

Technical cooperation on
The Development of Basic Schemes for PRTR
System in the Kingdom of Thailand

Progress Report No. 7

September 2014

Pollution Control Department, MONRE
Department of Industrial Works, MOI
Industrial Estate Authority of Thailand, MOI
Japan International Cooperation Agency

Abbreviation

AIT	Asian Institute of Technology
AQNMB	Air Quality and Noise Management Bureau (PCD)
CMR	Carcinogenicity, Mutagenicity, Reproductive Toxicity
CRJA	Chonburi Rayong Japanese Association
C/P	Counterpart Personnel
DG	Director-General
DDG	Deputy Director-General
DEQP	Department of Environmental Quality Promotion
DOA	Department of Agriculture
DIW	Department of Industrial Works
DLA	Department of Local Administration (Ministry of Interior)
EARTH	Ecological Alert and Remediation for Thailand (NGO)
ECNEQ	Enhancement and Conservation of National Environmental Quality Act
EF	Emission Factor
ERTC	Environmental Research and Training Center
ESIE	Eastern Seaboard Industrial Estate (Rayong)
EQLD	Environmental Quality and Laboratory Division (PCD)
FTI	Federation of Thai Industry
GDP	Gross Domestic Product
GSEI	Good Governance for Sustainable Environment Institute (NGO)
GPP	Green Partnership Program
HAPs	Hazardous Air Pollutants
HSB	Hazardous Substances Bureau (DIW)
IET	Institute of Environmental Training
IEAT	Industrial Estate Authority of Thailand
IRIS	Integrated Risk Information System (US EPA)
ITD	IT Division (PCD, DIW)
IWETB	Industrial Water and Environmental Technology Bureau (DIW)
JCC	Joint Coordination Committee
JpCC	Japanese Chamber of Commerce
JICA	Japan International Cooperation Agency
M/M	Man/Month
MONRE	Ministry of Natural Resources and Environment
MOI	Ministry of Industry
MOT	Ministry of Transport
MOA	Ministry of Agriculture
MSDS	Material Safety Data Sheet
NEB	National Environmental Board
NESDB	National Economic and Social Development Board
ONEP	Office of the Natural Resources and Environmental Policy and Planning
OTP	Office of Traffic and Transport Policy and Planning
PCC	Pollution Control Committee
PCD	Pollution Control Department
PDM	Project Design Matrix
PRTR	Pollutant Release and Transfer Register
PSB/MOPH	Policy and Strategy Bureau/Ministry of Public Health
R/D	Record of Discussion
SAICM	Strategic Approach for International Chemical Management
TEI	Thailand Environment Institute (NGO)
TF	Task Force
TAIA	Thai Automotive Industry Association
TAPMA	Thai Autoparts Manufacturers Association
TCPA	Thai Crop Protection Association
TPMA	Thai Paint Manufacturer's Association
UNEP	United Nations Environment Program
US EPA	United States Environmental Protection Agency

VOCs	Volatile Organic Compounds
WHO	World Health Organization
WHSMB	Waste and Hazardous Substances Management Bureau (PCD)
WQMB	Water Quality Management Bureau (PCD)

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2.	Paper/Report prepared	
	<ul style="list-style-type: none"> • Pilot project Implementation 4th Progress report • Point source consultation report • Estimation manual for point sources <ul style="list-style-type: none"> ➤ Wood/furniture industry ➤ Metal industry ➤ Electrical machinery industry ➤ Plastic industry ➤ Rubber industry • Estimation manual for non-point sources <ul style="list-style-type: none"> ➤ Mobile sources ➤ Agriculture ➤ Paint/Construction ➤ Gas station ➤ Hospital ➤ School/research institute ➤ SMEs 	

➤ Household

3. **Meeting/Visit/workshop memo**
4. **JICA PRTR website and newsletter**

1. General

1.1. Project Outline

- **Title of the project**

The Development of Basic Schemes for PRTR System in Kingdom of Thailand

- **Overall Goal**

Model of PRTR system for Thailand is established

- **Project Purpose**

Capacity of PCD, DIW and IEAT's staff for implementation of PRTR pilot project is strengthened

- **Project period** (please refer to section 1.2 regarding project extension)

4 years (March 6th, 2011 – March 5th, 2015)

- **Implementing agency**

Pollution Control Department, Ministry of Natural Resources and Environment

Department of Industrial Works, Ministry of Industry

Industrial Estate Authority of Thailand, Ministry of Industry

- **Outputs**

(Output 6 noted below was approved at Joint Coordination Committee meeting held on July 12, 2013.)

1. Basic design of PRTR system in Thailand is established
2. Emission reporting scheme of industry is developed
3. Capacity of estimation of emission and transfer for point source is strengthened.
4. Capacity of emission estimation for non point source is strengthened.
5. Importance of use of PRTR data including initial assessment is understood
6. Implementation structure of risk communication is developed in the pilot area.

- **Activities of the Project**

(Activity of the project noted below was approved at Joint Coordination Committee meeting held on July 12, 2013.)

Activity for output 1

- 1-1. Formulation of basic strategy
- 1-2. Organizational set up inside government and with other stakeholders
- 1-3. Development of project work plan
- 1-4. Development of criteria for target substance selection
- 1-5. Draft target substance list and revision
- 1-6. Draft basic design of PRTR system
- 1-7. Development of PRTR database and Web site

- 1-8. Draft pilot project implementation plan and set up organization
- 1-9. Organizing awareness raising and training workshop for pilot project
- 1-10. Collection of data and disclosure for pilot project
- 1-11. Organizing risk communication meeting for pilot project
- 1-12. Obtaining feedback from stakeholders for pilot project
- 1-13. Final design of PRTR system and prepare action plan
- 1-14. Preparation of final report of output 1

Activity for output 2

- 2-1. Collection of available data for preparing point source definition
- 2-2. Development of point source definition (reporting thresholds)
- 2-3. Development of reporting form
- 2-4. Identifying reporting procedure from point sources
- 2-5. Listing of candidate point sources and sending reporting form to them
- 2-6. Collecting reports from point sources
- 2-7. Verification of point source data
- 2-8. Compilation of point source data
- 2-9. Revision of point source definition and reporting form
- 2-10. Preparation of final report of output 2

Activity for output 3

- 3-1. Establishment of task forces on development of release estimation manuals for specific industries
- 3-2. Development of draft release estimation manuals for specific industries
- 3-3. Conducting model studies for industries for which release estimation manuals are not prepared
- 3-4. Organizing workshop on point source release estimation for governmental officials and relevant agencies
- 3-5. Organizing workshop on point source release estimation for factories/facilities
- 3-6. Organizing consultation for factories/facilities to estimate releases by site visit
- 3-7. Responding to questions (via phone, e-mail) on release estimation from factories/facilities and preparing FAQs
- 3-8. Revision of release estimation manuals for specific industries
- 3-9. Preparation of final report of output 3

Activity for output 4

- 4-1. Establishment of basic idea for estimation of emissions from non-point sources (NPS)
- 4-2. Survey of availability of activity data and emission factors (EFs) necessary to estimate
- 4-3. Selection of target categories and target chemicals for NPS and responsible bodies to estimate
- 4-4. Validation of data used for estimation; activity data and EF

