EcoVillages as Models for Sustainable Urban Neighborhoods:
Design Guidelines and Methods for Understanding, Analyzing and Designing Sustainable Communities

by

Samantha Rebecca Cohen

B.S. Civil and Environmental Engineering
Massachusetts Institute of Technology, 2011

Submitted to the department of urban studies and planning in partial fulfillment of the requirements for the degree of
MASTER IN CITY PLANNING
at the
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
June 2017

© 2017 Samantha Rebecca Cohen. All rights reserved.

Signature redacted

Certified by: __

Certified by: __

Approved by: __

The author hereby grants to MIT permission to reproduce and to distribute publicly paper and electronic copies of this thesis document in whole or in part in any medium now known or hereafter created.
Ecovillages as Models for Sustainable Urban Neighborhoods:
Design Guidelines and Methods for Understanding, Analyzing and Designing Sustainable Communities

by

Samantha Rebecca Cohen

Submitted to the Department of Urban Studies and Planning on May 24, 2017 in Partial Fulfillment of the Requirements for the Degree of Master in City Planning

ABSTRACT

Ecovillages, which are grassroots intentional communities focused on the shared values of environmental sustainability and community-building, offer an alternative to traditional development primarily focused on developer profit, which creates incentives to build cheaply with little consideration for sustainability, reducing operating costs, creation of community or innovation in building techniques. The problem with modern development practices is that there is an absence of truly sustainable, community-oriented housing options on the market that are economically empowering, socially just, and which enhance the ecology of place by building all forms of capital—economic capital, social capital, and environmental capital. Ecovillages provide a solution to this, as well as many other ‘wicked’ problems our society faces—they are blueprints for how communities can live sustainably.

This thesis explores the best practices in ecovillage urban design in urbanized and rural settings to improve the design of current and future ecovillages and to use as a design model communities or designers in building sustainable communities, as urban design is inherently linked to sustainability. Through the creation of a matrix of sustainable urban design strategies, this can be used to compare various ecovillages and sustainable communities to understand and analyze how values are embodied in the physical site design or constrained by urban site conditions, and give a process and design guidelines to designers and communities looking to create sustainable neighborhoods or ecovillages.

Thesis Co-Supervisor: Mary Anne Ocampo
Title: Lecturer of Urban Design

Thesis Co-Supervisor: Rafi Segal
Title: Associate Professor of Architecture and Urbanism
I. Table of Contents

I. TABLE OF CONTENTS .............................................................................................................................. 3

II. INTRODUCTION ......................................................................................................................................... 5
    A. RESEARCH OBJECTIVE .......................................................................................................................... 5
    B. RESEARCH QUESTIONS ....................................................................................................................... 6
    C. RELEVANCE ......................................................................................................................................... 6

III. METHODOLOGY ......................................................................................................................................... 6
    A. RESEARCH STRATEGY .......................................................................................................................... 6
       1. Community Sustainability Matrix .................................................................................................. 7
       2. Case Studies .................................................................................................................................... 7

IV. LITERATURE REVIEW ............................................................................................................................ 11
    A. DEFINITIONS, CONTEXT AND FRAMEWORKS .................................................................................... 11
       1. Intentional Communities .............................................................................................................. 11
       2. Sustainability .................................................................................................................................. 14
    B. THE SUSTAINABILITY MOVEMENT ................................................................................................. 19
       1. Urban Design Theories and strategies ............................................................................................ 19
       2. Sustainable Economic Movements ............................................................................................... 22
    C. HISTORY OF INTENTIONAL COMMUNITIES AND SOCIAL EXPERIMENTS IN LIVING ............ 24
       1. A brief history of intentional communities .................................................................................... 24
       2. What we can learn looking back .................................................................................................... 26
    D. HISTORY OF ECOVILLAGES AND THE ECOVILLAGE MOVEMENT ........................................... 27
    E. MODERN INTENTIONAL COMMUNITIES, ECOVILLAGES AND COHOUISING COMMUNITIES .... 28
       1. A Brief Survey of Ecovillages ....................................................................................................... 29
       2. Ecovillage Types ............................................................................................................................ 29
       3. Governance and Decision Making ................................................................................................. 30
       4. Urban Ecovillages ........................................................................................................................... 31
    F. IMPORTANCE AND RELEVANCE OF ECOVILLAGES .................................................................... 32
       1. Ecovillage Impact ............................................................................................................................ 32
       2. The problems ecovillages can address ............................................................................................ 32
    G. ECovillage Creation and Dissemination .............................................................................................. 34
       1. Grassroots Diffusion, Innovation and Transition Theory Literature .............................................. 35

V. ECovILLAGES AS MODELS FOR SUSTAINABLE URBAN NEIGHBORHOODS:
   DESIGN GUIDELINES AND METHODS FOR UNDERSTANDING, ANALYZING AND
   DESIGNING SUSTAINABLE COMMUNITIES ......................................................................................... 36
    H. PRE-DESIGN ....................................................................................................................................... 36
       1. Community Formation ................................................................................................................... 36
       2. Site Acquisition .............................................................................................................................. 38
    I. SENSE OF COMMUNITY ....................................................................................................................... 44
       1. Formulate a Shared Vision ............................................................................................................. 44
       2. Cooperative Governance and Citizen Engagement ...................................................................... 46
       3. Inclusive Process, Space and Program .......................................................................................... 51
       4. Physical Environment encourages social interaction ...................................................................... 55
       5. Health and Wellness ...................................................................................................................... 60
II. Introduction

A. Research Objective

There is an absence of truly sustainable, community-oriented housing options on the market that are economically empowering, socially just, and which enhance the ecology of place by building all forms of capital—economic capital, social capital, and environmental capital. Traditional developers are interested in maximizing profit—these create incentives to build cheaply with little consideration for sustainability, community or innovation. Traditional suburban development created sprawl, social isolation and car-oriented lifestyles, wreaking havoc on community and the environment. The identity of America has been coopted by cheap and replicable corporate architecture, strip malls and big box stores. The planning of communities marginalizes groups who need better integration and care, such as the elderly or mentally disabled. Cities have become inhumane through their anonymity, unaffordability, congestion, pollution, and lack of access to nature.

Ecovillages offer an alternative to traditional development focused on developer profit rather than community values or protecting habitat. Ecovillages are bottom-up developments formed by groups of people that decide to live together with shared values of environmental sustainability and community-building. The development of more ecovillages may be able to offer a solution to traditional development in urbanized settings, such as cities or suburbs, if it is possible to diffuse their sustainability, community, economic and educational innovations into an urbanized context. Normally, ecovillages are in rural settings, but a limited number of them exist in cities. Ecovillage site design best practices can be applied to urbanized areas to show how sustainable urbanized living is possible, and furthermore diffuse these innovations into mainstream society. Ecovillages can offer solutions on how to bring the ecological and social capital of a village-like community into urbanized areas. One of the biggest questions, is how can ecovillages be disseminated into larger scale or mainstream society without losing its fundamental value of locally owned, participatory design and governance? Through focusing on the urban design, or site design, of ecovillages, and understanding how the community's values and lifestyles are embedded into the design and layout of the community, I hope to better understand how mainstream urban design of neighborhoods can learn from ecovillage design to improve the sense of community, the ecology, create a circular economy, and promote education on sustainability.

If our species wants to survive the remnants of the Industrial Revolution, we need to continue the progression of the Sustainability Revolution we are currently in, and which began in the '60s. All revolutions include the phases of genesis, critical mass, and diffusion (Edwards, 2005). Currently, I believe we are at the turning point from critical mass into diffusion. From studying grassroots innovations diffusions mechanisms, Boyer (2015) has claimed that the best scale and geographic intervention to allow for the maximum diffusion of ecovillage sustainability innovations is at the local scale and geographically proximate but outside of a city center. Boyer (2015) states that further research can systematically look at how the urban fringe can be used as a spatial niche to encourage innovative development forms. Due to this research, my thesis attempts to understand the opportunities and constraints to urban ecovillage development through the lens of urban design.

This thesis explores the best practices in ecovillage urban design in an urbanized and rural setting to improve the design of current and future ecovillages and to use as a design model for sustainable communities to disseminate sustainable development in urbanized areas. I define sustainable development as having environmental sustainability, circular economies, community-building capacities and education and urbanized areas as urban or suburban areas.
B. RESEARCH QUESTIONS

For my thesis, I will answer the following questions:

I. What are the design philosophies and best practices of sustainable urban design in environment, community, economy and education that allow communities to be comparable?

II. What are common urban design strategies of all ecovillages? How do they differ? What design challenges differ between urban and rural ecovillages?

III. Generally, how can the urban design of ecovillages be improved upon?

IV. Is there anything that the urban design of ecovillages can teach us about the urban design of sustainable communities?

V. Finally, how can these ecovillage designs disseminate into their surrounding communities?

C. RELEVANCE

The impact of this research is to improve the design of current and future ecovillages and to disseminate ecovillage design as a model of sustainable communities and sustainable development. While there is a plethora of research on sustainable community design, there is a lack of critical analysis on the urban design of ecovillages, so this research will contribute to the growing field of knowledge on ecovillage research. Additionally, this research could be applicable to a variety of projects, such as adaptive reuse projects in urban areas that desire to become sustainable neighborhoods or incorporate sustainable designs, or projects in the built environment that deal with incorporating one of the four pillars of sustainability: environment, circular economy, community building or education.

Studying communities is studying natural social organization, which some people can apply to formal business organization and functioning. Charles Handy and Elizabeth Moss Kantor both began their careers by studying intentional communities, and later applied this knowledge to businesses through their sociological framework of study. This can also be true in how businesses are designing their office spaces to foster community, which has been linked to innovation, as the more people from various backgrounds interact and share their research, the higher likelihood of collaboration. Current corporations, such as Google or Facebook, understand that better social organization through design reinforces social interaction and work performance, and even fosters innovation through cross-disciplinary interactions (Lindsay 2014). Offices have been redesigned to be flexible, “open”, and encourage random interactions and community spaces. The relevance of this research on design could be applied to community building within office culture through better understanding how spaces foster or hinder community.

Ecovillages can also offer ways to deal with traditionally marginalized or uncared for people. Ecovillages are highly adept at managing groups of mentally disabled children or adults, the elderly, and even single mothers. It is projected that in 2030, 20 percent of the U.S. population will be aged 65+ at 71.5 million people (Howe 2012). This thesis explores examples of this.

III. Methodology

A. RESEARCH STRATEGY

To discover and compare best strategies for sustainable urban design, I generated a matrix of community sustainability strategies, adapted and changed from Loezer (2011), that can be used to compare various ecovillages and sustainable communities to understand and analyze how values are embodied in the physical site design, and give a process to designers and communities looking to create sustainable neighborhoods. Throughout this thesis, I develop urban design guidelines and best practices for each of these strategies, based upon a comprehensive review of one urban ecovillage case study, the Los Angeles EcoVillage (LAEV),
rural or suburban ecovillage case studies in Denmark, Dyssekilde and Hjortshøj, a rural ecovillage in Western Massachusetts called Sirius Community, an urban cohousing development in Cambridge, MA called Cambridge Cohousing, and literature review of sustainable community design. By comparing both urban and suburban/rural ecovillages, I will be able to see how best design practices change depending on land use and space constraints, and if it is necessary to have urban and rural urban design guidelines, or whether all ecovillages follow similar design principles, regardless of their urban or rural nature.

1. COMMUNITY SUSTAINABILITY MATRIX

Loezer (2011) was one of the few researchers who has studied the urban design best practices of urban ecovillages. I used Loezer’s matrix of urban design principles as a base, but included many more categories focused on specific urban design strategies. Loezer’s matrix lacks substantial detail of what these urban design strategies look like on a site plan. Through surveying various ecovillages and pulling from best urban design practices from literature, I will explore if there is an ideal community size, scale, location, space requirements, and proximity to other spaces that is recommended. Through interviewing communities on how these specific strategies within the matrix affect their life, community, and environment, I will be able to determine what the space’s role is within the community, which spaces the community defines as the most important for expressing a sense of community, environmental sustainability, creating a circular economy, and promoting education.

Education has been included within the sustainability matrix to address some of the questions of how to gauge the success of a community, which could be from the perpetuation of its ideas and penetration of its ideas into mainstream society, as suggested by Pitzer’s 'Communal Developmentalism' in the 1993 edition of Diggers and Dreamers. Ideas and practices can spread beyond the community through visitation and education to outsiders. The Farm, an established ecovillage, has had thousands of visitors come through its site, who are profoundly affected and both share their experience and go on to do related endeavors elsewhere (Bang, Growing Eco-Communities: Practical Ways to Create Sustainability 2007). My own enthusiasm for ecovillages was created through various visitations, where inspiration was fostered through seeing people’s lives firsthand. Wagner (2012) says that more academic research is needed in determining how ecovillages can transfer knowledge to a broader social context, and I believe education to visitors is a huge way this is possible.

The Sustainability Matrix can be found in Appendix A, and each section of the Chapter “Understanding Sustainable Urban Design Through Ecovillages” goes through each section of the matrix, analyzing

2. CASE STUDIES

Los Angeles EcoVillage (LAEV) is an urban ecovillage located in Koreatown, Los Angeles. An urban ecovillage was important to study for the possibility of how to transfer ecovillage design strategies to urban contexts. Sirius Community, located in Shutesbury, MA, was chosen as a rural ecovillage precedent that has had been around for many decades. Cambridge Cohousing, located in Cambridge, MA, was chosen as an urban precedent for cohousing, which is a style of development that many ecovillages choose to use due to its compact design.

Denmark was chosen as it has a long history of ecovillages, is where the movement started, and has huge government support. Dyssekilde is a model development of ecovillages, using transit-oriented development strategies, has experimental building methods, a café, a large communal building, pedestrian-oriented development, and a windmill on site. Hjordshoj also utilizes transit-oriented development, utilizes living
clusters and shared facilities, has pedestrian-oriented design, includes a living group of mentally disabled adults, and has a café and bakery on site.

<table>
<thead>
<tr>
<th>Community</th>
<th>Location</th>
<th>Density</th>
<th>Community Size</th>
<th>Land Area</th>
<th>Founding Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.A. EcoVillage (LAEV)</td>
<td>Koreatown, Los Angeles, CA</td>
<td>Urban</td>
<td>~40 people</td>
<td>~0.9 acres</td>
<td>1993</td>
</tr>
<tr>
<td>Cambridge Cohousing</td>
<td>Cambridge, MA</td>
<td>Urban</td>
<td>~90 people (40 units)</td>
<td>1.5 acres</td>
<td>1998</td>
</tr>
<tr>
<td>Sirius Community</td>
<td>Shutesbury, MA</td>
<td>Rural</td>
<td>~25 people</td>
<td>90 acres</td>
<td>1978</td>
</tr>
<tr>
<td>Dyssekiide</td>
<td>Denmark</td>
<td>Suburban/Rural</td>
<td>~170 people</td>
<td>32 acres</td>
<td>1987 (construction started in 1990)</td>
</tr>
<tr>
<td>Hjortshoj</td>
<td>Denmark</td>
<td>Suburban/Rural</td>
<td>300 people 105 units</td>
<td>75 acres</td>
<td>1986 (construction started in 1992)</td>
</tr>
</tbody>
</table>

**Figure 1- Map of Los Angeles EcoVillage (LAEV)**
FIGURE 2- Cambridge Cohousing

FIGURE 3- Map of Sirius Community
Figure 4 - Dyssekilde Ecovillage Aerial from a Map at the Entrance to Their Community

Figure 5 - Hjortshoj Ecovillage in Denmark
IV. Literature Review

A. DEFINITIONS, CONTEXT AND FRAMEWORKS

1. INTENTIONAL COMMUNITIES

An ecovillage is a type of intentional community. The Fellowship for Intentional Communities', which is a nonprofit that supports and promotes intentional communities and cooperative culture, defines intentional communities on their website as "a group of people who have chosen to live together with a common purpose, working cooperatively to create a lifestyle that reflects their shared core values. The people may live together on a piece of rural land, in a suburban home, or in an urban neighborhood, and they may share a single residence or live in a cluster of dwellings...Although quite diverse in philosophy and lifestyle, each of these groups places a high priority on fostering a sense of community—a feeling of belonging and mutual support that is increasingly hard to find in mainstream Western society.” Intentional communities includes ecovillages, communes, student co-ops, land co-ops, cohousing, income-sharing communes, land trusts, spiritual communities like ashrams and monasteries, farming collectives and more. Generally, these groups share land or housing, but can also be geographically close enough to be in a continuous active fellowship to carry out the values it has agreed upon fostering.

FIGURE 6- INTENTIONAL COMMUNITIES AS GRASSROOTS REAL ESTATE DEVELOPMENT ENABLES SOCIAL, CULTURAL OR ENVIRONMENTAL VALUES TO BE BUILT INTO DEVELOPMENTS RATHER THAN SOLELY PROFIT-MAXIMIZING, DEVELOPER-LED PROJECTS.

a) Ecovillages

(1) What are ecovillages?

The Global Ecovillage Network (GEN) describes ecovillages as: "intentional or traditional communities, consciously designed through locally-owned, participatory processes to regenerate social and natural environments. The four dimensions of sustainability (ecology, economy, social and cultural) are integrated into a holistic sustainable development model that is adapted to local requirements” (GEN int. board 2012).

Ecovillages are self-designed, grassroots, communal structures that voluntarily agree to live more sustainably, and can cover various facets of economic activity, infrastructure, governance, and consumption. Ecovillages respond to the challenges society faces in ecological, economical and social issues by experimenting in new forms of holistically sustainable living (Kunze 2009). Many involved in ecovillages believe in whole systems sustainability, and that a holistic approach is needed to address the problems of our society. Lois Arkin, the
founder of the LA Ecovillage, summarizes ecovillages as the convergence of the environmentalism
movement, communities movement, and voluntary simplicity movement. Ecovillages can range from 20
people to 500 or more and span the entire globe, from rural to urban areas.

The desire to live in a supported community, control one’s livelihood, and have a lighter impact on the earth
are the main forces behind the growing movement to create ecovillages—they are particularly focused on
environmental and social sustainability. All ecovillages differ greatly, since they are grassroots movements that
react to the unique climate, culture, site, and individuals that make up the community, which can vary widely.
However, the commonalities are that ecovillages are intentional communities, where groups of people come
together and agree upon the values of living more lightly upon the earth and enhancing their social and
natural environments. Many of them include socio-political or spiritual aspects, as well. Jonathan Dawson,
president of the Global Ecovillage Network (GEN), says ecovillages in the developed world are normally
characterized by a reaction against alienation and materialism of industrialized society; in the developing
world, they are characterized by a desire to reject the influence of industrialized nations and return to the
values and practices of traditional cultures. Most ecovillages share the commonalities of the importance of
environmental sustainability, community, shared values, shared resources and/or facilities, control over
livelihood (i.e. food, energy, housing), are grassroots development rather than real estate developers, and
many act as centers of research, demonstration and/or training. Most encourage values of connection and
stewardship.

One of the things that makes ecovillages so special, is that each one is different and represents the values of
the people that live within them. Ecovillages have participatory decision making, while each ecovillage decides
how it will make decisions and govern itself. Some ecovillages have income sharing, some don’t; some
ecovillages are commuter suburbs, some require participants to have a business on site; some ecovillages are
completely off-grid or don’t even have electricity, while others just utilize green building practices; and some
ecovillages are tightly embedded with surrounding neighborhoods and governments, while others are isolated.

Jan Martin Bang in Growing Eco-Communities argues that “the village sized community is the most natural place
for human beings to live,” and that ecovillages are a return to a previous way of life, accentuating the size of
the communities because this dictates how meaningful our relationships will be with others before it becomes
impersonal. However, villages and ecovillages differ in that ecovillages are consciously set up as self-created
and self-designed societies offering an alternative to the mainstream, focusing on creating a new, human-sized
fellowship with a lighter impact on the earth.

The ecovillage movement describes itself in four dimensions: social, ecological, spiritual and economic.

Social dimension. Ecovillages are based upon forming a community to feel supported, belonging and
connected. The social dimension is created through building upon common goals, group work and
socializing, and participatory decision making. Many ecovillages share in cultural activities, rituals and
celebrations to bring about a sense of community unity and mutual support.

Spiritual Dimension. Ecovillages are frequently founded on the belief that all beings on earth are
interconnected, and a spiritual connection with nature will lead to a peaceful and compassionate world.

Ecological Dimension. Ecovillages are founded on the basis on living in deeper connection with nature and
a lighter footprint on the earth. Many ecovillages are involved in farming, animal husbandry, conservation,
using local sustainable materials, renewable energy, protecting biodiversity, and preserving clean soil, water
and air.
**Economic Dimension.** Ecovillages are concerned with fair, just, and regenerative economies. Many ecovillages are involved in the circular economy movement, use local currencies, and have sharing economies. Many attempt to create economic vitality through promoting sustainable local economies, creating social enterprises, and sharing consumption.

b) **Cohousing**

In order to understand ecovillage design, cohousing design must also be understood, as many ecovillages utilize the cohousing model. This is either by having cohousing on site in addition to single-family residences, or model the development off of the co-housing pattern, where each family’s home is responsible for their own finances, food, laundry and childcare with, normally one central community area where the community can gather and come together for food, workshops or festivals and sometimes a childcare area (Bang, Permaculture: A Student’s Guide to the Theory and Practice of Ecovillage Design 2015).

The major design features of cohousing is pedestrian oriented development, with clustered parking off to the side and pedestrian-only walkways fronting the entrances to dwellings. There are normally shared outdoor gardens or lawn area. There is a shared house or shared common area with a communal kitchen and dining area, plus other amenities the community may decide to build such as a library, office space, recreation room, children’s room, teenager area and laundry. Development focuses on clustered, dense, attached multifamily units or apartment-style.

Cohousing is, according to The Cohousing Association of the United States’ website, “an intentional community of private homes clustered around shared space. Each attached or single family home has traditional amenities, including a private kitchen. Shared spaces typically feature a common house, which may include a large kitchen and dining area, laundry, and recreational spaces. Shared outdoor space may include parking, walkways, open space, and gardens. Neighbors also share resources like tools and lawn mowers.” Cohousing is typically 20 to 40 homes. There is no income sharing, but members socialize, share space, have meals together, have communal workdays and have meetings. The community structure makes it easy to share, whether it is tools, resources, a carshare, or organizing child or elderly care. Cohousing is normally designed to promote interaction and community through pedestrian-oriented development. Cohousing is typically in a legal structure of a homeowners’ association, housing cooperative (co-op), or condo association.

Many ecovillages opt into building cohousing, as it can provide for higher density development when compared to single-family homes, reducing building footprints to open up more undeveloped green space. Cohousing can help create more walkable communities through added density, provide smaller apartments to those interested in studios or rental apartments. Many ecovillages also build a communal house, similar to cohousing, where members can socialize, share meals, or hold events or meetings.

c) **Communes**

The Fellowship for Intentional Community’s website states that communes are “an intentional community of people living together, sharing common interests, property, possessions, resources, work and income.” Communes are focused on communistic principles of shared income and ownership, while many also use consensus decision-making, non-hierarchical organization and ecological living. Ron E. Roberts in the 1970s wrote of communes in “The New Communes” as having three main characteristics: egalitarianism rejecting hierarchy, human scale as a desire to reject the oversized modern social institutions, and anti-bureaucratic. Dr. Bill Metcalf in the book “Shared Visions, Shared Lives,” later wrote of communes sharing the principles of the importance of the group rather than the nuclear family, shared income, collective households, group
decision making, and intimate affairs. Many spiritual communities such as monasteries operate as a commune, and are included in this number.

Some ecovillages are communes if they share work and income, but not all communes are ecovillages. However, some communities steer away from using the word “commune,” as there are heavy connotations with the word, evoking popular images of heavy drug use, orgies, and dead-beat hippies.

d) Kibbutz

While kibbutzzim, the plural of kibbutz, are not focused on in this thesis, they are important within the intentional communities movement. Kibbutzzim are a communitarian movement focused on shared income and cooperative education, culture and social life started in 1910 in Israel. Each kibbutz shares income, work, and meals together (although this has begun to change). Work on each kibbutz is from industrial or agricultural ventures, economic services, or income from members working outside. While each kibbutz is its own socioeconomic community, a network has formed that coordinates efforts called the Kibbutz Movement. The International Communal Association’s website says that “the Kibbutz Movement is the largest communitarian movement in the world today,” with 274 kibbutzim and a population of 141,000 in 2012.

2. SUSTAINABILITY

Sustainability is defined in this thesis as encompassing the three pillars of people, planet, and profit. Edwards (2005) claims there is a fourth pillar, which is education, and I also include this in my definition. Ecovillages are proof that we already have all of the solutions to build completely sustainable, regenerative settlements.

The following sections explore the current problems we face in sustainability.

a) People / Social Sustainability

Definition:

Social sustainability is creating a sense of community and building social capital. A sense of community is essential to building healthy supportive lifestyles, and a sustainable world means a world where people are supported by their community around them, whether this is family, friends, neighbors, religious communities, or others. Kunze (2009) attempted to determine principles for social sustainability as: implementation of sustainability goals, balance between the individual and collective, flexible and responsive organizational principles, the ability to develop, and social and ecological town planning.

Thomas Sander of the Harvard Kennedy School defines social capital as “the collective value of all social networks (who people know), and the inclinations that arise from these networks to do things for each other (norms of reciprocity).” Social capital emphasizes “specific benefits that flow from the trust, reciprocity, information and cooperation associated with social networks...and creates value for the people who are connected, and for bystanders as well.” Sander also says social capital is “a powerful resource for individuals and communities. For individuals embedded in dense social networks, these networks and the attendant norms of trust and reciprocity strongly shape individuals’ ability to land jobs, earn higher salaries, and be happier and healthier. But, even for those not in the networks, having neighbors who know and trust one another affords benefits in some domains: better performing local government, safer streets, faster economic growth and better performing schools, among other public goods” (Sander 2012).

One of the most convincing studies of the importance of relationship-building and community is the Grant and Glueck study from Harvard that tracked the emotional and physical well-being of two populations of
poor men and Harvard graduated men over 75 years starting in the 1930s. The conclusions find that the quality of relationships reduces emotional and physical pain—this means not just the extent of your network, but how intimate, vulnerable, trusting, and dependable your relationships are. To do this there must be love, and being able to cope with difficulties without pushing love away. The feeling of loneliness can lead to earlier physical health decline and early death (Massachusetts General Hospital, Harvard Medical School 2015). An additional study done in 2015 by Brigham Young University used data from 3.5 million people collected over 35 years, and found that those that fall into the categories of loneliness, isolation, or living on their own see a risk of premature death rise 26 to 32 percent. The biggest takeaway, is that using “community as healthcare” is an effective strategy to battle rising health problems in the U.S. and other developed countries.

**Current Challenge:**

There are growing socio-economic divides and lack of affordable living options in cities, even though many people are moving to cities for access to jobs. An Urban Land Institute housing, transportation and community survey in 2015 revealed that American communities face significant barriers to living a healthy life, particularly minorities and millennials. They reported a lack of spaces offering outdoor recreation and healthy food options. Millennials were also willing to live outside of city centers to have affordable living. Finally, 60% of millennials want to live in areas where they can use their car less. Many American cities offer a low quality of life to its poorest residents, and are surprisingly ill-equipped at building community and social capital through urban form and architecture. The lack of American public space and suburbia’s individualized form has led to suburban and urban dwellers to frequently not know their neighbors, reinforcing a separatist culture and the idea of the “other.”

