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Support for the implementation of the Kyoto Protocol – National Registries

Final Report

April 2003

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1 INTRODUCTION

Emissions trade is an economically efficient way of achieving emissions reductions. The purpose of trade in allowances is to make the cheapest emissions reductions possibilities available to all via the market. The pivotal point in the trade in allowances is the end of the compliance period, when time comes for demonstrating compliance by presenting allowances to the supervising authority equal to the amount of emissions for that period. This means that information at the end of a compliance period has to be available on the number of allowances held by each participant. Under Kyoto the authority is the UNFCCC Secretariat, under national ET schemes this is the authority designated by the government. The obligated parties under Kyoto are the Parties to the Protocol, under national ET schemes it is the entities producing emissions. Information on the number of allowances held by the participants during the compliance period may also be important, e.g. authorities may want to supervise trade so that obligated participants do not sell too many of their allowances needed for meeting their obligation. The information on participant holdings during the compliance period can also be useful to e.g. assess the effectiveness of the policy, e.g. to determine whether goals are being met and whether the incentives for investing in projects to decrease emissions have been set at the right level.

For the purpose of continuously keeping track of the allowances or credits under an emissions trade scheme a registry is needed, a an accounting system which keeps track of the ownership of allowances, as well as cancellations and retirement.

Article 7, Paragraph 4 of the Kyoto Protocol states that “the Conference of the Parties serving as the meeting of the Parties to this Protocol shall also, prior to the first commitment period, decide upon modalities for the accounting of assigned amounts.” *Decision 19/CP.7 - Modalities for accounting of assigned amounts under Article 7, paragraph 4, of the Kyoto Protocol*, and the decision taken at COP8 in Delhi on the *Technical standards for data exchange between registry systems under the Kyoto Protocol* are the UNFCCC decisions made so far on National Registries. The amended proposal for a *Directive of the European Parliament and Council establishing a scheme for greenhouse gas emission allowance trading within the Community* also states that a registry is needed. Article 19 of the amended proposal states that “Member States shall establish and maintain a national registry in order to ensure the accurate accounting of the issue, holding, transfer and cancellation of allowances.” The amended proposal for a directive also states that the “Commission shall adopt a regulation (...) for a standardised and secured system of national registries in the form of standardised electronic databases,” this regulation is expected to be worked out by the end of this year.

Under UNFCCC rules the systems for keeping track of transfers of allowances are referred to as National Registries. The amended EU ETS Directive refers to these allowance tracking systems as registries. Both schemes require electronic registries for tracking allowances. The setting up and maintenance of these electronic account systems is a new type of task for most public administrations, despite the existence of large environmental databases, for several reasons. First, the registry is not just an information system, but the allowances represent a financial asset as well. The registry differs from databases in that it also has to have links to a central transaction log both under EU ETS and UNFCCC, and account holders have to be able to access their accounts and perform transfers and other transactions. There is also a need for additional functions, such as auditability, since several users have access to the system and it is necessary to be able to trace who performed which transaction.

The aim of this paper is to provide decisionmakers with some insight into the steps that have to be taken to acquire a registry, and to take a look at the functions that these registries perform by looking at already existing registry systems. We will also be looking at some costs associated with acquiring and maintaining a registry, as well as capacity needs associated with the maintenance of a registry. The section on the Hungarian background, however, will be of more interest to those not familiar with the current situation in Hungary regarding the implementation of the Kyoto Protocol and EU ETS in general, and registries in particular.

2 REGISTRY DESIGN

The first stage in the development of the electronic registry is designing a written version of the registry. When designing a model for a registry, the following factors have to be taken into consideration:

- Registry functionality, which is a factor of what the registry is to be used for, what the nature of the scheme is, as well as what general functions the system should perform (allowance tracking, trading platform, emissions tracking)
- UNFCCC and EU standardized requirements: the UNFCCC requirements are more elaborated than the EU requirements, but further work is still required. The requirements relate to some basic rules regarding functionality, and requirements for the standardization of registry interfaces, as well as principles regarding technical requirements concerning e.g. security, reliability, and availability.
- National information needs: these can be specific to the nature of the national scheme.

The choice between various technical solutions will depend on factors such as

- System needs: these relate to tracking needs which influence the size of the system, such as number of participants in the scheme, the number of transactions, and the amount of information involved in the transfers.
- Technical possibilities: Compared to electronic databases, with which public administration already has ample experience, some novel technical solutions have to be implemented in order to enable linkages and remote access, as well as security.
- Cost considerations: the different technical solutions have very differing costs. Trade-offs have to be made. An especially important trade-off is between costs and security.
- Institutional environment: an emissions allowance market is an artificial market created by regulation. This means authorities have a large part to play in setting up the market, supervising and controlling it so that it can fulfil its role. The authorities with a role in the creation and regulation of the emissions trade market have access to information regarding trade as well as control over some of the processes.

2.1 Registry Functionality

A registry, allowance tracking or allowance transfer system can have several functions:

- Registry function: tracking transfers of allowances between accounts. This is the narrowly defined registry function.
- Inventory function: tracking verified emissions both at an installation level and at a national level
- Trading platform: the tracking system can at the same time serve as a trading platform where individual information regarding bids and offers can be posted. Alternatively, the registry can be linked with already existing trading platforms.

Of these functions the National Registry under UNFCCC rules only has to perform the first function, however, if the countries that have ratified Kyoto are going to allocate units to entities and obligate them to reduce their emissions thus creating an internal emissions allowance market, as under EU ETS, then it seems sensible for a registry system to perform both of the first two functions. This way the entities can easily keep track of the discrepancy between the number of allowances they hold and their emissions.

Users can generally be divided into three large groups, with different authorizations for the three groups.

- Entities, which have authorization to perform the following functions:
 - Acquiring and posting information: checking status and reports of entire system and of own account, as well as information regarding other users, and trade information
 - Edit capabilities involve changing data or entering new data: e.g. changing company and installation information, entering emissions data
 - Transactions which involve a movement of allowances from one account to the other: transferring, acquiring, cancelling and retiring allowances
- Authorities have authorization to perform:
 - All functions account holders are able to perform concerning acquiring information, edit capabilities and transactions
 - Placing restrictions on transactions in general, especially transfers outside the registry
 - Authorizing entities to trade, placing restrictions on transactions by certain entities
 - Issuing and allocating units
 - Authorizing cancellations and retirement
 - Verifying project-based units
- Public
 - they are not necessarily account holders, but can query some of the information contained in the registry on holdings, cancellation and retirement.

Of course in reality the picture is more complex, because there can be different types of entities participating in trade with different purposes (obligated entities with compliance-driven trade, trade participants such as brokers, and NGOs and private persons with the aim of buying allowances to cancel them), there can be different levels of user authorizations within one organization (principal and secondary users) and the different functions performed by the authorities can be allocated at several different institutions.

The functions performed by two online registries, the UK ETR registry and the Environmental Resources Trust demo registry are presented in the Appendix III.

2.2 UNFCCC requirements for registries

The UNFCCC requirements concerning registries are limited to the function of tracking transfers of allowances. The requirements do not mention the trading platform or inventory function that the electronic system for tracking allowances may also perform.

The standardization of requirements relate to:

- the standardization of elements that are important for the purpose of linking registries with other registries and the transaction log, which relate to
 - Message sequences and transaction rules
 - Data formats
- minimally necessary information for determining compliance:
 - types of units
 - types of accounts
 - procedures for issuance, transfer, cancellation, retirement and carry-over, as well as restrictions on these transactions in terms of which account holders can perform them as well as quantitative restrictions.
- publicly available information
- system security requirements
- reliability and availability
- data accuracy

For many of these requirements, such as security and availability of the registry system only the general principles have been stated, and have not been specified at an operational level.

2.2.1 Structure of National Registries

The registry contains accounts for the Party, for legal entities authorized to trade, as well as 3 cancellation accounts for each commitment period, and a retirement account for each commitment period. The accounts of legal entities track how many units the entities are holding at any given time. The three cancellation accounts track different types of cancellation. The retirement account keeps track of units used for compliance.

Elements of account numbers

Element	Party and legal entities authorized to	Cancellation accounts	Retirement accounts
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	trade		
Party identifier (ISO 3166-1 country code)	✓	✓	✓
Commitment period (2n, for the 2008-12 compliance period = 01)	x	✓	✓
Account type (2n)	✓	✓	✓
Unique number (12 n)	✓	✓	✓

2.2.2 Types of units

There are 4 types of unit. Each of these units represent emissions of 1 tonne of carbon dioxide equivalent, but they differ in several respects, since some of them are allowances, others are credits for project-based mechanisms, some are for sequestration activities, while others are for reduction of emissions. Accordingly, these units differ in

- Who issues them
- To what extent they can be used for compliance
- To what extent they can be carried over

Elements of serial numbers of units

Element	AAU	RMU	CER	ERU
Originating Party identifier (ISO 3166-1 country code)	✓	✓	✓	✓
Issuance Commitment period	✓	✓	✓	✓
Unit type	✓	✓	✓	✓
LULUCF activity	x	✓	✓	✓
Project identifier	x	x	✓	✓
Unique number	✓	✓	✓	✓

2.2.3 Types of transactions

Transaction types were categorized at COP8 according to the following:

1. Issuance of units in a national registry or the CDM registry
2. Internal transfer of units
 - a) from the CDM registry pending account to another account or
 - b) from an account to a cancellation or retirement account
3. External transfer of units to a national registry
4. Carry-over of units, as appropriate, to the subsequent commitment period

The authorities of the Parties to the Kyoto Protocol and the legal entities participating in trade have different authorizations to carry out transactions. These are presented in the table below.

Authorizations for the different transaction types

Transaction type	Party authority	Legal entity
Issuance	✓	x
Holding	✓	✓
Cancellation under 12 (d) of decision 19/CP.7	✓	✓
Cancellation under 12 (e) of decision 19/CP.7	✓	x
Cancellation under 12 (f) of decision 19/CP.7	✓	x
Retirement	✓	✓
Carry-over	✓	✓

Restrictions on transactions are important for registry design, because these have to be built into the programme's automatic checks. There are different types of restrictions, first on who may perform a given transaction type, and second, there can be quantitative restrictions on certain types of transactions. These are presented in the table below.

Restrictions on transaction types

Transaction type	Unit type	Restriction in authorization	Quantitative restriction
Issuance	AAU	Only authority of party	Equivalent to its assigned amount pursuant to Article 3, paragraphs 7 and 8, calculated and recorded in accordance with paragraphs 5 to 10 of Decision 19/CP.7
	ERU	Authority of party	No restrictions
	CER	CDM executive board	
	RMU	Authority of party	Equivalent to the net removals of anthropogenic greenhouse gases resulting from its activities under Article 3, paragraph 3, and its elected activities under Article 3, paragraph 4, accounted in accordance with decision -/CP.7 (LULUCF) taking into account any adjustments applied in accordance with Article 5, paragraph 2. Issued annually or for entire commitment period. The total quantity of RMUs issued into its registry pursuant to Article 3, paragraph 4, for the commitment period cannot exceed the limits established for that Party as set out in decision -/CP.7 (LULUCF).

Transfer and acquisition	<p>No restrictions for any units, given that the entities taking part in the transfer are authorized entities, and for a transfer of units outside the registry does not infringe on the commitment period reserve, and that no more than 49% of all emission reductions are acquired through the flexibility mechanisms.</p> <p>Each Party included in Annex I shall ensure that its net acquisitions of CERs from afforestation and reforestation activities under Article 12 for the first commitment period do not exceed the limits established for that Party as set out in decision -/CP.7 (LULUCF).</p>		
Cancellation	All units	<p>Legal entities are only allowed to cancel units into the third cancellation account (other cancellations), the first two types of cancellation are performed by the Parties only (cancellation on the basis of its activities under Article 3, paragraph 3, and its elected activities under Article 3, paragraph 4,</p> <p>where such activities result in a net source of greenhouse gas emissions, and cancellation following determination by the compliance committee that the Party was not in compliance with its commitment under Article 3, paragraph 1, for the previous commitment period). Authorization for third type of cancellation left up to the discretion of the Parties.</p>	No quantitative restrictions
Retirement	No restrictions		
Carry-over	AAU	No restrictions	No restrictions
	ERU	No restrictions	No ERUs converted from RMUs can be carried over, and ERUs converted from AAUs can only be carried over to a maximum of 2.5 per cent of the assigned amount pursuant to Article 3, paragraphs 7 and 8, of that Party;
	CER	No restrictions	to a maximum of 2.5 per cent of the assigned amount pursuant to Article 3, paragraphs 7 and 8, of that Party;
	RMU	No restrictions	No RMUs can be carried over

2.2.4 Standardized communication: message sequences and transaction numbers

For registries to be able to communicate with each other and the ITL, message sequences and the format of information transmitted has been standardised by the UNFCCC.

Elements of transaction numbers:

- Originating Party identifier
- Commitment period
- Date
- Transaction type
- Unique number

The message sequences and content shall incorporate, as appropriate:

- (a) Time certification, using a common format;
- (b) Message identification, uniquely identifying the relevant message sequence, stage of the message sequence and message;
- (c) The transaction number assigned by the registry system initiating the message sequence;
- (d) The transaction record associated with the transaction number, as generated by the registry system initiating the message sequence, containing information, as appropriate, on:
 - (i) The total quantity of units involved;
 - (ii) The serial numbers of units involved, in blocks of consecutive numbers;
 - (iii) The account number of the transferring account;
 - (iv) The account number of the acquiring account;
- (e) The status of the transaction;
- (f) An indication of units for which a discrepancy has been notified by the transaction log, until it has been resolved;
- (g) Provision for the termination, by the acquiring registry, of a transaction for which a discrepancy has been notified by the transaction log that has not been terminated by the transferring registry;
- (h) Confirmation responses to notify that a message has been received;
- (i) Error messages, as necessary, identifying the point of failure.

