

# 3R and Resource Efficiency in the Context of 2030 Agenda for Sustainable Development

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***United Nations Centre for Regional Development***

*3Rs in the context of Green Economy*

*3Rs in a broader context - not just about municipal waste management, but is intrinsically linked with resource efficiency in a wide range of sectors with an objective to reduce or eliminate the waste load for final disposal towards transitioning to a resource efficient and green economy*

*Multilayer Partnerships and Coalition as the Basis for 3R's Promotion*

*3Rs in the context of Rio+20 outcome – The Future We Want*

**Pacific countries join 3R Forum**

**1st  
Regional 3R  
Forum in Asia  
Japan/2009**

**2nd  
Regional 3R  
Forum in Asia  
Malaysia/2010**

**3rd  
Regional 3R  
Forum in Asia  
Singapore/2011**

**4th  
Regional 3R  
Forum  
in Asia  
Viet Nam/2013**

**5th  
Regional 3R Forum  
in Asia-Pacific  
Indonesia/2014**

**6th  
Regional 3R Forum  
in Asia-Pacific  
Maldives/2015**

**3R as an  
Economic  
Industry**

**Tokyo 3R  
Statement**

**Singapore Recommendation**

**Surabaya 3R Declaration**

**Ha Noi 3R Declaration (2013-2033)**  
33 Goals for Urban/Industrial areas, Rural areas/Biomass, New and Emerging Wastes, Cross-cutting issues

**2nd East Asia Summit - Environment  
Ministers Meeting (EAS EMM), Brunei, 2010**

**Endorsed Regional 3R Forum in Asia**



**RIO+20**  
United Nations  
Conference on  
Sustainable  
Development

2030 Agenda for Sustainable  
Development / SDGs

**3R for Green Economy**

**3Rs for Sustainable Cities and Human Settlement  
(Healthy & Safe)**

**3Rs for Coastal & Marine Ecosystem**

**Needs for Innovative Partnerships**

# Conventional trend continues in most countries – What are the major Policy Gaps?

- Prevailing economic system does not provide adequate incentives for resource conservation and efficient resource allocation / 3Rs & resource efficiency are not part of macro economic policies as waste is conventionally thought of having no “economic” value.
- Prevailing production and consumption patterns do not effectively integrate resource efficiency, contributing to growing quantities of wastes that must be managed for final disposal; SMEs are major concern.
- As Asian industrial economies continue to grow, the region will generate more toxic chemicals & hazardous wastes, mostly coming from industrial, agriculture, and manufacturing processes, but current waste management policies are not linked with bio-diversity conservation/protection of ecological assets – fresh water resources, coastal & marine ecosystem, etc.



# Limitations & Challenges faced by SIDS..

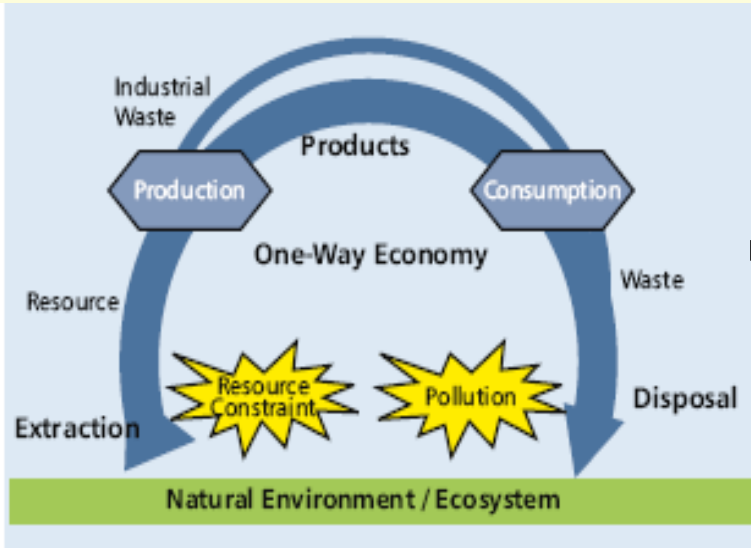
- small, remote and distributed over larger areas, prone to natural disasters and climate change
- fragile ecosystem vulnerable to emerging waste streams such as plastics
- limited land availability for waste disposal
- limited technical, institutional and financial capacity to manage emerging waste streams such as plastics, e-waste, oil, end-of-life vehicles, and health-care waste.
- Lack of recycling facilities



***=> Hanoi 3R Declaration calls for "3R + return" policy framework***

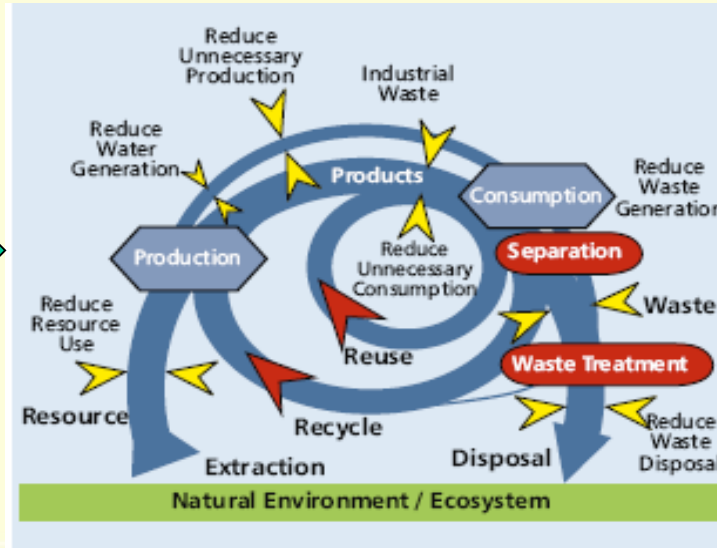
# The very nature of the economy drives resource efficiency ...