- 4-5. Establishment of estimation method in each target category
- 4-6. Preparation for drafts of estimation manuals
- 4-7. Collection such data used for estimation as activity data and EF
- 4-8. Estimation of emission amounts from NPS at pilot project area and Compilation of disclosed data
- 4-9. Collection of information, data necessary for revising estimation manuals and revision of estimation manuals
- 4-10. Implementation of workshop for estimation of emissions from non-point sources for government officials and relevant agencies
- 4-11. Preparation of final report of output 4

Activity for output 5

- 5-1. Introduction of domestic and overseas case studies on use of PRTR data including initial assessment of exposure risk to target substances
- 5-2. Utilization and possible development of model or tools for uses of PRTR data e.g. concentration estimating model
- 5-3. Implementation of case studies for use of PRTR data including initial assessment
- 5-4. Training for use of PRTR data including initial assessment for both government and private sectors
- 5-5. Preparation of final report of output 5

Activity for output 6

- 6-1. Development of basic strategy for promoting risk communication
- 6-2. Organizational set up inside government and with other stakeholders for promoting risk communication
- 6-3. Awareness raisings for risk communication importance for relevant agencies, relevant local governments and participating companies.
- 6-4. Development of training curriculum for facilitator and pilot project implementation of training course
- 6-5. Review of facilitator training course and follow-up for trainee
- 6-6. Development of the Handbook for risk communication
- 6-7. Planning the registration system of chemical advisor for supporting risk communication.
- 6-8. Development of the implementation plan, and pilot project organization of risk communication meeting with community people of Rayong
- 6-9. Preparation of final report of output 6

● **Project area**

Major activities of the project will be at Bangkok and surrounding area where the office of the implementing agencies are located. In addition, activities will be at area selected for pilot project.

1.2 Proposed extension of the project

Extension of the project duration has been discussed and PCD, DIW and IEAT agreed to request extension of the project for one year to ensure the feasibility and practicality of the project. It can be summarized as follows:

- PRTR reporting and data validation is likely to be delayed from the original schedule.
- Additional implementation activity of PRTR project is follows:
 - The PRTR awareness raising campaign to the public which will implement during August- September, 2014.
 - The discussion and consultation meeting on data disclosure format for Point Source which will be implemented during October-November, 2014.
 - Preparing the implementation of data disclosure and risk communication during November, 2014 – January, 2015.
 - To explore more feedback from all stakeholder sector for more coverage opinion.
 - The additional implementation for PRTR system sustainability of Thailand and the improvement of emission estimation manual.

Formal request of extension was submitted to JICA office and the matter is currently under consideration at JICA side.

Under the situation, this report follows such extension for plan of operation.

1.2. Project work plan for 4 years (Activities indicated by **bold underline** are on-going or completed as of September 2014)

Year	2011	2012	2013	2014	2015
Major work	<ul style="list-style-type: none"> • <u>Capacity assessment</u> 	<ul style="list-style-type: none"> • <u>Capacity assessment</u> 	<ul style="list-style-type: none"> • <u>Capacity assessment</u> 	<ul style="list-style-type: none"> • Capacity assessment 	<ul style="list-style-type: none"> • Capacity assessment
Output 1	<ul style="list-style-type: none"> • <u>Clarification on organizational matters.</u> • <u>Designing the element of basic PRTR system</u> • <u>Basic survey and listing of target chemical substances</u> • <u>Preparation for pilot project</u> 	<ul style="list-style-type: none"> • <u>PRTR design paper (draft) will be prepared.</u> • <u>Preparation for pilot project action plan</u> 	<ul style="list-style-type: none"> • <u>Designing the element of basic PRTR system.</u> • <u>Implementation of pilot project</u> 	<ul style="list-style-type: none"> • <u>Compilation of the pilot project data</u> 	<ul style="list-style-type: none"> • Implement questionnaire survey • Design of PRTR system for nationwide application
Output 2	<ul style="list-style-type: none"> • <u>Selection of target business and size</u> • <u>Review of existing reporting system</u> • <u>Design of PRTR reporting system.</u> 	<ul style="list-style-type: none"> • <u>Design of PRTR reporting system</u> 	<ul style="list-style-type: none"> • <u>Direct support to industry for PRTR reporting</u> • <u>Verification, compilation of reported data</u> 	<ul style="list-style-type: none"> • <u>Direct support to industry for PRTR reporting</u> • <u>Verification, compilation of reported data</u> • Disclosure of PRTR data from pilot project 	<ul style="list-style-type: none"> • Design of reporting system and format for nationwide PRTR system
Output 3	<ul style="list-style-type: none"> • <u>Preparation of industry specific emission estimation manual from point source</u> 	<ul style="list-style-type: none"> • <u>Preparation of industry specific emission estimation manual from point source. Draft manual will be prepared in English and then translated to Thai.</u> 	<ul style="list-style-type: none"> • <u>Continue Preparation of industry specific emission estimation manual from point source. Draft manual will be prepared in English and then translated to Thai.</u> 		<ul style="list-style-type: none"> • Revision of manual for point source estimation
Output 4	<ul style="list-style-type: none"> • <u>Selection of target business and activity</u> • <u>Advice on emission factor experiment</u> 	<ul style="list-style-type: none"> • <u>Advice on emission factor experiment</u> • <u>Preparation of emission estimation method from</u> 	<ul style="list-style-type: none"> • <u>Implement pilot project Estimate emission from non point source in pilot project area</u> 	<ul style="list-style-type: none"> • <u>Implement pilot project Estimate emission from non point</u> 	<ul style="list-style-type: none"> • Revision of manual for non point source estimation

	<ul style="list-style-type: none"> <u>Preparation of emission estimation manual from non-point source</u> 	<u>non-point source. Draft method document will be prepared.</u>	<u>(Including mobile source and pesticide).</u> <ul style="list-style-type: none"> <u>Preparation of emission estimation manual from non-point source. Revise manual</u> 	<u>source in pilot project area (Including mobile source and pesticide).</u> <ul style="list-style-type: none"> 	
Output 5		<ul style="list-style-type: none"> <u>Preparation of case study of PRTR data utilization</u> 		<ul style="list-style-type: none"> Preparation of case study of PRTR data utilization Application of models and tools for PRTR data utilization 	<ul style="list-style-type: none">
Output 6	<ul style="list-style-type: none"> <u>Review of current situation and design of human resource development</u> <u>Planning and development of risk communication training course</u> 	<ul style="list-style-type: none"> <u>Organization of training course for risk communication</u> 	<ul style="list-style-type: none"> <u>Support for training of risk communication</u> 	<ul style="list-style-type: none"> Support for training of risk communication 	<ul style="list-style-type: none">
Training (study visit)		<u>Training in Japan (study visit)</u>	<u>Training in Japan(study visit)</u>		
Evaluation		<u>Mid-term review</u>			Final evaluation
Seminar/Work shop	<ul style="list-style-type: none"> <u>JCC</u> <u>1st PRTR seminar</u> 	<ul style="list-style-type: none"> <u>JCC</u> <u>2nd PRTR seminar</u> <u>Seminar for PRTR awareness raising to industry</u> 	<ul style="list-style-type: none"> <u>JCC</u> <u>3rd PRTR seminar</u> <u>Point source estimation workshop for government officer</u> <u>Point source estimation workshop for industries</u> 	<ul style="list-style-type: none"> JCC 4th PRTR seminar <u>Point source estimation workshop for industries</u> Non point source estimation workshop 	<ul style="list-style-type: none"> PRTR data utilization & risk communication workshop
Sub-contract	<ul style="list-style-type: none"> <u>Basic survey for chemical substance</u> <u>PRTR Web site development</u> 	<u>Data availability survey for non point source</u>	<u>Direct factory support for pilot project</u> <u>Traffic survey in Rayong</u>	<u>Direct factory support for pilot project</u> <u>Traffic survey in Rayong</u>	

