Urban Heat Island is a phenomenon causing higher than normal temperatures in cities all over the world. On a wider scale, it’s a major contributor to the rising temperature of the Earth. UHI is the absorption, retention, and radiation of heat back into the atmosphere by building materials, pavement, and most surfaces that makeup a city. This issue can be attributed to rapid urbanization, or the migration of people from rural to urban areas. As cities grow and structures and roads are constructed, more and more of these materials add to the surface area able to absorb energy from the sun. The additional heat held in and radiated out by these materials can make cities up to 5.8 degrees hotter than the surrounding suburbs (K. David Pijawka. 2015). In places like Phoenix, where we routinely see 120 degrees on the thermometer in the summer, additional heat can be dangerous, and even deadly.

For many other cities and locations, there are factors that can help mitigate UHI. These include tropical climates, highland locations, being located on or near a coast (which regularly brings in a breeze), higher wind speeds, and increased cloud cover. Unfortunately, none of these apply to Phoenix, aptly nicknamed The Valley of the Sun. The city is surrounded by mountains, in the middle of the desert and sees more sunny days than any other city or metropolitan area in the United States. Because of the surrounding mountains, we rarely see a windy day, we’re nowhere near any major bodies of water, and Phoenix only sits about 1100’ above sea level. In ways, we’ve adapted, by constructing buildings of neutral, light colors to help reflect sunlight. Due to the damage from the sun, we tend to steer clear from plastics and painted surfaces as they tend to crack, fade or peel and require extra maintenance. This unfortunately leaves us with very few options for construction materials that stand up to the extreme desert environment. Most buildings are made of brick, concrete and/or coated in stucco. Roofs consist of clay tiles and fences are made of concrete blocks. These are all materials that absorb and retain high amounts of heat. All of the above factors contribute to Phoenix being very susceptible to the threats of Urban Heat Island.

In the past few decades or so, we’ve started to realize the effects of rapid urbanization, building practices and urban sprawl of the United States over the past century. Urban Heat Island has only recently been recognized as a term and formal studies on it are now coming to fruition as we’ve had the ability to study extended periods of time. Because of this, options for mitigation are finally being perfected. Arizona State University is leading the field in research with the largest Sustainability program in the nation. *(quote from asu page).* Due to their groundbreaking research, sustainable materials meant to lessen the effects of UHI have started to make it into mainstream building practices, though not on as wide a scale as what is necessary to see change. As the temperature of the Earth continues to warm, so too will major metropolitan areas, leading to many problems, most urgently being the heat-related deaths of citizens. We need to start making changes… *(working on transitioning to the next paragraph)*

Biophilic Design is an option for combatting Urban Heat Island. This method of design utilizes the addition of green features such as plants and water features to existing architecture. Things like rooftop gardens and living walls create a cover for roofs and walls. It stops sunlight and heat from being absorbed by a building, and instead gets absorbed by plants. The plants convert the light into food, and the soil insulates buildings, resulting in lower indoor temperatures. While Biophilic Design can make a great impact, from both an environmental and a design standpoint, it can take a lot of work to save a little. While this may help with a select few buildings, it’s not feasible to integrate these features into every single building. While it’s a great option, Biophilic Design alone will never stop Urban Heat Island.

Park Cool Island is the opposite of Urban Heat Island, and is the effect of lower temperatures associated with areas of cities that have integrated parks, lakes and open areas. When cities were first developing, we found out that lack of open spaces led to disease and sickness, and it was determined that addition of these features could provide the ability to move fresh air through a city. In modern times, it still works the same. Open areas allow air to move, meaning less hot air trapped in cities. However, a city isn’t a city if it’s all parkland. Similar to Biophilic Design, the amount of space needed to make Park Cool Island happen just isn’t available to a feasible option.

In addition to the previous alternative solutions, both seek to change the way that cities are laid out. Unless something in American changes in a major way, citizens aren’t going to stop building homes and cities aren’t going to stop expanding. Why not make the building process better? Making development more environmentally sustainable with changes to the materials that are used is key to mitigating UHI. The best option for combatting this problem is with the integration of sustainable materials that have been developed specifically to stop the absorption of heat. These include special concrete that has white particles mixed in, *(will compile a list of specific building materials). These* materials allow structures to be built as they normally would, just with different materials.

While there are obvious concerns with these changes, there are ways to make them with the least negative effects possible. The first, and largest issue is obviously cost. Brand new materials will cost more than traditional materials. This can be alleviated by implementing the changes in stages, similar to many other environmental laws and regulations. Another example could be regarding new developments. These materials can initially be offered as options for builders to pick from, and as time goes on, the traditional materials can be phased out. Another issue could be design and the appearance of the materials. As time passes, more and more options will be come available.

*(Working on a way to transition into the closing)*

With the most developed Sustainability program backed by research from a major university, in a city with some of the highest temperatures in the United States, can we really afford to not make these changes?

Bibliography

The Town of Gilbert Planning Commission. (2006, June 15). *Brochure on the Use of Cool Pavements to Reduce The Urban Heat Island Effect.* Retrieved from https://www.gilbertaz.gov/departments/development-services/planning-development/urban-heat-island

Julie Ann Wrigley Global Institute of Sustainability. ASU National Center of Excellence on Smart Innovations. Retrieved from https://ncesmart.asu.edu

United States Environmental Protection Agency. (2016, Aug 12). *Heat Island Cooling Strategies*. Retrieved from https://www.epa.gov/heat-islands/heat-island-cooling-strategies and https://www.epa.gov/heat-islands/adapting-heat

Baard, Erik. Beghtol, L. D. (2007, May 16). The Village Voice. *The Dark Side of Summer.* Pages 80, 82, 84. Retrieved from https://search-proquest-com.ezproxy1.lib.asu.edu/altpresswatch/docview/232292502/4B02A054BA684BDAPQ/4?accountid=4485

*\*\*Still working on integrating quotes from these sources and the multimodal component.*