

*Plastics Scorecard  
(V.2.0 beta):*

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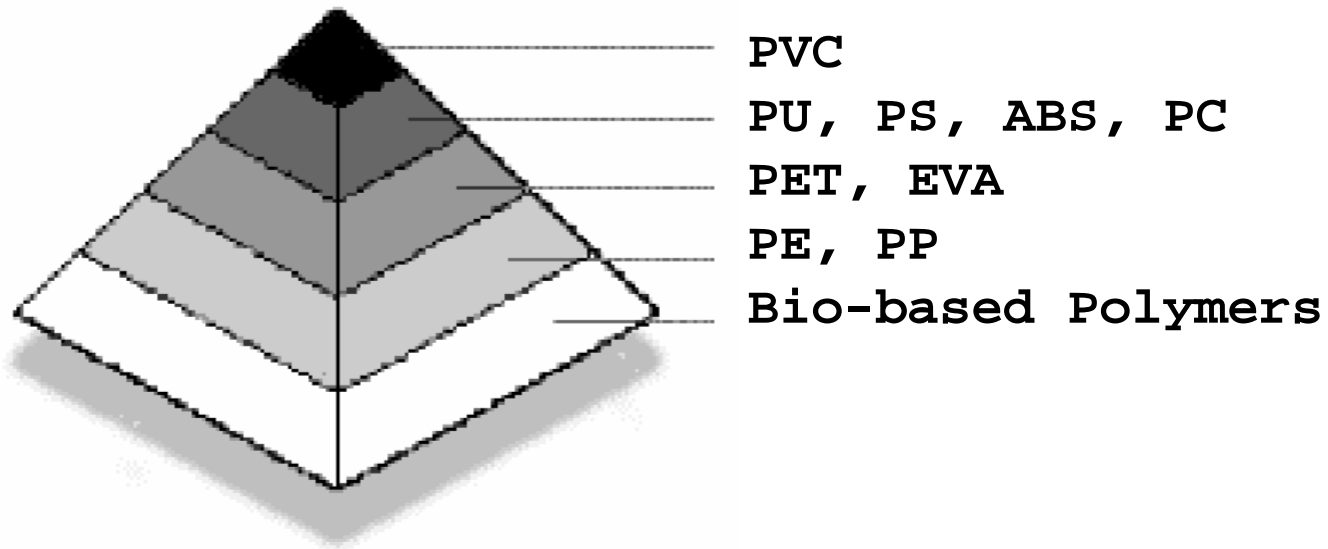
# Our Goals

- Provide direction for the future of plastics development
- Encourage green chemistry, move away from legacy polymers
- Promote closed loop systems for plastics
- Call for design revolution in plastics

# Issues

- Toxicity
  - Polymer
  - Monomer
  - Intermediates
  - Primary chemicals
  - Additives
  - Untested Nano
- Recycled content
- Compostable
- Recyclable
- Marine biodegradable
- Non food crop
- Transgenic seeds
- Sustainable Ag.

# Plastics Hierarchy



# Plastic: APR Design Guidelines

Closures/Closure liners Attachments	
Preferred	PP; HDPE & EVA with plastic
Undesirable	PVC and Aluminum; EVA with plastic
Basecups/Adhesives	
Preferred	No Basecups
If Basecup is used	Water-soluble adhesives or ones dispersible at temperatures between 140° and 180°F Unfilled HDPE or clear PET

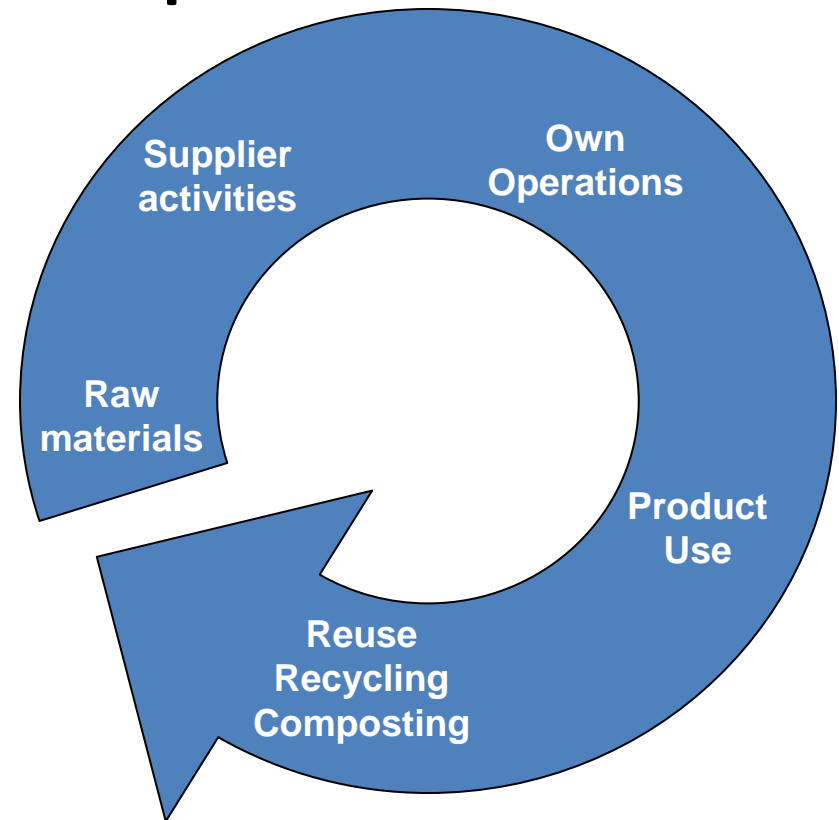
- ▶ Sleeves & Safety Seals
- ▶ Labels & Adhesives
- ▶ Direct Printing
- ▶ Inks & Adhesives
- ▶ Layers & Coatings
- ▶ Non-detaching components

