THE PHILOSOPHY OF SUSTAINABLE CITY DESIGN

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ABSTRACT

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Sustainable cities are not only a desirable future but a necessary one yet we still haven't achieved fully sustainable cities. We have the technological and economic means to create sustainable cities but attempts like Masdar City in the United Arab Emirates have failed to meet their potential. To create a sustainable city we also need to have harmony between the three E's of sustainability: environment, economy, and equity. The most essential element of sustainability isn't one of these E's though, it is community. Community is the thing that holds these principles together and without it, a city cannot succeed. We need more than just a successful community though, we need sustainable design to support the community and vise-versa.

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Chapter 1: Introduction

Sustainability as a word simplifies the incredibly complicated field of supporting our world, communities, food production, energy production, and much more. In the purest form, you can define it as the act of sustaining ourselves. While that might seem simple, it gives us a good jumping-off point for answering what sustainability is. Over time we have made sustaining ourselves easier in some ways while also making it difficult in others, if not impossible. We commonly associate sustainability with climate change and frequently think of it as a solution to climate change. This is because climate change is making it more and more difficult for us to sustain ourselves. At this point, it is important to ask the simple question of why we haven't "fixed" climate change if it is making it so that we are not able to sustain ourselves; in fact we have the technological and economic means to mitigate the harm of climate change so that we can still sustain ourselves.

Cities are complex systems because of the number of moving parts and the inhabitants. The communities that make up a city might be the solution to the lack of successful sustainability. At their core, communities are the people who inhabit the city and the city itself. The idea of a community is complex because it encompasses a number of groups. Without a sense of community, a city would simply be a collection of people living in an area. There are a lot of problems and solutions in sustainability but connecting solutions to problems seems to remain difficult. Communities can provide support for those who cannot advocate for themselves. Another beneficial element of communities is the moral responsibility it can necessitate, individuals who live together and participate in activities or work together can feel a

responsibility to act in certain ways if they would benefit those close to them. The biggest

obstacle to this would then be how to encourage or develop communities.

The scientific debate over climate change that largely started in the 80's has generally

come to a consensus that climate change does exist. Scientists have the science to back it up and

are aware of at least some of the impact that it is already having on our environment. The biggest

question to be asking about the environment as far as sustainability is concerned now is if and

how to address the climate change issue that currently exists and which will continue to get

worse. At current emission rates, we are looking at a temperature rise of between 8 and 10

degrees by 2100. This might sound fine but a temperature rise of this amount would lead to the

death of roughly 95% of the world's population. On top of this, a temperature rise of even 1.5

degrees Celsius would have massive effects (NASA). All is not lost, the emissions problem can

be fixed but action needs to be taken soon. The technological, economic, and equitable means of

solving climate change issues exist but implementation needs to happen immediately. This

requires massive changes to food production, built environment, and community efforts.

How will cities now and going forward need to operate, build, and support their systems

to be entirely sustainable? This will be the main question in this chapter. This focus is

specifically on the interaction between the environment, economy, equity, and community. The

basis of the question is how these different elements can best work together successfully. Even

more complex is the question of how they can have the ability to morph and adapt as technology,

architecture, and culture changes. It is easy to focus on one of the pieces of sustainability and it is

important to do so but we also must look at how the different pieces work together. This is akin

to working on different pieces of a rocket without ever looking at how they will fit together; if you don't think about the interaction of the separate parts the result will be a failure.

Philosophy has an intrinsic and inseparable connection to cities and communities. Philosophy tends to be shoehorned into a very specific field, but I look at philosophy, at its core, as a set of beliefs or rules that define the way people look at something, act, or interact. The subtitle under this is "Finding the Harmonious Element of Sustainability." Cutting straight to the core of what I want to examine in my thesis, the interaction between environment, economy, equity, and community. It is really easy to view each of those pieces separately or even two of them at the same time, but to figure out how they all work together is both integral to the functioning of sustainable cities and incredibly difficult. Philosophy is important also with the focus on ethics in relation to how we treat people, future generations, and our environment. This is everything from the treatment of workers in factories to the emergence of slums in cities to the ethical treatment of animals. The most important part of a sustainable city is a successful community due to the ability it has for providing moral incentives, collective action, and advocacy.

This brings up the question of what a community is and how one is created, though I wouldn't say it is something that is created as much as it is something that is fostered. Let's look at the city of Austin as an example. The city of Austin developed over time from its western roots to hippie central in the 70's and 80's to one of the biggest tech cities in America today. But it is that course development that nurtured the community that exists in Austin today. It developed over time and with that development formed a sense of place that people have an attachment to whether they grew up there or moved there and found themselves accepted into a

shared history that the people of Austin hold. In his book on Austin, William Swearingen says,

"The land and the times shaped the people. The people and their times shaped a city. And

modern Austin–its look, its feel, its landscape, its meaning–was created in that crucible where

the environment and the economy and the people met to practice politics" (Swearingen 8). If

community is something that takes time to develop then the question to ask is how to foster that

and install a community into spaces that lack one. Well, this is where design comes into play.

Austin doesn't just have community because there are people here and the city has changed over

time. The city has a community because of the spaces that the people inhabit and the connections

they make to those places as well as the connections that they have to those places themselves.

Areas in Austin like Barton Springs, Zilker Park, and the Green Belt give the residents spaces

that they all feel connected to and feel like they have a stake in, even if it is not a monetary stake.

It also gives people a space to meet new people, spend time, etc. However, the problem with this

is that as Austin has grown, more and more suburbs have developed and created areas that

discourage community rather than foster it. This is a topic that is discussed at length in an article

by Vikas Mehta who says, "At present there is a renewed interest in urban living and public

space. Although preference for suburban living has not waned in the West (particularly in North

America), and is gaining popularity around the world, many groups deem centre-city living

desirable" (Mehta). The conclusion of this article is essentially that suburbs are pushing us

further away but luckily people are becoming more and more attracted to living in the center of

cities whether it be for a shorter commute or needing to care for less. This is evident in Austin

with new policies like Code Next which keep popping up wanting to shift the house code to

focus more on smaller plots of land with more developments.

(dszc, City of Austin)

So, what does this mean for sustainability? A lot, when people are sharing spaces more and living closer together, they have more invested interest in forming communities with each other (Mehta). This type of living also does two direct things for sustainability, it can help cut down on power usage when you switch to smaller homes and it gives people more of a moral responsibility to treat the environment around them with more care out of respect to their neighbors. You don't see this as much in communities like Circle C because you can completely ignore your neighbors and put up a fence around yourself. When you have a responsibility to others it gives people more of a feeling of needing to do the "right thing," this is also due to herd mentality. We do have an ethical responsibility to others, whether people choose to pay attention to it or not. On a large scale, first world countries are the biggest polluters to our environment but

they also are the countries that bear the least of the impact. Though countries like America are

polluting the most, the least affluent nations are the ones that are unable to afford environmental

protection and mitigation. Food production issues in America can easily be mitigated by buying

from other countries yet other countries do not always have the funds to do the same. This also

creates more apparent class divides within these countries. On the local level, similar issues start

to emerge. For carbon emissions, if the city puts in place regulations that prohibit non-electric

vehicles then it will greatly disadvantage low-income individuals who are not able to afford

electric vehicles. A solution to this problem is improving our public transportation but this would

cause taxes to go up which could then push the same individuals further and further from

downtown. It is important to also consider these class divides as they pertain to the present but

also the future, in his article on Ethics in sustainability Anup Sinha says that

> For sustainable development, a reasonable degree of intra-generational equality would be
> necessary. In situations of extreme inequality the poor may be so desperate that they
> would unlikely be able to afford to think about the future to conserve resources and pass
> on adequate stocks to future generations. On the other hand, the very rich will continue to
> remain rich even if the current generation bequeaths only, say about half of its resources
> to the future generations. (Sinha)

It is easy to ignore the future and simply not take into consideration the effects our actions will

have on future generations but it is necessary that we consider this. Currently, the middle class

still has a say in what happens but in the future, it is very possible that the extremely rich will

control countries entirely. It is our responsibility to currently be pushing for changes. This is

where equity comes up in sustainability and it is important to be weighing all of our solutions

with the perspective of how this will affect different people. But, if you live in a community like

Circle C, you don't see those less affluent people. You don't walk by them on the street, swim

with them at the same pool, ride with them on public transportation, or sit next to them on a

bench. You don't even have to acknowledge their existence. This lacks the fundamental