**Opportunity:**

Intentional communities such as ecovillages offer a supportive community to those who have no family, no religion and even no friends. Emerging studies have shown that building social capital improves health, well-being, and economic success while reducing risky behavior, addiction, depression, and crime. Macmillan and Chavis researched how a sense of community was achieved, and the below image outlines the major components and formulas they created. These were membership, influence, integration and fulfillment of needs, and shared emotional connection.
Finally, an essential part of social sustainability is peacemaking, personal growth, conflict-resolution, negotiation, and group support in personal transformation, all of which occur within intentional communities. With the various wars and conflicts, as well as the racism, sexism, and oppression faced worldwide by minority groups, nuclear war or homicide might destroy humanity before humans ever reach the carrying capacity or ecological destruction of the earth from over-extraction, pollution or climate change. Thinking at a systems scale, peacemaking and personal growth is as important to sustainability as the technological innovations needed to reduce our dependencies on oil and our consumption of natural resources.

b) Planet / Environmental Sustainability

Definition:

Environmental sustainability is the absence of negative externalities—which are unaccounted for adverse impacts—from development, manufacturing, agriculture, transportation, or other human activities to ensure a livable planet for people now and into the future. Environmental sustainability includes protecting against pollution, reducing greenhouse gases, conserving sensitive ecological systems, preserving biodiversity, preserving soil health, protecting against soil erosion, and ultimately, enhancing natural capital.

Environmental capital (natural capital) can be defined as the ecological services provided by ecological systems. The *Millennium Ecosystem Assessment 2005* report separated ecosystem services into four categories: supporting (services that are necessary for the production of all other ecosystem services), provisioning (products, such as food and water, obtained from ecosystems), regulating (benefits obtained from the regulation of ecosystem processes such as carbon sequestration), and cultural (nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences).

The seventeen ecosystem services are:

- Atmospheric Regulation
- Maintaining balance of atmospheric gases at historic levels
- Maintaining healthy air quality
- Sequestering carbon

- Climate Regulation
  - Regulating local temperature, precipitation, and humidity through shading, evapotranspiration, and windbreaks

- Disturbance Regulation
  - Reducing vulnerability to damage from hazards such as flooding, storm surge, wildfire, and drought

- Water Regulation
  - Removing and reducing pollutants in air and water

- Water Supply
  - Storing and conserving water within watersheds and aquifers

- Erosion Control And Sediment Retention
  - Retaining soil within an ecosystem
  - Preventing damage from erosion and siltation

- Soil Formation
  - Building healthy, arable soil

- Nutrient Cycling
  - Recycling nutrients back into the ecosystem

- Waste Treatment
  - Breaking down waste

- Pollination
  - Providing for the reproduction of crops and other plants

- Species Control
  - Reducing vulnerability to pests and diseases

- Refugia/Habitat
  - Providing refuge and reproduction habitat to plants and animals, contributing to the conservation of biological and genetic diversity and evolutionary processes

- Food Production
  - Producing food, fuel, energy, medicine, or other products for human use
  - Ensure soils are healthy for food production and contact with people

- Raw Material Production
  - Biomass produced for any purpose other than food

- Genetic Resources
  - Enhancing and preserving biodiversity

- Recreation
  - Enhancing physical, mental, and social well-being as a result of interaction with nature

- Cultural Enrichment
  - Enhancing cultural, educational, aesthetic, and spiritual experiences as a result of interaction with nature

The various environmental sustainability initiatives are described in the next section.

**Current Challenge:**

This year we passed the carbon dioxide threshold that would have averted permanent climate change. There is a need for urgent innovations, prototypes, and solutions to sustainable living options. Our infrastructure provides a faceless, unknowable, and limitless supply of energy, water, food and waste that makes it
impossible to understand where our natural resources come from and where they go. For true sustainability, we must look to infill development and adaptive reuse of vacant buildings rather than creating more sprawl and new development.

**Opportunity:**

Ecovillages offer the world blueprints for how to build environmentally sustainable communities through a combination of sharing resources, building self-sufficiency, using renewable energy, and building mixed-use developments.

c) **Profit: Economic Sustainability**

**Definition:**

Economic sustainability looks are building economic models that provide fair wages, include externalities in the true cost accounting of a product or service, and is based off of sustainable natural resource extraction and management.

**Current Challenge:**

Our current economic model is based off of exponential growth, which is a limitless growth economic theory based off of a limited natural resource supply. Economic capital is the dominant form of capital that people use to get resources, maintain their livelihood, exchange goods or services, receive entertainment, and even give thanks in the form of gifts. However, economic capital does not contain the true cost of doing business or acquiring products as externalities, such as pollution, are not included in the true economic cost.

Our current systems of production and consumerism have led to a disconnection in understanding where and how our food, water, energy, resources and consumer items come to us. The loss of local production has caused a lack of accountability and transparency in the systems that serve us, leading to concealing the consequences of our consumer choices, which in some cases support social and environmental exploitation, such as poor working conditions and creation of environmental pollution. Sustainability is often value engineered out of projects or applied as a veneer over an otherwise conventional product.

**Opportunity:**

Ecovillages can help offer localized, regenerative economic systems based off of local production, right livelihoods, and local reinvestment. Additionally, there are various modern economic movements looking to redefine how the extractive, capitalist economy works through models called cradle-to-cradle manufacturing to the right livelihoods framework. All of these economic ideologies employ systems thinking, which helps to analyze the various networks, flows and wastes of all present sub-systems in order to create better integrated systems that can solve the complex problems our world faces. These are explored in the following section.

d) **Education**

**Definition:**

Education is essential to building a sustainable world, as the word “sustainability” has become a cliché that’s lost its meaning, or has become a greenwashing campaign for companies or products. By educating people on sustainable practices and the impacts of consumer choices, people can make more educated decisions on their lifestyle and the impact they will have.
Current Challenge:

There are not many examples within cities of neighborhoods or communities that are living sustainable lifestyles. The internet is the major source of information on sustainability, yet there are many localized solutions that are site-specific and only relevant based on the local climate, culture and natural resources located nearby. People need to see others living a sustainable lifestyle to know that it is possible, rather than read about it online or see it on TV.

Opportunity:

Eco-villages offer blueprints for how to build and live in a sustainable neighborhood. Through inviting visitors for tours and offering educational programs, visitors can see in person how it is possible to live a sustainable lifestyle, and take away important strategies to apply to their own life.

B. THE SUSTAINABILITY MOVEMENT

There is an explicit connection between the way we design and plan our towns and cities, and the inherent sustainability that these designs create. There exists a plethora of research on the best practices of sustainable community design. These sustainability movements and frameworks are comprehensive, including recommendations for the design process, site design strategies, low impact development, and much more. In addition, there are a variety of global movements to improve the sustainability of communities. The Transition Town movement, which started in the UK, is a global movement connecting and assisting towns in transitioning into a carbon-free society.

In particular, sustainable urban design has been influenced by such movements as the New Urbanists, who attempt to recreate walkable neighborhoods and maintain a community’s sense of heritage. Architecture movements such as earthships are almost completely off-grid homes. Urban agriculture has also been a prominent theme in integrating ecology into architecture. EcoDistricts and EcoCities have also been a growing international movement, with new “carbon-neutral” developments being built in Asia and the Middle East.

1. URBAN DESIGN THEORIES AND STRATEGIES

The following sustainable urban design strategies are organized by scale, from smallest to largest.

a) Complete Streets

Complete streets is a transportation and design strategy to create inclusive streets for all modes of transportation, regardless of age or ability. This means designing streets to be comfortable, safe and accessible for pedestrians, bicyclists, motorcyclists, riding public transit, cars, and even delivering goods. Many of the design strategies focus on slowing car traffic down to provide safer environments for pedestrians and bicyclists. They also include separated bicycle lanes, greenways, and proper pedestrian infrastructure that’s ADA accessible. It also includes safe and convenient access to public transit, with proper transit shelters. Residents can experience improved health benefits, and neighborhoods can see economic benefits from increased pedestrian and bicyclist traffic. By improving other modes of transit, it can also help improve the environment through reduced car use.

b) Pocket Neighborhoods

Pocket neighborhoods is a design strategy developed by Seattle-area architect Ross Chapin. Its design focus is creating houses with shared garden or backyard space. Groupings of four to twelve households can make an ideal community where meaningful relationships can be created. This requires a semi-public space such as an
apartment’s shared backyard, a suburban yard with no fences, pedestrian-only streets, or an alley turned into a public space.

a) Pedestrian Oriented Development (POD)
Pedestrian-oriented development (POD) is a way to design residential or commercial neighborhoods and transit stops with pedestrian access as the focal point of the design experience, not cars or parking. Pedestrian-oriented development can have a huge impact on the sense of community, improve access to public transit, and even improve the economy through providing better access to retail.

b) New Urbanism
Suburban sprawl developed after WWII due to a confluence of American optimism, a booming economy, government sponsored Veteran’s Administration, the Federal Housing Authority’s guaranteed home mortgage programs, and federal created interstate highway system providing easy access outside of city, and Euclidian zoning. The zoning regulations are so standardized, it has caused many communities to look alike (Hall, Jr. and Porterfield 2001). Additionally, Euclidian zoning (single-use zoning) created separation of uses and only would allow low-density, single family homes separated by certain distances, creating suburban sprawl with no allowance for amenities, retail, or employment opportunities. Bedroom suburbs were created, where suburbanites would travel long distances to the center of cities to work, coming home just to sleep. Large tracts of land were consumed, increased car use was required to buy amenities and travel to work, and the social structure of communities disintegrated due to the lack of community identity, gathering places and car culture.

The Congress for the New Urbanism (CNU) was founded in 1993 and helps address the suburbanization of American communities that helped destroy community and promoted car culture. It is a movement that “helps create vibrant and walkable cities, towns, and neighborhoods where people have diverse choices for how they live, work, shop, and get around. People want to live in well-designed places that are unique and authentic. CNU’s mission is to help build those places” (Congress for the New Urbanism n.d.). The movement helps create places for social exchange such as public plazas, front porches, corner stores, coffee shops, neighborhood schools, narrow streets, and sidewalks. CNU is a neo-traditional form of urban design that promotes traditional neighborhood development with a walkable city center and surrounding residential neighborhoods.

c) Transit Oriented Development (TOD) / Smart Growth
Transit-oriented development (TOD), or Smart Growth, is an urban development strategy to build mixed-use development within walking distance of public transportation. It typically is high density near the transit stop, with lower density spreading out the further from the stop. The transit stop is typically a train stop, light rail or rapid bus. This type of development may be key to getting the density needed to economically support retail, employment and services in the area accessible by walking or biking.

d) Green infrastructure / Low Impact Development
“Green” infrastructure, also called Low Impact Development, merges biomimicry with engineering to create infrastructure that works with plants, microbes, insects, animals and natural processes to allow stormwater to be filtered, absorbed, infiltrated and slowly released after a storm. Green infrastructure, by using plants and soil to absorb water like a sponge, can help add a layer of adaptability to grey infrastructure by creating flexible flood-spaces such as rain gardens or floodable athletic fields. Vegetation is a great way to manage water because it cleans water, slows water down, holds water back by slowly releasing it over time, and removes water from the drainage system by absorbing it, requiring less pumping for the drainage system and
reducing downstream flooding. Green infrastructure is an ecological and systems thinking approach to managing water. While green infrastructure is focused on the strategies to recreate natural hydrologic flows, Low Impact Development focuses on how the site footprint and site development impact can be minimized to maintain the natural hydrologic cycles of an area.

c) **Landscape Urbanism**
Landscape urbanism is a theory that the best way to organize a city is through the medium of landscape, rather than its buildings or streets. Landscape itself can be used as an infrastructural system to help provide water, waste recycling, climate regulation, recreation, transportation, and even energy. Landscape urbanism attempts to use landscape as a way to reintegrate large-scale infrastructure, open space, housing, and transportation. A major part of its theory is the focus on processes and understanding that nature is a constant set of changing and interacting elements, rather than a fixed set of elements, which is how architecture and urbanists imagine the city.

d) **Ecological Urbanism**
Ecological urbanism is focused on creating socially inclusive and ecologically sensitive urbanism. It is similar to landscape urbanism, in that its focus is process based, focusing on the biomimicry of natural systems on to man-made systems, and understanding that process, change and external forces will continuously alter and interact with the city. Ecological urbanism is a continuation of landscape urbanism that includes a more holistic, systems thinking approach to urban design and planning. It looks at the city as nature, enabling an understanding of the processes, forces, and elements interacting to create the current state of existence. It calls for thinking at a city-scale, rather than an architectural scale, in order to think and express complex interacting systems.

e) **Eco-cities or Ecodistricts**
Eco-cities are 21st century cities based on sustainable development practices, with focus on a self-contained, circular economy; carbon-neutral renewable energies; pedestrian oriented development with accessible public transit; natural resource management; zero-waste systems; restoring environmentally degraded places and living in harmony with nature; using urban metabolism principles (discussed below); support local agriculture; promoting voluntary simplicity and reducing consumption; using sustainable building design; and ensuring affordable housing and jobs for disadvantaged groups. Examples include newly constructed cities such as Masdar City in Abu Dhabi and the Sino-Singapore Tianjin Eco-City in China. Some eco-cities are adapted from older cities through adopting aggressive sustainability policies, such as Freiberg, Germany or Stolkholm, Sweden.

Ecodistricts are on a smaller scale, and are neighborhoods, normally within cities, based on creating sustainable urbanism and reducing the carbon footprint.

f) **Smart Cities**
A smart city utilizes “urban informatics” through an integrated information and communication technology (ICT) system with the internet of things (IoT) from sensors across the city to provide real-time responses to a variety of stimulus. The systems monitored and controlled can include garbage collection, water use and distribution, energy use and distribution, traffic management, on-demand public transportation, servicing needs, law enforcement, and other community services. Through monitoring in real-time, smart cities can function more as responsive, living organisms and can enable more integrated, reactive systems. It can reduce resource consumption and inefficiencies, reduce traffic jams, and provide real-time user feedback on consumption, all which can help in creating sustainable cities and lifestyles.
a) **Urban Metabolism**

Urban metabolism is a systems thinking metaphorical framework that analyzes and quantifies the flows of energy and resources within a city in a similar lens to a human metabolism to ecological system. Through thinking of a city or neighborhood as an organism, it provides a holistic system in which to think and analyze the various systems potentially creating a more integrated network, rather than disparate, linear, disconnected channels. This reduces the idea of waste, and transforms disparate systems into an interconnected network, strengthening it. While urban metabolism principles originally were meant to analyze physical elements such as natural resources and energy flows, they can also be used as a framework to analyze social, economic, or cultural flows of information, resources, opportunities, or human energy/work within a community or city to understand what existing resources, programs, economic opportunities or connections can be made within the greater community.

2. **SUSTAINABLE ECONOMIC MOVEMENTS**

**The Green Economy** is an economy based on sustainable development and using the full cost accounting to include the externalities faced by society or the environment within product costs. It aims at putting value on ecological services, biodiversity and natural capital. The 2011 UNEP Green Economy Report argues "that to be green, an economy must not only be efficient, but also fair. Fairness implies recognizing global and country level equity dimensions, particularly in assuring a just transition to an economy that is low-carbon, resource efficient, and socially inclusive."

One of these movements, the **Circular Economy**, is about moving away from the linear take-make-dispose economy that involves production, manufacturing, consumption, and landfill disposal patterns, and attempts to mimic nature in a closed loop cycle by reusing disposed of items in production rather than putting them in landfill. This would reduce costs, save on time, save on raw material use, reduce energy, reduce transportation, and improve sustainability. In nature, waste does not exist—everything is recirculated back into a constant decomposition and reintegration cycle. The Circular Economy, created in the 1970s, is outlined in a book by Walter Stahel and Genevieve Reday called “Jobs for Tomorrow: The Potential for Substituting Manpower for Energy,” which outlines a closed looped economy and its impact on job creation, economic competitiveness, resource savings, and waste prevention. Companies that use nonrenewable resources, such as steel, aluminum, plastics, or gold, are already operating on some semblance of the circular economy since the resources have diminished and extraction is expensive. The key to transitioning to a Circular Economy is through aligning businesses interests with humanity’s interests. Architecture uses concepts of the Circular Economy and Cradle to Cradle design by thinking of closed loop designs for building materials, energy, and water.

The Circular Economy is based on three key principles:

II. Preserve and enhance natural resources.

III. Optimize resource yields through keeping technical and biological resources recirculating through the economy.

IV. Reveal and design out externalities.

The Circular Economy shares philosophies with **Biomimicry**, which is the study of nature to imitate its processes and designs; with **Cradle to Cradle** ideas that advocates for an analysis and use of the full-lifecycle of a product from extraction to reuse with the idea that all waste, whether it is technological or biological, is just unused resources; and with the **Blue Economy**, based off a book by Gunter Pauli, which has created over 200 project case studies and $4B in investment, advocates for open-source, shareable solutions mimicked from natural processes that minimizes materials, reuses resources and creates a low-carbon society.
The Blue Economy is the Zero Emissions Research and Initiatives (ZERI) Network's ideas in practice. ZERI, from their website, is a think tank that "seeks sustainable solutions for society, from unreacheded communities to corporations inspired by nature's design principles." The Blue Economy aims to create new business models that use localized solutions to sustainably provide basic human needs using simple, clean, nature-inspired technologies rather than rare, high-energy resources and seek to create value, rather than cutting costs. This model can create economic benefits through job creation, reduced energy use, increased revenue streams, and benefit communities involved.

**CradletoCradle**

![CradletoCradle Design Framework](https://commons.wikimedia.org/wiki/File:Cradle_to_Cradle.png)

**Figure 8-Cradle to Cradle Design Framework Shows the Biological and Technical Cycles. (WikiMedia Commons by ZhiyinG.Lin. August 12, 2012)**

*Industrial Ecology* is the study of the processes, and material and energy flows through industrial networks with the aim to reduce resources and energy, and reuse industrial waste products in other industrial processes. Similar to the Circular Economy, Industrial Ecology aims to create more closed loop industrial processes by finding industries to reuse the waste products of other industries to reduce industrial waste.

**Community oriented sustainable economies:**

The *New Economy Coalition*, according to their website, is "a network of organizations imagining and building a future where people, communities, and ecosystems thrive...We must imagine and create a future where capital (wealth and the means of creating it) is a tool of the people, not the other way around. What we
need is a new system—a new economy—that meets human needs, enhances the quality of life, and allows us to live in balance with nature.” They define the “new economy” as representing an emerging vision for a just, sustainable, and democratic future that works for all people, including the marginalized, supports regeneration of human and natural systems, builds community resilience by placing wealth and power into the hands of the people on a finite planet, and incorporates democracy in the management of economic and civic life.

The **Solidarity Economy** is a modern term that is still evolving in definition, but it is an umbrella term that covers concepts rooted in seeking to improve the quality of life of people through improving the economic system, meaning economic aims are not the primary motive of a company and exploitation of workers is eliminated. Some definitions include it as the antithesis to globalized capitalism, seeking to create a localized, humanized economy. Examples of solidarity economy are fair trade items, open source software, commons-based ownership, trade unions, a gift economy, worker co-operatives, self-help organizations, ethical purchasing, alternative forms of local currency, ethical lending and bartering.

The **Sharing Economy** is an umbrella term with a range of meanings, but is generally an economic system based off of collaborative consumption and peer-to-peer exchange through sharing resources that are consumer-owned. Examples are Uber, time banks, car-sharing programs, AirBnB, or online marketplaces such as Ebay or Etsy. The range of exchanges under the sharing economy term is from highly capitalistic, such as Uber, to a pure gift economy, such as Couchsurfing or crowdfunding sites. The sharing economy can therefore be a misleading term, since many of its services may be solely profit-driven. While the sharing economy doesn’t necessarily denote services that improve the quality of life of people and move away from globalized capitalism (Ebay ships from China), it can reduce waste and improve inefficiencies due to people sharing or selling unwanted items or underutilized space rather than putting items in the trash.

C. HISTORY OF INTENTIONAL COMMUNITIES AND SOCIAL EXPERIMENTS IN LIVING

1. A BRIEF HISTORY OF INTENTIONAL COMMUNITIES

In order to understand the current place of ecovillages and its history, it is necessary to understand human’s history of intentional communities and social experiments in living.

The earliest known recorded intentional communities were around the time of Pythagoras and Plato. Pythagoras created a secretive brotherhood in Croton, Italy around 530 BC for religious and ascetic practices. They became known as the **Pythagoreans**, but their exclusivity led to jealousy and destruction. 500 years later, at the time of Christ, the **Essenes** were a radical Jewish group that formed intentional communities in the desert of the northern Dead Sea. They were estimated at a population of 4,000, had no private possessions, houses and clothes were communal, had communal meals, shared income, and took care of the ill or needy (Bang, Permaculture: A Student’s Guide to the Theory and Practice of Ecovillage Design 2015). The Essenes later went on to inspire more recent intentional communities, such as the Shakers, preeminent in 19th century America. See Appendix D for more information on the Shakers.

As Christianity became established, communities of religious hermits began forming, starting a tradition of **Christian monasticism**, such as the Rule of St Benedict, which is the oldest continuous intentional community tradition in western civilization, being a millennium and a half old.

With the Enlightenment came some of the first secular intentional communities outside the Church and as a reaction to social change. In 1649, the **Diggers** were established southwest of London. They only lasted two
years, but it marked the beginning of the British Labour and Cooperative movement and British Commune Movement.

The Industrial Revolution brought with it poor social conditions, resulting in widespread reactions and aversions to industrialization and modern, city living. The 19th century experienced explosive experiments in alternative communities in Europe, North America, and Australia, experimenting with new forms of economies, group marriage, women’s rights, equality, and spirituality. Many lasted only a short time, but became the foundation for modern communal living (Bang, Permaculture: A Student’s Guide to the Theory and Practice of Ecovillage Design 2015). **Robert Owen** set up a model industrial community in Britain at New Lanark in 1786 and closing in the 1950s. New Lanark inspired the Rochdale Pioneers cooperative, which became the seed of the Cooperative movement, which is the largest alternative to capitalism in the world (Bang, Permaculture: A Student’s Guide to the Theory and Practice of Ecovillage Design 2015). Owen later established New Harmony in the US.

The Amana (or Inspirationists) and Hutterite communities are one of the few communities that has lasted longer than a century. The Brudehoff communities go back four hundred years to the communities of the Moravian Bohemian Brethen founded in Eastern Europe in the 16th century. This group developed into the Hutterites, who emigrated to the Great Plains and Mid West after religious persecution. The Amana communities began in Europe in 1714 from a radical Pietist religion, having completely communal ownership and shared income, inspired from the Bible, Acts 2:44-45, to hold ‘all things in common.’ They had collective child rearing, held land, machinery and tools in common, ate in communal kitchens, had no persona lincome, and free schooling. After experiencing oppression, the group left for the US in the 1840s, first settling more than 800 people in four villages near Buffalo, and in the 1850s moved to a more isolated region in Iowa, as members were being tempted by nearby towns. By the end of the 19th century, there were seven villages with over 26,000 acres and about 1,800 members. In the 1930s, the group moved to a privatized economy rather than income-sharing, and yet the community did not lose its community or identity (Bang, Growing Eco-Communities: Practical Ways to Create Sustainability 2007).

Through studying American communities in the 19th century, Mark Holloway in *Heavens on Earth* observed that “the expedient communism of the religious groups was successful,” whereas “absolute, ideal communism was a failure.” Holloway measured success by the length of these communities—“The Ephrattans, the Shakers, and the Inspirationists have lasted longer than one hundred years; the Rappite community lasted almost a hundred years; the Zoarites and Icarians, fifty or more; Bethel, Aurora, and Oneida, more than twenty-five years. With the exception of the Icarians, these were all religious groups, for whom communism was not an end in itself, but a means of perpetuating a religious way of life.” Monasteries are the longest lived intentional community type, with some over 1500 years old. However, monasteries lack many aspects of what makes a well-rounded community, such as children or the elderly, mixed genders, and following celibacy. One of the longest-run religious communities, the Shakers, also practiced celibacy.

The kibbutz movement began before WWI in the 1920s and ‘30s. In the beginning children would sleep in the children’s house, but this changed in the 1980s and children moved back to sleeping with their family (Bang, Permaculture: A Student’s Guide to the Theory and Practice of Ecovillage Design 2015). The kibbutz movement is another long-lived social experiment in communism, and while it is not inherently religious, it is based in Judaism. These lessons in history show us that for communism to work in long-lived societies, religion and a strong moral imperative, or even God-spoken directive, in the belief of equality of all humans is necessary.
2. WHAT WE CAN LEARN LOOKING BACK

A clear pattern throughout history has shown that with great social upheaval comes with counteractions with the creation of intentional communities. The Pythagoreans emerged as philosophers questioned Greek society; the Essenes emerged as the Old Testament was being replaced with Christianity and Rabbinical Judaism and political struggles within the Roman Empire; and Robert Owen's social experiments coincided with the Industrial Revolution (Bang, Permaculture: A Student's Guide to the Theory and Practice of Ecovillage Design 2015). This great social upheaval has resulted in various “Back to the Land” movements, with groups of people returning back to the land and turning their backs on established society. The Industrial Era's smoke, refuse, and disease sparked a Back to the Land movement from 1880 to 1914. Thinkers such as Ebenezer Howard, Charles Fourier and William Morris developed utopias that lived in harmony with the land and reestablished man's broken connection with nature and with work as a way to create a better life. Ebenezer Howard married nature and city to provide the benefits of both. He was the first to imagine a self-sustaining city through managing natural resources. Howard, like others during his time, believed reconnecting man to nature could fix the ills of industrialized society. The City Beautiful movement during this same time also reacted to Industrial Era cities by beautifying cities through civic parks, which represented nature, and monumental architecture. Planners such as Lewis Mumford saw nature as a place for man's social redemption and a return to morality. Nature could allow people to escape the “Coketown” blight and experience the health and “redemption” of open air and light. City Beautiful then turned into City Functional. Planners became concerned that cities were too congested, and by making a more functional city, this would create a better, healthier society. This led to LeCorbusier's “city in the park” and Frank Lloyd Wright's Broadacre City. These ideas maintained the paradigm that by changing urbanism and providing for an access to nature could fix the ills of society.

While these Back to the Land movements have been prominent for the last couple of centuries, they do have a very high fail rate, are highly experimental and therefore many are not long-lasting. Many modern intentional communities even fail to get off the ground. Diane Leafe Christian says that only one in ten manage to last more than a couple of years, which seems to be a high fail rate. However, Bang (2015) offers a counterargument that only one in ten small businesses survive, yet we never question the longevity of businesses as a way of life. Chris Coates in his book, Utopia Britannica, analyzed the longevity of 360 communities in Britain from 1600 to 1945. What he found was very few last more than 50 years.

<table>
<thead>
<tr>
<th>Age of Community</th>
<th>Religious</th>
<th>Secular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2</td>
<td>20.5%</td>
<td>9%</td>
</tr>
<tr>
<td>2 to 5</td>
<td>27.25%</td>
<td>30%</td>
</tr>
<tr>
<td>5 to 10</td>
<td>13.5%</td>
<td>18.5%</td>
</tr>
<tr>
<td>10 to 25</td>
<td>8.25%</td>
<td>15.5%</td>
</tr>
<tr>
<td>25 to 50</td>
<td>12.5%</td>
<td>17.5%</td>
</tr>
<tr>
<td>50 to 100</td>
<td>11%</td>
<td>7%</td>
</tr>
<tr>
<td>100+</td>
<td>7%</td>
<td>2.5%</td>
</tr>
</tbody>
</table>
While western media portrays communes as a passing fad, Bang (2015) maintains that they are a firmly established phenomenon, with the existence of such associations as the Fellowship of Intentional Community, Federation of Egalitarian Communities, International Communal Studies Association, Diggers and Dreamers, L'Arche, Catholic Worker, Camphill Communities, and many others.

