Zero Waste: Theory & Practice Around the World

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United Nations, Jan 12, 2010
A. A quick word about sustainability
B. Zero Waste the Springboard to Sustainability
C. The critical step forward
D. From ZW to sustainability
E. ZW around the world
E. Back to the Big Picture
A. A quick word about sustainability

- We are living on this planet as if we had another one to go to
Sustainability

- We would need **FOUR planets** if everyone consumed as much as the average American.
- We would need **TWO planets** if everyone consumed as much as the average European.
- Meanwhile, India, China etc. are copying our consumption patterns.
- Something has got to change and the best place to start is with waste.
“The world has enough for everyone’s need but not for everyone’s greed”

Mahatma Gandhi
Our real task is to fight over-consumption
Please note that while waste incineration is aggressively promoted by many companies and countries, it is NOT sustainable.
### Kg Greenhouse gas/tonne Municipal Waste

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A combination of recycling and composting is 46 times better</td>
<td>-461</td>
</tr>
<tr>
<td>at reducing greenhouse gases than</td>
<td>X 46</td>
</tr>
<tr>
<td>Incineration generating electricity</td>
<td>-10</td>
</tr>
</tbody>
</table>

Waste Management Options and Climate Change. AEA 2001
B. Zero Waste is the Springboard to SUSTAINABILITY
ZERO WASTE IS A NEW DIRECTION
THE BACK END OF WASTE MANAGEMENT
NO to INCINERATORS

NO to LANDFILLS

THE BACK END OF WASTE MANAGEMENT

THE FRONT END OF INDUSTRIAL DESIGN

THE FRONT ENDFRONT END

OF OF

WASTEWASTE

MANAGEMENTMANAGEMENT
THE KEY

is to find a way to use

COMMUNITY RESPONSIBILITY

At the back end to drive

INDUSTRIAL RESPONSIBILITY

At the front end
FOUR STEPS FROM ZERO WASTE TO SUSTAINABILITY

1) THE FIRST STEP.
2) THE OTHER PRACTICAL STEPS.
3) THE KEY STEP TO GET TO ZW.
4) USING ZW TO GET TO SUSTAINABILITY.
1. Zero Waste starts with something everyone has

- The ten things on the end of our hands!
- These are the “magic machines” which can make sure that we do not convert discarded resources into waste
waste → Resources
Source Separation
2. Zero Waste continues with a series of simple steps

- which are
- Practical
- Cost effective and
- Politically acceptable
Source Separation

Door to Door Collection

Composting
Waste Reduction Initiatives

Door to Door Collection

Source Separation

Composting

Recycling

Waste Reduction Initiatives

Reuse, Repair & Deconstruction
<table>
<thead>
<tr>
<th>Source Separation</th>
<th>Door to Door Collection</th>
<th>Composting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recycling</td>
<td>Waste Reduction Initiatives</td>
<td>Reuse, Repair &amp; Deconstruction</td>
</tr>
<tr>
<td>Economic Incentives</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. The critical step forward to achieve Zero waste

- This is where Community Responsibility Must be used to drive Industrial Responsibility
Residual Separation & Research Facility
Waste Reduction Initiatives
Source Separation
Door to Door Collection
Composting
Reuse, Repair & Deconstruction
Recycling
Waste Reduction Initiatives
Residual Separation & Research Center
Economic Incentives
Door to Door Collection
Composting
Reuse, Repair & Deconstruction
Recycling
Waste Reduction Initiatives
Residual Separation & Research Center
Economic Incentives
Residual Separation & Research Facility
RESIDENTIAL SEPARATION & RESEARCH FACILITY

1. Built at entrance to landfill
2. No material can enter landfill without it being separated and screened
3. Toxics removed and identified
4. Dirty organics biologically stabilized
5. Non-recyclable materials STUDIED
RESIDUAL SCREENING & RESEARCH FACILITY

MORE RECYCLABLES

MORE TOXICS

NON-TOXIC, NON-BIODEGRADABLE FRACTION

RESEARCH CENTER

INTERIM LANDFILL

DIRTY ORGANIC FRACTION

BIOLOGICAL STABILIZATION
RESIDUAL SEPARATION & RESEARCH FACILITY

NON-RECYCABLE MATERIALS

Local University

Or

Technical College

RESEARCH CENTER
RESEARCH CENTER

- Improve capture rate of reusables, recyclables and clean compostables
- Recommend improved waste avoidance strategies by local businesses
- Develop some local uses for some materials
- Recommend better industrial designs to industry on packaging and products
- Research for CLEAN Production
The Message to Industry:

- If we can’t reuse it, recycle it or compost it,
- Industry shouldn’t be making it
- We need better industrial design for the 21st Century
- We cannot become sustainable without it
WITH THE ZERO WASTE 2020 STRATEGY

WE CONVERT 3 TONS OF TRASH into:

1 ton of compostables 1 ton of recyclables

and

1 ton of EDUCATION for SUSTAINABILITY!
Waste Reduction Initiatives

Source Separation

Recycling

Reuse, Repair & Deconstruction

Door to Door Collection

Waste Reduction Initiatives

Residual Separation & Research Center

Composting

Economic Incentives

Door to Door Collection

Research Center
Waste Reduction Initiatives
Recycling
Reuse, Repair & Deconstruction
Economic Incentives
Residual Separation & Research Center
Better Industrial Design
Temporary Landfill
Composting
Door to Door Collection
Source Separation
2020
San Francisco

- Population = 850,000
- Very little space
- 50% waste diverted by 2000
- 63% waste diverted by 2004
- 70% waste diverted by 2008
- 72% waste diverted by 2009
- GOAL: 75% waste diverted by 2010
- GOAL: 100% by 2020 (or very close!)
70 - 80% COMMUNITY RESPONSIBILITY

Residual Separation & Research Facility

Better Industrial Design

INTERIM LANDFILL
70-80% COMUNITY RESPONSIBILITY

20-30% INDUSTRIAL RESPONSIBILITY
Industrial Responsibility

- 1. Design for sustainability
- 2. Clean production
- 3. Extended Producer Responsibility
The Ontario (Canada) Beer industry has been using refillable glass bottles for 50 years:

- 98% recovered
- Each bottle reused 18 times
- It saves the company money
- 2000 jobs in collection and cleaning
- No cost to municipality
Extended Producer Responsibility - products

XEROX CORPORATION EUROPE

- Recovers copying machines from 16 different countries
- Takes them to huge warehouses in the Netherlands, where the machines are stripped down for parts and materials
- 95% of materials recovered for reuse or recycling!
- This is saving Xerox $76 millions a year!!
Solid waste is the visible face of inefficiency!
For more examples of Industrial Responsibility

- Contact Gary Liss at gary@garyliss.com
- For more information on EPR initiatives contact Bill Sheehan at Bill@productpolicy.org
4. To move from Zero Waste to Sustainability we must use the wisest and brightest minds in our society.
Research Institute for Zero Waste and Sustainability
Research Institute for Zero Waste and Sustainability

1) Research for better industrial design
Research Institute for Zero Waste and Sustainability

1) Research for better industrial design
2) Linking zero waste with other key developments needed for sustainability
Zero Waste 2020

Education For Sustainability

Sustainable Agriculture

Sustainable Agriculture

Sustainable Community development

Sustainable Energy

Sustainable Industries & Jobs

Sustainable Economic development

Sustainable Architecture
Zero Waste 2020

- Sustainable Agriculture
- Education for Sustainability
- Sustainable Architecture
- Sustainable Energy
- Sustainable Industries & Jobs
- Sustainable Community Development
- Sustainable Economic Development

Better Industrial Design
Zero Waste 2020

- Sustainable Agriculture
- Sustainable Community development
- Sustainable Economic development
- Sustainable Energy
- Sustainable industries & Jobs
- Sustainable Architecture
- Education For Sustainability
- Research Center
- Deconstruction
- Composting
- Anaerobic Digestion

Better Industrial Design

Incineration is not sustainable energy!
Zero Waste 2020

Sustainable Agriculture
Sustainable Community development
Sustainable Economic development
Sustainable Energy
Sustainable Architecture
Composting
Research Center
Deconstruction
Anaerobic Digestion

Better Industrial Design
Sustainable industries & Jobs
100’s of “green boxes”
Zero Waste 2020

- Education
- Sustainable Agriculture
- Sustainable Economic development
- Sustainable Community development
- Sustainable Energy
- Sustainable industries & Jobs
- Sustainable Architecture
- Composting
- Research Center
- Deconstruction
- Anaerobic Digestion
- Reuse & Repair Centers
- Better Industrial Design

100’s of “green boxes”
D. Progress towards Zero Waste around the world

- www.zwia.org
- www.GRRN.org
- www.no-burn.org (GAIA)
Envision a world without waste

- Mayor's directives
- Phase out of Urban Landfills
- RENEW LA
- No wasted resources
- Optimize City's collection programs
- 70% diversion by 2015
- 90% diversion by 2025
- Alternative Technology
- Convert the City's 750+ collection trucks to clean-burning LNG by 2010
- Sustainable waste resources/biosolids management
Solid Waste Integrated Resources Plan
All of us together can make Zero!

