

# Chapter 2

## Current Chemical Management Systems and Trading Amount in ASEAN and East Asia

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## CHAPTER 2

# Current Chemical Management System and Trading Amount in ASEAN and East Asia

## 1. Overview of Chemical Management Systems in ASEAN and East Asian Countries

### 1.1. Chemical Risk Management Regulations in Australia

#### *Existing Legal Instruments on the Chemical Management*

The Industrial Chemicals (Notification and Assessment) Act 1989 established the national inventory of Australia, in which all industrial chemicals available for use have been stored. Chemicals that are not in the inventory are subject to the new chemical requirement.

The following list is the existing legal instruments on chemical management, which covers industrial chemicals in Australia. This is mainly conducted at a national level, rather than a federal level.

#### **A) Acts on industrial chemical management**

- ✓ Industrial Chemicals (Notification and Assessment) Act 1989
- ✓ The Poisons Standard 2011
- ✓ Competition and Consumer Act 2010

**B) Acts on labor protection**

- ✓ Safe Work Australia Act 2008
- ✓ Model Work Health and Safety Act – under development
- ✓ Hazardous Substances Regulatory Package – under review

**C) Acts on waste and recycle**

- ✓ Hazardous Waste (Regulation of Exports and Imports) Act 1989
- ✓ Product Stewardship Bill 2011

**D) Act on transport of hazardous material, shipping**

- ✓ Carriage of Goods by Sea Act 1991

**E) Acts on transport of hazardous material, aeronautical**

- ✓ Civil Aviation Act 1988
- ✓ Civil Aviation Safety Regulations 1998

**F) Acts on transport of hazardous material, rail and road**

- ✓ Model Act on the Transport of Dangerous Goods by Road or Rail
- ✓ Australian Code for the transport of Dangerous Goods by Road and Rail – 7th edition
- ✓ National Transport Commission (Road Transport Legislation – Dangerous Goods Act) Regulations 2006

**G) Acts on environment, general**

- ✓ Environment Protection and Biodiversity Conservation Act 1999
- ✓ National Environment Protection Council Act 1994
- ✓ National Environment Protection Measures (ambient air quality, ambient marine, estuarine and fresh water quality, environmental impacts associated with waste, re-use and recycling of used materials, National Pollutant Inventory reporting)

**H) Act on environment of water**

- ✓ Environment Protection (Alligator Rivers Region) Act 1978

**I) Act on environment of soil**

- ✓ Pipeline Authority Act 1973

**J) Acts on marine pollution**

- ✓ Great Barrier Reef Marine Park Act 1975
- ✓ Australian Maritime Safety Authority Act 1990
- ✓ Environment Protection (Sea Dumping) Act 1989
- ✓ Petroleum (Submerged Lands) Act 1967
- ✓ Protection of the Sea (Civil Liability) Act 1981, Protection of the Sea (Powers of Intervention) Act 1981, Protection of the Sea (Prevention of Pollution from Ships) Act 1983, Protection of the Sea (Harmful Anti-fouling Systems) Act 2006, and Protection of the Sea (Civil Liability for Bunker Oil Pollution Damage) Act 2008

**K) Acts on environment of atmosphere, global environment**

- ✓ Ozone Protection and Synthetic Greenhouse Gas Management Act 1989, Ozone Protection and Synthetic Greenhouse Gas (Import Levy) Act 1995, and Ozone Protection and Synthetic Greenhouse Gas (Manufacture Levy) Acts 1995
- ✓ Fuel Quality Standards Act 2000; Fuel Quality Standards Regulations 2001 (petrol, diesel, biodiesel, autogas, ethanol)

***List of Restricted Chemicals in Main Regulations***

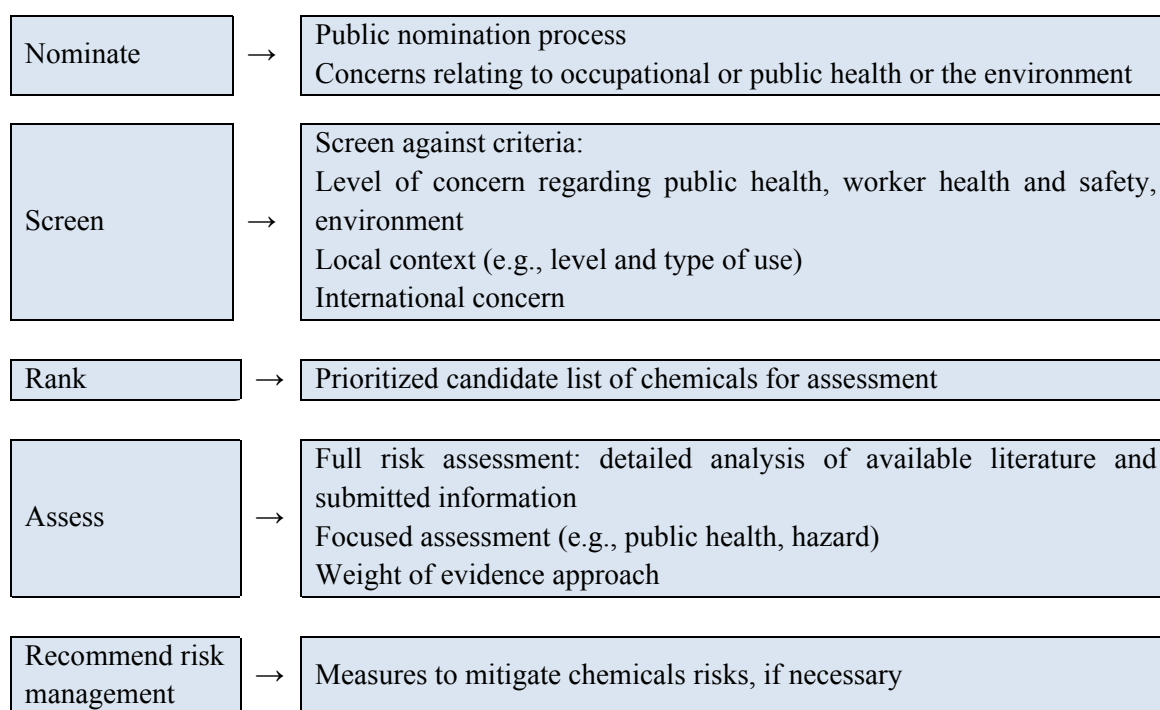
**Table 1: List of Restricted Chemicals in Main Regulations in Australia**

<b>Law Name</b>	<b>Decree/Circular/Standard</b>	<b>Field</b>	<b>List</b>
Industrial Chemicals (Notification and Assessment) Act 1989	Industrial Chemicals (Notification and Assessment) Regulations 1990	Chemical Management	Approx. 3,000 assessment reports on NICNAS website
Therapeutic Goods Act 1989	The Poisons Standard 2011	Public health	Schedules 5 and 6; Appendix C
Hazardous substances regulatory package	Model regulations for the control of hazardous workplace substances	Labor Safety	Schedule 2
	National Exposure standards for atmospheric contaminants in the Occupational environment 1995		Exposure standards for atmospheric contaminants in the occupational environment
	Model regulations for the control of scheduled carcinogenic substances 1995		Schedules 1 and 2
	National Standards (e.g. lead, mineral fibres)		SafeWork Australia website
	Approved Criteria for Classifying Hazardous Substances 2004		Hazardous substance information system
Competition and Consumer Act 2010	Mandatory standards (e.g. lead and DEHP in children's toys)	Consumer products	Product Safety Australia website

### ***Basis of Selecting Restricted Chemicals; Conventional Approach***

Australia has been transitioning from one scheme to another. The conventional approach is “stage-based” and is presented as follows. The chemicals that should be restricted are nominated, screened, ranked, assessed, and may be recommended for risk management.

**Figure 1: Outline of the Conventional Basis of Selecting Restricted Chemicals**

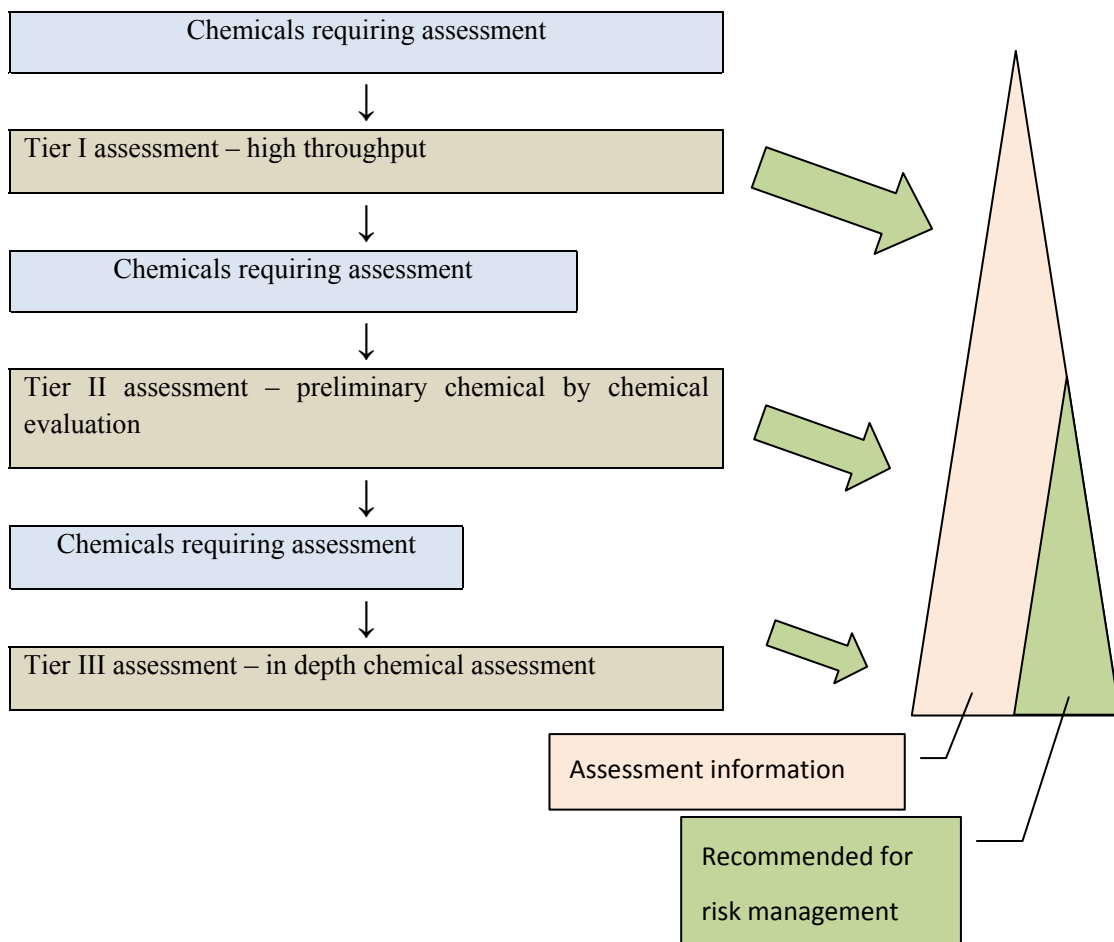


***Basis of Selecting Restricted Chemicals; New Approach***

A new approach can make an assessment much faster than can the conventional approach. Tier 1 is called “high throughput” and assesses the industrial chemicals by referring the list of concerned chemicals overseas. Tier 2 is chemical evaluation, with a predicted model of techniques. Some chemicals that need further examination go through in-depth assessment in Tier 3.

Criteria – impacts on public health, worker health and safety, and environment

**Figure 2: Outline of the New Basis of Selecting Restricted Chemicals**



### ***Implementation Status of SDS and GHS***

In Australia, SDS is implemented in the following regulation/standard.

- ❖ National Model Regulations for the Control of Workplace Hazardous Substances – 1994 (has been updated)
- ❖ National Standard for the Storage and Handling of Workplace Dangerous Goods – 2001 (currently being revised)

On the other hand, GHS is now under development. The detailed progress situation is as written below.

- ✓ Workplace – National Code of practice for the labeling of Workplace Chemicals – 2012
- ✓ Consumer products – under development
- ✓ Environment – labeling scheme under consideration



## **1.2. Chemical Risk Management Regulations in Cambodia**

### ***Existing Legal Instruments on the Chemical Management***

The existing legal instruments on chemical management, which covers industrial chemicals in Cambodia, are as follows:

#### **A) Acts concerning on industrial chemical management**

- ✓ Law on the Management of Quality and Safety of Products and Services, 2000
- ✓ Law on Administration of Factory and Handicraft, 2006
- ✓ Sub-Decree on Classification and Labeling of Chemicals, 2009
- ✓ Sub-Decree on the Master List of Prohibited and Restricted Goods, 2007
- ✓ Declaration No. 110 on the Management and Control of Uses, Import, Export and Distribution of Chemical Substances in Industry Sector, 2004
- ✓ Technical Guidelines on Handling of Chemical and Hazardous Substances 2011

#### **B) Acts concerning labor protection and criminal protection**

- ✓ Law on Labor/Labor law, 1997
- ✓ Sub-Decree on the industrial Standardization of Cambodia No. 42, May 15, 2001
- ✓ Law on Strong Acid, 2011

#### **C) Act on waste and recycling**

- ✓ Sub-Degree No. 37, on Solid Waste Management, April 27, 1999
- ✓ Law on Pollution Control, 2012( Draft)

**D) Act on hazardous material, security and accident prevention**

- ✓ Sub-Decree No. 21 on the Facilitation of Trade through Risk Management of the Royal Government of Cambodia, 2006

**E) Act on transportation of hazardous material**

- ✓ Sub-Decree on the Management of Road and Transportation of Goods and Passengers

**F) Acts on environment, general**

- ✓ Law on Environmental Protection and Natural Resources Management; December 24, 1996
- ✓ Law on Protection of Natural Resource Areas, 1993
- ✓ Sub-Degree No. 72, on The Environment Impact Assessment Process August 11, 1999
- ✓ Joint Prakas/Notice on Tax Service for Control on the Report of Environment Impact Assessment, Monitoring and Evaluation.

**G) Act on environment of atmosphere, global environment**

- ✓ Sub Degree No. 42 on Air and Noise Pollution Control, July 10, 2000
- ✓ Sub-Decree No. 47 on the Ozone Layer Pollution and Depletion Management, 2005

**H) Act on environment of water**

- ✓ Sub-Degree No. 27, on Water Pollution Control, April 06, 1999

***List of Restricted Chemicals in Main Regulations***

**Table 2: List of Restricted Chemicals in Main Regulations in Cambodia**

<b>Law Name</b>	<b>Decree/Circular/Standard</b>	<b>Field</b>	<b>List</b>
Prakas On Management and Control of use, Importation, Exportation and Distribution of Chemical Substances in Industrial Fields	Certification on import, export, uses and distribution, 2004	Chemical Management	Article 2
The Labor Law, 1997		Workers safety Industrial Safety and Environment	
Law on the Management of Factory and Handicraft, 2006	Technical Guidelines on Risk Management & Risk Assessment		
Law on Environmental Protection and Natural Resource Management	Sub-Decree on Air Pollution	Environment Protection	ANNEX1, 2, 3, 4, 8
	Sub-Decree on Water Pollution Control		ANNEX 1
Cambodian Law on Protected Areas, 2008			

### ***Basis of Selecting Restricted Chemicals***

Cambodia follows guidelines of the WHO,FAO, International Convention and Protocol by taking into consideration the following:

- ✓ Terrorism, National and Regional Security
- ✓ Human, Animal and Plant Health
- ✓ Contamination to the environment

Cambodia takes measures on risk assessment and the receipt of third party notifications to regulate the following perilous chemicals: acids and radioactive materials, food colorants and additives, CFC, POPs, Potassium nitrate and Sarin or mustard gas.

### ***Implementation Status of SDS and GHS***

In Cambodia, SDS is implemented in the following regulation/standard.

- ❖ Regulation (Prakas) No. 110 of MIME on February 11, 2004, on the management and control of import-export and distribution of industrial chemical substances
- ❖ Regulation (Prakas) issued by MAFF, MoE and MoH

On the other hand, GHS is implemented in the following regulation/standard.

- ✓ In the Sub-decree on GHS Classification and Labeling of Chemicals in Cambodia, issued 2009:
  - Roadmap, National Implementation Strategy on GHS in Cambodia, 2009-2011

- National Report on the Status of Chemical Management in Cambodia, Dec. 2009
- Gov. Ordinance 345 for implementation of Sub-Decree No. 69 on Standards and Management of Agricultural Inputs
- Prakas No. 110 on Management and Inspection of Industrial Chemicals used, import, export and distribution
- Other trainings, workshops conducted, technical guidelines on handling of Chemical and Hazardous Substances and GHS and REACH Information System for use in the Industrial Sector (draft)

### **1.3. Chemical Risk Management Regulations in Japan**

#### ***Existing Legal Instruments on the Chemical Management***

Japan has a number of categories of legal instruments. In particular, the Poisonous and Deleterious Substances Control Act and Industrial Safety and Health Act requires inventories. Manufacturers cannot produce chemicals that are not included in these inventories.

The existing legal instruments on chemical management covering industrial chemicals in Japan are as follows:

#### **A) Acts concerning chemical management**

- ✓ Poisonous and Deleterious Substances Control Act
- ✓ Act on Special Measures against Dioxins
- ✓ Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.
- ✓ Act on Confirmation, etc., of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof

#### **B) Acts concerning on Industrial Safety and Health**

- ✓ Labor Standards Act
- ✓ Industrial Safety and Health Act

#### **C) Acts on waste and recycling**

- ✓ Act on Control of Export, Import and Others of Specified Hazardous Wastes and Other Wastes
- ✓ Waste Management and Public Cleansing Act

- ✓ Act on Special Measures concerning Promotion of Proper Treatment of PCB Wastes
- ✓ Act on the Promotion of Effective Utilization of Resources
- ✓ Law Concerning the Promotion of Procurement of Eco-friendly Goods and Service by the State and Other Entities

**D) Act on hazardous material, security and accident prevention**

- ✓ Fire Service Act
- ✓ Explosives Control Act
- ✓ High Pressure Gas Safety Act
- ✓ Act on the Securing of Safety and the Optimization of Transaction of Liquefied Petroleum Gas

**E) Acts on transportation of hazardous material, shipping**

- ✓ Ship Safety Act
- ✓ Act on Port Regulations
- ✓ Maritime Traffic Safety Act

**F) Acts on transportation of hazardous material, aeronautical**

- ✓ Civil Aeronautics Act

**G) Acts on transportation of hazardous material, rail and road**

- ✓ Road Act
- ✓ Road Transportation Act
- ✓ Road Transport Vehicle Act
- ✓ Railway Business Act

**H) Acts on transportation of hazardous material, mailing**

- ✓ Postal Act
- ✓ Act on Correspondence Delivery by Private Business Operators

**I) Act on environment, general**

- ✓ Basic Environment Act

**J) Acts on environment of atmosphere, global environment**

- ✓ Air Pollution Control Law
- ✓ Act on the Quality Control of Gasoline and Other Fuels
- ✓ Act Concerning Special Measures for Total Emission Reduction of Nitrogen Oxides and Particulate Matter from Automobiles in Specified Areas
- ✓ Act on the Regulation, etc., of Emissions from Non-road Special Motor Vehicles
- ✓ Act on the Protection of the Ozone Layer Through the Control of Specified Substances and Other Measures
- ✓ Act on Ensuring the Implementation of Recovery and Destruction of Fluorocarbons concerning Designated Products
- ✓ Act on the Promotion of Global Warming Countermeasures
- ✓ Act on the Promotion of Contracts of National Governments and Other Entities Involving Due Care for the Reduction of Greenhouse Gas Emission
- ✓ Offensive Odor Control Law
- ✓ Building Standards Act
- ✓ Act on Maintenance of Sanitation in Buildings

**K) Acts on the environment of water**

- ✓ Water Pollution Control Law
- ✓ Act on Special Measures concerning Conservation of Lake Water Quality



- ✓ Act on Special Measures concerning Conservation of the Environment of the Seto Inland Sea
- ✓ Water Supply Act
- ✓ Act on Special Measures concerning Water Quality Conservation at Water Resources Area in Order to Prevent the Specified Difficulties in Water Utilization
- ✓ Sewerage Act
- ✓ Law concerning Special Measures for Compensation of Minamata Disease
- ✓ Hot Springs Act

**L) Act on environment of soil**

- ✓ Soil Contamination Countermeasures Act
- ✓ Agricultural Land Soil Pollution Prevention Act

**M) Acts on marine pollution**

- ✓ Act on the Prevention of Marine Pollution and Maritime Disasters

***List of Restricted Chemicals in Main Regulations***

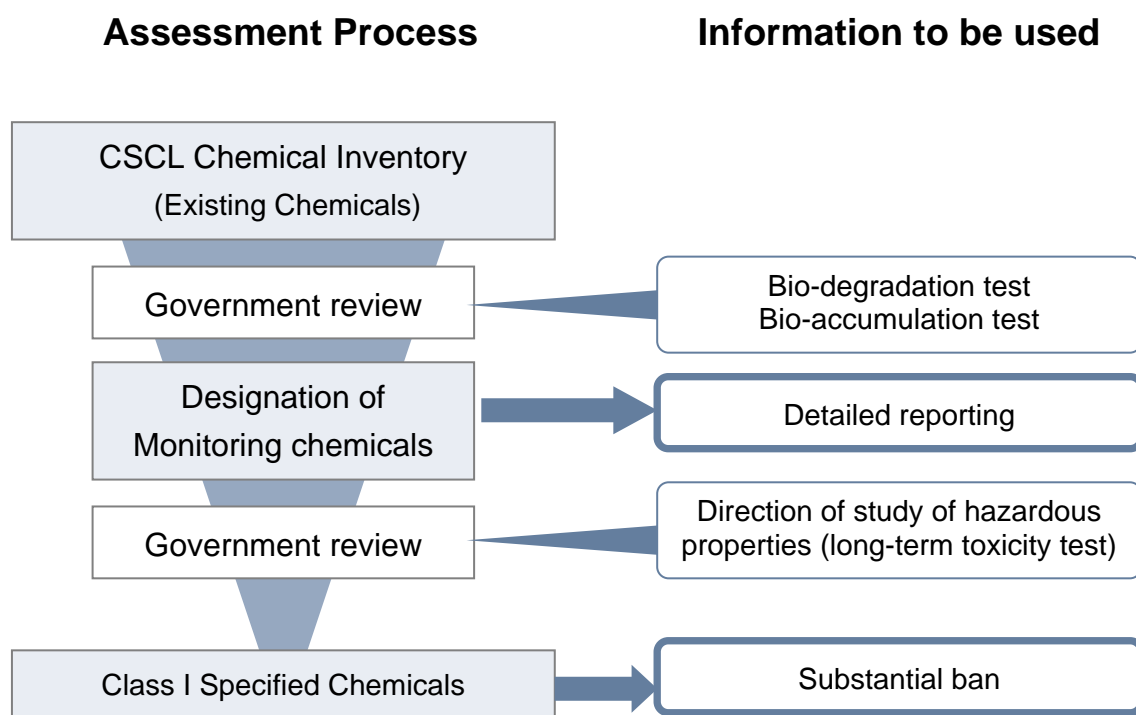
**Table 3: List of Restricted Chemicals in Main Regulations in Japan**

Law Name	Decree/Circular/Standard	Field	List
Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. (CSCL)	Order for Enforcement of the Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.	Chemical Management	Article 1, 1-2, 3, 5
Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof	Order for Enforcement of the Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof		Appended Tables 1, 2
Poisonous and Deleterious Substances Control Act			
Industrial Safety and Health Act	Enforcement Order of the Industrial Safety and Health Act	Labor Safety	Appended Table 3
Law on Environmental Protection		Environment Protection	
Air Pollution Control Law			
Water Pollution Control Law			
Soil Contamination Countermeasures Act			

### ***Basis of Selecting Restricted Chemicals in the CSCL Monitoring and Class I***

The Chemical Substance Control Law (CSCL) has two categories of chemicals to be regulated. The first category is PBT (Persistent Bioaccumulative and Toxic) chemicals. Japan has 20,000 listed chemicals on its CSCL Chemical Inventory, and this list covers many CAS No. The government picks up chemicals with PBT properties based on the following process. An overview of the assessment process for this first category is described as follows:

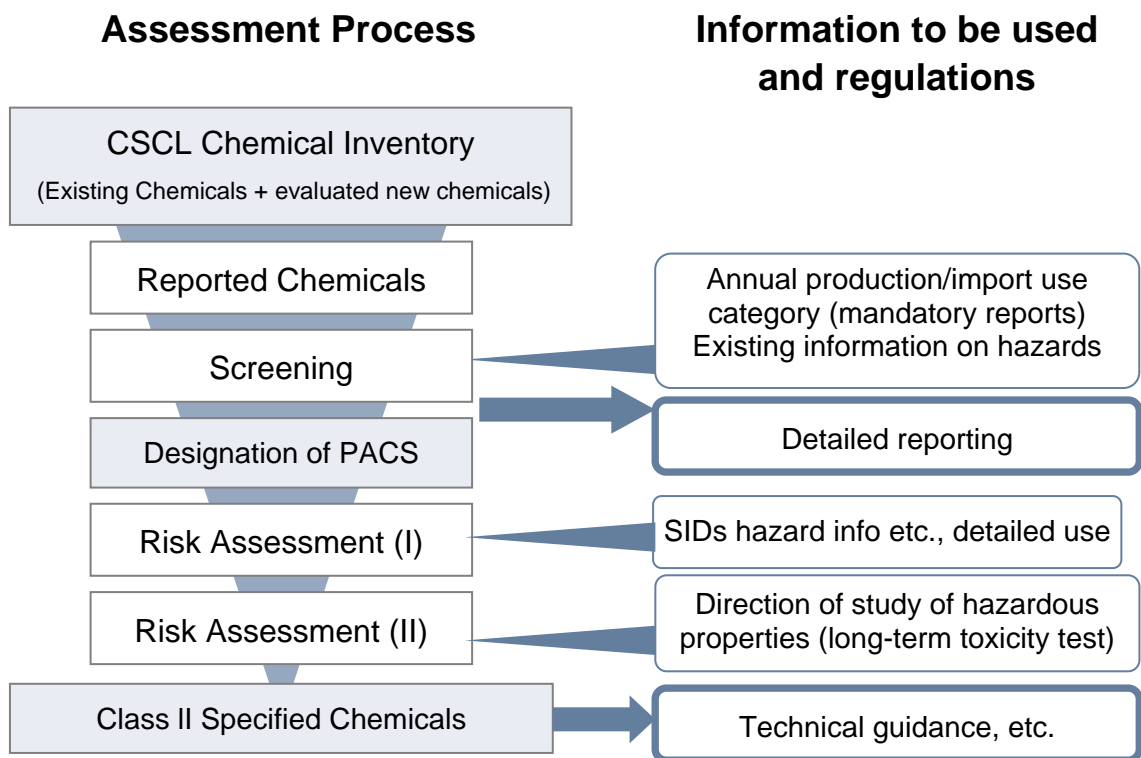
**Figure 3: Basis of Selecting Restricted Chemicals in the CSCL Monitoring and Class I**



***Basis of Selecting Restricted Chemicals in the CSCL PACCs and Class II***

Chemicals that are not bioaccumulated are addressed in this category through a prioritized risk assessment approach. The chemicals covered in this category are not only existing chemicals, as described in the previous Figure, but also evaluated new chemicals. The overview of the assessment process of this category is described as follows:

**Figure 4: Basis of Selecting Restricted Chemicals in the CSCL PACCs and Class I**



### ***Implementation Status of SDS and GHS***

In Japan, SDS is implemented in the following regulation/standard. These three laws cover the different lists of chemicals.

