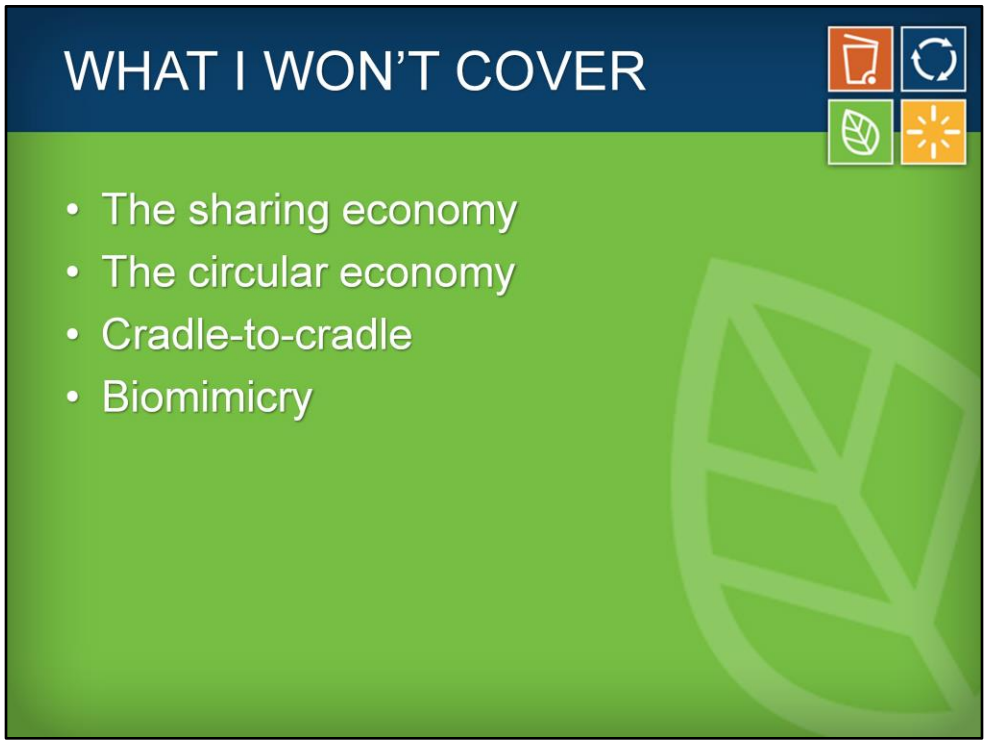
LAST YEAR I GAVE A PRESENTATION TO THIS GROUP TITLED "LESS IS LESS" ABOUT THE REALITY THAT WE ARE IN A NEW ERA OF TRASH:

- THE U.S. IS NO LONGER THE SAUDI ARABIA OF GARBAGE

THIS YEAR I WANT TO BUILD UPON THAT PRESENTATION & LOOK AT HOW ZERO WASTE – HOWEVER YOU DEFINE IT – IS HAVING AN IMPACT ON SOLID WASTE & RECYCLING

<u>FIRST I WILL TELL YOU WHAT I AM NOT GOING TO COVER</u>

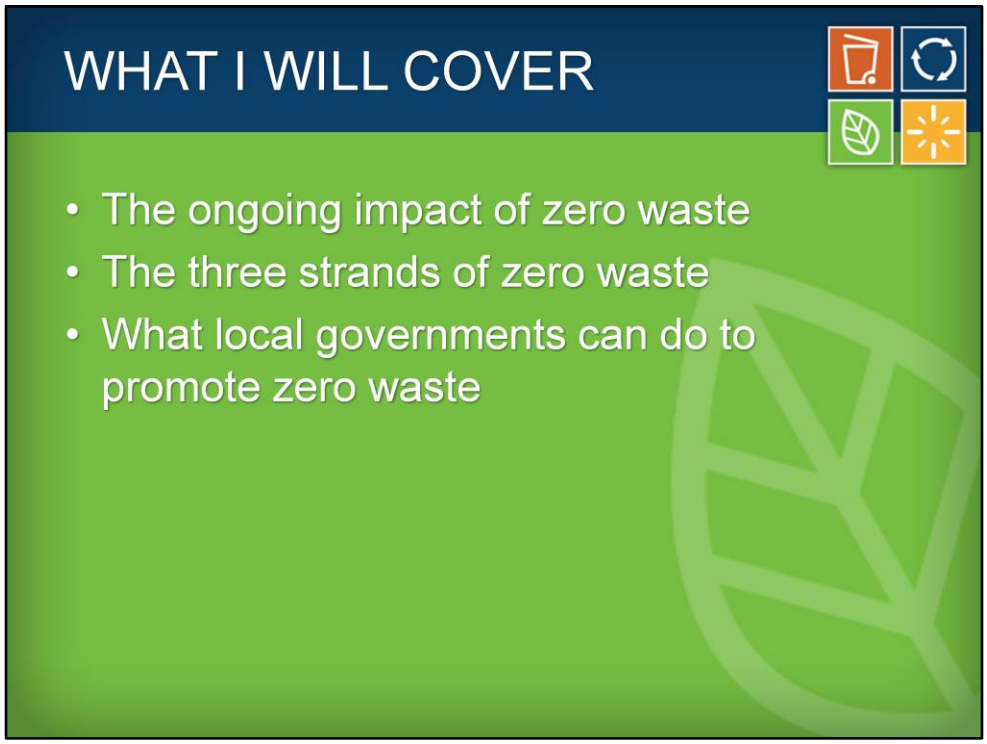


MUCH OF THE ZERO WASTE DISCUSSION CENTERS AROUND THESE CONCEPTS:

- THE SHARING ECONOMY
- THE CIRCULAR ECONOMY
- CRADLE-TO-CRADLE
- BIOMIMICRY

THESE ARE ALL GREAT CONCEPTS W/THE POTENTIAL TO FURTHER CHANGE OUR WASE STREAM, BUT AT THE MOMENT THEY ARE PRIMARILY THEORY NOT REALITY

<u>WHAT I WILL COVER</u>?



