Reduction of Film Plastic in the Environment

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Film plastic was developed in 1933 by Ralph Wiley, a lab worker at Dow Chemical. It was first developed as a spray, then into a wrap using PVDC (Polyvinylidene Chloride) in 1953 and finally using LDPE (Low-Density Polyethylene) because of the environmental concerns associated with PVDC in 2004. Food grade plastic wrap is not meant to come in contact with foods high in fat (like meats and cheese) as the chemicals can transfer into the food as it can do when heated as well.

Film plastic is an example of a single use product as part of the traditional linear economy. It is used by most companies on a large scale and is a major source of waste. It is a thin flexible packaging made from polyethylene (PE). It is used for wrapping pallets to secure them (also known as shrink wrap) as well securing foods and sealing them to keep them fresh. This wrap can be found in the packaging for toilet paper, paper towels, disposable cups, disposable napkins, disposable plates, grocery bags, bread product bags, packaging for beverages, etc.

The linear economy consists mainly of single use items that take raw materials, process them into products to be used and then are discarded to waste after use. This economy focuses on producing and selling large quantities of products. The recycling economy focuses on taking the product (mostly single use) at the end of its life and recovering a percentage of the material to use again with new raw materials to manufacture another product (mostly single use).

The circular economy focuses on sustainability through design, production and consumption through the reduce, resume and finally recycle model. Raw materials are used to produce higher quality products which can be repaired easily (and less frequently), components replaced when necessary to be reused and the finally repurposed and remanufactured; compostable materials are returned to the earth to regenerate it and non compostable materials are used for remanufacturing. The circular economy begins with redesigning products,

procedures, and methods to produce food that eliminates waste; the raw materials and resources will keep their value and recycling would be the last resort. Raw materials that are blended to make a product make it almost impossible to recover the individual raw materials to remanufacture and reuse them such as blended fabrics with cotton and polyester. Glue also poses a problem because it is used to adhere materials together long term and is not designed to be separated. Some companies have researched and found alternatives because they see the value in the circular economy and want to be part of the solution to climate change, pollution, waste reduction and biodiversity.

There are alternatives to film plastic such as glass containers with tops, reusable covers made of silicone or cloth, beeswax food wraps and ties made of cotton cloth dipped in beeswax, food wraps made of cotton cloth dipped in plant wax (soy or candelilla), silicone lids, huggers or bags, cotton cloth bags/towels, compostable butcher paper, compostable cling wrap made with natural starch and even reusable sandwich wraps made from recycle #4 plastic. These small scale circular models by individual consumers can make a difference in the film plastic waste.

The single use plastic which is not biodegradable, creates pollution during production and often ends up as waste in landfills can be avoided by changing the traditional linear economy model. Many companies see the value of the circular economy and are trying to make the move away from single use plastics on a larger-scale; Notpla, a UK company has researched and designed compostable packaging made from a renewable source using brown seaweed, plants and mineral extracts. The flexible film packaging is 100% biodegradable and compostable using renewable resources. Currently, they make take away boxes, pipettes, paper and sachets for sauces, condiments and drinks. There are two companies in the US using seaweed as well. Sway is making retail and polybags which they claim are stronger than plastic film and grocery bags

and are compostable, non-toxic and carbon negative. They biodegrade quickly in the soil, and improve the soil as well. The company uses a variety of species of seaweed, so there are different naturally vibrant pigments available. The other US company, Loliware, aims to replace single-use plastics by making edible cups and straws using seaweed agar with the addition of flavours such as grapefruit, vanilla, cherry, etc. Evoware in Indonesia uses seaweed to create edible packaging that is environmentally friendly and nutritious to ease the waste management of plastic packaging. Most waste in Indonesia comes from packaging and plastic food containers and it is the world's second-largest contributor to ocean pollution. The company has "multiple products such as the Ello jello cups, seasoning sachets, burger wraps, single-serving instant coffee powder sachets, and also for packaging non-food products such as straws, sanitary napkins, soaps, and toothpicks." These companies are manufacturing products in a process that adheres to the principles of the circular economy. The company is passionate about their impact on the environment and the need for sustainable packaging to reduce waste and pollution.