- ✓ Act on Confirmation, etc., of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR Law)
- ✓ Poisonous and Deleterious Substances Control Law
- ✓ Industrial Safety and Health Law

On the other hand, GHS is implemented in Industrial Safety and Health Law, and the industrial standard is available

- ✓ GHS Classification Results
  - Uploaded at <http://www.safe.nite.go.jp/ghs/list.html>

## **1.4. Chemical Risk Management Regulations in Malaysia**

### ***Existing Legal Instruments on Chemical Management***

The existing legal instruments on chemical management, which covers industrial chemicals in Malaysia, are as follows:

#### **A) Acts concerning chemical management**

- ✓ Occupational Safety and Health (Classification, Packaging and Labeling of Hazardous' Chemicals) Regulations, 1997
- ✓ Occupational Safety And Health (Use And Standards Of Exposure Of Chemicals Hazardous To Health) Regulations, 2000

#### **B) Acts concerning on Industrial Safety and Health**

- ✓ Occupational Safety and Health Act, 1994
- ✓ Occupational Safety And Health (Employers' Safety And Health General Policy Statements) (Exception) Regulations, 1995
- ✓ Factories and Machinery Act 1967

#### **C) Acts on waste and recycling**

- ✓ Environmental Quality (Scheduled Wastes) Regulations 2005 (amended in 2007)
- ✓ Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment And Disposal Facilities) Regulations, 1989
- ✓ Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment And Disposal Facilities) Order, 1989 (amended in 2006)

#### **D) Acts on hazardous material, security and accident prevention**

- ✓ Fire service Act, 1988

- ✓ Explosive Act, 1957
- ✓ Occupational Safety And Health (Control of Industrial Major Accident Hazards) Regulations, 2000
- ✓ Occupational Safety And Health (Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease) Regulations, 2004

**E) Act on transportation of hazardous material, shipping**

- ✓ Petroleum (Safety Measures) (Transportation Of Petroleum By Water) Regulations, 1985

**F) Act on transportation of hazardous material, aeronautical**

- ✓ Civil Aviation Act, 1969

**G) Act on transportation of hazardous material, rail and road**

- ✓ Road Transport Act, 1987

**H) Act on transportation of hazardous material, mailing**

- ✓ Postal Service Act, 1991(Amendment in 2001)

**I) Act on transportation of hazardous material, pipelines**

- ✓ Petroleum (Safety Measures) (Transportation Of Petroleum By Pipelines) Regulations, 1985

**J) Act on environment, general**

- ✓ Environmental Quality Act, 1974
- ✓ Environmental Quality (Prescribed Activities)(Environmental Impact Assessment) Order, 1987

**K) Acts on environment of atmosphere, global environment**

- ✓ Environmental Quality (Clean Air Regulations), 1978
- ✓ Environmental Quality (Dioxin and Furan) Regulations, 2004
- ✓ Environmental Quality (Control of Emission from Diesel Engines) Regulations, 1996

**L) Act on environment of water**

- ✓ Environmental Quality (Industrial Effluent) Regulations, 2009
- ✓ Environmental Quality (Sewage) Regulations, 2009

**M) Act on environment of soil**

- ✓ Environmental Quality (control of Pollution from Solid Waste Transfer Station and Landfill) Regulations, 2009

**N) Act on Marine Pollution**

- ✓ Environmental Quality (Delegation of Powers on Marine Pollution Control) Order, 1994
- ✓ Environmental Quality (Prohibition on the Use of Controlled Substances in Soap, Synthetic Detergent and Other Cleaning) Order, 1995

***List of Restricted Chemicals in Main Regulations***



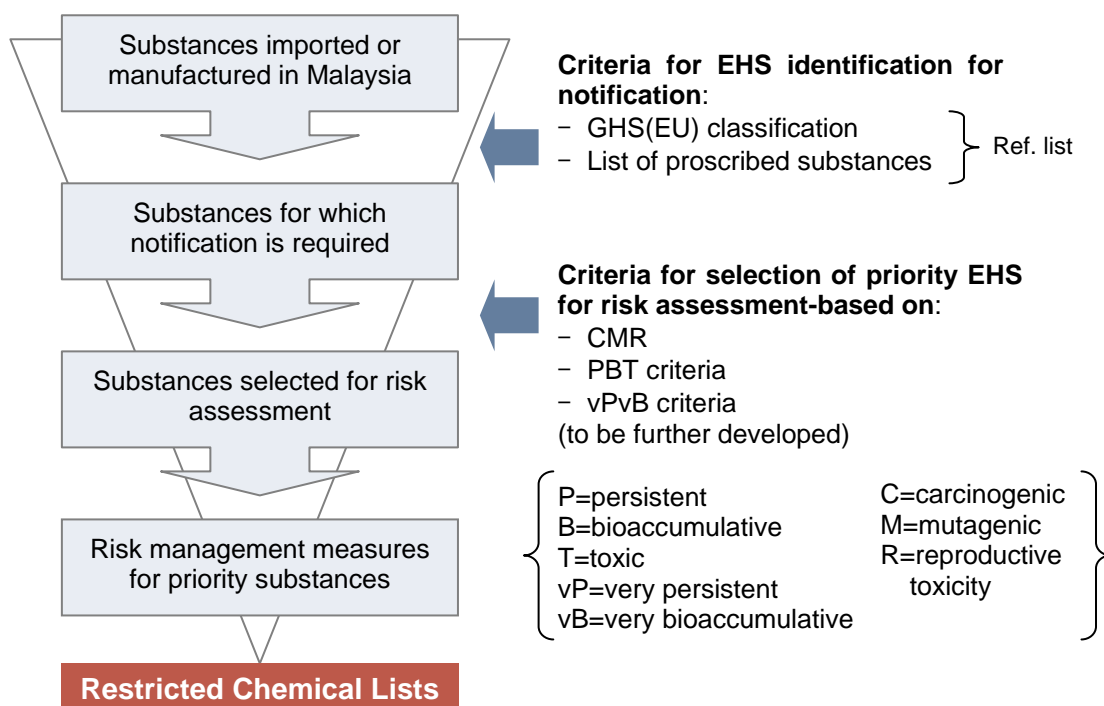
**Table 4: List of Restricted Chemicals in Main Regulations in Malaysia**

Law Name	Decree/Circular/Standard	Field	List
Environmentally Hazardous Substances (EHS) Notification and Registration Scheme (draft)		Chemical control	EHS and CMR Reference List
Factory Act	Factories and Machinery (Mineral Dust) Regulations 1989		Silica, Mineral dust
	Factories and Machinery (Lead) Regulations 1984	Labor safety	Lead
Occupational Safety and Health Act	Occupational Safety and Health (Classification, Packing and Labeling of Hazardous Chemicals) Regulations 1997	Labor Safety	Table I
	Occupational Safety and Health (Use and Standards of Exposure of Chemicals Hazardous to Health) Regulations 2000		Schedule 1 Schedule 2
	Occupational Safety and Health (Control of Industrial Major accident Hazards) Regulations 2000		Schedule 2
Poison Act	Poison (Psychotropic Substances) Regulations 1989	Poison Regulations	Second Schedule
	Poison (Sodium Hydroxide) Regulations 1962		
Environmental Quality Act	Environmental Quality (Clean Air) Regulations 1978	Environment Protection	Regulation 26, 27, THIRD SCHEDULE
	Environmental Quality (Industrial Effluent) Regulations 2009		FIFTH SCHEDULE
	Environmental Quality (Sewage) Regulations 2009		SECOND SCHEDULE

### ***Basis of Selecting Restricted Chemicals***

Environmentally Hazardous Substances (EHS) is defined as substances which are classified as hazardous under GHS classification and listed as hazardous under the proscribed list of international convention. EHS imported and manufactured are required to be notified under the EHS Notification and Registration Scheme. The lists of hazardous chemicals known as EHS Reference List and CMR Reference List are two lists of dangerous substances which were adopted from the EU Directive. Certain criteria will be used for selecting EHS of concerned such as CMR, PBT criteria, vPvB criteria. This selected EHS will go through the risk assessment process in order to enable the Malaysian government to come out with the risk management measures.

**Figure 5: Identification and Evaluation Scheme for EHS**



### ***Implementation Status of SDS and GHS***

In Malaysia, SDS is implemented in the following regulation/standard:

- ❖ Occupational Safety and Health (Classification, Packaging, and Labelling of Hazardous Chemicals) Regulations, 1997.
- ❖ Malaysian Standard MS 1804:2008: GHS For Classification, Labelling of Chemicals – Specification For The Classification, Labelling and Formulation Of Safety Data Sheet For Chemical Products.
- ❖ Guidelines For The Formulation Of A Chemical Safety Data Sheet
- ❖ CLASS (Classification, Labelling and Safety Data Sheet) Regulations 201X

On the other hand, GHS is implemented in the following regulation/standard:

- ✓ Malaysian Standard MS 1804:2008: GHS For Classification, Labelling of Chemicals – Specification for the Classification, Labelling and Formulation of Safety Data Sheets For Chemical Products.
- ✓ The translation of the GHS Purple Book into national language is completed (based on the 3rd Revision).

## 1.5. Chemical Risk Management Regulations in New Zealand

### *New Zealand's Chemical Control Legislation*

In New Zealand, there is a single legislative framework covering the management of all substances with hazardous properties – the **Hazardous Substances and New Organisms (HSNO) Act, 1996**. The hazardous substances part of this legislation regulates the introduction (import and/or manufacture) and use of new chemicals and chemical products, and the use of existing chemicals and chemical products.

For hazardous substances, the HSNO Act brings together the management of all the adverse effects of a substance under one Act and one authority. Before this law was introduced, individual hazardous substances were controlled under a number of separate laws such as the 1957 Explosives Act, the 1974 Dangerous Goods Act, the 1979 Toxic Substances Act, the 1979 Pesticides Act and parts of the 1967 Animal Remedies Act. The HSNO Act repealed all these individual laws and brought the management of all hazardous substances together under one law.

### *Other Chemical Control Legislation in New Zealand*

#### A) Agricultural Compounds and Veterinary Medicines (ACVM) Act, 1997

Hazardous substances that are pesticides and veterinary medicines are also regulated under the ACVM Act. For these substances, the HSNO Act addresses risks to human health and the environment, and registration under the ACVM Act addresses risks to trade, animal welfare, biosecurity, and chemical residues in food.

## B) Health and Safety in Employment (HSE) Act 1992 and Regulations

The purpose of the HSE Act is to promote the prevention of harm to all persons at work and other persons in or around a place of work. The HSNO Act sets out the controls and conditions for the safe use of hazardous substances, and where these are used in the workplace, there are general requirements under the HSE Act to identify the chemicals used and to take steps to ensure that they are used safely.

## C) Transport Laws

New Zealand's transport legislation, covering the transport of hazardous substances on land, sea, and air, generally follows international transport agreements in terms of the safe transportation of hazardous substances:

- **The Land Transport Rule: Dangerous Goods 2005 (Rule 45001/1)** sets out the requirements for the safe transport of dangerous goods on land in New Zealand. The Rule covers the packaging, identification and documentation of dangerous goods, the segregation of incompatible goods, transport procedures, and the training and responsibilities of those involved in the transport of dangerous goods. The Rule's requirements are applied according to the nature, quantity and use of the goods.
- **The Maritime Rules Part 24A Carriage of Cargoes – Dangerous Goods** sets out the responsibilities of seafarers, ship owners, shippers, consolidators and packers with respect to dangerous goods to be carried by sea.
- **The Civil Aviation Rules Part 92** prescribes rules governing the carriage of dangerous goods by air. It includes the packaging, marking, and labelling requirements of dangerous goods, and the operators' training and operating responsibilities.

D) The Gas Act, 1992

The Gas Act 1992 provides for the setting of standards concerning the design, construction, installation, importation, or manufacture of distribution systems, gas installations, fittings, or gas appliances. The purposes of this Act are (a) to provide for the regulation, supply, and use of gas in New Zealand; (b) to provide for the regulation of the gas industry in New Zealand; (c) to protect the health and safety of members of the public in connection with the supply and use of gas in New Zealand; and (d) to promote the prevention of damage to property in connection with the supply and use of gas in New Zealand.

E) Ozone Layer Protection Act 1996 and Ozone Layer Protection Regulations 1996

New Zealand's commitments under the Montreal Protocol on substances that deplete the Ozone Layer are contained in the Ozone Layer Protection Act 1996 and the Ozone Layer Protection Regulations 1996.

The Ozone Layer Protection Act sets out the broad controls for ozone-depleting substances, while the Ozone Layer Protection Regulations contain the rules relating to specific substances.

F) The Imports and Exports (Restrictions) Act, 1988, and the Imports and Exports (Restrictions) Prohibition Order (No. 2), 2004

The Imports and Exports (Restrictions) Act and Regulations make up the domestic legislation which implements the Basel Convention in New Zealand, aimed at managing the transboundary movement of hazardous waste.

## G) Resource Management Act, 1991 (RMA)

The HSNO Act sets controls on hazardous substances, which apply regardless of location. The RMA allows local authorities to manage the effects of the use of hazardous substances in specific locations in relation to sensitive environments or conditions – for example where there are schools, hospitals, lakes, or earthquake-prone areas.

### *The HSNO Act Framework*

The purpose of the HSNO Act is to protect human health and the environment by preventing or managing any harmful effects of hazardous substances and new organisms.<sup>1</sup> For hazardous substances, the HSNO Act covers the full lifecycle of a substance – controls and conditions are assigned to approved substances, which set out requirements for how they can be contained, labeled, stored, used, transported, or disposed of. The HSNO Act covers a broad range of chemicals with hazardous properties:

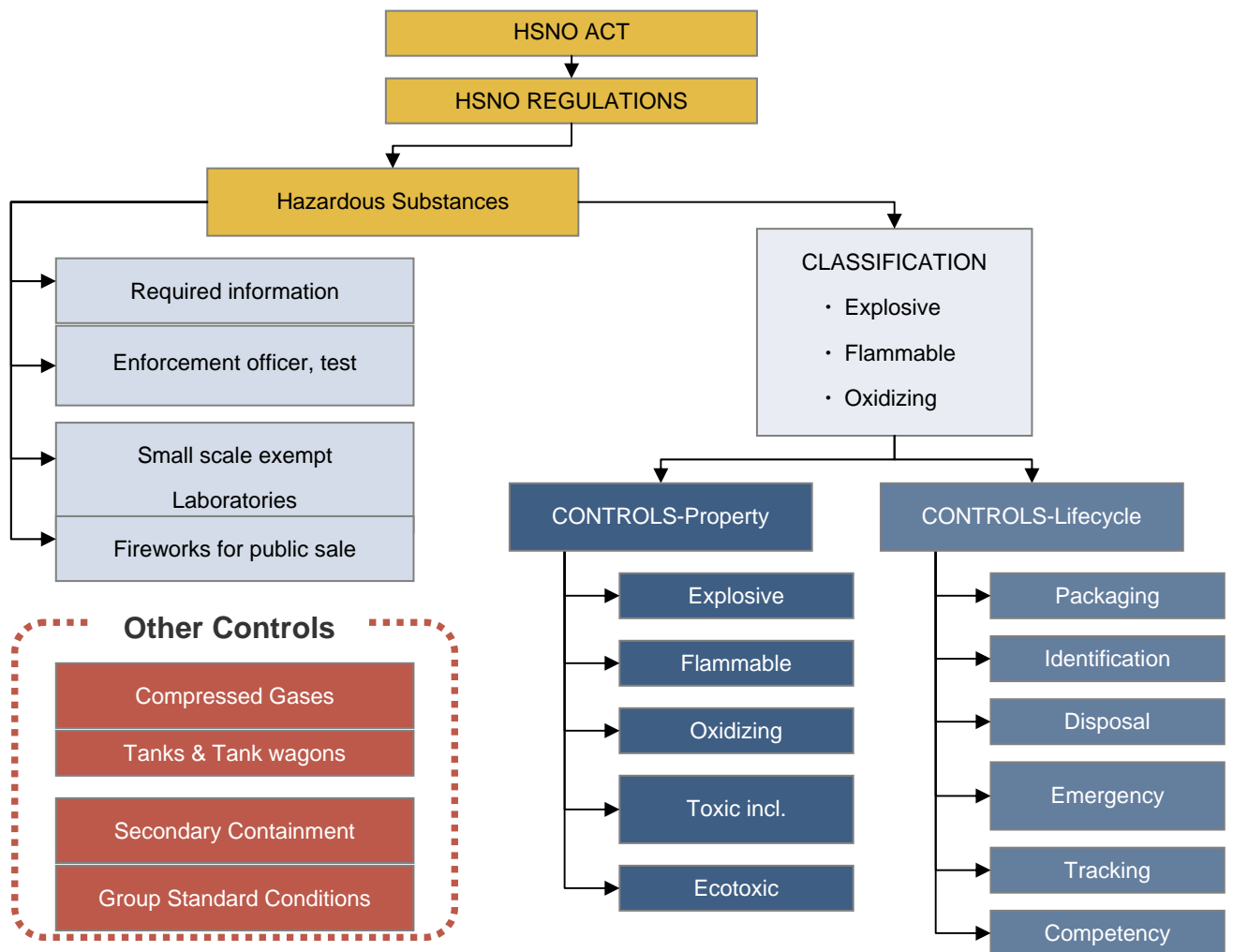
- Explosives (including fireworks and detonators)
- Dangerous goods (substances that are flammable, oxidising and corrosive)
- Pesticides and veterinary medicines
- Toxic substances
- Cosmetics and other consumer products available to the general public
- Gases under pressure (including compressed air and LPG)

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<sup>1</sup> The HSNO Act also covers the introduction of new organisms (species coming into New Zealand for the first time). A new organism can include a plant, an animal, a micro-organism or a genetically modified organism.

It also covers mixtures and finished products, in addition to single chemical substances as well as the requirements for the certification and approval of people and equipment relating to hazardous substances (such as bulk storage tanks and tank wagons, burners, dispensers, vaporizers, and compressed gas cylinders).

**Figure 6: HSNO Legislative Framework**





A) HSNO Regulations:

Hazardous Substances (Minimum Degrees of Hazard) Regulations 2001

Hazardous Substances (Classification) Regulations 2001

Hazardous Substances (Personnel Qualifications) Regulations 2001

Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001

Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001

Hazardous Substances (Identification) Regulations 2001

Hazardous Substances (Packaging) Regulations 2001

Hazardous Substances (Disposal) Regulations 2001

Hazardous Substances (Emergency Management) Regulations 2001

Hazardous Substances (Tracking) Regulations 2001

Hazardous Substances (Tank Wagons and Transportable Containers) Regulations 2004

Hazardous Substances (Compressed Gases) Regulations 2004

Hazardous Substances (Exempt Laboratories) Regulations 2001

Hazardous Substances (Fireworks, Safety Ammunition, and Other Explosives Transfer)  
Regulations 2003

Hazardous Substances (Fireworks) Regulations 2001

Hazardous Substances and New Organisms (Methodology) Order 1998

B) What is a hazardous substance?

Under the HSNO Act, a hazardous substance is any substance that has one or more of the following hazardous properties exceeding specified thresholds:

- explosiveness
- flammability

- toxicity (including chronic toxicity)
- capacity to oxidise
- corrosiveness (to human tissue or metal)
- ecotoxicity

The hazardous property thresholds are based on the GHS (Globally Harmonised System of Classification and Labelling) and are set out in the HSNO *Hazardous Substances Minimum Degrees of Hazard Regulations*.

Examples of hazardous property threshold levels:

- If a substance has an LD50 (oral) of less than or equal to 5000 mg/kg, it is a hazardous substance because it triggers the threshold for **oral toxicity**
- If a substance has a flash point (closed cup) of less than or equal to 93°C, it is a hazardous substance, because it triggers the threshold for **flammability**

Any substance can trigger more than one hazardous property threshold.

### C) Classifications – type and degree of hazard

The classification criteria for the HSNO Act hazardous properties are set out in the *Hazardous Substances (Classification) Regulations 2001*. These regulations prescribe for each intrinsic hazardous property a number of degrees or types of hazard. When a substance is assessed, it is assigned one or more classifications that reflect the type and degree of hazard.

The classification scheme specifies a degree of hazard for each hazardous property, made up of:

- numbered classes (for example, class 6), indicating the intrinsic hazardous property
- numbered subclasses (for example, subclass 6.1), indicating the type of hazard

- lettered categories (for example, category A) indicating the degree of hazard.

The hazard classification scheme follows as closely as possible the GHS (Globally Harmonised System of Classification and Labelling) for hazard classification.

For physical hazards, (explosiveness, flammability, oxidising capacity) the classification system follows agreements of the United Nations Committee of Experts on the Transport of Dangerous Goods (UNCEDTG).

For biological hazards, (toxicity, ecotoxicity and some corrosives), the classification system follows the schemes agreed by the OECD Advisory Group on Harmonisation of Classification and Labelling (AG-HCL), as part of the GHS.

Examples of Classifications:

3.1A – Flammable liquids: very high hazard

3.1B – Flammable liquids: high hazard

3.1C – Flammable liquids: medium hazard

3.1D – Flammable liquids: low hazard

6.7A – Substances that are known or presumed human carcinogens

6.7B – Substances that are suspected human carcinogens

D) Controls – assigned to manage the risk

Each hazardous property classification triggers a number of controls aimed at managing the adverse effects of a substance. If a substance has more than one hazardous property (for example, it is toxic and flammable), then controls will be assigned to manage both its toxicity and its flammability.

There are two general types of controls:

**Hazardous property controls**, applying to:

- Biological hazards – aim to limit exposure of people or the environment to the adverse effects of the substance;
- Physical hazards – aim to avoid initiation of the hazard (for example, by keeping ignition sources away from flammable substances).

**Life cycle controls**, relating to:

- Packaging and containment (for example, packages and bulk containers being strong, durable, and resistant to their contents)
- Identification – information on labels, signs, documentation, advertising, and safety information for workers
- Competency of handlers – requiring appropriately trained people to be in charge of highly hazardous substances
- Emergency preparedness – ensuring information or equipment is on hand to deal with emergencies
- Tracking – systems for locating highly hazardous substances
- Disposal – to be done in a way which does not create damage or harm

***Approved Chemicals***

No hazardous substance shall be imported or manufactured except in accordance with an approval issued under the HSNO Act.

All hazardous substances must have an approval:

- Single component chemicals (for example, acetone, toluene)
- Chemical products and mixtures (for example, pesticide formulations, cleaning products)

Hazardous substance approvals:

- Are not specific to an approval holder – an approved substance can be used by any person as long as the controls are complied with
- Are valid until the approval is declined through the reassessment process
- Can cover single component substances (“pure” chemicals) as well as chemical products that are hazardous
- Can cover substances that have been grouped together according to a common characteristic (for example, they are of a similar type or nature, or have a common use) under Group Standard approvals.

### ***Registers and Lists***

Link to registers and lists:

<http://www.epa.govt.nz/search-databases/Pages/default.aspx>

#### A) Register of Controls on Approved Substances

The register of approved substances sets out the controls that have been assigned to each substance.

