

Global Case Competition 2015

AFSHIN KHAN: My name is Afshin Khan, and I'm a PhD student in the School of Environment, and also a member of last year's team that took the first place, Wazzu Worldwide. So the Global Case Competition began in 2011 to enable undergraduate and graduate students-- international and non-international students, students from different areas of study and from different WSU campuses-- to work collaboratively in small teams to solve complex global issues.

My team members were from bioengineering, immunology, and earth and environmental sciences, and human resources. Before you hear this year's student theme presentations on the problem of plastic waste in Manaus, Brazil, I'd like to introduce some very special guests.

Doctor Karl Englund, research professor of WSU's Composite Materials and Engineering Center, who provided all students competing in this year's competition a sneak preview into why plastic waste is a global concern. Members of this year's Global Case Steering Committee, please stand as I call your name. Doctor Dan Dolan of Civil Engineering, Dr. Karen Weathermon of WSU Learning Communities, Dr. Christine Oakley of International Programs, Dr. Kate Hellmann of International Programs, Alex Murphy and Harmony Davis of Global Connections, Cassie Rowland of Center for Civic Engagement, [? Kaylin ?] [? Alison, ?] Global Learning Peer Advisor, and Mr. Orlin Reinbold of Landmark Turf and Native Seed, and our esteemed panel of judges, Jessic Castleman of Foreigners College, Pat Hunt of School of Molecular Biosciences, Rich Finch of WSU Waste Management, Judy Dunn-Gray, former WSU Recycling Waste Reduction Education coordinator, [? Phil ?] [? Ferris, ?] Information Technology Consultant.

I'd also like to acknowledge all of the students, staff, and faculty from Brazil who are joining us today. Thank you for all your contributions for making this event such a wonderful success. I'd also like to share with you the premiere showing off a video of Wazzu Worldwide's trip to Bangladesh, the location of last year's Global Case, to understand the problem of arsenic poisoning from the people who experience it directly.

My team member's visit to Bangladesh was made possible by Orlan Reinbold, who is a longtime supporter of the Global Case Competition. We can't express how truly grateful we are for his generous gift that made this trip possible.

[VIDEO PLAYBACK]

- In November 2014, a delegation of Washington State University students and faculty went to Bangladesh to learn more about arsenic contamination in the soil and in the water, a complex global issue that the World Health Organization calls the largest mass poisoning in history.

In Bangladesh, over 80 million people are at risk for arsenic related diseases.

- [NON-ENGLISH].

- Team member Jordan Rehwaldt gives insight about his trip to Bangladesh.

- Hi, my name is Jordan Rehwaldt, I am a bioengineer from Washington State University. And I was a member of Wazzu Worldwide. We initially found the SONO filter and some of in-home filters. And when we compared long-term cost between the SONO filter and the SAR systems that he's describing-- that's a large scale where you're talking 10,000 liters per day, 20,000 liters per day-- it was substantially cheaper.

- The students who traveled to Bangladesh participate in WSU's Global Case Competition, an annual event that brings together interdisciplinary teams of WSU students to develop innovative solutions to complex global issues. They went to Bangladesh to learn how their solutions to arsenic poisoning might be used in this real world setting.

- Traveling to the location of this Global Case help them better understand the rich cultural heritage of Bangladesh. They visited large urban centers and the small rural towns and villages where the Bangladeshi people live and work. They're goal was to experience different ways of life and to become thoughtful and engaged global citizens.

- Yeah, and so even there's this arsenic issue, there are a lot of things going well. I mean clearly they have colleges popping up everywhere, you know, education is really on the rise.

- Now, truthfully, before the Global Case Competition I rarely applied my knowledge and effort to global issues. It's not that I didn't care, it was more of a lack of awareness. Seeing situations in the news or reading about them in the paper is one thing, but actually being there, now that's something completely different. We had to evaluate the country itself. We had to evaluate the political, social, technological, and economic landscapes. And finally, we had to determine a solution that not only worked from a scientific standpoint, but a solution that complemented or at least did not conflict with the current trends and conditions of the country.

- Both the students and faculty who are traveling to Bangladesh gained a deeper understanding of how the Bangladesh people created their own solutions for clean water.

- [NON-ENGLISH] And if you want to clean the tank you have to open this one.

- Oh, you purge them here.

- During our trip we visited multiple villages and rural areas. In fact, most of these areas were arsenic hot spots. The lifestyles in these areas was harsh, much more primitive than anything I'd ever seen before, and yet even in these conditions-- conditions which most Americans would find unbearable-- we encountered some of the most kind and hospitable people that I've ever met.

- We're very honored to be the first group of seven Americans to visit this village. And we appreciate that we're friends with a man from your village. And we feel that there is now a connection between you and Washington State.

- I wrote this letter to Mayhim, a new friend I have met here in Bangladesh. It says, Mayhim, thank you so much for having us in your home today. It was such a nice time to experience Bangladesh with you. It was my favorite time here so far. Please know that you're beautiful and I will miss you. Love your American friend, Brittany.

- Our team did determine a solution, and we're very proud of what we proposed. However, it became very apparent during the research process of how difficult it is to solve a problem that's over 7,200 miles away. So one of the main objectives of going to Bangladesh was simply to get boots on the ground. We needed to see the problem firsthand, because only then could we judge how applicable our solution was.

- The Global Case Competition is made possible by the generous support of WSU alumnus Mr. Orlin Reinbold. By giving students the opportunity to actually experience the country that their solutions might impact, he has truly created global cause.

[END PLAYBACK]

AFSHIN KHAN: Let's begin our program with information about our case today and why it was selected as the global issue for our teams to address. Please join me in welcoming Dr. Christine Oakley from the International Programs, the sponsor of the Global Case Competition.

CHRISTINE OAKLEY: Hi, as Afshin said, my name is Christine Oakley, and I'm with International Program's Department of Global Learning. And this is the fifth year that the Global Case Competition has gone on. And I have been honored and privileged to be a part of four of those, so it's been a great honor for me to be involved in this competition for the last four years.

This year we had the highest number of students competing. We had 120 students who registered. And of course, those kids are put on teams-- Excuse us for a slight technical difficulty.

SPEAKER 1: Does that one work? Yeah.

CHRISTINE OAKLEY: Luckily I have a big voice, so you could hear me but our folks listening from a distance could not. We have 120 students registered for the case this year, and we put them on 20 different teams. Usually they don't know each other, they're from across the disciplines, across WSU campuses. And after they form their teams, then they are given the case to solve. So those teams-- the solutions for the case that we have this year were read by our panel of judges. They read all of the two page solutions that all of the teams submitted and they selected the top five solutions out of those 20 sets that were submitted. Those are the students that you're going to hear today, the students whose solutions made it to this final competition.

Each year a complex global issue is submitted to us for the case. And that comes to us in a variety of ways. For example, the first year of the Global Case Competition was current event oriented. The incidents that occurred in Haiti in 2010, in January there was the 7.0 earthquake. In November of that year were massive hurricanes. And so the case that year was disaster relief in Haiti. So it was current event oriented.

The case that Afshin participated in, arsenic poisoning in Bangladesh, came to us from a group of WSU researchers. They were researching and investigating the issue of arsenic poisoning worldwide, specifically in Bangladesh. They came to us and said, this is a very important issue that nobody knows about, we want some visibility for that at WSU, we want some visibility for that in general. Would you take that on as being a case for Global Case? And of course we said, yes. So that's how that case came about.

