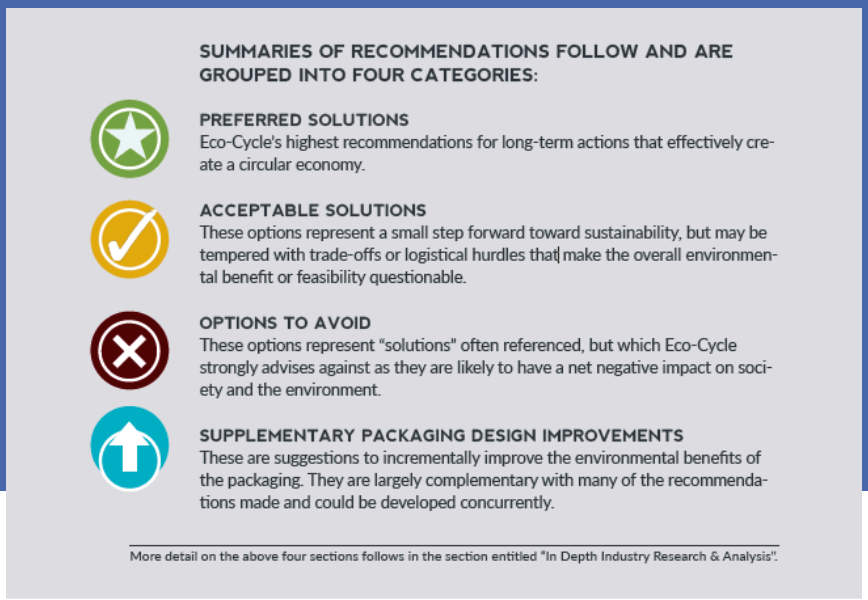
pet sustainability coalition

www.petsustainability.org

The enclosed “Examination of Multilaminate Pouches” report was developed on behalf of Only Natural Pet by Eco-Cycle, one of the country’s oldest and largest non-profit recycling organizations. Only Natural Pet in-turn gifted the results of this study to the Pet Sustainability Coalition (PSC), a pet industry nonprofit that advances business through environmental and social impact.

As a Coalition committed to providing leading tools and resources for sustainability, we believe that this report will have maximum utility in the hands of as many pet industry leaders as possible. PSC has reviewed the report, its findings and recommendations at length and recognizes this report as an exemplary overview of flexible packaging alternatives and in-depth discussion of many solutions currently available in the marketplace.

The future of sustainable packaging is advancing rapidly and requires collaborative leadership from brands, packaging suppliers, and the recycling community. In addition to making tools like like these available to our industry, PSC is committed to working with our member companies to implement sustainable solutions and to providing collaborative opportunities for the all supply chain partners to come together so that we may advance progress at an accelerated rate.



**SUMMARIES OF RECOMMENDATIONS FOLLOW AND ARE GROUPED INTO FOUR CATEGORIES:**

**PREFERRED SOLUTIONS**
Eco-Cycle's highest recommendations for long-term actions that effectively create a circular economy.

**ACCEPTABLE SOLUTIONS**
These options represent a small step forward toward sustainability, but may be tempered with trade-offs or logistical hurdles that make the overall environmental benefit or feasibility questionable.

**OPTIONS TO AVOID**
These options represent "solutions" often referenced, but which Eco-Cycle strongly advises against as they are likely to have a net negative impact on society and the environment.

**SUPPLEMENTARY PACKAGING DESIGN IMPROVEMENTS**
These are suggestions to incrementally improve the environmental benefits of the packaging. They are largely complementary with many of the recommendations made and could be developed concurrently.

More detail on the above four sections follows in the section entitled "In Depth Industry Research & Analysis".

The results of the study enclosed are the views of Eco-Cycle and do not necessarily reflect the beliefs, opinions or recommendations of the Pet Sustainability Coalition or its members. In particularly, in the “Options to Avoid” section, PSC believes that the future of sustainable packaging may require chemical recycling and other programs like the Hefty Energy Bag as solutions for hard to recycle materials.

For questions and comments related to this report you can email info@petsustainability.org

eco·cycle®

# EXAMINATION OF ALTERNATIVES TO MULTILAMINATE POUCHES

## REPORT & RECOMMENDATIONS

PREPARED FOR

ONLY NATURAL PET®

eco·cycle®

Eco-Cycle is one of the oldest and largest non-profit recycling organizations in the U.S. and has an international reputation as a pioneer and innovator in resource conservation. We have over 40 years of hands-on experience in providing Zero Waste services and programs throughout Boulder County that gives us a uniquely qualified perspective to provide recommendations on packaging for Only Natural Pet. Our relevant qualifications include:

