

learning_{in}360°

by Kristin Todd

BEST STUDENT Projects in Energy

Students in the BEST program at Baylor's Hankamer School of Business applied analytical and upper-level thinking skills to leave lasting impressions both domestically and internationally this past year. From sugar cane to methane, students explored opportunities for alternative energy resources and discovered potential positive economic results of their efforts.



DANA HAMANN'S interest in international business development soon came to fruition as her plane landed in the Dominican Republic this past September. Hamann was part of a BEST student project team that devised a business plan for a semi-portable sugar mill, which was developed in the Dominican Republic (DR). The plan also examined the potential for ethanol production as a solution for an alternative energy resource.

For Hamann, a senior Management and International Business major, the project was a monumental opportunity to capitalize on her passion for her field of study. She served as the group's representative by visiting the country and experienced the culture first-hand.

Omar Bros, an agronomist and civil engineer from the DR, served as the students' main contact in the country. Bros is co-founder and member of the Dominican Foundation, and engineered the infrastructure and design of the mill. "Five days after we spoke with Omar, I was flown down there,"

Hamann said.

"I was only there for one full day — it was definitely a whirlwind. I visited the communities who would share the sugar mill and got the feel of the people and the climate."

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The group's business plan involved two communities that would benefit from the sugar mill:

Mata Palma and Guayubin. The sugar mill would process the sugarcane harvest in Mata Palma, then be relocated to Guayubin for the remainder of the year to process the sweet sorghum harvest. Through their research, students found that 30 percent of the DR population lives below the world poverty line. The semi-portable mill would guarantee year-round production of syrup, and in turn provide a stable source of profit for the communities. The team named the sugar mill project, "Molino Mata Palma," or the Mata Palma Mill.

According to the group's plan, if the mill operates on a 24-hour basis, seven days a week, it has the potential of processing 15 tons of sugarcane or sweet sorghum per hour, which would be up to 360 tons of cane per day to produce syrup. Distilleries purchasing the syrup could then create by-products such as sugar, sweeteners and ethanol fuel. This could lead to market expansion within the DR and also provide a channel for worldwide exportation of goods, establishing a stronger economy for the country.

The students said the semi-portable mill project is an initial step toward the overall vision for production of alternative fuels and bio-sustainable communities in the DR. Currently, the DR imports about 98 percent of its gasoline supply; this statistic alone validates the need for alternative fuel sources, and the production of ethanol would serve as an asset. The sugar mill would also yield an additional energy source from the waste of its harvesting process — electricity. This conversion process would allow the mill to be self-sustaining.

Keeping the background research in mind, the students took a holistic approach to the plan by making it about more than just turning a profit.

"Our business plan can be described with a Venn diagram," Hamann said. "The three outer circles would be social, economic and environmental responsibility with the middle convergence as the sugar mill. We wanted to be mindful of the affects the mill would have on the country's culture as a whole."

ALI EWERT, a senior Marketing and Real Estate major, focused mainly on the group's marketing plan for Molino Mata Palma.

"I researched import and export numbers in the Dominican Republic, and discovered the possible market and industry for our products in the country," Ewert said. "We looked at the market profitability of the mill, as well as our marketing strategy, differentiation points and selling operations."

**Molino Mata Palma:
Innovation in the
Dominican Republic**

BETHANY BROTHERS, a senior Finance major, said organizing the research seemed at times a daunting task.

"It was challenging to condense the extensive information and research into a concrete business plan," Brothers said. "Sometimes the information would become overwhelming, and we would have to step back and re-evaluate which information potential investors would consider most important."

STEVEN HOFER, a senior Finance and Entrepreneurship major, felt the project gave him an opportunity to test skills learned from the business school.

"I helped with the financial assessments for the project," he said. "I think we all applied skills toward accomplishing the project's real-world entrepreneurial lessons, which led to its success."

Ewert said learning about the business practices in the foreign, developing country was crucial to the success of the group's plan. Students studied trade practices, taxation and legal requirements of a business start-up in the DR. After overcoming cultural differences and communication barriers, Ewert said she was pleased with the outcome of the project.

