

The Fantastic Five

Our team began our project work by having each team member choose a piece of trash to research and propose for the project theme. We each presented our piece of trash and research to the team members and coaches. We then decided to focus on the wonderful project of aluminum can waste. We did further research to understand what happens to aluminum cans after they are used. We discovered three main things that can happen after an aluminum can is used. Our research opened our eyes to a number of facts previously unknown to us. For example, we discovered that recycling aluminum produces toxic byproducts and that aluminum cans are wonderful for building a wall! Our initial project was a public awareness campaign. But after our first tournament when we were reviewing our rubrics, we noticed *beginner* selection on the page with a note that said: as *first* notified you: if you do a public awareness campaign, you will be marked down for not having an innovative solution. (This happened about a week before the tournament and we didn't have enough time too successfully change our entire project, so we had to hope for the best). Even though we got a beginner mark, we still **ADVANCED!** Because of the judges' marks and notes, we changed our project to using aluminum cans in solar cells, but this has already been done, so to make it our own we decided to make it into a kit, of which has never has been done (as far as we know).

The life cycle of aluminum cans is relatively simple. The process for making aluminum cans requires lots of energy and toxic chemicals thus making it bad for both health and the environment. Schlesinger (2007) nicely outlines the process for making aluminum cans. Aluminum is a light, non-corrosive, malleable, naturally occurring element. It is found in bauxite ore. This ore is mined and then aluminum is chemically leached from the bauxite ore. Next, it is put into the electrolytic process. This is a process where electricity is used to separate pure elements from ore. The pure aluminum from this process is cast into ingots. Ingots are solid pieces of metal that are formed into a particular shape for storage. These ingots are sent to companies that will create the aluminum cans for their beverage products. One alarming statistic that we found was that stated by Annie Leonard "Making one aluminum can takes energy equivalent to one quarter of the can's volume in gasoline" (examiner.com, 2010, p. 2). After it is made and then used by humans, there are three main fates of the aluminum can. These include: trash (litter in the environment or the landfill), recycled, or reused. The three destinies each have their positives and challenges. Below we list what we found through our research.

Large amounts of aluminum cans make their way to the landfill, and while this is better than them being littered every which way, they are stored in the landfill, out of the environment but this material cannot be used again. In fact there are 100 billion aluminum cans consumed each year, and 65% of those are thrown away each year (examiner.com, 2010). This is enough aluminum to rebuild the commercial air fleet four times over (Humes, 2013). Our team is not promoting aluminum cans being thrown in the garbage. However, this is better

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than the cans being littered into the environment. Since aluminum cans are 100% recyclable, the landfill is NOT the place for them!

If the cans are recycled, the factories begin the recycling process; the cans are sorted, shredded, and then melted back into ingots. The ingots renew the lifecycle of the aluminum cans. This process takes far less energy than mining bauxite ore and extracting aluminum. This also reduces landfill waste and through expending less industrial energy, fewer greenhouse gases are emitted. Recycling sounds like an extremely good way to renew, and at the same time dispose of aluminum cans, right? Surprisingly, there is also a bad side to this process. When recycled, the printing on the cans creates an extremely toxic byproduct called Dross. Also, the melting process releases fumes called dioxins. Our team decided that the best way to dispose of aluminum cans is NOT to dispose of them but, rather reuse them! Also, we felt that an alternative to aluminum cans should be put in place and initial production of aluminum cans should be reduced. Reuse: Our team also researched the reuse of aluminum cans and here we discovered some exciting uses for this potential piece of trash. We discovered that cans are used in handful of functional and creative places. We found some exquisite art, household items (flowerpots, bird feeders) and building materials.

Problem Statement: Too much aluminum is thrown away and when it is recycled it releases toxic by-products.

Solution Statement: to reduce the amount of aluminum can waste by reusing them to make an aluminum can solar panel heater.

Why is our Solution Innovative? Our solution is innovative because aluminum cans are abundant, but no one thinks to reuse before recycling. Our idea is improving an existing solution by making it better. We are going to be educating the public about the problems with using aluminum cans for beverage packaging and advocating for alternatives to aluminum AND reuse of these problematic beverage containers.

How does this solution help? This solution helps by providing free heat for places without electricity such as garages, chicken coops, and sheds.

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Books

- Aluminum Recycling by Mark E. Schlesinger (2007)
- Garbology by Edward Humes (2013)

Websites

- Storyofstuff.org
- The Aluminum Association, non-profit trade organization
- Michael Hones of Lesotho, Africa
- Tin Can Wall – Wikipedia
- Examiner.com article—The Aluminum Can: Not a Sustainable Alternative to plastic
- Education.seattlepi.com—Environmental Problems Associated with Recycling Aluminum
- National geographic Solar Energy Facts
- US department of energy
- Solar energy introduction by Eric brown.

Experts

- Heather Curless, Architect, Owner of Greenerstock Building Supply
- Chris Clements, Director of Imago Earth Center (Environmental Education Center)
- Sister Winnie, Director of Earth Connections at Mount Saint Joseph University (Sustainable Building, Environmental Education and service Garden for the Poor)