

Improving Community Development through Sustainability and Affordable Sustainable Housing

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By

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ABSTRACT:

Sustainability is one of the most discussed topics in the world. Sustainability innovation and principles are immeasurable and are remarkably effective if, applied correctly. Such principles can impact governmental decisions making on national, state, and local levels. The values of sustainability can always be improved and shared among everyone, not just those with the economic resource to afford its techniques. This study investigated the importance of improving sustainable practices in low-income communities while creating affordable housing through data collection, analysis, and interpersonal surveys. It was found that investing in sustainable communities and affordable housing has both environmental and economic growth benefits all people will enjoy.

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Introduction:

Sustainability has several definitions ranging from humans' interaction with the environment, to preserving natural resources. Over time, the meaning has evolved past preserving resources and shifted towards limiting and restoring resources that have been captured. Today, the most common characterization of sustainability is in line with creating sustainable developments. The term 'sustainable development' was established by the Brundtland Commission of the United Nations in 1987. This Commission defines sustainable development as: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." For something to be sustainable it must balance how it meets human needs without ignoring the natural environment. The concept of sustainability and sustainable development could not be more imperative to how, and where humans live. Our communities are the backbone to a functioning society; without sustainable communities the resources needed to help make communities thrive would dissolve affecting the cost of living and other everyday essentials.

Thesis Statement / Question:

Knowledge of the importance of sustainability is gaining traction worldwide and is working its way into many communities, but not all communities. This research study hopes to enlighten community leaders, those wanting to make changes in their communities, and those looking to invest in low-income communities to create more sustainable environments with affordable housing.

The most asked questions are, how much would a sustainable community cost? Is there any benefit to investing resources into low-income communities? Is affordable low-income sustainable housing achievable? This research study will attempt to answer these questions through analyzing research data, engaging with those living in low-income communities, and reviewing what others in the field have observed.

Literature Review:

Populations Attributes and Demographics:

The U.S. population is increasing; most projected calculations are based on previous census data taken every 10 years. What is known from these census data surveys is that people are living longer. According to recent reports from the U.S. census, Americans are projected to have longer life expectancies in the coming decades. By 2060, life expectancy for the total population is projected to increase by about six years, from 79.7 in 2017 to 85.6 in 2060. With the increase in life expectancy, natural resources are in danger of being diminished predictably by six times.

The increase of life expectancy effects in the economy creates a greater division among social class putting more people and families into the lower-income classes. However, there is a silver lining, reported from the Census Bureau, “the official poverty rate in 2019 was 10.5 percent, down 1.3 percentage points from 11.8 in 2018.” According to their records this is the fifth consecutive annual decline in poverty and low-income classes. The relationship between population growth and growth per capita income is clear; the per capita income equals total income divided by population. The growth rate of per capita income generally equals the difference between the growth rate of income and population growth rate. If the nation’s population continues to expand at the same rate as the past 50 years, economic growth is less likely to translate into improvement in the average standard of living.

According to Statista Research Department, in a report from January 2021, “about 33.98 million people were living at or below the poverty line, which correlates to 7.8% poverty rate of families and 14.4% child in the US.” Statista defines poverty as “the state of a person or group of people that lack a specific amount of money or material possessions.” I would define poverty (low-income) as groups of people living without the ability to be financially self-sustaining, access to food, education, health resources, without adequate clean water, and sanitation.

Pew Research Center states: “Nearly one-third of American households, 29%, live in “lower class” households. Pew continues to suggest “lower class adults whose annual household income is less than two-thirds the national median. That is after incomes have been adjusted for household size, since smaller households require less money to support the same lifestyle as larger ones.” The share of U.S. adults considered lower class varies depending on where you live. Pew also notes that: “The metropolitan areas with the largest shares of lower-income adults are located primarily in the Southwest.”

The data clearly shows the astonishing figures that the U.S. is trending in a direction that could put eventually place more people and families into undesirable situations. Knowing this is happening in one of the wealthiest economies in the world, having people living on the streets

unable to receive the necessary resources to help themselves is unacceptable. Expanding resources, introducing sustainability, investing in communities with a higher concentration of poverty and low-income stricken communities is essential to propelling these groups up.

Sustainable Communities:

In the Journal, *The Next American Metropolis*, Peter Calthorpe reflects on the Ecology, Community, and the American Dream. He establishes that every American envisions what their American Dream would be. Such as where they would live, what size home they will own, what kind of career they will obtain, and the list goes on. What stands out is how relatable the author's American dream vision is my efforts to improve sustainable developed communities and affordable housing. His depiction of the evolution of the American Dream maps the changes in how people view communities is thought provoking. In the book Calthorpe states, "The American Dream is an evolving image, and the American Metropolis is its ever-changing reflection. The two feed one another in a complex, interactive cycle. At one point a dream moves us to a new vision of the city and community, at another the reflection of the city transforms that dream with harsh realities or alluring opportunities ." This statement could not be truer in the sense that the opportunity to invest and changing lives through sustainable enrichment for low-income communities is within our grasp. How we handle sustainable development reflects not just the focused community but the surrounding communities. The aspiration to improve communities through sustainability changes the systemic patterns of our society that are becoming more fractured. Without realizing many communities have created segregation of various degrees, which is increasingly isolating people without the ability to create diverse network connections.

I believe practices of sustainable community development would best service the low-income groups. Many case studies have shown that sustainable principles have improved the populations' health, economy, and uses of natural resources. The United States Environmental Protection Agency, EPA Administrator – Lisa Jackson states, "A clean, green, healthy community is a better place to buy a home and raise a family; it's more competitive in the race to attract new businesses; and it has the foundations it needs for prosperity."