Media Breakfast Briefing
January 23, 2007

Reina Pereira, Project Manager, SWIRP and
Senior Environmental Engineer,
Los Angeles Bureau of Sanitation
As a result of a state law passed in the early 1990’s, hundreds of California cities exceeded over 50% diversion from landfills and incinerators by 2000.

Some communities said why stop at 50%, why not 60%, 70%…

Why not aim for Zero Waste?
NEW ZEALAND

Over 70% of communities have declared a Zero Waste strategy.
Prince Edward Island, Canada

- Whole island has door to door collection of recyclables and compostables
Nova Scotia

- 50% diversion in 5 years (Halifax ~ 60%)
- 1000 jobs created collecting and treating discarded materials
- Another 2000 jobs created in the industries handling the collected material
- Nearly all the separated materials are reused in Nova Scotia’s own industries.
Over 2000 communities in Italy are achieving over 50% diversion using “door to door” collection systems.

Over 200 communities achieving over 70% diversion.
Italy

- **Novara** - (a city near Turin, population = 100,000) achieved 70% diversion in just 18 months!
The Treviso region - 22 communities averaging 76% diversion (Priula consortium)
Italy

- Villafranco d’Asti (Piedmont) has reached 85% diversion
Some other developments

- Canberra, Australia
- Kovalam, India
- The Philippines and
- The UK
E. Some practicalities
“The Fantastic 3”

The San Francisco system
I “Fantastici 4”

Capannori, Italia
<table>
<thead>
<tr>
<th>Giorno</th>
<th>Percorso</th>
<th>Icona</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lunedì</td>
<td>Organico</td>
<td>🍁</td>
</tr>
<tr>
<td>Martedì</td>
<td>Multi Materiale</td>
<td>🔄</td>
</tr>
<tr>
<td>Mercoledì</td>
<td>Carta</td>
<td>🍂</td>
</tr>
<tr>
<td>Giovedì</td>
<td>Frattono Residualetto</td>
<td>🍃</td>
</tr>
<tr>
<td>Venerdì</td>
<td>Organico</td>
<td>🍁</td>
</tr>
<tr>
<td>Sabato</td>
<td>Multi Materiale</td>
<td>🔄</td>
</tr>
</tbody>
</table>
Composting plant for San Francisco
Composting Facility
Composting Facility

Materials Recovery Facility
MATERIALS RECOVERY FACILITY

at Pier 96
Composting Facility

Materials Recovery Facility

Residual Fraction
We have to minimize the residual fraction with...

1) Waste reduction initiatives
2) Reuse, repair and deconstruction
3) Economic incentives
Waste Reduction Initiatives
Undesirable packaging

Four options:
- Ban it
- Tax it
- Put a returnable deposit on it
- Avoid it
Ireland

- Government put a 15 cent tax on plastic shopping bags
- reduced use by 92% in one year!
Italy

- Several supermarket chains are providing dispensers which allow customers to refill shampoo and detergent bottles...

- As well as wine, water and milk
Alcune iniziative italiane per la riduzione
• Un pizzico di creatività a monte può far risparmiare milioni a valle
Reuse, Repair and Deconstruction
## VALUE OF L.A. DISCARDS

