

# Reducing Environmental Impacts

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## The Importance of Zero Waste for Sustainability

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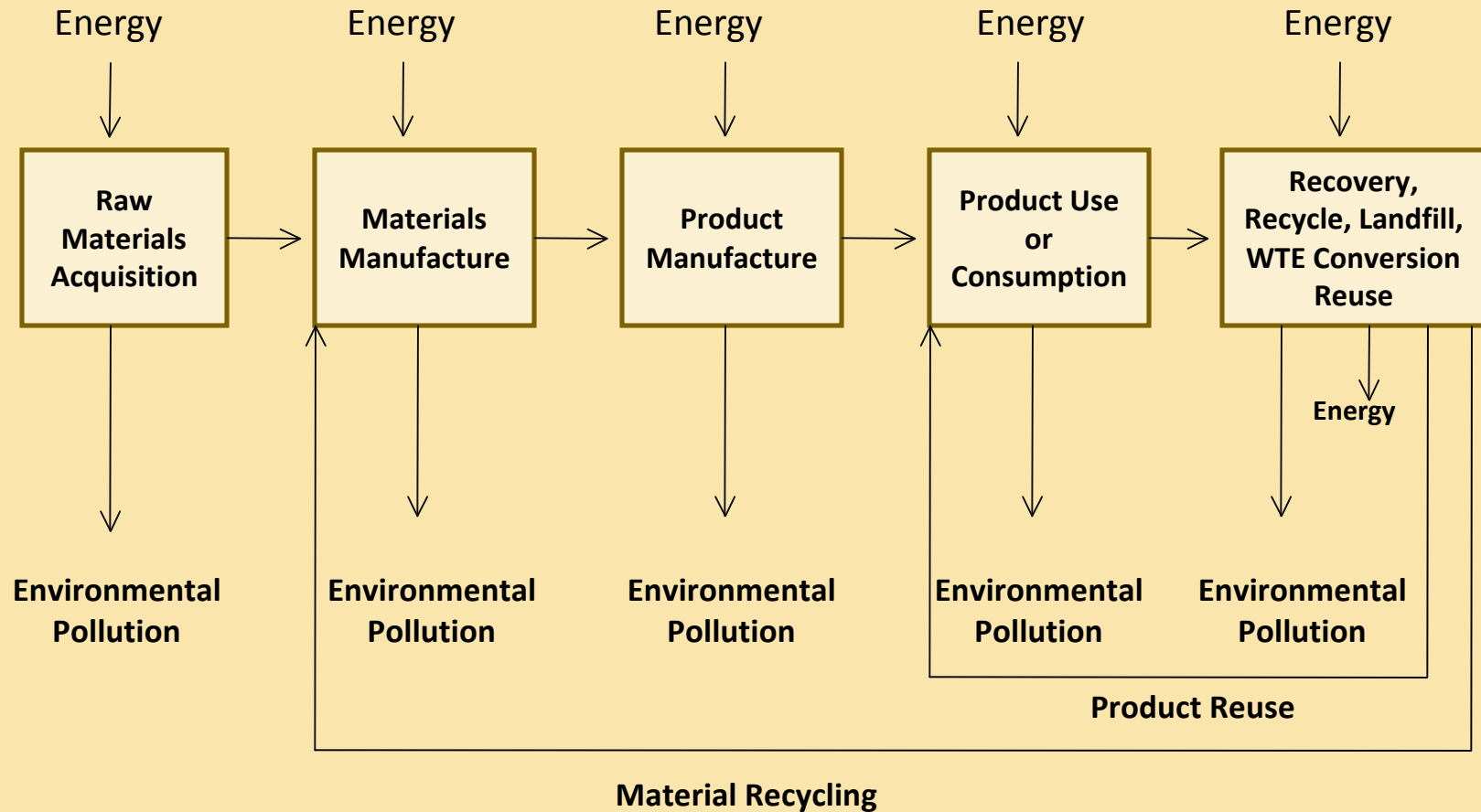
Recycling Council of Alberta Plenary, October 14, 2009

# Economics – The Good, The Bad & The Ugly

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1. Efficiency & Equilibrium – the magic of competitive markets (Adam Smith's invisible hand creates optimality).
2. Externalities – pollution from free disposal (If it doesn't have a price or cost the market ignores it).
3. Equity – dollar votes drive markets (Those without dollars don't get to vote; those with more dollars get more votes).

# Life Cycle Analysis (LCA)



## 3 Phases to a Product's Life Cycle

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1. Upstream - “cradle”
2. Use
3. End-of-Life (EOL) - “grave”, or if recycling rather than disposal is EOL fate, then “cradle”.

## The CEI Solution

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- An index like the CPI - except covers all consumer purchases, not just unchanging basket, and measures changes over time in environmental impacts, rather than prices.
- Covers all phases of a product's life cycle.
- Should decline when there are decreases in toxic substances, wastes and/or pollution associated with upstream, use, and/or end-of-life for a product or service.

