

**An Investigation into an Inspiring Art Piece**

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# Sustainability Project

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## An Investigation into an Inspiring Art Piece

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The design committee for the New SUB design is considering an art installation for the atrium space. The report is a triple bottom line assessment on whether a large or small art installation should be placed into the space.

## Abstract

The purpose of the project is to investigate the possibility of installing an inspiring art piece in the New SUB Atrium. The design would encourage students to become aware about the environmental and sustainability. The specific aspect of the inspiring art piece analyzed that potential benefits between a large permanent structure and multiple small installations. The design must be constrained to fit either the inside or outside of the New SUB Atrium, as detailed in the detailed drawings. The research was completed by analyzing academic literature and reported media. The end result was the completion of a triple bottom line assessment (environmental, economic and social). Environmental analysis showed more benefits with the overall volume of waste reduced and higher amount of recycled embodied energy. Economic factors did not show any benefits or disadvantages for either. The social aspect revealed greater benefits from creating multiple projects of a smaller scale. The overall report concludes that based on the higher importance of the social effects, the resulting design for the art installation would be multiple small projects each led by different people.

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## Glossary

**Ecological Footprint** = *A measure of human demand on the Earth's ecosystems.*

**Bio-capacity** = *The capacity of ecosystems to produce useful biological materials and to absorb waste materials generated by humans, using current technologies.*

**Embodied Energy** = *The sum of energy inputs that was used in the work to make a product.*

**Insurance Premiums** = *Financial cost of obtaining and maintaining an insurance policy.*

**Participatory Design** = *A design ideology where multiple groups are involved in the creation of a design.*

**Student Developmental Theory** = *Idea of how students may learn in post secondary institutions.*

**Stimulational Marketing** = *Promoting an activity which stimulates demands for another product for people who are neither aware nor interested in.*

## **1.0 Introduction**

An inspirational art piece is designed to promote the idea of merging sustainability with different aspects of everyday life. Humans have been living outside their means with an ecological footprint of 1.5 times the bio-capacity of the earth (Global Footprint Network). These problems mostly related to human waste and demand for pre-packaged goods are negatively impacting the human existence. This sustainability awareness campaign through an artistic media would be a passive means of achieving the end goal of reducing the overall waste produced by people.

## 2.0 Sustainable Art Installations

Sustainable art installation can be found in all areas of the world. Their size varies with the message the artist intends to portray. Large art pieces typically take enormous quantities of everyday materials (compact discs, plastic bags, rubber tires or aluminum cans). A great example of sustainable art is the “Plastic waterfall” by Katherine Harvey. The art piece on the right is 19 ft wide by 17 ft tall and is one of two creations by Harvey which show the potential of eco art (Meinhold, 2011).



Figure 1 - Plastic Waterfall by Katherine Harvey

The “CD wasteland” is another art installation designed to combine ecological concerns with modern art. It’s a 5400 sq ft project utilizing 65,000 unsold and unwanted compact discs. The artist Elise Morin compares it to an oil spill to create a message about the sustainability of modern products (Toor, 2011).



Figure 2 - CD Wasteland Art Piece



The “Plastic Bag Monster” is smaller compared to these other projects but spans a larger area. The creation consists of 40,000 plastic bags and 7000 plastic cups collected from the local area. The piece is designed by Miha Artnak to question consumerism in society. It exists in a small park but spans 100ft tentacles (Wooster Collective,2010).



Figure 3 - Plastic Bag Monster in Slovenia

Smaller eco art installations also exist around the world. The majority of these designs are either hung from building roofs or placed on top display cases. These designs are also found to be more practical based on the examples found. A prime example of small sustainable art is the recycled computer head “Sistema Alternator” (Recycled Architecture, 2011). It’s small size and lightweight design allows it to be hung from the building roof.



Figure 4 - Computer Board Head Art Piece

Other art installation of smaller stature is the recyclable lamps (IGreenSpot, 2008) and the tire covered BMW (Joslin, 2011) Both share common characteristics of reusing common waste materials. The lamps combine the usage of paper cups and plastic cutlery while the tire covered car uses synthetic rubber.



Figure 5 - Plastic Bottle Lamp Design

The tire covered vehicle is less of an expression of eco-art but more of an artistic view with vehicles.



