

Current LCI database development in Japan

A result of the LCA Project

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AIST



Research Center

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- Characteristics of the database
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Background of the LCA project

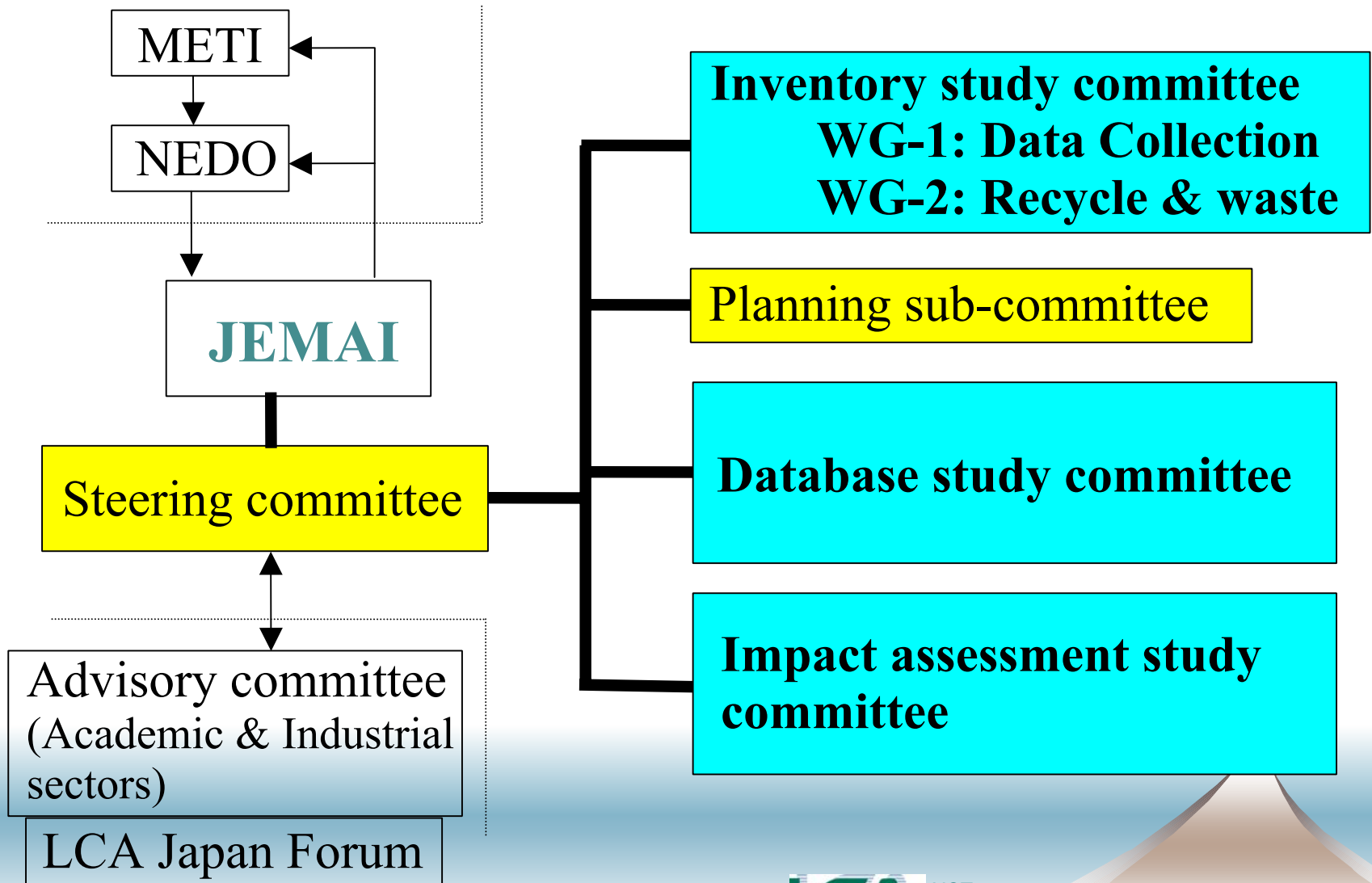
Main activities

- 1995 October** Establishment of LCA Japan Forum
- 1997 June** **Proposal for national LCA project**
- August** Informal decision of project establishment to Government
- 1998 April** Settlement of LCA development Division in JEMAI
- October** Concrete plan of the new project
- Contract of the commission research between NEDO and JEMAI
- Development of assessment technology of life cycle environment impacts of products
- Start of national LCA project**
- 2003 March** **Summary of the project**
- 2003 August** **Start of trial open of the LCA database (Library) to February, 2004**

