Study Tour Chilean Experts 2017

Registry
GIZ Study Tour – Chilean Delegation

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E 2.4 – Registry Administration

Berlin, 13 December 2017 – DEHSt / German Emissions Trading Authority

Outline

1 **General principles**

2 **German example**

3 **Lessons learnt and recommendations**

4 **Security & Fraud Prevention**

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General principles

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Emissions Registry System

- A registry is an electronic database system
- Generally a registry …
  - contains accounts and emission certificates
  - holds account holders and account representatives
  - can be accessed by users through the internet
  - can be used to carry out transactions
  - has a secure private section and a public section
- Every Kyoto Protocol party has to maintain its own national registry or a consolidated registry
- A registry system can be conducted as a stand alone system or as a system connected to other national or regional systems
- European Member states are operating a single consolidated system - the "Union Registry"

➢ *Registry is similar to Online Banking System*

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Specifications for maintaining a registry system

Technical Specifications

- Kyoto Protocol level
    - **DES** – **D**ata **E**xchange **S**tandards for registry systems under the Kyoto Protocol
- EU-ETS level
    - Until 2011 regulated in the EU Registry Regulation based on the DES of the Kyoto protocol
    - From 2012 on regulated by the **DETS** – **D**ata **E**xchange and **T**echnical **S**pecifications

Legal Specifications

- Commission Regulation (EU) No 389/2013 of 02/05/2013
    - amended through the Delegated Regulation (EU) 2015/1844, which is in force since 13/10/2015

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Defined Processes
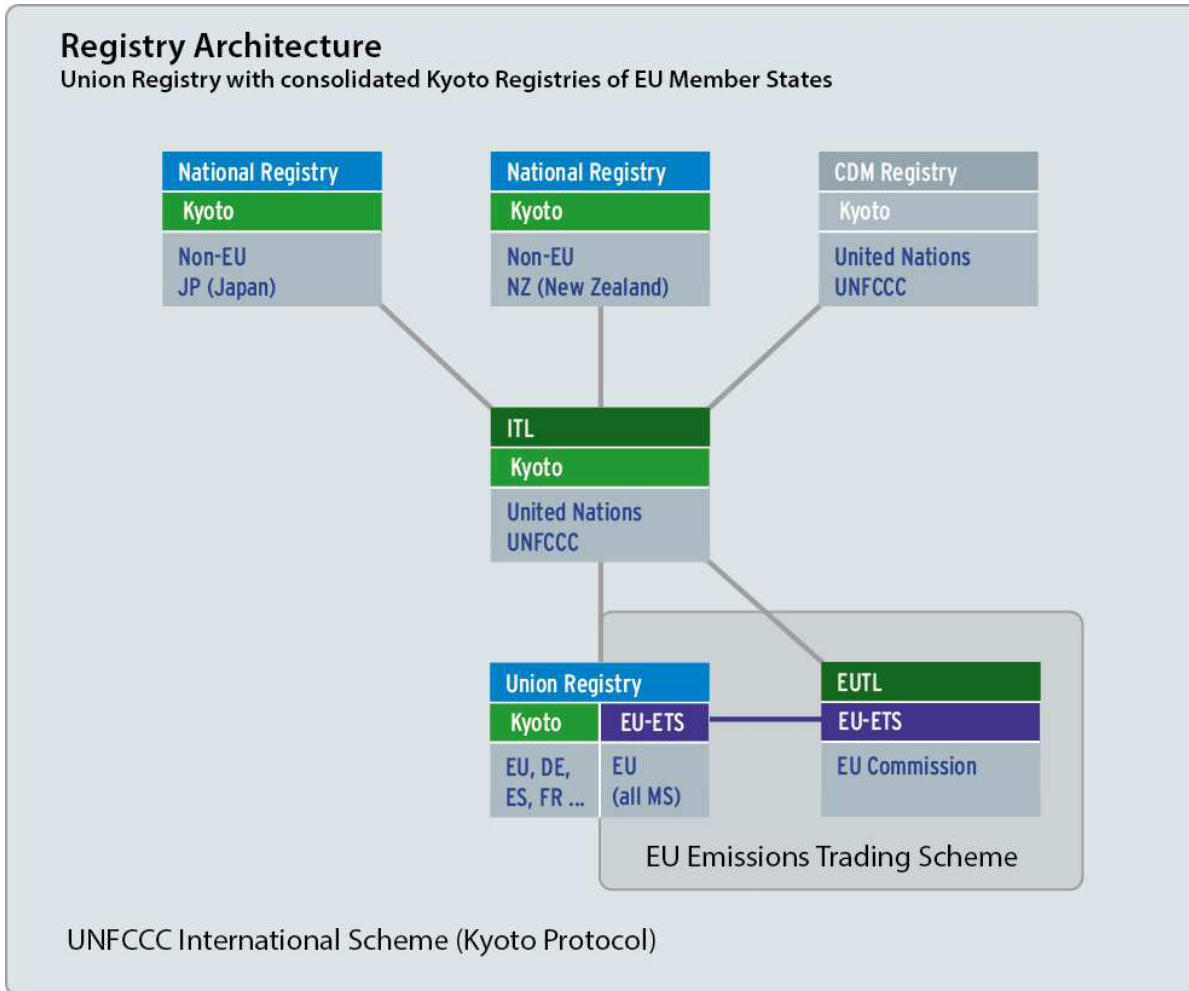
DES regulates in detail the following processes

- Data exchange mechanism specifications
- Unit transaction processes
- Reconciliation processes
- ITL administrative processes
- Data logging specifications
- Change management specifications
- Registry initialisation specification

➢ *ITL operated by the United Nations Framework Convention on Climate Change (UNFCCC) provides excellent documentation about all aspects*

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Union Registry

since January 2012 (fully available since mid 2012)

