Reports from Industries

Economic System and Industries in the Future

The 2nd Biomass-Asia Workshop

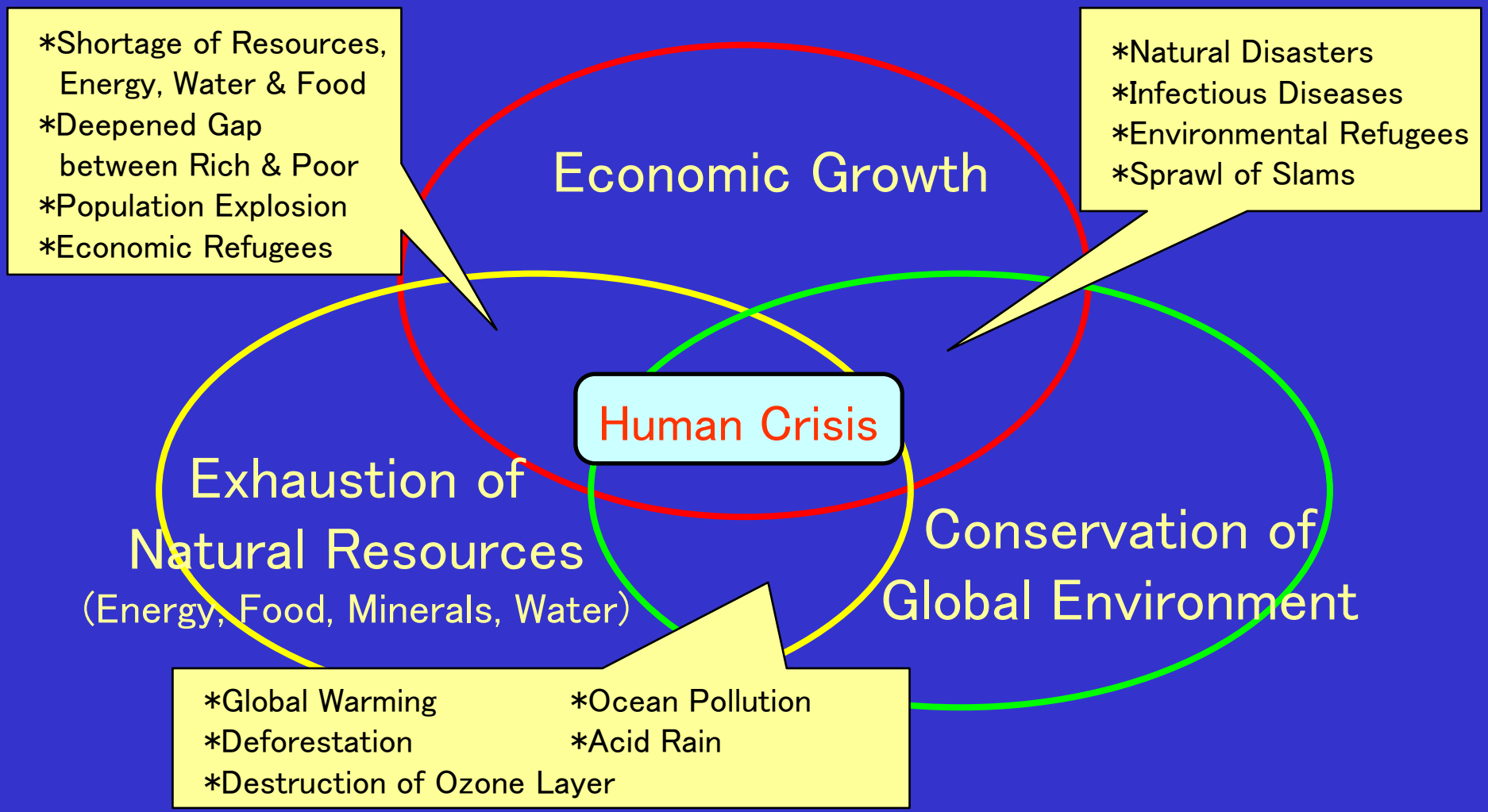
December 13, 2005

Bangkok, Thailand

Chairman of Zero Emissions Forum,
the United Nations University
Chairman of Divisional Group of Manufacturing,
Tokyo Chamber of Commerce and Industry
Hiroyuki Fujimura

