

UNC Charlotte – Lee College of Engineering Senior Design Program

Senior Design Project Description

Company Name	<i>Bakkavor</i>	Date Submitted	<i>05/29/2019</i>
Project Title	<i>Comprehensive Energy Audit and Recommendations for Improvement</i> BAK_ENERGY	Planned Starting Semester	Fall 2019

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

Discipline	Number	Discipline	Number
Mechanical	3	Electrical	3
Computer		Systems	2
Other ()			

Company and Project Overview:

Bakkavor is a leading provider of fresh prepared food in the UK, with an international presence in the US and China. Our 19,000 employees operate from 43 locations, developing and producing innovative food for a wide variety of occasions and budgets. In the UK and US, we work with leading grocery retailers to prepare fresh meal offerings focusing on their own label brands. In China, we supply international and local foodservice operators. We manufacture and market a wide variety of fresh prepared food products across a range of price points to meet people’s convenience aspirations no matter what the meal occasion or the budget. We group our products into four broad product categories: meals, salads, desserts and bread & pizza.

Our factories are operational 24/7, 364 days a year, providing over 2,000 different short shelf-life products to customers every day. We operate a ‘just-in-time’ model, using fresh raw materials to produce only what is required by customers' and we have a proven ability to deliver high-quality products to customers. Essential to the success of our 'just-in-time' model is our logistics expertise in managing our inbound and outbound supply chain. Raw materials are delivered on time to our factories and finished products are delivered on time through our distribution centers into customers’ depots.



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We manufacture food that is not only great tasting for consumers, but also meets the highest standards of safety. Sites are audited regularly, often on an unannounced basis, by internal food safety experts, customers and independent bodies for compliance with food safety standards. We employ more than 500 food safety professionals and conduct over 2,000 in-house microbiology and chemistry tests every day.

Bakkavor has a large food production facility located in south Charlotte on Westinghouse Blvd. The facility is a high volume operation producing prepared food in batches which are private brand labeled by customers in the Southeast. Individual ingredients are received into the location and moved into refrigerated food production areas where the food is processed in ultra-sanitary conditions. This operation is a huge consumer of energy. Bakkavor desires a comprehensive energy audit of the facility and recommendations for energy reduction strategies.

Project Requirements:

Bakkavor consumes energy in many forms including electricity, natural gas, water, air pressure and steam production. Energy costs are one of the highest cost that Bakkavor has in running this location. In its efforts to run a more sustainable and environmentally friendly business, Bakkavor goal for this project is to examine every use of energy and utilities to understand individual consumption usages and then analyze and recommend strategies to reduce energy consumption without negatively affecting quality, safety or production efficiency. Team is to implement recommendations as agreed with Bakkavor to validate savings. If implementation is not practical due to investment required or time allowed, then analysis will be performed to validate. Goal to develop a minimum of \$25,000 in cost savings recommendations.

Expected Deliverables/Results:

- Comprehensive documentation of energy and utility consumption usages.
- Recommendations for energy savings in all areas
- Implementation of changes as agreed with Bakkavor and validate of predicted results.
- For changes that require capital approval timing outside the project, an engineering economy analysis report prepared justifying the investment cost and payback financial calculations.
- For changes that cannot be implemented in the course, written implementation plans to be provided for each recommendation.

Disposition of Deliverables at the End of the Project:

Work product is to be displayed at the last Expo then immediately handed over to the supporter unless arrangements have been made to deliver at a future date (which must be prior to graduation)

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- SEGR 2106 - Engineering Economic analysis will be utilized for Return on Investment calculations in recommendations, so interest in this course area will be useful.
- Ability to travel to Bakkavor facility in Charlotte to gather baseline data, multiple trips are



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expected

- Much of the facility is refrigerated, ability to tolerate cold working conditions.
- The Bakkavor facility is operated using food safety sanitary standards which must be diligently followed by the student team.