The Role of Zoning Policies on Sustainable Development and Climate Change

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Abstract

Climate change is one of the top threats to the quality of life that most Americans are accustomed to. The United States faces many looming climate catastrophes including increased risk of wildfires, droughts, flooding, heat waves and other extreme weather events. The common denominator is the need to greatly reduce greenhouse gas (GHG) emissions through decarbonization. However, as a country, the United States will not reach its goals solely through advances in green technologies and increased efficiencies. The Biden administration declared its intention to reduce greenhouse gas emissions to 50% of 2005 levels by 2030 with a goal of net-zero emissions by 2050.[1] Researchers found that increasing urban density could significantly lower greenhouse gas emissions in the United States since low-density areas produced almost four times as much greenhouse gas emissions as high-density areas.[2] This paper includes a background analysis and review of the research surrounding the benefits of increasing urban density as a strategy to combat climate change, how increased urban density feeds into sustainable development, and the reduction of urban sprawl through high-density development. Seattle and Chicago are the two US cities highlighted as part of a case study comparison on their unique approaches to urban development, and the use of urban density as a tool in combating climate change and societal inequities. The similarities and differences between the Seattle and Chicago schools of thought represent a microcosm of the opportunities and difficulties of implementing high-density sustainable development in the United States and beyond. Combatting the worst effects of climate change will require more flexibility in local zoning regulations and a laser-focused push towards the construction of transit-oriented development and urban villages to increase urban density and reverse urban sprawl.

1. Introduction

Urban sprawl is defined as a pattern of uncontrolled development around the periphery of a city or metropolitan area.[3] This type of unsustainable development is a normalized feature of the built environment in the United States and throughout the industrialized world.[4] Urban sprawl is a catalyst for several major issues facing cities including greenhouse gas emissions, air pollution, road congestion and a lack of affordable housing.[5] Sprawling developments contribute to a multitude of health problems in humans including obesity, diabetes, cardiovascular disease, and respiratory disease while exacting a massive environmental toll through deforestation, disruption of wildlife habitats, and water quality reductions caused by increased surface runoff.[6]

According to the Organization for Economic Cooperation and Development (OECD), urban density refers to how intensively urban land is utilized.[7] Relative to urban density, urban sprawl is defined by low density, low proximity, and low centrality.[8] Low density refers to urban land

developed as single-family homes with a relatively low population compared to the space they occupy characterized by high consumption of land per inhabitant.[9] Low centrality and proximity describe the large spatial distance between suburbs and central areas.[10] High urban densities and controlled urban sprawls can lead to and are characterized as compact cities that are ideal for urban sustainability due to its walkable infrastructure, abundant public transportation, and a lot of mixed-use developments that are conducive to easier access to goods, services, and information.[11]

Urban development is only sustainable when it can support social conditions and cohesion, encourage resource efficiency and economic sustainability, and provide a high quality of life for all residents.[12] Densification of cities through increases in population and built density is a key urban planning policy tool that can help combat climate change by reducing carbon emissions.[13] High urban density is the key that unlocks the potential for sustainable urban development and can result in the reversal of urban sprawl trends. This is true because the higher density of the built environment in cities enables economies of scale in the delivery of public transit, reduces automobile usage, and results in a reduction in per capita carbon emissions.[14]

Urban sprawl contributes to higher greenhouse gas emissions than would otherwise be emitted. This is especially true of low-density developments in suburban and exurban areas. For example, greenhouse gas emissions and energy use in low-density developments are 3.7 times higher than those found in high density developments.[15] Additionally, suburban subdivisions with four homes per acre produce 25% more carbon emissions than an urban environment with 20 homes per acre.[16] Data supporting higher-density developments shows that a doubling of population-weighted density is associated with reductions of carbon emissions from household travel and residential energy consumption by 48% and 35% respectively.[17] These types of results confirm the importance

of densifying major cities in the United States to reduce greenhouse gas emissions that contribute to devastating climate change impacts.

Sustainable urban developments are critical to increasing urban density, reversing urban sprawl, and mitigating potential climate change impacts. The most important question is regarding which methods to pursue in the implementation and construction of these developments. Sustainable urban planning activists advocate for a smart growth approach. The smart growth approach "promotes compact, dynamic development intended to improve urban neighborhoods by creating jobs, attracting residents and increasing local tax revenues".[18] The goal of smart growth policies is to create an urban development pattern based on high population density, walkable and bikeable neighborhoods, preserved green spaces, mixed-use development, available mass transit, and limited road construction.[19]

In essence, the implementation of smart growth policies would lead to higher-density urban developments that create self-sustaining neighborhoods that reduce dependence on automobile transportation through the creation of multi-modal public transit infrastructure. There is a positive feedback cycle between high density developments and public transit infrastructure because high density developments lead to higher population densities. Higher population densities mean that more people will utilize public transit. Greater public transit utilization leads to higher fare revenues that get reinvested into expanding and upgrading transit infrastructure that attracts private investors to create higher density developments with more job opportunities and residents. This type of positive feedback cycle between higher density developments and public transit usage is one potential outcome of a successful implementation of smart growth.

2. History and Application of Urban Sprawl and Land-Use Development

Within the United States, urban sprawl has its origins in the white flight to the suburbs that began in the 1950s.[20] Many people wanted to move away from city centers to avoid traffic, noise, crime, and other problems associated with cities and wanted larger homes with more yard space.[21] Globally, there are numerous factors that have contributed to urban sprawl over the last half century including demographic, economic, geographic, social, technological, and political factors.[22]

In 1950, 65% of people living in US cities lived in the core urban area while 35% lived in suburban areas.[23] However, the formation of the US middle class and the strengthening culture of mass consumption along with a substantial increase in the use of private automobiles and low oil prices led to the start of mass urban sprawl.[24] This new middle class was able to spend more disposable income on consumer goods and services beyond their basic needs including improving their quality of life through larger homes.[25] Western Europe saw similar factors brewing, but at a much slower pace than the United States due to lower income levels, higher oil prices, a lack of abundant land to develop, and a greater reliance on public transit.[26]

By the mid-1970s, urban sprawl slowed in growth in the United States and Western Europe with the advent of the 1970s energy crisis that meant the temporary end of cheap oil. By this point, there was a stark difference in the economic and social situations between suburban areas and inner-city areas of the United States with more than 17% of the inner-city population living below the poverty line while only 7% of suburban residents lived below the poverty line.[27] Financial institutions and individuals disinvested from urban land markets while many working-class jobs disappeared that led to the degradation of inner cities which created a vicious cycle of disinvestment that lasted decades.[28] Real estate investors and institutions sought out suburbs due to higher incomes

and financialization that required credit access to obtain loans for mortgages and construction loans.[29]

This process led to gutted inner cities and a wealthier ring of sprawling suburbs. However, the growth of urban sprawl in many areas of the United States slowed down in the years leading up to the crash of the US housing market that triggered the Great Recession of 2008. Many US cities have leaned on neoliberal urbanist solutions to urban decay including the development of financial and cultural districts, gentrification of neighborhoods, and made intensive efforts to increase tourism.[30] As an example, Chicago has been committed to this approach since the late 1990s and is continue this approach into the 2020s. A steep decline in crime rates in Chicago between the mid-1990s and mid-2010s along with concerted efforts by local leadership to lure in real estate developers has led to growth in high-density urban development that started in the downtown area and has expanded outward into the nearby North Side, West Side and South Side neighborhoods.