The catalyst for this year's case, as many of you in the audience are very much aware, is the common read. The common read this year that all freshmen are asked to read is a book called Garbology. And the subtitle of Garbology is, "Our dirty love affair with trash." This particular book, the focus of it is, waste is one of the environmental and economic harms that ordinary working Americans have the power to change and prosper in the process.

Our students presenting today took that message and expanded it globally. Manaus, Brazil was the focus, the geographic focus of the case for two very, very different reasons. The first reason is, plastic waste isn't the most important issue in that part of Brazil. Manaus is in the Amazon region, and one of the most important issues in that area is rain forest deforestation. Although Brazil has done a miraculous job in reducing the damage of rain forest deforestation it has crept up a little bit in the last couple of years.

So we gave our students the challenge, here's a case that is probably not the most important issue in the country that we've selected. So that in and of itself is a challenge. The second reason was much more practical, Cassie Rowland, who is here in our audience-- a member of our Steering Committee-- visited Manaus on an education abroad program that was coordinated by Jessica Castleman, one of our judges. And they saw the plastic waste problem firsthand. And because of that they said, this would be an excellent location for the case this year if we're going to look at plastic waste. So that's how those two things together made the case that you're going to see from our students.

There's a small description of the case in your program if you want to read a little bit more of that. I'm going to hand the program back over to Afshin to introduce the teams, which is probably why you're here in the first place. So let me hand the program back to her.

AFSHIN KHAN: Now, what you all have been waiting for, our student team solutions to this very important and complex global issue of global waste management, particularly plastic waste in Manaus, Brazil. Excuse me. Each team will have 10 minutes to present, followed by a five minutes question and answer session from our judges. So we will begin with team Edo Manaus, faculty advisor, Dr. Teresa Jordan of Department of History.

SPEAKER 1: Can you hear me on this one? It's good?

AFSHIN KHAN: I think it's a Portuguese name, Edo Manaus. Excuse my Portuguese, I don't know if I'm pronouncing it correctly.

ALEXIS BALLARD: Can you guys hear me? OK. Hello, my name is Alexis Ballard, and we are team Edo Manaus. So the problem and background. Manaus is located in Northern Brazil, and it is the capital of the Amazon. And Manaus is the seventh largest city in Brazil. And it has a population of over 1.6 million people.

Through implementation of its free trade zone it has rebranded itself into a major industrial hub. As a result of industrialization and a poor funded waste management sites it has seen a tremendous increase in plastic waste as you can see from the image. This is highly detrimental for Manau because it negatively affects the health of its citizens and its environment.

So to remedying this we have created a solution which Celena will now overview.

CELENA CANODE: Can everyone hear me? Our solution, we want to curb the growth of plastic waste with recycling awareness programs at schools done in parallel with standardize collecting and sorting strategies that are meant to strengthen the current structure of recycling entities. Then, having the sort of materials recycled into useful products, and in some cases upcycled. Besides our process, our marketing and promotion strategy, and our funding and sustainability plan will help us be successful. Maxwell will tell you more about our school awareness program.

MAXWELL RELSTER: Thank you, Celena. So, we recognize schools as a foundation of change in society. And in light of this we want to promote the recycling program at schools in Manaus and develop those schools as convenient drop off site for recyclables from home. Our education program would teach what plastic goods to recycle, where to recycle those goods, and how to do so safely, the concept of upcycling, and also provide reusable collection bags for the students.

The lessons would spread back to the student's families to establish a culture of recycling in Manaus. We want to create a student competition where the grade that comes up with the best upcycling concept would win additional classroom supplies or a branded soccer ball that would be built with recycled materials, which I'll expand on later.

In the meantime, Innu will explain our collection facilities.

INNU CHAUDHARY: Thank you, Maxwell. So far our collection centers would be the sites for the collectors to drop off the waste, and the personnel employed for that would be the waste workers as we currently have in Manaus, but they would be trained and certified for this process. And also the schools, the universities, and the municipal corporations would also be a part of our collecting facility.

This facility would have the technology so that it can directly communicate with the recycling centers in terms of location of the collection trucks, and also the collection trends that are reaching each and every recycling center. The basic idea behind this strategy is to have the opportunity for the poverty stricken people of Manaus so that they can have the steady jobs, better incomes, and also incorporate the healthy lifestyle of those people, and also have prepared the recycling center for the accurate sorting procedures.

Now, Angela will discuss about the sorting strategies.

ANGELA PEDEN: So why sorting facilities? Sorting facilities give us the opportunity to monitor and manage the recycling process without competing with people who rely on recycling as a source of income. We will be placing the sorting facilities in relation to the current collection centers and population centers of Manaus. And we will also be hiring people to help come and sort the materials by hand which will help ensure accuracy in the process.

We have three primary goals we want to accomplish with the sorting facilities. The first one being reducing contamination. A lot of the recycling materials that come in from waste pickers will be contaminated with organic waste, and this organic waste lowers the value of the plastics themselves. And for businesses who buy these recyclable materials, they have to have an extra expense to clean them. It's also a health issue because many of the waste pickers go around and pick these recyclable materials from contaminated rivers and the landfills themselves.

We also want to create jobs with the recycling and sorting facilities, and shift the opinion of waste picking as a socially unacceptable profession. And finally, we want to give back to the recycling collection centers and the local communities by using a portion of the sorted materials for upcycling projects which Celena will cover in the next slide.

CELENA CANODE: So one of the things that's important about the plastics is that they do have to be sorted. As you can see from the slide, number two plastics for instance can be used to create plastic lumber and playsets that can be put back into the community. Upcycling projects can be used to create new gardens and other places that communities can use. The Composite Materials and engineering Center at WSU is who we will be looking for to help us guide and train citizens in the skills needed to create these new products.

We'll also seek out industrial partners to invest in the development of these factories, thus creating a larger industry in Manaus. Increased jobs and the ability to see a community product result from recycling will help strengthen the process and lead to more recycling by the people in the community. Maxwell's going to tell you more about our marketing and promotion strategies.

MAXWELL RELSTER: So an effective campaign will be necessary to increase the recycling awareness in Manaus. And our campaign will build off the Brazilian cultural enthusiasm for football-- known as soccer in America-- with a program branded soccer ball made of recycled

materials featuring the campaign slogan, "E do Manaus." It's a twist on a Portuguese soccer idiom meaning, it's for Manaus.

We are interested in working with ball manufacturers like Adidas or Nike to build the balls from recycled plastics. We also want to partner with the Nacional Futebol Clube, and feature Manaus-born professional athletes like Cristiano Moraes de Oliveira, and Fabio Bala in our media promotions with the ball. We will utilize local media markets of Manaus including print ads, radio, television, internet campaigns.

In addition our outlined educational component will use the balls as a non-monetary incentive to spread awareness of the program from the students to their parents. Celena will now tell you a little bit about our funding proposals.

CELENA CANODE: Funding is a fundamental component of any project, but we understand that this is a very large scale project. Companies and organizations such as Gates Foundation, Coca-Cola, Pepsi Co. And Inter-American Foundation provide a number of grants for communities and organizations working on recycling projects. In particular, we would like to help extend Coca-Cola's current recycling program called Colectivo Recycling to Manaus, and make it stronger, because it contains a similar component to our plan, which is supporting recycling cooperatives.

The Gates Foundation, in addition, may find our proposal interesting because this plan will help us tackle the public health situation. In addition we'll ask the Brazilian Development Bank, local government, and federal government for financial support, and grants, and other components. And Alexis is going to talk more about our prevention and sustainability plan.