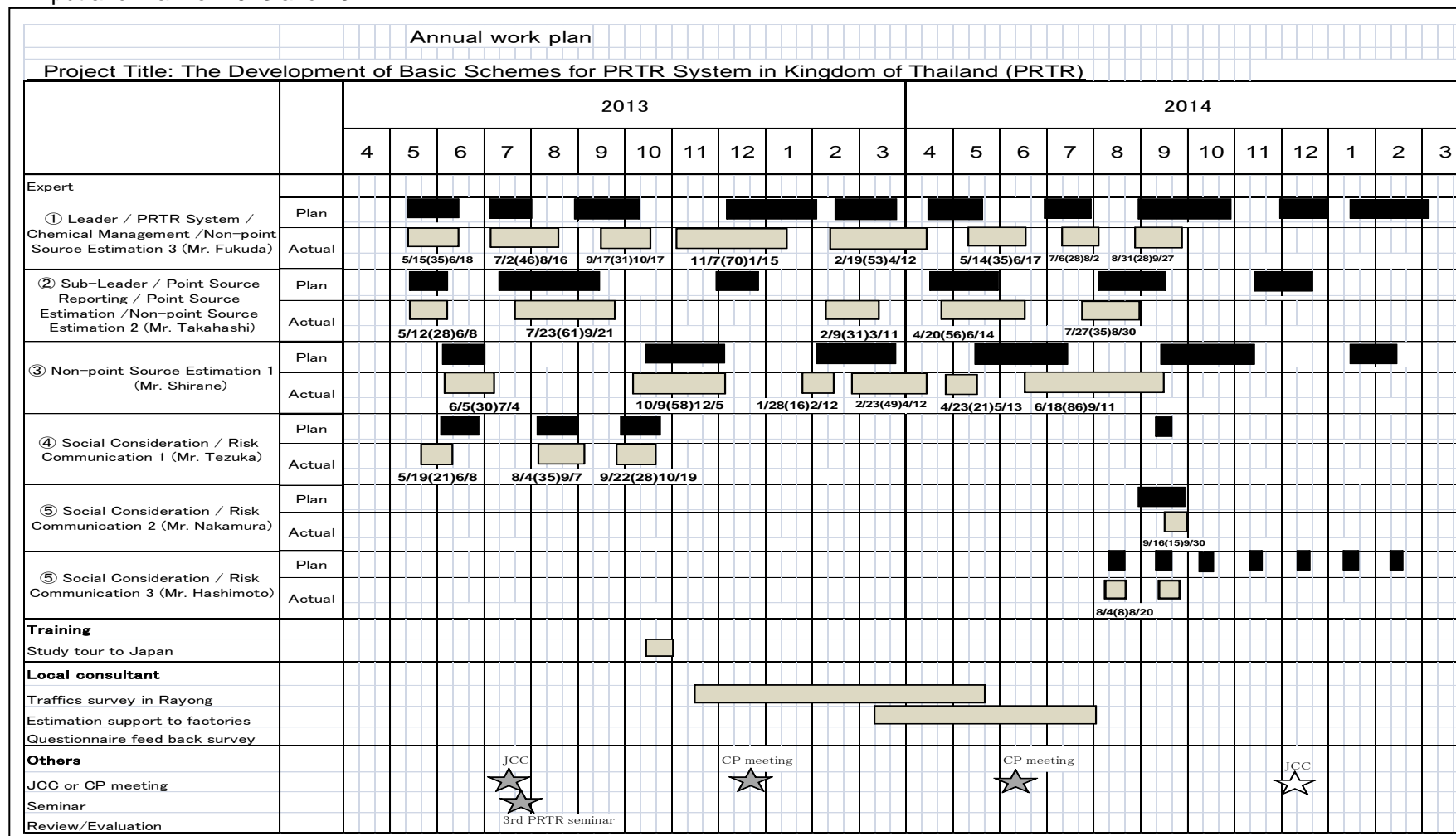
Plan of Operation

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1.3. Input and Plan for 2013 and 2014



* Period covered by this progress report is indicated by the rectangular box in dotted line.

During the period, new JICA expert, Mr. Shinya Hashimoto, was introduced to enhance the activity in the area of risk communication. Mr. Hashimoto will take charge of implementation support of risk communication.

Input of the JICA side is as follows.

- For the period of this progress report
 - Expert assignment was shown in following table.

Expert	Assignment period
Munehiro Fukuda	4/1 – 4/12/ 2014 7/6 – 8/2/ 2014 8/31 – 9/27/2014
Makoto Takahashi	4/20 – 6/14/2014 7/27- 8/30/2014
Yoshiharu Shirane	4/1 – 4/12/2014 4/23 – 5/13/2014 6/18 – 9/11/2014
Shinya Hashimoto	8/4,8,13-15,18-19/2014

- Organization of number of seminar/workshops
 - Sub-contract for direct consultants support to point sources (continued).
 - Organization of awareness raising activity for public
- Plan for next six months
 - Continue the expert assignment. Approx. 7M/M is expected in (October-March 2015).
 - Compile all PRTR data
 - Provide follow up training for risk communication facilitator
 - Develop chemical advisor registration
 - Consultation of PRTR data with stakeholders
 - Disclose PRTR data and organize risk communication meeting

2. Summary of progress (overall)

2.1. Summary sheet

Summary	Various works to prepare for the estimation in pilot PRTR were carried out. Approx. 200 point sources have reported to PRTR system. All non point source emission were estimated.
Major Activity	<ul style="list-style-type: none">● Sub-contracted work by JICA team for direct consulting support for 5 category industry was completed.● Sub-contracted work by JICA team for Rayong traffic data survey was completed.● On-site coaching visit to point source was provided by JICA expert and C/P.● Approx. 200 point source reports were received and validated.● Estimation of all non point source, including mobile, agriculture, paint/construction, hospital, school/research institute, SME, household, gas station, were completed
Major Paper/report prepared	<ul style="list-style-type: none">● Estimation manual for 5 industrial categories (wood/furniture, metal, electrical machinery, plastic and rubber industry).● Consultation report for point source.● Estimation manual for non point sources● Handbook for risk communication facilitators (1st draft)● Updated pilot project progress report No.4.● Progress Report No.7
Plan	<ul style="list-style-type: none">● Start compiling the data.● Prepare for data disclosure and risk communication