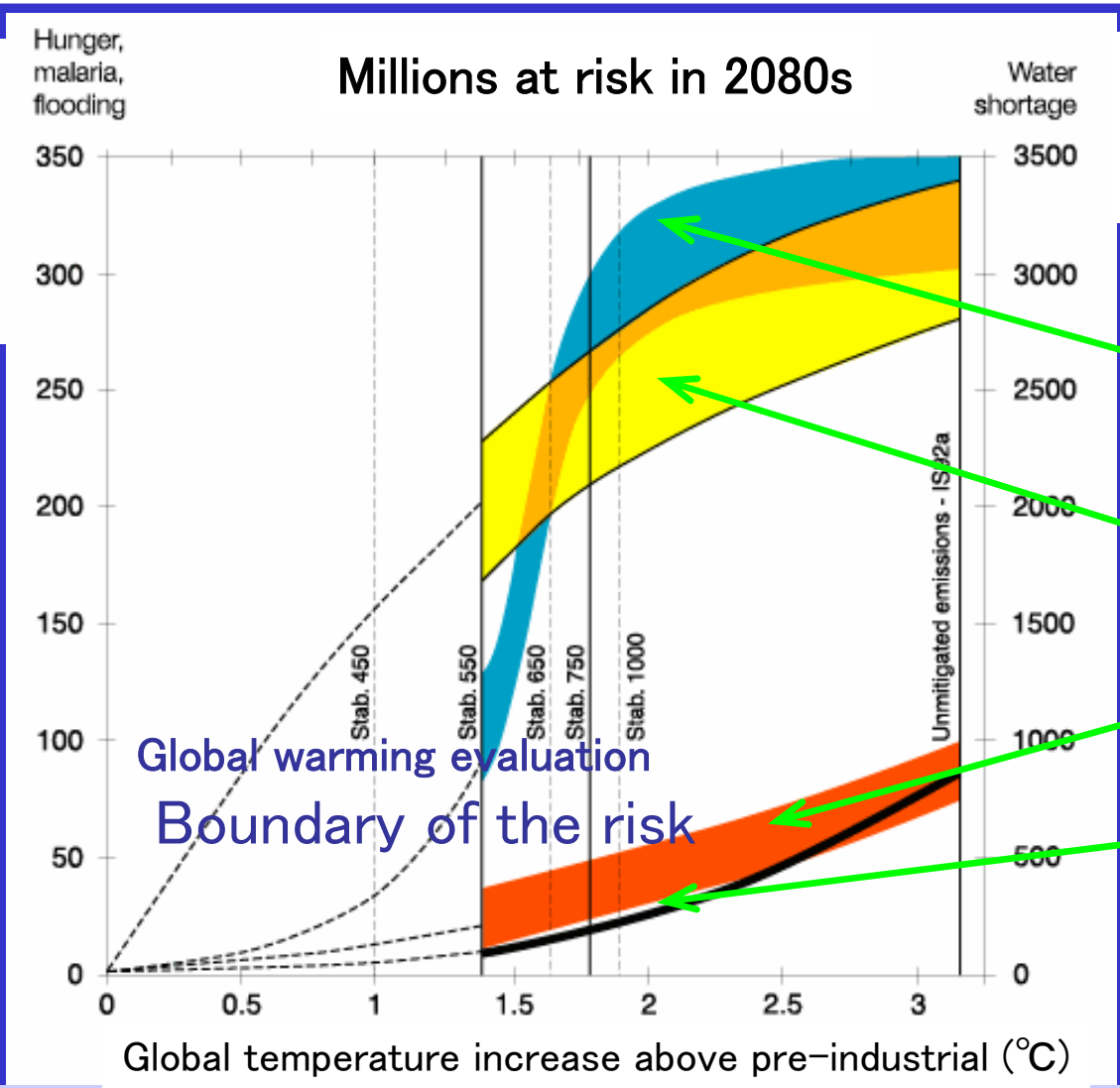
Contemporary Challenge

Global Tri-lemma



Millions at Risk (Parry et al, 2001)

Hunger, malaria, flooding (million people at risk)

