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# VALIDATION REPORT

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“Reduction in specific energy  
consumption ratio by  
installation of energy efficient  
direct melt technology in PET  
film manufacturing unit at,  
Uttaranchal, India”

REPORT NO. 2009-1377

REVISION NO. 02

DET NORSKE VERITAS



## VALIDATION REPORT

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Recommendation for approver by: <b>K.V.Raman</b>	Approved by: <b>Michael Lehmann</b>
Client: <b>Polyplex Corporation Limited</b>	Organisational unit: <b>DNV Climate Change and Environmental Services</b>
	Client ref.: <b>Mr. N. Ram Mohan</b>

**Project Name:** Reduction in specific energy consumption ratio by installation of energy efficient direct melt technology in PET film manufacturing unit at, Uttaranchal, India

**Country:** India

**Methodology:** AMS-II.D

**Version:** 11

**GHG reducing Measure/Technology:** Energy efficiency for industrial facilities

**ER estimate:** 7 703 tCO<sub>2</sub> e/annum

**Size**

☐ Large Scale

☒ Small Scale

**Validation Phases:**

☒ Desk Review

☒ Follow up interviews

☒ Resolution of outstanding issues

**Validation Status**

☐ Corrective Actions Requested

☐ Clarifications Requested

☒ Full Approval and submission for registration

☐ Rejected

In summary, it is DNV's opinion that the "Reduction in specific energy consumption ratio by installation of energy efficient direct melt technology in PET film manufacturing unit at, Uttaranchal, India" as described in the PDD version 2 dated 3 May 2010, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-II.D, version 11. DNV thus requests the registration of the project as a CDM project activity.

Report No.: <b>2009-1377</b>	Date of this revision: <b>12 July 2010</b>	Rev. No. <b>02</b>
Report title: <b>Reduction in specific energy consumption ratio by installation of energy efficient direct melt technology in PET film manufacturing unit at, Uttaranchal, India</b>		
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Key words:                      Service Area  
Climate Change                      **Validation**  
Kyoto                      Protocol                      Market Sector  
Validation                      **Process Industry**  
Clean                      Development  
Mechanism

- ☒ No distribution without permission from the Client or responsible organisational unit
- ☐ Limited distribution
- ☐ Unrestricted distribution



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### Abbreviations

BOPET	Biaxially-Oriented Poly Ethylene Terephthalate
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
DNA	Designated National Authority
DNV	Det Norske Veritas
GHG	Greenhouse gas(es)
GP	Gear Pump
GWP	Global Warming Potential
HCA	Host Country Approval
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MoEF	Ministry of Environment and Forests
MOM	Minutes of Meeting
MP	Monitoring Plan
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PCL	Polyplex Corporation Limited
PDD	Project Design Document
PET	Poly Ethylene Terephthalate
PO	Purchase Order
PP	Project Proponent
SEIAA	State Level Environment Impact Assessment Authority
SPCB	State Pollution Control Board
UNFCCC	United Nations Framework Convention on Climate Change



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### 1 EXECUTIVE SUMMARY – VALIDATION OPINION

*Det Norske Veritas Certification AS (DNV) has performed a validation of the “Reduction in specific energy consumption ratio by installation of energy efficient direct melt technology in PET film manufacturing unit at, Uttaranchal, India” The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host Party criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.*

*The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.*

*The project is being developed as a unilateral project with host Party as India. India fulfils the participation criteria and has approved the project and authorized the project participant. The DNA of India confirmed that the project assists in achieving sustainable development through its letter of approval dated 17 July 2009 /20/.*

*The project correctly applies AMS-II.D “Energy efficiency for industrial facilities”, version 11.*

*The proposed project activity utilises direct melt technology in BOPET film manufacturing process, replacing equipments like extruder, crystallizer, feeder and dehumidifier used in conventional process, thereby resulting in reduced electricity consumption and hence results in equivalent amount of emission reduction. Hence the project results in reductions of CO<sub>2</sub> emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It has been demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.*

*The total emission reductions from the project are estimated to be on the average 7 703 tCO<sub>2</sub>e per year over the selected 10 year fixed crediting period. The emission reduction forecast has been checked, and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.*

*Adequate training and monitoring procedures have been implemented.*

*In summary, it is DNV’s opinion that the “Reduction in specific energy consumption ratio by installation of energy efficient direct melt technology in PET film manufacturing unit at, Uttaranchal, India”, as described in the PDD of version 2 dated 3 May 2010, meets all relevant UNFCCC requirement for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-II.D, version 11. DNV thus requests the registration of the project as a CDM project activity.*



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## 2 INTRODUCTION

Polyplex Corporation Limited has commissioned DNV to perform a validation of the “Reduction in specific energy consumption ratio by installation of energy efficient direct melt technology in PET film manufacturing unit at, Uttaranchal, India”. This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

### 2.1 Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

### 2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AMS-II.D, version 11. The validation team has carried out the validation activities based on the recommendations in the CDM executive board Validation and Verification Manual, version 1.1 /17/.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.



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### 3 METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the project design documents
- II follow-up interviews with project stakeholders
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

#### 3.1 Desk Review of the Project Design Documentation

The following table lists the documentation that was reviewed during the validation:

- /1/ Polyplex Corporation Limited: *CDM-SSC-PDD, version 1, dated 6 February 2009 and revised version 2 dated 3 May 2010*
- /2/ Polyplex Corporation Limited: *CER calculation spread sheets*
- /3/ Polyplex Corporation Limited: *Minutes of board meeting dated 13 July 2007 for approval of the project activity.*
- /4/ Polyplex Corporation Limited: *Contract agreement between Ms PCL and Aquafil Engineering GmbH dated 4 September 2007, supplier of the polymerisation process*
- /5/ Polyplex Corporation Limited: *Contract agreement between Ms PCL and Lindauer Dornier GmbH dated 21 September 2007, supplier of the direct melt technology, BOPET film making process*
- /6/ Bruckner Maschinunbau GmbH & Co.KG (Alternative supplier of BOPET film making process): *Certification on direct melt process in PET film industry in India dated 23 March 2009, stating the technology is first of its kind in India and it is real challenge to project proponent and equipment supplier due to uncertainty of the technology*
- /7/ Lindauer Dornier GmbH (Supplier of BOPET film making process): *Certification on direct melt process PET film production in PCL dated 9 March 2009, stating first of its kind in India and having technological risk for successful implementation of the project activity.*
- /8/ Lindauer Dornier GmbH: *Specific energy consumption of PET extrusion with cascade extruder dated 29 September 2008*
- /9/ Bruckner Maschinunbau GmbH & Co.KG: *Specific energy consumption data for cascade extrusion system dated 13 October 2008*
- /10/ Polyplex Corporation Limited: *Technical detail of the PET film plant as provided by the supplier DORNIER*
- /11/ Uhde Inventa-Fischer: *Worlds first multi line BOPET direct film casting (DFC) polymer plant in China by M. Hittorff dated 16 April 2005, the only one similar technology with direct melt technology*
- /12/ Polyplex Corporation Limited: *Request for quotation for validation of CDM project of Polyplex Corporation Limited to DNV dated 4 February 2009*
- /13/ Extrex®: *Technical specifications for Extrex-140 GP melt pump*
- /14/ Polyester Film Industries Association: *Certificate to PCL as first and only Indian polyester film manufacturer to be using direct melt technology to produce polyester film dated 17 December 2009. The letter also establishes the technological barrier associated with the direct melt technology to produce polyester*



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- /15/ PCi Film Consulting Limited: *Quarterly business report; Quarter Three 2009, report no. 60; page 15- stating PCL direct melt process is first of its kind in India and second in worldwide as only one Chinese company Cifu had this facility.*
- /16/ Polyplex Corporation Limited: *Land registration deed for the project activity dated 8 August 2008*
- /17/ CDM Executive Board: *Validation and Verification Manual. Version 1.1*
- /18/ CDM Executive Board: *AMS-II.D, "Energy efficiency and fuel switching measures for industrial facilities." version 11, Sectoral scope 4.*
- /19/ SPCB: *Consent to established dated 22 January 2009*
- /20/ DNA of India: *HCA dated 17 July 2009*
- /21/ Government of Uttaranchal: *Notification of approval of land for PCL dated 1 August 2008*
- /22/ Lindauer Dornier GmbH: *Commissioning certificate of the project activity dated 17 March 2010*
- /23/ The Economic Times: *Article on Polyplex Corporation Limited (PCL) dated 19 December 2008*
- /24/ Ernst & Young: *Engagement letter for CDM project advisory dated 13 October 2007*
- /25/ Polyplex Corporation Limited: *Attendance sheet of stake holder consultation process dated 17 April 2009*
- /26/ Central electricity authority of India: *Baseline Carbon Dioxide Emission Database Version 4.0 available in <http://www.cea.nic.in/>*
- /27/ MoEF: *Notification vide S.O. 1533 (E) dated 14 September 2006 for environment impact assessment. Can be available: <http://envfor.nic.in/legis/eia/so1533.pdf>*
- /28/ SEIAA: *Environnemental clearance; Ref: EC-9/2009/1.5.7 dated 3 November 2009*