- Over 40 years of experience in processing and marketing recyclable materials for Boulder County, which provides hands-on insights into recycling operations and end market partnership. Today Eco-Cycle processes roughly 50,000 tons/year of single-stream recyclables and has an industry reputation for clean materials, strong market partnerships and a commitment to recovering as much material as possible in an environmentally and socially responsible way.
- Over 15 years of experience in collecting compostable materials, including food scraps and compostable packaging, and working directly with local composting facilities on how to design collection services, education programs and local policies to meet the composters' needs.
- Over 18 years of experience in creating new markets and collection programs for hard-to-recycle materials. Eco-Cycle created the first Center for Hard-to-Recycle Materials (CHaRM) and now accepts 23 different types of items — electronics, plastic bags, toilets, mattresses, etc — that can be recycled or repurposed but for which the infrastructure and markets necessary to do so on a large scale do not yet exist.
- Over 40 years of award-winning education programs to engage the community on the hows and whys of recycling, and developing best practices on communicating with the public on recyclability.
- Over 10 years of international and national consulting and speaking engagements as an innovator in the Zero Waste movement.

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**Redesign pouches to be recycled with PE-only**

**Support the creation of an industry group similar to the Carton Council**

## ACCEPTABLE OPTIONS

**Redesign pouches to be 100% certified compostable for commercial composting facilities**

**Redesign for Curbside Recycling Programs**

**Support efforts to collect flexible  film in curbside recycling**

**Recycle existing packaging through TerraCycle**

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# EXAMINATION OF ALTERNATIVES TO MULTILAMINATE POUCHES

## SUMMARY OF RECOMMENDATIONS

Multilaminate pouch recycling has been described as “the multi-million dollar question-of-the-day” in the packaging industry. Flexible film packaging offers many benefits for the packager, but it is largely unrecyclable and made from plastics, a non-renewable resource. While flexible and multilaminate film plastics are a rapidly growing market share, the challenges with recycling the material have not been addressed, and this packaging largely goes to the landfill, or worse, ends up in waterways or oceans. It is currently a linear system: from design to consumer to the dump.

However, concerned companies such as Only Natural Pet are looking at solutions that could have a positive effect, not only on their own packaging, but on their industry and others who use similar packaging. These solutions have the potential to create a shift toward responsible packaging and a circular economy.

On behalf of Only Natural Pet, Eco-Cycle worked to identify potential alternatives to using disposable flexible film pouches for pet food sale and storage, as well as to examine potential reprocessing and recycling methods that could be applied to the materials currently in use. Eco-Cycle looked both at system-wide changes that would require wide-scale alterations to national and international practices and at changes that Only Natural Pet could make unilaterally.

## Goal Statement:

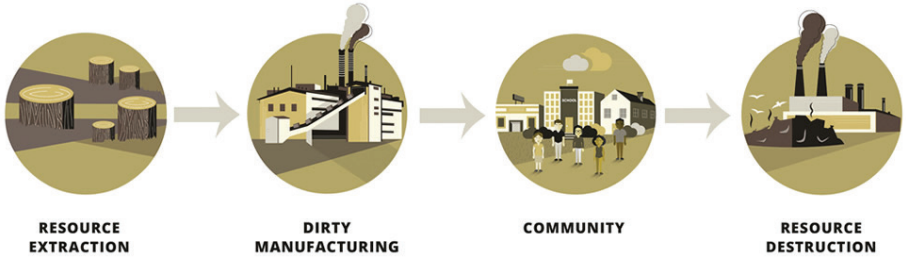
# TRANSITION PACKAGING TOWARD A CIRCULAR ECONOMY

Eco-Cycle advises that Only Natural Pet consider each packaging choice from the perspective of contributing to a Circular Economy. Less than 9% of plastics ever made have been recycled. Even when plastics are recycled, it is almost always a one-time process, meaning they are recycled into an "end-use" product like carpeting or synthetic textiles that is not recyclable at the end of its use. This is called downcycling. By contrast, an aluminum can or glass bottle can be recycled indefinitely and becomes part of a circular economy.

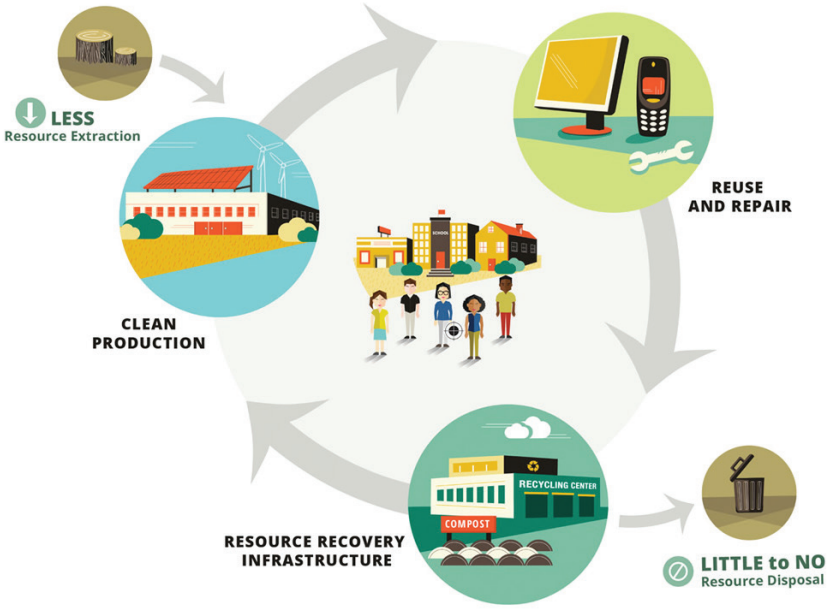
In a circular economy, resources are kept in use for as long as possible, the maximum value is extracted from them while in use, then the products and materials are recovered to regenerate new products at the end of each service life.

