DETERMINATION REPORT

REHABILITATION OF DOLNA ARDA HYDROPOWER CASCADE, BULGARIA

(JI REFERENCE NUMBER 0040)

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DET NORSKE VERITAS

DETERMINATION REPORT

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Summary:
Det Norske Veritas Certification AS (DNV) has performed a determination of the "Rehabilitation of Dolna Arda Hydropower Cascade, Bulgaria" project. The determination has been performed on the basis of the UNFCCC criteria for JI projects, in particular the verification procedures under the Article 6 supervisory committee, as well as criteria given to provide for consistent project operations, monitoring and reporting.
The determination consisted of the following three phases: i) desk review of the project design documents, ii) follow up interviews with project stakeholders and iii) the resoloution of outstanding issues and the issuance of the final determination report and opinion.
In summary, it is DNV's opinion that the project, as described in the project design document of May 2007, meets all relevant UNFCCC requirements for the JI.

Report No.: 2005-3525	Subject Group: Environment	
Report title: Rehabilitation of Dolna Arda Hydropower Cascade, Bulgaria		
Work carried out by: Susanne Haefeli, Viktor Saroch		
Work verified by: Michael Lehmann		
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Abbreviations

BLS	Baseline Study
CAR	Corrective Action Request
CEF	Carbon Emission Factor
CH_4	Methane
CL	Clarification request
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
DNV	Det Norske Veritas
EIA	Environmental Impact Assessment
ERU(s)	Emission Reduction Unit(s)
FP	Focal Point
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
HPP	Hydropower Plant
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
MP	Monitoring Plan
MOEW	Bulgarian Ministry of Environment and Water
NDC	National Dispatch Centre
NEK	National Electric Company (Natsionalna Elektricheska Kompania EAD)
NGO	Non-governmental Organisation
PDD	Project Design Document
UNFCCC	United Nations Framework Convention for Climate Change
TPP	Thermal Power Plant

1 INTRODUCTION

VA TECH Hydro of Austria has commissioned Det Norske Veritas Certification AS (DNV) to perform a determination of the "Rehabilitation of Dolna Arda Hydropower Cascade, Bulgaria" project (JI reference number 0040).

This report summarises the findings of the determination of the project, performed on the basis of the UNFCCC criteria for JI projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The determination team consists of the following personnel:

Mr Michael Lehmann	DNV Oslo, Norway	Technical reviewer
Ms Susanne Haefeli-Hestvik	DNV Oslo, Norway	JI validator
Mr Viktor Saroch	DNV Prague, Czech Republic	GHG auditor

1.1 Objective

The purpose of the determination is to have an independent third party assessing the project design. In particular, the project's baseline, the 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. Determination is a requirement for JI projects following the verification procedures under the Article 6 supervisory committee and it is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of the emission reduction units (ERUs).

1.2 Scope

The determination scope is defined as an independent and objective review of the Project Design Document (PDD) and other relevant documents. The information contained in these documents is reviewed against the Kyoto Protocol requirements for Joint Implementation (JI) projects, the guidelines for the implementation of Article 6 of the Kyoto Protocol (Decision 16/CP.7) as agreed in the Marrakech Accords, in particular the verification procedures under the JI supervisory committee, and decisions adopted by the JI supervisory committee. DNV has, based on the recommendations in the Validation and Verification Manual /5/, employed a risk-based approach in the determination process, focusing on the identification of significant risks for project implementation and the generation of ERUs.

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

1.3 The Dolna Arda Hydropower Cascade Project

The "Rehabilitation of Dolna Arda Hydropower Cascade, Bulgaria" project is intended to be designated as a JI project between Bulgaria and Austria. The project location is in the valley of the Arda River in the South-eastern part of Bulgaria.

The proposed project consists of two main activities:

- Rehabilitation and refurbishment of 3 existing hydropower plants in Studen Kladenets, Kardjali and Ivailovgrad
- Installation of a new 16 MW unit at the existing hydropower plant in Studen Kladenets

The project is forecasted to reduce 267 465 tCO_2 in the years 2008 to 2012.

2 METHODOLOGY

The determination of the project commenced in November 2005. The determination 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 (Corrective Action or Clarification Requests) and the issuance of the final determination report and opinion.

The determination has been carried out in line with the verification procedure under the Article 6 supervisory committee, as well as, in line with determination process outlined in the Validation and Verification Manual /5/.

In order to ensure transparency, a determination protocol was customised for the project, according to the Validation and Verification Manual. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The determination protocol serves the following purposes:

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

The determination protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed determination protocol for the "Rehabilitation of Dolna Arda Hydropower Cascade, Bulgaria" project is enclosed in Appendix A to this report.

Determination Protocol Table 1: Mandatory Requirements			
Requirement	***Reference***	***Conclusion***	***Cross reference***
The requirements the project must meet.	*Gives reference to COP decision where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the determination report.*	*Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent determination process.*

Determination Protocol Table 2: Requirement checklist				
Checklist Question	***Reference***	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
The various requirements in Table 1 are linked to checklist questions the project shall meet. The checklist is organised in six different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	*Gives reference to documents where the answer to the checklist question or item is found.*	*Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (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.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question (See below). **Clarification (CL)** is used when the independent entity has identified a need for further clarification. N/A means not applicable.*

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

Figure 1 Determination protocol tables

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

i) mistakes have been made with a direct influence on project results;
ii) JI or host Party requirements have not been met; or
iii) there is a risk that the project would not be accepted as a JI project or that emission reductions will not be certified.

The term *clarification* may be used where additional information is needed to fully clarify an issue.

2.1 Review of Documents

The Project Design Document (PDD) /1/ (version 01 of November 2005, version 02 of January 2007 and version 03 of May 2007) for the "Rehabilitation of Dolna Arda Hydropower Cascade, Bulgaria" project prepared by Pöyri Energy GmbH (formerly Verbundplan GmbH) using data supplied by „National Electric Company" (NEK or Natsionalna Elektricheska Kompania EAD), as well as additional documents supporting the PDD, i.e. the Baseline Study (BLS) /2/ and the Monitoring Plan (MP) /3/, were assessed during the project determination.