Objectives of the LCA project in Japan

1. LCA methodologies;
 - To learn/disseminate Practical LCI method.
 - To develop LCI method for recycling.
 - To develop LCIA method
based on endpoint modelling.
2. LCI data collection by industrial associations.
3. A network system to show above results.

Organization of the LCA project



Inventory study committee

WG-1: Inventory data collection

- Transparent and reliable LCI data of around **250 industrial products** were collected **voluntarily** by **22** industrial associations of the committee and **34 industrial associations** joined in the project.

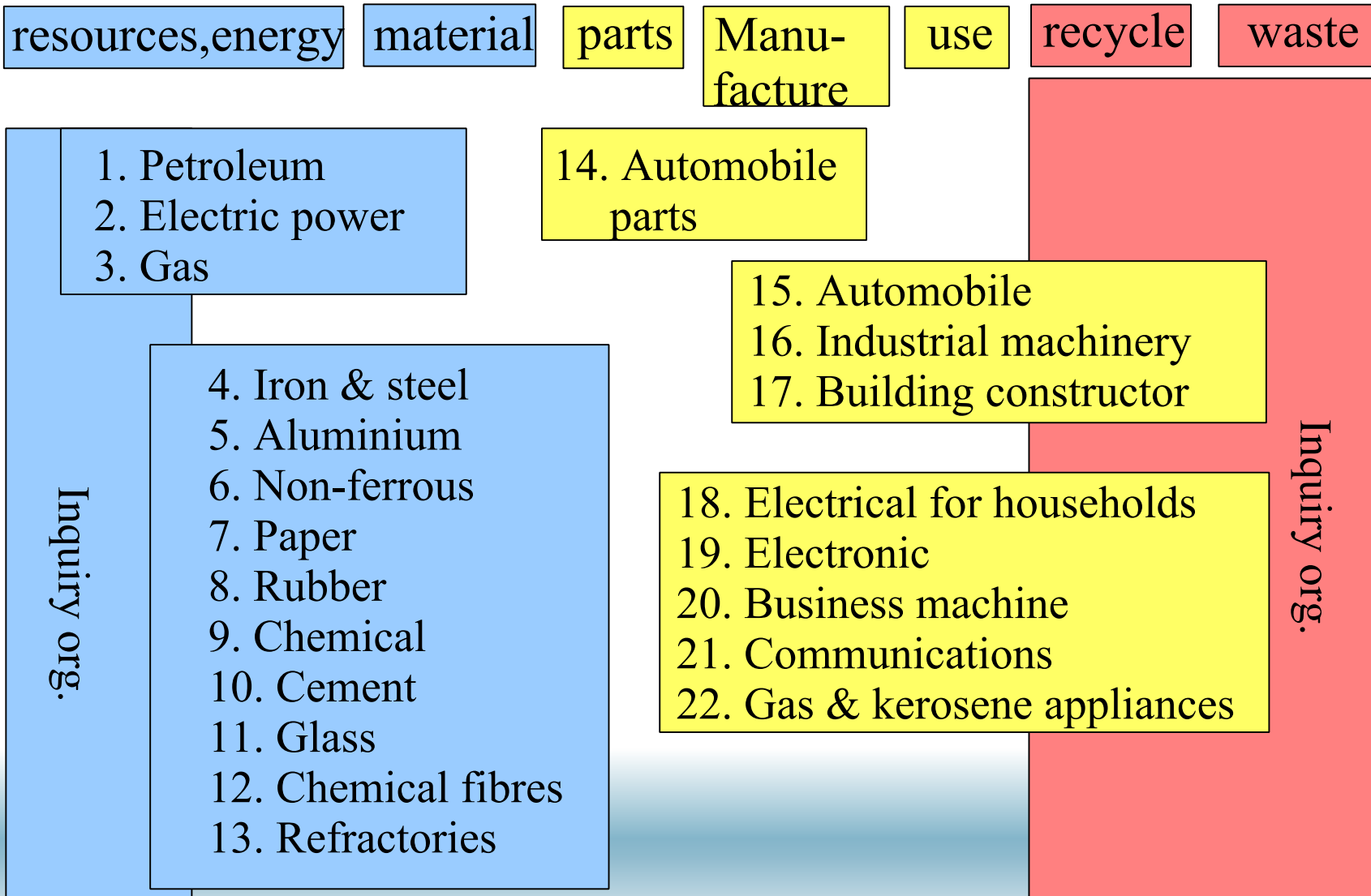
- System boundary: “**Gate to Gate**” .

