

Thai National LCI Database

Life Cycle Assessment (LCA) Lab
National Metal and Materials Technology Center (MTEC)
National Science and Technology Development Agency (NSTDA), Thailand

29 November 2017

Thai National LCI Database

1

Thai LCI Dataset Roadmap

2

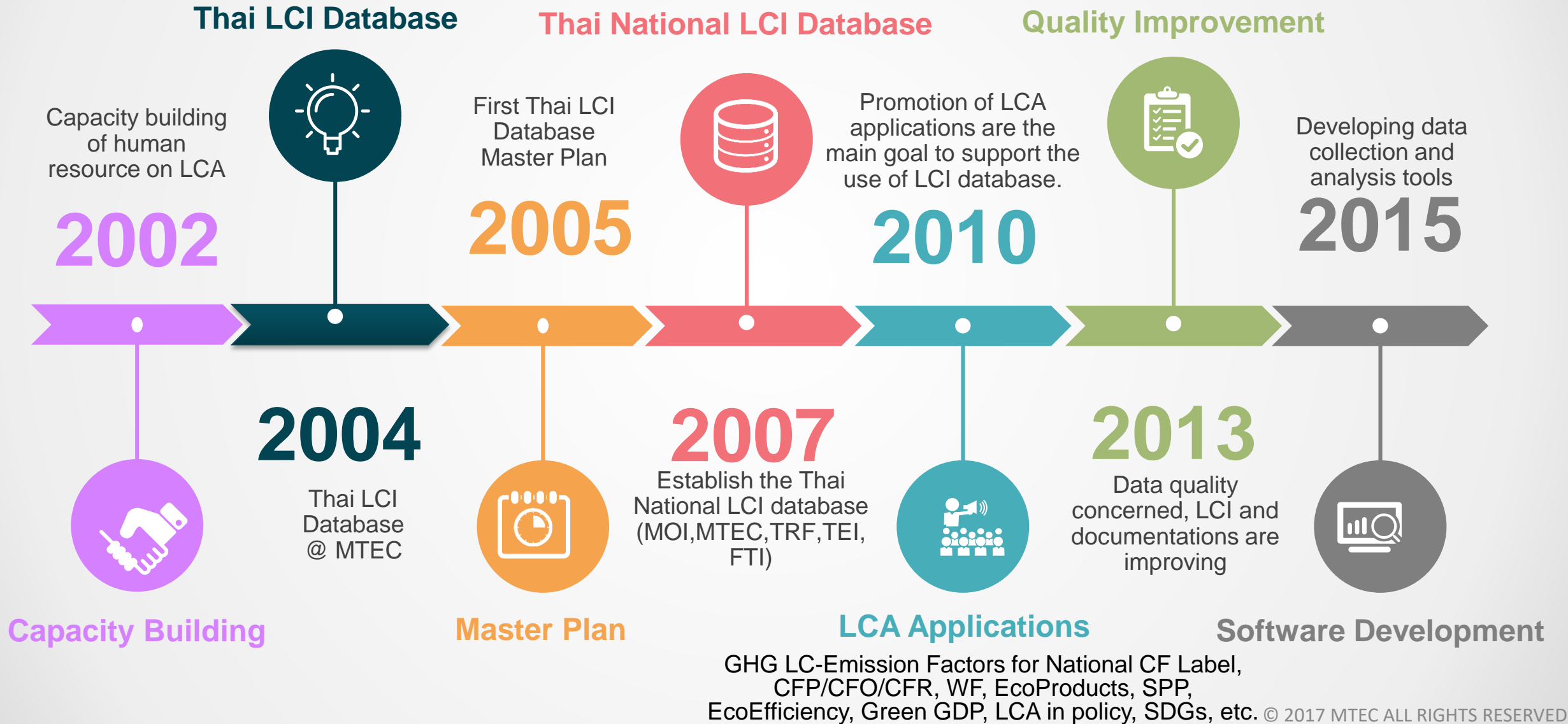
Software for Thai LCI Database

3

Stakeholder Encouragement

4

Thai National LCI Database Development Pathway



Thai Data Center Management



Establishment of national LCI database development committee