**Countries and corporations around the world are recognizing a circular economy as a fundamental goal to creating a more just, sustainable future. In October 2018, a Global Commitment, led by the Ellen MacArthur Foundation in collaboration with UN Environment, was made to eliminate plastic waste and pollution at the source. In part, their goal is to ensure that 100% of plastic packaging can be easily and safely reused, recycled or composted by 2025. It was signed by more than 250 governments and organizations, representing 20% of all plastic packaging produced globally.**

### LINEAR ECONOMY



## CIRCULAR ECONOMY




The decision before Only Natural Pet is which path to take: **should its current multilaminate film packaging be replaced with an alternative that is more recyclable, compostable or reusable?** To help answer this question, Eco-Cycle considered packaging decisions from a systems perspective that includes all the steps in the process: product design; collection and sorting of the used products; and processing (recycling/composting/reusing) used packaging back into a circular economy system.

## SUMMARIES OF RECOMMENDATIONS FOLLOW AND ARE GROUPED INTO FOUR CATEGORIES:

### PREFERRED SOLUTIONS
Eco-Cycle's highest recommendations for long-term actions that effectively create a circular economy.

### ACCEPTABLE SOLUTIONS
These options represent a small step forward toward sustainability, but may be tempered with trade-offs or logistical hurdles that make the overall environmental benefit or feasibility questionable.

### OPTIONS TO AVOID
These options represent "solutions" often referenced, but which Eco-Cycle strongly advises against as they are likely to have a net negative impact on society and the environment.

### SUPPLEMENTARY PACKAGING DESIGN IMPROVEMENTS
These are suggestions to incrementally improve the environmental benefits of the packaging. They are largely complementary with many of the recommendations made and could be developed concurrently.

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More detail on the above four sections follows in the section entitled "In Depth Industry Research & Analysis".

## PREFERRED SOLUTIONS

| | PROS | CONS |
|---|---|---|
| **Develop a reusable, refillable packaging solution** | Most sustainable, truly circular packaging choice<br>Demonstrates strong brand leadership and commitment to sustainability<br>Significantly decrease overall packaging use<br>Can be used with established online sales venues<br>Opportunities for partnering with third-party packaging service for ease of execution | Logistics and infrastructure largely undeveloped<br>Requires redesign of packaging<br>Expensive to join Loop project<br>Durable packaging will be more expensive per unit in the short term<br>Added logistical complexity of tracking containers and receiving spent containers<br>FDA requirements for sanitation |
| **Redesign pouches to be recycled with PE-only film plastics** | End markets are already established and relatively stable<br>Collection infrastructure already in place and growing<br>Maintain low energy cost of using thin film flexible packaging<br>Many design options currently on the market<br>National educational campaign<br>Brand leadership as first pet food company to use this packaging | Requires redesign of packaging<br>Limited consumer participation in drop-off programs<br>Materials downcycled and not circular<br>Limited options on the market for products requiring low air and moisture permeability<br>Very limited options for stand-up pouches |
| **Support the creation of an industry group similar to the Carton Council** | Aggregate market influence can be coordinated to affect significant change<br>Opportunities to bolster recycling at any stage of the process | Not an actual solution- just a framework for creating change.<br>Potentially greater challenges in pouch recycling than in carton recycling |