2.2 Follow-up Interviews

DNV has carried out interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. On 28 – 29 November 2005, DNV met with representatives of NEK /6/ and the National Dispatch Centre /7/. At the same time, DNV also spoke with a representative of the Bulgarian Ministry of Environment and Water (Bulgarian JI Focal Point) /8/. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organisation	**Interview topics**
National Electric Company" (Natsionalna Elektricheska Kompania EAD) & National Dispatch Centre	➢ Valid construction permit and environmental licence ➢ Baseline monitoring methodology ➢ Availability of dispatch data to determine the marginal power plant on an hourly basis ➢ Additionality assessment ➢ Availability and processing of necessary data to determine carbon emission factors (CEF) of power plants at the margin ➢ Procedures for calibration and maintenance of monitoring equipment
Bulgarian Ministry of Environment and Water	➢ Approval of the project as JI project between Bulgaria and Austria ➢ Environmental Impact Assessment and other legal requirements

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the determination was to resolve any outstanding issues which needed to be clarified for DNV's positive conclusion on the project design. The initial determination identified two Corrective Action Requests (CAR) and seven requests for Clarification (CL).

The response provided by the project participants on DNV's initial determination findings resolved the identified requests for Clarification to DNV's satisfaction.

To guarantee the transparency of the validation process, the concerns raised and responses given are documented in Table 3 of the Determination Protocol in Appendix A.

3 DETERMINATION FINDINGS

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

The final determination findings relate to the project design as documented and described in the revised and resubmitted project design documentation of May 2007.

3.1 Project design

The proposed project consists of two main activities:

1) Rehabilitation and refurbishment of 3 existing hydropower plants in Studen Kladenets, Kardjali and Ivailovgrad. As a result of the rehabilitation, the efficiency of thee existing hydropower plants will be improved and their annual power generation will be increased by about 20,9 GWh/a. Rehabilitation is envisaged for the following main components:
    - Turbines – new runners and wicket gate mechanisms; new butterfly valves and turbine governors; new oil-pressure systems and servo- motors;
    - Generators – re-insulation of the rotor windings;
    - Generators excitation systems – new static excitation systems;
    - Relays protections – new digital relay protection systems;
    - Monitoring and control – new monitoring and control systems.
2) Installation of a new 16 MW unit at the existing hydropower plant in Studen Kladenets which will utilise a part of the overflow from the existing Studen Kladenets dam.

The project design represents good engineering practice. The project intends to introduce state-of-the-art technology from a reputable Austrian supplier group, resulting in a technology transfer from Austria to Bulgaria. The project design engineering for the construction of the HPP Studen Kladenets and for the refurbishment of 3 existing hydropower plants in Studen Kladenets, Kardjali and Ivailovgrad, reflects good engineering practice. Some existing structures, built in the past but never used, will be used, increasing their original efficiencies.

Due to the nature of the project and NEK EAD's extensive experience with hydropower projects, no extensive training is going to be required to implement and operate the proposed project.

The start of the project activity was March 2006 and ERUs will be claimed for the period 1 January 2008 to 31 December 2012.

The project participant is „National Electric Company" (NEK or Natsionalna Elektricheska Kompania EAD) of Bulgaria. The host Party Bulgaria has approved the project on 10 October 2006 and has authorised NEK as project participant. No other Party has yet provided approval of the project. However, in accordance with the clarification given by the JI Supervisory Committee at its 6th meeting, this approval may only be provided when submitting the first verification report for publication.

3.2 Baseline

No approved CDM baseline and monitoring methodology is applied and instead a methodology is proposed for the proposed project in accordance with the criteria set out in appendix B of the JI guidelines. The baseline methodology applied by the project is *Marginal Plant Only* (Least cost dispatch analysis) baseline methodology.

Five different approaches (found in pertinent literature) for selecting a baseline for this type of project are described and in a transparent way the *Marginal Plant Only* (Least cost dispatch analysis) baseline methodology is selected. This methodology for the electricity sector sets out in economic terms which technologies or specific generation units that are likely to be displaced by a new generation plant to be added to the grid. The methodology requires an evaluation of the last units to be switched on for each hour of the year. The least cost dispatch analysis methodology is appropriate when i) necessary data for the despatch is available and ii) the renewable energy plant is likely to replace peak load electricity. Both requirements are accomplished by the project.

In fact, i) dispatch data is available from NEK EAD and the National Dispatch Centre and ii) the Studen Kladenets HPP as well as the other 3 rehabilitated plants will be operated mainly as a peaking plants, while nuclear power plant units are providing base-load electricity generation in Bulgaria.

The baseline sufficiently takes into account relevant national and sectoral circumstances. The baseline determination analyses the Bulgarian Electricity Power Sector (EPS) for the period 2004-2012 with and without the capacity added to the Bulgarian electricity sector by the proposed project. Bulgarian energy exports as well as the expected future developments in the electricity sector in Bulgaria in the years 2005-2020, including the expected decommissioning of two units at the Kozlodui nuclear power plant in 2006, are analysed in the baseline determination.

Conservative assumptions have been used to determine baseline emissions. The selected energy demand scenario (maximum scenario) is conservative as it rather underestimates baseline emissions than overestimates baseline emissions.

3.3 Additionality

The additionality of the project activity is demonstrated through a qualitative assessment of investment barriers and a quantitative financial analysis, which shows that the expected ERU revenues improve the financial viability of the project. DNV was able to confirm that prevailing investment barriers have been overcome by designating the Dolna Arda Hydropower Cascade Project as a JI project. Designation of the project as a JI project is a prerequisite for a substantial part of the project funding. It is sufficiently demonstrated that the necessary funding could only be secured due to the realisation of the project as a JI activity.

3.4 Monitoring Plan

The monitoring methodology allows a transparent, accurate and complete *ex-post* calculation of baseline emissions. It also mitigates monitoring errors and uncertainties to the extent that it is reasonably possible.

As the project itself does not produce significant project emission, no data has to be collected to monitor project emissions. Moreover, the project is not expected to cause leakage effects.

The monitoring methodology for determining baseline emissions builds on measuring electricity generation by the Studen Kladenets, Kardjali and Ivailovgrad HPPs. The amount of electricity produced by the project is eventually multiplied with a carbon emission factor (CEF) of the one or two marginal power plants, the electricity generation of which is assumed to be displaced by the project. The boundary for determining baseline emissions is the entire Bulgarian EPS. Emissions in the electricity sector in neighbouring countries are not likely to be significantly affected and hence not considered.

