

An Academic Review and Critique of the following text:

Roy, R., & Tinianov, B. (2009, June). Building Materials, Energy Efficiency, and the American Recovery and Reinvestment Act. (G. Bugliarello, Ed.) *The Bridge*, 39(2), pp. 31-37.

Introduction

While most of the human population has an understanding of the impact on the environment in the form of using fossil fuels, mining, and other harmful operations, it seems as though most do not realize the great negative impact that our built environment has on the planets as well. Not only do buildings produce a large portion of emission issues post-construction, they also require a significant amount of harmful energy use prior to completion as well. Much of this is taken into account during the material production phase of the process. Conceptually, usable materials arrive to a job site ready to be placed together in order to construct the design, however, we seem to sometimes overlook the process of getting that material to the site and what all was entailed in harvesting, producing, and transporting that product. Additionally, upfront costs versus negative environmental impact seems to fly under the radar far too often when it comes to today's built environment on a large scale, and largely, sustainability and affordability do not go hand-in-hand. This article, written by Robin Roy and Brandon Tinianov, two seniors at Serious Materials, provides a look at the industry from a perspective of economy versus sustainability, and provides an overview of different techniques and programs set in place in order to enhance this ratio.

Summary

Since the time of the industrial revolution, great advances have been made in order to grow the built environment at an increasing rate. However, until relatively recently, little care has been taken to ensure that these actions do not pose a negative impact in the world. As earlier mentioned, buildings play a major role in the human degradation toward the natural environment. “The ‘built environment’ is responsible for [fifty-two] percent of greenhouse gas emissions worldwide” (Roy & Tinianov, 2009, p. 31). Society tends to ignore this fact however, while advancements are made in other sectors that do not have as large an impact on the environment. The authors explain, “...as everyone is looking for ways to make our country more energy efficient, we tend to overlook...ubiquitous building materials in favor of advanced technologies for, say, automobiles and electricity generation” (Roy & Tinianov, 2009, p. 31). They go on to claim that not only would advancing the technology of building materials help from an environmental standpoint, but also, “...create opportunities [for jobs] in the \$1.3 trillion U.S. construction market” (Roy & Tinianov, 2009, p. 32).

Continuing through the next section of the article, Roy and Tinianov lay out details of the concept of high-performance windows, a major factor of building efficiency issues. The authors reference many reports and documents that cover the topic of building efficiency as it relates to windows and the techniques in which they are used in current building strategies. Throughout the piece, they explain that, “...we can solve this problem today with highly insulating windows that can reduce heating and cooling costs by as much as 50 percent” (Roy & Tinianov, 2009, p. 32). Roy and Tinianov continue to describe details behind using enhanced glazing technologies through providing graphs and figures that display the data behind their claims of heightened practices and outline the benefits of using such materials.

Through the next few sections of the article, Roy and Tinianov describe their involvement and thoughts toward the American Recovery and Reinvestment Act (ARRA). This act is described as, “[acknowledging the sustainability issue as a] national priority with initiatives such as low-income weatherization, tax credits for energy improvements in private homes, energy refurbishment of public and assisted housing and schools, and energy improvements in local, state, and federal government buildings” (Roy & Tinianov, 2009, p. 32). The authors give praise to the program, explaining that it is beneficial in a number of ways. “One of the main goals of ARRA is to create jobs while simultaneously transitioning toward a more sustainable U.S. economy” (Roy & Tinianov, 2009, p. 32). Although the new Act does seem to be seemingly useful and easy to adopt, there are hindrances that prevent it from going through. They describe a major issue being the resistance to change within the field, stating “[the practice is] based on ‘rules of thumb’ and often outdated information about the cost and/or performance, many energy-efficiency auditors, specifiers, engineers, and installers have been resistant to considering replacement windows and other new technologies” (Roy & Tinianov, 2009, p. 33).

In further depth, Roy and Tinianov begin to break down the different elements of the ARRA beginning with the topic of low-income weatherization. Described as the Weatherization Assistance Program, the initiative seeks to provide assistance to low-income households that qualify to improve the energy and insulation performance of their homes, in turn making it more affordable. Through the use of improved materials and advanced sustainability techniques, the homes are retrofitted with newer technology to enhance the overall performance. Despite the great benefits, due to budget issues, “only about 100,000 households have been weatherized annually, a small fraction of the more than 15 million low-income households estimated by [the Department of Energy] to be eligible.” The authors go on to provide details on the ways in which

the ARRA looks to help the current program stating, “ARRA provides an additional \$5 billion in funding for [the Weatherization Assistance Program]” (Roy & Tinianov, 2009, p. 33).