democratization that is necessary for sustainability.
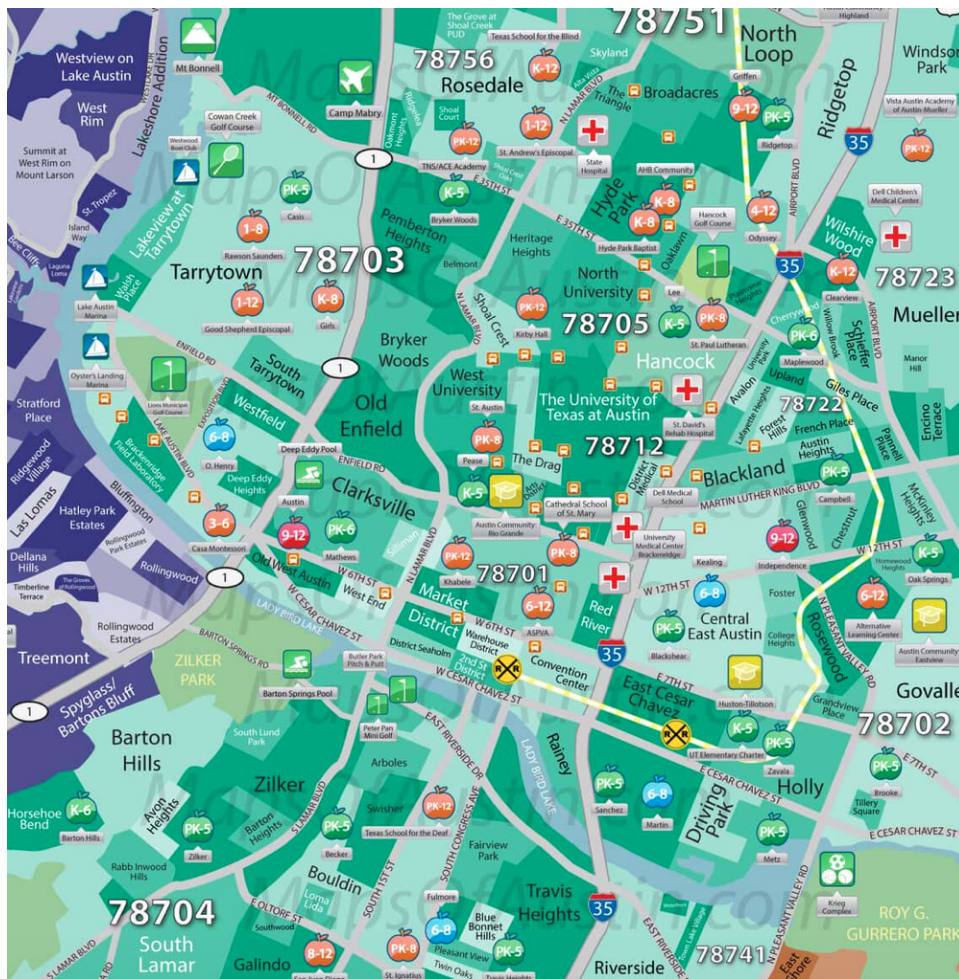
(Maps of Austin, Austin Neighborhood Map)

There is an interesting dividing of people within communities. As discussed in Swearingen's book, there is a large community known as Austin. Communities such as Austin have grown and changed over time but remain a collective in their own right. But there are also subdivisions within Austin: North Austin, South Austin, East Austin, and West Austin. Neighborhoods within those broad areas: Clarksville, Travis Heights, Hyde Park, and Govalle just to name a few. But each of those communities, ideally, feels a connection to Austin as a whole whether that be that they vote in Austin elections, go to large public spaces like Barton Springs, or attend local festivals. Members of those neighborhoods might identify as both a member of the greater Austin community and their neighborhood community and many more, whether it be their church or their local poker club. Swearingen says that,

> It wasn't just the physical environment that did so much to define our lives growing up in Austin. It was the music, the more liberal culture, the laid-back feel of the place. I grew up watching Willie Nelson play and sing at events; we learned what marijuana smelled like by walking past the performers' tents…I sat on the side of the stage at free outdoor music concerts where Stevie Ray Vaughan taught us about blues music. (Swearingen 11)

But the version of Austin that Swearingen grew up in was defined by the spaces that intertwined parts of the city together, the parks, the streets, the clubs, the life of the city. Without those places, Austin wouldn't have been able to create such a community identity that people today tell people when traveling that they are "an Austinite." You cannot ignore those small communities. Mehta talks about the importance of evaluating the needs of those communities and deciding

what are the necessary public spaces for each area. He says, "there is no denying that even within the North American context, different regions and cities (and even parts of cities) have their own cultures and subcultures. Evaluating public spaces in such contexts must take into account the possible changing need and focus on aspects of public space" (Mehta). If there is a neighborhood like Clarksville that tends to have older couples, then the city needs to include public parks. In up and coming neighborhoods on the Eastside have a lot of younger couples with kids, then the city needs public swimming pools and playgrounds. Without those spaces, the neighborhood doesn't care for its inhabitants.

With the traditional three-legged stool that researchers tend to talk about with sustainability, there is the 3 E's, environment, economy, and equity. These are the core principles that support sustainability and that people need to use in designing cities but at the core of those three principles is community. It would be better to think of a four-legged stool, after all, wouldn't you rather stand on a four-legged stool to change a lightbulb? It is a more stable model. Community is important in sustainability because it gives us the fundamental reasons for sustainability and it gives us the means of developing sustainable solutions. Communities allow people to interact and give them a sense of who they are but also give them a sense of obligation to others around them. The best way to foster that community is to develop spaces for people to inhabit, to foster neighborhoods and connections within them, and to foster design elements in cities to develop communities more and separate people out less.

Chapter 2: Sustainable Communities

Sustainability can be defined simply as the act of sustaining ourselves and one of the largest drivers of successful sustainability are the groups of communities that form. The subdividing of people out into groups allows for people living in a city to not become isolated and also allows those individuals to form an identity as part of a group. The groups can also encourage individuals to act with the group in mind. This can be great for the individuals in said groups but can fall apart when you have many different groups in a city due to disagreements. Groups also help with the advocacy of policies that might be beneficial for them.

The most fundamental group in a city is the city itself, in a city like Austin, Texas, that group is called Austinites. There is an identity that is formed as being a part of that group just by living within that city, working in that city, shopping in the stores in that city, and interacting with individuals in that city. Residents of Austin get to vote in local elections and on local policies. And residents have a stake in the city itself because they inhabit it and a change in the structure of the city, physical or metaphorical, could affect them. Whether someone lives in North Austin, South Austin, Downtown, or the Eastside, they are a member of the greater community that is Austin and might participate in that community by voting, taking part in music festivals, or going to the Public Library.

Though there is a divide within Austin of Central, North, South, East, or West, that is less important than that of neighborhoods. In her 2018 book, *Neighborhood,* Emily Talen explains that the word neighborhood partially originates from a "1425 reference to "myn neghebores," but that is a group of people rather than an actual place" (Talen 64). This is an important distinction because it is common to think of neighborhoods as things\. If the thought of these

places as being a grouping of people was completely removed, there would be very little

distinction between neighborhoods in a city. Possibly just a main road separating them or a

certain architectural style. This is what is at the center of neighborhoods and why they are so

important to sustainable cities, despite the fact that many people take them for granted now as

they have become the location of your house rather than the place that you live and the people to

interact with. And interestingly, ancient cities themselves have "been described as clusters of

neighborhoods" (Talen 64).

Neighborhoods frequently have their own rules and regulations. These allow for local

political interaction on a more personal level than even city politics, as there are neighborhood

boards that create the regulations of the neighborhoods. And these regulations go beyond

beautification rules into historic preservation projects, speed limit restrictions, etc. Talen

provides a useful list of advantages provided by local regulations within neighborhoods:

> The self-governed and self-managed neighborhood controls its own destiny.
> Theoretically this provides four advantages: efficiency (because of decentralization and
> subsidiarity), accountability (via greater transparency since local residents are closer to
> the issues), familiarity (which improves resident interaction and effectiveness at getting
> things done), and convenience (thus giving neighborhoods instant relevance). (Talen
> 160)

These advantages are particularly of interest to the field of sustainability because of the nature of

self containment. If a neighborhood is able to self-regulate and control itself then it is simply not

relying on other areas and regulatory bodies as heavily. This goes back to the definition of sustainability, these neighborhoods are able to sustain themselves regarding regulation. The direct interaction allows for residents to feel responsible for their neighborhood. The neighborhood was intended to be more of a village inside of a city that is purely a part of a city or a standalone living space. One interesting observation that has been made about community engagement within cities is that "neighborhood activism has tended to play out as a strategy for poor neighborhoods or a strategy for rich ones" (Talen 175). Which interestingly are the two types of neighborhoods that might form the deepest bonds due to similarities in the community and a common interest in either making their neighborhood better or keeping their neighborhood the same. It is as opposed to middle-class neighborhoods which might not fight for one thing or another because they lack a drive, they are neither a Goliath nor a David.

Community events within these neighborhoods also create a sense of camaraderie with block parties and park events. These allow for bonding between neighbors and smaller communities. But there is a disconnect "between ideals about communal spirit and the reality of urban life" (Talen 181). It is easy for us to speculate that individuals in a community will have events and participate in community activities but the realities of life mean that that is not always realistic, especially in more impoverished communities. This led to the rise of community centers to operate as a "local meeting place or center embedded in a neighborhood" (Talen 182). This operates as a resource for the community rather than putting the burden of creating a space within their own houses or blocks.

Neighborhoods also create a reliance on others within the community. Neighbors have different tiers, and this can be seen in our own lives; there are the people we live near that we

might nod at when we are on a walk, there are those that we might have a quick conversation with when we take out the trash, or there are those that we might have over for dinner and interact with on a regular basis. Neighbors also provide knowledge, connections, etc. "If older adults moved into the neighborhood, triggering a change in their 'role setting,' neighbors became especially important as a source of knowledge, help, and social contact" (Talen 193). Proximity increases social interactions and individuals tend to be friends with those who they are physically closest to. Yet, this has declined slowly with the rise of automobiles, this has led to the idea that "the neighborhood is to be designed *in spite of* the automobile" (Talen 202). In recent years this has been combated with self-sufficiency by building schools, shopping centers, and businesses within neighborhoods to create more of a self-contained environment. More neighboring and neighbor interactions come out of this containment. This is shown when keeping the neighborhood safe by communicating with others when a robbery happens or by hosting a playdate at your house. People form a reliance on others around them, to help take care of their kids and protect themselves when they primarily exist in a select space. Though most people don't think about it like this anymore because they think about themselves as being more evolved, there is still an animal part of people that relies on others to help provide themselves with food, protection, and childcare. These people are now called grocers, police, and babysitters, but people rely on them just as much as their ancestors.

Within cities people also are parts of social groups, these groups have been around before civilization though tribes and clans. Even within those tribes and clans there was the group that hunted together for the tribe, those that gathered food for the tribe, those that made clothing for the tribe, etc. Modern neighborhoods can be social groups themselves but these are just one of

many modern social groups and though people may use the term social group frequently, most might not have a real understanding of what that term means, yet people rely on those around them for support entertainment. A social group could be friends to go out drinking with, the people to work with, the parents of the friends your child makes, or the congregation at your local church. And the activities that people participate in with those people define our lives, "we go to bars and restaurants, we study together in schools, and we work together on production lines and in businesses" (Stangor).