I AM GOING TO LOOK AT:

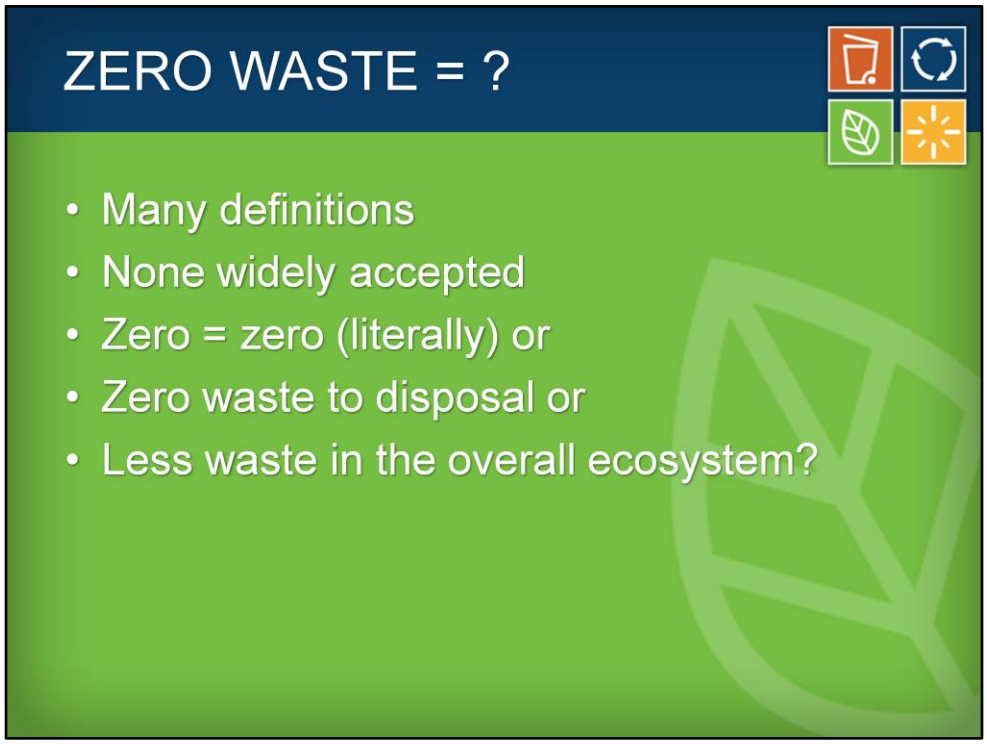
- THE ONGOING IMPACT OF ZERO WASTE
- HOW ZERO WASTE WORKS
- & MOST IMPORTANTLY, WHAT LOCAL GOVERNMENTS CAN DO TO GET TO “ZERO”

MOST IMPORTANTLY – WHEN WE TALK ABOUT ZERO WASTE – WHAT ARE WE REALLY TALKING ABOUT?

<u>BUT FIRST WHAT IS ZERO WASTE?</u>

ASK THE AUDIENCE HOW THEY DEFINE ZERO WASTE

SEGUE: HERE'S HOW I DEFINE IT



MANY DEFINITIONS EXIST
- NONE WIDELY ACCEPTED

ZERO WASTE USUALLY DOESN'T MEAN "ZERO" AS IN ABSOLUTELY **NO** WASTE
- *WASTE IS NATURAL: ORGANISM THAT DOESN'T EMIT WASTE IS DEAD*

INSTEAD WE TEND TO DEFINE IT IN TWO WAYS : THE MOST COMMON IS AS LESS WASTE TO DISPOSAL VIA MORE RECYCLING & COMPOSTING
- THESE ARE END OF THE PIPELINE STRATEGIES
- STILL MANAGING WASTE

THE MORE IMPORTANT IS AS LESS MATERIAL & ENERGY USE IN THE OVERALL ECOSYSTEM
- BEGINNING OF THE PIPELINE STRATEGIES

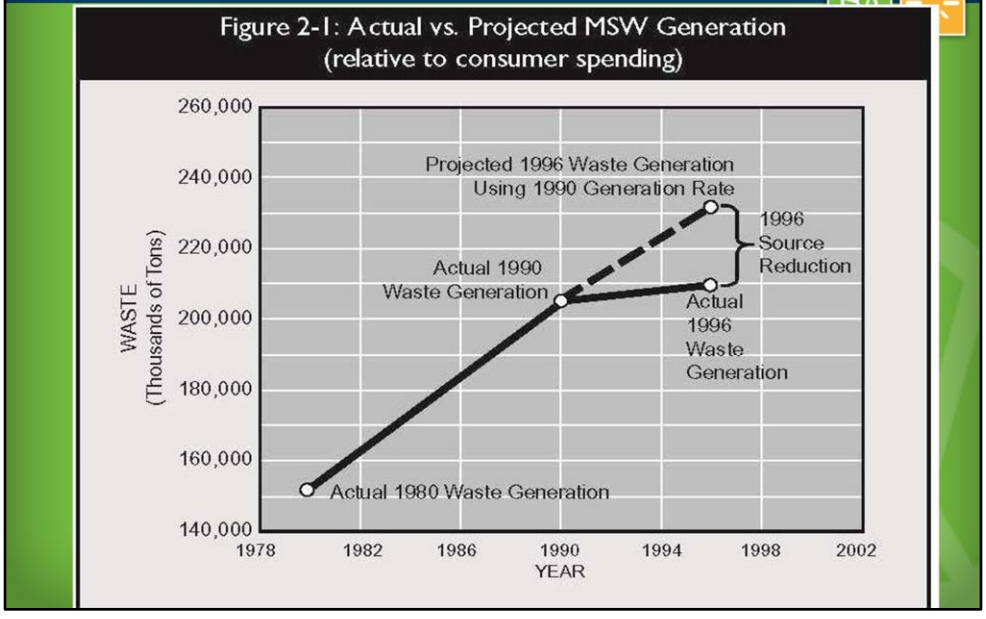
TO ME, ZERO WASTE MEANS JUST THAT: CREATING LESS WASTE TO MANAGE IN THE OVERALL ECOSYSTEM

SO LET'S START WITH THE ONGOING IMPACT OF ZERO WASTE

ZWIA: Zero Waste is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use. Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them. Implementing Zero Waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health.

EPA DOES NOT DEFINE ZERO WASTE BUT FIRST NOTICED THE TREND TO ZERO WASTE IN 1999

ZERO WASTE? EPA 1999



THIS CHART COMES FROM AN EPA PUBLICATION TITLED THE "NATIONAL SOURCE REDUCTION CHARACTERIZATION REPORT FOR MSW IN THE US".

