

BizNGO Plastics Scorecard – Identifying More Sustainable Plastics



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Berkeley, CA
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Agenda:

3:40 – 5:00 pm - Sustainable Plastics

Moving to more sustainable plastics

What are the opportunities? What are the challenges?
What are some examples of sustainable plastics? How can we analyze options?

BizNGO Plastics Scorecard Overview

What is the purpose of the Scorecard? Who are the intended users? What is the overall framework for the Scorecard?

The Safer Chemicals Module of the Plastic Scorecard

How does this module assess the chemistry of plastics?
How can the module move us towards safer plastics?

Next Steps for 2013

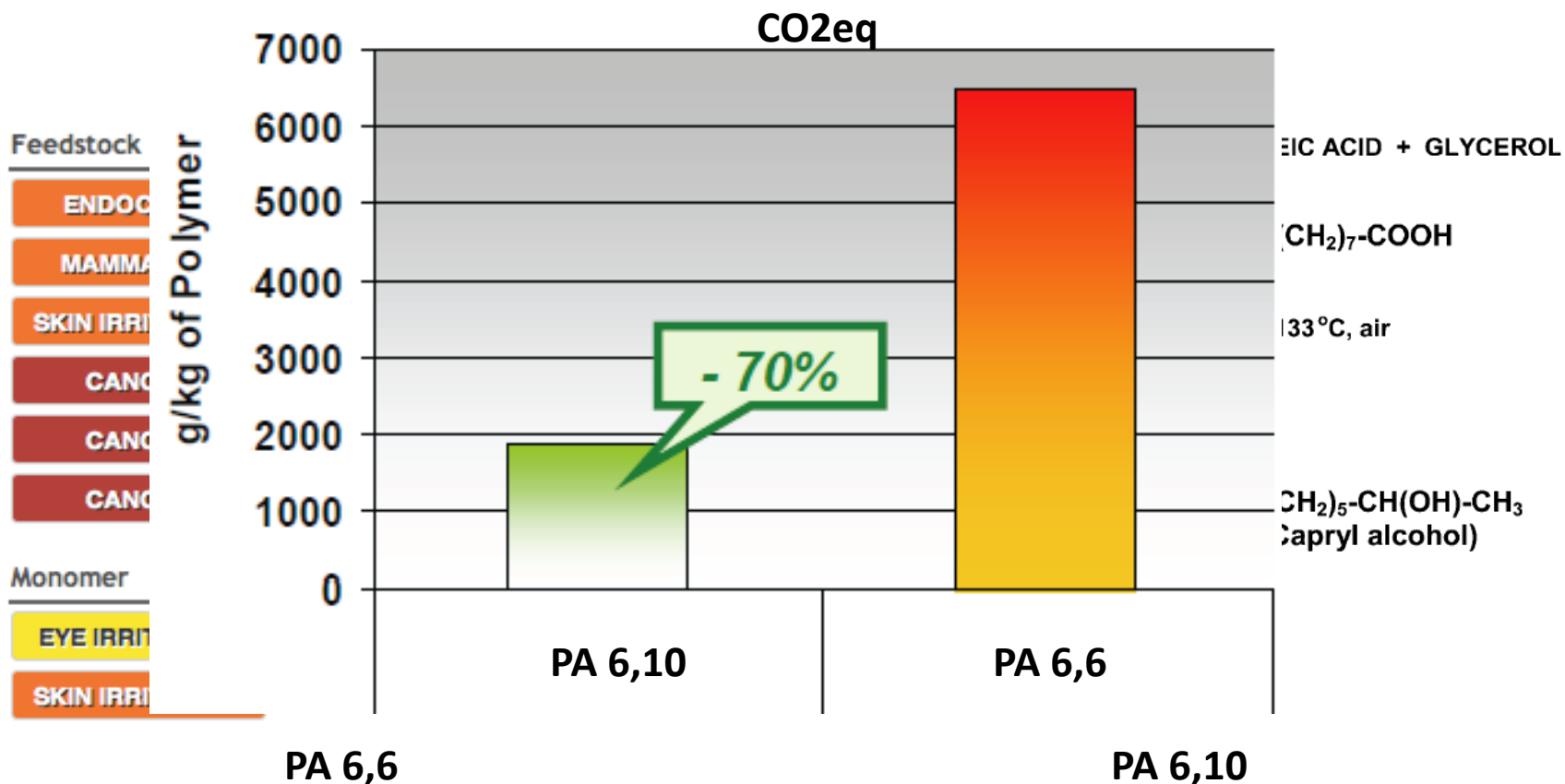
What should the Sustainable Materials Work Group's priorities be for 2013 to build out and/or pilot the Plastics Scorecard? Who else should we partner with?