Groups give a sense of belonging and provide individuals with the people they interact with. These are the people that they ask for help from but they are also those that give them a sense of who they are, "social category memberships can be important as a source of pride, comfort, and friendship" (Stangor). These social groups can be broken down into categories, necessary groups, useful groups, and enjoyable groups. Necessary groups might be the people that they work with at their job, though it is possible that they just don't participate in that group. It is a necessary part of most jobs, you need to interact with the other people at your company, firm, store, etc…for the business to successfully operate. Useful groups are those such as a church, school board, or neighborhood association. They are not necessary but they provide a use in our daily lives and also help connect people socially. They are not exactly for fun, they serve a purpose and that purpose gives us a unity behind an initiative or project. Fun groups are groups like a weekly poker game, sandlot baseball team, or book club. These groups provide a social connection that provides entertainment and enjoyment. It provides a stable connection to a group of people to enjoy participating in a common interest. Groups at their core provide comfort and

safety. While we don't require the protections that we once did, we still rely on these people to support us emotionally, financially, and even physically through hard times.

> The earliest human beings lived a nomadic life, moving regularly from place to place in search of food, hunting and eating together in small groups. Since then, as the number of people on the planet has increased, the life of human beings has also become more complex…all of the most important human achievements, from the building of the Pyramids in Egypt to the development of the Internet have been achieved through the cooperation of groups. (Stangor)

The groups that people form or become a part of interact with other groups, whether that is another baseball team or a government, these are all just different categorizations of groups. And they are an essential underpinning of everyday life.

Community ties are crucial to the efficacy of a community or group, people need to have some kind of connection, reliance, or direct tie in order for them to feel truly a part of a group. A very simple form of this is just a family; a child feels tied to their family because generational bonds, reliance, and frequent direct connections, "the family provides the most safety and security, and this is provided at a time when we are most vulnerable—as infants and children" (Stangor). The child is tied to their family through some kind of heritage connection to past generations. There is a certain level of responsibility to the other members of the family that extends beyond emotions and into historical connections. Children also rely on their parents and

other family members from birth and this reliance creates both a sense of responsibility in reciprocation and also a base established reliance.

Community ties can be seen in all aspects of communities though. Social support from others is a crucial part of our existence and is something we interact with on a daily basis whether we realize it or not, "we feel loved and cared for, esteemed and valued, and part of a network of important others. People with social support can turn to their support networks when they face difficulties, and these groups have substantial positive influence on mental and physical health" (Stangor).

These social groups also have a significant influence on policies. Social groups influence policies by volunteering, engaging others, etc. And we rely on these group so that we ourselves can have an influence that which we care about, "we frequently use working groups to make important decisions, both because we think that these decisions will be better than those that we make alone and because the group can be useful in assuring that the decisions are properly implemented" (Stangor). It is not just that we are part of a group and others in that group happen to be pushing for a similar change, it's that the sway of a whole group working in tandem is more powerful than an individual. This engagement comes up in many parts of life, "we may use groups to help others, as when we join a political party or volunteer in the Peace Corps in order to work toward positive social changes" (Stangor). This is not to say that individuals in a group don't disagree, this is something that not only happens frequently but is almost guaranteed to happen. It is not exactly a bad thing for people to disagree, sometimes this kind of collaboration is a good way of pushing us to think outside the box and come up with new ideas. It is a

compromise though and there is endless debate on how much benefit this compromise provides. Nevertheless, this influence ties groups together.

At its core, our social infrastructure has the idea of our social identity, the feeling that we belong to something. Though this concept is theoretically easy to understand, it can be hard for us to understand this in practicality due to the haziness of everyday life. We don't necessarily think about the people at our job, in our neighborhood, or who shop at the same grocery store as us, as a group. These are just parts of our everyday life. The odd part about us is that this is what we build our own identity around, "Social Identity is defined as the part of the self-concept that results from our membership in social groups" (Stangor). We form our idea of who we are based on the neighborhood that we live in, the job that we have, and the stores that we shop at. We also pride ourselves on the people that we surround ourselves, we get to pick who we are based on the people we want/get to be around. "Social identity might be seen as a tendency on the part of the individual to talk positively about the group to others, a general enjoyment of being part of the group, and a feeling of pride that comes from group membership" (Stangor). And this pride or enjoyment is what makes a group work and be sustainable. We need to have either a pride or enjoyment or necessity of the group in-order for us to want to remain a part of the group and for the group itself to continue to grow and expand. One caveat or problem with groups and the sustainability of groups that we need to mention is a possible lack of diversity.

But strong neighborhood identity could also coincide with forced social separation. The most conspicuous example is the Jewish ghetto, first established in Venice in 1516, and a few decades later in Rome. The term "ghetto" later became the word used for any Jewish

neighborhood in Europe, and later of course it came to mean the segregated realm of poor

African Americans. (Talen 64)

 Whether it be that you live in a rich neighborhood or a poor neighborhood, it is likely that the

people who are around you are somewhat similar to you. This principle extends to work, the

places you shop, and even the clubs we are a part of. This lack of diversity is also, sadly, one of

the things that might make a group more successful due to the support that you could provide to

someone who thinks the same way you do.

It is important to understand how individuals are viewed by their government because the

success or failure of a government informs the creation or need for a certain social group. The

infrastructure that is built by a government also influences social interactions. If a government

designs public spaces in a city to encourage social interaction, then an individual doesn't have

the same challenges in finding a social group. Another simple example is a government that

provides free maternity leave and childcare, Denmark is a country that is leading the charge in

this. In a USNews article entitled *Denmark's Model: Quality Living, With Benefits*, Christopher

F. Schuetze explains that "maternity or paternity leave — parents can decide to split it up — is a

full year. Nurseries and then schools are both guaranteed and paid for by the municipality"

(Schuetze). Going back to our previous discussion on the need in ancient tribes for people to help

take care of the child, if the government is providing both time for the parents to raise their

children and support once they go back to work, the parents don't need to seek support in their

communities. In this case, community becomes more fun than necessary. And this is not the only

case of this in Denmark, we can see the support that Denmark gives its citizens and this support

shows us how valued it believes its individuals are.

> University education is tuition free and students can apply for living expenses. Families
>
> with children receive a generous allowance, regardless of income level. Even elderly
>
> care, such as senior centers, adapted transport and meals-on-wheels programs are paid for
>
> by the state. (Schuetze)

These benefits don't only provide citizens with an easier life and substantial support, they force

citizens into a completely different type of group. They allow for citizens to develop more

socially instead of fighting for survival.

      Citizens that have the kind of freedom that those in Denmark have are able to develop

into sustainable lifestyles. The ability to not focus on daily needs like student debt, healthcare, or

childcare, allows for them to focus on sustainability efforts. There has previously been a thought

that a "social shift is needed where people should be more concerned with 'being' rather than the

consumerist 'to have,'" (Winter). I would argue that the movements and changes that have been

seen in recent years in countries like Denmark have created this social shift. The pure freeing up

of time and resources have left a void and sustainability has been one of the things to fill that

void. This also gives rise to socially oriented sustainability, when you have a large group of

people in a city or country that are pursuing sustainability then a social element is introduced into

the picture. There can be a desire from people to practice a sustainable lifestyle in-order to be a

part of a group but this also creates some class divides. Even though Denmark supports its

citizens through reliefs, there are still differences in people's earning and living possibilities. Sustainability goals in a city push areas of the city to develop more sustainable practices and force the residents in those areas to change their lifestyles and physical environments but there are consequences that can be overlooked. Individuals who can not afford to adjust their lives to a more sustainable model or who cannot afford to set up solar panels or other sustainable solution might be pushed out of those areas. This can be combated by government funding for more impoverished residents but this does require substantial funds. Another possible problem is that the desire to achieve a certain level of sustainability might simply push out those who cannot meet those requirements and this might be a desirable effect for the city. This causes "the deportation of marginalized inner-city residents who do not fit in the disneyesque creative city' as policies often legitimize 'the need to cater to the 'economically sustainable population' in order to better compete on a global scale'" It allows a city like Copenhagen to become the sustainable capital of the world but to become that they push out all of the residents who don't meet that standard.

(Baan, The Red Square)

We talked about public spaces inside of cities and neighborhoods as places but what does

this look like beyond a community center? Public space helps sustain the communities they exist

in and helps foster more connection in these spaces. Public parks are one of the most useful

examples of this. In an article focusing on public space in Tampa, Florida, Vikas Mehta explains

that "while modern societies no longer depend on the town square or the piazza for basic needs,

good public space is required for the social and psychological health of modern communities"

(Mehta). Parks are a democratized space, people from all different classes use and share the

space. The public nature of a park allows communities to feel less segregated and more unified,

"it is an arena for the collective voice and shared interests, but is also the space where the

differences and conflicts of various groups play out" (Mehta). Parks also create a sense of

common interest in communities. If you have a shared public space in a neighborhood then

everyone in that neighborhood can feel as though the park belongs to them and that creates a collective sense of ownership. This allows for community building and strengthening. The shared responsibility that a group feels towards a space can force the individuals to come together for the collective interest of the park. These are only a few ways of thinking about the importance of public spaces, the importance of public spaces appears throughout different fields.

> Urban designers, landscape architects, architects and planners primarily think of it as physical space and are often concerned with the relationship between people and space; urban sociologists discuss public space in the context of social dynamics; geographers and political scientists are concerned with public space in the context of civil society and the rights of individuals and groups. (Mehta)

Public spaces like parks can define neighborhoods and cities since they can beautify the spaces and build community at the same time. As we previously discussed, when a neighborhood lacks any real public space, it burdens the residents with organizing events or inviting others over to their spaces. When you have public spaces though, it creates a space for spontaneous interaction and as a result creates more community.