ALEXIS BALLARD: OK, so we want to create sustainability through partnerships. So two of our partnerships, the first one being Whole World Water, which is an organization that strives to establish clean and safe water projects around the world. We would encourage hotels to partner with Whole World Water. With partnering with them they would receive water filtration systems and reusable glass bottles that they could sell to tourists that visit their hotels. Then through their partnership it is required that they would provide 10% of their earnings back to Whole World Water, which their fund could then be aided in cleaning up the contamination in the rivers. And this would also reduce tourist waste.

We would also want to partner with Seychelles, which is a water filtration company. We would want them to give their water filtration bottles into local retail stores in Manaus to help transition the locals into a greener life more rapidly.

And then we also would want to create prevention through law. Currently there is no regulation for corporate wastes in correlation to the free trade zone. So we advocate for the government to partner with the United Nations Environment program that already has a major impact in Brazil in terms of their environmental issues.

So lastly Innu will conclude with our cooperative model.

INNU CHAUDHARY: To execute the solution in an innovative structure we have designed a cooperative model that would work in accordance with all of the elements of the solution that we have discussed so far. So the general idea behind a cooperative is that the common man is the manager of the cooperative. We have also included the regulatory bodies that would maintain the Manaus Recyclers Association. And we also have the organizational committee--

AFSHIN KHAN: Excuse me, I will have to cut you off because you are over 10 minutes. I would encourage the judges to go ahead and ask their questions. And you have five minutes for them.

SPEAKER 2: Nice presentation guys. So you mentioned that you were going to put recycling bins in. There's already a lot of waste pickers there who are making their living off this, so how are you going to not compete with those people and take away their livelihood?

INNU CHAUDHARY: So we're dealing with having the current waste pickers and the family owned recycling centers in place, and trying to equip them with the technology of better collection and the sorting facilities. So we are not trying to compete with them in terms of their bread every day. So we are just having them and improving the standards of their life also so that they recognize that the health is an important issue. And this will also create jobs for them and a steady income.

So we are having the waste pickers which are currently there, and we are also employing them. But we just training them for that purpose.

SPEAKER 3: Follow up, Innu mentioned, lifestyle of workers. What was behind that phrase?

INNU CHAUDHARY: So lifestyle of workers was just mentioned in regard to the health, so that they recognize that health is an important issue. And then when they are trained to do that by giving them training, that you are already doing a waste picking thing, but if you do it like this it's going to help you so that you just live a more healthy life.

CELENA CANODE: May I cut in? It's helping set standards so that the individuals are not subjecting themselves to practices that are going to endanger their health. So wearing masks, wearing gloves, ensuring that there's standards in place so that they can continue to do what they're doing, but also live long and healthy lives and come back to their families. Thanks.

SPEAKER 4: So you have a wide array of ideas for funding. I'm glad you elaborated on that. You are pretty dependent on grants and partnership. So do you have some pretty clear indications that companies like Coca-Cola, the Gates Foundation, and especially Whole World Water would be willing to be involved in something like this?

CELENA CANODE: If I could start real quick, Alexis, and then you can talk about Whole World Water. Pepsi Co, Motorola-- which I didn't include-- Coca-Cola, they all have active recycling

programs and grants around the world. And I think it would be an easy way to tap in. And I think they would find this proposal really interesting because it doesn't just have a Band-Aid on a situation, it helps create more of a recycling of a whole idea and a whole community so that later on in life it's-- we're working on prevention, not just a Band-Aid. Alexis do you want to talk more about Whole World Water?

ALEXIS BALLARD: Yes. So you mentioned, why would they want to help? So Whole World Water is a fund, and how it works is they recruit people who apply, so that could be an individual or a business. And so then as an individual or a business to sell their product and thus then 10% of your earnings go back to their organization. That's how they develop their fund. And the purpose of their fund is to help provide clean water projects around the world.

And so how they figure out which projects to tackle is their ambassadors apply with grant proposals, and then they review the proposals, and then they do pick and choose which projects to do. So that's why we wanted the main partners to be hotels, because the hotels would generate a lot of income, which then could serve in their fund. And then they could also spread a lot of awareness about Whole World Water, which in turn would have more members and in Manaus hopefully join Whole World Water. And then they would have more people actively seeking to get a grant proposal approved to help their community.

SPEAKER 1: Thank you team E do Manaus.

SPEAKER 3: Are we out of time?

AFSHIN KHAN: Yes. Thank you team E do Manaus. I wish you good luck.

Our next team is Team Verde, faculty advisor, Dr. Grant Norton of WSU Honors College. So let's all welcome Team Verde, Can everybody hear me? Can everybody hear me? Good afternoon everybody. Thanks for coming. We are Team Verde. And we are happy to see you here. We are going to present our solution to this year's case.

SPEAKER 9: I'm Brazilian, I'm very happy to be here talking about my people and my country. So first of all, lack of education and responsibility towards the environment. So Brazilians were asked about, what is sustainable consumption? About 2/3 of the population replied they don't know. Also, when they were asked about their participation and actions towards the environment to help the environment at home, work, the community, 80% replied no participation. In addition, they said that the responsibility to solve Brazilian's environmental issues belongs mostly to the state government. We really would like to change this behavior and this mentality.

SPEAKER 6: So in order to change the behavior and mentality, what we're looking at is focusing on education. So with a core on education, that's also going to transfer into a reduced use of plastic. And then also we're going to look at reusing plastic through our PET classroom project.

And then finally, we're going to be leveraging existing infrastructure through a neighborhood pickup program, which will expand current recycling efforts.

And so for our case we did focus on PET plastics, mainly because Brazil is a major consumer of those. But we feel our solution would actually apply to many other types of plastics and pollution.

SPEAKER 7: To tackle this issue we wanted to implement a community based learning model, this model has four different steps. The first step is to identify the community needs through qualitative and quantitative research done by students at high schools or even college students. The second step is to design and implement community led projects with collaboration with NGOs and community leaders.

This structure shows us that we get to interact with people on different levels. And the final step is to evaluate and monitor the projects. Right here we see the progression of our community based model. The first step is to brainstorm and to find the problems. We do this by researching through qualitative and quantitative research. Students will do this during their class and outside in the field, which we'll talk about next. Students will go into the field, into different areas and ask people-- interview people-- and see what are the actual needs for that community.

The next step is to plan out the actual project. Students will work with different NGOs and community leaders to come up with a plan and see if that could be implemented in their community and with the resources they have.

The final step is to create the projects, go advocate, ask for funding, and see what they can do to implement the projects in their communities.

SPEAKER 9: OK, so using this strategy we are going to implement Green Week in schools. So what is Green Week? So basically it is an intensive core training and teaching for the next generation of Brazilians. So we are a very interdisciplinary team, each can contribute to the design and development of the core courses in this curriculum. So each course is going to relate with plastic waste. For example, health courses, arts and crafts-- for example, students learn how to do souvenirs with plastic-- environmental, social issues, recycling 101.

In addition, we are going to have a very fun and friendly competition between schools. For example, which school gathers the most amount of plastic. And the students will be rewarded. We really think it's crucial to make people a part of our solution.

SPEAKER 6: We're also going to incorporate other members of the community and other community groups, more specifically informal waste pickers or catadores. So catadores are folks that have typically lived on the fringes of society and have made a living by collecting recyclable waste. And Brazil is really progressive in utilizing catadores. They realize that

recycling rates are higher when they do support individuals that are doing this, and that it's also a good financial solution to their infrastructure problem.

