

Grading Criteria - Feedstock Production

Feedstock production is the growing or extracting of the raw material resources for plastics. Today the feedstocks for plastics are overwhelmingly fossil fuels, primarily crude oil and natural gas.

The Plastics Scorecard grades plastics on four feedstock production attributes:

1. Pesticide Use in Agriculture
2. Genetically Modified Organisms (GMOs) in Agriculture
3. Sustainable Agriculture Practices
4. Post-Consumer Recycled Content

The first three attributes apply only to biobased plastics and the last criterion applies only to fossil fuel-based plastics.

In today's global market there is no way to distinguish the sources of fossil fuel feedstocks for plastics. Crude oil and natural gas are commodity products that cannot be differentiated by sustainability criteria. No one can buy plastics sourced solely from natural gas or crude oil sourced in a less environmentally damaging manner. Opportunities for "greening up" fossil fuel extraction through purchasing choices simply do not exist. While producers of fossil fuels can take actions to lessen their environmental impacts (for example, no extraction in pristine places, better control and treatment of well head wastes, etc.), there is no capacity to discern among these less damaging sources of fossil fuels in the market. Thus the Plastics Scorecard does not attempt to differentiate among fossil fuel sources for plastics because it cannot be done.

Because fossil fuels cannot be differentiated in the market place based upon their environmental impacts, the Plastics Scorecard penalizes fossil fuel-based plastics by not allowing fossil fuels to attain Grade A+. The highest attainable grade for any fossil fuel based plastic is A-. The Scorecard addresses the environmental and human health impacts of fossil fuel feedstocks through the use of post-consumer recycled (PCR) content. By increasing the PCR content of a plastic product manufacturers reduce the environmental and human health impacts of fossil fuel extraction. That is why PCR content is included under feedstock production rather than manufacturing.

The attributes for biobased plastics are directed at growing feedstocks in a more sustainable manner. This is because the current biobased feedstocks for plastics are agricultural crops, especially commodity food crops like corn and sugar beets. But this will change given the increasing research and development activities directed at making plastics from biobased waste products, including food waste. When viable, commercial operations emerge from biobased waste products the feedstock production attributes for renewable materials will need to be updated.

The Plastics Scorecard's (v.1.0 beta) goals for biobased feedstocks are:

- Crops grown without the use of pesticides of high concern to human or environmental health (see Criteria 1.A. below).
- Crops grown from plants that have not been altered by genetically modified organisms (GMOs) (see Criteria 1.B. below).
- Crops grown in accordance with measures that lead to sustainable agriculture, including (see Criteria 1.C. below):
 - conserving, protecting and building soil,

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- conserving nutrient cycles,
- promoting biological diversity and
- developing and certifying a comprehensive sustainable agriculture plan.
- Crops that are not used for food production (for example, use switchgrass, not corn).

Over time the Plastics Scorecard's feedstock production criteria will need to be adjusted to the opportunities and activities surrounding the manufacture of plastics from biobased waste products. In the current design of the Scorecard, plastics manufactured from biobased waste products receive a pass on feedstock production - they are not graded on feedstock production, only on manufacturing, use and end of life.

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Grades are assigned for four feedstock attributes:

- Pesticide Use in Agriculture
- Use of Genetically Modified Organisms (GMOs) in Agriculture
- Sustainable Agriculture Practices
- Post-Consumer Recycled Content (applies only to fossil fuel-based feedstocks)

If the feedstock for the plastic material is a biobased crop, it will have three grades for feedstock production: pesticide use, GMOs and sustainable agriculture. If the feedstock for the plastic material is fossil fuel-based, it will have one grade for feedstock production: post-consumer recycled content. If the plastic material has both biobased and fossil fuel-based feedstocks, then it will have four grades. If the feedstock is a biobased waste product (such as food or yard waste), the plastic material will have no grade for feedstock production. The grading criteria for each of the Feedstock Production attributes are described below.

1.A. Pesticide Use in Agriculture

This attribute only applies to plastics made from agricultural feedstocks.