The interaction between sustainable lifestyles and social groups creates the incentive of a moral responsibility towards others in your community. There is a "moral dimension that, as I will show, often conventionally focuses on the environmental pillar of sustainability and involves calculations, footprints, and eco-technologies" (Winter). There are two general forms of a sustainable lifestyle: transferring your current life into a sustainable form or living with less.

The former doesn't really necessitate a moral responsibility towards others, you don't need to be thinking about your responsibility because you can simply be acting based on the possible personal benefits that could come out of switching to sustainable resources. These benefits could be a healthier lifestyle, more affordable energy, or the simple satisfaction of knowing you are helping the environment. Living with less can have these same drivers but without the luxury component. There is an implicit moral reliability that comes out of areas of sustainable societies. Whether it be the feeling that others might not have the same privilege to live with less, the moral obligation you have towards future generations, or the judgement you might experience from others who are practicing sustainability. There is a moral responsibility that underlies all of these.

Communities, whether they be social groups or neighborhoods, are central to society as we know it today. We might not always be aware of these communities but they exist none-the-less and we need to be aware of them if we are to create a sustainable city. Social groups allow for fun, support, and camaraderie. Throughout this chapter we have seen the effects that building a sustainable society would have on the communities we have discussed, the influence that these social groups have on policy is also an integral part of building a sustainable city. And changes in our societal structure are necessary for these communities to evolve towards sustainability, no matter the consequences of those changes. There is a feedback loop that is created in systems like these. The policies that social groups advocate for influence the social group itself and other groups in the same area. This is necessary for the success of a sustainable city as this feedback loop allows for the city to evolve and change with the input of its residents.

Chapter 3: Failures and Successes in Sustainable Cities

When the construction of Masdar City was announced to be underway in 2006 it was one of the first fully sustainable city plans to be enacted. The city was planned to be completed in eight years, had a projected cost of $22 billion, and an ambitious water and energy plan, "water will be provided through a solar-powered desalination plant, Masdar says. The city will need a quarter of the power required for a similar sized community, while its water needs will be 60% lower" (BBC). Renewable energy company Masdar, also known as Abu Dhabi Future Energy Company, began developing Masdar city on a plot of land located in the desert close to Abu Dhabi.

(Foster + Partners, Masdar Master Plan Model).

The origins of Masdar City, ironically, come from the oil and gas industry. Abu Dhabi became financially significant through these non-clean energy industries and "has the fifth-largest proven oil reserves (about 9% of the world's reserves) and the sixth-largest natural gas

reserves (about 5%)" (Shahan). The city was a way of diversifying income through clean energy. With the government of Abu Dhabi aware of the dwindling supply of oil and gas as well as the need for sustainable energy with climate change, Masdar was a decent outlet for the government to sink some $15 billion into.

The city was planned to be a little over two square miles and would house residential buildings, businesses, and schools including its first tenant, Masdar Institute of Science and Technology. The architectural elements of the city are interesting, featuring walls that surround the city and help control the temperature of the city. The location of Masdar is due to the simple availability of land in the desert vs. the already developed coast. And though the location of a desolate desert allowed for a completely new environment to be created, the sand also created structural challenges which slowed construction.

Another city that is leading the charge in sustainability is Copenhagen, Denmark, the government is developing a sustainable city in a very different way than Masdar. From what started as a small town, Copenhagen became the capital of Denmark in the 15th century, Copenhagen has grown to be 69 square miles and house a population of almost 2.4 million as of 2020. The city is the economic hub of Denmark, producing almost half of the nation's GDP. The city has numerous universities and hosts over 35,000 students, which is almost the target population for a fully developed Masdar.

Copenhagen has been called the "green capital of the world" due to its sustainability initiatives and encouragement of sustainable lifestyles. In 2001, Copenhagen initially installed 20 windmills just off its coast, at the time this was the largest offshore wind farm and it was Copenhagen's first large scale sustainability project. Upon its completion, the wind project

supplied Copenhagen with 4% of its energy. In 2007 Copenhagen published its "City

Development Strategy Paper 2007", which essentially laid out a smart and sustainable growth

plan. Their commitment to sustainability has resulted from the combined efforts of the

government and the residents of the city.

> Since 1990, Copenhageners have reduced their CO2 emissions by 25%, primarily as a
>
> result of the operation of the use of cleaner fuels and the efficiency of its district heating
>
> system. Equally impressive, 90% of building waste is reused and 34% of Copenhagen's
>
> workforce bicycles to work. (OECD 181)

Copenhagen is doing well at supporting sustainable practices in fields like transportation,

sustainable buildings, and energy productions but that is only in relation to other major cities.

Copenhagen has plenty of room to improve but it is doing better than most cities.

Renewable energies in sustainable cities are crucial to their success and that energy

production either needs to be self-contained in the city or needs to be coming from a sustainable

source that is financially viable, ideally for an indefinite period of time. Masdar wanted to

become the biggest clean energy producer in the world. With Abu Dhabi already being one of

the biggest producers of oil and gas, Masdar wanted to carry on that tradition into clean energy.

In "Masdar — Manufactured Silicon Valley Of Cleantech?" Zachary Shahan elaborates that,

"Masdar Clean Energy is focused on actually deploying clean energy projects in the region. It

has invested in many of the largest cleantech projects in the world — such as the London Array,

which will be the world's largest wind farm once completed" (Shahan).
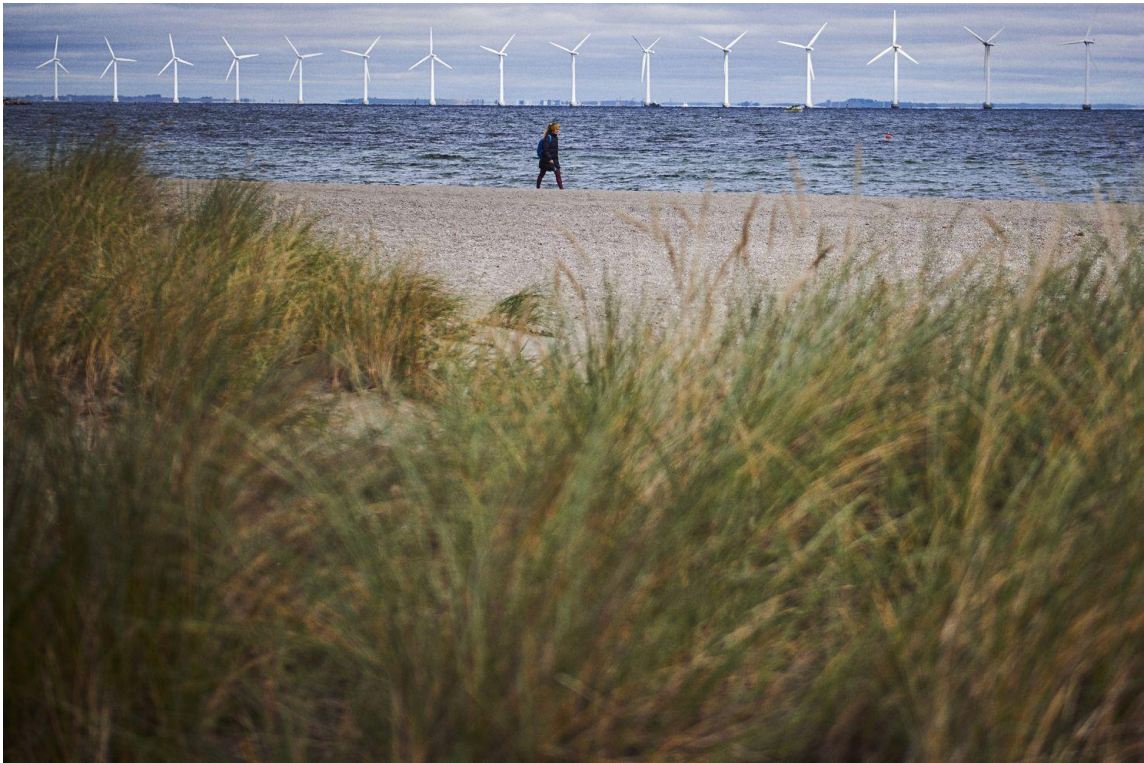
(Svane, Copenhagen Windmill Farm).

  Copenhagen uses wind turbines as its primary green energy producer, this still only constitutes 18% of energy currently. The green energy was due largely to "tax breaks on capital investment, mandated targets, preferential pricing and a ban on nuclear power generation" (OECD 99). Copenhagen has also expressed interest in "green-collar" jobs, essentially jobs in renewable energy industries. Denmark currently "controls 35% of the world market" on wind turbines (OECD 182). On September 15, 2019, Copenhagen produced enough power via windmills to power Denmark for a 24 hour period. This is a remarkable milestone because it could indicate a path to zero-carbon emissions in Copenhagen's energy sector. And this wasn't including other possible renewable energies such as solar or nuclear. One of the most recent power suppliers for Copenhagen is Copenhill, a power plant that doubles as a year-round ski slope. The power plant uses waste to create energy and provides tens of thousands of homes with

power. This is also the largest waste to energy power plant that currently exists, capable of

burning 440,000 tons of waste every year.

(Ghinitoiu, Copenhill).

Due to its location, Masdar has issues with natural resources. Though the area has

become a large exporter of oil and gas, it lacks resources like water. With its growing population,

especially from foreign workers moving to the area, this is going to be an increasing issue.

Federico Cugurullo reports that "Over 90% of groundwater in Abu Dhabi is saline and the

remaining percentage is not enough to sustain the growing urban population of the emirate"

(Cugurullo). This means that Abu Dhabi currently relies on desalination to create usable water.

The process of desalination uses copious amounts of fossil fuels, which is the exact opposite of

sustainable. Masdar plans on using a similar desalination process but it will not be able to utilize it until the city is complete. Currently Masdar is relying on "off-site energy sources and, more specifically, on Emirati oil and gas" (Cugurullo).