EPA LOOKED AT THE SIZE OF THE WASTE STREAM IN 1996

- ASKED WHY IT FAILED TO MEET EXPECTATIONS BASED ON POPULATION & ECONOMIC GROWTH TRENDS

EPA ATTRIBUTED THE LOSS OF WASTE GENERATION TO <u>SOURCE REDUCTION</u>:

- WHICH IS FIGURING OUT HOW TO REDUCE THE AMOUNT OF MATERIALS OR PRODUCTS BEFORE THEY BECOME WASTE
- INCLUDES REUSE
- IS THIS ZERO WASTE?

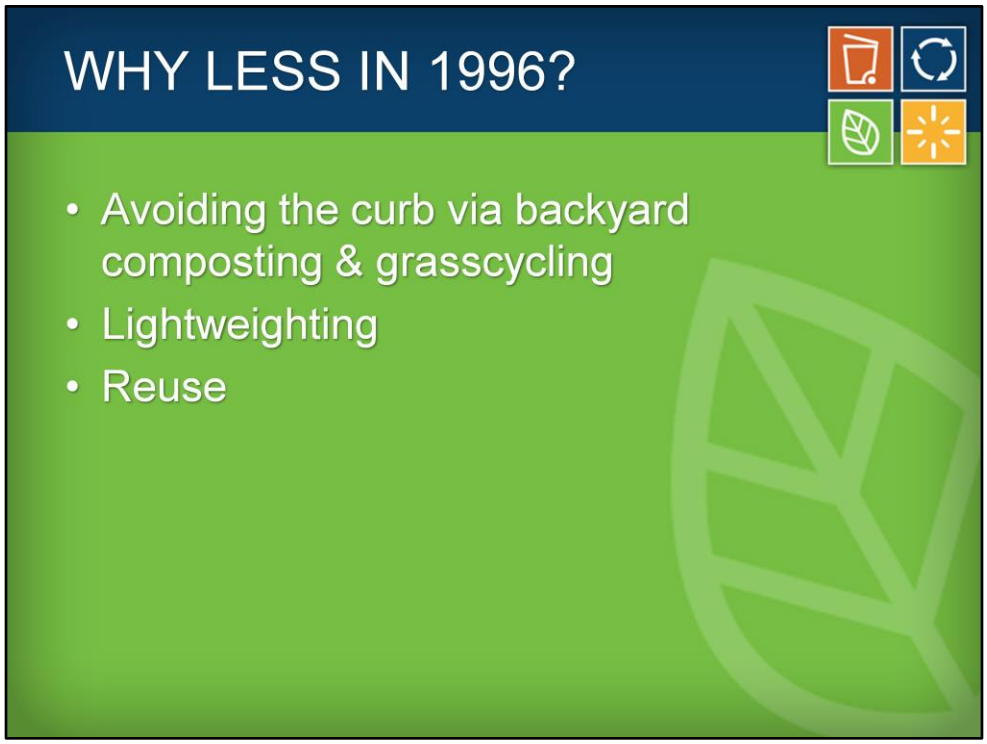
INTERESTINGLY, THE AGENCY NEVER USES THE TERM "ZERO WASTE" IN THIS REPORT

- EVEN THOUGH THAT TERM WAS FIRST USED IN THE MID 70'S.

NONETHELESS, SOURCE REDUCTION IS CLEARLY A KEY COMPONENT OF ZERO WASTE

- B/C LESS MATERIAL TO MAKE THINGS MEANS LESS WASTE WILL BE CREATED.

<u>WHAT WERE THE SOURCE REDUCTION/ZERO WASTE SUCCESSES EPA CITES</u>?



THE KEYS WERE LIGHTWEIGHTING, REUSE & AVOIDING THE CURB

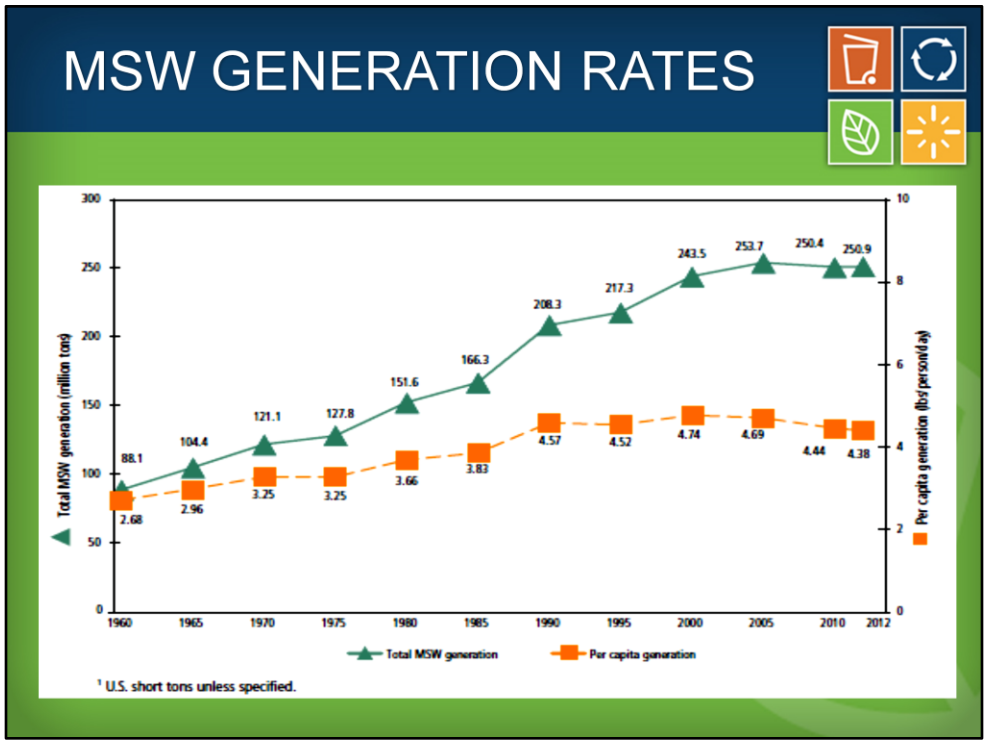
AVOIDING THE CURB HAD BY FAR THE BIGGEST IMPACT
- ABOUT HALF WAS MULCHING LAWNMOWERS (GRASSCYCLNG) & BACKYARD COMPOSTING
- THIS WAS "WASTE" THAT NEVER BECAME WASTE
- IT DID NOT GO "AWAY" – IT STAYED!