Main changes between the version published for the 30 days stakeholder commenting period and the final version submitted for registration:

1. *Estimated emission reduction changed from 7 080 tCO<sub>2</sub>e/annum to 7 703 t CO<sub>2</sub>e/annum. This is due to the change of extrusion quantity for BOPET films per annum. In earlier version ad hoc 30000 tonnes/annum was considered. In the revised version the calculation has been carried out based on 4 tonnes/hour production capacity (technical specification of the equipment) and 340 days of operation.*
2. *The geographical coordinate has been incorporated in the final PDD version as in the web hosted PDD it was missing.*
3. *All the applicability criteria of AMS-II.D version 11 has been discussed in the final PDD version which was missing in the web hosted PDD.*
4. *Start date of the project activity has been revised from 4 September 2007 to 21 September 2007 when contract with Lindaur Dornier for supply of film line has been signed /5/. On 4 September 2007 contract agreement between Ms PCL and Aquafil Engineering GmbH was signed /4/ which is for polymerisation section. As the polymerisation section is out of the project boundary 21 September 2007 has been considered.*





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5. *The project boundary has been revised in the final version of the PDD to restrict the signal to noise ratio in the project activity as per the applicable methodology AMS-II.D version 11.*
6. *Barrier analysis has been revised in the final version of the PDD with providing references of third party evidences of the barrier.*
7. *Monitoring procedure of extrusion quantity for BOPET films per annum has been revised to restrict the signal to noise ratio in the project activity as per the applicable methodology AMS-II.D version 11.*
8. *Start date of the crediting period has been revised.*

### 3.2 Follow-up Interviews with Project Stakeholders

On 25 and 26 August 2009, DNV visited the corporate office of Polyplex Corporation Limited at Noida and the project site in Bajpur in the state of Uttaranchal. DNV performed interviews with selected project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Polyplex Corporation Limited, local villages and consultants Ernst & Young were interviewed. The main topics of the interviews are summarized below.

Name of the organisation and personnel	Interview Topics
<b><i>Polyplex Corporation Limited</i></b> <i>Mr. N. Ram Mohan – Profit Centre Head (India)</i> <i>Mr. R. S. Gaur - Plant Head (Bajpur)</i> <i>Mr. A. R. Siddiqui – Head Engineering</i> <i>Mr. R. K. Gupta – Dy. General Manager (Projects)</i> <i>Mr. Y. P. Arya – Factory Manager</i> <i>Mr. Ashoke Sharma – Manager (projects)</i> <i>Mr. Abhinav Sharma – Manager (General management)</i>	<ul style="list-style-type: none"> <li>➤ Proof of CDM consideration</li> <li>➤ Applicability criteria for AMS II D</li> <li>➤ Determination of project boundary</li> <li>➤ Determination of baseline scenario and emission factor</li> <li>➤ Assessment of project additionality and discussed investment analysis</li> <li>➤ Uniqueness of project activity</li> <li>➤ Emission reduction calculations and data used</li> <li>➤ Review of project design and technology used</li> <li>➤ Leakage due to shift of existing equipments</li> <li>➤ Review of monitoring and verification procedure of the organisation and management structure of the organization for the project activity.</li> <li>➤ Environmental consents and permits</li> <li>➤ Review of the stakeholder consultation process.</li> </ul>
<b><i>Ernst &amp; Young</i></b> <i>Mr. Abhishek Bansal - Consultant</i>	



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<p><i>Mr. Govind Singh, savapati (village leader) of Bikrampur village</i></p> <p><i>Mr Khem Singh, ex area panchayat member</i></p>	<p>➤ Stakeholder issues and comments</p>
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### 3.3 Resolution of Outstanding Issues

The objective of this phase of the validation is to resolve any outstanding issues which need be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in the figure below. The completed validation protocol for the "Reduction in specific energy consumption ratio by installation of energy efficient direct melt technology in PET film manufacturing unit at, Uttaranchal, India" is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of CDM criteria or where a risk to the fulfilment of project objectives is identified. Corrective action requests (CAR) are issued, where:

- mistakes have been made with a direct influence on project results;
- CDM and/or methodology specific requirements have not been met; or
- there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

A request for clarification (CL) may be used where additional information is needed to fully clarify an issue.



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<i>Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities</i>				
<i>Requirement</i>	<i>Reference</i>	<i>Conclusion</i>		
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	This is either acceptable based on evidence provided ( <b>OK</b> ), a <b>Corrective Action Request (CAR)</b> of risk or non-compliance with stated requirements or a request for <b>Clarification (CL)</b> where further clarifications are needed.		

  

<i>Validation Protocol Table 2: Requirement checklist</i>				
<i>Checklist Question</i>	<i>Reference</i>	<i>Means of verification (MoV)</i>	<i>Comment</i>	<i>Draft and/or Final Conclusion</i>
<i>The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the large-scale PDD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i>	<i>This is either acceptable based on evidence provided (<b>OK</b>), or a <b>corrective action request (CAR)</b> due to non-compliance with the checklist question (See below). A request for clarification (CL) is used when the validation team has identified a need for further clarification.</i>

  

<i>Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests</i>			
<i>Draft report clarifications and corrective action requests</i>	<i>Ref. to checklist question in table 2</i>	<i>Summary of project owner response</i>	<i>Validation conclusion</i>
<i>If the conclusions from the draft Validation are either a CAR or a CL, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 2 where the CAR or CL is explained.</i>	<i>The responses given by the project participants during the communications with the validation team should be summarised in this section.</i>	<i>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".</i>

**Figure 1 Validation protocol tables**



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### 3.4 Internal Quality Control

The final validation report underwent a technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

### 3.5 Validation Team

<i><b>Role/Qualification</b></i>	<i><b>Last Name</b></i>	<i><b>First Name</b></i>	<i><b>Country</b></i>	<i><b>Type of involvement</b></i>					
				Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Expert input
CDM validator / technical team leader	Biswas	Soumik	India	✓	✓	✓	✓		
GHG auditor / Sector expert	Rana	Indrajit	India	✓	✓	✓			✓
GHG auditor	Kapoor	Nitin	India		✓				
Technical reviewers	Kakaraparthi	Venkata Raman	India					✓	

The qualification of each individual validation team member is detailed in Appendix B to this report.



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### 4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design as documented and described in the revise and resubmitted project design documentation version 2 dated 3 May 2010.

#### 4.1 Participation Requirements

The host Party is India and the project participant is the private entity Polyplex Corporation Limited (PCL) of India. The project activity is proposed as a unilateral activity and no Annex-I Party project participant has been identified yet. The host Party India meets all the requirements for participating in a CDM project. The letter of approval for the project from the DNA of India dated 17 July 2009 /20/ has been submitted to DNV. The letter of approval also confirms that the project meets the sustainable development criteria for the host country. It has been also verified from the CDM India website (<http://cdmindia.nic.in/cdmindia/projectList.jsp?search=search>) that the project has indeed been approved by the DNA of India.

The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA.

#### 4.2 Project Design

The project activity aims to improve the energy efficiency in the PET manufacture by the introduction of direct melt technique for producing BOPET films in the green field plant of Polyplex Corporation Limited (PCL), located at Bazpur village of Udham Singh Nagar district in the state of Uttarakhand (erstwhile Uttaranchal) of India.

The project activity involves the installation of a direct melt continuous process instead of the commonly used conventional chips manufacturing and extrusion batch process for production of BOPET films. In the conventional technology the polymer melt produced is converted into polymer chips which are stored intermediately before being re-melted, extruded and then converted into films of different grades. Hence the conventional technology has a separate extrusion section before the filming section. The direct melt technology is a continuous process and the polymer melt produced in the continuous polymerization process directly goes into the film making section. Hence the direct melt technology does not include equipments like extruder, crystallizer, feeder and dehumidifier which are used in the extrusion section of the conventional process. Hence the direct melt technology involves the removal of equipments like extruder, crystallizer, feeder and dehumidifier. DNV has compared the two technologies, conventional and direct melt, and confirms that the only difference in terms of operating equipment between the two technologies is the above four equipments. The direct melt continuous BOPET film production process has been supplied by Lindauer Dornier GmbH /5/ and commissioned on 17 March 2010 /22/ after which the operation of the direct melt continuous process have been handed over to Polyplex Corporation Limited. Lindauer Dornier GmbH is renowned in the field of PET film technologies, and the project design reflects good engineering practices.



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Beside this project activity Polyplex Corporation Limited have PET film production unit in India, Thailand and Turkey and its existing capacity is 110 000 MTPA making it the world's fourth largest producer of thin polyester film /23/. In all these units conventional technology which involves extruder, crystallizer, feeder and dehumidifier is used. Thus, in the absence of the project (of using the direct melt technology), conventional technology for BOPET film production would have been installed.

The operation of direct melt process results in savings of equivalent amount of electricity from the grid leading to emissions reductions of 7 703 tCO<sub>2</sub>e per annum.