While intentional communities may be full of idealistic thinkers, their history has brought great impact to the world around us. Chris Coates reviewed British utopian communal experiments, and distilled the following impacts within the U.K.: Italian educationalist Heinrich Pestalozzi’s ideas were used by the Sacred Socialists and the Owenites in the early 19th century and now are the basis for the British educational system; utopian communities at the turn of the twentieth century helped to adopt modern Aesthetic Dress clothing; Ebenezer Howard’s Garden City idea helped shape Britain’s Town and Country Planning System; and four British Prime ministers have strong connections to utopian communities (Bang, Growing Eco-Communities: Practical Ways to Create Sustainability 2007). Finally, the Welfare State, written by William Beveridge of Toynbee Hall and editor of a Ruskinite paper attempted to distil utopian communism to the masses. Even if these communities are short-lived, their ideas live on forever and are studied by people curious enough to dream of other ways of existing.

D. HISTORY OF ECOVILLAGES AND THE ECOVILLAGE MOVEMENT

The ecovillage movement is a grassroots, bottom-up movement carried by single ecovillages, which were all created by unique, individual groups of people. While intentional communities have been recorded in history since the Pythagorean brotherhood two and a half millennia ago, the term ecovillage was coined in 1985, and the ecovillage movement started in the early 1990s. This movement is different from ‘anti-society’ movements such as the early environmental and commune movement (Kunze and Avelino, 2015).

While they weren’t called ecovillages then, technically, the first ecovillages were created ten thousand to fifteen thousand years ago as agricultural villages, which Richard Critchfield in Villages states, is “man’s oldest and most durable social institution”.

The Global Ecovillage Network (GEN) was set up in 1995 to act as an umbrella organization to connect sustainable communities who were striving towards the same goals but unaware of each other. It describes itself as “a growing network of sustainable communities and initiatives that bridges different cultures, countries, and continents. GEN serves as umbrella organization for ecovillages, transition town initiatives, intentional communities, and ecologically-minded individuals worldwide” (GEN website).

The ecovillage movement is also closely related to the permaculture movement, with several of the founders of the GEN being permaculture teachers. Permaculture design (from permanent agriculture) is a design methodology to create sustainable human habitats, developed in the late 1960s by Bill Mollison and his student, David Holmgren, looking for a form of agriculture that regenerated the land rather than creating soil depletion. Bang, 2015, defines permaculture as “a set of design tools, based on observing the patterns in nature’s cycles, which we can use as models to design the infrastructure we need for a sustainable future.” Bang suggests that permaculture is the theory and ecovillages are the application.
E. MODERN INTENTIONAL COMMUNITIES, ECOCITIES AND CO HOUSING COMMUNITIES

Some of the longest-run ecovillages today began in the '60s or '70s. There were a series of spiritually motivated eco-communities that formed, including Findhorn in Scotland, Solheimer in Iceland, Damanhur in Italy, The Farm in Tennessee, Auroville in Invida, Sarvodaya in Sri Lanka and the NAAM movement in Burkina Faso. Twin Oaks ecovillage began as a radical commune in the '60s inspired by the psychological ideas of B.F. Skinner's "behaviorism," which tries to understand how to create optimal conditions to nurture a better type of human. A popular theory of liberalists and anarchists in the '70s was that the modern nuclear family was one of the major causes of human suffering and the downfall of society (Bang, Growing Eco-Communities: Practical Ways to Create Sustainability 2007).

Camphill Communities work with children and adults with mental disabilities alongside community members and combine social therapy with the creation of an alternative society. They were originally created in the 1940s by a group of Austrian refugees, and were inspired by Rudolph Steiner, an influential philosopher and social reformer who also inspired Waldorf Schools and helped create biodynamic farming. There are more than 1000 communities in over sixty countries (Bang, Growing Eco-Communities: Practical Ways to Create Sustainability 2007). Steiner analyzed the corruption of modern society from industrialization and nationalism starting at the Industrial Revolution, and saw that human nature desired a "threelfold social order" to feel complete—Fraternity, Equality, and Liberty. Steiner claimed the Industrial Revolution modernized the economic life, leading to workers demands for more fraternity through trade unions and labor party politics to protect workers. The French Revolution changed the legal life, with citizens demanding for equality. In Middle Europe (later unified as Germany), changes in spiritual life lead to demands for liberty. Camphill communities were designed to feed the spiritual sphere through worship, philosophy, and creating music and art to develop freedom within ourselves; collective decision making in the sphere of laws and rights would create equal rights, leading to equality; and the production in the economic sphere would create fellowship in looking after each other. Camphill Communities still exist today, and represent just one type of intentional community thriving in modern society. It is very difficult to estimate the current proliferation of intentional communities—there is no agreed upon definition, many do not want the publicity and others just may not be a part of a global internet community.

While the co-operative worker movement is not the same as intentional communities, both operate on the same fundamental values of community. As of January 2014, it is estimated the global cooperative movement has members of about one billion, and offer services to about three billion people. Just in Britain, cooperative membership increased 20% from 2008 to 2013 to 13.5 million people (Conaly, 2014).

In 2009, Ralf Gering did a comprehensive survey of intentional communities worldwide, listing 281 organizations or movements, and 3,802 intentional communities, with a total of 407,250 residents. In North America, the Fellowship for Intentional Community listed 1,055 communities in 2010 with 100,000 people. There are thousands of ecovillages worldwide, many documented, and many more undocumented, especially in the Global South (Bang, Permaculture: A Student's Guide to the Theory and Practice of Ecovillage Design 2015).

The Global Ecovillage Network (GEN) acts as an active source of education, networking, and information dissemination with governments, other ecovillages, or interested individuals. GEN is active in Europe, North America, Africa, Latin America and Asia.
Many ecovillages today are still heavily influenced by permaculture design, and offer certified Permaculture Design Courses, which are ways that invite visitors into ecovillages, teaching them about sustainability while experiencing ecovillage life and seeing in-person examples of sustainability. Similar to the permaculture course, the Ecovillage Design Education (EDE) program, launched at Findhorn Ecovillage in Scotland in 2005, is a four-week program designed to teach participants how to design a sustainable community anywhere. These two courses enable some of the largest volumes of dissemination of ecovillage design and sustainable living across the world.

Finally, traditional villages across the globe are attempting to convert into modern ecovillages. The Senegalese government has made a national ministry to assist in transitioning traditional villages into ecovillages.

1. A BRIEF SURVEY OF ECOVILLAGES

Findhorn ecovillage in Scotland is more than 50 years old, has 400 residents, 181 homes, exports its renewable energy, has biological water treatment, uses a local eco-currency, and has about half of residents who work on-site (Bang, Permaculture: A Student's Guide to the Theory and Practice of Ecovillage Design 2015). Over 60% of its income comes through spiritual and ecological trainings on its grounds. They also offer farming and creative ventures one-day a week to mentally disabled adults.

Earthhaven ecovillage in North Carolina was founded in 1995, has a couple neighborhood clusters, a cohousing building, a seminar center, and several small businesses on site. The ecovillage utilizes sustainable building technologies such as strawbale, mud, timber and reuse, heated by solar and wood stoves, and energy from photovoltaics. Toilets are composted and greywater is recycled. The community is also socially engaged with hosting and teaching seminars.

Auroville in India was founded in 1968 by two mystics and serves as a place to raise your consciousness. It has over 2,000 residents, half of them from India, a large portion from France and Germany, and others from around the globe. There are 100 settlements in 20 square kilometers, and the site hopes to hold 20,000 to 60,000 residents. In the middle of the ecovillage is the spiritual center, a gold dome. Everyone receives food, a home, and some money. They grow their own food, have their own school and health center, a Town Hall, a Visitors Center, and businesses in organic food, clothing, leather goods, computer services and book publishing.

2. ECOVILLAGE TYPES

Ecovillages are bottom-up developments, each with its own unique governance, climate, community, values, and economic system. The following represents the variance and extremes of various ecovillages, with examples of communities in parenthesis.

- CONNECTION/ISOLATION.
  - Outward (connected to local community, governments, organizations)
  - Inward (insular, remote, isolated)
- GOVERNANCE AND DECISION-MAKING
  - Father/Mother figure, guru, spiritual leader (Auroville)
  - Vote
  - 70% consensus
  - 100% Consensus
  - Sociocracy
- SHARING ECONOMY
  - 100% income sharing
  - Income independent
• **ON-SITE PRODUCTION**
  o 100% self-reliant (on-site economic production, food production, water, energy, school, healthcare)
  o Commuter suburb (ecologically conscious with renewable building technology or sharing economies, but no on-site production of food, no on-site economic production, some renewable infrastructure)

• **LOCATION**
  o Urban
  o Suburban
  o Rural

• **WORK**
  o Commuter suburb/sleeper suburb
  o Live-work on-site. Income and businesses on-site

• **SECULARITY**
  o Core spiritual focus (Auroville, Damanhur)
    ▪ Ecovillage centers around shrines, temples or spiritual spaces
  o Secular
    ▪ Ecovillage centers around shared spaces or communal house

• **LIFECYCLE**
  o Young (in development)
  o Stable (Earthaven)
  o Mature (established practice and rules) (The Farm, TN or LAEV)

3. **GOVERNANCE AND DECISION MAKING**

Ecovillages can make decisions through 100% consensus, but can also fall back to voting for certain situations. Each ecovillage decides for itself how it wants to govern itself, and under what conditions projects can and cannot move forward. In some ecovillages, one person dissenting on an idea stops it from going forward, but that dissent must be grounded in legitimate and relevant reasoning, not just personal dislike.

**Consensus** serves to reach the highest and best solution for all, removing polarizations in groups. Consensus decision-making stemmed from the Quaker community meetings, where they believed ‘there is something of God’ in every one; consensus became popularized in the ‘60s during protest movements in America, such as the civil rights movements and anti-war movements, as group decisions needed to be made to push agendas forward (Bang, Growing Eco-Communities: Practical Ways to Create Sustainability 2007). Consensus works because it makes sure each member is heard, and does not lead to the division seen in majority voting, where the minority is left unhappy. However, in a highly diverse or large population above 50 members, consensus may not be the best decision-making process. Consensus is the most popular form of governance that communities use.

Communities can communally decide to change the way they govern themselves if they become too large, dynamics change, or decision-making becomes too time consuming. Many larger communities have opted to experiment with **Sociocracy**. Sociocracy is consensus based, rather than majority voting after a community discussion of the issues. It uses the Sociocratic Circle Organization Method of a hierarchy of circles that are various departments or working groups of an organization, all of which form a circular hierarchy with “core groups” having representatives from each adjacent circle forming links with other related circles (see Figure 5). Each circle decides by consent.
4. URBAN ECOVILLAGES
As of 2003, there were only four urban ecovillages in North America, with the L.A. EcoVillage (LAEV) being the oldest, founded in 1992. The rest are in the rustbelt: Cleveland, Cincinnati, and Detroit. While the L.A. EcoVillage was born out of the '92 riots in L.A., the others rose out of the collapsing industrialism which led to a plethora of abandoned property and unused open space (Jacob Stevens Cordivae. “Why Urban Ecovillages are Crucial.” 2003). However, there are many urban cohousing communities that already exist in the U.S.

Urban ecovillages are crucial to the ecovillage movement as the education and outreach through visitation, local news articles, and engagement with local government is magnified by reaching and affecting a larger audience and population. However, urban ecovillages deal with a new set of challenges and opportunities faced by rural ones. The boundaries of urban ecovillages are hazier and less defined, meaning there is more interaction with neighbors and mainstream culture. This allows urban ecovillages to interact with a larger and more diverse sect of people, meaning diversity and race will play a larger role in ways rural ecovillages do not deal with. Urban ecovillages can serve as a change agent and leader for environmental justice issues. Urban ecovillages do not face the social isolation that rural ones do, meaning it will be harder to create a new culture, which is one of the powerful outcomes of intentional communities. Urban ecovillages need to figure out how hard their boundary edges are, and what the drawbacks and opportunities are for being more open.
or closed. Urban ecovillages also have the challenge of adaptive re-use of existing buildings and urban form. This can involve retrofitting and rehabilitating or salvaging materials from on site, which may be more important than using sustainable building technologies. Urban ecovillages offer an opportunity for community building and village-scale living that cities are in lack of (Jacob Stevens Cordivae. “Why Urban Ecovillages are Crucial.” 2003).

F. IMPORTANCE AND RELEVANCE OF ECOVILLAGES

1. ECOCITY IMPACT

Ecovillages act as demonstration sites and testing beds for what sustainable communities can look like in practice, for a solution to climate change, and for providing examples of different ways of living from mainstream society. They serve as models of sustainable living, serving to educate visitors, neighbors, local government authorities, and even national governmental policies in the possibilities of best practices in sustainable, community-oriented living. As Helena Norberg-Hodge, founder and director of the International Society for Ecology and Culture, wrote in the Ecologist in February 2002, “[Ecovillages] represent an altogether new development vision with different economic underpinnings, energy uses, social structures and values to those of industrial society. Ecovillages provide models for living close to the land and in community with one another.” Jonathan Dawson (2006) wrote, “The types of applied research, demonstration and training that ecovillages are engaged in are precisely those that will be needed to navigate rough waters ahead.” Today, Jonathan Dawson in Sevier et. al. (2008) estimates there are around 1,500 ecovillages worldwide, though no-one knows the exact number. It is still a relatively small movement, with only a small number of ecovillages per country.

Despite being relatively small, ecovillages have been having a huge impact in disseminating sustainability initiatives. Many ecovillages have received global attention, like Damanhur, Italy, who in 2005, was recognized by the Global Human Settlements Forum of the United Nations with the Award for Sustainable Communities. In 1998, Findhorn Ecovillage in Scotland was awarded a United Nations Habitat Best Practice Designation. This global attention has brought many visitors to ecovillages around the world, creating a huge amount of educational awareness on sustainability practices, which is brought home with the visitors. Findhorn attracts 14,000 visitors a year. Findhorn capitalizes on its experiences and global outreach in order to have a larger impact. They have created a UNITAR Associated Training Centre and publications, including the UK’s first technical guide to ecological housing.

The research on ecovillages is surprisingly robust, even though the movement has only been gathering speed the last 15 years and the term came into use in the 1990s. The Global Ecovillage Network (GEN) has been active in formulating research, connecting global ecovillages for knowledge sharing, and engaging with research universities. Additionally, GEN, in coordination with Gaia University, has created an ecovillage design course offered at many ecovillages worldwide. Wagner (2012) has completed a research review of existing ecovillage research. Most of the research on ecovillages are theses doing case studies and existing gaps in research are the economic impact of ecovillages. The urban design of ecovillages is also a less studied topic. Lozez (2011) was one of the few who studied the urban design best practices of urban ecovillage, and created a matrix of sustainable measures for the criteria of analyzing urban design practices in ecovillages.

2. THE PROBLEMS ECOVILLAGES CAN ADDRESS

The ecovillage movement today is gaining traction, both in the developed and developing world. The Senegalese government has set up a ministry within their national government for ecovillages in order to help transform traditional villages into ecovillages. The Global Ecovillage Network (GEN) and The Moroccan Agency for Tourism Development (SMIT), has initiated a collaboration called the "Eco Villages for Touristic
Clusters Programme”. This program will help support rural area transformation into tourist economic clusters as a way to create income and employment for citizens, will attempt to integrate the social, ecological, economic and cultural dimensions of sustainability, and pioneer groundbreaking solutions to accomplish the Sustainable Development Goals (SDGs) outlined by the Paris Climate Agreement.

The importance of ecovillages is varied, since each one is created to address certain values of its participants. Ecovillages can be created to build self-sufficiency, live in a more ecologically-conscious way, have ecological farming, build more communal or democratic forms of society, create gifting or sharing economies, create a spiritual community, or to live in harmony with nature, among many other things. Many of them work to build sustainable living practices, including creating local currencies or sharing economies, intergenerational living, and gardening.

Ecovillages can address a variety of ‘wicked’ problems modern society faces. ‘Wicked’ problems are problems that society faces that are difficult or impossible to solve because of incomplete, contradictory or changing elements that are difficult to recognize. ‘Wicked’ problems are problems that have complex interdependencies, such that solving one aspect of the problem may reveal or create more issues, and they are symptoms that are caused by other problems. Ecovillages may solve such ‘wicked’ problems such as environmental issues related to climate change, habitat destruction, and excessive consumerism; social issues related to deteriorating family structures, loneliness and isolation; and economic issues related to the extractive and exploitative qualities of capitalism.

The threats of climate change include extreme weather patterns, reduced food production, increasing wars and mass migration. Ecovillages contribute to preventing climate change by 1) reducing our dependence on fossil fuels by reducing residents’ carbon footprints (Sevier 2008) and 2) increases community resilience through localized food production, infrastructure, energy and businesses. They offer solutions for community-led responses to climate change.

Ecovillages can also help address environmental sustainability. Sustainability is not just about implementing sustainable technologies—it is more about changing behavior. Through creating supportive communities that encourage sustainable behavior change, such as walking or biking rather than driving, sharing resources rather than buying individual items, or committing to living a simple lifestyle can have a greater impact on reducing resource consumption than implementing sustainable technologies.

A study conducted by MIT, Cornell and Ithaca College compared the ecological footprint of Ithaca Ecovillage, a 100 adult and 60 children ecovillage on 60 houses within a 71 hectare site, to an average US neighborhood of the same size. They found Ithaca Ecovillage residents used 40% fewer resources, 71% lower water use, 45% work-at-home, 75% waste recycling/composting, 90% land use for cultivation, forest, water or grazing, and 40%-50% less energy use in domestic buildings (Bang 2015, 34).

Various numbers of environmental impact assessments have been done on ecovillages, looking at their ecological footprint when compared with other developments in the region. Sevier (2008) references a 2005 study of the 450-member ecovillage of Findhorn Foundation in northern Scotland, where they were found to have a 40% smaller ecological footprint than the UK average. Findhorn ecovillage in Scotland has an ecological footprint of 2.71 gha/person, compared with the UK/Scotland average of 5.40 (Bang 2015). Similar results, written by Kaj Hansen in Lærne in 2009, recorded similar reductions in Danish ecovillages. A University of Kassel study in 2004 found residents in the ecovillage Sieben Linden to have less than a third of the carbon footprint of the German average.
Ecovillages also offer solutions to the economic collapse confronted by mainstream western culture. Ecovillages can also have an impact on their local community and economy, depending on their level of engagement. The Findhorn ecovillage has acted as a catalyst to start numerous businesses, charities, community bodies and sister communities in the surrounding area. Sevier (2008) writes that Findhorn has created 300 jobs on site, and it is estimated that the ecovillage and associated activities contribute in excess of £5 million to the economy of the Findhorn, Forres area of the Highlands in Scotland.

As Sizemore (2007) studied through his case study of the urban ecovillage in Cincinnati called Price Hill Ecovillage, urban ecovillages have the potential to spark economic and environmental revitalization in deteriorating neighborhoods, capitalizing on the existing built and natural environments. This places urban ecovillages in a perfect spot to be used in blighted neighborhoods.

Interestingly enough, the Danish government has been supporting ecovillage development by offering up old farms or plots of land that become available to ecovillage groups who want to build villages. They are doing this as an economic development initiative as they have found that many citizens are moving to cities, abandoning the rural countryside and leaving in its wake economic collapse. Ecovillages can help bring tourists, learning centers, a greater population, and economic development to struggling rural regions.

Socially, ecovillages help build social capital by creating stronger support networks and closer relationships between members. Ecovillages have the potential to create better integration and support networks for the marginalized or unsupported groups, such as the mentally disabled, homeless, orphans, refugees, elderly, recovering addicts, previously incarcerated and even single parents. This social capital can be seen in examples of the mentally disabled being able to live more independently in intentional communities, such as the Camphill Communities, or in the Hjortshod ecovillage I visited in Denmark. The independence is possible through having support networks close by, and pairing each mentally disabled person with a community member who lives on site. The Farm includes an adjacent retirement community, Rocinante, where elderly can live next to a supported community. This can reduce hospice and home-care costs, reduce loneliness, depression and early death, and even help provide support to the community, such as child-care. It is projected that in 2030, 20 percent of the U.S. population will be aged 65+ at 71.5 million people (Howe 2012). With baby boomers entering into retirement over the next decade these millions of people will need some sort of elderly care, but where will they go?

Additionally, living in community gives residents tremendous opportunities for self-reflection and self-growth through learning how to live closely with other people through the intimate relationships created, the work required to sustain relationships, and the conflict-resolution skills needed to mediate relationships. Engagement in community is a way to create sympathy and empathy.

![Figure adapted from Bang, 2015.](image)

G. ECOVILLAGE CREATION AND DISSEMINATION

One of the biggest questions, is how can ecovillages be disseminated into larger scale or mainstream society without losing its values of locally owned, participatory design and governance? This question is also embedded in my research. Through focusing on the urban design, or site design, of ecovillages, and
understanding how the community's values and lifestyles are embedded into the design and layout of the community, I hope to better understand how mainstream urban design of neighborhoods can learn from ecovillage design to improve community, ecology, economy, education and sense of place.

1. **GRASSROOTS DIFFUSION, INNOVATION AND TRANSITION THEORY LITERATURE**

Through understanding grassroots diffusion, innovation, and transition mechanisms, theorists, designers and planners may better understand how to promote sustainable development. Grassroots diffusion theory looks at how bottom-up initiatives can penetrate mainstream markets. According to Smith (2007), grassroots diffusion happens in 3 ways:

1. Replicate.
2. Scaling up.
3. Translation to mainstream settings

Replication is the most frequently observed for grassroots innovations. Scaling up involves economies of scale, meaning standardization of plans, materials and techniques, resulting in a profitable construction business. This is difficult for ecovillages to achieve because of their environmental sensitives and community needs. For translation to occur, there are three options. The first is a condition of crises in the mainstream market open an opportunity for niche practices, which is an example of the need for low-carbon housing due to climate change. The second is through the niche adapting itself to resemble the mainstream. The third is for 'intermediate' projects, which position themselves between the grassroots niche and the mainstream.

From this research, for sustainability innovations to penetrate the market, replication and translation through ‘intermediate’ projects are the two most viable options of the diffusion of ecovillages. Smith (2007) claims that grassroots innovations are best in ‘intermediately’ situated projects to facilitate the translation, or institutional adoption, of alternative practices to the mainstream. Boyer (2015) examines what ‘intermediate’ means for ecovillages in the complex urban development landscape of the US. While his study needs further internal validation through the analysis of more ecovillages, his study concluded that niche-to-regime translation is a phenomenon experienced at the local scale, probably due to local zoning and subdivision codes, and that the ‘intermediate’ project of Ithaca Ecovillage located on the urban fringe of Ithaca is geographically proximate to a city center and integrated into the city culture, yet removed enough from the urban context to have less constraints of the urban fabric. Boyer (2015) states that further research can systematically look at how the urban fringe can be used as a spatial niche to encourage innovative development forms.

Research from Smith (2007) and Lovell (2004) also indicates that the lack of developers using green technologies is due to the fundamentally different discourses, practices and governance of sustainability between developers and green builders. The barriers of this practice are ideological, cultural, social, political and ethical factors, as well as economic and technical ones.

Finally, Mulgan et al. (2007) claims that more research is needed into the nature of, and success factors of the development and diffusion of grassroots innovations for sustainability coming directly from communities. Grassroots innovations are context specific, individually built, and small in scale, making them difficult to scale up and replicate. Additionally, Fine and Leopold (1993) find that the ideologies behind them can be barriers in to mainstream values, making it difficult to transfer ideas and practices.
Lovell (2004) and Shove (1998) also write that ecovillages are very specific in how their green socio-technological niches address their own circumstances of geography, climate, personality, economics, culture, politics and values. In diffusing these innovative niches through reproducing the innovation, the socio-technical conditions cannot easily be replicated.

Recent studies include some studies on how urban development practices contribute to social innovation, governance and community building. However, it is surprising that there is a scarcity of literature focusing on how urban design contributes to social innovation, governance and community building, since participatory planning creates bottom-up development.

V. Ecovillages as Models for Sustainable Urban Neighborhoods: Design Guidelines and Methods for Understanding, Analyzing and Designing Sustainable Communities

The following sections explore the four dimensions of the sustainability matrix, Community, Environment, Circular Economy, and Education, and how each of these urban design strategies are expressed and meet their various sustainability component. Designers may use these sustainability components to guide Sustainable neighborhood design can

The organization of this section is broken down into these various elements:

The “Questions to ask” section outlines what questions a community should ask itself in order to explore and discuss the sustainability component further.

The “Design Considerations” section outlines how the sustainability component effects the design of the community, and what aspects of the component need to be considered for design.

The “Urban Constraints” section outlines the difficulties or opportunities that lie specifically in the design, construction, or management of urban ecovillages. In this regard, urban means urbanized—so locations that are urban or suburban in density, as opposed to rural, more isolated communities.

The “Case Study” section explores precedents for how various ecovillages or cohousing communities have implemented the sustainability component, with specific focus on design.

The “Related Sustainability Goals” section delineates what other sustainability goals are related to the current sustainability strategy.

H. PRE-DESIGN

Before site design can begin, a community must be formed, a design team assembled, and a site acquired. The following section outlines important considerations to account for in forming a community and acquiring a site.

1. COMMUNITY FORMATION

The first step to building an ecovillage is forming a group of committed individuals or families that decide they would like to live together and share a common vision, outlined in the section “Formulate a Shared Vision” below. Many resources exist to assist group formation and acquiring land. The appendix will include resources that communities can utilize to assist in the formation, design, planning and development.
a) **Size of a community**

In Diane and Robert Gilman's original definition of ecovillages, suggested at the GEN conference at Findhorn in 1995, the size of ecovillages was recommended from 50-500 members, with exceptions. Larger ecovillage populations can exist, but it is harder to get to know everyone in the ecovillage. Additionally, the larger the group, the more complicated management and participatory decision making becomes as there are more voices to be heard and compromises to be made. Auroville, India is likely the largest ecovillage in the world, with its home page claiming a population of 2,500 people in February of 2017, with a target population of over 20,000. Sometimes, too large of a population can create a bureaucratic, institutional feel which could be one of the reasons people seek living in community in the first place. At a larger scale, after speaking with residents at various ecovillages, they find about 150 people to be a good total population size for an ecovillage.

Some residents claim that 50 adults is a good cap on population for consensus based decision making. If larger than 50, committee groups need to be created for decision making as a monthly meeting becomes too long to include all items on the list. The formation of committees has the potential to formulate decisions without the entire community’s input, which can lead to discontent amongst members if decisions are not properly communicated. With 50 people, it is possible to communicate directly to everyone, know everyone well enough, and respect everyone's opinions due to familiarity with them.

On the other extreme, the smallest ecovillage is Finca Tierra in the Canary Islands, which is an intentional community with one full time resident and a group of temporary volunteers. A minimum population of 20 adults is recommended, as this way there is enough diversity in members to satisfy finding others to relate to and not getting claustrophobic.