- Union registry functions as a Kyoto registry as well as a EU-ETS registry
- Hosting and software development of the Union registry is managed by EU Commission / DG Climate Action
- Member states are responsible for account and user management and user support (1st and 2nd level support)
- Since January 2012 aviation part is operational
- Migration of existing national registries took place in June 2012
- After migration Union registry covers complete EU-ETS and Kyoto functionalities
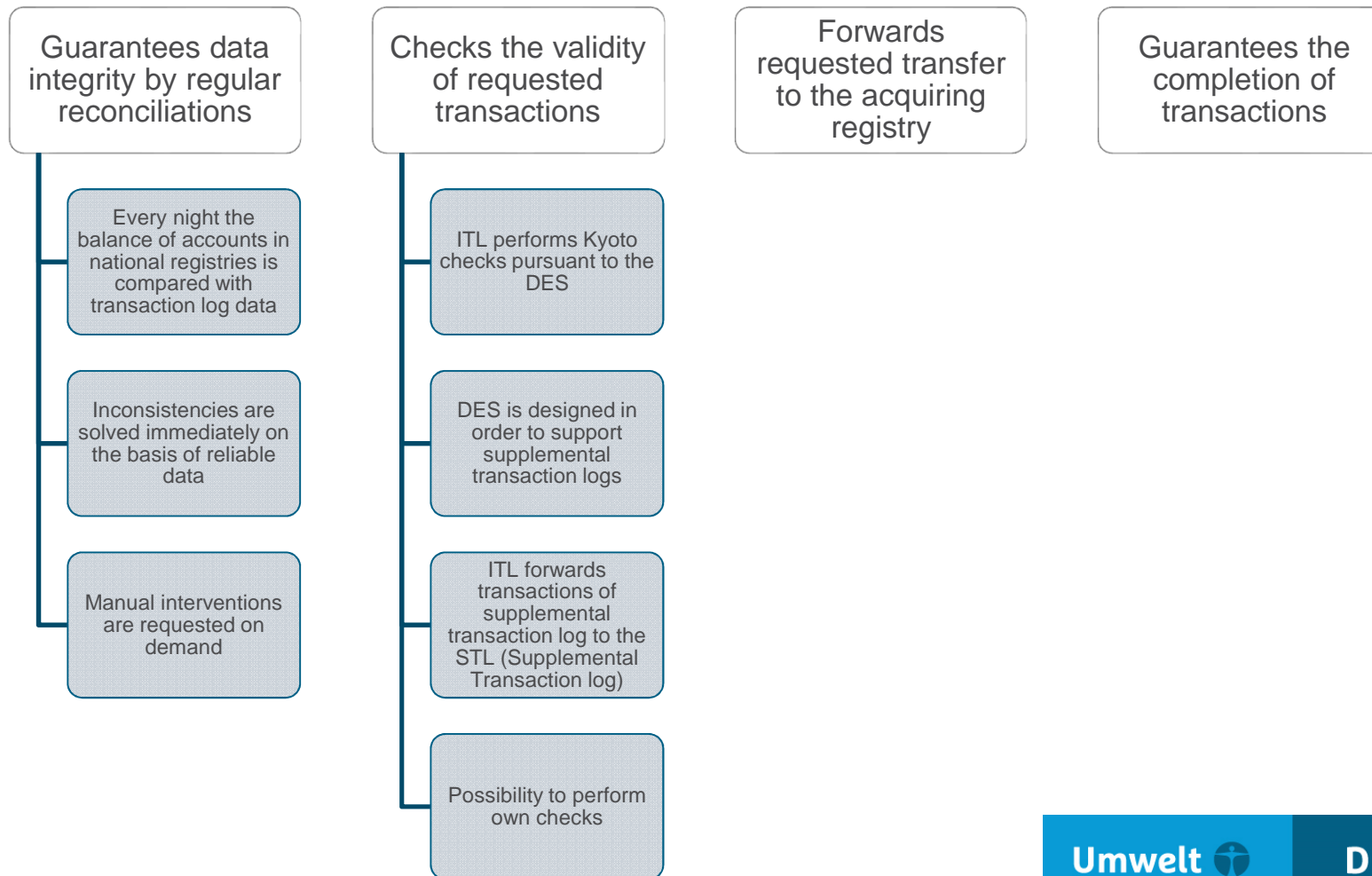
Architecture of the International Registry System

Registry Architecture
Union Registry with consolidated Kyoto Registries of EU Member States

National Registry	National Registry	CDM Registry
Kyoto	Kyoto	Kyoto
Non-EU JP (Japan)	Non-EU NZ (New Zealand)	United Nations UNFCCC

ITL
Kyoto
United Nations
UNFCCC

Union Registry
Kyoto | EU-ETS
EU, DE, ES, FR ... | EU (all MS)

EUTL
EU-ETS
EU Commission

EU Emissions Trading Scheme

UNFCCC International Scheme (Kyoto Protocol)

Linking with the ITL is only possible for Annex I countries of the Kyoto Protocol

The ITL – International Transaction Log

Purpose of independently maintained transaction logs

Guarantees data integrity by regular reconciliations	Checks the validity of requested transactions	Forwards requested transfer to the acquiring registry	Guarantees the completion of transactions

Guarantees data integrity by regular reconciliations
- Every night the balance of accounts in national registries is compared with transaction log data
- Inconsistencies are solved immediately on the basis of reliable data
- Manual interventions are requested on demand

Checks the validity of requested transactions
- ITL performs Kyoto checks pursuant to the DES
- DES is designed in order to support supplemental transaction logs
- ITL forwards transactions of supplemental transaction log to the STL (Supplemental Transaction log)
- Possibility to perform own checks

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Account Types

Different account types for different purposes

- Kyoto account types

    - National holding account (type 100)

    - Operator holding account (type 120)

    - Person holding account (type 121)

    - Cancellation accounts for special purposes (types 210 to 250)

    - Retirement account (type 300)

    - Replacement accounts for special purposes (types 411 to 423)

- European registries use Kyoto account types for internal purpose
- 31 different account types altogether

- ➢ *Distinct account types are useful but specific account types for each case is too much of a good thing*

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Kyoto Unit Types

AAU
Assigned Amount Units

- Units representing the initial assigned amount of each Annex B Party

RMU
Removal Units

- Units given for net removals from land use, land-use change and forestry activities

ERU
Emission Reduction Units

- Units converted from AAUs or RMUs on the basis of JI projects

CER
Certified Emissions Reductions

- Credits given for emission reductions certified for a CDM project

tCER and **ICER**
Temporary and Long-term CER

- Credits for emission removals certified for an afforestation or reforestation CDM project

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Unit Types of the EU ETS

Kyoto unit types can be used in the EU-ETS

EUA
EU-Allowances
and aEUA
Aviation EU Allowances

- EUA and aEUA are allocated for free or auctioned to operators
- EUA and aEUA can only be transferred within the Union Registry

Kyoto units
allowed to be exchanged by operators

- ERU (converted from AAU) and CER can be exchanged up to a limited amount and only from specific projects

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Elements of serial numbers – source of information

- 1st element: Originating registry
- 2nd element: Unit type
- 3rd element: Supplementary unit type
- 4th element: Unit serial block start
- 5th element: Unit serial block end
- 6th element: Originating commitment period
- 7th element: Applicable commitment period
- 8th element: LULUCF activity (only RMU, ERU, tCER, ICER)
- 9th element: Project identifier (only RMU, ERU, tCER, ICER)
- 10th element: Track (only ERU)
- 11th element: Expiry date (only tCER and ICER)

- Example EUA from 2008-2012: **DE**-**1**-**1**-**2343245**-**2345000**-**1**-**1**

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Account Balance

Account Main	Holdings	Authorised Representatives	Additional Authorised Representatives	Trusted Accounts	Account Statements

ID	Account Holder Name	Account Name	Account Status	Account Type
EU-100			Open	Trading Account

Page 1 of 1 (20 rows found) — 20

Unit Type	Original CP	Applicable CP	Project Number	Project track	Eligible	Ineligible	Balance	Reserved for transaction
Aviation allowance	2	2			0	0	4,034,046	0
General allowance	2	2			0	0	82,231,062	0
CER	1	1	CL248		60,000	0	60,000	0
CER	1	1	CN1008		31,340	0	31,340	0
CER	1	1	CN1276		2,673	0	2,673	0
CER	1	1	CN1452		5,673	0	5,673	0
CER	1	1	CN544		11,128	0	11,128	0
CER	1	1	MX163		9,890	0	9,890	0
CER	1	1	MX53		407	0	407	0
CER	1	1	MX57		85	0	85	0
CER	2	2	CN3503		4,673	0	4,673	0
CER	2	2	CN4725		134,141	0	134,141	0
CER	2	2	UZ3339		24,156	0	24,156	0
ERU from AAU	1	1	DE1000168	TRACK_1	34,275	0	34,275	0
ERU from AAU	1	1	RO1000219	TRACK_1	55,040	0	55,040	0
ERU from AAU	1	1	RU1000366	TRACK_1	3,243	0	3,243	0
ERU from AAU	1	1	UA1000438	TRACK_1	13,220	0	13,220	0
ERU from AAU	1	1	UA1000492	TRACK_1	285,545	0	285,545	0
ERU from AAU	1	1	UA1000499	TRACK_1	4,789	0	4,789	0
ERU from AAU	1	1	UA1000513	TRACK_1	150,000	0	150,000	0
				Total:		87,095,386		

Page 1 of 1 (20 rows found) — 20

GREEN: eligible to be held and used on an EU ETS account

RED: ineligible to be held and used on an EU ETS account.