Development of data format and data collection method and design system boundary



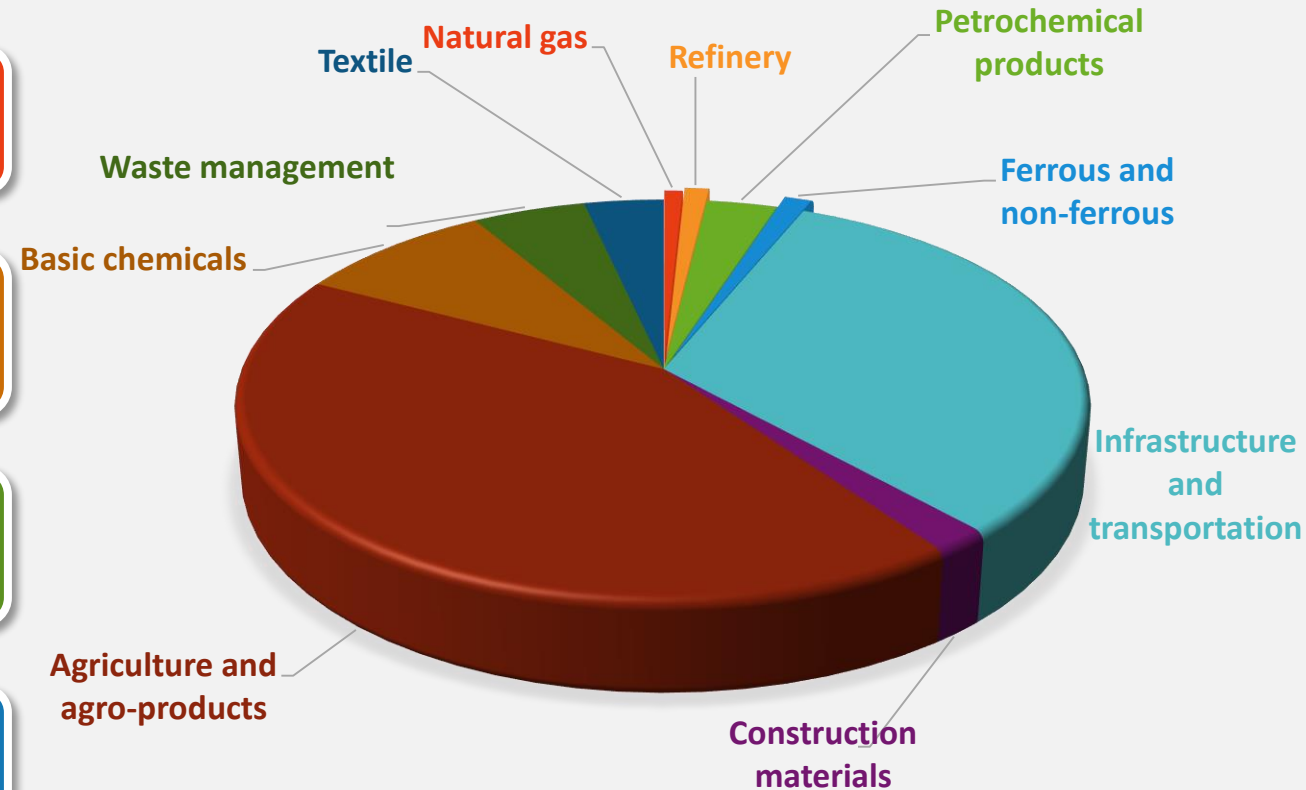
Management of system and database



Development of Thai LCI guidance



Promotion of Thai database and its services



**Datasets in Thai LCI Data Center
(1,484 datasets)**

Last update Nov. 2017

Components of Thai National LCI Database

Budget

- NSTDA, Ministry of Science and Technology (MOST) → 2003
- The Thai Research Fund (TRF) → 2005
- Ministry of Industry → 2007
- NSTDA, Ministry of Science and Technology (MOST) → 2012 to present



