Basel Convention Coordinating Centre
Stockholm Convention Regional Centre
URUGUAY

LATU

Ministerio de Vivienda
Ordenamiento Territorial
y Medio Ambiente
MVOTMA

Waste Management

Ing. María José González

Regional Training in Hazardous Waste
September 30 – October 2, 2014
San José, Costa Rica

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Tuesday, September 30	
08:30 - 09:00	Registration
09:00 - 09:30	Opening of the Workshop: a. Welcome b. Introduction and Workshop goals c. Presentation of participants
09:30 - 10:15	Consequences of a poor waste management Definition of waste and types of waste, hazardous waste, classification
10:15 - 10:45	Coffee Break
10:20 –13:00	Waste management principles (hierarchy, cleaner production, extended producer/importer responsibility, etc.) International Conventions
13:00 - 14:30	Lunch
14:30 - 15:30	Situation in each country – 1
15:30-16:00	Coffee Break
16:00-16:30	Situation in each country – 2
16:30-17:00	Survey results
Wednesday, October 1	
09:00 – 12:30	Visit to a lead-acid battery recycling plant
13:00 - 14:30	Lunch
14:30 - 15:30	Waste treatment
15:30 –16:00	Coffee Break
16:00-16:30	Sanitary and secure landfills
16:30-17:00	Remediation of contaminated sites
Thursday, October 2, 2014	
08:00–10:30	Medical waste, expired drugs, tires, used oils, solvents, PCBs – Polychlorinated biphenyls, pesticides and pesticide containers
10:30–11:00	Coffee Break
11:00-13:00	WEEE (scrap metal, cells and batteries, monitors, PCs, energy-saving lamps, white goods, brown goods)
13:00–14:00	Lunch

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention


Urban waste: 0.75 and 1.14 kg/inhab/day in LAC
Domestic waste: 0.45 and 0.74 kg/inhab/day in Latin America and the Caribbean
http://www6.iadb.org/Residuos/bienvenida/Inicio.bid


Stockholm Convention


BOMAG
512

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

TROS

CENTRES

Stockholm Convention

Stockholm Convention

NTROS
la
Caribe
colmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Basel Convention
Latin America & the Caribbean
Stockholm Convention

Why should we do something about waste?

ENVIRONMENTAL

- Increase in the lifespan of landfills
- Control of pollution and reduction of the use of natural resources

SOCIAL

- Potential for job creation and generating income
- NIMBY effect

ECONOMIC

- Reduction of costs with public services, such as servicing contaminated areas with garbage collectors, collection and public health problems
- Economy of energy and raw materials

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Origin

- The generation of waste is associated with the existence of man and human activities.
- Initially, generated waste was easily assimilated by the environment.
- Waste generation is growing and its composition is increasingly complex.

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

DIFFERENT TERMS TO MEAN THE SAME THING

WASTE
GARBAGE
REFUSE
SCRAP

¿How is it defined?

Subjective concept that generates uncertainties, that is why express text is included in regulations

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

According to the Basel Convention

Any substance or object which the holder discards or intends or is required to discard

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

TYPES OF WASTE – by origin

- ✓ Domestic and urban solid waste
- ✓ Industrial solid waste
- ✓ Medical solid waste
- ✓ Civil works solid waste
- ✓ Special solid waste

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

TYPES OF WASTE – by potential effects

- ✓ Hazardous waste: due to its nature, it may have adverse effects on human health and the environment.
- ✓ Non-reactive hazardous waste: it has undergone treatment, whereby it has lost its hazardous nature.
- ✓ Inert waste: it does not undergo any significant physical, chemical or biological transformation.
- ✓ Non-hazardous waste: it does not belong to any of the above (domestic, catering, etc.).

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Hazardous wastes

They may cause damage to health or the environment for being inherently hazardous when exhibiting any of the following characteristics:

Corrosive

Reactive

Explosive

Toxic

Flammable

Biological-Infectious / Ecotoxic

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

How do we know if waste is hazardous?

- It is included in specific lists.
- It is included in lists of waste generated in specific processes.
- It exhibits any of the hazardous characteristics (CRETIB) – exceeds limits of standardized tests.
- It contains substances defined as hazardous.

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Definitions – Basel Convention

Hazardous wastes:

- Wastes that belong to any category contained in Annex I, unless they do not possess any of the characteristics contained in Annex III.
- Wastes that are not covered under the above paragraph but are defined as, or are considered to be, hazardous wastes by the domestic legislation of the Party of export, import or transit.

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Basel Convention – Annex I

Annex I presents:

- 18 types of streams or processes that generate hazardous wastes (Y1–Y18).
- 27 elements or compounds that when present as constituents in waste define it as hazardous (Y19–Y45).

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

ANNEX I

CATEGORIES OF WASTES TO BE CONTROLLED

WASTE STREAMS

Y1	Clinical wastes from medical care in hospitals, medical centers and clinics
Y2	Wastes from the production and preparation of pharmaceutical products
Y3	Waste pharmaceuticals, drugs and medicines
Y4	Wastes from the production, formulation and use of biocides and phytopharmaceuticals
Y5	Wastes from the manufacture, formulation and use of wood preserving chemicals
Y6	Wastes from the production, formulation and use of organic solvents
Y7	Wastes from heat treatment and tempering operations containing cyanides
Y8	Waste mineral oils unfit for their originally intended use
Y9	Waste oils/water, hydrocarbons/water mixtures, emulsions
Y10	Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs)
Y11	Waste tarry residues arising from refining, distillation and any pyrolytic treatment
Y12	Wastes from production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish
Y13	Wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives

WASTES HAVING AS CONSTITUENTS:

Y19	Metal carbonyls
Y20	Beryllium; beryllium compounds
Y21	Hexavalent chromium compounds
Y22	Copper compounds
Y23	Zinc compounds
Y24	Arsenic; arsenic compounds
Y25	Selenium; selenium compounds
Y26	Cadmium; cadmium compounds
Y27	Antimony; antimony compounds
Y28	Tellurium; tellurium compounds
Y29	Mercury; mercury compounds
Y30	Thallium; thallium compounds
Y31	Lead; lead compounds
Y32	Inorganic fluorine compounds excluding calcium fluoride
Y33	Inorganic cyanides
Y34	Acidic solutions or acids in solid form
Y35	Basic solutions or bases in solid form
Y36	Asbestos (dust and fibres)
Y37	Organic phosphorus compounds

Basel Convention – Annex III

It defines the hazardous characteristics

H1	Explosive
H3	Flammable liquids
H4-1	Flammable solids
H4-2	Substances or wastes liable to spontaneous combustion
H4-3	Substances or wastes which, in contact with water emit flammable gases
H5-1	Oxidizing
H5-2	Organic peroxides
H 6-1	Poisonous (Acute)
H 6-2	Infectious substances
H8	Corrosives
H10	Liberation of toxic gases in contact with air or water
H11	Toxic (Delayed or chronic)
H12	Ecotoxic
H13	Capable, by any means, after disposal, of yielding another material, e.g., leachate, which possesses any of the characteristics listed above

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Basel Convention – Annex VIII and IX

To facilitate the identification of hazardous wastes, new annexes were added (1998).