Propose a transaction

15

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Transaction Types in a Kyoto Registry

Different transaction types for different purposes

- Kyoto transaction types (examples)
  - 01 00 Issuance – Initial creation of a unit (AAU, CER)
  - 02 00 Conversion – Transformation of AAUs to create an ERU
  - 03 00 External – External transaction of units between registries
  - 10 00 Internal – Internal transaction of units within a registry
  - 04 00 Voluntary cancellation
  - 05 00 Retirement – Transaction in order to fulfil Kyoto requirements
  - 06 00 Replacement – Replacement of tCER or lCER
  - 07 00 Carry-over – Change of validity to subsequent Commitment Period
  - 08 00 Expiry date change

Supplemental transaction type, useable by supplemental systems

Kyoto transaction type

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Additional Transaction Types

Examples for possible use (as long as EUA were linked with AAU)

- Retirement for ITL but additional purposes in EU ETS
    - 05-01 Retirement surrendered EUA
    - 05-02 Retirement unallocated EUA

- Internal Transaction for ITL but additional purposes in EU ETS
    - 10-02 EUA surrender
    - 10-41 Cancellation and replacement
    - 10-52 EUA issuance
    - 10-53 EUA allocation
    - 10-61 Conversion surrendered EUA
    - 10-62 Conversion unallocated EUA

Supplemental unit type, useable by supplemental systems

Kyoto transaction type – internal transaction

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Role Management

Registry software facilitates different user roles

external:
- Authorised representative
- Account holder
- Verifier
- Additional authorised representative
- read only access

internal:
- Registry administrator
- Database Manager
- Service desk
- Technical administrator

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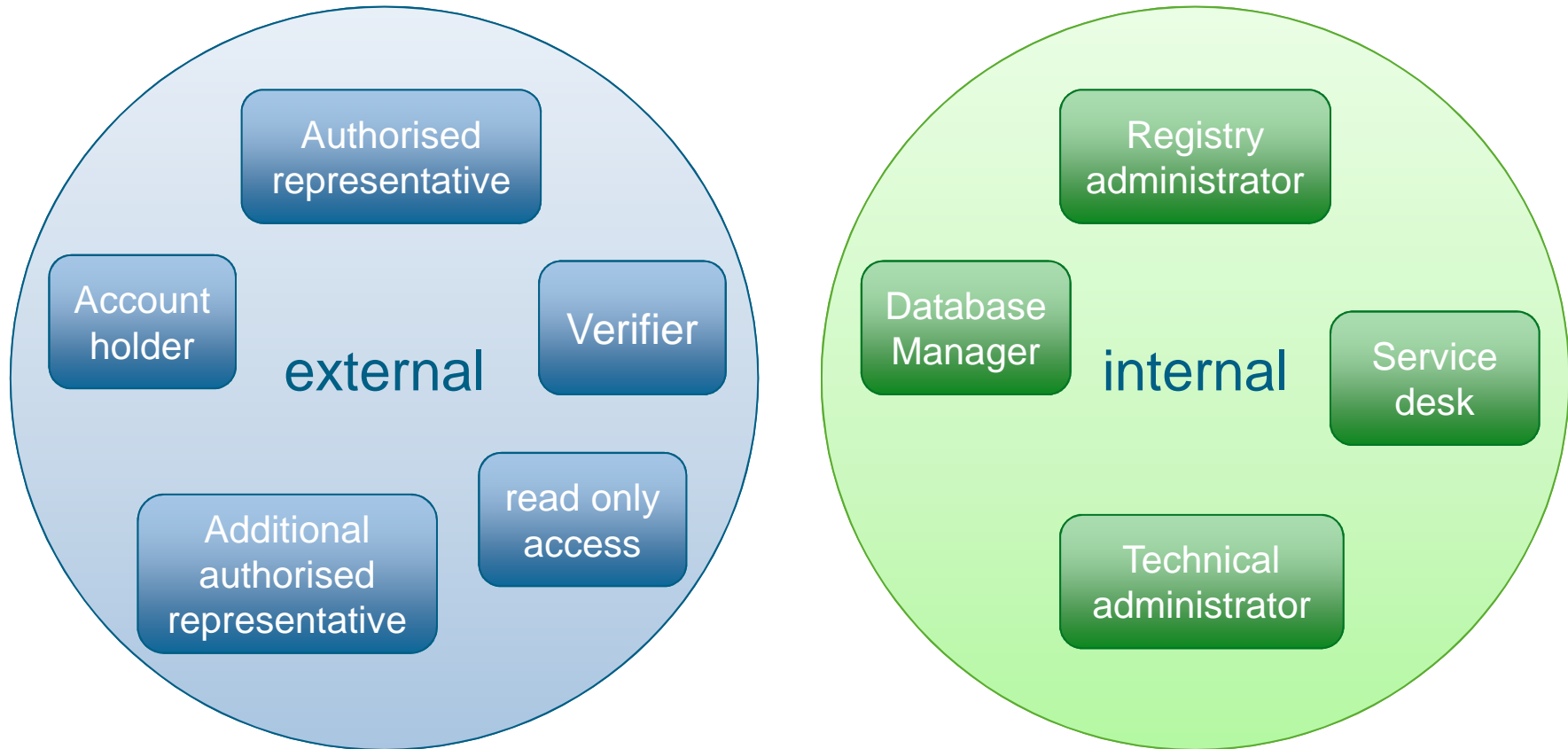
User Roles 1/2

Account representative (AR)

- Conducting or proposing transactions, changing account information (acc. holder, its own personal data, nominates or remove AR/AAR, link verifier to installation account, sets transaction limits, selects acquisition price management
- Only he can change its own personal data

Additional account representative (AAR)

- Approves by AR proposed transactions, have access to transaction list, account balance, account information
- Only he can change its own personal data

Account representative of a verifier

- Enters verified emissions to linked installation accounts
- Only he can change its own personal data

Account holder (AH) and account contact

- Both have no access to the account

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User Roles 2/2

Technical administrators

- Claim applications, Approves or reject account applications,
- Changing of AR/AAR, changing or entering verified emissions
- Approves or rejects mobile phone numbers of AR/AAR
- Setting transferrable unit types per account
- Setting limits for surrendering of CER/ERU
- Setting start and end date of EU ETS participation
- Disable login for particular users
- Resetting password for AR/AAR
- Initiates reclaims and monitors its fulfilment

National administrators (NA)

- Same as technical administrators
- Issuance (creation) of units (AAU)
- Conversion of units (AAU → ERU, AAU → EUA, EUA → AAU)
- Enter national JI-Projects
- Retirement of units in order to fulfil Kyoto commitments
- Upload National allocation table and changes of it
- Initiate automated allocation transactions
- Create national holding accounts and other Kyoto account types (Cancellation, Retirement etc.)
- Carry-over of AAU, CER, ERU
- Generate Kyoto reports
- Manage reconciliations and data discrepancies
- Registry clean up at the end of a trading period

