A beginner's guide to reusable bags

*(compiled from **reduce.org** and **igotmybag.org**)*

May the bag be with you

- Store the bag in your car and put it back when you're done.
- Bring back the sack! While you're at it, stuff some old shopping bags in there, too! Paper or plastic, reuse is fantastic!
- If you need to accept a disposable plastic bag, reuse it as many times as you can before disposing of it. Make sure any disposable bags in your care do not become litter.
- Get several reusable bags — you'll probably need more than one, and you're going to get hooked on their convenience and general awesomeness.
- Put your coupons in your bag and keep it by the door.
- Give a fun bag to someone as a gift and tell them why they should use it.
- Decorate your own bag.
- Ask the kids to remind you to bring your bags as part of earning their allowance.

Put it out there

- Make a note: Remind yourself to use that bag with a line on your shopping list or a sticky note on your car's dashboard.
- Get in the habit. Challenge yourself to use a reusable bag for your next five shopping trips.
- Be prepared: If there's a bagger at checkout, let them know ahead of time that you have your own bag that you want to reuse.

Important notes about the Problem with Plastic Bags

1. Single use plastic bags are energy intensive and come from a non-renewable resource, and are mostly avoidable.
2. Plastic bags are unsightly and are a hazard to birds and other animals that mistake the bags for food.
3. disposal: single use plastic bags are not designed to break down; plastic is a very stable substance)

Negative environmental impacts related to single use plastic bags in the landfill are often seen as the major issue associated with these bags. This is possibly due to the fact that the issue is often seen as a "waste issue." However, considering that plastic bags are relatively low in weight (1% of landfill by weight) and do not degrade in landfills, the landfill accumulation issue is not overly pressing. The potential hazard for animals who

mistake plastic bags for food is *far more* problematic than that associated with landfill accumulation problems.

Global warming is currently the most pressing environmental issue associated with single use plastic bags as the consequences can negatively affect all of life on earth. Therefore, plastic bag problems associated with global warming should be seen as the number one problem linked to these bags. It should also be noted that there are significant green house gas emissions produced in the production and transportation of plastic bags (even if they are a by-product) furthering this viewpoint.

Also, with respect to plastic bag decomposition time, figures of 1000 years appear to be arbitrary and should not be used as a result. There are numerous variables that contribute to the decomposition time, such as: the type of plastic used (referring to code), the gauge of the plastic, exposure to sunlight, exposure to oxygen, heat of surroundings among others. Figures of 1000 years are obviously extrapolations as there has never been a 1000 year study. The need to place a number next to the lifespan is unnecessary and over complicates the issue due to results that continuously vary. If anything, a wide range should be used when quantifying decomposition time.

The big idea that should be taken away is that plastic is an extremely resilient substance due to the fact that plastic molecules are stable, unappetizing for microbes and repel water molecules. The only thing that we know is that they will last for a very long time in any natural setting. The decomposition time for plastic exposed to light and oxygen, though shorter, is also long enough that stating a number is unnecessary and can be counterproductive. (Ex: the decomposition time for a plastic bag is obviously much longer than 5 years. Imagine all the animals that would still die in those five years from choking on plastic bags! Even a high tech plastic bag that could decompose in 1 year could potentially kill many animals, and for what, so that we can maintain an unnecessary convenience/luxury?). The question is…where is the value in having a specified number for decomposition time?

Lastly, paper is a poor alternative (simply more polluting) and, often, so are compostable bags. Promoting a switch to compostable bags is analogous to promoting nuclear power instead of renewable forms. Compostable plastic bags come with their own share of problems!

Quick Facts

1. ***Plastic bag recycling rates in the United States are estimated to be between 1-5%.***
2. ***Plastic bags are very recyclable. For example, a variety of products like plastic lumber and plastic bags are made with recycled plastic bags.***
3. ***Plastic bags will degrade but require heat or ultraviolet light (UV).***

4. ***Because of the stability of the plastic molecules, plastic bags do not degrade easily. Estimates of 1000 years are random and inexact. Depending on the climate, a plastic bag will decompose into a powdery substance within a few years.***
5. ***The absence of heat, light, and moisture in landfills means that nothing biodegrades quickly in a landfill***
6. **When 1 ton of plastic bags is reused or recycled, the energy equivalent of 11 barrels of oil are saved**

Sources: **http://www.sierraclub.org/bags/**
http://retail.commandpackaging.com/encore_facts.asp

Myths

Myth: *Plastic grocery bags take 1,000 years to decompose in landfills.*

Fact: *Virtually nothing – not paper, food, plastic or even compostable or bio degradable products – decompose in today's landfills, because they are actually designed to be as stable and dry as possible. Research by William Rathje, who runs the Garbage Project, has shown that when excavated from a landfill, newspapers from the 1960s can be intact and readable.*

Plastic bags do not bio*degrade, they* photo*degrade, which means [that when they are exposed to sunlight,] they slowly break down into smaller and smaller bits that can contaminate soil and waterways.*

Plastic litter is estimated to take up to 1,000 years to decompose. This estimate is based on the decomposition rates of plastics buried in landfills for up to 100 years.