2.2.5 Information available to the public

Account information

- (a) Account name: the holder of the account;
- (b) Account type: the type of account (holding, cancellation or retirement);
- (c) Commitment period: the commitment period with which a cancellation or retirement account is associated;
- (d) Representative identifier: the representative of the account holder, using the Party identifier (the two-letter country code defined by ISO 3166) and a number unique to that representative within the Party's registry;

(e) Representative name and contact information: the full name, mailing address, telephone number, facsimile number and email address of the representative of the account holder.

Article 6 project information:

- (a) Project name: a unique name for the project;
- (b) Project location: the Party and town or region in which the project is located;
- (c) Years of ERU issuance: the years in which ERUs have been issued as a result of the Article 6 project;
- (d) Reports: downloadable electronic versions of all publicly available documentation relating to the project, including proposals, monitoring, verification and issuance of ERUs, where relevant, subject to confidentiality provisions in decision -/CP.7 (Article 6).

Holding and transaction information for each calendar year:

- (a) The total quantity of ERUs, CERs, AAUs and RMUs in each account at the beginning of the year;
- (b) The total quantity of AAUs issued on the basis of the assigned amount pursuant to Article 3, paragraphs 7 and 8;
- (c) The total quantity of ERUs, CERs, AAUs and RMUs acquired from other registries and the identity of the transferring accounts and registries;
- (d) The total quantity of RMUs issued on the basis of each activity under Article 3, paragraphs 3 and 4;
- (e) The total quantity of ERUs, CERs, AAUs and RMUs transferred to other registries and the identity of the acquiring accounts and registries;
- (f) The total quantity of ERUs, CERs, AAUs and RMUs cancelled on the basis of activities under Article 3, paragraphs 3 and 4;
- (g) The total quantity of ERUs, CERs, AAUs and RMUs cancelled following determination by the Compliance Committee that the Party is not in compliance with its commitment under Article 3, paragraph 1;
- (h) The total quantity of other ERUs, CERs, AAUs and RMUs cancelled;
- (i) The total quantity of ERUs, CERs, AAUs and RMUs retired;
- (j) The total quantity of ERUs, CERs, AAUs carried over from the previous commitment period;
- (k) Current holdings of ERUs, CERs, AAUs and RMUs in each account.

A list of legal entities authorized by the Party to hold ERUs, CERs, AAUs and/or RMUs under its responsibility.

Upon expiration of the additional period for fulfilling commitments:

- (a) The total quantities of the categories of ERUs, CERs, AAUs and RMUs listed in paragraph 47 (a) to (j), for the current calendar year until the end of the additional period for fulfilling commitments (defined according to Greenwich Mean Time);
- (b) The total quantity and serial numbers of ERUs, CERs, AAUs and RMUs in its retirement account;

(c) The total quantity and serial numbers of ERUs, CERs and AAUs which the Party requests to be carried over to the subsequent commitment period.

2.2.5.1 Schedule of events in the National Registry

1. Beginning of a commitment period
 - Issuance of AAUs and RMUs
2. Commitment period
 - transfer and cancellation of ERUs, AAUs, RMUs and CERs, issuance of ERUs
3. End of commitment period
4. Beginning of next commitment period
5. Additional period for fulfilling commitments
 - Continuing transfer and cancellation of units
 - Retirement and carry-over
 - cancellation

2.2.6 Infrastructure requirements

Infrastructure requirements were first dealt with at COP8, and in most respect, only principles and general requirements have been stated. The topics of security, reliability, automated checks have been only briefly addressed. These are summarized below.

- 1) *Interface between registries*: through a central communications hub integrated with the transaction log.
- 2) *Security measures* have to ensure:
 - a) Confidentiality
 - b) Authentication
 - c) Non-repudiation
 - d) Integrity
 - e) Auditability.
- 3) *Reliability*: The scheduled downtime of registry systems shall be kept to a minimum.
- 4) *Internal checks*:
 - a) Ensure that its data records and transactions are accurate;
 - b) Ensure that data are protected against unauthorized manipulation and any change in data is automatically and securely recorded using journaling and auditing functionality;
 - c) Ensure that it is protected against exposure to security compromises, such as through viruses, hackers and denial of service attacks;

- d) Ensure that it has robust systems and procedures for safeguarding data and recovering data and registry service in the event of a disaster;
- e) Prevent inconsistencies and, where they are found, halt transactions until the inconsistencies have been resolved;
- f) Prevent discrepancies from occurring.

3 TASKS AND COSTS ASSOCIATED WITH SETTING UP A REGISTRY

There are several tasks associated with setting up and maintaining a registry system.

The setting up of a system requires

- Determining system requirements: an operative description of the functions a registry should be able to perform based on the UNFCCC decisions regarding registries, as well as national or regional (e.g. EU) requirements
- System development
 - Functional decisions, a task for experts on the KP and other UNFCCC requirements that affect registry development
 - technical decisions on e.g. hardware capabilities, database software, physical communications protocol necessary for the functioning of the system. This is an IT task.

Software development and decisions related to communications protocols have to be taken based on ensuring the functionality of the system, cost considerations, as well as security considerations.

The cost of setting up the system is made up of the following components:

- Software costs:
 - Registry software
 - System software
- Hardware costs
- Cost of establishing a secure environment for locating system
- Cost of setting up a physical communications protocol
- Personnel costs

3.1 Software

There are several options for obtaining a registry system. A new registry software can be developed which is tailored to the needs of the purchaser. Another option is buying a licence or obtaining a registry through some other model, e.g. joint venture. There are several registry softwares which have been developed already, which can be used as models for independently developing a registry software, or provide options if it is decided that a registry software

licence should be bought. The main attributes of these registry softwares are briefly described below.

One of these systems is EATS (Emissions and Allowance Tracking System), being developed for the US EPA by Perrin Quarles Associates (PQA), based on OATS, the On-line Allowance Transfer System which was available at <http://www.epa.gov/airmarkets/transfer/index.html> until 6th March, and was used in the US to track trade in the SO₂ and NO_x allowances. OATS has been replaced as of March 11 by the Clean Air Markets Division Business System (CBS), available at <https://cfint.rtpnc.epa.gov/camd/cbs/index.cfm>, which supports all the emissions trading inventory and registry functions for SO₂ and NO_x. There is USD 20 billion worth of allowances being tracked by this system, so the necessary security measures are in place. The information provided below on the three US allowance tracking systems is based on personal communication with Peggy Quarles of PQA.

The attributes of the CBS software are:

- Web-based, real time
- Operates on a Windows NT extranet server web server,
- Written in ColdFusion 5.0
- Application security: user IDs and passwords and encryption
- Transmission security. Secure Sockets Layer (SSL) technology
- Web server and application connected to Unix Oracle server containing the data
- Supports emission trading, inventory and registration processes

The EATS software will be offered by EPA at no cost to other governments needing allowance tracking, but will have to be adapted at the cost of the governments for tracking trade in CO₂. The first version of EATS will be in place in mid May this year, and a demonstration site will be available by the end of May. The attributes of the software being developed are:

- Web-based, real-time
- Run on Windows NT, Windows 2000, or Unix
- Written in ColdFusion
- Oracle or SQL server database
- Designed to run either as a single internal PC desktop application or as an extranet web application running on several clustered servers
- Flexible business rules
- Unicode compliant, include features supporting multiple languages
- Flexible data-driven business rules, which allow customization of the application to meet program requirements which are specific to the program (expected to be done by PQA)
- Application security: user IDs and passwords and encryption
- Roles and limited access to data
- Audit capability

- Other security features

Each agency that the EATS software is distributed to will have to bear costs other than the cost of the software, including:¹

- Customizing the software to track trade in CO2
- any other customization or modification of the software
- training of personnel to use software
- installation, including providing the necessary hardware and secure environment
- language translation
- ongoing technical support
- appropriate hardware
- software licences (the EATS system will be distributed with an SQL server database which does not require a licence, but later versions will support Oracle database which will need to be purchased)

The Environmental Resources Trust is developing a registry, which will also be an on-line and real-time accounting system, in association with ForumOne Communications. They are interested in sharing their registry approach with governments in order to build the necessary infrastructure for emerging emissions trade markets. A demo version of the software can be viewed at www.ecoregistry.org. Their registry supports most of the key elements required by Marrakesh,² but further development is required. The functions performed by the demo registry are contained in Appendix III.

The UK Emissions Trading Registry is an operating registry, available at http://etr.defra.gov.uk/Web_TsAndCs.asp, with the following features:³

- on-line, real time, available 24 hours a day, all year round
- account user access through the internet with username and password
- 128 bit SSL encryption
- criteria such as security, access and auditability built in
- has been built on a Microsoft platform using Windows 2000, SQL Server 2000, and COM+
- resilient (will still function if one component fails)

Further details are available on the UK ETS registry in Appendix I and III.

All of these systems are joint inventory and registry systems, internet-based, real-time, with user access through a username and password.

¹ Peggy Quarles, PQA

² Wiley Barbour, Environmental Resources Trust, Inc.

³ Martin Devine, UK Emissions Trading Scheme, Global Atmosphere Division, DEFRA

In order to get some idea of the costs of developing a registry, we used two methods: asking Hungarian experts to give an estimate for costs of development, and asking the developers of already existing registries about the costs they incurred. In the absence of a precise description of the functions the registry has to perform, the connections to other systems, etc., it was not possible to get a price offer from a software developer. We asked some banking IT experts for an expert estimate, but after some consideration the expert price estimate was not included in this report because it was not considered reliable enough. The actual cost of developing a registry, if it were to be developed locally, would be expected to be lower than the costs in other countries that have already developed various allowance tracking systems, due to the difference in labour costs. The cost of development in other countries can be used as a higher bound on expected costs.

The development cost of the UK ETS system was GBP 800 000 over 18 months,⁴ the development cost for EATS is expected to be between USD 750 000 and 1 m⁵, but this figure is still very uncertain.

The cost of obtaining a software licence is also uncertain. The EU is considering developing a software which may be distributed to countries participating in EU ETS, but at this point in time this is still very uncertain.⁶ In any case, this will be decided on before the implementation of the EU ETS. The decision should be made soon, so the countries participating in the schenóme will have enough time left to consider their options for acquiring a registry.

The cost of customization is very dependent on the requirements of the specific needs of the customer, and the developers of EATS were unable to give an estimate of these costs. Another option is obtaining a licence for a software, in which case the costs of customization and translation would be added to the cost of the licence. The cost of obtaining an already existing software are also very uncertain, Martin Devine from DEFRA indicated that the costs of obtaining the UK registry software would be very dependent on the form of cooperation, i.e. if this were a joint venture, individual licensing, etc. However, these costs will be expected to be significantly lower than the cost of development.

In addition to the cost of the registry software, the cost of the software licences that the system is built on also have to be considered. This is not an issue with potential maintainers of the registry, both the Ministry of Environment and Water Management, and Keler Rt, as well as any other non-governmental entity who could be considered as a potential candidate for maintaining the registry would already have the necessary software.

3.2 Hardware

Precise hardware requirements are dependent on the scale of operations planned for the emissions trade system (i.e. the number of participants, number of transactions) as well as data requirements per transaction. This means that precise hardware requirements cannot be determined at this stage. The elements of the required hardware, generally speaking, for an emissions trade system are:

⁴ *Martin Devine*

⁵ *Peggy Quarles*

⁶ *Olivia Hartridge, EU Commission, DG Environment, at the workshop on the Support of the Implementation of the Kyoto Protocol in Countries with Economies in Transition: Development of Registries, held 8th April, 2003, at the Regional Environmental Center, Szentendre, Hungary.*

- Database server and backup for storing data
- Intranet server and LAN for access for the authorities
- Internet server for enabling account holder access
- Firewalls and other security measures

Peggy Quarles indicated that the EATS system is being designed to run either as a PC desktop application but also as an extranet web application running on clustered servers. Thus the cost of hosting the system is very dependent on the specific requirements of the operator of the system, which in turn is dependent on the scale of the system and system requirements. The UK registry hardware costs were GBP 80 000,⁷; this is a hardware system that has the necessary security measures implemented, and access for several authority users as well as internet based account holder access. The system is also resilient, and operation is unaffected even if one part of the system disfunctions. The hardware system for the UK registry is presented below. The cost of the hardware for the UK ETS scheme can thus be considered a higher bound cost estimate.

3.3 Linkages and security measures

National Registries are not separate, isolated systems, but are linked to other systems, including the transaction log, account holders, authorities. This means that the security measures that have to be implemented are quite complex, and physical communications protocols have to be designed for access by the different types of users. Though the international security standards for National Registries have not yet been developed, the requirements have been stated in general terms by the COP8 decision on national registries:

Registry systems, and the exchange of data between them, shall apply security measures, already mentioned, that ensure:

- (a) Confidentiality: data transmitted between registry systems shall be encrypted so as to be unreadable by any party not involved in the transaction;
- (b) Authentication: the communicating registry systems shall be uniquely and securely identified and identifiable. The transaction log shall act as the central reference database for authentication information;
- (c) Non-repudiation: there should be a single full and final record of all actions such that those actions cannot be disputed or repudiated;
- (d) Integrity: data exchanged between registry systems shall not be modifiable by any party not involved in the transaction;
- (e) Auditability: a full audit trail shall be maintained for each message and message sequence to document all processes, actions and messages and the date and time at which they occurred.

Each registry system shall implement measures, including automated internal checks, to:

- (a) Ensure that its data records and transactions are accurate;
- (b) Ensure that data are protected against unauthorized manipulation and any change in data is automatically and securely recorded using journaling and auditing functionality;

⁷ *Martin Devine*

- (c) Ensure that it is protected against exposure to security compromises, such as through viruses, hackers and denial of service attacks;
- (d) Ensure that it has robust systems and procedures for safeguarding data and recovering data and registry service in the event of a disaster

Security measures for systems have been developed for different applications in different sectors, in the banking sector, for securities depositories, for military use, for governmental organisations. Standards have also been developed which can rate the degree of security of systems. Uniform security categories have been defined by e.g. the TCSEC in the US and ITSEC by the EU. These contain security requirements concerning several system elements, such as secure environment, hardware, software, data carriers, documents, data, communications and personnel. The range of security measures include measures to guide from fire hazard, robbery, as well as security requirements connected to personnel, not just measures directly associated with the IT system itself, such as firewalls and physical communication protocol.