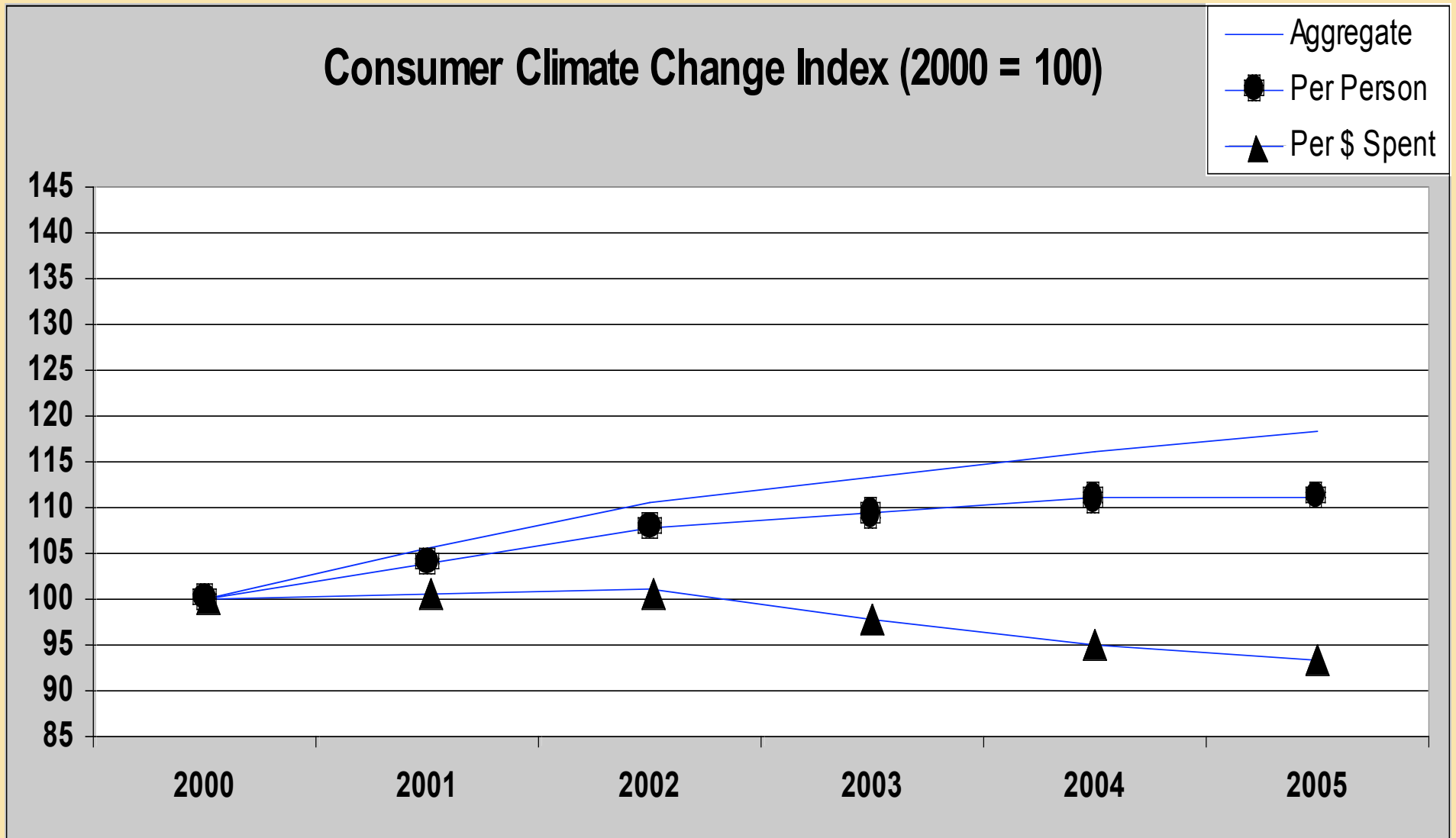
# 2005 Pollution Intensity WA Consumer Spending

