

TGO's Registry Technical Infrastructure



PMR WORKSHOP

“Building Registries to Support the Next Generation of Carbon Markets”
Sacramento, CA, USA 23 Sep 2015

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Contents :

- Thailand's domestic market mechanism : T-VER
- Registry technical infrastructure
- Transaction management
- Develop from scratch vs modify existing software vs SaaS
- Experience and lessons learned

Overview : Thailand Domestic Market Mechanism

- Project base GHG reduction
 - using baseline-and-credit concept
- Not limit size of project and bundling projects are eligible
- Domestic Carbon Credits
 - TVERs (Thailand Verified Emission Reductions)
 - Using TER as credit code in registry system
- Cover 3 Greenhouse Gases
 - CO₂, CH₄, N₂O

Objective of T-VER Program

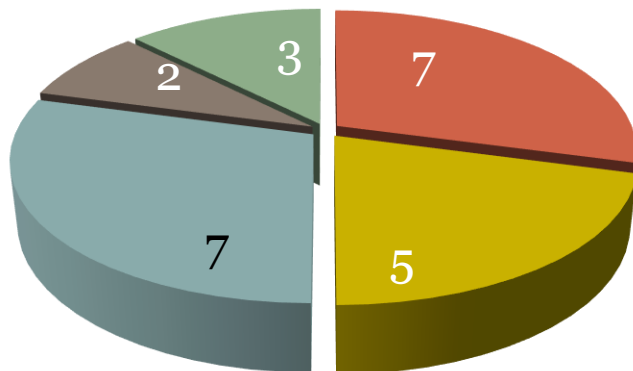
- To encourage domestic emission reduction along with co-benefit in project implementation through certifying carbon credits
- To promote Voluntary Carbon Market in the Country
- To raise consciousness /awareness of climate change for public and private sector to involve in GHG mitigation
- To prepare all stakeholders for the new agreement for GHG emission reduction in the near future

Credits are mainly used for CSR and voluntary carbon offsetting of companies



Statistics of T-VER

T-VER Methodology



- Energy efficiency
- Renewable Energy
- Waste Management
- Agriculture

Project Statistic

| Status | no. of projects | emission reduction |
|------------|-----------------|------------------------------|
| registered | 19 | 703,670 tCO ₂ e/y |
| issued | 7 | 343,645 tCO ₂ e |

Initiatives to promote the domestic carbon market

Existing initiative instruments

Thailand Carbon Offsetting Program (T-COP)

T-COP is a carbon offsetting program, launched in August 2013, aiming to use contributions from participants for supporting domestic GHG emission reduction activities, especially for projects under the T-VER program.



Thailand Voluntary Emission Reduction Program (T-VER)

T-VER is a domestic GHG crediting mechanism (project-based), using methodologies Which developed by TGO. The T-VER program launched in 2013.



Proposed initiative instruments under the PMR

Energy Performance Certificate Scheme (EPC)

EPC is a voluntary target-and-reward scheme aiming to achieve energy efficiency in energy-intensive factories & buildings and to build core market readiness components in order to be a foundation for establishing the future ETS.



Low Carbon City Program (LCC)

LCC is a GHG crediting mechanism which will be a part of T-VER program, aiming to achieve GHG emission reductions implemented by municipalities and local communities.



Registry Technical Infrastructure

- System Requirement
- Functional Specification
- Software design and development tools
- System Architecture and Security Measure

Summarized the requirements to registry development

Carbon Registry (T-VER)

- Generic function for Holding A/C
- Built-in A/C for scheme management
 - Cancellation A/C (corrective action)
 - Voluntary Cancellation A/C (T-COP offsetting program)
- General statistic report
- Issue Offset Certification

Energy Registry (EPC)

- Require complete functional spec. like ETS
 - Commitment period
 - Credit Expiration (retirement)
 - Carry Over
 - Compliance
- The credit is not carbon but the energy (Tonne Oil Eq.)
 - Unit code is “EPC”

Functional Specification

Generic Function

- Holding A/C
- Built-in A/C
 - Cancellation A/C
 - Voluntary Cancellation A/C
 - Mandatory Cancellation A/C
- Transaction Fn
 - Issuance / Holding
 - Transfer/Acquisition (internal only)
 - Cancellation / Compliance
 - Retirement / Carry Over

Specific Function

- Unit Conversion
 - Off-line external transfer
 - To receive the CDM-CER back to domestic scheme and re-issuance to TER units.

