AGI glaspac

(An SBU of HSIL Ltd.)

Government & NGO Support in Glass Re-cycling

Date : 29th June 2011

SEMINAR ON

"GLASS RECYCLING IN INDIA"

GOVERNMENT AND NGO SUPPORT IN GLASS RECYCLING

A. Glass Recycling what it is?

Waste Disposal Hierarchy

A1. Reduce
A2. Reuse
A3. Recycle

A1.Reduce

Incorporating the notion of product responsibility is to encourage industry and the consumer to consider the matter of waste as early as the decision-making stage for product development, production and consumption and to develop and apply ideas on waste avoidance and reduction. This concerns not only the benefit and serviceability of a product, but also the entire product life cycle, i.e. the cycle from product development, through production, distribution, return, recycling, use to renewed production.

Waste avoidance is seen as the primary avoidance of the waste quantity and harmfulness. Companies who develop, manufacture, work and process or distribute products are subject to the waste avoidance obligation

A2.Glass Reuse

Reuse of glass containers is preferable to recycling according to the waste hierarchy. Refillable bottles are used extensively in many European countries, Canada and until relatively recently, in the United States. In Denmark 98% of bottles are refillable and 98% of those are returned by consumers. A similarly high number is reported for beer bottles in Canada. These systems are typically supported by container deposit laws and other regulations. In some developing nations like India and Brazil, the cost of new bottles often forces manufacturers to collect and refill old glass bottles for selling carbonated and other drinks.