## 1. One-way/conventional Economy



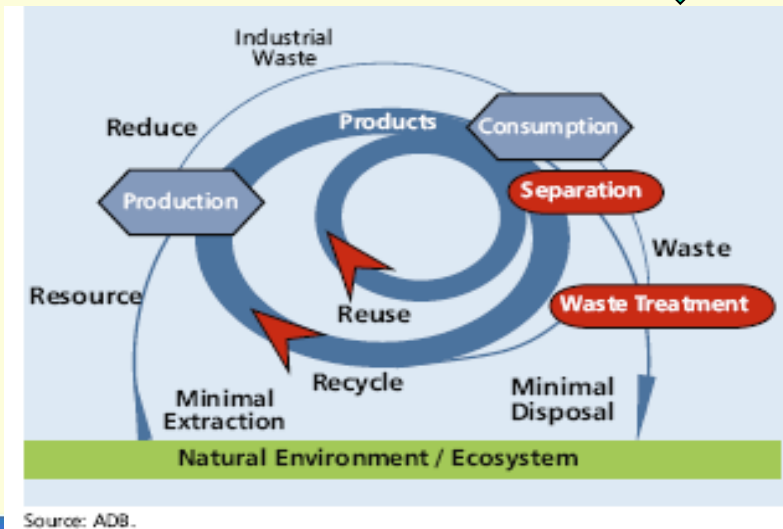
Source: ADB.

## 2. More resource efficient economy



Source: ADB.

## 3. Closed Loop Economy



Source: ADB.

1. **one way economy** -> a little effort is made to reduce the amount of materials consumed in production and hence the wastes are produced. Also little effort is made to reuse or recycle those wastes which mainly go for landfill.
2. **greater resource efficiency** -> by reducing consumption and waste of materials, and by reusing and recycling waste/byproducts minimize (per unit of product or services) – quantity of input raw material/energy /water as well as pollution /emission/environmental impact of the residual materials flow that flow to disposal sites.
3. **closed-loop economy** -> nearly all waste/outputs either become inputs to other manufacturing processes or are returned to natural systems as benign emissions rather than as pollutants.

Source: Adapted from ADB, 2011



## A Major Driver => Macro-Economic/Development Policies Integrating Resource Efficiency and 3Rs

- **Japan**: Fundamental Law for Establishing a Sound Material Cycle Society (2001); New Growth Strategy (2010) which places green innovations as top of seven strategic areas; Finance initiatives to build a Low Carbon Society (providing grants, investments, financing, interest subsidies for – (i) promotion of Green Buildings, (ii) development of Low Carbon Cities, (iii) bilateral offset Credit Mechanism, and (iv) enhancement, commercialization, and R&D of Low Carbon Technologies;
- **Republic of Korea**: National Strategy and Five Year Plan for Low Carbon and Green growth (2008); Framework Act and Presidential Decree on Low Carbon, Green Growth; Green New Deal Policy (2009); Resource Recirculation Policy, etc;
- **PR China**: Circular Economic Law (2009) led by NDRC-China; Long Term Renewable Energy Development Plan (2007); Chinese Circular Economic Law offers a long term plan for transformation that seeks to integrate economic, environmental, and social strategies to achieve high resource efficiency as the way of sustaining improvement in quality of life within natural and economic constraints; circular economy is now a trillion dollar opportunity
- **India**: National Solar Mission; National Mission on Enhanced Energy Efficiency;
- **Malaysia**: National Green Technology Policy (2009); Green Building Index (2009); National Renewable Energy Policy and Action Plan (2010);
- **Singapore**: Green Mark Incentive Scheme for buildings (2005); Water Efficiency Fund (2008);
- **Thailand**: Alternative Energy Development Plan and Target (2008); Thailand Climate Change Master Plan (2012–2050), etc.



# Rio+20 Outcome – The Future We Want

In the “Future We Want”, the States call for:

- **Increasing resource efficiency and reduction of waste** to achieve green economy in the context of sustainable development and poverty eradication to enhance the ability to manage natural resources sustainably and with lower negative environmental impacts
- **development and implementation of policies for resource efficiency** and environmentally sound waste management, including commitment to further **3Rs** as well as to increase energy recovery from waste with a view to managing the majority of global waste in an environmentally sound manner
- development and enforcement of comprehensive **national and local waste management policies, strategies, laws and regulations.**
- continued, new and innovative **public-private partnerships** among industry, governments, academia and other non-governmental stakeholders aiming to enhance **capacity and technology** for environmentally sound chemicals and waste management, including for **waste prevention**



**RIO+20**  
United Nations  
Conference on  
Sustainable  
Development

Rio de Janeiro, Brazil • June 2012

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future  
we  
want →

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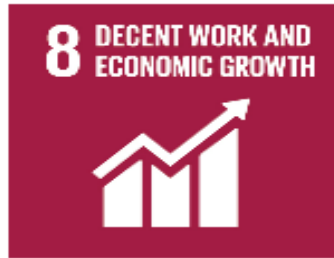


United Nations Centre for Regional Development (UNCRD)

# Post-2015 Development Agenda ~13 of the 17 goals refer to the need to sustainably manage natural resources



## SUSTAINABLE DEVELOPMENT GOALS





# Relevance of 3Rs in 2030 Agenda for Sustainable Development

## ❖ *Goal 2: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture*

⇒ Target 2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality – **3R (full scale utilization of organic waste as composting for sustainable agriculture and food security)** (Hanoi 3R Declaration / Goal 2)

## ❖ *Goal 3: Ensure healthy lives and promote well-being for all at all ages*

⇒ Target 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination – **3R (proper and effective management of hazardous waste and chemicals)** (Hanoi 3R Declaration / Goal 9, 13, 14, 16, 26)

## ❖ *Goal 6: Ensure availability and sustainable management of water and sanitation for all*

⇒ Target 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and increasing recycling and safe reuse by [x] per cent globally – **3R (type and level of waste management and sewage treatment activities are important drivers for water quality, quantity and security); Reuse and recycling wastewater)** (Hanoi 3R Declaration / Goal 25)