#### B) Chemical Classification and Information Database (CCID)

The Chemical Classification and Information Database (CCID) details the chemicals classified in accordance with the HSNO Classification regulations. The CCID can be used by industries to classify formulated products to enable their substances to be assigned to a group standard. It can also be used to assist industries to design less hazardous products by providing classification information on potential alternative components.

The CCID provides chemical identification information, hazard classifications, and classification data. The information may also be useful for the preparation of labels and safety data sheets:

- Chemical Abstracts Service (CAS) Registry Number
- Name and synonyms
- United Nations Dangerous Goods (UN) Number and UN Class (where applicable)
- HSNO approval number (if the chemical has HSNO approval)
- Selected information on physical property
- Hazard classifications
- Classification data - each hazard classification is based upon classification data. The CCID includes references to the source of this data, where possible.

#### C) New Zealand Inventory of Chemicals

Group Standards impose a condition that requires notification to the Authority of the presence of any new chemical in products approved under that standard.

The chemicals listed on the Inventory of Chemicals are those chemicals present in New Zealand (compiled from the list of components of toxic substances notified under old legislation and any newly notified chemicals).

The inventory currently on the EPA website has limited functionality. The development of a searchable web-based database is currently underway. The search function will be based on CAS number, with limited searching on chemical names. The design includes the ability to then directly make an application for listing a new chemical component by emailing in the completed form. Note that notifications also require the submission of data on the hazard of the new chemical component.

#### D) Register of Controls on Approved Substances

The register of approved substances sets out the controls that have been assigned to each substance.

#### E) Safety Data Sheets (SDS)

Safety data sheets (SDSs) are a key element of the HSNO control framework – they provide information on the hazards of the substance and how it should be safely used, stored, transported and disposed of. SDSs also describe emergency procedures, such as what to do in the event of a spill or fire.

It is the responsibility of the importer or manufacturer to supply an SDS. SDSs must include information under each of the following headings:

1. Product and company identification
2. Hazard(s) identification
3. Composition and information on ingredients
4. First-aid measures
5. Fire-fighting measures
6. Spillage, accidental release measures
7. Handling and storage
8. Exposure controls and personal protection
9. Physical and chemical properties
10. Stability and reactivity
11. Toxicological information
12. Ecological information
13. Disposal considerations

14. Transport information

15. Regulatory information

16. Other information

SDSs in the above format, which meets the requirements of overseas jurisdictions, are acceptable, but some additional information is required, including:

- Name and contact details of the NZ supplier and NZ emergency contact details (Section 1 of the SDS)
- HSNO regulatory information, including the HSNO approval number or title of the group standard approval, if relevant (Section 15 of the SDS)

This can be provided by adding a front sheet or over-sticker to the SDS. Further information is available on the EPA website:

<http://www.epa.govt.nz/hazardous-substances/about/HSNO-controls/Pages/Safety-data-sheets.aspx>

## F) Labelling

Manufacturers and importers must ensure that the label provides information in accordance with the hazards of the substance. Labels should include information on the hazards of the substance, disposal requirements, and emergency management procedures (for example, first aid).

The labelling requirements are based on the GHS. The pictograms, signal words, and hazard and precautionary statements are derived from the substance's hazard classifications, and are based on the proposals presented to the UN GHS Committee. A labelling guide for manufacturers and importers is available from the EPA website:

<http://www.epa.govt.nz/Publications/hsnogen-labelling-guide.pdf>



## G) Implementation of the GHS in New Zealand

New Zealand implemented the United Nations GHS in 2001. The Hazardous Substances (Minimum Degrees of Hazard) Regulations 2001 and the Hazardous Substances (Classification) Regulations 2001 are based on proposals for the GHS, as developed in late 2000. New Zealand effectively has one legislative framework (HSNO Act) and one competent authority (the Environmental Protection Authority) for the management of all hazardous substances over all sectors. Correspondingly, when GHS was adopted into the HSNO regulations in 2001, all of the GHS classification “building blocks” were adopted, regardless of type and sector of use. However, under the HSNO Act, the “building block” approach can effectively be applied through the ability of the EPA to vary the controls attached to a particular hazard classification category.

Since the Hazardous Substances regulations have not been updated since they came into force in July 2001, there are now differences in a number of areas between the criteria in the HSNO regulations and the GHS. A discussion document setting out the options for addressing these differences was released early last year, but no legislative changes to the classification framework have yet been made.

### ***Information Needs on Chemical Management***

Because of the Group Standards framework, the majority of new and existing hazardous substances used in industry are covered by an existing group standard approval. The EPA provides information to industry through the Chemical Classification and Information Database (CCID), to assist them to self-classify their chemicals and chemical products.

## 1.6. Chemical Risk Management Regulations in the Philippines

### *Existing Legal Instruments on the Chemical Management*

The existing legal instruments on the chemical management, which covers industrial chemicals in the Philippines, are as follows:

#### **A) Acts concerning chemical management**

- ✓ An Act to Control Toxic Substances and Hazardous And Nuclear Wastes, Providing Penalties For Violations Thereof, and for Other Purposes (RA 6969)
- ✓ Implementing Rules and Regulations of RA 6969 (DAO 1992–29)
- ✓ Temporary Banning of the Importation and Use of Endosulfan (DMC 2009–02)
- ✓ Prescribing Additional Requirements for the Issuance of the Priority Chemical List (PCL) Compliance Certificate (DAO 2007–23)
- ✓ Revised Priority Chemical List (DAO 2005–27)
- ✓ Priority Chemicals List (DAO 1998–58)
- ✓ Toxic Chemical Substances for Issuance of Chemical Control Orders (DAO 2005–05)
- ✓ Chemical Control Order for Polychlorinated Biphenyls (PCBs) (DAO 2004–01)
- ✓ Chemical Control Order for Asbestos (DAO 2000–02)
- ✓ Chemical Control Order for Mercury and Mercury Compounds (DAO 1997–38)
- ✓ Chemical Control Order for Cyanide and Cyanide Compounds (DAO 1997–39)
- ✓ Scope of Compliance Monitoring for Industrial Chemicals and Toxic Substance Under Title II of Republic Act 6969 (MC 2003–011)
- ✓ Delegation of Authority to the EMB Regional Offices to Issue “Permit to Issues Permit to Transport” for Hazardous Wastes, and “Certification” and “Importation Clearance” for Chemicals and Chemical Substances (DMC 2002–02)

- ✓ Act Creating the Fertilizer and Pesticide Authority, 1977 (PD 1144)

**B) Acts concerning industrial safety and health**

- ✓ Labor Code of the Philippines, 1974 (PD 442)
- ✓ Occupational Safety and Health Standards:
  - ✓ Rule 1090 – Hazardous Materials
  - ✓ Rule 1140 – Explosives
  - ✓ Rule 1150 – Materials Handling and Storage
  - ✓ Rule 1950 – Pesticides and Fertilizers
- ✓ Consumer Act of the Philippines (Republic Act (RA) 7394)
- ✓ Food and Drug Administration (FDA) Act, 2009 (RA 9711)
- ✓ Food, Drug and Cosmetic Act, 1963 (RA 3720)
- ✓ Comprehensive Dangerous Drugs Act, 2002 (RA 9165)

**C) Acts on waste and recycling**

- ✓ An Act to Control Toxic Substances and Hazardous and Nuclear Wastes, Providing Penalties for Violations Thereof, and for Other Purposes (RA 6969)
- ✓ Implementing Rules and Regulations of Republic Act 6969 (DAO 1992–29)
- ✓ Philippine Ecological Solid Waste Management Act, 2000 (RA 9003)
- ✓ Implementing Rules and Regulations of Republic Act 9003 (DAO 2001–34)
- ✓ Technical Guidelines for Municipal Solid Waste Disposal (DAO 1998–49)
- ✓ Guideline on the Use of Alternative Fuels and Raw Materials in Cement Kilns (DAO 2010–06)
- ✓ Procedural Manual Title III of DAO 92-29 “ Hazardous Waste Management” (DAO 2004–36)

- ✓ Order Amending Annex A of DAO 94-28 Interim Guidelines for the Importation of Recyclable Materials Containing Hazardous Substances (DAO 1997–28)
- ✓ Delegation of Authority to EMB Regional Offices of Various Requirements of DAO 2004–01 Which Includes Issuance of “PCB Registration Certificates” and “Importation Clearance” for Non-PCB Equipment (DMC 2007–03)
- ✓ Delegation of Authority to the EMB Regional Offices to Issue “Permit to Transport” for Hazardous Wastes, and “Certification” and “Importation Clearance” for Chemicals and Chemical Substances (DMC 2002–12)

**D) Acts on hazardous material, security, public safety and accident prevention**

- ✓ Revised Fire Code of the Philippines of 2008 – An Act Establishing a Comprehensive Fire Code of the Philippines, Repealing Presidential Decree 1185, and for other Purposes (RA 9514)
- ✓ Act Regulating the Sale, Manufacture, Distribution, and Use of Firecrackers and Other Pyrotechnic Devices, 1992 (RA 7183)
- ✓ Act Defining and Penalizing Certain Prohibited Acts Involving Petroleum and/or Petroleum Products, Including Shortselling and Adulteration of Petroleum Products, 1983 (PD 1865)

**E) Acts on environment, general**

- ✓ Decree Establishing an Environmental Impact Statement (EIS) System Including Other Environmental Management Related Measures and for Other Purposes (PD 1586)
- ✓ Implementing Rules And Regulations (IRR) for the Philippine Environmental Impact System (EIS) System (DAO 2003–30)
- ✓ Law Providing for the Revision of Republic Act 3931, Commonly Known as the Pollution Control Law, and for other Purposes, 1976 (PD 984)

**F) Acts on environment of atmosphere, global environment**

- ✓ Philippine Clean Air Act of 1999 – An Act Providing for a Comprehensive Air Pollution Control Policy and for Other Purposes (RA 8749)

- ✓ Implementing Rules and Regulations for Clean Air Act or RA 8749 (DAO 2000–81)
- ✓ Policy on Compliance and Permitting for Industrial Facilities Relating to Air Quality (MC 2007–003)
- ✓ Guidelines on the Requirements for Continuous Emission Monitoring Systems (CEMS) and Other Acceptable Protocols, Thereby Modifying and Clarifying Certain Provisions of Section 5, Rule X Of Dao 2000-81 and Other Related Provisions (DA 2007–22)
- ✓ Revised Emission Standards for Motor Vehicles Equipped With Compression-Ignition and Spark-Ignition Engines (DAO 2007–27)
- ✓ Interim Guidelines on Regulation for Industrial Facilities Using Bunker Oil (DAO 2007–30)
- ✓ Revised Emission Standards for In-Use Motor Vehicles Equipped With Spark-Ignition and Compression-Ignition Engines (DAO 2003–51)
- ✓ Hydrocarbon Standards for Motorcycle (DAO 2003–25)
- ✓ Implementing Rules and Regulations (IRR) for Mandating the Phase-Out of Leaded Gasoline as One of the Means of Solving Air Pollution (DAO 1998–47)
- ✓ 1998 Revised Rules and Regulations for the Prevention, Control and Abatement of Air Pollution from Motor Vehicles (DAO 1998–46)
- ✓ Order Mandating the Phase-Out of Leaded Gasoline as One of the Means of Solving Air Pollution (EO 1997–446)
- ✓ List of Alternatives to Ozone Depleting Substances (DMC 2005–03)
- ✓ Registration of Dealers, Re-Sellers and Retailers of Ozone Depleting Substances (ODS) (DMC 2005–23)
- ✓ Revised Chemical Control Order for Ozone Depleting Substances (DAO 2004–08)
- ✓ Code on Sanitation of the Philippines, 1975 (PD 856)

### **G) Acts on environment of water**

- ✓ The Clean Water Act -An Act Providing for a Comprehensive Water Quality Management and for other Purposes, 2004 (RA 9275)
- ✓ Revised Industrial EcowatchSystem Amending Implementing Guidelines of DAO 98–51 Series of 1998 (DAO 2003–26)
- ✓ Revised Effluent Regulations, 1990, Revising and Amending the Effluent Regulations of 1982 (DAO 1990–35)
- ✓ Philippine Standards for Drinking Water, 1993, Under the Provision of Chapter Ii, Section 9 of PD 856, Otherwise Known as the Code on Sanitation of the Philippines (DAO 1994–26a)
- ✓ The Water Code of the Philippines and its IRR (PD 1067)
- ✓ An act creating the LAGUNA LAKE DEVELOPMENT AUTHORITY Prescribing Its Powers, Functions and Duties, Providing Funds Thereof, and for Other Purposes (RA 4850)
- ✓ Strict Implementation of the 50 Meters Buffer Zone in Aerial Spraying (MC 2009–14)
- ✓ Procedural Manual for the Designation of Water Quality Management Areas (MC 2009–15)
- ✓ Amending Revised Procedural Manual for DAO 03–30 on the Classification of the Fast-Food Stores, Restaurants and Similar Quick-Service Establishments (EMB MC 2009–002)
- ✓ Issuance of the Ambient Water and Effluent Quality Monitoring Manuals (EMB MC 2008–008)

### **H) Act on marine pollution**

- ✓ Revised Coast Guard Law, 1974 (PD 601)

*List of Restricted Chemicals in Main Regulations*

**Table 5: List of Restricted Chemicals in Main Regulations in Philippines (1)**

<b>Law Name</b>	<b>Decree/Circular/Standard</b>	<b>Field</b>	<b>List</b>
Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (Republic Act 6969)	DENR Administrative Order DAO 1992-29 Implementing Rules and Regulations of Republic Act 6969	Chemical Management	DAO 2005-27 – Priority Chemical List
	Chemical Control Orders		DAO 97-38 (CCO for Mercury and Mercury Compounds), 97-39 (CCO for Cyanide and Cyanide Compounds), 2000-02 (CCO for Asbestos), 2004-01 (CCO for Polychlorinated Biphenyls (PCBs)), 2000-18 and 2004-08 (CCO for ODS)
	JOINT DTI-DENR-DOF-DOH-DILG-DOTC ADMINISTRATIVE ORDER for the Adoption and Implementation of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)		
	(3rd draft) Rules and Procedures for the Safety Data Sheet (SDS), Labeling Requirements and Hazards Classification under DENR Administrative Order No. 29, Series of 1992 of RA 6969 for the Adoption and Implementation of the GHS		Annex 2

**Table 5: List of Restricted Chemicals in Main Regulations in Philippines (2)**

<b>Law Name</b>	<b>Decree/Circular/Standard</b>	<b>Field</b>	<b>List</b>
The Philippine Labor Code	The Occupational Safety and Health Standards (OSHS), 1978	Labor Safety	Table 8, 8a, 8b
	Draft amendments to Rule 1090 of the Occupational Safety and Health Standards (OSHS) entitled “Hazardous Materials” for GHS implementation in the workplace	Environment Protection	Article 19, 21, 30, 31, 32
Clean Air Act of 1999, RA No. 8749 (Act providing for a Comprehensive Air pollution Control Policy and for Other Purposes)	Implementing Rules and Regulations for RA 8749 (DAO 2000-81)		
Clean Water Act (RA No. 9275) An Act Providing for a Comprehensive Water Quality Management and for other purposes	Implementing Rules and Regulations of the Philippine Clean Water Act of 2004 (Republic Act No. 9275) (DAO 2005–10) DAO 1990–35 Revised Effluent Regulations of 1990, Revising and Amending the Effluent regulations of 1982		Table 1



## ***Basis of Selecting Restricted Chemicals***

### **A) Criteria for inclusion in the priority chemical list**

Primary Consideration:

- ✓ Bio-accumulative
- ✓ Persistence
- ✓ Toxicity

Secondary Consideration:

- ✓ Actual volume Use
- ✓ Importation

### **B) Guidelines and Classification of Restricted Chemicals / Pesticides**

#### **Guidelines on restricted pesticides**

A restricted pesticide is covered by two basic guidelines:

- ✓ They may not be allowed for distribution, sale and use in certain crops and/or areas of the country
- ✓ They may be used only by and under the supervision of certified applicators, or under such conditions as the FPA Administrator may require

#### **Classifications on restricted pesticides**

The list of restricted pesticides is categorized as follows:

- ✓ Those that are not for importation, except in cases of emergency. Such cases are to be determined by the Authority
- ✓ Those to be used for *termite control only*
- ✓ Those to be used under *specific limitations*

- ✓ Fumigants and other chemicals for use only by *certified fumigators*

### ***Implementation Status of SDS and GHS***

In the Philippines, SDS is implemented in the following regulation/standard:

- ✓ The Act to Control Toxic Substances and Hazardous And Nuclear Wastes, Providing Penalties For Violations Thereof, and For Other Purposes (RA 6969)
  - SDS is a requirement in the application for issuance of PMPIN, SQI, PCL and PICCS clearance or compliance certificate

In the Philippines, GHS is implemented in the following regulation/standard:

- ✓ Implemented in the JOINT DTI-DENR-DOF-DOH-DILG-DOTC ADMINISTRATIVE ORDER for the Adoption and Implementation of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

## 1.7. Chemical Risk Management Regulations in Singapore

### *Existing Legal Instruments on the Chemical Management*

There is no chemical inventory and chemical notification process in Singapore. In Singapore, hazardous chemicals are regulated by different authorities and on a list basis, as follows:

- **National Environment Agency (NEA)** licenses the import, storage, usage, sales, and supply and disposal of prescribed hazardous substances listed under the “Environmental Protection And Management (Hazardous Substances) Regulations” (EPMA). The EPMA is more concerned with environmental health.
- **Singapore Civil Defense Force (SCDF)** regulates the transport and storage of petroleum and bulk flammable substances.
- **Ministry of Manpower (MOM)** issues the Factory license, and regulates the Workplace, Safety and Health (WSH) Act.

The existing legal instruments on chemical management, which includes industrial chemicals in Singapore, are as follows:

#### **A) Acts concerning chemical management**

- ✓ Environmental Protection and Management Act (EPMA)
- ✓ Air Emissions Standard
- ✓ Code of Practice on Pollution Control (COPPC)
- ✓ Environmental Pollution Control

- ✓ Fire Safety Regulations, 2005 (for petroleum and other flammable materials)
- ✓ Guidelines for Quantitative Risk Assessment (QRA) Study for Installations which Store, Transport or Use Hazardous Substances
- ✓ Company Emergency Response Team Audit (CERT)
- ✓ Guidelines for Open Plant Structures in Oil, Chemical and Process Industries
- ✓ Strategic Goods Control List
- ✓ National Authority (Chemical Weapons Convention)
- ✓ Arms and Explosives Act
- ✓ Misuse of Drug Act and Regulations
- ✓ Medicines Act and Regulations
- ✓ Approved Code of Practice SS 586 Part 2 – Specification for hazard communication for hazardous chemicals and dangerous goods – Globally harmonized system of classification and labeling of chemicals – Singapore’s adaptations
- ✓ Approved Code of Practice SS 586 Part 3 – Specification for hazard communication for hazardous chemicals and dangerous goods – Preparation of safety data sheets (SDS)
- ✓ Chemical Weapons (Prohibition) Act
- ✓ Workplace Safety and Health Act
- ✓ Chemical Management Program (CMP)

**B) Acts that are related to chemical management**

- ✓ International Maritime Organization Testing Requirements for Electrical Grading of Chemicals
- ✓ WSH Safety and Health Management System and Auditing Regulations

*List of Restricted Chemicals in Main Regulations*

**Table 6: List of Restricted Chemicals in Main Regulations in Singapore**

Law Name	Decree/Circular/Standard	Fields	List
Environmental Protection Management Act (Cap.94A)	Environmental Protection and Management (Hazardous Substances) Regulations	Chemical control	SECOND SCHEDULE 2
Workplace Safety and Health Act (Cap. 354A)	Workplace Safety and Health (General Provisions) Regulations 2006	Labor Safety	FIFTH SCHEDULE PART II 34. THE SCHEDULE 2
Fire Safety Act (Cap. 109A)	Fire Safety (Petroleum and Flammable Materials) Regulations 2005		
Environmental Protection Management Act (Cap. 94A)	Environmental Protection and Management (Air Impurities) Regulations	Environmental Protection	THE SCHEDULE Regulation 4 9, 10
	Environmental Protection and Management (TRADE EFFLUENT) Regulations		

### ***Basis of Selecting Restricted Chemicals***

- ✓ Proposals for restricting chemicals are managed by the respective government agencies regulating chemical controls.
- ✓ Selection is based on health, safety and environment, and security concerns for both the industry and the community.
- ✓ The requirements of international conventions or protocols to which Singapore is party are another basis for consideration.

### ***Implementation Status of SDS and GHS***

In Singapore, GHS is implemented in the following regulation/standard.

- ✓ Aligned SS 586 with GHS requirements has been endorsed as an Approved Code of Practice (ACOP) on 26 January 2011, and came into effect on 15 February, 2011
- ✓ Capacity-building through training and promotion through awareness seminars
- ✓ The GHS website is now available on the WSH website. GHS information leaflets (4 types – GHS Fact Sheet, SDS, Labeling, and Classification) and posters are available on the WSH website
- ✓ A virtual GHS expert group, which includes GHS experts from Japan and UN TDG expert based in Australia was established to serve immediate needs
- ✓ A national GHS task force has conducted a number of GHS Awareness workshops over the last few years
- ✓ The SCIC also coordinates and conducts GHS Users and Classification courses in Singapore

The timeline is as follows:

**Table 7: Timeline of Implementation of GHS**

<b>Phase</b>	<b>Timeline</b>	<b>Target Industry</b>	<b>Requirement</b>
1A	Feb 2012	All Chemical Manufacturers & Suppliers	Preparation of GHS SDSs & Labels for Single Substances
2A	End 2012	All Users of Chemicals	GHS Labeling of Containers for Single Substances.
1B	Mid 2015	All Chemical Manufacturers & Suppliers	Preparation of GHS SDSs & Labels for Mixtures.
2B	Mid 2015	All Users of Chemicals	GHS Labeling of Containers for Mixtures.

## **1.8. Chemical Risk Management Regulations in Thailand**

### ***Existing Legal Instruments on Chemical Management***

The existing legal instruments on chemical management, covering industrial chemicals in Thailand, are as follows;

#### **A) Acts concerning chemical management**

- ✓ Hazardous Substance Act B.E.2535, 1992
- ✓ Factory Act B.E.2535, 1992
- ✓ The Custom Act B.E.2534, 1991
- ✓ Enhancement and Conservation of National Environmental Quality Act B.E.2535, 1992
- ✓ Public Health Act B.E.2535, 1992
- ✓ Armament Control Act, B.E. 2530, 1987
- ✓ Disaster Prevention and Mitigation Act B.E.2550, 2007

#### **B) Acts concerning Industrial Safety and Health**

- ✓ The Factory Act, 1992
- ✓ Occupational Safety, Health and Environmental at Work Act B.E.2554, 2011
- ✓ The Industrial Estate Authority of Thailand Act, 1979
- ✓ Public Health Act B.E.2535, 1992

#### **C) Acts on waste and recycling**

- ✓ Factory Act B.E.2535, 1992
- ✓ Hazardous Substance Act B.E.2535, 1992



**D) Acts on the transportation of hazardous material**

- ✓ The Land Transportation Act B.E.2535, 1992
- ✓ Hazardous Substance Act B.E.2535, 1992

**E) Acts on the environment, general**

- ✓ Enhancement and Conservation of National Environmental Quality Act B.E.2535, 1992
- ✓ Factory Act B.E. 2535, 1992

**F) Acts on the environment of the atmosphere, global environment**

- ✓ Enhancement and Conservation of National Environmental Quality Act B.E. 2535, 1992

**G) Acts on environment of water**

- ✓ The Navigation on the Thai Territorial Water Act, 1913
- ✓ Enhancement and Conservation of National Environment Quality Act (NEQA) B.E.2535, 1992
- ✓ Factories Act B.E.2535, 1992
- ✓ Navigation in Thai Waterways Act (Volume14 )as amended in 1992
- ✓ Public Health Act B.E.2535, 1992
- ✓ Cleanliness and Tidiness of the Country ActB.E.2535, 1992

***List of Restricted Chemicals in Main Regulations***

**Table 8: List of Restricted Chemicals in Main Regulations in Thailand (1)**

<b>Law Name</b>	<b>Regulation, year</b>	<b>Fields</b>	<b>List</b>
Hazardous Substance Act B.E.2535, 1992 Ministry of Industry	Ministerial Notification on the list of Hazardous Substances No.2 B.E.2543, 2000	Chemical Management	List Kor& List Khor
	Ministerial Notification on the list of Hazardous Substances B.E.2546, 2003		List Kor& List Khor
	Ministerial Notification on the list of Hazardous Substances No.3 B.E.2548, 2005		List Kor
	Ministerial Notification on the list of Hazardous Substances No.4 B.E.2549, 2006		List Kor&List Khor
	Ministerial Notification on the list of Hazardous Substances No.5 B.E.2549, 2006		List Kor& List Khor
	Ministerial Notification on the list of Hazardous Substances No.6 B.E.2552, 2009		List Kor
	Ministerial Notification on the list of Hazardous Substances No.7 B.E.2553, 2010		
	Ministerial Notification on Designation of a specialized person responsible for the safety of hazardous substance storage under authorization of DIW at the hazardous substance business facility. B.E.2551, 2010		Article

**Table 8: List of Restricted Chemicals in Main Regulations in Thailand (2)**

<b>Law Name</b>	<b>Regulation, year</b>	<b>Fields</b>	<b>List</b>
	Notification of DIW on Guideline for warehousing of Hazardous substances B.E.2551, 2010		Appendix
	Ministerial Notification on land transportation of hazardous material B.E.2546, 2003	Transportation of hazardous material	UNTDG
Factory Act B.E.2535, 1992 Ministry of Industry	Ministerial Notification order to enforce of the Act on the industrial waste management B.E.2548, 2005	Industrial Waste	Appendix 1-2
	Ministerial Notification No.2 B.E.2535, 1992 order to enforce of the Act on the environment industrial (waste water)	Environment	Article No.2
	Ministerial Notification order to enforce of the Act on the environment B.E.2549, 2006 (industrial air pollution)		Article No.3
	Ministerial Notification order to enforce of the Act on the environment B.E.2548, 2005 (industrial air pollution from the used oil)		Article No.2
	Notification of the Ministry of Industry: Level of impurities in the emission of factories B.E.2548, 2005		Appendix

**Table 8: List of Restricted Chemicals in Main Regulations in Thailand (3)**

<b>Law Name</b>	<b>Regulation, year</b>	<b>Fields</b>	<b>List</b>
Armament Control Act, B.E. 2530, 1987 Ministry of Defense	Ministerial Notification order to enforce the Act on Armament Control	Chemical Management	Article No.2.2 chemical in war implement. Article No.2.3 chemical use in the mixture of explosive materials.
	Royal Decree controlling the exportation of arms armament and war implements B.E.2535, 1992		Appendix No.6
Occupational Safety, Health and Environment at Work Act B.E.2554, 2011 Ministry of Labor	Ministerial Regulation on the Prescribing of Standards for Administration and the Management of Occupational Safety, Health and Work Environments in Relation to Hazardous Chemical Substances B.E.XXXX <sup>2</sup>	Labor Safety	Ongoing process
The Land Transportation Act B.E.2522, 1979 Ministry of Transportation	Notification of Department of Land Transportation B.E.2543, 2000: Type and Class of Hazardous Substance	Transport of hazardous material	UNTDG
	Notification of Department of Land Transportation B.E.2553, 2010: Type and Class of Hazardous Substance require Driver license Type 4		Article

<sup>2</sup> As of March 2012, this regulation is under legislative process. Establishment year is to be determined.

