

Zero Waste: **A Key Stepping Stone to Sustainability**

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OUTLINE

- A. A quick word about sustainability
- B. Zero Waste
- C. 10 Steps to Zero Waste
- D. The critical step forward
- E. From ZW to sustainability
- F. 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

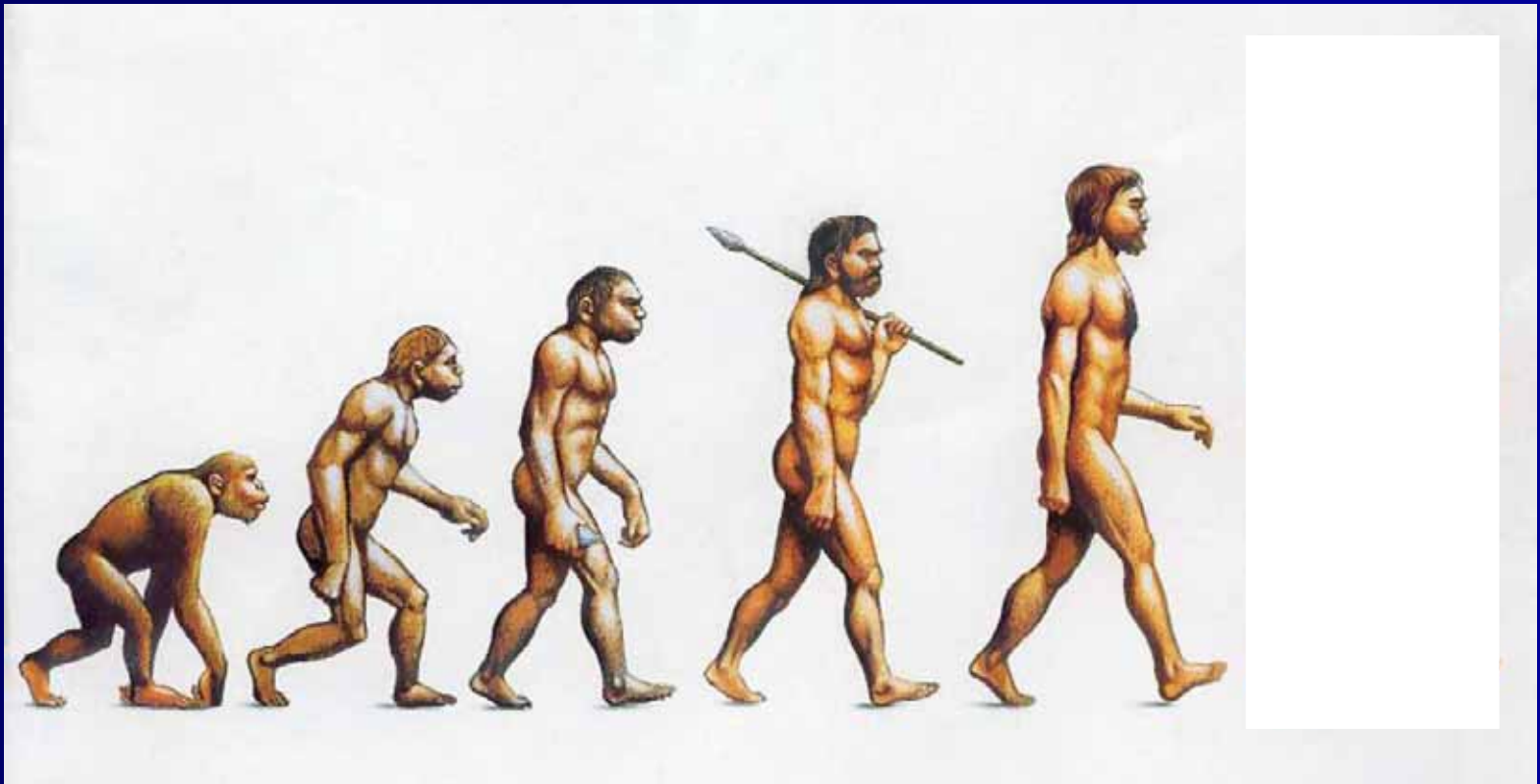
- We would need **FOUR planets** if every one consumed as much as the average **American**
- We would need **TWO planets** if every one consumed as much as the average **European**
- Meanwhile, **India, China etc.** are copying our consumption patterns
- **Something has got to change and the best place to start is with waste**