Data on the hourly dispatch order will be collected and archived to determine the marginal power plant, for which electricity generation is assumed to be displaced by the project. For determining the CEF of the marginal plants at the margin, electricity generation, fuel consumption and specific heat rate and carbon content of the fuel used for generation are determined and a carbon emission factor is calculated for each month at each thermal power plant.

Dispatching order data and fuel characteristics of marginal plants will be furnished by NEK EAD. However, the monitoring plan does not yet include detailed provisions for collecting and archiving the necessary data for determining the CEF of the power plant operating at the margin. Records on the CEF of the plants operating at the margin are necessary for a later verification of emission reductions attributable of the project. The necessary provisions (measuring plans, agreement with independent power producers, etc) for collecting and archiving data necessary for determining the CEFs of these plants, i.e. electricity generation, fuel consumption and the specific heat rate and carbon content of the fuel, will hence have to be developed prior to the starting date of ERU generation of the project.

Authorities and responsibilities for monitoring activities are defined. Calibration and maintenance of monitoring equipment will be carried out in accordance with the Bulgarian Measurement Act.

NEK AED is responsible for the development and implementation of the management and operational system of the monitoring plan. Monitoring procedures including training and maintenance and calibration of the monitoring equipment, are not yet described, and such procedures should be developed and implemented prior to the starting date of the crediting period. Also, procedures for performing internal auditing, reviews, record control and handling of corrective actions should be developed prior to the project commissioning. Monitoring of the TPPs should be based on the methodology of determination of CO_2 emissions based on the EU Monitoring and Reporting Guidelines.

3.5 Calculation of GHG Emissions

Changes, due to the proposed project, on the CO_2 emissions of the Bulgarian electricity sector were determined in a complete and transparent manner. The proposed project is likely to displace fossil-fuel based electricity generation and it is demonstrated that the emission scenario for the Bulgarian EPS for the period 2005-2012 results in fewer GHG emissions in the project scenario (with the capacity added to the Bulgarian electricity sector by the proposed project) than in the baseline scenario.

The calculations are transparently documented and conservative assumptions were used, where applicable, regarding expected additional electricity generation by the Studen Kladenets, Kardjali and Ivailovgrad HPPs.

The likely marginal plants have been determined using the IRP Manager Model and taking into account future developments in the Bulgarian electricity sector previously identified in the least costs development plan of the Bulgarian electricity sector for the period 2005-2020. In order to determine the emission factor of the marginal plants, fuel characteristics and plant specific operation information were taken into consideration.

Uncertainties are sufficiently addressed in the emission estimations and will be mitigated by the monitoring plan.

The project is forecasted to reduce 267 465 tCO_2 between 2008 and 2012.

3.6 Environmental Impacts

According to the national law no EIA has been required. The possible environmental effects are discussed in the Environmental Audit Report. As the project involves only extension of the existing capacities, no significant direct environmental impacts can be expected either during the construction or the operation phase. This was also confirmed by a decision made by the MoEW (Regional Inspectorate Haskovo) No. XA-57-ПР/2005.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND OBSERVERS

The PDD of January 2007 was made publicly available on the JI website and Parties, stakeholders and observers were through the Secretariat invited to provide comments during a 30 days period from 07 March 2007 to 05 April 2007. No comments were received.

Prior to this, the PDD and the BLS of November 2005 were made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and observers were on 21 December 2005 through the Climate-L mail list invited to provide comments during a 30 days period from 22 December 2005 to 20 January 2006. No comments were received in this earlier call either.

5 DETERMINATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a determination of the "Rehabilitation of Dolna Arda Hydropower Cascade, Bulgaria" project. This determination was performed on the basis of the UNFCCC criteria for JI projects, in particular the verification procedures under the Article 6 supervisory committee, as well as criteria given to provide for consistent project operations, monitoring and reporting.

It is DNV's opinion that the project meets all relevant UNFCCC requirements for JI projects.

The project is intended to be designated as a JI project between Bulgaria and Austria. The host Party Bulgaria has approved the project on 10 October 2006. Austria has not yet provided approval of the project. However, in accordance with the clarification given by the JI Supervisory Committee at its 6th meeting, this approval may only be provided when submitting the first verification report for publication.

The project design appears to represent good engineering practice and the project will introduce state of the art technology developed in Austria, resulting in technology and capacity transfer to Bulgaria. No EIA was required by the Bulgarian Ministry of Environment.

The selected "Marginal Plant Only" (Least cost dispatch analysis) baseline methodology is appropriate because the project hydro power plants will be operated mainly as peaking plants, and the electricity generated by the project will hence likely displace electricity generation at thermal power plants operating at the margin. The baseline is determined in a transparent manner and takes sufficiently into account relevant national and sectoral circumstances.

It is demonstrated that the emission scenario for the Bulgarian EPS for the period 2005-2012 results in fewer GHG emissions in the project scenario (with the capacity added to the Bulgarian electricity sector by the proposed project) than in the baseline scenario. A qualitative and quantitative analysis of the investment barriers demonstrates that the proposed project activity 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.

Emission calculations are transparently documented and conservative assumptions were used, where applicable, regarding expected electricity generation by the Studen Kladenets, Kardjali and Ivailovgrad hydro power plants.

The monitoring plan sufficiently specifies the monitoring requirements of the main project indicators. However, the monitoring plan does not yet make the necessary provisions for collecting and archiving the necessary data for determining the CEF of the power plant operating at the margin. Procedures for this will have to be developed prior to the starting date of the ERU generation period of the project to ensure later verification of ERUs. Moreover, detailed QA/QC procedures will need to be developed before the project can generate ERUs.

6 REFERENCES

Documents provided by the project proponent that relate directly to the project:

/1/ Pöyri Energy GmbH (formerly Verbundplan GmbH, Austria: *Rehabilitation of Dolna Arda Hydropower Cascade, Project Design Document*. Version 01 of November 2005, version 02 of January 2007 and version 03 of May 2007.

/2/ Verbundplan GmbH, Austria: *Rehabilitation of Dolna Arda Hydropower Cascade,* Baseline Study. July 2005 (*included as Annex 3 in version 02 of PDD of January 2007 and version 03 of May 2007*).

