

Student 2

Sustainable Development Summarized

Sustainable development became a topic originally discussed in 1987, however more innovative design ideas are being implemented in recent years. Sustainable development, as paraphrased from multiple sources is the idea of development that fulfills present needs without compromising or hurting the ability to fulfill needs of the future generations or world. The three main dimensions that go into sustainable development and design practices are social inclusion, the environmental protection, and economic growth. These factors need to be intertwined to support each other in the most efficient yet conscious way possible. Implementing these developments comes along with multiple difficulties. While dealing with a growing population, architects and developers must tackle challenges involving prices and the effects of inflation and competing for limited supplies of non-renewable resources.

Sustainable development, as opposed to general sustainability, focuses on the different, short-term actions that facilitate creating the larger goal of sustainability. Popular implementations of these developments have examples such as incorporating green space into urbanized areas, crop rotation within agriculture, choosing water efficient fixtures, and using clean and renewable forms of energy. Developments find greater challenges when discussed within the context of architecture. There are several examples of famous architecture and architects that have successfully achieved a stable, functional building, as well as executing sustainable practices and models.

I am going to begin by giving examples of specific, sustainably built buildings and what features they implemented that can be applied to other buildings. After I will summarize overall trend examples and what architectural changes can be made within any structure. Sanko Headquarters in Istanbul, Turkey and the Vertical Forest in Milan, Italy both feature aspects of green space lining the inside and outside of the building which help the structure contrast solar radiation rather than having steel or glass reflect the sun's rays. The plants also assist in the buildings humidity and keeping the temperature cooled. Along with purposefully placed greenery, Sanko Headquarters features a void (hole) within its atrium which allows more natural light to penetrate the building, lowering electrical needs. Depending on the climate of an area, a different way that buildings have developed to lower electrical needs is the usage of large balconies and railings to reduce rays entering and the heat they exude, this can be seen at the Beitou Public Library in TaiPei, Taiwan. Another sustainable change architecture has made involving nature is making sure rainwater and local canals have been put to use. Architect Rob Harrison is in large favor of utilizing water as energy and giving it a purpose rather than simply letting rain, for example, go to "waste." Utilization of water can be seen in Beitou Public Library, which uses a rainwater catching system to supply toilets and water indoor plants inside the building. The Museum of Tomorrow, located in Rio de Janeiro, Brazil, also channels water from the local bay to help supply its pools and cool the interior of the attraction.

A feature that almost all the buildings mentioned contain is the use of PV solar panels. Some structures, such as the Pixel Building in Melbourne, Australia, present solar panels that adjust their direction based on where the sun is facing during the day to optimize light energy. Others use stationary solar panels that still function to receive power and electricity throughout the buildings. Two other notable aspects of the Pixel Building are the achievement of net 0

carbon emissions through using technology like beforementioned PV solar panels, along with wind turbines. It also was constructed with concrete that contains half of the embodied carbon that normal concrete uses, making it even more environmentally friendly. For developers and architects that want to get super creative with sources of power, One Angel Square in Manchester, UK, demonstrates a lovely example of growing and using their own rapeseed oil to supply heat and power throughout the building.

All these design examples can be broken into different forms of architectural ideas. Passive sustainable designs such as considering the sun placement when designing window and solar panel placement can help structures reduce their energy needed to function properly. Additionally, taking the climate of an area into account when designing a building can impact what type of structure and features utilized would optimize sustainability. Active sustainable designs are factors that require contractors to develop active forms of sustainability such as implementing high efficiency plumbing, electrical, and HVAC systems throughout the building. These require more architectural and developmental energy to ensure that the systems used are highly sustainable yet efficient to minimize any dead or wasted space. Using renewable energy systems like the wind and solar power previously mentioned also has beneficial sustainable impact. There is less pollution caused by these sources and less damage to the environment as opposed to harvesting oil from the earth or other harmful substances.

Something that can be done when designing and constructing any structure, regardless of energy preferences is using construction materials that are sustainably conscious. The first part of sustainable consciousness, within the context of materials, is the materials themselves. Glen Murcutt, a famous architect, stresses trying to use pieces that are made from recycled materials,

easily renewable materials, and materials that won't have a long-term detrimental impact on the planet. Purchasing materials from companies that also use environmentally responsible practices and techniques is a good way to support sustainably friendly businesses and deter competitors from using unsustainable practices. The final sustainable architectural trend that can be used is paying attention to the native terrain and landscaping being built on. Using plants that are native to that area can lessen irrigation needs and save water and money. Keeping in mind what terrain a building will be on is also important in creating a structure that functions and doesn't damage the area. This is a very important aspect of architect William McDonough who insists that nature lasts longer than any man-made structure, therefore society needs to use nature as a model as opposed to an obstacle. All these factors need to be considered when trying to create a functional, sustainable development.

I would also like to list a few randomized design elements I found very applicable within normal architectural developments. To begin, using sloped windows allow for more light to enter a room and lowers electrical and heating needs. Utilizing cooling towers as a form of A/C is also a common development I read within multiple articles. Additionally, structuring buildings with thicker walls allows for insulation that effects heat and cold retainment. Something that has become highly normalized with building shape is prioritizing height over width to take up less overall space and create more ease when developing active sustainable designs. This optimizes site potential which can be cheaper when purchasing land and salvaging any remaining green space. In cases when dealing with land when a building is already present, trying to retrofit the existing building to be more sustainable, rather than destroying and rebuilding one, can save costs and recycle materials that are already present.

Even with something as seemingly positive as sustainable development, there are challenges. While protecting the environment by lowering emissions and destroying natural habitats and terrain is overall a positive, sometimes it can be hard to implement. There currently are a limited number of strategies society has in place to combat destructive developments. Developers and architects are working harder than ever to create and adopt more strategies towards the goal of a better future for our planet and generation to come. With that being said, some implementations can be costly and timely. Not only is designing sustainable layouts time consuming but sourcing sustainable products/means of production tends to be much more expensive than keeping things quick and unsustainable. This is a challenge we face because many companies still use unfavorable practices and may possibly be put out of business if they do not change the way they function. There is a hard balance between choosing sustainable options, and not putting companies out of business that harming the economy due to their unethical practices. As companies shift towards sustainability this challenge will decrease, however governments and large companies have a lot of red tape surrounding what changes can be made because it can greatly affect their profits. Change needs to occur in favor of sustainability within the elite groups for true sustainability to ever be possible. Once there are multiple, feasible ways to develop sustainably, we can finally reap the benefits of lessened damage to the environment. With less damage to the planet and minimal contribution to global warming, our growing population can find solace in no longer competing for finite resources and enjoy the benefits of recycling materials rather than polluting the earth and landfills. Heightened levels of skin cancer and other forms of cancer will hopefully drop due to the ozone healing itself and less pollution in the air we breathe. The initial raised costs of construction will be worth lowered expenses accrued through electric, sewage, and other HVAC needs. Overall, companies, business, and

even households can save money through choosing sustainable design ideas. As Scott Ceaser voices, nice environments lead to people's happiness which also leads to greater productivity, all of which can be achieved through sustainable development.

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