<table>
<thead>
<tr>
<th>Market Categories</th>
<th>%</th>
<th>Tons/Year</th>
<th>$/ton</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reuse</td>
<td>2.0</td>
<td>72,000</td>
<td>550</td>
<td>39,600,000</td>
</tr>
<tr>
<td>2. Paper</td>
<td>22.8</td>
<td>792,000</td>
<td>20</td>
<td>15,840,000</td>
</tr>
<tr>
<td>3. Plant Debris</td>
<td>5.5</td>
<td>198,000</td>
<td>7</td>
<td>1,386,000</td>
</tr>
<tr>
<td>4. Putrescibles</td>
<td>17.0</td>
<td>612,000</td>
<td>7</td>
<td>4,284,000</td>
</tr>
<tr>
<td>5. Wood</td>
<td>4.0</td>
<td>144,000</td>
<td>8</td>
<td>1,152,000</td>
</tr>
<tr>
<td>6. Ceramics</td>
<td>13.0</td>
<td>468,000</td>
<td>4</td>
<td>1,872,000</td>
</tr>
<tr>
<td>7. Soils</td>
<td>10.0</td>
<td>360,000</td>
<td>7</td>
<td>2,520,000</td>
</tr>
<tr>
<td>8. Metals</td>
<td>4.0</td>
<td>144,000</td>
<td>40</td>
<td>5,760,000</td>
</tr>
<tr>
<td>9. Glass</td>
<td>2.0</td>
<td>72,000</td>
<td>10</td>
<td>720,000</td>
</tr>
<tr>
<td>10. Polymers</td>
<td>8.0</td>
<td>288,000</td>
<td>100</td>
<td>28,800,000</td>
</tr>
<tr>
<td>11. Textiles</td>
<td>2.0</td>
<td>72,000</td>
<td>20</td>
<td>1,440,000</td>
</tr>
<tr>
<td>12. Chemicals</td>
<td>0.5</td>
<td>18,000</td>
<td>15</td>
<td>270,000</td>
</tr>
<tr>
<td>No market (diapers, treated wood, mistakes)</td>
<td>10.0</td>
<td>360,000</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL PER YEAR</strong></td>
<td>100</td>
<td>3,600,000</td>
<td></td>
<td><strong>$103,644,000</strong></td>
</tr>
</tbody>
</table>
Reuse, Repair & Deconstruction

Urban Ore, Berkeley, California
“Economically, incineration represents ONE BIG BLACK BOX

The Zero Waste strategy represents 100’s of LITTLE GREEN BOXES”

(Ted Ward, Zero Waste, Del Norte County, California)
Deconstruction
VIDEOS

“On the Road to Zero Waste”

- Part 1: Nova Scotia
- Part 2: Burlington, Vermont
- Part 3: Canberra, Australia
- Part 4: San Francisco
- Zero Waste: Idealistic Dream or Realistic Goal?
- Pieces of Zero: Creativity versus Waste

www.AmericanHealthStudies.org
Economic Incentives
The “Pay by bag” system
The “Pay by bag” system

1
2
3

free
The “Pay by bag” system

1 free

2 free

3
The “Pay by bag” system

1 free

2 free

$ The more you make, the more you pay!
The “Pay by bag” system

1. No surcharge

2. No surcharge

$ Surcharge!
The “Pay by bag” system

1. No surcharge
2. No surcharge

Total cost of program comes out of local taxes

Surcharge!
Composting Facility

Materials Recovery Facility

Community Initiatives to Reduce waste

Reuse & Repair & Deconstruction

Residuals ?
Residual Separation & Research Facility
One stop shopping!
The Resource Recovery Park

Materials Recovery Facility (MRF)
The Resource Recovery Park

Composting Facility
The Resource Recovery Park

C & D
The Resource Recovery Park

Residual Screening & Research Center
F. Back to the Big Picture
Current situation

Consumption of materials

Consumption of fossil fuels

Standard of living
Change 1

Solar Energy

Consumption of materials

Standard of living
Change 2

Solar Energy

Zero Waste

Standard of living
Change 3

Solar Energy

Zero Waste

Quality of Life
We have to separate the **Quality of life** from the **material consumption**
We have to separate the **Quality of life** from the **material consumption**
We have to separate the **Quality of life** from the **material consumption**

Material consumption

Quality of life
To fight over-consumption

We need to swap a life built around acquiring a series of objects...
To a life built around a series of expanding human relationships
In the 1960’s

“Make Love, Not War”
In the 2000’s

“Make Love, Not Waste”
In the 2000’s

“Make Friends, Not Waste”
Conclusions

- We do not need mega-landfills or incinerators!
- There is a better alternative
- The ZERO WASTE strategy is
- Better for our health (LESS TOXICS)
- Better for the economy,
- Better for our children, and
- Better for the planet (MORE SUSTAINABLE)!