Copenhagen relies primarily on ground water extraction in the city's surrounding area. This is currently slightly worrisome though with the new EU-water framework directive which is implementing restrictions on ground water extraction (Godskesen et al. 566). The other issue is that this water source is threatened by contamination, "Copenhageners enjoy reasonably high water quality and consume fairly low amounts though water sources are vulnerable to leakage from contaminated sites" (OECD 182). Copenhagen has suffered from similar problems to Masdar though because the primary treatment plants currently rely on fossil fuels to clean water. Copenhagen has suggested using wind turbines and solar cells and seems to be heading in that direction due to social forces but as of now, the treatment of water remains an environmental threat.

(Chard, Masdar PRT).

Masdar developed a new transit system to operate under the city named Personal Rapid Transit or PRT. These are essentially tiny four-person car-like vehicles that are fully electric. "There are no tracks — the car is autonomous, driven by a computer that charts direction with the help of tiny magnets embedded in the road" (Walsh). The idea behind them is to provide a similar environmental benefit to that of buses or subways but provide inhabitants with more privacy. Since Masdar's initial plan was that it would rely exclusively on green energy upon completion, the PRT would be zero-emissions. This does rely on Masdar actually succeeding in powering itself exclusively with green energy such as wind and solar. Because of the presence of PRT in the city, Masdar announced at the beginning of development that no car would be allowed to operate in the city. This forces inhabitants to use public transportation due to the lack of alternate options. PRT might seem a little silly though because it only actually runs a half a mile distance, a distance that most people could easily walk.

In the 1960s, Denmark began a massive transportation plan that relied heavily on cars. Copenhagen faced a transportation problem due to the country being separated into many islands, this forced the country to develop a complex transit plan heavily relying on bridges. "Since the 1930s, Denmark has built many important bridges and connected the major islands…Since 1997, Copenhagen has been connected to mainland Denmark via the Great Belt Link, which connects Sjaelland via the island of Fyn to Jutland" (OECD 154). In the 2008 paper, *Eco-Metropolis. Our Vision for Copenhagen 2015*, Copenhagen announced its vision for the city to become a city for and of cyclists. Announcing both projects to build new infrastructure for cyclists such as bike paths, bridges, etc, and Copenhagen set a goal for this new transportation plan, "When we achieve our goal of 50 % of Copenhageners cycling to work, we will reduce

CO2 emissions by a further 80,000 tonnes per year in the traffic of Copenhagen" (City of

Copenhagen). It should seem fairly clear though that cycling isn't very practical in all situations.

Copenhagen also announced with this a plan to increase the public transportation options in the

city and surrounding area.

(Malling, Cykelslangen).

One of the largest flaws of Masdar city is its inherent lack of community. This is not an

avoidable problem when you are building a city from the ground up. In Masdar, there is not a

longstanding community with traditions and connections like that which you would see in a city

that has existed through several generations. However, there does seem to be some identity

disconnect in Masdar because the plan for developing the city is to allow natural growth,

"Counter to what many probably think, the city is to develop somewhat organically over time,

using a market-driven approach" (Shahan). Yet, at the same time Masdar has only been able to

attract residents with its university. The businesses that have buildings in Masdar don't actually

have many employees in the city, "In addition, the agency's 90 or so staffers are the only

occupants of the six-storey, 32,000m space. Fewer than 2,000 people work on the campus,

according to tour guides" (Goldenberg). This was reported in 2016 and for a city that had been

under development at the time of this reporting for 10 years, this is worrisome. This is especially

true if Masdar is planning to rely on natural growth.

Since Copenhagen has been around for such an extended period of time, there has been

time for a community to develop and with it a set of values that people inhabiting Copenhagen

share. This is not to say people don't face conflict but community ties take time to foster and

Copenhagen has had the time to develop them. The two things that I believe have contributed the

most to the sustainable community that exists in Copenhagen in addition to its legacy is the

individual lifestyles fostered in the city and the government's strong suggestions for citizens to

be "a good carbon citizen" (Winter). Though these aren't even really to separate things but

actually two interacting parts. The state influences citizens to be environmentally responsible and

the lifestyles that emerge out of these state encouragements influence the state agencies. A good

example of this is the citizen advocacy for sustainable options. In 2008 a opinion poll was

conducted congestion charges and the results of the poll actually revealed that citizens would

encourage charges like these. The poll showed that 750 people indicated that between 65% and

80% of the citizens in the Capital Region consider that introduction of congestion charges would

be positive, if congestion was reduced and if the benefits were used for investments in

infrastructure and public transportation in the region. A majority of road users in Denmark

consider variable taxes on car driving more acceptable than fixed ones (OECD 164).

The fascinating thing about this is that it both benefits the environment and the citizens of

Copenhagen but it doesn't exclusively rely on citizens wanting the environmental benefits of the

congestion charges. The congestion charges would be a good alternative because it produces

money to fund most public transportation which would allow citizens to use transportation other

than the standard car system that has existed. Through personal incentives and social incentives,

Copenhagen seems to center around the concept of how one should live sustainably. This creates

a social environment that strives for sustainability. And though it has not completely succeeded

in obtaining that sustainable image completely yet, a threshold seems to have been hit that is

tipping the scales towards sustainable solutions to everyday situations.

  Both Masdar and Copenhagen have many successful sustainable elements and some

failures/shortcomings. So why did they not succeed? In 2016, the year that Masdar was initially

to be completed, *The Guardian* reported that the managers were downgrading from a zero-

carbon to a low-carbon city. The article explained that, "Masdar City is nowhere close to zeroing

out its greenhouse gas emissions now, even at a fraction of its planned footprint. And it will not

reach that goal even if the development ever gets fully built, the authorities admitted"

(Goldenberg). The biggest challenge for the city came in with the financial crisis in 2007/2008.

The project's completion date was announced to be pushed back to 2025-2030 from its original

2016 goal because of "market realities and technology priorities" (Haider). The financial crisis

caused many potential investors either invest less or not at all. As of 2016, only 5% of the original 2 square mile city plan had been completed.

Meanwhile, Copenhagen has gone in the opposite direction as Masdar announcing a carbon neutrality goal of 2025. Previous to this new initiative, Copenhagen was caught in a limbo between a society that advocates for a sustainable lifestyle and the existing infrastructure, both physical and governmental. There is a more obvious problem on existing power plants in Copenhagen that need to run their lifecycle before more sustainable options can replace them. The new plan pushes the hardest but most necessary part of creating a sustainable city in a non-sustainable world, restrictions and intentional legislation. To eliminate cars in the metro area, "Copenhagen has raised the annual resident parking fee from $1.48 to $148" (Birnbaum). Copenhagen is also putting in new public transportation options due to the necessity of them with the new restrictions, "A subway line opened in September with 17 new stations that encircle the city center (Birnhaum). While Masdar has failed to create an economy around sustainability and was forced to downgrade, Copenhagen has actually continued steady growth along with the sustainable initiatives. "In total, [Copenhagen] plans to spend about $400 million over the course of the 11-year effort, which started in 2013. But officials emphasize that economic growth has continued even while the city has invested in becoming greener" (Birnhaum). This investment in sustainability is not only beneficial for the environment but also a good for the citizens. Copenhagen recognized that with the dwindling supply of fossil fuels, the prices will continue to escalate and people will be threatened. The investments that Copenhagen is making in a sustainable future is a protection against fossil fuel dependency.

There is a question of whether Copenhagen is doing enough or not. The carbon neutral goal is not truly sustainable, "Among other issues, being carbon neutral — the product of an elaborate set of calculations, offsets and assumptions — is not the same as being emissions free" (Birnhaum). This type of sidestep works through an entity, for example, paying for the planting of a forest, funding a sustainability project that will eliminate carbon emissions in another sector, or fund other methane absorption mechanisms. This is better than most cities but is far from perfect. Even if Copenhagen meets its 2025 goal it will still be generating carbon emissions. Regardless, this is a step in the right direction and with the wind and solar power initiatives being enacted with the carbon goals, Copenhagen could power itself fully with renewable energy in the next 30 years.

Chapter 4: Austin and Mueller

Austin, Texas currently exists in a middle scape between sustainable and not. Though the city has been championing sustainable solutions for years, the city fails in many respects and as a result can't seem to achieve its sustainability goals. The city currently has a carbon neutrality goal of 2020 and net-zero community-wide greenhouse gas emissions by 2050. Yet, the city is currently only powered by roughly 10%-20% renewable energies. And though the city has been striving for environmentalism and sustainability, "the prospects of carbon neutrality by 2050 — that is, making no net release of carbon into the atmosphere — remains cloudy" (Price). This is worrisome given that the city wants to achieve these goals in only 30 years, which might seem like a lot of time but when you are trying to transform a city that lacks true sustainability into the model city of sustainability, it is a real challenge.

In his 2010 book entitled *Environmental City: People, Place, Politics, and the Meaning of Modern Austin,* William Swearingen establishes that the Austin we see today is a result of how "the land and the times shaped the people. The people and their times shaped a city. And modern Austin…was created intuit crucible where the environment and the economy and the people met to practice politics" (Swearingen 1). Austin doesn't have as old a history as Copenhagen but it has been around long enough for not only a city to develop out of the landscape but a culture. The city has changed from an old farming and cowboy town to a small college town to the tech giant that it is becoming today. These changes have defined the spirit, the layout, and the community of Austin, for better or worse. Austin exists in a middle ground though now between the old small town it once was and the boom metropolis it claims to now

be. As a result of this, Austin has continued to expand outwards rather than develop the current

spaces.