Cohousing communities follow a similar ideology to ecovillages, in that too few of people can be claustrophobic or close to living in a large family, and too many can be too distant. Small cohousing communities are from 8 to 15 households, and large cohousing communities range from 26 to 35 households (Durrett 2011). Some claim that 33 units is the ideal size for a community.

Finally, the size of a community impacts the design and affordability of the site. Larger communities can accommodate more shared facilities as there is a larger budget and economies of scale. Normally, development costs are fixed for a project. For example, project management costs are the same for building 18 units as building 30 units. Having larger projects means it is easier to control for costs, including larger financial investments for common spaces.

![Figure 11: The "Magic Size" of Communities](image)

**FIGURE 11** - THE “MAGIC SIZE” OF COMMUNITIES—ONE SIZE DOESN’T FIT ALL, BUT CERTAIN “MAGIC” NUMBERS DO EXIST
a) **Assembling the right design team.**

To create a successful ecovillage, there needs to be a good, working relationship between many actors, including the regional government, an architect, planner, engineer, lawyer, permaculturist, ethical bank, home loan association, contractors, and financiers (Bang, Growing Eco-Communities: Practical Ways to Create Sustainability 2007).

Lawyers can assist in site acquisition through determining if there are any legal barriers to multiple families living on site, reading the fine print of bank loans for site acquisition and construction financing and scrutinize contracts for construction. For community enterprises on site, they can also scrutinize contracts and prepare export agreements. Finally, lawyers can assist the community in any general legal troubles with outsiders, such as nearby residents or upset ex-members.

Someone on the architecture, planning, or engineering team should be familiar with local building codes and zoning regulations to guide the community in the planning and design process. Additionally, having one of these people who has worked with the city government’s permit approvals and knows someone within city government to contact will be invaluable.

---

**FIGURE 12- ASSEMBLING THE RIGHT TEAM TO GET THE SITE DESIGNED AND BUILT**

2. **SITE ACQUISITION**

The transition from community formation to site acquisition is one of the most challenging parts of forming an intentional community, and is where most communities fail. As with any real estate venture, the lack of land and high real estate values hinder the development of large-scale projects. Land acquisition is the most expensive and can be the most difficult part of creating an ecovillage. Due to the large amount of land needed to house many individuals and families, legal structures are normally needed to own and manage the land. Additionally, it may be difficult to gain community access to and control over land, water and food, especially in urban areas.
The lack of capital and financing can hinder the development of ecovillages. Many banks do not understand what ecovillages are, so acquiring a loan can be difficult. Additionally, many banks do not give mortgages or loans to cooperatively owned real estate or business ventures, and if they do they are at very high interest rates. Each state or city has its own set of regulations on co-ops and bank lending, depending on the history of cooperatives. For example, New York City had a strong movement of cooperative housing and has strong lending options for cooperatives, yet the state of Massachusetts does not have favorable laws for co-ops, and a Condominium ownership model is one way to build cooperatively owned real estate.

Case Study:

For Cambridge Cohousing, they first formed an LLC to purchase the land and had members front money for architectural fees. Then, they secured a construction loan, and when the building was completed purchased it from themselves and transformed it into a condominium association. One of the challenges they faced, was that they had no way to get a mortgage or insurance to cover them as a cooperative. While the National Co-op Bank in DC lends all over the country and was willing to fund them, it was with a very high interest rate, which would have priced some members out of participating. Cohousing enabled a wider range of lower-income people to live in the community, since the co-op model would increase housing costs due to insurance and mortgage interest rates.

LAEV created an Ecological Revolving Loan Fund in order to create a way to group members’ funds and donations into a useable pool of money, which when paid back can be used for another project.

a) Site type

The following site types are possible for development:

- Greenfield
- Retrofitting
  - Abandoned army bases
  - Abandoned jails
  - Abandoned hospitals
  - Abandoned schools
  - Reuse of multi-family apartments or single-family homes
  - Farms
- Integrating with residents already living on-site

Legally, acquiring existing buildings may be easier than new greenfield development due to zoning regulations and planning laws, depending on where you live. Acquiring old abandoned military bases, schools or hospitals may be the perfect building to retrofit. Many ecovillages are retrofitted from farms.

Case studies:

- ZEGG ecovillage in Germany was established in 1991 on an old Stasi training camp.
- Lebensgarten ecovillage was established in 1985 in Germany on an old Nazi slave labor factory.
- Findhorn ecovillage in Scotland was built on an old caravan park, and later acquired a hotel. Many of the houses are legally temporary mobile homes in order to get around building regulations.
- Christiania in Denmark, while not considered an ecovillage, is an intentional community outside of Copenhagen within an abandoned military base and is now home to about 850 people, bustling nightlife and many on-site businesses.
b) Site characteristics

Desired site characteristics vary by community, since each community will want to be a certain population size, have certain on-site amenities, be near to certain amenities, or have the ability to farm or garden, include existing buildings or barn. Besides the limitations put on the site by the community itself, the site itself will want to have certain characteristics to make itself amenable to more communal or ecological living.

Questions to ask:

How does the site fit within the broader regions social, political, economic and environmental ecosystems?

Place-based characteristics to consider:

- Greater bioregion and climate
- State regulations
- County regulations
- City regulations
- Political climate and relationships
- Economic ecosystem
- Waterbodies and water
  - Wells vs. topography vs. surface water vs. rainwater collection
  - Rainfall
- Site microclimate
- Passive solar opportunities for buildings
- Solar availability for farming
- Soils
- Ecology

![Diagram](image)

**Figure 13- How does the site fit within the region's larger social, economic, political and environmental ecosystems?**

c) Zoning and Building Regulations

One of the biggest barriers to communal, mixed-use, live-work communities is zoning. Euclidian zoning, which is defined as single-use only zoning, has highly defined separation of uses, dividing residential, industrial, commercial, and mixed-use zones from each other. Zoning not only limits the site use, but also the density of buildings allowed on the site. The key zoning regulations to look for are:

- Ensure that the density/FAR allows for the density desired. If it doesn’t, see how hard it is to get exemptions or land-use changes.
• Ensure that the zoning allows for any retail, office, commercial, or manufacturing space that the community desires on site. If it doesn’t, see how hard it is to get land-use changes.

Additionally, city, county, or state building code regulations may limit the number of adults or families legally allowed to live in one building. Working with someone familiar with the city, county or state building codes is key to a successfully designed project.

Zoning laws and regulatory restrictions on building codes can limit site planning due to zoning codes, limit building materials through building codes, limit the numbers of families and density on site through zoning codes, and limit the types of sustainable infrastructure on site, such as alternative wastewater treatment. Having someone on the design team, whether it is the lawyer, architect or engineer, familiar with the city, county and state regulations will make permitting much easier, especially if they are familiar with the people in the city’s Planning Department. Working with city and county government to allow land use changes, or even changing the city and county building codes can be a long and expensive process, but the latter will allow others to build more sustainably in the future and make it easier down the line to expand or build similar communities. Regulations to be aware of are related to the city and county planning department, department of transportation, building department, environmental health department, and fire regulations. State regulations govern cooperative ownership, and depending on the state’s regulations, this can increase the challenges of cooperative ownership or getting a mortgage.

Questions to ask:

Zoning:

• What uses are not allowed on the site?
• What density is allowed on site?

Building code regulations:

• What are the legal limitations on number of adults living in one building?
• What building code regulations exist that would limit building design, such as dense clustered development, on site?
• Do building code regulations allow for the animal husbandry, such as chickens or cattle?
• What building code regulations exist on sustainable or renewable infrastructure?
  • Is rainwater collection and greywater recycling allowed?
  • Is it legal for solar photovoltaics to feed back in to the local grid, or is energy storage necessary?
  • Can on-site wastewater treatment, such as willow evaporation ponds, constructed wetlands or compost toilets, be used to treat sewage?

Case studies: The Hudral ecovillage spent a decade negotiating building permits and usages, so it may be necessary to be patient (Bang, Permaculture: A Student's Guide to the Theory and Practice of Ecovillage Design 2015).

Sirius Ecovillage owns the property as a 501c(3) nonprofit, which allows zoning regulations and property taxes to be ignored. This could be a good tactic if there is no way to get appropriate zoning variances.

d) Site Development

When a site has been chosen, the community or founders can walk the site to determine where are good places to develop, conserve, or use for various purposes. Additionally, if groups haven’t already decided
before finding land, they can decide what their maximum size of the community should be. This can be determined by the allowed building density of the existing or approved zoning, or if groups wanted to be self-sufficient, by the carrying capacity of the land.

For greenfield or retrofit sites, it is good to walk, observe and map the land to find places that are beautiful to conserve, land suitable for agriculture, gardening and orchards; existing water flows through identifying flood plains, erosion gullies, springs and stream courses or where water naturally travels through the site, and identifying potential pond sites; identifying the existing plant communities and ecology of the site; identifying areas to develop into potential homes, potential business sites, village centers, outdoor gathering areas, and areas for future development; and layout where major infrastructure will go such as roads, walkways, renewable energy generation, power lines, sewage treatment areas, and site drainage.

In order to begin site development, aerial photos and a contour map with property boundaries are very useful to begin planning the layout of the property. If any existing buildings are on site, gaining access to their floor plans can also be useful to lay out the rooms in the buildings and see exactly how much space can be utilized.

Once an initial site plan has been made, the community should come together and agree upon it.

Choosing, purchasing, designing and beginning to build a site can be the most difficult part of building a community, and can take years before breaking ground.

Case study: Earthaven ecovillage, in North Carolina, took three years to map and observe the plan, agree upon a proposed site plan, and simultaneously raise money to pay off their owner-financers and built the first stages of the physical infrastructure.

e) Site Ownership

A site can be developed through a variety of models:

- Individual led
  - One owner acquires and develops land, and during or after site purchase finds people to live there and purchase their plot

- Developer led
  - This is more easily accomplished through the building of cohousing rather than ecovillages, as cohousing is closer to a typical apartment building, where as ecovillages are collections of homes and normally includes larger tracts of land

- LLC of a group of individuals purchase land together

- Individuals or families buy individual plots or parcels of adjacent land, eventually selling it to an LLC or owning their individual plot. An LLC owns the communal land.

Land ownership and site development can change the dynamics of a community through individuals believing other members have more or less power and influence. The following explores various ownership models that communities may wish to pursue:

- Limited-equity housing co-op
  - Shared equity homeownership models are typically applied to multi-family complexes or apartment buildings. Each unit purchases a share in the cooperative rather than owning their individual unit. Limited equity housing co-ops have limits on the resale value of each share of the stock, keeping it below market-rate value. The share prices are set by a formula created in the co-op's bylaws, subscription agreement and stock certificates, which created a
shared equity formula. Some limited equity co-ops have income limits of new residents. Common areas and building maintenance are a collective responsibility.

- **+ :** Below market-rate, affordable housing
- **+ :** There is common ownership and shared decision making. Members have the right to live in a unit and vote on issues, which is what an intentional community would want.
- **+ :** There can also be financial benefits to a shared mortgage, rather than individual ones
- **+ :** In addition to creating affordable housing through limiting the resale value of shares, most limited equity co-ops accept Section 8 vouchers to pay for the “carrying charge” in the same way as rent.
- **- :** There may be troubles in securing low-interest mortgages for a co-op

**Zero equity housing trust**

- Similar to limited-equity housing co-ops, the zero, or no-equity model means that shareholders may not sell their share for any profit. Shareholders pay an initial, low purchase price in order to become a member, and recoup their purchase price upon sale. This model looks very similar to renting, as there is a monthly “carrying charge” in addition to the purchase price and no equity is made through the purchase.
- **+ :** This model helps maintain extremely affordable housing
- **- :** It is not meant as a mechanism to create equity for owners who are selling their share and moving out.

**Community land trust (CLT)**

- A CLT is a nonprofit corporation that can provide permanent affordable housing by acquiring land and homes in a certain geographically focused area, and permanently alters the mechanisms of home purchase and sale. A resident can buy their home, but leases the land itself from the CLT who owns the land. The CLT sets regulations on how much a home price can be sold for, keeping the sale price affordable for new residents moving in. This maintain permanent affordability because even as homeowners change, the CLT owns the land. The resident pays an annual fee to the CLT to maintain its operations. CLTs counteract the market-driven housing increases every time there is a change in ownership. The CLT is typically governed by CLT residents, neighbors, and experts or stakeholders.
- **+ :** Permanently affordable housing
- **- :** The only downside to CLTs is that residents would not build as much equity in their home as market-driven homes.

**Cooperative ownership (co-op)**

- Several owners jointly own a building of multiple units, but the building is owned by a corporation made up of shareholders, each holding shares of stock in the corporation. Shareholders pay a monthly “carrying charge” to cover the co-op expenses of maintenance, insurance, taxes, and payments on loans held by the co-op.
- **+ :** Cooperative ownership and management
- **+ :** Ability to vote in members
- **+ :** Ability to move around to different units with a changing family
- **- :** Co-ops are financed differently than condominiums, and normally do not get mortgages from banks, but sometimes provide “share loans” to cover a purchase of the share price. This can lead to problems securing financing.

**Condominium association**

- In a condominium, each owner holds a deed to their individual unit and an interest in the common areas.
- **+ :** Condominium covenants, conditions and restrictions are legally binding rules members must follow, which may help intentional communities form a cohesive set of guidelines, although formally restrictive
Unlike cooperative ownership, condominium owners have little say in who moves in to the other units. For creating an intentional community, members need to be aligned to the core values.

- **LLC**
  - Residents can acquire 999 year leases from the LLC that owns the land, free to sell it whenever they desire.
  - +: Reduces individual liabilities against lawsuits
  - +: Pass-through taxation, avoiding double taxation from the corporation and the shareholders, with only shareholders needing to pay taxes, not the LLC itself
  - -: Multimember LLCs need to carefully spell out each other’s rights in case of death or disagreements

- **Nonprofit**
  - A nonprofit owns the land and leases it to individuals.
  - +: Zoning regulations are inapplicable
  - +: No property taxes
  - -: Not paying property taxes or following zoning codes could strain the relationship with the municipality.

- **Traditional / Individual plot ownership with shared ownership of shared spaces**
  - +: Maintenance responsibilities are clear—individual owners maintain their own property and own land.
  - -: Reinforces the status quo of traditional private land ownership, and treats land as a privately owned commodity. Communal land ownership and management can foster a sense of community and individual responsibility.
  - -: Reinforces single-family home land development, as individual ownership of parcels more easily facilitates individual ownership of homes.

I. SENSE OF COMMUNITY

Having a strong and well-run community is the key to success and longevity of the community and having a supportive community improves the health and longevity of individuals. This can be accomplished through the following, which will be explored in this section:

Shared values: Agree upon and share a common set of values

A Set Process: Set out rules of governance, decision making, and managing membership to prevent conflict and facilitate working together

Division of labor: Form focus groups to maintain and run the ecovillage

Conflict-Resolution: Determine how conflict-resolution will be mediated

Socializing: Create community cohesion through social events, learning together, eating together, cooking together, and having festivals

Working together: Create community cohesion through work parties, building something together

1. FORMULATE A SHARED VISION

In the process of community formation, groups of individuals and families should assure that they are aligned along the same values through group discussion and agree upon a written vision statement. While this vision is recommended to be created during the group’s insemination in order to maintain focus and intention, if a vision statement has not yet been crafted, it is important to create one before acquiring land.
a) **Current vision of community**

A shared vision statement can be co-opted from other ecovillages or communities, or created from scratch. The Earth Charter is an international declaration of essential values and principles to create an equitable, sustainable and peaceful society, and can be used as inspiration for a community’s vision.

**Questions to ask:**

- What common goals, vision and objectives are held by the community?
- What is the desired process for creating this vision?
- How often do communities want to rework their vision?

**Major considerations for design:**

Sharing a common vision enables site design decisions, site maintenance, and future community growth to be aligned amongst members, preventing possible future conflicts. A crafted community vision can help guide site design decisions, such as providing space for community gardening, animal husbandry, increasing density or residents on site, and the types of commercial businesses on site.

**Urban Constraints:**

For creating urban communities, it is relevant to think about what the community’s role will be in facilitating or creating interactions between the community and its neighbors, city government, the school system, businesses, environmental or social groups or marginalized groups of people. This will also help guide the community in the design and construction of the types of public spaces open to the entire neighborhood or city the community would like to create.

**Case Study:**

Cambridge Cohousing created a vision to be multiracial, multigenerational, near transportation, have green space, be accessible, have south facing windows, and include sustainability initiatives. This guided their site design and enabled new members to know what was expected of them.

LAEV has created the following shared values:

1. Celebrate & include joy in all our endeavors
2. Take responsibility for each other & the planet through local environmental & social action.
3. Learn from nature and live ecologically
4. Build a dynamic community through diversity & cooperation, giving & forgiving
5. Inspire compassionate, nurturing, & respectful relationships
6. Create balanced opportunities for individual participation & collective stewardship
7. Engage our neighbors and broader community in mutual dialog to learn, act and teach

b) **Future vision of community**

A shared vision can also be a future vision of a community, but it is important to distinguish between current, short-term and long-term visions and goals.

**Questions to ask:**

- How do the community’s visions project into the future and what are the plans to get there?
- How does the site’s design play into this future vision?
- What would the idealized version of the community look like?
• Are there possibilities for expansion or growth? What maximum population would the community be comfortable with? Would expansion mean buying nearby land, increasing density, or developing undeveloped parcels? Would expansion mean adding or expanding retail, on-site businesses, food production, or community spaces?
• Are there goals the community would like to meet but currently isn’t addressing? This could include building climate change adaptations, improving self-sufficiency, creating affordable housing, welcoming marginalized groups such as the homeless, mentally challenged or refugees, creating more biodiversity, welcoming more businesses, building a school, or creating educational centers.
• What are the priorities and current capacities of the community for new projects?

Major considerations for design:

In order to guide future development, the community must form a vision of its future, idealized form. Without knowing where the community wants to go, it will be hard to decide on new building projects, growing the community size, or rejecting or trying to acquire new members.


c) Sustainability indicators, targets to mark progress, and action plan
Creating sustainability indicators, targets to mark the progress of a project or goal, and an action plan can help a community stay aligned, prioritized and focused in achieving its goals and marking their progress. An important part of community is not just working together, but celebrating together. Achieving certain progress marks or indicators can be a great cause for the community to come together and celebrate, which is an opportunity to build social capital and enhance the sense of community.

Questions to ask:

• How is the community ensuring its goals and vision are being met?

Design Considerations:

A community may decide to undergo further construction projects, change site maintenance or management methods, or acquire more land in order to help meet various sustainability goals. Additionally, any new projects should try to meet the sustainability indicators outlined by the community.

2. COOPERATIVE GOVERNANCE AND CITIZEN ENGAGEMENT

While there are design features that many ecovillages hold in common, like having a common house, organic gardens, and sustainable building design, there is no blueprint for an ecovillage. Each group can create a participatory design and management process to design, adapt, or change plans, as needed.

a) Cooperative Governance & Group Decision Making

One of the key defining features of intentional communities, including ecovillages, is their cooperative governance—residents voluntarily rule themselves through self-created, self-governing practices. An important way to create a sense of community is through belonging and identification—feeling like members fit in and that this is “their community” (Chavis 1986). To create this, members must feel that they have autonomy, control, influence and responsibility to their community, and self-governance is one aspect of this.

(1) Group Communication

Communities can communicate and coordinate with each other in a variety of ways: in community meetings, in task force meetings, over email, on online forums, during work parties, during communal dining, during communal events, on physical message boards, through group calendars, and through informal socializing.
**Design considerations:**

Having a communal meeting room, which can function as a multipurpose room, that is large enough to fit the entire ecovillage, is essential to having cooperative governance. It is important that the community has semi-private spaces with enough room to fit the size of the community desired. Community multi-purpose rooms for meetings and gatherings should be able to fit the entire community comfortably, preferably in a circle formation, as well as in an audience-presenter formation. Having a projector and whiteboard to show presentations, write down notes, and do collective brainstorming will prove to be essential to organizing the group and getting everyone on the same page.

Another important community gathering space would be a lobby, entrance area, common area or communal house where members may formally or informally gather. Message boards with announcements, events, and upcoming meetings should be located in this area, hopefully frequented by many people. The space should be designed as an entrance area, and could perhaps hold members’ mail, act as a “public living room” or communal dining area, and be inviting to be within. It is important to consider circulation and mobility in designing the placement of these spaces, as encouraging random social interaction can be as simple as providing more opportunities for lingering chance encounters to happen.

Along with large spaces that can accommodate the entire community, smaller, intimate spaces to gather are important for building community and allowing for informal conversations or smaller meetings. These spaces could include hallway nooks with couches, smaller shared living rooms between apartments, outdoor patios or garden hangouts, small lounges, communal libraries and communal kitchens or dining areas.

How communities govern themselves and how community meetings are held is tightly coupled with architectural design. When meetings are held in a room with rows of seats and a podium for the speaker, there is a clear hierarchy of power, focus and control over the group. It is a formation meant for listening to an ‘expert’ or ‘leader’ rather than a space to facilitate discussion. Sitting in a circle provokes the feeling of equality since everyone can be seen and heard. The focus is not on one particular person, roles can easily be switched without changing the seating positions, and it is a good shape to facilitate discussion. Sitting in a circle implies that everyone has something to contribute and something to learn.
Case Study: LAEV's lobby acts as a hub for informal and formal interaction and communication to the community through its message and announcement board, couches, and connection to an outdoor courtyard garden for communal cooking and dining. LAEV lacks in more informal indoor lounge areas, but contains outdoor areas to gather within the courtyard garden or within people's homes. Safety and environmental hazards from idling trucks has become an issue, and for those with children, the front yard areas facing the street have been less activated due to this.

(2) Online Community Organization

Organizing a community online is just as important as in person. Much of the communication to the wider community may be through email, as not every person may be attending community meetings.

Design considerations: For older members who don't use the internet or have a computer, having a communal computer for group use in the lobby, library, or other communal area may prevent people from feeling excluded. Additionally, a digital monitor displaying the online message board or calendar may be desired for older members who refuse to use a computer or the internet.

Case Study: LAEV uses a mailing list and wiki to organize its residents and keep everyone informed. This mailing list also contributes to the community's informal sharing economy, through requests being asked through email. At one biweekly community meeting I attended, about 30 members were in attendance, which is only a fraction of the entire LAEV population. These meetings help decide the future of LAEV, but most of its communication to its members happens through online message boards.

b) Membership process

Community is defined by its members sharing a sense of belonging and identity to the group (Chavis 1986). This means that members should share a common vision or goals, and that there should be boundaries created for keeping others who do not share these out. Every community needs to decide how it will deal with new members entering the community. From various research in visiting communities and from
academic research on communities, having a well-formed membership application and review process leads to less surprise conflicts with new residents who could be misaligned in the shared values, or create drama and conflict among members if there are personal misalignments. It is easier process to prevent a new member from joining than to kick out an existing member.

**Design Considerations:** Providing space within the ecovillage for potential or new members to live during a “trial period” or just to experience ecovillage life for a short amount of time is priceless for acquiring new members, and seeing how they fit into the community on an intimate level. Some people seem great at first impression, but may be different months into a relationship. This space can be short-term housing in the form of seasonal housing or short-term rentals. Seasonal housing can be used for resident housing in the off-season or winter months, and used for income generation during the summer months from visitors and tourists. Short-term rentals can also be used to allow short stays; apartment rentals can be limited to 6 month or 1 year leases.

**Case Study:**

The LAEV accepts new members after reviewing a 25-question application. They use a trial period of six months to see how new members fit into their community. Each potential member is assigned a liaison to help them through the process. After six months, they can enter the candidate phase after an interview with residents present, followed by a voting process with members only to allow the individual to become a resident.

**c) Participatory Site Design**

The beauty and appeal of ecovillages is that members can feel autonomy over the environment and choose the type of governance structure that they live in. Autonomy and control over one’s environment in collaboration with a group fosters a sense of community (Chavis 1986). Having control over the community’s site can be done throughout the lifecycle of a community.

**Questions to ask:**

- How do the group’s core spiritual, ecological, ethical and social values manifest in the site’s design?
- How do communities engage in group, participatory design?

**Design considerations:** Before a site is developed, members can communally decide how they would like the site to look. Many communities work with architects in order to realize their collective vision. Once the community is designed, new projects are always possible by putting them up for review in community meetings. New parcels of land may open up for development, demographics may change, or the values of the community may change.

**Case Study:**

After acquiring a site, Cambridge Cohousing invited its existing members to contribute to the site design through creating a Design Committee of members who were willing to spend time in figuring out the design. The Design Committee made a list of all the types of spaces and put them into two categories: “definite” and “would be nice.” Then, at a community meeting the list of spaces was finalized and written up on a large piece of paper. Each member in the community was given a certain number of dots, and the community voted on which spaces they wanted the most. The spaces with the most votes “won,” and were included in the design of the Cohousing, which was handed over to a professional architect for the final design. Residents
worked with the architect to coordinate the size of the apartments, number of bedrooms and the final cost of the units.

LAEV has a newly formed “Aesthetics Committee,” which helps improve and maintain the beauty of the urban ecovillage. The committee focuses on improving the lighting and public spaces.

d) Participatory Site Maintenance and Management
Communities need to decide how the site will be collectively managed. Two important aspects to maintaining a sense of community within membership is personal investment and belonging and identification (Chavis 1986). Members taking on accountability and completing work on the site enables residents to feel control and responsibility for the community. Many communities form work-groups or volunteer shifts to maintain the site, requiring residents to work a certain number of hours per week or per month, whether through joining a work party or a dedicated work-group. Working groups within the ecovillage can help manage their own waste, landscaping, and maintenance. Volunteering keeps site maintenance costs down, but comes at the cost of resident’s time. Maintenance fees can be increased to pay residents or workers to maintain the site, reducing the amount of volunteer time needed—cohousing communities may adopt this model, as city living frequently correlates to increased work, family and social obligations.

Depending on the ownership structure and living arrangements on site, building maintenance can be done through individual ownership if there are single-family homes, to a hired maintenance staff if in a cohousing set up. Work groups can be set up so that residents or hired staff are paid to be on the building maintenance team, or ecovillages can have reduced volunteer hours or reduced fees for resident building maintenance work.

Design Considerations: How the site looks is the direct result of how a community decides to maintain and manage the site. Permaculture design principles can be used to better manage resident’s time, with things that need constant attention close to the home, and areas that barely need management further away. Radial sectors can be used to concentrate related functions in one area, making maintenance more efficient and integrated into the design of the site.

Urban Constraints: As noted, city living frequently correlates to less time available for work—this may limit the maintenance and even governing structures within urban ecovillages since many residents may not be open to committing 3+ hours of work a week in exchange for lower costs and increased social bonding.

Case Study:

LAEV uses work groups to divide up labor and responsibilities to keep the community running. Additionally, the community hires maintenance staff to keep up with building repairs. LAEV’s workgroups include some of the following: Emergency Preparation Committee, Conflict Resolution Committee, Water Committee, Garden Committee, and the Management Committee (members must be voted on).

Cambridge Cohousing does not require residents to volunteer any of their time, but in response, living fees are very high at $800 to $900 a month for utilities, facilities and common area maintenance, which is the highest facilities fee I’ve seen in any ecovillage.

e) Autonomy Over Local Resources
Many people move to ecovillages in order to feel more autonomy and ownership over where their resources come from, and a desire to live closer to and in greater harmony with the land.
Design Considerations: Rural ecovillages are traditionally on large tracts of land, where there is room to grow food, conserve wild or sensitive areas, protect water sources, and promote healthy living. However, some sustainability initiatives, such as self-sufficiency through food production, rainwater harvesting, or providing for on-site businesses can be limited through lack of autonomy and rigorous regulatory and zoning controls.