The starting date of the project activity is 21 September 2007, i.e. the date on which the contract agreement for the direct melt process of BOPET film production /5/ has been issued to Lindauer Dornier GmbH. The lifetime of the project is 20 years which is deemed appropriate for PET film manufacturing facility. The project has selected a fixed crediting period of 10 years starting from the date of registration of the activity as a CDM project or 1 September 2010, whichever occurs later.

### 4.3 Baseline Determination

The approved small scale methodology AMS-II.D, "Energy efficiency for industrial facilities", version 11 has been applied for the project activity. The selected baseline methodology is applicable since:

- The project involves energy efficiency in a green field industrial facility for BOPET film manufacture by implementing direct melt process instead of the conventional process. Total electricity saving achieved by the project activity is 9.629 GWh<sub>e</sub> per annum which is less than 60 GWh<sub>e</sub> annual electricity savings as stipulated by the methodology AMS-II.D, version 11.
- In the project activity it is possible to directly measure and record the energy use (electricity) within the project boundary as described in the section 4.5 of this report.
- In the baseline emission calculation specific energy consumption of the removed equipments and output of molten polymer from melt pump has been used. It has been evidenced from the certificates of two technology provider's /8/9/ that, the value of the specific energy consumption at the highest extrusion throughput of 4 MT/hour has been considered. This is deemed conservative considering the fact that at lower throughputs, specific energy consumption per tonne of throughput will be higher. The output of molten polymer from melt pump (Extrex-140 GP) will be monitored, which provides the inflow of virgin molten polymer at the melt pump. Thus *ex-ante* fixed specific energy consumption in extruder, crystallizer, feeder and de-humidifier is conservative and deemed appropriate. Thus there is no signal to noise ratio in measurement of the energy saving in the project activity.

Two alternatives to the project have been identified and discussed:

- i. Continuation of conventional technology of BOPET film manufacture as used in the country /14/ /15/ and by the project proponents in their other manufacturing units, i.e. implementing conventional BOPET film production line
- ii. Implementation of the project activity as energy efficiency measures at the PCL unit without the CDM benefits.

DNV considers the list of realistic and credible alternatives to be complete.



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As per the barrier analysis discussion presented in section 4.4 below, alternative ii) is not a realistic and credible alternative since it faces prevailing practice barrier and technological barrier.

Hence in absence of the project, the conventional BOPET film production line would have been implemented and the extruder, crystallizer, feeder and de-humidifier installed in the conventional plant would have consumed electricity corresponding to the specific electricity consumption of these equipments as mentioned by the technology provider /8/9/. Thus the electricity consumption by the above equipments (extruder, crystallizer, feeder and de-humidifier) in a conventional BOPET film production line has been selected as the baseline scenario.

The project boundary is clearly defined in line with the methodology “*The project boundary is the physical, geographical site of the industrial or mining and mineral production facility, processes or equipment that are affected by the project activity*”. Thus the BOPET film line up to melt pump which starts after molten polymer feeding unit and ends at out put line of melt pump has been included in the project boundary.

The application of the baseline methodology is transparent and conservative.

### 4.4 Additionality

The project additionality has been assessed as per Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

#### 4.4.1 CDM consideration and continued action to secure CDM status

The start date of the project activity is 21 September 2007 which is the date on which contract agreement with Lindauer Dornier for supply of direct melt BOPET film line has been signed /5/. Although Polyplex Corporation Limited has signed Contract agreement with Aquafil Engineering GmbH for polymerisation unit on 4 September 2007 /4/, contract agreement for direct melt BOPET film manufacturing process is the first commitment to expenditures by Polyplex Corporation Limited towards this project activity as polymerisation unit is outside the project boundary. Hence, the start date of the project activity has been considered as 21 September 2007.

The installation of the direct melt BOPET film manufacturing process was approved by the board of directors of PCL as a CDM project activity on 13 July 2007 /3/. In the board approval note the top management mentioned the technological barrier and implementation risk associated with the project activity as this direct melt technology was so far not used in India by any PET film manufacturer. But the top management confirmed that this risk would get off set to some extent in view of availability of carbon credits. Subsequently, the contract agreement with Lindauer Dornier for supply of direct melt BOPET film line on 21 September 2007 /5/ was signed. Moreover within one month from the start date of the project activity (i.e. 21 September 2007) the project proponent appointed CDM consultant on 13 October 2007. Thus it is evident that the project proponent was aware of CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project.

The following chronology of events to establish real and continuous action to secure CDM benefits was also evidenced:





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- Appointment of CDM consultant Ernst & Young on 13 October 2007 /24/
- Request for quotation from DOE on 4 February 2009 /12/
- Local Stakeholder consultation for project activity on 17 April 2009 /25/
- The PDD was webhosted on 16 April 2009

The above chronology events establish that the time gap between two events for securing CDM status for the project activity is less than two years which implies the continuous procedures towards securing CDM status and demonstrates sufficient efforts to secure CDM status in parallel with the implementation.

### 4.4.2 Barrier analysis

The project proponent has demonstrated the additionality of the project activity through prevailing practice barrier and technological barrier which prohibit the implementation of the project activity with out CDM benefit.

**4.4.2.1 Prevailing practice barrier:** Not only in India, but globally the penetration of direct melt BOPET film production technology is poor. From the following third party documents DNV has validated that the project activity is first of its kind in India.

- Bruckner Maschinunbau GmbH & Co.KG (alternate supplier of BOPET film making process): Certification on direct melt process in PET film industry in India dated 23 March 2009, stating the technology is first of its kind in India /6/
- Lindauer Dornier GmbH (Supplier of BOPET film making process): Certification on direct melt process PET film production in PCL dated 9 March 2009, stating first of its kind in India and having technological risk /7/
- Polyester Film Industries Association: Certificate to PCL as first and only Indian polyester film manufacturer to be using direct melt technology to produce polyester film /14/
- PCi Film Consulting Limited: Quarterly business report; Quarter Three 2009, report no. 60; page 15- stating PCL direct melt process is first of its kind in India and second in worldwide as only one Chinese company Cifu had this facility /15/

Thus it is DNV's opinion that the barrier due to prevailing practice for implementation of direct melt technology instead of conventional BOPET film production line is real and prohibits the upcoming of the technology in PCL and hence the project is deemed additional

**4.4.2.2 Technological Barrier:** The direct melt technology in BOPET film production directly integrates the polymerization section with the film processing section. Where as in conventional process intermediate polymer chips are produced and these polymer chips are further processed for film making separately. Since the conventional process has an intermediate extrusion step, the process is more stable and does not lead to production losses. This intermediate step is removed in the direct melt technology, and thus this technology destabilizes the conventional procedure of BOPET film production process. Hence any disturbance in polymerization will destabilize the film processing and vice versa. As per Lindauer Dornier GmbH /7/, one of the BOPET film making technology provider "*the new direct melt process would involve removal of some key equipments involved in the conventional manufacturing process and lead to less stable production, make the process vulnerable to any fluctuations in the out put of the polymerization unit and also make it risky*"





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to operate”. Other BOPET film making technology provider Bruckner Maschinunbau GmbH & Co.KG /6/ says “the successful commissioning operation of this project would promote the adoption of such advanced production process in the polymer processing industry in India and eventually also across the globe”. The only other similar technology was implemented in Shaoxing P.R. China. This multi-line BOPET Direct Film Casting (DFC) line is the world’s first and largest plant of its kind and is recognized as a revolutionary technology step /11/. The project was also a tremendous challenge for both the project proponent as well as supplier of the film line due to the instability of the technology /6/ /7/. This instability of the plant results in frequent stoppages of the production process and reduction in quality of the product which results in monetary and market losses /14/. However the PP could not able to forecast the risk due to failure of the new technology as they do not have any earlier record of that. A successful implementation of this plant with CDM benefit will promote the use of this energy efficient technology in the BOPET film manufacturing industry and lead to sustainable development.

Hence in DNV’s opinion the technological barrier associated to the project activity is deemed appropriate. These barriers are not associated with the conventional procedure of BOPET film production process since in the conventional process a chip manufacturing process is involved in between which effectively isolates the film making process from the polymerization process and creates a buffer such as process destabilization in the polymer section does not affect the film making process and vice-versa.

From the above discussion, it is DNV’s opinion that the project activity faces significant barriers those are not faced by the selected baseline. Thus the project activity is thus deemed additional.

### 4.5 Monitoring

The monitoring plan is in accordance with the monitoring methodology AMS-II.D, version 11. The monitoring plan will give opportunity for real measurements of achieved emission reductions. The extrusion quantity for BOPET films per annum, specific volume flow through melt pump, density of polyester and specific energy consumption by extruder, crystallizer, feeder and dehumidifier, will be required to calculate electricity saving and these parameters have been addressed in the monitoring plan.