Austin has continued to push for growth in the city and long with growth has tried to

achieve sustainability. The biggest problem that Austin has seemed to run into is only ever

getting part of the way there. "Austin's carbon footprint fell 75 percent from 2007 to 2016,

according to the memo. But most of that came from the city choosing renewable energy to power

city-owned buildings, eliminating the electricity portion of its carbon creation" (Findell). By

moving all of its buildings over to renewable energies it is able to lower its carbon emissions by

only regulating themselves and not having to put policies into place to restrict citizens. This is

easier than having to push through restrictions that would restrict people that might try to fight

against it. It also is easier to sidestep interest groups. It is important and necessary to move city

buildings over to renewable energy but it is a solution to only part of the issue. Austin currently

operates only 418 electric or hybrid vehicles or pieces of equipment of its 3,500 sized fleet of

vehicles/equipment. So, how will the city of Austin reach its 2020 goal? The Austin-American

Statesman reported in 2018 that "the city won't make it to carbon neutral by 2020 without

buying 'carbon offsets' — essentially, paying for green energy elsewhere to balance out your

own emissions" (Findell).

One of the biggest challenges for sustainable growth in Austin is problems with funding

growth for equitable sustainability vs. gentrification. Funding growth in a city can be easier in

certain areas than others, more wealthy areas have more residents that can sink private funds into

their areas. Developers are also more likely to work in these areas because of higher profit

returns. When a developer knows that they can sell apartments for more, this incentivizes them

to sink more money into their developments and furnish them with more expensive utilities. The more wealthy areas also have more political sway because they can put their money into private interest groups, local initiatives, and political campaigns. This allows them more control over their areas. Wealthier residents also have more free time to spend on volunteering for their local initiatives and spend time pushing for change in their areas. Residents in more impoverished areas are simply more restricted in their time whether that be a need to work, cook, or take care of their children. This prevents them from advocating for themselves in the same way that wealthy areas can. Austin is seeing some of these issues and has been struggling as it continues to develop.

> Since the late 1990s, two trends are evident. First, there is new interest in urban space, lifestyles, and consumption preferences in a city long defined by suburbanism. Second, municipal leaders and real estate developers recognized the potential for significant increases in exchange values—and property taxes—by refurbishing parts of the neglected urban core. (Busch)

This push has been under the umbrella of New Urbanism, which in the most simple term means designing areas to be more walkable and livable in small areas. Similar to some neighborhoods we discussed in chapter 2, New Urbanism pushes for self-contained neighborhoods where people can live, work, eat, shop, etc. This does cause issues though. In addition to this, the push for more environmentally sustainable developments in areas across Austin has put minorities and middle/low class residents at risk. Similar to what we saw in Copenhagen, the push for a more

sustainable lifestyle, whether that be structural or social, can force those who can't afford those costs out of areas that are under development. Discrimination like this has existed in Austin for a long time, "almost all African Americans were relocated to the Eastside by 1940…Residents who remained in Clarksville, the oldest free African American community in Texas, had no access to municipal facilities and the city made no improvements there until well into the 1970s" (Busch). This has recent discrimination has been dubbed "green gentrification". We cannot allow this type of gentrification and discrimination but we also desperately need to have these sustainability changes. Ways of combating this are requiring developers to build quotas of affordable housing within sustainable developments, guarantees of housing for current residents, and other protection policies. But these policies require real legislation and policy implementation. This again runs into the problem of how people in areas threatened are less able to fight for policies that might be beneficial for them. Community support on a large scale addresses this. Diverse sustainable communities allow for those who are able to, to advocate for those who cannot. This is one of the many reasons that it is important for sustainable communities to be fostered within cities. They allow for equity and support within the community.

Transportation is a big problem in Austin due to the sheer size of the city. More specifically, Austin has a problem that has emerged in many U.S. cities, the lack of a fleshed out public transportation system. We previously saw Copenhagen's traffic emissions restrictions and the positive results and this type of solution has also been implemented in other cities like London. These policies can also take into account those who are less privileged and provide incentives for acquiring more sustainable vehicles, "when London introduced a congestion

charging zone in the city center, it provided exemptions for people with disabilities, drivers of

electric vehicles, and emergency services" (Du and Hart). But, these policies wouldn't currently

work in Austin even with incentives and exemptions due to the lack of public transportation. It

would be irrational to put in place a congestion charge without appropriate alternatives to

driving. Beyond enacting these policies, the lack of public transportation also causes negative

effects for those who cannot afford to buy a car or pay for gas. This creates a feedback loop

where those people might not be able to get work in areas that would elevate their financial

standing due to the simple lack of access. The two forms of public transportation that currently

exist are the Capital Metro and Capital MetroBus. The rail system was initiated in 2010 and only

runs from Downtown Austin to North Austin, around 32 miles. But the monthly ridership still

averages around 73 thousand in a city of almost a million, this is largely due to the routes small

size and the location of the route not serving poorer areas that actually necessitate a rail system.

The reason for this limited service is that this line was supposed to be a starter line that would

then be expanded, yet this has still not happened, even though there have been numerous

proposals for expansion that have been rejected. The bus system in Austin is more fleshed out

and serves the larger Austin area with more robust routes. The ridership of Capital MetroBus is

around 2 million riders a month, this significant increase from the Capital MetroRail is due to the

increased coverage. These busses aren't perfect either; the buses struggle from delays and

breakdowns frequently. There are currently 368 busses in Capital Metro's fleet. Until 2020, none

of those busses ran on renewable energy or fuel. In 2019, Capital Metro was approved to

purchase 10 electric busses and "over the next five years, the regional transit agency is aiming to

purchase 80 electric buses" (Denney). Two of the new buses went into service in January 2020

but this is still far behind other cities like Copenhagen where "politicians have decided that all

the city's diesel buses are to be replaced by electric buses no later than 2025" (State of Green).

Politicians in Copenhagen explained that reason behind the decision was that they believes in

making the air in the city as clean as possible. And despite Capital Metro's CEO, Randy Clarke,

saying that "'[Electric] is the movement in transit, and there's no getting around it'" (Denney),

Austin is a long way off from other "sustainable cities" such as Copenhagen.

(Brown, Austin MetroRail)

Transportation has been an issue that Austin has tried to address again and again. In

2000, Capital Metro, under the leadership of Lee Walker, put up a plan for a light rail system in

Austin. The plan was extremely ambitious and would have likely shaped Austin into a very

different city than we see today. In 2014, KUT published a story looking back on the lightrail proposal. They explain that the "15-mile line would have gone from Ben White and South Congress through downtown on Guadalupe and Lamar, all the way up past Parmer Lane" (Henry). The connection that this would have allowed could have drastically changed the carbon emission in Austin in the following years, KUT added that "the line was projected to have over 37 thousand trips a day." A significantly higher ridership than current averages in a much smaller and less populated Austin. The plan was more than this though, the plan was part of a larger vision to retrofit Austin areas into the space of New Urbanism. And the plan would have done this in a way that was democratic, the light rail would allow people from all demographics access to fast, easy, and cheap transportation through the most densely populated parts of Austin. But the plan failed and was voted down by only a 2,000 vote majority, "While a slight majority of voters within city limits cast ballots in favor of the plan, the vote was in all of Capital Metro's service area at the time. Suburban voters were seen as pivotal in defeating the measure" (Henry). One of the biggest critiques of the plan was the possibility for it to cause more urban sprawl. Ironically, the lack of the rail also caused urban sprawl in Austin, the lack of the light rail made impoverished individuals unable to have easy and affordable access to travel. And those in more privileged positions were able to take the hit of having to drive 30 minutes to an hour to work everyday and had the funds to be able to afford that. The failure of the light rail meant more than it seemed on the outside. The lightrail system would have also received a large amount of government funding,

when it proposed in 2000 building the first phase of a $1.9 billion, 52-mile plan (and

voters, by less than 2,000 votes, said no, had a couple of hundred million dollars banked.

It was able to run its bus system each year and still set aside $25 million or so. And at

that point, the Federal Transit Administration was funding as much as 80 percent of local

rail projects that made it through the agency's competitive process for such grants.

(Wear)

Capital Metro came back in 2004 with a new proposal that was largely tamped down and smaller

but they were able to get the votes and it passed with over 60% of the vote. This opened the door

for future projects and one big success in this victory was that the win was largely due to

community support and advocacy for the new rail system. This goes back to the importance of

build communities in cities and allowing those communities to operate sustainably. One of the

shortcomings of the community that caused the failure of the 2000 vote and the eventual cut

down success in 2004 was the large number of voter turnout for the George W. Bush election.

The community was not united, there was a significant partisan divide and republicans were

simply not in favor of the rail. This might have also been due to a lack of real understanding of

the intricacies of the 2000 proposal vs. the 2004 one. To design a successfully sustainable

transportation system is not easy and the reality of that is one of the biggest challenges to

enacting successful policies in that field. Transportation exist as not only transport but also

community building, development, and commerce. A transportation system can define the layout

of a city, the demographics, and the success or failure.

In 2020 the city of Austin will be voting on a new lightrail system that would very well change the current concept of what life in Austin is. The new system would connect greater swaths of Austin and allow more people affordable and easy access to parts of Austin. The plan would not have the same impact that its 2000 look-alike would have but that is largely due to the way that Austin has developed.