- Inventory: 14 flows

(air) CO₂, CH₄, HFC, PFC, N₂O, SF₆, NO_x, SO_x, dust

(water) BOD, COD, total P, total N, SS

Members of industrial associations



Members of inventory data collecting

Members of committee

Gas
 Petroleum
 Electric power
 Iron and steel
 Aluminum
 Non-ferrous metals
 Glass
 Paper
 Refractories
 Cement
 Chemical
 Chemical fibers
 Rubber
 Automobiles
 Automobile parts
 Business machine
 Electrical for households
 Communications
 Electronic
 Gas and kerosene appliance
 Industrial machinery
 Building constructor

Additional members of data collecting industry

Limestone mining
 Glass fiber
 Fineceramics
 Titanium
 Stainless steel
 Batteries
 Railway transport
 Electric Arc Furnace
 Electric wire & cables
 Resinoid
 Carbon black
 PolyVinylCholoride
 Chloro-carbon
 Petrochemical
 Urea & ammonium
 Titanium dioxide
 Industrial gases
 Soap and detergent
 Paint
 Expanded PS
 Plastic Waste Management
 Methanol-formaldehyde
 Sulfuric acid
 Chemical products
 Printing ink
 Aclylonitrile
 Synthetic rubber
 ABS resin
 Emulsion
 Soda
 Engineering plastics
 Aromatic
 Urethane row materials
 Methacrilate Resin

Examples of inventory data of the project

Gas	Town gas	LNG		
Petroleum	heavy oil A	heavy oil C (low S)	Naptha	Diesel
	Crude oil	heavy oil C (high S)		
Electricity	Grid Mix			
Aluminum	Al pipe	Al sheet	Al foils	Al paste
Chemaical	PET	PS	PP	PVC
Iron & Steel	Shapes	Plate	bars	Zn coated sheet
	Weld pipes	Tin free steel	Tin plate	Ni-based stainless
Glass	Plate glass			
Cement	Portland cement	BF cement	Fly ash cement	
Refractories	Burned refractories	Monolithic refractories		
Chemical fibres	polyester fibers	Tire cord		
Non-ferrous metal	Copper	Lead	Zinc	
Rubber	Tire for automobile	Tire for truck	Tire for bike	
Paper	Paper	Board		
Building constructor	Business office			
Gas & kerosene appliances	Oven	Fan heater	Water heater	Stove
Industrial machinery	Pump	Blower		
Automobile	Automobile (1500CC)			
Automobile parts	Fuel tunk	Brakes	Car air-conditioner	Drive shaft
Business machine	Copying machine			
Electronic	Color TV	Desk top PC	Laptop PC	
Communications	Handy phone			

Progress of constructing the inventory database

Year	Inventory committee		Database committee
	WG-1	Task group	
'98	1. Basic plan of data collecting 2. Data format	1. Preparation for LCI guideline	1. Basic plan of database system
'99	3. Arrangement of data items for each industry association	2. LCI data collecting guideline 3. Collecting trial 4. Instructing caravan to association	2. Data input software 3. Data input manual
'00	4. Data collecting by each industry assoc.		4. Data supplying server
01~'02	5. Data check and case study 6. Revise the data		5. Complete the database system 6. Total system trial