#### 4.5.1 Parameters determined ex-ante

The monitoring plan contains all necessary parameters as required by the methodology AMS-II.D version 11. In compliance with the methodology, the following parameters have been determined *ex-ante* by Polyplex Corporation Limited and will remain fixed for the entire crediting period:

- Baseline emission factor of the Grid has been fixed on *ex-ante* basis based on the baseline Carbon Dioxide Emission Database Version 4.0 /26/ published by CEA which is a statutory organization under Ministry of Power. The *ex-ante* fixed value is 0.8 tCO<sub>2</sub>/MWh for the NEWNE grid to which the manufacturing unit is connected.
- Density of Polyester has been fixed from technical specifications of Extrex-140 GP melt pump /13/. The *ex-ante* fixed value is 1.15 gm/cm<sup>3</sup>
- Specific volume flow through melt pump has been fixed from technical specifications of Extrex-140 GP melt pump /13/. The *ex-ante* fixed value is 1493 cm<sup>3</sup>/revolution



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- Specific energy consumptions by extruder, crystallizer, feeder and dehumidifier have been fixed on *ex-ante* basis based on two technology suppliers' data, namely Lindauer Dornier GmbH and Bruckner Maschinenbau GmbH & Co. KG. As per Lindauer Dornier GmbH /8/ specific energy consumption by extruder, crystallizer, feeder and dehumidifier is 0.2971 kWh/kg and as per Bruckner Maschinenbau GmbH & Co. KG /9/ the value is 0.295 kWh/kg. Thus specific energy consumption provided by Bruckner Maschinenbau GmbH & Co. KG at 0.295 kWh/kg polymer is conservative and hence this value has been considered for the emission reduction calculations (specific energy consumption of Extruder crystallizer, feeder and dehumidifier are 0.185 kWh/kg, 0.1 kWh/kg, 0.01 kWh/kg and 0 kWh/kg respectively). In DNV's opinion it is deemed justified to consider the specific energy consumption of the removed baseline equipment only rather than the specific energy consumption of the entire plant to avoid the noise to signal ratio as there are other factors that would influence the specific energy consumption of the entire process..

### 4.5.2 Parameters monitored ex-post

In the project activity no additional equipment would be installed with respect to baseline scenario (conventional BOPET film making process). Only four major equipments, i.e. extruder, crystallizer, feeder and dehumidifier, of the conventional process have been removed in the direct melt technology for BOPET film making. Thus metering of the energy use of the additional equipment installed is not relevant for this project activity. In compliance with the methodology, the following parameters will be monitored on *ex-post* basis:

- Extrusion quantity for BOPET films per annum will be monitored *ex-post*. The value will be monitored based on the number of revolution of the melt pump and the *ex-ante* fixed density of poly ester and specific volume of melt flow through melt pump. Revolutions of the melt pump will be monitored by a DC Induction Proximity Switch. The data will be monitored shift wise. The DC Induction Proximity Switch will be calibrated annually.

The project proponent is capable of abiding by the above mentioned monitoring procedures. The readings will also be available by electronic system and same will be transferred to log book. The shift in charge would be responsible for monitoring and recording the necessary values and all the data archived for crediting period + 2 years.

### 4.5.3 Management system and quality assurance

The management structure for monitoring the emission reduction has been well defined. The *ex-post* parameters would be monitored and logged in log sheet by the respective shift in charge. Based on the logged data a report would be prepared by CDM supervisor on a monthly basis. The CDM supervisor will forward the report to the CDM coordinator at head office where the data is compiled. The data would be reviewed by conducting an inter department review meeting once in 6 months. The control panel log sheet is audited regularly according to the specified procedure.

## 4.6 Estimate of GHG Emissions

The emission reductions have been calculated using conservative estimates. The baseline emissions have been calculated as multiplication of the extrusion quantity for BOPET films



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per annum with specific energy consumption by extruder, crystallizer, feeder and dehumidifier and grid emission factor. The extrusion quantity for BOPET films have been calculated as multiplication of revolutions of the melt pump with density of polyester and specific volume flow through melt pump. Specific energy consumption by extruder, crystallizer, feeder and dehumidifier provided by Bruckner Maschinenbau GmbH & Co. KG is conservative /8//9/. Thus *ex-ante* fixed value is 0.295 kWh/kg (specific energy consumption of extruder, crystallizer, feeder and dehumidifier are 0.185 kWh/kg, 0.1 kWh/kg, 0.01 kWh/kg and 0 kWh/kg respectively).

In the project activity there is no project emission as there is no excess energy consumption due to direct melt film making process instead of convention film making process.

Since the direct melt process for BOPET film making implemented under the project is a green field project, there is no leakage emission due to transfer of equipment from another activity or to another activity.

The data sources as well as the emission reduction calculations have been checked by DNV and found to be correct. The project results in emission reductions of 7 703 tCO<sub>2</sub>e per annum.

### 4.7 Environmental Impacts

The project activity has been implemented in PET film manufacturing facility. As per the Notification vide S.O. 1533 (E) /27/ dated 14 September 2006 published by Ministry of Environment and Forests (MoEF), Government of India, an environmental clearance from the State Level Environment Impact Assessment Authority is required before implementation PET film manufacturing facility. The continuous polymerisation plant of PCL has obtain, an environmental clearance from State Level Environment Impact Assessment Authority, Uttarakhand under schedule 5 (f) of this notification /28/ and all the necessary clearances have already in place for operating the plant. The project has valid consent to establish from Uttaranchal state pollution control board dated 22 January 2009 /19/.

The project is also not likely to create any adverse environmental effects and there are no trans-boundary impacts due to the project.

### 4.8 Comments by Local Stakeholders

The local villagers, the employees of PCL and technology supplier and contractor have been consulted as local stake holders. The local villagers were approached through a meeting dated 17 April 2009 /25/. During the validation site visit DNV interviewed local village representatives Mr. Govind Singh, savapati (village leader) of Bikrampur village and Mr Khem Singh, ex area panchayat member for their views and comments on the projects. All of them are aware of the project activity and none of them expressed any areas of concern on the project. Thus it is DNV's opinion local stakeholder's consultation process for this project is adequate.

### 4.9 Comments by Parties, Stakeholders and NGOs

The PDD of 6 February 2009 was made publicly available on the CDM website and Parties, stakeholders and NGOs were through the CDM website (<http://cdm.unfccc.int/Projects/Validation/DB/D4GSKTVYW6LC34CJUS113PSDXM0GMO>



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[/view.html](#) ) invited to provide comments during a 30 days period from 16 July 2009 to 14 August 2009.

No comment was received.

## APPENDIX A

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### CDM VALIDATION PROTOCOL

**Table 1 Mandatory Requirement for Clean Development Mechanism (CDM) Project Activities**

Requirement	Reference	Conclusion
<b>About Parties</b>		
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	OK
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	OK
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	OK
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	OK
<b>About additionality</b>		
10. Reduction in GHG emissions shall be additional to any that would occur in the	Kyoto Protocol Art. 12.5c,	OK

Requirement	Reference	Conclusion
absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	CDM Modalities and Procedures §43	<del>CL-5</del> <del>CL-6</del> <del>CAR-3</del> CAR-4
<b>About forecast emission reductions and environmental impacts</b>		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK
<b>About small-scale project activities (if applicable)</b>		
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakech Accords and shall not be a debundled component of a larger project activity.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK <del>CAR-1</del>
13. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and use the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK
14. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK
<b>About stakeholder involvement</b>		
15. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
<b>Other</b>		
17. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK

Requirement	Reference	Conclusion
18. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
19. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
20. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK
21. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK



**Table 2 Requirements Checklist**

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<b>A. General Description of Project Activity</b> <i>The project design is assessed.</i>					
<b>A.1. Project Boundaries</b> <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial boundaries (geographical) clearly defined?	/1/	DR/I	Yes. The project activity has been implemented within the plant premises of M/s Polyplex Corporation Limited, at village Bajpur, district Udham Singh Nagar in the state of Uttaranchal in India  However the PP is requested to provide the longitude and latitude of the location of the project activity in the PDD	CL-1	OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/	DR/I	The project boundary includes the entire manufacturing process of the BOPET film production from the raw material input to finished product to the market. However, as observed during the site visit, the project would affect only the process from the continuous polymerization process till feeding to the film section. The project proponent is thus requested to suitably modify the project boundary to include only the relevant systems are included in the project boundary.	CL-2	OK
<b>A.2. Participation Requirements</b> <i>Referring to Part A, Annex 1 and 2 of the PDD as well</i>					