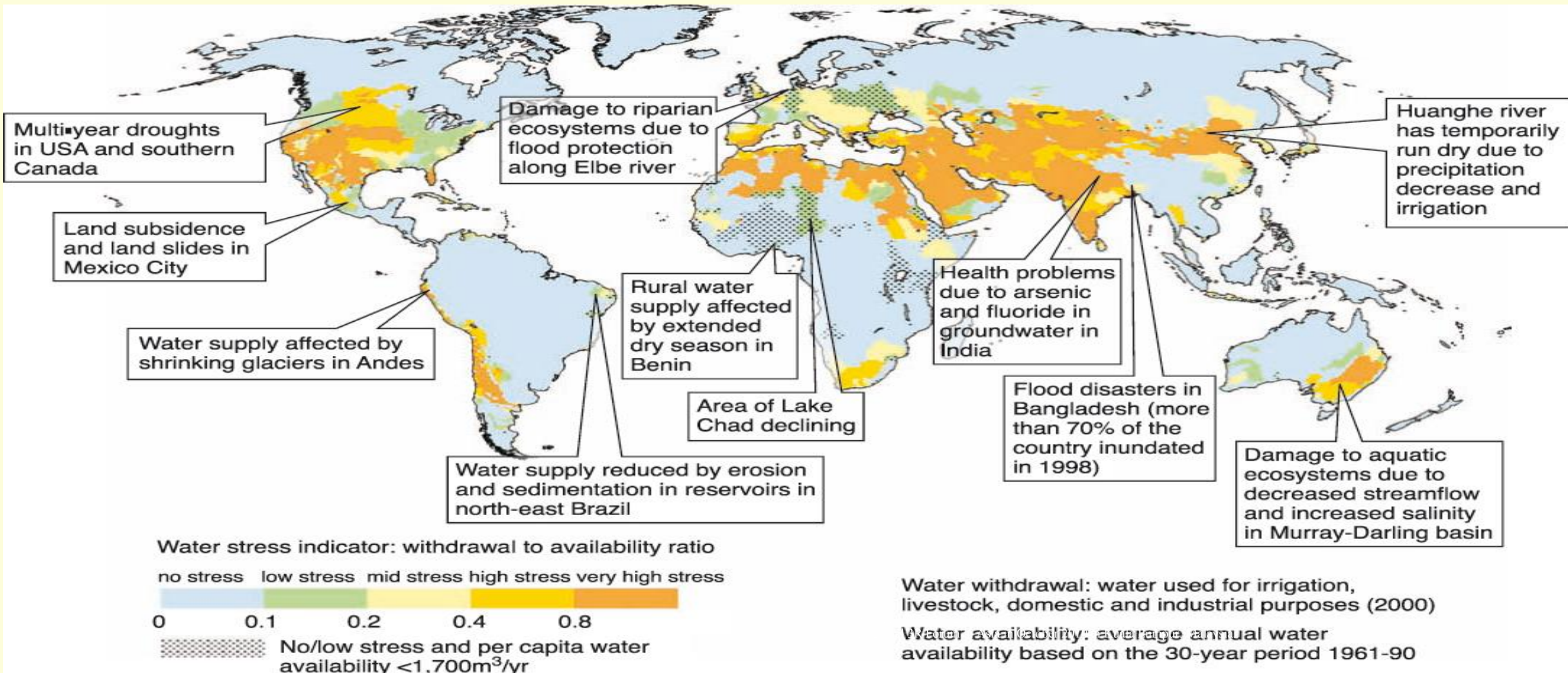
⇒ Target 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity – **3R and resource efficiency (water efficiency by using water saving technologies, rain water harvesting, desalination, wastewater treatment/reuse/recycling technologies)** (Hanoi 3R Declaration / Goal 18, 20, 22, 24)

(Contd).

Source: Adapted from United Nations, 2015

# Selected World Trends on Human activities - Degradation of water resources

By the year 2025, as much as two-thirds of the world population may be subject to moderate to high water stress.



Source: Water Stress Map generated by World Meteorological Organization 2008 based on data available at Alcamo et al. (2003)



# Waste-Freshwater Nexus in India – 3R offer many win-win solutions - business opportunities in waste sector for water security and improved health condition in India



❑ The Energy and Resources Institute in New Delhi has estimated that **by 2047**, waste generation in India's cities will increase **five-fold to touch 260 million tones per year**.

❑ The CSE survey, released earlier this year, shows that **70-80 percent** of India's wastewater was ending up in its rivers and lakes. **"We are drowning in our excreta,"** Sunita Narain, Director of CSE.



## 3R Developments in Asia: Informal Resource recovery and recycling



- ❑ Nearly **80 percent** of the river's pollution is the result of raw sewage. The river receives **more than three billion liters of waste per day**.
- ❑ **Highly contaminated** leachate seeps untreated into groundwater, a source of drinking water....

**Clean India Mission (Swachh Bharat Abhiyaan) and 100-smart cities programme by Prime Minister Narendra Modi offer tremendous business opportunities in waste sector for water security of India**

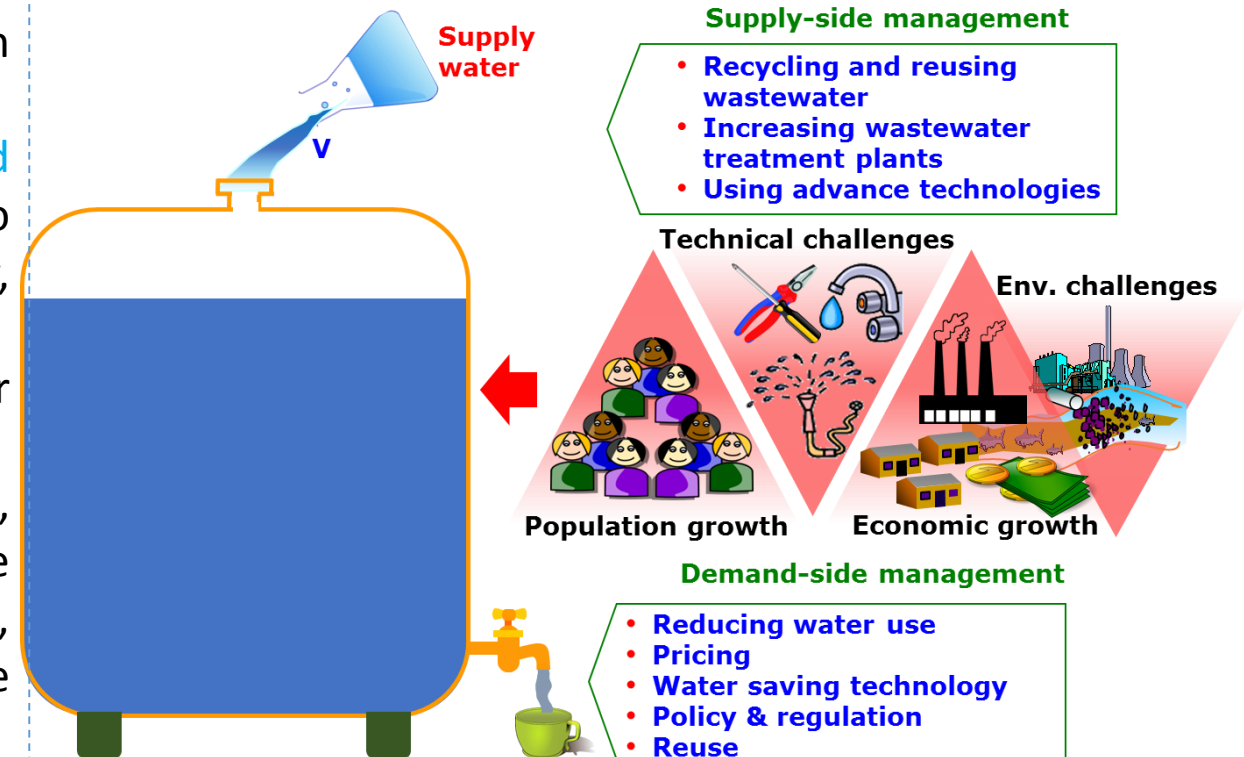
## Need for change and attitudes to view "Waste" as "Resource"