- Annex VIII (List A): wastes characterized as hazardous.
- Annex IX (List B): wastes that are not considered hazardous.
- BUT: Annex III can be used to demonstrate that a waste is not hazardous, and vice versa with Annex IX.

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Concept of risk

Risk is associated with the exposure to hazard

Probability that the direct EXPOSURE to hazardous wastes, or to the contamination they generate, causes adverse effects or damage to:

- Human health
- Ecosystem
- Environmental compartments
- Goods

RISK = f (hazard, exposure)

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Concept of risk

HAZARD is inherent to waste and can only be changed by treating it; RISK can be managed in order to minimize it

EXPOSURE	Direct and Indirect
HAZARD POTENTIAL	Any of the hazardous characteristics

HAZARD analysis + EXPOSURE analysis enable a RISK ASSESSMENT

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Sustainable Waste Management

Human activity → **Solid waste**

But

Common attitudes:

- NIMBY: Not in my back yard
- NIMET: Not in my elected term
- BANANA: Build Absolutely Nothing Anytime, Near Anybody
- CATNAP: Cheapest Available Technology Narrowly Avoiding Prosecution

Response

Sustainable Waste Management: environmentally efficient, economically affordable and socially acceptable

Strategy

1. Reduce the amount of waste generated
2. Develop Integrated Waste Management Systems to manage waste inevitably generated

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Minimization

Minimization affects waste volume, but also its nature

- First option to consider, the most desirable
- Reduces treatment systems
- Reduces wastes and inefficiencies
- Saves resources

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Integrated Waste Management

INTEGRATED WASTE MANAGEMENT:

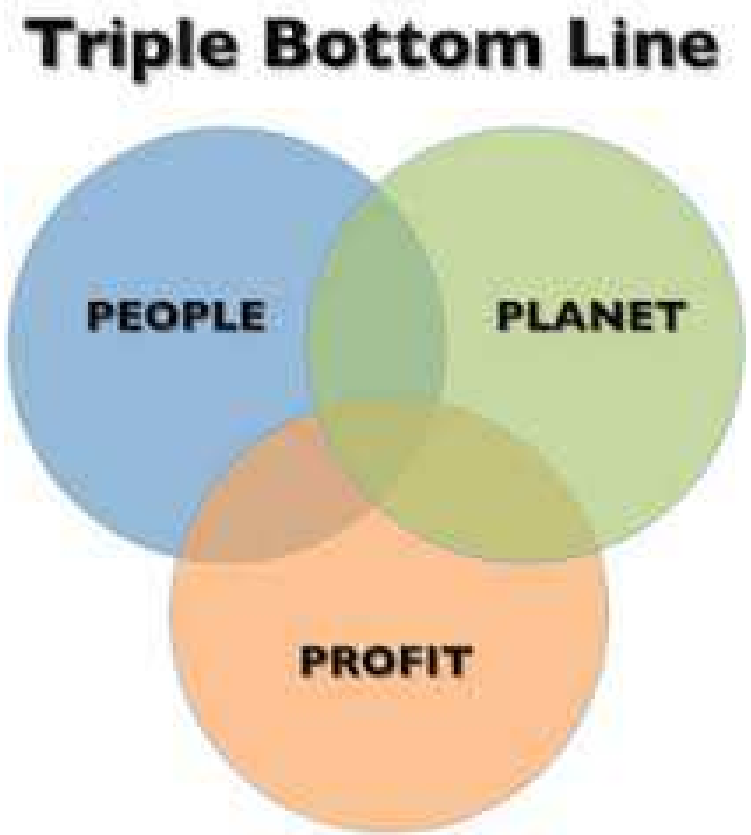
Integrated waste management systems combine waste streams with collection, treatment and final disposal methods, with the objective of achieving environmental benefits, economic optimization and society's acceptance. This will lead to a practical waste management system for any specific region.

The key features are:

1. Overall approach (all actors involved)
2. Use of a range of collection and treatment methods
3. Management of all materials in the waste stream
4. Environmentally effective
5. Economically affordable
6. Socially acceptable

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Three pillars are required for it to be sustainable, if one is missing…



Principle of Hierarchy

This principle was established in Agenda 21, and was later reintroduced and developed in different laws and regulations, being one of the most universally applied principles in waste management. It establishes the following order of preference for managing waste:

It states that the possibilities of the previous operation should be exhausted before moving to the next one.

This principle is criticized and a holistic approach is suggested based on the concept of INTEGRATED WASTE MANAGEMENT AND LIFE CYCLE.

Principle of Extended Producer Responsibility

Principle of Extended Producer/Importer Responsibility for the final management of products.

- It transfers to producers or importers of certain products the responsibility for collecting, recycling, recovering, treating or disposing of their post-consumer products.
- It applies for certain mass consumer products.
- They are also responsible for financing these activities.

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Principle of Extended Producer Responsibility

Principle of Extended Producer/Importer Responsibility for the final management of products.

- The Polluter Pays principle is applied.
- The waste generator (CONSUMER) is the one who finally pays for the service, not for a fee but in the price of the product.
- But the generator does not assume responsibility for management, the producer or importer does. The roles of payment responsibility and operational responsibility are separated.
- This method is fairer than a municipal charge, since only those who consume pay, not the whole population.

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

LIFE CYCLE ANALYSIS

LIFE CYCLE ASSESSMENT:

Definition: compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle.

