Waste and Recycling Perspectives on the Product to Service Transition

Think Green.

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Personal Profile

1990-2001, Tellus Institute
- Senior Scientist, Business and Sustainability and Sustainable Community Groups
- Select clients: EPA, United Nations, various state agencies, businesses, and municipalities

2001-2003, Tuck School of Business at Dartmouth
- Founded Tuck Business and Sustainability Initiative

2003-2008, WM-Upstream
- Senior Director, Directed Zero Waste Enterprise and Supply Chain Service Group
- Select customers: diversified manufacturers, food & beverage companies, cruise lines, pipelines, petrochemical, automotive

2009-Present, WM-Greenopolis
- Managing Director, Greenopolis
- Select customers: Pepsico, Nestle Waters, Elmers, Whole Foods
WM Overview

+20 MILLION CUSTOMERS
390 COLLECTION OPERATIONS
1 ACTIVE HAZARDOUS WASTE UNDERGROUND INJECTION WELL
345 TRANSFER FACILITIES

14 CONSTRUCTION & DEMOLITION RECYCLING FACILITIES
5 INDEPENDENT POWER PRODUCTION PLANTS, 2 PRODUCE RENEWABLE ENERGY
119 LANDFILL-GAS-TO-ENERGY PROJECTS
273 ACTIVE MUNICIPAL SOLID WASTE LANDFILLS, 5 ARE ACTIVE HAZARDOUS WASTE LANDFILLS

91 TRADITIONAL RECYCLING FACILITIES 31 ARE SINGLE STREAM*
8 ELECTRONIC WASTE & RECYCLING SECONDARY PROCESSING FACILITIES
34 ORGANIC PROCESSING FACILITIES*
17 WASTE-TO-ENERGY PLANTS*
OVER 43,000 EMPLOYEES

*As of September 2010
Products in the ever changing waste stream provide important perspectives and insight on the product to service transition...
Film has become more compact and efficient

<table>
<thead>
<tr>
<th>1920’s</th>
<th>1990’s</th>
<th>2009</th>
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</thead>
<tbody>
<tr>
<td>Cellulose Acetate Film</td>
<td>35 mm Film</td>
<td>Memory Card</td>
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<tr>
<td>1,000 photos</td>
<td>1,000 photos</td>
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<tr>
<td>over 16 lbs.</td>
<td>2 lbs.</td>
<td>1 gram</td>
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Print media can now be accessed online

- **Newspapers**
  - 10 annual subscriptions
  - Nearly 4 tons

- **Books**
  - 3,500 books
  - nearly 2 tons

- **One Kindle DX**
  - 3,500 books
  - 1.2 lbs.
Music storage devices have been reduced by up to 99.9%

1920’s
467 records
over 200 lbs.

1970’s
350 cassettes
over 70 lbs.

1990’s
259 CD’s
over 9 lbs.

2009
1 iPod
0.34 lbs.
Perspectives - Waste or Resource?

Pessimist:
• Waste is a problem to be managed...
  - Design flaw
  - Indication of inefficiency
  - Entropy

Optimist:
• There are no waste streams, only wasted resources...
  - Materials
  - Energy
  - Food
Industrial Supply Chains are Complicated but Contained - Making the Product to Service Transition Easier to Activate

Service providers: internal staff; brokers; consultants; logistics; maintenance and janitorial contractors; industrial cleaning, waste & recycling companies

Fragmented offering - many players, duplicative processes and procedures, high transaction costs
Resource Management (RM) and the Product to Service Transition in the Waste Industry

RM is an alternative to waste management that focuses on resource efficiency through:

- Design/process improvements
- Technological innovations
- Behavior and consumption patterns
- Holistic “systems” management
- Aligned incentives in contracts/agreements between waste generators and service providers

Resource Management can be activated at every stage of the supply chain - industrial, retail, consumer products, and consumer
Features of Traditional Waste vs. RM Services

**Traditional Services**
- Multiple contracts for hauling, recycle, disposal, etc
- Minimal client interaction
- Large capital requirements
- Volume based compensation

**RM Services**
- Contract management, innovation, reporting
- Active strategic partnership
- Large knowledge & information requirements
- Gain sharing based on volume/cost reduction
RM Service Enhancement Illustration

Service Before RM: 9 Contracts
- Hauling (2 contracts)
- Disposal (4 contracts)
- Consulting Studies (1 contract)
- Waste Pad Assistance (1 contract)
- Sludge Clean Out (1 contract)

Service After RM: 1 Contract, 30% Savings
- Hauling
- Disposal
- Waste Pad Management
- Comprehensive Studies
- Two On Site RM Managers *
- Off Site Support *
- Comprehensive Recycling *
- Environmental Reports *
- Waste Tracking Systems *
- Staff Training *

* = new service

Sources of Value in the Product to Service Transition
Based on WM Sustainability Services - 2010

Note: Represents $15MM at over 100 locations serviced by WM Sustainability Services.
Industrial RM Demand Limitations

- RM demand is most developed in large industries
  - Organizations with supply chain orientation that demand more strategic value adding activities from vendors

- Demand for RM is limited
  - Disposal costs are cheap relative to other expenses
  - Purchasing managers (gatekeepers) influence buy decision
  - RM marketing effort must focus on higher levels in the buying chain
Industrial RM Market Drivers

• Provides means for diversifying service
  - Point of entry for marketing other services

• Results in longer term relationships/partnerships
  - Customer perception shifts from vendor cost focus, to value-added strategic service orientation

• Substantial untapped opportunities
  - RM increases the value of service contracts by at least 25%
Cracking the Consumer Code on the product to service transition...
The Product to Service transition in consumer supply chains is complex... based on interactions between industry, distributors, retailers, and consumers

- Beyond demand, consumers have limited ability to affect product to service transitions
- Consumer product waste is generally passed on to consumers in the form of packages and/or obsolete products
- Recycling provides a basis for understanding the complexity of product to service transitions in consumer supply chains
Recycling trends that illuminate the product to service transition in the consumer segment

- Recycling is widely embraced and understood by people around the world...over 70% of consumers have a positive association with recycling...

- Recycling processing technology is generally well developed, yet capture and collection remains challenging...
  - Participation is generally low;
  - Capture infrastructure is limited - e.g., 12% of out of home locations have ready access to recycling

- Recycling is generally positioned as a commodity oriented activity in which “stuff” goes away with the trash...

- While, there is growing interest in extended product/producer responsibility, neither companies nor agencies have any idea what happens to products after consumption...
Questions

• What if products and packages could be tracked into “best and highest use” at point of disposal?

• If recycling were a brand and consumer oriented activity instead of commodity oriented activity, would it be more valuable?
Product to Service Transitions in Consumer Segments Require Creating Connective Infrastructure that Brings Value to Multiple Stakeholders

The greenopolis Cycle
Closing Thoughts...

Waste and recycling systems provide important perspective on product to service transitions.

Resource Management (RM) represents another way to activate the product to service transition.

- Large industries have made significant progress...
- Commercial and retail is in process...
- Consumer driven RM has the potential to fundamentally change the game...but requires substantial investment and a “rethink” of existing consumer supply chains.

Process improvements, innovation, behavioral change, systems thinking, and aligned incentives are key to success in all segments...

There are no waste streams, only wasted resources...
rethink. recycle. reward. closing the loop together.