A3. GLASS RECYCLING

A. **GLASS RECYCLING** is the process of turning waste glass into usable products.

B. Glass makes up a large component of household and industrial waste due to its weight and density. The glass component in municipal waste is usually made up of bottles, broken glassware, light bulbs and other items.

C. Glass waste should be separated by chemical composition, and then, depending on the end use and local processing capabilities, might also have to be separated into different colors. Many recyclers collect different colors of glass separately since glass retains its color after recycling. The most common types used for consumer containers are colorless glass, green glass, and brown/amber glass.

D. Glass that is crushed and ready to be remelted is called **cullet.**

B. Why Glass Recycling

An interesting point about the glass recycling process is that glass can be recycled as many times as required, without any deterioration in quality.

1. Saves limited natural resources

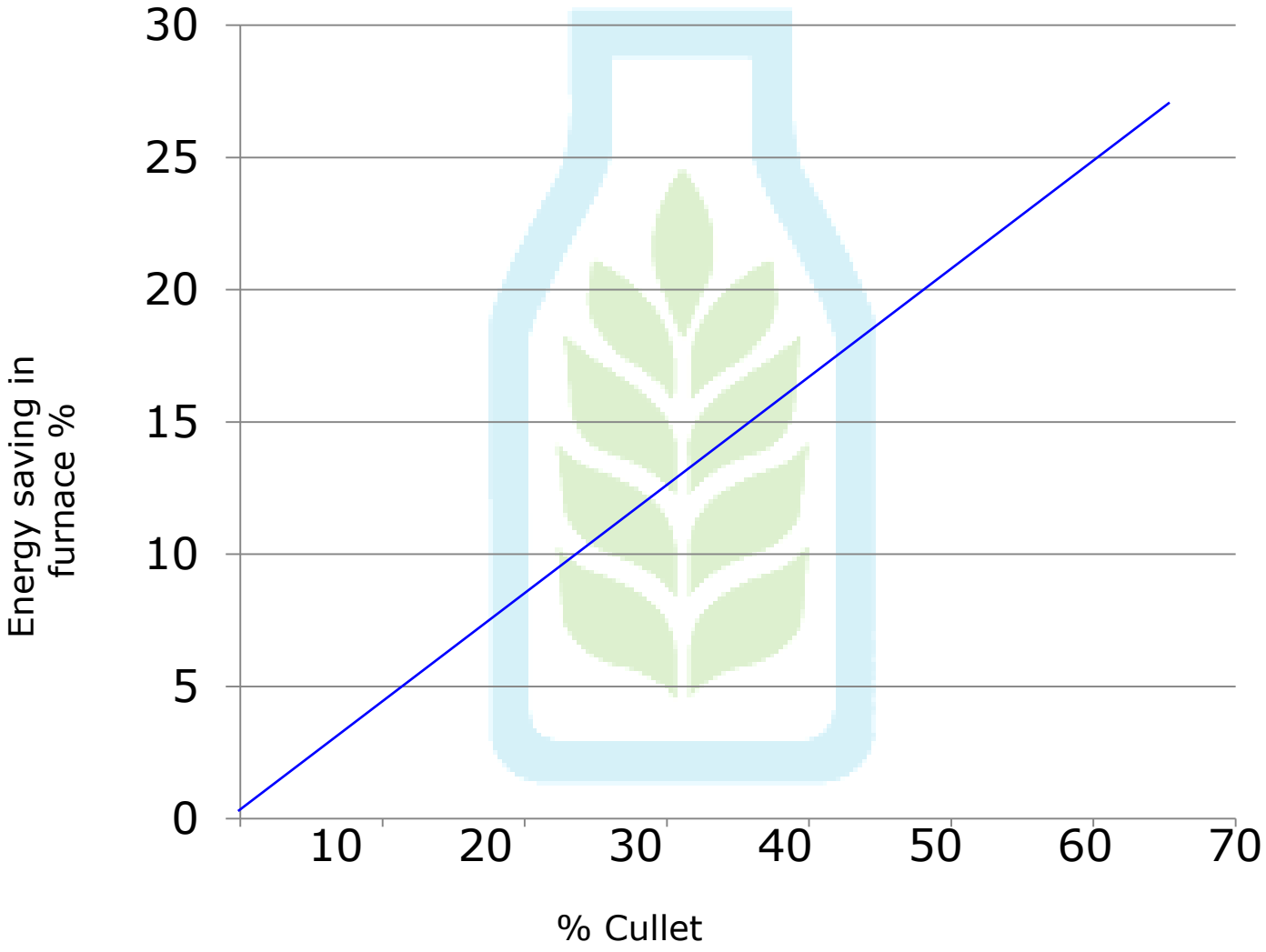
Here is only a finite amount of resources on this planet. Although some are renewable, our demand for resources is very high. By recycling, we reduce our demand for raw material to make the products we use. We return valuable materials back into the economic system, reducing our rate of resource consumption.