/3/ Verbundplan GmbH, Austria: *Rehabilitation of Dolna Arda Hydropower Cascade,* Monitoring Plan. July 2005 (*included as Annex 4 in version 02 of PDD of January 2007 and version 03 of May 2007*).

Background documents related to the design and/or methodologies employed in the design or other reference documents:

/4/ NEK: *Financial analysis spreadsheet*, November 2005.

/5/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): Validation and Verification Manual. http://www.vvmanual.info

Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:

/6/ NEK: Mr. Christo Schwabski – environment compliance expert

/7/ NDC (National Power Dispatch Centre, will participate in the monitoring): Mr. Georgi Stoilov Generation Planning Department Chief)

/8/ Ministry of Environment and Water, CCS Policy Dpt, JI Sector (Focal Point of Bulgaria): Ivona Grozeva, Head of JI Projects Sector (phone interview), Nevena Alexandrova, Expert

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APPENDIX A

JI DETERMINATION PROTOCOL

Table 1 Mandatory Requirements for Joint Implementation (JI) Project Activities

Requirement	Reference	Conclusion	Cross Reference / Comment
1. The project shall have the approval of the Parties involved	Kyoto Protocol Article 6.1 (a)	OK ~~CAR 1~~	The project is intended to be designated as a JI project between Bulgaria and Austria. The host Party Bulgaria has approved the project on 10 October 2006. Austria has not yet provided approval of the project. However, in accordance with the clarification given by the JI Supervisory Committee at its 6th meeting, this approval may only be provided when submitting the first verification report for publication.
2. Emission reductions, or an enhancement of removal by sinks, shall be additional to any that would otherwise occur	Kyoto Protocol Article 6.1 (b)	OK	Section B.2.2, D.2
3. The sponsor Party shall not aquire emission reduction units if it is not in compliance with its obligations under Articles 5 & 7	Kyoto Protocol Article 6.1 (c)	OK	Although no approval has yet been provided, Austria is the intended sponsor Party. The validation has not in detail assessed Austria's compliance with article 5 and 7 of the Kyoto Protocol. However, Austria has in place a national system for estimating GHG emissions and reported in April 2005 its latest national GHG inventory.
4. The acquisition of emission reduction units shall be supplemental to domestic actions for the purpose of meeting commitments under Article 3	Kyoto Protocol Article 6.1 (d)	OK	Although no approval has yet been provided, Austria is the intended sponsor Party. The validation has not in detail assessed Austria's domestic actions for meeting commitments under Article 3. However, Austria is undertaking several measures to reduce domestic GHG emissions, such as the implementation of the EU directive on emission trading and other measures listed in the Klimastrategie 2008/2012 adopted on 18 June 2002 by the Austrian council of ministers.

Requirement	Reference	Conclusion	Cross Reference / Comment
5. Parties participating in JI shall designate national focal points for approving JI projects and have in place national guidelines and procedures for the approval of JI projects	Guidelines for the implementation of Art. 6 §20	OK	The Bulgarian focal point is the Ministry of Environment and Water. Although no approval has yet been provided, Austria is the intended sponsor Party. The Austrian focal point is the Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft.
6. Parties participating in JI shall be a Party to the Kyoto Protocol	Guidelines for the implementation of Art. 6 §21a/24	OK	Bulgaria is a Party to the Kyoto Protocol and has ratified the Kyoto Protocol on 31 May 2002 respectively. Although no approval has yet been provided, Austria is the intended sponsor Party and has ratified the Kyoto Protocol on 15. August 2002.
7. The participating Parties' assigned amount shall have been calculated and recorded	Guidelines for the implementation of Art. 6 §21b/24	OK	Both Bulgaria's and Austria's assigned amount is 92% of the base year (1990) emissions.
8. The sponsor Party shall have in place a national system for estimating GHG emissions and a national registry and has submitted annualy its most recent inventory in accordance with Kyoto Protocol Article 5 and 7	Guidelines for the implementation of Art. 6 §21c,d,e,f	OK	Although no approval has yet been provided, Austria is the intended sponsor Party and has in place a national registry.
9. The host Party shall have in place a national registry in accordance with Article 5 of the Kyoto Protocol	Guidelines for the implementation of Art. 6 §21d/24	--	Bulgaria has not in place a national registry. Its establishment is expected in 2007.
10. ERUs shall not be issued as a result of project activities undertaken within the European Community that also lead to a reduction in, or limitation of, emissions from installations covered by Directive 2003/87/EC, unless an equal number of allowances is cancelled from the registry of the Member State of the ERUs' origin.	Directive 2004/101/EC of the European Parliament and of the Council of 27 October 2004	OK	The focal point of Bulgaria has confirmed that it will take all steps required to avoid double counting according to Directive 2004/101/EC.

Requirement	Reference	Conclusion	Cross Reference / Comment
11. Project participants shall submit to the independent entity a project design document that contains all information needed for the determination	Guidelines for the implementation of Art. 6 §31	OK	A PDD in accordance with the JI PDD has been submitted in January 2007 and May 2007. Earlier, a Project Design Document (PDD) in accordance with the Austrian JI/CDM Programme has been submitted for determination. The PDD is further supported by a Baseline Study and a Monitoring Plan including annexes and associated documents.
12. The project design document shall be made publicly available and Parties, stakeholders and UNFCCC accredited observers shall be invited to, within 30 days, provide comments	Guidelines for the implementation of Art. 6 §32	OK	The PDD of January 2007 was made publicly available on the JI website and Parties, stakeholders and observers were through the Secretariat invited to provide comments during a 30 days period from 07 March 2007 to 05 April 2007. No comments were received. Prior to this, the PDD and the baseline study of November 2005 were made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and observers were on 21 December 2005 through the Climate-L mail list invited to provide comments during a 30 days period from 22 December 2005 to 20 January 2006. No comments were received in this earlier call either.
13. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, in accordance with procedures as determined by the host Party shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out	Guidelines for the implementation of Art. 6 §33d	OK	Section B + Annexes 7 and 10 No EIA has been required by the national law and local environmental authorities.