Urban constraints: Managing resources effectively is the most important aspect of promoting urban autonomy over local resources. This means utilizing underutilized spaces, such as roofs, alleyways and even streets or parking spaces. Additionally, coordinating site designs with neighbors or local community groups can improve the efficacy and usefulness of spaces.

Autonomy over local resources is more difficult in urban settings, though not impossible. Much of the autonomy comes from collective ownership and stewardship of the natural resources on site, and since urban settings have expensive land and are directly adjacent to other properties, many elements cannot be directly controlled by the community. However, working closely with neighbors, nearby residents, and local community groups or schools, it is possible to do outreach to the larger community to activate a larger network of natural resource prevention. This can take the form of stormwater management, air pollution control through reducing driving or idling vehicles, increasing the plantings in the neighborhood to reduce urban heat island, improve stormwater management, and help filter air pollution. It is necessary to manage visions or conflicts with the surrounding neighbors who may have different visions of how they would like the neighborhood to be. While some neighbors might be aligned with the community in interests in vision, others may be opposed to what the community wants to do, and others may simply be apathetic. This has the potential to severely limit the greater impact the community could have in terms of blocking future construction projects or even holding large events. Projects such as green infrastructure, curb bump outs, pedestrian-oriented development, bicycle lanes, land conservation, and the creation of community land trusts could be unsupported by some of the larger, surrounding neighborhood.

Case Study: The LAEV can only control so much outside of their property line. Nearby stores have idling 16-wheeler trucks, limiting the group’s autonomy over supporting clean air. Additionally, fruit trees located on the street provide food for the local homeless, but also prevent residents from reaping their own harvest. LAEV has been active in promoting better stormwater management through green infrastructure, helping to replenish groundwater supplies, support vegetation and improve flooding issues.

3. INCLUSIVE PROCESS, SPACE AND PROGRAM

a) Diverse housing options
Providing a diversity of housing enables people from many walks of life to find accommodation within the community. The following represents the variety of housing options a community can choose to develop:

- Neighborhood clusters with single family homes
- Co-housing
- Duplexes or attached multi-family homes
- Ownership
- Rental
- Co-op

In order to create inclusive, diverse communities, a variety of housing types can be provided to accommodate various incomes and lifestyles. It is recommended to include:
- Rental units for life-style constrained residents who have transient lifestyles or may not be ready to invest in real estate
- Studio bedrooms for single occupants
- 2-bedroom, 3-bedroom or 4-bedroom units for various family sizes
- Provide low-income housing through community-created rent-stabilized apartments, through city-endorsed rent-stabilized apartments, or using shared rooms, shared baths, or shared kitchens to reduce living costs.

Questions to ask:

- What housing options do current residents desire?
- What housing options do new or potential residents desire?
- What housing options are in high or low demand?

Design considerations: Building or adapting existing structures into cohousing versus single-family homes is dependent upon zoning and building code regulations. Density, height, and the number of individuals living in a unit are regulated.

Urban constraints: Cohousing is good option for higher density development in urban settings, while single family homes may be more amenable to suburban neighborhoods. Urban areas have stricter zoning and building code regulations, possibly making certain development harder. Suburban neighborhoods typically have zoning for single-family residences, highly regulating the density and building height allowed on site, which can make cohousing difficult to construct.

Case Study: The LAEV provides a variety of sizes of rental units to its members. It is common for members to move around if certain units open up, providing flexibility in family planning or needing more or less space. This flexibility could be a huge benefit to urban dwellers, where space constraints are highly limited due to cost of living.

b) Diversity in membership

One of the critiques of ecovillages is that it is a privileged, white movement. However, the benefits of ecovillages from the reduced costs of living from creating an economy of sharing, producing on-site food, and the potential to create on-site employment opportunities should be extended to wider communities.

Questions to ask:

- How is diversity and inclusivity encouraged in the community’s membership process?
- How is diversity and inclusivity encouraged in the community’s programming to outside neighbors or nearby citizens?

Design considerations: Encouraging diversity in membership may be affected by the location chosen by the community—if it is already within a diverse neighborhood, membership diversity may already be high. This can be something the community can consider in deciding where the community should be located.

Urban constraints: Urban areas may be inherently more diverse than suburban or rural areas, providing better opportunities to create diverse membership.

Case Study: Cambridge Cohousing included in its vision to be accessible, multiracial and multigenerational. Despite this vision, its current membership is mostly White. While its membership includes lesbians, Asians,
and a wide variety of religions, such as Quakers, it has never had its membership include African-Americans, gays, nor transsexuals.

c) Affordability

Affordability can be created through a variety of mechanisms within the community, such as affordable housing options, shared access to facilities and services, time banks, and access to free or reduced childcare services. Some of the more expensive costs that a family must deal with are housing, health insurance, food, child-care, and transportation. If child-care could be covered or subsidized by the community, it could save families a lot of money.

While diverse housing options can enable a diverse community, the creation of affordable housing for ownership or rental is a good way to include low- or moderate-income members. There are a variety of ways to create affordable housing, either through a legal ownership mechanism such as a community land trust (CLT), limited-equity housing co-op, or zero-equity housing co-op. Limited equity housing co-ops are a great ownership model for affordable housing, as in addition to creating affordable housing through limiting the resale value of shares, most accept Section 8 vouchers to pay for the "carrying charge" in the same way as rent. In addition to the legal ownership models mentioned above, communities can also create affordable housing through the following three legal mechanisms:

City Housing Authority subsidies or purchase. The community may reach out to its city’s Housing Authority to create permanently affordable rental units or homeownership through selling some of its units to the city’s affordable housing program.

Community subsidized housing. Communities may decide that they want to subsidize their own affordable housing through subsidizing rental units to low- or moderate-income members, or offering low-interest, below-market rate loans for homeownership.

Deed-restricted, owner-occupied housing. The city may place affordable housing restrictive covenants, or Deed Riders, on new developments in order to maintain stable home buying prices for neighborhoods. Deeds vary, but can regulate how long an owner may live in the home before renting it, how much rent can be charged to tenants, may need to get permission before refinancing, or may have a set resale price based on a resale formula.

Questions to ask:

- What ownership models and resale mechanisms are residents attracted to?
- Are owners okay with receiving limited equity?
- Are there any state limitations on forming certain ownership models, or would there be difficulties in securing an affordable mortgage?

Design considerations:

While limited equity cooperative ownership models, deed-restrictions, or subsidies can all create affordable housing through legal mechanisms, it is also important to keep the building design, construction and operation costs low. There are many affordable ways to build sustainable housing, such as sandbag construction. However, some construction methods or materials might be restricted due to building codes, and an unknowledgeable or unskilled designer or construction force. Building efficient design may be more expensive in upfront costs, but may reduce operating costs in the long-term.
Additionally, the size of the community can impact the affordability of the site, as smaller communities have smaller budgets, more expensive shares of communal space, and lose on economies of scale.

Creating space within the community for a child-care center could be highly valuable for residents, and could even be as a for-profit venture. Creating adequate indoor and outdoor space for children of all ages to play is essential to creating a diverse community enjoyed by all.

**Urban Constraints:** Urban or suburban areas may have restrictive regulations on building techniques or materials, perhaps limiting the affordability of the design and construction.

**Case Study:**

Cambridge Cohousing allowed the City of Cambridge Housing Authority to purchase two units for affordable housing. This provides two spaces within the Cohousing complex for permanent affordable housing purchase to residents who have 50% to 80% of Area Median Income. Additionally, one of the units is a First Homebuyer, which limits what the resale value is. Additionally, Cambridge Cohousing was not able to secure a loan under cooperative ownership due to high interest rates, and so they were limited to a condominium ownership model. Finally, Cambridge Cohousing’s members did not want a limited-equity model, because if residents ever decided to move they did not want to be limited in their options for new housing, since they would not recoup the full market price of their home. The units were originally modestly affordable due to the lower market home prices in Cambridge, but as the prices in Cambridge have increased, Cambridge Cohousing’s units have become accordingly unaffordable to moderate- or low-income people.

LAEV has an on-site childcare facility that takes care of children within the ecovillage as well as the surrounding community in a for-profit business. While LAEV currently doesn’t cover child-care for its residents, it is currently under discussion and may begin next year. Additionally, they have an outdoor children’s play area.

d) **Inclusive Design**

Inclusive design means creating spaces that people can access and use for a wide diversity of people including differences in gender, race, age, sexual orientation, physical ability, mental ability, language, or culture.

**Questions to ask:**

- How to certain spaces make people feel welcome or unwelcome?
- What spaces feel safe and why? What spaces do not feel safe and what can be done to change them?
- What are the defined boundaries within the community for public, semi-public, semi-private, and private? Do any of these spaces or definitions need to be altered to accommodate better privacy or better inclusivity?
- Is the community ADA accessible, children friendly, and accessible to the elderly?

**Design considerations:** To create inclusive design means recognizing the diversity and uniqueness of individuals during design. This can be created through inclusively designed personalization or providing for flexible adaptation by users. This enables self-determination by the users, allowing the adaptive design to encourage the growth of self-knowledge. Additionally, creating inclusive design processes and tools will create inclusive design. These tools and processes should be easily understandable and useable by participants. The design team should be as diverse as possible—this can be the architectural team or members of the
community itself. This also means the design team should be accessible and understandable to the community. Finally, recognizing the broader beneficial impact of inclusive design can help designers and participants become aware of the broader implications of design decisions.

To ensure that a design is user-friendly, sometimes designing places for children or the elderly can help determine if it is safe, accessible, understandable, and inclusive.

Deborah Howe in “Aging as the Foundation for Livable Communities” recommends the following four design principles for planning for aging:

1. **Engagement.** Making sure elderly experiences are heard and appreciated.
2. **Diversity.** The elderly need a wide variety of housing options, including assisted living.
3. **Linkages.** Coordinating the flow of movement between spaces to be safe and accessible, with careful attention to detail.
4. **Flexibility.** Cost effective changes in space in response to changing needs, and accommodate various uses and needs of a space.

**Urban constraints:** Urban areas are potentially more racially and socioeconomically diverse. This means cultural, language, or seriocomic constraints should be considered in design or participation in spaces.

**Case Study:** Currently, Cambridge Cohousing does not have any physically disabled residents, but in the past had two of its units adopted for physically or mentally disabled residents. They enabled the residents to move out of inaccessible units into elevator-accessible or first-floor units. One of the units was outfitted for a resident with muscular dystrophy, and another unit was outfitted with a couple who was taking care of four mentally disabled adults. Through including the construction of elevators and allowing residents to change units based off of special needs, more inclusive design was facilitated.

4. **PHYSICAL ENVIRONMENT ENCOURAGES SOCIAL INTERACTION**

This section explores how the physical design of a community can encourage social interaction amongst its members or surrounding neighbors.

a) **Creating pocket neighborhoods/living groups**

Being able to know or recognize other community members or neighbors can encourage social interaction, create familiarity, increase the feeling of safety, and increase the feeling of community and belonging.

**Design Considerations:**

From visiting various ecovillages and speaking to residents, a common design feature for larger communities is to create more intimate, village-like living conditions by creating neighborhood clusters, or living groups, within the larger design of the community. It is only possible to get to know about 20 to 25 people closely and interact with them on a frequent enough basis to keep up a close relationship. Neighborhood clusters create more intimate, tinier clusters of homes together, often sharing a common yard and common house used for laundry, communal dinners, and informal gatherings. In this way, a sense of community can still be created even amongst a much larger community population.
FIGURE 15: NEIGHBORHOOD CLUSTERS WITH A COMMON HOUSE, SHARED YARD AREA, AND SIDE PARKING TO ENCOURAGE PEDESTRIAN-ORIENTED DEVELOPMENT ARE TYPICAL OF COHOUSING AND EC OVILLAGE DESIGNS.

Urban Constraints: Urban areas are often constrained by land availability and high prices. This means in combination with density regulations, the plot itself can limit the community size. Finding a desirable piece of land to develop can be expensive or difficult. It may be easier in urban settings to rehabilitate an existing multi-family home, in which case “pocket neighborhood” design strategies can be used.

Many urban ecovillages opt to use cohousing as a way to create community within an urban framework.

b) Safety and privacy

Chermayeff and Alexander in Community and Privacy argue that hierarchical organization of the privacy of urban spaces helps humanize environments built for speed and mobility. Varying levels of privacy and a clear hierarchy of spaces help citizens, particularly urban dwellers, feel safe and in control of their environment, as cities face overcrowding, and safety and privacy help act as barriers to protect citizens from the chaos of cities (Chermayeff 1963). Privacy services four purposes for an individual: personal autonomy, self-evaluation, protection and release of emotions (Lang 1987). Chermayeff and Alexander define six levels of “urbanity” of community and privacy within urban spaces:

1. **Urban-Public**: The places and facilities in public ownership. This includes highways, roads, and civic parks.
2. **Urban-Semi-Public**: The special areas of public use under government and institutional control. This includes the post office, school, government buildings, and court house.
3. **Group-Public**: The meeting place between public services and private property with joint access and responsibility. This includes garbage collection areas, utilities, and fire fighting equipment.
4. **Group-Private**: The residential components under control of management acting on behalf of tenants. This includes community garden, reception area, playgrounds, laundries, and service spaces.
5. **Family-Private**: The spaces within private domain controlled by single family and devoted to communal family activities. This includes dining, entertainment, bathrooms and maintenance areas.
6. **Individual-Private**: The room of one’s own and the innermost sanctum where individuals may withdraw from family.
Questions to ask:

- How is safety encouraged in walkways, outdoor spaces and within the building?
- Which spaces feel unsafe and why?
- Are there a variety of spaces ranging from public, semi-public, semi-private to private?

Design considerations:

The amount of integration that is desired with the surrounding neighborhood should be decided by the community. This will determine much of the site's planning, and should be discussed in the beginning of site planning to prevent the cost and time of retrofitting later.

The level of privacy, safety and openness the community desires from the surrounding neighborhood should be discussed. Privacy is also interlinked with safety and integration with the surrounding community.

Urban constraints: While openness and integration with the surrounding community is desired, it must be balanced with the challenges of urban living. Urban ecovillages face a security and safety issue due to the density and closeness of nearby residents. Additionally, if urban ecovillages are in more dangerous areas of the city with high levels of crime, this can cause a shutting off to the surrounding neighborhood, perhaps isolating the community from its neighbors. One of the benefits of creating an urban ecovillage is that its strategies can be shared with residents as a testament to alternative ways of living. Isolation may prevent the ecovillage from sharing its ideas with neighbors, or may even feel unwelcome to outsiders. Public areas open to the surrounding neighborhood need to be carefully designed to feel safe. There are a variety of design strategies to creating spaces that feel safe. These strategies include: using lighting at night; creating good visibility with open sight lines so users can see what is in front and behind them; not using a confusing layout; building porches or balconies fronting public space to create “eyes on the street;” activating public space with programming; and having good maintenance.

Case study: Recently, LAEV has been dealing with security issues, involving people breaking in through hopping over fences or going in open doors to steal things or hang out in spaces. Attending one of their community meetings, they had a session that involved going around and members adding their concerns and suggestions to a growing list on a white board, with repeats of concerns receiving extra marks. Residents with children felt threatened with unwelcome intruders. The community is attempting to create more secure fencing with better locks, is trying to create better surveillance through “eyes on the street” and is asking residents to question strange guests in the hallway.

c) Adequate indoor and outdoor public space

One of the most important ways to build community is to provide adequate indoor and outdoor public space in a range of sizes, uses, and levels of privacy. Outdoor dining and kitchen areas, patios, courtyards, gardens with seating, hammocks, porches, and benches can all provide small-scale, intimate places for small groups to gather. On the larger end, having big outdoor spaces to hold events, parties, celebrations, music, and even festivals can be invaluable to allowing communities to come together or host events. Depending on the size of the community, these larger outdoor spaces should be able to hold the entire population of the community at once. These larger spaces can simply be lawn areas, a barn, amphitheaters, or even a stage.

Large indoor public spaces should include a communal dining area with an industrial kitchen, and a meeting room, both of which can hold the entire community. Smaller indoor spaces should include a place to hold workshops, a place to hold dance or yoga classes, smaller communal dining areas, and informal gathering
areas. Other spaces that can be included are libraries, office space, studio or workshop space, and a recreation or TV room.

**Questions to ask:**

- What spaces are necessary, and what spaces would be a luxury?
- If more land or resources became available, what would be the priorities of new public spaces to build?
- Do the current public spaces serve the needs of the community and how could they be improved or changed?

**Design Considerations:**

Larger outdoor areas can include amphitheaters or a natural stage to host music, performance, or large events. Large lawn areas can double as recreational fields as well as spaces to hold large events such as festivals. For smaller outdoor spaces, “circle” space is a frequently shared technique to gather in groups, and building fire circles or spaces large enough to sit in a circle can create intimate gathering spaces where everyone feels welcome and seen.

The total size of the community will have a large impact on the sizes of the space. This can especially be true if the current size of the community is not the ideal, future size. It is important to consider phasing and building reuse to transition old communal houses or meeting rooms into new uses when the community needs to move on to larger spaces.

**Urban Constraints:**

Urban spaces have the challenge of space constraints. This means spaces need to be creatively designed to serve many functions. Having a well-designed multifunctional space can serve as the communal dining area, meeting room, conference room, classroom, and dance or yoga studio.

Urban spaces will frequently have every square foot of space used or designed for a particular use. This means frequently underutilized spaces can be activated, such as roofs, front yards, stoops, and even alleyways. The same is true for indoor spaces. By providing adequate public or semi-public spaces, residents do not need to spend as much time inside of their unit, saving space for hang out areas or even office space. With residents utilizing public or semi-public space, this increases the possibility of chance encounters with neighbors, fostering community.

**Case Study:**

LAEV’s outdoor space is made up of a front yard space which has seats, some gardens, a cob bench, and behind a fence, a portico/porch space. However, due to car and truck pollution and security issues, many residents do not utilize the front yard area or portico space. The portico space is activated Wednesdays during a music class. The main outdoor public space is the inner courtyard at 117 Bimini Place, which is adjacent to the lobby and main entrance. This area has an outdoor kitchen that was recently constructed, as well as a small gathering area to hang out or dine. Most of the area is gardens, including a variety of edible plants and chickens. On the back side of the building is an alleyway that connects to the courtyard and garage space of 129 Bimini Place. An outdoor children’s play area is located here, as well as additional garden space. Outside the garage area is a paved “flex” space where on the day of my visit, an outdoor flea market was being held. An alleyway connected to this courtyard and between the two buildings is named “Avocado Alley,” with a
seating area created by one of the residents who lives there. LAEV has future plans to take a public alleyway currently used for parking and turn it into a pedestrian walkway and small retail zone. LAEV would also like to permanently close off the street to cars and turn the street into a mini park.

Once within the community, which is secured via a fence and lock system, there is main entrance and lobby that has mail boxes, a free shelf for “take it/leave it,” desks for office space, couches, a piano, and a mini library. The other main indoor public space is a converted apartment that functions as a multipurpose room for community meetings, conferences, dance classes, and communal dining.

Feedback from LAEV residents on improving public space:

- Front could encourage more interaction (but there are safety and air pollution issues for children).
- Free music lessons on Wed afternoons in front
- Need more circle space
- Courtyard is great for circle space
- Cubbies in hallway could be good for extra storage
- The hallways could add more artwork, adding to sense of place and perhaps making the hallways feel more welcome
- Need more indoor nooks and outdoor open spaces with sun

**d) Human-scaled design**

Designing human-scaled, walkable neighborhoods can create social interaction through the simple act of designing well thought out pedestrian intersections with places to hang out in. Creating spaces that feel comfortable to be within causes people to linger in them. This can help create a better sense of community by encouraging chance encounters. The field of environmental psychology has explored how architecture effects emotions and the impacts of megastructures on how it impacts the human experience. Dictators such as Hitler have used megastructures to instill fear and awe in people, and as an attempt to lose their sense of individuality to the state (Sudjic 2006).

**Questions to ask:**

- What does human-scale mean to the community? What is the right scale for buildings, gathering spaces, and reflection spaces?
- How can spaces feel more comfortable and more welcoming?

**Design considerations:** Human-scaled design can be used as a design strategy help create places for people. This means places that encourage social gathering, offer an opportunity to take a break, or present a moment of reflection and quiet. Many of our streets and sidewalks have become places of movement, not places for lingering, reflection, or connection. The social dynamics of street intersections used to be places of meeting and gathering. With cars, street dynamics changed, and intersections became dangerous to idle in. Intersections can be redesigned to be places of gathering—wide sidewalks, park benches, and intimate spaces protected from car traffic can all be strategies to utilize for reintroducing the intersection as a gathering place.

**Urban constraints:** Autonomy over the size of buildings, façades, sidewalks, availability of benches, and the public space in surrounding neighborhoods may be impossible. Sites undergoing adaptive reuse may limit what changes in scale or space is possible. Urban space constraints limit the size and availability of what is possible to build.
**Case study:** LAEV has future plans to turn a public alleyway adjacent to their property that is currently used for parking into a pedestrian-only walkway and park. LAEV would also like to turn the street into a park, cutting off traffic. While these new conditions would create more welcoming spaces and a more human scaled design in a city exclusively designed for cars, getting neighborhood and city support may prove difficult or impossible.

a) **Pedestrian-oriented development**

Pedestrian-oriented development (POD) is a way to design residential or commercial neighborhoods and transit stops with pedestrian access as the focal point of the design experience, not cars or parking. Pedestrian-oriented development can have a huge impact on the sense of community, improve access to public transit, and even improve the economy through providing better access to retail.

**Questions to ask:**

- Are bikes or pedestrian-oriented mobility encouraged in the design of the project?
- How can more pedestrian-oriented mobility be created in and around the community?

**Design considerations:** In pedestrian-oriented development, the design goal is to create a comfortable, safe, and easily accessible walking environment for pedestrians. Compact development is encouraged, and buildings are typically located closer to the street, with main entrances along a sidewalk facing the street. Mixed-use buildings provide better access to amenities, services, employment, from home or from work. A variety of housing styles are offered. For retail, the design encourages facades with window displays facing the street and sidewalk. Parking areas are limited in size, not a major component of the design, and typically aggregated away from the main thoroughfares and activity to encourage walking. Traffic calming devices are used such as woonerfs, curb bump-outs, narrow streets, or winding streets. Alternatively, pedestrian-only thoroughfares could be used. There are accessible schools and playgrounds.

**Urban constraints:** Cities are more capable of providing pedestrian-oriented development due to its already compact density, access to public transportation, and mixed-use buildings. Suburbs and more rural areas face constraints in getting the appropriate zoning codes changed to allow for compact, mixed-use development and providing adequate public transportation.

**Case study:** LAEV has utilized curb bump-outs and intersection painting to slow down car traffic on the street. The ecovillage is located in an area with dense public transportation options, and a bicycle storage room enables residents to safely store their bicycles.

### 5. **HEALTH AND WELLNESS**

Building a nourishing community means having members who feel good and are supportive of each other. In order to feel good, one must begin with taking care of one’s self, which can then be applied to being able to take care of others. Taking care of one’s personal health within a supportive community can offer greater support in improving one’s health and wellness through accountability and encouragement. This can promote feelings of peace, happiness and even personal transformation. Design can play an important part in promoting a healthy lifestyle.

a) **Access to recreational facilities and programs**

Access to recreational facilities and programs can promote the health and wellness of a community. These spaces can include an indoor or outdoor workout area, natural play area for children, field game area, bicycle...
or hiking trails, and natural wilderness and conservation areas. Programs can include meditation, yoga, nutrition classes and exercise classes.

Questions to ask:

- What kinds of health and recreational facilities or programs exist? How do they contribute to the health, wellbeing and community?
- What additional facilities or programs are of interest to the community and how can they be supported?

Design considerations: Natural play areas for children may be integrated into conservation areas or hiking trails. Seasonality of spaces can also be considered—a barn used for storage in the winter time may become open in the summer. Recreational facilities may also be designed with neighbors or the surrounding community in mind and collaboration and open access could be considered. Finally, it is important that current or desired recreational programs have the appropriate spaces to be held within the community or in nearby community centers.

Urban Constraints: An exercise room or dance studio may be possible, but space constraints may limit the outdoor scale of recreational facilities. Indoor workout spaces such as dance studios may serve as multifunctional spaces. Outdoor recreational spaces may also be multifunctional, serving as both recreational playing fields as well as public spaces for events. Additionally, the community may want to work with the city to promote better access to nearby parks, recreational facilities, or community centers if there are none in the area.

In urban settings, bicycle trails, hiking trails, and wilderness or conservation areas may be hard to create due to site constraints or autonomy over neighboring areas. The community may desire to advocate for more bicycle trails, hiking trails and wilderness or conservation areas in the city.

Case Study: Cambridge Cohousing has set aside a small space in the basement as a workout room. While modest in size, it allows its residents to save money from not getting a gym membership and provides easier, more accessible entrance into to a healthy lifestyle.

Related sustainability goal:

- Adequate Indoor and Outdoor Public Space (Sense of Community-Physical Environment)
- Engagement with outside community (Sense of Community-Cooperative Governance & Citizen Engagement)
- Affordability

b) Use of biodegradable, nontoxic, healthy materials

Creating healthy environments for people to live in and work in can improve health and wellbeing. High VOC-emitting materials can cause a variety of health problems and even reduce productivity through loss of focus. A healthy individual can help create a healthy community. Additionally, toxic, non-biodegradable materials create an polluted environment during their manufacturing and disposal, potentially leaching toxic chemicals into the world, which can enter our food and water.

Questions to ask:

- Are the building materials, furniture or carpet nontoxic and biodegradable? Do they have high VOC emissions?
Design Considerations: If building new construction, request that all building materials, furniture, and carpet be biodegradable, nontoxic materials.

Urban Constraints: If working within existing structures, there is sometimes not much that can be done to use biodegradable, nontoxic materials. However, during renovations, it is important to use low-VOC, nontoxic, biodegradable materials to maintain a healthy environment for residents.

Related sustainability goal:
- Building materials (Environment-Sustainable building design)
  c) Peacemaking, community support, personal transformation and spirituality

To create a sense of community, members need to feel emotional safety, which can be created through conflict-resolution processes or support, creating trust with other members (Chavis 1986). Additionally, members can enhance the sense of community through shared emotional connection (Chavis 1986). Communities can support emotional safety, emotional connection, personal transformation, and community-building through group spiritual practice, meditation, yoga, conflict-negotiation, and peace-making practices or workshops.

Many ecovillages around the world focus on peacemaking, a spiritual connection to the earth and all its beings, and personal transformation as a part of their vision statement and goals in communal living. Living in community offers members an intimate reflection of their own personal problems, challenges, and issues, which is sometimes unwanted.

Questions to ask:
- What is the role of peacemaking, personal transformation, and spirituality in the community? How can this be supported by the community?
- What spaces would the community like to support this work?

Design Considerations: To encourage peacemaking and personal transformation, spaces can be built within the community where members can gather for meditation, yoga, dance, classes, or workshops. Additionally, many ecovillages create sacred spaces throughout the community, both indoor and outdoor, for individuals to use for reflection, walking, and meditating. These spaces include beautiful places in nature, defined sacred spaces, meditation nooks, and other places meant for reflection.