Elsewhere in the world, urban sprawl is experienced very differently. In developing countries including in Africa and Latin America, urban sprawl occurs due to an overflow of poverty that materializes in massive processes of rural-urban migration, land takeovers, and mostly unlawful building of large sections of popular neighborhoods.[31] However, there are similar policy solutions being implemented to combat urban sprawl in both developing and developed countries. These solutions include urban growth boundaries, land preservation, and smart growth.[32]

Government plays a major role in implementing policies that support the intensification of urban sprawl. Local policy preferences in many suburbs and urban areas for maximum density restrictions, strict and inflexible zoning regulations, and taxation that does not factor the social cost of low-density development have all increased urban sprawl.[33] Regarding land-use regulations, cities with building height restrictions and regions that fund massive investments in road infrastructure

meant for increased automobile use are greatly contributing to the demise of compact cities and public transit systems.[34] Throughout the world, gasoline taxes were created to fund road infrastructure maintenance and construction costs. However, when fuel taxes are not in line with the full costs of maintaining roads and do not account for social costs of air pollution, climate change and congestion, then more people will be encouraged to use their private vehicle to get around.[35] Low-density development and infrastructure are tailored to the needs of individual automobile owners rather than residents that prefer to use public transport or cannot afford their own vehicle.

There are several environmental, economic, and social consequences directly and indirectly caused by urban sprawl. Low-density areas are defined by large physical distances between residences, jobs and daily destinations that need to be traversed by a personal automobile due to the lack of public transport.[36] The increased use of personal automobiles leads to higher air pollution and more greenhouse gas emissions.[37] Urban sprawl also increases the per-user costs of providing public services due to the higher costs of building and maintaining infrastructure such as water supply, sanitation, electricity, public transport, waste management, and policing in areas with vast amounts of physical space.[38] People that live in compact cities with high-density development are more likely to gather in parks, restaurants, and streets to socialize. In an environment where individuals live far from one another and must travel by car, there is less social interaction which has serious negative impacts on physical and mental health.

3. Case Study #1: Seattle

3.1 History of Land-Use Development

Like most US cities, land use in the Seattle area is regulated by zoning laws. In the early 20th century, land use was defined by unregulated development that impeded the ability of cities to be spacious and sprawling.[39] Over time, states allowed local governments to take full reign of land use

policy which led to spacious, sprawled cities.[40] The outward growth of Seattle was not without consequences. By the early 1990s, low-density and sprawling developments in the Greater Seattle region threatened the area's quality of life and the regional economy due to traffic congestion and unsustainable population growth.[41] Legislators in the Washington State government aimed to reduce sprawl through the passage of the Growth Management Act that codified controlled growth and encouraging development in areas already served by public facilities and services, by providing integrated public transportation systems, and maintaining quality transportation services to match increased development.[42]

The growth management plan passed in Washington State was inspired by the success of comprehensive urban planning regulations instituted by Vancouver, British Columbia, one of Seattle's main regional rivals.[43] In 1929, Vancouver implemented a comprehensive plan for development that included narrow streets meant for dense living, complete neighborhoods with community centers, schools, and parks, and the promotion of high-density and mixed-use developments.[44] While most major US cities were building highways, Vancouver invested in public transportation and urban sprawl was limited by the British Columbia government in 1972 by an executive order that froze all commercial and residential development of agricultural land that limited agricultural land use to farming.[45] Another key difference is all the municipalities of the Greater Vancouver region came together and signed the binding 1972 Livable Region Strategic Plan (1972 LRSP) to coordinate urban planning and enforce Smart Growth policies.[46] The four main components of the 1972 LRSP which were reaffirmed in the 1999 LSRP are a commitment to mass transit over freeways, a commitment to staying a compact region, the promotion of self-sustaining neighborhoods, and the protection of the Green Zone that limits urban expansion.[47]

Seattle and Washington State took detailed notes of the comprehensive planning and coordination occurring in Vancouver at the local and regional level and British Columbia at the state/provincial level. Immediately following the newly enacted Growth Management Act in 1990 in Washington State, the Greater Seattle region was required to implement binding comprehensive plans at the municipal and regional levels.[48] Seattle implemented its first comprehensive plan in 1994 and updated it in 2006 with the goal of creating self-sustaining neighborhoods through zoning with 24 neighborhoods designated at Urban Villages.[49] Prior to the Growth Management Act, the Greater Seattle region came together to create the Puget Sound Regional Council (PSRC) that acts as a body for developing policies and making decisions on regional growth strategy, transportation issues, environmental issues, and economic development.[50] The PSRC designed a regional plan that includes several goals including protecting the natural environment, focus growth on areas that are connected to public transit, improving housing access, pursue sustainable economic growth, work towards a better transportation system, and support infrastructure and public service improvements that are aligned with regional planning objectives.[51]

3.2 Local Sustainability Plans on Land-Use Development

Seattle's Climate Action Plan was originally published in June 2013 to define Seattle's role in lower its greenhouse gas emissions to combat climate change. In 2011, the City of Seattle adopted the goal of reaching net-zero greenhouse gas emissions by 2050.[52] Within Seattle's Climate Action Plan, there is an entire section of Actions to Implement by 2015 that includes transportation and land use priorities.[53] These actions include developing a citywide transit communities' strategy that integrates neighborhoods through high-capacity transit.[54] Additionally, there is a strong focus on prioritizing biking, walking, and other modes of transport that generate less greenhouse gas

emissions and on making sure that new developers are equitable to avoid displacement of lower-income and minority residents.[55]