External Connection

- Not yet develop

Software design and development tools

Database Design

- All of the data properties base on the KP's DES
- Additional data properties are added for software logical control.
- Using MS SQL Server

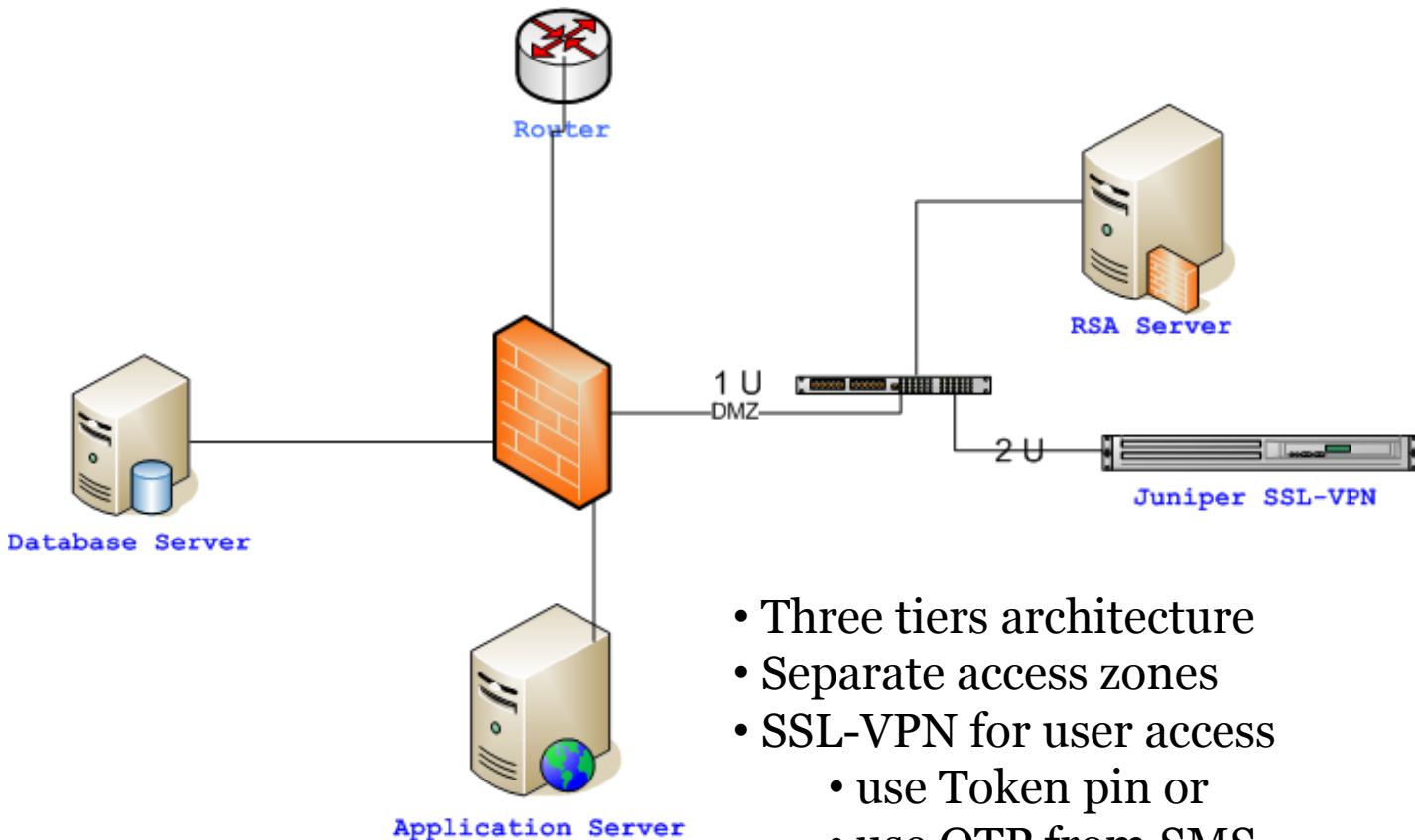
Software Design

- Service Orientation Architecture (SOA) design
- Web Application
- Using Java and JSP

