



# Thinking Like a System

Kevin Palmer  
Sustainability Guy  
[palmerk@saic.com](mailto:palmerk@saic.com)



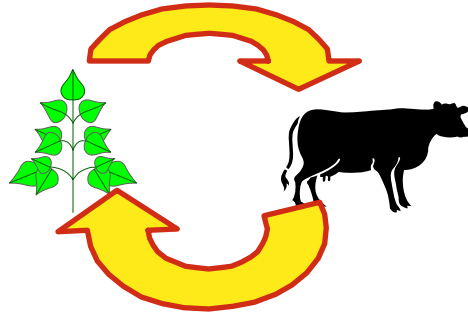
# Overview

- The Good
- The Bad
- The Inefficient
- Systems and Resources

# The Good - The Way Nature Works

**In cyclical natural systems, waste does not exist.**

**Waste = Food.**



# The Bad

Step 1 - bauxite is mined in Australia

Step 2 - bauxite is trucked to plant for chemical processing  
1 ton ore yields up to 1/2 of Aluminum Oxide

Step 3 - shipped to Norway for processing

Step 4 - oxide sits at smelter site for up to 2 months

Step 5 - 2-hour smelting reduces 1/2 of oxide into 1/4 ton of metal

Step 6 - metal ingot cured and shipped to Germany to be rolled

Step 7 - ingot is heated to 900°F and rolled into coil

Step 8 - coil is stored and cold rolled into sheet

Step 9 - sheet metal is shipped to England punched and formed into cans

Step 10 - can is washed, dried, primed and painted

Step 11 - can is lacquered and coated inside

Step 12 - cans are palletized, stored, and shipped

Step 14 - bottler cleans and fills with product

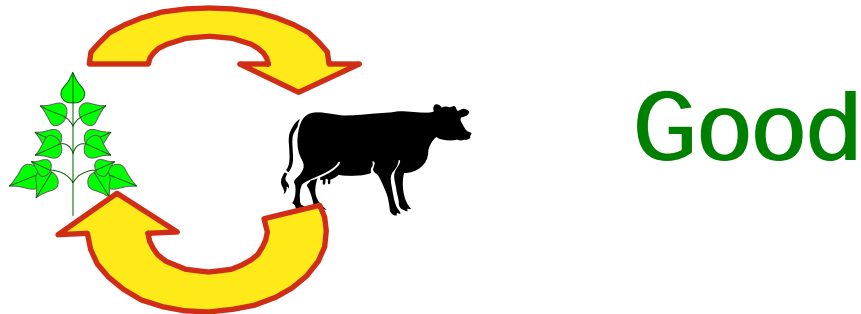
Step 15 - cans are packed in promotional boxes palletized and shipped to retailer

Step 16 - Can is purchased, contents consumed within a few minutes and is thrown away

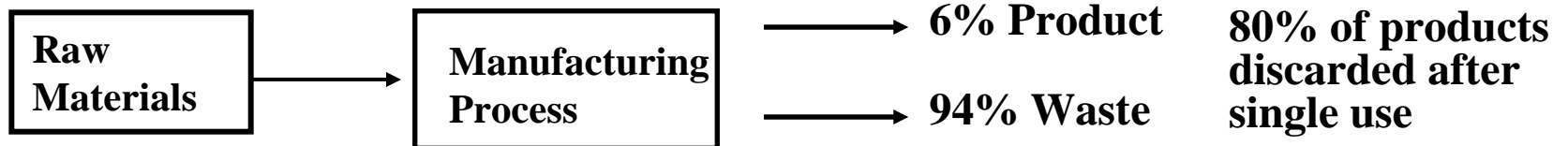


# The Inefficient - Material Flows

In cyclical natural systems, waste does not exist. Waste = Food.



**Linear Industrial Processes: Waste is created faster than it can be reconstituted to quality resources. Take-make-waste**



(Source: NAE / *Factor 4* p. xx, 1997)

**Really Bad**

**It is estimated that 99% of the original materials used in the production of, or contained in, the goods made in the US become waste within 6 weeks of sale.**

(Attributed to Paul Hawken, *Factor 4*, 1997)

# Water Resources

May present opportunities to test new approaches:

- Solar/wind powered desalination
- Water recycling (at building or community level)
- Energy from water opportunities (hydro and tidal)
- Distributed water treatment systems (reduce pumping losses and energy)

# Waste Water to...

Reduces Energy and Aquifer Depletion

Water to Drinking Plant

Methane/Power Production

Water to AG

Plants become raw Material for product Used by Post

Waste Water 8MGD

Digestion

Constructed Wetland

Bio-uptake Provided by plants

Ranges protected & provides "banking" opportunity

Aquifer Recharge

"Moat" alters Land use patterns

# The Little Moat

# Systems & Resources

Need to examine systems to find synergies that protect resources by:

- Taking less
- Making “waste=food” loops
- Partnering with companies that are willing to create new services and products that will support our goals





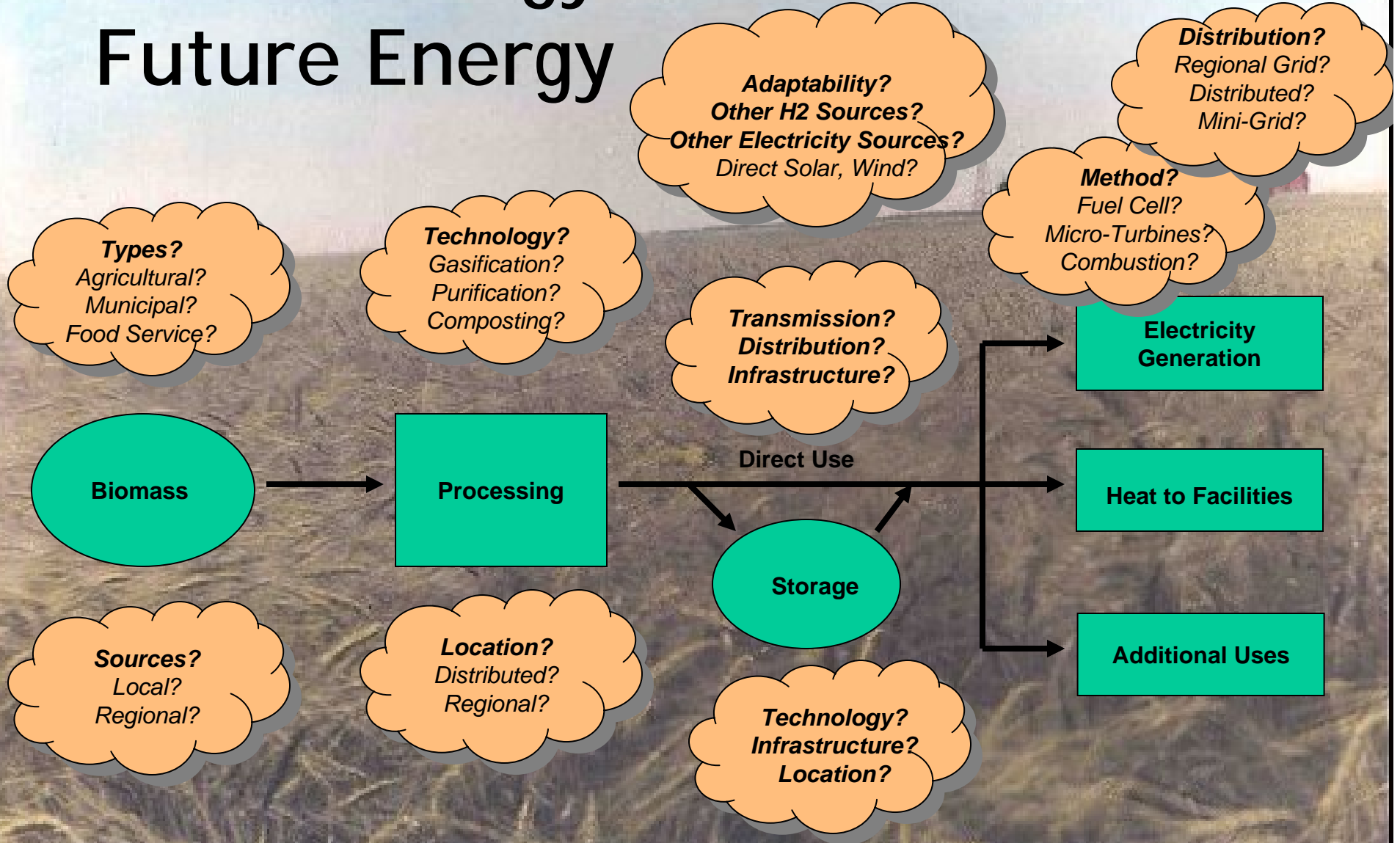
# Energy



Partners and key considerations:

- Biomass - USDA, USFS, Companies. Most installations are located in primarily rural areas. Create significant biomass wastes at installations.
- Primary renewable energy - Utilities, DoE. Strong wind profiles for several. Good solar (great for a few)
- Distributed generation to reduce loss from transmission
- Waste to energy - various technologies

# Bio-mass Energy to Future Energy



# Product Supply Chains

A photograph of a wooden desk and chair in a warehouse setting. The desk is made of light-colored wood and has a white paper on top. The chair is also made of wood and has a white seat. The background shows a warehouse floor and some equipment.