2.2. Organization structure

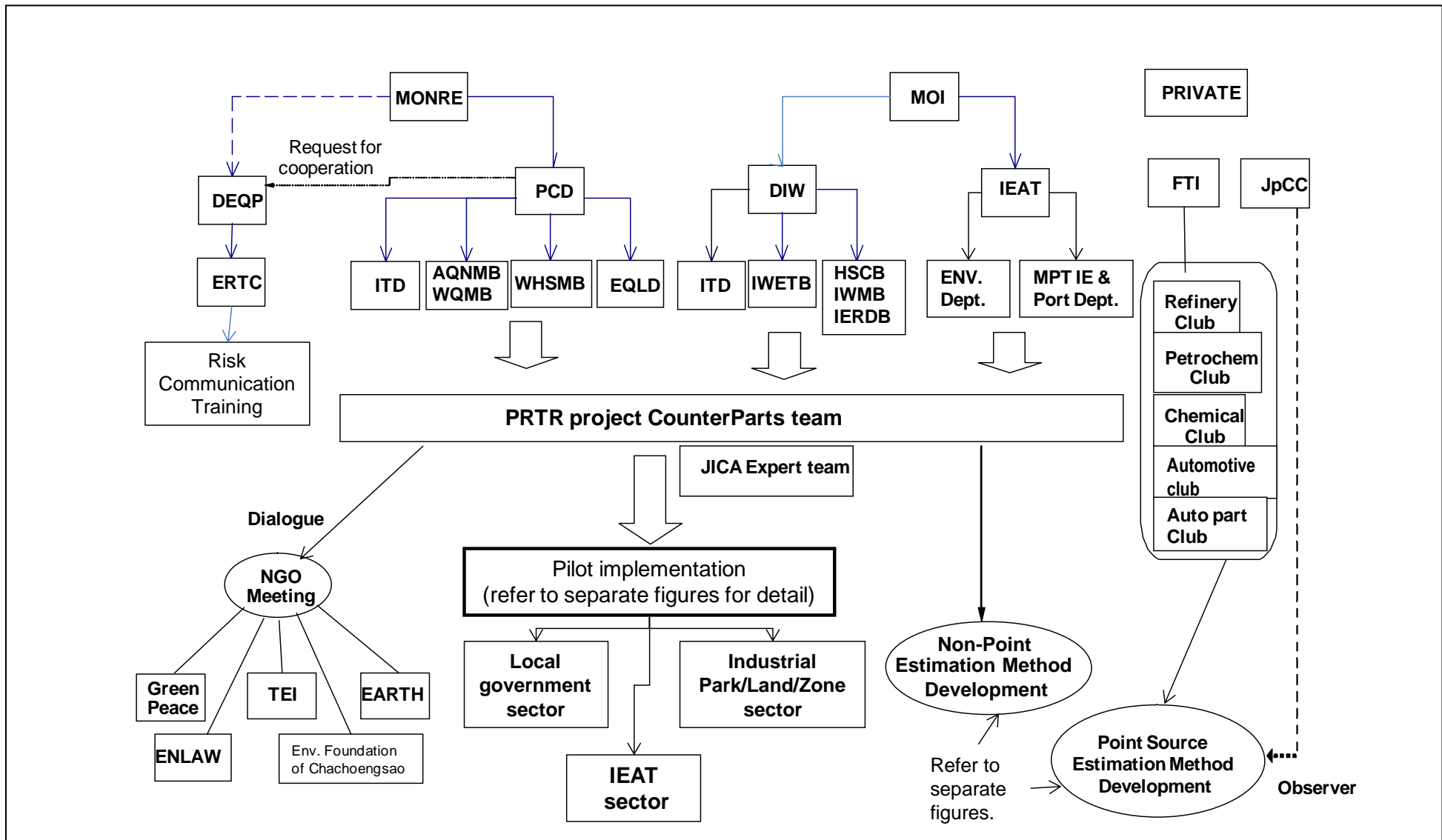
Diagrams in next pages show organization structure of the project and the relationship with various stakeholders as of September 2014. There was no major change in the structure during last 6 months

Separate diagrams were prepared to show the structure of point source activity as well as non point source activity. There is no major change in the implementation structures.