(ISO 14040: Environmental Management 1997 – Life Cycle Assessment – Principles and Framework)

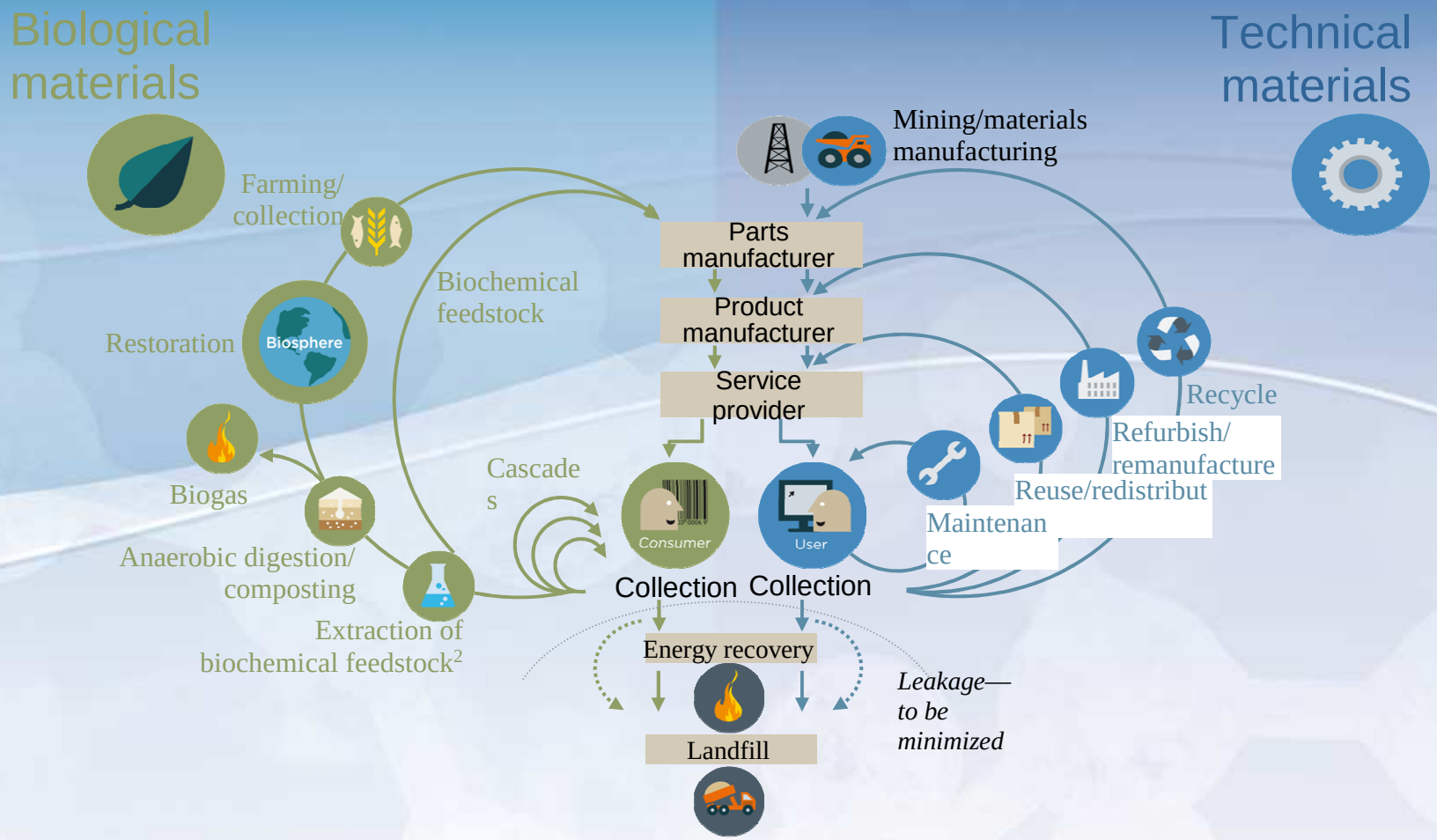
It is an environmental management tool used to understand how a product or service is provided "from cradle to grave".

While it may seem an ideal environmental tool, it has its weaknesses, since it does not consider actual impacts, i.e. when, where and how they are released into the environment. To take this into account, additional elements must be used.

LIFE CYCLE OF SOLID WASTE: to predict, as accurately as possible, the environmental burdens of an Integrated Waste Management system.