**Our real task is to fight
over-consumption**

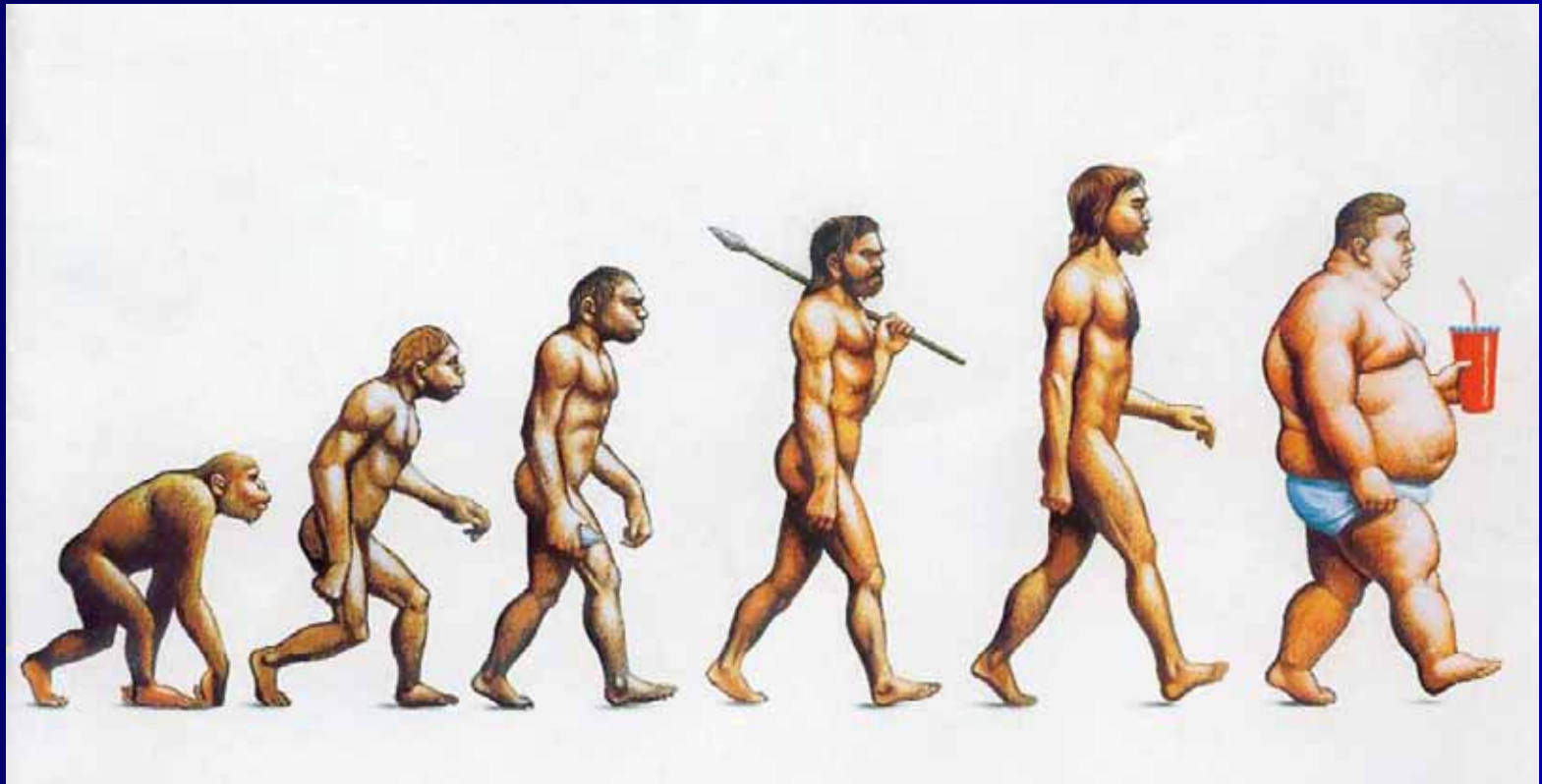
**"The world has enough
for everyone's need
but not for everyone's
greed"**

Mahatma Gandhi

Man




Modern man!



Please note that
while **waste incineration** is
aggressively promoted by
many companies and
countries, it is NOT
sustainable

Kg Greenhouse gas/tonne Municipal Waste

<i>A combination of recycling and composting is 46 times better</i>	-461
<i>at reducing greenhouse gases than</i>	X 46
<i>Incineration generating electricity</i>	-10



Waste Management Options and Climate Change. AEA 2001

B.