LIGHTWEIGHTING WAS PRIMARILY:
- REDUCTIONS IN NEWSPAPER SHEET SIZE & WEIGHT (1/8TH)
- & PRODUCTS SWITCHING FROM GLASS TO PLASTIC ALSO (1/8TH)
- CLEARLY LESS RAW MATERIALS WERE USED IN BOTH CASES
- & LESS "WASTE" CREATED

REUSE WAS PRIMARILY REUSABLE WOOD PALLETS (ALMOST 1/8TH)
- AGAIN LESS RAW MATERIALS

<u>THIS TREND CONTINUES</u>

NOTE: EPA ALSO ESTIMATED "SOURCE EXPANSION "B: INCREASES IN GENERATION AS A RESULT OF CONSUMER SPENDING
- *MOSTLY MORE CORRUGATED BOXES & PRINTED PAPER*
- *SOURCE EXPANSION ADDED 6.6 MILLION TONS*
- *THAT WAS OFFSET BY 30 MILLION TONS IN SOURCE REDUCTION*

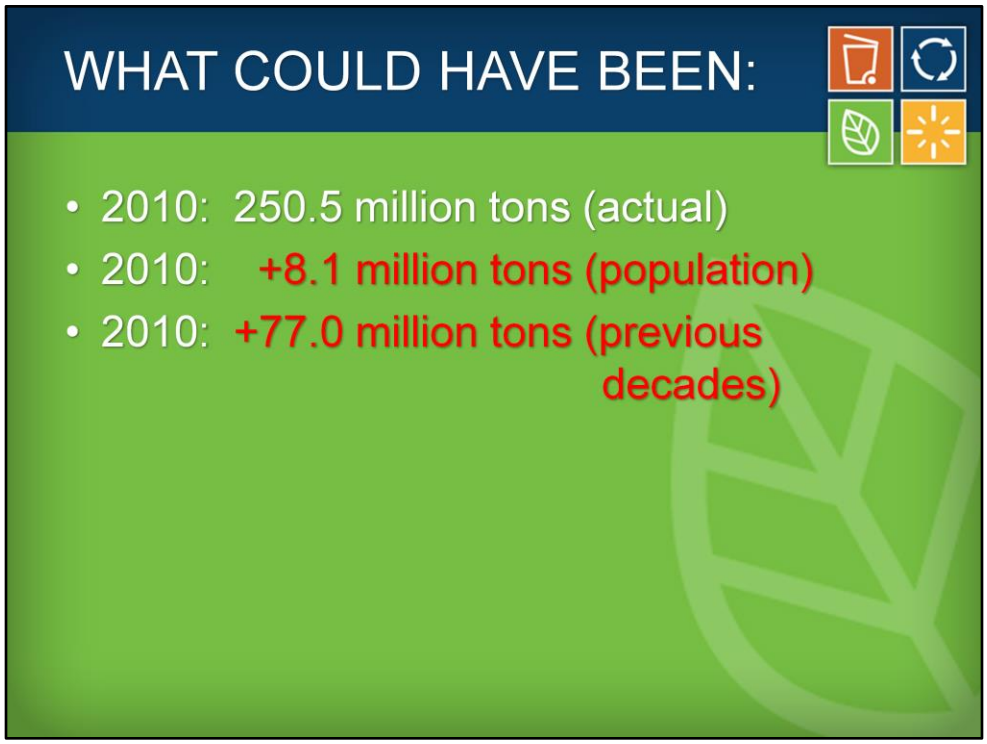


THIS IS OUR RAW MATERIAL: 1960 – 2012 TOTAL AMOUNT OF WASTE WE GENERATED BEFORE RECYCLING & COMPOSTING
(NOTE ALL DATA EPA)

THE BOTTOM LINE IS PER PERSON
- DOWN 7.6% SINCE 2000

THE TOP LINE IS TOTAL WASTE GENERATION
- NOTE THE SLOWDOWN IN ITS GROWTH SINCE 1990

WHAT COULD HAVE BEEN IF THE OLD TRENDS CONTINUED?



AN EXTRA 8.1 MILLION TONS BASED ON POPULATION GROWTH

AN EXTRA 77 MILLION TONS BASED ON THE PREVIOUS GROWTH IN THE LAST TWO DECADES

SO THE FIRST TAKEAWAY IS THAT WE HAVE BEEN MAKING PROGRESS ON LESS WASTE – ZERO WASTE? – SINCE THE 90'S

THE CONTINUING SLOW DOWN IN WASTE GENERATION CONFIRMS THAT SOMETHING IS HAPPENING TO REDUCE OUR ABILITY TO CREATE UNENDING PILES OF GARBAGE

- ZERO WASTE, HOWEVER YOU DEFINE IT, IS CLEARLY HAVING AN IMPACT

<u>SEGUE: LET'S LOOK AT THE THREE STRANDS OF ZERO WASTE</u>

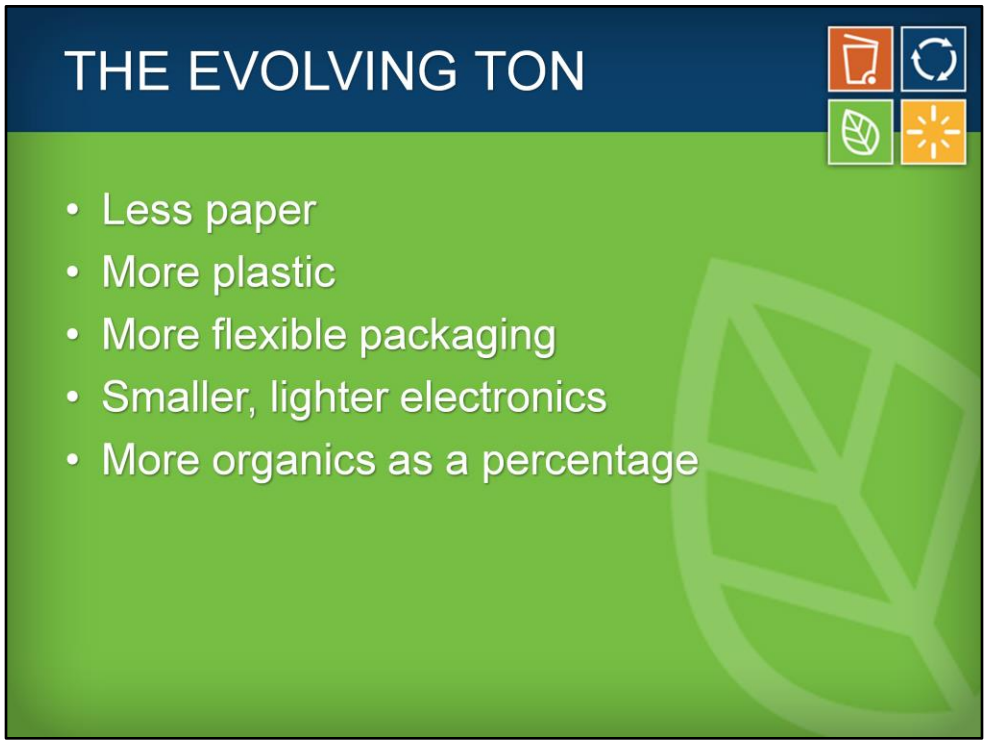
POPULATION INCREASED BY 13.2% IN THE 90'S AND 9.7% IN THE 00'S
SOLID WASTE GENERATION INCREASED BY 37.4% FROM 1980 TO 1990 , BY 16.9% FROM 1990 – 2000 & BY 3.2% IN THE LAST DECADE
NOTE: 37.4% GROWTH WOULD ADD 77.9 MT B/W 1990 & 2000 BUT IT ONLY ADDED 35.2 MT
16.9% GROWTH WOULD ADD 41.2 MT BY 2010 BUT IT ONLY ADDED 6.9 MT.
77.9 + 41.2 = 119.1 MT LESS 35.2 + 6.9 = 42.1 MT. 119.1-42.1 = 77 MT