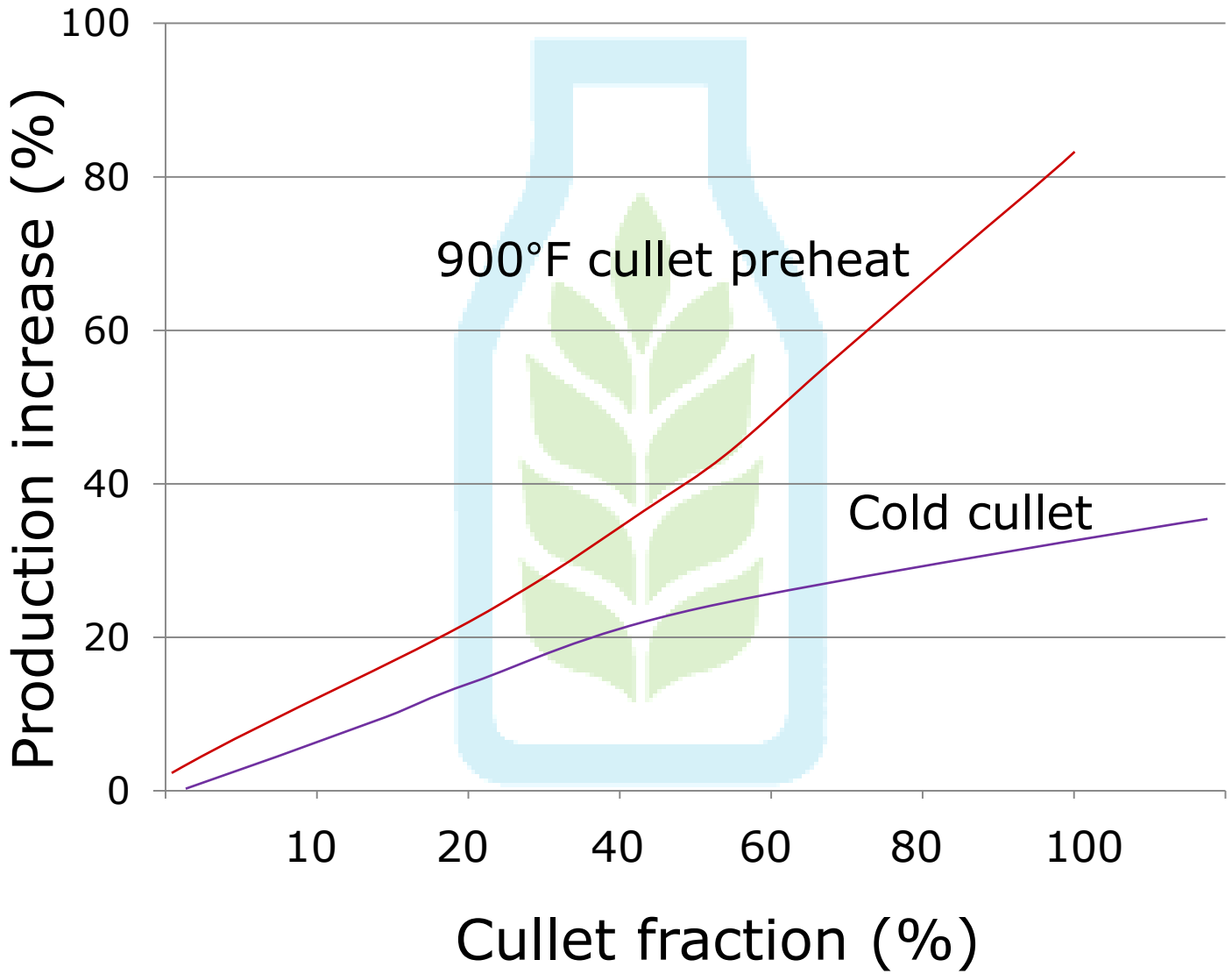
2. Prevents air and water Pollution

Recycling is a proven way to reduce air and water pollution, reduce energy consumption and decrease greenhouse gases emissions linked to global warming.

3. Saves Energy

Saves Energy. Glass recycling uses less energy than manufacturing glass from sand, lime & soda ash. Costs for energy drop about 2-3% for every 10% recycled glass containers used in the manufacturing process.


30
25
20
15
10
5
0
Energy saving in furnace %
10
20
30
40
50
60
70
% Cullet


100
80
60
40
20
0
Production increase (%)
900°F cullet preheat
Cold cullet
10
20
40
60
80
100
Cullet fraction (%)

4. Provides raw materials for industry

Recycled glass other than use in glass industry has also beneficial application in;

1. Glass in ceramic , sanitaryware production
2. Glass a flux agent in brick manufacture
3. Glass in astroturf and related applications
4. Glass as water filtration media
5. Glass as an abrasive
6. Mixed glass waste streams can also be recycled and converted into an aggregate.

5. Creates Employment

A. Recycling is good for the economy.
B. Recycling is a job creator.
C. Recycling employs about 100,000 people directly or indirectly in our country.

6. Saves landfill space

According to the European Environment Agency, in 2006 Germany land filled only about one percent of the country's untreated waste. In 2007, the EPA reports that the U.S. sent 54 percent of its waste to more than 1,700 landfills.

In India we continuously strive to locate new areas for land fill as the same are highly opposed sometimes by the population closer to the landfills.

7. Reduces Production cost & Improves our nation's ability to compete

This is because cullet or recycled glass costs much less than raw material used to manufacture glass from scratch, and use of Cullet also consumes less energy thereby reduces manufacturing costs. It also enhances furnace pull.

8. Reduces greenhouse gas emissions

As use of cullet consumes less energy which translates to decrease in carbon dioxide and nitrogen oxide, which are green house gases that contribute to the carbon footprint.

Glass: The Perfect Cycle

The new glass package is filled with product and distributed through retail outlets