Some states have already made efforts to change course take for example Maryland. Maryland's Department of Housing and Community Development's Sustainable Communities Program. (MDHCDSCP) This program is a place-based designation offering a comprehensive package of resources that support holistic strategies for community development, revitalization, and sustainability. The Department of Sustainable Communities provides local governments the framework advocating for environmentally, economically, and socially responsible growth and development in established older communities. According to the Maryland Department of Housing and Community Development, "The Sustainable Communities Act (SCA) of 2010 establishes a shared geographic designation to promote efficient use of scarce State resources

based on local sustainability and revitalization strategies. The Sustainable Communities program consolidates geographically targeted resources for historic preservation, housing, and economic development under a single designation. The designation places special emphasis on infrastructure improvements, multimodal transportation and development that strengthens existing communities.” The SCA provides guidelines as follows:

- Development of a healthy local economy.
- Protection and appreciation of historical and cultural resources.
- A mix of land uses.
- Affordable and sustainable housing, and employment options.
- Growth and development practices that protect the environment and conserve air, water, and energy resources.
- Encourages walkability and recreation opportunities, and where available, create access to transit.

This type of government involvement is a model to strive for. Another resource that provides a compelling argument on improving of community development through sustainable practices comes from the (EPA). These informative practices are as follows:

#1: Facilitate Meaningful Community Engagement in Planning and Land Use Decisions. Having the community involved in the planning phase and voting to make decisions establishes trust and reassurance that the community’s needs are being met. Each community is different and has different needs. A high-income community may need one thing, but on the other side of town, in a lower- income community they might need that one thing plus more. There should not be a one size-fits all in sustainable development.

#2: Promote Public Health and Clean and Safe Environment. Creating a clean community environment involves more than picking up trash along the road or in the parks. It involves finding ways to reduce the carbon footprint. It involves creating green spaces. It involves cleaner more efficient planning and land use. It involves creating clean public transportation. The cleaner the environment is the healthier the community is the safer the community becomes.

In many low-income communities, these steps are challenging due to existing design planning. Most low- income communities are interrupted by highway systems, and near manufacturing facilities. In both cases, these environments are not particularly clean nor safe. The EPA suggests that communities should “Clean and reuse contaminated properties – specifically, brownfields and Superfund sites – in ways that support the community’s vision for the future. This can be critical to revitalize neighborhoods and increase access to needed amenities in established communities.”

#3: Strengthen Existing Communities. Redevelopment of communities and reclaiming areas lost are sustainable practices rarely used in low-income communities. Some find it easier to tear down and rebuild, rather than redevelop and redesign. Each community holds a history

that should be preserved. The integration of old has its advantages and disadvantages, such as cost savings in a prime location where the best advantages for redevelopment practices are. Unknown site conditions and lay restrictions are a few disadvantages of new development. Sustainable practices take advantage of the existing. Depending on the scope of work and location, while developing multi-family housing units, the cost to develop new construction was approximately \$40,000 to \$70,000 (25 to 45%) higher per unit than rehab existing properties.

#4: Provide Housing Choices. Providing affordable housing options allow people and families of all income to live in proximity of career opportunities, and valuable resources and services. According to the EPA, “Preserving affordable housing using tools like deed restrictions, housing trust funds, rehabilitation assistance, and Low-Income Housing Tax Credits can maintain housing choices and access to opportunities for low and moderate-income families in revitalizing areas and catalyze investment in struggling neighborhoods.” These findings are just a few out of many ways to improve community development through sustainability. Low-income communities are far more disadvantaged, and the available resources are not always the answer as they cause gentrification. People and families should not be displaced based on what they can afford. Families and people move based on advancing to better opportunities. Rehabbing communities is not a threat of taking over communities. It is a way for communities to invest resources to create better opportunities to enrich communities and empower them to self-sustain.

Affordable Sustainable Housing:

Low-income residents and their families need shelter that is affordable and sustainable. This section investigates affordable housing and programs to assist these residents. When thinking of low-income people and families which structure best accommodates the increasing number of people looking for assistance? Which building structure best fits into the sustainable model? The American Dream typically envisions a large home with a white picket fence, and a nice full green yard. This description is unachievable for low-income individuals and their families, even for those in the “middle- class.” Sustainability teaches us to live modestly, not to take more than what is needed. Sustainable housing should follow this modestly but still reflecting the culture and style of the community.

To answer the two above questions, I believe, the research collected will support that multi-family mixed-use dwellings are the best approach to affordable, sustainable housing. This type of living may not provide single-family private spaces and yard space, but sustainable mixed-use development provides communities with shared green spaces. EPA suggests: “Affordable, healthy, high-quality housing is one of the basic elements of a sustainable community. It is important to provide decent homes in safe neighborhoods, convenient to jobs, good schools, and daily necessities for people of all income levels, family sizes, and stages of life. Having a variety

of housing price points and types, including rental apartments, townhouses, and large and small single-family homes, can ensure that everyone—from a young person living on her own for the first time, to a working family, to a retired couple—can find an affordable place to live.”

Maintaining attractive housing in low-income communities is essential. The affordability of housing helps stabilize low-income populations. It creates a sense of belonging with access to new opportunities and better quality of life. What I found interesting while reading the case study by the EPA is that: “Building new affordable housing is another way to expand housing choices for low- and moderate-income households and is important not only in neighborhoods with sizeable low-income populations, but also in more affluent communities currently lacking housing opportunities for low-income earners, young people, and seniors.” This is interesting because their approach takes segregation practices out of the scenario. If done correctly, their approach will bring people from different backgrounds together to develop stronger communities. In Peter Calthorpe’s book – *The Next American Metropolis*, he states: “Affordable housing must start with affordable neighborhoods.”