So in the city of Manaus they fully support their catadores, and so they have been giving them a lot of support. So we want to also include them with our solution. And so how are we going to include them is we're going to provide education to the catadores when we do our Green Week training. And then we're also going to teach students about catadores and other social issues. And then during Green Week students will also learn about recycling and how to sort and clean different recyclables. And then they're going to pick a drop off point in their neighborhood and they'll leave those presorted, pre-cleaned recyclable materials for a catadore to come pick that up, with the goal of increasing recycling in the area, and also increasing the financial development of catadores.

So the neighborhood pick up program, using the catadores, is one way that we're working in the community. But we're also going to have a marketing campaign in the community. So we'll also be doing a visual campaign, which would be posters, videos, consumables on phones or tablets, and then also social media. And we already have our little logo so far for it. And then we're also going to be looking at corporate sponsors for Green Week.

There are a lot of organizations in Manaus that are really high consumers of PET, or we even have an organization there that produces PET plastics. And so we're going to look to them to help sponsor some of these activities and look for their support moving forward.

SPEAKER 8: All right, so once students are educated about PET plastics and what plastics can do to our environment and our health, we have an idea to create bottle schools. So bottle schools are made out of bottles, they replace the use of cinder blocks for insulation. And these are really useful and beautiful places that inspire kids to learn more about the environment and to clean up their environment.

Additionally, this is a very volunteer-based process, meaning the entire community gets involved, they show enthusiasm for the project, they show that they desperately care about their community and they want to clean it up. So not only are they cleaning up a community, they're also creating a wonderful space for future generations to learn about plastics and the environment and other subjects.

SPEAKER 6: So we also wanted to take a moment and talk about the funding of this project. We feel one of the assets of this project is that it should be fairly cheap. The biggest expense is going to be getting trainers. But we would like to partner with WSU and the University of Manaus to do a cultural exchange and actually get professors and students to Manaus to help do some of these programs. We would also like to investigate doing a Fulbright scholar program and see if we can't have a Fulbright scholar have Green Week as their project. So those are some ideas.

And additionally, we will pursue different grant funding like Captain Planet funding, which has done some international funding. And they are geared specifically towards youth. For the Green Week costs we're going to look at the National Science Foundation to see if we can get some funding for those costs. We're really, really going to lean very heavily on corporate sponsorships here. We have corporations like Pepsi Co. We have Coke in the area. And they are wanting to do some sustainable activities. And so we feel that we can work with them to get some sponsorships. It's going to be fairly cheap for them, and hopefully there'll be enough passion and drive around this movement that they'll want their names attached to it.

And then finally, the average Brazilian makes about \$400 a month selling souvenirs. And so we're hoping that we could investigate selling some of the arts and crafts that we make during Green Week to see if we can make a self-funding project as well.

So to wrap it up we have this timeline. And so we're going to just focus on this last part of the timeline. Within five years we want Green Week in every school in Manaus. We want the neighborhood pick up program offered in 70% of the city. And we want to continue to build PET classrooms in communities that need it. We feel like our solution is a strong solution because it's feasible, it's affordable, and it's empowering. We're empowering Brazilians to take control of their environment and actually make an impact, and really be able to see what they're doing and take ownership of their environment. And so that is our solution. Thank you.

AFSHIN KHAN: Let's have the questions from judges.

SPEAKER 4: Hi, so you talked quite a lot about education-- and that's certainly a part of it-- and the idea of the houses as a use. But if you are successful in raising awareness do you think there is enough infrastructure in place in Manaus to handle an increase in recycling that you might generate?

SPEAKER 6: Yeah, I think there is. So with the informal recycling, they're actually working on building sites right now in Manaus for a localized sorting facility. So I think that the development is coming. But because we are using people at the local level I think infrastructure will build as we build. And then I think we won't really need as much infrastructure and maybe some other projects might because we are leveraging the informal sector, which is already operational.

SPEAKER 5: Thank you for your presentation. You know that Manaus is next to a river, right, and much of the waste is right in the river. How would you address some of the issues that that presents?

SPEAKER 10: So the community-based learning model that we presented is an interdisciplinary approach to building these projects. So a student could focus on the science behind using the river or different ways to navigate using the river in their project. So depending what the students want we can easily make use of the river and see how we can reduce waste that way.

SPEAKER 3: Most of your model is based on-- what you started out with-- talking about brainstorming with the local community to get a community-based solution. So as I understand, your five year timeline, it is aimed at the publicity awareness training, none of which actually recycles a single bottle. And your costs were all focused on training. Did you look at the labor of recycling, the science, the facilities that are needed, and the costs that would be needed in whatever solution this community people came up with?

SPEAKER 6: So I'll field that one. So we did brainstorming about some different ideas of maybe looking at turning plastics into oil or something like that, but we felt like this was a more feasible solution because we're starting at the root of the problem in reducing pollution to begin with. And we felt like that was a better way to approach it, instead of putting a Band-Aid on a problem let's get to the problem at its core.

SPEAKER 3: So your emphasis is on the local recycling from where the waste is created to where its solved and put into a bottled school or whatever, right, without actually being shipped anywhere, is what you're saying?

SPEAKER 6: Correct.

SPEAKER 3: OK.

AFSHIN KHAN: Unless there are any other questions from any of the judges then we can thank Team Verde.

Next we have the Team We Stand For Brazil, faculty advisor, Dr. Kim Hauser, Carson College of Business. So let's all welcome We Stand For Brazil.

[VIDEO PLAYBACK]

- Nestled along the irreplaceable Amazon River sits Manaus, a city of which creates 3,379 tons of PET plastic waste a month. This plastic waste makes its way into the land and waterways of Manaus, and I fear irreversible damage will soon follow. Fortunately, this is a problem with a solution but I cannot do this alone. We need to stand up together and work towards redemption. Will anybody stand with me?

[END PLAYBACK]

SPEAKER 11: In order to fully understand this issue we first need to look at the city where the issue takes place. Manaus is located in Northern Brazil with a population of 2 million people. It's highly religious with 65% of its population practicing Roman Catholicism. It's located in a free trade zone with 600 established industries, many of which use and create plastic waste. This plastic waste is increasing by 5% every year, largely in part to the rapid urbanization of Manaus. This waste then enters the landfills drainage systems and waterways. As you can see from this picture, a large majority of the waste is plastic bottles or PET plastic.

Our group to focus on PET because it accounts for the largest majority of plastic produced at 34%. It's low in cost and has a low weight to content ratio, making it a good choice for producers.

According to Ana Lucioa Machado, she reported that the average person in Manaus will throw away three PET bottles per day, which if you add that up considering the entire Manaus population, it's 3,379 tons of PET plastic waste per month, 60% of which will enter the landfills.

SPEAKER 12: So in order to mitigate the problem, in 2010 the local government of Manaus established a public private alliance program which aims to implement a selective collection for recyclable waste, and this includes PET. The main features of this program include establishment of four collection facilities and the professionalization or employment of 300 catadores.

Catadores, or waste pickers play a very important role in the solid waste management program of Brazil. Unlike developed countries where most of the recycling process is highly mechanized, in Brazil everything is done manually. So the catadores are the ones collecting, sorting, and processing this waste, hence they're very important in this program. However, since the implementation of this selective collection scheme there remains to be a very big gap from the tons of PET collected per month to the potentially produced PET per month.

And one of the possible reasons is that this scheme was limited to only 17% of the population-- at least in 2014-- hence if we want to decrease PET pollution, strategies that would entail increased PET recovery and expand the scale of collection is very much needed. So for our solution our group developed a comprehensive approach to manage PET waste.