- Link between "waste" and "resource" is not well understood /waste is traditionally thought of having no value.
- Too much emphasis on "downstream" waste management limiting many business opportunities.
- Limited efforts on "upstream" resource management and waste reduction aspects

# Response for both Water-Demand and Supply Side Issues

- ❑ Water **drives the economy** (food-energy-transport-manufacturing/production-as well as service sector like tourism) is dependent on water;
- ❑ Water is the resource **used across all supply chains**, but wastewater is the largest untapped waste category in industries;
- ❑ Water security **policies should promote investing and incentivizing the “reduce, reuse, recycle”** systems, and has to cover the holistic urban water cycle inclusive of water supply, treatment, reuse application;
- ❑ Requires **closed-loop system technological innovations** for water saving and reclaiming and reuse of wastewater;
- ❑ **Installation of a recycling and reuse infrastructure** (for example, construction of new wastewater treatment plant, dual pipe system for distributing recycled wastewater in houses, retrofitting of water saving appliances etc.) may also be promoted via these institutions;
- ❑ Expanding a range of **financial services opportunities** -both public funding and private financing; and
- ❑ Solutions for **smart wastewater management** must be socially and culturally appropriate.

3Rs in the context of water, offer effective tools for both demand and supply side management



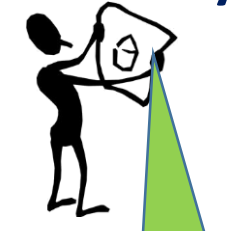
# Relevance of 3Rs in 2030 Agenda for Sustainable Development

- ❖ **Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all**
  - ⇒ **Target 7.1** By 2030, ensure universal access to affordable, reliable and modern energy services – **3R (waste-to-energy as affordable energy sources)** (Hanoi 3R Declaration / Goal 2, 11, 28)
  - ⇒ **Target 7.3** By 2030, double the global rate of improvement in energy efficiency – **3R and resource efficiency (cleaner production, technologies for clean energy and renewable energy)** (Hanoi 3R Declaration / Goal 5, 6, 22, 24)
- ❖ **Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all**
  - ⇒ **Target 8.2** Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value-added and labour-intensive sectors – **3R and resource efficiency (state of art resource recovery facilities, recycling industries, waste to energy, eco-industrial zones, etc.)** (Hanoi 3R Declaration / Goal 3, 5, 8, 23)
  - ⇒ **Target 8.4** Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead – **3R (resource and material efficiency, circular economy, sound material cycle )** (Hanoi 3R Declaration / Goal 3, 5, 6, 7, 8)

## R & D/Engineering



### Energy Efficiency



Energy service companies (energy audit, energy efficient system design /equipment manufacturing, specialty engg. services, etc.)

Nano tech market : more than US\$1 trillion



### Green Chemistry & Nano Technology

- cosmetics, baby lotion, computer chips, paints, medical equipments, etc.

### Water Efficiency

- Water saving devices
- distribution efficiency
- Zero leakage,
- Waste water treatment,
- Rain water harvesting, etc.



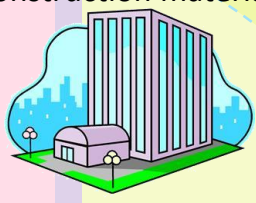
### Waste-Water-reuse for urban agriculture practices



- Water purification technologies, waste water treatment (ecological engineering: constructed wetlands for pre-treatment of urban run off water & river water)
- Distributed sewage treatment systems, etc.

### Green Buildings

- Engineering, design & construction materials



### Sustainable Transportation

- ITS, IFS, BRT, Railways, walkways & bicycle ways
- Fuel efficiency measures
- Vehicle I/M
- Alternative fuels, PPP for urban transport. etc.



### Bio-economy (high value processing/conversion of biomass)



- Bio-products
- Bio-energy
- Bio-Engineering
- Landscape trimming, etc.

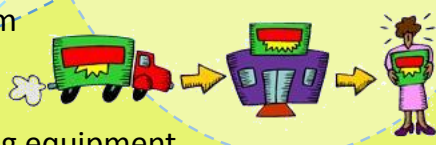
Synthetic fibers/oil, bioplastics, materials from fiber by-products, composts, animal feeds, bio-chemical

### Resource Recovery/3R



### Sustainable Farming Support Companies

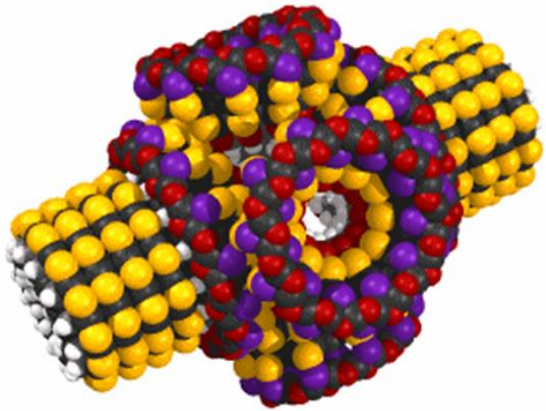
- Efficient water & nutrient management system
- Water & nutrient delivery system
- Biomass energy company
- Energy efficient cultivating, harvesting, hauling equipment
- Compost industry (e.g. Dhaka Community-based Composting System)
- Roof top agriculture (urban greening) for food security



CH4 & fertilizer from animal manure /sewage sludge with anaerobic or aerobic digesters, refused-derived fuel (RDF), etc.