Legislation in many cities have established programs to assist low-income individuals and families such as inclusionary zoning, updated land use regulations, and Low-Income Housing Tax Credits. In Montgomery County, Maryland the county adopted one of the first inclusionary zoning programs in the country in 1974 producing over 100,000 affordable units. With the Counties Moderately Priced Housing law requires “12.5 to 15 percent of the units in large new developments be moderately priced and that 40 percent of those units be offered to the county and nonprofit housing agencies for low- and moderate-income families” (Montgomery County Department of Housing and Community Affairs Moderately Priced Dwelling Unit Program). In nearby Washington D.C., their inclusionary zoning program requires that 8 to 10 percent of all new residential development be affordable housing units or 50 to 75 percent of the additional units the developer can build in exchange for creating affordable housing. (District of Columbia Department of Housing and Community Development. Inclusionary Zoning Affordable Housing Program). In Washington State, community development corporations are assisting in the Affordable Housing efforts.

According to the U.S. Department of Housing and Urban Development, The Umpqua Community Development Corporation worked with Roseburg, OR. Local Initiatives Support Corporation converted a former hotel in downtown Roseburg into a mixed-use development with retail on the ground floor and 37 housing units upstairs. With \$3.2 million generated from Low-Income Housing Tax Credits, \$1 million from historic rehabilitation tax credits, and other funding, Umpqua ensured that 33 of those units are affordable to very low- and moderate-income. It is important to note that state and local governments cannot act alone. They have jurisdiction to pass laws and provide tax incentives, but it takes private corporations, land developers, and housing developers to invest in affordable housing.

According to Investopedia.com, an article titled [Affordable Housing: Investing for Profit](#) written by Denis Finney provides a perspective from the private investors, stating: “An

investment in affordable housing can be both a business and an investment strategy.” Finney provides some key takeaways that investors should know about, as follow:

- Affordable housing is included in the portfolios of many property investors largely because of the associated government tax credits.
- Property investors interested in affordable housing should ensure that such an investment is profitable and marketable in their area.
- Investors should calculate the costs involved in buying, renovating, and maintaining affordable housing to determine whether it is a viable investment proposition.
- Ideally, an investor will have the best properties in desirable areas at good prices to ensure adequate demand and profitability.

These key points are imperative for investors to understand as they make decisions entering affordable housing projects.

Brumer suggests that “the lack of affordable housing has been a growing issue since the Great Recession. Recently mainstream media has directed attention to this problem, actively publicizing it as a national crisis that only seems to be getting worse. While policymakers attempt to find a long-term solution to this problem, their process for initiating and funding new policies can be long and arduous.” She goes on to state: “There is an opportunity for the private sector, including real estate investors, to help increase the supply of affordable housing while potentially receiving positive tax benefits and risk-adjusted returns.”

According to The Center on Budget and Policy Priorities, four in 10 low-income people are either homeless or spend 50% or more of their income on housing. The National Low Income Housing Coalition (NLIHC) found that the United States needs more than 7 million affordable homes to meet the current housing demand for the nation's more than 11 million extremely low-income families. Knowing there is a need for affordable housing the challenge is to make them sustainable. Sustainable housing is about creating eco- friendly, energy-efficient homes that will not drain the natural resources but will also meet the occupants’ needs. There are many approaches to fulfill sustainable housing. Some approaches are government-sponsored, others are by private developers, the individual can do some in a few cases.

In the Department of Housing (HUD) creation of the sustainable housing acts, according to HUD, “Secretary Shaun Donovan announced the launch of the Office of Sustainable Housing and Communities in February 2010, he committed the agency to supporting the construction and rehabilitation of green affordable housing, recognizing that affordable homes should be located close to transportation, jobs, and schools and designed to maximize health and environmental benefits. The Sustainable Housing Initiative, within the Office of Sustainable Housing and Communities, helps to coordinate intra- and inter-agency energy-efficiency and green building goals and initiatives for the Department.” In late 2011 HUD’s Office of Multifamily Housing Programs issued a NOFA for the Multi-family Energy Innovation Fund. This fund provided \$25

million in grants to be used for the purpose of energy efficiency upgrades at multifamily properties.

What do energy-efficient upgrades look like? Energy-efficient housing investigates a home's energy weak points, control airflow, window systems performance and proper insulation. Energy-efficient homes are designed to maintain low flow rates. If the resources are available smart timers and switches will benefit the home's electrical usages.

Choosing low-flow fixtures will save money (see figure 11). Considering rainwater collection and storing it in underground tanks for the use of toilets and watering gardens. The water can be treated and filtered for other uses in the home. Through passive design, the properties can use the sun to supplement energy cost along with shading and wind protection. Sustainable features and technologies incorporated into the initial design and construction will reduce the costs of future retrofiting. Sustainable design principles, and the right construction methods and materials, will have a considerable effect on the overall cost.

Each sustainable building strategy must be applied at the appropriate stage of the project to avoid closing options. For example, not much can be done to affect the property's orientation after the framing is completed. However, much can be done during the property design, and even more during the layout of the project. In some existing low-income areas, passive site orientation may not be applicable. However, some existing properties can become sustainable and energy efficient. Building Sustainable Homes research has shown that building to the 2016 zero-carbon energy standard added up to 12.9% onto build costs.