Committee

- Steering Committee
 - Verification and certification committee → 2009
 - Development committee → 2011
- Technical and Development Committee → 2010
- Working Group
 - Database management supporting → 2011



International technical assistance/ collaboration

- Japan Government
 - Green Partnership Plan
- European Commission
 - Joint Research Center (JRC)
- UN Environment
 - Life cycle initiative



Dataset Roadmap

1



National Strategic Plan

2

NSTDA's Strategic Plan

3

LCI Data Center

**New Engine of Growth
(First S-curve
& New S-curve)**

Bio-economy

Targeted Sectors

*Next-generation Automotive
Affluent, Medical and Wellness Tourism*

Agriculture and Biotechnology

Food for the Future

Smart Electronics

Aviation and Logistics

Robotics

Digital

Biofuels and Biochemicals

Medical Hub

Modern Transportation

Biochemicals and Biofuels

Health and Quality of Life

Food Innovation

Innovation for Sustainable Agriculture

Infrastructures

Building materials

Bio-energy

Bio-chemicals

Biological products

Food and feed

2017

- Natural gas
- Refinery
- Sericulture
- Sugar cane
- Bioethanol

2018

- Electricity
- Tap water
- Iron
- Cassava
- Rice

2019

- Building material
- Petrochemical Products
- Bio-chemicals

2020

- Petrochemical Products
- Packaging

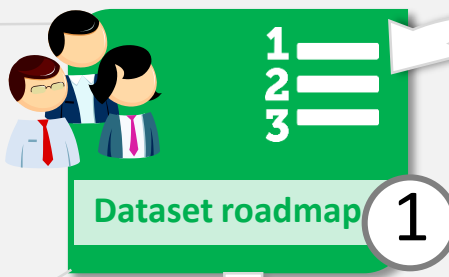
2021

- Bio-plastics
- Bio-polymer
- Bio-materials
- Food & Feed

Thai LCI Development

Dataset road can be revised:

- The roadmap will be **revised annually**
- **Budget** allocation
- Dataset **priority**
- **Partner** available

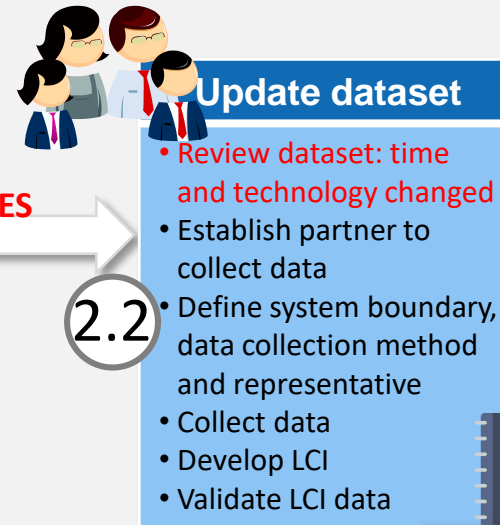


Requires update

2

Existing data

YES



Review & revise

- At least **twice a year**
- Inventory check
- Update background data
- Time and technology changed

7

Public datasets

6

Users

Create dataset

- Establish partner to collect data
- Define system boundary, data collection method and representative
- Collect data
- Develop LCI
- Validate LCI data