Inventory data collecting manual

1. Selection of Products and scope

- Representative products : production method, function, size

2. Unification of Name and Unit

- Name: in the Industrial Statistic Table
- Unit : Unit of valuable function of the product, SI unit

3. Method of Data Collection

- Unit process / Subsystem, Averaging Method
- Parts
- Use stage
- Recycle and Waste stage
- Facility / Worker

4. Data Input

- General and I/O data of Subsystem

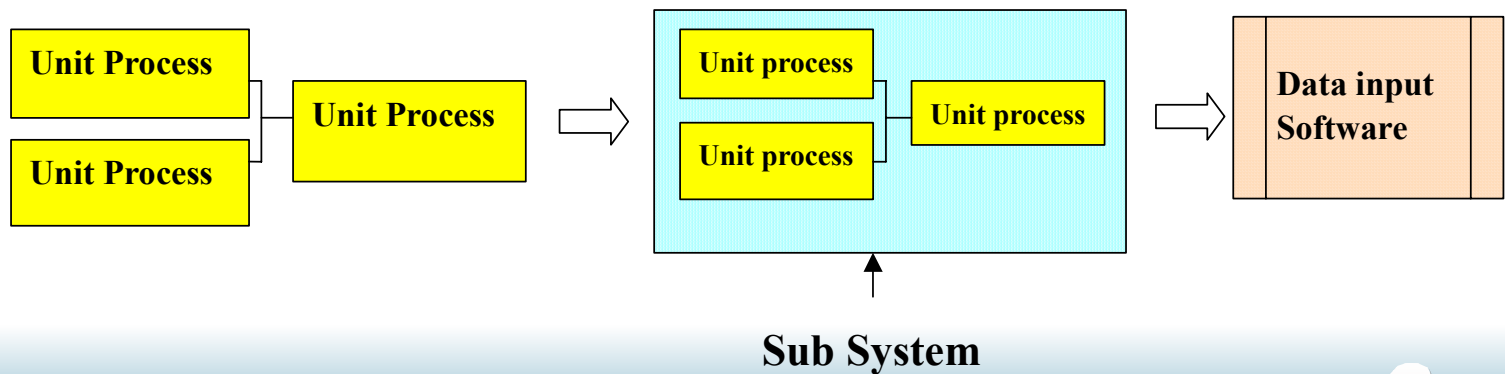
LCI-Data manual

Example-1 : Overall procedure of data gathering

① Input & output data collection for unit process

② Summarizing the data for subsystem using Format-1,2

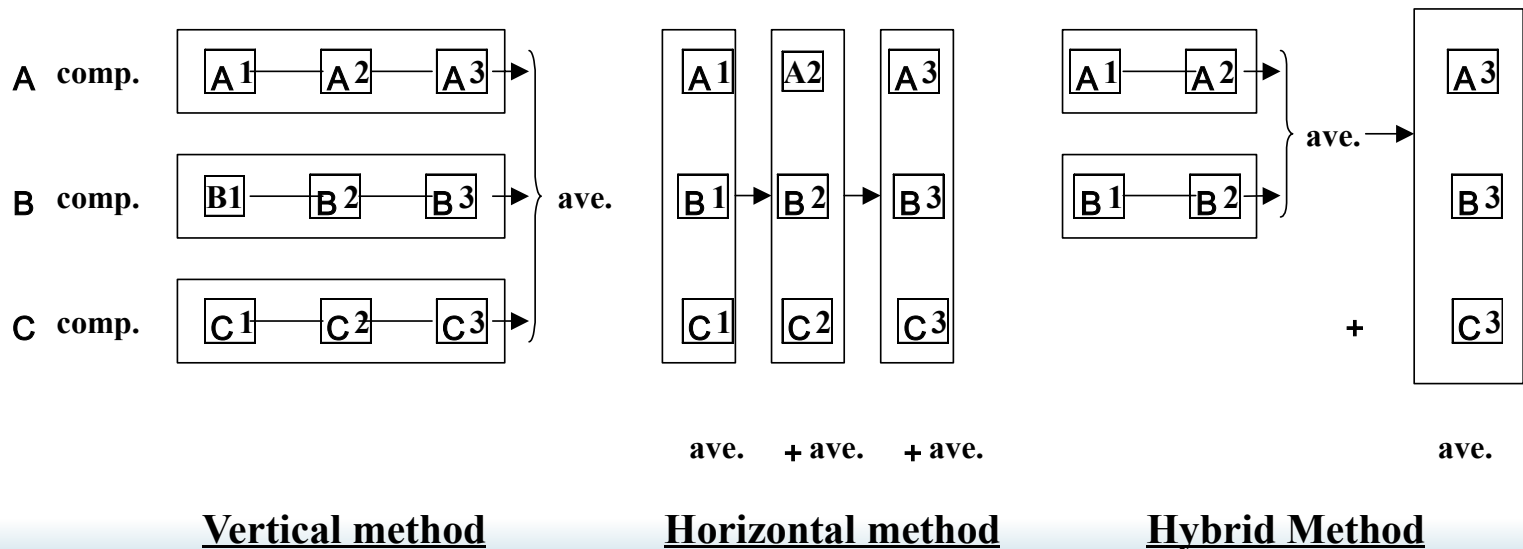
③ Data input



LCI-Data manual

Example-2 : Choice of vertical or horizontal method

Choice of vertical or horizontal method depends on the condition of material supply, energy management etc. → Choice depends on the judgement of each industrial association.