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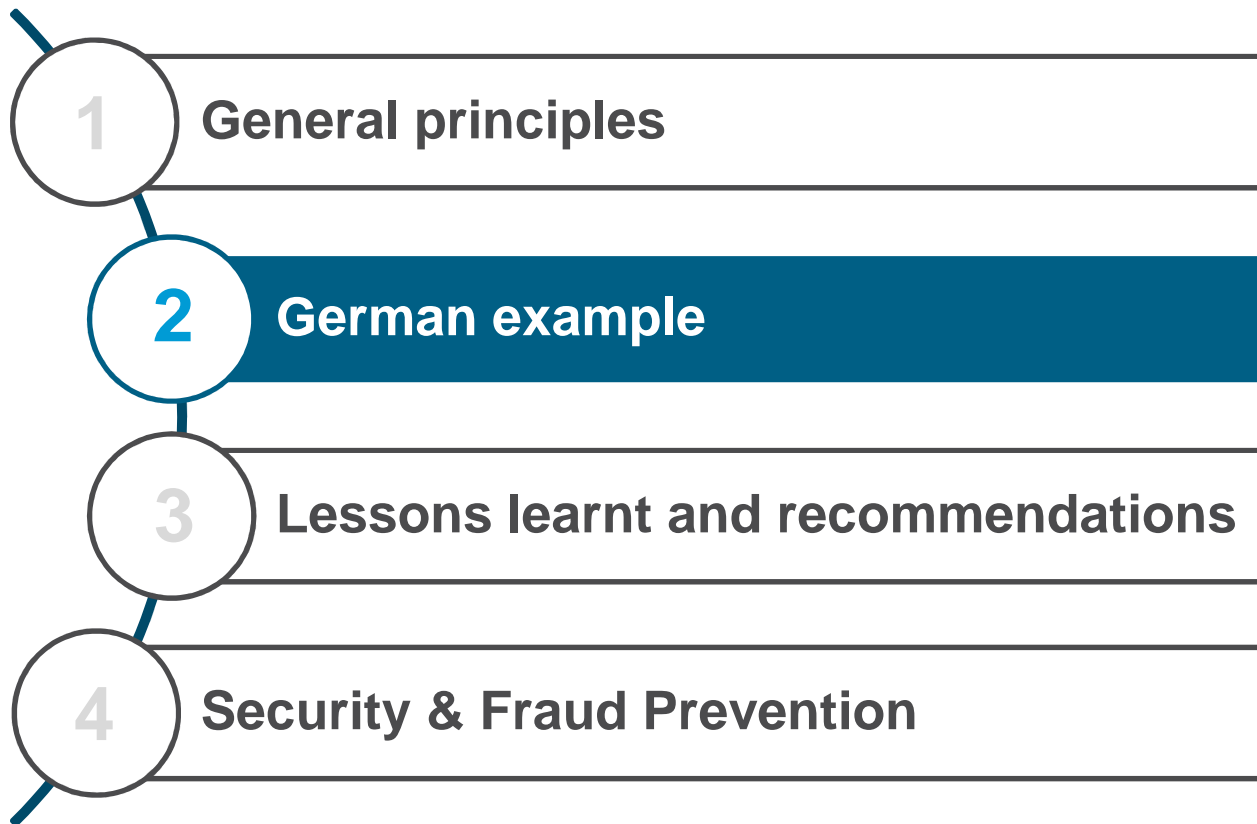
DEHSt Help Desk requests (E-Mail + Telephone)

Category	2016	2015
Registry	883	1342
Virtual Post Office	784	969
Electricity price compensation	512	710
Allocation 2013-2020 (+CL,MzB)	379	455
Events	354	511
Miscellaneous	348	437
Monitoring	336	390
Forms Management System	298	201
Reporting 2013-2020	282	274
Aviation	197	378
Mailings	146	101
Legal topics	124	212
JI / CDM / Carbon Offsetting	82	63
Job / internship inquiries	46	72
Fees	40	50
Verifiers	15	27
Phone calls to experts	0	295

■ 2016 ■ 2015

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End user Support

3 levels of support
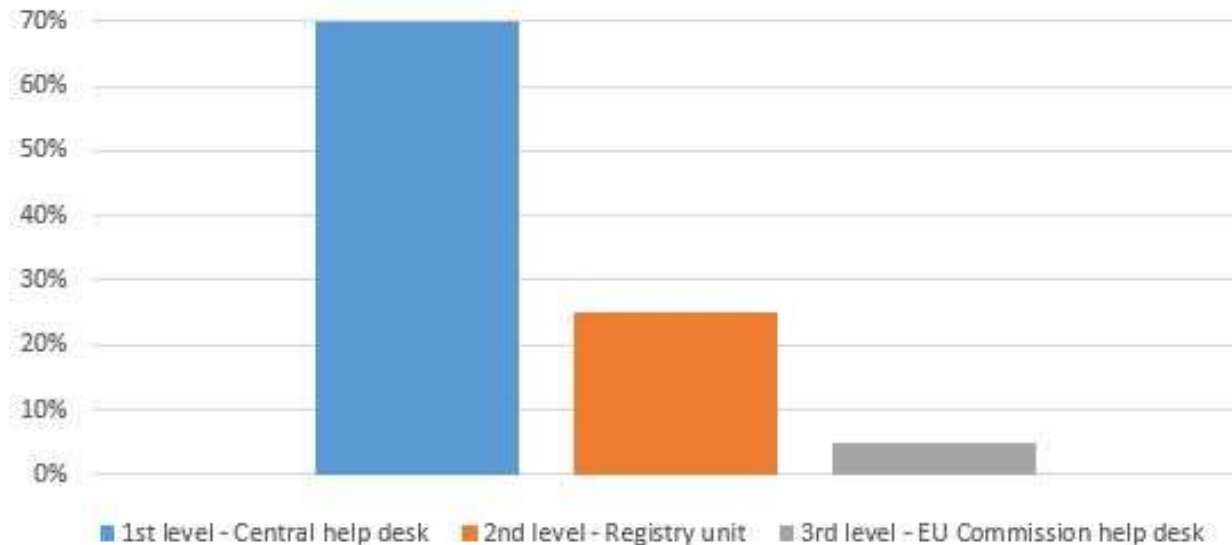
- User guides (needed for different roles)
- General information and FAQs on the Website
- Training courses at introduction and on demand
- High frequency of user fluctuation has to be considered
  - One administrative employee manages up to 500 accounts

Registry Administration Unit 1/4

7 administrative employees

- 2nd level support
- Day-to-day management of the accounts and representatives

1 database administrator (computer scientist)

- Day-to-day management of IT-applications
- Providing data to other units

4 scientific employees (mathematicians and scientists)

- Conceptualizing and further developing software and internal processes
- International coordination and working groups
- Cooperation with other registry administrators
- reporting

1 head of unit (mathematician)

- Management

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Registry Administration Unit 2/4

Administrative tasks

- Account management
    - Account openings (69 last year)
    - Send enrolment keys
    - Approve account representative addition/removal/exchange (>1,700)
    - Updates of account data
- End-of-year-confirmation (per Account holder = 1,400)
- Re-approval of documentation (tri-annual)
- Requests (Government, tax authorities, other national administrators, investigation bodies …)

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Registry Administration Unit 3/4

Working Groups

- UNFCCC
  - Security Working Group
  - CP2 Working Group
  - RSA Forum (annually)
- EC
  - Change Management Board
  - Security Working Group
  - Registry Administrators Meetings (bi-monthly)

Cooperation

- National administrators (informal workshops, preparatory meetings)
- Investigative bodies
- Financial intelligence units

Registry Administration Unit 4/4

- Bug Tracking & Help Desk
  - SMS challenge problems
  - NAT updates
  - ICE table updates
  - Stuck transactions
  - Security related issues
- Software Development
  - REMA processes
  - Transaction analysis
  - Reporting tools
- Documentation – constant adaptation
  - User handbook
  - FAQ
  - Website
  - Forms

Month	Created issues	Resolved issues	Open issues
October 2016	67	61	302
November 2016	154	162	295
December 2016	149	127	317
January 2017	124	132	304
February 2017	130	98	330
March 2017	214	195	342
April 2017	261	277	322
May 2017	100	87	325
June 2017	52	77	297
July 2017	75	72	300
August 2017	66	58	310
September 2017	58	53	315
October 2017	72	71	297

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IT Infrastructure - Main Components in Germany