2.1

NO

LCI guidance

All dataset needs validation and quality control

LCI guidance

PASS

Central Data Center

5

National database

Pilot database

FAIL

Validation

3

Critical review

4

External

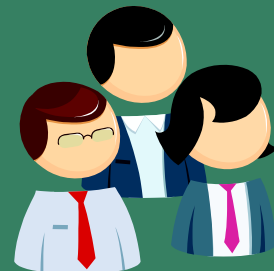
Thai LCI Development Actors

Internal



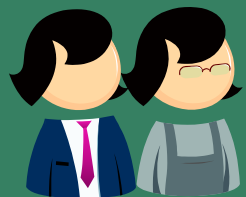
Steering committee

Approve the roadmap and establish technical committee



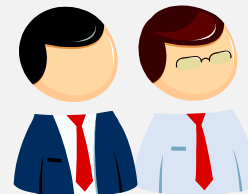
Technical committee

Participate in the critical third party LCA review



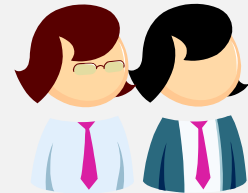
Partner/LCA expert

Design data collection method, also work with LCI data developer for developing LCI database which follow the guidelines



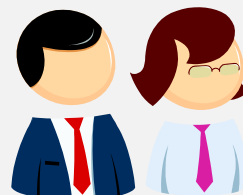
LCI data developer team

Identify system boundary and representative of dataset. Also, partner selection to develop LCI data



Internal reviewer

Validate the quality of LCI dataset and control and define the LCI quality standard



QA team

Correct the mistake of dataset, and maintain the quality of data. Review the data availability.

Software for Thai LCI Database

DALA:
Web-based collaboration tools

2015



(beta version)



SimaPro



thinkstep
GaBi



JEMAI-Pro

umberto®
know the flow.

Central Data Center

National
database

Pilot
database



First implementation

Software selection

Stop using JEMAI-Pro

SimaPro

- JEMAI-Pro

- Umberto
- GaBi
- SimaPro

- SimaPro
- GaBi

- SimaPro
- GaBi

2007

2008

2010

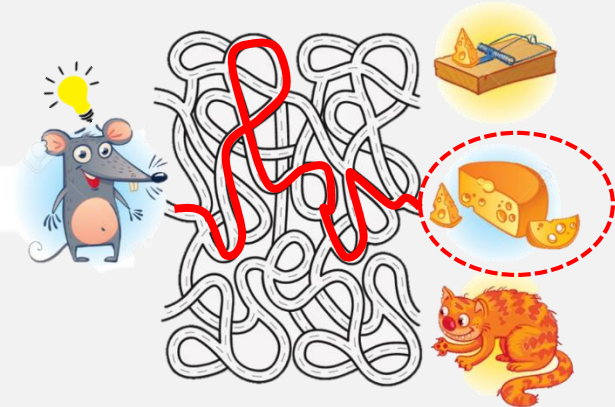
2012

2017

Web-based Collaboration Tools: DALA (beta version)

Targets problem

- **Fragmented**
 - Data
 - Collection ≠ Association
 - Node
 - Intermedia data source
- **No expert in field**
 - Lack of understanding
 - Do not know how to start



features

- **Graphic User Interface**
- **Dataset development**
- **Documentation**
- **Validation**
 - Functional unit
 - Allocation
 - Mass/Water/Energy balance
 - Reference flow
- **Data quality**
- **Process status**
- **Security control**
- **User roles**
- **Duplicate data**
- **Interoperability**

- Reliability
- Standard conformance
- Transparency
- LCI data harmonization
- Guided system

Supports GLAD

Stakeholder Encouragement (2017)