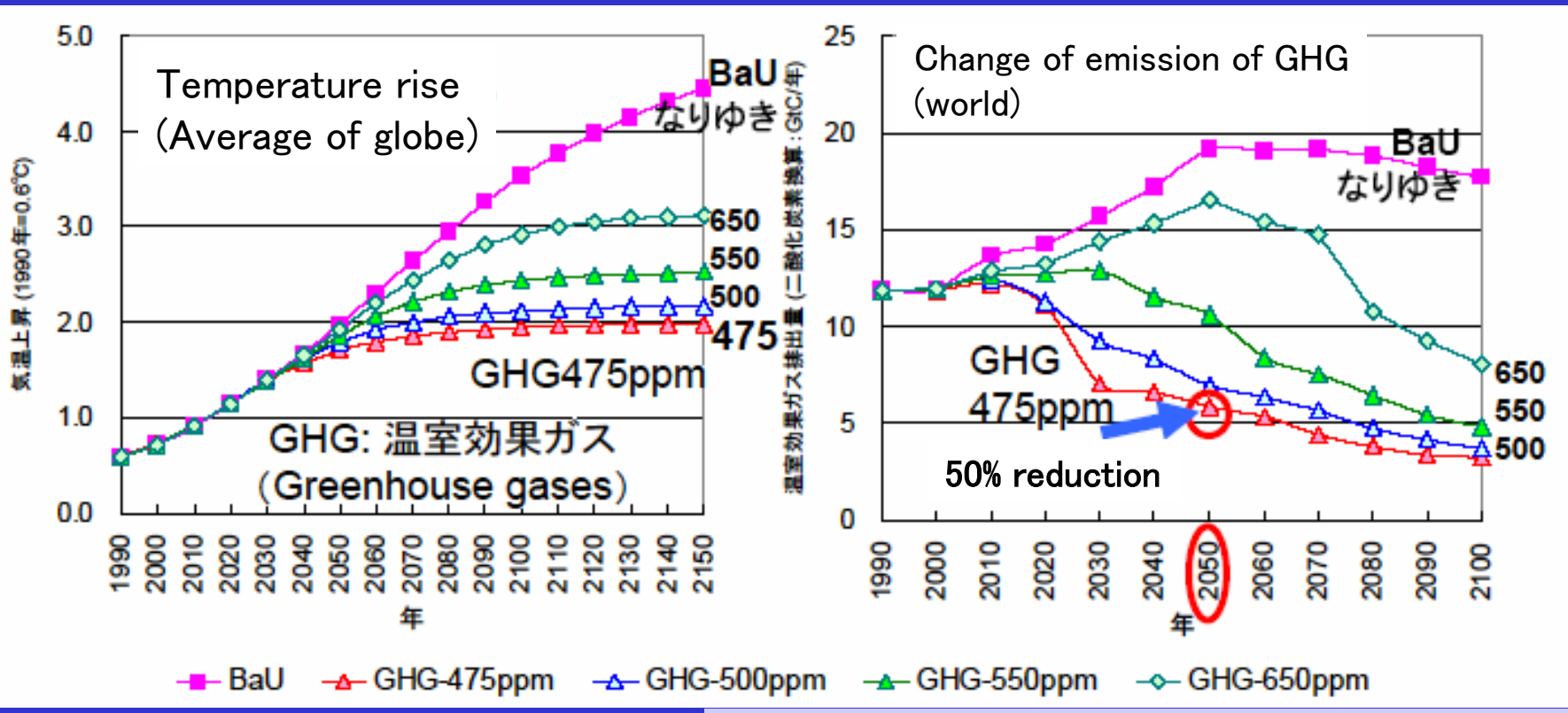


Water shortage (million people at risk)

- Risk of water shortage
- Risk of malaria
- Risk of hunger
- Risk of coastal flooding

Parry et al studied the risks of water shortage, malaria, hunger and coastal flooding which will be caused by global warming. Drastic increase of number of the people at risk is seen around 1.5 to 2.0℃.

To Keep Temperature Rise under 2℃



Greenhouse gases
Gases which has greenhouse effect: CO_2, Methane, Nitrous Oxide, CFC, PFC and SF_6

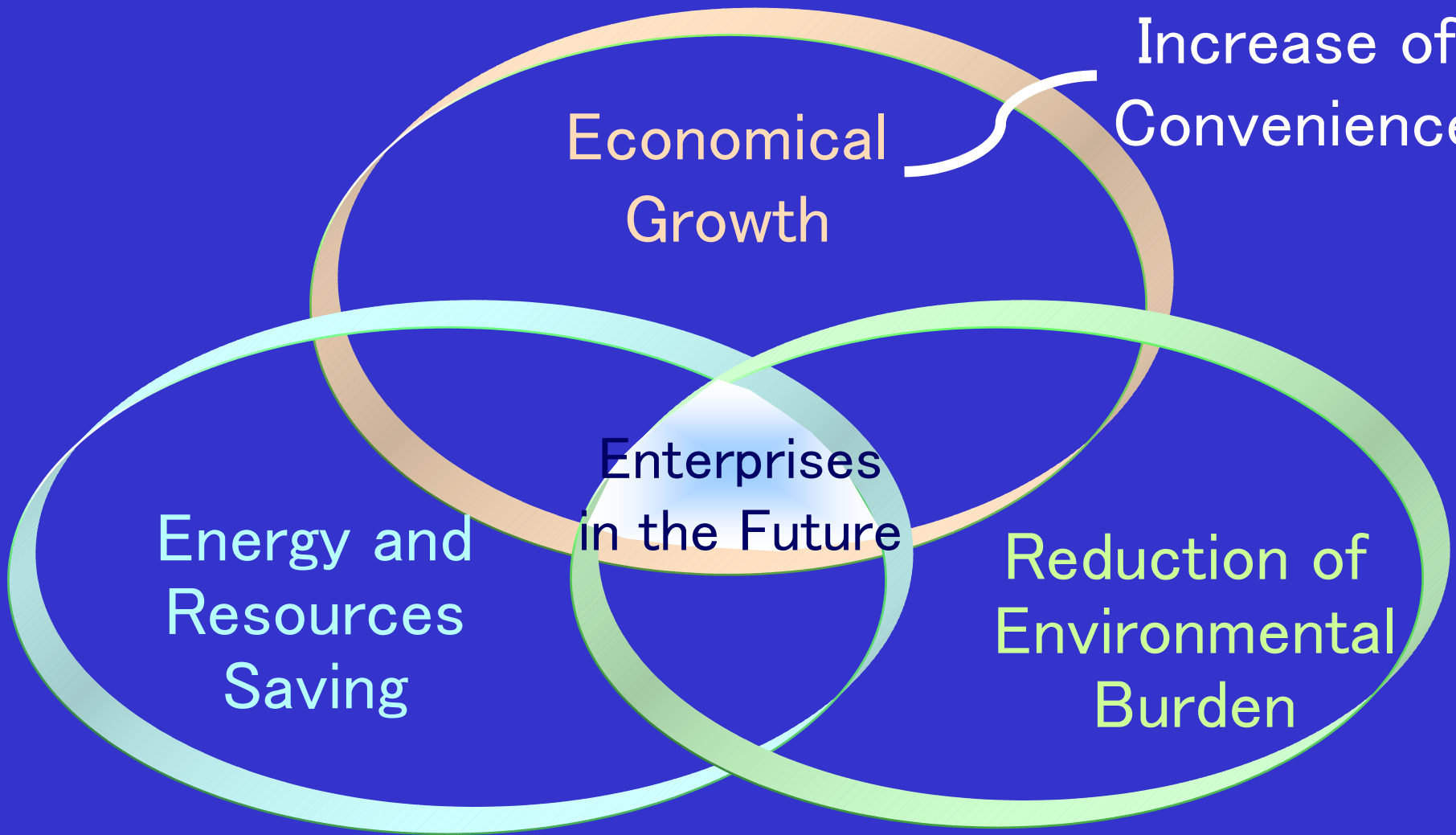
Information delivered to "International response in the future to the climate change issue, the 2nd interim report (May, 2005) " of International strategic committee on climate change, Central Environmental Council, Global Environment Division