	%Tot\$	<u>Climate</u>		<u>Particulates</u>		<u>Toxins</u>		<u>Carcinogens</u>		<u>EcoToxicity</u>	
		Kg/\$	%Kg	Kg	%Kg	Kg	%Kg	Kg	%Kg	Kg	%Kg
<i>Home Heat/Cool</i>	5.5%	5.13	30.7%	9.2E-03	46.2%	1.62	8.2%	4.2E-03	26.0%	1.7E-02	9.3%
<i>Transportation</i>	17.7	1.63	31.5	9.2E-04	15.0	1.33	21.8	1.9E-03	37.0	2.2E-02	38.5
<i>Food</i>	11.6	1.07	13.5	1.3E-03	14.0	1.09	11.8	4.7E-04	6.2	6.9E-03	8.0
<i>Home Furn/Sup</i>	11.1	0.52	6.3	5.9E-04	6.1	1.50	15.4	6.9E-04	8.6	1.2E-02	13.9
<i>Shelter</i>	19.0	0.35	7.3	4.2E-04	7.3	1.23	21.6	4.8E-04	10.2	6.2E-03	11.8
<i>Clothing</i>	4.0	0.56	2.4	7.9E-04	2.9	1.18	4.3	6.7E-04	3.0	1.5E-02	6.0
<i>Tobacco</i>	0.3	0.37	0.1	2.3E-03	0.6	1.04	0.3	4.2E-04	0.1	5.0E-03	0.1
<i>Average</i>		0.91		1.1E-03		1.08		8.9E-04		1.0E-02	
<b>Total Mg/Person</b>		<b>18.57</b>		<b>0.02</b>		<b>21.92</b>		<b>0.02</b>		<b>0.20</b>	

# Examples of Product Pollution Intensities

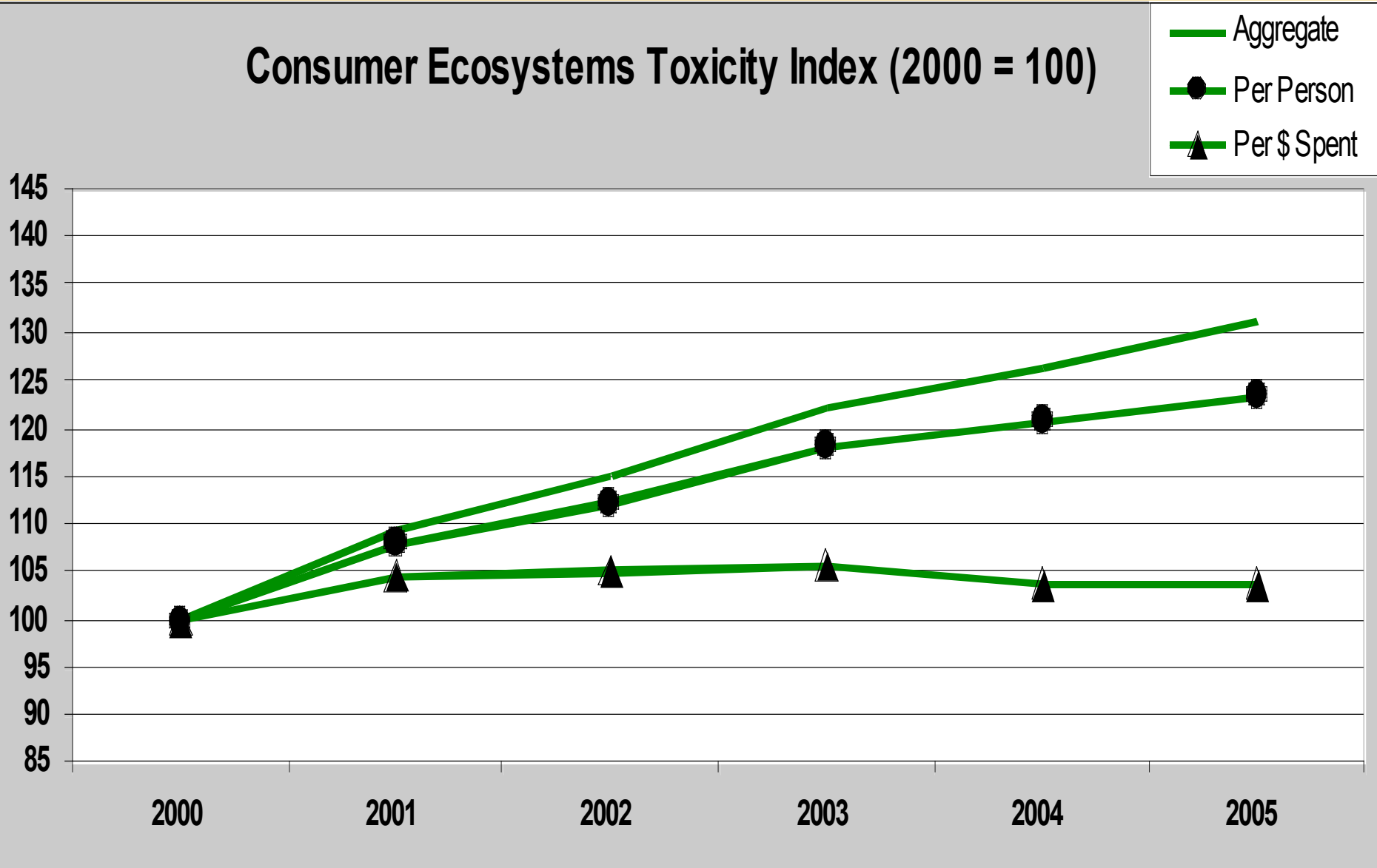
	<u>GHG</u> (kg/\$)	<u>Particulates</u> (g/\$)	<u>Toxics</u> (kg/\$)	<u>Carcinogens</u> (g/\$)	<u>EcoToxics</u> (g/\$)
Natural Gas Heating Fuel	10.9	2.0	1.3	0.5	7.3
Heating Oil	10.7	7.1	2.8	2.6	11.0
Electricity	10.5	14.9	1.6	1.6	41.8