Figure 6 - Tire Covered BMW Vehicle

Sustainable and environmental art is a growing trend around the world. An installation similar in nature for the New SUB atrium will help continue this trend and add value to the space. The space allocation of the project varies with the artist and location, as seen above. Therefore a triple bottom analysis will provide suggestions for the ideal size.

### 3.0 New SUB Atrium

The area in which the project will be installed at is the New Student union building atrium. It is a large open space consisting of 2 separate floors. The space extends into the upper floors of the New SUB. Landmarks such as the knoll have been incorporated into the design layout. The building will have lots of light due to the multiple panes located above the atrium area and along the façade (Alma Mater Society, 2010).



Figure 7 - New SUB Atrium Interior Rendering

The outside environment shows lots of concrete space which would accommodate an art piece on its surface. Most of the space on the exterior area of the building appears to be dedicated to pedestrian walkways.



Figure 8 - New SUB Atrium Exterior Rendering

The overall plan of the new sub building provides an atrium indoor space of 48m long, 24 m wide and 20 m tall. However, this space is limited by different obstacles seen in figure 8 as the different building floors, staircases, green space, architectural features and walkways.

## 4.0 Environmental Analysis

This section of the report looks at the environmental benefits of a large art installation versus a small art installation in the New SUB atrium.

### 4.1. Material selection

There is a wealth of post consumer waste materials that could be used as a part of the study. Products such as plastic cutlery, plastic containers, plastic bags and others are readily available in all communities. The scope of this project is limited to reviewing the size of the art installation thus only one material will be selected to ensure consistency. The material that will be used in the analysis for this report is synthetic rubber tires. Reviewing the attributes of rubber tires it was found that the embodied energy is 110MJ/Kg (Alcorn, 1998) with average car tire weight as 10 kg (Rubber Manufacturers Association, 2011) Tires come in sizes from 8 to 28" (Tire Rack, 2011) but the median tire size of 17" will be used.

### 4.2. Variables for analysis

The premise of the design is to utilize recycled material therefore design will be based on reviewing the ecological affects of the art installation with respect to:

- Volume
- Embodied energy

The volume the art installation takes up (i.e. length width and height) is assumed to be the total volume of tires that would be used. If the tires are used in the art installation they are effectively removed from waste sites. This volume represents a specific amount of energy required to be made, which is known as the embodied energy. Instead of adding more energy to reuse the product or waste this energy, this energy is stored. Lastly, other equipment is a criteria for the art installation because it represent the requirement of utilizing more energy to display the product in some manner.

### 4.3. Volume

The assumption will be made that the entire space is allocated to the art installation (small or large). This would may have an impact on the programmable space if applied inside the building as well as interfere with walkway space for pedestrian. These effects will be ignored for the purpose of the study.

A large scale art installation would have the possibility of being installed inside or outside of the atrium area. The interior of the building would provide a space of 24m long by 6m wide and limited by two structural floors or 10 m (floor 1 and floor 2). This area is highlighted in figure 9.