Research Methodology:

This section describes the data gathering and analysis processes used in this report. It is organized into; Survey Data and Analyzing Data. The reviews of data and research provided for this study come from many sources. The collected data uses analytical research qualitative and quantitative methods to investigate how to improve the development of sustainable communities along with in-depth observation of analyzed data on the investments required to provide sustainable affordable housing for the low-income communities. The assortment of research data collected comes from expert articles, journals, and government databases such as The Department of Housing (HUD.gov). It is important to examine the total population living in low-income communities and look income requirements are to be classified as low-income. The research will investigate which type of housing format is common in the low-income communities. Interviews were conducted with residents in Dallas, TX, to collect their accounts of living in low-income communities. The following results provide an outlook on what low-income

communities are lacking. The charted data below should act as a visual aid of the trending need for sustainable practices in low-income communities and sustainable affordable housing.

Survey and Data Collection:

The research and surveys introduced to close family and friends and national survey databases show that sustainable practices would benefit low-income areas. According to the Southern Crescent Habitat for Humanity, sustainable housing system look to cut energy cost. A few benefits from sustainable practices could/ would improve livable comfort levels year-round, a better long-term investments, provide more durable housing, decrease the cost of living regarding the efficient use of natural resources. The type of housing that benefit the most from sustainable practices would be attached housing such as condos and apartments, or even attached housing or row housing.

Survey:

Survey questions asked: (sample size 15 participants)

Which type of housing would benefit low-income groups of people?

The use of sustainable practices is beneficial for those in low- income areas?

Are you satisfied with how your current city governments are managing low-income areas?

If not, please explain way?

What factors should be improved or is important in creating sustainable low-income areas?

Results:

Of those that responded in a timely manner, the results are common. Most feel that the government has not done enough to improve the low-income areas and that creating sustainable living in any form would be beneficial. Of those interviewed 90% say they would like to see communities with mixed development mean not just single-family home, and not just apartment style. They would like to live in a community with diversity. One individual surveyed mentioned: "I would like to live in a community like New York as far as being able to live over a coffee café but have the lifestyle of living in New Orleans." Another individual surveyed mentioned: "I would like to see our communities better managed, even have high systems relocated out of our community." " I would also like to see more green spaces, and the local governments hire with the community to work in the Park and Recreation Department."

100% of those interviewed shared their sentiment that low-income communities would benefit from investors redevelop the community to meet sustainable requirements. However, they fear that once the community is completed, they will be forced to pay higher taxes and then displaced due to failure to pay. Incentive programs are just the first step. Local and state governments need to find funding to keep people and families in their homes. The most diverse question result received comes from the question: What factors should be improved or is important in creating sustainable low-income areas? Those surveyed did not know much about sustainability or how it is used. 85% say they wanted to improve transportation, 70% wanted to see more green spaces, and 30% wanted to see a complete teardown and all new development. 85% wanted improvements to the infrastructure. After the record winter blast in TX that killed power to hundreds of thousands of people, 100% of those interviewed wanted back-up energy system, and free solar panel. Funding for the last items may be difficult, However, these interviews demonstrate that people are interested in sustainable affordable development in their communities. Some work has shown that suburban houses, according to data in one Australian study (conducted by coauthor Cox's consultancy), use less energy than do the dwellings of inner-city urbanites. As British scholar Hugh Byrd noted, suburban roofs would be ideal places to site photovoltaic solar technology. In the future, he suggests if this usage becomes commonplace, "suburbia will have a renewed role as both a collector and supplier of energy, a characteristic that cannot be achieved in the higher density areas." Additionally, according to Energy Star, multi-family housing has a source EUI of 127.9 kBtu/ft². The data for single family homes do not have a record presently. By creating attached living spaces for low-income area, we can track and collect data on energy usage and how to make it more sustainable. While there are benefits of improving sustainable housing, a comprehensive (U.S.) report confirms that minimal increases in upfront cost of 0-2% to support green design will result in life cycle savings of 20% of total construction costs- more than ten times the initial investment. In other words, an initial upfront investment of \$100,000 to incorporate green building features into a \$5 million project would result in a saving of \$1 million over the life of the building. These findings may cause some pause, it is important to strive for mixed-used development. According to the Center on Budget and Policy Priorities, there has been a decrease in assisted housing for families with children from 2004-2015. In 2004 the data shows a 50.68% assisted living for families with children. By 2015, the percentage dropped to 46%. What caused the drop? Possibly the Housing Choice Voucher Program. The government should create sustainable housing and energy-efficient housing, making a way for those living in these houses be more affordable.

Conclusion:

Efforts to assist low-income communities are an ongoing challenge. These communities should not be discarded or be gentrified. Creating sustainable communities in low-income areas is an economically efficient approach. This allows people to assist in the development of their

communities. Who knows what a community needs more than the individuals living in them? The challenges low-income families face is their inability to own property as opposed to renting. The incentive of developing affordable housing is quickly gaining popularity in mixed-use developments. Single family homes are still desirable, but land in some low-income communities is currently not planned for such development. There is overwhelming data that shows how low-income communities would benefit from sustainable intervention; they lack the required investment and financial capital. Governments have just begun resourcing these communities to the right a wrong done decades ago with redlining and the Highway Act of 1956. There is much to improve on in finding methods of reducing the production of sustainable materials. Affordable housing has vastly improved over the years. Different organizations and government programs are working together to find funds to develop affordable housing. The next step in affordable housing is to include sustainable principles like making these affordable home sustainable. Through technology advances, properties should be Net Zero. We have much to do and little time to act. The population is increasing, the economy is not showing growth, and low-income communities are waiting for solutions. We as sustainable professionals need to act and be proactive. Earth is ours to protect, and it is the only one we have, we must share it.