THE FIRST STRAND IS THE BURST OF ENTHUSIASM IN THE EARLY 90'S FOR BACKYARD COMPOSTING & GRASS CYCLING

TOOK WASTE OUT OF THE SYSTEM COMPLETELY

BIG LOCAL GOVERNMENT SUCCESS STORY
- YARD WASTE DISPOSAL WAS BANNED IN HALF THE STATES
- LOCAL GOVERNMENTS/SERVICE PROVIDERS SITED 3000+ YARD WASTE COMPOSTING FACILITIES

<u>THE SECOND STRAND IS CHANGES IN THE MATERIALS WE USE ON A DAILY BASIS</u>



THIS IS KNOWN AS THE EVOLVING TON
- A TERM COINED BY REPUBLIC SERVICES

SINCE 2000 THE WASTE STREAM HAS

LESS PAPER: PAPER GENERATION DOWN BY MORE THAN 18 MILLION TONS 2000 - 2012
- VIRTUALLY ALL IS PRINTED GRADES
- USE BITS & BYTES, NOT PAPER, TO TRANSMIT KNOWLEDGE

MORE PLASTICS: UP 6.2 MT: 25%
- DISPLACE HEAVIER PACKAGES

MORE FLEXIBLE PACKAGING:
- DISPLACE RIGID PLASTIC PACKAGES

SMALLER LIGHTER ELECTRONIC PRODUCTS

MORE ORGANICS AS A PERCENTAGE DUE TO LESS PAPER & LESS PACKAGING

LOCAL GOVERNMENTS ONLY OPTION TO THE EVOLVING TON IS TO BE MORE FLEXIBLE IN YOUR SOLID WASTE PLANS

ARE THESE CHANGES ZERO WASTE? – THEY CLEARLY LEAD TO LESS WASTE

<u>THE THIRD STRAND IS WASTE/SOURCE REDUCTION</u>

FOR A BUSINESS – “ZERO” WASTE/WASTE/SOURCE REDUCTION IS SIMPLY SMART CAPITALISM

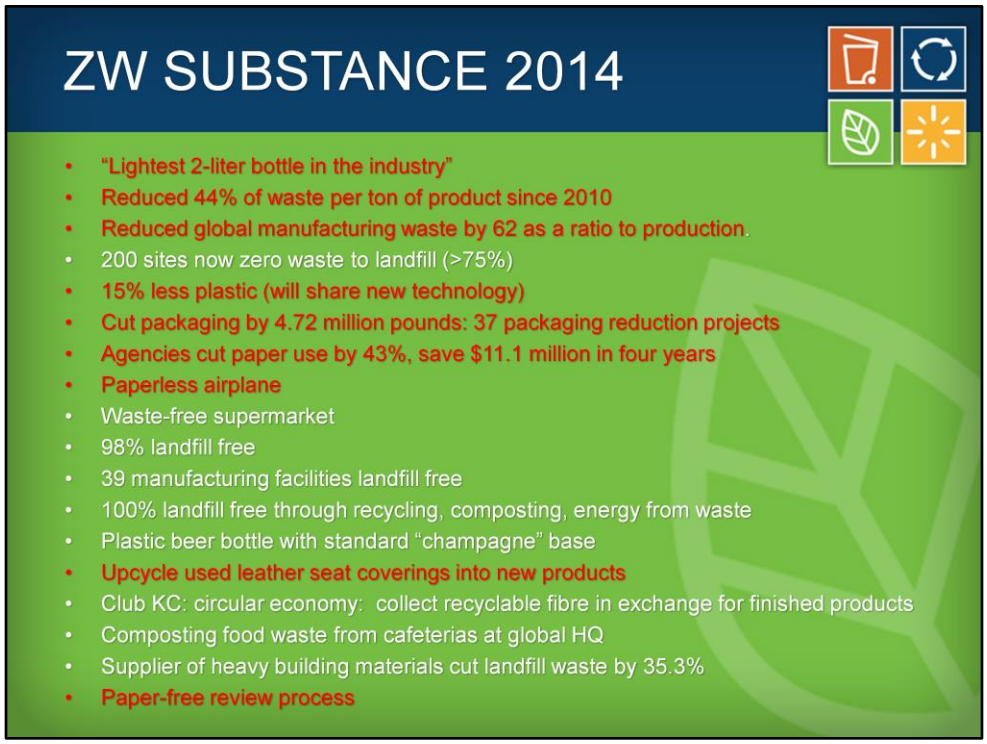
- TURN A COST CENTER INTO AN ASSET/REVENUE CENTER
- MORE URGENCY AS COMPANIES LOOK FOR NEW WAYS TO GET AN EDGE ON THEIR COMPETITORS

BUSINESSES HAVE NATURAL ADVANTAGES OVER LOCAL GOVERNMENTS IN ACHIEVING ZERO WASTE:

- THEY CONTROL WHAT COMES INTO THEIR FACILITIES & WHAT GOES OUT
- THEY ARE PROFIT MOTIVATED
- THEY CAN REWARD INDIVIDUALS WHO ACHIEVE GOALS THROUGH BONUSES