## Urban Services and Supplies

# Advanced business opportunities in Nanotechnology (waste prevention/treatment/3Rs)



Macroscopic  
Microscopic  
**NANO**  
Molecular

Nanotechnology is the **second coming of the industrial revolution** that seizes the initiative of **technology capital** in the world. One of the main obstacles to achieving the goal will be **to control, reduce, and ultimately eliminate environmental and environmental related problems** associated with this technology; the success or failure of this new use may well **depend on the ability to effectively and efficiently address these environmental issues.**

Nano-remediation has been most widely used for groundwater treatment, with additional extensive research in wastewater treatment.

## Nanotechnology – the promise

(nano market growth to 1 trillion € over the next 10 years)

Fields of application potential:

- **Membrane filtration** (drinking and wastewater)
- **Anti-microbial nanoparticles** for disinfection and microbial control
- **Removal of arsenic and heavy metals**
- **Nano sensors** for water quality monitoring

## Nanomaterials Waste Streams

- Pure Nanomaterials Manufactured (e.g., Carbon Nanotubes)
- Nano By-products with organic or inorganic
- Liquid Suspensions Containing Nanomaterials
- Items Contaminated with Nanomaterials (e.g., Wipes/PPE)
- Solid matrixes with Nanomaterials

## Nanomaterials during disposal/recycling

- Intrinsic Toxicity (for example Arsenic or Cadmium)
- Recyclability Properties such as thermal, mechanical, chemical properties of nano composites.

Source: Musee, N. Nanowastes and the environment: Potential new waste management paradigm. Environment International, 37: 112-128, 2011.

Source: Theron, J.; J. A. Walker; T. E. Cloete (2008-01-01). "Nanotechnology and Water Treatment: Applications and Emerging Opportunities". Critical Reviews in Microbiology 34 (1): 43-69. doi:10.1080/10408410701710442. ISSN 1040-841X. Retrieved 2014-

07-29

Source: Dr. Lou Theodore, July 2006 Symposium on Nanotechnology and the Environment: Waste Management of Nanomaterials: Biography

# Advanced business opportunities in Green Chemistry (waste prevention/treatment/reduce)



Green chemistry, also called **sustainable chemistry**, is a philosophy of **chemical research and engineering** that encourages the design of products and processes that **minimize the use and generation of hazardous substances** in the manufacturing process.

## Aiming

- ❑ Making chemical products that do not harm either our health or the environment,
- ❑ Using industrial processes that reduce or eliminate hazardous chemicals, and
- ❑ Designing more efficient processes that minimize the production of waste materials and decreases the amount of non-renewable energy used.

❖ Prevent waste rather than treating it

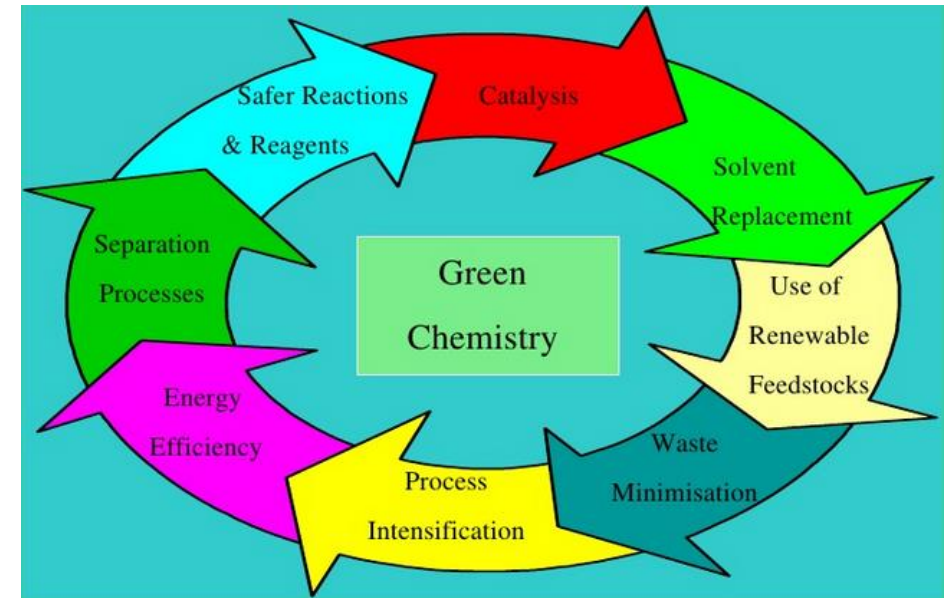
❖ Use renewable source of energy

## Reducing lead pollution

- Replacing lead in paint with safe alternatives, and
- Replacing tetraethyl lead with less toxic additives (e.g., “lead-free” gasoline).

## Chemical foams to fight fires

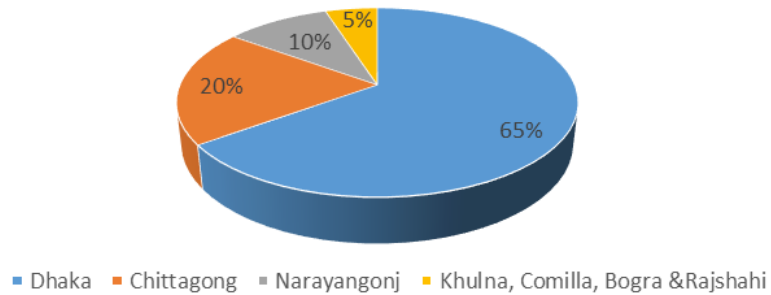
- A new foam called **Pyrocol FEF** has now been invented to put out fires effectively without producing the toxic substances found in other fire-fighting materials.



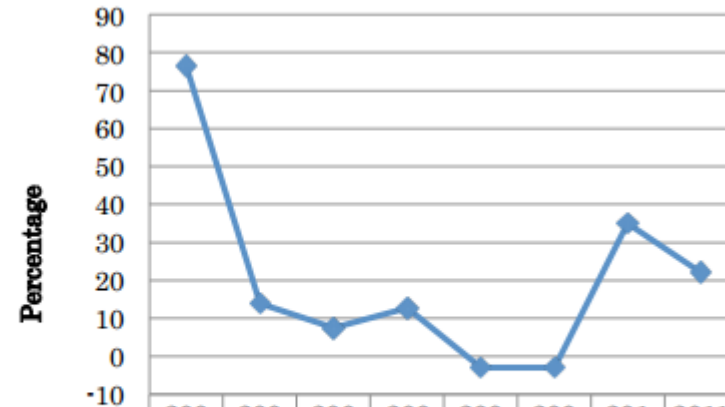


# Business opportunity: Recycling of plastic waste in Bangladesh

Plastic Industries in Bangladesh



Plastic waste is ranked **12<sup>th</sup>** in terms of **export oriented sectors** of the country