## ACCEPTABLE ALTERNATIVES

| | PROS | CONS |
|---|---|---|
| **Redesign pouches to be 100% certified compostable for commercial composting facilities** | Perceived as a very "green" option<br>Turns product back into soil<br>Design technologies are rapidly improving<br>Opportunity to lead industry development | Requires redesign of packaging<br>Is still a single-use item<br>Industrial composting is not available to most people in the US<br>Composting facilities are readjusting standards for "compostability," and may not accept packaging in the near future<br>Permeability performance rates are not as high as those achievable with mixed-material flexible packaging<br>Compostable packaging alternatives are not currently suitable for heat-packed high moisture content foods<br>Certification may be expensive<br>Raises concerns about water pollution, GMOs, and appropriate land use |
| **Redesign for curbside recycling programs** | Curbside recycling is most accessible, convenient option for consumers<br>Highly recyclable materials with strong markets<br>Can mimic design from existing product lines<br>Requires very limited behavior change from consumers<br>Some alternative materials (like glass) can be recycled indefinitely | Plastic packaging or plastic-lined paper are not compatible with a circular economy<br>Increased transportation impacts of products<br>Packaging may not meet all desired attributes |
| **Support efforts to collect flexible film in curbside recycling** | Curbside recycling is the most accessible, convenient recycling option for residents<br>No product redesign needed<br>Major brands sponsoring research and testing | Very limited end markets for sorted materials<br>End market value does not cover increased processing costs<br>Process unlikely to be economically advantageous in most settings<br>Capital-intensive to upgrade recycling equipment<br>Contaminates paper quality at recycling center<br>Unlikely that MRFs will widely adopt this methodology<br>Long time-scale to upgrade MRFs |
| **Recycle existing packaging through TerraCycle** | Relatively low cost to implement the mail-in program<br>Program can be implemented quickly<br>A number of companies in the pet food industry are already doing this | Requires behavior change for consumers<br>Low recovery rates<br>Limited end markets<br>Materials can only be recycled once |
| **Replace fossil fuel-based plastics with plant-based conventional plastics** | Reduction of fossil fuel use<br>May be recyclable in conventional thermal and mechanical recycling processes<br>May be made of sustainably-grown plants | Raises concerns about water pollution, GMOs, and appropriate land use<br>Is still a single-use item<br>Processors have expressed that they prefer to not take this type of plastic<br>Materials can only be recycled once<br>Widely available options only replace 30% of fossil-fuel plastic<br>Multilaminate applications would still not be recyclable in current markets |

## OPTIONS TO AVOID

| | PROS | CONS |
|---|---|---|
| Pyrolysis or chemical recycling | May recover some energy from the fossil fuels in plastics | Pollution concerns<br>Results in the burning of carbon-based fuels<br>Unstable markets for end products<br>Does not reduce use of disposable plastics<br>Economic feasibility |
| Hefty Energy Bag or other mixed plastics collection options | Convenience for consumers | Current applications use pyrolysis as their end markets<br>Program has limited growth potential<br>Will create economic burdens for recycling facilities<br>Does not reduce the use of disposable plastics |
| Degradable plastic additives | Reduces visible plastic litter | Microplastics may cause more harm than larger plastic pieces<br>Microplastics get into the food chain more easily<br>Microplastics are likely to cause toxicity in animals that eat them<br>Packaging is not recyclable or compostable |

## SUPPLEMENTARY DESIGN IMPROVEMENTS

| | PROS | CONS |
|---|---|---|
| Increased recycled content in packaging | Helps create demand for recycled products<br>Strengthens recycling markets<br>Improves environmental footprint of packaging<br>Reduces use of fossil fuels to make new plastics<br>Opportunity to lead industry development | FDA requirements for food containers with PCR content<br>Limited range of packaging source choices<br>Concerns about inconsistent coloring in PCR plastic |
| Join the How2Recycle program to improve product labeling | Supports a nationwide effort to streamline communication around recyclability<br>Helps consumers to know what to do with empty packaging<br>No product design changes | Does not increase the actual recyclability of packaging |
| Sell products in larger packages | Reduction of packaging materials<br>Opportunities for sales in bulk stores | Product may spoil before consumption if incorrect package size is purchased<br>The majority of Only Natural Pet's customers are online making purchasing at bulk stores next to impossible. |

# PREFERRED SOLUTIONS

Eco-Cycle's highest recommendations for long-term actions that represent a significant step forward toward sustainability and a circular economy.

## DEVELOP A REUSABLE, REFILLABLE PACKAGING SOLUTION

Durable, reusable packaging has always been the most preferable solution for a circular economy, but until recently, reusable and refillable packaging was considered a niche market. That all changed in January 2019 when more than a dozen leading international brands announced a new online shopping service called Loop. Loop sells household consumer goods in durable, reusable containers, delivered and picked up right from your home through a waste-free delivery system that eliminates cardboard, ice packs and other shipping materials. Most products are offered in reusable stainless steel canisters, replacing commonly used single-use, disposable plastic packaging. The project will launch officially in New York and Paris in April 2019.

**Loop's reusable packaging comes in a variety of styles that include some see-through containers.**

Loop is a game-changer. While most industry initiatives to date have focused on making disposable products less bad, Loop rejects disposable packaging all together, disrupting how we think about the consumer experience and redefining our relationship with convenience. While Loop is still in a pilot phase, there are currently small businesses that are already successfully using reusable packaging that serve as a good model for Only Natural Pet, such as Plaine Products.

Despite best efforts to make plastic pouches more recyclable or compostable, plastic is ultimately not part of a circular economy. To truly be sustainable, stand out among brands and commit to delivering healthy, high quality products in ethical packaging, Eco-Cycle strongly contends that reusable is the best path forward. The launch of Loop and the existence of other small-scale providers suggests that a reusable package can become a reality in the near future for Only Natural Pet. Therefore, the redesign of Only Natural Pet's packaging to be durable and reusable is our strongest recommendation as the best solution for our planet and our health.