Urban Constraints: Sacred spaces in nature may be difficult to build in urban settings due to the noise, pollution, density, space constraints, and crowdedness. Building a small meditation nook with plants or art may be a good option, whether it is indoor and/or outdoor. Additionally, multiuse rooms may function as a dance, meditation, or yoga studio as well as a classroom.

Case study: Sirius Community has trained many of its members with a certified conflict-resolution group so that members who are experiencing troubles can come to one of these trained facilitators and work out their problems. Additionally, Sirius Community has built a sacred stone circle similar to Stonehenge, where members can go on a forest walk and sit in reflection. They have also created a yoga and meditation room, open at all times for members to use.
6. SENSE OF PLACE
Creating a sense of place makes residents feel at home, feel that their home is unique, feel ownership over the space, feel that they contribute to its uniqueness, and take pride in their community. All of this contributes to a greater sense of community and belonging.

a) Recognizable icons
Creating a sense of place, designing a common symbol system such as a logo or icon, and having outsiders know and recognize the community creates a sense of community and belonging amongst members (Chavis 1986).

Questions to ask:
- What symbols are important to the community and how can they be displayed through art, logos, clothing and sculpture?

Design considerations: Creating recognizable icons means they should be unique, as well as special to the community. Enabling participatory design and decision-making on these icons will also foster a sense of community.

b) Public art
Creating recognizable icons can take the form of public art, which can help foster a sense of community. Public art can also become symbols for the community itself, creating pride in the beauty it offers to its residents and its neighbors. Beauty through public art is an important part of creating livable communities, where residents feel beauty, inspiration, wonder, and even humility.

Questions to ask:
- What public art is inspiring to the community and how should it be shared?
- How can beauty and art be incorporated into the design of the buildings and the site?

Design Considerations: Determine how art can become integrated into the buildings and site itself, rather than as an add on at the end. Use art as a way to highlight beautiful areas, draw people to a certain reflective spot, or create a more welcoming atmosphere.

Urban Constraints: It may be difficult to get public permission to create or display public art, especially if it is in a public way.

Case Study: LAEV painted a street intersection outside of its main entrance. This helps define that something is different here compared to other places in the neighborhood, helps define the ecovillage's boundaries, create a sense of community and uniqueness, and create an inviting and fun atmosphere.
Related sustainability goal:

Participatory Site Design (Sense of community- Cooperative governance)

Participatory Site Maintenance and Management (Sense of community- Cooperative governance)

Human-scaled Design (Sense of community- Physical environment encourages social interaction)

c) Defined public realm

Creating a public realm creates a sense of place and helps foster a sense of community. Having a defined public realm creates a space for the community to come together.

Questions to ask:

- Is there a defined public realm, and if so, how it is utilized? What could be improved or changed?

**Design Considerations:** The public realm can be only open to community residents, or open to the larger neighborhood and surrounding area.

**Urban Constraints:** Space constraints are always an issue in urban environments. It may be possible to work with neighbors or the city to create public space in the nearby vicinity rather than on the community's private property. Security and safety should be considered during the design so that users feel safe and secure.

d) Ability of citizens to make the place their own

For members to feel that this is “their community,” members need to have autonomy, control, influence and responsibilities in the community (Chavis 1986). While members can participate in site governance and maintenance, it is also important for members to feel that they can make their own place, whether it is in their apartment or home and in an outdoor area such as a garden or seating area.

Questions to ask:

- Do members feel like they have the autonomy or control to influence their environment?
- What is the community’s process to approve design proposals?
Design considerations: Site planning can account for an area where residents can have their own community garden or outdoor space, to grow or do what they like with the space. These plots can be in front of people's homes or apartments or consolidated into one area.

Urban Constraints: Due to space limitations, it may be impossible for every member to have their own garden plot or outdoor space that they can call their own. A lottery or decision-making process to obtain outdoor space may be necessary if there are more requests than spaces. A way around this is to utilize outdoor space effectively through vertically stacking garden systems, and using roof, balcony, alleyway and even the space between the street and sidewalk.

Case study: LAEV allows its members to have a part of the garden within the courtyard or in the front yard. If residents have a desire to build a project or create something new, they must bring it up in a community meeting, and members discuss whether they approve it or not.

e) Enhance unique qualities and ecologies of a place
Modern U.S. architecture and landscaping practices have regularized architecture and plants. Suburban homes with green lawns look the same all over the U.S., regardless of climate or culture. Many local stores have been replaced with chains or big-box stores, and the same ornamental plants can be found across the U.S. This has led to a large-scale loss of a place's culture, history, climate, and ecology. By enhancing the unique qualities of a site and highlighting the unique ecology of the place, it can create a sense of place, enhancing a sense of membership to a specific place, and ultimately a sense of community.

Questions to ask:
- What unique qualities or ecologies already exist on the site and can be enhanced?
- What unique qualities or ecologies does the community want to create?

Design considerations: Certain areas of the site may be particularly beautiful, unique, or special. Preserving or enhancing these areas with enhanced access, benches, art, some maintenance or maintained views can enable residents to access and appreciate these spaces. These areas may be natural areas, a certain type of historic architecture, or even a location of a historic event.

Urban constraints: Many urban plots no longer have remnants of its unique qualities or ecologies present, as they may be leveled, mowed, or already have existing structures. In this case, it is important to decide what qualities of the site are already special, or want to be made more unique, and which areas would be best, or even possible, to grow plants.

f) Integration with surroundings
Modern U.S. architecture and landscaping practices is largely the same all over the U.S., regardless of climate, culture, or the surrounding neighborhood or ecology. Integrating architecture and site planning with the surrounding neighborhood or ecology can create a more harmonious relationship with nature or a neighborhood with a special character.

Questions to ask:
- How is the site and architecture integrating with its natural and manmade surroundings, or not? How could it be improved?
Design Considerations: Architecture used to be relevant to its culture and climate and take advantage of natural cooling, heating or shading to regulate the temperature of a house. Presently, homes are all constructed the same, look the same, and operate the same regardless of culture or climate. This causes a large expenditure of energy and money to just cool or heat a house, and can contribute to greenhouse gas emissions. The vernacular architecture on site should respond to the climate and culture of the place it is in.

Additionally, clear-cutting a site should be avoided. Try to work within the existing vegetation on-site, especially large trees, and minimize site damage when possible. The site landscaping should try to work with native plants, when possible.

Urban Constraints: In urban areas, there is likely to be man-made ecology, rather than natural ones, so the only integration that may be possible is with the surrounding architecture of the area. It's possible to bring in historic architecture or plants that were prevalent in the area.

J. ENVIRONMENTAL SUSTAINABILITY
1. SUSTAINABLE BUILDING DESIGN
Sustainable building design should incorporate local, natural, nontoxic materials and building methods; be appropriate to its climate; utilize natural site design to capture energy and water on site, protect natural features such as wetlands and steep slopes, and minimize site footprint and disturbance. Building should renovate if possible, as reusing structures and existing infrastructure is more sustainable than new construction. Additionally, design for the entire life-cycle use, including waste disposal and reuse.

While the focus of this paper will not be in sustainable building design, I will focus on some of the unique building techniques that ecovillages tend to utilize: strawbale construction; earth berm and green roof construction; south-facing greenhouses; earth ships and passive house design.

a) Natural building materials
Many homes in ecovillages follow a self-build method with natural or recycled materials found on site or nearby. The following building construction methods are popular in ecovillages, but struggle with local adoption into city building codes. There is extensive research on natural building materials for homes, and just a couple that are frequently seen used in ecovillages are included below.

Cob building uses an earth, sand and straw mixture similar in process to sculpting clay. There are no forms, ramming, cement, or bricks, and so can create organic, curvilinear forms. It is very inexpensive, as all materials can be found on site. It does not contribute to deforestation, pollution or mining, nor need manufactured materials or power tools. Cob is an abundant, renewable, recyclable, cheap and healthy building material located everywhere in the world. The building form is great for cold climates or deserts as the cob helps regulate temperatures through the wall's thick insulation due to earth's high thermal capacity, meaning the large mass helps regulate temperatures and can save on energy bills.
Earth berm, earth sheltered, or green roof construction are all names for a similar construction process of using the earth to cover the roof of a home, providing added natural insulation. This gives a very high insulation to the building, regulating internal temperatures. These homes can be built into an existing hill, or can manipulate the topography to create an artificial hill, blending the building into the surrounding landscape.

Straw bale construction builds load-bearing walls or building insulation out of stacked, high density, properly compressed straw bales over a raised footing or foundation. The bales are tied together with pins of bamboo or wood, or with a structural wire mesh. The walls are then finished with lime plaster, stucco or earth plaster, sealing in the straw and protecting it from moisture and rot. The straw bales carry the vertical loads. Straw bale construction, similar to cob building, has highly insulating walls that contribute to lower energy bills. A straw bale wall can reduce energy costs up to 75% over a thirty-year mortgage (Morrison 2004). Waste straw in the U.S. is disposed of through burning, adding greenhouse gases to the environment. This waste material can be reused in the building of homes. Straw is incredibly quick to grow, is available in almost every local market, and is a renewable resource. Straw bale homes can also be cheaper than traditional home building methods. Disadvantages include susceptibility to rot, high space requirements for the straw bale, and getting insurance coverage.
Sandbag construction is a cheap way to build an earthen home. Sandbags are first filled with a variety of material, whether it is sand, soil, or crushed volcanic rock. Sandbags are layered on top of one another, building solid, thick walls. The sandbags are finished with plaster on the exterior and interior walls. The materials are cheap, readily available, and reusable. Depending on what the sandbags are filled with will determine the thermal efficiency of the walls.

**Figure 18- Straw Bale House Under Construction.** (Source: By Chris RubberDragon (Own Work) via Flickr, Licensed under CC 2.0)
Earthships are one of the more popular forms of sustainable housing, and they use discarded tires packed with earth to create earthen walls, helping create highly insulated walls. Each house uses about 1,000 tires that would have ended up in a dump or landfill. The homes are powered by the sun, collect rainwater, use plants to filter the home’s wastewater, and can even grow their own food in an attached south-facing greenhouse.
FIGURE 20: EARTHSHIP HOME MADE OUT OF RECYCLED TIRES IN THE DESERT OF NEW MEXICO.
(SOURCE: BY BIODIESEL33 (OWN WORK) [CC BY-SA 3.0 (HTTP://CREATIVECOMMONS.ORG/LICENSES/BY-SA/3.0)], VIA WIKIMEDIA COMMONS)

Case study: Sirius Community utilizes various form of on-site materials, including wood, strawbale and cob. However, local building regulations have prevented the cob house from being used as a residential home due to the small window sizes.

b) Passive site design
One of the aspects of living in harmony with nature is studying and utilizing the natural forces found on site—including the sun, water, and prevailing winds. From the various ecovillages I have visited, it is common for buildings to utilize passive site design for buildings. In the Northern hemisphere, this includes south facing greenhouses, enabling residents to grow food all year round just through the power of the sun. If there isn’t a greenhouse, colder climate buildings have large windows facing the south to help heat houses in the winter, and overhangs over the windows to block the higher angled sun in the summer.

Consider solar energy in siting and building direction for home heating and cooling and garden plantings.

c) Energy and heating
Sustainable buildings should focus on low energy and cooling costs to reduce energy usage—this means having site specific design depending on if it’s a cool or warm climate. In cool climates, houses should have very good insulation to reduce heating costs. In warm climates, houses should be porous to allow winds to ventilate the house, and utilize passive cooling designs harnessing the movement of warming or cooling air. For natural ventilation, use a “Trombe” wall—an indirect heating method that allows solar radiation on a darkened wall, vented at the top and bottom. Hot air warmed by the walls rises and enters the room, sucking cool air into the space from the bottom. Other options to heat a home are to use wood-burning stove with high thermal mass fireplace in order to store and radiate heat throughout the day and night, as well as wood gasification, which is a highly energy efficient use of wood. Hot water needs can be met by solar hot water
heating, in which the sun heats water in pipes on a roof. Beyond cooling and heating, energy usage can be harvested through renewable resources such as solar panels or wind turbines.

Utilize passive house design principles:

- Thermal bridge free design
- Superior windows
- Ventilation with heat recovery
- Quality insulation
- Airtight construction

Utilize these guidelines:

- Limit heating energy demand to 15 kWh per square meter of net living space
- Minimize total energy to 120 kWh per square meter of floor area
- Maximum of 0.6 air changes per hour

d) Water

Building-scale sustainable water systems can include rainwater harvesting, greywater recycling and water-efficient fixtures.

Questions to ask:

- What water collection, reuse, or recycling methods are allowed by law in the town?

Design Considerations: Rainwater can be collected for irrigation in the gardens into a rain barrel, with overflow from a rain barrel into a rain garden. This both helps save energy used to filter municipal water, prevents water from entering the sewer system, which is sometimes filtered in municipal wastewater treatment plants, and helps replenish groundwater.

Greywater can also be recycled on site through collecting kitchen, laundry and shower water, and reused for irrigating gardens.

Urban Constraints: Urban areas have stricter building codes and regulations for greywater recycling, which may not be allowed. In some areas, rainwater harvesting is also illegal.

Related sustainability goal:

- Water and Stormwater (Environment- Site-scale Infrastructure Systems)

2. SITE-SCALE INFRASTRUCTURE SYSTEMS

Utilizing site-scale strategies to create self-sufficiency can make a dramatic impact on reducing consumption and waste, as well as function as a role model to individuals, communities and cities. Strategies can help to reduce and recapture waste and promote renewable energies can have a huge impact on reducing energy consumption, reducing waste, reducing water use, and recycling nutrients back into the environment.

a) Reducing waste through reuse, recycling and composting

Our consumer-based society creates large amounts of non-biodegradable waste that ends up in the landfill. Landfills are plastic-lined containers that hold waste never to be recycled or reused. If not built properly, they can leach toxic liquid called leachate into groundwater systems. According to the EPA website, organics make
up 34.3 percent of municipal landfills in 2013 (food was 14.6%, yard trimmings were 13.5%, and wood was 6.2%), which is an untapped resource that could be used for creating fertile soil and help replace some of the fossil-fuel created fertilizers used on plants.

Questions to ask:

- What materials can be replaced with compostable ones?
- How can waste be reduced, reused or upcycled?

Design Considerations: Composting is essential to building healthy soil, recycling nutrients back into the soil, and improving the ecology of a place from the soil up. Composting should be located somewhere not frequented often, but still convenient, as it could potentially smell.

Having a reuse area where residents can leave unwanted items helps reduce the number of items entering the trash.

Urban Constraints: While composting may seem impossible in an urban context, not much space is needed. If designed properly, pests and rodents will not be a problem. There are also various composting pick-up companies that will come to collect household waste. Urban soil is frequently polluted from historic activities or from fill used to build up the land. Urban composting can help contribute to building a new layer of healthy soil to create a thriving ecological system.

Case Study: LAEV used recycled tires as stairwell tread, has a reuse and “free” shelf to prevent items from having a new life before entering the trash, and has a composting system for organics, capturing the waste and reusing it before entering the landfill.

Related sustainability goal:

- Use of Biodegradable, Nontoxic, Healthy Materials (Sense of Community- Health and Wellness)

b) Urban metabolism principles

Urban metabolism is a metaphorical framework that analyzes and quantifies the flows of energy and resources within a city in a similar lens to a human metabolism to ecological system. Through thinking of a city or neighborhood as an organism, it provides a holistic system in which to think and analyze the various systems potentially creating a more integrated network, rather than disparate, linear, disconnected channels. This reduces the idea of waste, and transforms disparate systems into an interconnected network, strengthening it. While urban metabolism principles originally were meant to analyze physical elements such as natural resources and energy flows, they can also be used as a framework to analyze social, economic, or cultural flows of information, resources, opportunities, or human energy/work within a community or city to understand what existing resources, programs, economic opportunities or connections can be made within the greater community.

Questions to ask:

- What are the flows of energy (human and electrical), waste (human and material), water, food, and other resources (physical and nonphysical) that come into and out of the community? Which of these flows can be connected to others? How can the waste from one process be the input to another?

Design Considerations: If designed from the beginning, designers can trace the flows of energy, materials and waste through the neighborhood or urban system as a whole to create closed loop systems and make circular
metabolisms to recycle resources and create as little waste as possible. This can be particularly relevant if there are workshops, manufacturing, industrial processes, or agricultural processes on site, as all of these will create large amounts of waste material that can be reused for other things. In design, these systems want to be physically collocated together to make the transfer of resources effortless.

Urban Constraints: Many tightly coupled systems are dependent on all of the systems working properly in order to keep the system running smoothly. If one of the systems goes out of business or stops working for some reason, other systems could potentially fail due to the tight interdependence of all the systems. Sometimes, urban environments face a greater amount of volatility in businesses due to rising rents or change in competition. Additionally, there may be zoning regulations or space constraints limiting the types of systems that can be built.

c) Renewable energy sources

With the rise of global greenhouse emissions, it is essential to build communities that run off of renewable energies. This can include reducing energy demand through insulated buildings and energy efficient appliances, using solar power, wind power, geothermal, or biofuels.

Design considerations: Proper site placement is imperative to have successful renewable on-site energy. Solar panels can be placed on roofs or can be placed in fields. Wind turbines need to be placed where there is adequate wind on site, which would take pre-planning. If wood is used for heating, any forestry on site needs to be managed, or partners made with people who have nearby wood sources. Geothermal design may be a good option, although might take some pre-planning.

Urban constraints: In cities, it is likely that solar panels can only be placed on roofs due to site constraints. This means that having good solar access and roofs facing the right direction is essential to having solar energy on site. There might be limitations beyond solar on the types of renewable energy available. Geothermal energy may not be possible in cities due to sensitive underground conditions. Zoning and building code regulations may limit the scale and type of energy systems, such as large wind turbines.

Case Study: Dyssekilde ecovillage built a wind turbine on site to power their ecovillage with renewable energy. However, the expense and lack of technical skills to maintain the windmill led to the ecovillage selling the windmill to a private company to operate and maintain it. Before building highly technical renewable energies, it is important to know whether you have the knowledge, skills and resources within the community to operate and maintain the infrastructure.

Related sustainability goals:

- Passive site design (Environment-Sustainable Building Design)
- Energy and heating (Environment-Sustainable Building Design)

Water and stormwater management

Water systems to consider for design or redesign at a site-wide scale can include drinking water, irrigation, and stormwater drainage (sewage is discussed in the next section).

Urban soils and groundwater systems are typically starved for water since the drainage systems of city typically collect, transport, and dispose of water through concrete streets, drains and pipes, resulting in “urban stream syndrome.” Urban stream syndrome is caused by stormwater accumulating pollutants from the street within the water, which is normally dumped into local waterways, increasing the speed and volume of water
being transported leading to flash flooding, increasing the temperature of the water from hot concrete or asphalt surfaces, and depriving urban soils of enough water. Employing green infrastructure, or sustainable drainage techniques, can help improve the ecological systems and water systems of an urban area.

Questions to ask:

- How does water move through the site? What natural erosion patterns are seen? Where do gutters or pipes empty into?
- What opportunities are there to slow down, store, or infiltrate stormwater on site?
- What opportunities are there to reuse water on the site?

Design Considerations:

For drinking water, it is important to do a cost-benefit analysis of getting municipal water versus on-site sources. If there is adequate groundwater or a spring onsite for the population demands, then this might be a viable option. Rainwater harvesting is not a great option for drinking water—rainwater can contain pollutants captured from making contact with pollutants in the air or even be acid rain. If rainwater is to be used for drinking water, it may be good to get it tested for pollutants. Rainwater is distilled water, and needs to be remineralized before being ingested, as low or demineralized water can have adverse effects on human health.

Rainwater harvesting is perfect to use for irrigation in gardens, showering, or laundry. Rainwater can be collected from roofs, directed into large rainwater barrels, and have overflow into rain gardens, which are small gardens that help replenish soil and groundwater with water.

Greywater reuse is a great way to reuse water multiple times before it enters the sewer or infiltrates back into the ground. Matching water quality with use is a key design principle in deciding which water sources should be used for what site uses. Irrigating ornamental plants can be done with greywater from the kitchen, sinks, laundry or bath. Irrigating edible plants can be done with rainwater or cleaner sources of greywater from the kitchen, sinks, bath, and even laundry depending on the type of detergents used.

Urban Constraints: In urban or suburban areas, it may be cheaper and easier to get a municipal supply of drinking water. However, in some urban areas such as New Orleans or Detroit, drinking water supplies may be unreliable, in which case off-grid solutions for drinking water will help create reliable sources of water. Additionally, many cities have regulations on rainwater harvesting and greywater reuse.

Urban stream syndrome and urban stormwater management is a huge issue that urban and suburban areas face. Design can help address these problems by utilizing green infrastructure design that focuses on storing, slowing, and releasing water into the soil. This can be accomplished by reducing the surface area of impervious surfaces to allow water to infiltrate into the soil through using permeable pavements or vegetated areas. Additional design strategies are gutter downspout disconnects into storage barrels or rain gardens. Rain gardens can help slow down, collect and infiltrate stormwater through a garden.

Case Study:

LAEV utilizes greywater recycling for its laundry and outdoor kitchen to irrigate plants in their garden. They have created a stepped terrace on a slope in their front yard, which helps store and hold back water onsite to infiltrate it into the soil rather than let it enter the municipal storm sewer system. They've also helped create the Bimini Slough Ecology Park in a public alley down the street, turning it into a lush green infrastructure stormwater park.
Related sustainability goal:

- Water (Environment - Sustainable Building Design)
- Sewage systems (Environment - Site-scale Infrastructure Systems)
- Minimize impervious surfaces (Environment - Open Space Preservation)

e) Sewage systems

While our modern society views sewage as waste, in nature, it is seen as fertilizer, helping to build rich soil and increase the growth in plants. Municipal sewage typically contains carbon, nitrogen, phosphorous, and trace elements such as potassium, magnesium, manganese, iron, copper, zinc and nickel. All of these are essential nutrients for plants to grow. Typical fertilizers use fossil-fuels to create synthetic nitrogen, which is a readily available nutrient found in our sewage. Some municipal systems collect sewage and make fertilizer pellets for application on ornamental plants, but this is not a widespread practice and the scale of treatment may not be the most energy efficient. Additionally, many cities in the US face the issue of combined sewer overflows, which dumps untreated, raw sewage into local waterways during rainstorms due to overcapacity from a combined stormwater and sewage system.

The following describes and lists the pros and cons of each type of sewage treatment.

**Wetland treatment ponds** or **living machines**. These systems employ a series of wetland treatment cells using microbes and plants to digest the nutrients in wastewater. Systems vary in complexity from outdoor systems requiring less maintenance, to indoor systems that are highly engineered.
- + : Creates biodiversity, habitat and enhances the ecology of a place
- + : Minimal energy inputs except for human energy
- - : Extensive maintenance, knowledge or skills needed
- - : May not meet city or state regulations

**Willow treatment pond.** These systems employ a lined pond with willows that grow and filter the nutrients from the wastewater.

- + : Creates biodiversity, habitat and enhances the ecology of a place
- + : Little to no energy inputs except for human energy
- - : Moderate maintenance, knowledge or skills needed
- - : May not meet city or state regulations

**Composting toilets**

- + : Best utilization and recycling of resources to build rich soil
- + : Simple operating and maintenance
- + : Little to no energy inputs except for human energy
- - : Higher maintenance requirement
- - : Undesirable and dirty maintenance

**Anaerobic biodigester**

- + : Renewable form of cooking gas, replacing the need for natural gas
- + : Creates fertilizer in addition to cooking gas
- + : Little to no energy inputs except for human energy
- - : Operating and maintenance may require technical skills and knowledge
- - : May not meet city or state regulations

---

**FIGURE 22- LIVING MACHINE WASTEWATER TREATMENT SYSTEM.** (SOURCE: BY STAN SHEBS [CC BY-SA 2.5 (HTTP://CREATIVECOMMONS.ORG/LICENSES/BY-SA/2.5)], VIA WIKIMEDIA COMMONS)
Septic

- +: Simple maintenance, knowledge or skills needed
- +: Meets city or state regulations
- +: Little to no energy inputs except for human energy
- -: Does not recapture and reuse fertilizer to build rich soil
- -: May pollute downstream sources

Municipal waste treatment

- +: Simple/no maintenance, knowledge or skills needed
- +: If connected to large biodigestors, it can
- +: Meets city or state regulations
- -: Most wastewater is not recaptured for fertilizer use
- -: Large amounts of energy are expended to treat wastewater with little to no value in return, except for clean water

Questions to ask:

- What is the acceptable level of maintenance for the community?
- How much fertilizer or cooking gas is needed for the site?

Design Considerations: Each of these systems requires a different amount of space and can operate at a variety of scales. All of the systems except the composting toilets needs to be in a lower elevation than homes so that sewage can gravity feed into the systems. If properly maintained, these systems should not smell, but it may be wise to locate them in areas not frequented often by people, or separated by vegetation screens or agriculture. The areas should be fenced off to prevent children from accessing the area, and a sign should be placed informing people of its function. If using an anaerobic biodigester, placing it close to the home is ideal so that piping for the cooking gas can remain at a cost minimum. Future population growth should be considered during site planning to ensure that there is enough existing capacity within the sewage treatment systems or space to accommodate additional systems.

Urban Constraints: Urban space constraints would limit the types of systems available for use, not just due to space constraints, but also because the site may not need compost or fertilizer, although this could be a potential revenue stream for the community. Living machines and anaerobic biodigestors may both be good options for indoor use that doesn’t take up huge amounts of space. In cities, many building permits require a municipal water and sewage connection, so this would need to be respected. Building regulations may also limit what kinds of onsite sewage treatment is possible, and a variance may be required. There is also a cost-benefit balance that communities must discuss in whether they prefer onsite or municipal treatment, comparing cost, time and environmental benefits.

Related sustainability goal:

- Urban metabolism principles (Environment- Site-scale Infrastructure Systems)
- Reducing waste through reuse, recycling and composting (Environment- Site-scale Infrastructure Systems)
f) Food production

Communities can be self-sufficient in food depending how much space, time and energy they want to commit to large-scale, coordinated animal husbandry and agriculture.

Questions to ask:

- What scale does the community want to produce food at? How much space, time and energy do they want to commit?

**Design Considerations:** Food production for personal use and self-sufficiency (as compared to for profit) can take a variety of forms. If there’s enough space, a community may have a large-scale agriculture production that requires volunteer time, or hires residents or outside laborers to produce food for the community. On an individual, small-scale, community gardens can be another option sited in a dedicated plot or in front of people’s homes.

When designing a site it is important to determine whether the scale of food production the community is interested in, and lay out appropriate sites that have enough sun, access to water, and good soil for growing. Whether large or small, composting is essential to building healthy soil and should be included in the site management and design.

**Urban Constraints:** Urban sites may not have the space to do large-scale agricultural production, but in many urban and suburban areas, small-scale animal husbandry and gardening is allowed. There are many creative strategies to create highly productive spaces in a small scale. Vertical gardening, green walls, and rooftop greenhouses are all great options for urban spaces. Urban soils can be potentially polluted, and should be tested before grown in directly, otherwise raised bed gardens with fresh soil can be used.

**Case Study:** LAEV residents have garden plots in the courtyard and front yard available for use, dependent on permission from the community for the space.

