-
Number of blades	3	pieces
Rated frequency	50	Hz
Designed product life	20	Year

During this monitoring period, no special event occurred during this monitoring period, which may impact the applicability of the methodology. In this monitoring period (from 01/04/2013 to 31/07/2018), the total emission reductions achieved is 273,021 tCO<sub>2</sub>e.

**B.2. Post-registration changes****B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies or standardized baselines**

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There is no any temporary deviations have been applied during this monitoring period.

**B.2.2. Corrections**

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There are no any corrections to project information or parameters fixed at validation have been approved during this monitoring period.

**B.2.3. Changes to the start date of the crediting period**

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There is no change to the start date of the crediting period.

**B.2.4. Inclusion of monitoring plan**

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NA

**B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools**

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There is no permanent change from registered monitoring plan or applied methodology or applied standardized baseline.

**B.2.6. Changes to project design**

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There is no notification or request of approval of changes from the project activity as described in the registered CDM-PDD.

**SECTION C. Description of monitoring system**

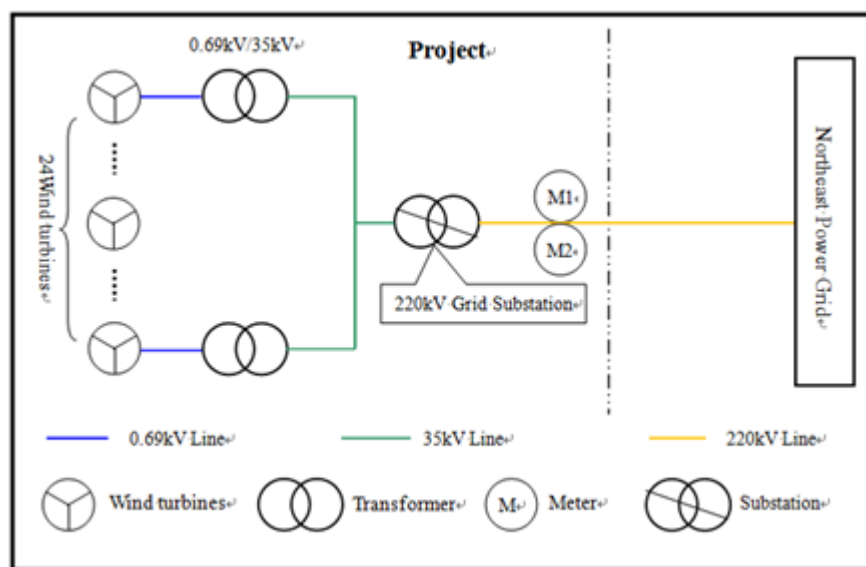
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**1. Monitoring Equipment**

According to the registered PDD, The electricity meters measuring power output & input to the grid will be calibrated in line with the relevant and applicable standard. This ensured that the equipment operates at 0.2s. The metering equipments were calibrated annually by the qualified organization according to the requirement from the Technical administrative code of electric energy metering (DL/T448—2000) (DL/1664-2016).

The gateway meter (hereafter referred as the meter M1) and a backup meter (hereafter referred as the meter M2) is installed at the high volt side of the 220kV Substation on the project site. The power was delivered through 220KV station to the Liaoning power grid then to the NEPG. The precision of the meters is at least 0.5s.

A diagram of the temporary plan shows how parameters are monitored is presented as follows:



## 2. Monitoring procedure

The quantity of net electricity generation supplied by the Proposed Project to the grid ( $EG_{\text{facility}, y}$ ) will be calculated as following:

$$EG_{\text{facility}, y} = EG_{\text{out}, y} - EG_{\text{in}, y}$$

A key meter was installed to monitor the electricity supplied to the grid and the electricity imported from the grid. In order to keep the consistency of measuring, a backup meter was also installed. The final electricity sent to the grid was determined by the key meter and when the key meter is out of operation, the backup meter was used. Before being put into operation, the meters should be checked by a third party co-authorized by the owner and the local grid company.