Diesel Vehicle Fuel	9.0	7.6	2.5	2.6	9.9
Gasoline Vehicle Fuel	8.3	2.4	1.4	2.1	8.9
Water/Sewer Utilities	7.8	0.4	0.5	0.2	4.6
Bottled Gas Heating Fuel	6.8	1.5	1.3	0.6	8.0
Wood Heating Fuel	3.4	260.8	1.0	60.8	45.0
Dairy	2.4	1.7	1.5	0.0	8.7
Meat	1.9	2.3	1.8	0.0	9.5
Airline Trips	1.8	0.5	0.7	0.3	4.8
Ship Cruises	1.4	5.2	0.7	0.3	5.6
Sugar	1.4	1.4	1.3	0.8	44.0
Pet Food	1.2	1.1	1.1	0.5	7.7
Train Trips	1.1	2.1	0.7	0.3	6.8
Fruits & Vegetables	1.0	1.7	1.0	0.0	6.5
Grains & Cereals	1.0	2.7	0.8	0.0	5.4
Fish	0.9	0.9	0.9	0.0	5.4
Refrigerators	0.7	0.7	1.6	0.7	32.3
Laundry	0.7	0.6	3.0	1.2	11.3
New Cars & Light Trucks	0.6	0.7	1.7	1.1	32.5
Bus Trips	0.6	2.8	0.8	0.4	5.8
Clothing	0.6	0.8	1.2	0.7	15.0
Televisions	0.5	0.5	1.1	0.5	10.7
Computers	0.4	0.4	2.4	1.0	13.0
Hospital Room	0.4	0.4	1.2	0.5	5.3
Newspaper	0.4	0.4	0.6	0.2	3.1
Cigarettes	0.4	2.4	1.1	0.4	5.2
College Tuition	0.3	0.3	1.0	0.4	4.8
Postage & Delivery Services	0.3	0.2	1.7	0.7	6.5
Movie, Theater, & Ballet	0.2	0.2	0.5	0.2	2.8
Health Care	0.2	0.2	0.6	0.2	2.7
Dating Service	0.1	0.1	0.5	0.2	2.6
Insurance	0.1	0.1	0.4	0.1	1.4
<b>Average</b>	<b>0.9</b>	<b>1.1</b>	<b>1.1</b>	<b>0.5</b>	<b>10.0</b>