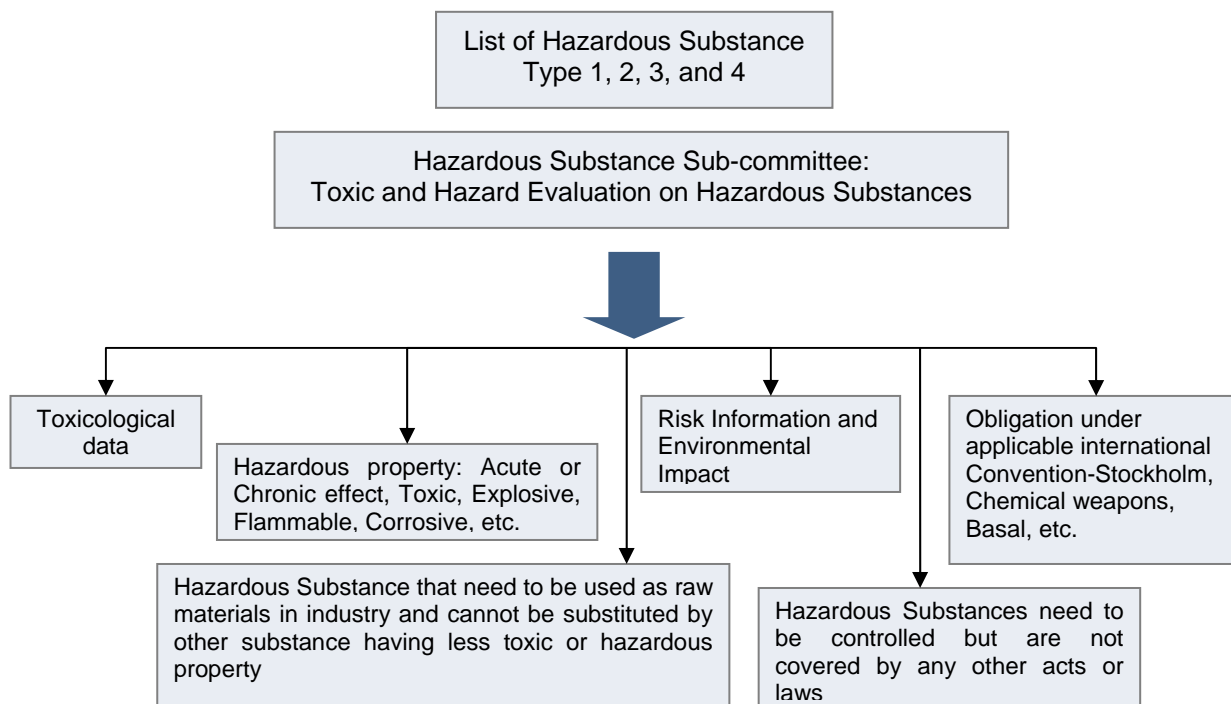
**Table 8: List of Restricted Chemicals in Main Regulations in Thailand (4)**

<b>Law Name</b>	<b>Regulation, year</b>	<b>Fields</b>	<b>List</b>
Enhancement and Conservation of National Environmental Quality Act Ministry of Science, Technology and Environment,	Notification of the Ministry of Science, Technology and Environment, No.3, B.E.2539, 1996, issued under the Enhancement and Conversation of the National Environmental Quality Act	Environmental Protection	Appendix
	Notification of Pollution Control Department on monitoring value for volatile organic compounds in 24 hours B.E.2551, 2008		Article 1
	Ministerial Notification on criteria of emission standard from industries B.E.2549, 2006		Article 2
	Notification of National Environment Committee No.30 on monitoring values for volatile organic compounds in the atmosphere within 1 year.B.E.2550, 2007		Article 1

### ***Basis of Selecting Restricted Chemicals***

Chemical substances must be under specific national procedure, as follows:

**Figure 6: Basis of Selecting restricted Chemicals n Thailand**



### ***Implementation Status of SDS and GHS***

In Thailand, SDS is implemented in the following regulation/standard:

- ❖ Hazardous Substance Act B.E.2535, 1992 (to be approved by the Minister of Industry, which complies with the GHS)

On the other hand, GHS is implemented in the following regulation/standard:

- ✓ Hazardous Substance Act B.E.2535, 1992 (to be approved from the Minister of Industry)
- ✓ GHS Classification Results will be available on <http://www.diw.go.th> by December 2011

## 1.9. Chemical Risk Management Regulations in Vietnam

### *Existing Legal Instruments on the Chemical Management*

The existing legal instruments on the chemical management covering industrial chemicals in Vietnam are as follows:

#### **A) Acts concerning industrial chemical management**

- ✓ **Chemical Law**, 2007 (enforced 2008)
- ✓ **Decree No. 26/2011/ND-CP**, April 8 2011, amended and supplemented some articles of Decree No. 108/2008/ND-CP, October 7 2008, details and guides the implementation of some articles of Chemical Law
- ✓ **Decree No. 15/2010/ND-CP** on administrative punishment in the production, trading of fertilizers, March 1, 2010
- ✓ **Decree No. 90/2009/ND-CP** on administrative punishment of chemical activity, October 20, 2009
- ✓ **Decree No. 108/2008/ND-CP**: “Detailed regulation and guideline of implementation of several articles in Law of chemicals,” October 2008
- ✓ **Decree No. 68/2005/ND-CP** on chemical safety, May 20, 2005
- ✓ **Decree 27/ND/CP** allowing the use and trade of explosive industrial materials, 20 April, 1995
- ✓ **Circular 28/2010/TT-BCT**, guiding the implementation of Chemical Law, June 28, 2010, and Decree 108/2008/ND-CP, October 7, 2008
- ✓ **Circular 30/2011/TT-BCT**, providing temporary regulation on the limitation of some hazardous chemicals in electrical and electronic products, August 10, 2011

#### **B) Documents on Industrial Safety and Health**

- ✓ Labor law

**C) Documents on environment, general**

- ✓ Environmental Protection Law

**D) Documents on Waste and recycle**

- ✓ Decree No. 67/2003/ND-CP, regulating waste water management, June 13, 2003
- ✓ Decree 59/2007/NĐ-CP, regulating solid waste management, April 9, 2007

**E) Documents on Hazardous material, security and accident prevention**

- ✓ Safety law for production, use, storage and transportation of dangerous chemicals

**F) Documents on transport of hazardous material, shipping)**

- ✓ Decree No. 13/2003/ND-CP, listing hazardous goods for land transportation, February 19, 2002

**G) Documents on the environment, including atmosphere, global environment, water, soil**

- ✓ QCVN 05:2009/BTNMT National regulation on ambient air
- ✓ QCVN 06:2009/BTNMT National regulation on some hazardous substances in ambient air.

***List of Restricted Chemicals in Main Regulations***

Chemicals management

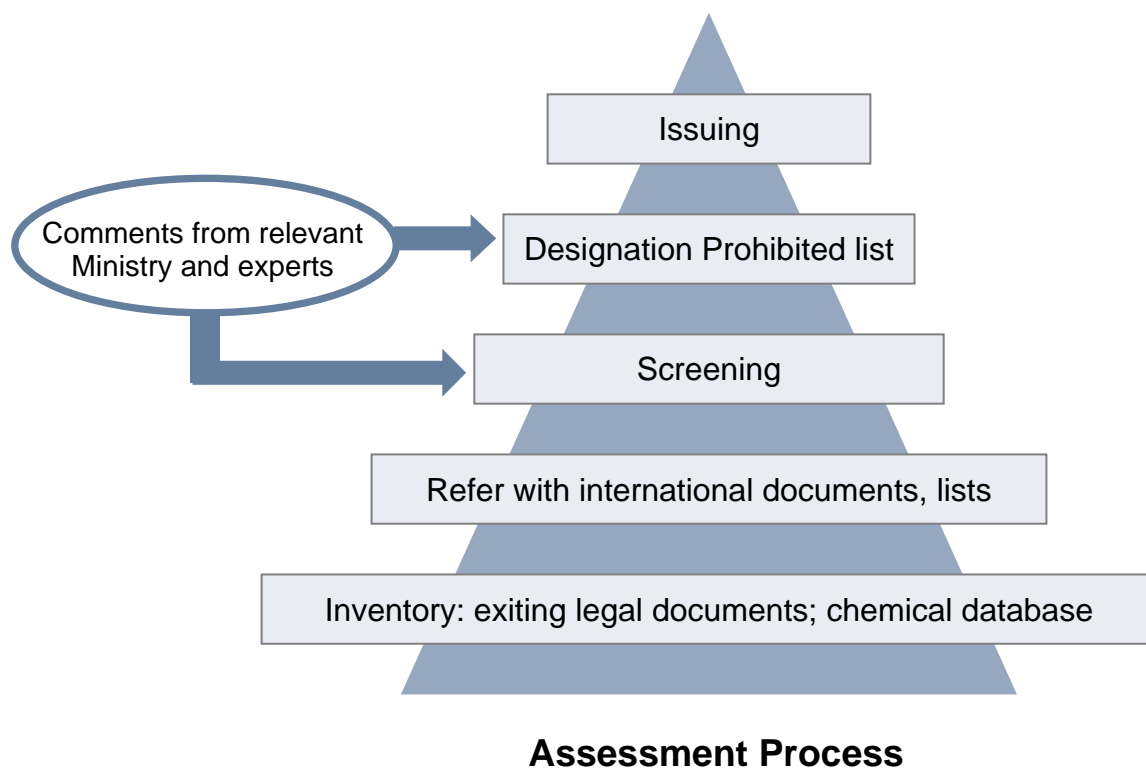
Decree 108/2008/ND-CP, appendix III, List of restricted Chemicals

**Next steps:** Relevant ministries will issue the guidance documents on permission for import, export, production and using Restricted Chemicals for special purposes.



## *Basis of Selecting Restricted Chemicals*

**Figure 8: Assessment Process**



## *Implementation Status of SDS and GHS*

In Vietnam, SDS is implemented in the following regulation/standard:

- ❖ Decree No. 108/ND-CP/2008 and Decree No. 26/ND-CP/2011

**Next steps:** MOIT will issue the Circular guidance on Chemicals Declaration, and SDS will be a major part of that Circular

On the other hand, GHS is implemented in the following regulation/standard:

Dissemination:

- ✓ Awareness Raising Seminar on GHS and GHS implementation. Vinachemia, in cooperation with Sweden Chemicals Agency, held a workshop entitled “guidelines for implementation of chemicals classification and labeling in global harmonized system” in Hanoi and Ho Chi Minh City
- ✓ Participation in training courses in other countries such as Japan, Singapore, and Indonesia.

Legal documents:

- ✓ The guidance classification and labeling for chemicals was issued at the end of 2011.
- ✓ Road map: 2 years for substances (2011–2013)
- ✓ Road map: 4 years for mixtures (2011–2015)

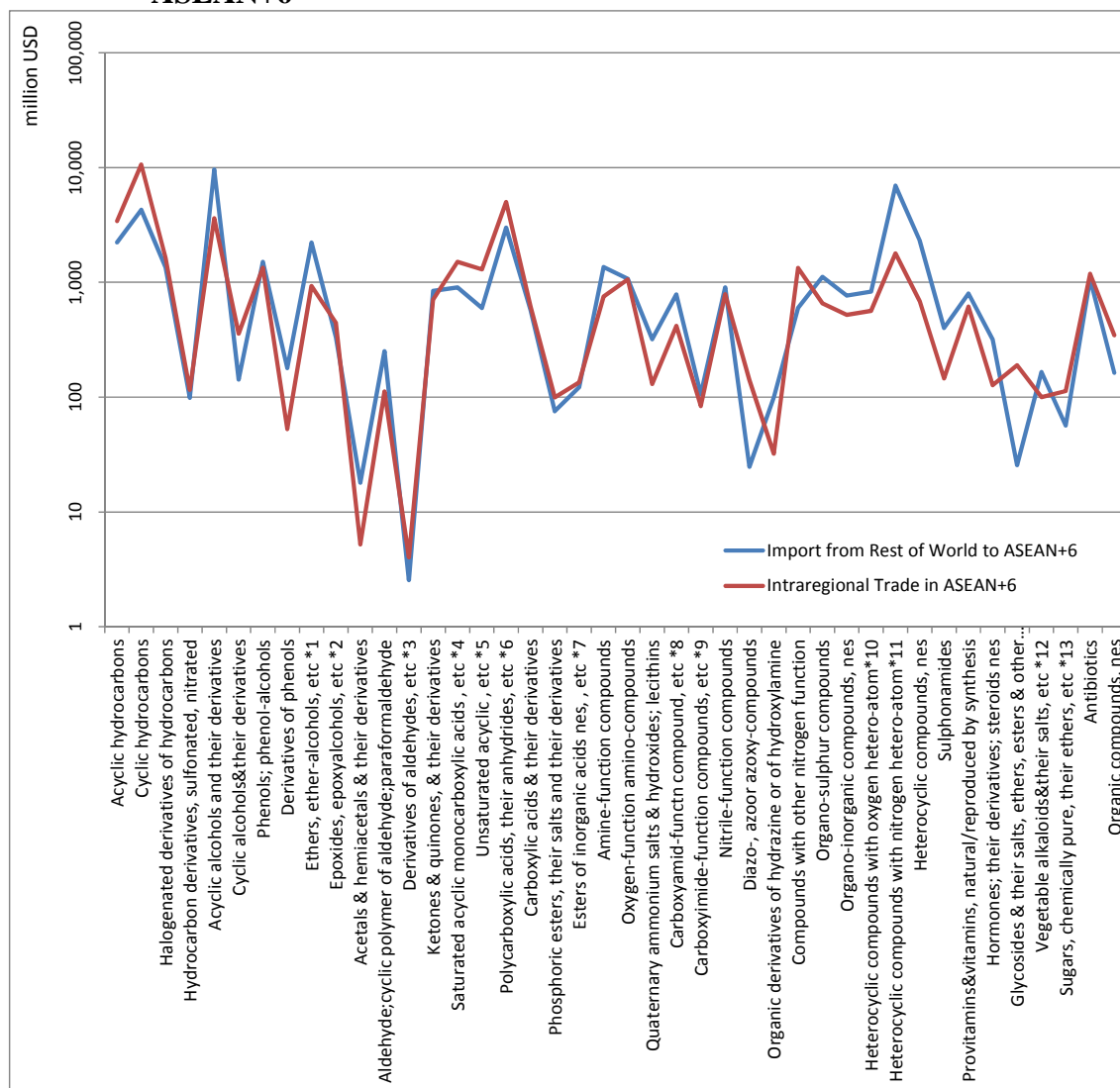
**Next steps:** Setup National Action plan for GHS implementation

## 2. Overview of the Trading Amount of Chemical Substances in ASEAN and East Asian Countries

### 2.1. Chemical Substance Trading in ASEAN and East Asian Countries in Brief

The values of imported chemical substances in 42 segments (based on HS code) are mostly the same as those of the values of intraregional trades in ASEAN+6 (Figure 9). The significant difference is shown in the value of Diazo-, azoor azoxy-compounds, Glycosides and their salts, and Heterocyclic compounds.

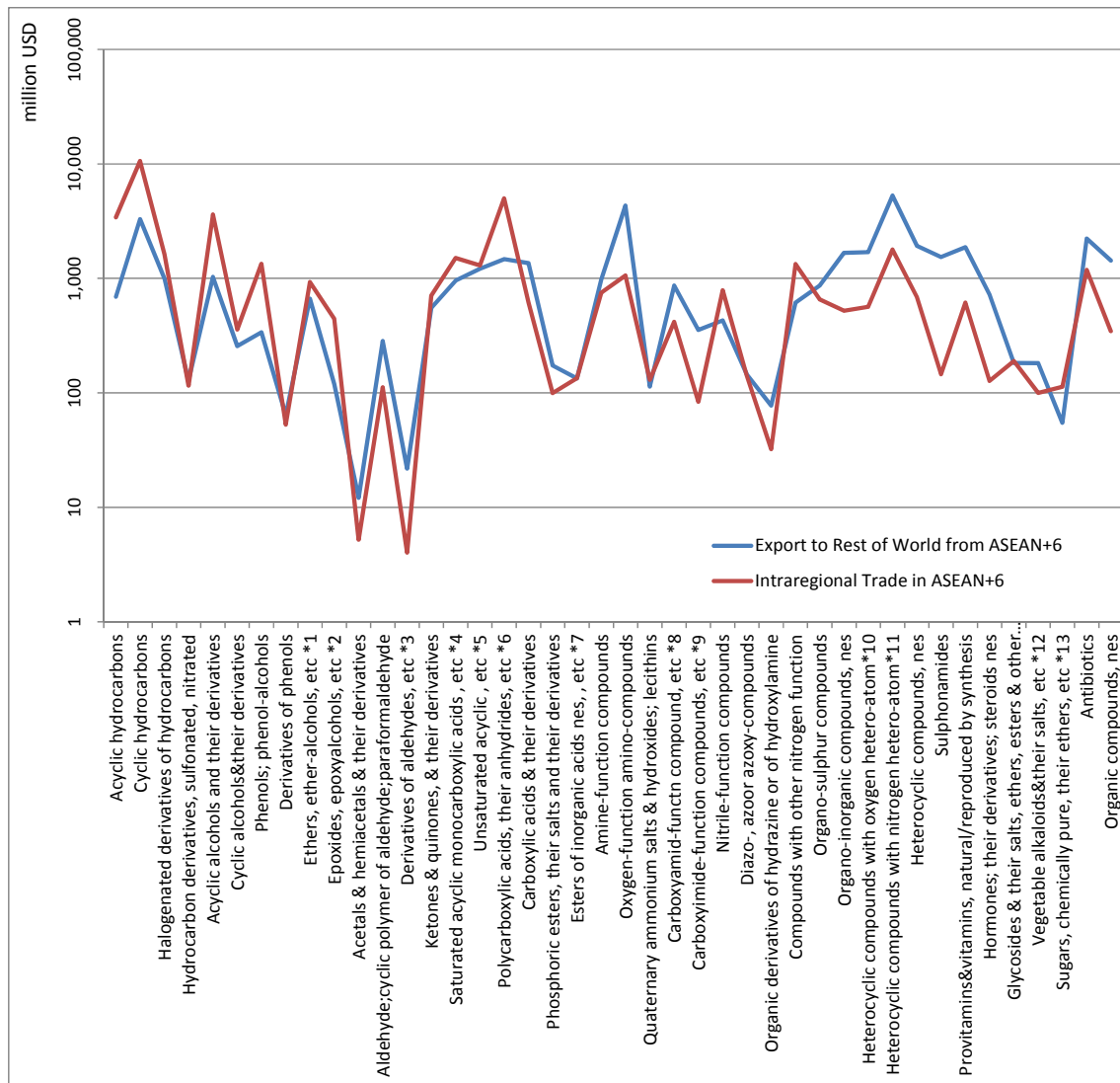
**Figure 9: Amount of import from intraregional trade and rest of the world to ASEAN+6**



Source: UN comtrade

Just as in the result in Figure 9, the values of exported chemical substances in 42 segments are similar to the values of intraregional trade in ASEAN+6 (Figure 10). The significant differences are shown in Glycosides and their salts, Acyclic alcohols and their derivatives, Phenols, Epoxides, Derivatives of aldehydes, Polycarboxylic acids, Oxygen-function amino-compounds, Carboxyimide-function compounds, Sulphonamides, Hormones, and Organic compounds. Here, a significant difference is recognized if the difference rate (=export/intraregional) is more than 300%, or less than 30%.

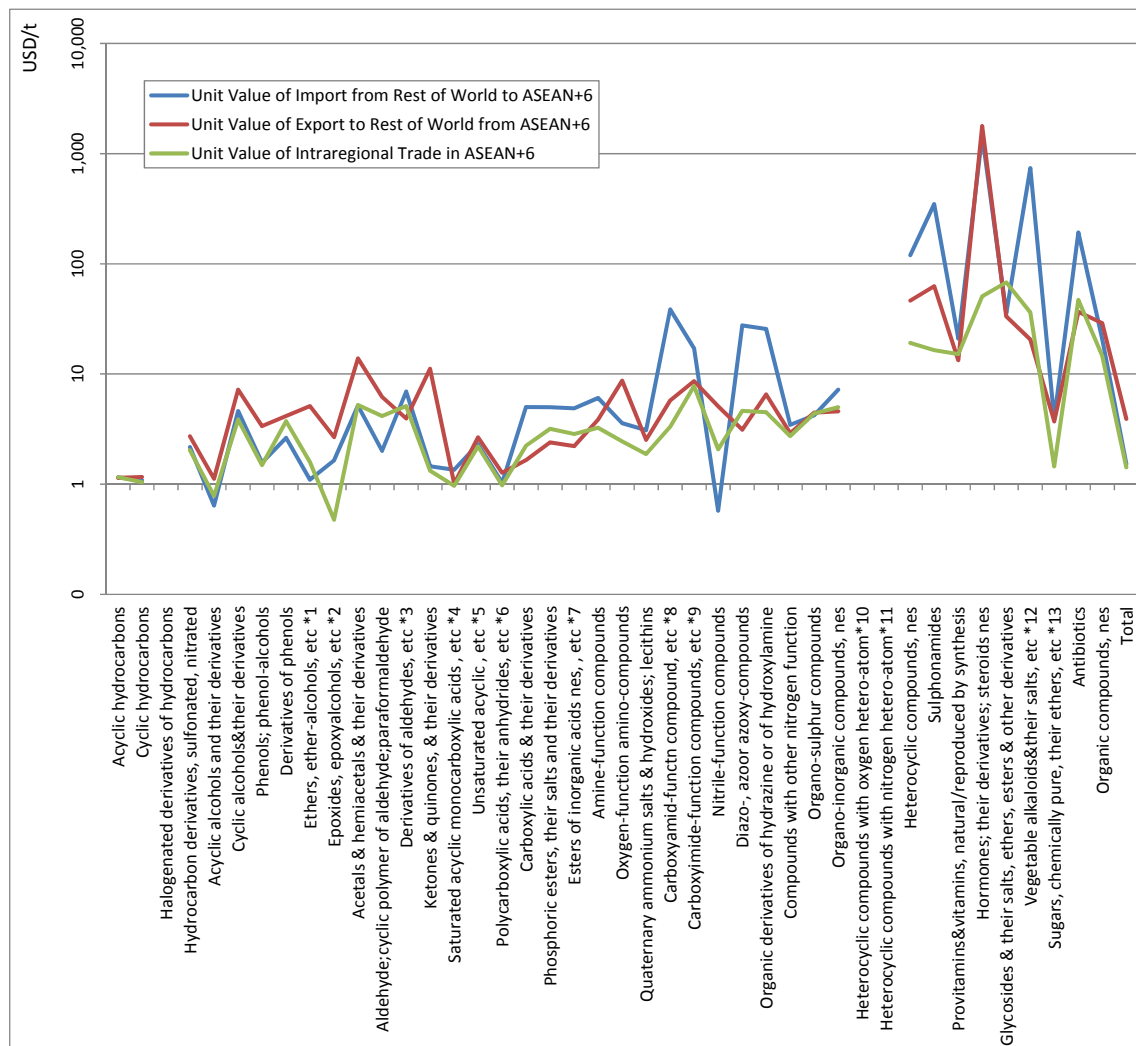
**Figure 10: Amount of exports from ASEAN+6 to intraregional trade and rest of the world**



Source: UN comtrade

Lastly, the unit values (=USD/t) of each of the 42 segmented chemicals for import/export/intraregional trade were calculated as shown in Figure 11. The most remarkable point is that the unit value of export to rest of world from ASEAN+6 is about 3.9 USD/t, whereas that of import and intraregional trade is around 1.5 USD/t. This result indicates that the companies in ASEAN+6 import/trade intra-regionally cheap chemicals and export highly valued chemicals to rest of the world.