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

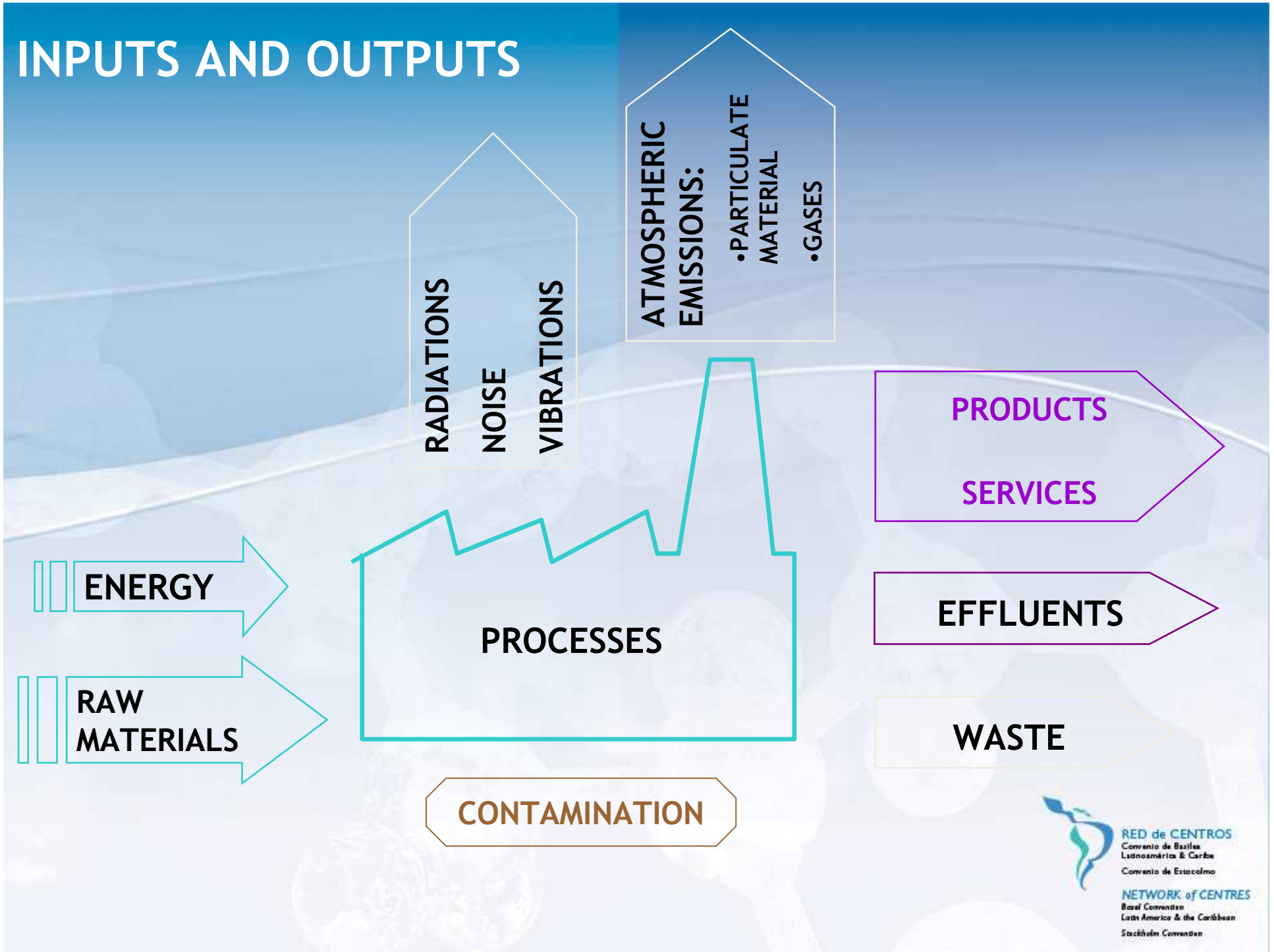
CIRCULAR ECONOMY



Re-thinking Progress:
https://www.youtube.com/watch?v=bJ64sVJfumI

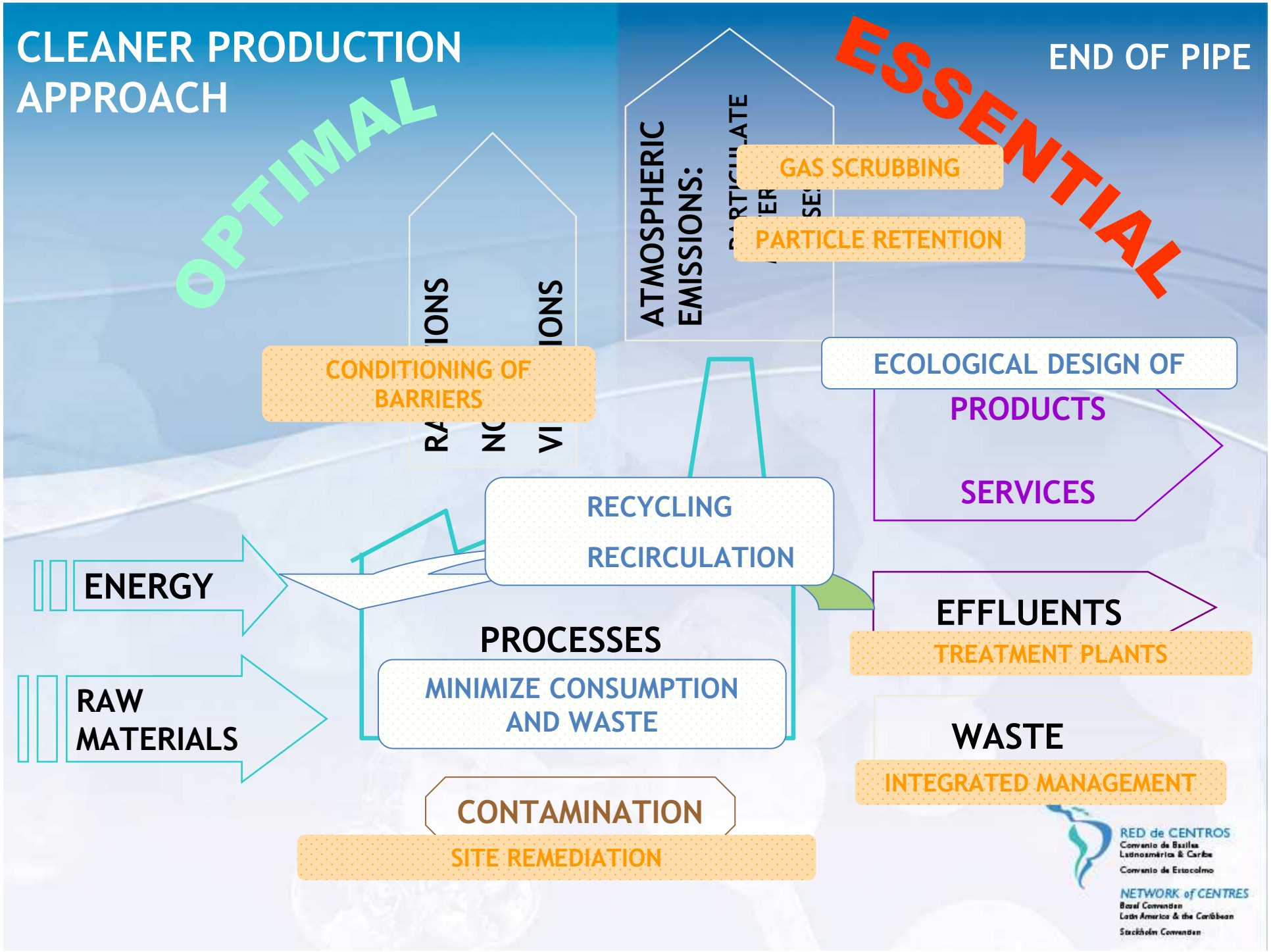
RED de CENTROS
Convenio de Basilea Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention Latin America & the Caribbean
Stockholm Convention

INPUTS AND OUTPUTS



RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention


CLEANER PRODUCTION APPROACH
OPTIMAL
END OF PIPE
ESSENTIAL
ATMOSPHERIC EMISSIONS:
GAS SCRUBBING
PARTICLE RETENTION
CONDITIONING OF BARRIERS
ECOLOGICAL DESIGN OF
PRODUCTS
SERVICES
RECYCLING
RECIRCULATION
ENERGY
RAW MATERIALS
PROCESSES
MINIMIZE CONSUMPTION AND WASTE
EFFLUENTS
TREATMENT PLANTS
WASTE
INTEGRATED MANAGEMENT
CONTAMINATION
SITE REMEDIATION
RED de CENTROS
Convenio de Basilea Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention Latin America & the Caribbean
Stockholm Convention

-END OF PIPE-
CONVENTIONAL APPROACH

1. The emission is generated!
2. How to treat it?
3. Where to carry it?

Environmental costs

Energy

Raw materials

Water

PRODUCTIVE PROCESS

Solid waste

Liquid effluents

Atmospheric emissions

Treatment

-Waste

-Effluents

-Emissions

Final disposal to the environment

Acting

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

CLEANER PRODUCTION APPROACH

Waste/Effluent/Emission is generated!