Zero Waste

**ZERO WASTE
IS A
NEW
DIRECTION**

THE BACK END OF WASTE MANAGEMENT

**The
BACK END
of
WASTE
MANAGEMENT**



**The
FRONT END
of
RESOURCE
MANAGEMENT**

**The
BACK END
of
WASTE
MANAGEMENT**



**The
FRONT END
of
RESOURCE
MANAGEMENT
&
BETTER
INDUSTRIAL
DESIGN**

**The
BACK END
of
WASTE
MANAGEMENT**



**The
FRONT END
of
RESOURCE
MANAGEMENT
&
BETTER
INDUSTRIAL
DESIGN
&
POST-
CONSUMERISM**

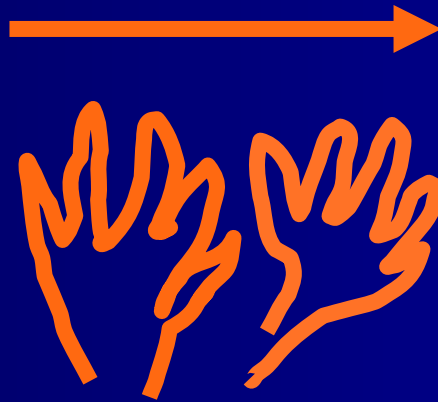
C.

TEN Practical steps towards Zero Waste

STEP 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

1. Source Separation

**1.
Source
Separation**

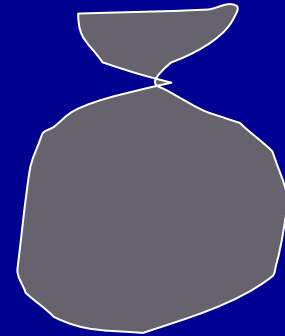
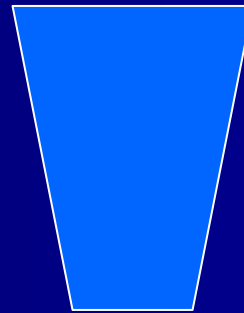
**2.
Door to Door
Collection**

"The Fantastic 3"



The San Francisco system

I "Fantastici 4"



Capannori, Italia

Capannori

LUNEDI	ORGANICO	
MARTEDI	MULTIMATERIALE	
MERCOLEDI	CARTA	
GIOVEDI	FRAZIONE RESIDUA	
VENERDI	ORGANICO	
SABATO	MULTIMATERIALE	

**1.
Source
Separation**

**2.
Door to Door
Collection**

**3.
Composting**

Composting plant for San Francisco



**1.
Source
Separation**

**2.
Door to Door
Collection**

**3.
Composting**

**4.
Recycling**

MATERIALS RECOVERY FACILITY



at Pier 96



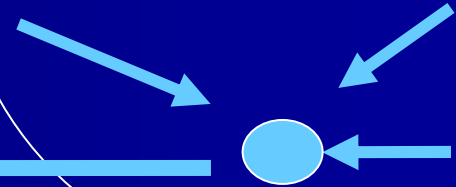
Cities

Rural areas



**Composting
Plants**

**Recycling
Plants**



1

**Composting
Facility**

2

**Materials
Recovery
Facility**

3

**Residual
Fraction**

We have to minimize the residual fraction with...

- 1) Waste reduction initiatives
- 2) Reuse, repair and deconstruction
- 3) Economic incentives

**1.
Source
Separation**

**2.
Door to Door
Collection**

**3.
Composting**

**4.
Recycling**

**5. Waste
Reduction
Initiatives**

Undesirable packaging

- THREE options:
- Ban it
- Tax it
- Put a returnable deposit on 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**

Italy

www.EFFECORTA.it

Capannori

60 taps for liquids



- Un pizzico di
creatività a monte
può far risparmiare
milioni a valle



**1.
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Separation**

**2.
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**3.
Composting**

**4.
Recycling**

**5. Waste
Reduction
Initiatives**

**6. Reuse,
Repair &
Deconstruction**

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)