Emissions Trading Registry

Virtual post office

Installation database

Electronic file system

Application system

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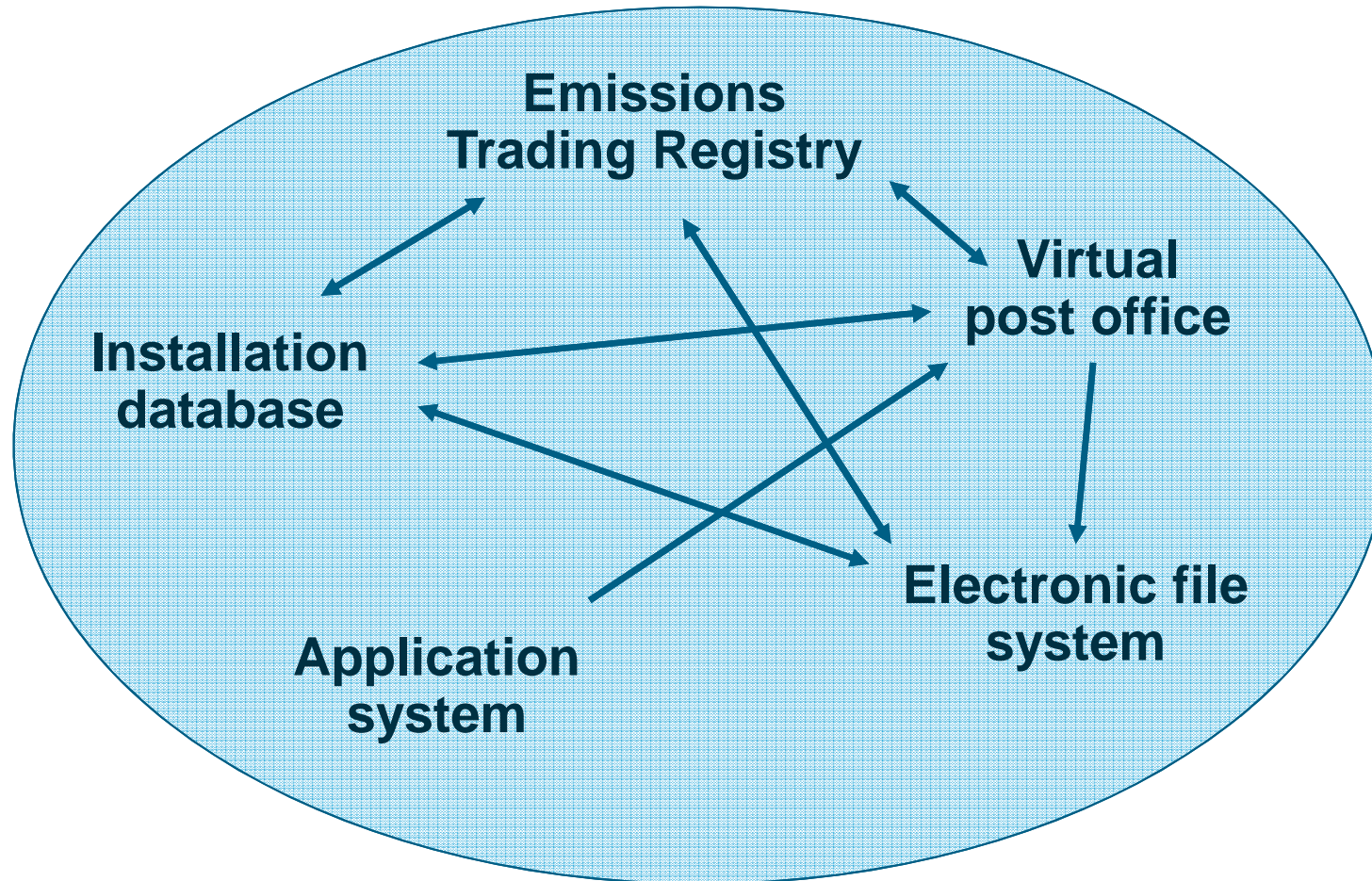
Key Figures

German registry in 2016

>2,500 Open accounts

>1,400 account holders

~5,800 authorised representatives

~900 additional authorised representatives

~25 Verifier accounts

>17,000 performed transactions last year

>7,5 Billion units held on the accounts

~13 Billion transferred units within last trading period

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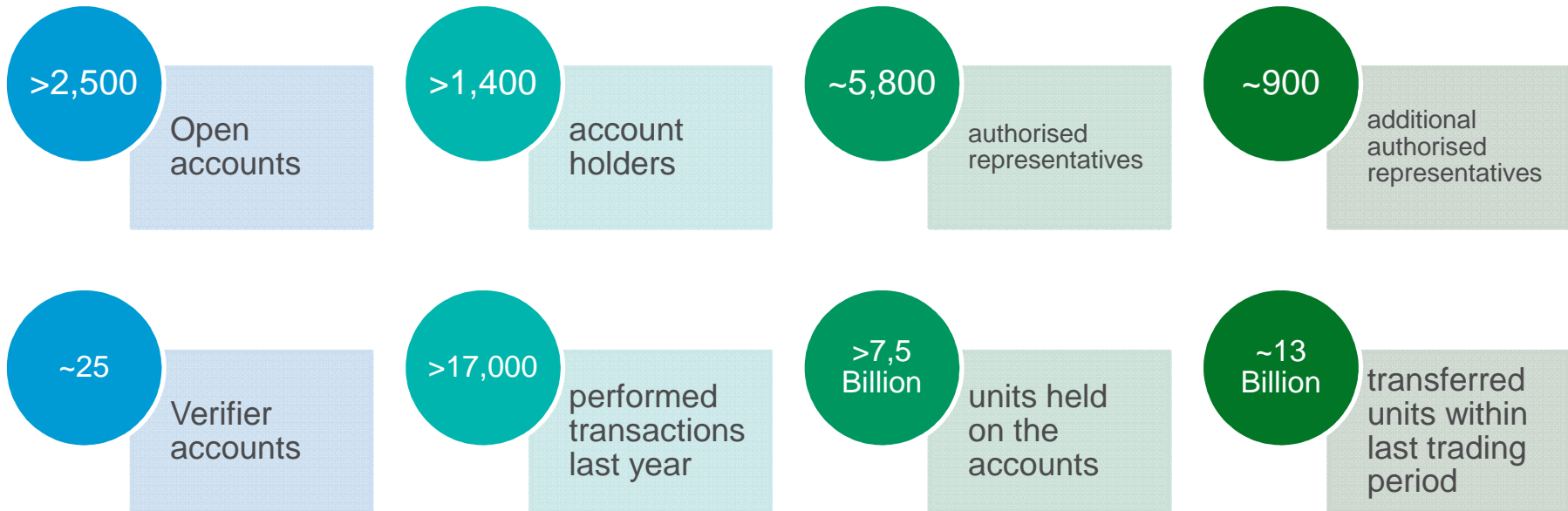
User Information - Account Balance

Source: DEHSt 2011

Account Balance Sheet


Source: DEHSt 2014

Transaction Voucher

Source: DEHSt 2010

1 General principles

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Lessons learnt

- Creation of redundant data
  - address information is gathered by each IT module at different times → (1) different spelling, (2) updating the data has to be done at each module

- Lack of proper historic data management
  - Change of the operator of an installation
  - Change of account representatives
  - "Who was AH/AR at a certain account 5 years ago?" might be something investigative bodies want to know

- Missing price information for emissions certificates in transactions
  - In order to combat i.e. money laundering