> Cap Metro and the city of Austin have unveiled their recommended Project Connect (2.0) plan for high-capacity transit in Austin – an investment of nearly $10 billion ($6 billion in local funds) in light rail in the Lamar/Guadalupe/South Congress corridor (the Orange Line) and along East Riverside to the airport (the Blue Line), both serving underground Downtown stations within a new transit tunnel and with new crossings of Lady Bird Lake. (Cark-Madison)

The new system takes into consideration the development path that Austin has taken and appears to be aimed at connecting communities and allowing for New Urbanism in the existing neighborhoods of Austin. If the line is voted up then it will allow democratized access to travel throughout Austin. And if the stops are designed right and placed in the right locations then it could mean a path forward in Austin without the necessity for cars.
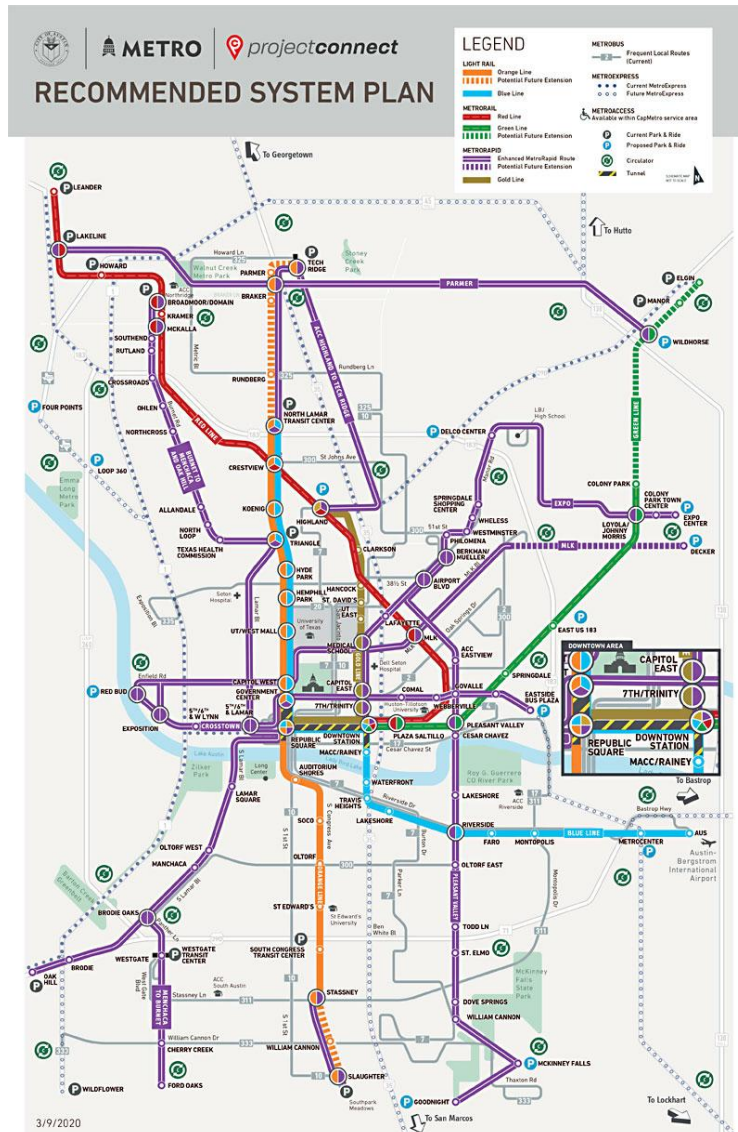
(Capital Metro, Proposed Lightrail Map)

Austin has a lot of problems as far as sustainability but the city has made a genuine effort,

and officials and residents seem to want change. So, how can Austin become the next green

capital, what would it take to implement the sustainable practices that we have discussed? There

is a divide between the sentiment for sustainability and sustainable action. We have addressed

the existence of systemic issues within sustainability but beyond those issues we also have to

address what it takes to bring a city that has a history into a new future. At the current size of

Austin, it is unrealistic for it to become a Masdar or Copenhagen. The city has spread out so far

that it feels that each area is a town of its own, this is not necessarily a problem isolated to

Austin. Cities are struggling with this across America and we cannot simply rewind the growth.

The development of communities inside of cities in a New Urbanist fashion is probably the best

solution to the sustainability process. One of the most interesting sustainable developments

inside of Austin is the Mueller Community, a new sustainable community close to downtown

Austin. In this chapter, we will look at Mueller's successes, failures, and its place inside of

Austin.

(Robinson, Mueller Community Master Plan)

The Robert Mueller Municipal Airport operated from 1930 until 1999 and served as

Austin's main airport for that period. It was closed in 1999 and replaced by Austin Bergstrom

International Airport and sat dormant for 10 years before Cetellus, in partnership with Austin,

began developing the Mueller Community. The Community was somewhere between Masdar

and Copenhagen. The land that it was being built on was mostly empty except for the area of the

old airport yet the space was located just minutes from Downtown Austin. This gave the planners

the advantage of being able to build a community essentially from the ground up without having

to desperately try to draw residents. Sure, the mere location in relation to Austin doesn't exactly

guarantee residents. But with the growing population size of Austin, people seemed to like the

idyllic vision that Mueller presented. The population of the community has grown steadily, "the

massive mixed-use development is home to 8,500 residents. That number is expected to grow to

14,000 residents once the project is completed in the coming years.Now, over two decades since

the closure of the airport, the Muller community has become one of the centers in Austin for both

sustainability and New Urbanism, "a town-within-a-city has emerged, transforming the former

airport site into a bustling neighborhood that continues to grow, fulfilling the vision of city

leaders and the larger community" (Novak). The nature of its New Urbanist vision seems to be

the source of its success, obviously there are other factors though. The community has developed

not only as a residential area but also contains businesses, shopping centers, grocery stores,

restaurants, and even a movie theater. This type of growth allows for the community to be self-

contained and with more and more business moving to Mueller or opening offices in Mueller, the

concept of living and working in the community seems not only possible but likely an option

now or in the near future, "an estimated 14,000 employees are expected to work at Mueller when

it is fully built out, up from 5,500 employees today" (Novak). Mueller has also been one of a

number of communities that has been monitored for energy use, in a 2014 Time Article they

explain how the community was the center of a new environmental movement in the U.S. They

explain that "Researchers track when and why Mueller's residents consume power and how fast-

growing new technologies–like solar panels, connected appliances and electric cars–are affecting

the grid" (Walsh). This type of community participation is simple and important because it

shows a certain amount of dedication to ideals.

   While Mueller is part of the New Urbanism movement, the developers have sidestepped

the green gentrification that has been associated with the movement. Through affordable

housing, Mueller will be able to provide residents with easy and affordable access to a

sustainable and beautiful area.

   Once it is fully built out, 1,550 of Mueller's homes and apartments will be at below-

   market rates, in line with the housing goals agreed upon as part of the public-private

   partnership forged between the city of Austin and Catellus. Mueller's goal to have 25%

   of its housing earmarked for income-qualified residents will make it one of the highest

   concentrations of affordable housing in Austin, Catellus executives say. (Novak)

Mueller is creating affordable housing inside of its community in a sustainable model, the areas

that include the affordable housing feature parks, public spaces, etc. One of the most recent

developments in Mueller has been led by Habitat for Humanity and is the first community that

the organization has created. The purpose behind it is to provide an affordable house that is

beautiful, well designed, and sustainable. Not the easiest thing to do but the organization has

developed a building style that allows for the structures to be relatively affordable to fabricate while also creating something that looks appealing.

The first project will have 11 homes that are lined in a row with shared walls. The look it creates is something akin to a modern brownstone but allows for a reduced amount of materials and land that is typically required. "The homes have a contemporary look and have three to four bedrooms. They'll include a gravel hike and bike trail, sidewalks and parking in the back" (Norwood). And it is not that housing of this kind is going to become more necessary, this type of housing is necessary now. The city of Austin has grown to 305.1 sq mile area and is continuing to grow. This is not going to become unsustainable, it currently is completely unsustainable. Community suffers due to the size, the power production and distribution is not very efficient, and it can put burdens on low-income workers who have to travel long distances for work. The type of housing that Habitat for Humanity is creating in Mueller is an active push against the type of expanse that has taken place, "with Austin's growth, they're trying this style out because it's a way to keep clients close to the city with using as little land as possible" (Norwood). This is just one affordable housing project that is housed in the Mueller Community and there have been proposals for more to come.

Mueller has been doing more than just offering bottom of the line affordable housing, the community also has tried to push below market value housing. This is to allow new families and partners to be able to afford to buy their first home without having to pick between living extraordinarily far from the city center and attempting to take out a high priced mortgage to afford to live closer in. "The prices for Mueller's market-rate homes start at about $480,000. Mueller's below-market homes are priced from the $170,000s to the $230,000s" (Novak).

Another Organization focusing on sustainable housing in Mueller is Foundation Communities.

They are developing the Jordan, an apartment building complex containing 132 units being

leased only to low income individuals, "the one-, two-, and three-bedroom units will be leased to

income-qualified families who earn less than about $60,000 a year, depending on household size.

Fourteen units will be reserved for families who are homeless or at risk of homelessness"

(Novak). This type of resource and housing allocation isn't just a way to help prevent green

gentrification but also combats public health and wellbeing issues like homelessness. Imagine if

all the showing developments use this type of model, we could address serious issues in addition

to developing communities as these New Urbanist Sustainable visions. This is a good example of

how sustainable communities are creating not only a more environmentally sustainable life but a

more luxurious life in general.

The Mueller development's inclusion of public space and parks is crucially important to

the community they wanted to create. The center of the community is Aldrich Street, "a town-

center district that ultimately will have 1.8 million square feet of space and just over 33 acres of

parks" (Novak). Mueller has developed 8 parks so far, the 8th park named Mary Elizabeth Banks

Park began work in 2019. At the center of the Mueller park system is the Mueller Lake park, a

30 acre park that features playscapes, trails, public art installations, an amphitheater, and the park

will be the future home of the Mueller town center. The park features farmers markets on the

weekends, frequently hosts music and art events, and simply provides an open recreational area.