Why?

Where?

How?

When?

How much?

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

CLEANER PRODUCTION

Cleaner Production (adopted by UNEP) – preventive approach to environmental management.

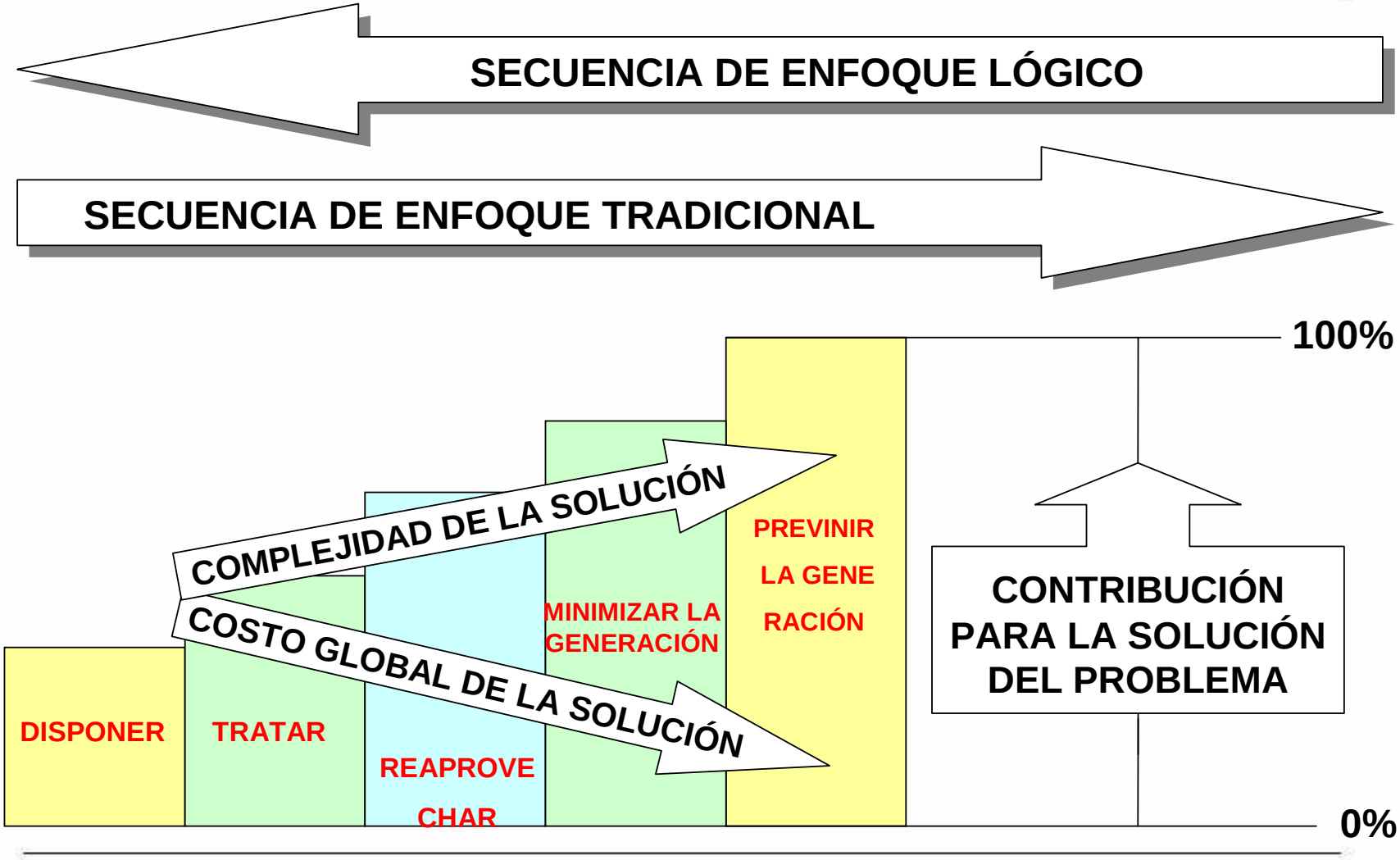
It refers to how goods and services are produced or provided with a minimal environmental impact, considering current technologies and financial limits.

It is a "win-win" strategy, since it favors the environment, workers and consumers, while improving company efficiency, profitability and competitiveness.