Moving to more sustainable plastics

What are the opportunities? What are the challenges?
What are some examples of sustainable plastics? How
can we analyze options?

In search of sustainable plastics: Nylon 6,10 vs. Nylon 6,6



Discussion

Q. What are some other examples of sustainable plastics – polymer and additive examples?

q. What makes this polymer/additive sustainable?

q. What could be some concerns/downsides from a sustainability standpoint?

Sustainable Plastics Examples

Polymer/Additive Example	Sustainability Advantages	Potential Sustainability Downsides
Nylon 6,10	Can use castor-based (bio-based) sebacic acid rather than petro based adipic acid	Impacts on land and water associated with growing castor seeds



BizNGO Plastics Scorecard Overview

What is the purpose of the Scorecard? Who are the intended users? What is the overall framework for the Scorecard?



The Business-NGO Working Group promotes the creation and adoption of safer chemicals and sustainable materials in a way that supports market transitions to a healthy economy, healthy environment, and healthy people.

Sustainable Materials Workgroup 2011



Principles for Sustainable Plastics

Plastics provide benefits to people across the globe. Lightweight, durable, flexible and safe for use in baby car seats.

Principles

1. Sustainable Resources
2. Closed Loop Systems
3. Energy Efficient & Renewable
4. Safer Chemicals
5. Healthy Workplaces & Communities

1) Sustainable Resources — The growing, harvesting, and use of natural resources used to manufacture a plastic should contribute to environmental quality, support biodiversity, build habitat and not compete with the production of food.

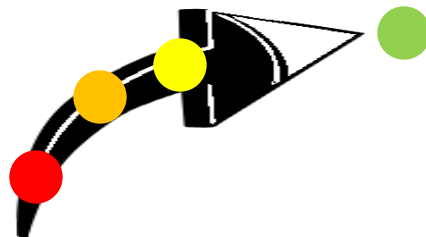
2) Closed Loop Systems — The lifecycle of a plastic and its associated product should

“...Principles for Sustainable Plastics [will] provide the foundation for a BizNGO framework that evaluates, identifies and selects more sustainable plastics.”

BizNGO Sustainable Plastics Scorecard

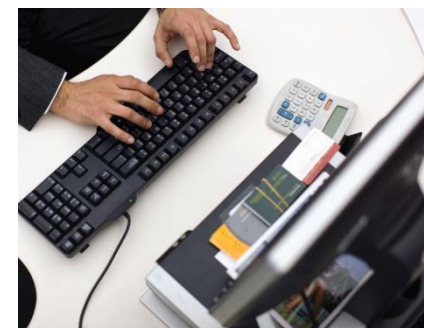
A decision making tool for material developers, product designers, material and product specifiers, and purchasers to design and select more sustainable plastics.

A tool to track progress toward more sustainable plastics



Plastics Scorecard Framework

Sustainable Plastic Principle	Life Cycle Stage			
	Feedstock Production	Polymer Manufacturing	Product Use (Product Content)	End-of-life
1. Sustainable Resources				
2. Closed Loop Systems				
3. Energy Efficient & Renewable				
4. Safer Chemicals				
5. Healthy Workplaces & Communities				



Safer Chemicals Module of the Scorecard

Sustainable Plastic Principle	Life Cycle Stage			
	Feedstock Production	Polymer Manufacturing	Product Use (Product Content)	End-of-life
1. Sustainable Resources				
2. Closed Loop Systems				
3. Energy Efficient & Renewable				
4. Safer Chemicals				
5. Healthy Workplaces & Communities				



Safer Chemicals Module



Safer Chemicals Module of the Scorecard

Chemical Scores for Major Polymers

Primary Chemicals	Intermediates	Monomer(s)	Catalysts*
Benzene 71-43-2	Cumene 98-82-8	Bisphenol A 80-05-7	Pyridine 110-82-7
Propylene 115-07-1	Sulfuric Acid 7664-93-9	Phosgene 75-44-5 (BM P1)	
	Acetone 67-64-1 (BM P1)	P-t-butylphenol 98-54-4 (BM P1)	
	Phenol 108-95-2		