# Consumer Climate Change Index



# Consumer Ecosystems Toxicity Index

Consumer Ecosystems Toxicity Index (2000 = 100)

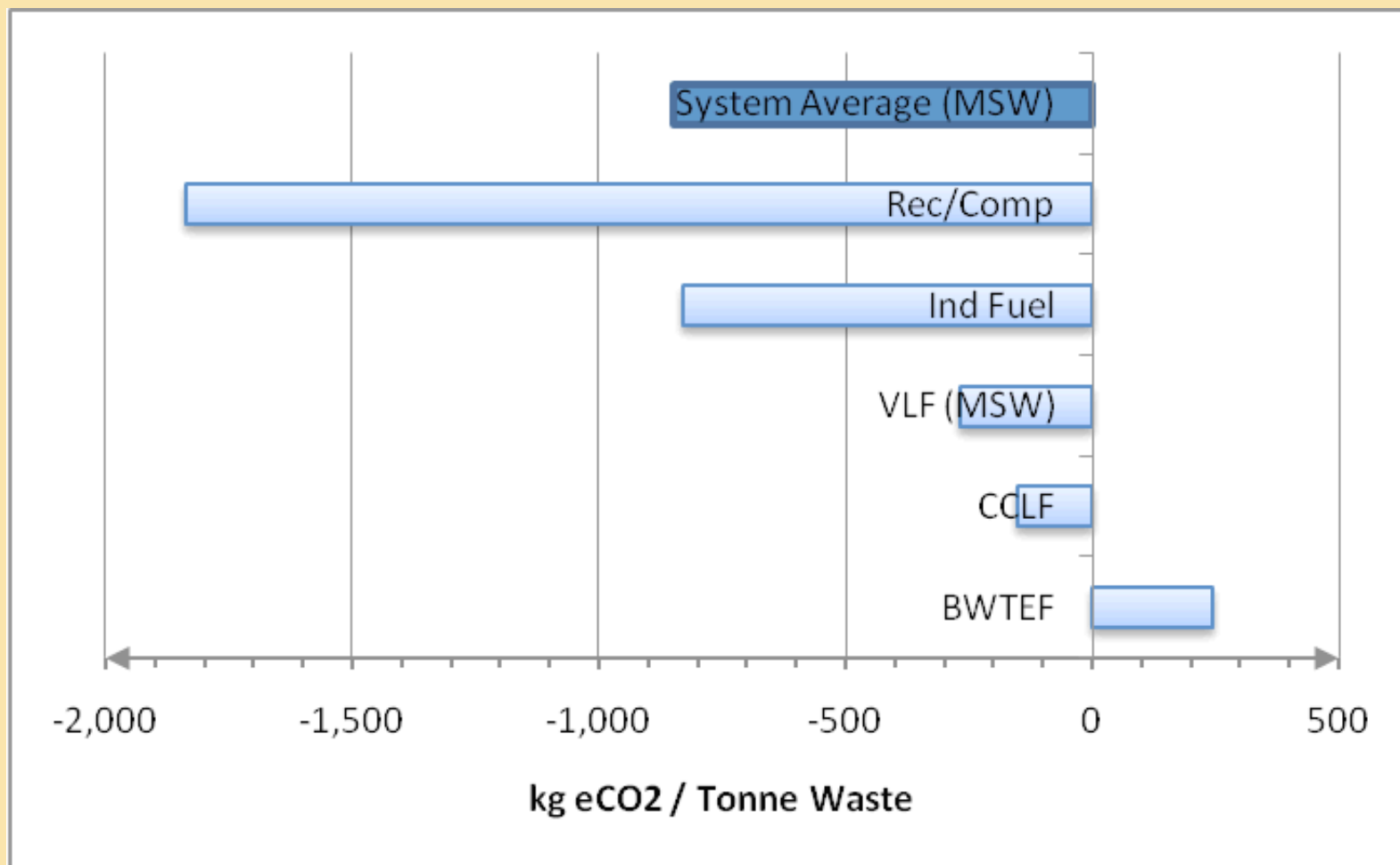


**Zero Waste Focus:**

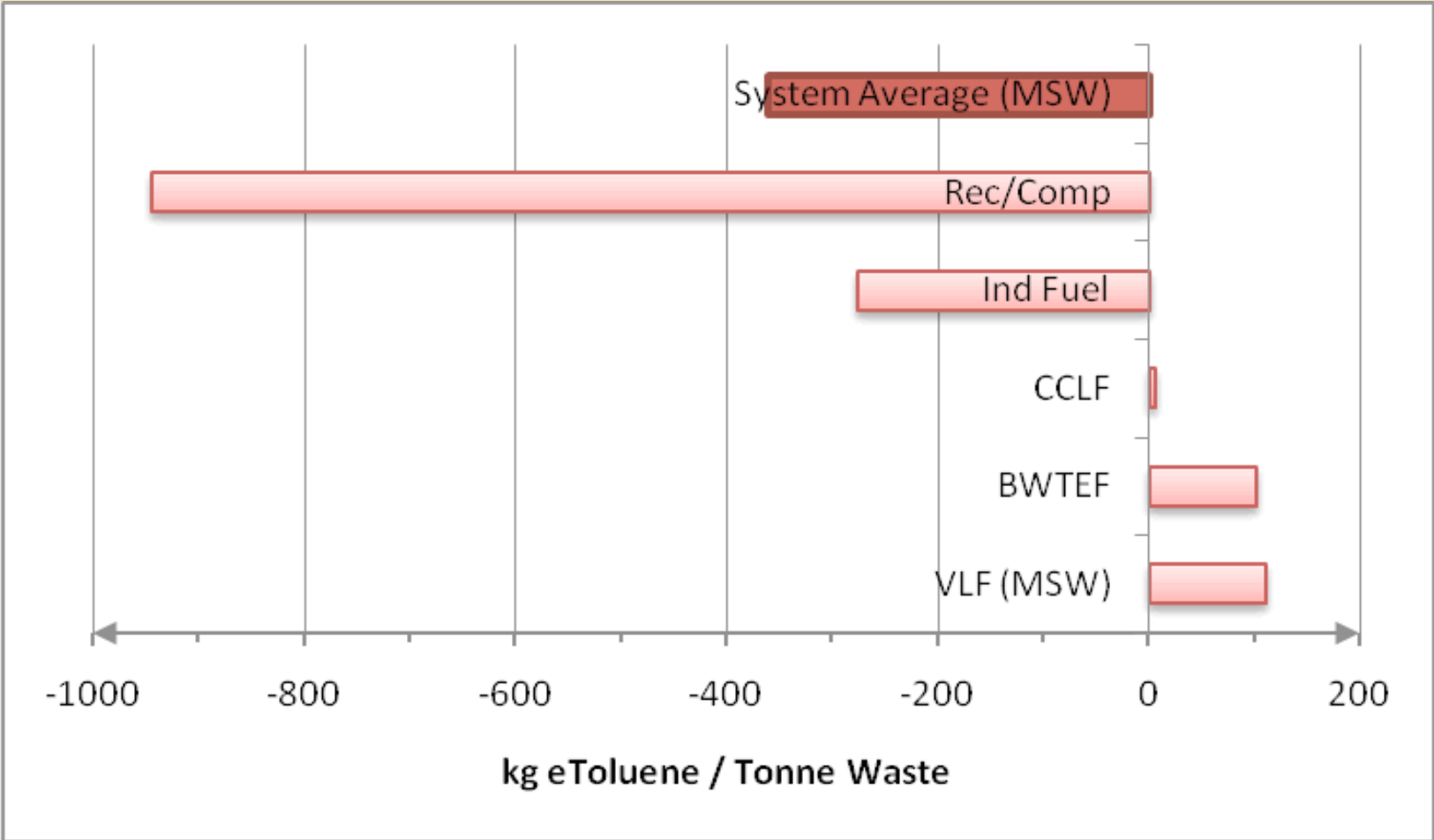
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**Waste Materials Are Resources  
That Reduce Pollution &  
Energy Use!**

