Event: **Technical Seminar**
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#	**Jaime Arias** Ph.D., Master of Science, Mechanical Engineer	
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Presentation title:	**Energy Modelling of Supermarkets**	

Supermarkets and other food stores are intensive users of energy. In Sweden supermarkets account for approximately 3% of the total energy used. Many new ideas and concepts have been introduced in supermarkets with the intention of decreasing energy usage and minimizing refrigerant charge. Some of these new ideas and concepts are beneficial while others are less so. The supermarket sector has more or less used the trial and error approach to implement and evaluate these new ideas and concepts. One example is the introduction of heat recovery systems to reduce energy consumption. A supermarket is a complex system where many subsystems interact. A system approach must be taken in evaluating the impact of energy efficient measures in different subsystems in the supermarket. It is necessary to implement a systems model in order to predict and evaluate the introduction of new concepts and ideas in supermarkets. A computer model that predicts building heating and cooling loads, HVAC system performance and refrigeration system performance of a supermarket will be described in the presentation. A theoretical explanation of the model and results from the model and measurements will be presented. Some results from the project SuperSmart which is an EU funded Horizon 2020 project will also be presented and discussed.

CV:	

Associate Professor Jaime Arias' research has mainly been focused on sustainable cities and energy efficiency in buildings and supermarkets. He has developed a user-friendly computer program, which calculates the total energy performance of a supermarket with reasonable accuracy. The model describes the properties of the different components in the system when different energy measures are compared. He has been involved in different international projects about energy utilization in Supermarkets as IEA HPT Annex 31 "Advanced Modeling and Tools for analysis of energy Use in Supermarkets", IEA HPT Annex 44 "Performance indicators for energy efficient supermarket buildings" and EU funded Horizon 2020 project "SuperSmart".

He has been involved in different research projects with focus on sustainable cities and energy efficiency in buildings. One of these projects studies the implementation of energy efficiency measures in buildings which is addressed as the most cost effective way to reduce energy utilization and increase energy security. In Sweden a large part of the existing multifamily houses have to be refurbished in order to continue to deliver the high level of service that is associated with modern multifamily buildings. Another main aspect which has an important impact on the energy usage in buildings is related with occupant's behaviors which can significantly affect building operation and performance. He was also involved in an EU FP7 project with focus on Smart Cities called CIVIS (Cities as drivers of social change). The project aimed at moving one step further the conventional role of ICT in smart grids to a more "holistic", socio-technical perspective whereby ICT plays a crucial role in connecting the potential of social systems and dynamics in achieving a more efficient and environmentally compliant energy system.

Associate Professor Jaime Arias has also a brief pedagogical experience. He is responsible and examiner for two courses at the Royal Institute of Technology in Stockholm Sweden. The courses, Modelling of Energy Systems and Green Building, are part of the fourth year of the Master Program Sustainable Energy Engineering. He has also been involved in other courses as Sustainable Energy Utilization; Introduction to Mechanical Engineering; Project Course in Sustainable Energy Systems, Applied Energy Technology and Applied Refrigeration and Heat Pump Technology. He has supervised more than 70 undergraduate students who have completed their Master's Thesis projects and he has co-supervised five PhD students of which two have been graduated.