Requirement	Reference	Conclusion	Cross Reference / Comment
14. The baseline for a JI project shall be the scenario that reasonably represents the GHG emissions or removal by sources that would occur in absence of the proposed project	Guidelines for the implementation of Art. 6, Appendix B	OK	Section D + Baseline Study No baseline for the electricity grid has yet been approved in Bulgaria by the Focal Point.
15. 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	Guidelines for the implementation of Art. 6, Appendix B	OK	Section D.2 .3 + Baseline Study
16. The baseline methodology shall exclude to earn EURs for decreases in activity levels outside the project activity or due to force majeure	Guidelines for the implementation of Art. 6, Appendix B	OK	Section D.2 .3 + Baseline Study
17. The project shall have an appropriate monitoring plan	Guidelines for the implementation of Art. 6 §33c	OK	Section E + Monitoring Plan

Table 2 Requirements Checklist

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A. General Description of Project Activity The project design is assessed.					
A.1. Project Boundaries Project boundaries are the limits and borders defining the GHG emission reduction project.					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	Yes. The geographical boundaries are defined as the existing hydropower plants - Studen Kladenets - Kardjali and - Ivailovgrad that will be refurbished as well as the additional generation unit - Studen Kladenets.- installation of new 16 MW unit, another 1MW turbine will be installed in order to utilise water energy when the HPP is not operated at the moment and water needs to be released anyway due to ecological reasons. The generated power will be used for own consumption of the plant and will not be considered in calculation of emissions reduction. The valley of Arda River is located in the south-eastern part of Bulgaria.		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR	Yes. The project's system boundaries encompass the national electricity grid of Bulgaria.		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A.2. Technology to be employed 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.					
A.2.1. Does the project design engineering reflect current good practices?	/1/	DR	Yes. New equipment is installed according to international standards.		OK
A.2.2. 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	Yes. Francis turbines are used as well as other state of the art components.		OK
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/	DR	No. The project equipment has a forecast lifetime of at least 30 years.		OK
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/1/	DR I	No. NEK runs already other hydropower plants. Moreover, the project involves extension of the existing plants.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/	DR I	Yes. VA TECH Hydro GmbH is responsible for providing sufficient training.		OK
A.3. Compliance with host country requirements *The project's contribution to sustainable development is assessed.*					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/	DR I	The Bulgarian Ministry of Environment and Water issued a Letter of No Objection for the "Rehabilitation of Dolna Arda Hydropower Cascade, Bulgaria" project on 27 April 2005. Compliance of the project with the relevant		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			national legislation has been also confirmed by a decision made by the MoEW (Regional Inspectorate Haskovo) No. ХА-57-ПР/2005. This document also confirms that no additional Environmental Impact Assessment is required. The Bulgarian Ministry of Environment and Water approved the project on 10 October 2006.		
A.3.2. Is the project in line with host-country specific JI requirements?	/1/	DR I	The Bulgarian Ministry of Environment and Water approved the project on 10 October 2006.		OK
B. Project Baseline The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the discussion and selection of the baseline methodology transparent?	/1/	DR	Yes. The project will use the dispatch analysis, which is based on a least cost approach: It is assumed that the project displaces the electricity of the one or two plants that dispatch electricity at the margin of each hour, based on the hourly electricity price. Baseline used is the same that was used for the Vacha project. It was already determined by DNV (2003). The project was approved both by both the Bulgarian		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			and Austrian FP.		
B.1.2. Does the baseline methodology specify data sources and assumptions?	/1/	DR	Yes. The following data is needed for the dispatch analysis: - hourly price of electricity - the electricity generation and fuel use of the one or two power plants that deliver electricity to the grid at the margin, measured on an hourly basis - the electricity generation by the project The project also measures the efficiency of the project plants, as it is a requirement of the Austrian FP. The sources are the National Dispatch Centre (NDC) and the power plant operators of the marginal power plants as well as the project plants i.e. NEK. All assumptions are clearly specified.		OK
B.1.3. Does the baseline methodology sufficiently describe the underlying rationale for the algorithm/formulae used to determine baseline emissions (e.g. marginal vs. average, etc.)	/1/	DR	Yes. The marginal approach is chosen based on the assumption that the project does not displace base load electricity generation. This approach is widely used and deemed reasonable.		OK
B.1.4. Does the baseline methodology specify types of variables used (e.g. fuels used, fuel consumption rates, etc)?	/1/	DR I	Yes. The CO_2 emissions are based on the following data from the one or two marginal plants: - Electricity generation - heat rate - NCV - Fuel Carbon Content - Fraction of carbon un-oxidised - Auxiliary power needs	~~CL 1~~	OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			The NCV values have been received by NEK through questionnaire which was sent to the TPPs with request from the Ministry of Economy and Energy, No follow-up cross-checks have been performed afterwards by NEK. The accuracy of these values will have to be assessed during verification. It needs to be clarified whether the approach recommended by the EU ETS M&R Guidelines is adopted i.e. to calculate the baseline CO_2 emissions as follows: fuel quantity * NCV * carbon emission factor * oxidising factor (batch analyses).		
B.1.5. Does the baseline methodology specify the spatial level of data (local, regional, national)?	/1/	DR	Yes. Data will be measured at each plant individually.		OK
B.2. Baseline Determination The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/1/	DR	Yes. The dispatch analysis is a well-known approach.		OK
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/	DR	Accurate rather than conservative assumptions have been chosen in general. Further, the baseline has not taken into account the CO_2 emissions from using fossil fuel for de-sulphurising the coal, which is conservative.		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B.2.3. Has the baseline been established on a project-specific basis?	/1/	DR	Yes. The dispatch analysis looks at the marginally delivering plants to the extent of the electricity generated by the project.		OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	Yes. The baseline CO_2 coefficient will be measured ex-post and thus all trends will be included.		OK
B.2.5. Is the baseline determination compatible with the available data?	/1/	DR	The baseline scenario was calculated by the investor based on the data received through questionnaire which was send to the TPPs with request from Ministry of Economy and Energy. No follow-up cross-checks have been performed afterwards by NEK or anybody else. The baseline does not include process emissions generated by fumes desulphurisation have not been considered. This decreases the TPP emissions about approximately 5%.		OK
B.2.6. Does the selected baseline represent a likely scenario in the absence of the project?	/1/	DR	Yes. The marginal power plant generation is the most likely to be displaced by the project.		OK
B.2.7. Is it demonstrated that the project activity itself is not a likely baseline scenario (e.g. through (a) a flow-chart or series of questions that lead to a narrowing of potential baseline options, (b) a qualitative or quantitative assessment of different potential options and an indication of why the non-project option is more likely, (c) a qualitative or quantitative assessment of one or more barriers facing the proposed project activity or (d) an indication that the project type	/1/	DR	A financial analysis has been presented and it has been clearly shown that the project needs additional cash flow to service the debt. Also, investment barriers have been sustained that would have prevented the project from receiving the up-front payment to do the investment. A Net Present Value of the project has been calculated and shows a positive NPV of 11.58 million Euros, excluding revenue	~~CL 2~~	OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
is not common practice in the proposed area of implementation, and not required by a Party's legislation/regulations)?			from selling ERUs. - Further clarification is needed with regards to the high investment costs of 59 million Euros, - It is also unclear how a positive NPV can be achieved if investment costs are 59 million Euros and direct operating and maintenance costs are around 2.5 million Euros and electricity revenues are only between 4.4 and 10.6 million Euros between 2008 and 2012 as indicated in the spreadsheet,		
B.2.8. Have the major risks to the baseline been identified?	/1/	DR	Yes. In case less CO_2 intensive power plants are at the margin, the dispatch analysis will take this into account. This is hence not an issue. Moreover, marginal plants can produce power anyway, because they have direct contracts with some (protected) customers. This has been considered by the forecast emission reduction analysis as well. It is however unclear why the Chaira hydro power plant, the purpose of which is to save power during low peak times (through pumping) and contributing electricity to the grid during high peak times, is not included in the list of power plants that see their generation displaced by the project activity. If Chaira needs to be included, this means that the current forecast emission reductions are overstated. Please clarify.	~~CL 3~~	OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B.2.9. Is all literature and sources clearly referenced?	/1/	DR,I	Yes. The NDC is the main source of information. The information source related to the fuel quality collected by the Ministry of Economy and Energy is nevertheless missing.	~~CL4~~	OK