## REDESIGN POUCHES TO BE RECYCLED WITH PE-ONLY FILM PLASTICS

Currently, the most viable, and therefore common, option for recycling some types of existing flexible film packaging is to collect PE (Polyethylene)-only thin films through in-store collections and drop-off centers and to recycle the plastic into durable products. PE-only film can be used to produce composite lumber for making decks, benches, and playground sets. It can also be reprocessed into small pellets, which can be made into new bags, pallets, containers, crates, and pipe. The market demand for PE-only film plastics is strong and stable, making it a reliable choice for recycling.

Unfortunately, test results on Only Natural Pet's packaging showed the pouches currently contain too much polyester to be compatible with PE-only film recycling programs.

Most communities in the U.S. have collection programs for PE-only film plastics (often seen in the form of plastic bag collection sites at grocery stores) and there is an industry-led effort to expand collection options and convenience, as well as to educate consumers on how and why to recycle these plastics. However, as with all recycling programs that depend on separate in-store collection or drop-off centers, participation is limited.

As with nearly all plastics recycling, these materials are downcycled into a product that can no longer be recycled. This means the plastic is reused once in another product but still goes to the landfill after that use. While this is a step forward from no recycling at all, it still falls short of the goal to move toward a circular economy and should be considered as a valid short-term solution until more circular packaging solutions can be implemented.

Despite the inconvenience of the collection options and the fact that these materials can only be recycled one or two times, Eco-Cycle believes redesigning Only Natural Pet's packaging to be compatible with PE-only film recycling represents the best opportunity to recycle their packaging. While some markets exist or are in development for multilaminate pouches, these markets are unstable and small

**BREAKDOWN OF POUCH COMPOSITION**

**2-3% Ink**

**10-15% Polyethylene Terephthalate (PET)**

**82-88% Low Density Polyethylene (LDPE)**

## WHAT IS THIN FILM PACKAGING?

"Thin film" is a blanket term used to refer to a broad range of flexible plastic or metallic material commonly used in food packaging. This material is defined by characteristics such as its flexibility, its resilience to cracking or tearing, its light weight, and its ability to be adapted for many different types of applications. Grocery bags, energy bar wrappers, chip bags, bubble wrap, and flexible film pouches all fall under this broad category. "Flexible film" is another term that is used to refer to thin film.

"Multilaminate film" is a subset of thin film packaging that makes use of layers of different types of plastic and metal. The different materials have different features and characteristics that contribute to the overall packaging performance. Examples of materials that fall into this category of thin films are potato chip bags, and Only Natural Pet food bags.

"PE-only films" is another subcategory within thin film packaging. While there may be multiple different layers of material in PE-only films, all the layers are made from polyethylene plastics. Examples of materials that fall into this category of thin films are grocery bags, bubble wrap and bread bags.

scale, and perceived as fairly high risk. By contrast, the markets for PE-only film plastics are low risk and well established, and represent a better opportunity to ensure that packaging is recycled responsibly.

### SUPPORT INDUSTRY-WIDE EFFORTS TO INCREASE RECYCLABILITY

The Pet Sustainability Coalition is an example of pooling resources and knowledge within an industry to create positive change, and, as a founding member, Only Natural Pet has established itself as a leader among pet food brands. Using a similar model, the Carton Council, an industry group representing most of the world's largest manufacturers of carton packaging, has achieved astounding increases in access to recycling services for their product by engaging with nearly all steps of the recycling process--by supporting emerging end markets, helping MRFs to update their machinery to be able to accept their packaging, working with industry partners to increase awareness of the recyclability of cartons, running public education campaigns, and working with local governments to set policies in place to encourage the recycling of their packaging.

Now there is a coalition of some of the world's largest corporate consumers and manufacturers of thin film packaging that are banding together to close the loop on their product. The group, the Materials Recovery for the Future (MRFF) project, is forming around a research project meant to look at every step of the recycling process and investigate similar ways to make multilaminate packaging widely recyclable.

While the formation of an industry group is not by itself a solution to the problems of multilaminate thin film packaging, it offers a framework for affecting industry-wide change and pools the resources and collective market influence of large corporations to make sweeping wide-scale changes much more achievable. For this reason, Eco-Cycle encourages Only Natural Pet to join with the MRFF project to be a voice in creating a positive outcome for their packaging.

# ACCEPTABLE SOLUTIONS

These options represent a small step toward sustainability, but may be tempered with significant trade-offs or logistical hurdles that make the overall environmental benefit or feasibility questionable. They are not listed in any particular order of preference.