VALUE OF L.A. DISCARDS

Market Categories	%	Tons/Year	\$/ton	\$
1.Reuse reuse	2.0	72,000	550	39,600,000
2.Paper	22.0	792,000	20	15,840,000
3.Plant Debris	5.5	198,000	7	1,386,000
4.Putrescibles	17.0	612,000	7	4,284,000
5.Wood	4.0	144,000	8	1,152,000
6.Ceramics	13.0	468,000	4	1,872,000
7.Soils	10.0	360,000	7	2,520,000
8.Metals	4.0	144,000	40	5,760,000
9.Glass	2.0	72,000	10	720,000
10.Polymers	8.0	288,000	100	28,800,000
11.Textiles	2.0	72,000	20	1,440,000
12.Chemicals	0.5	18,000	15	270,000
No market (diapers, treated wood, mistakes)	10.0	360,000		0
TOTAL PER YEAR	100	3,600,000		\$103,644,000

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

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**6. Reuse,
Repair &
Deconstruction**

**7.
Economic
Incentives**

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!

D.

**A critical step to achieve
Zero Waste**

**1.
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Economic
Incentives**

**8. Residual
Separation &
Research
Center**

RESIDUAL 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

Nova Scotia, Canada

- Has already built Residual Separation Facilities in front of their landfills to remove more recyclables and stabilize the dirty organic fraction before landfilling.

RESIDUAL SCREENING FACILITY



**MORE
RECYCLABLES**

MORE TOXICS

**DIRTY
ORGANIC
FRACTION**



**BIOLOGICAL
STABILIZATION**



Operating in
Nova Scotia

INTERIM LANDFILL

RESIDUAL SCREENING & RESEARCH FACILITY

```
graph TD; A[RESIDUAL SCREENING & RESEARCH FACILITY] --> B[DIRTY ORGANIC FRACTION]; A --> C[MORE RECYCLABLES]; A --> D[MORE TOXICS]; A --> E[NON-TOXIC, NON-BIODEGRADABLE FRACTION]; B --> F[BIOLOGICAL STABILIZATION]; C --> G[INTERIM LANDFILL]; D --> G; E --> H[RESEARCH CENTER]; H --> G; F --> G;
```

The diagram illustrates a waste management process starting from a 'RESIDUAL SCREENING & RESEARCH FACILITY'. This facility leads to four distinct fractions: 'MORE RECYCLABLES', 'MORE TOXICS', 'NON-TOXIC, NON-BIODEGRADABLE FRACTION', and 'DIRTY ORGANIC FRACTION'. 'MORE RECYCLABLES' and 'MORE TOXICS' are sent to an 'INTERIM LANDFILL'. 'NON-TOXIC, NON-BIODEGRADABLE FRACTION' is sent to a 'RESEARCH CENTER', which also leads to the 'INTERIM LANDFILL'. 'DIRTY ORGANIC FRACTION' undergoes 'BIOLOGICAL STABILIZATION' before being sent to the 'INTERIM LANDFILL'.

**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

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!

- The Residual Separation and Research Facility

- Is where

- The Community

- Must drive

- Industrial Responsibility

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

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**5. Waste
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**6. Reuse,
Repair &
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**7.
Economic
Incentives**

**8. Residual
Separation &
Research
Center**

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**7.
Economic
Incentives**

**8. Residual
Separation &
Research
Center**

**9. Better
Industrial
Design**

**1.
Source
Separation**

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**4.
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**6. Reuse,
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**7.
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**8. Residual
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Center**

**9. Better
Industrial
Design**

10. Interim Landfill

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Research
Center**

**9. Better
Industrial
Design**

10. Interim Landfill

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!)

Italy

- **Novara** - (a city near Turin, population = 100,000) achieved **70% diversion** in just **18 months!**

Italy

- The Treviso region - 22 communities averaging 76% diversion (Priula consortium)

Italy

- Villafranco d'Asti
(Piedmont) has reached
85% diversion

Spain

- Usurbil in Basque Country
- Has gone from 28% to 86% in 7 months

U.S.

Island of Nantucket has reached 92%
diversion

70 - 80%

COMMUNITY RESPONSIBILITY

8. Residual
Separation &
Research
Facility

9. Better
Industrial
Design

10. INTERIM LANDFILL

2020

70-80%
COMMUNITY RESPONSIBILITY

20-30%

**INDUSTRIAL
RESPONSIBILITY**

Industrial Responsibility

- 1. Design for sustainability
- 2. Clean production
- 3. Extended Producer Responsibility

E.

From Zero Waste to Sustainability

**To move from Zero Waste to
Sustainability we must use the
wisest
and brightest minds
in industry, academia and
society-at-large**

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**



F.

