Annex 3

DEVELOPMENT OF THE CLEAN DEVELOPMENT MECHANISM REGISTRY

I. INTRODUCTION

1. In accordance with decisions 17/CP.7 and 19/CP.9, the Executive Board shall establish and maintain a CDM registry to ensure the accurate accounting of certified emissions reductions (CERs), temporary certified emission reductions (tCERs) and long-term certified emission reductions (lCERs) on the part of non-Annex I Parties.

2. The public call to Parties and organizations for inputs to the development of the CDM registry, issued by the Executive Board at its ninth meeting, resulted in 17 responses, including six responses relating to specifications and software that could be made available as the basis for the development and implementation of the CDM registry.

3. The Board, at its twelfth meeting, considered the results of the public call and issues and options concerning the development of the CDM registry. At that meeting, the Board agreed that the secretariat was to further explore the development of the CDM registry, including the possibility of adapting one of the registry software systems identified through the public call, taking account of the:

(a) Overall costs, including maintenance and licensing costs;

(b) User-friendliness of the CDM registry and its interface with the transaction log, national registries and the UNFCCC CDM web site;

(c) Time of delivery of the CDM registry;

(d) Other software systems identified through the public call for input.

4. Since the twelfth meeting of the Board, the secretariat has conducted a survey of the candidate registry systems identified through the public call in order to gather further information on the extent to which these systems already meet, or could be adapted to meet, the requirements of the CDM registry, as well as on options for the hosting, maintenance and upgrading of the CDM registry. The survey was sent to six organizations which had expressed willingness to provide specifications or software. Five responses to this survey were received as of 10 March 2004 (the sixth organization withdrew its interest in providing software). The evaluation of the survey responses is considered in section III below, based on the detailed assessment of each option in appendices A and B. The survey questions, including detailed questions regarding the technical approach of the systems, are reproduced in appendix C.

5. Section IV of this note contains a proposal for the development and implementation of the CDM registry, based on one of the options considered through the survey, including a proposed work programme and an indication of resource requirements.

6. In accordance with the agreement of the Board at its ninth meeting, the secretariat has developed a complete draft of the functional specifications of the CDM registry. These include requirements specified in decisions 17/CP.7, 19/CP.7 and 19/CP.9 in relation to the CDM registry, as well as requirements specified by the Executive Board at its twelfth meeting and in the latest draft of the data exchange standards, to which the CDM registry must conform. These functional specifications provide the basis for the key technical requirements considered in this annex and require further development as the benchmark against which the development and implementation of the CDM registry is undertaken.

II. REQUIREMENTS OF THE CDM REGISTRY

7. The secretariat has developed two sets of criteria for evaluating the options considered through the survey, namely technical requirements and hosting requirements.

A. Key technical requirements

8. The key technical requirements were derived from the draft functional specifications of the CDM registry and are outlined in table 1 below. These summarize the functions the CDM registry is to perform, including communications with the transaction log as prescribed in the data exchange standards.

Table 1
Key technical requirements

Key requirements	Description
1. Processing of standard transactions	The registry must process the (a) issuance of units, (b) internal transfer (forwarding) of units between accounts within the registry, (c) external transfer (forwarding) of units to national registries and from national registries for cancellation to compensate any excess issuance of units and (d) separation of the quantity of units for the share of proceeds. The registry must provide information at each stage to the transaction log for its checks of the validity of each transaction.
2. Processing of interim transactions	The registry must issue and forward units on an interim basis, before the transaction log is operational, and subsequently interact with the transaction log for the interim processing to be checked.
3. Reconciliation of data with the transaction log	The registry must provide required data to the transaction log, in the relevant format, and make any necessary data adjustments.
4. Secure electronic communication	The registry must communicate electronically with the communication hub integrated with the transaction log, in a secure manner, in accordance with the data exchange standards.
5. Record keeping	The registry must maintain records of account unit holdings, transactions, internal activities and interactions with the transaction log.
6. Report management	The registry must generate and manage reports for use by the registry administrator, account holders and the general public.
7. Internal checks	The registry must conduct internal checks of its transactions, messages and records, to ensure the integrity of its actions and data.
8. User-friendly interfaces	The registry must provide user-friendly interfaces for the operation and customization of the registry by the registry administrator, the viewing of reports and delivery of instructions by account holders and the viewing of reports by the general public.
9. Link to the CDM information system	The registry must exchange data with the CDM information system maintained by the secretariat (including unit issuance information).
10. Customization	The registry must incorporate structures and customization features that allow its simple adaptation.
11. Efficiency	The registry must meet performance targets and must be scalable to accommodate growth in the number of units and transactions.
12. Availability	The registry must be available as close as possible to 24 hours a day.
13. Security	The registry must protect data from security compromises. The registry must control the actions that may be performed by different user types.
14. Testing	The registry must conduct regular tests in a manner that minimizes disruptions and is consistent with the data exchange standards.
15. Recovery systems	Recovery systems and procedures must be in place for safeguarding, backing-up and recovering data and registry service.