The registry will be linked electronically to the International Transaction Log (ITL) and to other registries. Information from the registry will also have to be made publicly available. Account holders will have to be able to access their accounts as well, though there are no international requirements regarding the mode of access, we have assumed that this will be done electronically as well.⁸ This means that appropriate security measures have to be taken to protect the registry from security compromises. The security measures that can be taken are discussed below:

There are 3 main types of communications protocol available:

- Access through the internet through a SSL or https connection. This solution requires an ADSL connection and a browser that supports the appropriate level of encryption, in the case of the UK ETR this is 128 bit encryption. Other examples of the use of this type of connection are OTP Direct in Hungary, the UK registry, and the CBS system of the EPA. The accounts can be accessed by a username and password.
- Access through virtual private network (VPN): this method uses an ADSL line, but is not accessible through the internet. It requires separate software programme to run instead of an internet browser, as well as a 'black box' for a secure connection. This mode of account access is used by some banks.
- Non-internet access, such as leased lines or switched network: the physical protocol is a network which is physically separate from the internet. Leased lines are provided by MATÁV in Hungary. Using a leased line for account access is an option for users of Keler's system for accessing accounts.

Possible physical protocols for national registry linkages:

- *Connection to the ITL*: the nature of the connection has not been specified by the UNFCCC, but since the transaction log is the central authority, as well as the basis for

⁸ In the UK registry, where access to accounts is via the Internet, access through fax and phone is also possible, by providing a password. This is a resort for cases when the website becomes unavailable, but is also left up to the choice of the user if he does not wish to access his account through the Internet, or is unable to do so.

comparing information from the registries, the connection will have to be very secure, and probably the best option available will be a non-internet based solution.

- *Links to other national registries:* the NR is connected with other NR through a central communications hub integrated with the transaction log. This means that only one connection will be required for communicating with other national registries.
- *Account holder access:* there are 3 different options available for account holders in theory; in practice the option used will depend on the development of technical standards, as well as cost considerations. The technical options for the physical protocol in increasing order of security are internet access, VPN and a leased line. For all three options a chip card can be used to identify the user in addition to the physical protocol mentioned. This is especially relevant for the first two options, where the connection is less secure than the third, and the accounts can be accessed from anywhere where there is an internet connection. The fact that the registry can be accessed from anywhere is also an advantage, especially if there is to be no non-electronic back-up version for access to the NR, such as for the UK Registry. But a chip card may also be used in the third option to add to the security that no unauthorised users will access the account of a company with many employees. An example of a similar structure to the system of national registries is the banking sector. The registries provide access for account holders to their accounts, and account holders in different registries are connected to each other via their respective national registries and the central communications hub in the ITL. Similarly, banks also have clients who can have access to their bank accounts electronically, and are connected to clients of other banks through an interbank GIRO system. The communications protocol between the bank and the client can vary in form and thus in security, costs, etc., from an internet connection to a leased line. A hybrid approach is also possible, where e.g. customers would have internet access to their brokers, and the brokers would access the accounts in the registry through a leased line. The advantage of this approach is that it provides an inexpensive mode of access for those who only wish to trade small amounts of allowances.
- *Links to the authorities:* The ministry or any other authority will have to have access to the transaction log as an account holder, but will also have other user rights above those of the trade participants. There are two options here, depending on who will maintain the registry: If the registry is maintained by the ministry, then there will be no need for a secure physical connection from the ministry to the registry. If the registry is maintained by a private or partly privately owned entity, or is located outside ministry quarters, then there will be need for a secure connection from the ministry to the registry. The physical protocol of the connection should probably be a leased line.
- *Public access to information:* the public has to be provided with information through the internet. In order to do this without a security compromise, a server separate from the server operating the registry has to be maintained, on which information is periodically updated from the registry.
- *Other databases:* it is not an international requirement, but it is recommended that the registry be connected to the inventory, the database of the authorities responsible for approving projects under JI, the entities responsible for the validation of projects verification of project units, the database of the authorities giving permission to entities to trade, the authority responsible for GHG trade strategy. If the registry will be located within the Ministry of Environment and Water Management, this will not

be a problem, because connections through leased lines already exist between the Ministry and other governmental organisations, and many of the above functions will be performed by the Ministry anyway.

The monthly cost for operating an ADSL line in Hungary is approximately 65 USD. This is a cost that would not be additional in many cases, since most legal entities that will participate in trade will already have an ADSL connection for the internet. This is a requirement if the physical communication protocol will be via the internet or VPN.

The monthly costs associated with a 128kb leased line in Hungary are approximately USD 1000 including the cost of data transfer, the lease cost, and telephone costs, the one-time cost of being connected is USD 1000-1200. This is higher than for an ADSL line, but would still be a relatively small cost for obligated entities or brokers. On the other hand, if private persons or NGOs will be allowed to open an account in the registry in order to cancel allowances, as required by the EU Directive, Article 12,⁹ then it will be desirable for the costs of participating in trade to be as low as possible.

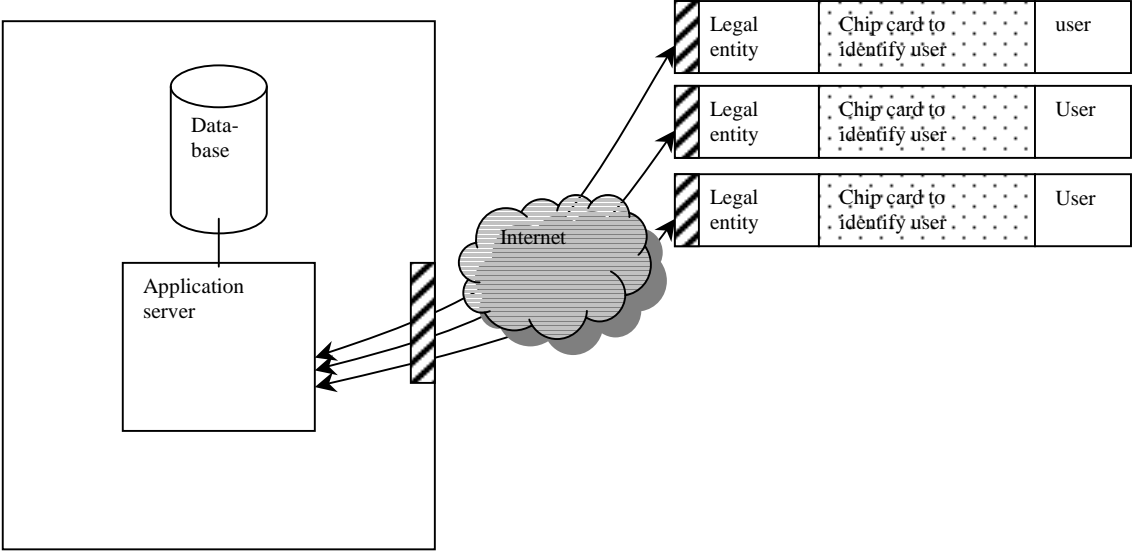
The cost of a chip card which is a secure method of determining user authorization is approximately USD 40. A chip card can be used in addition to a VPN or internet solution.

The experience of the UK ETR, ERT, and OATS registry systems seems to suggest that internet access for account holders provides an appropriate level of security. The cost considerations are also in favour on web-based account access.

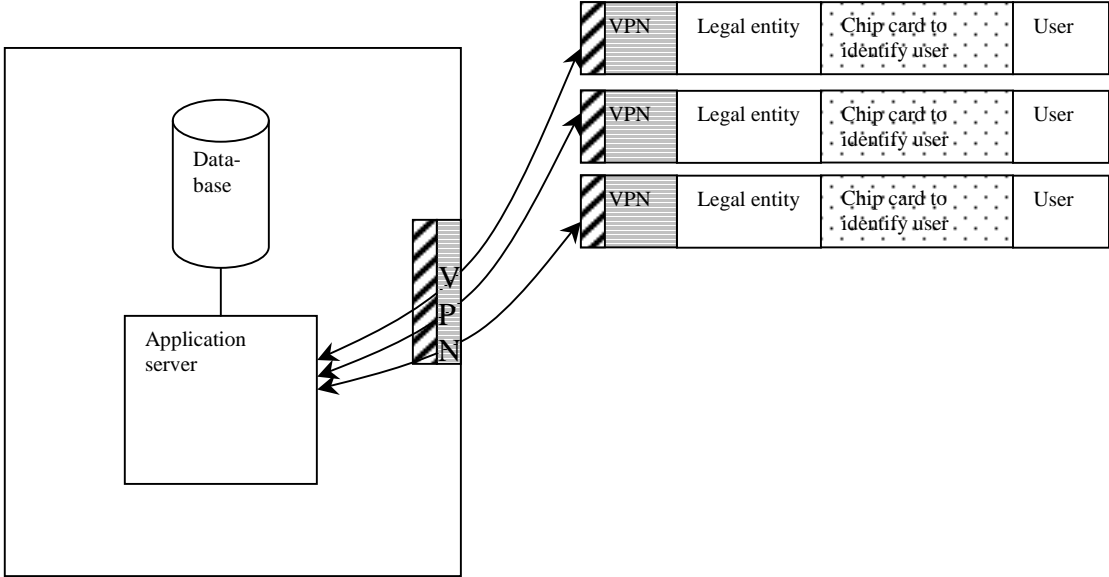
⁹ stating that " Member States shall take the necessary steps to ensure that allowances will be cancelled at any time at the request of the person holding them"

OPTIONS FOR ACCOUNT HOLDER ACCESS

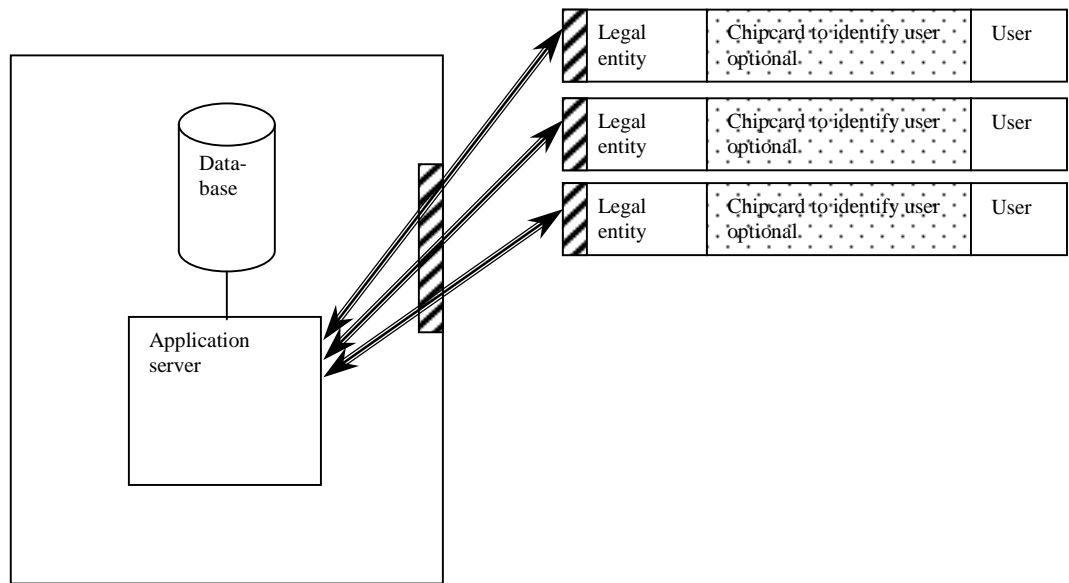
Version I.: Trade participants connected to the system via the internet through a https or ssl connection



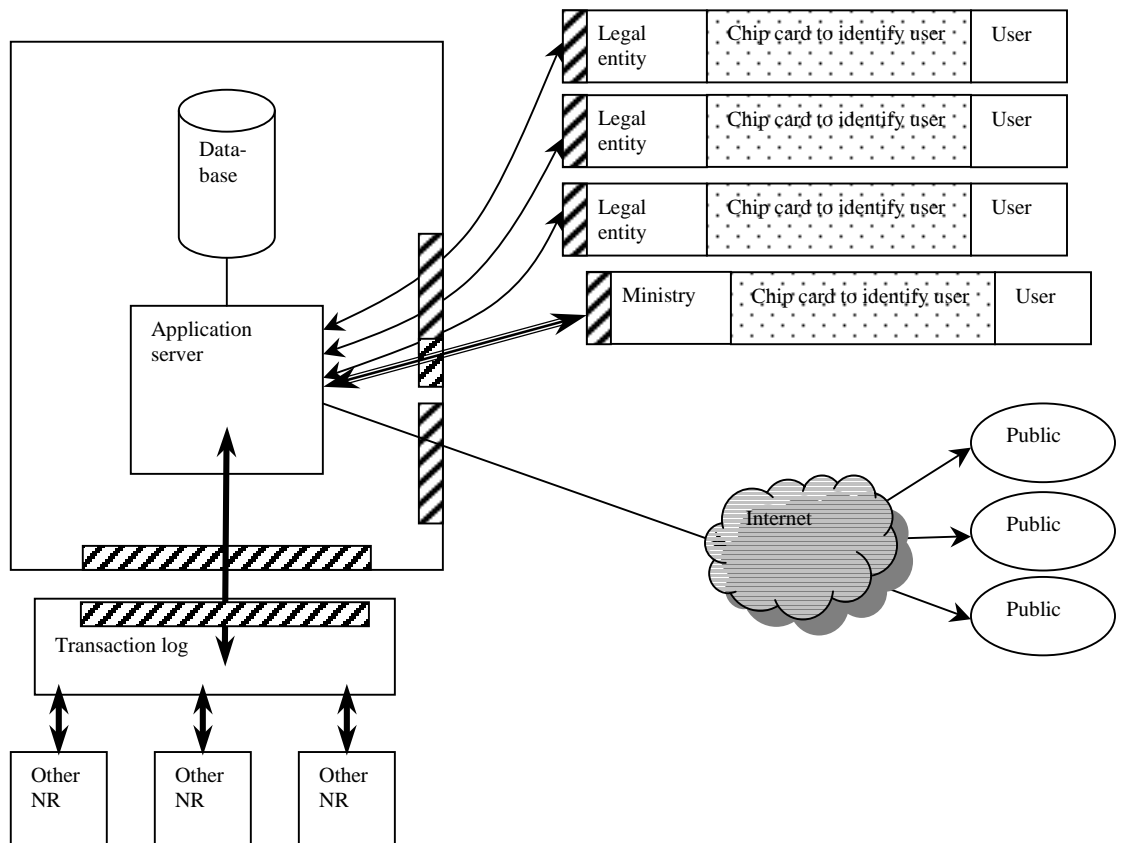
Version II.: Trade participants connected to the system via the internet through virtual private network