"Our project provided the country with the possibility of social and economic advancement simply by combining emerging technology with existing resources," Ewert said. "The communities and the people will be given leverage to think outside the box with their daily business practices. Hopefully, this will propel a movement to utilize this beneficial, portable, self-sustaining product in other developing countries."

David Allen, director of Baylor's John F. Baugh Center for Entrepreneurship, said the international project benefitted students in a number of ways.

"They learned that they can develop a business plan around a technology with which they have little familiarity, and they contributed to the responsible use of resources," Allen said. "They helped devise a business plan that has the potential to raise the standard of living for an impoverished people."

Students hope the Molino Mata Palma project plan will ultimately enhance the quality of life for citizens of the DR.

"This project was an opportunity to do real-life application," Hamann said. "I saw the faces of people who would be directly affected by the project — I think that was what motivated us to produce a successful plan."

Brothers agreed that the social entrepreneurial aspect of the project proved inspirational.

"It is amazing to think that someday Molino Mata Palma will become a reality and forever change the lives of people in the Dominican Republic for the better," Brothers said.

Agri-Gas: From Waste to Resource

BEST students also focused on national opportunities to capitalize on alternative energy solutions, and they discovered that animal manure has the potential to be much more valuable than some may think.

"We developed a business plan for an invention that was actually created in the 1970s," said senior **EMILY WADE**, a Finance and Economics major. "We partnered with the company, Agri-Gas, LLC, to come up with a creative and efficient way to introduce the invention of the Agri-Gas digester and make it marketable to investors and to the agriculture industry in general."

GENNA ROBBEN, a senior Marketing and Management major, said the group's interest was sparked by current trends in the demand for and decreasing amount of energy resources.

"Alternative energy resources are such a hot topic right now," Robben said. "We thought it would be an interesting outlet to pursue through our project."

So how does the Agri-Gas digester work? On a basic level, the process involves the transformation of crop and animal waste into natural energy.

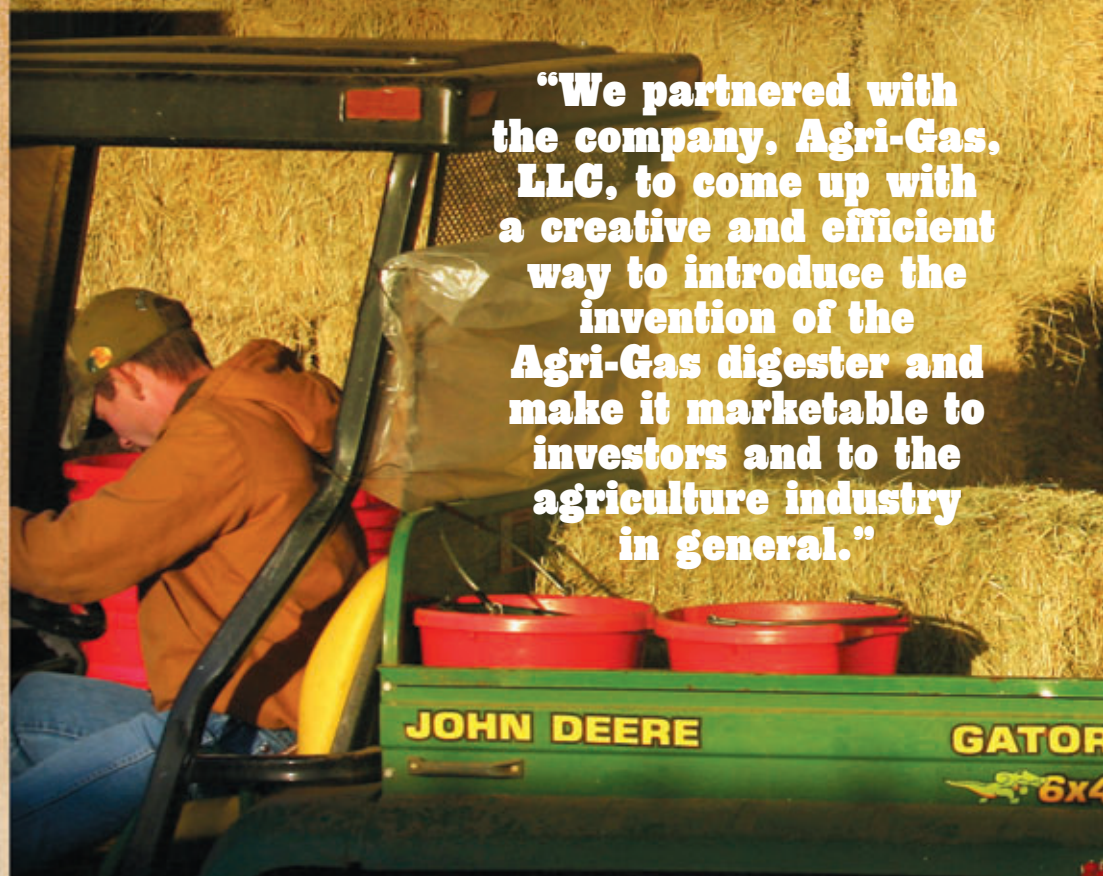
"The animal and crop waste is converted into methane gas and other viable by-products that can prove profitable," Wade said. "The digester process involves anaerobic, continuous feed digestion and can process anything composed of a cellulose structure."