- To keep temperature rise under 2℃, it is necessary to keep GHG concentration within atmosphere under 475ppm.
- It is necessary to reduce GHG emission in 2050, 50% of 1990 level
- Japan has probability to be requested to reduce GHG more than that (60–80%)
- European countries are also considering reduction of GHG(UK 60%, Germany 80%, France 75%)

Exhaustion of Natural Resources

「Economics of Natural Resources」(Takashi Nishiyama, Chuko Books)

Industries and Social System that can Solve Global Tri-lemma Simultaneously



Evaluation Method of "Sustainability of the Society"

Evaluation method

Information disclosure

Company value
Value of society
$\propto$

Sustainability of the society $= \frac{\text{HAPPINESS}}{\text{TLCC}}$

TLCC = Lifecycle cost + Cost for environmental burden recovery

= LCC + {Burden estimated by LCA × Marginal cost}

Environmental burden Exhaustibility of resources

Conception of LCC, Cost Converted LCA and TLCC

Total Life Cycle Cost　　Life Cycle Cost　　Life Cycle Assessment

TLCC ＝ LCC ＋ LCA

（Cost converted environmental loads）

¥　　¥　　¥

Cost conversion

（Marginal cost method）

Example of infrastructures such as refuse treatment plant

Ex）kg−CO_2

Cost	Environmental Loads
Manufacturing	Manufacturing
Construction	Construction
O & M	O & M
Repair works	Repair works
Renewal	Renewal
Disposal	Disposal

Examples of Marginal Cost

Environmental Loads	Explanation	Marginal Cost (Yen／kg)
CO_2	Carbon Dioxide	7
Dust	Suspended Particle Materials	6,700
NOx	Nitrogen Oxides	2,500
SOx	Sulfur Oxides	43
BTOD	Causative Agent of Eutrophication	1,600
TCE, PCE	Trichloroethylene, Tetrachloroethylene	15,000,000
Heavy Metals	Lead, Cadmium, Zinc, Mercury…	20,000
DXNs	Dioxins	19,000,000,000
CFC	Chlorofluorocarbons	24,000