System Architecture

- Three tiers architecture
- Security compartment to protect the system
 - SSL-VPN for user access the system
 - Point-to-point VPN for Administrative access

System Architecture and Security Measure



- Three tiers architecture
- Separate access zones
- SSL-VPN for user access
 - use Token pin or
 - use OTP from SMS
 - session time out for idle logged in at 10 mins
- Point-to-point VPN for Administrative access
 - use Token pin

Transaction Management

- A/C Management Function
- Function module execution
- Business logic table and time period
- Transaction tracking / auditing

A/C Management

Holding A/C

Holding A/C

- Open – Close A/C
- A/C Suspended function for investigate the case
- A/C Lock function as pre-process before compliance action

Built-in A/C

- Can create built-in A/C as much as policy need
 - Cancellation A/C
 - Buffer A/C
 - Other specific purposes A/C
- System admin has to take action since the initialize of commitment period.

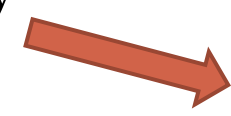
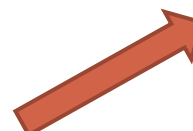
Issuance of Credit

Issuance

- **Another system (PDM)** support the reduction calculation and the amount of reductions have to reconcile before issuance
- Credit levy is automatic process to deduct a number of credit transfer to scheme buffer a/c
- Credit expiration is assign by default

Business Logic Table

- Software will check for the business rules
 - Check for the A/C – Project binding
 - Check the levy rate and rule validation period
 - *rate can be set to zero
 - *rule period relate to commitment period and check by system date
 - Expiration value is match to eligible in commitment period and automatic input by default value
 - *code no 99 is mean no expiration



Credit Transfer

Credit Transfer

- Using FIFO for simple transfer (sorting by serial no. and expiration date)
- User can select transfer block manually
- Allowance reserve amounts in particular commitment period
- Transaction can be tracked by system admin.
- **Rollback is possible to do but very restrict action**

Business Logic Table

- Set maximum transfer volume for allowance unit
 - Check for the A/C own allowance credit
 - *no restrict for non-A/C own credit**
 - Can be set to any no.
 - Rule validation period related to commitment period

Corrective transaction!

Credit Cancellation

Cancellation

- Built-in A/C for cancellation
 - Cancellation A/C
(corrective action)
 - Voluntary Cancellation A/C
(T-COP offsetting program)
 - Mandatory Cancellation A/C
- Compilation process execute by system admin.

Rule

- **Rollback is not possible!**

Unit Conversion

Unit Conversion

- Like issuance the credit
- Need to record all of credit information.

Rule

- Approval by scheme committee before execution in the system
- Criteria;
 - Allow only Thai's CDM projects
 - Voluntary cancellation from CDM registry

Transaction tracking / auditing

- All transactions are record in database as transaction log.
 - There are built-in functions to retrieve and filtering for investigate
- System will automatically generate notification email send to relevant parties regarding that transaction.
- System Admin. is always notified to enable monitoring capability.
- Traffic log must be kept to compile Thai Cyber Crime Act'2007

Dev.
from
scratch

Much uncertainty in
policy directive

VS

SaaS

Modify
existing
S/W

Lessons learnt from implementing experience registry

- Clear in policy directive is the most critical key factor of overall implementation steps
- Business rule and best practice processes are the secondly important to software design
- The developer who has experience in the online banking system is really help in design process
- More flexible lead to more complicate in system logical design so investigate will be more difficult.

Thank you for kind attention



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