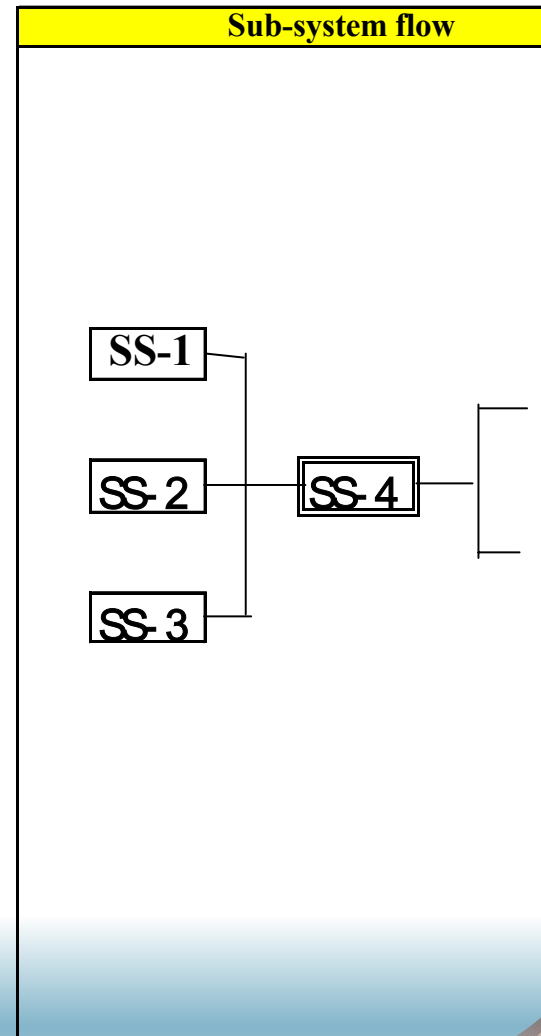


Inventory Data Format-1

Identification	
Product name	
Sub System	
Cord Number	Component
Unit	
Value	
Collected Period	
Collected Area	
Tecnology	
Representativeness	

Practitioner	
Date	
Name	
Affiliation	
Address	
e-mail	
TEL	
FAX	

Remarks



Inventory Data Format-2

Product		Sub-system	Unit Process (included)	Transport (Inflow)				Manufacturing										
Name	Coord			Materials	Traffic	Fuel	Energy	Raw Material	Material	Parts	Facility							
Name	Coord			Name	Coord	Name	Coord	Name	Coord	Name	Coord	Name	Coord	Name	Coord	Name	Coord	

Manufacturing					Transport (Outflow)				Use				
Output					Input				Input			Output	
Sub products	E Load	Comp	Waste		Traffic	Fuel		Energy	Article of cons	E Load	comp	Waste	
name	coord	name	coord	name	coord	name	coord	name	coord	name	coord	name	coord

