Just Two Ounces of Steel

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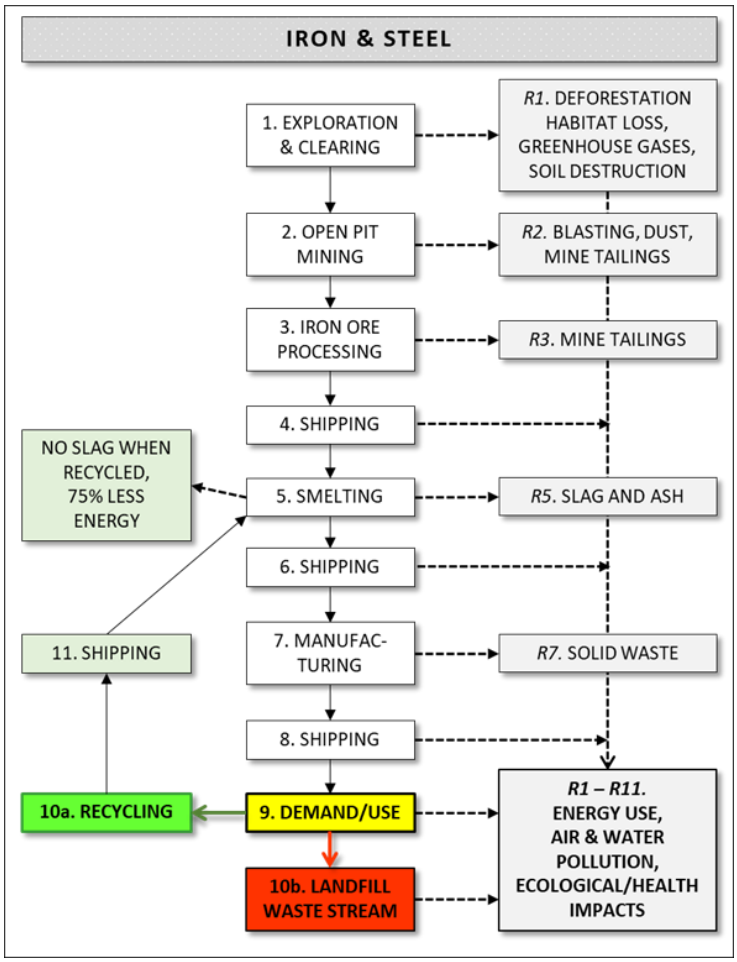
It's been a long day. You just want to finish the dishes, clean up the kitchen, and sit down. You glance at the last item on the counter—an empty pet food can. It would be easy to throw it in the trash but the "2% voice" in the back of your mind clearly says recycle. If it was almost any other food item (e.g., black olives, artichoke hearts, peaches, crushed tomatoes, etc.) a quick rinse would do and take no time at all. But these sticky, smelly cans are a pain in your conscience. It's just two ounces of steel. Does it even matter? Yes, in fact, it does (or I wouldn't be writing about it). So, you catch yourself, fill it with warm soapy water, get the old bottle brush out of the junk drawer, and quickly wash it out for recycling. It took about one minute to do so. Once we take a "systems view" you may be very surprised by the true value of your time, especially as it relates to the environmental damage avoided, the energy not wasted, and the climate change averted. I also happen to think the "my time is too valuable to waste on recycling" excuse rings as hollow as an empty can.

When you made the deliberate choice to wash and recycle the can, you went from the yellow box (#9) to the green box (#10a) on the flowchart (or lifecycle analysis diagram) below. If you mindlessly threw it in the trash (#10b …the red box), the next can you purchased started back at box #1 or #2, at least in a figurative sense. The next can could have had 70-80% recycled content …but you failed do your part.

Steel is one of the most important and efficient items to recycle. Steel items can be readily separated from mixed-stream recycling (metal, plastic, glass, paper, cardboard) with powerful electromagnets. The cans, lids, and other items are crushed, baled and efficiently shipped back to steel producers who are eager to buy them. Why? Reduced cost and increased efficiency …which in this case also yields a host of environmental benefits. I use the word "benefit" advisedly since reducing our demand for cans (e.g., buying fresh vegetables in season, dried beans, etc.) would be even better. Recalling earlier essays in this 2% series, carefully using and maintaining a car (~55% steel) or major appliance (~75% steel) to maximize their service life, further increases the total **environmental damage avoided**. And, once again, it is worth noting that doing the right thing saves money.