**Figure 11. Comparison of the Unit Cost of the Intraregional Trade and Others**



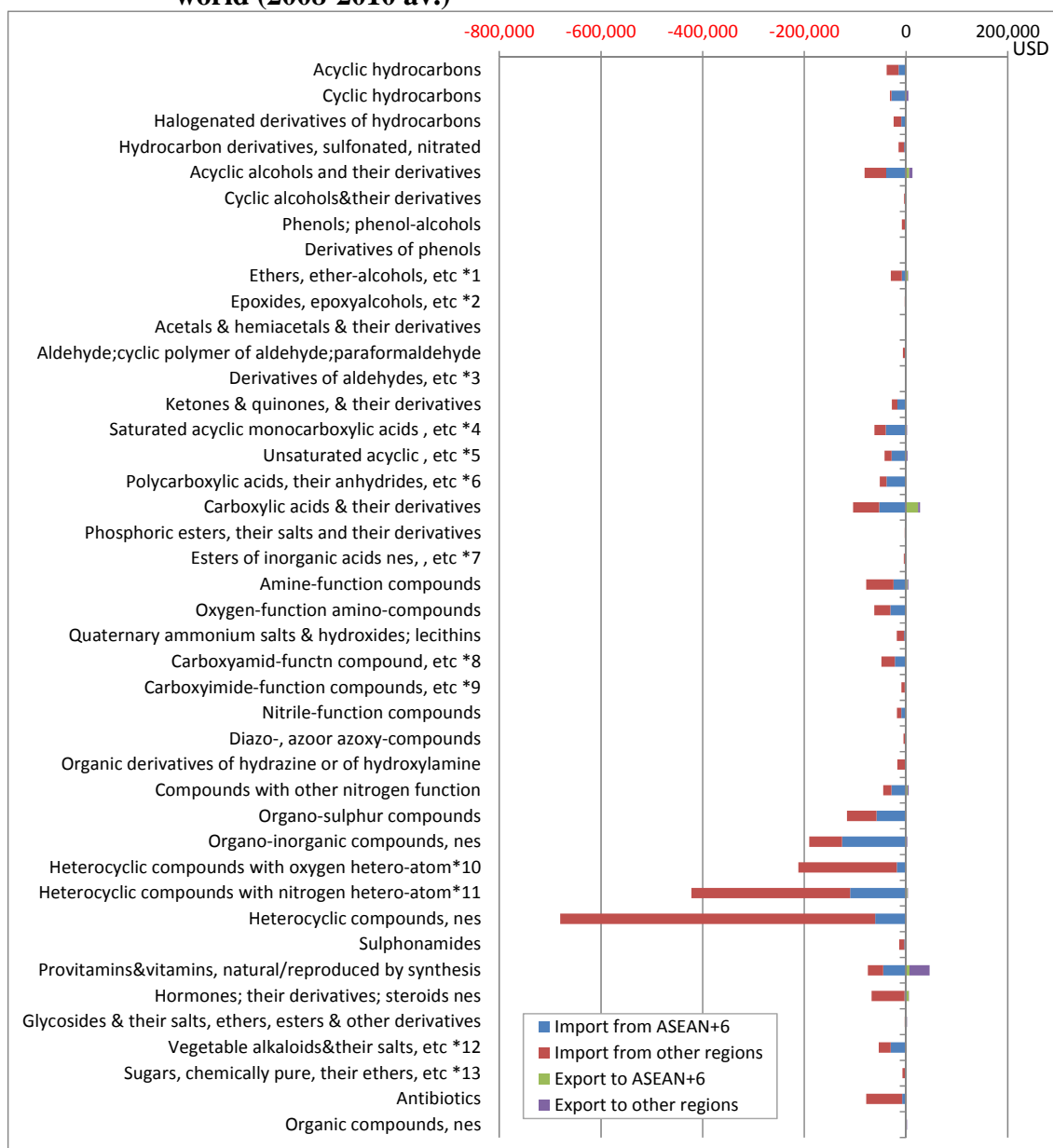
Source: UN comtrade

## 2.2. Chemical Substance Trading in Australia

### Trading of Chemical Goods

In Australia, the imported value is much higher than that of exported value in the field of organic chemical goods, and especially the import of the Heterocyclic compounds is of high value (Figure 12).

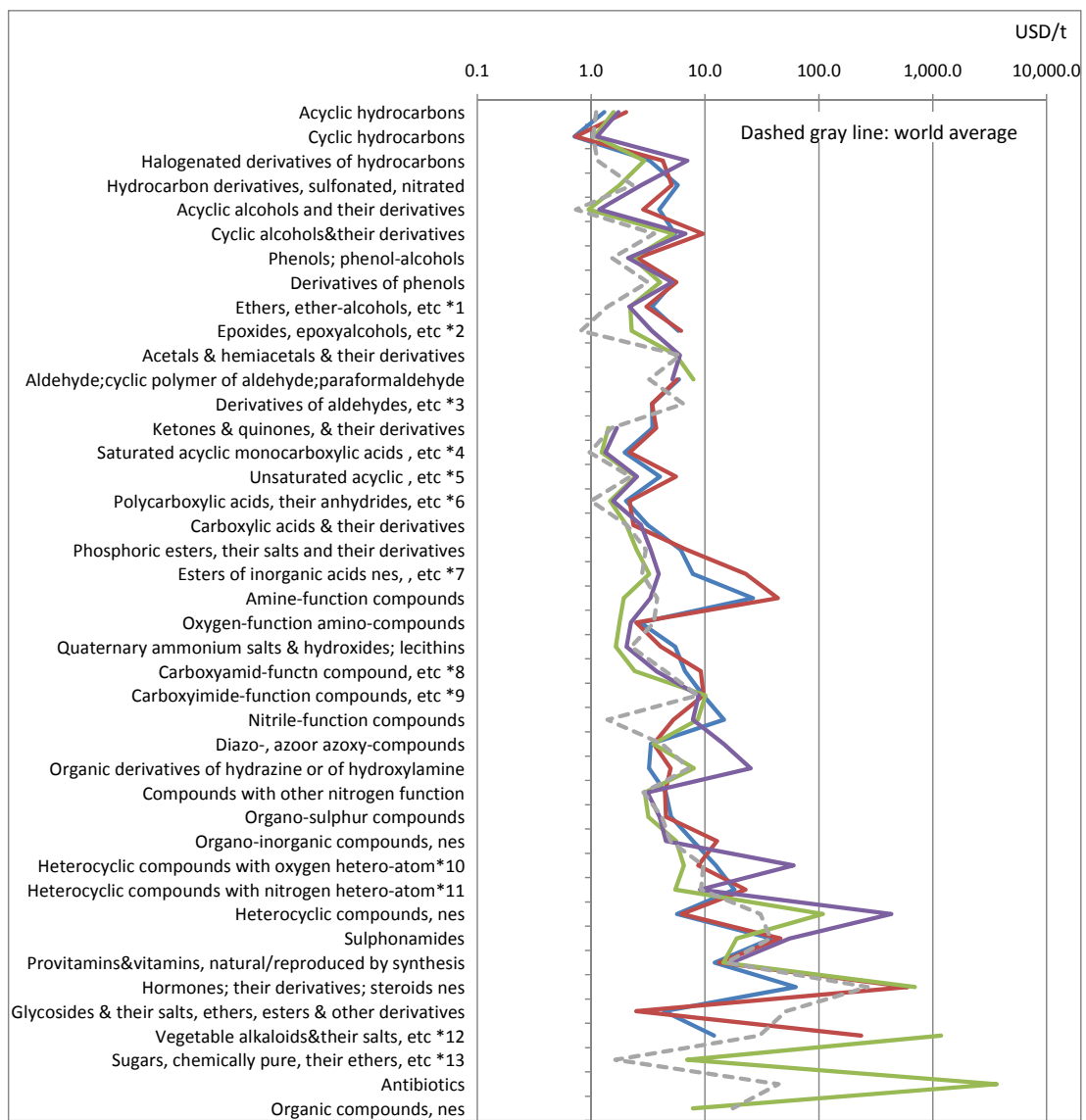
**Figure 12: Value of import (negative) and export (positive) to ASEAN+6 and world (2008-2010 av.)**



Source: UN comtrade

The difference of unit costs for importing and exporting, with respect to the goods criteria is shown in Figure 13. Although some items show large differences (e.g. “Hydrocarbon derivatives, sulfonated, nitrated” or “Heterocyclic compounds, nes”), these differences are mainly because the exported volume of these items is quite small. Therefore, these differences do not necessarily reflect a difference in the industrial structure.

**Figure 13: Unit value of Import and Export (2008-2010 average)**



Source: UN comtrade

## 2.3. Chemical Substance Trading in Cambodia

### Trading of Chemical Goods

In Cambodia, the imported value is higher than that of exported value in the field of organic chemical goods, and, in particular, the import of the Oxygen-function amino-compounds is of high value (Figure 14).

**Figure 14: Value of import (negative) and export (positive) to ASEAN+6 and world (2008-2010 av.)**

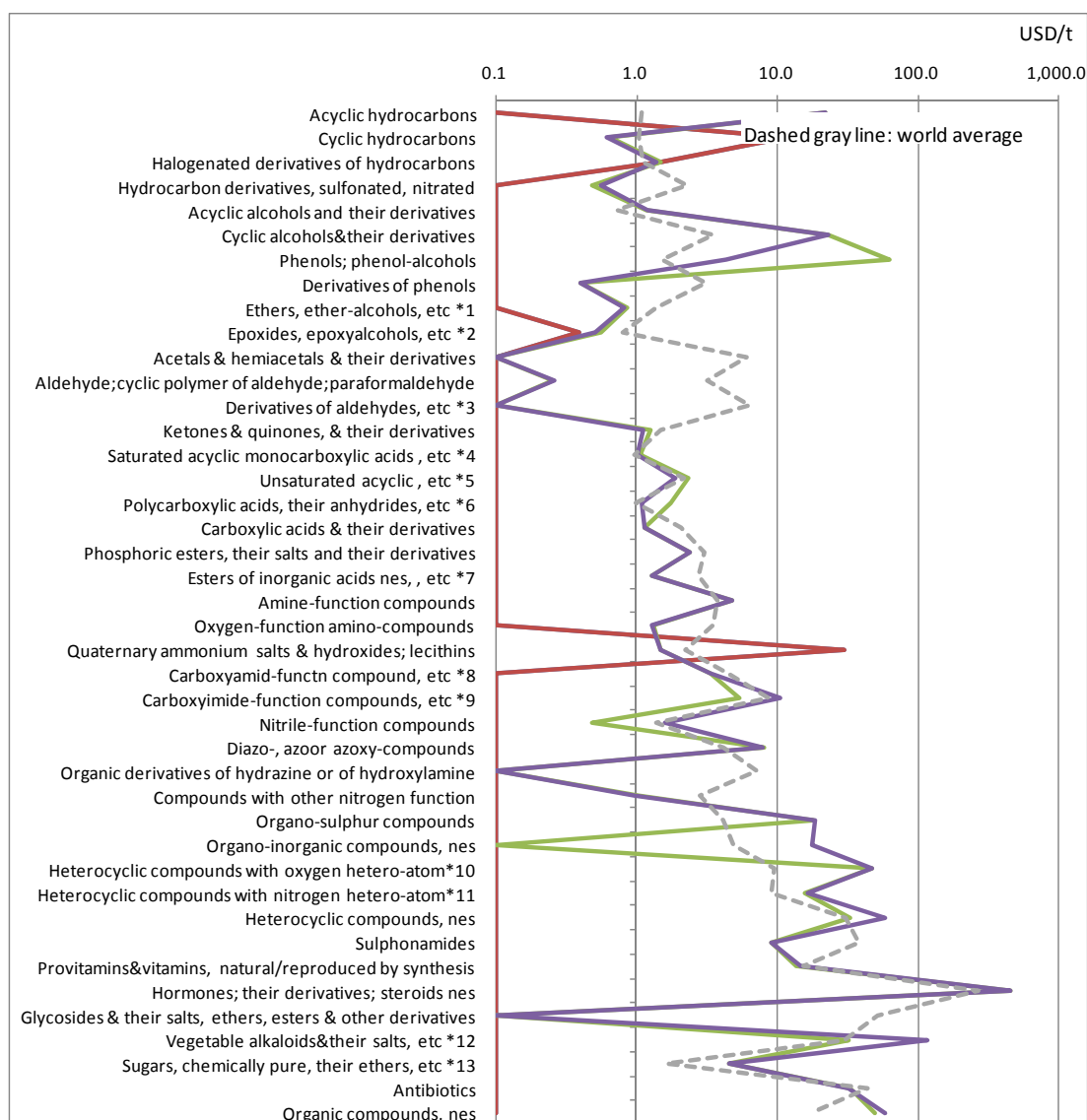


Source: UN comtrade



The difference of unit costs for importing and exporting, with respect to the goods criteria, is shown in Figure 15. Although some items show large differences, these differences are mainly because the exported volume of these items is quite small. Therefore, these differences do not necessarily reflect a difference in industrial structure.

**Figure 15: Unit value of Import and Export (2008-2010 average)**



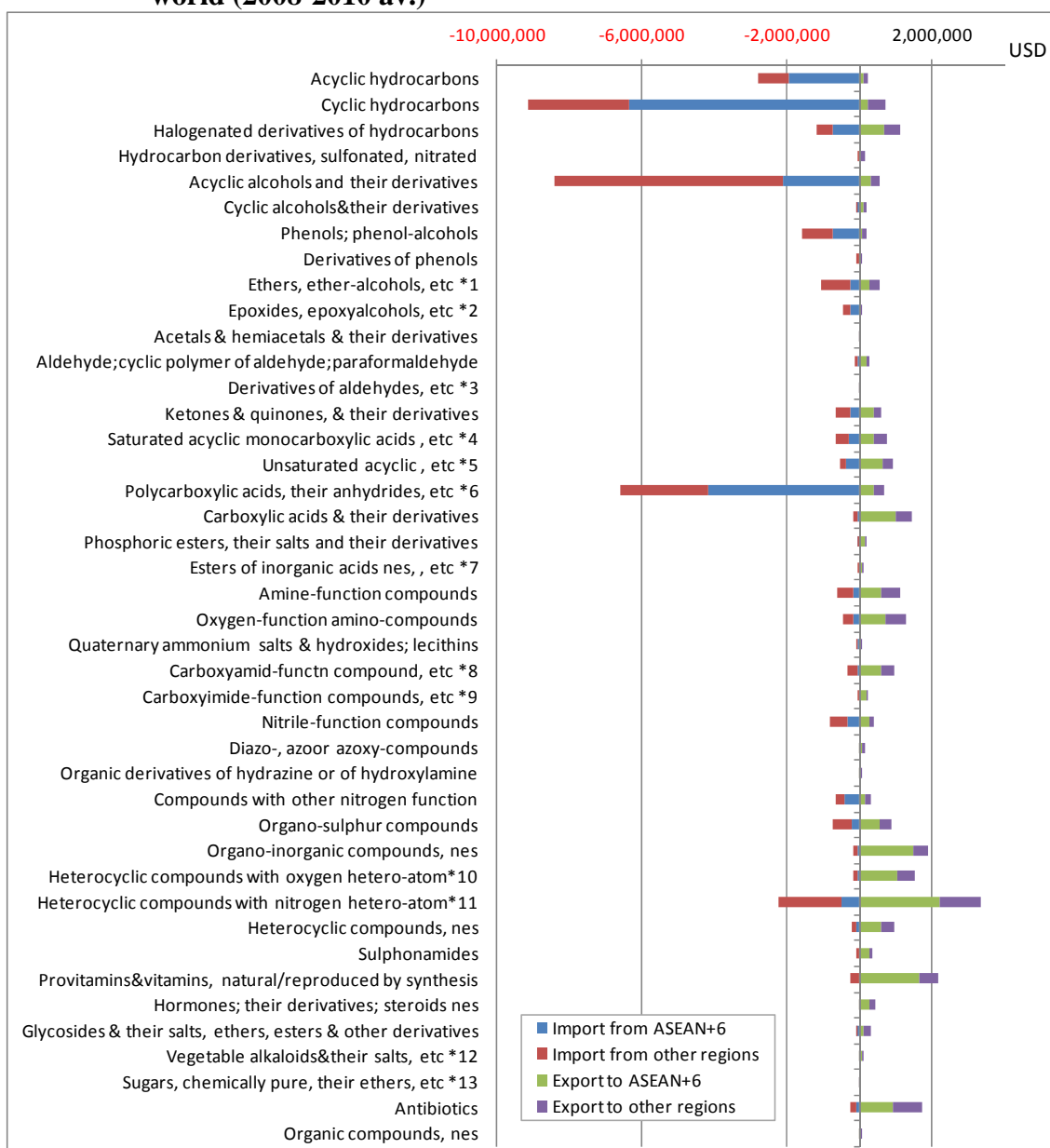
Source: UN comtrade

## 2.4. Chemical Substance Trading in China

### Trading of Chemical Goods

In China, exported value is generally higher than imported value in the field of organic chemical goods, although some chemical compounds record high imported values (e.g., Cyclic hydrocarbons, Acyclic alcohols and their derivatives, Polycarboxylic acids, their anhydrides, etc.).

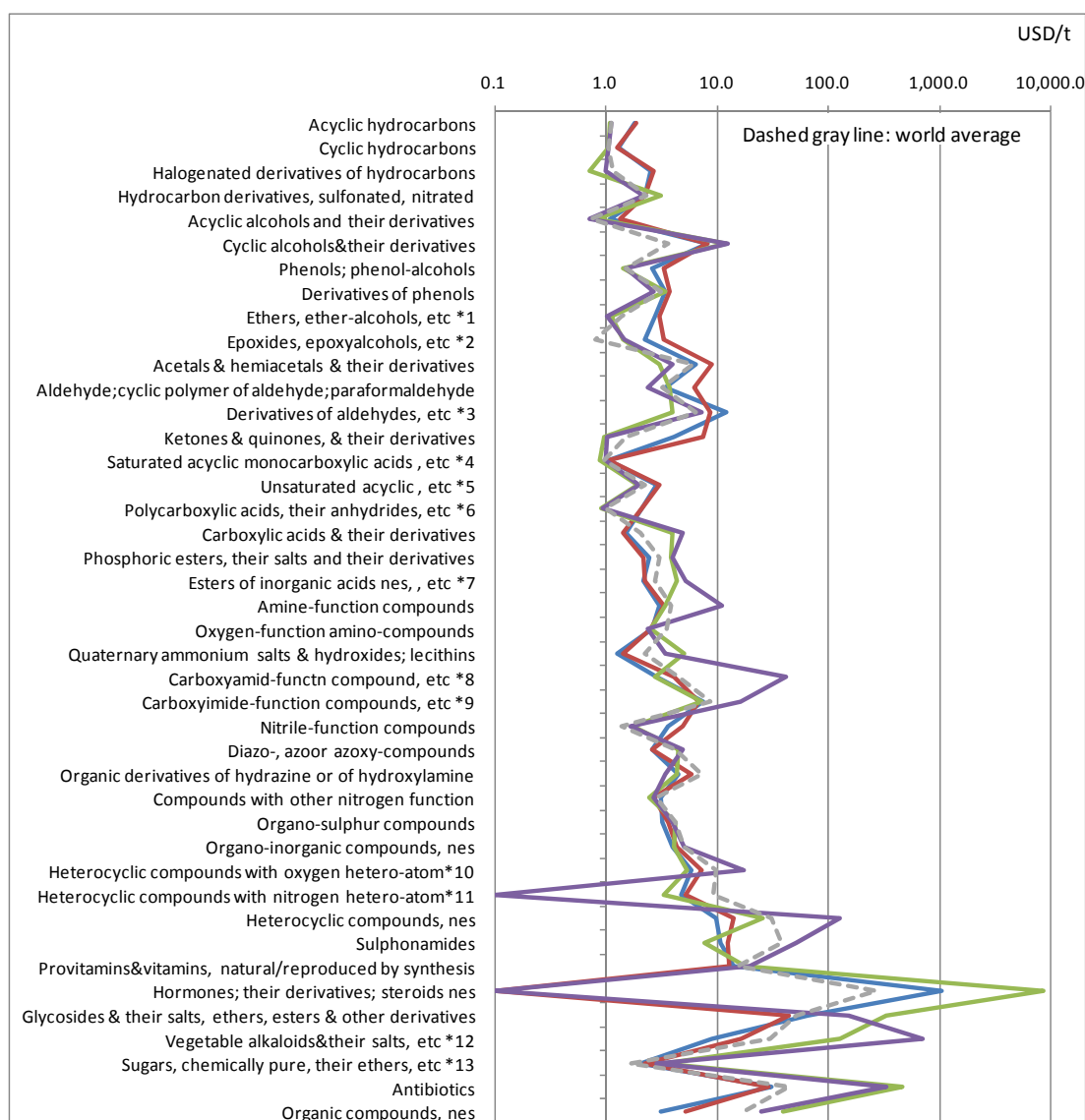
**Figure 16: Value of import (negative) and export (positive) to ASEAN+6 and world (2008-2010 av.)**



Source: UN comtrade

The difference of unit costs for importing and exporting with respect to the goods criteria is shown in Figure 17. Although some items show large differences (e.g., “Hormones; their derivatives; steroids nes”), these differences are mainly because the exported volume of these items is quite small. On the other hand, some chemical compounds (e.g., antibiotics) record a higher value for the exported compounds with a certain volume of exports.

**Figure 17: Unit value of Import and Export (2008-2010 average)**



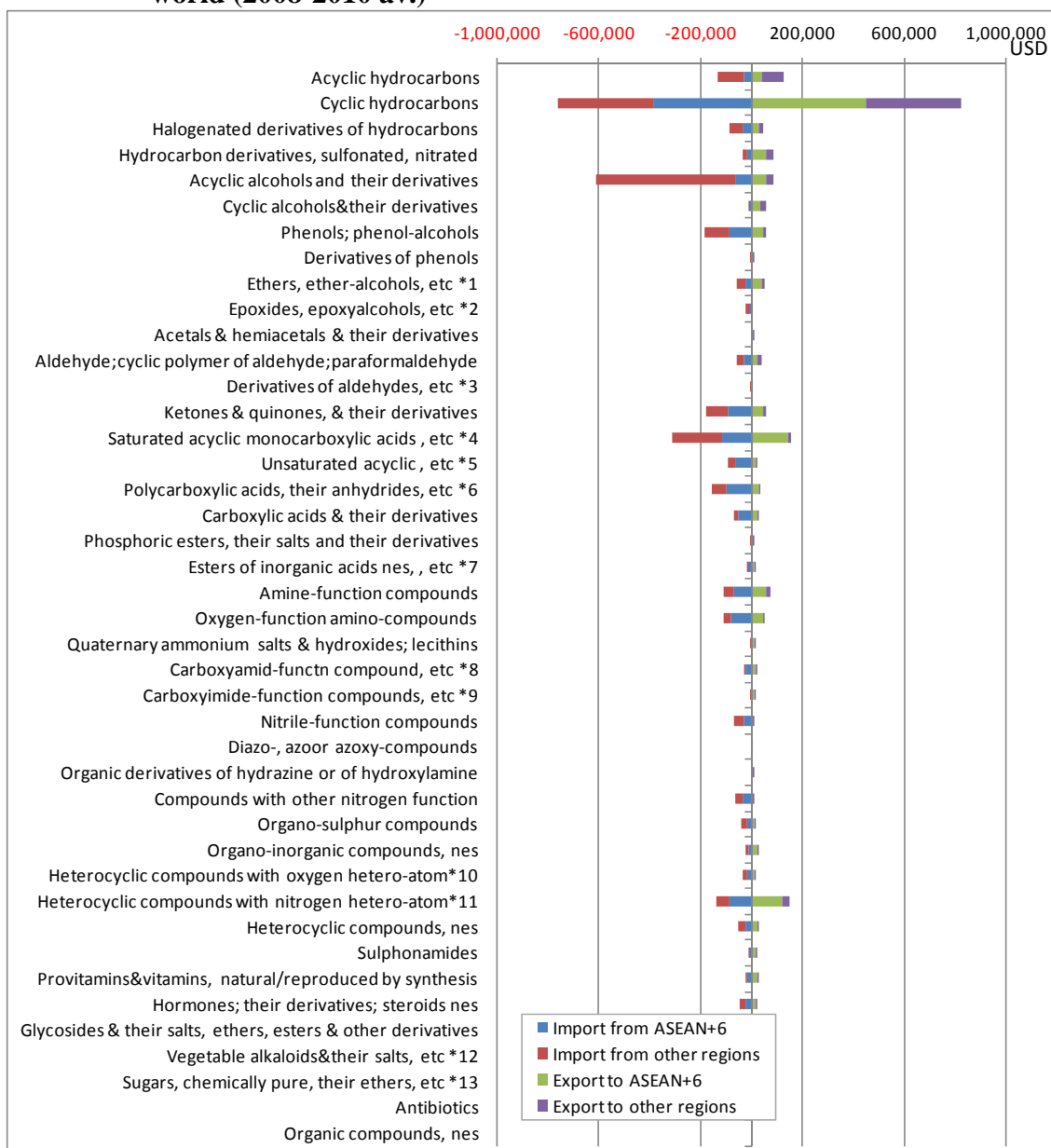
Source: UN comtrade

## 2.5. Chemical Substance Trading in India

### Trading of Chemical Goods

In India, the imported value is generally higher than that of exported value in the field of organic chemical goods. In particular, cyclic hydrocarbons record the highest volume of exports as well as of imports.