9. The CDM registry is to be similar to the national registries to be maintained by Annex I Parties under the Kyoto Protocol, including their submission of data to the transaction log for its checks of the validity of each transaction and their conformity to the data exchange standards. As a result, any national registry that meets the requirements set out in relevant decisions of the COP, including in relation to the data exchange standards, would fulfil the majority of the CDM registry requirements.

10. Several of the key requirements outlined in table 1 relate to functions required only of the CDM registry. These require specific development, in addition to the functions performed by national registries. They include the separation of CERs, tCERs and lCERs constituting the share of proceeds to accounts held on behalf of the Adaptation Fund and the Executive Board, as well as the issuance and forwarding of CERs, tCERs and lCERs on an interim basis prior to the operation of the transaction log.

11. The data exchange standards, currently being developed by the secretariat, contain detailed technical specifications for the structure and functioning of national registries and the CDM registry. These specifications chiefly relate to the manner in which registries communicate with the transaction log, including the secure communication channels, message contents, data formats, identifier formats and response codes. These standards also specify means to ensure the quality of each registry, for example through the setting of test protocols, and to ensure the transparency and accountability of each registry, for example through setting data recording requirements and reconciliation procedures.

B. Key hosting requirements

12. The key hosting requirements for the CDM registry are outlined in table 2 below. These relate to the timeframe in which the CDM registry may begin operation and the level of work and cost involved in its adaptation, implementation and operation.

Table 2
Key hosting requirements

Key requirements	Description
1. Timing of start	The CDM registry should be operational in the second or third quarter of 2004, for the purposes of interim issuance and forwarding of units.
2. System costs	Any licence fee for the basic registry system should be low-cost. The adaptation of the system to the CDM registry requirements should be performed at low-cost, preferably by the system developers.
3. Implementation costs	The implementation of the registry, including installation and hardware and software purchases, should be low-cost.
4. Ongoing costs	The operation and maintenance of the registry should be low-cost. Hardware replacement and registry upgrades should be performed at low-cost, preferably by the system developers.
5. Executive Board authority	The operation of the registry must conform to the instructions of the Executive Board. The registry host should be directly accountable to the Executive Board for its operation of the registry.
6. Consistency with UN rights and privileges	The registry, and data stored in it, must be treated in a manner consistent with UN rights and privileges. Where necessary, hosting contracts or agreements need to be feasible and enforceable.

13. Numbers 1 to 4 of the key hosting requirements may be specifically addressed in relation to specific options for the hosting of the CDM registry. In the absence of specific contracts or agreements having been negotiated with potential registry hosts, numbers 5 and 6 may only be considered in general terms. Such general consideration is discussed in section III in relation to hosting of the registry internally or externally to the secretariat (either by the registry developer or by a third party).

III. EVALUATION OF THE SURVEY RESULTS

14. The evaluation of the candidate systems for the CDM registry proceeds in two steps: a positive assessment of each system against the technical requirements is a prerequisite for further consideration of each system against the hosting requirements. The technical evaluation is considered in section B below. For those systems that meet the technical requirements, and are being developed in a timeframe consistent with requests for issuance of CERs in the second or third quarter of 2004, a number of different hosting options may be considered. These options are considered in sections C and D below.

A. Responses received

15. Five responses to the survey were received as of 10 March 2004. The respondents and their systems are summarized in table 3 below. Four of these systems (CDC, Japan, PQA and UK) are currently under development for application as national registries of Annex I Parties. The fifth system (Veregister) is not currently being developed as a national registry under the Kyoto Protocol. The sixth organization to which the survey was sent withdrew its offer to provide its system.