We have identified three main features, stakeholders, elements, and aspects. The stakeholders, we identified the local government, the catadores of the waste pickers, the families, and the churches, the industry, and the NGOs which we will be working with. The aspects include all the policies and realities of which our management system operates, everything from the environmental, socio-cultural, political, even to the financial resources and limitations of our system has been considered, or was considered.

The elements is the technical portion of our management system. This includes all the strategies that we are going to implement such as educational component and the collection component. Having considered all this and understanding their equally important roles we are very confident we can achieve an effective, efficient, and sustainable PET waste management system.

ALLEGRA SUNDSTROM: Our timeline will be split into five main phases. Phase one is contacting existing organizations and fundraising. Phase two is educating and advertising. The third phase will consist of implementing new resources. The fourth phase is when we will propose a new solution to the United Nations Environment Program. And phase five is sustainably maintaining our solution through the five year period.

Phase one will be based on making potential partnership connections and fundraising. First we will make connections with the local churches to promote a waste-free lifestyle by distributing reusable bags later in phase two. The funds will come from Kickstarter, a grant from Coca-Cola Coletivo, and our student organization called Cougs for Brazil. Our organization will hold fundraisers here on campus and has already made a profile on Kickstarter where over 8.3 billion people have donated to other projects in the past.

Coca-Cola Coletivo has supported 700 non-governmental organizations in the past two years including Asta, an organization that sells products made from recycled materials. Through our connections with Asta we will apply for a grant from Coca-Cola Coletivo to fund our new facilities. Lastly we will partner with an organization that advocates for better recycling habits among Brazilian businesses called Cempre, to train the catadores once a sorting facility has been implemented.

Then in phase two, by connecting with the churches in the first phase we will be able to distribute the reusable bags. We chose to donate reusable bags to that the people of Manaus will have an easy way to transport their plastic waste to the collection bins. We will also consult with Dr. Patricia Hunt-- a reproductive biologist WSU-- about possibly presenting in the churches in Manaus to emphasize the risks of plastic waste.

DARBY MACKENZIE: The other part of phase two is advertising. And by partnering with Asta we imagine that Coca-Cola Coletivo would be willing to advertise over the sustainable actions they support. Because the culture in Manaus mainly verbal we intend to have these ads broadcasted by TV and radio, especially during the 2016 Olympics. And they will carry on from the beginning of phase two all the way through our five year period.

Phase three is about implementation. First we will implement recycling bags into the homes of Brazilians to encourage recycling. Second, we will put collection bins throughout the city so its easier for everybody to recycle their waste. Third, we plan to implement a new sorting facility. And fourth, we would like to partner with Cempre's preexisting sites to provide training education. Our goal is to increase the PET recovery up to 75%.

So phase four is about social responsibility and policies. Currently there are no governmental policies to standardize environmentally friendly procedures. With the Olympics coming up and civil protests going on we understand that the Brazilian government's first priority may not be plastic policies, and with that in mind we decided that our best bet would be to suggest voluntary PET production caps to the UNEP for businesses operating in Brazil.

Phase five is all about monitoring how we're doing. So for sustainability we'll continually monitor and evaluate the systems that we have come up with.

So let's talk money. What's it going to cost right, and how are we going to get this? For reusable bags, they come at \$0.30 each. And we want to distribute this through the churches. We want to hit 50% of the homes-- so that's 100,000 bags-- that comes to a total of \$32,000. For the

collection bins we want to place them all around the city, we want to use 48 of them. They're \$500 each, so this is kind of a picture showing what our plan is to accomplish here. So that's \$24,000 total. The sorting facility is \$300,000.

And how we plan to fund for all these-- so for the reusable bags we have our student organization Cougs for Brazil, which will bring in immediate funds. But we understand that for our long-term goal that we need to rely on our Kickstarter account. For the collection bins we rely on Asta-- our partnership through Asta-- for those bins. And for the Coca-Cola Coletivo program, we're going to apply for a grant of \$300,000.

Last year Coca-Cola Coletivo gave 16 million dollars to the NGOs that they support. Asta is one of those, so we're going to use our partnership with Asta to hopefully reach that goal.

Our team was inspired by this case to do something in our own homes, so we created an organization called Cougs for Brazil. Last Sunday we picked up trash along the Pullman-Colfax highway-- this is pictures demonstrating that. And we also held a fundraiser where we talked to 54 people and we made enough money to buy 150 reusable bags to send to Brazil today. We realized that this problem is not just in the homes of Manaus, but it's also in our home. And with that being said, the solution lies in all of us. But first we must take a stand.

My name is Darby Mackenzie. I study entrepreneurship. And I stand for Brazil.

KENDRA FAIR: My name's Kendra Fair. I study strategic com. And I scan for Brazil.

ALLEGRA SUNDSTROM: My name is Allegra Sundstrom. I'm majoring in environmental science. And I said from Brazil.

SPEAKER 12: I'm [? Jeffery ?] [INAUDIBLE]. I'm a graduate student in crop science. And I stand for Brazil.

KENDRA FAIR: And our last team member is Rachel [? Exton, ?] who's our Global Cougar connection. Right now she's in Medford, Oregon. She's also a graduate student studying strategic com. And together we stand for Brazil.

AFSHIN KHAN: Thank you team members. If we can have the questions from the judges.

SPEAKER 4: OK. You had talked about the need for-- excuse me-- infrastructure of a sorting facility. And are you sure that that is required and that there isn't enough? And what caused you to believe that you would need more infrastructure?

DARBY MACKENZIE: So currently there's only four sorting sites in Manaus, and they're all in one centralized location. Only 17% of the public has access to these sites so we'd like to expand that. One of the steps is with a new sorting facility.

SPEAKER 2: I saw the results of your recycling efforts last Sunday. Thank you very much. So you mentioned that you thought there should be a cap on PET production, but you're going to partner with the people who use PET plastic to package their products. How do you think that's going to go over with them? And how would you handle it if they say to you, what do you mean-- what was it-- phase four for you is try to put a cap on this?

KENDRA FAIR: I think one interesting point to this question is that these companies, yes, they do use PET plastic, but they have already started taking steps to resolve these effects like with the Coca-Cola Coletivo. They've been going in with-- they've donated six million dollars in the last year to help-- what was it, 700-- 700, yeah organizations. So they are aware that is an issue and they're more than willing to start working towards a solution.

SPEAKER 3: Tell me again what you're doing with the sorted PET plastics after it's collected.

SPEAKER 12: OK. So we mentioned we also work Cempre, and Cempre is a leading NGO in charge of not only educating and professionalizing the categories, but at the same time they are building cooperatives that would be-- so the cooperatives would be composed of the catadores, and then after that they also help them sell those recovered PET waste. So they have a system that's in place that links to private companies.

SPEAKER 3: They process this in some way?

SPEAKER 12: They help it turn into a product that would be readily bought by different industries that would use recycled PET.

SPEAKER 2: You mentioned the churches, can you share what type of problems would you encounter by working with churches, perhaps people from different religions, and then you representatives of the United States.

DARBY MACKENZIE: We are going to use the churches as our segway in, you know, a foot in the door kind of approach. We feel like it would be easiest. But we're not going to be biased to those who aren't religious. It's just kind of our foot, we feel like the easiest connection would be going through the churches because over 50% of the population is religious.

SPEAKER 2: Do you know how many churches are in that area and what denomination's?