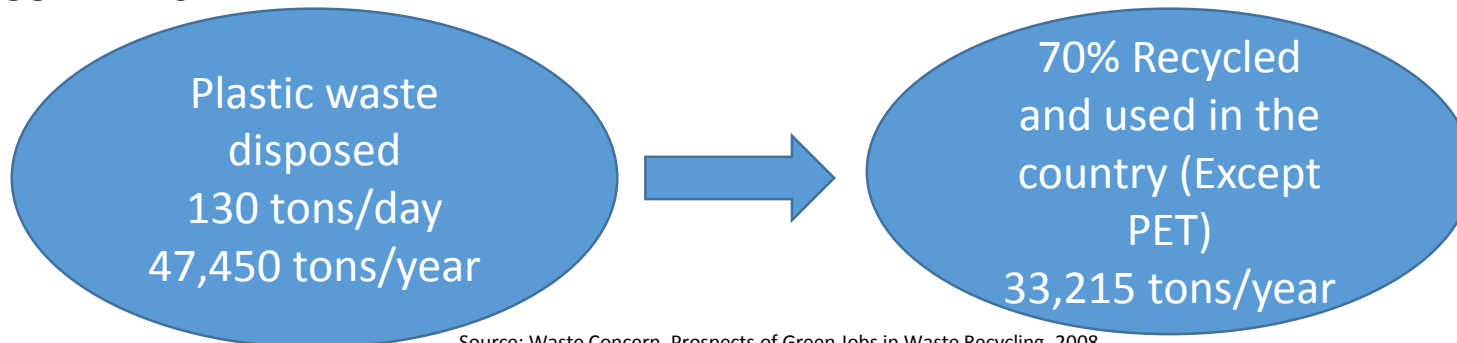
Growth rate of plastic export



**Plastic waste recycling follows direct economic benefit**

- (a) **Less landfilling** requirement
- (b) **Large recycling industry jobs and economic output**
- (c) **Direct savings** of foreign currency

❖ Per capita consumption of plastics in Bangladesh is 5 kg per year. The plastic sector constitutes **1.0 of GDP** and provides **employment for half a million people**. Total export earning for both direct and deem exports is about US \$ 337 million.



- ❑ **Generating 21,000 jobs**
- ❑ **Saving expenditure** of Tk3.08 crore by avoiding plastic waste
- ❑ **Saving Foreign currency** of US \$51 million/year by avoiding import of virgin plastic.

Source: Waste Concern, Prospects of Green Jobs in Waste Recycling, 2008.

# Business opportunity: Recycling of Lead acid battery in Bangladesh

- ❖ Recycling of lead acid batteries are taking place in an **environmental sound manner** to adopt public policy for **economically efficient** and also keeping in view the **health hazards arising from exposure to lead**.
- ❖ Lead acid battery has more than **ten parts** such as, plates, separator, hard rubber container, lead, bitumen, battery cap, cork, connectors, electrolyte, electrical accumulator, negative plate or anode positive plate or cathode, sealant and chemical compound: CFCs, carbon tetrachloride, halons, methyl chloroform, lead, Sulphuric acid.
- ❖ Approximately, **3,420 tons of lead are recovered per year** from ULABs in Bangladesh. This allows to meet **60%** of the total lead requirement of the country **from secondary lead**.

In recycling process, the price of used battery is increasing by about 100% in each stage of transfer.

Small buyers → Broker → Separator → Re-builder/Smelter

❑ **Recovered Lead:** 6000 ton/Year

❑ **Savings:** 4.73 million US\$/year

(avoiding lead import using foreign currency (60% recycling rate at present)

❑ **Jobs Created:** 6000 new jobs



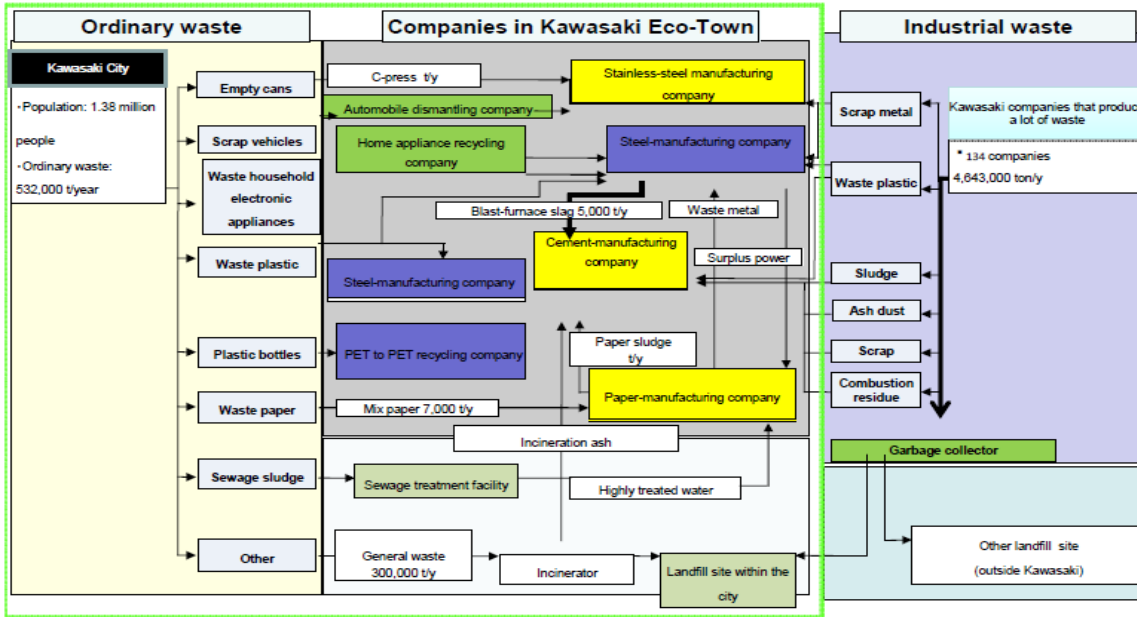
# Relevance of 3Rs in 2030 Agenda for Sustainable Development

**Target 8.5** By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value – **3R (Hanoi 3R Declaration calls for health and safety aspects in waste sector, complete elimination of illegal engagement of children in informal waste sector, mandatory of health insurance for informal waste pickers) (Hanoi 3R Declaration / Goal 32)**