Table 3
Responses to the survey on the CDM registry

Reference	Organization	Description of system
1. CDC	Caisse de depot et Consignations, France	The Seringas software has been developed by CDC as the registry of France for the purposes of EU emissions trading and the Kyoto Protocol. A limited version is currently operational and is able to perform issuance and internal transfer transactions. It is undergoing further development in 2004 to meet the requirements of EU emissions trading and the Kyoto Protocol.
2. Japan	Ministry of Economy, Trade and Industry (METI) and the Ministry of the Environment, Japan	This registry has been developed by the NTT Data Corporation under contract to the government of Japan. A limited version of the registry is currently operational and is able to perform issuance and internal transfer transactions. It is undergoing further development to meet the requirements of the Kyoto Protocol by the end of 2005.
3. PQA	Perrin Quarles Associates, United States of America	The Emissions Allowance and Tracking System (EATS) is a generic registry developed by PQA to support emissions trading programmes in relation to any pollutant. It is able to perform issuance and internal transfers, is currently in use in state-level NO_x and SO_2 trading programmes in the USA and is undergoing further development in 2004 to meet the requirements of EU emissions trading and the Kyoto Protocol. EATS was initially developed under the sponsorship of the US Environmental Protection Agency and is based on systems that PQA has developed for the US trading programmes under the Clean Air Act.
4. UK	Department for Environment, Food and Rural Affairs (DEFRA), United Kingdom	DEFRA is currently developing a generic registry, on the basis of the registry of the existing UK emissions trading programme, that may be adapted further for a variety of different emissions trading schemes. The generic registry is to be further developed during 2004 to meet the specific needs of the EU emissions trading scheme and the Kyoto Protocol, and is to be the UK registry for both. It is currently the subject of a cooperative exercise, chiefly among EU member States, to manage this development.
5. Veregister	Veregister Corporation, United States of America	Veregister is a web-based system for, inter alia, recording greenhouse gas emissions and account balances.

B. Evaluation of specific options against the technical criteria

16. At present, all the candidate systems fulfil the key technical requirements to some degree. Two issues are examined in this section, on the basis of the assessment contained in appendix A:

(a) How closely, and when, will the candidate systems match the technical requirements;

(b) Has the system developer demonstrated an understanding of the technical requirements that remain to be met in order to fully meet the requirements of the CDM registry.

17. All candidate systems are currently able to process internal transactions, such as issuance and internal transfers, though none has yet been fully modified to use CERs, tCERs or lCERs or to conduct such transactions in the manner required by the data exchange standards. The four systems currently under further development as national registries have in place plans to develop the full requirements for the Kyoto Protocol, including full compatibility with the data exchange standards. These systems can be expected, upon completion, to fulfil all the technical requirements except for those specific to only the CDM registry. These CDM-registry-specific requirements would require additional development plans.

18. Appendix A indicates the extent to which current development plans can be expected to result in the fulfilment of the technical requirements and which requirements would need additional development plans, should the system be selected as the basis for the CDM registry. This assessment indicates that:

(a) The PQA and UK systems are currently the most advanced in meeting the technical requirements and have demonstrated the fullest understanding of the additional requirements that are specific to the CDM registry;

(b) The PQA and UK systems are designed as generic registries and incorporate structures and customization features that allow relatively simple adaptation to the context of the CDM registry;

(c) The CDC system also fulfils most of the technical requirements, but provided less information on how it would fulfil these, particularly in relation to the additional requirements specific only to the CDM registry, and does not offer the same degree of customization features;

(d) The Japanese system can be expected to meet all technical requirements, in time, though the 2005 completion date for this system means that it is not as advanced as the others at this stage;

(e) The Veregister system was considered, on the basis of the response to the survey, to be less suitable as the basis for the development and implementation of the CDM registry.

19. On the basis of this assessment, the PQA and UK systems provide the best technical basis on which to develop and implement the CDM registry. Both systems would require additional development plans in order to provide the functions that are specific to the CDM registry.

C. General comparison of hosting options

20. Several broad options exist for the hosting of the CDM registry. These include:

(a) Internal hosting of the CDM registry by the secretariat;

(b) External hosting of the CDM registry by the system developer;

(c) External hosting of the CDM registry by a commercial third party service provider.