## REDESIGN POUCHES TO BE 100% CERTIFIED COMPOSTABLE FOR COMMERCIAL COMPOSTING FACILITIES

Compostable packaging is a burgeoning industry and attracts a lot of attention as a promising solution to move away from petroleum-based plastics. However, composting facilities face several challenges in accepting these materials and it is likely that the composting industry will oppose the collection of pouches and other packaging for composting. Most composters see compostable products only as a mechanism to collect more food scraps from residents and businesses--this means they are willing to accept this packaging if it provides more access to food waste. However, in the case of Only Natural Pet's packaging, there is little-to-no residual food scraps that would go to the composter, which means this packaging is not delivering any value to the composting operations to justify the increased costs of processing.

Currently only half of the U.S. composting facilities that process food scraps will also accept packaging that has been certified as compostable by the Biodegradable Products Institute (BPI). Many composting facilities even have site-specific regulations on what they will and will not accept, and these regulations are likely to become more stringent over time. Additionally, less than 5% of U.S. households have access to a commercial composting facility for food scraps, which means this market is very much in its infancy.

In addition to the collection and composting challenges, a fully-certified compostable pouch is a few years away from market at best, according to one industry insider that Eco-Cycle spoke with. There are a number of compostable thin film packaging options on the market that can meet the needs of shelf-stable products, but foods with high moisture content have posed a significant hurdle for packaging engineers and scientists. Compostable films are also about two or three times more expensive than traditional plastics, creating a significant cost barrier as well.

The hurdles to designing an appropriate compostable plastic packaging solution that would meet the needs of all Only Natural Pet's products and would avoid the logistical issues facing industrial composters are high. Without strong options for compostable packaging and a less-than-rosy outlook for future acceptability in industrial composting operations, Eco-Cycle does not see compostable packaging as a preferred solution for Only Natural Pet.

## REDESIGN PACKAGING FOR CURBSIDE RECYCLING PROGRAMS

Eco-Cycle recommends that Only Natural Pet explore using four potential materials for an alternative packaging that would be more easily recyclable: glass container, plastic clamshells, plastic jars or paperboard box with a separate, recyclable PE-only plastic liner. Aluminum is also a highly recyclable material but was ruled out because it would not meet the need for the product to be visible through the packaging.

Because plastic-coated paper is not recyclable, if a paper box option is chosen, it would require the box to be uncoated and include the use of a separate plastic liner inside, such as a cereal box or boxed wine, but these options increase the use of plastic used in the product and the total amount of packaging used, which makes them less favorable from an environmental perspective.

Both plastic jars and plastic clamshells can provide strong, see-through packaging that protect the product during transportation. Plastic jars are widely recyclable although clamshells are only acceptable in a much smaller subset of recycling programs. The same concerns remain about perpetuating the use of plastics, making these choices viable but not suitable for the long term.

Glass represents the best option for a 100% recyclable package for Only Natural Pet. However, there is substantial packaging redesign needed to convert to these materials and several significant trade-offs with breakage, rigidity, transportation costs and resulting carbon footprint,  and other issues. As such, Eco-Cycle recommends glass as an acceptable solution but notes that these efforts may be better redirected to designing a reusable container.

**Thin films are one of the biggest challenges for MRFs because these materials get tangled around the sorting equipment, costing recycling facilities thousands of dollars per year in maintenance costs. Above: Before and after photos of sorting equipment with tangled plastic bags and films.**

## SUPPORT EFFORTS TO COLLECT FLEXIBLE FILM IN CURBSIDE RECYCLING

Curbside recycling is the most convenient option for collecting and recycling packaging from consumers. Over 9,800 U.S. communities have curbside recycling programs. This represents the greatest opportunity for Only Natural Pet to provide the most convenient, widely accessible recycling option for its packaging, and there is a national coalition of major brands working to develop this system. However, there are two substantial obstacles to this solution that make it highly unlikely this idea will become a reality for most of the U.S. market: There are very limited markets to buy the collected packaging and the processing costs and challenges are quite high. Combined, these challenges carry a steep price tag, making the overall economics of such a recycling program another significant obstacle.

Recycling is fully dependent upon having an end buyer or market for the collected material, a company that can use the feedstock to make new products. There are very few end markets for multilaminate packaging, meaning that almost no one purchases these materials from a recycling center after they are collected. Without an industry to collect a post-consumer material and make it into something new, the material in question will not be recycled. This remains the largest barrier to multilaminate recycling.

Processing these materials in a typical recycling facility is also a substantial challenge. Because MRFs are fundamentally designed to separate "flat" objects (paper) from 3-D (containers), thin films pose a significant problem. They flatten and act as a paper item would, ending up as a serious contaminant in paper bales and costing the MRFs in fees and/or rejected paper bales. Thin films are one of the biggest challenges for MRFs because these materials get tangled around the sorting equipment, costing recycling facilities thousands of dollars per year in maintenance costs.