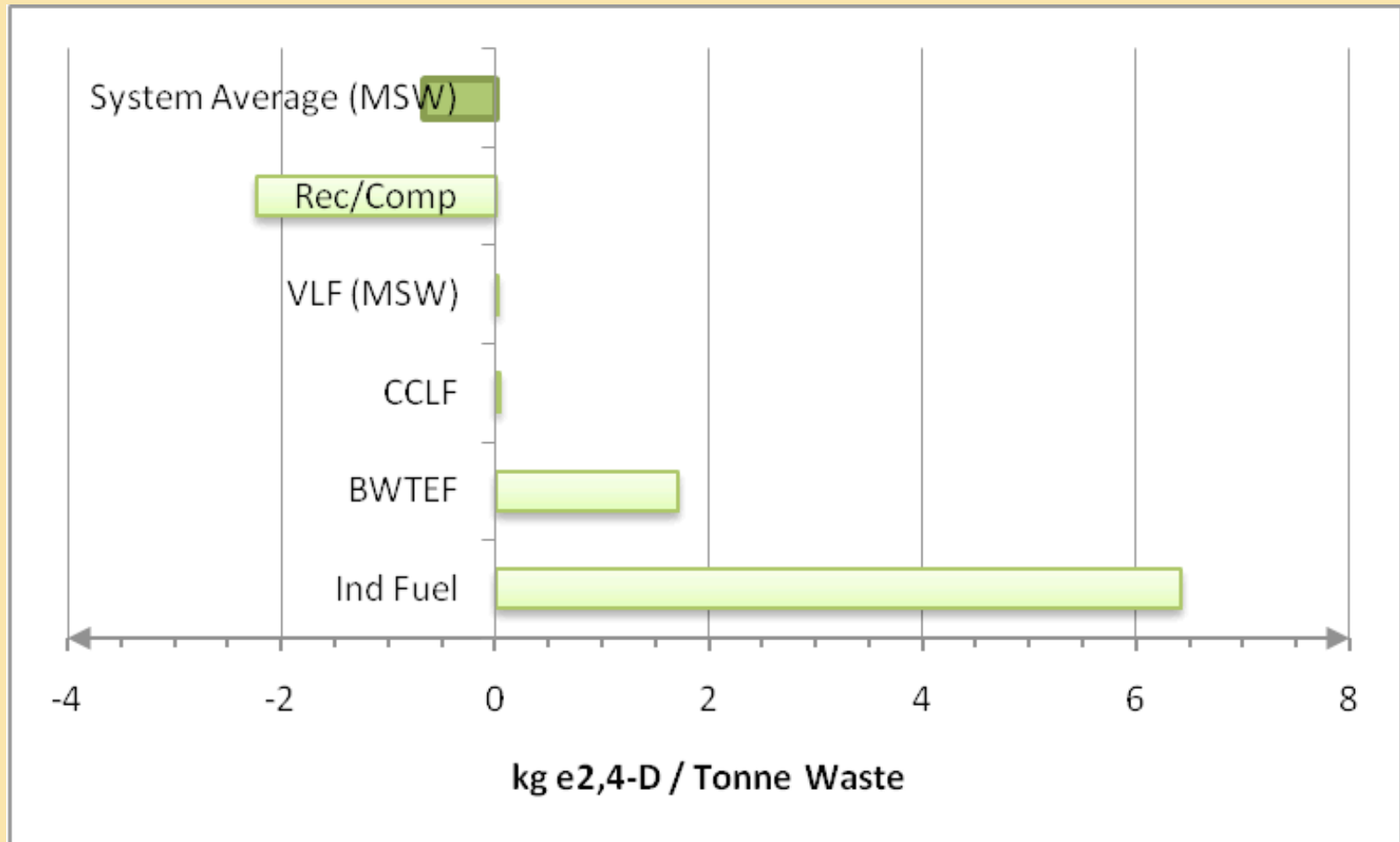
# Greenhouse Gas Emissions per Tonne – MSW (2008)