21. There are potential cost advantages to having the registry developer or a third party service provider host the CDM registry. These arise through the possibility of sharing hardware, software and personnel costs with other applications (though measures would be required to keep the CDM registry separate from other registry applications). Hosting the CDM registry internally to the secretariat would

stand to benefit less from such sharing arrangements, though some overlap does exist in relation to such features as security frameworks, backup facilities and load balancing.

22. The hosting of the CDM registry by the system developer would provide for the direct use of expertise gained through the development of the system. This input, including through the training of personnel by the system developer, would need to be additionally arranged in the case of either hosting by the secretariat or by a third party service provider.

23. There may be a greater level of accountability to the Executive Board if the secretariat were to host the CDM registry. Subject to the availability of resources, the secretariat would be in a position to respond to instructions and requests without needing to coordinate these with priorities arising from other applications of the registry software. Such accountability could be arranged with an external host, where they are willing, but this would require negotiation and enforcement through contractual agreements.

24. Hosting the CDM registry internally within the secretariat would simplify the link to the CDM information system, currently held by the secretariat, through avoiding the need to establish additional, secure communications channels. This link is required for exchanging information such as issuance and forwarding instructions and public reports for publication on the CDM module of the UNFCCC website.

25. Any external hosting option would require contractual arrangements with the host covering a wide range of issues. These issues would include obligations and assurances that the registry and its data are treated in a manner consistent with UN rights and privileges under the Convention on the Privileges and Immunities of the United Nations. In particular, all data records are inviolable under the Convention, and are therefore not subject to national law, and the UN may generally not be held liable to third parties for the operation of the CDM registry. Such issues would add to the complexity of negotiating and enforcing contractual agreements. The time required to develop such contractual arrangements may have implications for the possible start date of CDM registry operations.

26. Furthermore, in the case of any payment needing to be made by the secretariat for services, the selection of a registry option needs to take place in a manner consistent with UN procurement policies and practices, which may also have implications for the possible start date of CDM registry operations.

27. On the basis of this comparison of the broad hosting options, the secretariat considers that an internal hosting arrangement would be preferable. However, this general conclusion needs to be viewed in the light of the evaluation of specific hosting options in the next section.

D. Evaluation of specific options against the hosting criteria

28. This section evaluates the specific hosting options for the CDM registry, on the basis of the systems considered to sufficiently meet the technical requirements in the timeframe required by the Board. The Japanese system, while it is expected to meet these requirements in the future, will only reach this stage in the course of 2005. The following specific options are considered:

(a) The CDC system, hosted by the secretariat;

(b) The CDC system, hosted by CDC;

(c) The PQA system, hosted by the secretariat (PQA did not offer to host the CDM registry);

(d) The UK system, hosted by the secretariat;

(e) The UK system, hosted by DEFRA.

29. Appendix B contains an assessment of these options. All five are expected to meet the timing needs of the Executive Board: PQA expects that their system could be adapted to the full CDM registry

requirements by August 2004; CDC and the UK systems could be fully adapted by September 2004. As discussed by the Board at its twelfth meeting, these dates are roughly consistent with the expected receipt of the first requests for issuance in the second or third quarter or 2004. It would not be possible to develop a CDM registry by other means within this timeframe.

30. Appendix B indicates the following resource implications of these hosting options:

(a) Licence fee: CDC and PQA would require a licence fee where a CDM registry, based on their systems, is hosted by the secretariat. This licence fee would be to cover the shared expenses of developing the system up to the level of a national registry (this fee may be lower, depending on the numbers of Parties implementing a national registry based on these systems);

(b) Adaptation costs: For the CDC and PQA systems, the expenses of the CDM-registry-specific development would need to be covered. DEFRA has indicated that it may be in a position to cover the costs of adapting the UK system to the CDM-registry-specific requirements (the secretariat has requested the clarification of this issue prior to the thirteenth meeting of the Board);

(c) Hardware and software costs: All hosting options, with the exception of hosting of the UK system by DEFRA, require the purchase of hardware and software. These costs vary with the recommended specifications of each system and the hosting location.

(d) Installation and training costs: Under the secretariat hosting options, expenses would need to be covered for the installation of the CDC and PQA systems and training of secretariat staff;

(e) Operational costs: These costs are difficult to assess as they depend on the management structures of the hosting organization and the extent to which personnel resources can be shared. While hosting by the system developer or a third party service provider may reduce operational costs, the assessment of the secretariat is that the operational costs for internal hosting options are comparable. In the case of the secretariat hosting options, the developers of all the candidate systems have expressed readiness to train secretariat staff further for the operation of the CDM registry.

