Understanding the role of education programs in implementing sustainability initiatives

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ABSTRACT

Early sustainability efforts focused on environmental and economic factors; however recent studies have demonstrated the impact of end users on building performance outcomes. An earlier case study, that looked at alignment between end user engagement and sustainability plan implementation, was used to better understand the social aspect of sustainability. The research presented builds upon the early study and will focus primarily on understanding how to institutionalize sustainability efforts and improve end user support. Research methodology includes completion of a pre-education survey to gauge participant interest-in and knowledge-of sustainability; development and implementation of educational programs; and completion of a post-program survey. Pre- and post-program building data, including energy and utility usage and total tonnage of waste, will also be collected. A comparative analysis of the survey and building data will be presented to demonstrate the impact of sustainable education programs.

BIOGRAPHY

Tabitha L. Sprau Coulter earned her Ph.D. and M.S. in architectural engineering from the Pennsylvania State University and completed her undergraduate studies at Lafayette College. Dr. Sprau Coulter is an assistant professor of civil engineering at King’s College, where she is working with undergraduate research students and the campus sustainability coordinator to identify and implement sustainability initiatives on campus. She previously worked as an energy modeler for Reese Engineering and as a mechanical engineer for KlingStubbins. While pursuing her Ph.D., she was an NSF Grant recipient, and was involved with the Consortium for Building Energy Innovation (CBEI).
The Potential Emission Reductions of a High-Efficiency Combined Heat and Power System

Alexander Hartwell, Ph.D. Student, Syracuse University

ABSTRACT

One of the largest proportions of electricity consumption in both the residential and commercial sector is from heating, ventilation, and air conditioning (HVAC) equipment. Split between electrical usage and natural gas usage, HVAC in the residential and commercial sector accounts for approximately half of all energy consumption. Any advancements in this field have tremendous potential to reduce the damage we are doing to our environment. A high efficiency combined heat and power (CHP) system has been developed which uses a fully integrated fuel cell generator to produce power to address this potential. As opposed to many other prevalent CHP systems which have isolated photovoltaic, internal combustion engine, or fuel cell generators; in the system introduced here, the fuel cells are integrated directly into the combustion chamber itself, making use of the high temperature environment as well as the exhaust gases present from the initial combustion of the heater fuel. This allows power generation from the “waste” of the heating system. A key investigative focus of this project has been on the development of a novel “inside-out” tubular fuel cell to allow for direct addition into a boiler or other combustion chambers with radial burners. This technology and its widespread possibility for adoption has tremendous potential to curb greenhouse gas emissions, and aid in halting the progression of climate change.

BIOGRAPHY

Alexander Hartwell is a PhD student at Syracuse University and a member of the combustion and energy research lab (COMER lab) at the Syracuse Center of Excellence. In 2018 he graduated from the College of Nanoscale Science and Engineering with dual bachelor’s degrees in nanoscale engineering and applied mathematics. For over 5 years he has been working in university level academic research on topics including solid oxide fuel cells, ceramics manufacturing, microscale/nanoscale biomaterial and bio-compatible systems, and microscale/nanoscale manufacturing techniques. He also chief technical officer of FirePower, a startup out of the COMER lab working on developing a resilient combined heat and power system using a fully integrated fuel cell generator.
An Analysis of Complete Streets Implementation Strategies in Non-Urban Community Contexts

Autumn Lennon, Undergraduate Researcher, Clarkson University C3G

Anna Poe, Undergraduate Researcher, Syracuse University

ABSTRACT

Sustainability has become increasingly important in urban development, with a growing awareness of the relationship between the natural and built environment in communities. Part of the push toward sustainable planning is the development of Sustainable Holistic Planning Systems, which attempt to tackle problems such as climate and anthropogenic environmental change in ways that are “smart and connected” (Backus et al., in development). A limitation to this shift is that the lack of financial, technical, and staff resources (EPA, 2014), characteristic of many non-urban environments hinder large-scale planning efforts. For this reason, effective community engagement is vital to the success of SHPS projects, especially in non-urban contexts. Another challenge many urban and non-urban communities face is the growing ineffectiveness of street designs and infrastructure. With existing road infrastructure focused on vehicles, the safety and wellbeing of other motorists is overlooked. The solution lies within a comprehensive Complete Streets program. An analysis of methods that have been implemented in the past is necessary to determine the degree of success of traffic calming techniques in various locations. Analytical Hierarchy Process (AHP) was used to rank the features of various traffic calming measures and ascertain which practices are most applicable to the Northern New York context. In addition, various community engagement techniques were implemented in an exploratory case study in Governeour, New York to aid the community in the Complete Streets effort.

BIOGRAPHY

Autumn Lennon is originally from Beacon, New York, and is a sophomore Civil Engineering student at Clarkson University.
Green building rating systems: present status, challenges and future perspectives

Elham Mohammadrezaei, Student, Iowa State University

ABSTRACT

In today’s fast growing world, we are frequently facing urbanization growth results and effects on the environment surrounding us since it’s influenced by human activities and newly built constructions. These environmental effects are badly affecting the human health as well. Life cycle of traditional and old buildings and continuous building are harmful to environmental and human well-being and it’s harmful to the sustainability of the entire ecosystem. Thinking green and building green is one of the best strategies to maintain sustainability in the recent construction industry. Green Building Rating System is a tool to evaluate a green building and its sustainability and it helps to say whether a building has been built properly based on sustainable features. Green Building Rating Systems mainly evaluate the building environmental performance and give directions to measure the performance. There are different Green Building Rating Systems around the world and some of them are BREEAM (UK), LEED (USA), Green Star (Australia), Green Building Index (Malaysia), GRIHA (India) and SBTool (Collaborative), which have gained increased attention because of their scoring system, composition, cost and consideration. Most of the green buildings which are designed and constructed in the world are certified by using these rating systems. This research is attempting to propound a comprehensive and critical definition of existing literature with the present status of green building rating systems, their advantages, challenges and how their future perspectives are going to be like.

BIOGRAPHY

I'm 3rd year grad architecture student at Iowa State University, originally from Tehran, Iran. I'm interested in sustainability and have worked on couple of projects over 8 years of my studies and practice in architecture and am pursuing my professional practice in sustainable architecture and design.