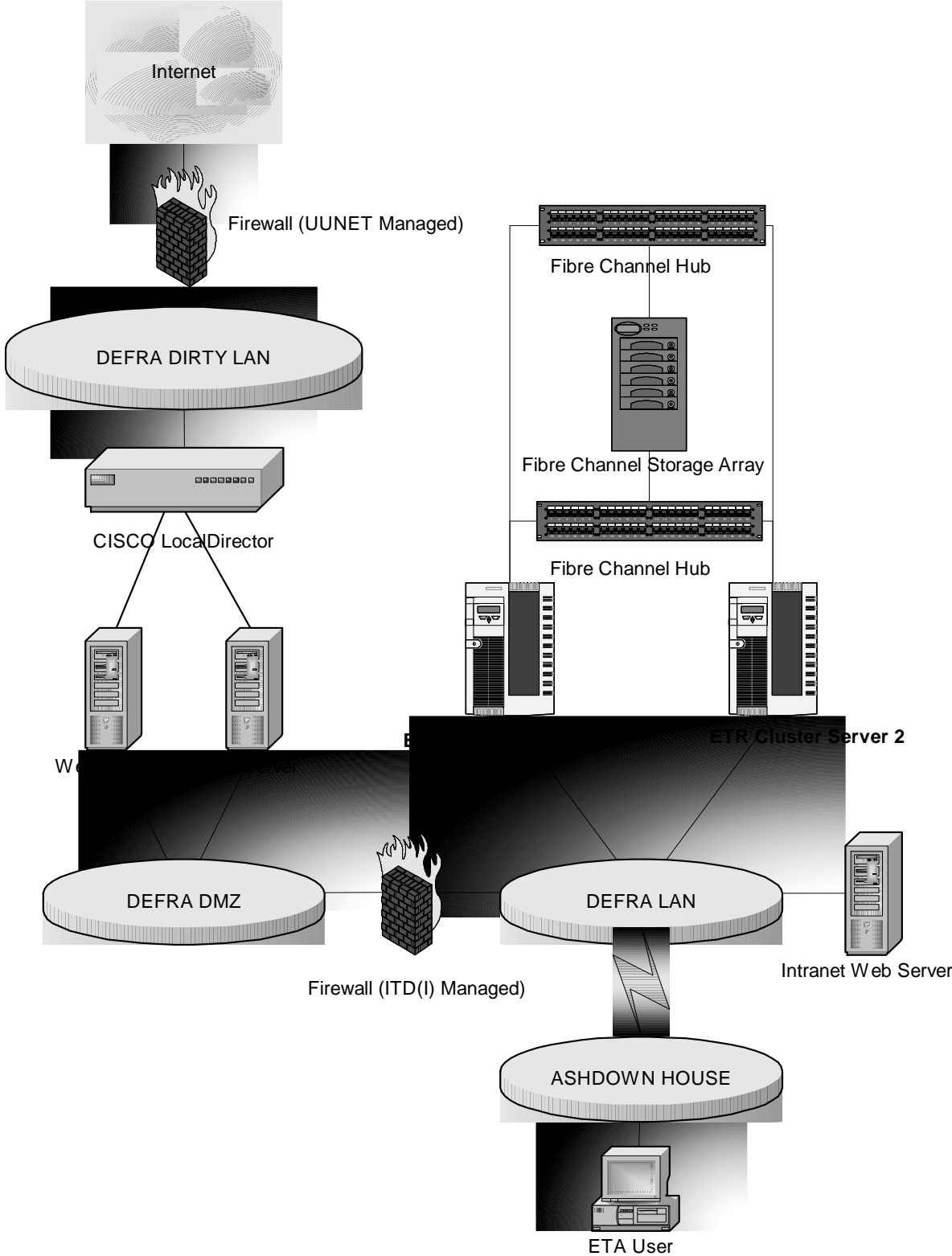
Version III.: Trade participants connected to the registry system via a leased line



AN EXAMPLE OF AN ENTIRE REGISTRY SYSTEM



THE UK REGISTRY



Source: Martin Devine, UK Emissions Trading Scheme, Global Atmosphere Division, DEFRA, UK.

4 THE RELEVANT LEGAL AND INSTITUTIONAL BACKGROUND IN HUNGARY FOR THE IMPLEMENTATION OF THE KYOTO PROTOCOL AND EU ETS

As far as the implementation of the Kyoto Protocol and the EU Emission Trade Scheme, there are three areas that we feel are relevant for registries, which we will briefly summarize. Since there is very little progress that has been made concerning registries in particular, we will look at the wider legal and institutional framework that can serve as a background for the implementation of the schemes, including registry implementation.

The first of the three areas examined is the institutional and legal framework established so far for the implementation of the Kyoto Protocol itself. The second is the collection of environmental information, especially information on emissions of air pollutants at the facility or installation level. We think that such experience is relevant for several reasons. First, the EU ET is a scheme with installation level quotas and obligations, which means that emissions measurement or calculation is necessary at an installation level, even though tracking this information does not have to be included in the registry itself. This means that emissions of GHGs have to be measured, calculated or estimated in some form. If there are already somewhat similar schemes in place then less institutional capacity building is required, and experience is available regarding data collection from entities, as well as compiling and handling data. Also, the EU ETS requires that information regarding the results of monitoring of emissions be made accessible to the public. Making information available on installation or facility level emissions may require some legal measures, since this is currently not practice for any air pollutants in Hungary. Also of relevance is the implementation of the European Pollutant Emissions Register (EPER) and Pollutant Transfer and Release Registers (PRTR), since there may be synergies between the tracking of emissions under EPER and EU ETS.

4.1 Progress made in the implementation of the Kyoto Protocol

As far as the implementation of the Kyoto Protocol is concerned, some progress has been made in establishing both legal and institutional capacity in general, although little progress has been made concerning registries. The LXXXIII law of 1995 enacting the United Nations Framework Convention on Climate Change. The Parliamentary Decree 49/2002 (VII. 19.) made Hungary's joining the Kyoto Protocol official. Hungary also has a Climate Change Strategy, contained in the 2206/2000 (IX. 13) Government Decree. A government decree in 2003 established an inter-ministerial body for overseeing certain strategic tasks associated with the Kyoto Protocol. The next National Environmental Programme (NEP), for the period 2003-2008, which has not yet been accepted, will include a Climate Change Action Programme. This is a step forward, as the previous NEP did not address this issue separately.

A law is currently being prepared on Hungary's participation in Joint Implementation, and is expected to be accepted by the end of May this year. The acceptance of this law was first due in September 2002, but because of the different interests of the different parties involved, such as the conflicting views of the Ministry of Environment and Water Management and the Ministry of Economic Affairs, it was not accepted in time. The proposed JI law concentrates on JI only, and the institutional framework necessary, and does not include regulation on IET or EU ETS. The law is planned to be a transitional one, and will be revised in two years if experience shows that it is necessary. This proposed JI law foresees the National Registry as being maintained by the same institution as the inventory, which is currently a background

institution of the Ministry of Environment and Water Management, the Environmental Management Institute (KGI).

The institutional capacity for dealing with Climate Change issues is currently not well developed. There are 2-3 people employed in the Ministry of Environment and Water Management dealing with strategic issues, there is a department in the KGI who prepare the inventory, and there is an inter-ministerial body, as mentioned above, to address issues concerning coordination of tasks related to flexibility mechanisms, establishing a national standpoint on international agreements regarding Joint Implementation, and on the flexibility mechanisms and EU ETS.

Apart from the inventory, not much progress has been made on information systems necessary for the implementation of the Protocol. Although a limited amount of work has been outsourced on National Registries by the Ministry of Environment and Water Management, Hungary is still very far from obtaining a registry. Hungary's Climate Change Strategy mentions the necessity for a Project Emission Reduction Inventory. It also mentions an emission monitoring and calculation method in line with OECD and EU requirements which has to be made accessible to the public. This would be the emissions tracking system at an installation or facility level. The registry is mentioned indirectly by the strategy, in which it states that the "development of the necessary databases and accounting systems is conceivable parallel to the development of the power exchange."

4.2 Experience with bottom-up systems of emissions to air

As opposed to the national inventory, for EU ETS emissions have to be estimated not only at the national level using a top-down methodology, but also for each installation. There is some experience with bottom-up emissions databases in Hungary, where companies, facilities, installations are obliged to report data on certain emissions to air to the environmental authorities. The relevant laws in this respect are:

- law LIII of 1995 on the general rules concerning the protection of the environment
- 21/2001 (II.14.) Government Decree on rules concerning air quality protection
- 211/1997 (XI.26.) Governmental Decree on the authority and jurisdiction of the Environmental Inspectorates and the National Park Directorates, as well as the Inspectorate of Environmental and Nature Protection
- 22/1998 (VI.26.) Decree of the Ministry of Environment and Rural Development on the air emission standards for powerplants with a capacity of 50MWth and above
- 7/2000 (V.18.) Decree of the Ministry of Environment on the rules regarding data systems of environmental authorities.
- 22/1993 (VII.20.) Decree of the Ministry of Environment and Rural Development on the implementation on the international agreement on the protection of the stratospheric ozone layer

The relevant documents for the implementation of EPER are:

- Commission Decision 2000/479/EC of 17 July 2000 on the implementation of a European Pollutant Emission Register (EPER) according to Article 15 of the Council Directive 96/61/EC concerning Integrated Pollution Prevention and Control (IPPC)
- Guidance Document for EPER implementation, European Commission, Directorate-General for Environment

The law on the protection of the environment states that it is the responsibility of the user of the environmental services to measure or calculate its environmental load and resource use

according to a separate regulation, to keep records of the data, let the relevant authorities look at the records, and to report data to the relevant authorities. The law also states that data on the state of the environment, as well as data on the use of the environment has to be made accessible according to the laws governing public information, if the cost of obtaining the data is covered from the state budget.

The Decree on air quality protection states that the emissions of air pollutant have to be determined using measurement or calculation, and reported on a reporting for to the environmental authorities. def air pollutants. The processed data on measurement attributes and evaluated and verified data, as well as the raw data have to be reported to the National Environmental Protection Information System (Országos Környezetvédelmi Információs Rendszer). The information accessible to the public is on air quality, not on emissions. The decree also states that it is the task of these authorities to collect data, maintain the necessary information system, and maintain the national emissions measurement network.

The decree on environmental inspectorates states that it is the responsibility of these authorities to make information on the state of the environment accessible to the public. Thus here also, information on emissions is not publicly accessible.

The law on large combustion plants makes measurement of emissions of SO₂, NO_x, CO, particulates and O₂ compulsory, and includes a form for reporting data to the authorities. The reporting form includes data on both measured emissions, and some fuel characteristics, such as SO₂ and metal content. The calculation of CO₂ emissions is not required, and neither is that the data be made accessible to the public.

The Aarhus Convention has been signed by Hungary, and enacted in the law LXXXI of 2001. The access to environmental information in practice is very problematic. There is very limited information posted on websites of governmental organizations, and access to information that is not actively publicized is usually difficult.

Pollutant Transfer and Release Registers (PRTR) are publicly accessible, bottom-up databases. The European Pollutant Emission Register (EPER), the European PRTR, gives information on emissions by facility, the emissions of substances which have to be reported under EPER include all six greenhouse gases listed in the Kyoto Protocol. Thus implementation of EPER would be relevant for EU ETS, since the two would complement each other. So far there are plans in Hungary to implement PRTR within the framework of EPER, the Hungarian law on chemical safety, and the IPPC Directive. The implementation of PRTR has not progressed very rapidly, there is an intergovernmental committee with the task of preparing a law for the implementation of PRTR, but so far no law has been accepted.

5 CAPACITY FOR THE MAINTENANCE OF AN IT SYSTEM

There are several options for who should maintain the registry once it has been developed. If maintained at a national level, then there is an option for the registry to be maintained by either a governmental organisation, such as the Ministry of Environment and Water Management, or by an entity outside the governmental sector. From our interviews it seems that in Hungary the necessary capacity for maintaining a registry exists in both the Ministry of Environment and Water Management, and outside the governmental sector, such as in the central securities depository Keler Rt, which is owned by the National Bank of Hungary, the stock exchange and the commodity exchange. This means that it is 50% state-owned and 50% privately owned. Naturally, the fact that we have chosen Keler as a case study does not mean that there are no other entities who could be equally well prepared to maintain the registry.

The choice of Keler was due to the parallels often drawn between the registry system and security depositories' accounting systems.