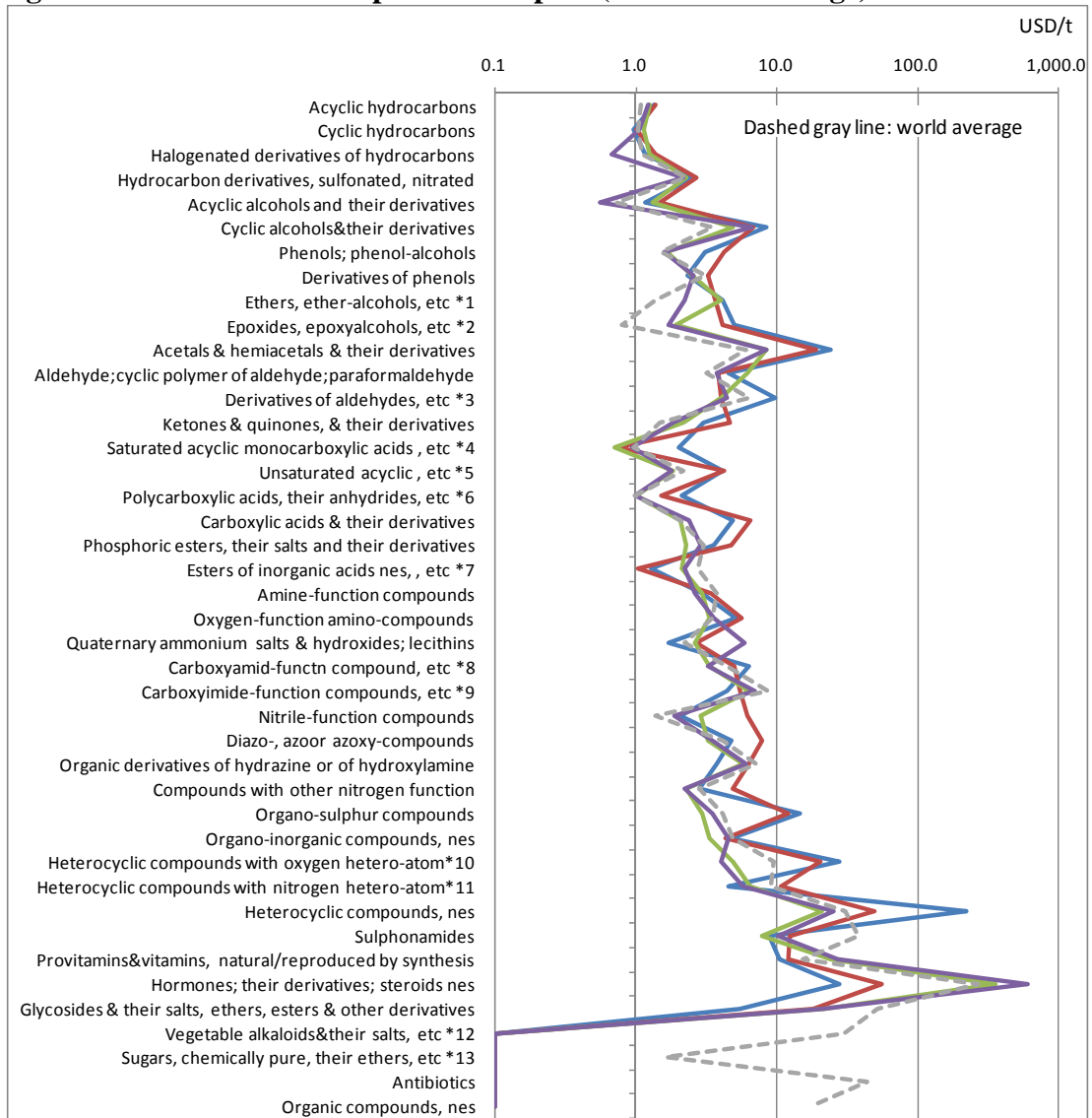
**Figure 18: Value of import (negative) and export (positive) to ASEAN+6 and world (2008-2010 av.)**



Source: UN comtrade

The difference of unit costs for importing and exporting with respect to the goods criteria is shown in Figure 19. Although some items show large differences (e.g., “Hydrocyclic compounds”), these differences are mainly because the exported volume of these items is quite small. Therefore, these differences do not necessarily reflect differences in the industrial structure.

**Figure 19: Unit value of Import and Export (2008-2010 average)**



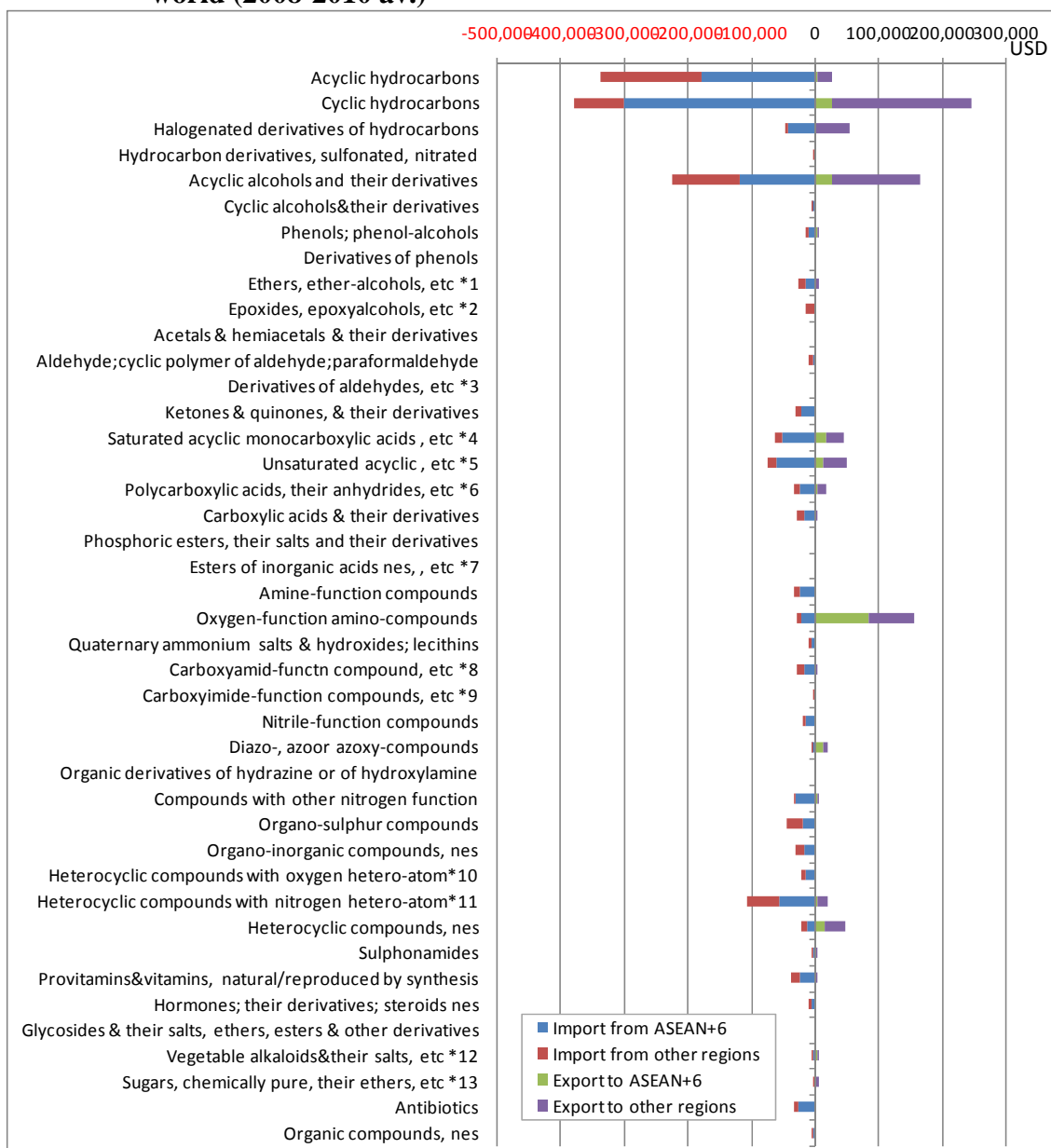
Source: UN comtrade

## 2.6. Chemical Substance Trading in Indonesia

### Trading of Chemical Goods

In Indonesia, the imported value is generally higher than the exported value in the field of organic chemical goods, although there are some chemicals with a higher exported value than imported value (e.g. “Oxygen-function amino-compounds”).

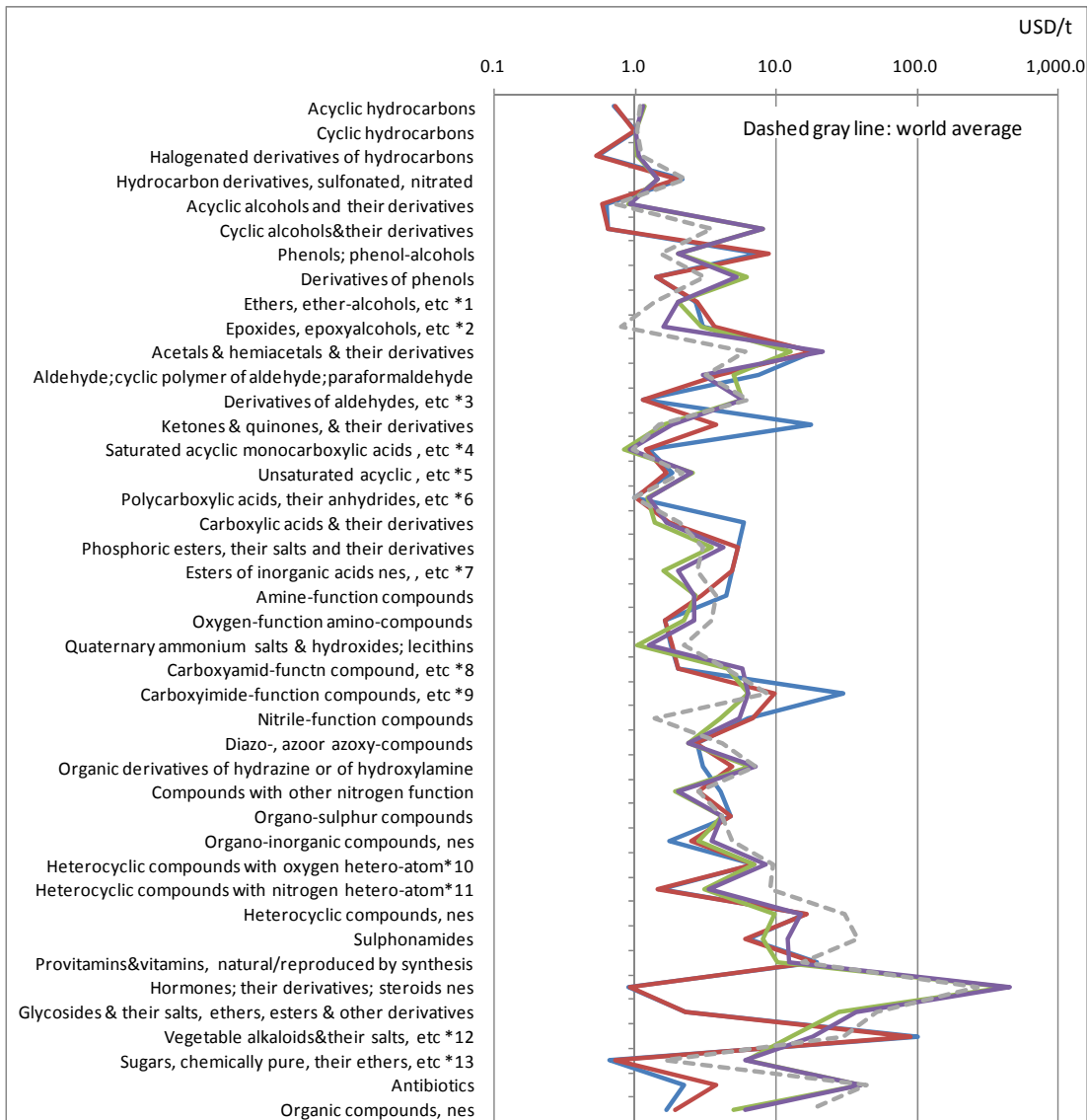
**Figure 20: Value of import (negative) and export (positive) to ASEAN+6 and world (2008-2010 av.)**



Source: UN comtrade

The difference of unit costs for importing and exporting with respect to the goods criteria is as shown in Figure 21. Although some items show large differences (e.g., “Hormones; their derivatives; steroids nes”), these differences are mainly because the exported volume of these items is quite small. Therefore, these differences do not necessarily reflect differences in the industrial structure.

**Figure 21: Unit value of Import and Export (2008-2010 average)**



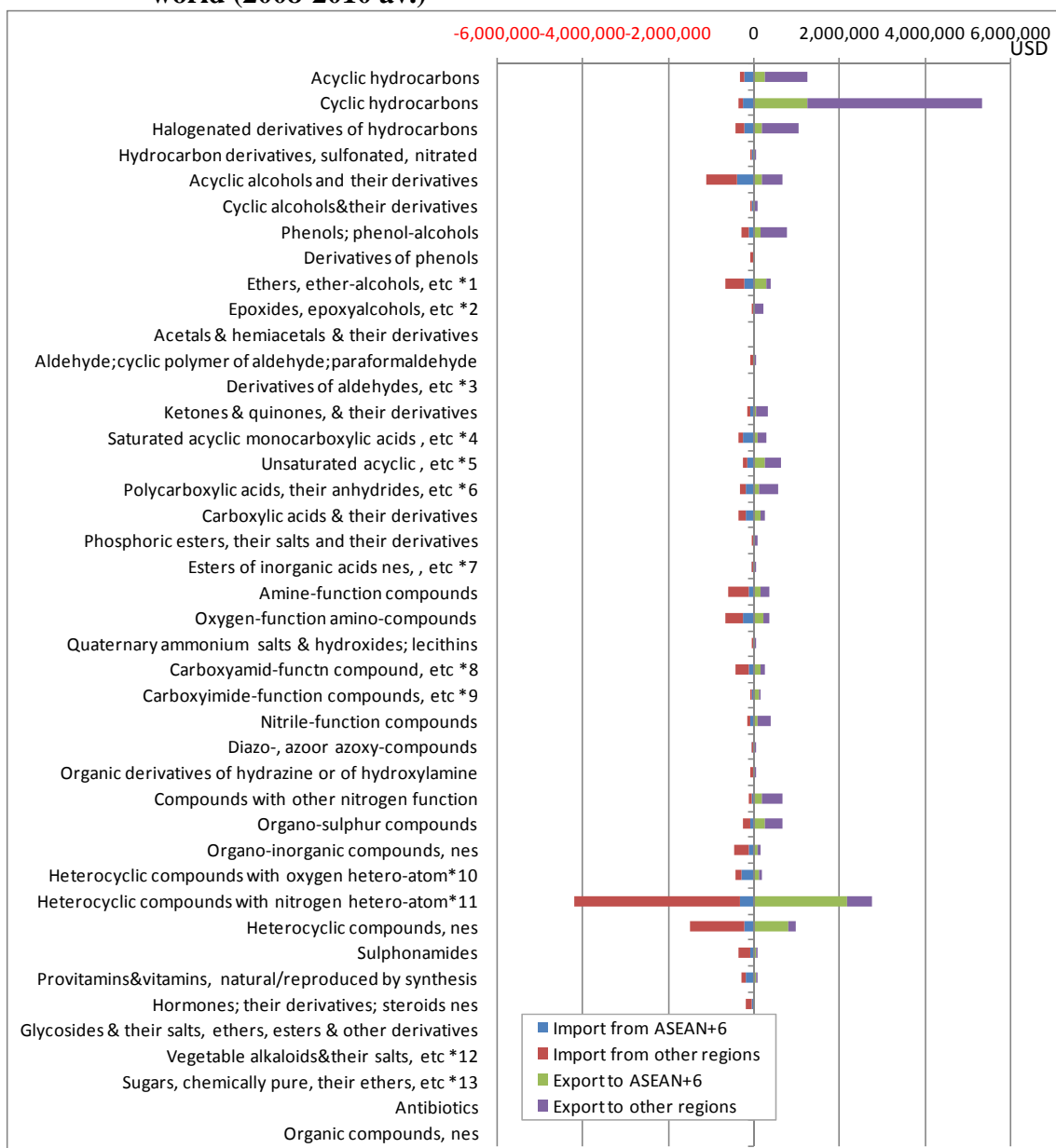
Source: UN comtrade

## 2.7. Chemical Substance Trading in Japan

### Trading of Chemical Goods

In Japan, the exported value is much higher than imported value in the field of organic chemical goods, and particularly the export of cyclic hydrocarbons is of the highest value.

**Figure 22: Value of import (negative) and export (positive) to ASEAN+6 and world (2008-2010 av.)**

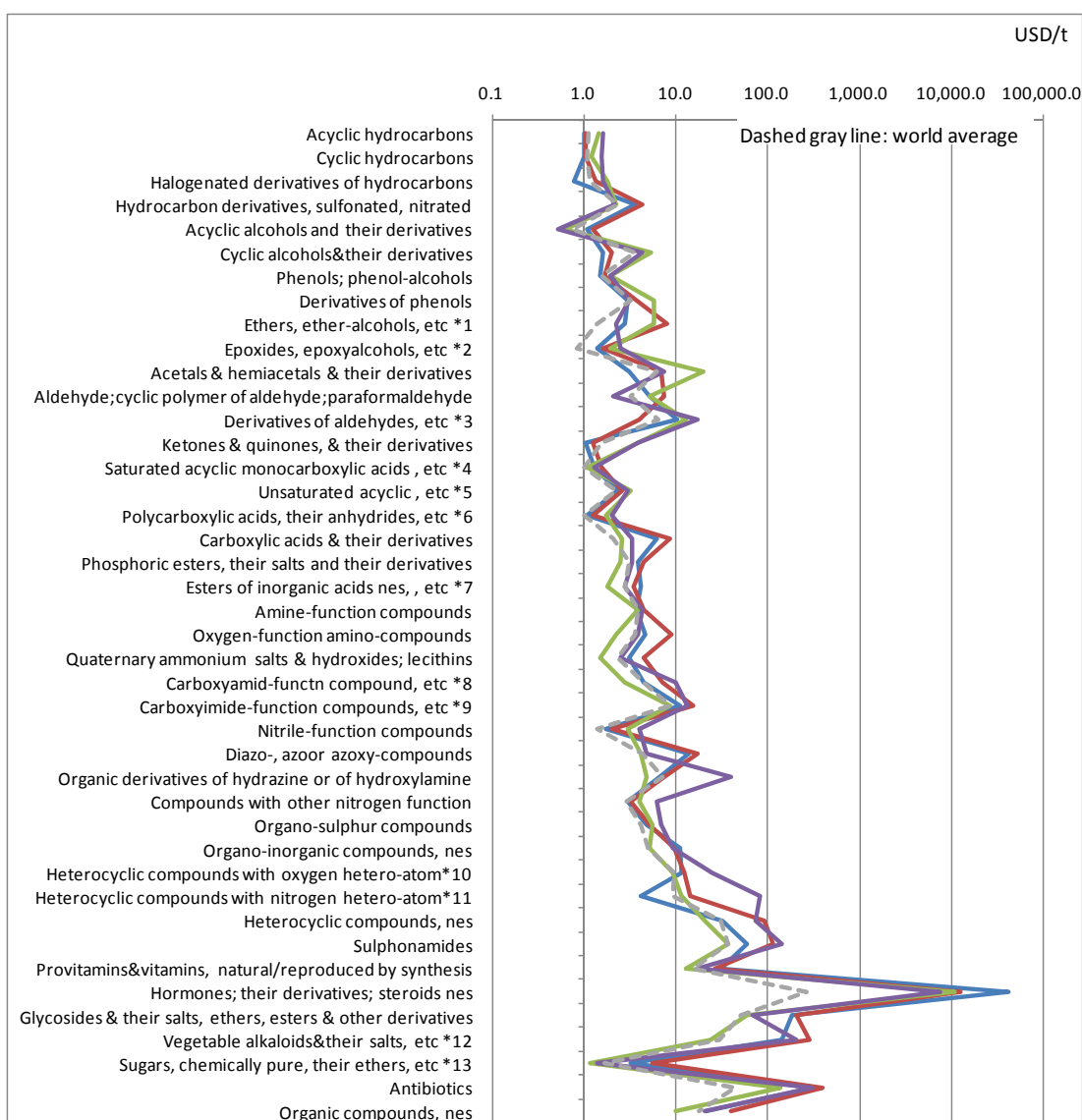


Source: UN comtrade



The difference of unit costs for importing and exporting with respect to the goods criteria is as shown in Figure 23. Although most of the items do not record large differences from the world average, the unit costs of import items as well as export items are generally higher.

**Figure 23: Unit value of Import and Export (2008-2010 average)**



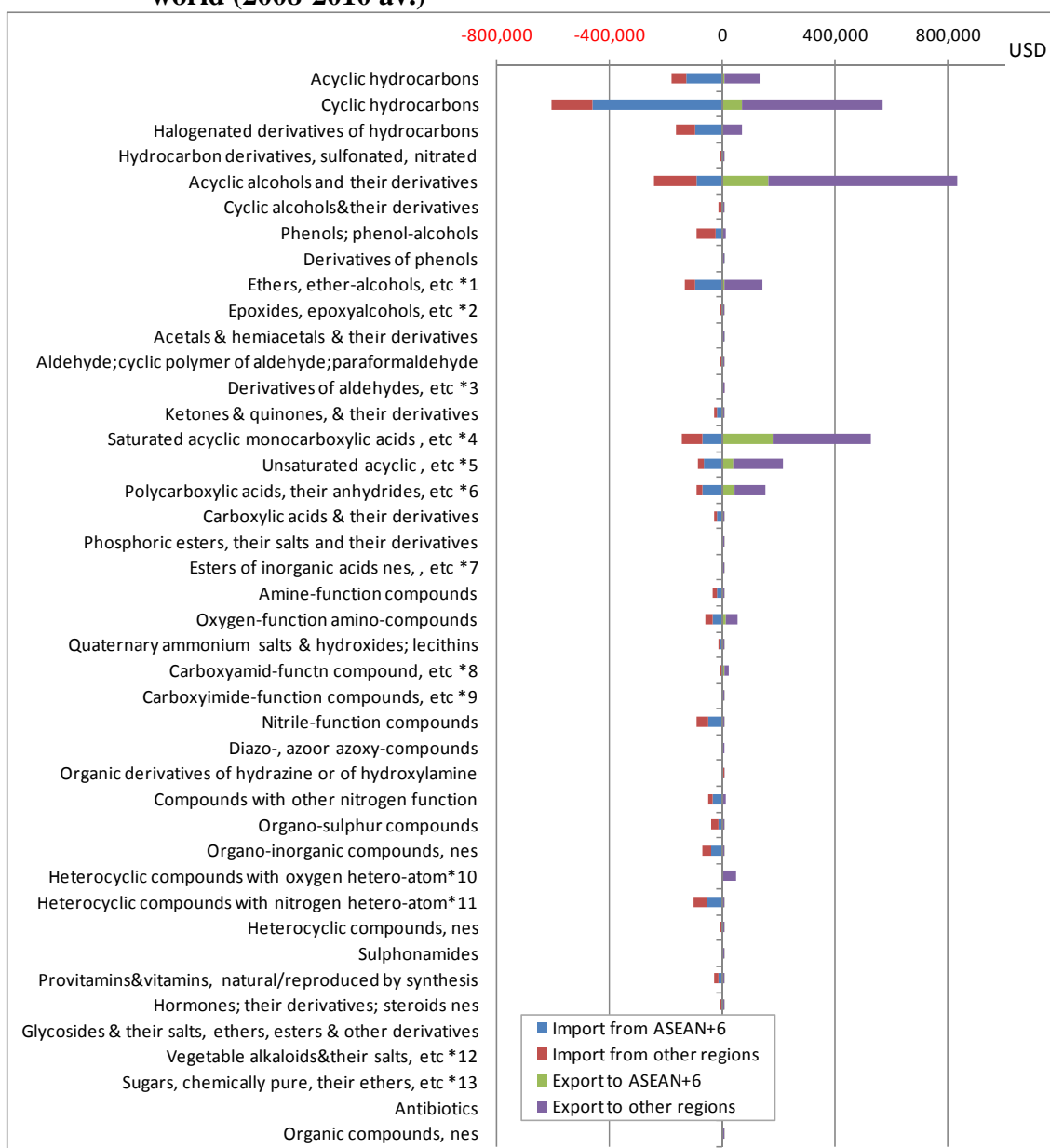
Source: UN comtrade

## 2.8. Chemical Substance Trading in Malaysia

### Trading of Chemical Goods

In Malaysia, the imported and exported value depends on the kind of chemical goods. While some organic chemicals such as “Cyclic hydrocarbons” record higher imported and exported value, there are many other chemicals with low imported and exported values.