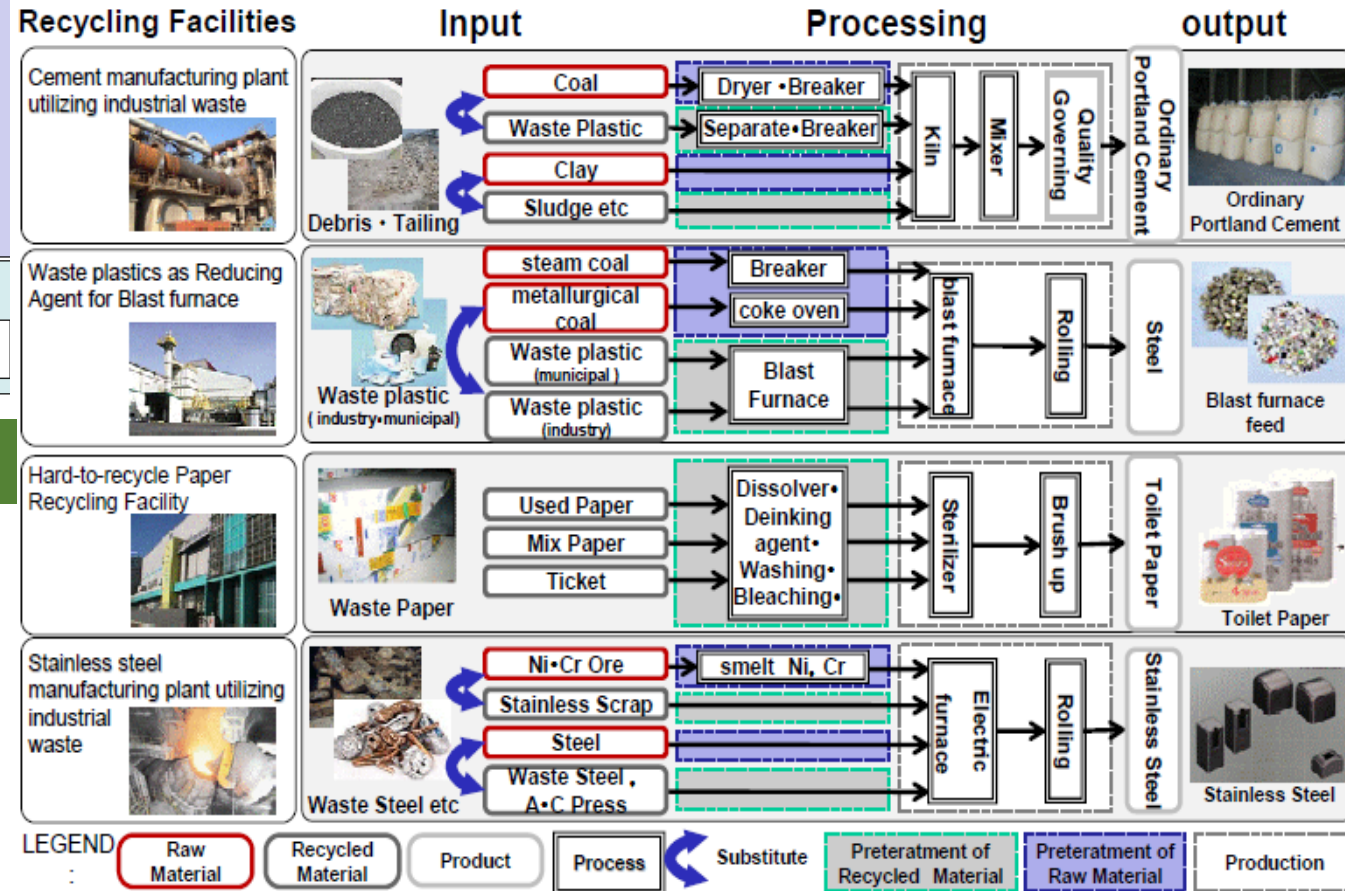
## ❖ **Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable**

**Target 11.6** By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management – **3R and zero waste policies, programs and infrastructures are intrinsically linked to realization of safe, resilient, smart and sustainable cities with a focus to quality of life and better living conditions; e.g., Japanese eco-towns, which serve good examples to demonstrate how science-policy-business are closely tied to each other for their own success and survival as well as achieving resiliency. (Hanoi 3R Declaration / Goal 4, 9, 13, 16, 18, 25)**

# Kawasaki Eco-Town - where economy and environment are integrated to create sustainable business opportunities exhibit strong science-policy-business link and interdependency



## Formation of a Regional Network for Resource Recycling



## Key Features of Kawasaki Eco-Town

1. revitalization through environmental technologies accumulated in traditional industries
2. Industrial symbiosis through a regional network for resource reuse/recycling
3. local private companies take their own initiative in environmentally sound business operations and contribute to preventing local and global environmental pollution.
4. strong collaboration between R&D industries and private companies on environmental technologies
5. international cooperation in technology transfer

## Quantified material accounting for Symbiosis in Kawasaki

# Relevance of 3Rs in 2030 Agenda for Sustainable Development

## ❖ Goal 12: Ensure sustainable consumption and production patterns

**Target 12.1** Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries – **3R policies, programmes and infrastructure directly contribute to SCP through resource efficient development (Hanoi 3R Declaration / Goal 3, 5, 6, 7, 8)**

**Target 12.2** By 2030, achieve the sustainable management and efficient use of natural resources – **3R / LCA directly contribute to sustainable use of natural resources and virgin raw material / recyclables substituted as secondary raw materials (Hanoi 3R Declaration / Goal 3, 4, 5, 6, 7, 8, 17, 19)**

**Target 12.3** By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses – **3R policies contributes to reduction of food waste (Hanoi 3R Declaration / Goal 10)**

**Target 12.4** By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment– **3R policies, programmes and infrastructure directly contribute to safe and environmentally sound management of hazardous and toxic chemicals and wastes (Hanoi 3R Declaration / Goal 9, 13, 14, 26)**

**Target 12.5** By 2030, substantially reduce waste generation through **prevention, reduction, recycling and reuse**

# Relevance of 3Rs in 2030 Agenda for Sustainable Development

**Target 12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities – 3R policies, programs, markets promote trade in recyclable products, green purchasing, eco-products (Hanoi 3R Declaration / Goal 21, 22, 23)**