KENDRA FAIR: So we're not positive on the exact number, that's something that we could very easily look up. As far as the denomination's, the most prominent is Roman Catholic. There's also some Protestant and a few are not as common, you know, there's a few other religions that aren't as prominent.

AFSHIN KHAN: All right, thank you judges. And thank you team, We Stand For Brazil. Our next team is Cougar Cogeneration, faculty advisor, Dr. Chuck Pezeshki, of School of Mechanical and Materials Engineering.

SERGIO BARAVALLE: Hi, I am Sergio Baravalle.

STEPHANIE GARDINER: Hi, I'm Stephanie.

PHILIP BEHREND I'm Philip.

ANNALISE MILLER: And I'm Annalise. And we are Cougar Cogeneration.

Now, plastic waste is an issue around the world but the situation in Manaus is a little bit different. Manaus it is situated in the state of Amazonas. It is home to 1.8 million people-- excuse me-- and despite a large industrial sector acting in the free trade zone, 30% of its population live in poverty. This industrial sector generates a large amount of plastic waste and relies mostly on fossil fuels. Manaus is simply unequipped to handle the amount of plastic waste that they generate.

In addition to the industrial sector, the middle class remains uninvolved in plastic collection and generates a large amount of waste as well. Due to high poverty and the growing PLASTIC waste issue a waste picker community has formed around the landfill. These individuals scavenge for a living, picking and selling primarily high valued plastics such as PET. Their standard of living is very low and they have limited access to clean water. This results in a lot of health issues.

In 2010 Manaus implemented a lot to professionalize these pickers. While this created additional collection sites, the other benefits didn't reach most of the picker community. Together these three segments make up the issue of plastic waste in Manaus and they all need to be part of the solution.

PHILIP BEHREND: Our driving objective for a solution is first of all to create value for the low valued plastic polypropylene. Polypropylene contributes to over 40% of the waste stream, yet because it is not cost effective to recycle it continues to accumulate in landfills. By giving waste pickers and additional plastic to collect we will be providing them with an additional source of income improving their lives. Not only will we involve the waste pickers, but we also intend to include other demographics such as the industrial sector and the middle class. We intend to accomplish this by creating a sustainable waste to energy system that will benefit the entire community in Manaus.

STEPHANIE GARDINER: Just like what Phillips in our first stage, we will have the waste pickers pick a second type of plastic. Currently the PET plastic collecting is working really well, but we want to have the polypropylene plastic be collected to help with that problem. So we're going to allow waste pickers to collect that plastic, and then we are going to have them take that and increase their income by doing that. And on top of increasing their income we'll be able to reduce the plastic waste as well.

The sanitary conditions that they're working under is really, really poor so they're at increased risk of all sorts of diseases, particularly the fecal-oral diseases like Hepatitis A and typhoid. So

part of our solution is when the waste pickers come to get their income we are going to take the opportunity to educate them as far as what they're at increased risk for. So we're going to let them know and we're going to also give them some personal protective equipment such as gloves, make sure that they have footwear and masks. And at that time all the vaccine related illnesses, we're going to offer them to have vaccines to help reduce that as well.

And they're picking through dirty syringes, more at risk for Hep C, AIDS, all of that, so we want to do that. As well as waste picker's we want to involve the middle class. We are involving the middle class using the same method on a currently successful program that has been going now for five years in Argentina. And this is very successful. And it exceeded their expectations for plastic waste with the same goals.

So what this program is and how we are going to implement it would be having the middle class collect plastics and bringing them to a hospital collection point. So at the hospital collection point, that would be used and recycled and the money that came from recycling those plastics would go to help the sick community, sick children. And this really worked already previously so we wanted to kind of use an approach that has worked to get the middle class involved.

PHILIP BEHREND: In addition we're considering a waste gasification plant. Dr. Carolyn Roos from WSU conducted significant research that shows that waste gasification is a clean and efficient method of waste management. Gasification is the process of superheating waste in an oxygen poor environment, elementally decomposing it and producing syngas which may be used for electrical power generation. Our initial waste gasification plant will cost about 2.5 million US dollars, and that's based on our prior literature. And in addition to this it will have a capacity of 10 tons per day, which is approximately 10% of the polypropylene waste generated in Manaus each day.

The waste gasification plant will help with the development of relationships of companies in the industrial sector who produce significant amounts of plastic waste. This will be invaluable for future investment as we further develop the relationships. The primary goal of our first stage is to create a positive perception of waste to energy processes. The second stage will provide a more holistic solution.

SERGIO BARAVALLE: OK, so far what we have presented is a waste management system that helps poor people, that creates a positive perception on the middle class, and also provides the industrial sector-- now you're listening-- the industrial sector with an alternative to manage their waste and also the possibility to include this activity in their CSR-- you know what I mean, the corporate responsibility and social plans-- in order to increase the value of their own trademark. This is just the first stage and this is a good starting point, however we would like to leverage on this starting point to provide a more holistic and have a higher much important impact in Manaus, mainly because Manaus has some needs that should be addressed.

For example, they are still-- in this first stage-- sending plastic to the landfills. They are still leveraging on fossil fuel to produce their own energy, and the fact that they have poor people

that don't even have access to drinkable water. So we would like to address all that in our second stage. So we ask ourselves, OK, what if we manage the 100% of the plastics that are available, and if we increase the capacity of our plant? In that scenario we could provide water to 18,000 families with drinkable water, and we could also change the structure of energy in Manaus by including renewable energy in their metrics.

What is more, since we will increase the demand of plastic we would require a sorting facility that could provide us with the amount of plastic that we need to achieve these goals and also provide jobs and improve the income of poor people.

PHILIP BEHREND: So this is a schematic of the situation before the implementation of the second stage. And as you can see in the lower left hand corner, we have the landfill and the waste picker community which is a problem that we are trying remedy. So after the implementation of the second stage one of the most notable solutions is the generation of purified water. Research and prior literature has shown that excess heat from waste gasification plants can actually be used to purify and desalinate water with remarkable efficiency. As Sergio said, we would have capacity to help over 18,000 families.

In addition, the sorting facility would be operated in a co-op structure. It would be owned by the government but it would be run by the waste picker employees who we would take from the landfill. This would provide further incentive because of a profit sharing program, further incentive for efficiency of operations. In turn this would create greater levels of feedstock for waste gasification and in turn greater levels of energy for the community.

SERGIO BARAVALLE: So we ask ourselves, OK, if this is a dream ideal solution but what about numbers? I spent my entire thesis in my MBA working on this kind of plants, so I run the numbers that we got from Brazil and fortunately they look really well, Mainly because the energy that they paid in Manaus is almost the double that you pay here for your kilowatt. That creates a really interesting niche to develop sustainable solutions and this kind of project. And these are the numbers that shows that this is feasible economically and technically.

STEPHANIE GARDINER: So we really like our plan because it's within five years, it's realistic, and not only are we reducing waste but we're also helping with the health disparity. And it coincides with the Healthy People 2020 goals as well as the World Health Organization goals.

ANNALISE MILLER: We realized that this is a complex solution, but our multifaceted approach handles not only the plastic waste issue, it addresses sanitation, clean water, and clean energy, generating socioeconomic growth throughout society. Thank you.

AFSHIN KHAN: Thank you team, let's have the questions from the judges.

SPEAKER 4: I like your solutions. I think you cover a lot of ground. The one thing that I wasn't clear on is you're discussing a very considerable investment up front, and how do you plan to come up with that initial funding?