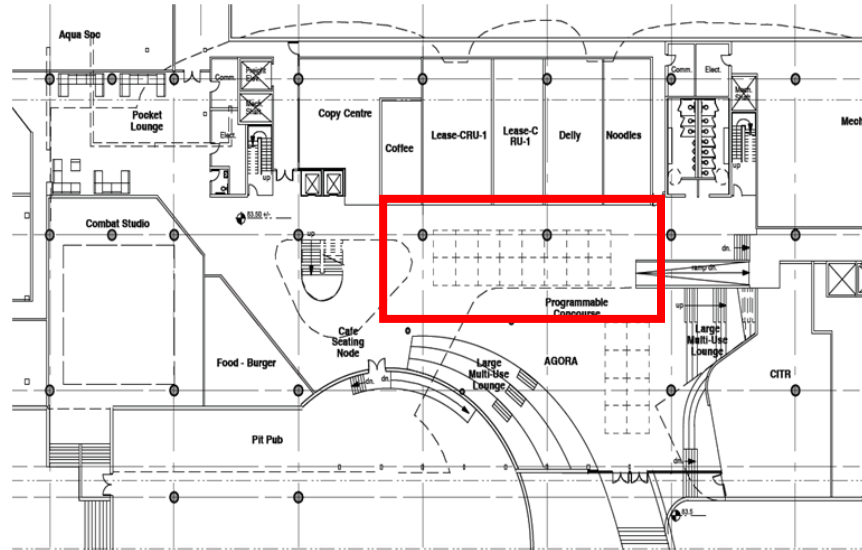


Figure 9 - First Floor Plan for New SUB

The total volume that could be occupied by this space is 24mx6mx10m or 1440 m<sup>3</sup>. This represents an equivalent savings from the volume displaced in landfills. The average dimension of a tire is 0.43m diameter with a width of 0.225m. This provides the following calculations for the number of tires which can be used for a large art installation. The net tire usage of this project would be 91 tires.

- Tire in length =  $24/0.43 = 55.8$  tires = 55 tires
- Tires in width =  $6 / 0.43 = 13.95$  tires = 13 tires
- Tires in height =  $10/0.43 = 23.26$  tires = 23 tires

A small art installation would take up a smaller footprint compared to the space occupied by the larger art piece. The dimension of the small art installation will mirror the design of the art piece of the “goddess of democracy” already existing in SUB area (UBC Archives, 2007).



Figure 10 - Photograph of Goddess of Democracy at Current SUB (Wikipedia, 2011)

The statues dimensions are approximately 1m by 1m and 3 m tall. The overall volume of the design is  $9\text{m}^3$ . Following similar tire dimensions listed before, the tire usage for a small art installation is:

- Tire in length =  $1/0.43 = 2.326$  tires = 2 tires
- Tires in width =  $1 /0.43 = 2.326$  tires = 2 tires
- Tires in height =  $3/0.43 = 6.977$  tires = 6 tires

The net tire usage of a small art installation is 10 tires. In both cases other materials could be added increase the volume of the waste product used in the design. Nevertheless, based on the calculations provided, a large art installation has the benefit of removing more tire volume from waste sites.

#### 4.4. Embodied energy

A study done in New Zealand determined that the embodied energy of a tire is around 110MJ/Kg. The average car tire weight according to is 10 kg. This implies that each tire possesses an embodied energy of 1100 MJ.

A large scale structure described above has the capability of recycling 100100 MJ of energy. This is a significant value considering this energy is reused and further processing does not increase this energy to make it something else that is useful.

A small scale art installation would have a lesser embodied energy given its size. The total embodied energy would be 11000 MJ. In order to reuse an equivalent amount of embodied energy there would need to be 9.1 small projects versus 1 large art installation. If each small project was instigated on a different year the project would take 9 years to reach an equivalent embodied energy.



There are some benefits from developing several small projects over one large one. First, there is the potential the material can be varied throughout the life of the project. Different waste material can alter the embodied energy reused and not wasted. The size can also vary through the lifespan of the project, thus if a larger project is more desirable later then it can be altered. If the project continues for many years the art installation can remove a large volume from landfills and represent a non-wasteful usage of the embodied energy of a product.

#### **4.5.Environmental Analysis Recommendation**

A large scale art piece has the potential to reuse the 100100 mega joules of energy used in the original purpose of the synthetic rubber tires. The volume of a large scale art piece can significantly displace waste in landfill sites up to 1440m<sup>3</sup> over the 9m<sup>3</sup> of a smaller art installation. Environmentally, the benefit of having smaller projects would not result in immediate value but it does have the potential to represent a better environmental savings over a longer period of time. An infinite number of small scale projects cannot be created. A point will be reach where all the small projects need to be relocated or recycled which will undesirably increase the embodied energy of the art piece. Based on this information it's recommended from an ecological view to invest in a large scale art piece. More research is needed into the recycling procedure and practices for reusing the components developed into the art pieces. If the potential of the material is extended further for the original purpose then the material may be better suited to not be used as a sustainable art piece.

## 5.0 Economic Analysis

Determining the cost of SUB Art Project is no easy task. Public art commissions vary widely in their purchasing costs. The cost is highly influenced by the artist choice, size of the art piece, and materials chosen. For this reason it is hard to analyze the difference between a small piece that costs \$100,000 and a much larger piece that costs \$10,000 and to determine where the cost discrepancies come from.