Another park of note in the Mueller park system is John Gaines Park. Acting largely as a

gardening center that features 132 community garden plots, it allows community interaction and

collaboration. The park also features a community pool and recreational sport fields. The park

was largely designed as a usable park, one that offers the community the opportunity to participate in projects, activities, etc. This allows for community building and simple entertainment. This contrasts the primary parks that have existed in Austin previously like Auditorium Shores or Barton Springs. The park system that Muller has designed operates as more purpose-based areas, whereas typical parks in Austin have tended towards being open green spaces with the occasional pool or play scape. The more thought out park system of Muller and its purpose-based nature encourages people to interact with the park system because it offers general uses. Mueller explains that

> Mueller's parks, trails and open space weave through the community, establishing a native, local ecosystem and bringing outdoor recreation and education options to Mueller residents, employees and neighbors. With 20 percent of the neighborhood dedicated to parkland and open space, every resident will live less than 600 feet away from a community greenspace. (Mueller)

There is a central element of Mueller focused on access and this is what gives Mueller the true elements of New Urbanism. Designing a community that puts residents close to that greenspace increases the quality of life for all, not just those who are economically advantaged. It is important to implement equity throughout all aspects of life. While money is a critical part of a city and does inherently shape the structure of life, equity can and needs to be implemented on a more systematic scale like Mueller is doing with access to green space. Understanding that someone's economic status can impact their access to green areas is important and this is an issue

that Mueller is addressing with its low-income housing. Another side of the equity that Mueller

is implementing though is the general placement of these parks, there isn't a bias on the

placement. They are planning out developments around green areas and include low-income

housing. It is an interacting system. To understand this you can contrast it with the historical

social equity problems with parks. Historically, parks in poorer neighborhoods received less

funding than those in richer neighborhoods. This is deeply connected with the issues of

representation and advocacy that we discussed in chapter 2. People in poorer areas might not

have the time or money to advocate for themselves to get funding to improve or create parks in

their area. Community Impact reported on park equity in Austin and found that "40% of

Austinites do not live within a 10-minute walk of a public park, per ParkScore, and the total

spending per capita here is $119.18, compared to $270.40 in top-ranked Washington, D.C."

(Freer). In Austin there is a base problem of lack of access to public parks. This seems to have

arisen from a lack of funding and this issue has gotten worse over time. Beyond this there is also

a historical divide in Austin where more wealthy areas have developed and maintained more

environmental protections than lower-income areas. The most important part of addressing this

issue is developing and rehabilitating parks all over Austin and doing so in an equitable way.

There is no set design for a public park though, the key part is that the park is for the public. We

cannot go into a neighborhood and put in a park that is a cookie cutter style. A park needs to be

developed along with the community, especially in historical areas.

Despite the smart sustainable design and initiatives in Mueller, there is still a big

sustainability problem: density. Though Mueller does have apartment buildings, the majority of

the housing in the Mueller areas is single-family homes on decent sized lots. This is strictly

speaking, unsustainable and not scalable. At the current size of Mueller they have been able to maintain the lifestyle benefits, equity, and sustainability of a dream city. This is not possible on an Austin sized city scale. It is not sustainable for power, emissions, or community. This is compared to the density of Downtown Austin which has drastically improved in recent years. While there are many parts of the infrastructure in Downtown Austin that are not sustainable and do not work socially, it has overcome the density issues due to demand and incentives. One amazing thing is that the community in Mueller is not only aware of the density issue, it is actively trying to address the problem of density. The Mueller Neighborhood Association sent a resolution to the city office in 2016 asking for the city to lift the significant density restrictions on Mueller. "Not only does the neighborhood association urge Catellus to build to the density limit, but it calls for the city to work with Catellus and Capital Metro "to connect Mueller to transit sufficiently to allow the density caps limited by any traffic impact analysis to be lifted" (Clifton). This is just another demonstration of not only the importance of successful and sustainable communities in cities who can advocate for themselves but also shows how much transportation, transportation, design, and policy interact with each other. Has this fixed density issues in Mueller? No, it has helped inform future developments that are being worked on in Mueller, which include new apartment complexes designed by AMLI Development Co. (Novak).

To be fair, Austin has not been totally ignorant of the need for density. In 2018, Austin City Council proposed CodeNEXT, a possible rewrite of the city land development code. The rewrite would change a lot of the development code but one of the big selling points was to make it easier to develop different forms of housing than the classical single-family unit. This would provide an incentive for developers who would be able to sell more units to different people or

families by developing more than a single unit on a lot. Austin really needs a code rewrite of this kind because the code we are currently operating with does not fit with the city we have developed. We have been able to create a relatively dense Downtown area and if you look at photos from 2010 compared to 2020, the skyline of Austin has changed drastically. Yet, other historic parts of Austin and neighborhoods are trapped under old code that limits the number of units on a plot of land, the size of development, etc. This also drives up the prices of units close to downtown causing similar social equity problems to those that we have previously discussed. CodeNEXT received a large amount of backlash from historic communities and neighborhoods though and wound up being knocked down in 2018. The code rewrite came back up again in 2019 and was met with similar backlash from sections of the community and the city was actually taken to court over failing to notify residents of a possible code change. This lawsuit came in an effort to prevent the city from even going through deliberations on the new CodeNEXT policy proposal. In March 2020 KUT reported that "District Court Judge Jan Soifer ruled that the city of Austin violated local government code by failing to formally notify individual property owners of potential zoning changes that are part of the rewrite" (Salazar). This will tie up the possibility of CodeNEXT for a while if not completely killing this proposal for the foreseeable future.

The type of pushback that Austin experienced with CodeNEXT is understandable and ironically shows a certain amount of success as far as the community that has been built in Austin. That community is not a complete representation of the city of Austin though. Let's look at Travis Heights, a wealthy neighborhood just south of Downtown Austin. When CodeNEXT was announced in 2018, the neighborhood was one of the most crucial opponents of the possible rewrite. Travis Heights is a barometer for the change that has taken place in Austin over the last 20 years. In 2000, an average family could still afford to buy a house in the neighborhood, by 2020 the neighborhood experienced a complete

price bubble which locked low/middle class families out of purchasing or renting property. The type of property increase value we saw in neighborhoods like Travis Heights not only locked out new buyers and renters but it pushes out current residents. As property values increase, the property tax also increases. In Travis County, the county can increase the property tax by 10% every year, and they frequently do. This might not seem like a lot but over the course of 10 years, the property tax far more than doubles. Along with this though, most wages and salaries have not doubled. The majority of the people who now live in Travis Height have slowly become upper-middle class and upper-class. So the neighborhoods like Travis Heights form a relatively homogeneous selection of people that are able to afford to pay a lot to buy their houses and can afford to pay the increasing property taxes on those houses. These people would not want the development code to change because it would mean that they might have to pay more for their current property or lose their property, neither of which would benefit them. The optimistic hope would be that these people would understand the need for density to help those in-need and to help the sustainability of a city but you can't expect this in actuality. The advocacy in Mueller is a good antidote to the community problems that neighborhoods in Austin experienced with both CodeNEXT failures and it is due largely to the inclusion of low-income and homeless housing.

In summary, Mueller is the best model for what sustainable cities should and can become but it is a first draft. As we saw, the lack of housing density in Mueller is a huge issue that needs to be addressed and probably will in future developments. We have actually seen this in communities like the Domain. The brightside is that the community that the Mueller Community design created actually works as an antidote to the problems which is why I believe that the Mueller Community is so sustainable. The community, as we saw in chapter 2, is central to the sustainability of a city and Mueller created a successful one.

Chapter 5: Conclusion

It is a necessity to change and restructure our current cities into sustainable models for us to be able to continue to sustain ourselves. We have developed cities to be quite the opposite of sustainable though. Over the course of this paper we have seen sustainability attempts, successes, and failures. Even when these projects fail though it is a necessary and good step forward. Without the failure of cities like Masdar, we would not have been able to learn how to fix the source of those problems. Places like the Mueller Community have shown us just how successful a sustainable community can be and we can and should apply the model that Mueller uses not only onto other neighborhoods in Austin but onto cities across America and the world. And that word "community" is central to the success of these developments as the centerpiece of a larger system.

The basis of a sustainable city is community and community design. You need to have a community at the center of a sustainable place because you need people to inhabit the place and shape it. Community commonalities, diversity, and history are all integral parts of a sustainable community that can succeed. The community needs to be able to support each other and care for each other and themselves. There is a paradox within historical communities, while they are extremely useful for building sustainable places due to their strength and existing connections. However, the problem with a historical community is the desire to hold on to the present and the past. There is an inherent resistance to change due to the fact that those people have lived there for a significant period of time and that might cause them to think that nothing needs to change. Afterall, they have lived there for x amount of time and it has worked, their view is that change would not benefit them, even if it would. There is a certain tangibility to the house they live in,

the backyard they have, etc., that you do not have talking about the benefits of sustainability.

There is a necessity for those people to either see the social benefits, personal, benefits,

etc...going forward. And this type of view is harder to achieve than the reality of their current

situation. That is not to say that everyone views it this way...many people might see the benefits

they would be providing others and themselves through a switch over to sustainability. But these

people seem to be in the minority. If you contrast this is with new cities and communities like

Mueller or Masdar, inhabitants do not have the same emotional connection to a new structure or

way of life. They have not been living there for years, they have not developed an emotional

connection to their space, and as a result they are better able to accept change.

To create a sustainable city we also need to have harmony between the three E's of

sustainability: environment, economy, and equity. The most essential element of sustainability

isn't one of these E's though, it is community. Community is the thing that holds these principles

together and without it, a city cannot succeed. We need more than just a successful community

though, we need sustainable design to support the community and vise-versa.

A city is an interlocking system of transportation, housing, businesses, and public spaces.

Public transportation is central and important because it democratizes a city and provides a more

green form of transit. I will admit that we might not be able to expect everyone to immediately

switch from private to public transportation and we do have an in-between with services like

Uber and Lyft but to be sustainable they need to be switched over to be fully electric. This also

goes for anyone that isn't willing to give up their cars yet, we need a full switch over to electric

vehicles. Housing systems need to be drastically changed in cities like Austin, there is a problem

with the lack of density we have in cities and while we cannot go back and stop the development

of the expansive cities that dominate countries like America, we can and should develop the

areas we currently inhabit into more sustainable areas through increased density. Affordable

housing is also a crucial part of this system since it both fosters diversity in communities and

democratizes cities and opportunities. To support all of these systems we also need a sustainable

economy, one that is self-contained in that it supports itself. This is crucial to a sustainable city

because it helps block failures that might occur when a city relies entirely on outside funding.

The important thing is the harmony of these pieces together. We need to have each of these

pieces and they have to work together. We cannot just have a couple or it will fail as we have

seen with other communities like Masdar.

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Biography

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