(f) Maintenance and system upgrade costs: These costs are also difficult to assess, as they depend on the nature of any bugs found and on any useful improvements that may identified. Furthermore, the candidate systems are being considered by Annex I Parties for application as national registries, such that maintenance and upgrade costs would be shared among all such registry applications. In the case that the secretariat hosts the CDM registry, the developers of all the candidate systems have expressed readiness to assist in the maintenance and upgrading of the CDM registry.

IV. PROPOSAL ON THE DEVLEOPMENT OF THE CDM REGISTRY

A. Proposed CDM registry option

31. The secretariat proposes that the UK system be selected as the basis for the CDM registry. This proposal is made for the following reasons:

(a) The current development plan for the UK system can be expected to deliver all the necessary technical requirements of the CDM registry, except for the additional elements that are specific only to the CDM registry. This development plan is concrete and already underway. It would be possible for the secretariat to become involved in the current cooperative exercise with other Parties, as facilitated by DEFRA, in order to provide inputs to the development of the UK system.

(b) DEFRA has demonstrated a clear understanding of the additional functions required by the CDM registry (over and above a national registry) and is able to undertake their development;

(c) The UK system is specifically designed as a generic registry and incorporates structures and features that would facilitate the initial and any subsequent customization of the CDM registry;

(d) The recommended hardware architecture and software is considered to be reasonable and robust, such that it could fulfil the performance and quality requirements;

(e) The cost of implementing the UK system is the lowest of the candidate systems that meet the technical requirements of the CDM registry. The hardware and software costs lie between those of the CDC and PQA systems. There is no licence fee for the UK system and DEFRA has indicated that it may cover the costs of adapting the system to the CDM registry requirements;

(f) DEFRA is able to provide ongoing support in the form of training secretariat staff to operate the CDM registry and providing expert assistance with the maintenance and future upgrades of the CDM registry. In particular, it would be possible for the secretariat to remain involved in the cooperative exercise with DEFRA to define how maintenance and future upgrades would be undertaken.

32. Most of the reasons underlying the proposal of the UK system also apply to the PQA system. The decisive factor in favour of the UK system is the readiness of DEFRA to absorb such a high degree of costs. The assessment of the secretariat is that the UK and PQA systems would both fully meet the technical requirements of the CDM registry and allow for hosting options that are fully satisfactory.

33. The secretariat also proposes that the UK system be hosted internally by the secretariat rather than externally by DEFRA. This has advantages in terms of a greater level of accountability of the host to the Executive Board, without needing to coordinate activities with the priorities of national registries, the direct link to the CDM information system and the avoidance of the need to develop contractual hosting agreements (thus avoiding potential delays in the start of operations).

34. Such internal hosting by the secretariat would require hardware and software purchases by the secretariat (approximately US $52,000 in total), over and above those required for a system hosted by DEFRA. However, these are one-off costs relevant only to the implementation of a registry which will continue to perform over many years. Incurring these up-front costs would also reduce other costs, such as those associated with coordination with an external host and those relating to contractual agreements.

35. It would be necessary for the secretariat to explore means of sharing operating resources with other secretariat systems. It would be possible to draw on the expertise of the system developer through the training of secretariat staff and assistance with maintenance and future upgrades.

B. Proposed elements of the work programme

36. The elements of the work programme outlined in this section relate to a broad overview of the work that would be required to develop and implement the CDM registry on the basis of the UK system. A detailed work programme could be reported to the Board at its fourteenth meeting.

37. The Executive Board may wish to request the secretariat to undertake the following activities:

(a) Begin concrete discussions with DEFRA on the development and implementation of the CDM registry in order to develop specific activities and detailed timelines, including through participating in the cooperative exercise with other Parties being facilitated by DEFRA;

(b) Identify detailed resource requirements for specific hardware specifications and for the operation, maintenance and upgrade of the CDM registry;

(c) Continue the development of the functional specifications of the CDM registry.

(d) Report to the Board, at its fourteenth meeting, on the results of discussions with DEFRA, including a final work programme and the detailed resource requirements;

(e) Forward to the Board, at its fourteenth meeting, final functional specifications of the CDM registry, including any operational rules required for the registry.