[www.plasticsrecycling.org](http://www.plasticsrecycling.org)

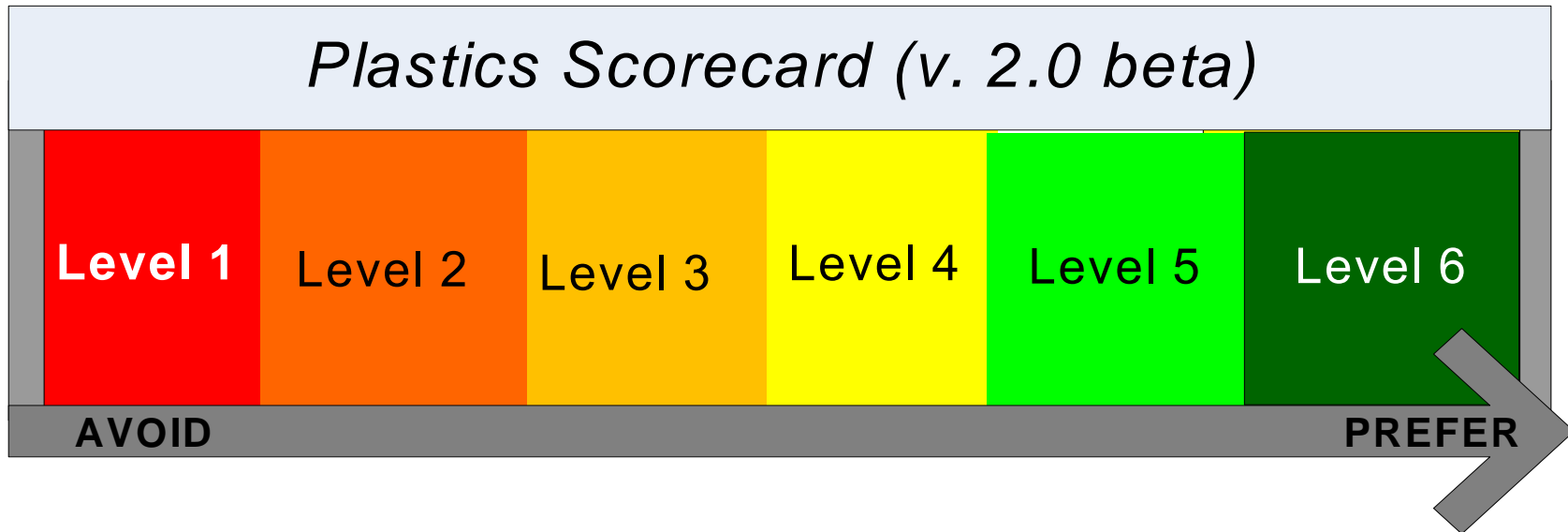
# Guiding Principles

## Life Cycle Thinking

1. Sustainable Agriculture
2. Renewable Resources
3. Green Chemistry
4. Closed Loop Systems



How can you maximize performance in each of these areas?



- This is a *beta* version! Comments welcome
- Plastic products scored on a scale of red to green
- Scorecard designed as a generic platform that can be applied across various product categories

# Plastics Life Cycle

1. Feedstock production: extracting or growing
2. Plastics manufacturing
  - Primary chemicals – e.g., ethylene + chlorine
  - Intermediate chemicals – e.g., ethylene dichloride
  - Monomer – e.g., vinyl chloride monomer (VCM)
  - Polymer – e.g., polyvinyl chloride (PVC)
  - Additives – e.g., plasticizers, stabilizers, colorants, etc.
3. Product use
4. Product end of life management



## Plastics Scorecard (v. 2.0 beta) – Summary

Feedstock Production	Manufacturing	Use	End of Life
<p><i>For bioplastics:</i></p> <ul style="list-style-type: none"> <li>- Transgenic crop with offset (level 3)</li> <li>- No transgenic crop (level 4)</li> <li>- No use of prohibited pesticides (level 4)</li> <li>- Grown according to sustainable agriculture principles (e.g., not grown on biodiverse land) (level 5)</li> <li>- Not a food crop (level 6)</li> </ul>			