<u>HERE’S A LIST OF ZERO WASTE COMPANIES IN 2014 (ALL I COULD FIT ON THE SLIDE)</u>

SEGUE: THE NEXT SLIDE IS WHAT THEY DID W/EACH LINE CORRESPONDING TO THE SAME LINE ON THE PREVOUS SLIDE



DOVE BODY WASH: BREAKTHROUGH IN BOTTLE TECHNOLOGY WHICH USE GAS-INJECTION TO CREATE GAS BUBBLES IN THE MIDDLE LAYER OF THE BOTTLE WALL & REDUCE THE DENSITY OF THE BOTTLE & THE AMOUNT OF PLASTIC REQUIRED

HORMEL: 1.2 MILLION TON SAVING BY SWITCHING TO INDUSTRY STANDARD TOTE BIN DESIGN WHICH ELIMINATED AN INTERNAL INSERT

- *800,000 POUNDS BY REDUCING DELI MEAT PACKAGING FROM 8 INCHES TO 6.55 INCHES WIDE (HARDER TO OPEN?)*
- *REDESIGNED CASE PACKER & PALLETIZER FOR COOKED HAMS LINE: SAVE 596,000 POUNDS OF PACKAGING*
- *OPTIMIZED SHIPPING CASE DESIGN FOR 1-LB BACON FROM A FULL-OVERLAP CASE TO A 1-INCH CASE SAVING 364,000 POUNDS*
- *SUBSTITUTED FULLY PRINTED FILM FOR A PAPER CARRIER BOARD IN 1-POUND TURKEY BACON SAVING 314,000 POUNDS*

EASYJET ELIMINATING 25 KG OF PAPER: FORMS, CHECKLISTS, DETAILED MANUALS BY USING E-PAPER TECHNOLOGY (PANASONIC TOUCHPADS) WHICH REPLACE LAPTOPS AND PRINTED NAVIGATIONAL CHARTS IN COCKPITS

- *SAVE $500,000 IN FUEL COSTS: 220 AIRBUS*

GERMAN WASTE FREE SUPERMARKET SELLS PRODUCE & WATER FROM BULK BINS & REFILL LINES

- *CUSTOMER BRINGS OWN CONTAINERS, BORROWS A REUSABLE CONTAINER FROM THE STORE OR USES BAGS MADE FROM RECYCLED PAPER (FOR ITEMS SUCH AS CLEANING SUPPLIES)*
- *OVERBUYING IF IN BULK?*
- *ALAS A SIMILAR STORE IN BRITAIN: UNPACKAGED – LASTED A YEAR BUT HOPES TO REOPEN THIS FALL*

<u>IMPRESSIVE? BUT HOW DOES THIS APPLY TO ORGANICS – THE LARGEST COMPONENT OF THE WASTE STREAM</u>

SEVERAL OPTIONS FOR GENERATORS:
- ANIMAL OR HUMAN CONSUMPTION
- COMPOSTING
- ANAEROBIC DIGESTION

GENERATORS:
- MANUFACTURERS: MOSTLY ANIMAL FEED
- 15 MT MFR (FWRA STUDY) + 5 MT LAND APP
- 2.7 MILLION TONS SPENT BREWERS GRAINS

GENERATORS:
- GROCERY STORES: MORE THAN 40% DIVERTED FROM DISPOSAL
- ANIMAL FEED, COMPOSTING, BIOFUEL & EDIBLE CONSUMPTION

EDIBLE FOOD: FEEDING AMERICA:
- 2,000,000 MILLION TONS IN 2013 TO FEED THE HUNGRY
- 530,000 TONS DIVERTED BY RETAILERS BEFORE EXPIRATION DATE
- CALORIC CONTENT FROM BAKERY STARCHES TO DAIRY, PRODUCE & MEAT

LET'S LOOK NOW A LITTLE MORE AT ZERO WASTE & LOCAL GOVERNMENTS & YOU SHOULD REMEMBER THE ADVANTAGES THAT I SAID BUSINESSES HAVE OVER LOCAL GOVERNMENTS & MY INDUSTRY

WE COMPOST 30% OF YARD & FOOD WASTE MOSTLY YARD TRIMMINGS (57% RECOVERY)
- *4.25 MILLION TONS*
- *UP 26% FROM 2000*

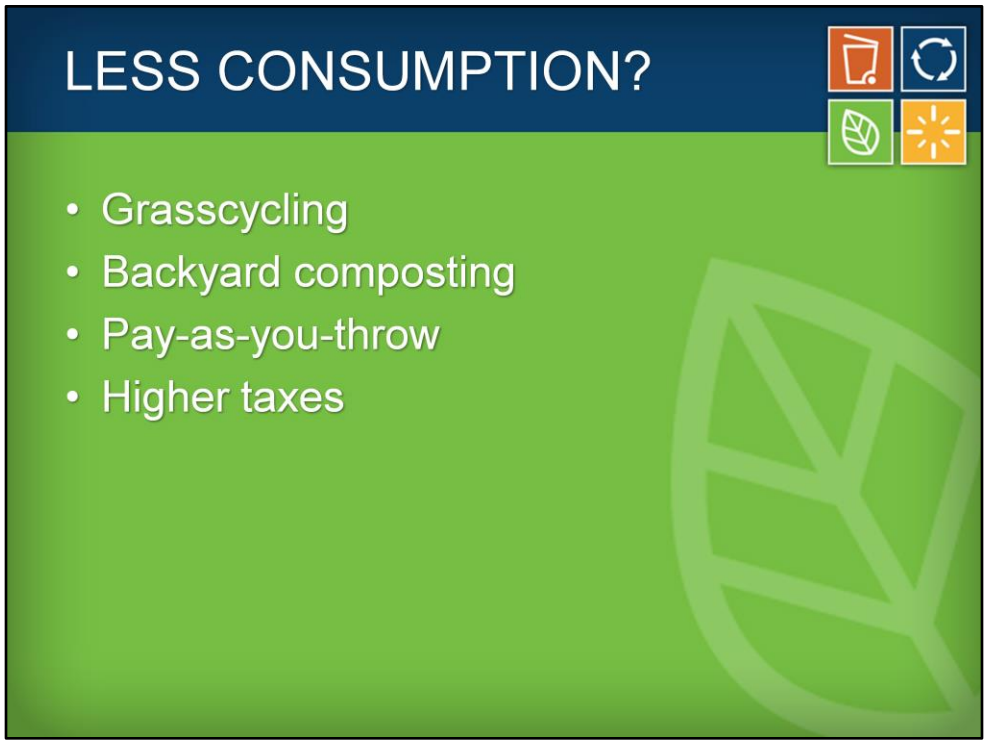
100+ LOCAL GOVERNMENTS HAVE PASSED RESOLUTIONS ADVOCATING ZERO WASTE

- MOSTLY “ZERO WASTE IS GOOD”