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Consideration: Using an existing software solution?
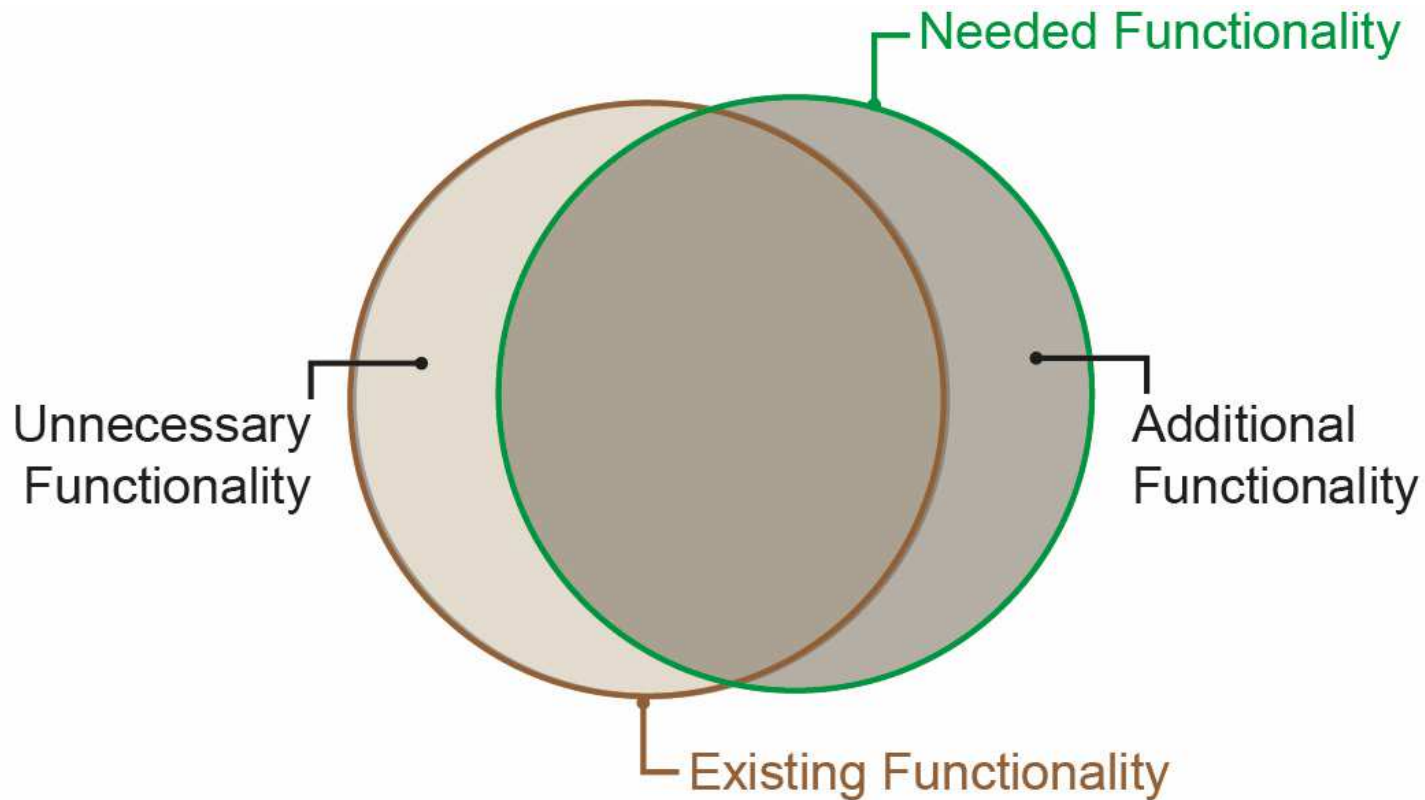
National Adaptation

- Optical adjustments (Logos, colours, font type etc)
- Translations and if necessary additional languages
- Disabling unwanted functionality
    - Public information (?)
    - Role verifier (?)
    - Role contact (?)
    - Automated account blocking in case of non-compliance (?)
- Units
    - Creation process, renaming, new types, used/unused serial elements, new elements (?)
- Transactions
    - Renaming, new types, used/unused types, new types (?), new checks, disabling existing checks

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General recommendations for IT infrastructure

- Open source solutions without license costs
  - Become product owner of the source code
- Modularisation of the different components
- Interfaces between components (modules) are very important
- Determine unique identifiers for the use in each module in order to easily identify installations, account holders and persons
- Avoid redundant data (i.e. operator name, address information)
  - Module address management to hold account holder name and address at one single point
- Avoid adapting standard software to use for your own purposes
  - Otherwise, the adaptation process has to be repeated with each new version of the standard version
- You should plan sufficient time for software development process

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Main Software Functionality

Supports different account types

- Installation acc., National acc., Trading acc., "Evidence" acc. (Retirement), Cancellation acc. and many more
- Different acc. types > different properties > different functions

Supports different unit types

- Currently 7 different UN types and 2 EU ETS types
- Different unit types > different properties > different functions and checks

Supports different user roles

- Acc. holder, acc. representative, administrators, technical administrators, verifier (for emissions)
- During the online account opening process all necessary information is requested, applicant gets a PDF document with the provided information in order to sign and send it in along with all necessary documents (certified passport copy, extract from the trade register, etc)

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Information Needs by Users

Necessary and helpful user information of a registry system

Account balance

- Online, downloadable as PDF and possibly in writing (yearly)

Transactions

- Online and immediate E-Mail notification in case of new transactions

Transaction history

- Online, downloadable as PDF and together with yearly account balance

User login

- Online information about successful and denied logins
- Immediate E-mail notification

Entry of Verified Emissions

- Immediate E-mail notification of the verifier and the account representatives about the entered figure in order to prevent errors

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External Contractors Usually Necessary

Professional external support of the German registry 2008-2012

Hosting Company

- Hosting of the registry application (possibly high availability, high safety requirements)
- Different software environments (production, test for developer, test for service desk, acceptance)
- Distinct emergency platform

SMS Provider

- SMS provider that delivers international SMS

Software Developer

- Development of the registry software
- 3rd level support
- Reporting and documentation
- Consulting

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2 German example

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Legal Provisions

What needs to be foreseen legally in order to protect the ETS?

Recognize the exposure of the ETS

- ETS vulnerable against **VAT fraud** (carrousel fraud)?
  - Reverse-Charge Mechanism – the buyer is paying the VAT instead of the seller
- ETS vulnerable against **money laundering**?
  - Check money flow and try to find patterns
- ETS vulnerable against **terrorist financing**?
  - Check the beneficial owners and the money flow

➢ *Other fraud mechanism possible – Market transparency and monitoring allows to detect fraud and to take counter-measures*

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Phishing Counter Measures

Phishing is a method to steal credentials (username, password, TAN)

E-Mails from the NA without active hyperlinks

- Fraudsters would like to lure a user to a foreign website
- If a user receives an E-Mail with hyperlinks, it cannot come from NA

4-eyes principal – every transaction needs to be confirmed by a second person

- Minimizes phishing risk
- Counter measure against internal threads

Mass-mailings to be found at the NA homepage

- a digital certificate clarifies origin and owner of the homepage

E-Mails from NA digitally signed

- S-MIME certificate

➢ *Liability can be excluded if users enter their credentials at a foreign website (terms of use)*