01 Encourage industry on environmental friendly

113 companies registered carbon footprint for organization

02 Environmental information in consumers decision making

88 companies (550 products) registered carbon footprint for product

53 companies (240 products) registered carbon footprint reduction

33 companies registered Carbon Reduction

03 Support information that is needed to benchmark and evaluate performance

~20 Projects for support scientific data

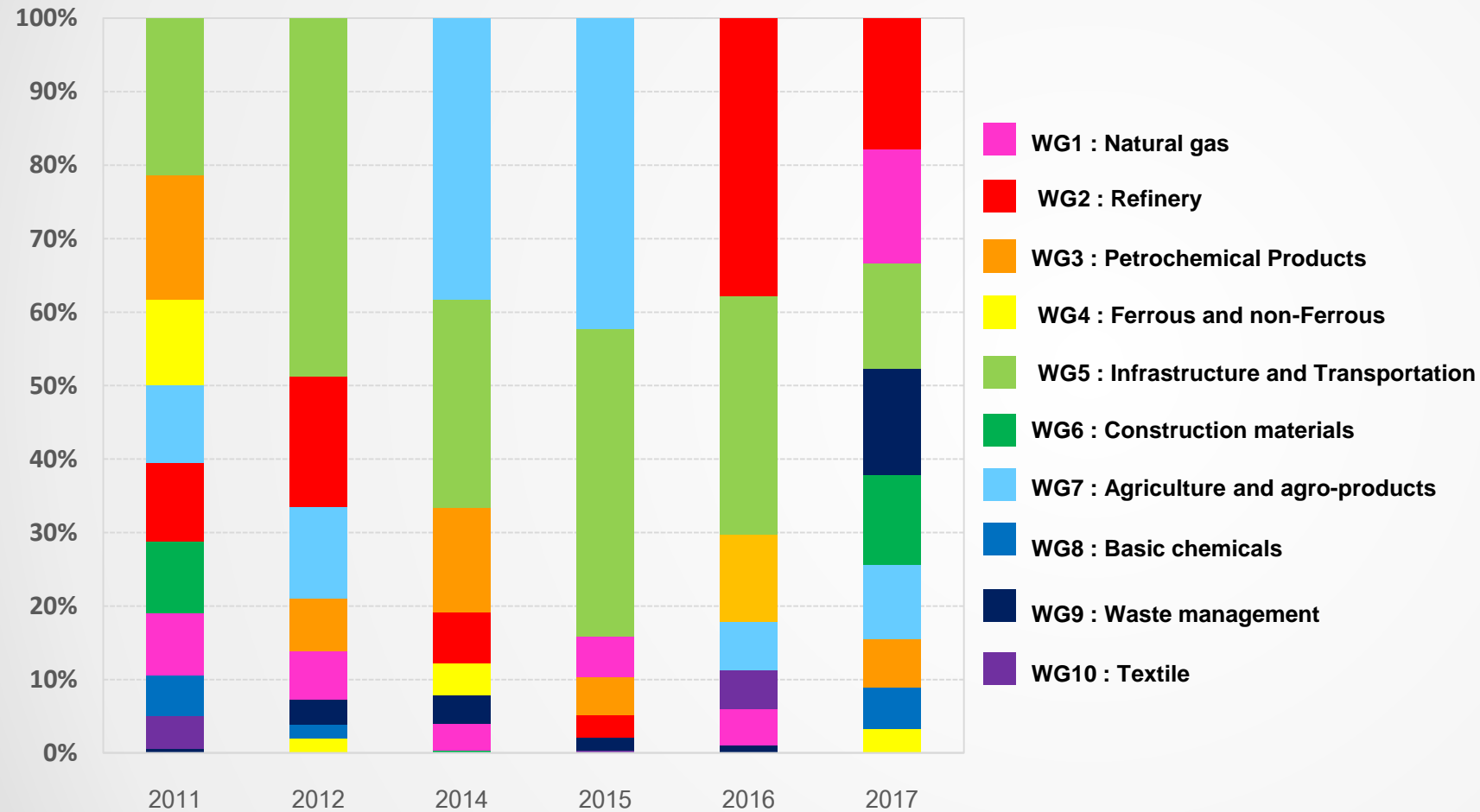
04 Support governmental policy

17 governmental policies supported technical information from Thai LCI Database.