FOOD PROCESSOR

GROCERY

The product is purchased by consumer and consumed

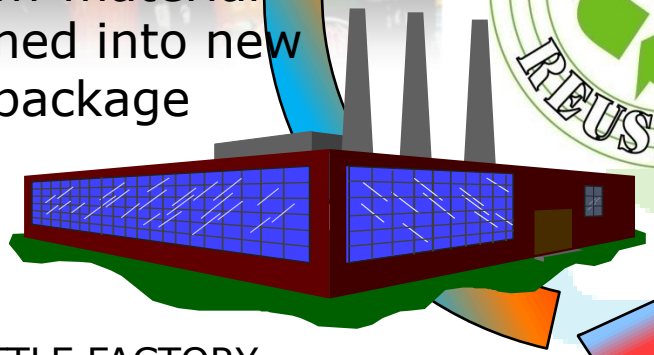
RECYCLE

REDUCE

REUSE

Containers are collected through curbside or drop off centers

The raw material is formed into new glass package

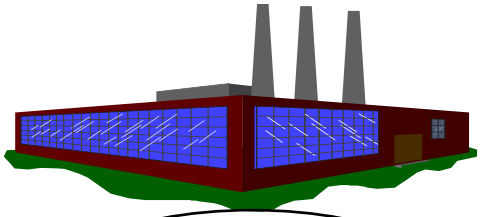


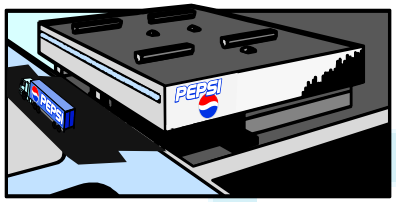
BOTTLE FACTORY

virgin raw materials are added as needed to the mix for new packages

cullet

GLASS RECYCLING & REUSE IN INDIA

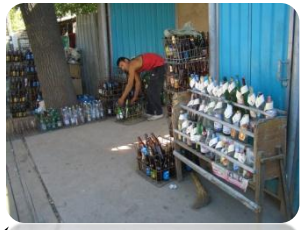




Glass Bottle Manufacturing

Customer Filing line

Consumer



In House Use

Municipal waste

Landfill

Collection boys

Multiple Intermediate

Washing

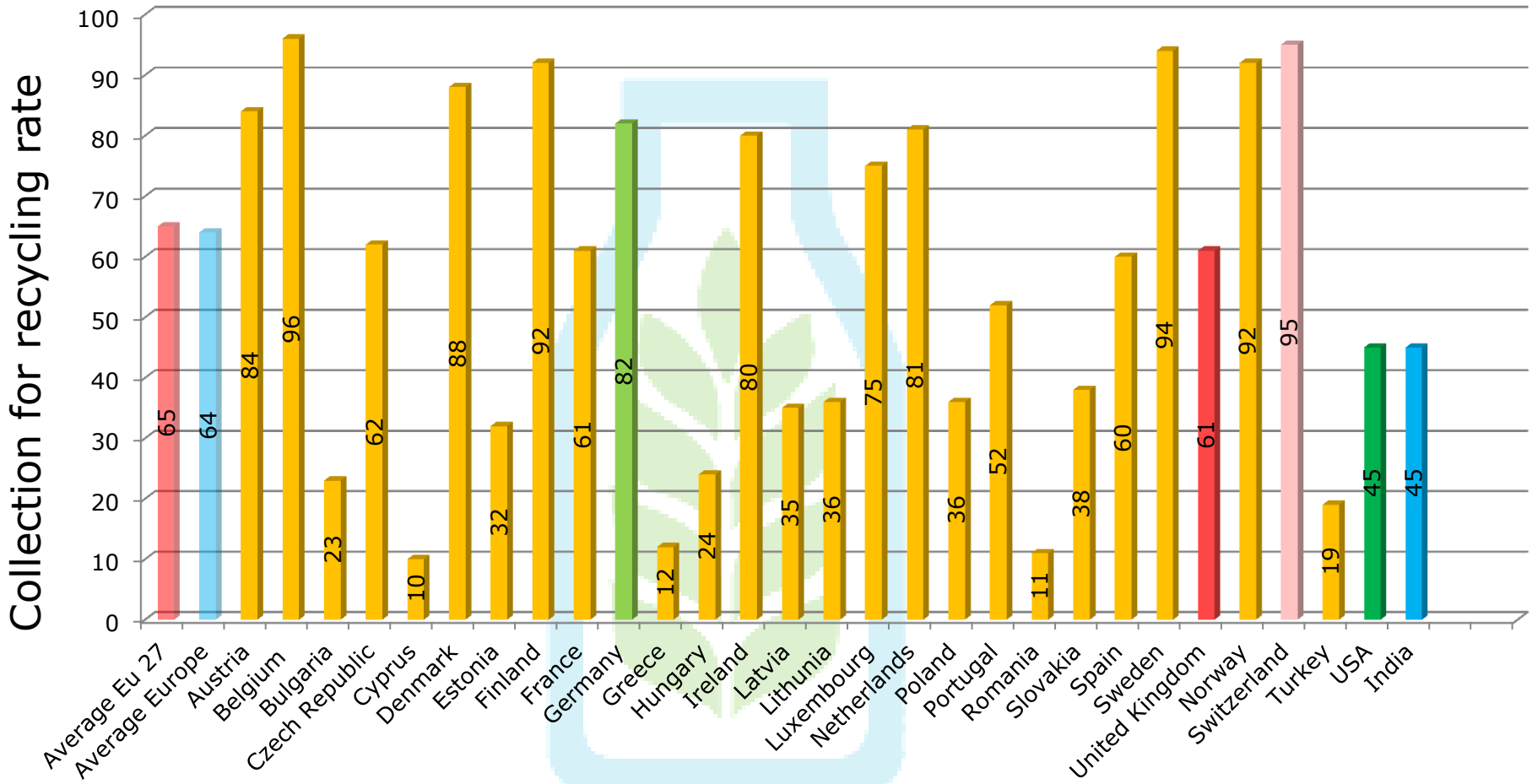
Used Bottle dealers

Collection Agent

Sorting

Broken cullet dealer

GLASS COLLECTIONFOR RECYCLING IN VARIOUS COUNTRIES



Figures in %

LEGISLATIONS / PRACTICES IN VARIOUS COUNTRIES ON RECYCLING

1.GERMANY

Germany leads the European nations in recycling, with around 70 percent of the waste the country generates successfully recovered and reused each year. To put that figure into perspective, consider this: In 2007, the U.S. was able to recover only about 33 percent of the waste generated that year.

To operate such a successful waste management system nationwide is certainly no small feat, but for the past several years the Germans have made it look easy. So how do they do it

And while the country's conscientious waste management strategy requires cooperation from the government, the industry and the citizens, it starts at the very beginning of the waste creation process – with the product manufacturers.

By incorporating waste avoidance into industry, much of Germany's waste management becomes "invisible," as corporations are forced to re-think every aspect of manufacturing. Packaging, processes and disposal of items are all engineered with recycling and elimination of waste in mind.

Federal Waste Management Policy

In 1996, German lawmakers who were concerned about the country's growing number of landfills passed the Closed Substance Cycle and Waste Management Act, which requires businesses to eliminate waste production by implementing one or more of the three management strategies.