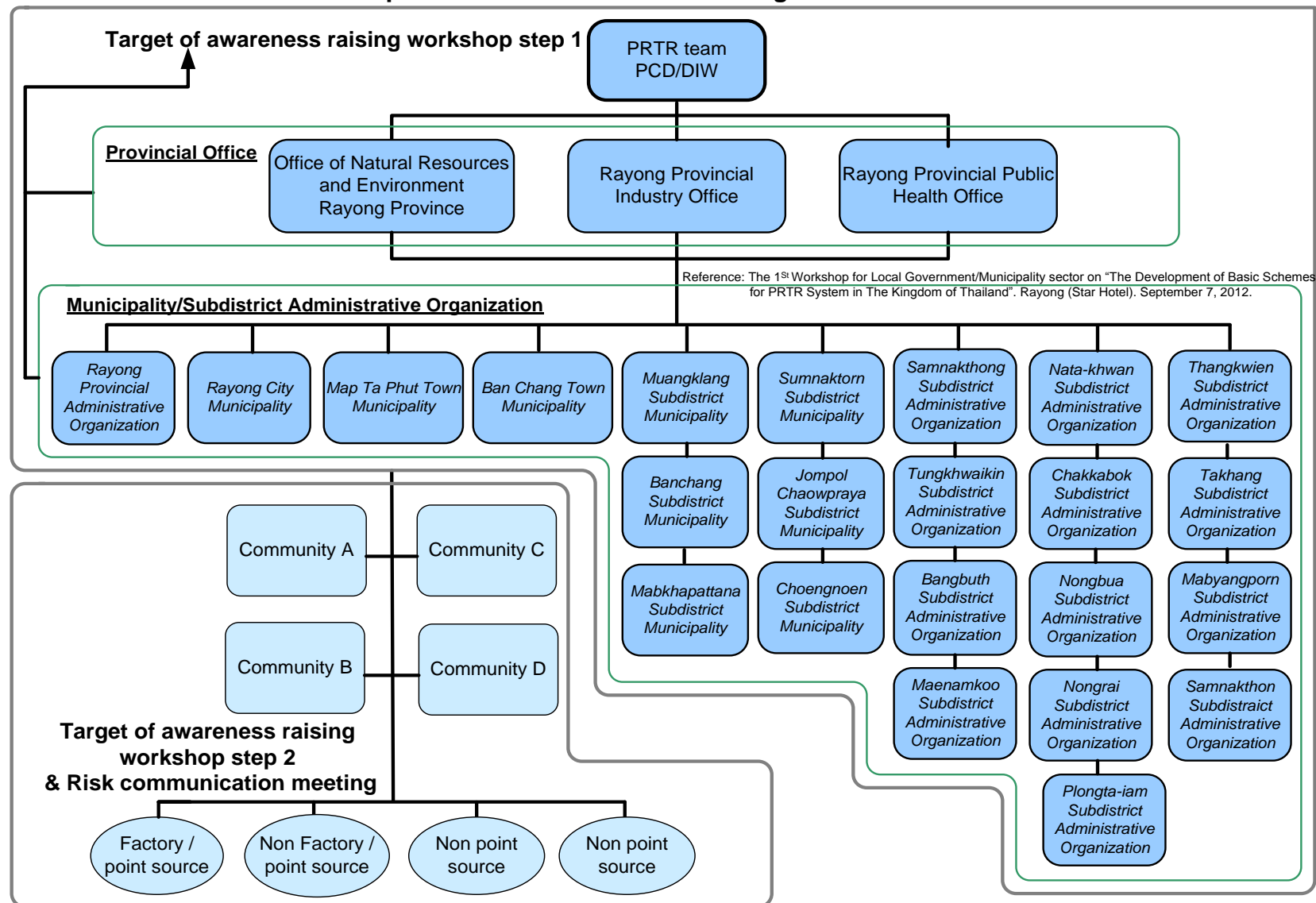
2.3 Major Issues and problem

- Due to decision to extend the project for a year at Thai side and probable approval at JICA side, most of the problem related to time constrain were solved.
- Sustainability of project outcome and direction towards system establishment is yet to be clarified and agreed.

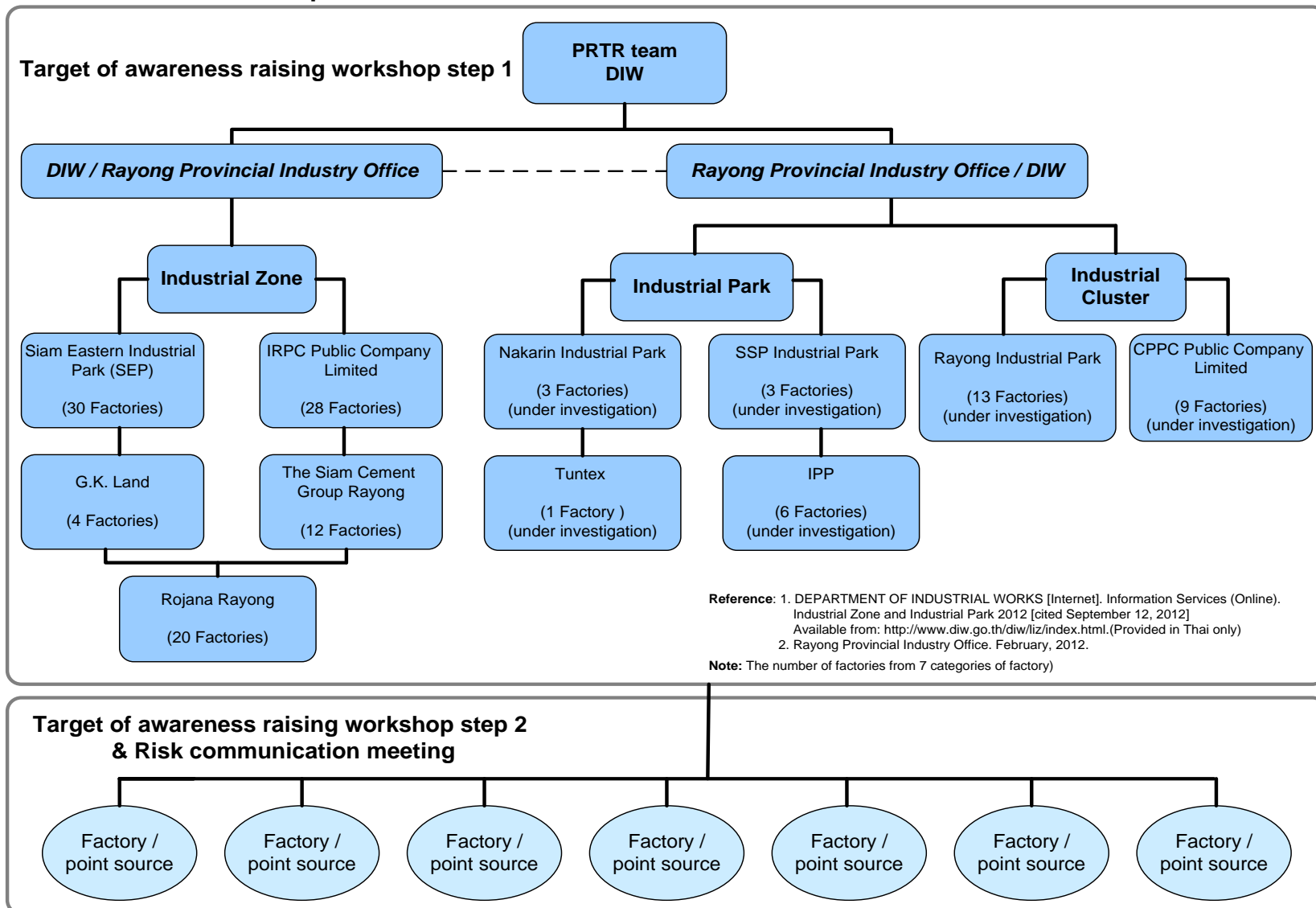
Organization structure of the project and relation with stakeholders