Appendix A

Assessment of the key technical requirements

The table below indicates the extent to which the respondents to the survey have demonstrated to the secretariat the ability of their systems to fulfil the technical requirements of the CDM registry.

The following notation has been used:

Yes The response to the survey demonstrated an understanding of the requirement and the manner in which candidate system meets it, or will meet it under current development plans.

Add The response to the survey demonstrated an understanding of the requirement and the manner in which candidate system could meet it as an additional function to be developed.

No The response to the survey did not address the requirement or did not demonstrate a full understanding of the requirement.

Assessment of the key technical requirements					
Key requirements	**CDC**	**Japan**	**PQA**	**UK**	**Veregister**
Processing of standard transactions					
Issuance	yes	yes	yes	yes	yes
Internal transfer	yes	yes	yes	yes	yes
External transfer	yes	yes	yes	yes	no
Prevention of transactions	yes	no	yes	yes	no
Separation of the share of proceeds	add	add	add	add	no
Processing of interim transactions					
Interim issuance	add	no	add	add	add
Interim internal transfer	add	no	add	add	add
Subsequent transaction log validation	no	no	add	add	no
Reconciliation of data					
Sending reconciliation data	yes	no	yes	yes	no
Controlled manual adjustments	no	no	no	no	no
Secure electronic communications					
Virtual private network (VPN)	yes	no	yes	yes	no
Web services	yes	no	yes	yes	no
XML formats	yes	no	yes	yes	yes
Record keeping					
Account-based unit holdings	yes	yes	yes	yes	yes
Logging of transaction history	yes	yes	yes	yes	yes
Logging of reconciliation history	no	no	yes	yes	no
Logging of changes to data	yes	no	yes	yes	no

Assessment of the key technical requirements (continued)					
Key requirements	**CDC**	**Japan**	**PQA**	**UK**	**Veregister**
Report management					
Flexible report definition	yes	no	yes	yes	no
Administrator reports	no	no	yes	yes	no
Account holder reports	yes	no	yes	yes	yes
Public reports	yes	yes	yes	yes	yes
Internal checks					
Process checks	yes	no	yes	yes	no
Health checks	yes	no	yes	add	no
Interfaces					
Administrative user interfaces	yes	yes	yes	yes	no
Account holder user interfaces	yes	yes	yes	yes	no
Link to the CDM information system	add	no	add	add	no
Non-functional requirements					
Customization	no	no	yes	yes	no
Efficiency	yes	yes	yes	yes	no
Availability	yes	no	yes	yes	yes
Security	yes	yes	yes	yes	no
Testing	yes	no	yes	yes	no
Recovery systems	yes	yes	yes	yes	yes

Appendix B

Assessment of the key hosting requirements

Assessment of the key hosting requirements (all costs in US dollars)					
Key requirements	**CDC hosted by secretariat**	**CDC hosted by CDC**	**PQA hosted by secretariat**	**UK hosted by secretariat**	**UK hosted by DEFRA**
Timing of start					
Basic registry functionality	immediate	immediate	immediate	Mar 2004	Mar 2004
National registry functionality	Jul 2004	Jul 2004	Aug 2004	Jul 2004	Jul 2004
Full CDM registry functionality	Sep 2004	Sep 2004	Aug 2004	Sep 2004	Sep 2004
Implementation costs					
System licence	$31,000	0	$36,000[1]	0	0
Adaptation to CDM registry	$148,000	$156,000	$60,000	0[2]	0[2]
Hardware	$62,000	$37,000[1]	$20,000	$32,000	0
Software	$10,000	0	$16,000	$10,000	0
Installation and initial training	$5,000	0	$5,000[1]	0[2]	0
Secure network	$10,000	0	$10,000	$10,000	0
Ongoing costs					
Operation	na	na	na	na	na
Maintenance and upgrades	na	na	na	na	na
Assistance by the developer					
Operation	yes	yes	yes	yes	yes
Maintenance and upgrades	yes	yes	yes	yes	yes

Notes

1. Costs are provided as estimated levels and would depend on the numbers of Parties implementing a national registry based on this developer's system.
2. To be confirmed prior to the thirteenth meeting of the Executive Board.