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant.</i>					
A.2.1. Which Parties and project participants are participating in the project?	/1/	DR	The private entity Polyplex Corporation Limited is the project participant and the host Party is India.		OK
A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?	/1/	DR/I	The Ministry of Environment & Forest (MoEF), Government of India, the DNA of India has approved the project. The project proponent has submitted the letter of approval dated 17 July 2009 to the validator.		OK
A.2.3. Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation - Designated a National Authority	/1/	DR	The Ministry of Environment and Forests (MoEF) is the DNA of India. India ratified the Kyoto Protocol on 26 August 2002. The Party has confirmed their voluntary participation.		OK
A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/1/	DR	The project does not have any public funding from any Annex I Party.		OK
<b>A.3. Technology to be employed</b> <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.3.1. Does the project design engineering reflect current good practices?	/1/	DR	Yes, the project design engineering reflects current good practice		OK
A.3.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/	DR/I	The project proponent is requested to provide the technical details of the project activity to the validator.		OK
A.3.3. Does the project make provisions for meeting training and maintenance needs?	/1/	DR/I	The project proponent made provisions for meeting training and maintenance needs of the operators before the commissioning of the project.		OK
<b>A.4. Contribution to Sustainable Development</b> <i>The project's contribution to sustainable development is assessed.</i>					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/1/	DR	The Letter of Approval dated 17 July 2009 from the DNA of India confirming the project's contribution to sustainable development has been submitted to the validator.		OK
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR/I	The project may enhance technology replication in the polyester film industry. The project activity reduce electricity consumption for same level of output in polyester film production hence contributing to conservation of non-renewable fossil fuels like coal, natural gas etc.		OK
<b>A.5. Small scale project activity</b> <i>It is assessed whether the project qualifies as small-scale</i>					

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>CDM project activity</i>					
A.5.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/	DR/I	The project proponent is requested to substantiate that the project qualifies as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM and meets the applicability criteria of maximum 60 GWh <sub>e</sub> annual savings as per the methodology AMS-II.D version 11	<del>CAR-1</del>	OK
A.5.2. Is the small scale project activity not a debundled component of a larger project activity?	/1/	DR/I	There is no registered CDM project activity by the same project proponent. Hence, the project is not a de-bundled component of a larger project activity.		OK
<b>B. Project Baseline</b> <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
<b>B.1. Baseline Methodology</b> <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.2. Does the project apply an approved methodology and the correct version thereof?	/1/	DR	Approved small scale methodology AMS-II.D, version 11 has been applied for the project, which was pertinent at the time of web hosting.		OK
B.1.3. Are the applicability criteria in the baseline methodology all fulfilled?	/1/	DR/I	The project proponent is requested to substantiate all the applicability criteria of the small scale methodology AMS-II.D in the PDD. The PP is also requested to clarify in	<del>CAR-2</del>	OK

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			the PDD whether the project is a Greenfield activity or a replacement, modification or retrofit of existing processes.		
<b>B.2. Baseline Scenario Determination</b> <i>The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.</i>					
B.2.1. What is the baseline scenario?	/1/	DR/I	The manufacturing process of BOPET film as per the conventional manufacturing process which includes crystallizer, dryer and extruder has been selected as the baseline scenario.		OK
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/	DR/I	Other than the baseline of conventional BOPET film production, the alternative of project without CDM benefits has been considered.		OK
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/	DR	Yes, determination of baseline scenario selection corresponds to the methodology AMS-II.D, version 11.		OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/ /8/ /9/	DR	The baseline scenario has been determined on the basis of the reduction of specific energy consumption in BOPET film manufacturing in the project activity. However the specific energy consumption in BOPET film production is likely to depend on the through put of the plant and the grade of the BOPET film. However it is not been clear from the certificates provided by the	<del>CL-3</del>	OK

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			technology providers how the specific energy consumption in extruder, crystallizer, feeder and de-humidifier vary with the production and grade of the BOPET film. Thus project proponent is requested to substantiate the appropriateness of the specific energy consumption figures assumed in the calculations. Also as these values are being fixed on <i>ex-ante</i> basis, the PP is requested to substantiate the conservativeness of the specific energy consumption figures with proper supporting documents.		
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	Yes, relevant national and sectoral policies have been taken into account.		OK
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR/I	The project proponent is requested to provide the production of the Turkey BOPET film plant of Ms PCL and specific energy consumption of crystallizer, dryer and extruder of that plant.	<del>CL</del> 4	OK
B.2.7. Have the major risks to the baseline been identified?	/1/ /8/ /9/	DR	The major risk to the baseline has been identified as specific energy consumption in extruder, crystallizer, feeder and dehumidifier in the conventional BOPET film manufacturing process. As these are being fixed on <i>ex-ante</i> basis, the PP is requested to substantiate the appropriateness and conservativeness of the specific energy	<del>CL</del> 3	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>of its kind activity in the BOPET film production industry in the host Party India. Among the various technology providers only one “Bruckner” has confirmed that they did not provide direct film casting technology in India. However there are other technology providers in this field. Hence the project proponent is requested to provide suitable evidence for substantiating that the project activity is a first of its kind in the BOPET film production industry in the host Party India</p> <p><u>Other barrier:</u> Under the heading other barrier the PP has argued on financial expenditure and financial risk. The PP is requested to either provide the financial analysis of the project activity for substantiation of financial expenditure and financial risk in the project activity or remove the same from the PDD.</p> <p>The PP is requested to provide the chronology of events for securing CDM status for the project activity in the PDD section B.5</p>	<p><del>CAR-3</del></p> <p><del>CAR-4</del></p>	
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/1/ /4/ /5/ /6/ /7/	DR/I	Please refer to B.3.2.	<p><del>CL-5</del></p> <p><del>CL-6</del></p> <p><del>CAR-3</del></p> <p><del>CAR-4</del></p>	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	/8/ /9/ /11/ /12/ /14/ /15/ /16/ /21/ /24/				
B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?	/1/ /4/ /5/ /16/ /21/ /24/	DR	The project proponent has selected 4 September 2007 as the start date of the project activity which is the date on which contract agreement has been signed between M/s PCL and Aquafil Engineering GmbH for implementing the continuous polymerisation process.  Project proponent is further requested to provide chronology of steps pursued to ensure CDM benefits for the project activity in the PDD	CAR-4	OK
<b>B.4. Calculation of GHG Emission Reductions – Project emissions</b> <i>It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.4.1. Are the <b>calculations documented</b> according to the approved methodology and in a complete and transparent manner?	/1/	DR/I	The project emission calculation has been documented based on the approved small scale methodology AMS-II.D, version 11.		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			However in the project activity there are no project emissions as some unit operation has been removed from the conventional PET film making process without addition of any extra unit operation in the project activity of direct film making.		
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/1/	DR	Please refer to B.4.1		OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/1/	DR	Please refer to B.4.1		OK
<b>B.5. Calculation of GHG Emission Reductions – Baseline emissions</b> <i>It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR/I	The baseline emissions have been calculated as per the small scale methodology AMS-II.D, version 11. Emission due to energy consumption in extruder, crystallizer, feeder and dehumidifier in the conventional BOPET film making process for similar out put of the project activity has been taken as the baseline emissions.		OK
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	The major risk to the baseline has been identified as specific energy consumption in extruder, crystallizer, feeder and	<del>CL-3</del>	OK

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			dehumidifier in the conventional BOPET film manufacturing process. As these are being fixed on <i>ex-ante</i> basis, the PP is requested to substantiate the appropriateness and conservativeness of the specific energy consumption in crystallizer, dryer and extruder with proper supporting documents.		
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	Please refer to B.5.2 and B.2.4	<del>CL3</del>	OK
<b>B.6. Calculation of GHG Emission Reductions – Leakage</b> <i>It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	The project activity is a green field activity and it does not involve any transfer of project equipment from/to other activities. Hence there are no leakage emissions in the project activity.		OK
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR	Please refer to B.6.1		OK
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	Please refer to B.6.1		OK
<b>B.7. Emission Reductions</b> <i>The emission reductions shall be real, measurable</i>					