Myth: *Compostable bags can degrade in backyard composts.*

Fact: *In order to breakdown, compostable bags must be sent to an industrial composting facility, not backyard piles or municipal composting centers. There are very few of these facilities in the U.S. and where these facilities are not available, compostable bags will sit in landfills because they can't be recycled.*

Myth: *Low recycling rates for plastic bags prove recycling them doesn't work.*

Fact: *Recycling does work. The problem is not everyone knows that plastic grocery bags are 100%recyclable and not everyone has access to plastic bag recycling in their community*

Sources: "National Marine Debris Monitoring Program Report." Ocean Conservancy, 2007.
http://www.oceanconservancy.org/site/DocServer/NMDMP_Data_Results.pdf?docID=3226

Background Notes

In practice, plastic bags are awkward to handle and expensive to recycle, because they are so light. Depending on size and weight, it can take up to 150,000 bags to make a tonne. Collecting, baling and shipping all those bags uses a lot of energy and costs money. But if we are going to have unused post-consumer plastic bags, they do need to be recycled. Experience elsewhere indicates that less than 4 per cent of plastic grocery bags are currently recycled. ***(compiled from*** *Recourse Conservation Manitoba* ***and*** *reusablebags.com****)***

How Much Petroleum?

Plastic Bags Contain Energy

- Plastic bags are made from non-renewable fossil fuels.
- The average Canadian uses about 272 plastic bags a year.
- Collectively we use over nine billion plastic bags a year, or 17 000 bags each minute. Tied end to end, these plastic bags would circle the earth 55 times.
- Approximately nine plastic bags contain enough embodied petroleum energy to drive an average car one kilometre.
- If everyone in Canada switched from single-use plastic shopping bags to reusable ones, we would save the amount of fuel used by 56 753 cars each year.

Sources:
http://www.greenerfootprints.com/plasticbagfacts/
http://www.greenerfootprints.com/
http://www.reusablebags.com/facts.php?id=4

Assumption: Canadians use 272 plastic bags per capita per year (Derived from total plastic bags divided by the population at the time this statistic was created).

The "…equivalent to removing 56, 753 cars…" stat was derived from the assumption that Canadians use 272 plastic bags per capita per year. The annual driving distance of the average car was taken to be the average of 17,000 km and 20,000 km, which happens to be 18,500 km. Both 17,000 (changed from 17,009 for simplicity) and 20,000 are implicitly stated to be reasonable assumptions for annual driving distances on NRCAN (OEE). For example, 8.7 bags = 1km, so 272 x Canada's current population = total bags used in Canada each year. This means that we can translate that number into km's. We then take that number and divide it by 18,500 km (the avg annual driving distance for each car) to find out how many cars this equates to.

The Cost of Plastic Bags

*(Compiled from **reusablebags.com**)*

To see the real costs, we must look at the "cradle to grave" multiple impacts and the effects of each phase of a bag's life.

Phase 1: Production Costs

- The production of plastic bags requires petroleum and often natural gas, both non-renewable resources that increase our dependency on foreign suppliers. Additionally, prospecting and drilling for these resources contributes to the destruction of fragile habitats and ecosystems around the world.
- The toxic chemical ingredients needed to make plastic produces pollution during the manufacturing process.
- The energy needed to manufacture and transport disposable bags eats up more resources and creates global warming emissions.

Phase 2: Consumption Costs

- Annual cost to US retailers alone is estimated at $4 billion.
- When retailers give away free bags, their costs are passed on to consumers in the form of higher prices.