1.A.1. **Grade F = Use of Restricted Pesticides.** If any crop used to manufacture the plastic material is grown using a pesticide on any of the following lists it receives Grade F for pesticide use (with an exception for atrazine - see atrazine offset option below):

- 1.A.1.a Stockholm Convention on Persistent Organic Pollutants (POPs),¹
- 1.A.1.b the United Nations Prior Informed Consent (PIC) list,²
- 1.A.1.c the Pesticide Action Network Dirty Dozen list,³
- 1.A.1.d the U.S. Environmental Protection Agency's List of Banned and Severely Restricted Pesticides⁴ or
- 1.A.1.e the European Union Directive 79/117/EEC, Council Regulation 805/2004/EC or Directive 91/414EEC, list of banned or severely restricted pesticides.³

Grade C+ = Atrazine offset option: to allow a transition to more sustainable agricultural practices, an offset will be allowed for the use of atrazine in growing corn. A buyer can increase the grade for pesticide use from F to C+ if: it purchases an offset, such as a Working Landscapes Certificate,⁵ and the only restricted pesticide used in the growing of the crop is atrazine.

1.A.2. **Grade D = Use of a Green Screen for Safer Chemicals⁶ red chemical as a pesticide.** If any crop used to manufacture the plastic material is grown

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using a pesticide that is a Green Screen red chemical (that is, a chemical of high concern to human or environmental health), the plastic material receives Grade D for pesticide use (with an exception for buyers participating in a sustainability offset program - see offset option below).

Grade C+ = Sustainability offset option. To allow a transition to more sustainable agricultural practices, an offset will be allowed for the use of pesticides of high concern. A buyer can increase the grade for criterion 1.A.2. from D to C+ by purchasing a sustainability offset, such as a Working Landscapes Certificate.

- 1.A.3. **Grade C- = No Integrated Pest Management (IPM) practices.** If no farms growing the crops use IPM practices or no sustainability offset is purchased (such as Working Landscapes), then the plastic material receives Grade C- for pesticide use.
 - 1.A.4. **Grade B- = Some IPM practices.** If only some of the farms growing crops use IPM practices, then the plastic material receives Grade B- for pesticide use.
 - 1.A.5. **Grade A- = IPM practices in place for all feedstocks.** If all crop feedstock sources maintain an IPM plan and use all appropriate IPM techniques, then the plastic material receives Grade A- for pesticide use.
 - 1.A.6. **Grade A+ = Organic Farming.** If all crop feedstock sources are grown or processed in accordance with the standards of organic farming, then the plastic material receives Grade A+ for pesticide use.
 - 1.A.7. **No Grade =** Plastics made from fossil fuel feedstocks or biobased waste products.
- 1.B. **Use of Genetically Modified Organisms (GMOs) in Agriculture**
This attribute only applies to plastics made from agricultural feedstocks.
- 1.B.1. **Grade F = GM (genetically modified) plant with plastic in it.** If a plant is genetically modified to grow plastic in the plant, then the plastic material receives Grade F for the use of GMOs. "Growing plastic in the plant" means a plant is genetically modified to grow plastic in the plant and the plastic is then harvested from the plant at the end of the growing season.
 - 1.B.2. **Grade D = GM Seeds** (with an exception for buyers participating in a GM or sustainability offset program - see offset option below).. If a plant is grown from GM seeds, then the plastic material receives Grade D for the use of GMOs. For example, making plastics from GM corn or soybean.
Grade C+ = GM offset option. To facilitate the transition to more sustainable agricultural practices, an offset is allowed for the use of GM crops. A buyer can increase the grade of its bioplastic by purchasing a GM offset or a sustainability offset that includes GMO-free crops, such as a Working Landscapes Certificate. With a Working Landscapes Certificate or equivalent, the maximum grade the bioplastic can achieve is Grade C+.
 - 1.B.3. **Grade A+ = No GM Seeds.** If the bioplastic is manufactured from crops that are not genetically modified, then the plastic receives a Grade A+ for GMOs.⁷
 - 1.B.4. **No Grade =** Plastics made from fossil fuel feedstocks or biobased waste products.