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Security Measures

- SSL Data transfer (Secure Socket Layer)
    - all data transferred between users and the registry is encrypted
- Two-factor authentication mandatory for login
    - Username + Password + SMS challenge 3x3
- SMS confirmation of transactions
    - SMS contains acquiring account, amount, unit type
- Hardware token in use for NA
- 4-eye-principle (AAR)
- Trusted account list
- Transaction delay of 26 hours
- E-mail notifications in case of...
    - Successful and denied logins
    - Incoming and outgoing transactions
    - Entry or change of verified emissions (including the verified emissions figure for reference)
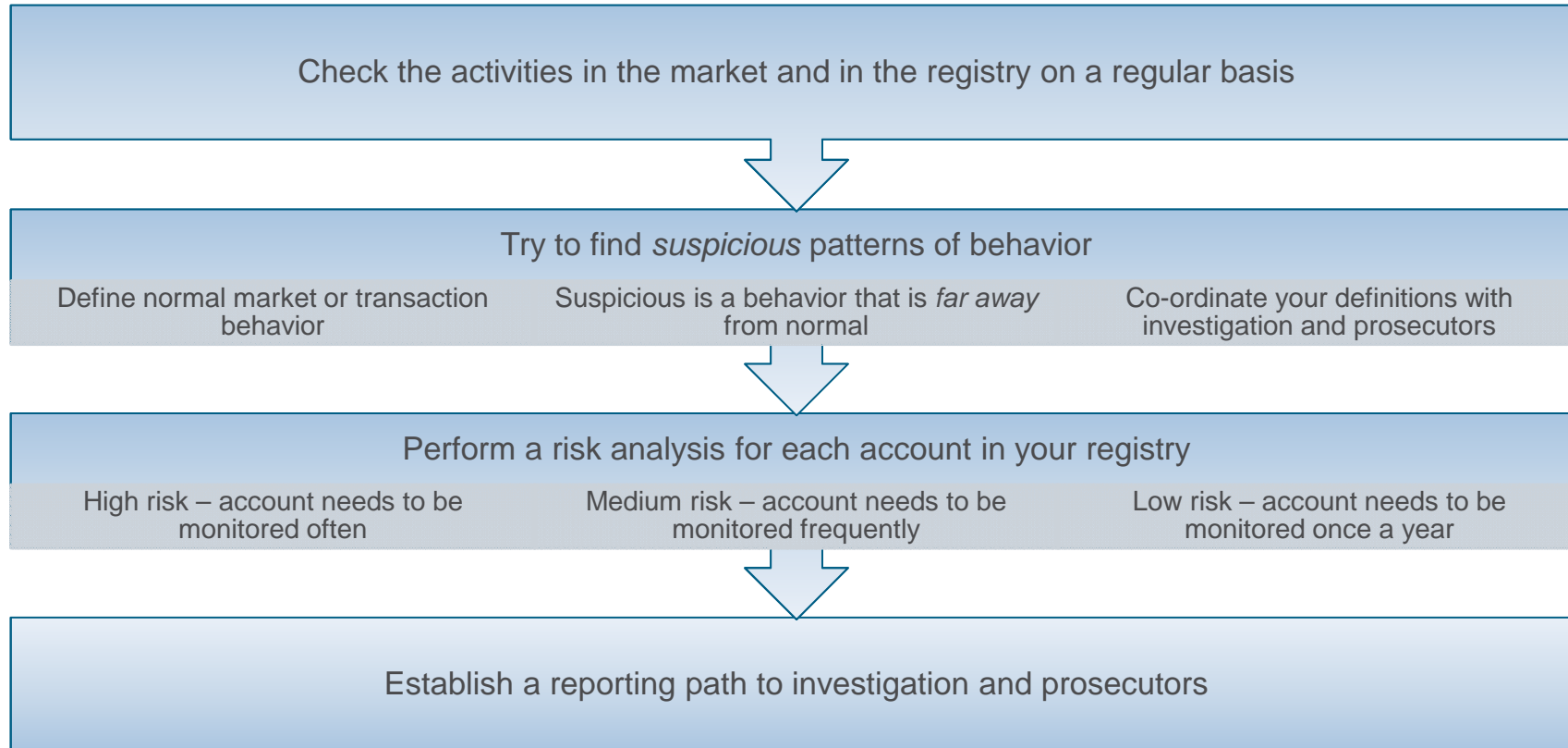   - other notifications

Know Your Customer (KYC)

Know Your Customer Checks Performed by the National Administrators of the ETS

- Check the customer at opening of account

  - Trading registry (identify company)

  - ID-cards (identify people)

  - Beneficial Owner (>= 25% of the company)

  - Criminal records of directors and account representatives (AR)

- Check the customer at every change of company or AR

- Repeat the opening check on regular basis (every 3 years)

- KYC checks to be recommended for all market participants (not just registry account owners)

➢ *KYC is necessary but not sufficient*

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Transaction Monitoring

Know what is going on in your market and registry

Check the activities in the market and in the registry on a regular basis

Try to find *suspicious* patterns of behavior

| Define normal market or transaction behavior | Suspicious is a behavior that is *far away* from normal | Co-ordinate your definitions with investigation and prosecutors |

Perform a risk analysis for each account in your registry

| High risk – account needs to be monitored often | Medium risk – account needs to be monitored frequently | Low risk – account needs to be monitored once a year |