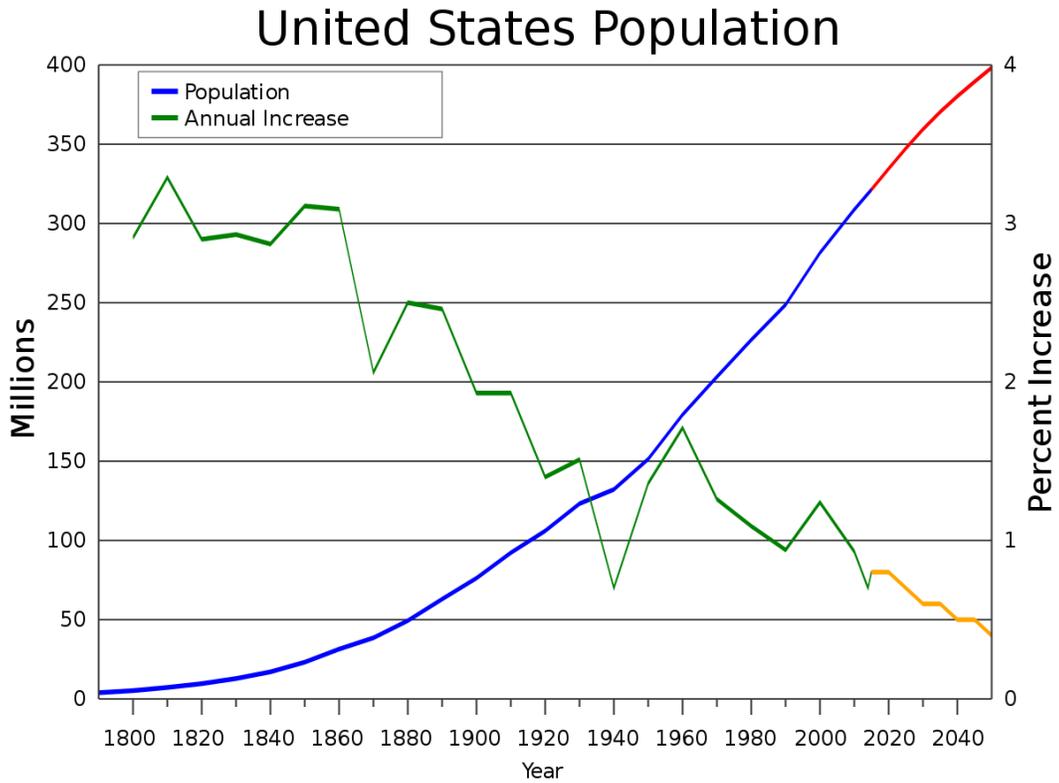


Figure 1: This image shows the projected population growth of the United States beyond 2020. The graph also shows the Annual increase or birth rate.

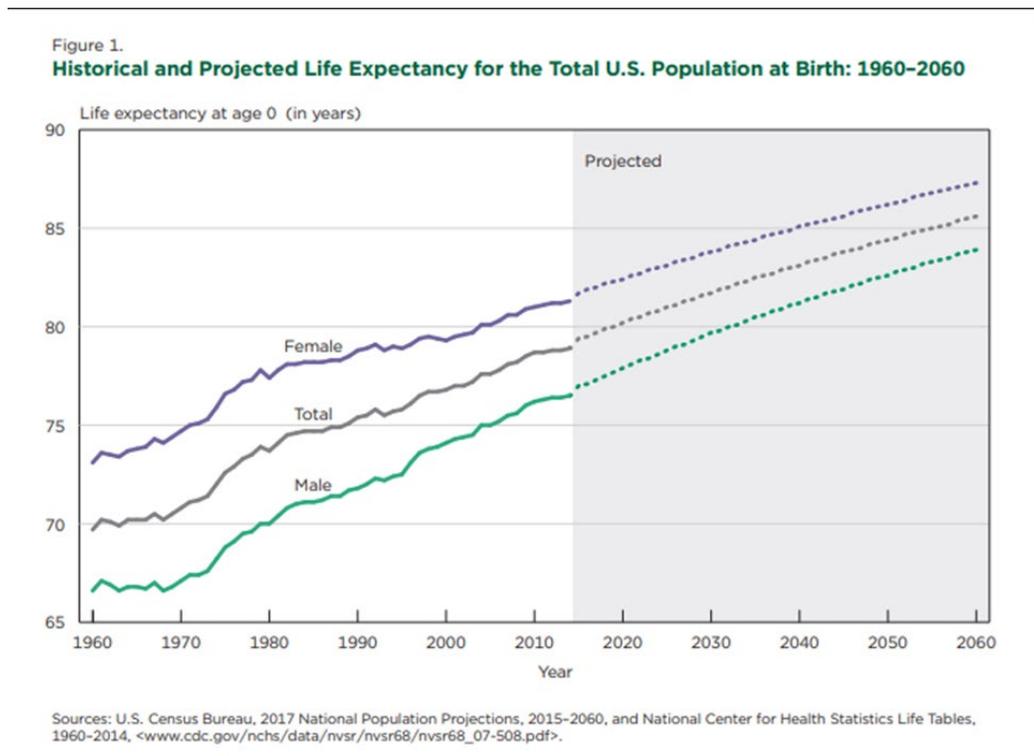


Figure 2: Displays a chart of the projected increase of longevity in the United States.