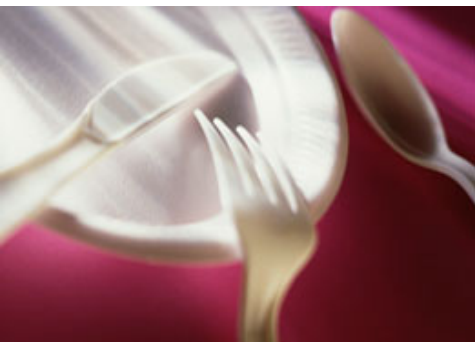
Choosing More Sustainable Plastics

Draft Nov. 2012

Part I - A User's Guide to the BizNGO Safer Chemicals Module of the Sustainable Plastics Scorecard

I. Introduction and Purpose of the Guide

Plastics provide benefits to people across the globe. Lightweight, durable, flexible and easy to form, their use continues to grow rapidly.....



Safer Chemicals Module of the Scorecard

Goals:

1. To promote plastics that use inherently safer chemicals in all steps of polymer production and have safer degradation and transformation byproducts; and
2. To promote the use of plastic additives that are inherently safer to consumers and the environment.

Guided by the **12 Principles of Green Chemistry**, in particular

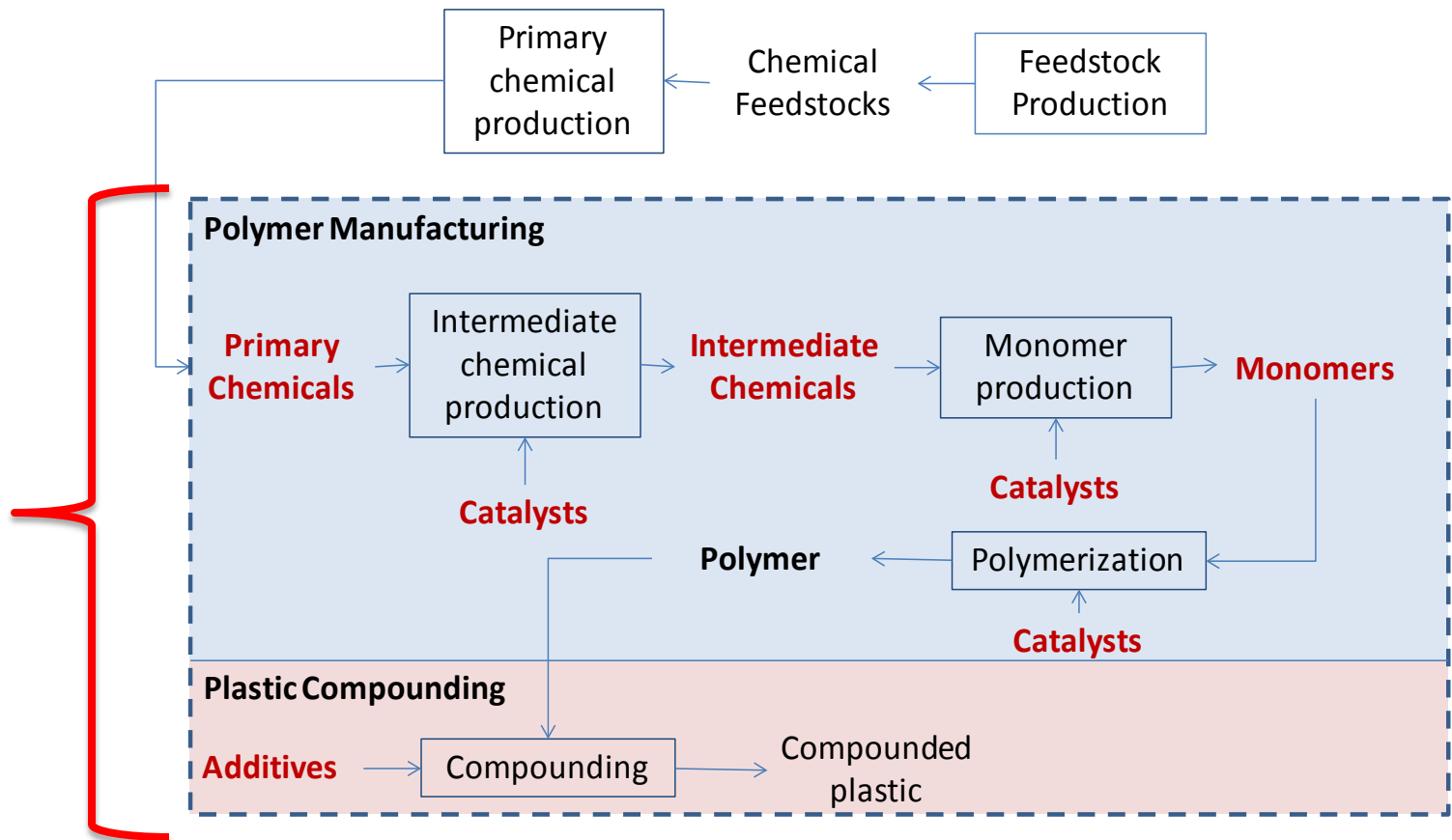
Design safer chemicals and products: Design chemical products to be fully effective, yet have little or no toxicity.