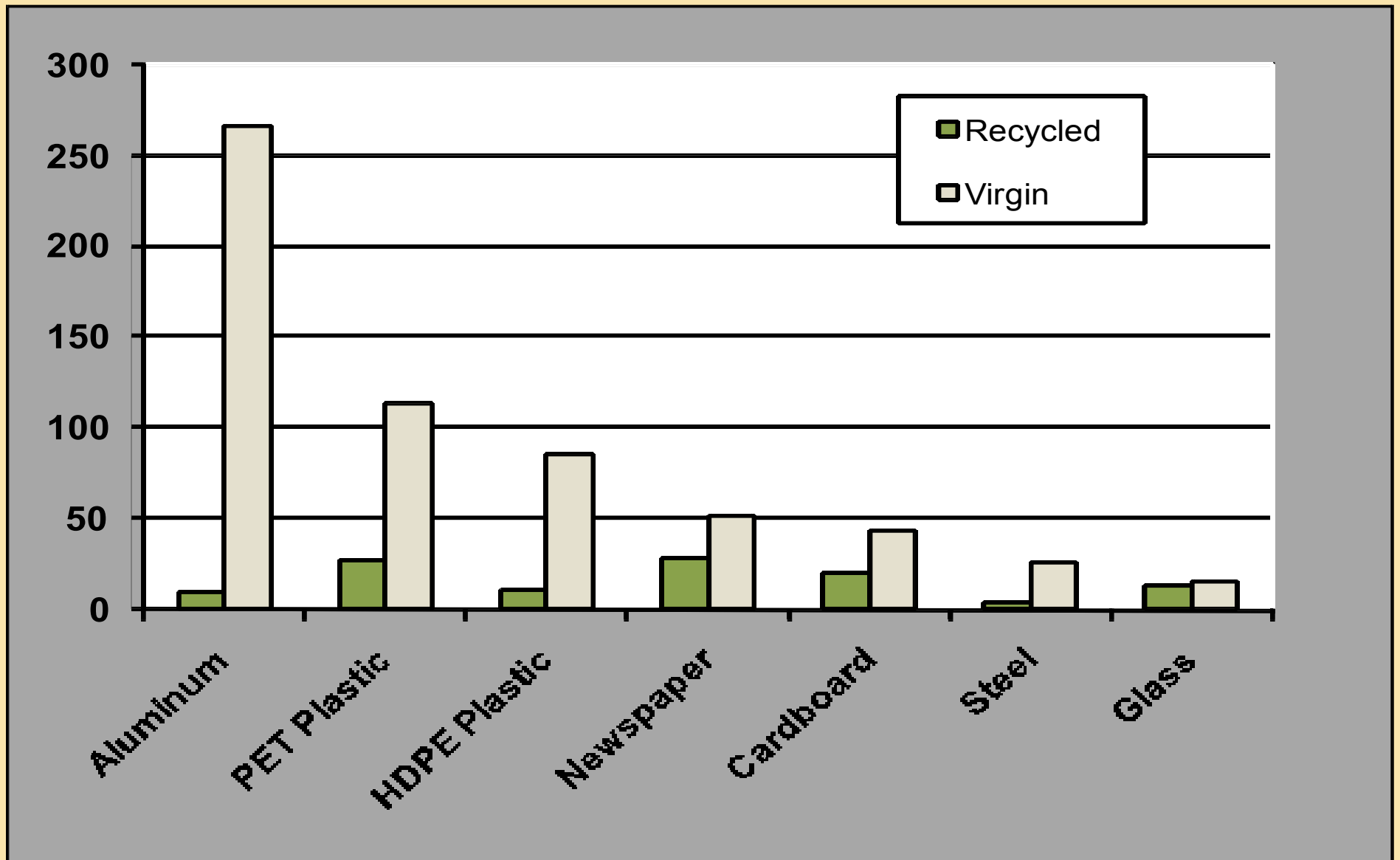
# Human Health Emissions per Tonne – MSW (2008)