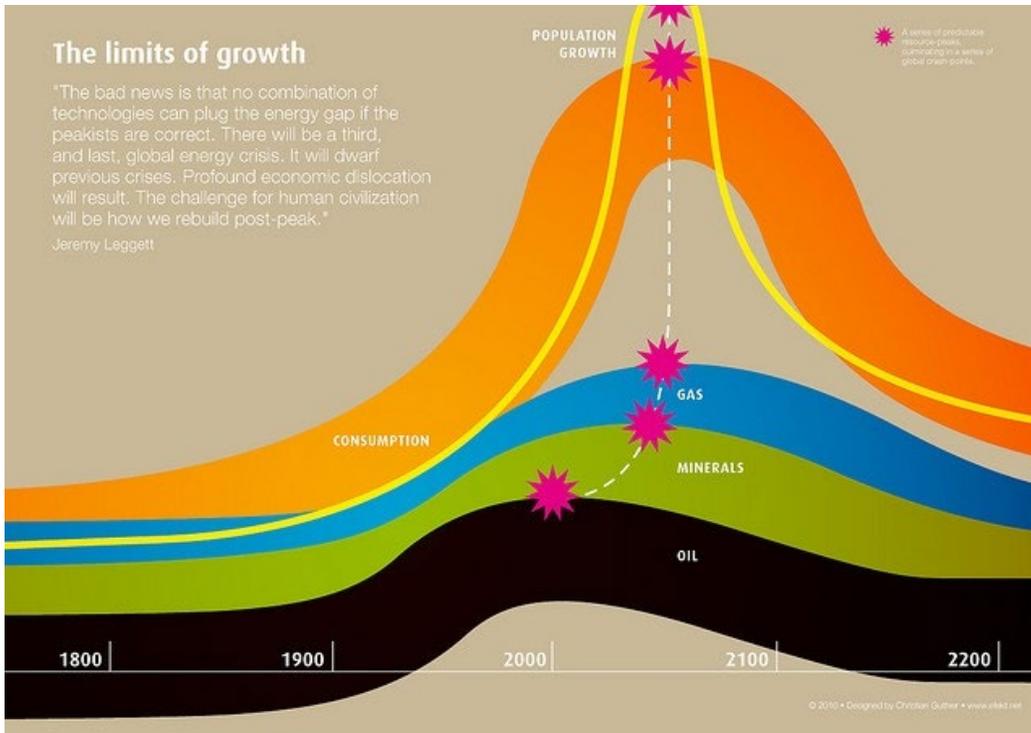


Figure 3: The image show the relationship of population growth and the natural resources consumption.

Map 2.1

Low income areas of the contiguous 48 United States (1 km grids in which 40 percent of population have incomes below 200 percent of the Federal poverty level)

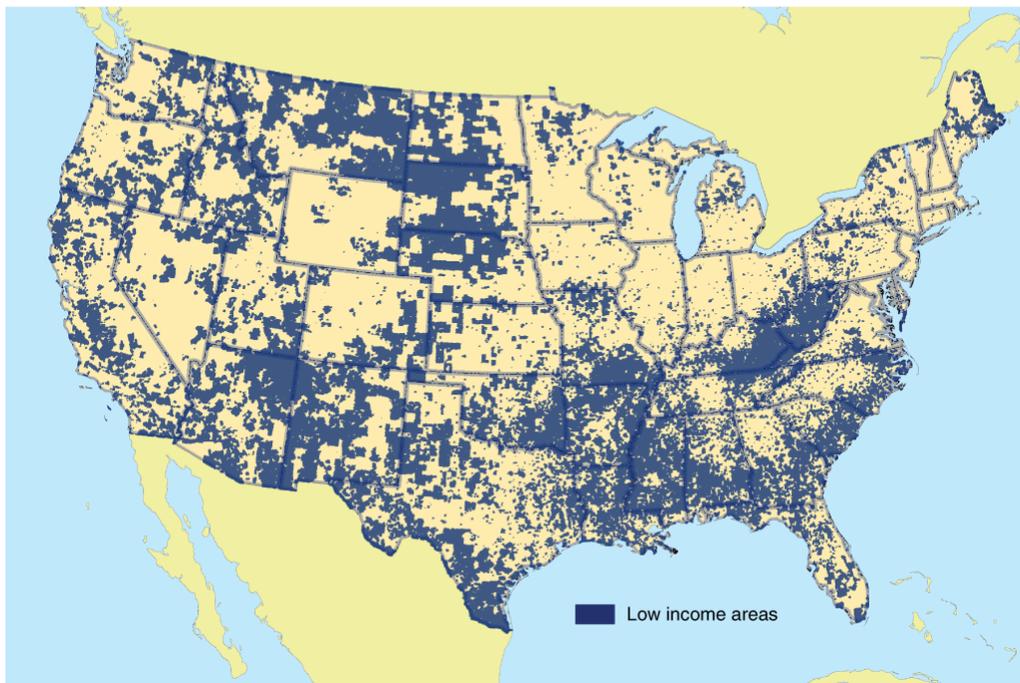


Figure 4: shows the United States Low-income. Most of the concentrated low-income areas in the southeast. But as population expands, the blue area will increase.