Appendix C

Survey of options for the development and operation of the CDM registry

Table 1
Questions contained in the survey

Section A: Contact details

1. Please provide contact information of your organization.

Section B: System description

2. Please describe the current purpose and key functions of your system.
3. Please provide a summary of how your system currently meets the requirements set out in the draft functional specifications for the CDM registry, as attached to this survey. Please provide more detailed explanation of individual aspects of your system using the attached list of detailed questions on technical approach.
4. Where further development of the system is being undertaken under a current development plan, when would the following functionality of the system be completed and available to the UNFCCC secretariat?

Section C: Adaptation to the CDM registry requirements

5. What would need to be done, beyond the current development plan, to adapt the system to the CDM registry requirements? Please provide information on functions which would need to be added to, or subtracted from, your system.
6. Would such adaptation require detailed re-programming? Please describe any interface in place to enable the CDM registry administrator to adapt the functionality without detailed re-programming?
7. Would your organization be prepared to undertake the adaptation work in order for the system to fulfil the CDM registry requirements? If yes, please specify possible timeframes for the adaptation work and an estimate of any cost implications to the UNFCCC secretariat.

Section D: Hosting and maintenance/update

8. Please provide information on minimum hardware and software requirements for hosting a CDM registry based on your system. Please indicate whether, and for what purposes, any specific proprietary software would be necessary.
9. Please indicate whether, and on what basis, the following hosting arrangements would be possible. Please include an estimate of any cost implications to the UNFCCC secretariat, over the short and long term (please specify timeframes), of these hosting arrangements.
10. Please indicate whether, and on what basis, your organization could provide maintenance and upgrade services, under the following options. Please include an estimate of any cost implications to the UNFCCC secretariat, over the short and long term (please specify timeframes), of these services.
11. If applicable, please indicate what licensing conditions would be necessary in the event of a CDM registry based on your system being hosted by the UNFCCC secretariat, under the following options. Please include an estimate of any cost implications to the secretariat, over the short and long term (please specify timeframes), of these services.
12. In the event of a CDM registry based on your system being hosted by the UNFCCC secretariat, would your organization be able to provide training to secretariat staff in the operation/maintenance and/or upgrade of the CDM registry? Please include an estimate of any cost implications to the secretariat of such training services.

Table 2
Questions attached to the survey regarding technical approach

Section I: Hardware and database structure

1. Please specify options (low, medium and high cost) for the hardware architecture of your system. In answering, please attach a diagram for each option and include explanatory text
2. Please describe the manner in which your system provides for connectivity and authentication over a hardware-based VPN.
3. Please briefly describe the type and structure of the database that allows your system to track holdings and transactions of individual units and to generate data in the appropriate formats for reconciliation purposes

Section II: Functional requirements

4. Please describe how your system components create and transmit the appropriate messages at the appropriate transaction or reconciliation stages.
5. Please describe how your system manages changes in unit transfer status and prioritizes transactions.
6. Please describe how your system would carry out interim issuance and interim internal transfer. Please describe how your system would ensure the accuracy of data to be transmitted to the transaction log for its subsequent check in relation to the interim issuance and internal transfer.
7. Please describe the audit functions your system deploys.
8. Please describe how reports are defined and generated by your system. Please also describe how some reports would be made publicly available or accessible to account holders.
9. Please describe how interfaces facilitate the operation of your system. Please describe any limitations in these interfaces.
10. Please describe how your system would interact with the CDM information system.

Section III: Non-functional requirements

11. Please describe how your system ensures fast and efficient processing, including how it would meet the 60 seconds 'time to live' limit and the sending of transaction confirmation messages within 24 hours.
12. Please describe the measures in place to ensure availability of the system as close as possible to a 24hours/7days a week basis, while remaining cost effective. Please indicate what level of scheduled availability is possible with your system on this basis.
13. Please describe your recovery systems and procedures. Please also describe how the recovery of system operation within 24 hours is ensured.
14. Please describe the measures taken by your system to protect data against exposure to the security compromises.
15. Please describe what functionality can be customized within your system and how such customization would be carried out.
16. Please describe your test environment, and how it is separated from the operational environment.
17. Please describe how your system manages the transition to new versions of the data exchange standards.

Section IV: Internal checks

18. Please describe what key internal process checks you believe to be necessary and how they would be implemented in your system.
19. Please describe what key internal health checks you believe to be necessary and how they would be implemented in your system.