### 5.1. Cost of Art Pieces

It is hard to describe the purchasing differences between a small portable art piece and a larger permanent structure. In the UK, three temporary art pieces ranged in price from \$16,000 to \$130,000 and produced results ranging from a moving piece that was exhibited all over Ireland for an extended period, to an 8-day exhibit in a single location. On the other hand, the same website shows large permanent art pieces showing the same range of prices (Public Art Online, 2011). It is impossible to tell what role the portability of each piece played in its cost, but there are some apparent cost tradeoffs:

- Temporary pieces are smaller and would require fewer materials.
- Permanent structures can be built to simply withstand the environment they are built for, and do not need to be robust enough to withstand different locations or transportation.

Since the purchasing costs of both scenarios vary greatly and could cover a similar (albeit large) range, different parameters are needed to financially differentiate a small portable design and a larger permanent design. Every public art piece has a number of other costs associated with it and in turn brings in revenue in the form of increased foot traffic to the area and added value to the space. The other costs associated with public art include insurance, maintenance, installation, security, and the cost of the space over time and in the case of a portable art piece, the cost to move the piece (Roberts, 1995).

### 5.2. Cost of Insurance

Insurance for the installation is two-fold. First insurance is needed for the public interacting with and around the art piece. Lydiate suggests that public art has a history of not always going according to plan and that injury or damage could occur as a result of the piece (Lydiate, 2010). He warns that it is impossible to build something that is 100% safe so it is important to plan for the worst and to make sure that the public art is properly insured. Insurance for this costs approximately 300-600\$ per year for a coverage of \$2-3 million in damages. Secondly insurance is needed for the piece itself. This again varies according to the value of the piece that is being insured, but in general premiums start at \$500. (Fractured Atlas, 2011)



### 5.3. Cost of Security

Security for the art would be another expense. Currently the AMS Security is in the process of negotiating a new contract after recently unionizing. As the contract is not currently in place, the cost of the security is hard to evaluate. It is also unclear if monitoring the piece would constitute additional duties, and therefore wages (Lai, 2011). A proposed security measure would be to install a security camera near the art piece (possible two depending on the size).

The security camera would act as a deterrent to small-scale vandalism and to larger destruction of property as well as recording video of the perpetrators if either event occurred. The sub recently purchased three new cameras at an estimated cost of \$4000-\$5000 (Toffoli, 2011), so the cost of a camera for the art piece would be around \$1500.

### 5.4. Installation and Maintenance Cost

Installation and maintenance of the device would be handled by “internal workshop and some handymen/engineers, but mostly it's UBC Building Ops”. (McElroy, 2011). UBC building ops were unable to speculate on the potential costs of installing, moving or maintaining the SUB Art piece, but their costs take into account: consulting and professional fees, construction costs, commissioning costs, contingencies and applicable taxes. It would be a reasonable assumption that these maintenance costs would be the same for both styles of art piece, but that the portable art piece would have reoccurring installation and transportation fees.

### 5.5. Cash Inflow

Now that all cash outflows from the SUB Art piece have been outlined, it is time to look at the cash inflow. Unless the chosen art is a fountain and SUB visitors choose to fill it with loose change, the SUB Art project will hardly be a direct revenue source for the AMS. However, that is not to say that it does not have some financial value. One way to look at the value associated with public art is to look at how municipalities fund public art. In Vancouver, private businesses are required to give \$.95 per buildable (FSR) foot for project over 160,000 sq. ft. (Public Art Online, 2011) Calgary has a similar policy, stating that one percent of all capital projects over \$1 million must be put aside for the commission, purchase and installation of public art. (City of Calgary, 2011)

Marion Roberts & Chris Marsh (Roberts, 1995) looked at the value that corporations place on public art when choosing a rental business property. Their study showed that public art in a space got an average importance rating of 6.8/10, which was only slightly lower than other factors such as rental cost,

location and quality. Those other factors achieved scores around 8. Public art in the sub can be used to attract new businesses to the SUB, or increase competition for space in the SUB that in turn will raise the amount the AMS is able to charge for rent.