An Example of Cleaner Production

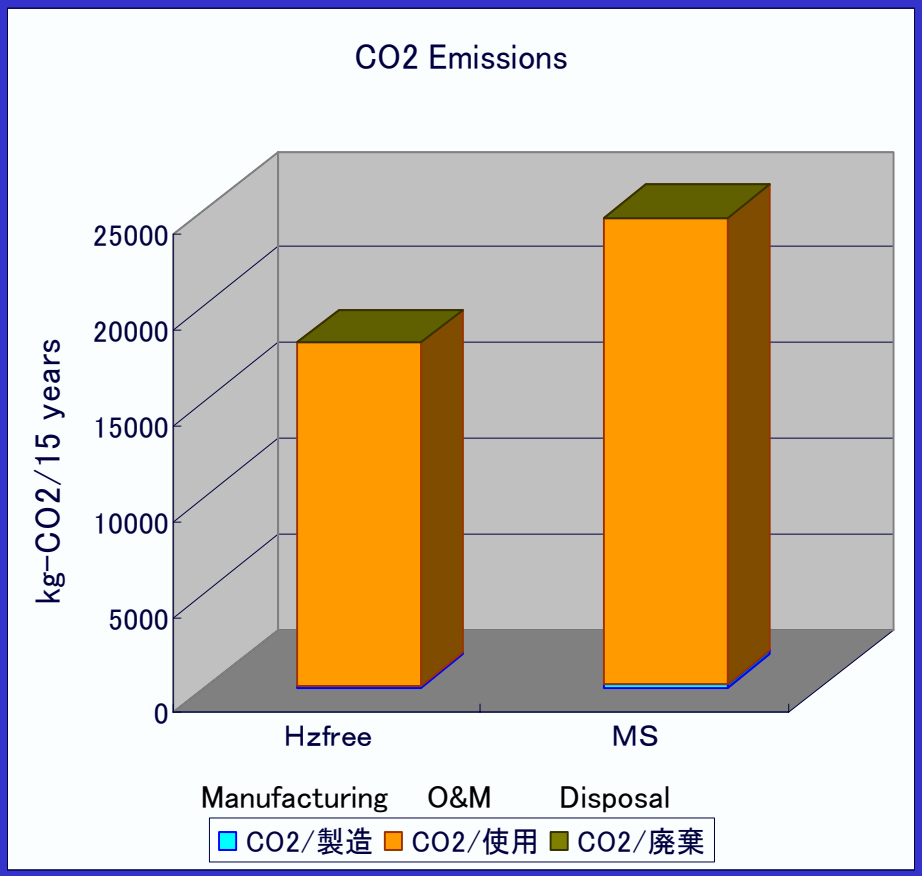
Definition of functional unit

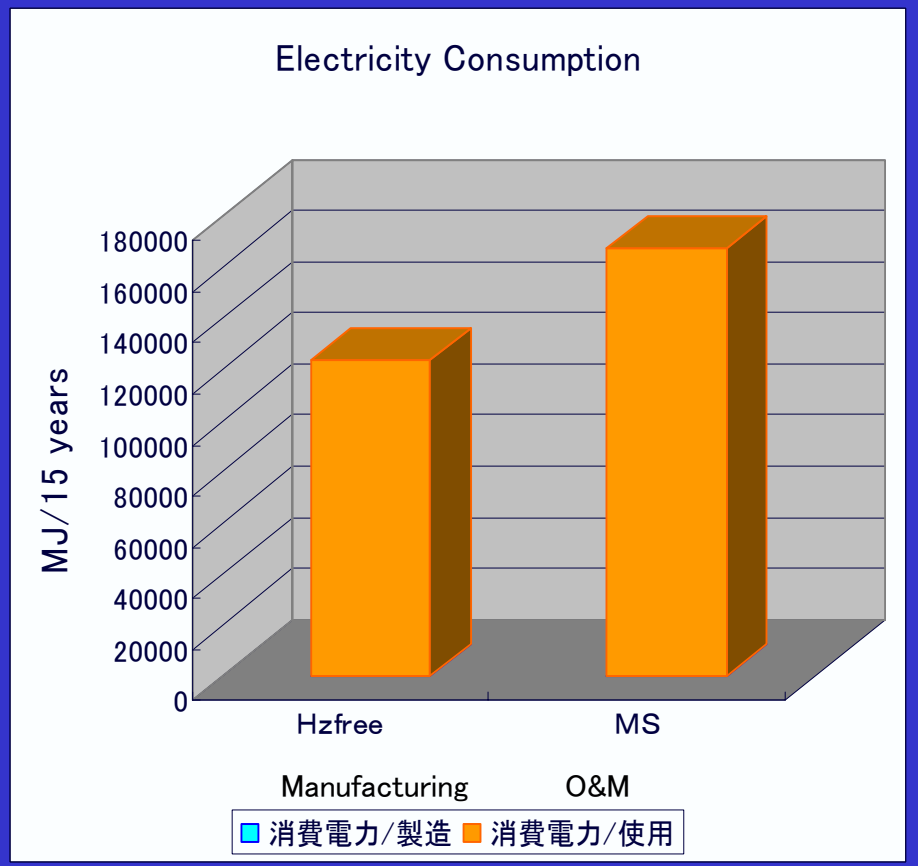
* Flow Rate ; 0.12m^3/min * Total Head ; 33m
* Operation ; 15 years （8hrs/d , 220days/y ）

	40MMF02.5	40MS452.2
Main casing material	Stainless Steel	Cast Iron
Total weight	21 kg	101 kg
Specification (Flow Rate & Total Head)	0.2m^3/min × 37m	0.15m^3/min ×35m
Output	0.8～2.5 kW	2.2 kW
Shape		

Life Cycle Assessment

LCA Analysis for Standard Pumps(1/2)