Phase 3: Disposal and Litter Costs

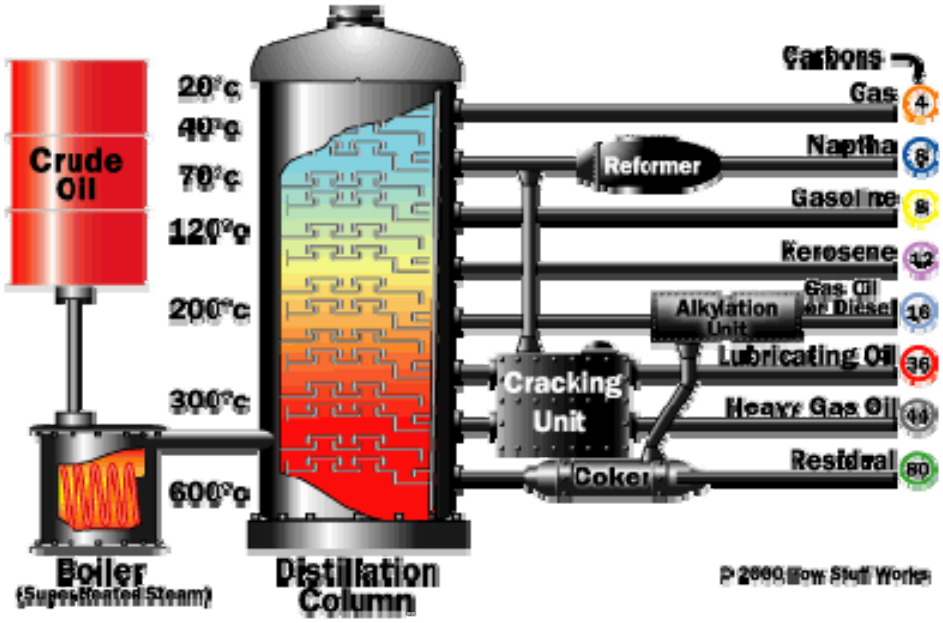
- Hundreds of thousands of sea turtles, whales and other marine mammals die every year from eating discarded plastic bags mistaken for food. Turtles think the bags are jellyfish, their primary food source. Once swallowed, plastic bags choke animals or block their intestines, leading to an agonizing death.
- On land, many cows, goats and other animals suffer a similar fate to marine life when they accidentally ingest plastic bags while foraging for food.
- In a landfill, plastic bags take up to 1,000 years to degrade. As litter, they breakdown into tiny bits, contaminating our soil and water.
- When plastic bags breakdown, small plastic particles can pose threats to marine life and contaminate the food web. A 2001 paper by Japanese researchers reported that plastic debris acts like a sponge for toxic chemicals, soaking up a million fold greater concentration of such deadly compounds as PCBs and DDE (a breakdown product of the notorious insecticide DDT), than the surrounding seawater. These turn into toxic gut bombs for marine animals which frequently mistake these bits for food.
- Collection, hauling and disposal of plastic bag waste create an additional environmental impact. An estimated 8 billion pounds of plastic bags, wraps and sacks enter the waste stream every year in the US alone, putting an unnecessary burden on our diminishing landfill space and causing air pollution if incinerated.
- Recycling requires energy for the collection, processing, etc. and doesn't address the above issues. To learn more visit **Recycling Can Fix This, Right?**

Want more? Check out these websites:
http://truths.treehugger.com/video/no_more_plastic_bags.php
http://myownbag.com/activism.html
http://www.grrn.org/resources/bag_reuse.html