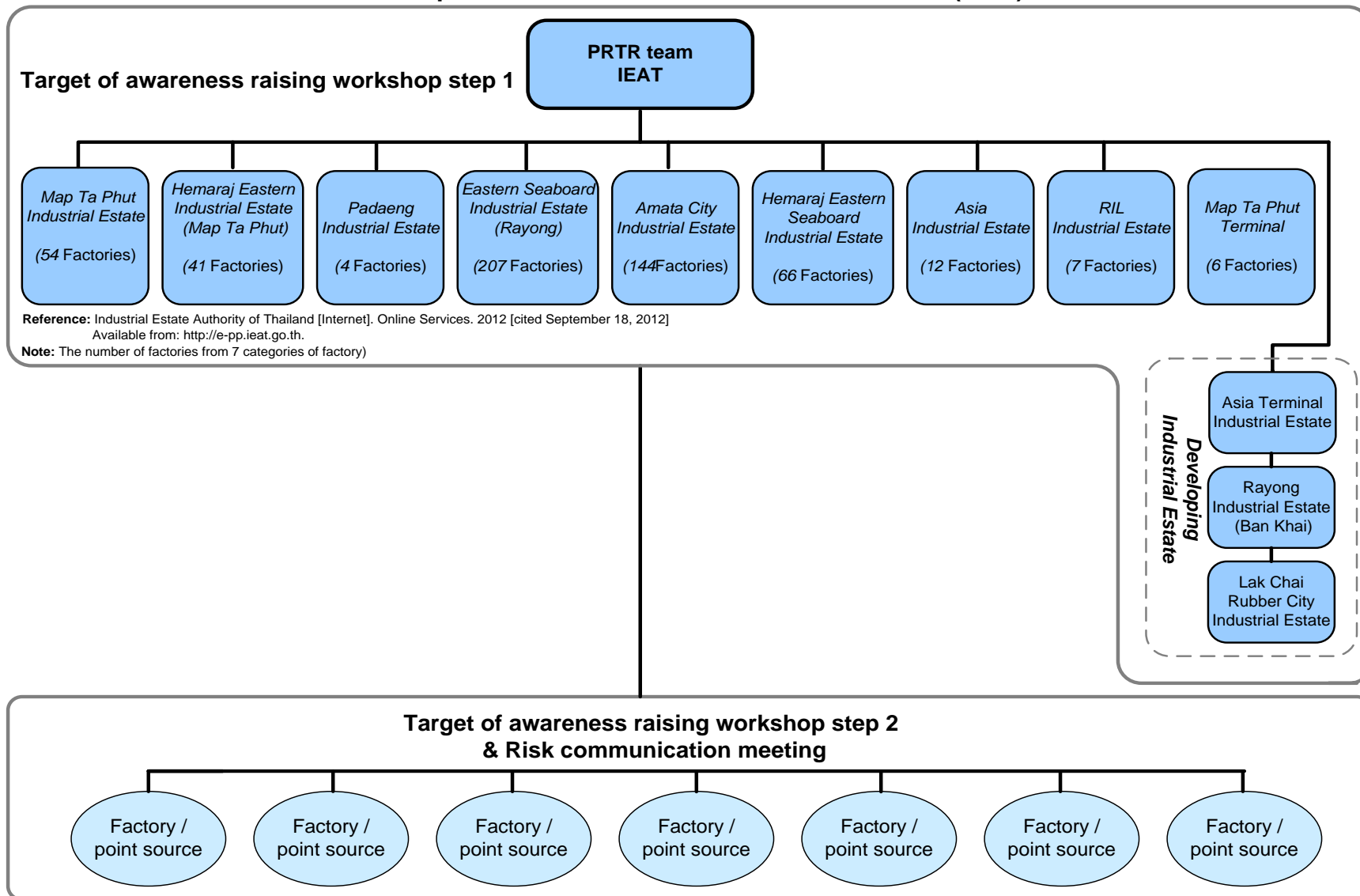
Implementation structure of Local government sector