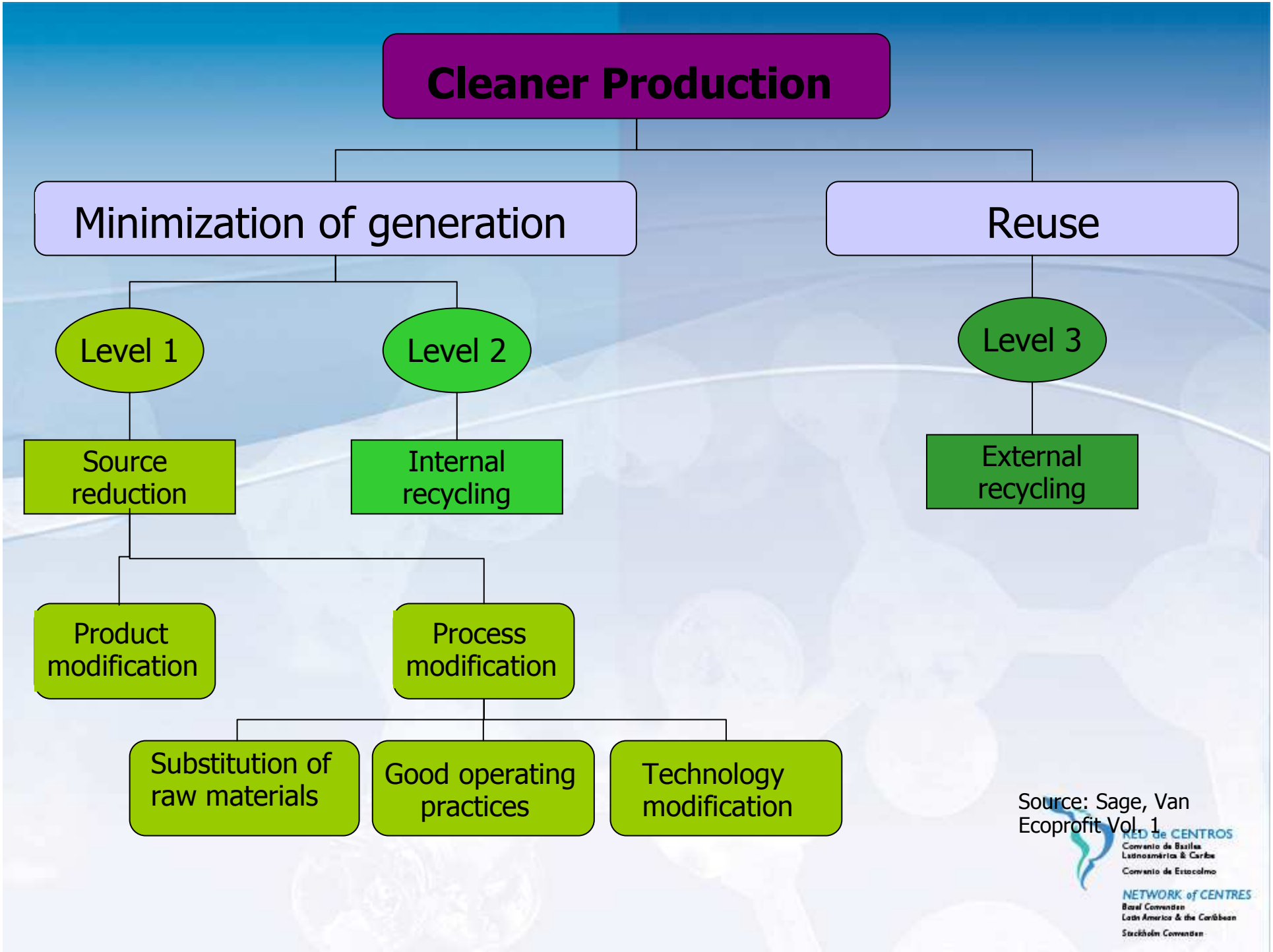
RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

CAMBIO DE ENFOQUE

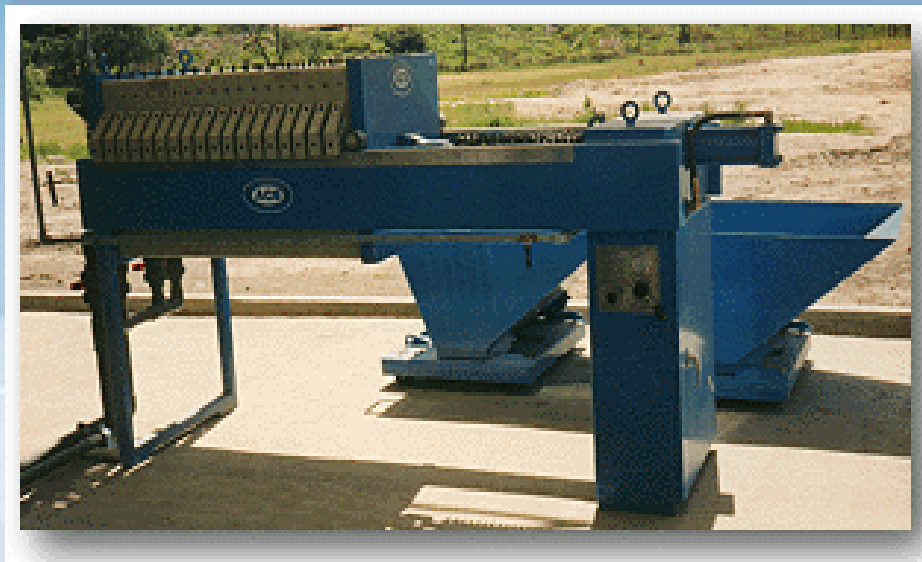


Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention



Source: Sage, Van Ecoprofit Vol. 1

Chemical Industry



By encouraging technological innovation, with a process change, the following environmental benefits were achieved:

- Reduction of the effluent load to be treated.
- Reduction of the amount of hazardous waste (SLUDGE) to be stored in the Warehouse.
- Better use of raw materials.

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Unused raw materials – Work with suppliers and delivery of raw materials

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Inevitable and unwanted waste

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

Auxiliary materials – other waste from all sectors / well-defined processes

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

CLEANER PRODUCTION METHODOLOGY

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo

NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

URUGUAY

Law 17.283/00 – General Law on Environmental Protection

Law 16.221 and 17.220/99 and Decrees – Accession to the Basel Convention

Decree 586/009 – Medical Waste (regulated since 1999)

Law 16.466/94 – Law on Environmental Impact Assessment

Decree 373/03 – Used lead-acid batteries

Decree 182/13 – Industrial Waste

Decree 152/13 – Agrochemical containers

IN PROGRESS

Decree on WEEE and TIRES / National Waste Law

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

URUGUAY

TREATMENTS

- Autoclave and incineration for hazardous waste
- Incineration for hazardous waste
- Oils in cement factories and authorized boilers
- Secure monofills for certain industries
- National secure landfill under construction
- Current disposal in sanitary landfill and large amounts stored in companies
- Mercury filtration in energy-saving lamps
- Private pyrolysis project with environmental authorization

2014 – the Business Chamber of Uruguayan Waste Managers (CEGRU) was created

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

URUGUAY

- There is no data on hazardous waste generation.
- Informal operations with several special wastes: WEEE, tires, lead-acid batteries.
- Collection of batteries for isolated storage – not treated.
- Private initiatives (state telephone company) for the recycling of cell phones and PCs.
- Export of waste with PCB oils to Europe.

RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

SURVEY 2014 – Preliminary Results

ANSWERS FROM 19 GRULAC COUNTRIES

- Near 63% of countries have hazardous waste regulations in place, but 88% of population have specific regulations.

- All countries have medical waste regulations in place.