Life-Cycle of a Single Use Plastic Bag

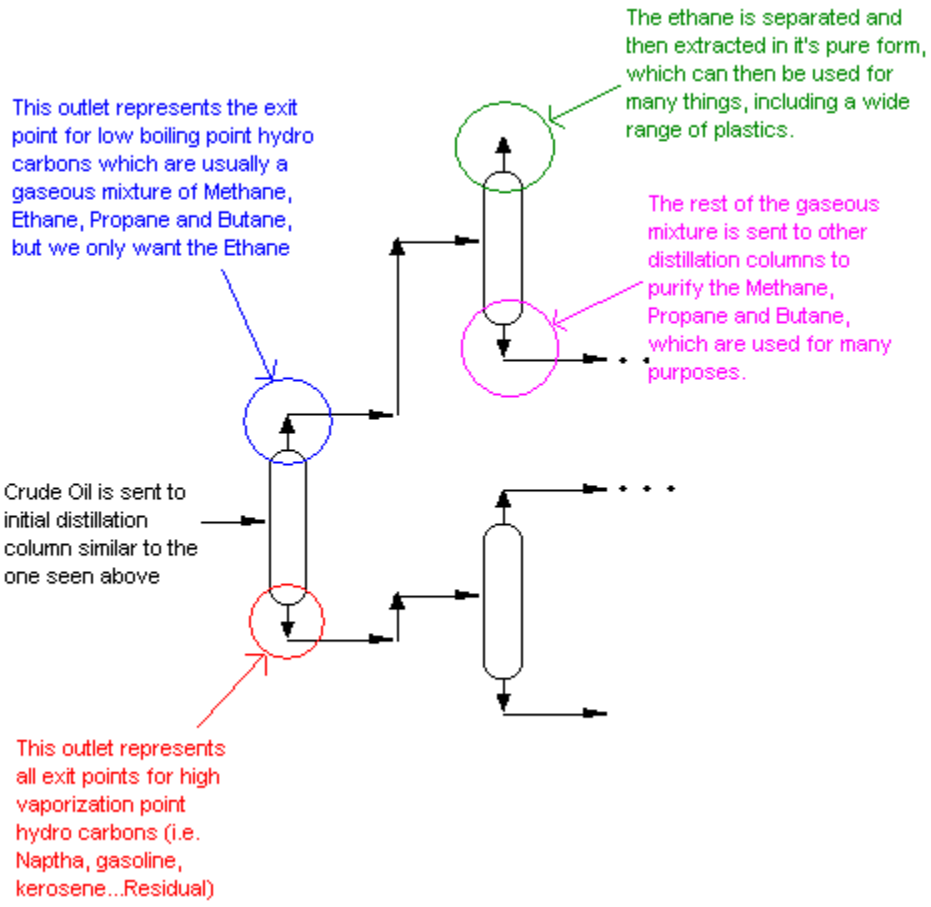
1. First, the crude oil (AKA Petroleum) is **pulled from the ground**. It should be noted that there are many greenhouse gas emissions associated with the machines used to extract the crude oil and transport it to refineries, with the greatest of these emissions, per barrel, coming from Alberta's oil sands. Also, consider the negative effects of **habitat displacement**.

2. The crude oil is then mostly vaporized by **heating** it with superheated steam, which is about **600°C**. This vapour containing various hydrocarbons (i.e. molecules made from Carbon and Hydrogen, which contain very large amounts of stored energy) are then sent to a distillation column whereby the gases are separated and condensed returning them to



their liquid states. The various hydrocarbons can be separated this way due to their different boiling points.

3. The remaining gases (i.e. vapours) are collected at the top of the column due to their low boiling points. The gaseous mixture consists of Methane, Ethane, Propane and Butane. These gases can then be further isolated/purified into pure Methane, Ethane, Propane or Butane using other distillation columns.



4. Once the Ethane has been isolated/purified, it will be sent to a **furnace** called a plug-flow reactor where it will undergo a chemical reaction that enables the Ethane to convert to Ethylene. After the Ethane has been converted to Ethylene, the Ethylene is further purified by removing water, methane and other impurities that are still present.

5. Metallic catalysts (i.e. metal particles which help move a reaction forward) are then added to the pure ethylene gas and then **heated to about 100°C and pressurized** before being sent to a **reactor**. In the reactor, a chemical reaction links the ethylene molecules together to form chains called Polyethylene. The Polyethylene chains can be recognized by the eye as conventional plastic. These chains (plastics) are split into numerous pellets which are then **melted down** and **turned into plastics bags**. To see how this happens, watch the “How It’s Made” video contained in the link below.

http://www.youtube.com/watch?v=eQZ35KVEqrc

***While you're watching the video, be sure to make note of the machines used to process the plastic bags, and consider the energy needed to power and heat them.

6. Once the plastics bags are ready for use, they are placed on a **Truck and transported** to the individual grocery outlets.