According to the students' research, the digester is capable of waste-to-gas conversion rates as high as 80 percent per cycle. The remaining 20 percent includes high quality carbon solids, of which carbon-rich fertilizer is created. The ready-to-use fertilizer does not contain aerobic or odor emitting elements exposed to the atmosphere. Considering the United States Department of Agriculture estimates the country's annual production of "dry matter" waste to be 335 million tons, the Agri-Gas digester could come in handy for environmentally conscious farmers.

Kevin Ainsworth of Agri-Gas served as the main contact on the group project and regularly met with students about the company's emerging energy technology. His father, Jack Ainsworth, actually invented the digester, and Kevin remembers being involved in its development plans over 30 years ago.

"At the time the digester was invented, we were introduced to the oil shortage of the '70s," Ainsworth said. "My father started thinking

"We partnered with the company, Agri-Gas, LLC, to come up with a creative and efficient way to introduce the invention of the Agri-Gas digester and make it marketable to investors and to the agriculture industry in general."



futuristically about energy resources with the development of the digester. Today, we hope it becomes a real asset to the agriculture industry.”

Students developed the business plan targeting cotton gins and farms in Texas and the southeastern United States. The group members combined individual strengths to complete portions of the project.

“I think our group worked well together due to the mix of participating students,” Robben said. “We had group members with majors in Finance, Economics, Accounting and Marketing, so we looked at the big picture and divided the workload by interest.”

However, students did not have expertise in engineering and needed to understand

the functionality of the invention in a conceptual manner.

“With no engineering background, the initial challenge was understanding the digester itself,” Robben said. “It is a simple system, but has detailed components.” **CATHERINE WARD**, a senior Finance and Real Estate major, concurred.

“It was funny to see all of us as business majors wrapping our minds around this extremely advanced piece of science,” Ward said. “That was a great lesson for our group to learn how to stretch our minds beyond just our training at the business school. As a result of this project, I feel better equipped to handle a variety of challenges that I might face in the workplace.”

Ainsworth said he found the project to be mutually beneficial, with students offering innovative solutions to help Agri-Gas while learning about the emerging technology and its positive environmental impacts.

“The students were prepared and professional at every meeting,” Ainsworth said. “After our first meeting, I could tell they were doing research and becoming informed about our technology and its commercial benefits.”

The digester is a portable, patented product. Ainsworth said upon receiving funding, there are plans to build a research pilot plant to test sustainability of the invention. Meanwhile, the students hope their efforts will lead to success for Agri-Gas.

“Part of the reason this project was so rewarding was seeing how passionate the Ainsworth family is about the invention,” Ward said. “This is something that the family has invested a lot of time in, and they have kept their original focus of benefitting the environment at the core of their business model.”



Pictured: Catherine Ward, Emily Wade, Genna Robben, Landon Ramsay Not pictured: Anne Roseman

BAYLOR'S BEST PROGRAM IS COMPRISED OF FOUR COMPONENTS:

BUSINESS, EXCELLENCE, SCHOLARSHIP AND TEAM. Students complete a group project each semester — for the Fall semester, students are paired with scientists to develop a business plan around technology. During the Spring semester, students partner with local companies and act as consultants for business strategy. For more information about the BEST program visit www.baylor.edu/best.