The City of Seattle understands that sustainable growth is the only viable option for long-term success. The Greater Seattle region expects to gain more than 100,000 new residents and 100,000 new jobs over the next 20 years and cannot keep constructing sprawling developments due to a lack of space.[56] Impressively, Seattle's population increased by 16% between 1990 and 2008 while per capita greenhouse gas emissions from road transportation decreased by 4%.[57] The plan emphasizes expanding public transit service, creating livable self-sustaining neighborhoods, and coordinated transportation and land use planning to build more transit-oriented development.[58] In the 2018 update to the Seattle Climate Action Plan, total greenhouse gas emissions decreased by 6% since 2008 despite population growth of 13% in the same period.[59] Seattle continues to point to smart growth as the foundation for its transportation policy and its urban village strategy as the keys to its decline in emissions.[60] There are a few new zoning incentives mentioned in the 2018 plan including allowing developers to build developments that have additional heights, floor area, or density than originally approved if they meet the City's Green Building Standard.[61]

3.3 Official Housing Plan and Zoning Limitations

The City of Seattle has seen a dramatic growth in its population adding 105,000 residents since 2010 and surpassing 700,000 residents in 2017.[62] This influx of new residents has led to a significant increase in housing prices especially in areas zoned for single-family housing. Between February 2017 and August 2018, the median home price in Seattle increased by $100,000 to $753,600.[63] Normally, when there is increased demand for housing, the natural response is for developers to start building more housing. However, Seattle's single-family zoning laws are inflexible and goes against what Seattle's leadership claims that it is supporting smart growth policies in its

local Climate Action Plans, regional planning coordination, and the state-level Growth Management Act. Roughly 75% of all the land that Seattle residents can live on is zoned for single-family homes.[64] Another issue is that most housing in Seattle is either single-family houses or large apartment buildings with a lack of small apartment building (2-9 units).[65]

Despite promises to commit to sustainable development, Seattle's population growth is unsustainable. Since 2006, over 80% of Seattle's growth has occurred in the 24 urban villages that make up less than 25% of Seattle's land while only 5% of all new net units that were built between 2010-2017 were built in single-family zones.[66] This type of development pattern will lead to displacement of longtime residents that cannot afford higher rents and cannot afford to purchase a single-family home or condo unit. Even long-term residents that own homes may be forced to sell if property values keep rising faster than their ability to pay the updated property tax assessments.

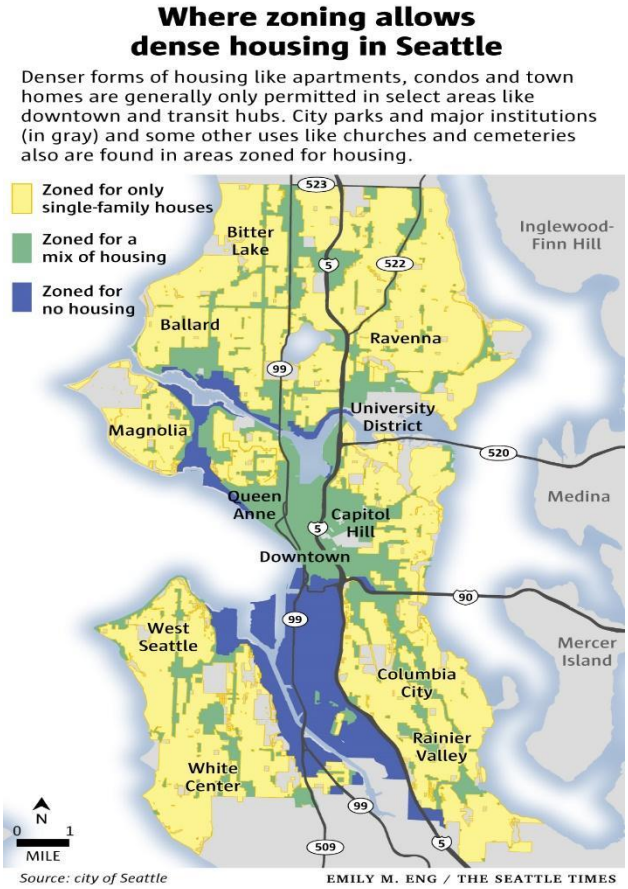

Figure 1: Seattle Home Zoning Map. Source: The Seattle Times https://www.seattletimes.com/business/real-estate/amid-seattles-rapid-growth-most-new-housing-restricted-to-a-few-areas/

The Seattle Planning Commission came out with its "Neighborhoods For All" report aimed at recommending some solutions to Seattle's housing market ails. The Commission recommends evolving Seattle's growth strategy to include residential areas across the city by expanding all established urban villages to within a 15-minute walk radius from public transit.[67] The report mentions the need to expand its urban village development strategy to include the 75% of the city that is currently zoned for single-family housing while also encouraging developers to build a broader range of housing beyond single-family and large apartment buildings.[68] Other tidbits include revising parking regulations to prioritize housing over car storage, reduce or remove minimum lot size requirements, and removing the occupancy limit for unrelated persons in single-family zones to allow unrelated roommates to rent out a house.[69] Greater Seattle is a story of a region attempting to

incorporate smart growth principles while trying to protect its single-family zones in the face of unrelenting population growth.

4. Case Study #2: Chicago

4.1 History of Land-Use Development

Chicago is a durable city that keeps standing despite facing many challenges through the years. The city grew rapidly from its humble origins as a fur-trading post in the early 1800s. Throughout the 19th century, Chicago was one of the fastest growing cities on the planet and not even the Great Chicago Fire of 1871 could disrupt the momentum. The city's population peaked in 1950 at the height of the post-war economic boom and the peak of the US Rust Belt. By 1970, Chicago's population began to decline with most of the region's growth occurring in the suburban peripheries. The Chicago area population growth between 1970 and 1990 was only 4% while the footprint of the region increased by 35%, a strong indicator of urban sprawl.[70] By the 2010s, population growth and land consumption increases equalized.[71]

In recent years, there are signs that the Chicago area is moving towards sustainable development patterns. Between the 1970s and 1990s, most of the regional population growth and development was taking place in the peripheral counties including McHenry, Kane, and Will Counties. However, since 2004, most of the new housing developments are taking place in Cook and DuPage Counties, the core counties of the Chicago area.[72] In fact, between 2010 and 2012, Cook County, home to the City of Chicago, accounted for more than half of the population of the six-county region.[73] Another positive trendline for sustainable development includes the type of housing structures being developed. In 1993, single-family homes made up 82% of new construction starts while by 2008, multi-family housing structures made up 50% of new construction starts.[74]