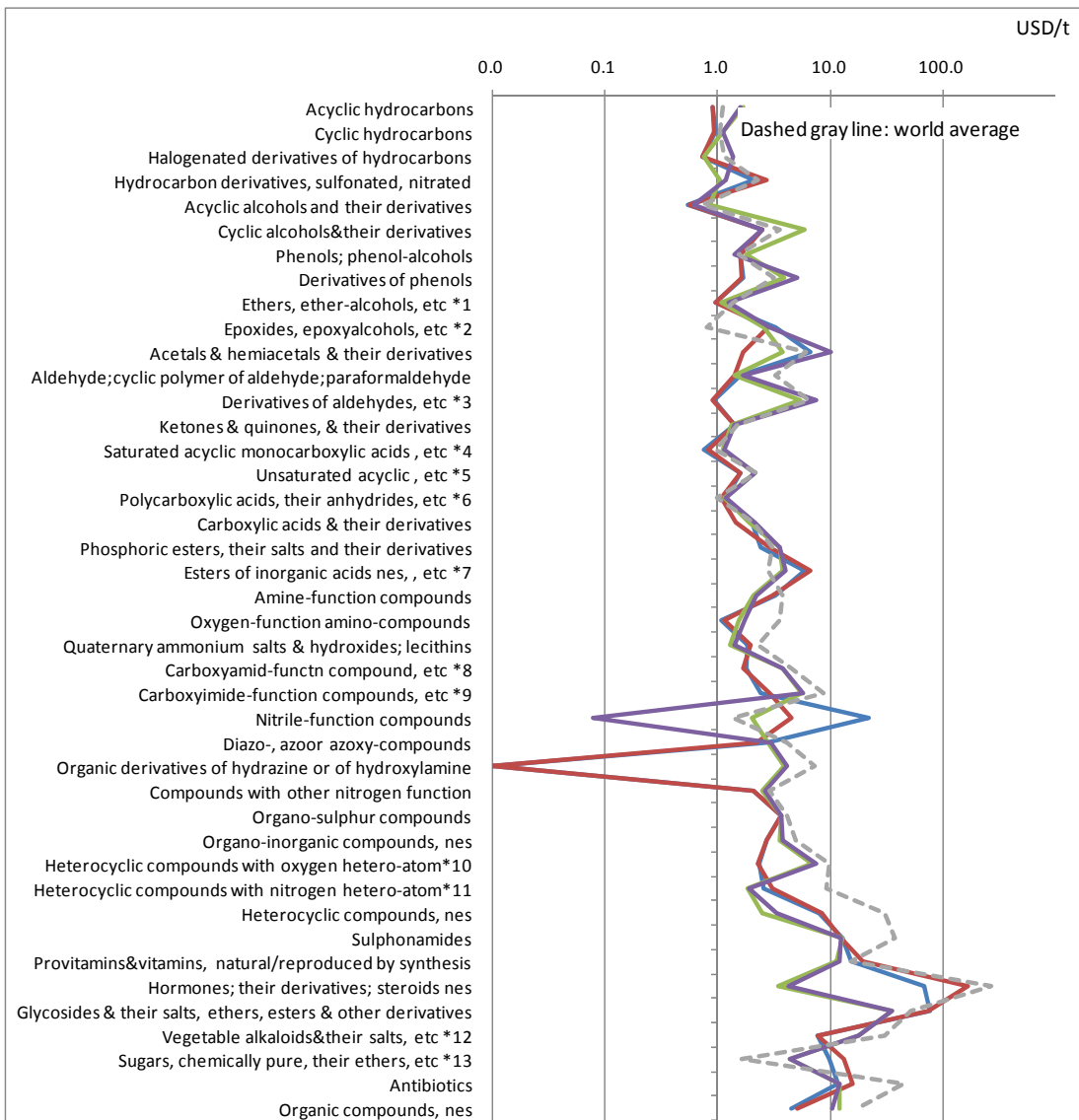
**Figure 24: Value of import (negative) and export (positive) to ASEAN+6 and world (2008-2010 av.)**



Source: UN comtrade

The difference of unit costs for importing and exporting with respect to the goods criteria is shown in Figure 25. Although some items show large differences (e.g., “Nitrile-function compounds” or “Organic derivatives of hydrazine or of hydroxylamine”), these differences are mainly because the exported volume of these items is quite small. Therefore, these differences do not necessarily reflect a difference in industrial structure.

**Figure 25: Unit value of Import and Export (2008-2010 average)**



Source: UN comtrade

## 2.9. Chemical Substance Trading in New Zealand

### Trading of Chemical Goods

In New Zealand, the imported value is generally higher than the exported value in the field of organic chemical goods, in spite of some exceptions such as “Acyclic alcohols and their derivatives.”

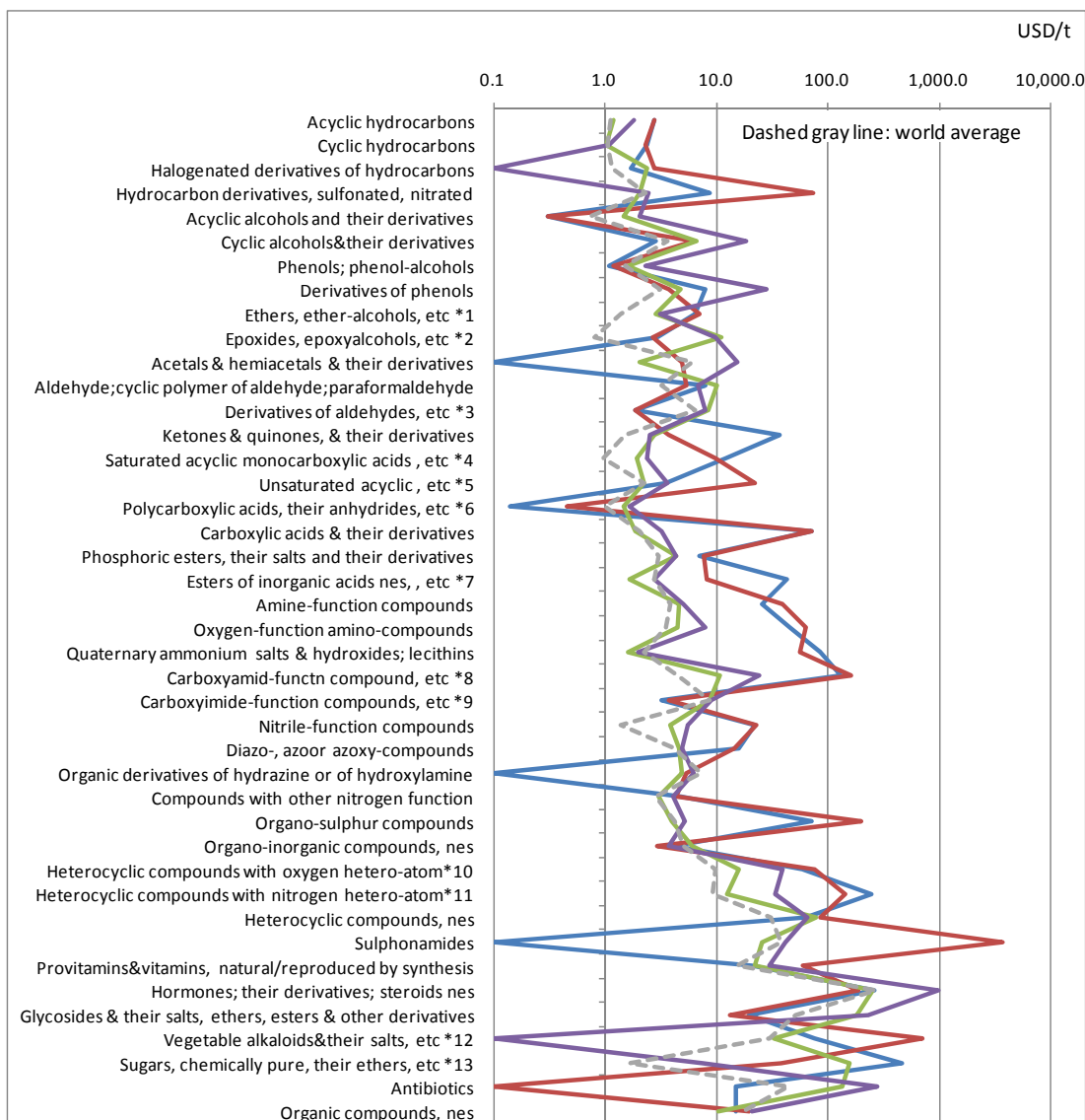
**Figure 26: Value of import (negative) and export (positive) to ASEAN+6 and world (2008-2010 av.)**



Source: UN comtrade

The difference of unit costs for importing and exporting with respect to the goods criteria is as shown in Figure 27. There are generally large differences in most of the chemical goods due to their small exported and imported volume, and unit costs of imported items are generally higher than the world average.

**Figure 27: Unit value of Import and Export (2008-2010 average)**



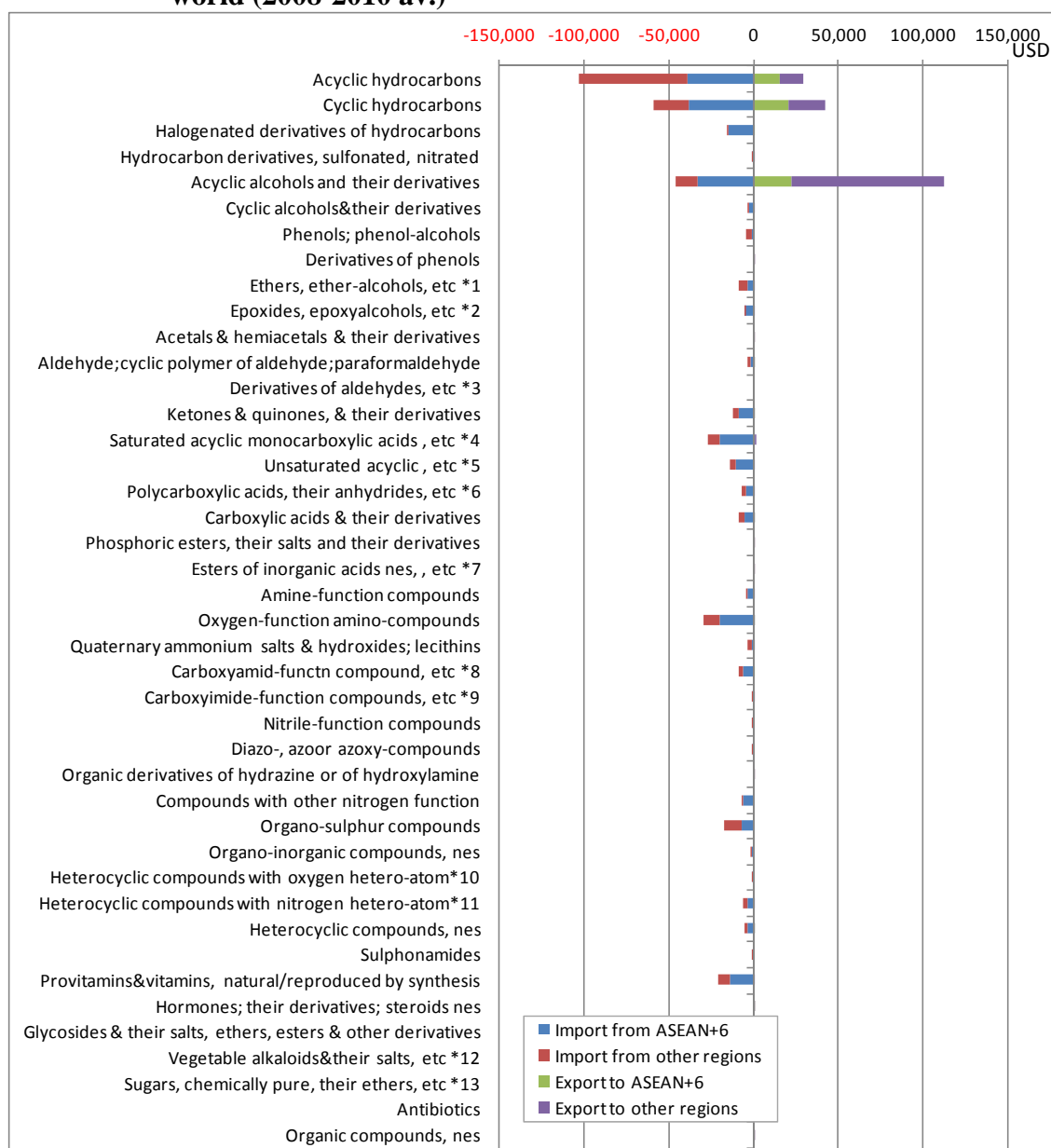
Source: UN comtrade

## 2.10. Chemical Substance Trading in the Philippines

### Trading of Chemical Goods

In the Philippines, the imported value is much higher than that of exported value in the field of organic chemical goods, although there are some exceptions (e.g., “Acyclic alcohols and their derivatives”).

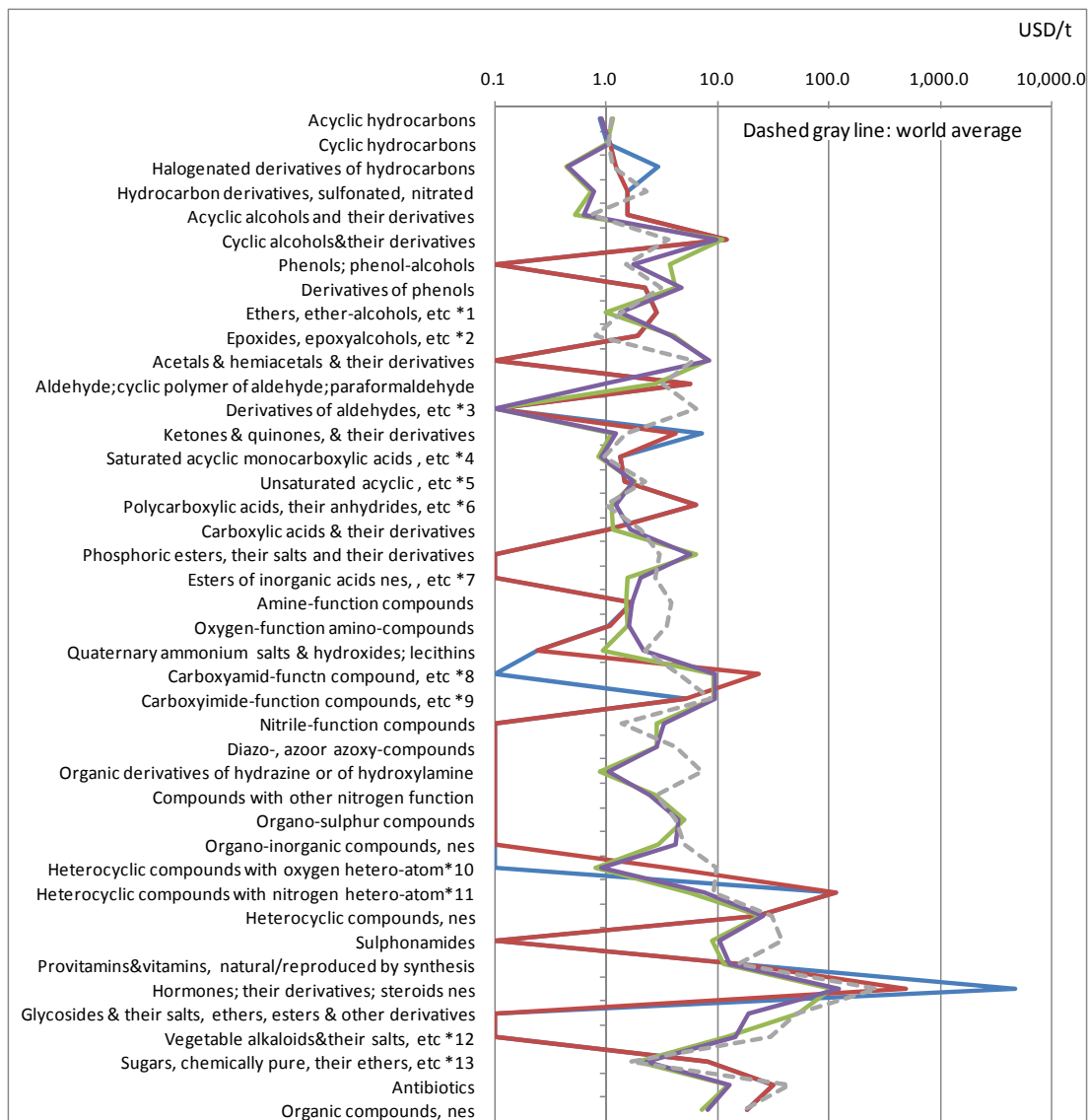
**Figure 28: Value of import (negative) and export (positive) to ASEAN+6 and world (2008-2010 av.)**



Source: UN comtrade

The difference of unit costs for importing and exporting with respect to the goods criteria is shown in Figure 29. Although some items show large differences (e.g., “Phenol; phenol-alcohols” or “Acetals and hemiacetals and their derivatives”), these differences are mainly because the imported and exported volume of these items is quite small. Therefore, these differences do not necessarily reflect differences in the industrial structure.

**Figure 29: Unit value of Import and Export (2008-2010 average)**



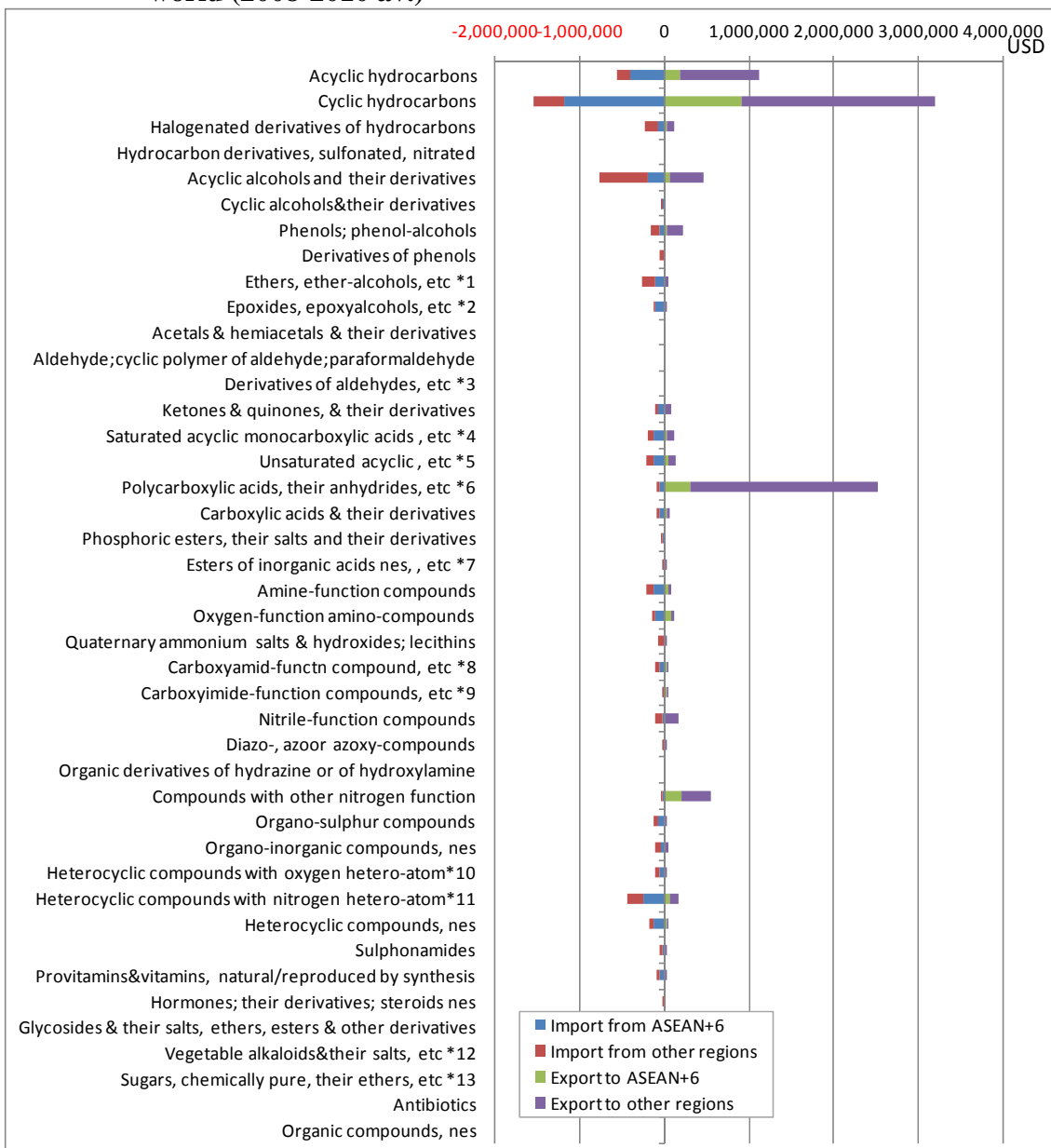
Source: UN comtrade

## 2.11. Chemical Substance Trading in the Republic of Korea

### Trading of Chemical Goods

In the Republic of Korea, the exported value is generally higher than the imported value in the field of organic chemical goods, and in particular, the export of the “Cyclic hydrocarbons” and “Polycarboxylic acids, their anhydrides, etc.” are of high value.

**Figure 30: Value of import (negative) and export (positive) to ASEAN+6 and world (2008-2010 av.)**

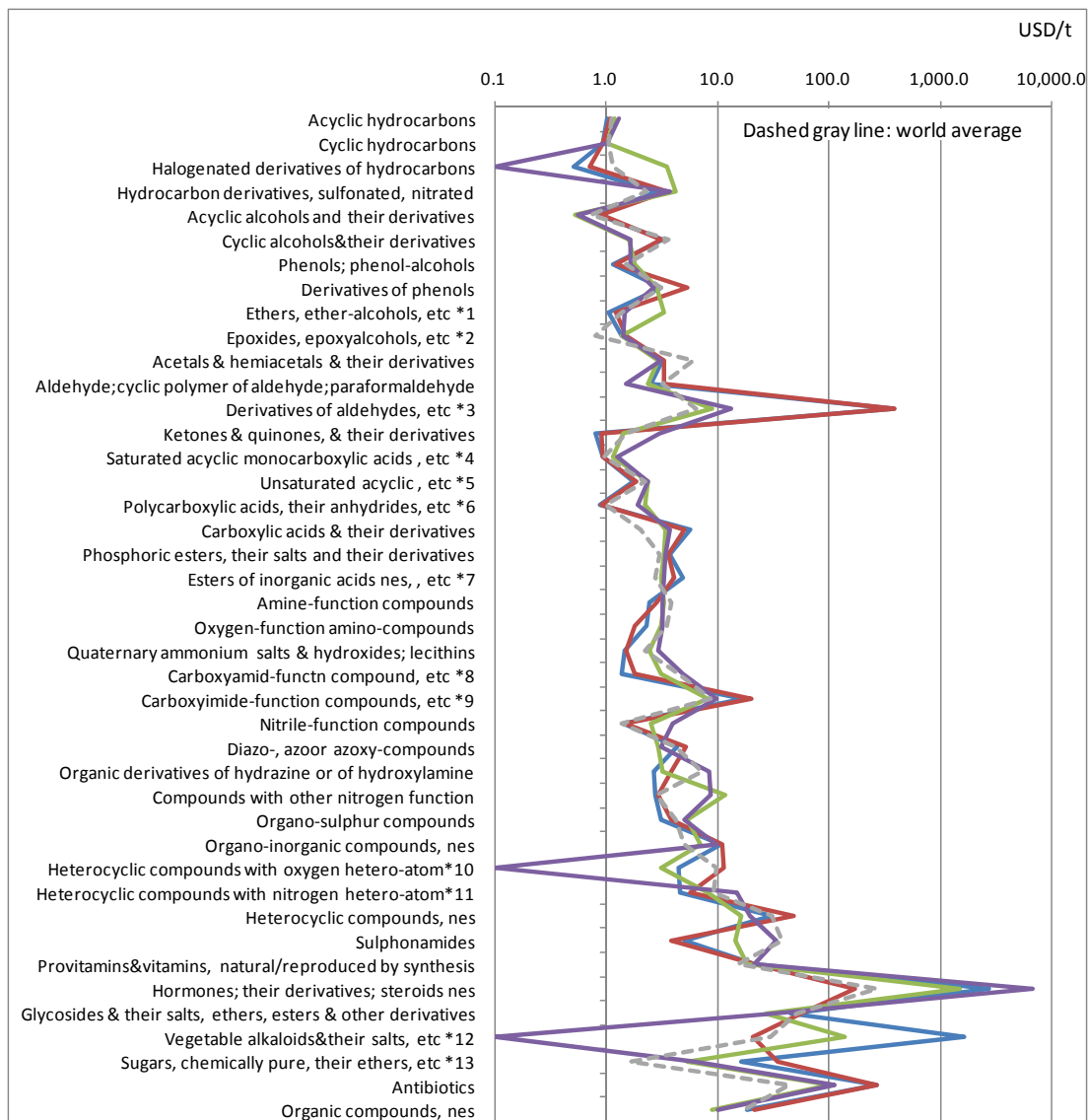


Source: UN comtrade



The difference of unit costs for importing and exporting with respect to the goods criteria is shown in Figure 31. Although some items show large differences (e.g., “Halogenated derivatives of hydrocarbons” or “Derivatives of aldehydes, etc”), these differences are mainly because the exported volume of these items is quite small. Therefore, these differences do not necessarily reflect differences in the industrial structure.