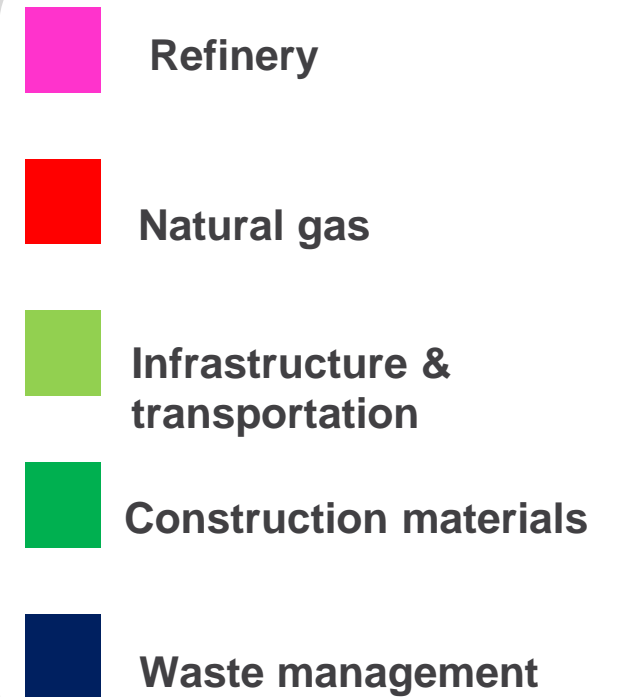
05 Support scientific data for green supply chain implementation

531 Emission factors for Support scientific data for green supply chain implementation

Service of Thai LCI Database



2017, top LCI requests



“Data shown only through website requests”

Government supporting is the most important



Government
Support

It will take enormous resources..



Powerful tool and software are required, also LCA expert.



Complex and large data is used through the supply chain.



Collaboration is needed for data development.



“Secondary data may
be an alternative to
LCI development”

NSTDA, National Infrastructure Programme, mainly supports for Thai LCI Data Center activities. LCI data is one of the most significant infrastructure for a country's progress in the modern and green economy.

Critical to Success!

National plan and strategy

- Decoupling natural resource use and environmental impacts from economic growth are concerned
- LCT and LCI have been included in National Environmental Management Plan

Stakeholder Involvement

- A strong contribution to maintain the national LCI
- Builds productive collaboration within and across a variety of sectors, including government, industry, university, and people

Finances and resources

- Robust financial management
- An effective team is the most significant to develop and manage LCI, also powerful tool

Research and innovation

- LCI as scientific environmental management tool, needs to ensure that reliability, accuracy and validity
- Research to improve the quality of LCT applications to promote environmental awareness

Thai LCA Collaboration: Thailand Organisations

Government sector

- Greenhouse Gas Management Organization (TGO)
- Thailand Research Fund (TRF)
- Iron & Steel Institute of Thailand
- Thailand Textile Institute (THTI)
- Provincial Waterworks Authority (PWA)
- Department of industrial works (DIW)
- Pollution Control Department (PCD)
- Department of Livestock Development (DLD)
- Office of Agricultural Economics (OAE)
- Department of Mineral Fuels
- Rice Department
- Department of Fisheries
- Etc.

NGO

- Thailand Environment Institute (TEI)

Thai LCA Collaboration: Thailand Organisations

Private sector

- Petroleum Authority of Thailand (PTT)
- Siam Cement Group (SCG)
- Charoen Pokphand (CP) Group
- BETAGRO
- Bangchak Corp
- Etc.

Education

- Kasetsart University
- Thammasat University
- Joint Graduate School of Energy and Environment (JGSEE)
- Chiang Mai University
- Chiang Mai University
- University of Phayao
- Mahidol University
- Chulalongkorn University
- Etc.

Thai LCA Collaboration: International Organisations



Food and Agriculture
Organization of the
United Nations



International
Resource
Panel



Life Cycle Initiative



JRC

EUROPEAN COMMISSION



Korea Environmental
Industry & Technology Institute



Japan Environmental Management
Association for Industry



NATIONAL INSTITUTE OF
ADVANCED INDUSTRIAL SCIENCE
AND TECHNOLOGY (AIST)



ITRI

Industrial Technology
Research Institute



東京都市大学

TOKYO CITY UNIVERSITY



Waseda University



SIRIM

THANK YOU

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