4.2 Local Sustainability Plans on Land-Use Development

Chicago published its first Climate Action Plan in 2008 under former Mayor Richard M. Daley. The main goal of this plan is to decrease greenhouse gas emissions by 80% from 1990 levels by the year 2050.[75] The 1990 baseline level of emissions is 32.3 million metric tons (MMT) and the emissions level in 2005 was 36.2 MMT for a per capita average of 12.7 tons/year for each of Chicago's 2.8 million residents.[76] Among the many policy recommendations in this plan, one pertinent recommendation that would increase urban density is the promotion of transit-oriented development with homes, shops, and jobs all within walking distance of transit stops.[77] This step was estimated to decrease Chicago emissions by 630,000 metric tons annually by 2020.[78]

In 2012, Chicago issued its 2015 Sustainable Chicago Action Agenda Plan. One of the targets of this plan was to accelerate transit-oriented development near transit stations to decrease road congestion and prioritize self-sustaining walkable neighborhoods.[79] The lynchpin for increasing transit-oriented development was amending the Chicago Zoning Ordinance to add a classification for Transit Oriented Development that would enable and encourage more high-density development near transit stations through greater flexibility on parking requirements.[80]

The Metropolitan Mayors Caucus, a caucus representing 275 municipalities in the Chicago region, came out with its most recent Climate Action Plan earlier this year. Regarding climate action, the goal is to reduce greenhouse gas emissions by at least 80% from 2005 levels by 2050.[81] Between 2005 and 2015, greenhouse gas emissions declined from 128 MMT to 119 MMT.[82] The Climate Action Plan calls for prioritizing sustainable transit-oriented and transit-supportive development to reach the emissions reduction targets which would be achieved by reducing vehicle miles traveled.[83] The reducing vehicle miles traveled reduction goal is 4.9 MMT from 2015 numbers by 2050.[84]

4.3 Official Housing Plan and Zoning Limitations

The City of Chicago has issued six consecutive five-year housing plans starting with the 1994-1998 Five-Year Housing Plan until the present with the latest five-year housing plan for 2019-2023 that was released in 2018. Between 2000 and 2016, the percentage of Chicago households earning more than $100,000 annually increased from 18.7% to 26.2%.[85] Increasing household incomes often leads to higher home prices if the amount of new construction does not keep up with housing demand. Chicago's rental housing market is one place where rising prices is making an outsized impact. Between 2012 and 2016, the deficit of affordable housing units (rent for less than 30% of the income of someone earning 150% of the poverty line) increased from 111,000 units to 119,000 units.[86]

Within Chicago, there are three housing markets: high-cost areas (39.4% of tracts), moderate-cost areas (34.6% of tracts), and lower cost areas (26.1% of tracts).[87] The lower-cost areas lost population between 2010 and 2016 while the moderate-cost areas have stable populations and available units, and high-cost markets saw population growth and steadily increasing rents.[88] The City aims to increase private investment in lower cost areas to create more homeownership opportunities through new developments.[89] Gentrification and displacement are major concerns for moderate-cost areas in transition and therefore the City is working to maintain affordability and preserve affordable housing.[90] In high-cost areas, the City plans to build more affordable housing.[91]

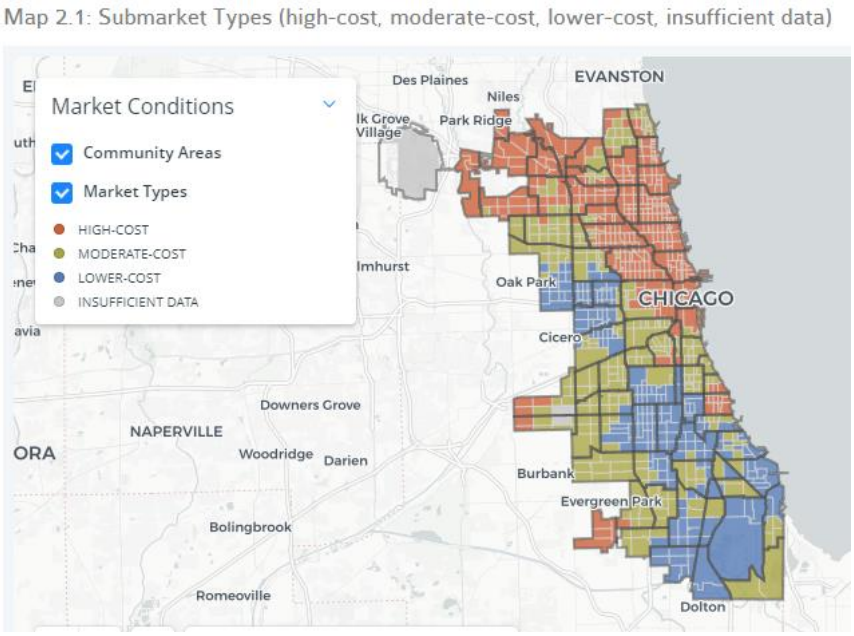

Figure 2: Submarkets within the Chicago Housing Market. Source: Institute For Housing Studies at DePaul University. https://fiveyearplandata.housingstudies.org/meeting-2-affordable-rental-housing.html

A major concern for Chicago is the need to preserve diversity of housing types and to prevent displacement due to higher rents and property values. Small buildings containing 2-4 units comprise 35% of the City's rental housing stock, but more than 20,000 units in 2–4-unit buildings disappeared between 2010 and 2016.[92] One way that Chicago plans to maintain affordability of housing is through the encouragement of transit-oriented development that provides affordable housing units on-site.[93] Chicago is a divided city between booming high-cost areas, moderate-cost areas undergoing gentrification, and underserved low-cost areas facing a bleak future. The City will not reach its full potential until every Chicagoan has equitable access to housing, jobs, schools, and parks.

5. Discussion

After analyzing the housing situations and progress towards sustainable development in Seattle and Chicago, there are clear advantages and disadvantages to both situations. From an economic standpoint, Seattle continues to boom as it has been for the last few decades leading

to population growth and expansion of housing developments. Chicago is experiencing rapid growth in housing and office developments from the downtown area outward and is expected to continue this growth in the years to come. One issue that stands out is the restrictive zoning regulations that Seattle continues to face regarding new housing construction in single-family zoned areas. It is unsustainable to expect to pile all the new developments into 25% of the city's land and leave 75% of the city untouched to denser housing development.