Many businesses have drop-off bins for film plastic that was clean and dry for consumers as well as their own recycle bins for pallet shrink wrap and product packaging. There are markets for recycled polyethylene (PE) plastic film products like composite lumber and new bags. The Swedish company, Ikea, has the goal to transition to the circular economy so it has committed to be plastic-free packaging by 2025 with the exception of some food products and all existing products will also be packaged without plastic by 2028. Some companies like Lush have committed to keeping their use of single-use plastic packing to a minimum packaging in a circular economy; most of the products don't have packaging and they redesigned some of their liquid products to be solid (shampoo, conditioner, etc.) while some are refillable in reusable containers. Danone's packaging is 100% circular, low carbon, and keeps materials in use and out

of the environment. In 2021, 84% of the packaging used is reusable, recyclable or compostable (compared to 80% in 2018) and 74% for the plastic packaging (compared to 65% in 2018). They double the usage of recycled content for plastics since 2018 and are at 11% in 2021. As well, they “reduced their plastic use by 60,000 tonnes overall and nearly 90,000 tons for virgin plastic, a 12% virgin plastic reduction” between 2018-2021.

However, many consumer drop-offs were removed during the Covid outbreak. Single use item usage increased during covid times as well. Many businesses have moved away from plastic film bags at stores by choice. Nearly 50% of the plastic produced in Canada is packaging and 95% of plastic packaging material value is lost after its first use. Here in Nova Scotia, single use plastic bags were banned after October 30, 2020. Canada banned all import and manufacture of harmful single-use plastics that are difficult to recycle such as grocery bags, cutlery, certain food service items, stir sticks and straws (with some exceptions) on December 20, 2020. This ban will reduce approximately “over 1.3 million tonnes of hard-to-recycle plastic waste and more than 22,000 tonnes of plastic pollution”. The Government of Canada is working with provinces to achieve a 90% collection rate for recycling plastic beverage bottles and is developing regulations that some types of plastic packaging contain 50% recycled material. Canada is also working with other countries to create a treaty to end plastic waste, which will be legally binding.

Regulations must be put in place for plastic manufacturers by governments and there must be strategies put in place for governments, industries, and individuals in order for zero plastic waste to be achieved along with incentives to do so. According to the 2019 Economic Study of the Canadian Plastic Industry, Market and Waste Executive summary,”87% of plastics waste in Canada ends up in landfills”. Plastic must be looked at as a renewable resource instead of waste. We must create a circular economy by eliminating unnecessary plastic items and those

that are problematic; ensuring that needed plastics are reusable, recyclable, or compostable; and keeping the plastic items needed out of the environment by circulating them in the economy. We need more companies like Enerkem, to innovate to make themselves part of the circular economy and help reduce waste production. The Canadian company extracts carbon from non-recyclable, non-compostable waste and turns it into a gas to make biofuels (methanol, ethanol) as well as renewable chemicals that can be used in thousands of everyday products. Enerek's vision is "to help reduce up to 90% of our waste by transforming non-reusable materials to power vehicles or manufacture lots of useful things in communities around the world."

Executive Summary

The production and use of film plastic has been primarily a traditional linear economy using the take, make, and waste model. Recycling if any comes at the end of life of the product and 95% of all plastics lose their value after the first use. As consumers, we can choose not to buy film wrap using alternatives that are more eco friendly and are part of the circular economy model and supporting companies that see its value in our changing climate. On a larger scale, companies are innovating and making changes to find alternatives to using film plastic to package and transport their products to reduce the waste and help the environment. Government regulations, incentives, strategies for long term solutions, industry involvement, and consumer changes are required, along with a different mindset about plastic being a resource instead of waste will help make positive changes to reach a successful circular economy model.

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