The calibration procedures was implemented in accordance with Technical administrative code of electric energy metering (DL/T448—2000)(DL/1664-2016), which came into force in 2000, the owner and the grid company should co-authorize a third party, qualified metrical organization to conduct the calibration of the devices accordance with Electronic energy meter testing procedures (JJG 596-1999).

## 3. Management Structure

Roles and responsibilities is defined for relevant staff involved in CDM monitoring, and the prospect of nominating a CDM Manager was considered. The CDM Manager has the overall responsibility for the monitoring system on this project. All staff involved in the collection of data and records were coordinated by him. The Project owner should take the responsibility for the monitoring plan implementation. A CDM team is to be established and consists of project manager, CDM manager, technical staff, and statistic staff.

Organizing structure of the CDM team is shown as figure C-1.

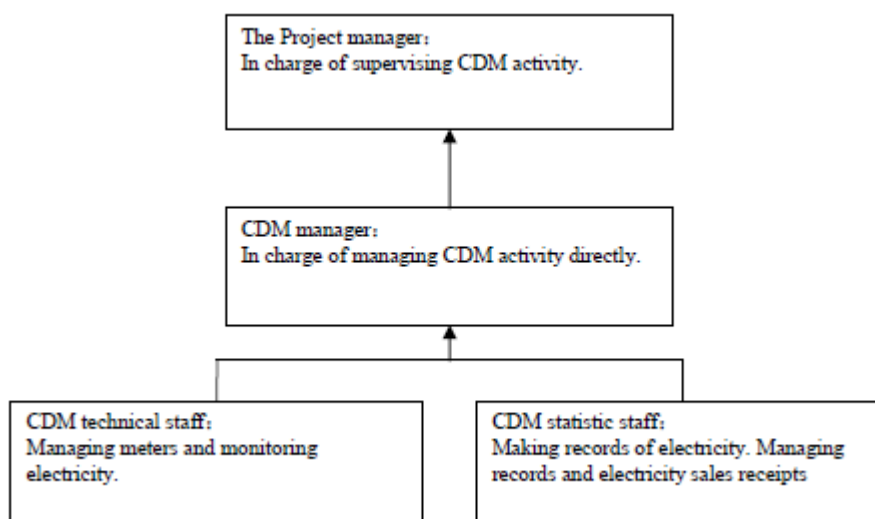


Figure C-1 Structure of the CDM team

#### 4. Data collection and record-keeping arrangements

All CDM relevant data was measured and collected as detailed in Section D. All data required for verification and issuance will be backed-up and retained for at least two years after the end of the crediting period or the last issuance of CERs of the Project, whichever occurs later.

#### 5. Data quality control and quality assurance

All data collected on-site was checked internally, the data should be checked by relevant electricity sales receipt of the project owner for the purpose of quality control, before being compiled in an electronic format, to ensure that it is complete and of appropriate quality, and will perform a final check of the data, and analyse project performance prior to any verification.

### SECTION D. Data and parameters

#### D.1. Data and parameters fixed ex ante

Data/Parameter	$EF_{grid,CM,y}$
Unit	tCO <sub>2</sub> /MWh
Description	Combined margin emission factor
Source of data	Registered PDD
Value(s) applied	0.9635
Choice of data or measurement methods and procedures	NA
Purpose of data/parameter	Baseline emission calculation
Additional comments	The baselines emission factor was determined ex ante and will be used throughout the first crediting period.

#### D.2. Data and parameters monitored

Data/Parameter	$EG_{out,y}$
Unit	MWh
Description	Electricity supplied by the project activity to the grid in year y.
Measured/calculated/default	It is monitored continuously through main meter
Source of data	Monthly reading records of the main meter

Value(s) of monitored parameter	284,030.2200
Monitoring equipment	Details can be showed in Table 2.
Measuring/reading/recording frequency	Continuously measurement and monthly recording
Calculation method (if applicable)	NA
QA/QC procedures	The metering equipments will be calibrated by a qualified Meter Calibration Organization once a year according to the management standard. Power supplied to the grid will be double checked according to electricity sales receipts.
Purpose of data/parameter	Baseline emission calculation
Additional comments	-