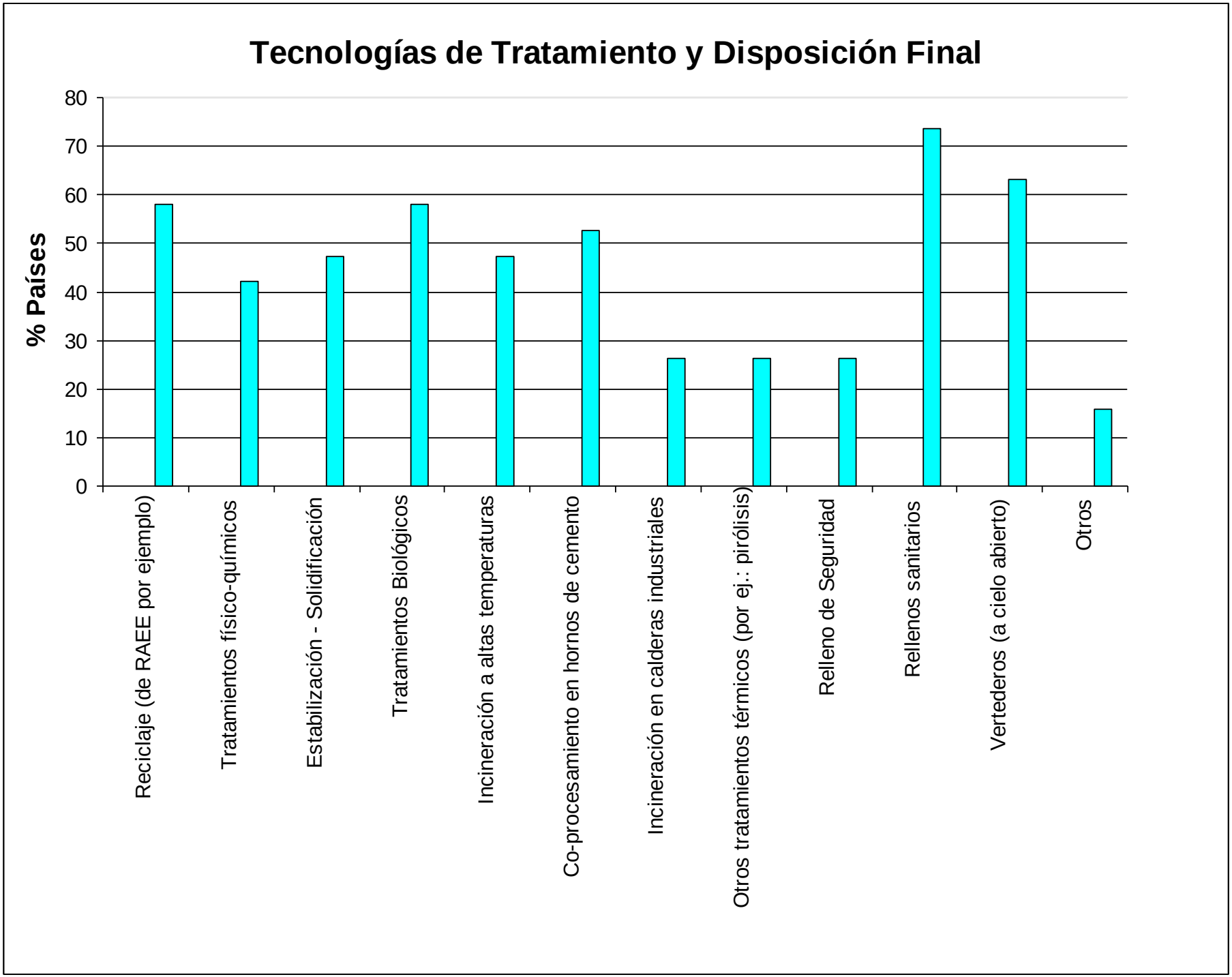
- Partial recycling initiatives for batteries and WEEE.

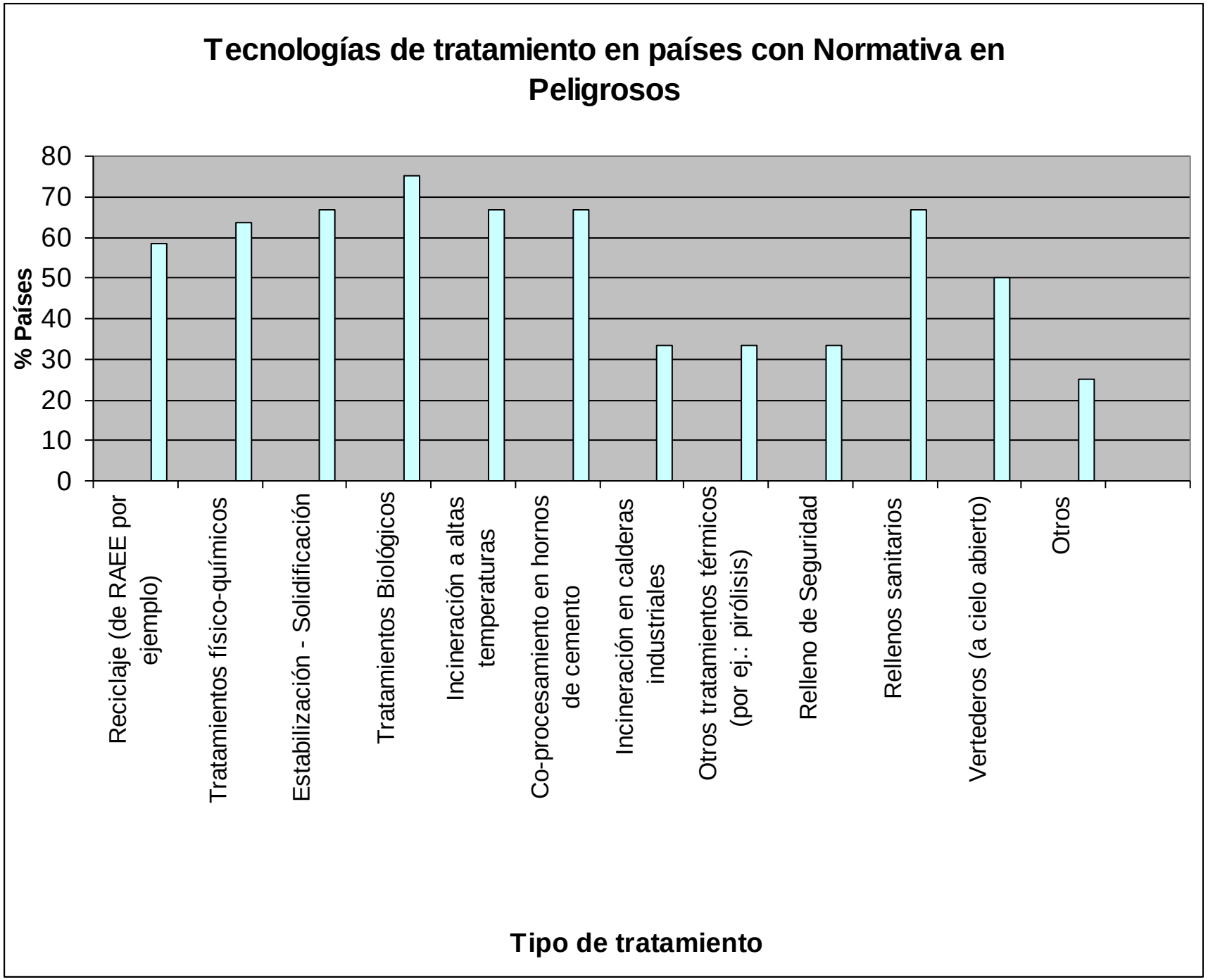
- Informal management in all countries.