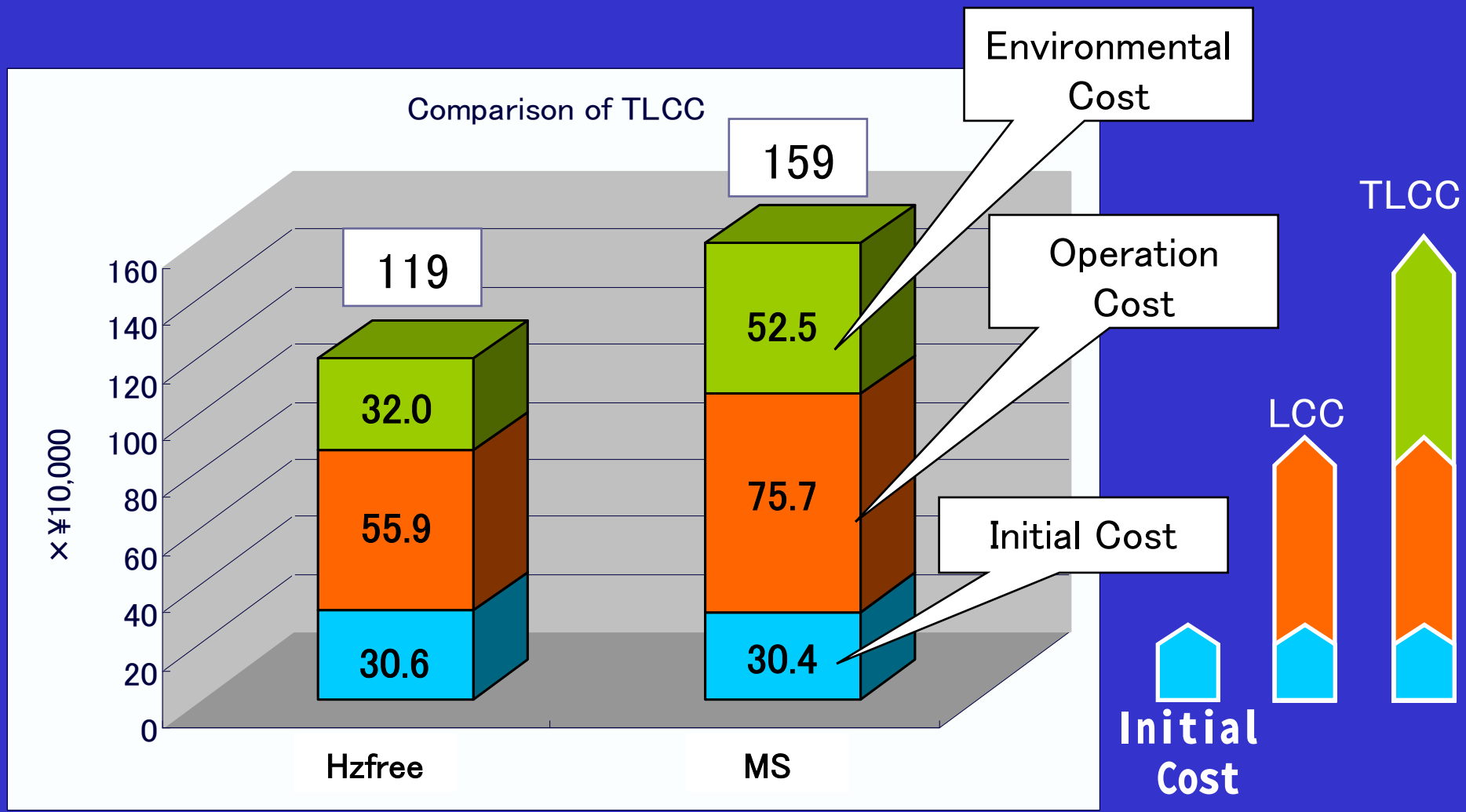


CO_2 Emission

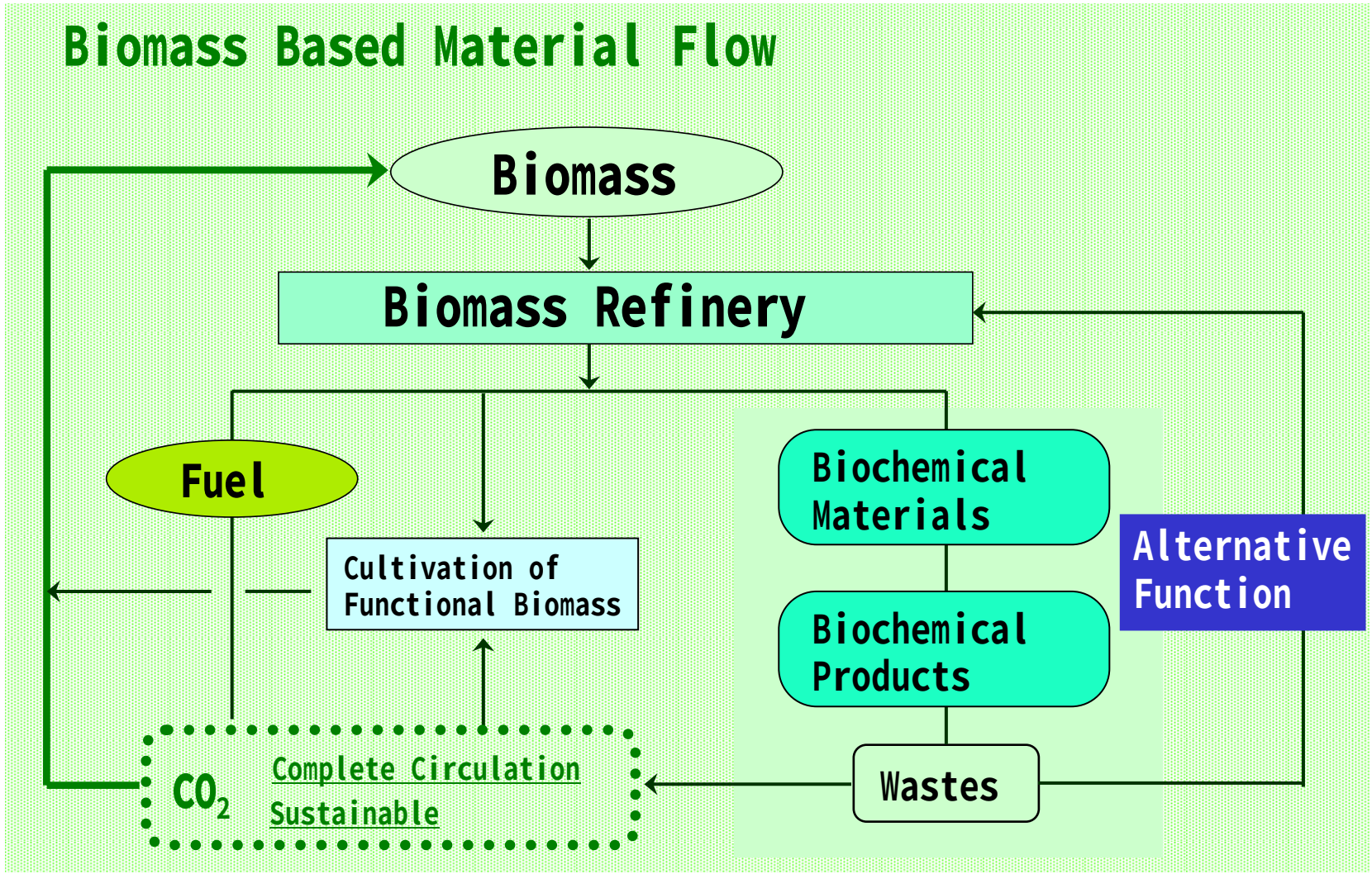
Electricity Consumption

Life Cycle Assessment

LCA Analysis for Standard Pumps(2/2)