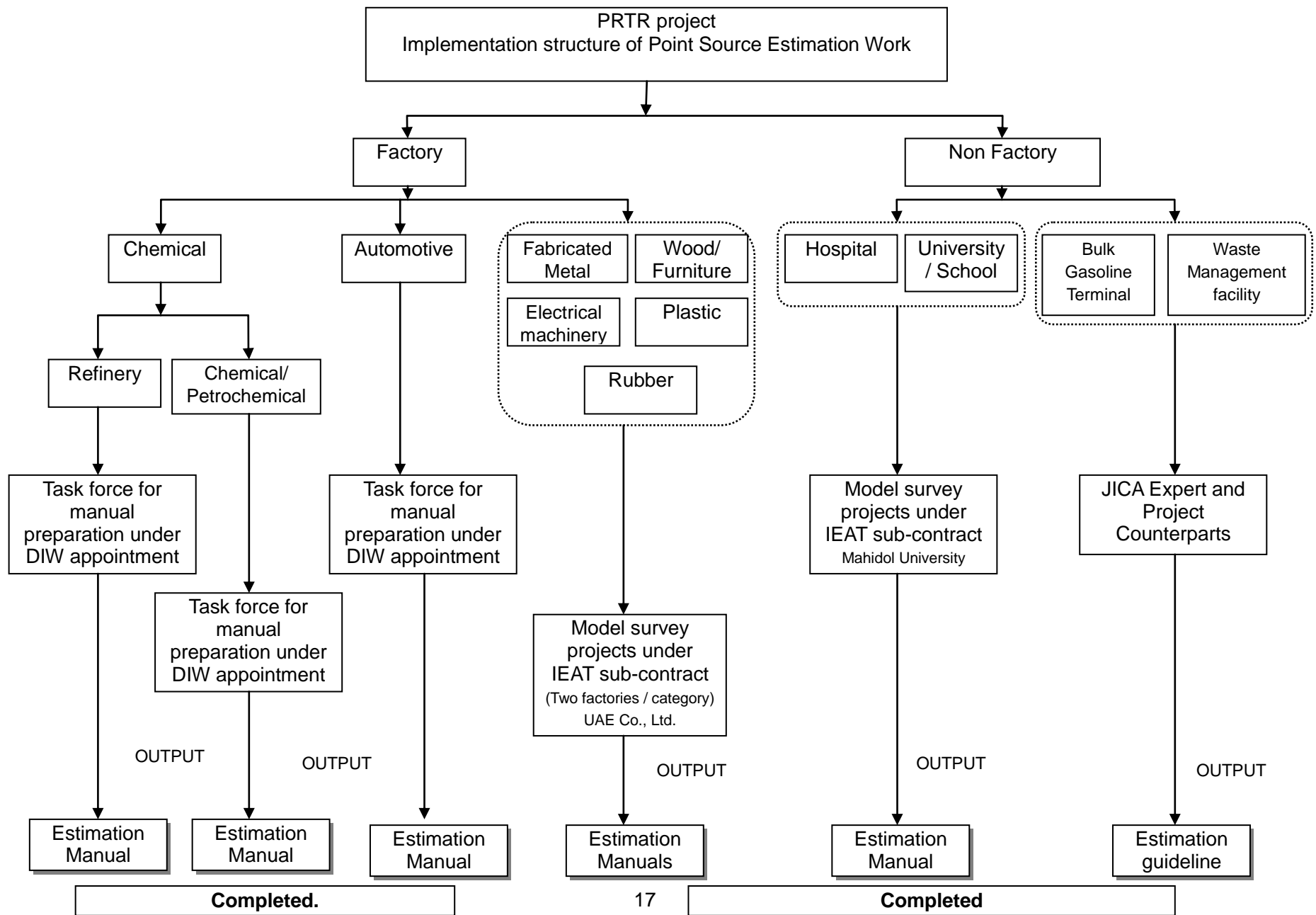


Implementation structure of Industrial Zone/Park/Cluster sector

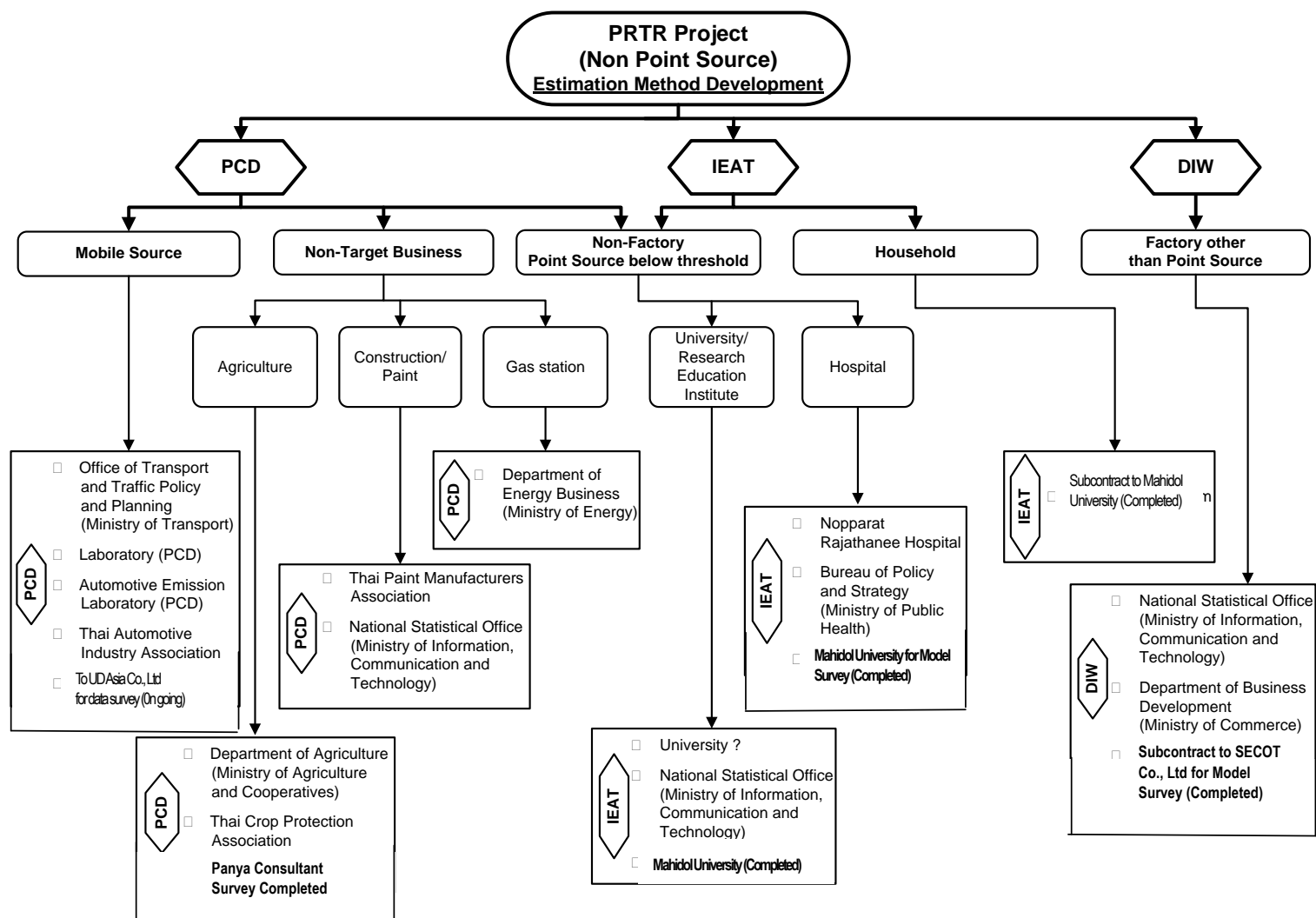


Implementation structure of Industrial Estate (IEAT) sector

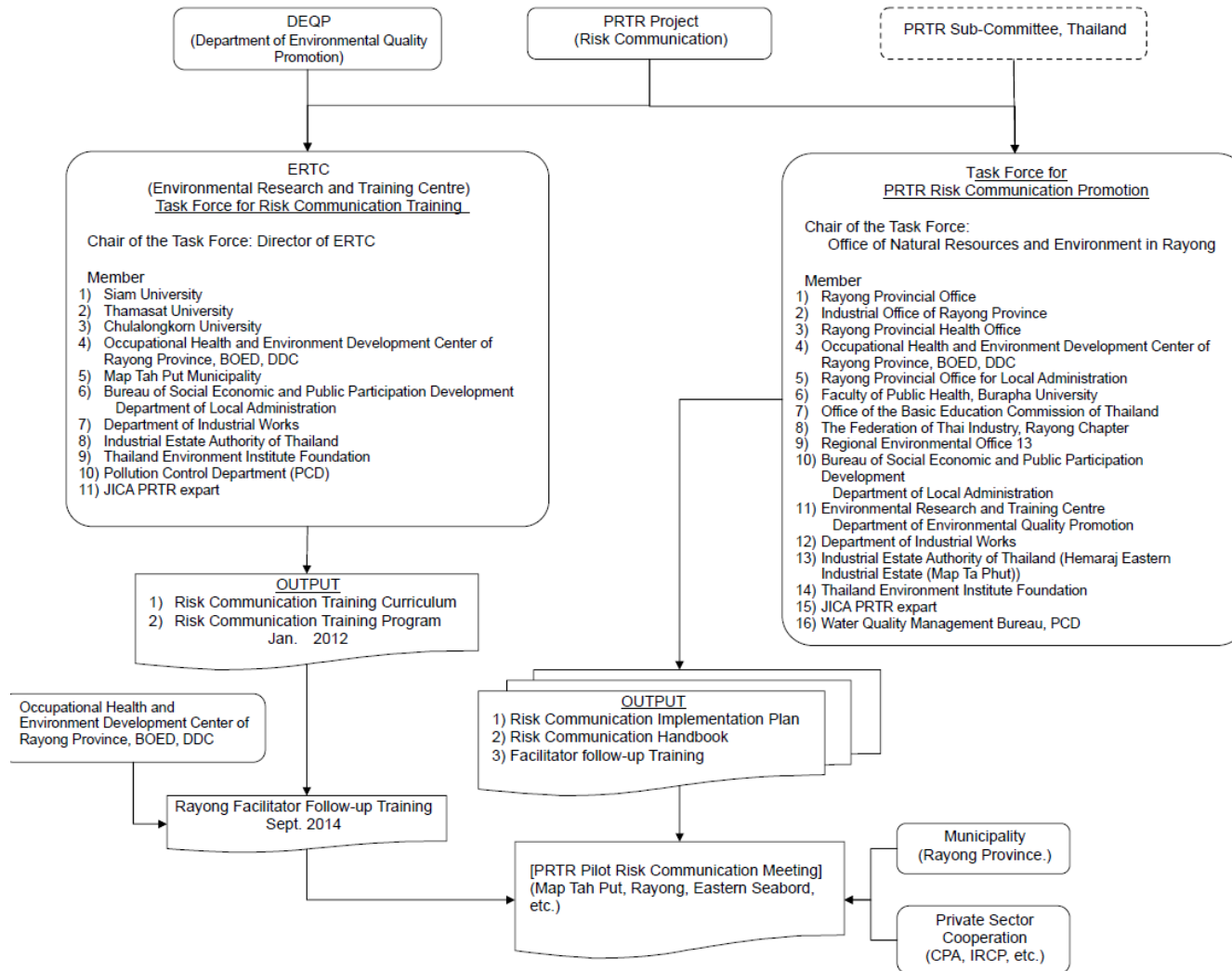




Organization Chart of Non Point Source



Implementation structure of Risk Communication work



3. Progress of each output

3.1 Output 1 Design of PRTR system	
Summary	<p>Additional workshops and seminars were organized to help industry and other point source to be ready for PRTR reporting in pilot. Approx. 200 PRTR reports were received from point sources and validation of the report in on-going.</p> <p>Database structure to be stored in PCD were discussed and confirmed. Web site for PRTR was opened at PCD.</p> <p>(Overall indicator of the progress) Out of 14 activities listed under OUTPUT 1 in the plan, 9 activities completed, 1 on-going, 4 yet to be done.</p>
Activity	<ul style="list-style-type: none"> ● 7th Counterpart meeting was held on June 12th, 2014. ● 6th NGO meeting was held on March 25th, 2014 ● Open PRTR web site in PCD. ● Present PRTR project in 2nd Toxicology in Occupational Health and Environmental Community Conference on June 16th, 2014..
Paper/report prepared	<ul style="list-style-type: none"> ● Pilot project progress report No.4
Issues	<ul style="list-style-type: none"> ● Measure to secure sustainability of pilot PRTR need to be clarified.
Plan	<ul style="list-style-type: none"> ● Compile all PRTR data and prepare for data disclosure. ● Present PRTR project in International conference on Environmental Chemistry on Nov. 24-26, 2014.