**Related sustainability goals:**

- Reducing waste through reuse, recycling and composting (Environment- Site-scale Infrastructure)
- On-site food production (Circular Economy- Community Enterprises)

3. OPEN SPACE PRESERVATION

Striking an acceptable balance between open space and development is a conversation communities must have before development begins and if future development opportunities arise. Priorities must be discussed about whether open space preservation, housing, or economic ventures are preferred.

a) **Minimize impervious surfaces**

Minimizing impervious areas, which includes site footprints and areas with asphalt or concrete, can help improve the ecological services of a site in various ways depending on the design. Many of the impervious surfaces built are for homes or for cars, including parking lots and streets. As discussed in the sustainability goal “Water and stormwater” in Site-scale Infrastructure Systems, urban and suburban areas suffer from urban stream syndrome, and reducing impervious surfaces help restore natural hydrologic cycles, as well as create space for ecological systems to take root. Impervious surfaces act as a “dead zone,” preventing soil from accessing air and water, and preventing plants from taking root. Finally, compact site development footprints can help preserve existing ecological systems.
Questions to ask:

- Is dense, compact development allowed in the zoning and building codes?
- Can existing provisions for car infrastructure, such as parking or street widths, be reduced?

Design Considerations: Two design strategies to accomplish minimizing impervious surfaces is to build densely clustered homes to reduce the site footprint of development and minimize surface parking lots, streets and paved areas. Many ecovillages opt into cohousing models due to the smaller development footprint compared to single family homes. Areas covered in concrete or asphalt can use pervious surfaces such as gravel, pervious pavers, and pervious asphalt. Alternatively, areas covered in concrete or asphalt, including sidewalks, can be reduced through providing less infrastructure for cars—if residents use public transit, bicycle or car sharing, less parking spaces are needed.

Urban Constraints: Zoning and building regulations may limit densely developed homes or multi-use buildings. Autonomy over streets and sidewalk construction may be limited—cities may not approve new types of sidewalk construction techniques, or may not allow streets to be narrowed. Additionally, developments are required by city law to provide a certain number of parking spaces, which may be difficult to get a variance on.

Case Study: LAEV offers residents $20 off of their rent if they don’t own a car, incentivizing residents to take public transit or bike. LAEV was also able to create an area of pervious pavement on its sidewalks, which was the first place in L.A. where this material was used.

Related sustainability goal:

- Water and stormwater (Environment- Site-scale Infrastructure Systems)
- Mobility (Environment)

b) Mixed-use development

Mixed-use development is development that allows the blending of residential, commercial, cultural, industrial and/or institutional uses. This can be a single building, block or entire neighborhood. Single use zoning, also called Euclidian zoning, led to the expanse of “sleeper suburbs” with no amenities or employment. Mixed-use development has been on the rise since the ’90s, and includes the benefits of reduced commuting, reduced greenhouse gas emissions, building a sense of community, access to amenities, ease of living for children and elderly, greater housing variety, more compact development, stronger neighborhood character, and pedestrian and bike-friendly access.

Questions to ask:

- What uses other than residential are desired onsite and how can these be incorporated into new designs or existing spaces?

Design Considerations: The site design should promote walkable neighborhoods with on-site amenities and live-work or employment opportunities. Buildings can mix first floor retail or office with residential on the upper floors. Site access for visitors should locate office or retail near the community’s entrance, parking area or close to public transit to increase revenue from visitors. Additionally, clusters of retail or office space collocated together may help support all of the businesses. This area can be located near to a visitor center, educational center, or conference center, if there is one.
Urban Constraints: Building mixed-use developments in urban areas is most likely easier than in suburban neighborhoods, since many suburbs still have Euclidian zoning and because mixed-use is more common in urban areas.

Case Study: Sirius Community utilizes mixed-use development, despite the fact that they live within a huge forest. They wanted to minimize site development impact, and because of that have no single-family homes on site. Each building has apartments, some with workshop space, dance studios, and small office space or libraries.

Related sustainability goal:
- Diverse housing options (Sense of Community- Inclusive Process, Space and Design)
- Minimize Impervious Surfaces (Environment- Open Space Preservation)
- Mobility (Environment)
- Community Enterprises (Circular Economy)
- Educational Center (Education- Hands-on Education)
- Visitor Center (Education- Engagement with Outside Community)

  c) Open-Space Conservation and Management

Existing open space should be conserved and once it has been conserved, it should be managed. Communities can also play a part in conserving open space in the larger community.

Questions to ask:
- What kind of open space does the community desire?

Design Considerations: If new open space has been created, the community must decide whether it is a wilderness area, maintained parkland, grazing or agricultural area, recreational area, or restored ecosystem. Each of these has different implications for safety, maintenance requirements, and ecological benefits.

Site planning should minimize site damage through appropriate siting of buildings, avoiding large trees or sensitive environmental areas such as steep slopes, wetlands, and unique habitats.

Urban Constraints: Urban wilds can potentially invite unwelcome activities or people, and should be designed with safety in mind. Potential design solutions are to have them located within the community, or have limited access with a fence to only allow access during the day. Additionally, the public can perceive wildness as inviting in danger and crime. While storytelling and perceptions are important, simple design interventions such as mowing areas near to the street, a fence, or lighting can give the impression that the space is maintained and cared for.

Related sustainability goals:
- Enhancement of Ecology (Environment)

4. ENHANCEMENT OF ECOLOGY

Beyond food production, many ecovillages value enhancing the ecology of a place. Enhancing the ecology of a place means restoring natural ecological functions such as the water cycle, the nutrient cycle, creating habitat, promoting biodiversity and protecting sensitive habitats.
a) **Enhanced Biodiversity**

Biodiversity is the diversity of plants, animals, bacteria, and fungi present within an ecosystem. Biodiversity helps create resilient systems resistant to pests and disease and for farming or forestry, can increase yields (Kiaer, Skovgaard and Ostergard 2009) (Piotto 2008).

**Questions to ask:**

- How does the site design contribute to enhancing biodiversity? How could it be improved?
- Where are the site’s various microclimates and how can these be used to create biodiversity?

**Design Considerations:** Ways to enhance biodiversity includes having space for gardens that are for producing food, beauty, include native plants and for pollinators. Planting pollinator gardens for bees and butterflies, can include flowering plants, native plants, and meadow grasses. Having an apiary (bee-keeping) on site can contribute to pollination in the garden and surrounding area. Creating a diversity of microclimates can support a greater variety of plants, and recognizing which parts of the site create which microclimates will help determine what can be planted where.

**Urban Constraints:** Space constraints and aggressive urban site conditions can make biodiversity a challenge. Sturdy, invasive species may be a better option in urban areas when compared to native plants. Many native plants original to the area may be unable to survive in the harsh environment of a city. The soils and air are most likely polluted, full sun may be blocked due to surrounding buildings, urban heat island effect may cause the temperature to be too warm, and there may even be acid rain. Planting hardy plants capable of withstanding urban conditions may be more important than trying to bring back species that are no longer “native” in the city. Many of these hardy species are considered “invasives.” In the natives-versus-exotics battle, the urban ecologist Del Tredici controversially argues that “the real ecology of the city is all about the dominance of invasive species, while the cultivation of the native species that once grew there is as artificial as the French-knot garden” (Tredici 2006). While Del Tredici argues for the use of invasive within cities as they are the only plants capable of surviving, it is important to experiment with what will grow and what won’t. Much of ecology is based off of healthy soils, and if urban soils can be improved and amended, it may be possible to grow anything, especially with some care and attention.

Additionally, urban rooftop gardens, vertical walls or vertical gardening can enhance the ecology of a place while not taking up precious real estate. Understanding the site’s microclimates will help plants grow well.

**Related sustainability goal:**

- Enhance unique qualities and ecologies of a place (Sense of Community – Sense of Place)
- Open-space Conservation (Environment- Open Space Preservation)

b) **Land stewardship**

Land stewardship is the responsible use, management and maintenance of natural resources and areas through conservation and sustainable land management. The idea of land stewardship can help people move away from a lens as land owner and controller and towards a lens of stewardship and caretaking of the land. Even wild areas can use land stewardship through protecting the land, doing minimal site clearance of underbrush or invasive species, adding soil amendments to improve the fertility or microbiology of the soil, and promoting the specialness of a place through allowing visitors or scientists access to the land.

Having autonomy of local resource management is essential to creating fully sustainable communities grounded in social and environmental justice. Autonomy over resources enables communities to protect the
air, water, and minerals surrounding them. Enabling communities to control their own resources ensures the protection of the natural resources around them since residents would not want contaminants in their air, water or food, and would want to sustainably extract only as much as they need to ensure they have enough for later. The loss of autonomy over natural resources has led to corporate extraction and pollution practices, since corporations do not deal with the consequences of pollutants or diminished natural resources—the community does.

Questions to ask:

- How is the community already being a steward of the land, and how can this be improved?
- What are strengths and weaknesses in the community’s resource management?

Urban Constraints: Urban areas have less land to steward, but the community may desire to extend its reach out into the surrounding area, helping to protect, restore or maintain existing or new spaces. This can help bridge relationships to the city, schools or neighbors who use and appreciate these spaces. Being a land steward in an urban environment can also just mean keeping the neighborhood free of trash, clear street drains of debris, maintain street trees, help maintain park space, help promote recycling and composting in the neighborhood, and even helping to educate neighbors on gardening, sustainability and land stewardship practices. It can mean supporting environmental causes through volunteer work or monetary support through direct donation or fundraisers.

Case Study: LAEV has built a learning garden across the street which nearby schools use as an outdoor classroom to learn about plants, chickens and the environment. This encourages land stewardship amongst public school students in the area.

In order to manage the land, LAEV residents have a garden committee and garden work parties to keep the gardens in order.

Related sustainability goal:

- Cooperative Governance and Citizen Engagement (Sense of Community)
  c) Protect and/or restore sensitive ecosystems

A large part of land stewardship is to give a voice to the environment by being able to create or preserve habitat and sensitive ecosystems.

Questions to ask:

- What existing habitat or sensitive ecosystems are on site or exist in nearby areas?
- Are any areas naturally wet, either ephemerally or permanently?

Design Considerations: During site planning, ensure steep slopes, wetlands, streams and sensitive ecological areas remain untouched and connected to nearby ecosystems to maintain its ecological integrity. If the site has previously built structures on it, visit the site during a rainstorm to see where water naturally collects and restore natural stream paths, ponds and wetlands. If located next to a stream or river, allow a no-build zone within a 100-foot buffer zone between the stream edge and riparian zone to protect the river from pollutants, erosion and protect the area from flooding.

Urban Constraints: Protecting habitat in urban and suburban areas is important since there are so few urban wilds left. Urban environments are more likely to restore sensitive ecosystems, which include streams,
waterways, wetlands, native habitats, and steep slopes. Natural habitat may also be restored through enabling a succession of plantings to take hold.

Case Study: LAEV created Bimini Slough Ecology Park as a way to restore a natural stream that was in the area and convert a public alleyway into a green infrastructure stormwater park for the neighborhood.

Related sustainability goal:
- Open-Space Conservation (Environment- Open Space Preservation)

5. MOBILITY
One of the most important aspects to creating an environmentally sustainable community is having access to employment, amenities and other services through public transportation.

a) Transit-oriented development
Trying to build an inclusive village with nearby amenities, employment, and services is essential to reducing our dependence on cars and fossil fuels. Transit-oriented development (TOD) is an urban development strategy to build mixed-use development within walking distance of public transportation. It typically is high density near the transit stop, with lower density spreading out the further from the stop. The transit stop is typically a train stop, light rail or rapid bus. This type of development may be key to getting the density needed to economically support retail, employment and services in the area accessible by walking or biking.

Questions to ask:
- What forms of public transit are nearby?
- Does the state have any grants or programs to build transit-oriented development, which might help fund the program or convince city officials of zoning variances?

Design Considerations: An ideal location for ecovillages is off of a train stop, light rail or rapid bus stop. Transportation via car is a heavy contributor to greenhouse gases and pollution. TOD is focused on amenities and services located nearby, reducing car travel, and provides public transit access to employment or additional amenities in the surrounding area. It is unlikely that everyone within the ecovillage will be employed on site, and having access to reliable public transit for access to larger employment opportunities is a key part of building a sustainable community.

Urban Constraints: Areas may already be built up around transit stops, or may be prohibitively expensive due to real estate prices. Moving further out of a city off of a train line, subway stop, light rail or rapid bus line may be the best location for siting an ecovillage while still remaining within a realistic cost of site acquisition. Additionally, it may be good to work with existing communities that lack essential services to help revitalize the area.

Case Study: The Danish government works with ecovillages to help groups acquire land near transit stops, helping to pair existing towns or villages with ecovillage developments. Dyssekilde is one such ecovillage, located next to a tiny farming village off of a train that has a stop almost directly next to the ecovillage and connects it to Copenhagen and the surrounding area.

Related sustainability goals:
- Mixed-use Development (Environment- Open Space Preservation)
b) **Promoting alternative forms of transit**

**Design Considerations:** Promoting alternative forms of transit such as car sharing, bicycling, and even motorcycling or mopeds can help reduce our use of fossil fuel based transportation. Promoting walking, bicycling and public transit can happen through community use and education. Through seeing others in the community doing it, it becomes a part of the culture and ethos of the community to reduce car use. The community may also desire to become bicycle advocates within the area to promote bicycle safety and access to bicycle trails.

**Urban constraints:** Rural constraints may limit the possibilities of biking to employment or amenities. Many cities are inherently walkable and bikeable due to their density.

**Case study:** LAEV has access to on-site, secure bicycle parking for its residents. LAEV also encourages a culture of biking, through offering residents $20 cheaper rent if they do not own a car. Additionally, the Bicycle Kitchen was created by a resident within LAEV to teach people how to fix their bikes. The Bicycle Kitchen eventually became too big for LAEV and moved to its own storefront. By empowering citizens to fix their own bikes it creates a low-cost means of accessibility to the entire city.

**Related sustainability goals:**

- Access to recreational facilities and programs (Sense of Community- Health and Wellness)


c) **Proximity to amenities, services and employment**

Being located next to public transit helps with access to employment, services and amenities, but building “complete” neighborhoods with retail, office, commercial and residential helps build vibrant places with street life, a defined neighborhood center or downtown, and a town gathering place and walkable or bikeable neighborhoods. This also creates more equitable places for children, the elderly, and low-income people, as accessing essential services such as groceries, doctors, playgrounds and pharmacies without the need to use a car or pay for public transit.

**Questions to ask:**

- What amenities, services and employment opportunities are located within or nearby the ecovillage? What other ones would the community desire?

**Design Considerations:** Designers or communities can use mixed-use development can help create dense, vibrant neighborhood centers that provide walkable access to nearby employment, services and amenities. Picking a defined area within the development to be the community center can help concentrate development and services. Clustering stores and services together helps support all of the services provided.

**Urban constraints:** The size of the community and the population of the surrounding area, plus what already existing amenities, employment and services are available may determine how many and what type of retail, businesses, employment or services the community may offer to itself and the surrounding area. Additionally, cities or towns may have zoning codes that limit what types of development are possible to build, such as retail, office or commercial.

**Related sustainability goals:**

- Mixed-use development (Environment- Open Space Preservation)
- Community enterprises (Circular economy)
6. **CLIMATE ADAPTATION**

Climate change is an urgent and real problem that communities and governments around the world are going to be facing with tangible effects possibly felt within our lifetime. Political will is an integral part of getting cities prepared for climate change resilience, but grassroots and community-led initiatives may help to show on-the-ground solutions to how communities can prepare for change. Ecovillages are already blueprints for how communities can reduce their dependencies on fossil fuels, and they may be able to offer us further solutions.

a) **Reduce dependencies on fossil fuels**

Fossil fuels have become heavily ingrained in many consumer items, food products, transportation methods, and resources. Much of the food we eat requires processing, fertilizers and transport, all which rely on fossil fuels. Consumer items that have any plastics in them, or require any transport, also rely on fossil fuels. In order to reduce our use of fossil fuels, eating locally and buying or sharing objects that are locally made or well-made can reduce our dependence on fossil fuels. Buying local food or items also includes can also reduce the “last mile” transport required to deliver the food or item from the store to your home.

**Design Considerations:** Creating space on the land for gardening can heavily reduce the need to get groceries, which were probably transported from around the world. Buying locally made items could be enhanced through creating an on-site marketplace or farmers market for artists and craftsmen to sell their wares. Workshops can also be made on site for residents to make or fix what they need to. Encouraging the use of car sharing and object sharing can reduce fossil fuel use and consumerism.

**Urban constraints:** Space constraints can limit the amount of food produced on site, although urban gardening techniques do exist to enhance the density of food production space. Other design options have already been discussed, but include encouraging pedestrian and bicycle use, building mixed-use development, using renewable energy, natural cooling or heating methods, and having good building insulation in cool areas.

**Related sustainability goals:**

- Passive site design (Environment- Sustainable Building Design)
- Energy and heating (Environment- Sustainable Building Design)
- Renewable energy sources (Environment- Site-scale infrastructure systems)
- A culture of sharing (Circular economy)
- Use or support local businesses, services and products (Circular economy- Promotes local reinvestment)

b) **Site protection from climate change**

Climate change may increase sea levels, cause more extreme storms, increase or decrease extreme precipitation, and may cause increased temperatures. Preparing the site for future climate changes will help protect the community and can act as a showcase for other communities how they can prepare.

**Design considerations:** If in a coastal location, help protect the site and neighborhood against sea level rise, storm surge and coastal flooding. If in an area with a predicted increase of drought, secure water sources, promote greywater recycling, and use water efficient appliances. If an area with a predicted increase in
precipitation, protect riparian zones along rivers and streams for increased flooding, build water retention areas to help hold back, slow and store water, and build new construction on higher ground.

Urban constraints: Sites should aim to reduce the amount of impervious surfaces to mitigate the urban heat island effect and protect residents and neighbors from rising temperatures. Sites should promote vegetation to shade and cool the area.

K. CREATE A CIRCULAR ECONOMY

1. COMMUNITY ENTERPRISES

Community enterprises can vary from income-generation through the selling or manufacturing of wares or services or leasing of spaces to benefits that primarily support the community by reducing the cost of living, such as gardens, shared child-care, a food purchasing cooperative, or a car sharing program.

Determine if there will be an income-generating portion of the site, how this portion of the site will be owned, if and how income will be distributed, and where on the site is best as a gateway to the public.

Community enterprises can help provide rent- or fee-free living to its residents, depending on the amount of income generated.

- Determine if land will be leased to tenants for community income generation (i.e. leasing farmland, leasing retail or restaurant space, leasing studio, workshop or office space, offering yoga or health and wellness classes, offering educational workshops, hosting conferences
- Determine what zoning regulations limit the potential uses for the site. Have a discussion with a local architect or city planning agent on what land use changes or exemptions are possible for future applications. Many zoning laws prevent the location of retail, commercial, office, industrial or manufacturing, and mixed-uses on certain zoned parcels of land, such as residential.

a) On-site food production

The United Nations Environment Program's report “Towards a Green Economy” from 2011 claims small-scale farmers produce 70% of the world’s food. There is a fallacy that industrial scale farming is the most efficient way to grow food—the United Nations Department of Economic and Social Affairs in 2011 claimed that small farms produce between 20-60% more food per acre than large, industrial-scale farms. Additionally, in 2007 the United Nations Food and Agriculture Association found a 132% increase in yield in organic farms worldwide versus the world average for agriculture. The future to of food lies in small-scale, organic production, and the way that are homes and sites are designed can heavily influence how productive the land can be.

Questions to ask to design a garden or farm, from Jenny Allen's Smart Permaculture Design:

- How much food and produce are you aiming for?
- How much time and energy do you have?
- What plants and structures do you want?
- What are your soil variations in different areas?
- How can you make the garden low maintenance?
- What beneficial micro-climates can you create?
- Is there a view to enhance or block?
- Is there a frost problem? If so, how can you reduce it?
- What does each plant require?
- How can you optimize water use?
How will the garden evolve over time?

**Design considerations:** The ecovillage can encourage edible landscapes to promote localized food production. A space for **composting** is an important part to building healthy soil, especially in urban environments that are built off of contaminated fill, or contaminated from particulates from planes, cars and trucks. Soil is the foundation to creating a healthy ecological system. Ideally, the compost is located away from main areas of circulation and is secure from rodents and pests.

Rural ecovillages can offer **community supported agriculture (CSA)** to its residents or its neighbors, depending on the amount of food production available. By cutting out the middleman, CSA sales can better support farmers. A store open to visitors within the ecovillage can be dedicated to selling food or products produced on site.

A food co-op using **bulk-order purchasing** can help residents save money. Space within the ecovillage should be dedicated to offering bulk-order food for purchase.

Food production does not have to be at the expense of ecology, and **food forests** have become a popular new method of promoting biological diversity through growing trees and food simultaneously in a vertically layered system, similar to a forest. Through utilizing permaculture design principles in the creation of the gardening on site, biological diversity, increased plant productivity, and increased food production can all be created simultaneously.

**Case profile:** The Farm, in Tennessee, has a mushroom growing enterprise, growing shitake mushrooms in its forests. During a time of economic need, some suggested clear-cutting the forest for money. However, turning the forests into capital they could sell went against their community values. They discovered that there was a growing market for mushrooms and that they had the perfect climate for mushroom cultivation. The lesson they learned was you could make much more money per acre per year growing mushrooms than selling lumber one time.

b) **On-site Manufacturing**

Beyond just producing food, whether it is for residents or as an income-generating venture, ecovillages can house a variety of production-based enterprises. On-site production is beneficial to creating holistic communities that not only consume goods but also produce goods or services. On-site production can create jobs for residents or neighbors, create income for the individuals or the community, and be a test bed for using managing resources sustainably or building sustainable production methods. Additionally, it can be used as a job training center or put mentally handicapped people to work, as is the case with the Camphill Communities or the Hjortshot ecovillage in Denmark. Other production-based businesses that the ecovillage can get involved with, depending on site constraints, are:

- Community Supported Agriculture (CSA)
- Other agriculture venture
- Animal husbandry (mushrooms, apiary, aquaculture, cheeses, etc.)
- Workshop space
- Consumer products
- Seeds and Plant Nursery
- Textiles/ weaving
- Artisan crafts (leather goods, art, wood crafts, glassblowing, etc.)
Design considerations: Depending on the type of work done, each space may require various changes in architecture or siting. However, multifunctional spaces can be created with forethought and phased into or out of use. If there is animal husbandry or other noisy or malodorous production, it needs to be far from residents to prevent annoyance. Trucks may need access to the site for deliveries.

Case profile: The Farm in Tennessee also has a Book Publishing House specializing in environmental and health issues, a Birthing Center, and a variety of environmentally focused business, such as selling a personal use Geiger-counter for radiation detection, a solar electronics company, a solar car company, and an environmental law project called the Natural Rights Center.

LAEV has old garages that it has turned into workshop space, including a carpentry workshop and sewing studio. While these spaces are open to all residents for hobby work, they also provide residents with workspace for construction. Pacific Electric Cooperative uses the LAEV workshop for many of its construction needs and said it would have to rent out space to work, but due to the outdoor space and nice weather in Los Angeles, doesn’t need to and can save on business costs.

LAEV is advocating to the city to convert an alley immediately south of LAEV that connects S Vermont Ave. with Bimini Pl. into tiny storefronts for LAEV residents and neighbors to sell their wares.

c) On-site businesses

Similarly to having on-site production, having on-site businesses creates a holistic community through opportunities for employment and not just a sleeper suburb or bedroom community. On-site businesses also allow residents to buy amenities on-site, creating walkable communities, rather than traveling to get goods or services.

On-site businesses can include:

- Office space
- Studio space
- Retail
- Childcare
- School
- Holistic health services
- Yoga and dance studio
- Café
- Bakery
- Restaurant
- Health food store
- Educational center or museum
- Gallery
- Conference center

Finally, it is important to support the work of residents and neighbors through a marketplace or gallery that showcases resident’s wares to visitors.

Case Study: LAEV has a glass case within its lobby to showcase residents’ work, steering visitors to the appropriate contact information for further inquiry, which is a low-cost method of supporting its artists and creators.
Designing and building ecovillages comes with a particular expertise in sustainable site planning, design and construction. With this experience, design consultancy or construction firms can be created from residents on site, both promoting sustainable design and generating additional income. The ecovillage at Lebensgarten developed at least two construction and consulting businesses from the experience gathered in adaptive reuse and sustainable design. The Farm, an ecovillage in Tennessee, became involved in humanitarian disaster relief through forming the aid agency ‘Plenty’, sending members down to developing countries in Central America to help rebuild with sustainable, local materials, all learnt through building on The Farm.

Additionally, it is not impossible to set up pension funds for workers on site, if there is a form of income sharing. The Norwegian Camphill movement uses a pension fund with Cultura Bank, an ethical bank, to use its pension funds to invest in ethical movements.

d) **On-site employment**

Beyond on-site farming or businesses, residents may also be employed by the ecovillage to maintain the building or property, manage accounts, review legal documents, work in the educational or daycare facilities, and/or do advocacy work with the local government to support its ventures. It should be encouraged for residents that are freelancers or entrepreneurs to have the space to start businesses and prototype new ventures. Successful entrepreneurship requires using resources wisely, and innovative

## 2. **PROMOTES LOCAL REINVESTMENT**

a) **Use of local currency**

Using a local currency (not the national currency) allows communities to create a truly circular economy by reinvesting money within the community. The ecovillage can reach out to the surrounding neighborhoods, cities and even other ecovillages and see if they will accept their local currency. This creates local rejuvenation within the larger community and concentrates wealth at a community level, without it dispersing into the globalized economy.

**Case study:** Since 2002, Findhorn ecovillage in Scotland has created an alternative, local currency called the Eko, which was set up by the community’s development trust, Ekopia. The Eko is accepted by most ecovillages, and enables money to stay circulating within ecovillage communities, creating regenerative economic impacts. Issuing the notes has enabled Ekopia to offer low-interest loans and donations to support ecological initiatives, such as a windfarm.

b) **Use or support local businesses, services and products**

There are locally produced, organic, biodegradeable food and consumer products available to the ecovillage.

**Design considerations:** If there aren’t local options for food or consumer items, a local store or purchasing co-op could be provided by the ecovillage. Space within the community would need to be allocated for this store, and should be located near other retail and be easily accessible to visitors.

During design, building materials can be sourced locally to the area. Additionally, any labor, including construction, design, engineering or planning can be done by local firms or people. If folks in the area aren’t trained in the specific construction method necessary, they can be trained on the job, enabling further dissemination and knowledge of the building method.

**Case Study:** Dyssekilde has an on-site café and health-food store where they sell local food, crafts and health store items.
3. **CHANGING CONSUMERIST CULTURE**

   a) **Encouragement of sustainable behavior changes**

   The environment, culture, and businesses encourages sustainable behavior through design, social norms and social pressure, and having sustainable consumer options available.

   **Questions to ask:**
   
   - How can the community better contribute to a culture of sustainable behavior?
   - How does the site design contribute to changes in behavior and consumption?

   **Design considerations:** Convenience and decision making can be about site design. For example, if a trash can is alone in the communal dining area, residents probably won’t compost or recycle. Making sure that residents have sustainable consumer choices available and convenient to them will ensure that they have options. If elevators are within the building, stairways should be placed in a prominent location to encourage walking instead. If possible, residents should be shown how much water and energy they consume and how much waste they create and be made public. Social pressure is a proven way to reduce consumption and make users aware of how much they consume.

   a) **Income sharing or communal fee structure**

   Sharing all or part of one’s income can help create monetary equality between all residents, especially if there are residents working in higher value jobs. While this can create resentment between members, it also has the possibility to create a strong community bonded by its belief in sharing.

   b) **Time bank or time share**

   If people do not have the money, a community can set up a formal or informal time bank system to allow residents to swap one hour of time for another’s. This prevents the need to exchange any money, and can be a more affordable option for people who are short on cash. The creation of a time bank can be through a formal system, such as existing online platforms open to the larger town, or through informal systems via a wiki or sign-up board.