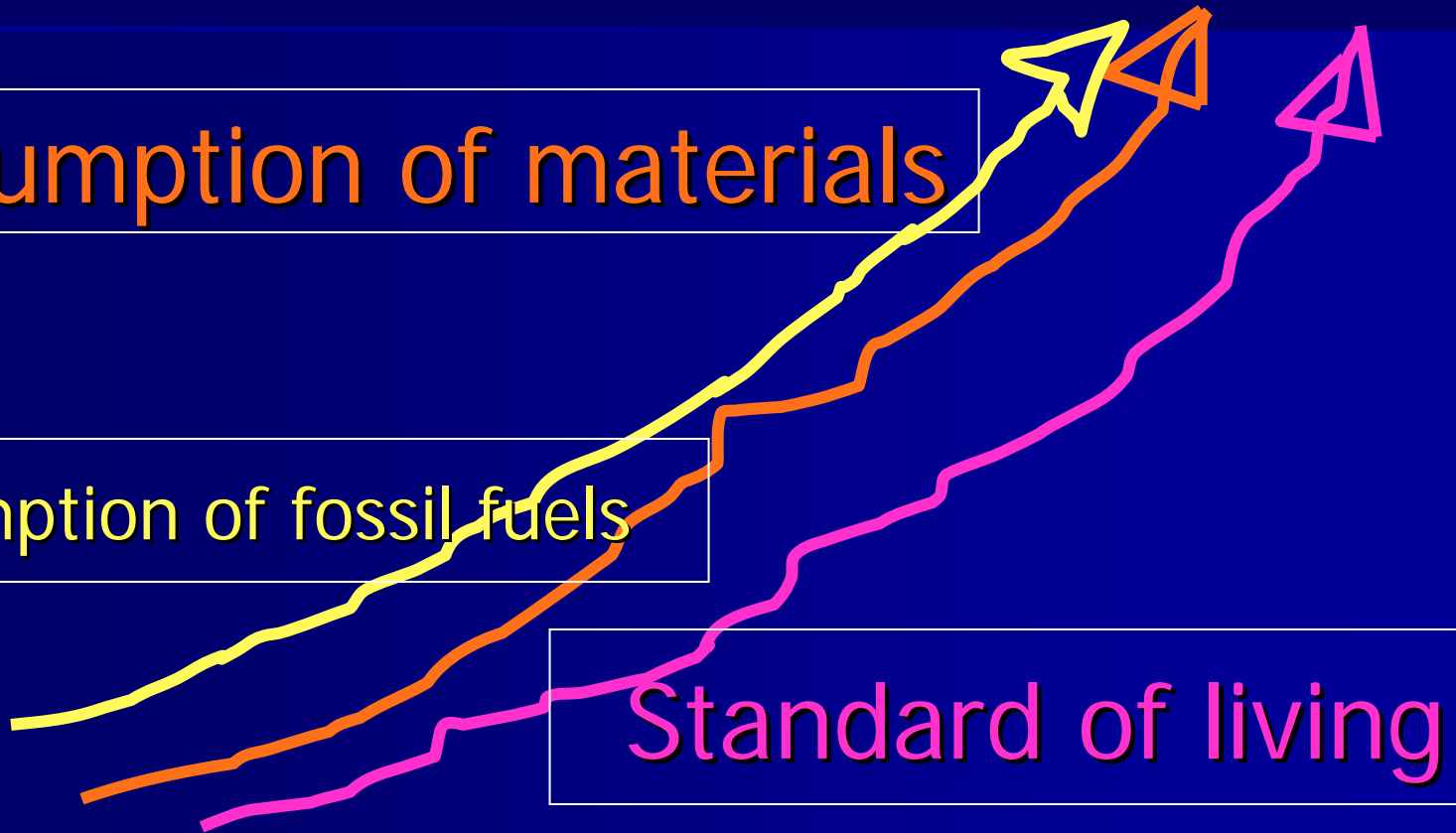
Back to the Big Picture

Current situation

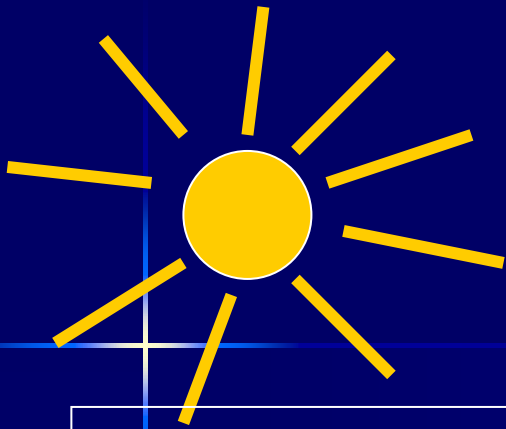
Consumption of materials

Consumption of fossil fuels

Standard of living

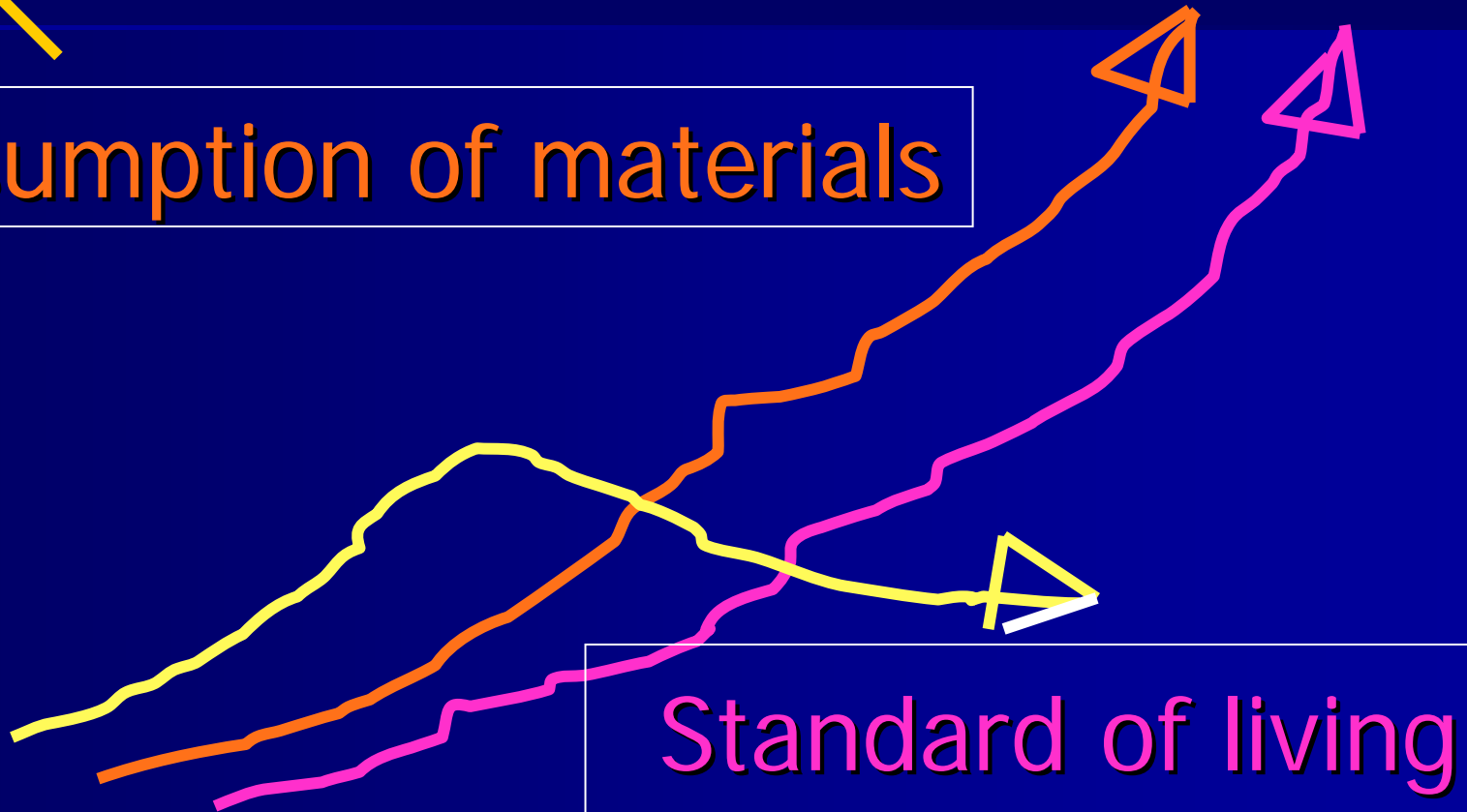


Change 1



Solar Energy