3.2 Output 2 Reporting system from Industry	
Summary	<p>Point source validation training was provided to DIW and IEAT staff by OJT. Approx. 190 PRTR reports were received from point sources and validation of the report in on-going.</p> <p>(Overall indicator of the progress) Out of 10 activity list under OUTPUT 2 in the plan, 6 activities completed, 1 on-going, 3 yet to be done.</p>
Activity	<ul style="list-style-type: none"> ● Meeting on PRTR reporting on EMCC database for factories in Eastern Seaboard, Hemaraj Eastern seaboard and Amatacity) at Pattana Golf Club in Rayong on March 31st, 2014 ● Organized report validation workshop for IEAT staff on Aug. 15th, 2014
Paper/report prepared	None
Issues	<ul style="list-style-type: none"> ● Some of the report still needs correction/revision. ● On-line database entry system at IEAT has various problem.
Plan	<ul style="list-style-type: none"> ● Validate and compile the data. ● Revise the estimation manuals.

3.3 Output 3 Estimation from Point Source	
Summary	<p>Training workshops were provided to point source for their estimation. On-site coaching for estimation and reporting was continued to</p>

	<p>provided. Supports for other industrial sector are being prepared through sub-contract to local consultants.</p> <p>8 estimation manuals were completed.</p> <p>(Overall indicator of the progress)</p> <p>Out of 9 activity list under OUTPUT 3 in the plan, 6 activities completed, 1 on-going, 2 yet to be done.</p>
Activity	<ul style="list-style-type: none"> ● Model survey for 5 industrial sectors was completed and 5 estimation manual completed, ● 5 Training workshops for 5 industrial sectors (furniture/wood, metal, electrical machinery, plastic, rubber) were organized during April 23rd – 25th, 2014.. ● Additional training workshop for Automotive categories in Eastern seaboard and Amata city estate was organized on May 27th, 2014.. ● On-site coaching factory visits were implemented by JICA expert and C/P team. ● Local consulting firm assisted 25 factories for report preparation..
Paper/report prepared	<ul style="list-style-type: none"> ● Project report under subcontract by IEAT for 5 industrial sectors (furniture/wood, metal, electrical machinery, plastic, rubber) including 5 estimation manuals. ● Consultation report from on-site coaching visit to factories.
Issues	<ul style="list-style-type: none"> ● Validation of the report.
Plan	<ul style="list-style-type: none"> ● Validate and compile the data. ● Revise the estimation manuals.

3.4 Output 4 Estimation from Non Point Source	
Summary	<p>All data collection activities were completed and emission from non point sources were estimated. Manual for estimation was prepared.</p> <p>(Overall indicator of the progress)</p> <p>Out of 11 activity list under OUTPUT 4 in the plan, 8 activities completed, 1 on-going, 2 yet to be done.</p>
Activity	<ul style="list-style-type: none"> ● Emission factor experiment at AEL completed and traffic survey in Rayong completed. ● Estimation of non point source for agriculture, mobile source, paint/construction, hospitals, school/research institute, gas station, SME and household completed. ● Estimation manual of non point source for agriculture, mobile source, paint/construction, hospitals, school/research institute, gas station, SME and household completed. ● Internal workshop on nonpoint source estimation was organized on Sept. 9th, 2014 ● Data validation check sheet was developed.
Paper/report prepared	<ul style="list-style-type: none"> ● Manual to Estimate Emissions from non point source for agriculture, mobile source, paint/construction, hospitals, school/research institute, gas station, SME and household ● Validation check sheet.
Issues	<ul style="list-style-type: none"> ● Data and manual to be approved at PRTR subcommittee.

Plan	<ul style="list-style-type: none"> ● Compilation of the data.
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3.5 Output 5 Utilization of PRTR data	
Summary	<p>Air modeling study using PRTR data was designed and prepared for implementation.</p> <p>(Overall indicator of the progress) Out of 5 activity list under OUTPUT 5 in the plan, 1 activity completed, 2 on-going , 2 yet to be done.</p>
Activity	<ul style="list-style-type: none"> ● PRTR data and climate data were compiled and prepared for air modeling study.
Paper/report prepared	None
Issues	<ul style="list-style-type: none"> ● Air modeling study result shall be used in risk communication.
Plan	<ul style="list-style-type: none"> ● Completed the study for priority chemical(s).

3.6 Output 6 Risk Communication	
Summary	<p>Preparation for risk communication was in progress for facilitator, chemical adviser and meeting material. Awareness raising for general public as preliminary step for data disclosure was planned in consultation with the stakeholders and implemented.</p> <p>(Overall indicator of the progress) Out of 9 activity list under OUTPUT 6 in the plan, 5 activities completed, 3 on-going, 1 yet to be done.</p>
Activity	<ul style="list-style-type: none"> ● Awareness raising campaign for general public were implemented as preliminary step of data disclosure and risk communication meeting. Consultations with various stakeholders were done in Rayong, including municipalities and community organization. ● Risk communication handbook for facilitators was drafted and being translated to Thai. ● Senior facilitator system was considered and candidates selected. ● Chemical adviser registration system was discussed with academic institute.
Paper/report prepared	None
Issues	<ul style="list-style-type: none"> ● Registration system for chemical adviser shall be set up.
Plan	<ul style="list-style-type: none"> ● Consultation meeting planned for data disclosure with various stakeholders. ● Once the PRTR data is complied, training material of facilitator will be updated and follow up training will be provided. ● Risk communication material will be prepared.

ANNEX

1. List of CP and task forces

- PRTR project CP list
- Risk Communication Promotion Task Force

2. Paper/Report prepared

- Pilot project Implementation 4th Progress report
- Point source consultation report
- Estimation manual for point sources
 - Wood/furniture industry
 - Metal industry
 - Electrical machinery industry
 - Plastic industry
 - Rubber industry
- Estimation manual for non-point sources
 - Mobile sources
 - Agriculture
 - Paint/Construction
 - Gas station
 - Hospital
 - School/research institute
 - SMEs
 - Household

3. Meeting/Visit/workshop memo

4. JICA PRTR website and newslette