Waste avoidance is first priority because it encourages companies to design their manufacturing processes and packaging with elimination of wastefulness in mind. Second, waste that can't be avoided must be recycled or converted into energy. Lastly, waste that can't be recovered must be disposed of in a way that is environmentally safe.

The concept in which private industries are responsible for eliminating waste – and for covering the costs – is described as the "polluter pays" principle. In other words, those who create the waste are responsible for cleaning up the mess. The U.S. has a "consumer pays" policy, in which waste management is funded by taxpaying citizens.

In 1991, Germany adopted its Packaging Ordinance, which requires all manufacturers to collect and then recycle or reuse their packaging after it is disposed of by consumers.

Making corporations responsible for their packaging to the end of its life cycle encourages them to package goods with fewer materials in order to minimize recycling and disposal costs.

The Ordinance focuses on improving three categories of packaging:

- Transport packaging (crates and shipping boxes)
- Secondary packaging (non-essential boxes, such as around bottles of vitamins)
- Primary packaging (casings that come in contact with the product, such as toothpaste tubes)

The Green Dot trademark ensures the responsibility of manufacturers' recycling and waste reduction practices.

2.SWITZERLAND

The seven swiss recycling organisations:

FERRO-Recycling (tin cans),
IGORA (household aluminium),
INOBAT (household batteries),
PET-Recycling Switzerland (PET beverage bottles),
SENS Foundation (electrical and electronic equipement),
TEXAID (textiles) and VetroSwiss (glass) are united in the umbrella organisation Swiss Recycling.

"This association exploits the communication synergies that exist between the individual recycling organisations by providing a common platform for disseminating information on the separate collection and appropriate recycling of materials. The association's independence and expertise make it a key contact for official bodies, politicians, retailers and schools throughout Switzerland on all issues relating to recycling."