Regarding urban sprawl, Seattle understands the need to prevent outward sprawl that dampens the quality of life of its residents. However, it will need to expand its urban villages and higher-density property development into the 75% of the city that is not seeing expanded options for housing. To that end, Seattle is taking baby steps towards such actions with the Office of Planning and Community Development (OPCD) releasing its rezoning concepts for the 2024 Comprehensive Plan Update that include five conceptual alternatives.[94] The best alternative plan will allow for a greater diversity of housing types in all neighborhoods throughout Seattle and will address past underproduction of housing and rising housing costs through the creation of complete neighborhoods throughout the city.[95] Once implemented in 2025, Seattle can begin to reshape its destiny in creating sustainable development within its boundaries.[96]

Chicago's zoning practices are more encouraging and more conducive to higher-density housing development. However, years of urban sprawl means that increased housing density will need to coincide with an increase in population and an increase in affordable housing to prevent the displacement of longtime populations. As a response to these issues, Chicago's city government passed The Connected Communities Ordinance in July 2022 that will extend transit-oriented development incentives more broadly and equitably throughout the city,

including within a 4-block radius from rail stations and 2-blocks from additional high frequency and strategic bus corridors.[97] The new ordinance also protects against the loss of 2-flats and 3-flats near transit to alleviate displacement pressures and increases the number of on-site affordable units in TOD projects.[98]

Both Seattle and Chicago are making progress towards reducing greenhouse gas emissions through energy efficiency for existing buildings, increasing high-density development near public transit, and committing to compact growth. Sustainable development must not only be sustainable regarding energy efficiency and water usage. Sustainable development is only sustainable when it takes environmental, social, and economic factors into consideration. There does not need to be high-rise apartment buildings in every single-family zoned area. A healthy dosage of 2–9-unit buildings would allow for buildings that fit the character of a residential area, increase population density, and lower rental and homeowner costs.

6. Conclusion

Throughout the world, combatting climate change must be the top priority to keep Earth healthy for the next generation. In the United States, steps are being taken at the local and state level to combat climate change through sustainable development including high-density developments in urban areas and towards containment of urban sprawl. However, the legacy of US urban sprawl will take a long time to contain and reverse considering that between 1960 and 2010, urban land area grew at a rate that was 1.7 times faster than population growth.[99] A built environment that forces each person in a household to drive their personal vehicles to work is not a sustainable development model. To that end, the US Federal Government must be given some credit for the passage of the Bipartisan Infrastructure Law in November that authorizes $89.9 billion towards public transportation expansion and maintenance.[100] Unfortunately, the

Bipartisan Infrastructure Law falls short as it is unclear how much of the funding for roads and bridges will be used for infrastructure maintenance versus how much of the funding will be used to encourage a new wave of urban sprawl through highway lane expansion and newly created highways. Despite the question marks about how the funds from the new law will be distributed, any funding that can be provided for public transit will allow cities to become denser and more compact.

Notes

1. Adie Tomer, Joseph Kane, Jenny Schuetz, and Caroline George. "We Can't Beat the Climate Crisis without Rethinking Land Use." Brookings. Brookings, May 12, 2021. https://www.brookings.edu/research/we-cant-beat-the-climate-crisis-without-rethinking-land-use/.
2. Singh, Maanvi, and Oliver Milman. "Denser Cities Could Be a Climate Boon – but Nimbyism Stands in the Way." The Guardian. The Guardian, August 22, 2021. https://www.theguardian.com/us-news/2021/aug/22/cities-climate-change-dense-sprawl-yimby-nimby.
3. Resnik, David B. "Urban Sprawl, Smart Growth, and Deliberative Democracy." American Journal of Public Health 100, no. 10 (October 2010): 1852–56. https://doi.org/10.2105/ajph.2009.182501.
4. Resnik, David B. "Urban Sprawl, Smart Growth, and Deliberative Democracy".
5. Agrawala, Shardul, Walid Oueslati, Ioannis Tikoudis, and Alexandros Dimitropoulos. "Rethinking Urban Sprawl: Moving towards Sustainable Cities POLICY HIGHLIGHTS." OECD, June 2018. https://www.oecd.org/environment/tools-evaluation/Policy-Highlights-Rethinking-Urban-Sprawl.pdf.
6. Resnik, David B. "Urban Sprawl, Smart Growth, and Deliberative Democracy".
7. OECD. "Urban Density: Promoting Sustainable Development – Part 1." Rics.org. RICS World Built Environmental Forum, April 1, 2021. https://www.rics.org/eu/wbef/megatrends/urbanisation/urban-density-promoting-sustainable-development--part-1/.
8. Bueno-Suárez, Carlos, and Daniel Coq-Huelva. "Sustaining What Is Unsustainable: A Review of Urban Sprawl and Urban Socio-Environmental Policies in North America and Western Europe." Sustainability 12, no. 11 (May 30, 2020): 1–36. https://doi.org/10.3390/su12114445.
9. Bueno-Suárez, Carlos, and Daniel Coq-Huelva. "Sustaining What Is Unsustainable: A Review of Urban Sprawl and Urban Socio-Environmental Policies in North America and Western Europe", 3.
10. Bueno-Suárez, Carlos, and Daniel Coq-Huelva. "Sustaining What Is Unsustainable: A Review of Urban Sprawl and Urban Socio-Environmental Policies in North America and Western Europe", 3.
11. OECD. "Urban Density: Promoting Sustainable Development – Part 1."