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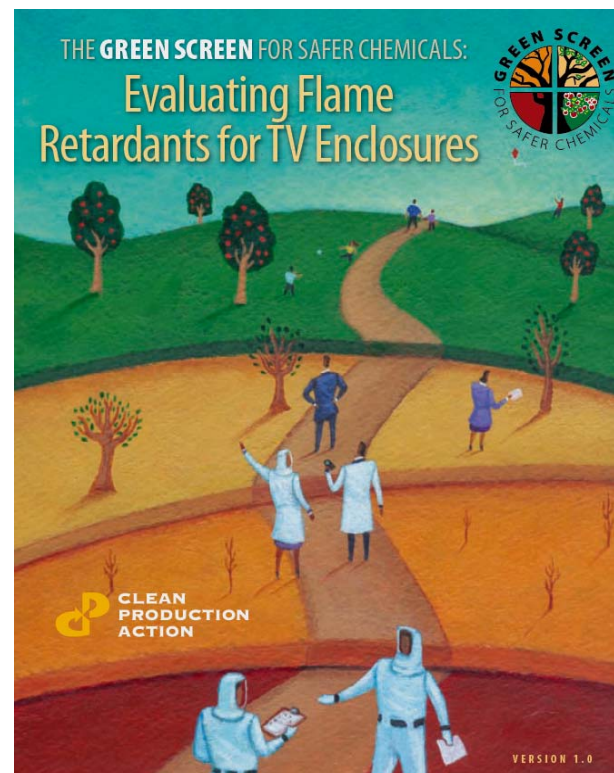
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# Chemicals of High Concern

As defined by Benchmark 1 in the  
*Green Screen for Safer Chemicals*

- PBT, vPvB, vPT or vBT
- Carcinogen
- Mutagen
- Reproductive or Developmental Toxicant
- Neurotoxicant
- Endocrine disruptor



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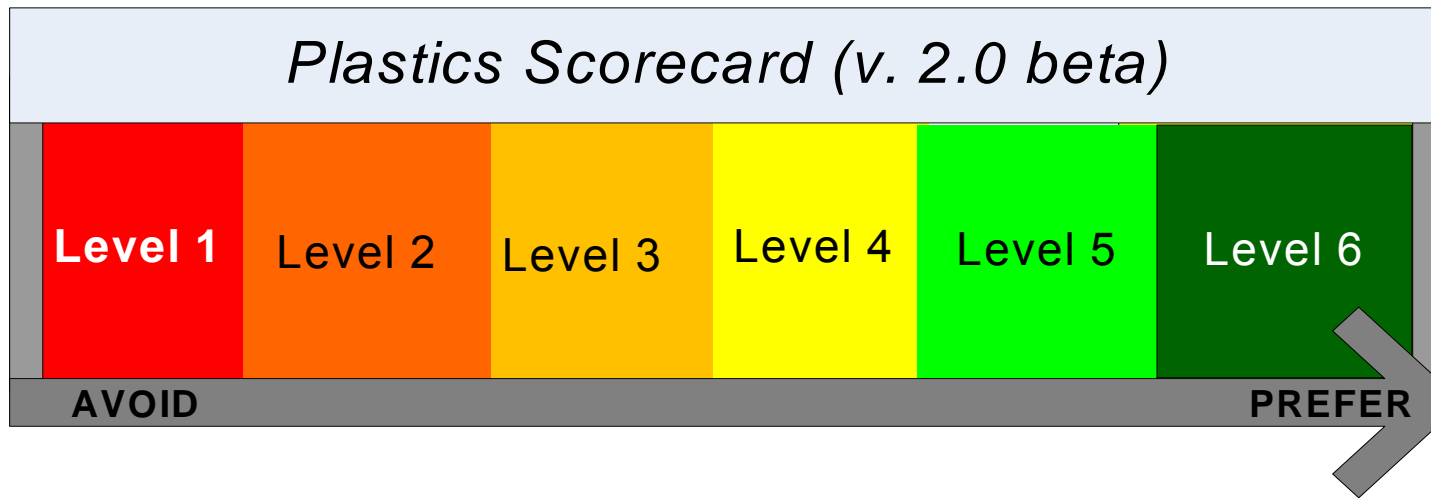
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Resin	Highest Level	Limiting Factor(s)
PVC	1-2	POPs formation (dioxin)
PC	1-2	Bisphenol A (BPA) - endocrine disruptor
PS	1-2	Styrene monomer - neurotoxicant
PET	3-4	Level 4 <b>if</b> it meets all PCR, nano and chemical requirements [Paraxylene & ethylene glycol]
Nylon	3-4	Level 4 <b>if</b> it meets all PCR, nano and chemical requirements [Adiponitrile]
PE	3-5	Level 5 <b>if</b> it meets all PCR, nano and chemical requirements [Ethylene]
PP	3-5	Level 5 <b>if</b> it meets all PCR, nano and chemical requirements [Propylene]
PLA	3-6	Level 6 <b>if</b> it meets sust ag, transgenic seed, additive, compostability, marine, non-food source, & 30% PCR requirements.



# Recommendations

- **Biobased Polymers Mfgs** promote more sustainable ag practices
- **Move away from legacy polymers** based on monomers and additives of high concern to polymers based on green chemistry
- **Disclose all additives** in polymers
- **Increase use of post consumer recycled (PCR) content**

# Thank You!

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