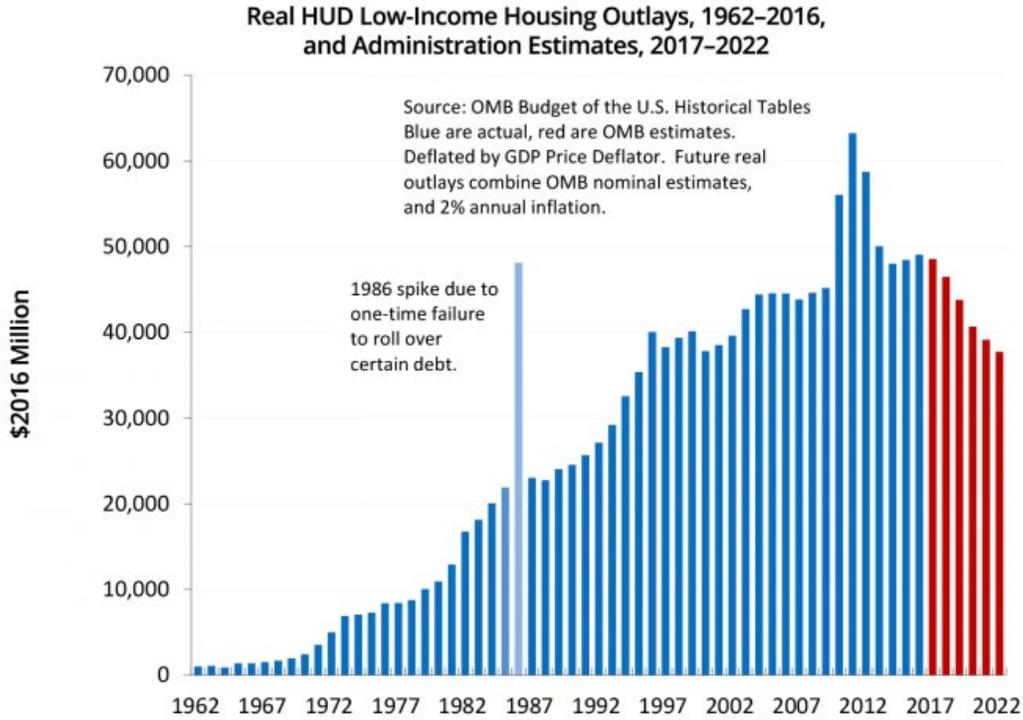
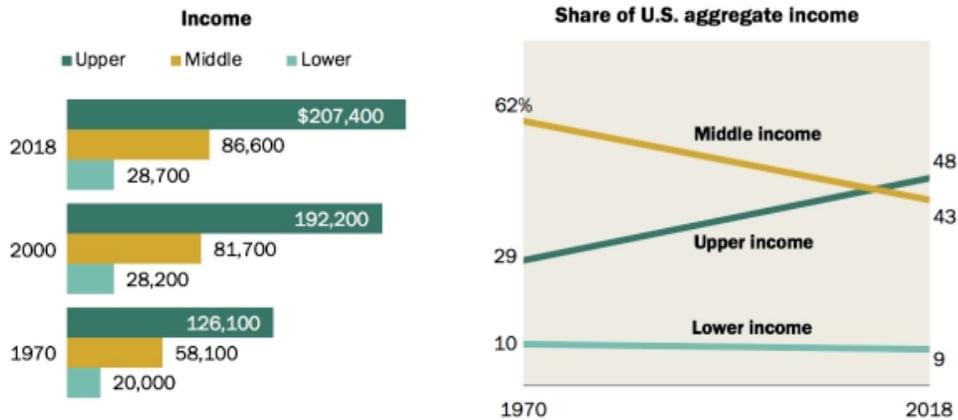


Figure 5: Displays the HUD projections of Low-income Housing. This data was take before Covid-19. So the projection is subject to change.

The gaps in income between upper-income and middle- and lower-income households are rising, and the share held by middle-income households is falling

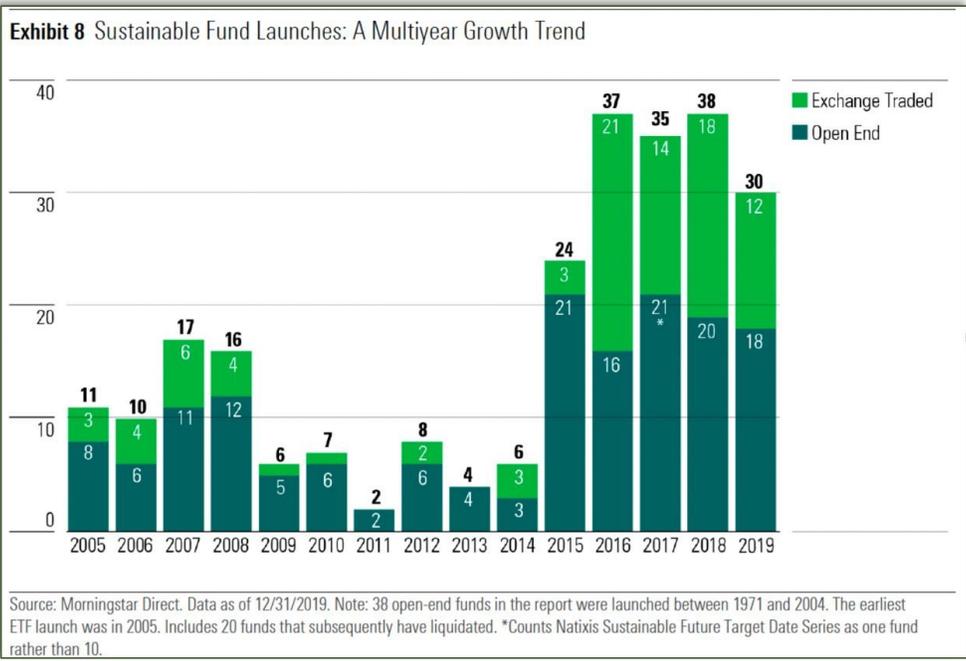
Median household income, in 2018 dollars, and share of U.S. aggregate household income, by income tier



Note: Households are assigned to income tiers based on their size-adjusted income. Incomes are scaled to reflect a three-person household. Revisions to the Current Population Survey affect the comparison of income data from 2014 onwards. See Methodology for details.
Source: Pew Research Center analysis of the Current Population Survey, Annual Social and Economic Supplements (IPUMS).
"Most Americans Say There Is Too Much Economic Inequality in the U.S., but Fewer Than Half Call It a Top Priority"

PEW RESEARCH CENTER

Figure 6: Income separtion among the classes. Pew Research Center.



Sustainable Fund Launches: A Multiyear Growth Trend. Graph from Jon Hale, Ph.d, CFA, "Sustainable Funds U.S. Landscape Report: Record Flows and Strong Fund Performance in 2019," Morningstar, February 2020.