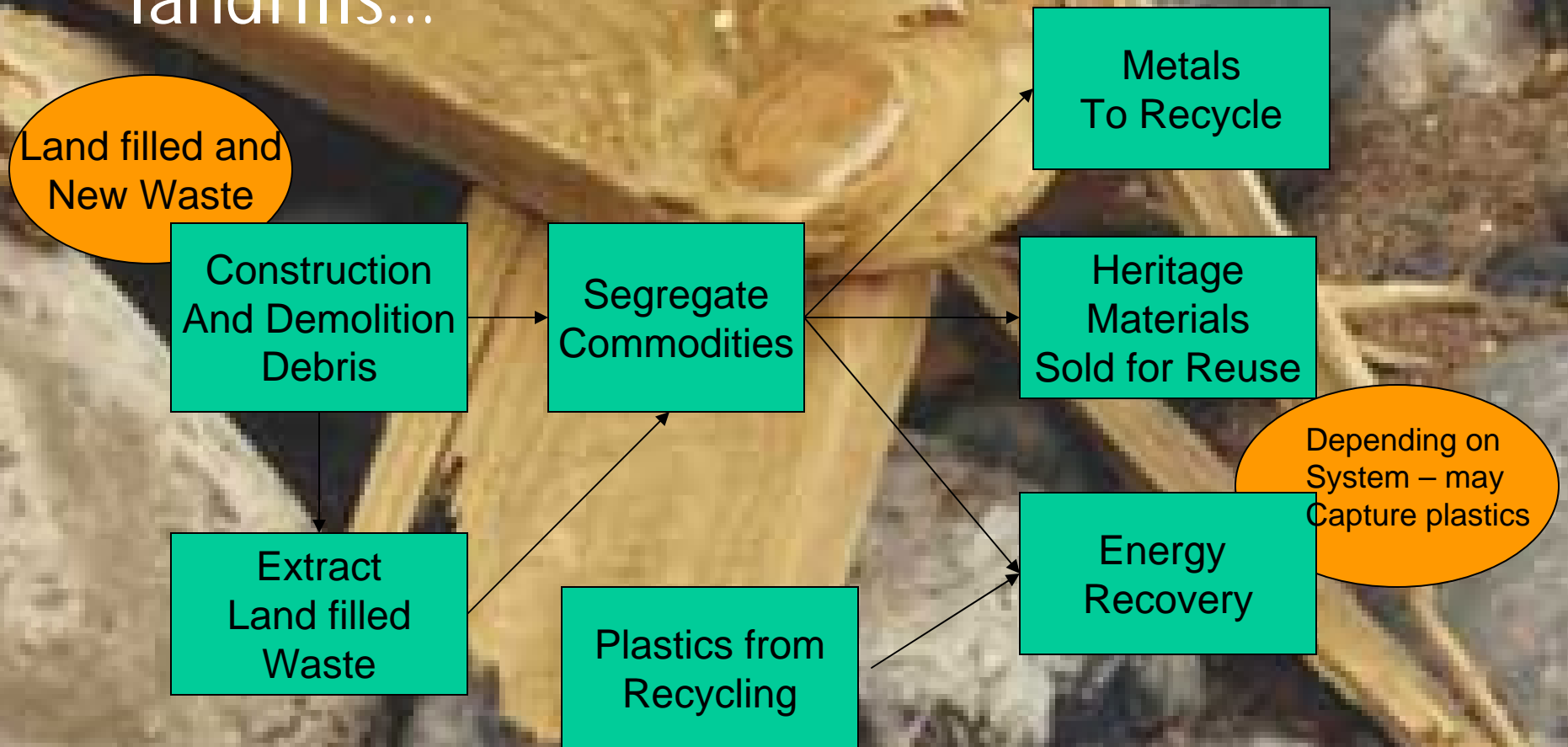
Must look at the stuff we use –  
find efficient systems to  
provide products or services.

Thomasville furniture for  
“furniture services”

Facility Solutions exploring  
remanufacture and sale of used  
barracks furniture

# Waste to ...

Evaluating potential to harvest waste and landfills...



# Agriculture




- Bio-derived fuels, chemicals, energy
- Sustainable and organic food industries
- Bio products like bamboo flooring, agri-board, many more
- Farm land retention through partnerships with farmers and land conservatories

# System Market - Buildings

- Location and its interaction with surroundings
- Building service - enhanced use lease to renovate and operate
- Energy efficient
- User of bio-derived products
- Platform for renewable energy production
- Source of heritage materials for next generation
- Bio-mass supplier





Can we do it?  
Can we create systems that  
work with nature and make  
it better for our species in  
the future?



# No Excuses

The GDP of the United States is  
\$10Trillion/yr

Purchases of the Federal Government  
alone account for 17% of the total  
GDP

That's \$1,700,000,000,000



# The Question

Do we want to leave the world a better place for them?



# Unless...

"Someone like you  
cares a whole awful lot  
Nothing is going to get better  
It's not..."

*The Lorax*  
by Dr. Seuss