Individual recycling rates

The recycling rates of the individual recyclable materials reached in 2006 a mean of 76% of all currently recyclable items being recycled. This has narrowly surpassed the Swiss government's 75% target, meaning that for the time being there will be no introduction of a recycling tax on glass bottles and jars, nor on clothes and textiles, plastic bottles, home-use batteries, light bulbs or paperware and card.

Waste incineration

Since the introduction of landfilling ban in Switzerland on 1. January 2000 all non recycled combustible waste must be incinerated. Switzerland disposes of 28 municipal solid waste incinerating facilities (April 2011).

3. UNITED KINGDOM

To set its nations on the path toward zero-waste communities, the U.K. has adopted policies similar to countries that already have some of the most successful waste management schemes, such as The Netherlands and Germany.

Until 2000, the household recycling and composting rate for the entire U.K. was less than 10 percent, but in 2006 and 2007, that figure passed 30 percent. To keep the momentum going, the U.K. Government has set goals for itself for future progress: 40 percent by 2010, 45 percent by 2015 and 50 percent by 2020, according to England's Waste Strategy Annual Progress Report (EWSAPR).

National Waste Strategies

Adequate waste collection and waste disposal are issues that the U.K. takes seriously, as made clear by the number of departments and organizations that have been formed in order to keep the countries organized and up-to-date in these matters.

The U.K. government ideally wants to reduce, or at least stabilize, the rate at which waste is created. It encourages the use of as few natural resources as possible in the manufacturing of goods, as well as efforts to recover value from whatever materials remain post-use.

According to the EWSAPR, all U.K. countries have adopted variations of essentially the same hierarchy of waste management prioritization, which is:

1. Waste prevention
2. Reuse
3. Recycling and composting
4. Disposal with energy recovery
5. Disposal

In 1990, the U.K.'s Environmental Protection Act (EPA) set forth a number of eco-conscious standards, including limits on emissions and guidelines for issuing waste disposal licenses. Added to the EPA five years later, the Environment Act of 1995 directed the Secretary of State for Environment, Food and Rural Affairs to prepare a National Waste Strategy for England and Wales and the Scottish Environment Protection Agency (SEPA) to create a strategy for Scotland.

According to the Environment Agency, in 2006 and 2007, the amount of material collected from households for recycling was 8 million tons and included:

- 36 percent compost
- 19 percent paper and cardboard
- 10 percent glass
- 7 percent scrap metal and miscellaneous

Of recycling in Belfast, Finch says, "The recycling is really good. Everyone does recycle, as it is pushed by the city. You get three trash cans per house: a green one for recyclables, a brown one for compost and a black one for trash. The city picks them all up every week."

4.CHINA

In 2004, the urban areas of China generated approximately 209 million tons of municipal solid waste, catapulting the nation past the U.S. as the largest generator of waste in the world.

Since then, that figure has increased at an accelerated rate. Currently, China is estimated to produce more than 220 million tons of municipal waste annually, and due to the country's rapid population growth and waste management structures, the amount is projected to reach a shocking 533 million tons by the year 2030, according to the World Bank.

In the course of the next several decades, municipal authorities will not be able to stop the waste stream from growing. However, experts say if China responds relatively quickly, and with the appropriate actions, the rate at which it grows could be dramatically reduced.

WASTE COLLECTION AND RECYCLING

By and large, people do not sort their trash at home; recyclables and regular waste are disposed of in the same bins. Also, levels of waste collection services vary across the country. In some areas, waste is collected up to three times per day, but in others, there is no regular collection at all. Overall, collection efficiency is more present in the east side of China than in the west.

"The trash collectors come around to take the trash away," says Yang. "What the citizens need to do is to place the trash bag at a specific place close to [their] residence building. In the public areas, there are sort-out trash cans, but people don't always realize it. They still throw all the trash into whatever trash cans."

Waste Pickers

China's waste management system has two components: formal and informal. Interestingly enough, there are more individuals who work in the informal sector of waste services than in the formal.

Urban waste collectors are paid by local governments to mainly collect and transport residential waste, but in some cities, these individuals may also sell the recycled materials to supply the municipality with an additional revenue stream.

The informal sector is comprised of low-income individuals, sometimes even children, called waste pickers, who collect recyclable materials to sell to recycling facilities.
Banned from collection bins because they interfere with collection services, these individuals frequently sort through waste in hazardous landfills and other locations.

Waste pickers may be considered a nuisance to landfill and collection site managers, but the World Bank estimates that they reclaim as much as 20 percent of the country's waste. Also, waste picking does provide informal employment for some.