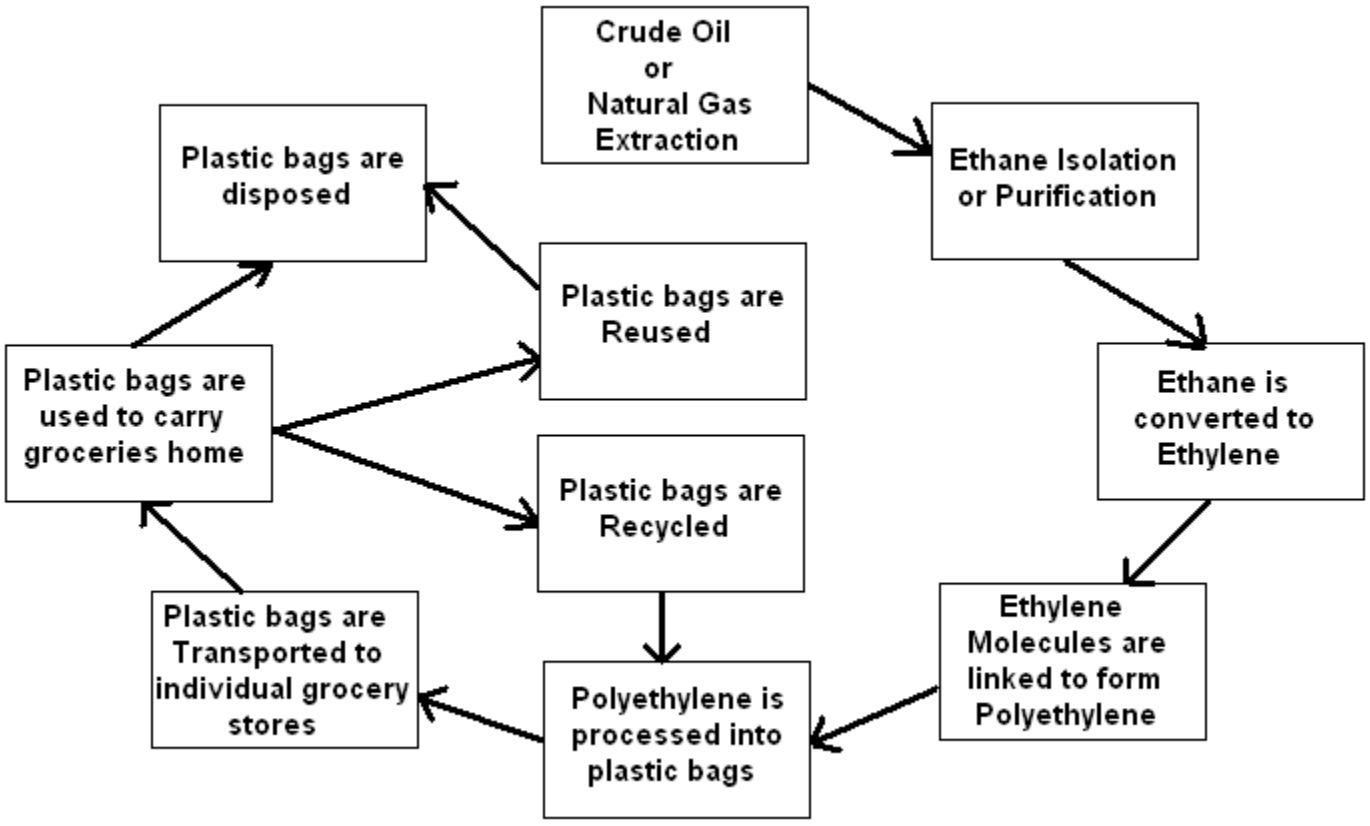
7. After being used to carry groceries from the store to the home, the plastic bags are likely thrown out, but are also often reused as garbage bags or other items.

   - The bags which are thrown out can easily make their way to water bodies where they are eaten by the animal species living there, such dolphins, turtles and sea birds. **When sea animals eat plastics, they often die due to their inability to digest the plastic**. Once the dead animals decompose, the plastics will remain, making them a continuous threat to other sea animals.

   - Plastic grocery bags are not usually recycled due to the fact that it requires more energy to recycle them than it does to produce them. **In**

both the United States and Canada, no more than 1% of these bags are recycled.

Finally, the life cycle of a plastic bag can be represented by the model seen below:



***Note: Oil based plastic bags **can exist in a landfill for hundreds or thousands of years** based upon their composition paired with the lack of light and oxygen needed to break them down.

ENERGY USE AND POLLUTANTS

Raw Material Acquisition

- Energy
  - 200 bags = **39,035 kJ**
- Pollutants
  - 200 bags = **26 g**

Materials Manufacture, Product Manufacture, Product Use

- Energy
  - 200 bags = **97,904 kJ**
- Pollutants
  - 200 bags = **83 g**

Total for the Product Life-Cycle

- Energy
  - 200 bags = **136,939 kJ**
- Pollutants
  - 200 bags = **108 g**

***NOTE: Energy use for the transportation of the plastic bags was not included here due to the various locations of the plastic

bag manufacturers and grocery stores.

All information was obtained from either:

Michigan Tech Environmental Education Website
http://techalive.mtu.edu/meec/module14/Plasticbaglifecycle.htm

Or

University of Washington's Engineering department website
http://faculty.washington.edu/finlayso/Polyeth/Group_B/