SERGIO BARAVALLE: From my perspective, having a profitable solution-- it's really strange at least for me, I dedicated many years trying to find a niche in which this kind of project is profitable by itself. So in a way, having that card to present to any kind of Bank of International Development or any international organization could provide you with a strong position to negotiate that kind of source. Although the government should of course-- as a main stakeholder in Latin America-- I come from Argentina so I really know the subject-- you have to count on them to support you. And we're talking about 37 million dollars. It sounds like a lot, we don't have it in our pocket, but it's not a number that scares me much.

PHILIP BEHREND: So I'd like to add something just to that. The first stage solution will only be 2.5 million dollars, which is still a considerable investment. But we're leveraging on the fact that the industrial companies right now are paying to get rid of their waste, whereas we would be taking their plastic waste and using it as a feedstock in our company. And so it would be mutually beneficial. And so we would rely somewhat on investment from those companies in addition to some of the well-established NGOs in the region.

SPEAKER 3: You mentioned two groups or two sources for collecting these, the normal catadores or the waste pickers. You also talked about a middle class that brings him to hospitals I think. And it seems that if the middle class gets on board with this the waste pickers won't have a job because that plastic won't be there. What do you think about that?

ANNALISE MILLER: He has a hard time hearing. Yes, the waste pickers might be out of a job eventually but that's why we have the second stage, and that's when they would be employed at the sorting facility. So basically the sorting facility is going to be owned by the government but it's going to employ waste pickers giving them a small salary. They'll be allowed to manage the profits so that way they have a stake in the efficiency of the plant and they still have-- we're taking them out of the landfills to improve their health but they still have income possibilities.

SPEAKER 2: So I have a follow up question to that. So we have curbside recycling and we have a hard time getting people to recycle. So how do you motivate this middle class to pick up the recycling and take it somewhere? The middle class is highly motivated. I would say based on the collectivist culture in Latin America that we highly would advertise that it's going to help the sick kids, it's going to bring in income to that hospital. Not only will they be able to fund programs for the sick kids, but in Argentina they were able to get a lot more new technology and stuff for the hospitals, so it's benefiting everyone. So the collectivist culture is really going to help.

SERGIO BARAVALLE: I would like to add something, the objective with middle class is to create a positive perception because they are a key stake holder when the government or the whatever organization is going to fund this will require their opinion. We are aware that this is not a solution. And the impact that they could have recycling their plastic is not enough at all. However, in Argentina, in five years they collected 1.7 billion cups, and mainly because they attached that plastic to the fact that they were helping poor people and they were purchasing

technology for the hospital. So it's a proven concept that we are leveraging in, but mainly to create a positive perception between waste and energy.

SPEAKER 2: OK. Can I ask you one other thing? So the gasification plan sounds interesting because you get energy, you get water, what about toxic chemicals that are released in the process of this meltdown?

SERGIO BARAVALLE: We didn't want to include that, but--

SPEAKER 2: I'm going to make you.

SERGIO BARAVALLE: --and it wasn't because we were hiding it. We didn't want to bring a much more complex solution. We work with my friend here in the department which is mainly based on algae production related to biofuels. And since we are producing sygas, which is a purified CO₂ and hydrogen composition which has this composition, you can easily compliment this plant with an algae biofuel production. And the fact that the cost structure of that business mainly depends on CO₂, electricity, and clean water, which is the three products that we are offering at a low cost, mainly because we are getting plastic from sources that will provide us with this competitive scenario. We didn't want to include that, but this was part of the solution.

PHILIP BEHREND: And in addition, this is a clean solution for plastics in general, it's even better for algae. But in my brief description of gasification I mentioned that--

AFSHIN KHAN: I'm afraid we have to stop it there. We're over five minutes.

PHILIP BEHREND: I can talk to you after the presentation.

AFSHIN KHAN: Thank you, judges.

And last but not least, Team Embrace who's faculty advisor is Doctor Sarah Petersen of WSU Tri-Cities College of Education.

SPEAKER 13: In the 1967 movie, *The Graduate*, it was said, "There is a great feature in plastics." We are in that future right now. Manaus, Brazil, in the heart of the Amazonian forest is a developing city with high poverty rates whose increase in plastic use, coupled with a lack of recycling facilities is causing environmental, social, and economic problems. Let us embrace our multi-disciplinary knowledge to find solutions to these problems. Embrace Manaus' existing waste institutions. Embrace the paradox presented by plastic. Embrace stands for our belief to empower Manaus to build, recycle, spread awareness, and produce clean energy.

Any breakthrough in the existing system will take years to implement. There is a long way to go from conceptualisation to implementation, but here we we're given the unique opportunity to work with people from different nationalities and majors to produce a plan that will be

successful, because parts of our plan are already being implemented in Manaus and other cities worldwide.

Our plan starts with networking to raise funds. Those funds will be used to professionalize Manaus' waste pickers. We'll use those funds again to promote community awareness and build homes out of something as simple as a plastic water bottle. In the long term we'll look to produce clean energy from biogas.

SPEAKER 14: Waste pickers work in hazardous, degrading conditions. And many don't recognize the millions and tons of waste that they recycle. Our goal in Manaus is to professionalize this industry and help these folks be more efficient with their work, and create business models out of them. Many don't realize that they have a big impact locally and internationally. We plan to work with [SPANISH] IBAM. With their help and many more partners we will create a system to identify each waste picker, create a sorting facility, and help reduce the harm and the waste that is in Manaus today.

SPEAKER 15: Instead of using this plastic to create toxic waste in environment we can use it to be a part of the solution. There are 7,000 individuals living around landfills in Manaus, Brazil. The main initiative of Embrace is to build plastic water bottle homes in order to provide shelter for these individuals. Now, you might be thinking, this is an impossible plan. But it's already been very successful in Guatemala with the help of the company Hug It Forward.

In the span of only six years, 57 bottle schools have been built and it's still standing there today. Because plastic is not easily degradable, which is why we hate it for the environment but love it for our plan, by using plastic water bottles for building homes, not only does it become a strong structure, but also a sustainable one as well. It takes about 3,250 water bottles to create one house, so the organization [? would find ?] secure location to help guide, train, and educate local individuals.

So here's the 411 on how to build a plastic water bottle home. Step number one, collect the plastic water bottle and trash and you stuff the trash into the plastic water bottle, this makes an ecobrick. Number two, you dig a foundation and you construct a structure. Number three, insert pins and attach and secure chicken wire. Number four, place the ecobrick row by row with concrete. Number five, just reinforce everything with more concrete and chicken wire. And lastly, add the roof, the door, and the windows and then you're done, so celebrate and inaugurate.

Bottle building is an effective solution for two huge problems waste and also poverty. This also creates environmental education as well as an environmental impact. So this also can take a group of local individuals and foster leadership as well as transferable skills for the future. And local families and communities can come together to solve a problem not only create jobs, but also improve a better quality of life. These water bottle buildings are so much more than a structure of waste, it's a home for these individuals.

SPEAKER 16: So we know that the impoverished benefit from our plan, but what about the rest of the community who is actually the cause of most of the problem? We want to implement recycling programs in schools and local universities, and we want to set them up with tools to create programs and classes to educate the people around them. Because when you educate a student about an issue you actually educate the community, that is where change happens.

So a similar grassroots approach was used in The Ugly Indian project in India, and local volunteers just went out and collected and cleaned up local landfills and dumpsites. And the community took notice and they have kept those areas clean now for a very long time. And this aids in the sustainability of our solution because when individuals sort their own plastics our waste pickers do not have to do that, so that increases the efficiency of our job initiative. And also, this habit of sorting your waste also helps with the next part of our plan.