Future Progress

According to the World Bank, China's current waste management data is largely insufficient, making it difficult to create accurate all-inclusive reports, or to even set long-term goals for waste reduction per capita, as well as for the country as a whole.

But experts agree that a few things are certain, regardless of the numbers: If China is to slow its rate of waste generation, it will have to take into consideration a number of factors, including:

- Brownfield cleanup
- Effective composting
- Waste segregation at the source
- Widespread collection services
- Safer landfills that can be used for longer periods of time

5. INDIA

Waste management is a major problem in India. Faced with rapid population growth, disorganization of city governments, a lack of public awareness and limited funding for programs, cities have struggled for years to find a way to responsibly manage the country's ever-increasing amount of trash.

The Central Public Health and Environmental Engineering Organization (CPHEEO) has estimated that waste generation in India could be as much as 1.3 pounds per person per day. That figure is relatively low, compared to the 4.6 pounds of waste generated per person per day in the U.S. However, as of July 2009, the U.S. population was close to 307 million, whereas India's population was nearly four times greater, at 1.2 billion.

These statistics mean that India could be generating as much as 27 million more tons of waste than the U.S. per year, although it has only one-third the land space when it comes to finding suitable locations for final disposal.

Many argue that the country's poorly organized waste management scheme will continue to result in serious health problems and irreversible damage to the environment. Most agree that the government, industry and citizens need to work together to make major improvements.

A City's Seven Responsibilities

In India, each municipality is responsible for organizing its own waste management in the following areas:

1. Waste segregation and storage at the source
2. Primary collection
3. Street sweeping
4. Secondary waste storage
5. Transport of waste
6. Treatment and recycling options for solid waste
7. Final disposal

Unfortunately, each of these seven stages are frought with difficulties, and city services and citizen cooperation can be, overall, inefficient.

Currently, there is no official system for the widespread collection of recyclables, and the tasks of collecting, transporting and disposing of waste are done under very unsanitary conditions. These problems have been created in part by low budgets and a lack of technology and manpower

Waste Management Legislation

State and city legislation include some directives for the collection, transport and disposal of waste, but the wording lacks specifics. The laws require each city's chief executive to see to it that streets are swept, trash bins are provided and waste is transported to dumping sites, but the laws do not say exactly how these tasks should be carried out.

The majority of city legislation also does not:

- Clearly prohibit citizens from littering
- Outline any widespread collection schemes
- Specify types of waste bins for storage
- Require sanitation workers to use covered transportation
- Require treatment of waste and landfills

Without laws to govern accountability, India's waste management system remains outdated.

In 1996, a public interest litigation was filed in the Supreme Court (Special Civil Application No. 888 of 1996) against the government of India, state governments and municipal authorities, claiming they were failing to fulfill their waste management duties in an acceptable manner.

Municipal Solid Waste Rules 2000

The four steps of the MSW Rules 2000 are:

1. Set up waste processing and disposal facilities.
2. Monitor the performance of processing and disposal once every six months.
3. Improve existing landfill sites.
4. Identify landfill sites for future use and make the sites ready.

The Rules 2000 put forth more strict requirements for collection, transport and disposal of waste. For example, different types of waste should not be combined and must be collected separately. Also, city officials must ask their state's pollution control board for authorization to set up waste bins and processing facilities, and these officials must also deliver annual progress reports to the board.

Future Progress

According to a 2008 report by The World Bank, if an efficient system were in place, roughly 15 percent of India's waste materials such as paper, plastic, metal and glass could be recovered and recycled. If the 35 to 55 percent that is organic waste could also be recovered, that would leave only 30 to 50 percent to be sent to landfills.

Part of India's improvements for waste sanitation will need to include better outreach to its citizens regarding the benefits of clean waste practices and caring for the environment. Also, experts have suggested that assigning some responsibilities to the private sector could provide advantages such as salaries based on job performance, access to better technology, job creation and more effective administration.

But as countries such as Switzerland, the Netherlands and Germany have already proven, a major key to reducing waste is limitation at the source of creation. Perhaps by creating more programs and initiatives to better encourage citizens, manufacturers and communities to be less wasteful, the country of India will find it easier to continue taking steps toward a cleaner, safer environment.