Recycle							Disposal			
Input				Output			Input		Output	
Energy	Facility	Rec. Material	E Load	Comp	Waste		Facility	Waste		
name	coord	name	coord	name	coord	name	coord	name	coord	

Software for inventory data input

(General information of sub-system)

The screenshot shows a software window titled "サブシステム情報" (Sub-system Information) with a close button in the top right corner. The window contains several input fields and buttons:

- At the top, there are three tabs: "サブシステム" (Sub-system), "データ作成者" (Data creator), and "データ品質" (Data quality).
- Below the tabs is a section titled "サブシステム情報" (Sub-system Information) containing:
 - "サブシステム分類" (Sub-system classification): A dropdown menu with "製造" (Manufacturing) selected.
 - "サブシステム名" (Sub-system name): A text field containing "ポリスチレンの製造" (Manufacturing of polystyrene).
 - "分類コード" (Classification code): A text field containing "203717" and a "参照" (Reference) button.
 - "製品名" (Product name): A text field containing "ポリスチレン" (Polystyrene).
 - "値" (Value): A text field containing "1" and a "単位" (Unit) dropdown menu with "kg" selected.
 - "重量" (Weight): A text field and a "単位" (Unit) dropdown menu.
 - "配分方法" (Distribution method): A dropdown menu.
- Below the input fields is a section titled "備考" (Remarks) with a large text area and a vertical scrollbar.
- At the bottom of the window are four buttons: "ヘルプ" (Help), "OK", "キャンセル" (Cancel), and "適用(空)" (Apply (Empty)).

Software for input of the data

マテリアルフロー図

ポリスチレンの製造

エネルギー	
電力	0.133 kWh
軽油	600.4 kcal
A重油	600.4 kcal
C重油	600.4 kcal
ナフサ	2408.7 kcal
液化石油ガス	271 cal
NGL	86.2 kcal

入力 →

ポリスチレン	1 kg
--------	------

出力 →

環境負荷物質(大気)	
CO2	1387... mg
NOx	1240 mg
SOx	262 mg
HC(ハイドロカ...	223 mg
ばいじん	34.9 mg
Cl2	1.1 mg
HCl	0.6 mg
CO	0 mg

原料	
ナフサ	0.962 kg
液化石油ガス	0.014 kg
NGL	0.025 kg
添加剤	0.013 kg
酸素ガス(液化...	0.012 kg

副製品、中間製品等	
ロス	0.026 kg

内部輸送	

環境負荷物質(水質)	
BOD	42.8 mg
COD	64.8 mg
全リン	4.2 mg
全窒素	119 mg
SS	47.8 mg
油分	0.8 mg
フェノール類	0.1 mg

環境負荷物質(土壌)	

処理委託廃棄物	
廃プラスチック	1730 mg
無機性汚泥	505 mg
ばいじん	872 mg
燃え殻	677 mg
廃酸	0.6 mg
廃アルカリ	3.2 mg