Realization of Zero Emissions Based on Biomass Utilization



Reference: "Aiming at Self Supporting Sustainable Society Utilizing Biomass as Material Resources " Dr. Akiyoshi Sakoda; Institute of Industrial Science, the University of Tokyo

Biomass Industrial Complex Network of Distributed Small Industries

Urban Area

Waste Treatment Industry

Municipal Wastes

Industrial Wastes

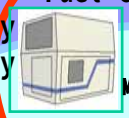
Wastes from Daily Life

Wastes from Urban Area and Industries

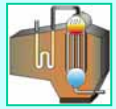
Small Size Energy Supply Complex

Fuel Cell

Electricity Heat Energy



Micro Gas Turbine

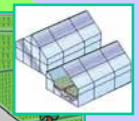


Biomass Generation

Bio-gas Hydrogen

Electricity Heat Energy

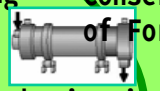
Agricultural Products with Brands



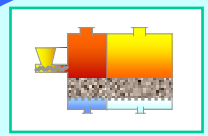
Cultivating with Green Manure less Pesticides

CO_2 Fixation Conservations of Forests

Composting Facility

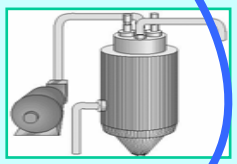


Carbonization Facility



Resource Gasification system

Biomass Refinery Industrial Complex



Methane Fermentation Facility

Biomass Resources within Agriculture, Forestry and Livestock Wastes

Fuel (Methanol / Ethanol)

Bio-degradable Plastics

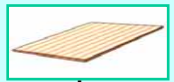
Recyclable Board (Wooden Furniture etc)