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>and give long-term benefits related to the mitigation of climate change.</i>					
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/1/	DR/I	The project will result in emission reductions over the baseline. The emission reductions are real, measurable and give long-term benefits related to the mitigation of climate change. The estimated emission reduction is 7 703 tCO <sub>2</sub> e per annum		OK
<b>B.8. Monitoring Methodology</b> <i>It is assessed whether the project applies an appropriate monitoring methodology.</i>					
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	The monitoring methodology selected complies with requirements of AMS-IL.D, version 11		OK
B.8.2. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/	DR/I	The monitored data will be retained and preserved for up to 2 years after the crediting period. Records will be maintained in electronic and/or paper media.		OK
<b>B.9. Monitoring of Project Emissions</b> <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR	There is no project emission related to the project activity.		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<b>B.10. Monitoring of Baseline Emissions</b> <i>It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.</i>					
B.10.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/	DR/I	<p>The monitoring plan in the PDD has provided for monitoring of quantity of PET sheets produced per annum to calculate the baseline emission by multiplying it with specific energy consumption of all the processes which has been removed in the project activity. However as evidenced during the site visit, quantity of PET sheet produced will not provide actual production which is related to the project activity. Thus the PP is requested to consider the suitable output which when monitored would represent the output most logically related to the project activity for calculating the baseline emissions.</p> <p>The project proponent is also requested to remove the monitoring of emission factor from section B.7.1 of the PDD since this is fixed <i>ex-ante</i> and is not monitored within the crediting period.</p>	<del>CAR-5</del>	OK
B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?	/1/	DR/I	CO <sub>2</sub> is the only baseline GHG indicator and the same has been accounted for.		OK
B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also	/1/	DR/I	Please refer B.10.1	<del>CAR-5</del>	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
deemed appropriate?					
B.10.4. Is the measurement <i>equipment</i> described and deemed appropriate?	/1/	DR/I	Project proponent is requested to describe the measurement equipment for each monitoring parameter with accuracy class of the equipment and measurement interval.	<del>CL</del> 7	OK
B.10.5. Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR/I	Please refer B.10.4	<del>CL</del> 7	OK
B.10.6. Is the measurement <i>interval</i> for baseline data identified and deemed appropriate?	/1/	DR/I	Please refer B.10.4	<del>CL</del> 7	OK
B.10.7. Is the registration, <i>monitoring, measurement</i> and <i>reporting</i> procedure defined?	/1/	DR/I	Yes, registration, monitoring, measurement and reporting have been defined.		OK
B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR/I	Please refer B.10.4	<del>CL</del> 7	OK
B.10.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR/I	Yes		OK
<b>B.11. Monitoring of Leakage</b> <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
B.11.1. Does the monitoring plan provide for the	/1/	DR	There is no leakage emission related to the		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
collection and archiving of all relevant data necessary for determining leakage?			project activity.		
<b>B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts</b> <i>It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR/I	The DNA of India does not mandate the monitoring of sustainable development indicators for small scale projects		OK
<b>B.13. Project Management Planning</b> <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
B.13.1. Is the authority and responsibility of overall project management clearly described?	/1/	DR/I	Yes the authority and responsibility of overall project management has been described clearly.		OK
B.13.2. Are procedures identified for training of monitoring personnel?	/1/	DR/I	The procedures for training of monitoring personnel has been identified		OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR/I	There is no potential emergency situation envisaged that might lead to unintended emissions.		OK
B.13.4. Are procedures identified for review of reported results/data?	/1/	DR/I	Yes, procedures for review and internal audits have been identified.		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR/I	Please refer to B.13.1		OK
<b>C. Duration of the Project/ Crediting Period</b> <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/1/	DR/I	Earlier the project proponent selected 4 September 2007 as the start date of the project activity which is the date on which contract agreement has been signed between M/s PCL and Aquafil Engineering GmbH for implementing the polymerisation process. However as the polymerisation section is out of the project boundary start date of the project activity was revised to 21 September 2007 on which date contract with Lindaur Dornier for supply of direct melt film line for project activity has been signed The lifetime of the project has been selected as 20 years which is deemed reasonable.		OK
C.1.2. Is the start of the crediting period clearly defined and reasonable?	/1/	DR	The start date of crediting period is 1 September 2010 or date of project registration whichever occurs latter.		OK
<b>D. Environmental Impacts</b> <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
D.1. For Small-scale projects					

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/1/	DR	The PP is requested to substantiate that as per host country legislation, EIA is not mandatory for the particular project activity.	<del>CL-8</del>	OK
D.1.2. Does the project comply with environmental legislation in the host country?	/1/ /19/	DR/I	Yes, the project has obtained consent to establish from the Uttaranchal state pollution control board..		OK
D.1.3. Will the project create any adverse environmental effects?	/1/	DR/I	The project is not likely to create any adverse environmental effect.		OK
D.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR/I	There are no negative environmental impacts due to the project activity.		OK
<b>E. Stakeholder Comments</b> <i>The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i>					
E.1.1. Have relevant stakeholders been consulted?	/1/	DR/I	The local villagers, the employees of PCL and technology supplier and contractor have been consulted.		OK
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR/I	The local villagers were approached through a meeting dated 17 April 2009. During the validation site visit DNV interviewed local village representatives Mr. Govind Singh, savapati (village leader) of Bikrampur village and Mr Khem Singh, ex area panchayat member for their views and comments on the projects. None of them expressed any areas of concern on the project.		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR/I	Stakeholder consultation is not mandated by the Indian DNA.		OK
E.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR/I	Summary of comments received during the stakeholder consultation process has been provided in the PDD.		OK
E.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR/I	The project did not receive any negative comments from the local stakeholders and hence no mitigating actions were necessary. The project proponent has obtained consent to establish for the plant from the State Pollution Control Board.		OK

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**Table 2b: Additional requirements checklist for VVM version 1 (EB 44)**

<b>A.6. Letter of approval</b>				
A.1.1 Is the LoA received directly from the DNA or through the project participant.	/1/	DR	Copy of the letter of approval has been received from project participant. However, approval of HCA for the project activity under consideration has been evidenced from the official web site of MoEF, the DNA of India.	OK
<b>A.7. Project design</b>				
A.2.1 Does the PDD describe the CDM project activity with all relevant elements in a transparent and accurate way?	/1/	DR/I	Yes	OK
A.2.2 Has the CDM project activity at the start of the validation been constructed or does the CDM project activity use existing facilities or equipment?	/1/	DR/I	The project activity has been constructed before the start of the validation.	OK
A.2.3 Is the project a large scale project, a small scale project with average annual emission reductions above 15 000 tonnes or a bundled small scale project? Has on-site visit been carried out?	/1/	DR	The project is a small scale project. On site visit has been carried out on 25 and 26 August 2009.	OK
A.2.4 Does the project activity involved alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/	DR/I	Being a green field project the project does not involve any alteration of existing installations.	OK
<b>A.8. Project emissions not addressed by the methodology</b>				
A.3.1 Does the methodology describe all project emission source for the project activity that contributes all 1% of the emission reductions? Sources that the methodology considers not to take into account are not relevant (e.g. cement and iron consumption for building hydropower plants).	/1/	DR	There will be no project emission and this complies with the requirements of the applied methodology AMS-II.D version 11.	OK
<b>A.9. Documentation of baseline emissions</b>				
A.4.1 Documentation of the baseline determination:	/1/	DR/I	Baseline determination has been done properly with reasonable data. All	OK

<p>a. All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced.</p> <p>b. All documentation is relevant as well as correctly quoted and interpreted.</p> <p>c. Assumptions and data can be deemed reasonable</p> <p>d. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD.</p> <p>e. The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity</p>			assumptions and data used by the project participants are listed in the PDD and all the data are properly referenced. All documentation is relevant as well as correctly quoted and interpreted. Project has got clearance from state pollution control board and host country approval from MoEF. The methodology has been correctly applied to identify what would occur in the absence of the proposed CDM project activity.		
<b>A.10. Documentation of the calculations</b>					
<p>A.5.1 Algorithms and/or formulae used to determine emission reductions</p> <ul style="list-style-type: none"> <li>All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced</li> <li>All documentation is correctly quoted and interpreted.</li> <li>All values used can be deemed reasonable in the context of the project activity</li> <li>The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration.</li> </ul>	/1/	DR/I	Formulae used to determine emission reduction has been sourced correctly from the methodology AMS-II.D version 11. All assumptions and reasonable data used by the project participants are listed in the PDD and all the data are properly referenced		OK
<b>A.11. Implementation of the monitoring plan</b>					
A.6.1 How were the plans for implementation of the monitoring plan, data management, QA/QC procedures assessed? To what	/1/	DR/I	The Polyplex Corporation Limited management has established QA/QC		OK

extent can the emission reductions achieved by the project by monitored ex-post and verified later by a DOE?			procedures for data monitoring and data management. The emission reduction by the project activity can be achieved at full extent by monitored <i>ex-post</i> and verified later by a DOE.		
<b>A.12. CDM consideration prior to starting date</b>					
A.7.1 The prior consideration of CDM for the project activity complies with EB41 annex 46	/1/	DR/I	Yes, please refer <i>CDM consideration and continued action to secure CDM status</i> under additionality discussion		OK