It has to be emphasised that who maintains the registry is a separate issue from who is given authorization to prepare and implement the Hungarian GHG strategy, and who exercises the rights of ownership over the units owned by the government. GHG strategy can be implemented by restrictions on certain types of trades, and these can even be built into the registry software as internal checks. Managing the trade in units owned by the government is possible for the units owned by the government, just as it is possible for other kinds of owners, through access to its own account. Thus, the government can and will have an account in the registry and a governmental institution will be given the rights to oversee that the trade in units is done according to the government's GHG strategy, and in line with the balance of national emissions and units held in the registry. The issues of who maintains the registry and who decides on GHG strategy and trade on behalf of the Hungarian government are two separate issues. The issue of registry maintenance is a question mainly of where the necessary capacity is available, as well as the costs of maintenance under the different solutions. At the present time the Ministry of Environment and Water Management are understaffed and under-sourced as far as the implementation of EU Emissions Trade and Kyoto are concerned. If this situation does not change, then the maintenance of the registry can be outsourced, with funding coming either from the government or from account holders, or a combination of both. There are of course other issues that have to be considered, but these are all separate from GHG strategy itself:

- Confidentiality of information: the confidentiality of information is provided for by laws, the question arises whether additional laws are needed for emissions allowance tracking, or whether the laws governing public access to environmental information and laws governing confidentiality are enough. Settling this is a issue would need a more thorough legal analysis.
- Learning experience for government: On a general level, market instruments are going to gain importance in environmental policy in Hungary, and specifically, implementing the Kyoto Protocol and EU ETS is unavoidable. In terms of the importance of market instruments, the authorities will have to learn how to implement market mechanisms, and the maintenance of a National Registry or EU ETS Registry can be an important learning experience.
- EU preferences: the EU at this point seems to prefer that the registries for EU ETS be maintained by governmental organizations,¹⁰ though currently this is not a requirement.

It is difficult to say what the scope of the task with developing a registry software and maintaining it will be, since much depends on the tracking needs of the system. Under EU ET approximately 100 installations will be obligated in Hungary, but since pooling is allowed for by the proposed EU ETS Directive, the actual number of accounts will be expected to be less, perhaps as few as a dozen, especially since one facility can have several operating installations, and may want to have only one account for all of them. International experience with the number of unit transfers shows that these are relatively small compared to e.g. trade

¹⁰ Olivia Hartridge, EU Commission, DG Environment, at the workshop on the Support of the Implementation of the Kyoto Protocol in Countries with Economies in Transition: Development of Registries, held 8th April, 2003, at the Regional Environmental Center, Szentendre, Hungary.

in stocks, even in the UK and US. It is possible, that the whole registry system will not require more than one desktop PC for operation.

5.1 Governmental organisations – The Ministry of Environment and Water Management

The Information Inter-departmental Committee (Információs Tárcaközi Bizottság) in Hungary is responsible for standardized governmental IT development. They have developed standards for ministries and other national authorities. These standards include security standards. Once the UNFCCC technical standards regarding security measures become available, the two can be compared.

In terms of the setting up of the registry, the Ministry of Environment has not made much progress. As far as Kyoto Protocol related demands go, the registry has been identified as one of two weaknesses in Hungary.¹¹ However, the technical expertise for maintaining a registry is available. The Ministry of Environment has 2-3 dozen information bases already operating, Oracle servers, and a local network with leased lines between the different buildings and to the environmental authorities.

It has to be emphasized that although experience with databases useful, the usefulness of experience with databases is limited when setting up a national registry. Experience with databases is useful from several perspectives:

- Software available for handling large databases
- General IT expertise available
- User knowledge of databases
- experience with backing up data
- Secure environment in which to locate system

Databases are not accounting systems, accounting systems jog megtestesítői, may need additional security measures

- Does not necessarily provide for outside access to data in terms of both access to information and the user authorization to carry out transactions
- Messaging requirements
- Auditability requirements

There is adequate technical expertise already available, the bottleneck in terms of human resources could be the number of staff employed, though there are approximately 15-20 people employed by the Environmental Management Institute (KGI), the institute responsible for the inventory, another 10 data administrators at other units, and also some staff employed by (VITUKI) (KGI and VITUKI will be merged by July of this year), the National Water Authority (OVF) also has a separate IT department.

Public information could be posted on the Ministry website, or governmental websites such as www.magyarorszag.hu or www.ekormanyzat.hu, which are sites maintained by the government for the purpose of providing information to the public, at little additional cost.

¹¹ Dora Kulauzov's presentation at the CATEP Workshop, Budapest, 7th Feb. 2003.

5.2 Profit oriented sector

The evaluation of the capacity in the profit oriented sector is based on the exchange of information with Keler Rt, which has operated a system for the accounting of securities for 10 years, and have used a real-time accounting system since 1999. Their system is one which provides account access to customers, has set a target to reach B1 level security according to Trusted Computer System Evaluation Criteria (TCSEC) standards, Oracle and Unix database servers, Windows and Unix running on a multi-server system. Account holders can access their accounts (transfer securities and view account information) electronically, security is provided through electronic signatures and coded information. The options for the physical protocol to the account holder is through an ISDN line, X25, leased line or analogue phone line. They have plans to introduce access through VPN and chipcards. Data archiving and auditability are provided for by their system. The maintenance of the accounting system is solved by internal IT staff employed for the purpose.

There are of course other potential players as well, primarily banks, who have experience with dealing with the electronic accounting of valuable assets, have a nationwide network for dealing with customers, also have services for selling securities, and have gained experience in implementing the necessary security measures in their data exchange, and have solved the problem of secure remote customer access to accounts.

The activities of the Central Securities Depository and securities depositories in general is governed by law CXX of 2001 on the capital market. The mode of issuance and transfer of dematerialized securities, and the security requirements relating to these activities are governed by the 284/2001 (XII. 26.) Governmental Decree on the mode of issuing and transferring dematerialized securities and security requirements, as well as the opening and keeping of a security account, central securities account, and customer account. The personnel, material, technical and security requirements of securities depositories is governed by the 283/2001 (XII. 26) Government Decree. In addition to satisfying these laws, the information in the possession of the central securities depository has to be maintained and handled according to the laws on data protection and data security. Despite this, several decisionmakers, and others in the governmental sector have apprehensions, especially regarding the security of data, and the possibility of misuse of the data. This apprehension is especially strong in the case when the maintainer of the registry also has access to price information.

5.3 Registry maintenance costs

Tasks associated with maintenance are providing a helpdesk for users, hardware maintenance, operating system support, providing for disaster recovery capability, and general operational support relating to hardware, operating systems and security.

The annual cost of maintaining the OATS system is USD 100 000 for computer processing costs, and another USD 100 000 for disaster recovery services. There is one person employed

at the Clean Air Markets Division of EPA who has the tasks of setting up account for users, watching the allowance tracking system, and troubleshooting when problems occur.¹²

The cost of maintaining the UK ETS Registry is around GBP 100 000 (USD) per annum, at DEFRA this cost is considered high because they are still adjusting the system, but when the system is complete, this figure is expected to be much smaller. Since trade is compliance-driven, at the busiest times they employ 3 people and one administrative staff, during quiet times half the time of one person is enough to work at the help-desk and deal with administrative tasks. They also employ one full-time developer for support, and they call in an IT team when necessary, and the support for the web service happens through DEFRA's central IT system.¹³

The cost of maintenance is difficult to estimate precisely, since according to Keler's experience, the cost of maintaining a more advanced accounting system can be 50 times the cost of maintaining a simpler system. Again, the cost of system maintenance given by EPA and DEFRA can be considered as an upper estimate.¹⁴

6 DEVELOPMENT AND MAINTENANCE ISSUES FOR A NATIONAL, REGIONAL OR GLOBAL REGISTRY

There are three issues which have to be addressed regarding who should develop and maintain the national registry:

- Development: Should the registry be developed tailored to local needs, or should a licence for an existing registry be purchased?
- Maintenance: There are two issues which have to be addressed here:
 - Should the national registry be maintained separately, or in a consolidated manner together with registries of other countries?
 - Should the registry be maintained by a governmental organization / organization authorized and set up by several governments or by an entity not in the governmental sector which may be owned partly or wholly by the government, but is profit-oriented)?

6.1 National development or licence purchase?

From communication with the developers of already existing registry software it seems that the question of whether to develop a registry or whether to buy a licence for an already existing registry is a question of cost only. Of the registries already in operation, the customization of the EATS registry to local needs will be possible, and the ETR registry also has flexible business rules adaptable to national conditions. Since already existing software can be customized to meet national information needs, national differences in the implementation of emissions trade will not necessitate the national development of registries.

¹² Communication with Janice Wagner, Chief, Market Operations Branch, Clean Air Markets Division, EPA.

¹³ Martin Devine

¹⁴ Gergely Horváth, Keler Rt.

The question remains how the cost of the licence together with the cost of language translation and customization compares with the cost of new development, but this is a question that cannot be decided on without the availability of specific price offers.

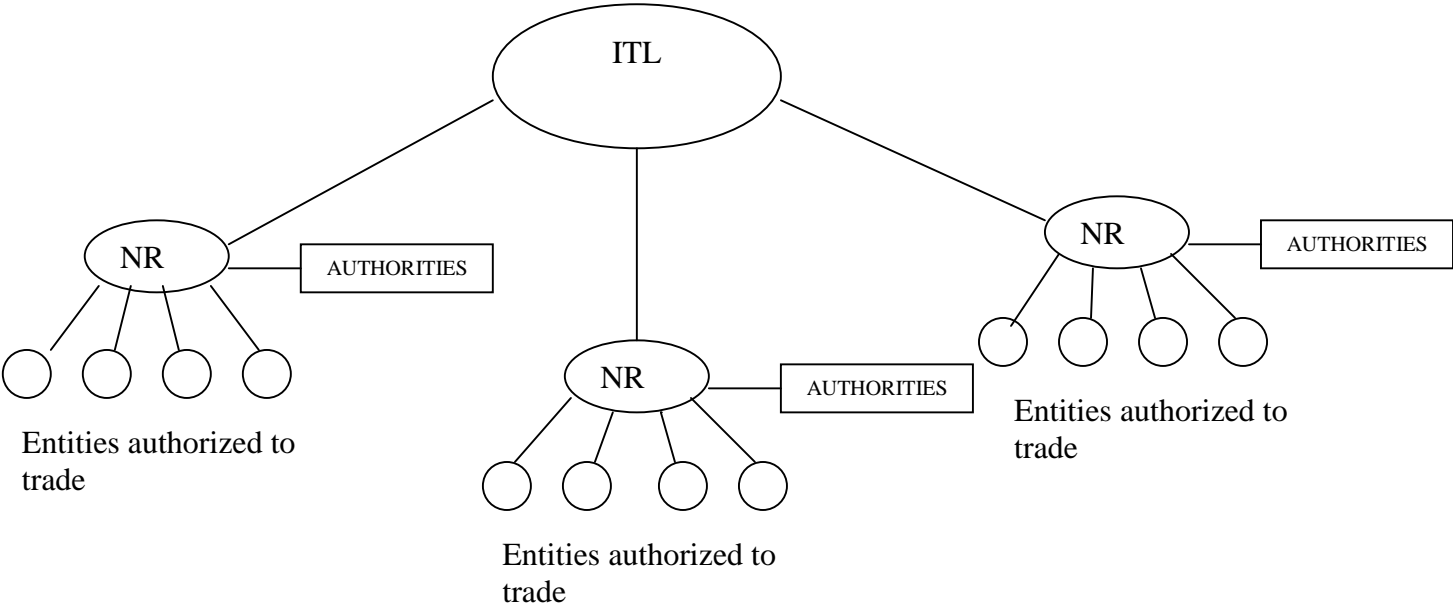
6.2 National or consolidated registry?

The Marrakesh Accords, in the Annex to the Draft decision ‘Modalities for the accounting of assigned amounts under Article 7, paragraph 4, of the Kyoto Protocol’ state that any two or more Parties may voluntarily maintain their respective national registries in a consolidated system, provided that each national registry remains distinct. Article 19 of the Common Position on a Directive of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowance trading within the Community also states that Member States may maintain their registries in a consolidated system, together with one or more other Member States.

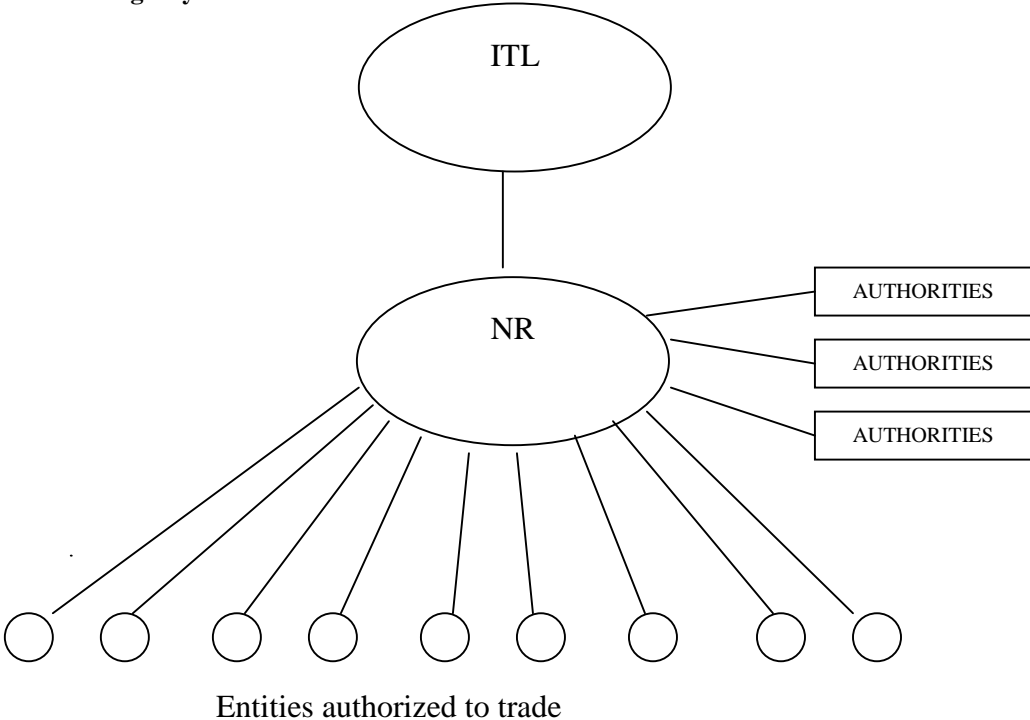
The question of consolidated registry maintenance is thus a technical issue, since the national registries themselves will remain distinct, the national targets remain unchanged, and the national authorities maintain their control over trade in the distinct national registries.