Material Recycle

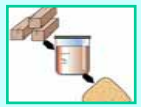
Mineral Resource Alternative Industry

Manufacturing System of Poly Lactic Acid

Alcoholic Fermentation



Wooden Plastics



Lignin Extracting Saccharification

Waste Treatment Industry

Agricultural Wastes

Livestock Excreta

Forestry Wastes

Biomass Resource produced in Forests and Agricultural Fields

Woods, Grasses Agricultural Products

Rural Agricultural Area

Food Additives Oil & Fat for Foods

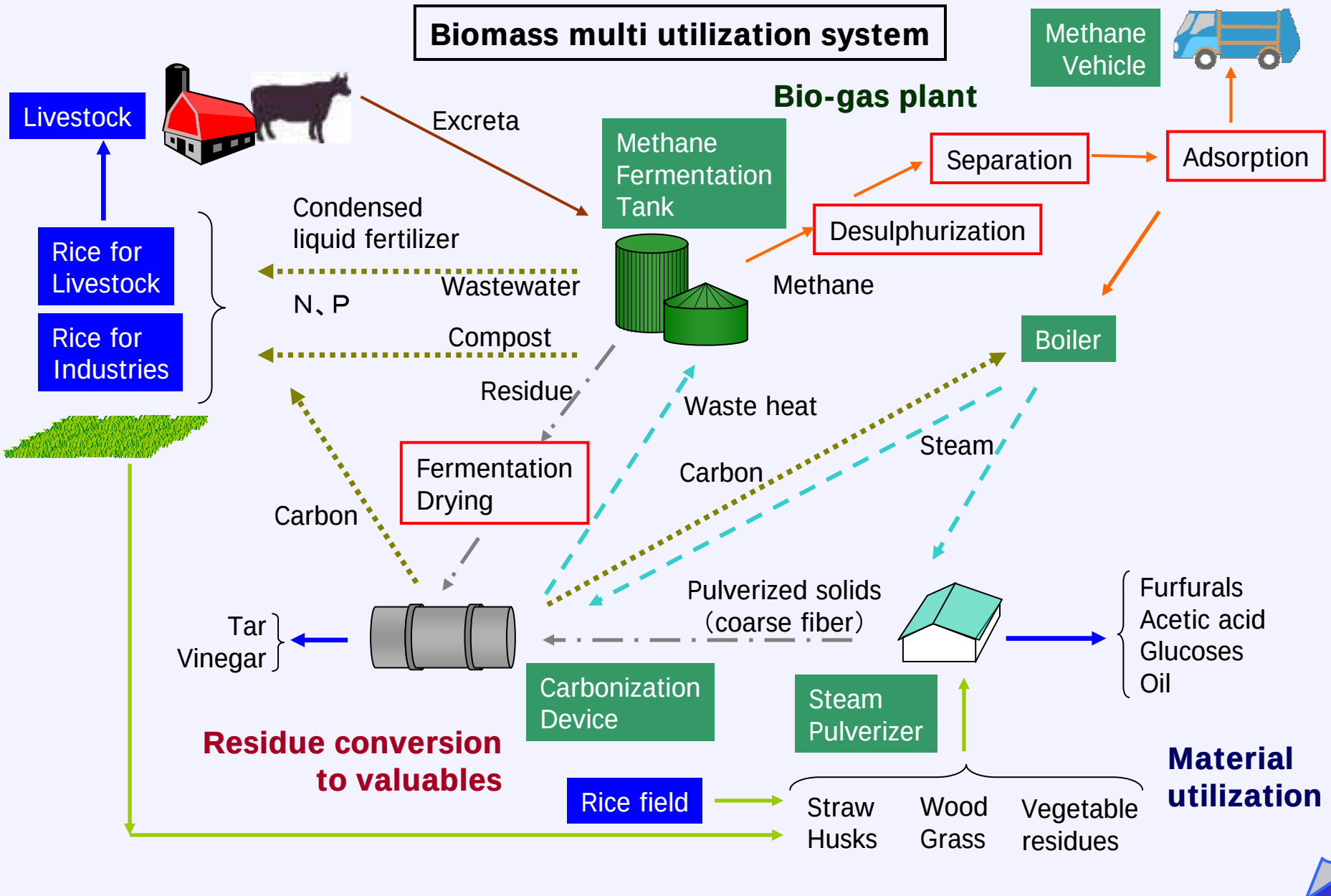
Pesticides, Medicine

Fine Chemicals Manufacturing

Cosmetics, Detergents

Biomass Resources Cultivating

Project Example of "Biomass Nippon (Japan)"



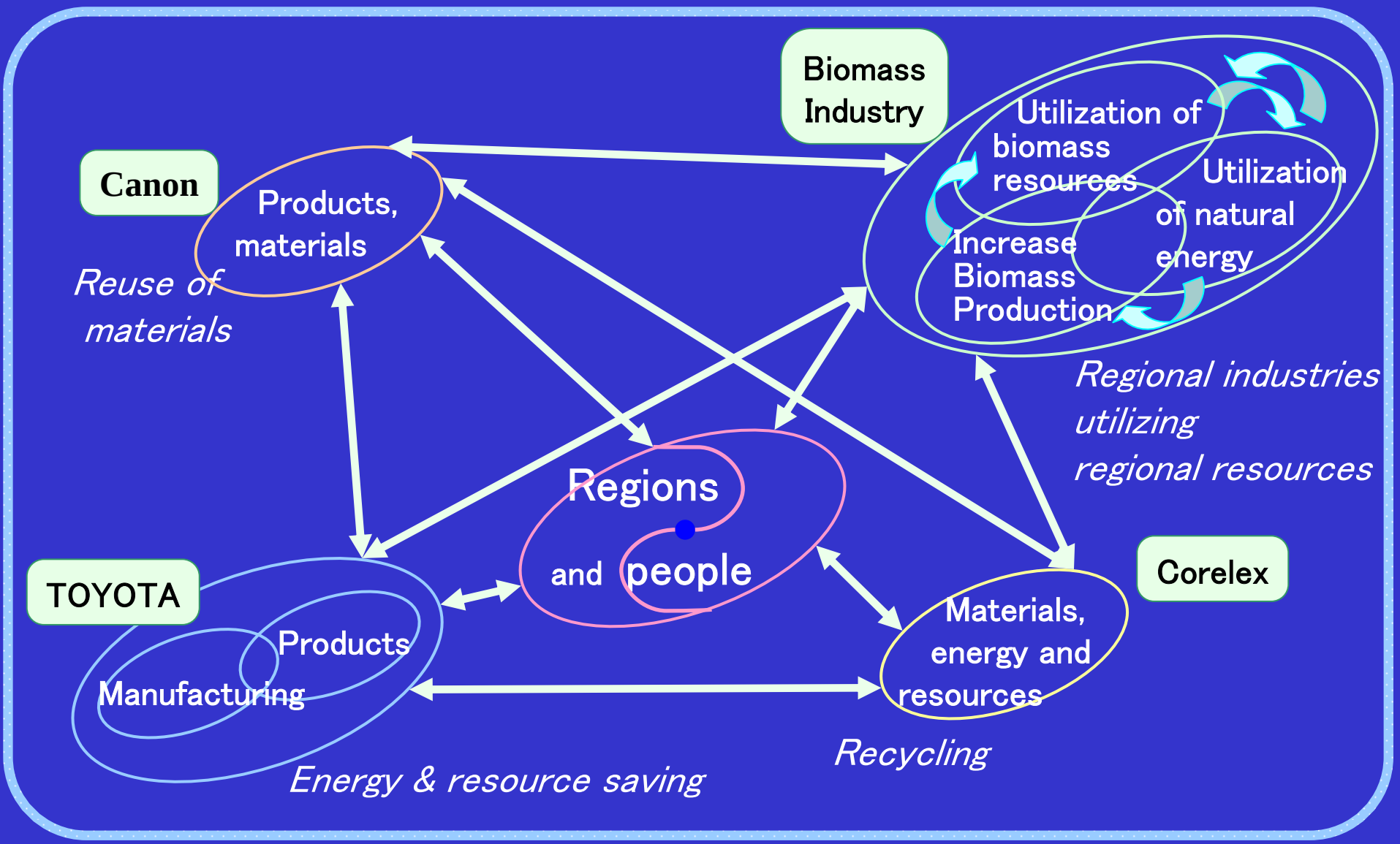
Project Example of “Biomass Nippon (Japan)”

Whole View of the Plant

Methane Fermentation Tank

Methane Vehicle

Examples of Industries that can Solve Global Tri-lemma Simultaneously



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