C. Duration of the Project/ Crediting Period It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/	DR	The project's starts in March 2006 and finishes refurbishment of the last plant in 2010. The operational life time 30 years.		OK
C.1.2. Is the project's crediting time clearly defined?	/1/	DR	Yes. The crediting period starts on 1 January 2008 and ends on 31 December 2012.		OK
D. Monitoring Plan The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
D.1. Monitoring Methodology It is assessed whether the project applies an appropriate baseline methodology.					
D.1.1. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/	DR	Yes. The monitoring includes the following: - electricity generated by the project - marginal plants at each hour - CO_2 emission factor of these plants		OK
D.1.2. Is the selected monitoring methodology supported by the monitored and recorded data?	/1/	DR	Yes. However, because the TPPs do not belong to NEK, NEK does not have a direct authority to impose the collection of		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			fuel specific data by the hour. This is why no detailed procedures for monitoring GHGs have been elaborated yet. This will have to be done before January 2008. Alternatively, conservative IPCC default values will have to be applied. This data availability will have to be assessed during verification.		
D.1.3. Are the monitoring provisions in the monitoring methodology consistent with the project boundaries in the baseline study?	/1/	DR	Yes.		OK
D.1.4.Have any needs for monitoring outside the project boundaries been evaluated and if so, included as applicable?	/1/	DR	Yes. The NDC provides all the necessary data.		OK
D.1.5.Does the monitoring methodology allow for conservative, transparent, accurate and complete calculation of the ex post GHG emissions?	/1/	DR	Yes. The monitoring protocol includes all the above-mentioned parameters.		OK
D.1.6.Is the monitoring methodology clear and user friendly?	/1/	DR	Yes. The monitoring is straight forward and the good communication between the NDC and NEK will ensure that all data is available as needed.		OK
D.1.7.Does the methodology mitigate possible monitoring errors or uncertainties addressed?	/1/	DR	Yes. Fuel data of the marginal plants will be monitored monthly or yearly. The hourly dispatch order is already being monitored by the NDC. The electricity generation of the project plants will be cross-checked with sales receipts. NEK will develop a procedure for checking the primary data obtained from the plants via NDC in a near future. No decision on the cross-check method selection has been		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			done, yet. This will have to be implemented before January 2008 and it will need to be assessed during verification.		
D.2. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.2.1. 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 are no project emissions.		OK
D.3. Monitoring of Leakage It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	There is no leakage.		OK
D.4. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining the baseline emissions during the crediting period?	/1/	DR	Yes. All data is collected according to the methodology.		OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	Yes. All baseline indicators are reasonably chosen.		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.4.3. Will it be possible to monitor the specified baseline indicators?	/1/	DR	Yes. The dispatch order will be monitored on an hourly basis and the fuel data of the marginal plants will be monitored on a monthly or yearly basis.		OK
D.5. Monitoring of Environmental Impacts It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.					
D.5.1. Does the monitoring plan provide for the collection and archiving of relevant data on environmental impacts?	/1/	DR	Yes, the Monitoring Plan describes how the CO_2 emissions data will be obtained, collected and reported. As described in the Environmental audit (Annex 10 to PDD) no significant impacts on the environment can be expected. The only environmental data that will be collected except for emission reduction data are waste generation and water usage (subject to taxation).		OK
D.5.2. Will it be possible to monitor the specified environmental impact indicators?	/1/	DR	Yes. Waste generation and water usage data needs to be recorded by law.		OK
D.6. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.6.1. Is the authority and responsibility of project management clearly described?	/1/	DR I	Yes. NEK is responsible for the project management.		OK
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR I	Yes. NEK has overall responsibility for monitoring and measurement; data will be supplied from NDC and the individual plants.		OK
D.6.3. Are procedures identified for training of	/1/	DR	This will have to be done before the		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
monitoring personnel?		I	project can generate ERUs and assessed during verification.		
D.6.4. Are procedures identified for emergency preparedness where emergencies can result in unintended emissions?	/1/	DR	There are no such situations that can cause unintended emissions.		OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR I	No detailed procedures for calibration of monitoring equipment have been elaborated yet. This will have to be done before the project can generate ERUs and assessed during verification.		OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR I	No detailed procedures for maintenance of monitoring equipment have been elaborated yet. This will have to be done before the project can generate ERUs and assessed during verification.		OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR I	No detailed procedures for monitoring, measurements and reporting have been elaborated yet. This will have to be done before the project can generate ERUs and assessed during verification.		OK
D.6.8. 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	No detailed procedures for day-to-day records handling have been elaborated yet. This will have to be done before the project can generate ERUs and assessed during verification.		OK
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR I	No detailed procedures for dealing with possible monitoring data adjustments and uncertainties have been elaborated yet. This will have to be done before the project can generate ERUs and assessed during verification.		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.6.10. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/	DR I	No detailed procedures for internal audits of GHG project compliance with operational requirements have been elaborated yet. This will have to be done before the project can generate ERUs and assessed during verification.		OK
D.6.11. Are procedures identified for project performance reviews?	/1/	DR I	No detailed procedures for project performance reviews have been elaborated yet. This will have to be done before the project can generate ERUs and assessed during verification.		OK
D.6.12. Are procedures identified for corrective actions?	/1/	DR I	No detailed procedures for corrective actions have been elaborated yet. This will have to be done before the project can generate ERUs and assessed during verification.		OK
E. Calculation of GHG Emissions by Source It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.					
E.1. Predicted Project GHG Emissions The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/	DR	Yes. There are no project emissions.		OK
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	Yes. All calculations are clearly documented.		OK
E.1.3. Have conservative assumptions been used to	/1/	DR	Yes. The forecast emissions reductions		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
calculate project GHG emissions?			are based on a maximum demand growth scenario, both for the baseline and the project emissions. The maximum demand growth scenario is based on national models used based on economic growth and energy intensity/GDP. It has been justified that the adoption of the maximum demand growth scenario is more conservative than the minimum demand growth scenario because the efficiency of the marginal power plants is supposed to increase and new power plants will be needed that also have an increased efficiency. This argumentation is deemed reasonable and conservative.		
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/	DR	Yes. The discussion is clear and transparent.		OK
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	/1/	DR	Yes. CO_2 is the only GHG involved.		OK
E.2. Leakage Effect Emissions It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/	DR	No leakage occurs.		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.3. Baseline Emissions The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1/	DR	Yes. The likely marginal power plants have been determined and their CO_2 emissions in the baseline as well as in the project scenario have been calculated.		OK
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/	DR	Yes. The list of the baseline plants is complete; it is based on NDC data and conformed by the NDC. The calculation has been made in a spreadsheet using correct formulae.		OK
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	Yes.		OK
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/	DR	Yes. The maximum demand growth scenario has been adopted and this is deemed conservative.		OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1/	DR	Yes. The modelling results are discussed based on their uncertainty. However, the actual CO_2 intensity of the displaced electricity will be measured ex-post.		OK
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	/1/	DR	Yes.		OK