NATIONAL OR CONSOLIDATED REGISTRIES – OPTIONS FOR LINKAGES

Separate national registries



Consolidated registry



There are several different factors that have to be taken into consideration when deciding whether it is desirable to maintain a consolidated national registry:

- Costs of registry development and maintenance could be lower for a consolidated registry than for several distinct national registries. The total cost is affected by the following factors:
 - The cost of registry software development can be reduced compared to separate national registry software development
 - The registry software will also have to support a multiple language interface, and possibly different information needs for the different and distinct national registries which would increase costs.
 - Additional national information requirements can be satisfied in theory even if there is a consolidated registry, but varying information needs for the distinct national registries within the consolidated registry would be a factor that would increase registry development costs.
 - The cost of the technical maintenance of the registry system itself would be expected to be reduced if there were only need for the maintenance of one system instead of several distinct systems.
 - Communication with users for providing help through a help desk or for setting up accounts would be more complex.
 - Unless international leased lines have to be used for account access, which is an expensive solution, the costs to account holders to access their accounts would be unaffected if an internet solution can be used.
 - The registry has to be linked with several national authorities, regardless of who operates the registry, since national authorities will be dealing with issues such as national GHG strategy, allocating rights to obligated entities, etc. The cost to governments to access their registries would become more expensive simply due to the geographic distance required for communication and the possible need for more secure connections than can be provided by the internet.
- User friendliness/transaction costs of users
 - A big advantage of a consolidated registry would be that users would benefit from a single user interface in terms of transaction costs. The trade participants would be able to view information on holdings of potential trade partners within one registry.
- EU preferences: if consolidated EU ETS registry is decided on, then the question becomes irrelevant

7 INFORMATION NEEDS NOT SPECIFIED BY KYOTO

There are two distinct ways in which information additional to that required by the UNFCCC can be included in the registry: marking units, accounts, participants, and including modules which can be useful but not required by the UNFCCC.

The UNFCCC requirements are often minimum requirements, and the way in which the commitments are achieved and the requirements fulfilled is up to the discretion of the governments of the Parties to the Kyoto Protocol.

The Kyoto Protocol obligates countries, and it is up to them how to achieve their respective targets. Countries in turn can choose to obligate entities to decrease their emissions. If there are obligated entities, then a distinction will have to be made between entities authorised to trade, and obligated entities. Also, it would make it easier for obligated entities to see how they are doing with fulfilling their commitments, if they can see both their verified emissions and units at the same time. This would mean that it would be useful for a national registry to perform an inventory function for obligated entities as well as a registry function for entities participating in trade.

If certain entities will be obligated entities, then some of the units under Kyoto, or distinct national allowances will have to be allocated to these entities. For the EU emissions trade scheme the EU can chose to use the Kyoto units for trade, and add an additional EU marker to distinguish these from other Kyoto units. This can be done for national emissions trade schemes as well. In this case the number identifying the unit could bear an additional piece of information relevant for the internal emissions trade scheme, but not for the international scheme. The EU ETS also provides for the pooling of allowances, which would have to be indicated in the registry.

One of the UNFCCC requirements is that the units international emissions trade is implemented in such a way that transactions do not infringe on the commitment period reserve (CPR). It is left up to country how to deal with this, one option is to mark the necessary percentage of units as non-tradable outside the NR. Another option could be a kind of gateway, similar to the UK gateway, which would stop trade which violates the CPR. Ideas have surfaced in the debate on Hungarian participation in international flexibility mechanisms on the differentiation between units and tradable units, where all units could be used in domestic trade, but only tradable units could be traded with other registries.

The possibility that the registry serve as a trading platform has also surfaced in the debate on Hungarian participation in the Kyoto mechanisms. The tender procedure for JI and CDM projects could be posted on the site where the registry is located, though obviously this information would not be stored in the tracking module of the registry. It would also be useful for the authorities in charge of the national GHG trade strategy, as well as for entities participating in trade if prices and a GHG prognosis were available at the same site.

A module could be linked to the registry containing data on JI project participants and the projects themselves, including project status (design, , validation, registration, approval, implementation, monitoring, verification, issuance), the expected number of allowances, and monitoring and verification reports.

8 CONCLUSIONS AND RECOMMENDATIONS

Three main questions have been raised by this report, which have to be answered

- Should the registry be developed nationally, or should a licence be purchased?
- Should the registry be maintained nationally, or consolidated with other registries?

- Should the operator of the registry be a governmental organization, or should the maintenance of the registry be outsourced?

We hope we have shed some light on the issues, but in order to be able to make a decision on the questions asked, further work on the topic of registries is required. In order to be able to decide the question of whether a registry software should be bought or whether a registry should be developed nationally, specific price offers are needed. These will not be available until technical standards have been developed regarding registries, because these greatly influence costs. There may, however be a possibility to obtain a registry at no cost, either through the EU, or from the EPA. The latter may need more than small adjustments, but this will not be known until the software can be viewed, and until the UNFCCC technical standards come out.

The question on national versus consolidated registries is also a question which cannot be settled yet. It seems that a consolidated registry will not be required by the EU from 2005, but in 2006 recommendations may be made which favour a consolidated EU registry. Again, an IT expert opinion would be useful to decide the question of which registry is preferable from a technical, as well as a cost view. It is also partly a political decision, it has to be decided how important is it for each country to have a registry to meet all national requirements, and whether compromises can be made on national requirements to make consolidated registry implementation easier.

The question of who should maintain the registry, whether it should be maintained by the government or whether it should be outsourced, is partly a political one, partly a question of EU preferences, and also a question of capacity in the governmental sector.

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APPENDIX I. UK EMISSION TRADING SCHEME REGISTRY

The UK registry provides several ideas which are worth considering when setting up a national registry required by the UNFCCC. Emission trade (ET) registries can be considered as providing a useful model for National Registries, but the UK registry can prove particularly useful, since the UK intends to use the registry which has been set up for domestic ET for EU emissions trade and as a national registry under the Kyoto Protocol. Here we will review the areas where the UK registry can be a useful source of inspiration when developing registries, after a very brief general description of the UK registry.

The UK registry is a registry which serves as an accounting system for companies participating in the UK domestic emission trade scheme, climate change agreements scheme, and also for renewable energy certificates under the Renewables Obligation Scheme (only for ROCs which are additional to the commitments necessary for fulfilling the obligation). Renewable Energy Certificates under this scheme can be converted using a carbon conversion factor into emissions allowances, and can be used in ET, but because of the wider policy goals of the renewable energy obligation, suppliers will not be able to redeem allowances from the ET scheme against these obligations. Possibly trade in energy efficiency improvements occurring above those required by the Energy Efficiency Commitment, and flare consents transfers (similarly to the ROC scheme, entities will not be able to use allowances from the ET scheme instead of flare consents) will also be tracked via the registry.

Under the UK emission trading scheme, there are two sectors, the absolute and relative sectors, with absolute and relative targets. The relative target holders may transfer allowances to absolute account, only if the gateway is open.

The UK registry is a web-based registry, with transactions taking place real time. The allowances themselves only exist in electronic form. Users of the system (authorities, account users and the public) have access to the system through the internet. A back-up option is available if the system becomes unavailable; the Emissions Trading Authority (ETA) may invoke a paper-based contingency system for critical transactions. Transfers can also be carried out by the ETA on behalf of participants requesting transfers by means other than the internet.

The UK ET registry is not a trading platform. This means that all financial transactions take place elsewhere. It also means that the registry does not record transactions that do not result in transfers (e.g. options and futures) only when the transactions take place. Naturally, in a system where anyone is allowed to participate in ET and does not require special authorisation, it is difficult to track who is actively participating in trade. This is especially so with deals that do not involve immediate transfers, in which case neither of those participating in the transaction has to be an account holder at the time of the transaction.

In the following we will examine some properties of the UK ET registry:

- The functions of the registry

- The institutional background of the registry
- The structure of the registry
- The structure of accounts, information available to account holders pertaining their own accounts,
- the format of the data stored in the system
- types of users
- information available to the public

The brief overview of the UK Registry will be based largely on the UK Emissions Trading Scheme Emissions Trading Registry User Manual (often using direct quotations from the text of the manual), as well as experience gained through the opening of a personal account for the purpose of experiencing the registry first-hand, and Charlotte Middleton's (Department of Environment, Food and Rural Affairs, UK) presentation at COP6 in Bonn.

The functions of the registry

The registry tracks trade in allowances to emit carbon dioxide as well as credits earned from projects. There are two different types of allowances, the ETA - UK scheme allowance, and the ETC - UK Project credit. There are also two sectors, one facing an absolute target, and one facing a relative target. Trade from the relative to the absolute sector is restricted, in order to preserve the environmental integrity of the absolute target. The Gateway provides the means for restricting trade between the relative and absolute sectors.

The registry also tracks trade in allowances and credits from other schemes. In the case of obligations such as the Renewables Obligation Scheme or the Energy Efficiency Commitment only the units above those required to fulfil the obligation can be converted into emissions allowances and traded. Other trade in ROCs and EEC credits takes place outside the registry.

The institutional background of the registry

The institutional background of the registry includes structures undertaking tasks associated with keeping the registry operating, analysis and reporting of data based on the registry which is embedded in a wider framework of the authority which deals with the CO2 emissions reduction goals and policies. There is monitoring and verification of the emissions of the obligated entities. Regarding tasks closely related to the operating of the registry there is also an institutional structure for enabling the linking of the registry via interfaces to account holders:

- helpdesk, PC support
- Website with information if registry becomes unavailable
- Contact address for users who require special assistance (large print version of user manual, or assistance in using registry)
- A user manual

A user manual is available from the website of DEFRA where it is possible to log in to the registry. The user manual includes information on:

- ET basics (emission trade, absolute and relative targets, allowances and credits from other schemes from which can be traded via the registry)
- Software requirements and error messages (browser requirements, problems with display, how to interpret error messages)
- What the registry is for, what its main functions are (registry for holding, transfer, cancellation and retirement of allowances)
- Types of users and the account operations they are authorised to conduct
- Information required for completing tasks such as registration, opening and closing of accounts, as well as transfer, cancellation, etc.
- Step-by-step explanation of how to use the registry to carry out the tasks associated with account management
- Contact information at ETA
- Trading participant agreement
- Website terms and conditions
- Aids such as diagrams of user interface with explanations and transfer decision chart
- Glossary

The structure of the registry

The registry contains account holders accounts, as well as a national cancellation account. There is no retirement account, retired allowances are transferred into the national cancellation account.

There are two account types for holding allowances:

- trading accounts: these are accounts for non-target holders, which play no part in the compliance process; they are analogous to accounts of entities authorised to take part in emissions trade under the Kyoto mechanisms (where Parties to the Protocol are the ones with the obligation, not the entities involved in trade – this does not however mean that some entities cannot be obligated by the parties to the Protocol under an emission trade scheme). Trading accounts can be opened freely by any legal entity (companies or NGOs) or private persons under the UK scheme. Trading accounts can be used to trade, but also by participants wishing to buy and then cancel allowances so that they cannot be used in future for compliance or trade. The purpose of this is to reduce the number of emissions allowances available, producing the effect of a stricter target for obligated entities.
- compliance accounts: for target-holders – analogous to Party accounts under Kyoto, or accounts of entities obligated by the Parties in order to help fulfil the Kyoto commitment. Compliance accounts can only be opened by target holders, and have to be authorised by the ETA.

The structure of accounts, information available to account holders, the format of the data stored in the system

The allowance type identifier is included as a 3 character string in the identifier of the allowance. This serves the identification of the type of allowance, and plays no part in the identification of the particular allowance, which is possible by knowing only the unique serial number and the vintage of the allowance. ROCs are first converted and then issued as allowances which can be traded / held / cancelled. The allowances are stored in blocks and identified by the “start serial number”, “end serial number” and the number of allowances in the account.

A trading account includes the following information on allowances within the account:

- start serial number, end serial number, number of allowances: the allowances are tracked in blocks of homogenous allowances, and are divided only if part of the allowances are transferred
- status (status of allowances involved in a pending transfer through the Gateway)

Account status information

The screenshot shows the DEFRA Emissions Trading Registry interface. The main content area displays account information for Bill Tracy (G-12345678-52BB). The account is identified as 'Relative Trade (GB-CD32008F-T - Trading)' with a status of 'Active'. Below this, a table lists activity records with columns for Activity ID, Date/Time Requested, Organisation Name, Account Name, Account ID, Transfer Status, Debit, Credit, and Balance.