自家処理廃棄物	
廃油	682 mg
有機性汚泥	202 mg

ヘルプ

OK

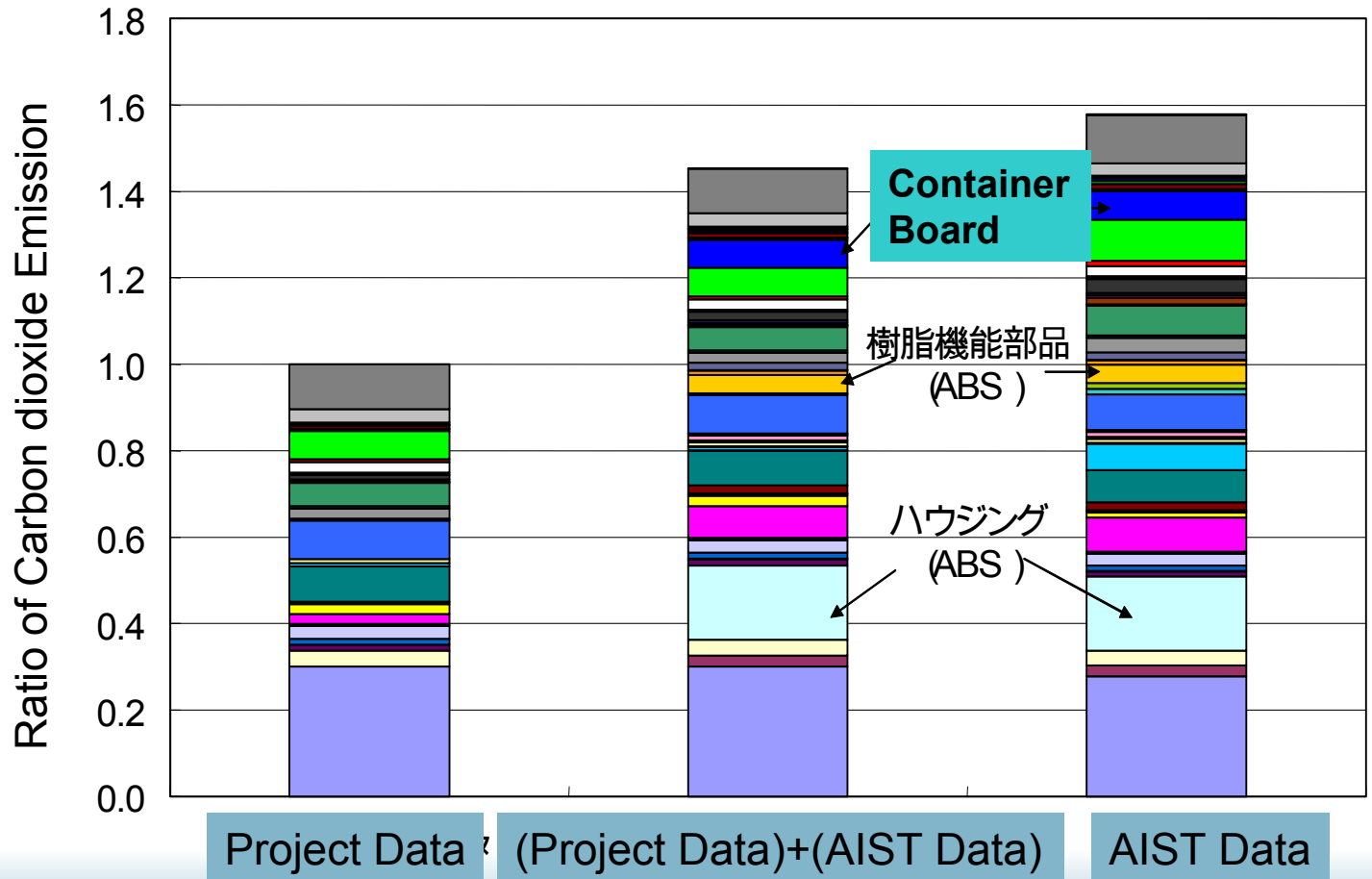
EXAMPLE
-This data is not actual-

Characteristics of the database

- (1) The system boundary of each product is “Gate to Gate”.
- (2) Input products of the downstream processes are not collected completely by the upstream industrial associations.

The data of the product should be complimented by other database for the “Cradle to Gate/Grave”. The database is now called as “LCA Library”.

Comparison of the CO2 emissions for a copy machine - data coverage of the current database -



Contents of the LCA Library

Database for LCI

Authorized by Inventory
Study Committee WG-1

250 items
by 56 industry associations.

WG-2 & literature

Database for LCIA

List for
characterization

List for Endpoints

List for weighting

Explanations of
these lists

Trial to open the LCA database

1. Schedule: August 2003 to February 2004

2. Objectives:

To clarify how LCA database was needed.

3. Target: Industries, Consumer etc.

4. Free

5. Members:

1) Corporative user (Suppliers of inventory data)