Checklist question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1/	DR	Yes. The project is forecasted to reduce 267,465 $ktCO_2$ over the 5 years of the crediting period.		OK
F. Environmental Impacts Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR	Yes.		OK
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/	DR I	No, an EIA is not needed for this kind of project neither by the law nor by the authorities.		OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	No significant environmental impacts associated with the project can be expected.		OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	No transboundary environmental impacts associated with the project can be expected.		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	The project is in line with all national requirements and the impacts on water and air have been sufficiently addressed.		OK
F.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	Yes, the project fully meets the Bulgarian legal requirements.		OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests	Reference	Summary of project participants' response	Final determination conclusion
CAR 1: Letters of Approval have not been issued both by sponsor and by host country Focal Points.	Table 1	The approval by the Bulgarian Ministry of Environment and Water has been included as Annex 8 in the PDD of January 2007. Since Austria has not yet provided approval, Austria has been removed as Party in the PDD of May 2007 together with the project participants VA Tech Hydro GmbH&Co and the Austrian JI/CDM Programme.	OK The host Party Bulgaria has approved the project on 10 October 2006. Austria has not yet provided approval of the project and can not yet be considered as participating Party and was thus correctly removed from the PDD. Nonetheless, in accordance with the clarification given by the JI Supervisory Committee at its 6th meeting, this approval may be provided when submitting the first verification report for publication.
CL 1: The CO_2 emissions are based on the following data from the one or two marginal plants: - Electricity generation - heat rate - NCV - Fuel Carbon Content - Fraction of carbon un-oxidised - Auxiliary power needs It needs to be clarified whether the approach recommended by the EU ETS M&R Guidelines is adopted i.e. to calculate the baseline CO_2 emissions as follows:	Table 2 B.1.4	The approach used in the BS to calculate baseline emissions is: gross power generation * gross heat rate * carbon emission factor * oxidising factor This approach was chosen because the results of the IRP Manager Model give information on the power displaced (GWh) due to the Dolna Arda project. In a further step, the CO_2 emission reductions were calculated using these power values and multiplying them with the specific gross heat rate. The specific gross heat rate was calculated based on historic data (2000-2004) using actual fuel quantity and power output values, representing the most detailed approach.	OK The additional information provided by the project participants sufficiently justified the use of the selected approach to calculate baseline CO_2 emissions.

Draft report clarifications and corrective action requests	Reference	Summary of project participants' response	Final determination conclusion
fuel quantity * NCV * carbon emission factor * oxidising factor (batch analyses).		The EU ETS M&R Guidelines have been developed for monitoring of CO_2 emissions and not for forecasting. Nevertheless, both approaches will definitely lead to the same results when forecasting. During the monitoring phase, the CO_2 emissions will be calculated using actual heat rate values which are based on actual fuel quantity data. (Please see p.13-14 of the MP for more detailed information.) Therefore, also during the monitoring phase, both approaches will lead to the same results.	
CL 2: A financial analysis has been presented and it has been clearly shown that the project needs additional cash flow to service the debt. Also, investment barriers have been sustained that would have prevented the project from receiving the up-front payment to do the investment. A Net Present Value of the project has been calculated and shows a positive NPV of 11.58 million Euros, excluding revenue from selling ERUs. - Further clarification is needed with regards to the high investment costs of 59 million Euros, - It is also unclear how a positive NPV can be achieved if investment	Table 2 B.2.7	The investment costs of 59 million EUR are based on the contract for the project, negotiated between NEK and VATECH Hydro on a competitive turn-key basis. It has to be considered that the investment costs include a significant portion of construction work required in order to rehabilitate existing structures and accommodate the new equipment. Furthermore, the implementation of the project must be carried out during the dry summer months individually for each cascade, thereby limiting the available construction time. As indicated in section A7.1. it is assumed that without the rehabilitation project, the existing power plants of the cascade would have a remaining lifetime of app. 15 years only, gradually decreasing their electricity generation. Although the project is not operating profitably during 2008 to 2012, a positive EBIT can be achieved from 2013 with steadily increasing	OK The additional information provided by the project participants sufficiently justified the investment costs and the results of the NPV analysis.