**Table 3 Resolution of Corrective Action and Clarification Requests**

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CAR 1</p> <p>The project proponent is requested to substantiate that the project qualifies as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM and meets the applicability criteria of maximum 60 GWh<sub>e</sub> annual savings as per the methodology AMS-II.D version 11</p>	A.5.1	<p>The total annual electricity savings envisaged from the proposed project activity will not exceed 60 GWh<sub>e</sub>, hence the project activity fulfils the eligibility criteria for project to utilize type II small scale methodologies</p>	<p><b>OK.</b> It has been evidenced from the CER calculation spread sheet /2/ total annual electricity saving is 9.628 GWh<sub>e</sub> which is less than 60 GWh<sub>e</sub> annual electricity savings as per the methodology AMS-II.D version 11. In the PDD version 2 this applicability criteria has been described properly.</p> <p>CAR is closed</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p><b>CAR 2</b></p> <p>The project proponent is requested to substantiate all the applicability criteria of the small scale methodology AMS-II.D in the PDD. The PP is also requested to clarify in the PDD whether the project is a Greenfield activity or a replacement, modification or retrofit of existing processes.</p>	B.1.2	<p>All the applicability criteria as per the small scale methodology AMS-II.D have now been mentioned in the section B.2 of the revised PDD.</p> <p>The project is a new installation i.e. a greenfield activity and actually replacing the conventional production process (involving chips production and extrusion) for production of BOPET Films. The same has also been mentioned in the Section A2 of the PDD.</p>	<p><b>OK.</b> All the applicability criteria of the small scale methodology AMS-II.D has been described properly in the PDD.</p> <p>Being an energy efficiency project, the project activity has been implemented in single industrial facility which is a green field project.</p> <p>In the project activity it is possible to directly measure and record the energy use within the project boundary.</p> <p>There is no signal to noise ratio in measurement of the energy saving in the project activity.</p> <p>CAR is closed</p>
<p><b>CAR 3</b></p> <p>Under the heading other barrier the PP has argued on financial expenditure and financial risk. The PP is requested to either provide the financial analysis of the project activity for substantiation of financial expenditure and financial risk in the project activity or remove the same from the PDD.</p>	B.3.2	<p>The barrier associated with financial risk is a notional risk and is not specifically quantifiable so the same has been removed from the PDD.</p>	<p><b>OK.</b> The direct melt technology in BOPET film production integrates the polymerization section with the film processing section directly. Thus this technology destabilizes the conventional procedure of BOPET film production process. Disturbance in polymerization will destabilize the film processing and vice versa. However the PP could not able to forecast the risk due to failure of the new technology as they do not have any early record of</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<p>that. Hence financial expenditure and financial risk under the heading other barrier has been removed from the PDD version 2.</p> <p>CAR is closed</p>



Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CAR 4</p> <p>The PP is requested to provide the chronology of events for securing CDM status for the project activity in the PDD section B.5</p>	B.3.2	<p>The chronology of events demonstrating the implementation timeline and the steps to secure CDM status of the project have now been included under Section B.5 of the revised PDD.</p>	<p><b>OK.</b> The chronology of events demonstrating the implementation timeline and the steps to secure CDM status of the project have been added in the PDD version 2.</p> <p>It has been evidenced from the chronology that before the start date of the project activity the PP was well aware of CDM and the board of director approved the project for implementation after considering the CDM benefit. More over it has also been evidenced from the chronology the time gap between two events for securing CDM status for the project activity is less than two years which implies the continuous procedures towards securing CDM status.</p> <p>CAR is closed</p>
<p>CAR 5</p> <p>The monitoring plan in the PDD has provided for monitoring of quantity of PET sheets produced per annum to calculate the baseline emission by multiplying it with specific energy consumption of all the processes which has been removed in the project</p>	B.10.1	<p>The point of monitoring will be at the melt pump (Extrex-140 GP) for pumping virgin bright melt polymer. This pump is a positive displacement pump and has a constant volume feed. The rotations the pump undergoes will be monitored on a shift basis by having</p>	<p><b>OK.</b> The suitable output which when monitored would represent the output most logically related to the project activity for calculating the baseline emissions is output of molten polymer from melt pump (Extrex-140 GP). In the project activity this will be</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>activity. However as evidenced during the site visit, quantity of PET sheet produced will not provide actual production which is related to the project activity. Thus the PP is requested to consider the suitable output which when monitored would represent the output most logically related to the project activity for calculating the baseline emissions.</p> <p>The project proponent is also requested to remove the monitoring of emission factor from section B.7.1 of the PDD since this is fixed <i>ex-ante</i> and is not monitored within the crediting period.</p>		<p>a counter which totalizes the rotations. Since the volume feed is constant the corresponding mass throughput will be obtained by multiplying by density of the polymer melt.</p> <p>Density of Polyester (<math>D_p</math>) = 1.15 g/cm<sup>3</sup>  Specific volume flow through pump (SVF) = 1,493 cm<sup>3</sup>/rev  (As per data from technical specifications for Extrex-140 GP melt pump)</p> <p>Therefore, the corresponding mass throughput after N revolutions of the pump will be = 1.15 * 1,493 * N grams</p> <p>The same has also been mentioned in the Section B.7.1 of the PDD</p>	<p>monitored and same has been described in the PDD version 2.</p> <p>The grid emission factor has been fixed on ex-ante basis and thus monitoring of emission factor has been removed from section B.7.1 of the PDD.</p> <p>CAR is closed.</p>
<p>CL 1</p> <p>The PP is requested to provide the longitude and latitude of the location of the project activity in the PDD</p>	A.1.1	<p>The exact geographical coordinates of the plant site are;</p> <p>Latitude: 29.17° N  Longitude: 79.16°E</p> <p>The same has also been mentioned in the PDD.</p>	<p><b>OK.</b> The geographical coordinates of the project activity has been incorporated in the PDD version 2.</p> <p>CL is closed.</p>
<p>CL 2</p> <p>The project boundary includes the entire</p>	A.1.2	<p>The project boundary has been modified in the revised PDD as required.</p>	<p><b>OK.</b> As the project would affect only the process from the continuous</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>manufacturing process of the BOPET film production from the raw material input to finished product to the market. However, as observed during the site visit, the project would affect only the process from the continuous polymerization process till feeding to the film section. The project proponent is thus requested to suitably modify the project boundary to include only the relevant systems are included in the project boundary.</p>			<p>polymerization process till feeding to the film section the project boundary has been revised accordingly in the PDD version 2. The project boundary comprises BOPET film line up to melt pump.</p> <p>CL is closed.</p>
<p>CL 3 The baseline scenario has been determined on the basis of the reduction of specific energy consumption in BOPET film manufacturing in the project activity. However the specific energy consumption in BOPET film production is likely to depend on the throughput of the plant and the grade of the BOPET film. However it is not been clear from the certificates provided by the technology providers how the specific energy consumption in extruder, crystallizer, feeder and de-humidifier vary with the production and grade of the BOPET film. Thus project proponent is requested to substantiate the appropriateness of the specific energy consumption figures assumed in the calculations. Also as these values are being</p>	B.2.4	<p>The certificates issued by the technology provider provide the value of the specific energy consumption at the highest extrusion throughput. Thus at lower throughputs, specific energy consumption per tonne of throughput will be higher.</p> <p>Thus the values of specific energy consumption as mentioned in the certificate are appropriate as these are the lowest possible conservative values.</p> <p>Further, it may also be noted that for monitoring purpose, the inflow of virgin molten polymer at the melt pump is being measured where no additives have been added.</p>	<p><b>OK.</b> It has been evidenced from the certificates of two technology providers' /8/9/ that the value of the specific energy consumption at the highest extrusion throughput 4 MT/hour has been considered. Thus at lower throughputs, specific energy consumption per tonne of throughput will be higher.</p> <p>Hence the values of specific energy consumption as mentioned in the certificate are deemed appropriate as these are the lowest possible conservative values.</p> <p>Also in the project activity output of molten polymer from melt pump (Extrex-140 GP) will be monitored which provides the inflow of virgin</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
fixed on <i>ex-ante</i> basis, the PP is requested to substantiate the conservativeness of the specific energy consumption figures with proper supporting documents.			molten polymer at the melt pump, where no additives have been added. Thus <i>ex-ante</i> fixed specific energy consumption in extruder, crystallizer, feeder and de-humidifier is conservative and deemed appropriate.  CL is closed.
CL 4 The project proponent is requested to provide the production of the Turkey BOPET film plant of Ms PCL and specific energy consumption of crystallizer, dryer and extruder of that plant.	B.2.6	No such data from the Turkey Plant can be availed in the prior scenario as the specific energy consumption is not monitored in the plant on equipment basis.	<b>OK.</b> As data is not available from the Turkey Plant lower specific energy consumption in extruder, crystallizer, feeder and de-humidifier among the two technology providers (Bruckner Maschinunbau GmbH & Co.KG and Lindauer Dornier GmbH) /8//9/ has been used for baseline emission calculation.  CL is closed.
CL 5 During the site visit the project proponent has explained the difficulties in continuous operation from polymerisation unit to film production unit. However this has not been reflected in the PDD. Thus the PP is requested to elaborate the technological barrier in the PDD with proper supporting documents. It	B.3.2	The technical problems envisaged in the project activity have now been elaborated in the PDD along with supporting documents. Since, the PP has not been able to obtain the supporting documents from similar technology plant in China, the	<b>OK.</b> The technical barrier has now been elaborately described in the PDD with third party supporting documents. Except this project only another one project in world had used same technology in China. However the PP has not been able to provide the supporting documents for the argument