SOME ADOPTED ZERO WASTE PLANS

- EMPHASIS ON END OF PIPELINE STRATEGIES: RECYCLING & CENTRALIZED COMPOSTING
- BETTER EDUCATION, ETC
- LESS WASTE TO DISPOSAL
- BUT CONSUMPTION OPTIONS ARE LIMITED

<u>LET’S LOOK AT ATTEMPTS TO LIMIT CONSUMPTION FIRST</u>:



LOCAL GOVERNMENTS HAVE SOME BEGINNING OF THE PIPELINE STRATEGIES

- MOST NOTABLE IS PROMOTING GRASSCYCLING & BACKYARD COMPOSTING

CAN LOCAL GOVERNMENTS AFFECT INDIVIDUAL PURCHASING & MATERIAL USE?

- PAY AS YOU THROW MAY HAVE SOME IMPACT
- CAN RAISE TAXES B/C THAT WILL LOWER CONSUMPTION

LOCAL GOVERNMENTS HAVE A NUMBER OF DISADVANTAGES

- ONE IS THAT THEY DO NOT CONTROL WHAT PEOPLE BUY
- HARD TO CONTROL HUMAN NATURE
- & WE MAY BE HARD WIRED TO BE ACQUISITIVE

<u>LET ME GIVE YOU AN EXAMPLE</u>

THIS POSTER IS USED IN A BRITISH FOOD WASTE REDUCTION CAMPAIGN

- DON'T YOU JUST WANT TO EAT ALL OF THAT TOMATO?
- EVEN THE STEM & SEEDS?

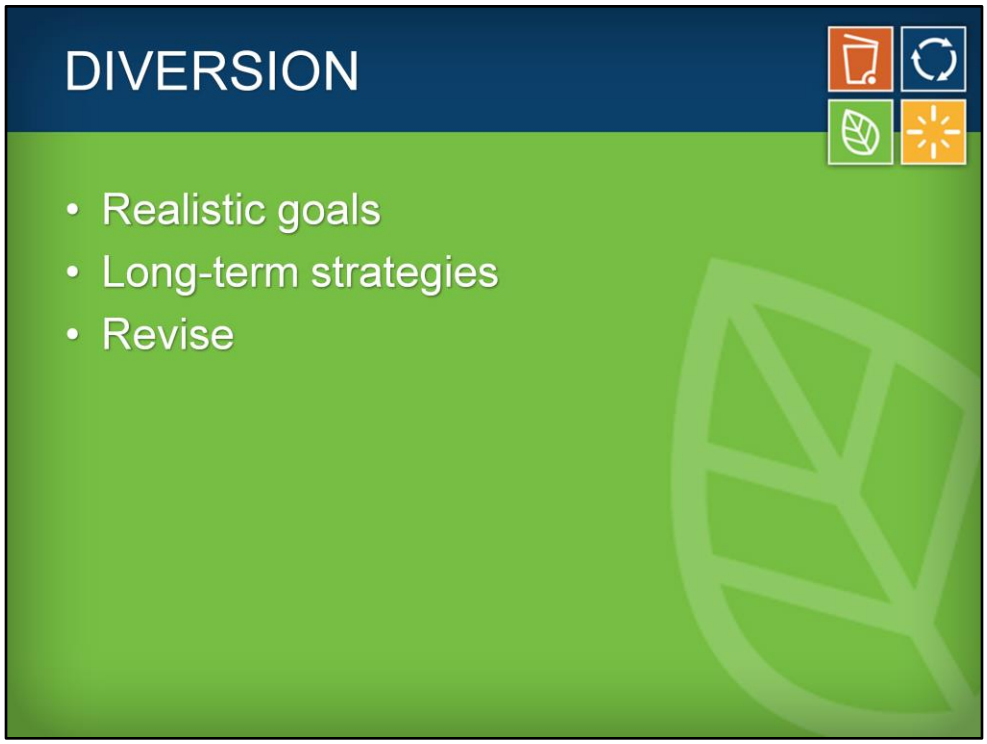
THE CAMPAIGN ENCOURAGES:

- PORTION CONTROL
- SMART SHOPPING
- UNDERSTANDING USE BY DATES
- STORING FOOD TO AVOID WASTE

PARADOX: PORTION CONTROL: SMALLER PORTIONS = MORE PACKAGING VS UNEATEN FOOD IN LARGER PACKAGES

- SHOULD LOCAL GOVERNMENT TELL ME HOW MUCH TO EAT
- HOW EFFECTIVE ARE THESE CAMPAIGNS IN THE SHORT & LONG RUN?

<u>WHAT ABOUT MORE DIVERSION</u>?



LOCAL GOVERNMENTS CAN BE VERY SUCCESSFUL HERE

SEATTLE: LONG TERM PLANNING W/AN EMPHASIS ON FLEXIBILITY & UPDATING

- CHECK COMPOSTITION OF WASTE STREAM EVERY 5 YEARS
- SET GOALS FOR STEADY INCREMENTAL IMPROVEMENT
- REALISTIC GOALS
- 70% IN 2023
- STARTED CURBSIDE IN THE 80'S OR EARLIER

BEWARE AGGRESSIVE ZERO WASTE RECYCLING GOALS CAN LEAD TO AGGRESSIVE REPORTING

- SAN FRANCISCO CLAIMS 80% DIVERSION
- 2/3 IS INERT FILL MATERIAL (PRIMARILY DIRT) & A LITTLE BIT OF BIOSOLIDS
- MAY NOT BE LANDFILLING BUT IS FILLING THE LAND

ZW AS SUSTAINABLE MATERIALS MANAGEMENT?

EPA DEFINITION OF MM (FROM OPPORTUNITIES TO REDUCE GREENHOUSE GAS EMISSIONS THROUGH MATERIALS & LAND MANAGEMENT PRACTICES).