<b>Data/Parameter</b>	<b>EG<sub>im, y</sub></b>
Unit	MWh
Description	Electricity imported by the project activity from the grid in year y.
Measured/calculated/default	It is monitored continuously through main meter
Source of data	Monthly reading records of the main meter
Value(s) of monitored parameter	665.8500
Monitoring equipment	Details can be showed in Table 2.
Measuring/reading/recording frequency	Continuously measurement and monthly recording
Calculation method (if applicable)	NA
QA/QC procedures	The metering equipments will be calibrated by a qualified Meter Calibration Organization once a year according to the management standard. Power supplied to the grid will be double checked according to electricity sales receipts.
Purpose of data/parameter	Baseline emission calculation
Additional comments	-

<b>Data/Parameter</b>	<b>EG<sub>facility, y</sub></b>
Unit	MWh
Description	Quantity of net electricity generation supplied to the Grid by the project activity in year y.
Measured/calculated/default	Measured by EG <sub>out, y</sub> minus EG <sub>im, y</sub>
Source of data	Monthly reading records of the main meter
Value(s) of monitored parameter	283,364.3700
Monitoring equipment	Details can be showed in Table 2.
Measuring/reading/recording frequency	Continuously measurement and monthly recording
Calculation method (if applicable)	NA
QA/QC procedures	Power supplied to the grid will be checked by internal verification procedure and electricity sales receipts.
Purpose of data/parameter	Baseline emission calculation
Additional comments	-



Table 2: Details of the metering instruments

Meters	Type	Accuracy Class	Serial number	Calibration date	Validity
M <sub>1</sub>	ZMD402CT44.0457	0.2S	96654247	11/07/2016	08/07/2019
M <sub>2</sub>			96673872	10/07/2017 09/07/2018	

### D.3. Implementation of sampling plan

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N/A

## SECTION E. Calculation of emission reductions or net anthropogenic removals

### E.1. Calculation of baseline emissions or baseline net removals

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In accordance with the ACM0002, Baseline emissions are calculated according to the following formula:

$$BE_y = EG_y \cdot EF_{grid,CM,y} = EG_{facility,y} \cdot EF_{grid,CM,y} = (EG_{out,y} - EG_{im,y}) \cdot EF_{grid,CM,y}$$

$EG_{facility,y}$  = Quantity of net electricity generation supplied to the Grid by the project activity in year y;

$EG_{out,y}$  = Electricity supplied by the project activity to the grid in year y.

$EG_{im,y}$  = Electricity imported by the project activity from the grid in year y.

The emission factor  $EF_{grid,CM,y}$  is equal to 0.9635 tCO<sub>2</sub>/MWh. It has been calculated in the Project Design Document and is not updated during the first crediting period.

The electricity supplied to and imported from the grid by meter  $M_1$  is listed as below:

Monitoring Period		EG <sub>out,y</sub>			EG <sub>im,y</sub>		
		Values from meter readings	Values from electricity sales receipts	Conservative	Values from meter readings	Values from electricity sales receipts	Conservative
		A1	A2	A=MIN(A1, A2)	B1	B2	B=MAX(B1, B2)
2013/4/1 <sup>1</sup>	2016/8/31	0	0	0	0	0	0
2016/9/1	2016/9/30	6,921.3900	6,921.3900	6,921.3900	42.7800	42.7800	42.7800
2016/10/1	2016/10/31	12,247.5000	12,247.5000	12,247.5000	34.5000	34.5000	34.5000
2016/11/1	2016/11/30	10,801.9500	10,801.9500	10,801.9500	27.6000	27.6000	27.6000
2016/12/1	2016/12/31	12,851.2500	12,851.2500	12,851.2500	48.3000	48.3000	48.3000
2017/1/1	2017/1/31	7,377.4800	7,377.4800	7,377.4800	43.4700	43.4700	43.4700
2017/2/1	2017/2/28	11,019.3000	11,019.3000	11,019.3000	24.8400	24.8400	24.8400
2017/3/1	2017/3/31	11,200.0800	11,200.0800	11,200.0800	30.3600	30.3600	30.3600
2017/4/1	2017/4/30	13,577.1300	13,577.1300	13,577.1300	2.7600	2.7600	2.7600

<sup>1</sup> The project activity put into operation on 04/09/2016, and the power supplied to the grid is 0 MWh from 01/04/2013 to 31/08/2016.