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
has also been argued that one plant in China with similar technology needed 1.5 year for stabilising normal operation. The PP is also requested to provide supporting documents for this argument.		same has been removed from the PDD.	that the plant in China needed 1.5 year for stabilising normal operation, the same has been removed from the PDD.  CL is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 6</p> <p>It has been argued that the project activity is a first of its kind activity in the BOPET film production industry in the host Party India. Among the various technology providers only one “Bruckner” has confirmed that they did not provide direct film casting technology in India. However there are other technology providers in this field. Hence the project proponent is requested to provide suitable evidence for substantiating that the project activity is a first of its kind in the BOPET film production industry in the host Party India</p>	B.3.2	<p>It may be noted that apart from “Bruckner” the other major equipment supplier “Dornier” has also certified that they have not supplied direct film casting technology to any other company in India.</p> <p>Further, an article in a publication, named ‘Quarterly’ that is published by PCI Films Consulting Limited, Seatons Business Centre, High Street, Guilsborough, Northhamphshire, England states in its Report No. 60 Page 15 that</p> <p>“A direct melt line for polymer chips in India which can be turned into final film. This will make Polyplex only one of two companies worldwide with this technology, the other being Cifu of China.”</p> <p>Thus proving that Polyplex is one of the only two PET film manufacturing companies to have implemented the Direct Melt technology in the world and Polyplex being the first in India.</p> <p>Further this fact has also been corroborated by Polyester Film Industries Association of India.</p>	<p>OK. From the following third party documents DNV has validated the project activity is first of its kind in India.</p> <ul style="list-style-type: none"> <li>• Bruckner Maschinunbau GmbH &amp; Co.KG: Certification on direct melt process in PET film industry in India dated 23 March 2009, stating the technology is first of its kind in India /6/</li> <li>• Lindauer Dornier GmbH: Certification on direct melt process PET film production in PCL dated 9 March 2009, stating first of its kind in India and having technological risk /7/</li> <li>• Polyester Film Industries Association: Certificate to PCL as first and only Indian polyester film manufacturer to be using direct melt technology to produce polyester film /14/</li> <li>• PCi Film Consulting Limited: Quarterly business report; Quarter Three 2009, report no. 60; page 15- stating PCL direct melt process is first of its kind in</li> </ul>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		An article published by Uhde Inventa-Fischer also states that the world's first and largest multi-line BOPET Direct Film Casting (DFC) line has been implemented in Shaoxing P.R. China. This article clearly states that the project was a revolutionary technology step and was a tremendous challenge for both the Project Proponent as well as supplier of the film line.	India and second in worldwide as only one Chinese company Cifu had this facility. /15/  CL is closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 7</p> <p>Project proponent is requested to describe the measurement equipment for each monitoring parameter with accuracy class of the equipment and measurement interval</p>	B.10.4	<p>The measurement equipment will mainly consist of the melt pump (Extrex-140 GP) that is used for pumping of virgin bright melt. The pump has a DC Induction Proximity Switch that can measure the number of revolutions which can be used to calculate the mass of polymer input.</p> <p>Parameter: Revolutions (N) Measurement would be done using the DC Induction Proximity Switch Frequency of measurement: Every shift The same have also been incorporated in the section B.7.1 of the PDD.</p>	<p><b>OK.</b> The only measurement equipment will mainly consist of the melt pump (Extrex-140 GP) that is used for pumping of virgin bright melt. The number of revolutions of the melt pump will be monitored by DC Induction Proximity Switch from which the total molten polymer output will be monitored. The frequency of measurement is on shift basis. Calibration of DC Induction Proximity Switch of the pump will be carried out annually.</p> <p>CL is closed.</p>
<p>CL 8</p> <p>The PP is requested to substantiate that as per host country India legislation EIA is not mandatory for the particular project activity.</p>	D.1.1	<p>The Ministry of Environment and Forests (MoEF), Government of India has released a Notification vide S.O. 1533 (E) S.O. 60(E) dated 14 September 2006 27/01/94 that lists the project activities requiring an Environmental clearance. The continuous polymerisation plant of PCL has obtained an environmental clearance from the State Level Environment Impact Assessment Authority, Uttarakhand under schedule</p>	<p><b>OK.</b> The project activity has been implemented in PET film manufacturing facility. As per the Notification vide S.O. 1533 (E) /27/ dated 14 September 2006 published by Ministry of Environment and Forests (MoEF), Government of India, an environmental clearance from the State Level Environment Impact Assessment Authority is required before implementation PET film manufacturing facility. The continuous</p>



Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		5 (f) of this notification and all the necessary clearances are in place for operating the plant.	polymerisation plant of PCL has obtain, an environmental clearance from State Level Environment Impact Assessment Authority, Uttarakhand under schedule 5 (f) of this notification /28/ and all the necessary clearances have already in place for operating the plant.  CL is closed.

## **APPENDIX B**

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### **CERTIFICATES OF COMPETENCE**



# CERTIFICATE OF COMPETENCE

***Indrajit Rana***

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes				
<b>Technical Area</b>	<b>CDM Validator</b>	<b>CDM Verifier</b>	<b>Sector Knowledge</b>	<b>Sector Expert</b>	<b>Technical Reviewer</b>
Landfill gas					
Renewables					
Hydro power					
Wind power					
Other renewable					
Biomass					
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery	Jan 2009	Jan 2009	Nov 2009		
Efficiency of thermal power plants		Sept 2009			
Coal mine methane					
Fuel switch		Sept 2009			
Manure management					
Waste / wastewater treatment					
Energy efficiency		Jan 2009		Jan 2009	
N <sub>2</sub> O					
HFCs					
Flare reduction					
PFCs					
Charcoal					
CO <sub>2</sub> recovery		Sept 2009			
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF <sub>6</sub>					

Høvik, 27 November 2009

*Michael Lehmann*

Michael Lehmann  
Technical Director, Climate Change Services



# CERTIFICATE OF COMPETENCE

***Soumik Biswas***

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

<b>GHG Auditor:</b>	Yes				
<b>Technical Area</b>	<b>CDM Validator</b>	<b>CDM Verifier</b>	<b>Sector Knowledge</b>	<b>Sector Expert</b>	<b>Technical Reviewer</b>
Landfill gas	Jan 2009				
Hydro power	Jan 2009	Sept 2009			
Renewables	Jan 2009	Jan 2009			
Other renewable		Sept 2009			
Biomass	Jan 2009	Jan 2009			
Grid connection of isolated system		Sept 2009			
Cement	Jan 2009	Jan 2009			Aug 2009
Waste-heat / waste-gas recovery	Jan 2009	Jan 2009	Nov 2009		Aug 2009
Efficiency of thermal power plants		Sept 2009			
Coal mine methane					
Fuel switch		Sept 2009		Jan 2009	
Manure management					
Waste / wastewater treatment					
Energy efficiency	Jan 2009	Jan 2009	Nov 2009		
N <sub>2</sub> O					
HFCs					
Flare reduction					
PFCs					
Charcoal		Sept 2009			
CO <sub>2</sub> recovery		Sept 2009			
Transport					
Non-renewable biomass		Sept 2009			
Biofuel					
Pipeline leakage reduction					
SF <sub>6</sub>					

Høvik, 27 November 2009

*Michael Lehmann*

Michael Lehmann  
Technical Director, Climate Change Services



# CERTIFICATE OF COMPETENCE

***Nitin Kapoor***

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

<b>GHG Auditor:</b>	Yes				
<b>Technical Area</b>	<b>CDM Validator</b>	<b>CDM Verifier</b>	<b>Sector Knowledge</b>	<b>Sector Expert</b>	<b>Technical Reviewer</b>
Landfill gas					
Renewables					
Hydro power					
Wind power					
Other renewable					
Biomass					
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery					
Efficiency of thermal power plants					
Coal mine methane					
Fuel switch					
Manure management					
Waste / wastewater treatment					
Energy efficiency					
N <sub>2</sub> O					
HFCs					
Flare reduction				Jan 2009	
PFCs					
Charcoal					
CO <sub>2</sub> recovery					
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF <sub>6</sub>					

Høvik, 9 January 2009

*Michael Lehmann*

Michael Lehmann  
Technical Director, Climate Change Services



## CERTIFICATE OF COMPETENCE

### *Raman Venkata Kakaraparthi*

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

<b>GHG Auditor:</b>	Yes				
<b>Technical Area</b>	<b>CDM Validator</b>	<b>CDM Verifier</b>	<b>Sector Knowledge</b>	<b>Sector Expert</b>	<b>Technical Reviewer</b>
Landfill gas	Jan 2009				
Hydro power	Jan 2009	Sept 2009			
Renewables	Jan 2009	Jan 2009			Jan 2009
Other renewable		Sept 2009			
Biomass	Jan 2009				Aug 2009
Grid connection of isolated system		Sept 2009			
Cement					Aug 2009
Waste-heat / waste-gas recovery	Jan 2009	Jan 2009		Jan 2009	Aug 2009
Efficiency of thermal power plants		Sept 2009		Jan 2009	Aug 2009
Coal mine methane					
Fuel switch		Sept 2009		Jan 2009	Aug 2009
Manure management					
Waste / wastewater treatment	Jan 2009				
Energy efficiency	Jan 2009	Jan 2009		Jan 2009	Aug 2009
N <sub>2</sub> O		Sept 2009			
HFCs	Jan 2009	Jan 2009	Nov 2009		Aug 2009
Flare reduction					
PFCs					
Charcoal					
CO <sub>2</sub> recovery		Sept 2009		Jan 2009	Aug 2009
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF <sub>6</sub>					

Høvik, 1 September 2009

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