LIFE CYCLE IS THE KEY

<u>THIS RAISES A BIG PROBLEM</u>

Sustainable materials management (SMM) is a systemic approach to using and reusing materials more productively over their entire lifecycles. It represents a change in how our society thinks about the use of natural resources and environmental protection. By examining how materials are used throughout their lifecycle, an SMM approach seeks to:

- *Use materials in the most productive way with an emphasis on using less;*
- *Reduce toxic chemicals and environmental impacts throughout the material life cycle;*
- *Assure we have sufficient resources to meet today's needs and those of the future.*

FLEXIBLE PACKAGING

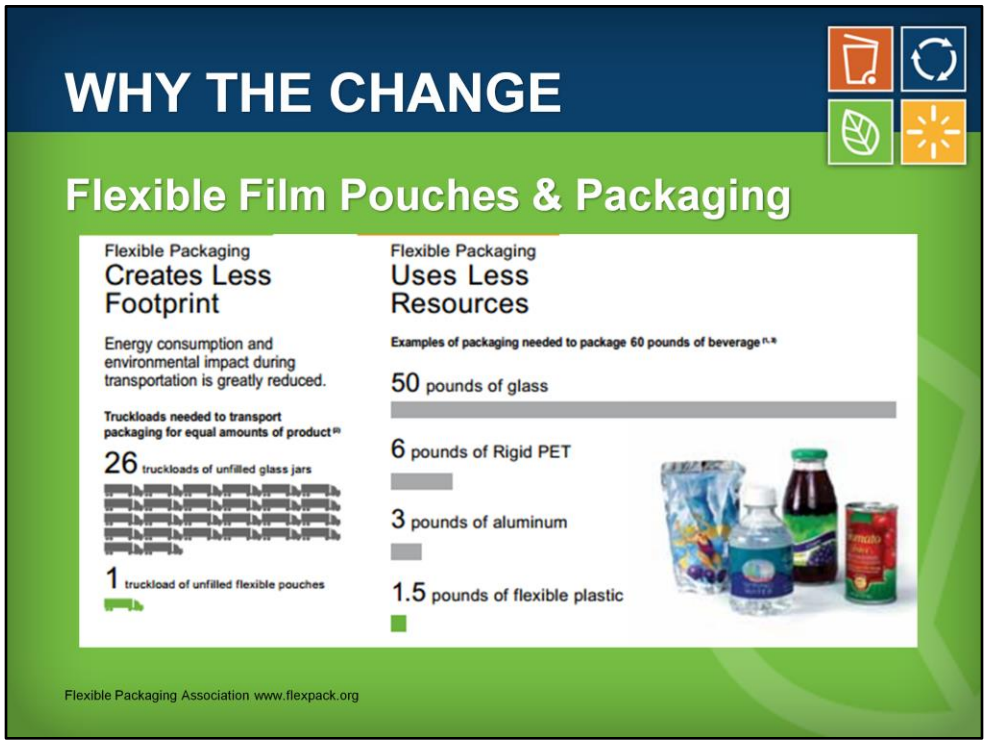
THESE POUCHES ARE EXAMPLES OF FLEXIBLE PACKAGING
- FLEXIBLE PACKAGES HAVE NO SHAPE OF THEIR OWN
- FASTEST GROWING PACKAGE
- MOSTLY PLASTIC *(69%)* BUT CAN INCLUDE PAPER *(15%)* FOIL *(4%)* & ADHESIVES, COATINGS & INKS *(12%)*
- 18% OF THE PACKAGING MARKET *(CORR 23%, RIGID PLASTICS 16%, METAL CANS 13%, PAPERBOARD 12%, GLASS 4%, OTHER 14%)*

FLEXIBLE PACKAGING IS:
- TECHNOLOGICALLY ADVANCED
- MULTI-LAYER & MULTI-RESIN
- BARRIER LAYERS & TIE LAYERS
- <u>NOT CURRENTLY RECYCLABLE</u>
- USUALLY REPLACE HEAVIER RIGID PLASTIC BOTTLES THAT CAN BE RECYCLED & HAVE RECYCLED CONTENT

FLEXIBLE PACKAGING HAS TREMENDOUS ENVIRONMENTAL & ENERGY SAVING BENEFITS
- LIGHTER WEIGHT
- CAN SHIP MORE PRODUCT USING LESS ENERGY
- A LOWER ENVIRONMENTAL FOOTPRINT THAN THE RECYCLABLE PACKAGES THEY DISPLACE

BUT THEY CAN'T BE RECYCLED
- IS THIS GOOD OR BAD?

<u>SEGUE:</u>



PACKAGING COMPANIES TOUT A NUMBER OF ADVANTAGES IN TERMS OF TOTAL ENVIRONMENTAL IMPACT & COST

IS THIS ZERO WASTE? AFTER ALL LESS WASTE IS CREATED IN THE MANUFACTURING PROCESS & IN TRANSPORTATION & STORAGE?

IS THIS COMPANIES LOOKING TO MINIMIZE THEIR OVERALL ENVIRONMENTAL FOOTPRINT: SMART CAPITALISM?

IS THIS GOOD OVERALL EVEN THOUGH BAD FOR RECYCLING?

CLEARLY THESE CONTAINERS WILL POSE CHALLENGES FOR LOCAL GOVERNMENTS & THEIR SERVICE PROVIDERS

- BUT THEY WILL CONTINUE THE TREND TOWARDS LESS WASTE TO MANAGE

<u>THE PARADOX OF ZERO WASTE & SUSTAINABLE MATERIALS MANAGEMENT</u>

IS 100% RECYCLING & COMPOSTING THE ULTIMATE GOAL?

- END OF THE PIPELINE WASTE MANAGEMENT VIA INCREASED RECYCLING & COMPOSTING

OR

LESS OVERALL WASTE IN THE ECOSYSTEM ?

- LOWERING THE EXTRACTION OF RAW MATERIALS & ENERGY USED IN MANUFACTURING & TRANSPORTATION
- EVEN THOUGH SOME OF THOSE PRODUCTS CANNOT BE RECYCLED & MUST BE DISPOSED?

I WOULD SAY THE SECOND OPTION IS THE BEST GOAL:

- THAT IS BETTER FOR THE ENVIRONMENT
- & LIKE THE EVOLUTION OF RECYCLING IS A PROCESS HAPPENING OVER TIME

<u>FINALLY: THE FUTURE OF ZERO WASTE</u>

DIMINISHING WASTE GENERATION WILL CONTINUE

DISPOSAL WILL CONTINUE TO SLOWLY DECLINE
- BUT REMAIN WITH US FOR A VERY LONG TIME

OUR PRODUCTS & MATERIALS WILL CONTINUE TO EVOLVE

SMART CAPITALISM WILL CONTINUE

EXCITING TIMES!

THE FUTURE AIN'T WHAT IT USED TO BE!

FOR MORE INFORMATION:

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