Activity ID	Date/Time Requested	Organisation Name	Account Name	Account ID	Transfer Status	Debit	Credit	Balance
GB-TR-000000031-2002:1	25/03/2002 10:32:00	Bill Tracy	Absolute Trading	GB-99417EFC-T	Q	9000		114000
GB-TR-000000030-2002:1	25/03/2002 10:29:00	Bill Tracy	Absolute Trading	GB-99417EFC-T	Q	15000		123000
GB-TR-000000023-2002:1	25/03/2002 10:13:00	Bill Tracy	Absolute Trading	GB-99417EFC-T	Q	12000		138000
GB-TR-000000026-2002:1	25/03/2002 10:07:00	Bill Tracy	Absolute Trading	GB-99417EFC-T	✓		50000	150000
GB-TX-000000018-2002	25/03/2002 10:04:36	ETA	ETA	ETA	✓		100000	100000
Current Balances:						36000	150000	114000

Source: DEFRA: UK Emissions Trading Scheme, Emissions Trading User Manual, p. 28

Transfers are defined by:

- transfer ID: a unique number is given to every transfer indicating:
- date, time requested
- organisation name: organisation other than account holder involved in transfer
- account name: name of other account involved in transfer
- account ID: unique number identifying account indicating the country the account was created in 'GB', a unique serial number (8 digits) and then an identifier to signify whether the account is a trading account ('T'), compliance account ('C') or a scheme account ('S').
- status of transfer (for transfers in the Gateway queue, valid statuses are 'completed', 'pending', 'cancelled', 'partial' and 'cancelled partial'. See below for further details of the potential activity statuses.
- debit/credit
- balance

The type of transfer is not indicated. There are the following types of transfer

- 'Intra-group' for the internal movement (non-sale) of allowances within an organisation;
- 'Domestic' for the sale of allowances to another organisation that is registered/based within the UK;
- 'Donation' for the non-sale movement of allowances to another organisation regardless of the of the country that the organisation is registered/based and
- 'International' for the sale of allowances to another organisation that is registered/based outside of the UK)

Transfer details



Source: DEFRA: UK Emissions Trading Scheme, Emissions Trading User Manual, p. 28

Types of users

Under the UK ET registry there are several types of account holders, differing in their authorisation to carry out certain account operations. The account holders are the following:

- authority: employees of the Emissions Trading Authority who manage the registry, only the authority is allowed to transfer (retire) units from a compliance account into the national cancellation account.
- account users:¹⁵
 - principal account users: appointed by the participant to use the registry. They use the registry for the participant, or if the participant has been authorised to use the registry on behalf of another organisation, then the principal account user uses the registry on behalf of these organisations as well.
 - secondary account users: created by the principal account user to use the registry for the organisation, or for another organisation that the principal account user is acting on behalf of.
 - third party account users: Appointed by a principal or secondary account user to have access to one or more accounts that belong to an organisation other than their own.

Information available to the public

¹⁵ The tasks that the different account users are allowed to undertake are listed in annex I.

Information available to the public: no information at present available on monitoring and verification details of obligated participants, since the registry and the emissions trade scheme is new, and the first compliance period is still under way. The relevant part of the Website Terms and Conditions agreed to by all participant scan be found in Appendix IV.

Tasks that the various kinds of account users are authorised to undertake on behalf of the participant or an organisation that the participant is operating on behalf of

Tasks	Principal account user	Secondary account user	Third party account user ¹⁶
Open trading accounts in the relative and absolute sectors	X	X	
Request compliance accounts in the relative and absolute sectors	X	X	
Close trading and compliance accounts	X	X	
Cancel allowances	X	X	X
Request project credits	X	X	X
View accounts and history of accounts account user has access to	X	X	X
View full details of allowances account user has access to	X	X	X
Submit transfer request intra-sector or across sectors	X	X	X
Modify/cancel a pending transfer request (providing it is not yet a partial transfer)	X	X	X
Modify own details held in registry	X	X	
Modify password	X	X	
Modify organisational details held in registry	X		
Create subsequent principal/secondary account users	X	X	
Delegate/revoke account to secondary and third party account users	X	X	
Reset password for secondary and other principal account users	X		
Revoke a secondary users access rights to the registry	X		
Promote an existing secondary account user to principal account user status	X		
Demote an existing principal account user to secondary account user status	X		
Delegate/revoke account to additional users within their organisation			X

¹⁶ The third part account user is an account user delegated by the principal account user to have access to an account belonging to an organisation other than themselves. The tasks undertaken by a third party account user are understood to be for the delegated account. The actions of the third party account user, contrary to those of the secondary and principal account users, is not the responsibility of the participant, but of the participant who delegated access of the accounts to that user.

Formats of allowance identifiers under the UK ET Scheme

UK Scheme – ETA allowances are of the format:

GB-0-1234567890-ETA-2002

This identifier is made up of:

- Two character country code (example ‘GB’)
- Single character commitment period under the Kyoto Protocol when the allowance was issued (‘0’ until 2008)
- Ten-digit sequential identifier for the allowance (example ‘1234567890’)
- Three character allowance type (‘ETA’)
- Four-digit vintage (example ‘2002’)

UK Projects - ETC credits are given a unique identifier that is of the format:

GB-0-N1AA567890-ETC-2002

This ID is made up of:

- Two character country code (example ‘GB’)
- Single character commitment period under the Kyoto Protocol when the credit was issued (‘0’ until 2008)
- Single character verification identifier (‘N’ for National verification, ‘S’ for Supervisory verification)
- Three character identifier that links the credit to the project from which the emissions reduction was made (example ‘1AA’)
- Six-digit sequential identifier for the credit (example ‘567890’)
- Three character credit type (‘ETC’)
- Four-digit vintage (example ‘2002’)

User interface: Sidebar options, and functions available for account holders

- Transfer
- Display Gateway Q
- View Account
- Manage Account...
 - Modify account details
 - Delegate Account Access
 - Open New Account
 - Close Account
 - Display Balance Details
 - Cancel Allowances
- Modify Account
- Details
- Manage Users...
 - Create New User
 - Change my password
- Request Project Credits
- Change My Password
- Reports
- Contact Us
- Help
- Email ETA
- Logout

Excerpt from the Privacy Statement included in the Website Terms and Conditions

Your information will be processed in connection with the Emissions Trading Scheme and in accordance with the tests set out in the Data Protection Act 1998. We may use the information, or disclose it to our agents, representatives or successors, or to other public bodies or third parties, for the following purposes:

- if you apply to open a trading account in the Registry, to assess your application (which may include making searches of your details with credit reference and fraud prevention agencies), and to open your account if your application is accepted;
- to maintain and manage your account;
- to operate and administer the Registry;
- to enable us to inform you about, or provide literature or services in relation to, the Emissions Trading Scheme;
- to carry out statistical analysis or research and development, in relation to the Emissions Trading Scheme;
- to provide data or information about the Emissions Trading Scheme upon request, on an aggregated or non-attributable basis;
- otherwise for the purposes of administering the Emissions Trading Scheme;
- to prevent or investigate fraud or other unlawful activity in relation to your account;
- for any of the purposes permitted by the Data Protection Act 1998.

The following information will be freely available to all account holders and to the general public:

- the names of all participants in the Scheme, and the name and contact details of their primary account users;
- a transaction log (published annually on the public pages of the website) recording the details of all allowance allocations, transfers, cancellations and retirements during the last commitment year.

APPENDIX II. EU EMISSIONS TRADE REGISTRY

The amended proposal for a EU Directive on EU-wide emissions trading (EU ETS) is especially relevant for those CEE countries which hope to become members of the EU before the start of, or during the first commitment period under the Kyoto Protocol, and may want to consider EU ETS requirements when developing a NR for international emissions trade (IET). The Amended proposal for a Directive of the European Parliament and of the Council establishing a framework for greenhouse gas emissions trading within the European Community COM(2001)581 contains some provisions regarding the emissions trade registry. The registry used for EU ETS and the registry used for tracking allowances for IET under the Kyoto Protocol can be one and the same, if this proves to be a useful way of tracking allowances under the two schemes.

In order to establish how a common registry could be operated for tracking allowances for both the flexibility mechanisms under Kyoto and EU ETS, the EU ETS scheme has to be examined and the requirements of the proposed Directive which influence registries have to be compared with UNFCCC requirements as well as national needs. Both the UNFCCC and EU ETS requirements are clearly stated, though not all aspects concerning registries have been finalised. For national registries under the Kyoto Protocol, decisions regarding the detailed functional and technical specifications of the interface between registry systems have been left to a later COP, with COP8 addressing the general design requirements of the technical standards.

The EU ETS contains even less guidance on operative issues concerning registries with the explanatory memorandum to the EU ETS proposed Directive also leaving work to develop details to a later date; stating that „detailed rules on the functioning of national registries should be undertaken by means of a separate Commission Regulation” and “The Commission shall adopt a regulation in accordance with the procedure referred to in Article 23 for a standardised and secured system of national registries in the form of standardised electronic databases, containing common data elements to track the issue, holding, transfer and cancellation of allowances, to provide for confidentiality as appropriate and to ensure that transfers are not given effect where this would be incompatible with obligations resulting from Kyoto.”

National needs arising above the minimum required by the UNFCCC and EU, e.g. in the form of additional data requirements (e.g. for serving a GHG trading strategy, or other policy goals) can vary from one country to another, and have yet to be worked out. It is an unresolved question whether there will be room for such national requirements if a consolidated EU registry is used to comply with the Kyoto commitments, or for EU ETS. Thus at the present time, despite the step forward at COP8, all issues have not been resolved as far as operative matters concerning registries go, and though some conclusions can be drawn about registry requirements, further study will be required as more detailed provisions regarding registries become available. Nevertheless a summary of the present state of EU plans concerning registries can be useful to decision makers in accession countries.

Emissions trade, as well as other Directives of the EU which aim at reducing GHG emissions are partly or wholly prompted by the Kyoto Protocol commitment, and therefore the goals formulated in the amended proposal for a Directive are such that they serve the fulfilment of the commitments undertaken at Kyoto. The explanatory memorandum to the proposed Directive states that the “proposal [for the EU ETS Directive] arises from the need for the European Union to reduce its emissions of greenhouse gases cost-effectively and meet its obligations under the United Nations Framework Convention on Climate Change and the Kyoto Protocol.” The memorandum also states that the “scheme has been designed to be compatible with the international emissions trading to be established amongst Parties included in Annex B of the Kyoto Protocol.” Thus there is congruity between the two schemes, the gases covered by the EU ETS are the same as the ones covered by the Kyoto Protocol (although only CO₂ emissions will be included to begin with), the targets of the EU ETS are related to the Kyoto targets, etc.

The proposed EU ETS Directive mentions some requirements which affect the development of registries for EU ETS, but some issues remain to be addressed, listed below, which will be elaborated under the following subsection.

Establishing a joint registry for both EU ETS and the accounting under the Kyoto flexibility mechanisms is possible, though several issues remain to be settled in part or in whole, to establish how this can be done, and whether it is worthwhile:

Structure of the registry:

- what accounts will the registry contain, will these be separate for the EU ETS national registry and the national registry for Kyoto? Questions such as the following arise:
- overlapping account holders (obligated entities and entities authorised to trade)
- separate units
- two separate transaction logs, separate authorities to report to
- who will maintain each registry, will the Kyoto and EU ETS registry be maintained separately by the various countries, or will a consolidated registry be maintained by the EU? What are the expected developments, and the rationale behind maintaining the various registries nationally or consolidated? Are the pros and cons the same for both registries, or is there a stronger argument for maintenance on a national level in either case, in order to provide countries with more flexibility in customising their registries to their own needs?
- links with other instruments applied in the EU aimed at reducing GHG emissions: there are no direct links affecting the development of registries, except in the case of project-based mechanisms; these are not yet accommodated for in the directive, but a separate directive on the linking of project-based mechanisms and EU ETS is underway, and is set to be completed by April. The desirability of the linking of project based mechanisms with EU ETS as already been stated in the amended proposal for the directive for EU ETS.

Allowances under the two schemes

Since allowances under the EU ETS scheme partly cover emissions covered by AAUs, these cannot be substituted for each other, i.e. an installation with a commitment under EU ETS cannot meet its obligation by purchasing AAUs. This means that there are two separate but parallel ET schemes, EU ETS and Kyoto, with some restrictions included in the EU ETS scheme that are not present in the Kyoto flexibility mechanisms, in order to promote domestic actions within the EU. Therefore, when speaking about a joint EU ETS and Kyoto registry, we are speaking of the parallel accounting of units under two different emissions trading schemes, which are nevertheless linked– “transfers of allowances to another Member State shall involve corresponding adjustments of assigned amounts under the Kyoto Protocol.”

Accounts within the national registry under EU ETS

The allocation of EU ETS allowances determines what account holders appear in the EU ETS registry as obligated entities. There are also other entities apart from the obligated entities that can hold accounts in the registries under both schemes, these are the accounts of participants in allowance trade, as well as private persons and NGOs who can buy allowances with the intention of cancelling them.¹⁷

The identity of obligated allowance holders is determined in a multi-step process:

- Overall national goal: The number of emissions allowances allocated to installations is to be determined at a national level, based on certain common principles elaborated in Annex III of the amended proposal for a Directive, ensuring that “the total quantity of allowances to be allocated (...) shall be consistent with the Member State’s obligation to limit its emissions pursuant to (...) the Kyoto Protocol.”
- Obligated installations are installations which conduct activities listed in Annex I: The emissions allowances are to be allocated to installations undertaking activities listed in Annex I of the Directive, according to principles stated in the Directive (later harmonisation of the method of distribution is possible), covering about 46% of projected emissions of the EU in 2010, equivalent to approximately 38% of the EU’s projected emissions covered by the Kyoto Protocol. Pooling of allowances is possible under EU ETS, in this case several entities hold one account together.
- Entities that wish to participate in trade: the question arises whether the requirements to participate in emissions trade will be the same for both ET schemes. Entities wishing to buy allowances to cancel them may also participate.

The retirement and cancellation of EU ETS units would be separate from the retirement and cancellation of units under Kyoto. This is so, because retirement under EIT and EU ETS would be to demonstrate the fulfilment of different obligations. Somehow the problem of

¹⁷ *The EU ETS Directive Article 12 states that “Member States shall take the necessary steps to ensure that allowances can be cancelled at any time at the request of the person holding them”, the explanatory memorandum to the proposed Directive states that this “would provide for the meaningful participation of civil society.” FCCP/CP/” §§’/”/Add.4 states that “legal entities, where authorised by the Party, may also perform [the] function [of cancelling allowances].*

cancellation accounts would have to be solved. For the cancellation accounts, the UNFCCC requires at least 3 cancellation accounts, while the EU ETS does not mention differentiating between different cancellation accounts. The accounts of account holders (obligated entities under the EU ETS as well as trade participants and NGOs) could be separate, holdings and transfers of both EU ETS and IET allowances could be tracked in the same account. It is not clear whether various considerations (user friendliness, software considerations, etc.) would favour one or the other solution, and to what extent the EU ETS and Kyoto registries would be integrated.