**Figure 31: Unit value of Import and Export (2008-2010 average)**



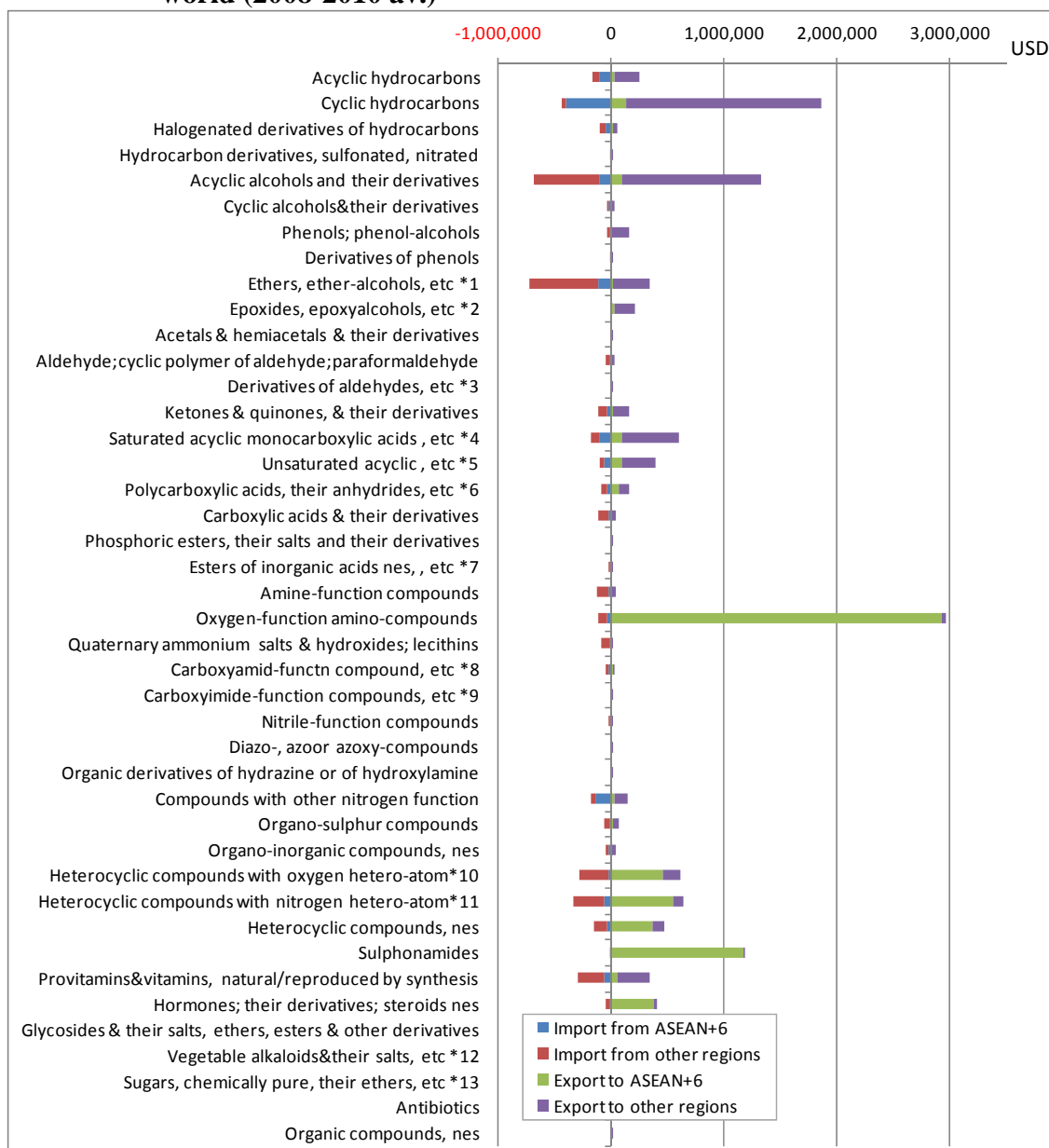
Source: UN comtrade

## 2.12. Chemical Substance Trading in Singapore

### Trading of Chemical Goods

In Singapore, the exported value is much higher than of the imported value in the field of organic chemical goods (e.g., “Oxygen-function amino-compounds” and “Cyclic hydrocarbons”).

**Figure 32: Value of import (negative) and export (positive) to ASEAN+6 and world (2008-2010 av.)**

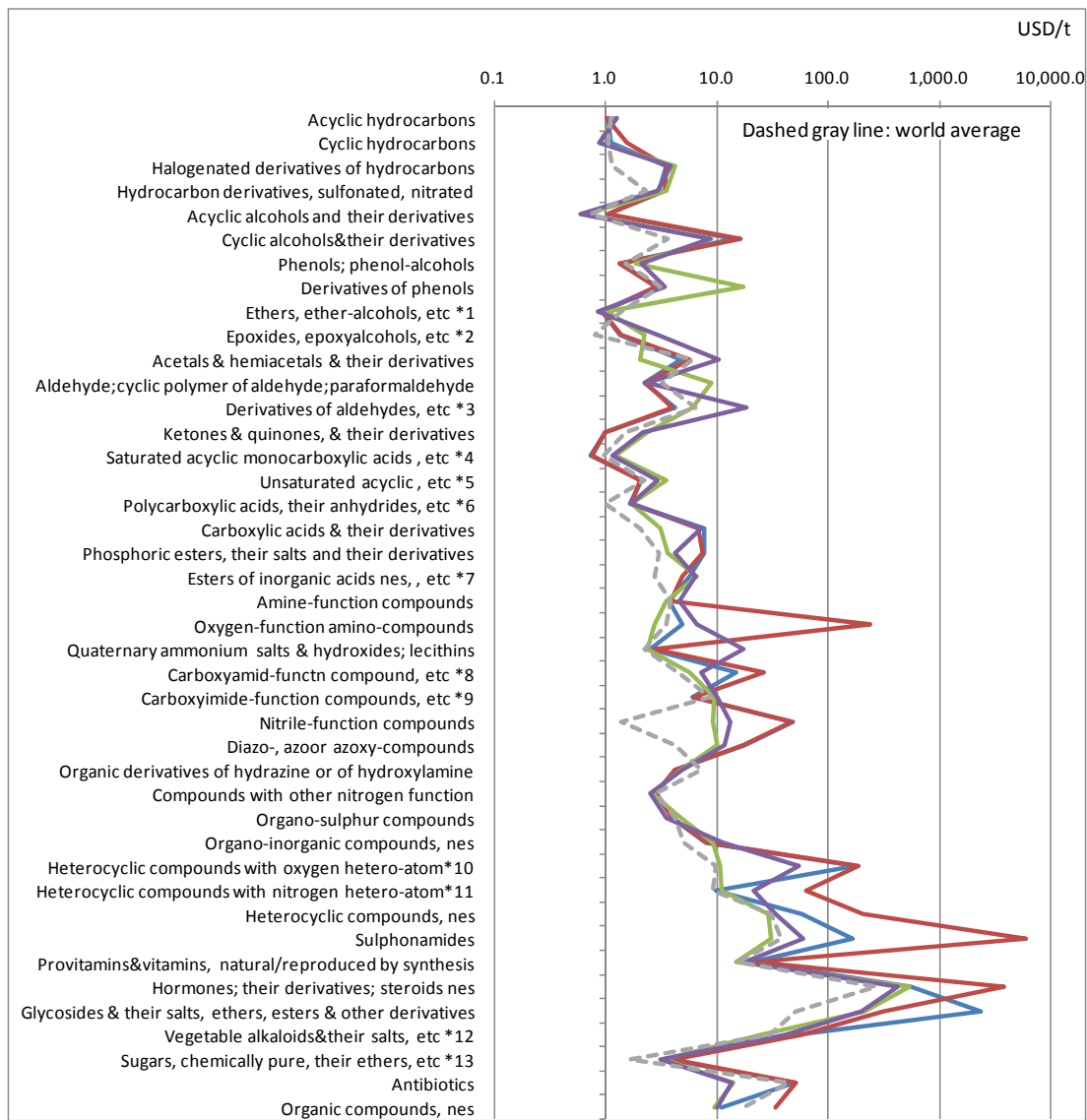


Source: UN comtrade

The difference of unit costs for importing and exporting with respect to the goods criteria is shown in

Figure 33. Although some items show large differences (e.g., “Sulphonamides” or “Hormones; their derivatives; steroids nes”), these differences are mainly because the exported volume of these items is quite small. Therefore, these differences do not necessarily reflect differences in the industrial structure.

**Figure 33: Unit value of Import and Export (2008-2010 average)**



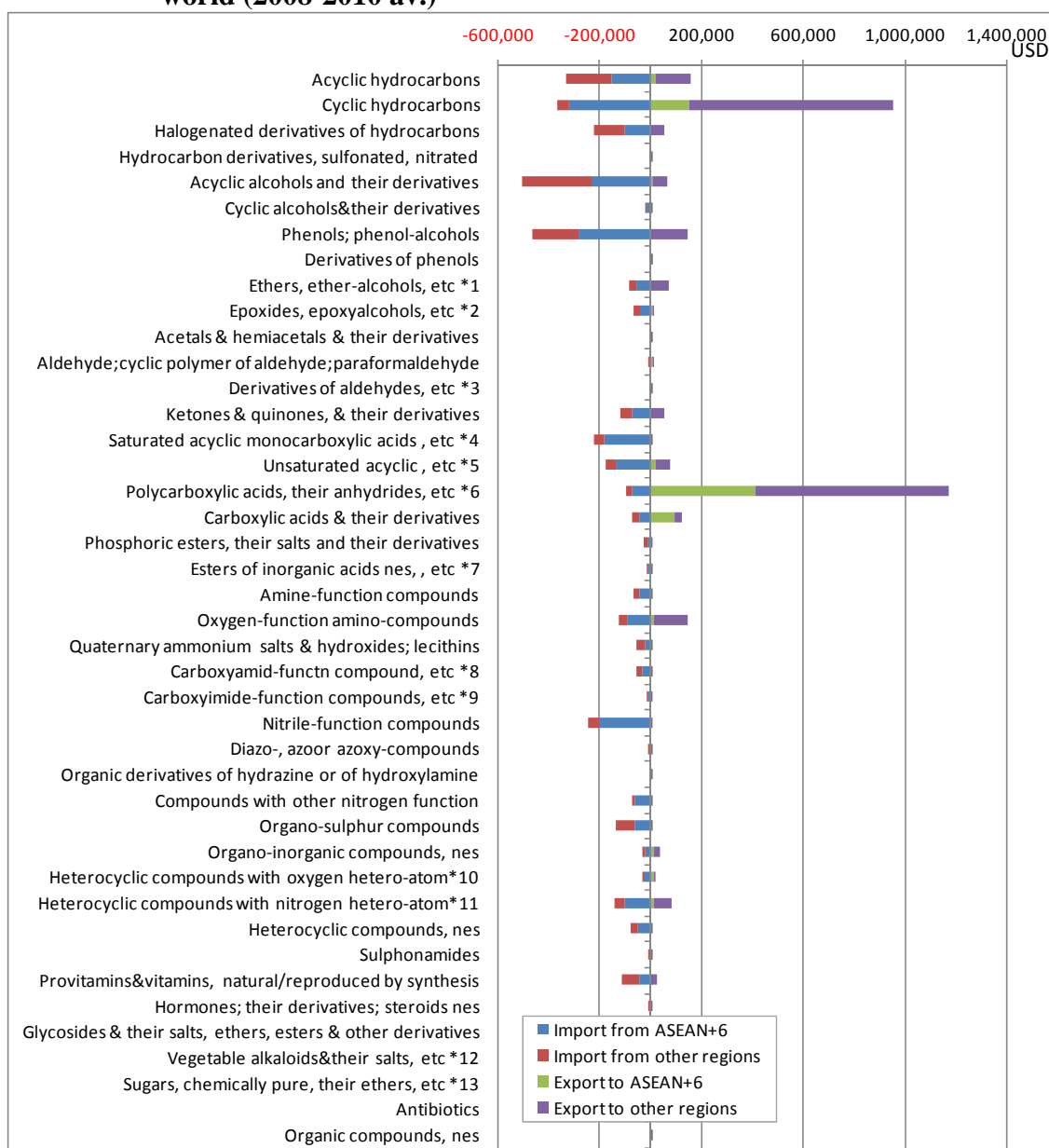
Source: UN comtrade

## 2.13. Chemical Substance Trading in Thailand

### Trading of Chemical Goods

The imported value is generally higher than the exported value in the field of organic chemical goods in Thailand, in spite of some exceptions such as “Polycarboxylic acids, their anhydrides, etc” and “Cyclic hydrocarbons.”

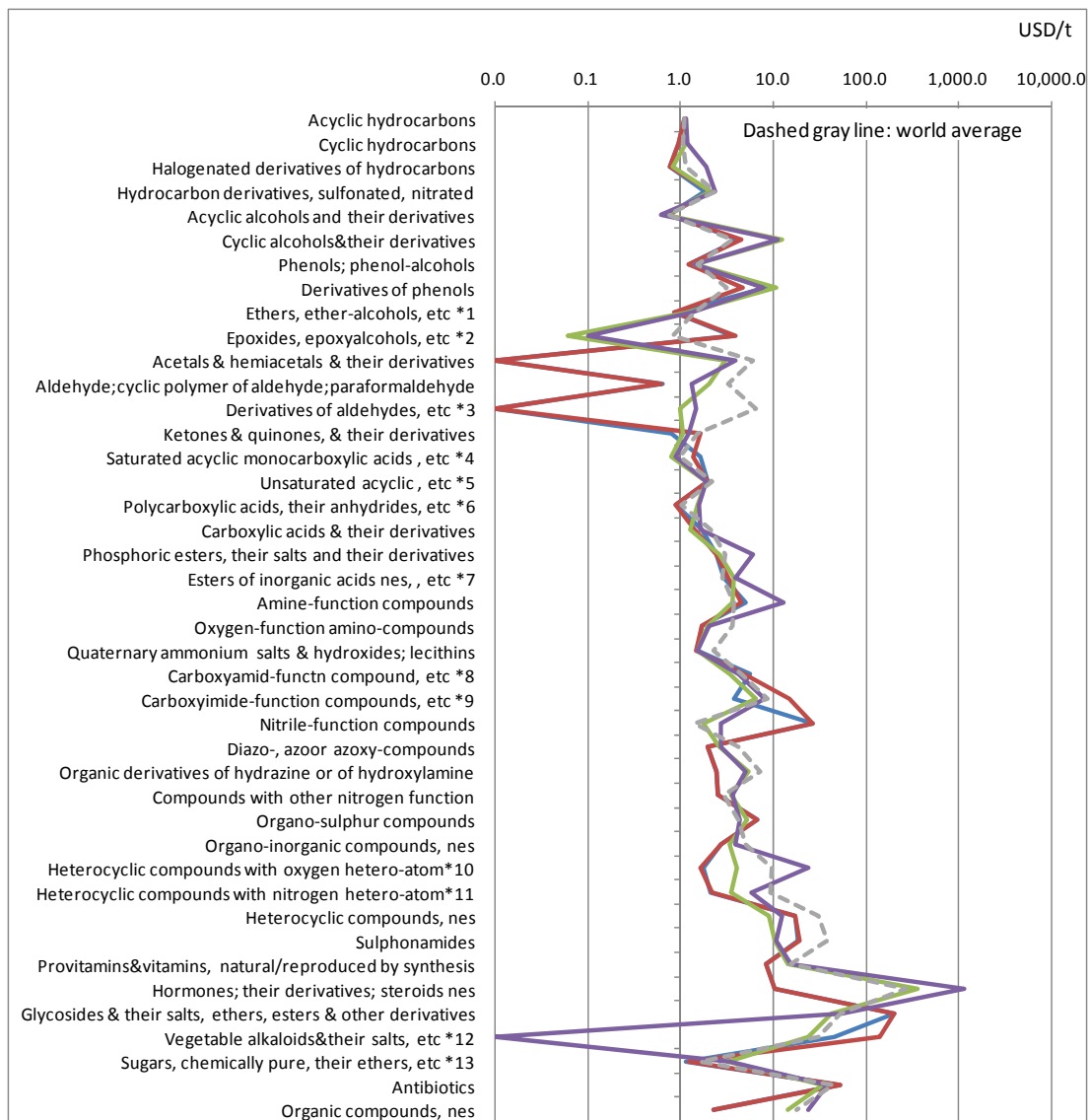
**Figure 34: Value of import (negative) and export (positive) to ASEAN+6 and world (2008-2010 av.)**



Source: UN comtrade

The difference of unit costs for importing and exporting with respect to the goods criteria is as shown in Figure 35. Although some items show large differences (e.g. “Acetals and himiacetals and their derivatives” or “Derivatives of aldehydes, etc”), these differences are mainly because the exported volume of these items is quite small. Therefore, these differences do not necessarily reflect differences in the industrial structure.

**Figure 35: Unit value of Import and Export (2008-2010 average)**



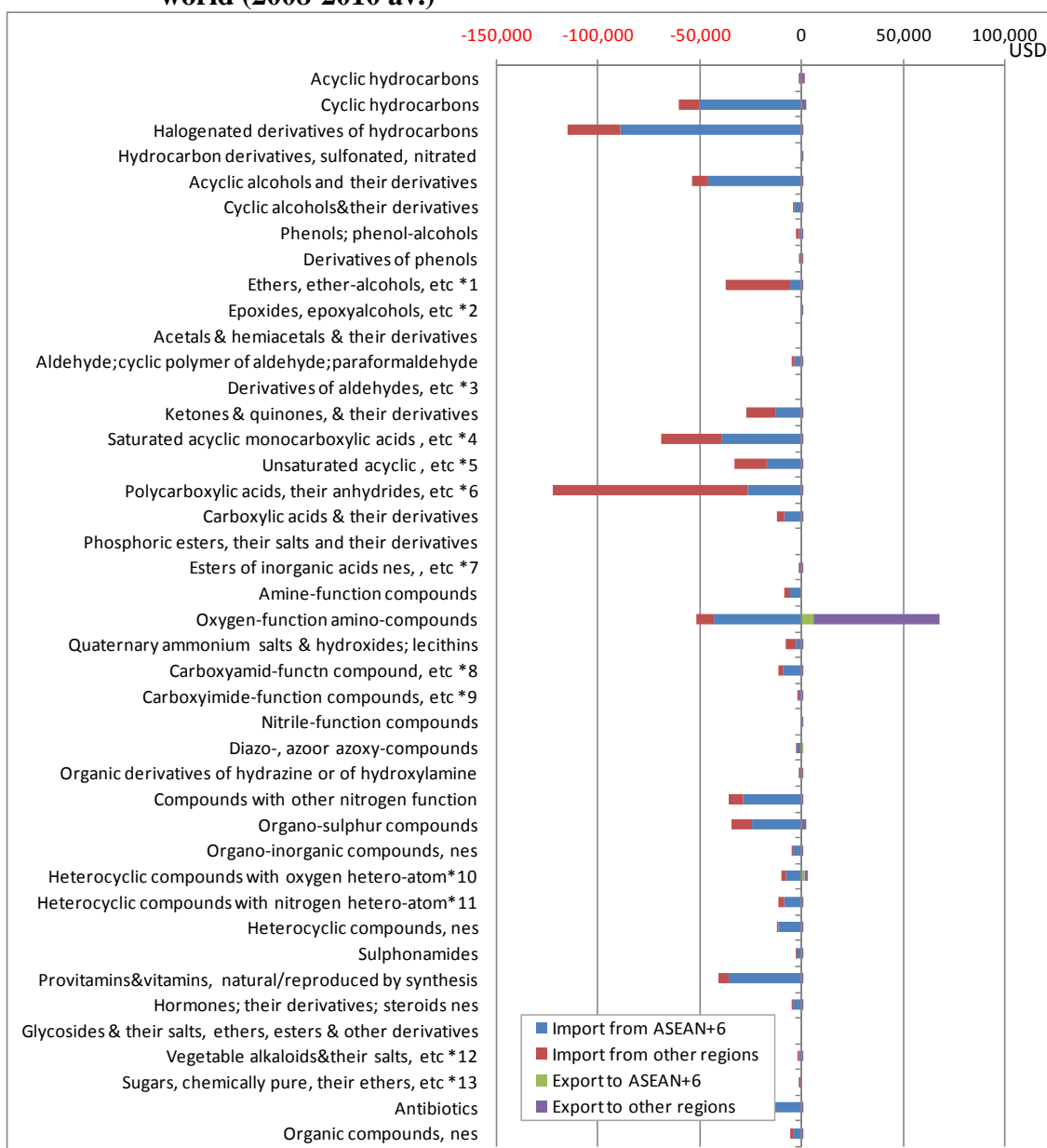
Source: UN comtrade

## 2.14. Chemical Substance Trading in Vietnam

### Trading of Chemical Goods

The imported value is much higher than that of exported value in the field of organic chemical goods in Vietnam, and especially the import of the “Polycarboxylic acids, their anhydrides, etc” and “Halogenated derivatives of hydrocarbons” are of high value.

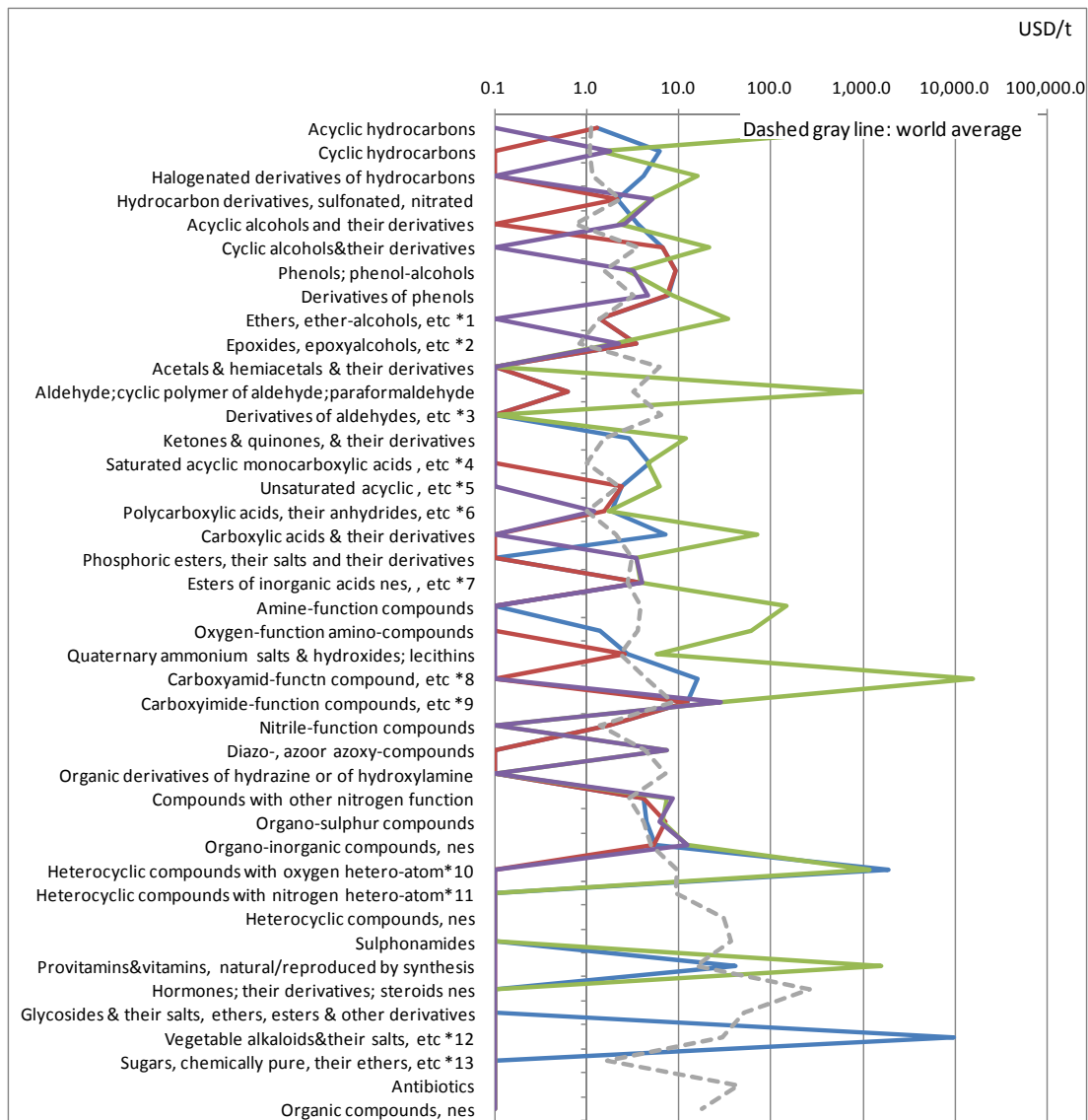
**Figure 36: Value of import (negative) and export (positive) to ASEAN+6 and world (2008-2010 av.)**



Source: UN comtrade

The difference of unit costs for importing and exporting with respect to the goods criteria is shown in Figure 37. Although most of the items show large differences, these differences are mainly because the exported volume of these items is quite small. Therefore, these differences do not necessarily reflect differences in the industrial structure.

**Figure 37: Unit value of Import and Export (2008-2010 average)**



Source: UN comtrade