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1.C. Sustainable Agriculture Practices

This attribute only applies to plastics made from agricultural feedstocks. Sustainable agricultural practices, beyond pesticide use (1.A) and GMOs (1.B) include: a) conserving, protecting and building soil; b) conserving nutrient cycles; c) protecting air and water quality; d) promoting biological diversity; e) reducing energy use; and f) developing and certifying a comprehensive sustainable agriculture plan.

- 1.C.1. **Grade F = No Sustainability Practices.** If the plastic manufacturer cannot demonstrate that its feedstocks are grown according to any of the six sustainability practices cited in 1.C, then the plastic receives Grade F.
- 1.C.2. **Grade C+ = Some Sustainability Practices.** If the plastic manufacturer can demonstrate that its feedstocks meet some of the six sustainability practices cited in 1.C, then the plastic receives Grade C+.
- 1.C.3. **Grade A+ = All Feedstocks Meet Comprehensive Set of Sustainability Practices.** If the plastic manufacturer can demonstrate that all of its feedstocks are grown according to a comprehensive set of sustainability practices (for example, see Working Landscapes), then the plastic receives Grade A+.
- 1.C.4. **No Grade =** Plastics made from fossil fuel feedstocks or biobased waste products.

1.D. Post-Consumer Recycled (PCR) Plastic Content

This attribute only applies to plastics made from fossil fuel-based feedstocks. PCR content is included as part of feedstock production because the increased use of PCR content lessens the environmental impact of fossil fuel production. The grade PCR content begins at Grade C- (rather than Grade F) to reflect the reality that PCR content in plastic products remains in general quite low as well as to create a system that creates incentives for using greater PCR content.

- 1.D.1. **Grade C- = 0-10% PCR Content.** If the plastic product contains 0-10% PCR content, then the PCR grade is C-.
- 1.D.2. **Grade C+ = 10%-30% PCR Content.** If the plastic product contains >10%-30% PCR content, then the PCR grade is C+.
- 1.D.3. **Grade B- = >30%-60% PCR Content.** If the plastic product contains >30%-60% PCR content, then the PCR grade is B-.
- 1.D.4. **Grade B+ = >60%-90% PCR Content.** If the plastic product contains >60%-90% PCR content, then the PCR grade is B+.
- 1.D.5. **Grade A- = >90% PCR Content.** If the plastic product contains >90% PCR content, then the PCR grade is A-.
- 1.D.6. **No Grade =** Plastics made from bio-based feedstocks.

ENDNOTES

¹ United Nations Environment Programme (UNEP), Stockholm Convention Secretariat Stockholm Convention on Persistent Organic Pollutants (POPs). For the list of 12 POPs under the convention, see: <http://chm.pops.int/Convention/12POPs/tabid/296/language/en-US/Default.aspx> (accessed 10/23/2008).

² United Nations, Department of Economic and Social Affairs. 2005. *Consolidated List of Products Whose Consumption and/or Sale Have Been Banned, Withdrawn, Severely Restricted or Not Approved by Governments, Eleventh Issue*. New York: United Nations (<http://www.un.org/esa/coordination/CL11.pdf> - accessed 9/16/09).

³ See the PAN Pesticide Database, which includes human toxicity and ecotoxicity data for about 6,400 pesticide active ingredients and their transformation products -- http://www.pesticideinfo.org/Search_Chemicals.jsp (accessed 7/27/09).

⁴ See: <http://www.epa.gov/opp00001/regulating/restricted.htm> (accessed 9/16/09).



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⁵ See: http://www.iatp.org/ruralcommunities/project_workinglandscapes.cfm (accessed 9/16/09).

⁶ See: <http://www.cleanproduction.org/Green.Greenscreen.php> (accessed 9/16/09).

⁷ Note for the moment GMOs, such as enzymes, are acceptable in the manufacturing stage.