### **5.6.Economic Analysis Recommendation**

The financial aspects of a SUB Art project are not easy to analyze. In all aspects of the cash outflow and inflow, from the initial commissioning of the piece to value of the business it may attract, there are very few discrete numbers. Hopefully this section gives a complete overview of the financial considerations that will need to be accounted for if the project moves forward. A decision on whether or not to proceed with a public art piece should be made predominately based on the other factors of a triple bottom line assessment, social and environmental effects.

## 6.0 Social Analysis

Social benefits of the art piece project are increased student interest, involvement and learning. When contrasting the social benefits of a permanent art piece and those of multiple changing art pieces, there are a few key factors that stand out. First of all, both approaches to the art project benefit from “participatory design” (Watkins, 2007); however, they differ in the amount of this social benefit they can provide to the community. The level of involvement of students can be further examined using student developmental theory (Astin, 1984). Finally, one can examine the approach of the art exhibit to the goals of inspiring students and teaching sustainability as a product that with which one can use stimulative marketing technique to increase demand in certain groups of students (Kotler, 1973).

### 6.1. Participatory Design

“Participatory design” is defined as an approach to design attempting to actively involve all stakeholders. Both the permanent art piece and temporary art pieces approaches benefit from participatory design in that they allow for greater student involvement. However, they differ in the number of students which can get involved. While the permanent art piece may create social benefits once through different groups bidding to create it, the temporary art piece maintains student involvement over a longer period of time and can thus involve more students. Just as Watkins states in his study of participatory design, the goal is to “establish a sustainable foundation for the project: “Producing an artifact should not be regarded as a one-shot affair, but rather as formulating a growing experience for engaging in the development of creating generations of artifacts.”” (Watkins, 2007) Thus, the temporary art piece approach creates a sustained student involvement which can create a legacy of student participation in the future.

Furthermore, student “developmental theory” can be examined to observe the positive impact of student involvement, and how sustaining this involvement is crucial to inspiring students in regards to sustainability. Astin states that one of the challenges common to student learning “is to find a “hook” that will stimulate students to get more involved” (Astin, 1984). Applying this to the art project, one can deduce that a possible “hook” to increase student learning in the area of sustainability would be to get them personally involved in such projects themselves. Astin goes on, remarking that a direct application of this theory to teaching is that one can “focus less on content and teaching techniques and more on what the students are actually doing” (Astin, 1984). This seems to indicate that students reap less benefit if they are presented with an educational art piece, which represents the teaching technique,

and the content, which represents the art piece, than if they were to be directly involved in the creation of this content.

## **6.2. Inspirational Design**

Kotler defines stimulative marketing as “the task of converting no demand into positive demand” (Kotler, 1973); this aligns with the goal of the art piece to inspire students that are not directly involved in campus activities, and thus turning their disinterest into concrete involvement. Kotler proposes three methodologies to deal with this. The first is to “try to connect the object with some existing need in the market place” (Kotler, 1973); an existing need of students is to have their work publicly recognized, whether it be in journals or in art galleries. The temporary art pieces allow students to have their work put on display in a public setting, and thus they may see the intrinsic value of this to their portfolio or resume. The next methodology is to “alter the environment so that the object becomes valued in that environment” (Kotler, 1973). This suggests that students may become desensitized to a permanent art piece. However, if the art pieces are changing, the environment is altered such that the emphasis of the structure is different and students can be inspired in a variety of ways. The last is that one must “distribute information or the object itself in more places in the hope that people’s lack of demand is really only a lack of exposure”. Many temporary art structures allow many different groups of students to get involved with the project, and thus distribute information about the purpose of the project to a greater number of students, creating a greater exposure. The permanent structure would lead to a single mass exposure event.

## **6.3. Social Analysis Recommendation**

Thus, the above factors seem to indicate an increase in social benefits from the temporary social exhibit approach. This approach encourages student involvement, which directly affects student learning, can inspire a larger population of students, as well as it becomes a great marketing technique to increase the “demand” for sustainability.

## **7.0 Conclusion**

The purpose of the project is clearly distinguished in the project title: “inspiring art piece.” The heavy emphasis on the project is to inspire thus greater weight should be given to the social recommendation. It is the recommendation that small art installations be placed into the new SUB design with the intention that the local community participates in the creation of these pieces.

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