There is currently a pilot project underway in Pennsylvania to test new equipment to sort and collect these materials at a large materials recovery facility. This equipment is expensive and complex, and the low value of multilaminate film makes return on investment dubious. This makes it further unlikely that a processor would want to accept this waste stream. As the operator of the Boulder County MRF for over 18 years, Eco-Cycle can speak firsthand to the challenges these materials pose to the recycling system.

With limited-to-no end markets to sell the materials to, high processing costs and infrastructure needs, and overall challenging economics to support the system, Eco-Cycle does not foresee curbside recycling of multilaminate pouches as a viable solution for Only Natural Pet. While Eco-Cycle would support these efforts if there were a way to make the economics and logistics feasible, the project is capital intensive and we predict that, without a massive external source of support, it will have limited applications across the U.S. at best.

## RECYCLE EXISTING PACKAGING THROUGH TERRACYCLE

TerraCycle currently recycles certain brands of pet food packaging through a national mail-back program that is free to consumers. Plastic pouches are separated out, combined with other pouches and extruded into plastic pellets, which are then remanufactured into different products, including, but not limited to outdoor furniture, playground equipment, and recycling bins.

This program is a viable solution for the short-term because it requires no major redesign or modification to existing packaging (though participating brands are allowed to add TerraCycle's logo to their packaging), is currently operational, and is accessible to consumers across the U.S. However, there are several shortcomings and risks associated with this collection program that make it much less attractive than the preferred solution of recycling Only Natural Pet's packaging with PE-only film plastics.


**Through Terracycle, plastic pouches are collected and remanufactured into outdoor furniture, playground equipment, and recycling bins.**

The biggest risk to Only Natural Pet with this project is that TerraCycle's end markets are not well developed and are considered somewhat unstable or niche. They typically use one-off projects such as playground equipment for a particular park. While this is acceptable for the current low volumes, it is not regarded as a scalable solution.

Further, TerraCycle's mail-in collection program is limited in its effectiveness and is much more limited in scope than PE-only film plastics programs. Only Natural Pet's nation-wide reach and subsequently dispersed customer base make it difficult to offer in-store TerraCycle drop-off sites that would capture a significant portion of Only Natural Pet's packaging. While it is available to all U.S. communities, it is up to individuals or businesses to start a collection program and stick with it. This means the collection system is subject to widespread fluctuations as people and participating collection points come and go in the program. TerraCycle operates the program exclusively with somewhat limited reach, whereas the PE-only film plastics recycling efforts are supported by the plastics industry at large.

With smaller, more unstable markets and more limited options for collecting used packaging, Eco-Cycle considers TerraCycle to be an acceptable short-term solution for Only Natural Pet's packaging, but not a preferred or viable long-term solution.

## REPLACE FOSSIL FUEL-BASED PLASTICS WITH PLANT-BASED CONVENTIONAL PLASTICS

Only Natural Pet was using 30% sugarcane-based conventional plastics in the packaging of its Mindful Meals product line as an alternative to fossil fuel-based plastics. Although there are certainly benefits to be gained by not extracting more fossil fuels from the earth, bio-based conventional plastics come with their own negative externalities.

Questionable recyclability, confusing messaging, possible increases in demands for GMOs, arable land use for providing feedstock for these materials, and the applicability of many of the same concerns that are associated with fossil fuel-based plastics are all reasons for more research into these emerging products. Eco-Cycle advises Only Natural Pet to proceed with caution if they wish to further explore the use of plant-based conventional plastics because there are still many unknowns in this relatively new technology and the potential trade-offs may outweigh the benefits of moving away from fossil fuels. There are other recommended action steps that offer a more clear path toward a circular economy and a reduced environmental impact of your packaging

# OPTIONS TO AVOID

These options represent “solutions” often referenced, but which Eco-Cycle strongly advises against.

## PYROLYSIS OR CHEMICAL RECYCLING

The process of pyrolysis is to heat up plastics in an oxygen-free environment so that the material breaks apart into its primary pieces but does not burn. The three primary outputs of the process are carbon gas, a liquid carbon material, and a solid referred to as “char.” The gas and liquid can be sold for further refining and eventual use as fuel, though the inconsistency of the inputs to the pyrolysis process often result in inconsistent quality of outputs. Most pyrolysis plants currently produce diesel or other fuels from waste plastics.

This process is not the same as waste incineration, which burns plastics and other waste in high-heat furnaces. There is a lot of controversy in the recycling industry as to whether pyrolysis is a big step forward, away from incineration, or just another more advanced form of an energy technology that carries similar risks and concerns. Doubts about the environmental soundness of the process abound among detractors, and in the end, pyrolysis plants take fossil fuel-based plastics and create outputs that are meant to be burned as fuel. The whole cycle has been described as “burning fossil fuels, but with a few more intermediate steps.”