Links of the EU ETS registry to other systems

The EU ETS registry has to be linked to several other systems:

- Transaction log for EU ETS
- National registries of other countries for tracking allowances under EU ETS
- National registries under Kyoto
- EU non-ET schemes aimed at GHG reduction
- Other ET schemes outside the EU
- Access to information has to be provided for the public
- Reporting based on data from NR to the Commission
- Reporting, monitoring and verification of emissions

The linkages between the NR under EU ETS and other systems are of different types.

Links that involve transactions:

- Links between national registries of different countries under EU ETS: it is not yet known whether the EU will have a single registry, Article 26 of the proposed Directive states that “*The Commission may draw up a report on the operation of the Directive, considering: (...) whether it is appropriate for there to be a single Community registry.*” Such a proposal, if made, will have to be made by the 30th of June 2006.
- Links between the NR under EU ETS and other ET schemes: mutual agreement between countries is a prerequisite to the recognition of allowances from other schemes: Article 24 of the proposed EU ETS Directive states that “agreements should be concluded with third countries listed in Annex B to the Kyoto Protocol which have ratified the Kyoto Protocol to provide for the mutual recognition of allowances between the Community greenhouse gas emissions trading scheme and other greenhouse gas emissions trading schemes (...)” The registry therefore has to be designed in such a way that it is capable of linking to other electronic registries, and can store data of a different format than that used for tracking allowances under EU ETS (e.g. different format for unique identifier of allowances).

Links that involve a one-way flow of information only:

- Public access to information: Article 17 of the EU ETS proposed Directive requires that “decisions relating to the allocation of allowances and the reports of emissions under the greenhouse gas emissions permit and held by the competent authority shall be made available to the public.” This means that there is need for public access to information which can also be provided through the internet - though the means for providing the information are not specified - similarly to publicly accessible information under Kyoto.

Links that involve a feed-back of information:

- Transaction log: a transaction log maintained by the secretariat will exist for checking operations of registries under the Kyoto Protocol, and another transaction log, maintained by a Central Administrator designated by the Commission, will exist for checking transactions and other operations under EU ETS. Article 20 of the proposed EU ET Directive states that “the Commission shall designate a Central Administrator to maintain an independent transaction log recording the issue, holding, transfer and cancellation of allowances. The Central Administrator shall conduct an automated check on each transaction in registries through the independent transaction log to ensure there are no irregularities in the issue, transfer and cancellation of allowances.”
- Reporting by Member States: Member States are required to report to the Commission on issues relating to the operation of the trading scheme, including experience with allocation, the operation of national registries, monitoring, reporting, verification, and enforcement.
- Reporting, monitoring and verification of emissions by installations to the competent authority in the given Member State.

Influence on design considerations, reconciliation of various policy goals and tools (this does not influence registry development):

- EU non-ET schemes: Article 3 of the EU ETS Directive states that an allowance is “valid only for the purposes of meeting the requirements of [the EU ETS] Directive. Annex III to the Directive states that “the plan shall be consistent with other EC legislative and policy instruments”
- NR under Kyoto: the memorandum to the proposed Directive states that “In addition to the transaction log function exercised by the Central Administrator, the Commission wishes to be integrated into the network of national registries for the purpose of monitoring progress towards the Community’s own international commitments under the United Nations Climate Change Convention and the Kyoto Protocol. *Such integration should not only comprise having access to a network of national registries linked to the EU’s emissions trading scheme, but should also be able to serve as the European Community’s registry in the context of the Kyoto Protocol’s flexibility mechanisms.*” Article 19 of the proposed Directive also states that “The Commission shall adopt a regulation (...) to ensure that transfers are not given effect where this would be incompatible with obligations resulting from Kyoto.” This means that the transaction log of the EU ETS will have to be linked with the UNFCCC transaction log, or be able to perform the same checks in order to determine that a transfer is in compliance with Kyoto. It is not clear whether this will affect registry development in any way.

- International project-based mechanisms: Credits acquired from project-based mechanisms can be traded under the Kyoto Protocol flexibility mechanisms, with some restrictions on sequestration projects and on the carrying-on of credits, and subject to observing the principle of supplementarity. Under the EU ETS scheme the method of inclusion of credits acquired from international project-based mechanisms is still uncertain, the explanatory memorandum to the proposed Directive stated that “if the rules agreed by the UN are insufficiently robust in terms of environmental value, it is possible that one or more Member States may want to not allow entities to use these credits to meet their obligations (...) if other Member States continued to allow the use of these credits, Member States trying to restrict their domestic use would find it particularly difficult to do so, There is thus an environmental integrity concern, but the amended proposal for a Directive states that the recognition of credits from project-based mechanisms for fulfilling obligations under this Directive as from 2005 will increase the cost-effectiveness of achieving reductions of global greenhouse gas emissions and shall be provided for by a Directive for linking Project-based mechanisms including Joint Implementation (JI) and the Clean Development Mechanism (CDM) with the Community greenhouse emission trading scheme.” The Proposal for this Directive is due to be finished by April this year.

Conclusion

There are two main issues the accession countries have to consider when developing their registries. Firstly, it is possible that the EU will operate a single consolidated registry, since the Marrakech Accords provides for this, and the EU ETS seems to want to keep this option open. The second main issue is that the EU may want to operate the same registry for EU ETS as for the tracking of allowances under Kyoto. The issue of having a consolidated registry will be settled no sooner than 2006, which is the latest date by which the Commission can submit a report proposing a consolidated registry. The issue of having a joint EU ETS and Kyoto NR is even further from implementation, since this possibility is not stated in the amended proposal for a Directive, only briefly mentioned in the explanatory memorandum to the proposed Directive.

The accession countries need to take these possibilities into consideration only as a long-term possibility. For the time being, they need to start considering creating both a NR for EU ETS and one for tracking allowances under international emissions trade and project-based mechanisms. The countries can consider whether they want to operate the registries under the two systems as one registry, though enough information is not yet available to decide on all operative matters. This means that the registry at this stage has to be developed in such a way so as to be easily adaptable to changes, e.g. in data formats, or in developing links to ET registries of countries outside the EU.

Consideration can be given to the issue of the extent of integration of the EU ETS and Kyoto registries. The registries have to keep track of allowances from the two systems separately and report to separate bodies, and their transactions have to be checked by different transaction logs, there will be different central cancellation and retirement accounts under the two schemes. Other issues, mentioned previously, such as possible differences in requirements for authorisation to participate in trade also arise. But the registries can be integrated to some

extent, to ease use of the system to account holders and the public. Different kinds of allowance holders may want to hold allowances under both systems, participants in ET trade may want to trade both types of allowances, NGOs may want to cancel both types of allowances, the public can be interested in information regarding both schemes, so the registries may be integrated in such a way that the user interfaces for the two systems are not separated.

APPENDIX III. FUNCTIONALITY OF THE UK ETS REGISTRY AND THE ENVIRONMENTAL RESOURCES TRUST REGISTRY

I. PUBLIC FUNCTIONS

UK ETR

Reports available electronically:

- Targets and initial allowances for direct participants
 - Winners
 - Overall target (tCO₂e)
 - Annual target for year 1 (tCO₂e)
 - Baseline
 - Baseline – Yr 1 annual target = Yr 1 annual allowances
- Information on all accounts in the registry including contact details
 - Organisation name
 - Organisation ID
 - Account name
 - Account ID
 - Contact First name
 - Contact Surname
 - Address
 - Address2
 - Address 3
 - Address 4
 - Postcode
 - Email
 - Transaction log details for all transfers in the previous compliance period
 - Total baseline and annual emissions for direct participants
 - Compliance status for each direct participant
 - Annual credit allocation for all projects

Ecoregistry (Environmental Resources Trust)

The public can view allocations of emissions rights, emissions and reductions in emissions achieved by companies under “current system compliance status”, as well as details on trading under “annual trading” and the “system balance report” which gives information on the total number of emissions right versus the total amount of emissions.

GHG reports:

Current system compliance status

(Note: Does NOT include pending Trades.)

- Current Year Total
- Allocations
- Prior Balance
- Allowances Purchased

- Allowances Sold
- Emissions
- Pending Emissions
- Reductions
- Pending Reductions
- TOTAL
- Status 2002 not yet CLOSED

Annual Trading

System Balance Report

- System Allocation
- Credits
- Balance forward
- Project Credits
- Purchases outside ETS
- Debits
- Emissions
- Sales outside ETS
- End of year balance
- Cum system balance

II. ACCOUNT HOLDER FUNCTIONS

UK ETR¹⁸

- User Registration (Company or Individual)
- User Management (create new, revoke, promote/demote, reset password, change user details)
- Account Management (open “Trading” account, close, balance enquiry, view transaction history, access control)
- Transfer Management (initiate transfer, cancel allowance, request project credits)
- Compliance Functionality (record actual emissions, retirement request)
- Report Functionality
- Emails (notifications, email ETA)

ETR Registry

Add business units

- Add the business unit
Company Name*
Use Parent Company Address (or)
Address 1* :

¹⁸ *Martin Devine*

Address 2 :
City* :
State* :
Postal Code* :
Country* :
SIC Code :
Parent Company ID :
If this is not a subsidiary/business unit, leave this blank.
Member :
Broker :

- Add the business unit admin user
 - *Last Name :
 - *First Name :
 - *Login ID :
 - *Password :
 - *Confirm Password :
 - *Company ID :
 - *Group :
 - Title :
 - *Telephone :
 - Fax :
 - E-mail :
 - Use Company Address (or)
 - Address 1 :
 - Address 2 :
 - City :
 - State :
 - Postal Code :
 - Country :
- Transfer allowances to business units
 - Company :
 - Year :
 - Tonnes :
 - Withholding %

Add reporting points

- Add an emission point type
 - Name of type
 - Description
 - Active
- Add the emission point data
 - Point Name :
 - Company ID :
 - Point Type :
 - Active :
 - Use Company's Addresss (or)
 - Address 1 :
 - Address 2 :
 - City :

State:

Zip_code:

Country :

- Add the reduction project data
Project Name :
Company ID :
EIA Project ID :
Project Type :
Operational Date :
(Format: DD-MM-YYYY)
Location :
Estimated Reductions : (tonnes)
Description :
Duration :
(years)
Active :
Use Company's Addresss (or)
Address 1 :
Address 2 :
- View reporting points
Point ID
Point Name
Point Type
Company Name

Perform bulletin board functions

- Post bids or offers
Company Name :
Orange County Power and Electric
*Contact User ID :
Bid Offer Type :
Bid Offer Amount : (tonnes)
Bid Offer Price : \$
Active :
Effective Date :
Description :
- View bids or offers
Pick
Company Name
Contact
Amount
Posted Date
Price
Description
- Add/Delete/Edit bids or offers
Type
Amount
Posted Date
Price

Description
tonne(s)

Document trade

- Sale to another system participant
 - Document sale data
 - Buying Company Name :
 - Trade Type :
 - Vintage :
 - Trade Amount :
 - Cost :
 - Cost per Tonne :
 - Seller Contact ID :
 - Date of Trade :
 - buyer completes sale
 - Buyer :
 - Buyer Contact :
 - Seller :
 - Vintage :
 - Quantity :
 - Date :
 - Cost : \$
 - Cost per Ton :
- sale to a non-participant
 - document sale data
 - Buying Company Name :
 - Trade Type :
 - Vintage :
 - Trade Amount : (tonnes)
 - Cost :
 - Cost per Tonne :
 - Seller Contact ID :
 - Date of Trade :
- Purchase from a non-participant
 - Selling Company Name :
 - Trade Type :
 - Vintage :
 - Trade Amount : (tonnes)
 - Cost :
 - Cost per Tonne :
 - Buyer Contact ID :
 - Date of Trade :

Add emission point type

- View list of existing types
 - Active Reporting Emission Points
 - Point Type
 - Description

- Date
- Add point type
 - Name of type
 - Description
 - Active

Report Emissions/reductions

- Select the reporting point and year
 - Reporting point name
 - Year
- Add the gas type for selected reporting type
 - Point Name :
 - Year :
 - Amount of Units:
 - Gas Type:

True-up end of year status

Reports

- List allocations
- List allowances
- Tradable balances
- Company compliance status
- System compliance for year
- Corporate structure in GHG
- Participants
 - Company
 - State/Province
 - Country
- Annual trading
- How are we doing?

Edit allowances transferred to business unit

Edit company data

- Select company to edit
 - Company name
 - Business unit
- Edit company data
 - Address 1* :
 - Address 2 :
 - City* :
 - State* :
 - Postal Code* :
 - Country* :

SIC Code :
Parent Company Name :
Member :
Active :
Broker :

Edit business unit data

- Select business unit
Company name
Business unit
- Edit selected business unit
Address 1* :
Address 2 :
City* :
State* :
Postal Code* :
Country* :
SIC Code :
Parent Company Name :
Member :
Active :
Broker

Edit reporting point data

- Select reporting point
Reporting point name
- Edit selected reporting point
Address 1 :
Address 2 :
City :
State:
Zip_code:
Country

Edit user data

- Update user data
Edit User Information
Last Name :
First Name :
Login ID :
Password :
Confirm Password :
Company ID :
Group :
Title :
Telephone :
Fax :
E-mail :

Use Company Address (or)
Address 1 :
Address 2 :
City :
State :
Postal Code :
Country

MANAGEMENT FUNCTIONS

UK ETR¹⁹

- All the Internet System Functionality
- *plus...*
- Account Management (freeze account, open compliance and other accounts, audit account/organisation activity)
- Allowance Decision Functionality (approve project credits, award UK ETA allowances, flag suspect allowances)
- Compliance Management (approve retirement requests, revise actual emissions)
- Regulatory User Management (create new, revoke, reset password, change user details)

¹⁹ *Martin Devine*