12. Dave, Seema. "High Urban Densities in Developing Countries: A Sustainable Solution?" Built Environment (1978-) 36, no. 1 (2010): 9–27. http://www.jstor.org/stable/23289981.
13. Moos, Markus. "The Velocity of Density: Can We Build More Sustainable Cities Fast Enough?" Sustainability 9, no. 12 (December 13, 2017): 2326. https://doi.org/10.3390/su9122326.
14. Moos, Markus. "The Velocity of Density: Can We Build More Sustainable Cities Fast Enough?", 1.
15. Flatow, Dana. "Density, Carbon Emissions, Transportation and Energy Efficiency." The University of Texas at Austin School of Architecture: Center for Sustainable Development. Accessed December 12, 2021. https://soa.utexas.edu/sites/default/disk/global_challenges/global_challenges/09_02_su_flatow_dana_paper_ml.pdf.
16. Flatow, Dana. "Density, Carbon Emissions, Transportation and Energy Efficiency", 4-5.
17. Moos, Markus. "The Velocity of Density: Can We Build More Sustainable Cities Fast Enough?", 1.
18. Hummel, Daniel. "The Effects of Population and Housing Density in Urban Areas on Income in the United States." Local Economy: The Journal of the Local Economy Policy Unit 35, no. 1 (February 2020): 27–47. https://doi.org/10.1177/0269094220903265.
19. Resnik, David B. "Urban Sprawl, Smart Growth, and Deliberative Democracy".
20. Resnik, David B. "Urban Sprawl, Smart Growth, and Deliberative Democracy".
21. Resnik, David B. "Urban Sprawl, Smart Growth, and Deliberative Democracy".
22. Agrawala, Shardul, Walid Oueslati, Ioannis Tikoudis, and Alexandros Dimitropoulos. "Rethinking Urban Sprawl: Moving towards Sustainable Cities POLICY HIGHLIGHTS", 10.
23. Bueno-Suárez, Carlos, and Daniel Coq-Huelva. "Sustaining What Is Unsustainable: A Review of Urban Sprawl and Urban Socio-Environmental Policies in North America and Western Europe", 5.
24. Bueno-Suárez, Carlos, and Daniel Coq-Huelva. "Sustaining What Is Unsustainable: A Review of Urban Sprawl and Urban Socio-Environmental Policies in North America and Western Europe", 5.
25. Bueno-Suárez, Carlos, and Daniel Coq-Huelva. "Sustaining What Is Unsustainable: A Review of Urban Sprawl and Urban Socio-Environmental Policies in North America and Western Europe", 5.
26. Bueno-Suárez, Carlos, and Daniel Coq-Huelva. "Sustaining What Is Unsustainable: A Review of Urban Sprawl and Urban Socio-Environmental Policies in North America and Western Europe", 5-6.
27. Bueno-Suárez, Carlos, and Daniel Coq-Huelva. "Sustaining What Is Unsustainable: A Review of Urban Sprawl and Urban Socio-Environmental Policies in North America and Western Europe", 7.
28. Bueno-Suárez, Carlos, and Daniel Coq-Huelva. "Sustaining What Is Unsustainable: A Review of Urban Sprawl and Urban Socio-Environmental Policies in North America and Western Europe", 7.
29. Bueno-Suárez, Carlos, and Daniel Coq-Huelva. "Sustaining What Is Unsustainable: A Review of Urban Sprawl and Urban Socio-Environmental Policies in North America and Western Europe", 7.

30. Bueno-Suárez, Carlos, and Daniel Coq-Huelva. "Sustaining What Is Unsustainable: A Review of Urban Sprawl and Urban Socio-Environmental Policies in North America and Western Europe", 8.
31. Bueno-Suárez, Carlos, and Daniel Coq-Huelva. "Sustaining What Is Unsustainable: A Review of Urban Sprawl and Urban Socio-Environmental Policies in North America and Western Europe", 2.
32. Hummel, Daniel. "The Effects of Population and Housing Density in Urban Areas on Income in the United States", 28.
33. Agrawala, Shardul, Walid Oueslati, Ioannis Tikoudis, and Alexandros Dimitropoulos. "Rethinking Urban Sprawl: Moving towards Sustainable Cities POLICY HIGHLIGHTS", 10.
34. Agrawala, Shardul, Walid Oueslati, Ioannis Tikoudis, and Alexandros Dimitropoulos. "Rethinking Urban Sprawl: Moving towards Sustainable Cities POLICY HIGHLIGHTS", 10.
35. Agrawala, Shardul, Walid Oueslati, Ioannis Tikoudis, and Alexandros Dimitropoulos. "Rethinking Urban Sprawl: Moving towards Sustainable Cities POLICY HIGHLIGHTS", 10.
36. Agrawala, Shardul, Walid Oueslati, Ioannis Tikoudis, and Alexandros Dimitropoulos. "Rethinking Urban Sprawl: Moving towards Sustainable Cities POLICY HIGHLIGHTS", 10.
37. Agrawala, Shardul, Walid Oueslati, Ioannis Tikoudis, and Alexandros Dimitropoulos. "Rethinking Urban Sprawl: Moving towards Sustainable Cities POLICY HIGHLIGHTS", 10-11.
38. Agrawala, Shardul, Walid Oueslati, Ioannis Tikoudis, and Alexandros Dimitropoulos. "Rethinking Urban Sprawl: Moving towards Sustainable Cities POLICY HIGHLIGHTS", 11.
39. Fox, David. "Halting Urban Sprawl: Smart Growth in Vancouver and Seattle." Boston College International and Comparative Law Review 33, no. 1 (January 1, 2010): 43–59. https://www.downeybrand.com/wp-content/uploads/2019/09/Halting-Urban-Sprawl_-Smart-Growth-in-Vancouver-and-Seattle.pdf.
40. Fox, David. "Halting Urban Sprawl: Smart Growth in Vancouver and Seattle", 45.
41. Fox, David. "Halting Urban Sprawl: Smart Growth in Vancouver and Seattle", 47.
42. Fox, David. "Halting Urban Sprawl: Smart Growth in Vancouver and Seattle", 47.
43. Fox, David. "Halting Urban Sprawl: Smart Growth in Vancouver and Seattle", 46-47, 54.
44. Fox, David. "Halting Urban Sprawl: Smart Growth in Vancouver and Seattle", 50.
45. Fox, David. "Halting Urban Sprawl: Smart Growth in Vancouver and Seattle", 50-51.
46. Fox, David. "Halting Urban Sprawl: Smart Growth in Vancouver and Seattle", 51-52.
47. Fox, David. "Halting Urban Sprawl: Smart Growth in Vancouver and Seattle", 51-53.
48. Fox, David. "Halting Urban Sprawl: Smart Growth in Vancouver and Seattle", 46-47.
49. Fox, David. "Halting Urban Sprawl: Smart Growth in Vancouver and Seattle", 54.
50. Fox, David. "Halting Urban Sprawl: Smart Growth in Vancouver and Seattle", 54-55.
51. Fox, David. "Halting Urban Sprawl: Smart Growth in Vancouver and Seattle", 54-56.
52. Seattle City Council. "Seattle Climate Action Plan." City of Seattle, June 2013. http://www.seattle.gov/Documents/Departments/Environment/ClimateChange/2013_CAP_20130612.pdf, 3.
53. Seattle City Council. "Seattle Climate Action Plan", 16-31.
54. Seattle City Council. "Seattle Climate Action Plan", 28.
55. Seattle City Council. "Seattle Climate Action Plan", 28.