Before we return to that two ounce can, here are a few notes about boxes #1 through #5 and their environmental results (***R1-R5***). If you ever find yourself standing near the edge of an open pit mine, look back over your shoulder at what it replaced. The mine site was once a forest, a prairie, or a desert ecosystem. In mining operations, soil is called "overburden" …something to be gotten rid of to access the ore deposit. That forest, prairie, or desert cleansed the air, filtered the water, stored carbon in the soil and vegetation, recycled nutrients, and provided habitat for thousands of living things for all the days, years, or millennia before the mining operation began.

Once the overburden is removed and the ore is exposed and blasted into pieces, enormous shovels lift 300-ton loads into 500-ton dump trucks that haul it to the processing plant. The mechanical and chemical methods, energy requirements, and air and water pollution output of ore processing depend upon iron content (ranging from ~15% to 70%). The "tailings" contain all "impurities" that crushing, heating, and other methods can remove before the ore is shipped to the smelter. Hence, if the mine produced low grade 15% iron content ore, about 75 or 80% of the material blasted from the earth is left in the tailings. It is also worth noting that the "disturbed" [destroyed] area may be three to five times larger for a mine with 15% ore versus one with the high grade 70% ore, in order to produce the same quantity of steel.

The total cost of mining and processing dictates how far the ore can be shipped to smelters and foundries. The highest grade (60-70% iron) ore now comes from Australia and Brazil and is shipped—with all the consequent energy and pollution costs—all over the world. The U.S. produces only about half of the steel it uses. The Missabe Iron Range in northern Minnesota produced very high-quality ore until those deposits were exhausted in the mid-1900s. These largely depleted mines now produce 15% iron content taconite and, at some point, will be abandoned. The massive pit near Hibbing, Minnesota is accurately (and sadly) advertised as the "Grand Canyon of the North."

Steel or Iron Kitchen Item	Weight (lbs.)
Pot and pan set (large and extra-large stockpots, small and large frying pans, small and large saucepans, four lids)	11.4
Kitchen knife set (Chef's, slicer, utility, paring, bread)	1.3
Kitchen tool set (spoon, slotted spoon, fork, spatula, ladle, potato masher, pasta server)	2.0
Mixing bowl set (small, medium, large, extra-large)	2.9
Measuring cups and spoons (complete baker's sets)	1.3
Two heavy duty loaf pans	2.0
Two heavy duty 9x9" baking pans	2.3
Colander	0.6
Six (5-piece) flatware sets (knife, dinner fork, salad fork, teaspoon, tablespoon)	3.0
Serving utensils (spoon, slotted spoon, fork, ladle)	0.5
Cast iron skillet	5.2
Total =	**32.5 lbs.**

When I rummaged through our recycling bin, I found that we use about five cans per week (~10 to 12 ounces). That adds up to 32.5 pounds of steel per year. Could we reduce that weight [demand for steel] without substantially changing our diet? Yes, but not by much since we already use dried beans, fresh vegetables, and have a large garden. This 32.5-pound revelation—we always use more materials and energy than we think—made me curious about its equivalent in useful and necessary household items. So, I got out my baking scale. Here is what I found by the time I reached the same total weight …a complete basic set of kitchenware.

There are about 300 households in the congregation of Christ Church Cathedral. If I scale up 32.5 pounds per household per year to the entire group that would total 9,750 pounds of steel (~4.9 tons …enough to build four cars). As obvious and important as not wasting these refined materials should be, the environmentally destructive activities (listed below) that **did not** happen, and the energy that **was not** used because we diligently recycled steel (and other materials) are both sobering and inspiring. The trivial amount of time we invest in recycling is very valuable indeed. (It's worth noting that recycling aluminum requires only 5% of the enormous amount of energy [five times more than steel] needed to make new aluminum from bauxite.)

- 30,225 kilowatt hours of **net energy savings** in the smelting process alone (less than 25% of the energy needed to make "new" steel from iron ore)
- 12,200 pounds of iron ore, 6,800 pounds of coal, and 600 pounds of limestone that were **not** mined, **not** processed, **not** shipped
- **All** the associated mine site expansion and ecological damage avoided
- **All** the air and water pollution and **all** the tailings and slag **not** produced

I can't think of a single reason why our 300 households should not save enough energy to supply four homes with electricity for a year, and enough steel to **re**-manufacture five tons of necessary, useful and durable items, as we avoid the environmental damage that making 5 tons of new steel would cause. **Recycle!**

2% Per Year List

1. Reusable shopping bags
2. Drive rationally
3. Don't "burn" electricity
4. Be frugal
5. Active Hope
6. Diligent recycling
7.