2) General user permitted by steering committee

6. Language: Only Japanese

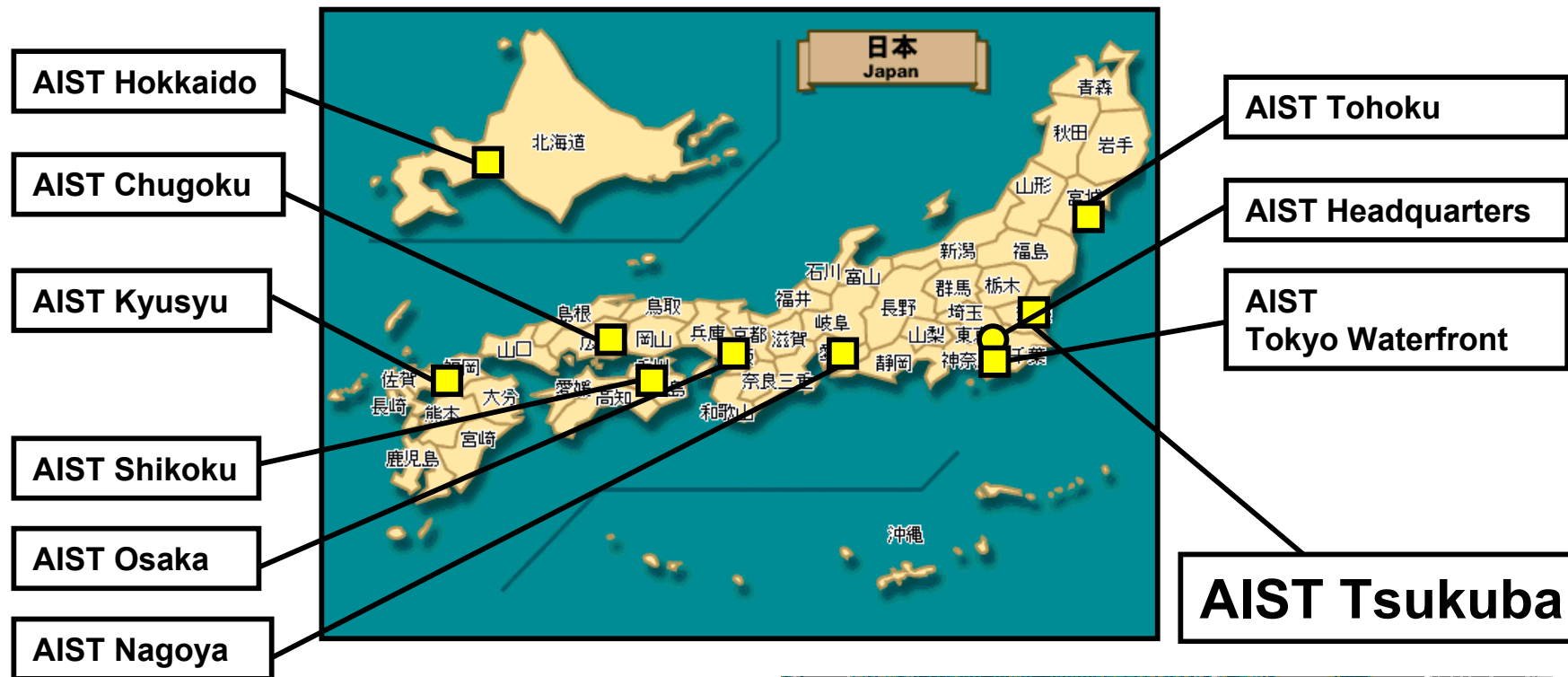
<URL: <http://lcadb.jemai.or.jp>>

e-mail: lca-project@jemai.or.jp

Conclusions

- LCA has been popular through the project.
- LCA Library in Japan
Inventory data of around 250 products,
Three types of the factor lists of LCIA.

National Institute of Advanced Industrial Science & Technology (AIST)



2500 Researchers
3200 Employees

Independent Administrative Institution
under
The Ministry of Economy, Trade and Industry (METI)



Research Center for Life Cycle Assessment

Director : A. Inaba Vice Director: M. Sagisaka

Administration/International

Eco-efficiency RT

Eco-Efficiency
Indicators
for Sustainability
Sustainable
Consumption

Tahara, Nomura, +2

LCA RT

LC-Impact Assessment
Software for LCA
Design for Environment
Inventory DataBase

Itsubo, Matsuno, +5, JSPS3, S4

Energy Systems RT

Local Energy System
Transportation
Waste Management

Tagita, Endo, Genchi,
Motoshita, +6, PD3, S2

Methodologies and Tools on Life Cycle Thinking