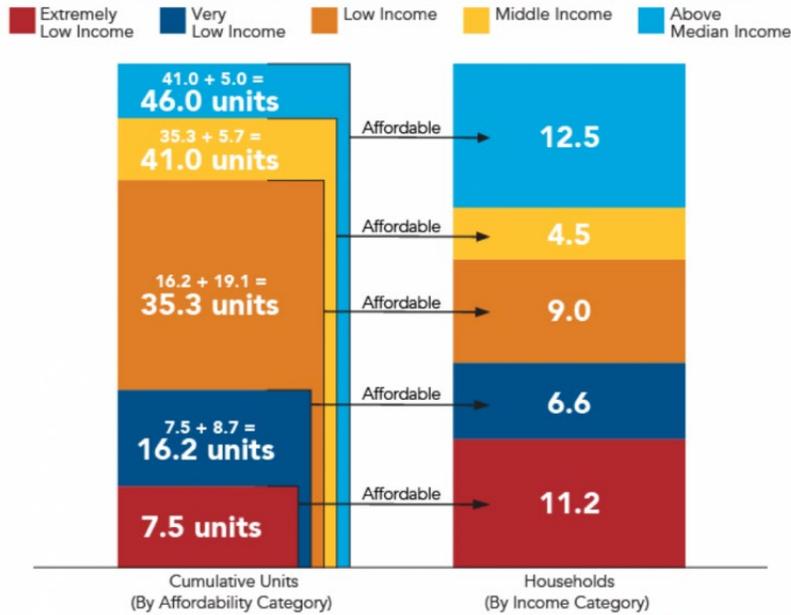
Figure 7: Displays the Sustainable Funding Trend.



Figure 8: This is a concept drawing of what Sustainable Communities look like and what is included.

THE GAP

FIGURE 1: RENTAL UNITS AND RENTERS IN THE US, MATCHED BY AFFORDABILITY AND INCOME CATEGORIES, 2016 (IN MILLIONS)



Source: NLIHC tabulations of 2016 ACS PUMS data.
©2018 National Low Income Housing Coalition



Figure 9: Displays Affordable housing of renters and rental units by income levels.

Affordable Rental Housing 2017 Income Limits					
The 2017 Income Guidelines for Orange County are listed below for your general information only. Please note that income limits vary between and within projects, and the exact limit will be specified on the vacancy notices that are mailed out.					
Household Size	HCD Income Limit		HUD Income Limit		Multifamily Tax Subsidized Projects
	50% Income Level	60% Income Level	50% Income Level	60% Income Level	
1	\$ 36,550	\$ 58,450	\$ 36,550	\$ 43,860	
2	\$ 41,750	\$ 66,800	\$ 41,750	\$ 50,100	
3	\$ 46,950	\$ 75,150	\$ 46,950	\$ 56,340	
4	\$ 52,150	\$ 83,450	\$ 52,150	\$ 62,580	
5	\$ 56,350	\$ 90,150	\$ 56,350	\$ 67,620	
6	\$ 60,500	\$ 96,850	\$ 60,500	\$ 72,600	
7	\$ 64,700	\$ 103,500	\$ 64,700	\$ 77,640	
8	\$ 68,850	\$ 110,200	\$ 68,850	\$ 82,620	

Source: California Department of Housing and Community Development (HCD)

Source: U.S. Department of Housing and Urban Development (HUD)

Figure 10: Displays the Orange County Affordable Housing Income Limits.

Table 4: Expected Savings from Energy Efficiency Features

Feature	Est. Annual Savings
R-30 Attic insulation	\$350
R-11 Wall insulation	\$743
Dual-glazed windows	\$2,800
Refurbish soar-assist hot water heater	\$1,600
Programmable thermostats	\$410
Fluorescent lighting	\$1,340
Efficient kitchen ranges	\$1,800
Energy Star refrigerators	\$1,700
Air sealing	\$390
Low flow water fixtures	\$240
Total	\$11,375

Table 5: Operating Costs

Operating Cost Category	Traditional usage	Traditional costs	Green usage	Green costs	Operating Savings
Electricity (kwh)*	no data	\$15,600	no data	\$6,065	\$9,535
Gas (Therms)**	12,429	\$10,162	10,309	\$8,461	\$1,701
Water (gallons)***	no data	\$20,514	no data	\$20,274	\$240
Total		\$46,276		\$34,800	\$11,476

* Traditional electricity costs are from actual records. Green costs are estimated from the Syska and Hennessy model.

** Green gas usage is estimated based on actual expenditures from 2002-2003. Traditional usage are from actual records from pre-rehab. Traditional expenditures are traditional usage amounts at 2002-2003 rates.

*** Green water costs are from actual expenditures from 2002-2003. Traditional expenditures are the green costs plus the expected savings from the model.

Figure 11: Expected cost and saving of creating sustainable energy-efficient practices.

Table 1: Median Initial and Adjusted Total Development Costs Per Unit

	All	AR	NC
Number of Projects	269	125	144
Initial Total Development Costs Per Unit	\$136,235	\$120,884	\$159,022
Number/Percent Requiring a Lifecycle Cost Adjustment	127 (47%)	56 (45%)	71 (49%)
Median Lifecycle Cost Adjustment Per Unit (excluding zeroes)	\$5,412	\$5,107	\$6,022
Median Adjusted Total Development Costs Per Unit	\$138,596	\$122,051	\$161,489

Figure 12: Sustainable Community Development example cost.

Figure 1: Market Rate versus Affordable Housing



Figure 13: Cost comparison of conventional housing and affordable housing.

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