2017/5/1	2017/5/31	17,504.6100	17,504.6100	17,504.6100	22.0800	22.0800	22.0800
2017/6/1	2017/6/30	10,957.8900	10,957.8900	10,957.8900	37.9500	37.9500	37.9500
2017/7/1	2017/7/31	12,215.7600	12,215.7600	12,215.7600	27.6000	27.6000	27.6000
2017/8/1	2017/8/31	6,752.3400	6,752.3400	6,752.3400	46.2300	46.2300	46.2300
2017/9/1	2017/9/30	10,876.4700	10,876.4700	10,876.4700	41.4000	41.4000	41.4000
2017/10/1	2017/10/31	14,556.2400	14,556.2400	14,556.2400	26.9100	26.9100	26.9100
2017/11/1	2017/11/30	15,393.9000	15,393.9000	15,393.9000	13.8000	13.8000	13.8000
2017/12/1	2017/12/31	8,978.2800	8,978.2800	8,978.2800	40.7100	40.7100	40.7100
2018/1/1	2018/1/31	10,642.5600	10,642.5600	10,642.5600	23.4600	23.4600	23.4600
2018/2/1	2018/2/28	8,968.6200	8,968.6200	8,968.6200	29.6700	29.6700	29.6700
2018/3/1	2018/3/31	16,978.1400	16,978.1400	16,978.1400	26.2200	26.2200	26.2200
2018/4/1	2018/4/30	19,135.7700	19,135.7700	19,135.7700	10.3500	10.3500	10.3500
2018/5/1	2018/5/31	16,304.0100	16,304.0100	16,304.0100	14.4900	14.4900	14.4900
2018/6/1	2018/6/30	13,063.0800	13,063.0800	13,063.0800	31.7400	31.7400	31.7400
2018/7/1	2018/7/31	15,706.4700	15,706.4700	15,706.4700	18.6300	18.6300	18.6300
<b>Total (Amount achieved from 1 January 2013)</b>		<b>284,030.220</b>	<b>284,030.220</b>	<b>284,030.2200</b>	<b>665.8500</b>	<b>665.8500</b>	<b>665.8500</b>
<b>Total</b>		<b>284,030.220</b>	<b>284,030.220</b>	<b>284,030.2200</b>	<b>665.850</b>	<b>665.850</b>	<b>665.8500</b>

As shown above, the net electricity supplied to the grid from the 01/04/2013 to 31/07/2018 is 283,364.3700MWh.

The baseline emission is:

$$BE_y = EG_y \cdot EF_{\text{grid,CM,y}} = 283,364.3700\text{MWh} \times 0.9635\text{tCO}_2\text{e/MWh} = 273,021 \text{ tCO}_2\text{e}$$

## E.2. Calculation of project emissions or actual net removals

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According to the registered PDD of the project, no project emission is to be counted by the Project.

Hence,  $PE_y=0$

## E.3. Calculation of leakage emissions

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According to the registered PDD of the project, No leakage was considered.

$Ly=0$

## E.4. Calculation of emission reductions or net anthropogenic removals

	Baseline GHG emissions or baseline net GHG removals (t CO <sub>2</sub> e)	Project GHG emissions or actual net GHG removals (t CO <sub>2</sub> e)	Leakage GHG emissions (t CO <sub>2</sub> e)	GHG emission reductions or net anthropogenic GHG removals (t CO <sub>2</sub> e)		
				Before 01/01/2013	From 01/01/2013	Total amount
<b>Total</b>	273,021	0	0	0	273,021	273,021

**E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD**

Amount achieved during this monitoring period (t CO <sub>2</sub> e)	Amount estimated ex ante (t CO <sub>2</sub> e)
273,021	$93051 \times 1948 / 365 = 496,612$

**E.6. Remarks on increase in achieved emission reductions**

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The actual value of emission reductions in this period is lower than that estimated in the PDD.