Establish a reporting path to investigation and prosecutors

➢ *Transaction Monitoring can provide clear indication for fraud*

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Profiling Accounts: PHA, External Transfer Kyoto Units, Oct 2009 – Sep 2010
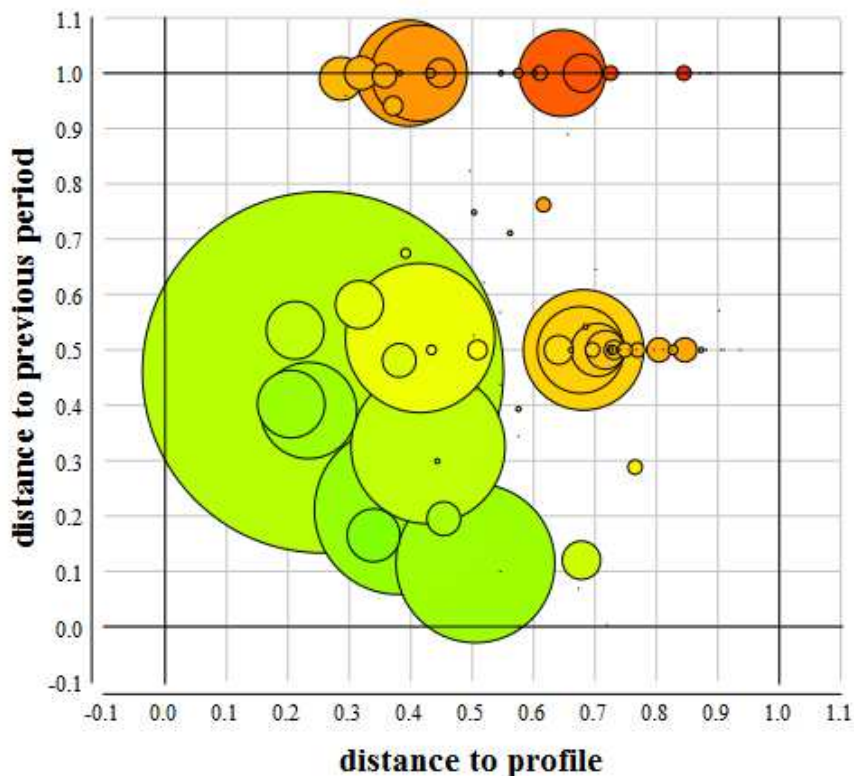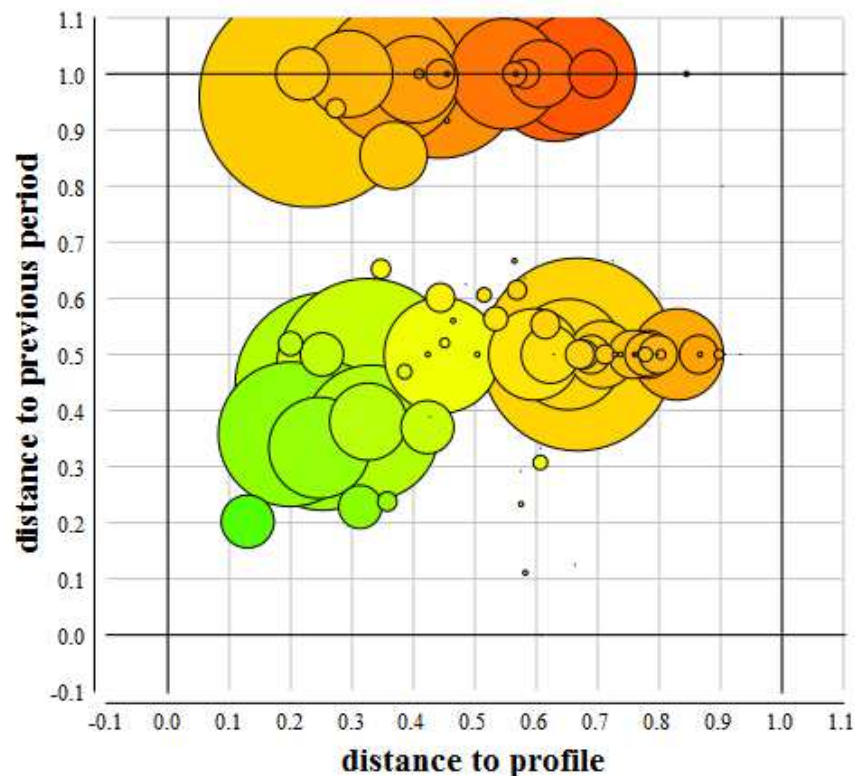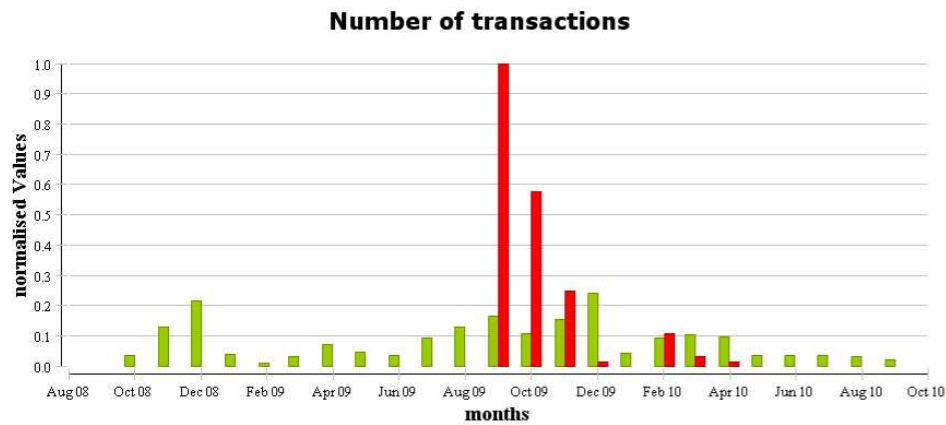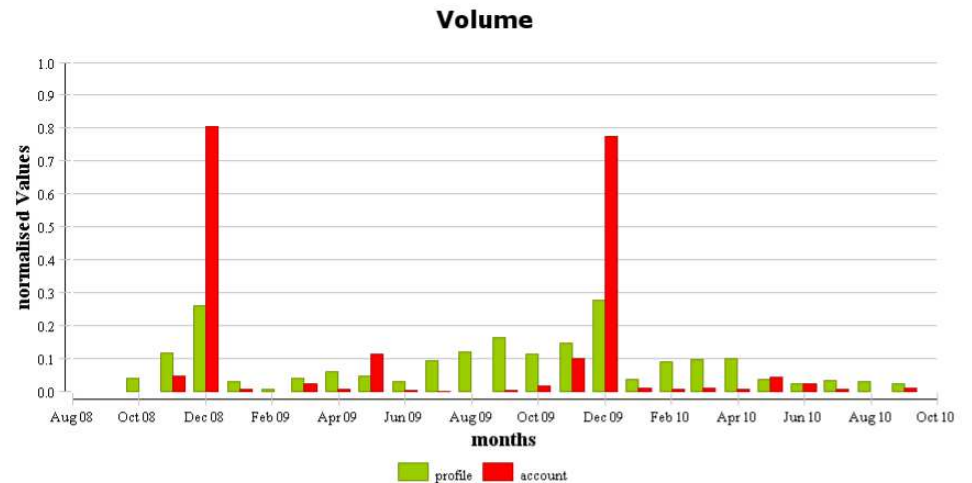
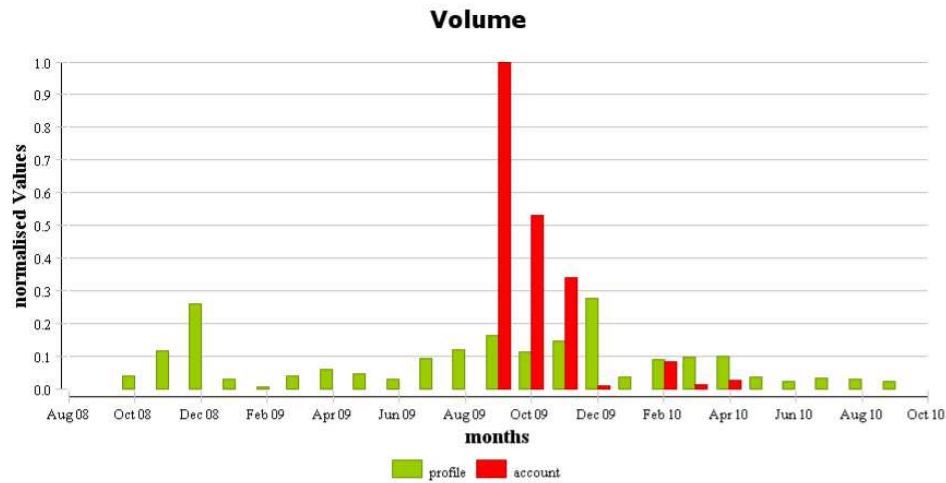# Trading Activities Profile

VAT Fraud Trading in DE   „Normal" Trading
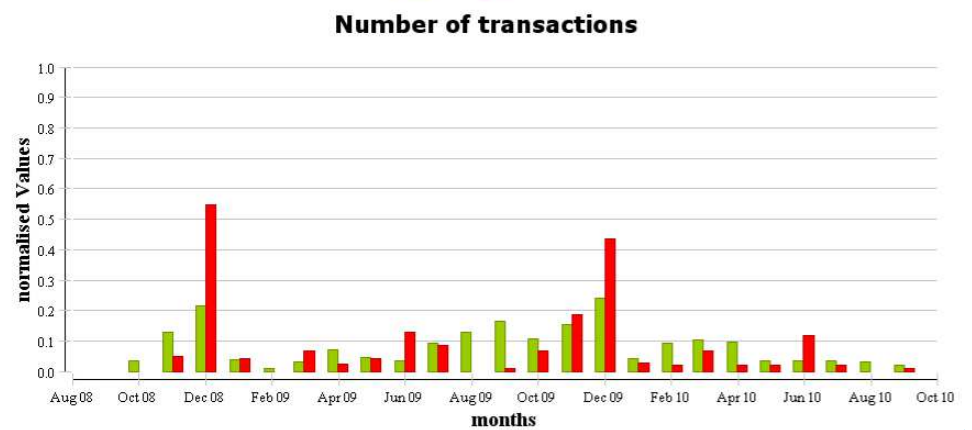
Co-operation with Investigation

Activities of international Investigation

Contact national and international investigation bodies before implementing ETS

Co-ordinate activities with them

Consult them regularly on recent development of crime

Report suspicious activities to national and international investigation

Make your customers and participants aware of your co-operation with investigation (transparency and deterrence)

INTERPOL
ENVIRONMENTAL CRIME PROGRAMME

Guide to Carbon Trading Crime

June 2013

http://www.interpol.int/Media/Files/ Crime-areas/Environmental-crime/ Guide-to-Carbon-Trading-Crime-2013

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Thank you for your attention!

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