SPEAKER 17: There's a huge potential in the waste that we create. We are already planning to build plastic bottle houses, and now another part of the solution can be using biogas. Our idea to use biogas is to facilitate segregation. It gets really difficult to clean out plastic recyclable waste from household trash that is mixed with wet organic matter. So what we plan to do here - and what we think is it all begins at home. At the household level people will segregate their wet waste and dump them into biogas plants. All the recyclable waste will be segregated out at the household level and with the help of waste pickers, and will be used to build homes or will be sent to recycling facilities.

We plan to build these kind of biogas plants at a small scale community level. This has already been implemented in India, and in fact at my own house, which has been running very successfully for the past 10 years. And others were doing, why would people want to do that? Why would people want to segregate their waste? They get an incentive out of it, they get clean cooking gas which is cheaper than the LPG gas which is normally used in Brazil. And also it creates employment because taking care of a biogas plant requires people.

So in the long run we want to create sustainable plastic bottle communities and also let people have their own biogas cooking gas used from their own dump.

SPEAKER 18: Through our research we found lots of organizations to help out with funding in addressing our Embrace idea that we are having. Empowering Manaus we have found Brazilian Institute of Municipal Administration, they already have professionalized waste pickers along with recyclable goods. US Environmental Protection Agency has a Brazilian joint initiative that already has additional waste pickers along with professionalized waste management.

NGOs can also assist with building houses. Hug It Forward, Peace Corps, and ECO-TECH are a couple to name a few. Hug It Forward already has sponsors such as Google, Dropbox, and the Oprah Magazine. Local families can also assist in their local community to help other families in need to build these houses. Spreading awareness can come from Coca-Cola as they have already provided 76 million dollars worth of grant money towards recycling. Additionally, they have Coletivo, which is a program already enabled and established in Manaus.

Clean energy can come from Export Import Bank. This organization can assist with the biogas idea that we're also having. Lastly, grants can come from a vast majority of grant funding, such as the Global Green Grant Fund, which has 45 million dollars worth of grant money, and 245 grants in Brazil already. And we would suspect that WSU would be able to assist with additional funding through our Embrace program.

SPEAKER 13: The input the implementation of the majority of our plan will be accomplished within five years. Long term we look to produce cooking fuels from biogas and watch as PET bottle communities become the hallmark of Manaus' waste plastic system. If we can keep one bottle from degrading our environment or help just one family out of poverty, our future will be better. Let us embrace our future, embrace Manaus. Thank you.

AFSHIN KHAN: Thank you Team Embrace. Questions from the judges.

SPEAKER 5: It's always interesting to see that-- you said that spreading awareness that you would reach out for Coca-Cola, isn't called Coca-Cola the main problem that we have in Brazil regarding plastic? Can you address--

SPEAKER 15: So the reason why Coca-Cola has been creating more funding for people to use is because they have been one of the problems. And I think by adding Coca-Cola-- saying, you can use your water bottles to create these homes for these individuals, we can use your money to spread awareness, I think sends a very powerful message to Coca-Cola. And I think that in that sense it also makes Coca-Cola very aware of their problem.

SPEAKER 4: I heard a lot of concrete going into these buildings, why not just build concrete buildings and leave the bottles out of them?

SPEAKER 15: Because we wouldn't be using as much concrete as we wouldn't necessarily plastic water bottles, it's just to make the ecobricks last longer. And if you want we can read you the structure by structure as to how to build it, and it makes more sense that you're not using as much concrete as you would a typical house.

SPEAKER 14: And even to add to that, the PET bottles prevent houses from burning. An example, which another reason why we would use them, unlike cardboard or wood which are very flammable even to your neighbor's homes, if you're using PET the plastic melts rather than expanding out to your neighbors homes, which is also a safety issue that goes along with building PET homes.

SPEAKER 15: And then to add one more thing, it also reduces a carbon footprint when we use these plastic water bottles and less concrete, so that was our main initiative.

SPEAKER 2: So I heard a lot about the biofuel idea, but I'm not sure what the connection with plastic is, so can you--

SPEAKER 17: So what we want to do is make sure that people get a reason to segregate their waste so that plastic does not get mixed up with the food waste. Even at our homes, if we really take the food waste out and put it in a compost pile we don't have to have a plastic trash liner just to keep the wet waste separate. And a lot of dry waste, like say cardboard, paper, or even plastic water bottles, are just easier to clean. But when mixed with our food and things it gets difficult to clean them, so having a biogas plant just to segregate the food waste will make that part of segregation easier.

SPEAKER 4: So I see the construction of bottle houses as a partial end use for plastics. Did you crunch the numbers to really determine how much of an impact it would have towards actually using the amount of plastic that is a problem as opposed to others?

SPEAKER 15: So through Hug It Forward they actually use, it says 6,500 plastic water bottles to create one school. So when you try to build one house depending on the size of it, it's about 3,250. But now you're going to build multiple houses and can if you want to make it bigger you'll be using more plastic water bottles. Now we're moving these plastic water bottles away from these landfills that are creating the toxic-- I think is a very big environmental solution, because the idea is that though we do want to reduce plastic consumption in general, what are we going to do about the problem for the plastic that already exists? And so a lot of these plastic water bottles are already in landfills and that's where waste pickers come in, and that's where we can use those water bottles to create houses.

Like I said, there's a lot of individuals that don't have any shelter. And I think by providing these shelters we can also get rid of plastic and provide these shelters. 7,000 is just in Manaus, so if we expand this to Brazil we'd be using a lot.

SPEAKER 17: And also at the same time we want to create awareness too, so we will be-- whatever home we are building, it's not just being done in one corner of the city. We will spread the word. We will spread it to the community so that people can really think about how much people are putting an effort to reduce their plastic footprint. And probably people will be inspired to produce less plastic over the years.

SPEAKER 4: A key part was educating or taking the waste pickers, professionalizing them, turning them into business leaders in the community. Who's going to train them and how will they know that?

SPEAKER 13: So there's existing organizations already in Manaus making this happen. A prime example is during the recent World Cup that was down in Manaus, organizations-- like [? IBAM ?] is one of the main ones-- comes alongside these waste pickers and goes up to these women and they let them know that here is what you can do to not only make more money but be more efficient in your waste picking. So we're going to go alongside and partner with these organizations to try and help train and educate, and really empower these waste pickers to make more of a difference and help themselves.

AFSHIN KHAN: Thank you. Thank you, judges. Thank you team.

Thank you teams for your excellent presentations. Let's all give them a big round of applause. I'd like to request all the teams to proceed to the Green Room to collect your belongings, and then you can proceed to the reception from there. Everyone else can-- if you can just wait for two more minutes. I have an interesting announcement for everyone.

I'd like to ask the judges to move to the judging room across the hall where you can data mine this year's winner for the fifth annual Global Case Competition. Can we have assistance for that?

CHRISTINE OAKLEY: Yeah, they're out there.

AFSHIN KHAN: And while they're deciding on our top teams today, each one of you is invited to join us for refreshments and conversation in the hospitality business management dining room down the hall.

CHRISTINE OAKLEY: There'll be somebody there to help you do that. It's a catered reception. It's really nice. Wait for our award ceremony so that you can see who is the first place, second place, third place team. And you can try to figure ideas about what team you would like and--

AUDIENCE: The award ceremony is there?

CHRISTINE OAKLEY: The award ceremony is in the reception.