Design less hazardous chemical syntheses: Design syntheses to use and generate substances with little or no toxicity to humans and the environment.



Safer Chemicals Module of the Scorecard

Chemical categories assessed



Safer Chemicals Module of the Scorecard

- **Uses the GreenScreen™ to assess chemicals**
- **Two Tiers:**



Tier 1: Polymer Manufacturing

- Chemicals associated with polymer production
- Allows comparison of one base polymer to another

Tier 2: Plastic Compounding

- Polymer + additives
- Allows analysis and comparison of polymer and additive options

Safer Chemicals Module of the Scorecard

Tier 1: Polymer Manufacturing

Polymer	Primary Chemicals	Intermediates	Monomer(s)	Catalysts*
PC	Benzene 71-43-2	Cumene 98-82-8	Bisphenol A 80-05-7	Pyridine (M) 110-86-1
	Propylene 115-07-1	Sulfuric Acid 7664-93-9	Phosgene 75-44-5 (BM P1)	
		Acetone 67-64-1 (BM P1)	P-t-butylphenol 98-54-4 (BM P1)	
		Phenol 108-95-2		
PLA	Sugar (dextrose aka l-glucose) 921-60-8	Lactic Acid 50-21-5	Lactide (L-lactide - 4511- 42-6; DL-lactide - 615-95-2)	Tin Octanoate 301-10-0

- Results based only on GreenScreen List Translator - identifies BM 1 & Possible BM1 chemicals


- **Red cell** = GreenScreen List Translator Benchmark 1

- **Red text** = GreenScreen List Translator Possible Benchmark 1




**In 2013 will conduct full GS assessments for PET, PP & PLA

Safer Chemicals Module of the Scorecard

Tier 2: Plastic Compounding

Polymer	Primary Chemical Score	Intermediate Chemical Score	Monomer Score	Catalyst Score	Additives		End-of-Life Concerns
					Colorant – ABC White		
					Chemical Ingredients	Score	
PC	1	1	1	1	Titanium dioxide 13463-67-7	1	
					Ultramarine Violet 12769-96-9		
					Antimony\ Chromium\ Titanium Buff Rutile 68186-90-3	1	
					Carbon Black 1333-86-4	1	
					ABS carrier 9003-56-9		

**** Current version does not roll-up polymer (Tier 1) or compounded plastic (Tier 2) chemical scores into a single score for polymer/plastic**

Polymer	Flag	Definition of Flag
PVC		Brominated and brominated/chlorinated dioxins and furans are formed when plastics containing brominated flame retardants are burned at lower temperatures. See for example http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/EPOC/WMP(97)4/REV3&docLanguage=En
PVC		Toxic phthalate plasticizers may leach out of products in landfills or when products are otherwise released to the environment (e.g., land or ocean litter)
PC		BPA monomer may leach out of PC products in landfills or when products are otherwise released to the environment



Next Steps for 2013

What should the Sustainable Materials Work Group's priorities be for 2013 to build out and/or pilot the Plastics Scorecard? Who else should we partner with?

Small Group Discussion

Reflecting on the discussion and presentation, discuss:

1. What dimensions of sustainable plastics are top priority for your organization?

E.g.,

- toxic chemicals/restricted substances
- recyclability
- recycled content
- biobased content
- biodegradable
- carbon footprint

2. What is needed to move to sustainable plastics?

3. What should the priorities should be for building out the Plastics Scorecard in 2013? Other activities focused on sustainable plastics?