# Ecosystems Toxics Emissions per Tonne –MSW (2008)



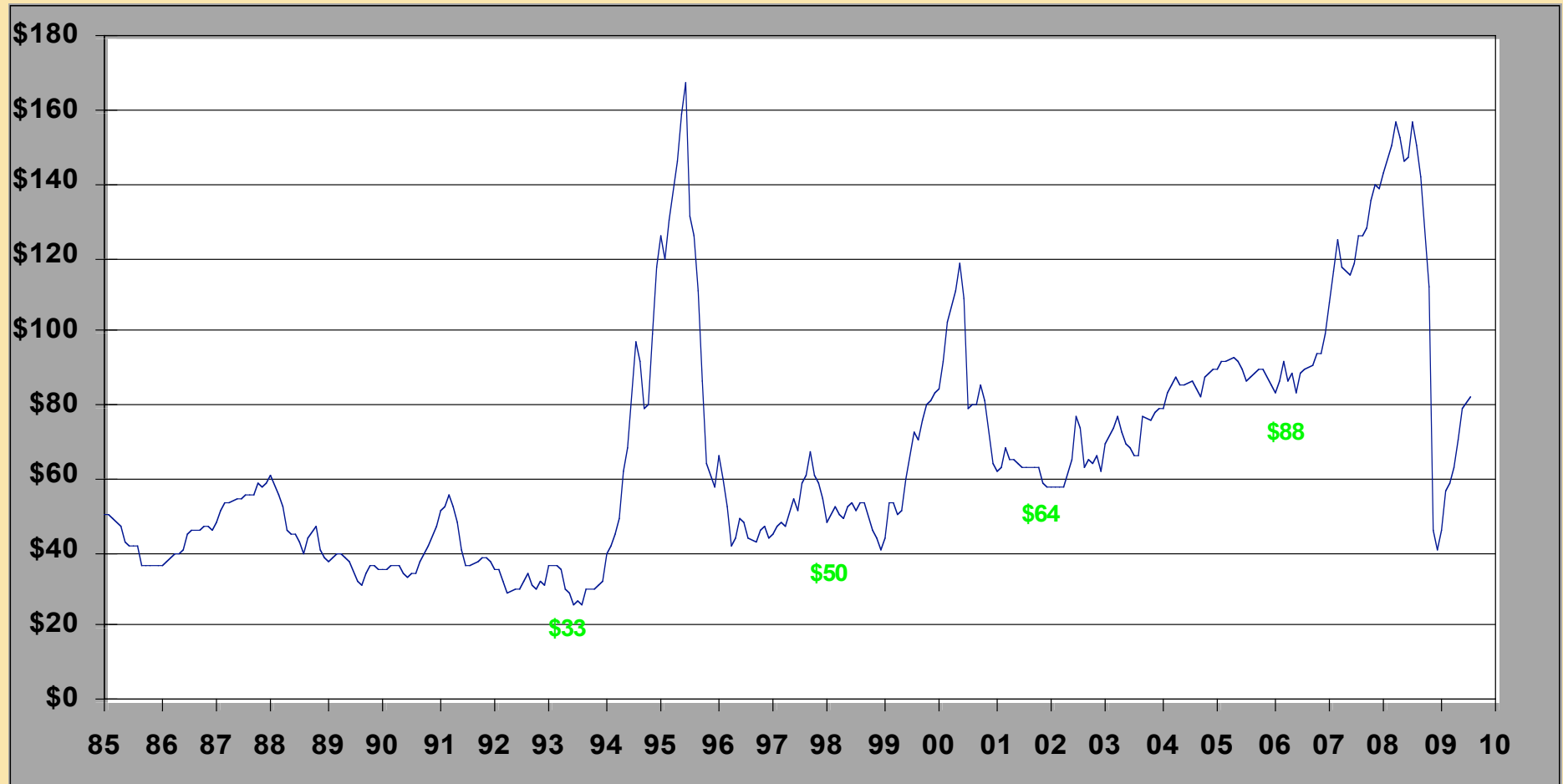
## Energy Use: Recycled & Virgin Content Products (MJ/kg)



# Environmental Value of Reuse & Recycling

Diversion Program	Environmental Value (Cn\$/tonne)
Blue Box – average	\$370
– range	70 (HDPE bottles) – 1,950 (aluminum)
WEEE Reuse – average	\$72,750
– range	3,750 (TV) – 116,250 (laptop)
WEEE Recycling – average	\$640
– range	230 (TV) – 980 (desktop)
MHSW – average	\$350
– range	60 (HDPE oil bottles) – 740 (paint)

# Market Value of Recyclables–US Northwest (US\$/short ton)



## Examples of Zero Waste & Sustainability

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1. Recycling and composting standard materials at home and work equivalent to cutting gasoline purchases by more than 50%.
2. Focus on packaging waste reduction can lead to substituting services for products, bulk purchasing instead of individually wrapped goods, and buying from local producers.
3. Focusing on waste reduction can lead to increased reuse of products – don't throw away, pass it on.

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# Thank you.

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