In the last few segments of the article, the authors lay out the details of two other programs: residential energy-efficient tax credits and school refurbishment. Similar to that of the low-income weatherization programs, these two initiatives both have their issues. The residential energy-efficient tax credit program provides tax credits to consumers who spend certain amounts of money on specifically rated products. However, “legislation has been introduced to roll back performance criteria, and some have suggested referencing Energy Star criteria instead of ARRA requirements.” They continue, “in our view, this would result in taxpayer dollars being wasted on unnecessarily inefficient products and would discourage innovation” (Roy & Tinianov, 2009, p. 35). Finally, referencing the subject of schools, they claim that, “ARRA does not provide funding specifically for the energy-efficiency refurbishment of schools...however, it does provide substantial financial support - \$22 billion in tax-credit bonds” (Roy & Tinianov, 2009, p. 35). While the program does not directly fund this sector, they do provide incentives for government related buildings and with schools serving as a major piece of necessary energy usage, the ARRA seeks to provide assistance and funding to upgrade these buildings. Overall, they give a large amount of praise and support toward the American Recovery and Reinvestment Act and provide insight on the program and its usefulness in many sectors.

Analysis

Upon analysis of this piece, it is clear that the authors, Roy & Tinianov are hopeful of the future and society’s presence in correcting current issues within the built environment. Their ideas on integrating new technologies in a cost-effective manner in order to create improved energy efficiency are somewhat utopian, however, could be enacted in theory.

Moving into their major topic of high-performance windows, their claim is backed up by several other works that explain how vital this piece of building design can be in impacting the sustainability of the project and the country as a whole. The importance of this aspect of construction is referenced in a supplementary document, *Zero Energy Windows*, a report from the U.S. Department of Energy states that, “windows in the U.S. consume 30 percent of building heating and cooling energy, representing an annual impact of 4.1 quadrillion BTU (quads) of primary energy.” Speaking on the types of improvements that Roy and Tinianov mention in this aspect of building construction, they claim that, “an additional 1 quad of lighting energy could be saved if buildings employed effective daylighting strategies” (Apte, Arasteh, & Selkowitz, 2006, p. 3-1).

In addition to techniques that can be undertaken on a smaller scale by designers and construction managers, Roy and Tinianov cite the many ways that the government has been or could be involved in sparking this change. Backing up their claim again, *Coming of Age in New York*, written by the Deputy Secretary for Energy in the State of New York, Paul DeCotis states that, “federal funding provided through the newly created U.S. Department of Energy State Energy Conservation Program...launched [New York’s] first efforts directory toward improving energy efficiency and reducing the demand for electricity.” He continues to say that even though the funding was limited, “...the effort represented an important first step in focusing attention on the need for and benefits available from improving energy productivity” (DeCotis, 2009, p. 39-40). Roy and Tinianov build on the principles outlined here, giving examples of past government involvement in sustainability and suggest improvements that the ARRA intends to make.

Response

Through experience in academia and other research, the optimism within this piece is very encouraging however not as easy to integrate into today's practices. According to the authors, with a little hope and encouragement the entire process of design and construction could be overhauled to conform to the relatively modern way of thinking about the practice. However, with the current mindset of the general public and condition of government concern with topics of this caliber, it is not hopeful that legislation to implement these guidelines is in the near future. Moreover, while the U.S. and other major countries have at least the knowledge and are beginning to take on some responsibility for the sustainability issue, the problem is more widespread than those few nations.

Conclusions

This article gives good insight not only to the current issues we face as a community, but also solutions both potential and in progress by a number of agencies. Through the use of both narrow and broad scale examples, Roy and Tinianov propose potential changes to the current system of building design and construction in order to improve the overall sustainability of the country. Although there are programs in place, they seem to be of low priority given the current budget and implementation issues of government agencies, but with the addition of the ARRA, the authors hope to gain a great amount of public involvement and have hope for change. From something as simple as replacing or designing in individual building materials to the complexity level of government involvement through tax benefits, there are many steps that can be taken to improve the built environment with benefits including the creation of jobs and a diminished negative impact to our natural environment.

References

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