Draft report clarifications and corrective action requests	Reference	Summary of project participants' response	Final determination conclusion
costs are 59 million Euros and direct operating and maintenance costs are around 2.5 million Euros and electricity revenues are only between 4.4 and 10.6 million Euros between 2008 and 2012 as indicated in the spreadsheet.		revenues, which leads to an overall positive NPV. On the other hand, the critical income situation during 2008 – 2012 emphasizes the importance of ERU revenues which contribute significantly to the project income during that time.	
CL 3: It is however unclear why the Chaira hydro power plant, the purpose of which is to save power during low peak times (through pumping) and contributing electricity to the grid during high peak times, is not included in the list of power plants that see their generation displaced by the project activity. If Chaira needs to be included, this means that the current forecast emission reductions are overstated. Please clarify.	Table 2 B.2.8	According to the IRP Manager Model used in this BS, only the four thermal power plants described on p.37 of the BLS are reported as marginal power plants with marginal operation costs. The 4 existing hydropower cascades operate at peak demand (Pump Storage HPP Chaira is part of one of this HPP cascades, and operates self-dependent or with other HPP in cascade Chaira-Belmeken). Immediately after particular cascade or PSHPP Chaira is started because of increasing peak demand of EPS, the marginal TPP Unit or Units are launched, coming to the grid for 15-16 hours. Neither the HPPs in the cascade nor PSHPP do replace each other; this situation could happen only hypothetically if HPP in operation has a failure, and in this time the cold reserve – marginal TPP Unit does not get connected to the power system.	OK. The project has also an effect on Chaira and other plants but as the baseline study considered the project's effect on the 4 power plants representing the top 35% of the electricity grid, in terms of total generation in 2012, the non-consideration of Chaira (i.e. -5 GWh due to project, see p. 37 BS: -18 + 13) is minor.
CL 4: Information source related to the fuel quality collected by the Ministry of Economy and Energy is missing in the PDD.	Table 2 B.2.9	The information on gross heat rate and net calorific value was collected from the power plants via a questionnaire that was sent by NEK to the Ministry of Economy and Energy. The data received was cross-checked for plausibility by NEK and Verbundplan.	OK The additional information provided by the project participants sufficiently clarify the source for the fuel quality data.

Draft report clarifications and corrective action requests	Reference	Summary of project participants' response	Final determination conclusion
CL 5: Why are the power generation figures for year 2000 shown in p. 18 (25.486 GWh) and power demand in p.24 (41.307 GWh) different? A revised PDD is required, clearly indicating all change s made between the version assessed by DNV and the new version.	BLS p. 18 and 24	The figures on p.18 of the BLS are actual figures for **net** consumption and **net** generation of electricity in Bulgaria. The net generation does not include auxiliary power used by the power plants. The net consumption does not include transmission and distribution losses, exports and auxiliary power used by the power plants. The figures on p.23-24 of the BLS represent the **gross** electricity demand forecast figures for Bulgaria. As described on p.23, these include: public sector and private sector demand as well as house consumption by power plants (i.e. auxiliary power), transmission and distribution losses and exports. Therefore, these figures are higher.	OK The additional information provided by the project participants explains the different power generation figures and no revised PDD is required.
CL 6: Why are the baseline emissions shown in p. 32 of the BLS 134 376kt and in p. 36 they are 134 109 kt? A revised PDD is required, clearly indicating all changes made between the version assessed by DNV and the new version.	BS p. 32 and p. 36	On p.32 of the BLS, the CO_2 emissions are 134376 kt for the baseline scenario, whereas on p.36 of the BS, the CO_2 emissions in the **project scenario** are 134109 kt. The difference between these two figures gives us the total CO_2 emission reductions achieved by this project in the period 2008-2012 (267465 t CO_2).	OK The additional information provided by the project participants explains the different baseline emission figures and no revised PDD is required.
CL 7: On p. 67, it reads for example for the year 2012: project emissions 23 186 * leakage 0 = -sum -23 186 + 23 249 = 62 967. Please clarify this calculation. Also, comparing these numbers to page 69, it reads that the emission coefficient is on average 0.919 t CO_2	PDD p. 67 PDD p. 69 Baseline study p. 32 and 36.	The wording in the first column of the table on p.67 of the PDD was already defined in the template received from the Austrian JI/CDM Programme. Throughout the entire BS and PDD, a comma (,) has been used as a decimal point, which is the common mathematical punctuation both in Bulgaria and in Austria and therefore also in the Excel spreadsheets. A point (.) has been used	OK The additional information provided by the project participants sufficiently clarifies the emission calculations.

Draft report clarifications and corrective action requests	Reference	Summary of project participants' response	Final determination conclusion
/MWh. However, dividing 62 967 t CO_2 by 44 465 MWh, gives a CO_2 coefficient of 1.4 t CO_2 / MWh. Please clarify. P. 32 of the baseline study: the baseline emissions are 134 367 t CO_2. How have this been determined? On page 36 the value is 134 109. Our calculations show 152 796. Please clarify.		as a 1000 separator. Hence, we have the following calculation: 23.186 * leakage 0 = -sum -23.186 + 23.249 = 62,967. To calculate the emission coefficient, which has been given on p.69 of the PDD, the emission reductions achieved by the project must be divided by the energy generated by the project, and **not** by the energy generated by the entire Bulgarian electric power system. The figure mentioned on the left (44465) is actually GWh and not relevant for this calculation. In our calculation, we have used the following figures for calculating the emission coefficient for the Maximum scenario: 267465 t CO_2 / 291000 MWh = 0,919 t CO_2/MWh In the Maximum scenario, 291000 MWh are generated by this project in the years 2008-2012 (please see Annex BLS 10 for a detailed breakdown of the energy generation). The clarification for the last question on the left is given in CL 6. These numbers represent the sum of the total CO_2 emissions in the baseline scenario (134367 kt) and in the project scenario (134109 kt). Please see Tables 15 and 19 of the BS and Annexes BLS 9 and 10 for a detailed breakdown of CO_2 emissions.	

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