TGO’s Registry Technical Infrastructure

PMR WORKSHOP
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(Public Organization)
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: 7
- Renewable Energy: 5
- Waste Management: 3
- Agriculture: 2

## Project Statistic

<table>
<thead>
<tr>
<th>Status</th>
<th>no. of projects</th>
<th>emission reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>registered</td>
<td>19</td>
<td>703,670 tCO2e/y</td>
</tr>
<tr>
<td>issued</td>
<td>7</td>
<td>343,645 tCO2e</td>
</tr>
</tbody>
</table>
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 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

<table>
<thead>
<tr>
<th>Database Design</th>
<th>Software Design</th>
</tr>
</thead>
</table>
| • All of the data properties base on the KP’s DES  
  • Additional data properties are added for software logical control.  
  • Using MS SQL Server | • Service Orientation Architecture (SOA) design  
  • Web Application  
  • Using Java and JSP |

<table>
<thead>
<tr>
<th>System Architecture</th>
</tr>
</thead>
</table>
| • 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

- 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

<table>
<thead>
<tr>
<th>Credit Transfer</th>
<th>Business Logic Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Using FIFO for simple transfer (sorting by serial no. and expiration date)</td>
<td>• Set maximum transfer volume for allowance unit</td>
</tr>
<tr>
<td>• User can select transfer block manually</td>
<td>▫ Check for the A/C own allowance credit</td>
</tr>
<tr>
<td>• Allowance reserve amounts in particular commitment period</td>
<td>*no restrict for non-A/C own credit</td>
</tr>
<tr>
<td>• Transaction can be tracked by system admin.</td>
<td>▫ Can be set to any no.</td>
</tr>
<tr>
<td>• Rollback is possible to do but very restrict action</td>
<td>▫ Rule validation period related to commitment period</td>
</tr>
</tbody>
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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 investigation
- 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

SaaS

Modify existing S/W

Much uncertainty in policy directive

VS
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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