For more than 20 years, pilot pyrolysis projects have been hailed as a way to handle plastics that are currently not recyclable. Very few of these facilities remain in operation or ever transitionedout of the pilot phase. These facilities face numerous challenges, including how to manage an inconsistent feedstock that contains different types of plastics and additives, how to manage air emissions based

on feedstock variations, and the high costs of these facilities compared to landfilling.

Another concern about the widespread use of pyrolysis processing is the risk of disincentivizing the innovation and redesign needed to move society away from non-recyclable plastics. Materials that are seen to have an end-of-life option that is not landfilling are often thought of as "sustainable," even if they still rely on non-renewable resources that are harmful to extract and do not fit into a circular economy.

As such, this is a risky technology to rely upon for Only Natural Pet's packaging. Further, like downcycling, pyrolysis captures some value from the recycled plastics, but these materials are only used once before being lost. This perpetuates our reliance on fossil fuels and is not compatible with a circular economy.

Eco-Cycle currently opposes the use of pyrolysis or chemical recycling for multilaminate packaging and other plastic products. We also strongly oppose waste incineration for any materials.

### HEFTY ENERGY BAG OR OTHER MIXED PLASTICS COLLECTION OPTIONS

The Hefty Energy Bag program is a pilot collection project in three U.S. communities that collects a wide variety of single-use, disposable plastic packaging from residents for processing in pyrolysis plants. The project is sponsored by the Dow Chemical Company. Residents purchase orange bags to collect their discarded plastics. The bags are placed in the curbside recycling carts and then sorted out from the other recyclables at the MRF.

Eco-Cycle advises against participating in this project for several reasons. First, the Hefty EnergyBag program uses pyrolysis plants as an end market for plastic materials, which carries with it substantial environmental and economic concerns, as noted above. Second, the program sends the wrong message that all disposable, single-use plastics can be collected together and somehow recycled, which drives consumers to continue to purchase and use these products and not move us toward a circular economy. Finally, the increased financial burdens on MRFs to handle these materials, as well as other economic and logistical barriers, make it highly unlikely that this program would be widely adopted. For all these reasons, Eco-Cycle opposes the Hefty EnergyBag program.

### DEGRADABLE PLASTIC ADDITIVES

Eco-Cycle strongly advises Only Natural Pet to avoid oxo-degradable or partially biodegradable plastic films or additives in all of its products. Oxo-degradable, photo-degradable or biodegradable plastics have been developed and marketed by the plastics industry as a way to break down plastics into small, microscopic pieces so they do not visibly accumulate in our oceans and on our lands. However, plastics by nature are not biodegradable because there are very few micro-organisms that can break down the polymer chains. This means that the plastic pieces actually persist in the environment forever and have been shown to be more harmful to the environment as micro-particles than conventional plastics.

Over 150 international organizations, led by the Ellen MacArthur Foundation, have called for a ban on these plastics because of their contribution to microplastic pollution and because they are not suited for effective long-

# SUPPLEMENTARY DESIGN IMPROVEMENTS

Eco-Cycle recommends three supplementary packaging design improvements for Only Natural Pet to improve the environmental performance of its packaging. These actions are largely complementary with many of the recommendations above and could be developed concurrently.

## INCREASE RECYCLED CONTENT IN PACKAGING

The recycling process is dependent upon manufacturers buying the collected materials to be made into new products. One of the best ways for Only Natural Pet and other companies to support the recycling industry is to increase the amount of recycled content in their packaging. This strengthens recycling markets and improves the economics of the system. Specifically, look to purchase post-consumer recycled content, which is recycled materials that come from community recycling programs, compared to pre-consumer recycled content, which is typically scraps leftover from the manufacturing process. There are several companies designing thin film pouches with higher post-consumer recycled content.

## JOIN THE HOW2RECYCLE PROGRAM TO IMPROVE PRODUCT LABELING

Determining what is and is not recyclable can be confusing for consumers, and oftentimes that leads to non-recyclable items ending up in the recycling center or recyclables being sent to the landfill. The How2Recycle program was created as a way to streamline recycling messaging on products and packaging, and has been adopted by dozens of major brands such as Nestlé and General Mills. A product does not have to be recyclable to carry the label. Eco-Cycle strongly encourages Only Natural Pet to adopt this nationwide streamlined labelling system on all its packaging to better help customers understand what end-of-life options are available for their empty containers.


## SELL PRODUCTS IN LARGER PACKAGES

Selling products in larger sizes reduces the ratio of packaging used per product delivered, which is one of the best methods to lower the environmental impact of a company's packaging. This is even more relevant for Only Natural Pet since the majority of the product line is not well-suited for bulk sales, which is also recommended as a great way to reduce packaging waste on products that have longer shelf lives.

Bulk food and "zero packaging" stores have become more popular in recent years as consumers are becoming much more aware of the plastic waste associated with their purchasing decisions. Simply Bulk in Longmont sells two dry dog food brands in bulk and may serve as a good model for Only Natural Pet to expand to bulk sales for some products, particularly the dehydrated food line.