ENHANCING GLASS RECYCLING IN INDIA - CHALLENGES

1. Lack of awareness among the citizens on the benefits of recycling.
2. Lack of awareness among Government functionaries on the benefits of recycling.
3. Primitive methods for collection and disposal of municipal waste.
4. Lack of initiatives from the industry on senisitising the citizens and the Government on the benefits of recycling.
5. Lack of infrastructure for separation and processing of various waste materials such as glass, tin, plastic etc. in scientific manner.
6. Geographical spread of consumers especially in the rural areas.
7. High cost of transportation.
8. Increasing man-power cost.
9. Unorganized Trade.

To Secure Government and NGOs support for glass recycling

1. Glass industry and industry associations have to take lead in sensitizing the people on the benefits of recycling of glass.

2. Serious efforts by the industry and the industry associations in convincing the state and central governments in connection with return of used packing material to the retainers in line with the similar legislations in countries where recycling rates are extremely high.

For example:

Germany has taken implementation of stringent measures very seriously and under the regulations retailers selling pre-packaged food and drinks are obliged to collect the packaging (bottles, cans, cartons etc.) from the customer from the point of sale. Mandatory deposit is charged on all non-returnable containers. Waste package is then returned to manufacturer and or marketer for re-use or re-cycling. For refillable beverage containers the authorities are set stringent returnable norms.

3. Influence the government to provide adequate infrastructure for collection and separation of waste.

4.Involve non-governmental organizations in bringing out above mentioned regulations and also sensitize the people regarding benefits of recycling.

For example:

a) October 2010: Federal Trade Commission, USA released "**GREEN GUIDES**" which provide recommendations on re-cycling.

b) Mexican Centre for Philanthropy awarded VITRO the distinction of being the socially responsible company 2010 for its recycling programme.

c) In September Verallia launched a website design and virtual glass recycling programme at www.captaincullet.com

d) In October, similarly Anchor Glass Container partnered with the Tampa Museum of Science to show case the value of glass bottle recycling. Several states in US legislate introduction and expansion of bottle deposit programmes.

5. To campaign through the media and promote events to put forth the benefits of recycling.

For example:

a. The Glass Packaging Institute's Recycle Glass Week was environmental sponsor for the 29th annual Race Across America, the 3000 mile endurance cycling race from Oceanside, California to Annapolis, Maryland. At Recycle Glass week sponsored event time stations in five cities, approx. 4000 people came out to show their support and learnt about the environmental benefits of recycling glass bottles and jars.

b. A Symposium recently organised by "**The Glass Manufacturing Industry Council – USA**."

"**Glass recycling in America – Challenges and opportunities"** is described as a first step towards the creation of a coalition involving glass manufacturers and suppliers, waste managers, cullet processors, city and state government authorities etc. bringing together all the constituents required to layout the technical and economic barriers and incentives to increased cullet utilization.

To Secure Government and NGOs support for glass recycling

6. Industry to develop aggressively light weight one way containers to increase the availability of waste glass and improve recycling.

7. Industry to actively lobby with the Government for 100% reimbursement on capital expenditure incurred on setting up cullet processing facilities by glass industries.

8. Removal of all state taxes and central taxes on sale of cullet.

Bottom line: As industry would be the largest beneficiary of increased glass recycling, it is up to the industry to sensitize all concerned such as government, NGOs and the citizens with regard to the economic and environment benefits of recycling and secure relevant regulations and responses.

Standards of cullet

Impurities	a	b
Organic substances i.e.paper, plastics, corks etc.	< 400 g/t	< 15 g/t
Magnetic metals	< 5 g/t	< ca. 0 g/t
Non-magnetic metals	< 5 g/t	< 5 g/t
Lead	< 5 g/t	< 2 g/t
Ceramic, stones etc.	< 60 g/t	< 30 g/t

a - Conventionally treated cullet
b - Treated cullet with washing and ceramic separation

Cullet Standards
Permissible Colour mix (ASTM E708)

Amber Glass Cullet:

90 to 100% Amber
0 to 10% Flint
0 to 10% Green
0 to 5% other Colours

Green Glass Cullet:

50 to 100% Green
0 to 35% Amber
0 to 15% Flint
0 to 4% other Colours

Flint Glass Cullet:

95 to 100% Flint
0 to 5% Amber
0 to 1% Green
0 to 0.5% other Colours

Glass Recycling video

THANK YOU