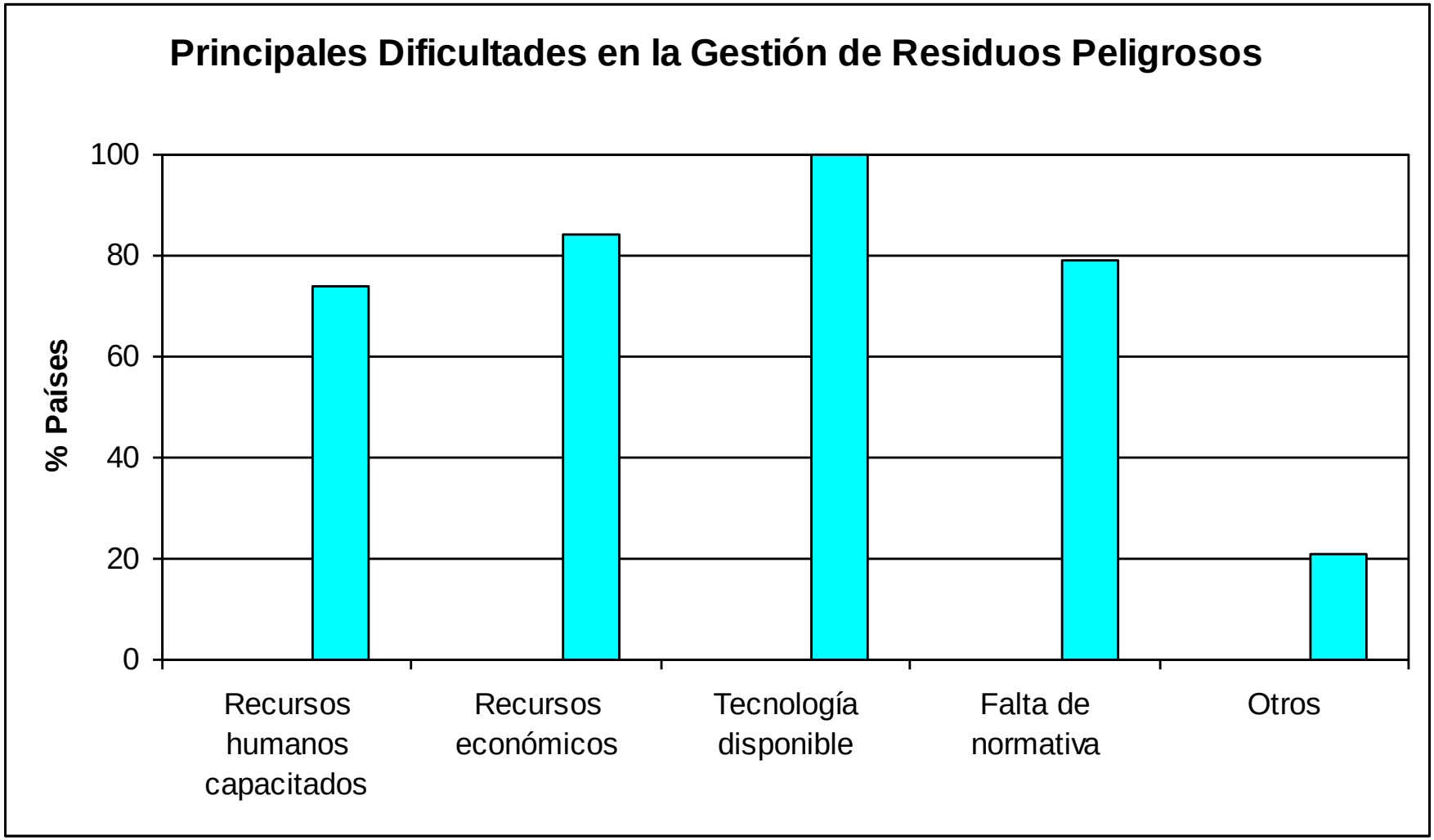
RED de CENTROS
Convenio de Basilea
Latinoamérica & Caribe
Convenio de Estocolmo
NETWORK of CENTRES
Basel Convention
Latin America & the Caribbean
Stockholm Convention

PRINCIPALES RESIDUOS
PELIGROSOS GENERADOS


¿Existen políticas, directrices, entre otros, en Instituciones Públicas tendientes a restringuir y sustituir el uso de productos con sustancias peligrosas por otros sin ellas?
% Países
60
50
40
30
20
10
0
Si
No
No contesta


Tecnologías de Tratamiento y Disposición Final
% Países
80
70
60
50
40
30
20
10
0
Reciclaje (de RAEE por ejemplo)
Tratamientos físico-químicos
Estabilización - Solidificación
Tratamientos Biológicos
Incineración a altas temperaturas
Co-procesamiento en hornos de cemento
Incineración en calderas industriales
Otros tratamientos térmicos (por ej.: pirólisis)
Relleno de Seguridad
Rellenos sanitarios
Vertederos (a cielo abierto)
Otros


Tecnologías de tratamiento en países con Normativa en Peligrosos
% Países
80
70
60
50
40
30
20
10
0
Reciclaje (de RAEE por ejemplo)
Tratamientos físico-químicos
Estabilización - Solidificación
Tratamientos Biológicos
Incineración a altas temperaturas
Co-procesamiento en hornos de cemento
Incineración en calderas industriales
Otros tratamientos térmicos (por ej.: pirólisis)
Relleno de Seguridad
Rellenos sanitarios
Vertederos (a cielo abierto)
Otros
Tipo de tratamiento


Principales Dificultades en la Gestión de Residuos Peligrosos
% Países
100
80
60
40
20
0
Recursos humanos capacitados
Recursos económicos
Tecnología disponible
Falta de normativa
Otros