56. Seattle City Council. "Seattle Climate Action Plan", 16.
57. Seattle City Council. "Seattle Climate Action Plan", 16.
58. Seattle City Council. "Seattle Climate Action Plan", 27.
59. City of Seattle. "Seattle Climate Action." City of Seattle, April 2018. http://greenspace.seattle.gov/wp-content/uploads/2018/04/SeaClimateAction_April2018.pdf, 5.
60. City of Seattle. "Seattle Climate Action," 8.
61. City of Seattle. "Seattle Climate Action," 11-12.
62. Seattle Planning Commission. "Neighborhoods for All." Seattle Planning Commission. City of Seattle, n.d. https://www.seattle.gov/Documents/Departments/SeattlePlanningCommission/SPCNeighborhoodsForAll-ExecSummary.pdf, 1.
63. Seattle Planning Commission. "Neighborhoods for All", 2.
64. Seattle Planning Commission. "Neighborhoods for All", 3-4.
65. Seattle Planning Commission. "Neighborhoods for All", 2-3.
66. Seattle Planning Commission. "Neighborhoods for All", 4.
67. Seattle Planning Commission. "Neighborhoods for All", 5.
68. Seattle Planning Commission. "Neighborhoods for All", 5.
69. Seattle Planning Commission. "Neighborhoods for All", 7.
70. Soot, Siim, and Brendan Dodge-Hayakawa. "Chicago-Area Sprawl Revisited: The Role of Demographics, Prosperity and Homeownership with a Note on Sustainability." uofi.app.box.com. Metropolitan Transportation Support Initiative (METSI); Urban Transportation Center; University of Illinois at Chicago, 2013. https://uofi.app.box.com/s/3e18c6ilhya0ro88rivlwi7dkqthd66c, 3.
71. Soot, Siim, and Brendan Dodge-Hayakawa. "Chicago-Area Sprawl Revisited: The Role of Demographics, Prosperity and Homeownership with a Note on Sustainability", 3.
72. Soot, Siim, and Brendan Dodge-Hayakawa. "Chicago-Area Sprawl Revisited: The Role of Demographics, Prosperity and Homeownership with a Note on Sustainability", 23.
73. Soot, Siim, and Brendan Dodge-Hayakawa. "Chicago-Area Sprawl Revisited: The Role of Demographics, Prosperity and Homeownership with a Note on Sustainability", 36.
74. Soot, Siim, and Brendan Dodge-Hayakawa. "Chicago-Area Sprawl Revisited: The Role of Demographics, Prosperity and Homeownership with a Note on Sustainability", 19.
75. City of Chicago. "Chicago Climate Action Plan: Our City. Our Future." City of Chicago, 2008. https://www.chicago.gov/content/dam/city/progs/env/CCAP/CCAP.pdf, 11.
76. City of Chicago. "Chicago Climate Action Plan: Our City. Our Future", 14.
77. City of Chicago. "Chicago Climate Action Plan: Our City. Our Future", 29-31.
78. City of Chicago. "Chicago Climate Action Plan: Our City. Our Future", 30-31.
79. City of Chicago. "2015 Sustainable Chicago Action Agenda." City of Chicago, 2012. https://www.chicago.gov/content/dam/city/progs/env/SustainableChicago2015.pdf, 17.
80. City of Chicago. "2015 Sustainable Chicago Action Agenda", 17.
81. Metropolitan Mayors Caucus. "Climate Action Plan for the Chicago Region." Metropolitan Mayors Caucus, June 2021. https://mayorscaucus.org/wp-content/uploads/2021/06/RegionalCAP_primary_and_appendices_062321-02.pdf, 22.
82. Metropolitan Mayors Caucus. "Climate Action Plan for the Chicago Region", 21.
83. Metropolitan Mayors Caucus. "Climate Action Plan for the Chicago Region", 33.
84. Metropolitan Mayors Caucus. "Climate Action Plan for the Chicago Region", 33.

85. City of Chicago. "One Chicago: Housing Strategies for a Thriving City Five Year Housing Plan 2019-2023." City of Chicago, 2018. https://www.chicago.gov/content/dam/city/depts/dcd/Housing%20Programs/20733_37_5_Year_Plan_Report_final_WEB_C.pdf, 4.
86. City of Chicago. "One Chicago: Housing Strategies for a Thriving City Five Year Housing Plan 2019-2023", 5.
87. City of Chicago. "One Chicago: Housing Strategies for a Thriving City Five Year Housing Plan 2019-2023", 7.
88. City of Chicago. "One Chicago: Housing Strategies for a Thriving City Five Year Housing Plan 2019-2023", 8-13.
89. City of Chicago. "One Chicago: Housing Strategies for a Thriving City Five Year Housing Plan 2019-2023", 15, 33.
90. City of Chicago. "One Chicago: Housing Strategies for a Thriving City Five Year Housing Plan 2019-2023", 20.
91. City of Chicago. "One Chicago: Housing Strategies for a Thriving City Five Year Housing Plan 2019-2023", 16.
92. City of Chicago. "One Chicago: Housing Strategies for a Thriving City Five Year Housing Plan 2019-2023", 28.
93. City of Chicago. "One Chicago: Housing Strategies for a Thriving City Five Year Housing Plan 2019-2023", 37.
94. Doug Trumm, "Seattle Reveals Rezoning Concepts and Invites Scoping Comments for Big 2024 Update," The Urbanist, June 23, 2022, https://www.theurbanist.org/2022/06/23/seattle-reveals-rezoning-concepts-and-invites-scoping-comments-for-big-2024-update/.
95. Doug Trumm, "Seattle Reveals Rezoning Concepts and Invites Scoping Comments for Big 2024 Update,"
96. Doug Trumm, "Seattle Reveals Rezoning Concepts and Invites Scoping Comments for Big 2024 Update,"
97. Mayor's Press Office, "City Council Passes the Connected Communities Ordinance to Grow Economy, Make Streets Safer, and Promote Affordability" (City of Chicago, July 20, 2022), https://www.chicago.gov/city/en/depts/mayor/press_room/press_releases/2022/july/PassesConnectedCommunitiesOrdinance.html#:~:text=Designed%20to%20stimulate%20equitable%20development.
98. Mayor's Press Office, "City Council Passes the Connected Communities Ordinance to Grow Economy, Make Streets Safer, and Promote Affordability"
99. Adie Tomer, Joseph Kane, Jenny Schuetz, and Caroline George. "We Can't Beat the Climate Crisis without Rethinking Land Use."
100. The White House. "President Biden's Bipartisan Infrastructure Law." The White House, 2021. https://www.whitehouse.gov/bipartisan-infrastructure-law/.