❖ **Goal 13: Take urgent action to combat climate change and its impacts**

**Target 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning – robust 3R policies, programs, infrastructure and market could reduce unnecessary reliance on landfilling responsible for emission of CH<sub>4</sub>, a potent GHG (Hanoi 3R Declaration / Goal 18, 19, 21)**

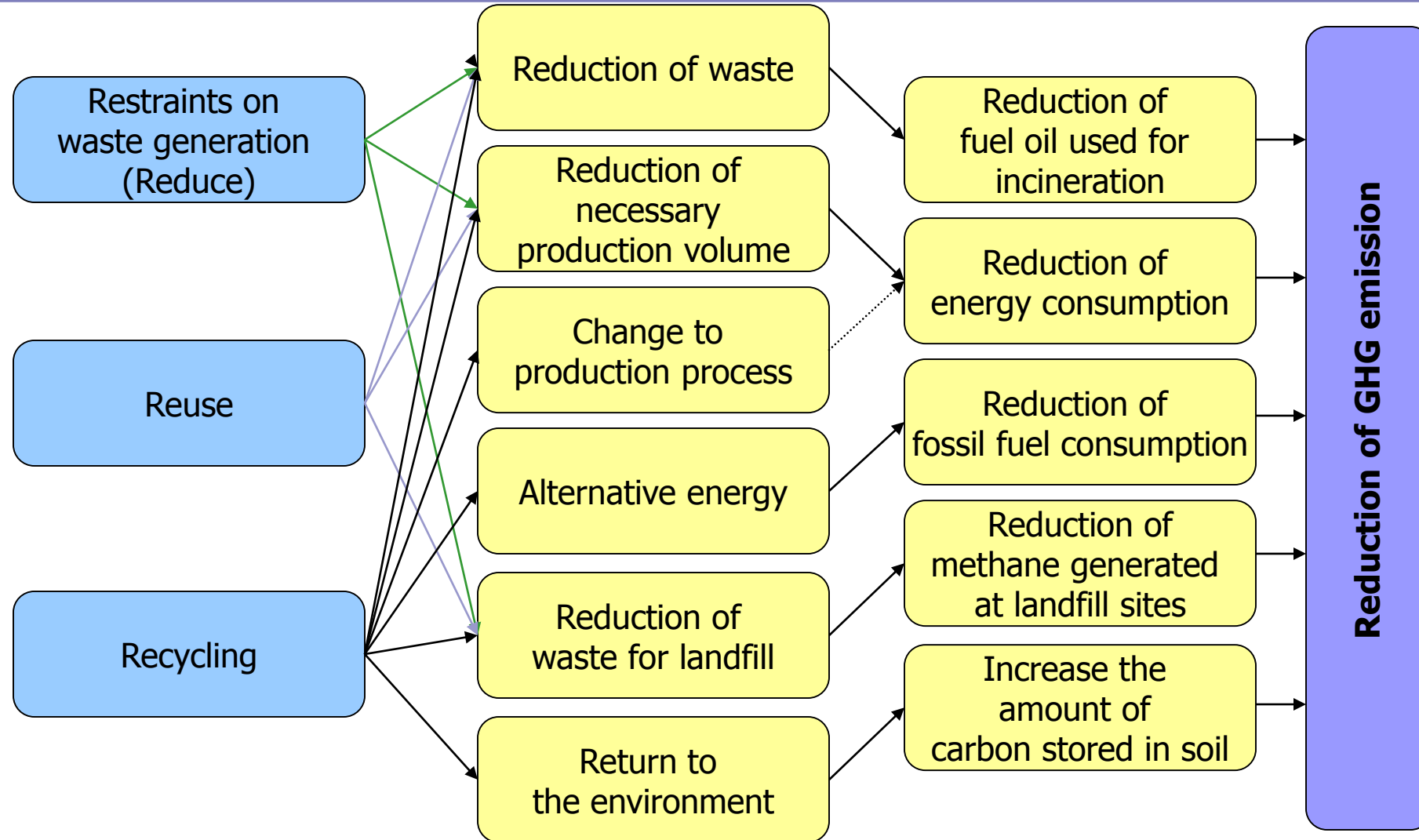
❖ **Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development**

**Target 14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution – a robust 3R policy, programme, and recycling infrastructure prevents plastics and other land-based pollutants getting into ocean and water bodies (Hanoi 3R Declaration / Goal 12, 25, 31)**

**Goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development**

**Target 17.1 Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection – 3R as an economic industry could help with domestic resource mobilization and other revenue generation; multi-layer partnership, including international partnership and cooperation in 3R areas (country-country, city-city, inter-municipal cooperation, industry-industry cooperation) through “Surabaya 3R Declaration (2014)” (Hanoi 3R Declaration / Goal 3, 23, 29)**

Resource efficiency in relation to GHG emission reduction – Every production, consumption, and waste management practice generates GHG from the process (directly) and through energy consumption (indirectly)



# Selected messages from Maldives 3R Forum – 3R as an economic industry can provide many potential solutions for building smart and resource efficient cities

1. In a smart **city or community, science, policy and businesses** are closely tied to each other for their own success and survival.
2. Eco-towns such as Kawasaki, Kitakyushu and others where economy and environment are integrated to create sustainable business opportunities progressively build strong **science-policy-business link and interdependency**.
3. Government policies supporting **R&D-oriented industrial structure and environmental efforts by companies** are critical to foster sustainable urban businesses in 3R areas.
4. Sustainable waste management can lead to highly profitable business opportunities if national, local governments or urban local bodies create **enabling policies, institutions, partnerships and investment regime** for expanding **market of environmental goods (equipment, technologies, eco-products, green energy, etc.) and services**.
5. **3R as an economic industry offers competitive solutions to many environmental issues and benefits to cities and communities** provided 3Rs and resource efficiency are integrated into the macro-economic development policies (e.g., circular economic policy of China).
6. As 3R and resource efficiency can provide important complement to achieving many of SDGs and targets, local and national governments should consider science-based policy making for achieving a win-win situation (in terms environmental, social and economic benefits) of through 3R solutions.





# Welcome to 7th Regional 3R Forum in Asia and the Pacific



***Theme: Advancing 3R and Resource Efficiency for the 2030  
Agenda for Sustainable Development***

***Venue: Adelaide Convention Centre, Australia***

***Date: 2-4 November 2016***

***Co-organizers: Green Industries SA, South Australia Government, CSIRO, MoE-Japan, UNCRD***