Consumption of materials



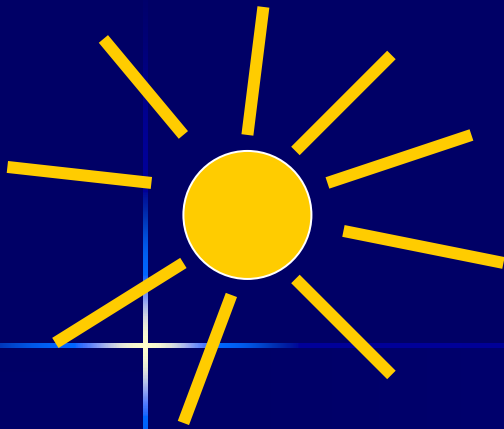
Standard of living

Change 2

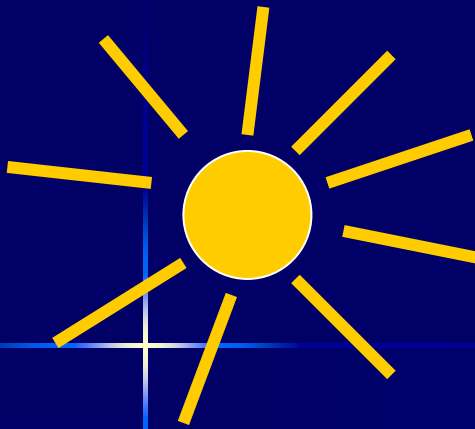
Solar Energy

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

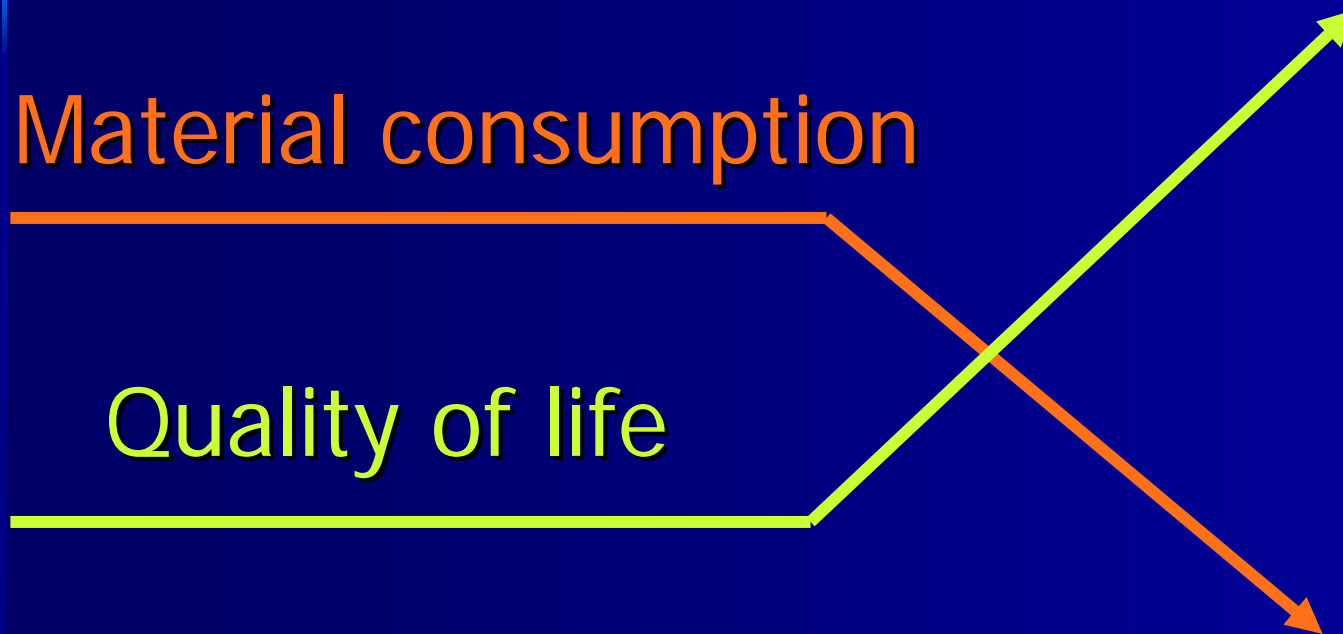
We have to separate the
Quality of life from the
material consumption

Material consumption

Quality of life



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



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 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)!