Redesign for Zero Waste

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“Transforming MRFs, Transfer Stations & Landfills to Resource Recovery Parks & Zero Waste”
A workshop by CRRA’s Global Recycling Council
In Burbank, California

December 5, 2014
“The core of its meaning is that resources be used over and over again and cycled through human economic-production systems in a way that is analogous to the cycles of elements . . . in natural ecosystems.”

Garrett De Bell
Environmental Handbook
January 1970
The Original Vision

“To properly recycle our wastes will require an industry perhaps as large as the present automobile industry. Recycling-plants can provide people with socially useful jobs, increase the resource base, and improve the quality of life for everyone.”

Garrett De Bell
Environmental Handbook
January 1970
By 2008 It Was Twice As Big as the Wasting Industry and Growing

“The recycling industry generates more than twice the revenue than the $100 billion waste management industry [National Solid Wastes Management Association] even though much more garbage is thrown out than recycled. That's because recycled materials generate economic value - waste disposal doesn't.”

– Progressive Investor
Feb-Mar 2008

By 2008, the recycling industry was twice as big as the $100 billion waste management industry and growing, generating more revenue than waste disposal. This is because recycled materials generate economic value, whereas waste disposal does not.
The Task: Change People’s Behavior

UODA’s approach to designs is different because Dan Knapp is a sociologist.
Engineers agree we have good machinery and engineering.
What we need is to change people’s behavior.
That’s what sociologists do.
UODA’s designs reward the behaviors we want.
2nd Law of Thermodynamics Dictates the Resource Hierarchy

- Transforming a material releases disorderly energy, increasing the entropy (disorder) in its system.
- Re-organizing the energy requires new energy from outside the system.
- For maximum conservation of energy and materials: Reduce, Reuse, and Recycle – in that order.
- Recover as high on the hierarchy as possible for Highest and Best Use.
Scientific Basis: 12 Master Categories of Commodities

• Complete: nothing left out, nothing left over. Empirically confirmed.
• Profiled by physical properties to produce clean feedstocks for industries.
• More subcategories = more value added.
• Can generate specialty enterprises to grow economic activity.
Profile Resources

List of 12 Master Categories
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Universe of Total Recycling

- **Reuse Area**
  - Receiving
  - Processing
  - Selling

- **Recycling Area**
  - Receiving
  - Separating
  - Processing
  - Selling/Removing

- **Compost Area**
  - Receiving
  - Separating
  - Grinding
  - Processing
  - Removing to Windrows

- **Ceramics Area**
  - Receiving/Sorting
  - Processing
  - Selling

- **Soils Area**
  - Receiving
  - Processing
  - Mixing
  - Selling

**Planet Friendly Disposal**

**Making and Using New Products**

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THE UNIVERSE OF TOTAL RECYCLING

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Illustration by Mark & Nancy Goroll, 2007
Cluster Enterprises to Share Facilities and Equipment and to Encourage Cooperation

UODA design for Del Norte County’s first proposed site.
Analyze Multi-Cluster Income Sources

Both tipping fees and product sales.
Change Disposal Behavior with Rates - Reward Clean Resources, Penalize Mixing

They “Say it with rates”* in Del Norte County, California

*Teddy Ward, Del Norte County
Urban and rural facilities can trade materials.

**URBAN**
- Yard debris
- Putrescibles
- Soil

**RURAL**
- Compost
- Resources for distant markets

UODA designs from the West Virginia Report.
Design Interactive Facilities

New Mexico is using a hub-and-spoke plan for large rural areas.
Design Facilities with Multiple Efficiencies

• Maximize recovery and resource quality.
• Shape customers’ behavior through fees and architecture.
• Serve customers quickly.
• Streamline materials flow.
• Provide pleasing work environment for maximum productivity.
Maximizes recovery and clean resource quality.

Proposed Berkeley Transfer Station

Yard debris, soil, ceramics, putrescibles
Construction materials
Regulated materials
Recycling
Reuse
The Rewards of Highest and Best Use

• As you structure and process for highest and best use, you create more value.

• Value is denominated in money.

• The money isn’t as easy as cramming everything together and getting guaranteed profits.

• But it’s bigger.
Most desirable actions come first and are favored financially.

- Pay a LOT. $$$$$
- Pay some, according to type. $$
- Free dropoff or materials are bought.
Customers get in and out fast because of long airport-style service area.
Proposed Berkeley Transfer Station

Streamlined materials flow.

Traffic and Materials movement
Proposed Berkeley Transfer Station

Nice place to work.

Offices - solar heating and electricity, garden roof, community meeting room.

Processing - skylights, no interior columns, adjustable interior walls, solar electricity.
Remember folks, waste isn’t waste until it’s wasted.
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