References

Adie Tomer, Joseph Kane, Jenny Schuetz, and Caroline George. "We Can't Beat the Climate Crisis without Rethinking Land Use." Brookings. Brookings, May 12, 2021. https://www.brookings.edu/research/we-cant-beat-the-climate-crisis-without-rethinking-land-use/.

Agrawala, Shardul, Walid Oueslati, Ioannis Tikoudis, and Alexandros Dimitropoulos. "Rethinking Urban Sprawl: Moving towards Sustainable Cities POLICY HIGHLIGHTS." OECD, June 2018. https://www.oecd.org/environment/tools-evaluation/Policy-Highlights-Rethinking-Urban-Sprawl.pdf.

Bueno-Suárez, Carlos, and Daniel Coq-Huelva. "Sustaining What Is Unsustainable: A Review of Urban Sprawl and Urban Socio-Environmental Policies in North America and Western Europe." Sustainability 12, no. 11 (May 30, 2020): 1–36. https://doi.org/10.3390/su12114445.

City of Chicago. "Chicago Climate Action Plan: Our City. Our Future." City of Chicago, 2008. https://www.chicago.gov/content/dam/city/progs/env/CCAP/CCAP.pdf.

City of Chicago. "One Chicago: Housing Strategies for a Thriving City Five Year Housing Plan 2019-2023." City of Chicago, 2018. https://www.chicago.gov/content/dam/city/depts/dcd/Housing%20Programs/20733_37_5_Year_Plan_Report_final_WEB_C.pdf.

City of Chicago. "2015 Sustainable Chicago Action Agenda." City of Chicago, 2012. https://www.chicago.gov/content/dam/city/progs/env/SustainableChicago2015.pdf.

City of Seattle. "Seattle Climate Action." City of Seattle, April 2018. http://greenspace.seattle.gov/wp-content/uploads/2018/04/SeaClimateAction_April2018.pdf.

Dave, Seema. "High Urban Densities in Developing Countries: A Sustainable Solution?" Built Environment (1978-) 36, no. 1 (2010): 9–27. http://www.jstor.org/stable/23289981.

Eng, Emily. Where Zoning Allows Dense Housing in Seattle. May 3, 2018. The Seattle Times. https://www.seattletimes.com/business/real-estate/amid-seattles-rapid-growth-most-new-housing-restricted-to-a-few-areas/.

Flatow, Dana. "Density, Carbon Emissions, Transportation and Energy Efficiency." The University of Texas at Austin School of Architecture: Center for Sustainable Development. Accessed December 12, 2021. https://soa.utexas.edu/sites/default/disk/global_challenges/global_challenges/09_02_su_flatow_dana_paper_ml.pdf.

Fox, David. "Halting Urban Sprawl: Smart Growth in Vancouver and Seattle." Boston College International and Comparative Law Review 33, no. 1 (January 1, 2010): 43–59. https://www.downeybrand.com/wp-content/uploads/2019/09/Halting-Urban-Sprawl_-Smart-Growth-in-Vancouver-and-Seattle.pdf.

Hummel, Daniel. "The Effects of Population and Housing Density in Urban Areas on Income in the United States." Local Economy: The Journal of the Local Economy Policy Unit 35, no. 1 (February 2020): 27–47. https://doi.org/10.1177/0269094220903265.

Institute for Housing Studies at DePaul University. Map 2.1: Submarket Types (High-Cost, Moderate-Cost, Lower-Cost, Insufficient Data). 2018. Overview of Chicago's Housing Market. https://fiveyearplandata.housingstudies.org/meeting-2-affordable-rental-housing.html.

Mayor's Press Office. "City Council Passes the Connected Communities Ordinance to Grow Economy, Make Streets Safer, and Promote Affordability." City of Chicago, July 20, 2022. https://www.chicago.gov/city/en/depts/mayor/press_room/press_releases/2022/july/PassesConnectedCommunitiesOrdinance.html#:~:text=Designed%20to%20stimulate%20equitable%20development.

Metropolitan Mayors Caucus. "Climate Action Plan for the Chicago Region." Metropolitan Mayors Caucus, June 2021. https://mayorscaucus.org/wp-content/uploads/2021/06/RegionalCAP_primary_and_appendices_062321-02.pdf.

Moos, Markus. "The Velocity of Density: Can We Build More Sustainable Cities Fast Enough?" Sustainability 9, no. 12 (December 13, 2017): 2326. https://doi.org/10.3390/su9122326.

OECD. "Urban Density: Promoting Sustainable Development – Part 1." Rics.org. RICS World Built Environmental Forum, April 1, 2021. https://www.rics.org/eu/wbef/megatrends/urbanisation/urban-density-promoting-sustainable-development--part-1/.

Resnik, David B. "Urban Sprawl, Smart Growth, and Deliberative Democracy." American Journal of Public Health 100, no. 10 (October 2010): 1852–56. https://doi.org/10.2105/ajph.2009.182501.

Seattle City Council. "Seattle Climate Action Plan." City of Seattle, June 2013. http://www.seattle.gov/Documents/Departments/Environment/ClimateChange/2013_CAP_20130612.pdf.

Seattle Planning Commission. "Neighborhoods for All." Seattle Planning Commission. City of Seattle, n.d. https://www.seattle.gov/Documents/Departments/SeattlePlanningCommission/SPCNeighborhoodsForAll-ExecSummary.pdf.

Singh, Maanvi, and Oliver Milman. "Denser Cities Could Be a Climate Boon – but Nimbyism Stands in the Way." The Guardian. The Guardian, August 22, 2021. https://www.theguardian.com/us-news/2021/aug/22/cities-climate-change-dense-sprawl-yimby-nimby.

Soot, Siim, and Brendan Dodge-Hayakawa. "Chicago-Area Sprawl Revisited: The Role of Demographics, Prosperity and Homeownership with a Note on Sustainability." uofi.app.box.com. Metropolitan Transportation Support Initiative (METSI); Urban Transportation Center; University of Illinois at Chicago, 2013. https://uofi.app.box.com/s/3e18c6ilhya0ro88rivlwi7dkqthd66c.

The White House. "President Biden's Bipartisan Infrastructure Law." The White House, 2021. https://www.whitehouse.gov/bipartisan-infrastructure-law/.

Trumm, Doug. "Seattle Reveals Rezoning Concepts and Invites Scoping Comments for Big 2024 Update." The Urbanist, June 23, 2022. https://www.theurbanist.org/2022/06/23/seattle-reveals-rezoning-concepts-and-invites-scoping-comments-for-big-2024-update/.