4. **A CULTURE OF SHARING**

   Creating a culture of sharing encourages and normalizes residents to the idea of sharing, whether it is food, clothes, hardware or tools, cars, and time. A culture of sharing both encourages reduced private ownership, leading to more sustainable behaviors of consumerism and enhances a sense of community by encouraging residents to share and engage with other members. The ecovillage should promote sharing of resources, reusing items, and upcycling materials. A culture of sharing reduces living costs, saves space, and can enhance community. A culture of sharing is promoted through having formal mechanisms in place for residents to communicate with each other on needs or gifts as well as physical places to encourage sharing.

   **Questions to ask:**
   
   - What shared facilities are there and how are they in relationship to other buildings and programs?
   - What space requirements and space needs are required for these shared facilities?
   - How have these shared facilities created community or failed to?
   - What is the most successful shared facility and why? Least successful?
   - How have these facilities reinforced a culture of sharing and how could they be improved, or what additional spaces would you want? What shared amenities do you find unnecessary?
Sharing amenities reduces the cost of living and encourages sustainable consumerism since not every home needs a laundry machine, tools, or even a kitchen or bathroom. The cost of living can be reduced by occupying less space in an apartment through access shared facilities or not needing to purchase certain equipment or tools, sharing the cost with other residents. Through creating indoor and outdoor child play spaces, this can save a large amount of private space in a home—something that could be advantageous for urban dwellers.

a) Communal dining: Communal houses, multi-use areas and industrial kitchens
The importance of communal dining cannot be stressed enough in the development of community. Many informal decisions and community building happens around food. In one example, the Kibbutz Gezer lost its group dining hall, and residents since then have claimed that the sense of community has been lost (Bang, Growing Eco-Communities: Practical Ways to Create Sustainability 2007). Communal dining can be the entire community, a neighborhood cluster, a group of friends, or even just your own family.

It is important to have a variety of dining options for different sized groups, or a multi-use area that can expand to hold more or less people, and be repurposed for other events. Having smaller, neighborhood cluster dinners that can accommodate 20-30 people, as well as areas that can fit the entire community are important. Additionally, having an outdoor gathering space is critical to facilitating larger gatherings. Finally, these type of spaces are also critical if the ecovillage or community would like to gain income from holding seminars, conferences, health and wellness classes and festivals.

b) Communal laundry
Sharing laundry facilities reduces the need for every family to have their own laundry machines, reducing each family’s carbon footprint. Additionally, if they are located in a central location, such as the communal house, the greywater from the laundry could be easier to collect and reuse.

c) Meeting room or multi-use area
Depending on the community, members will meet occasionally to discuss issues, make decisions on the community, and/or meet new members. Having a multi-use area that can accommodate the entire community is key to effective participation, inclusion, and good decision-making. The layout of the room should be sized to fit the community in a circle.

d) Children’s house, play area or day care
Having a space where children and teenagers can gather and play is integral to building childrens’ and teenagers' sociability and independence.

e) Reuse and free cycling
Spaces that contribute to this are areas designated for reuse so residents can discard of unwanted items, and other residents may reuse them. This space can also become a free cycling area to the greater neighborhood.

Case study: LAEV created a reuse area with a bookshelf within the lobby where residents could drop off or pick up unused items, through a “Little Free Library” located on the street where residents and neighbors could take a book or leave a book, and digitally through their mailing list, reaching out to residents if something large was available for reuse. The mailing list also is the ecovillage’s primary mechanism to encourage and facilitate reduced consumerism of residents through requests for items. Finally, LAEV has one
garage space that they have converted into a children’s toy library where neighbors and residents can borrow toys.

f) Shared office space/Library
Residents can save money on renting office space and not commute to work if there is space within the ecovillage to work. Additionally, residents may have similar backgrounds or interests in their businesses and may find further networking opportunities with other residents.

Case study: While LAEV did not have a formal sharing library, many residents had their books open for loan to other residents. Through email, residents can request a book to other residents.

g) Car sharing
Creating a formal or informal car sharing program with residents can discourage car ownership, improve affordability, reduce green house gases and pollution, and promote a culture of sharing.

h) Shared studio space, workshops and tool sharing
Having tools to share prevents individuals from all needing to own tools. Additionally, having studio or workshop space can promote a sense of community by sharing space to work together and create more affordable lifestyles for residents who like to make things.

Case study: LAEV had garages, one of which was converted into a communal woodshop and tool sharing and another which was a shared sewing studio.

Hjortshot ecovillage in Denmark converted old trailers or caravans into artist studios for its residents.

L. EDUCATION AND OUTREACH ON SUSTAINABILITY

1. ENGAGEMENT & INTERACTION WITH OUTSIDE COMMUNITY
Having an educational center or training program can allow residents and visitors to be involved in hands-on learning, bringing home tangible skills or being able to see how ecovillages offer a different model of living that can be a blueprint for sustainable living.

a) Engagement with Outside Community
Coordinating and engaging with the outside community is essential to making a larger impact beyond the boundaries of the community. This can assist in securing autonomy over local resources, educating neighbors, gaining neighborhood or city support, and helping to guide community decisions.

Questions to ask:

- How does the vision of the community align with that of its neighbors?
- What projects or platforms can be leveraged by support of the surrounding community?
- What services or infrastructure, such as utilities, schools, police, or fire department, will the community share or use with the surrounding town?
- How can the community engage with and serve the needs of the outside community?

Design considerations:

Surrounding neighbors should be involved in the design process of future developments if they will be impacted by its creation. In particular, if ecovillages can gain traction with surrounding neighbors on certain
projects, it can help more experimental projects be built by showing the city government support from its citizens. On the other hand, bad relationships with neighbors may thwart future development.

Whether the ecovillage is rural, suburban, or urban, having neighbors and being within municipal jurisdiction is likely. This means, if desired, the community may share schools, public utilities such as water, waste, energy, garbage pickup, and emergency services such as firefighters or hospitals, with the surrounding town. Communities should make sure that they discuss which of these services they'd like to contribute to, if at all, and how the community can be of service to the larger area, such as providing a special or alternative schooling system or even a compost pickup.

**Case Study:**

Sirius Community during its infancy experienced misunderstandings and misgivings from neighbors and city officials in the surrounding community. This prevented the community from moving forward with projects, such as getting building permit approvals. It was only until Sirius Community began to engage with the outside community through volunteering its labor to the town through building projects, such as building shelves for the library. Through this process, neighbors and city officials began to personally get to know members, appreciated their work in the community, and began a benevolent relationship. This relationship eventually moved members of the council who were skeptical and averse to Sirius a change of heart into endorsing their experimental forms of living, and even suggesting.

My biggest takeaways from visiting LAEV was that LAEV was more than just a shining example of how a group of people can commit to living sustainably—it is a hub for action, networking, and activism for social and environmental enterprises. Many residents of LAEV are involved in grassroots initiatives in LA, working to create more sustainable and more just cities. The multiuse room and guest rooms allow residents to hold meetings and conferences for groups working on environmental and social justice issues, sometimes free of charge. Members have access to the multiuse room to hold meetings for their own organizations and movements. Through knowing each other, they are within a supportive network of activists, and can connect residents to resources, people and even money. It is also this networking and impact hub effect that connects outsiders to LAEV and spreads what the ecovillage is doing.

b) **Educational or Visitor Center**

Questions to ask:

- Are there spaces or ways visitors can come and learn?

One of the largest contributors to ecovillage dissemination has been the multitudes of visitors that come to ecovillages every year, whether it be for conferences, permaculture design certificates, courses, group exercise or wellness, and/or tours. Through meeting residents, seeing ecovillage life, witnessing the sustainable building technologies, and seeing the permaculture designs and gardening, visitors come away with a deeper knowledge of real-world applications of sustainability. In order to allow for visitations, it is important to have guest rooms, hostel accommodations, a visitor center, multi-use conference room, and committee responsible for coordinating visitations. If done wisely, this can also be a considerable amount of income for the ecovillage.

**Design considerations:** An educational center can also act an anchor to facilitate visitors coming and learning about the community and sustainability. This center can be paired with a café, store, or gallery showcasing the ecovillage’s manufacturing wares, or residents’ crafts or goods. The center should be located near to other
retail or services and easily accessible to visitors. It should be big enough to hold a classroom, and can also function as a multipurpose room paired with other activities such as a conference center.

c) **Educational or training programs**

Many ecovillages have hands-on training programs that teach visitors how to build in sustainable ways, medicinal herb or gardening workshops, how to construct various sustainable technologies, have permaculture design courses, or hold ecovillage design education courses.

**Design considerations:** Space should be dedicated on-site for a classroom or training facility for visitors. Temporary housing can be built for short- or long-term volunteers or interns. If building a new area of the community, it may be an opportunity to hold a hands-on class to teach visitors how to build in whatever sustainable building method being used.

**Case study:** Sirius Community has an internship program where residents get room, board, and a small stipend to work on various sustainable construction projects across the community. In exchange for their work, they learn how to build in such methods as cob, strawbale, or lumber construction. A major source of their income is also doing educational trainings for various sustainability initiatives.

2. **OUTREACH & PARTNERSHIPS**

a) **Partnerships with local schools**

Using the ecovillage as an example of sustainability, as well as a sustainability playground and testbed for schools can show students real-life examples of people actually living a sustainable lifestyle. Additionally, many of the sustainability initiatives are only learned by avid students of permaculture or sustainability, and is currently not a part of mainstream education.

**Case study:** The LAEV has built a Learning Garden open to students of nearby schools where they learn about local plants, gardening, and growing food. The garden also has chickens, and students in the city can have a moment within nature in a city surrounded by concrete.

b) **Partnerships with local government**

Municipal or regional governments need to support the creation of sustainable communities. Additionally, municipalities can work with community networks to release small parcels of land for ecovillages or sustainable building development, in which zoning and regulations are relaxed to allow for more experimental neighborhood types.

Beyond the internal problems any community is bound to face, many of the problems communities will face will be related to development, building codes, and zoning. Having benevolent relations with local and regional city governments and being able to influence city regulations, such as building codes, zoning, and even cooperative business lending practices, can heavily impact the larger community’s ability to scale, replicate, or enter into mainstream settings, which are the three dissemination techniques for sustainable technologies. Support from local government can in particular support ecovillage practices entering mainstream culture, as well as the replication of projects across the city.

**Design considerations:** Ecovillages are pushing the status quo of what sustainable neighborhoods can be through sustainable building technologies and pushing the boundaries of zoning regulations. In order to get these projects off the ground, good relationships need to be built with local government officials.
Collaboration with or influence over local government can impact the surrounding communities by changing building codes or zoning regulations to allowing for more sustainable development.

**Urban constraints:** Rural ecovillages offer communities more freedom in design due to more lax building codes and zoning regulations. On the other side, urban or suburban ecovillages have close neighbors who could fight or block development, as well as strict building code regulations and zoning codes to follow. Urban ecovillages offer opportunities to influence building codes, zoning regulations, the construction industry and perceptions on new possibilities of sustainable development. Developing an urban ecovillage could be much more difficult than rural ones for experimental, mixed-use, pedestrian-oriented designs, including the use of sustainable building technologies, sustainable infrastructure, mixed use development, such as on-site businesses or manufacturing, and developing urban agriculture.

**Case study:** Hurdal ecovillage in Norway. The Hurdal municipality was inspired by the Hurdal ecovillage, and has established the valley of Hurdal’s regional plan to be a ‘Green Incubator’ for sustainable businesses, agriculture, transport, houses, and technology to create a replicable model across Norway (Bang 2015).

Sirius Community had bad relations with its neighbors and the local city government of Shutesbury, MA, as the city perceived Sirius as “hippies”. However, members of Sirius began to volunteer with the town, such as building shelves at the local library or cleaning at the public schools. Once the town officials and larger town population met members of the community, perceived perceptions changed and a benevolent relationship began. The town officials started to look towards Sirius as inspiration for how to build sustainably, rather than local nuisances that needed to be managed.

**VI. Conclusions**

**A. CHALLENGES**

1. **CHALLENGES TO CREATING AND RUNNING ECOVILLAGES**

   - There are community resilience challenges in being able to work together well, or there may be personal problems among members. There may not be enough commonality of interest to make it a strong and effective collective body.

   Despite the environmental, social, and economic benefits of ecovillages, they face many difficulties in design, development, and lifespan. These difficulties include finding affordable land and winning planning permission. Negotiating building codes to implement sustainable technologies is a huge barrier to environmental sustainability, such as compost toilets, straw bale houses, greywater recycling, wetland wastewater treatment and the inability to forego municipal connections to energy, water and sewer.

2. **URBAN SITE CONSTRAINTS**

   - The biggest urban site constraints are related to site acquisition, space constraints, and zoning and building code regulations. Additionally, autonomy over local resources is the hardest element to control in an urban setting, where neighbors affect stormwater runoff onto your property, pollution or even hazardous material from cars, trucks or manufacturing, and zoning and building code regulations preventing certain uses or sustainable building technologies from being utilized.

**B. CRITIQUES TO THE ECOVILLAGE MOVEMENT**

While many suburban or rural ecovillages utilize sustainable building technologies and renewable site infrastructure, they can still utilize new construction rather than reuse, have very large single-family homes,
taking up large site footprints and having large homes, requiring large amount of heating or cooling. And while ecovillages attempt to address social isolation created in suburbs, they can still function as commuter suburbs, ultimately not addressing the larger battles of behavior and lifestyle change needed to create a sustainable world. Finally, ecovillages can create isolated social bubbles, insulating themselves against their neighboring town. This creates a sustainable and meaningful life for its community members but ultimately leads to little impact on the world at large.

Additionally, ecovillages tend to attract a certain type of idealistic person—someone who has the privilege of time, money and space to be worrying about environmental sustainability and community building. This has traditionally limited the ecovillage movement to middle-class residents who are looking for homeownership and have the income available to make it possible, normally through purchasing or building a brand new, uber sustainable home in a suburban ecovillage. In my experience, the ecovillage and sustainability movement has also been very white—however, LAEV broke this stereotype and I believe other urban ecovillages can help diversify the environmental movement. Moving forward, ecovillages have a responsibility to create diverse, inclusive communities open to people of various needs, races and income. Those who need the social capital of ecovillages the most are low-income people, whether they are single mothers who need help with childcare or struggling to afford food or rent. The potential affordability that could be created through community land trusts or limited-equity housing co-ops is something low-income urban dwellers could benefit the most from.

Finally, living in an intentional community requires a lot of work from individual members on a physical level, in order to keep the site running and on an emotional or personal level, as living closely with people can be draining on time and energy. Many people, especially urbanites, do not have the time to dedicate four or five hours a week to doing work in the community or attending community meetings. Many urban dwellers juggle long jobs, family, chores, socializing, hobbies, and self-care—adding one more category of community might make some feel like they have no time to dedicate to the community.

1. AFTER ALL THIS, WHAT IS AN URBAN ECOVILLAGE, ANYWAY?

Can the oxymoron of an urban ecovillage even exist and if so, what sets urban ecovillages apart from urban cohousing or other intentional communities? Urban cohousing communities may share many of the same values as ecovillages, including a sense of community, participatory governance, shared outdoor space, and communal dining. However, cohousing communities may or may not be as ecologically conscious as ecovillages, meaning they are not focused on self-reliance, food production, reducing carbon footprints, or living in harmony with the earth. Additionally, many cohousing communities do not include “circular economy” initiatives such as on-site production, manufacturing, retail, or office space in their designs. Urban cohousing is normally singularly focused on fostering a sense of community, but in many other senses operate under normal urbanism, economic and cultural principles. This places urban ecovillages in a special spot for urban living, where they are focused on a whole-systems approach to addressing how urban citizens can engage differently with their home, their community, their money, and the earth.

My reflections upon leaving LAEV after my first visit, was “this is an ecovillage?!” After visiting rural and suburban ecovillages in Denmark, where the communities and ecovillage movement is very strong, and is where cohousing originated, LAEV was not what I expected an ecovillage to be. I imagine rolling pastures, animal husbandry, richly planted permaculture gardens, on-site sewage treatment or composting toilets, renewable energy technologies, experimental building technologies such as green roofs or cob, and the feeling of a rural village. However, many of these traditional images and feelings that I associate with ecovillages were absent when I visited LAEV, yet there were concentrated glimpses of a different kind of ecovillage—a place
with more concentrated human energy, with more activism, with urban challenges such as homelessness and air pollution sitting right at its doorstep, and with radical support for members riding bicycles in a city full of more cars than people. This latter item might be the most radical, sustainable and ecologically conscious action a community could support together in a city where bicycles are rarely seen.

In retrofitted ecovillages, which may be the most sustainable way to build new housing, radical, experimental building techniques are going to be hard to incorporate into existing structures, so the literal facades of a retrofitted ecovillage may not seemingly be as environmentally radical as others that are newly constructed, but are inherently more important to conserving resources and preventing greenfield development.

Finally, I think an important component that urban ecovillages can play is helping define what an urban ecovillage is, is helping to secure neighboring land for environment preservation and cultural enjoyment. LAEV was successful in building two ecological parks within a couple blocks of the community, one has transformed a corner of a parking lot into a school learning garden and the other has transformed an alleyway into a stormwater treatment park. LAEV has future plans to continue its expansion of parks and pedestrian-only walkways. I think that in order to be deemed a “successful” urban ecovillage is to help the community and surrounding neighbors reclaim the land and the neighborhood as theirs, reinforcing stewardship, autonomy and participatory governance.
C. MOVING FORWARD THE ECOVILLAGE MOVEMENT

From studying grassroots innovations diffusions mechanisms, Boyer (2015) has claimed that the best scale and geographic intervention to allow for the maximum diffusion of ecovillage sustainability innovations is at the local scale and geographically proximate but outside of a city center. Boyer (2015) states that further research can systematically look at how the urban fringe can be used as a spatial niche to encourage innovative development forms. I’m studying shrinking cities as urban fringe. Both areas have cheaper land values, larger parcels of land are available, ecovillages can bring economic revitalization, and city governments may be more open to experimentation.

In order to push the Sustainability Revolution further into the diffusion phase, governments need to support innovation in sustainability—social innovations, environmental innovations, and economic innovations, along with educational opportunities to learn of these innovations. This includes innovations in sustainable building technologies, alternative forms of housing, sharing economies, mixed-use zoning, increased densification, and informal economies, among other things.

In innovation transition theory, there is an emphasis that special niches need to have protective space in order to create innovations. According to Smith and Raven (2012) protection has not been systematically researched on defining what protection is, where it comes from, how it is contested, who is involved in shaping protection, or how protection is transformed and declines as transitions come about. Smith and Raven have proposed that protection have three properties: shielding, nurturing and empowerment.

In order to apply ecovillage living models to urbanized areas like shrinking cities, this means governments need to support citizen-led, grassroots real estate development, as well as more experimental, self-build sustainability technologies. Ecovillages offer solutions to all of these. My hypothesis is that local governments can create Experimental Zoning Districts to help encourage bottom-up development of experimental forms of living, working, playing or shopping that could better inform city development and reinforce participatory control over the city.

VII. Bibliography


—. (2015) *Grassroots innovation for urban sustainability: Comparing the diffusion pathways of three ecovillage projects.* In Environment and Planning. DOI: 10.1068/a140250p


## VIII. Appendix A: Community Sustainability Matrix

<table>
<thead>
<tr>
<th>DIMENSION</th>
<th>STRATEGY</th>
<th>OBJECTIVE</th>
</tr>
</thead>
</table>
| **SENSE OF COMMUNITY**        | Formulate a Shared Vision                     | 1. Current vision of their sustainable community.  
2. Future vision of their sustainable community.  
3. Sustainability indicators, targets to mark progress, and action plan to reach targets. |
| **Cooperative Governance and Citizen Engagement** | 1. Cooperative governance and group decision making  
2. Membership process  
3. Participatory site design.  
4. Participatory site maintenance and management.  
5. Autonomy over local resources. |
| **Inclusive Process, Space and Program** | 1. Diverse housing options  
2. Diversity in membership  
3. Affordability  
4. Inclusive design |
| **Physical environment encourages social interaction** | 1. Creating pocket neighborhoods/living groups  
2. Adequate indoor and outdoor public space.  
3. Safety and privacy  
4. Human-scaled design  
5. Pedestrian-oriented development |
| **Health and Wellness**       | 1. Access to recreational facilities and programs  
2. Use of biodegradable, non-toxic, healthy materials.  
3. Peacemaking, community support, personal transformation and spirituality |
| **Sense of place**            | 1. Recognizable icons.  
2. Public art.  
3. Public realm.  
4. Ability of citizens to make the place their own.  
5. Enhance unique qualities and ecology of place.  
6. Integration with surroundings. |
| **ENVIRONMENTAL SUSTAINABILITY** | Sustainable Building Design                  | 1. Natural building materials.  
2. Passive site design  
3. Energy and heating  
4. Water |
| **Site-scale Infrastructure Systems** | 1. Reducing waste through reuse, recycling and composting.  
2. Urban metabolism principles.  
3. Renewable energy sources.  
4. Water and stormwater management  
5. Sewage systems.  
6. Food production |
| **Open space preservation**   | 1. Minimize impervious surfaces.  
2. Mixed-use development.  
3. Open-space conservation and management. |
| **Enhancement of ecology**    | 1. Enhanced Biodiversity.  
2. Land stewardship.  
3. Protect and/or restore sensitive ecosystems |
| **Mobility**                  | 1. Transit-oriented development  
2. Promoting alternative forms of transit  
3. Proximity to amenities, services and employment |
Climate adaptation
1. Reduce dependencies on fossil fuels
2. Site protections from climate change
3. Carbon storage

CREATE A CIRCULAR ECONOMY
Community enterprises
1. On-site food production
2. On-site manufacturing
3. On-site businesses
4. On-site employment

Promotes Local Reinvestment
1. Use of local currency
2. Use or support local businesses, services and products

Changing Consumerist Culture
1. Encouragement of sustainable behavior changes.
2. Income sharing or communal fee structure
3. Time bank or time share

Culture of sharing
1. Communal dining: Communal houses, multi-use areas and industrial kitchens
2. Communal laundry
3. Spaces for informal gatherings
4. Meeting room or multi-use area
5. Recreational facilities
6. Children's house, play area of day care
7. Reuse and item exchange
8. Car sharing
9. Studio space, woodshop and tool sharing

EDUCATION AND ENGAGEMENT AND INTERACTION WITH OUTSIDE COMMUNITY
Engagement and interaction with outside community
1. Engagement with outside community
2. Educational or visitor center
3. Educational or training programs

Outreach
1. Partnerships with local schools.
2. Partnerships with local government.

IX. Appendix C: Annotated Bibliography of Key Resources

Key resources:

Bang, Jan Martin. 2007. Growing Eco-Communities: Practical Ways to Create Sustainability. Floris Books. This book is heavily focused on the design of ecovillages, offering examples of how communities have done it in the past.


Gaia Education. Ecovillage Design Education (EDE) Programme. Traditionally, this is a four week course founded on the permaculture design course education and expanded to include how to design ecovillages. It goes over the four aspects of ecovillages: social, economic, ecological, and worldview.

X. Appendix B: Research Methods and Documentation

D. Interview Questions
The following interview questions will enable me to understand the values of each ecovillage, how it came to be, and what major successes or challenges it has had in its site selection, urban design, environmental sustainability, circular economy, community-building and education.

Ecovillage Background
1. What is your role / affiliation with the ecovillage?
2. When did your ecovillage launch?
3. How did the ecovillage start and what were its motivations?
4. How long have you been with the ecovillage?
5. How many members does your ecovillage have?
6. What do you think makes your ecovillage similar or different to other ecovillages?
7. What are the values your ecovillage tries to embody?

Ecovillage Site Selection and Support
1. How did your ecovillage pick this site? Why this particular location and site?
2. How was the site acquired and financed?
3. What legal entities are associated with the ecovillage, if any?
4. What legal problems, if any, has the ecovillage encountered?
5. What support from the government or other groups, if any, was there in acquiring the site? Are there certain government policies, organizations, or groups that have played a large role in developing your ecovillage?
6. What support from businesses, corporations or organizations has been helpful or hurtful and why?
7. Is your ecovillage affiliated with any other nonprofits, organizations, and groups? If so, what is their role and how have they engaged with the ecovillage?
8. If you could choose a different site, why would you and what would you look for?
9. What are the biggest limitations in this site? What are the biggest advantages?
10. Is the site too big, or too small? Is the size of the population good?

Ecovillage Urban Design
1. What site design does your ecovillage utilize to help create the values it tries to embody?
2. What do you think are the most important and successful aspects of site design your ecovillage uses and why? Would you change anything about this and why?
3. What do you think are failed aspects of the site design your ecovillage uses and why? What would you change and why?
4. Are there any spaces you wish existed that don’t and why? Where would you put them?
5. If you would redo the site layout and design, how would you do it?
6. What are aspects of the design that are important to be adjacent to each other? Far from each other?
7. What are your favorite parts of the site and why? Least favorite? Most visited? Least visited?

Ecovillage Environmental Sustainability

1. What sustainable building technologies do the houses here use?
2. What sustainable infrastructure is built here? What is on and off grid? How do the economics and maintenance of this work?
3. What have been barriers, opportunities and lessons in implementing these technologies?
4. How have you negotiated building code regulations in using innovative sustainable building technologies? What were the biggest pushbacks and challenges in this? How did you ultimately get them approved for use?
5. What have been the most expensive and least expensive technologies to implement? What has been easy or difficult to implement and why?
6. What land management practices and maintenance regimes are used to improve the ecology on site?
7. How has the site plan or site location limited the ability to enhance the ecology or implement sustainable technologies?

Ecovillage Society

1. How does your ecovillage make decisions? What works about it and what doesn’t?
2. How do you handle conflicts?
3. What forms of communal administration, maintenance and land management exist? What works about it and what doesn’t?
4. What are the demographics (age, income, race) of the ecovillage?
5. How does your ecovillage create community? Are there celebrations, weekly gatherings, communal meals, or community work projects? What spaces are important for these community-creating events to occur?
6. How has the site planning and layout affected or detracted from building community?
7. What have been challenges in building community?
8. What has worked well in building community?
9. Is there outreach and engagement with surrounding communities? If so, what does it involve? What spaces or site design elements enable this to happen?

Ecovillage Economics

1. How do people finance their homes? Are these homes more or less affordable than the surrounding area?
2. Do people work at the ecovillage? Are there sources of income the ecovillage makes?
3. What are your membership fees? Or is there any form of income-sharing?
4. What is the total operating budget for the ecovillage and what is this spent on?
5. Does your ecovillage utilize alternative currencies, such as different forms of money, time banks, equipment sharing, day-care sharing, or car shares?

Ecovillage Education

1. Does your ecovillage have a school? If so, how is the ecovillage used to promote sustainability?
2. What sorts of educational programs or knowledge-sharing programs are on site for members, the surrounding community, or visitors, if any?
3. Is your ecovillage used for educational outreach to surrounding communities and visitors? If not, are there any plans to?
4. What is successful about the sustainability education on site and what could be improved?
5. How could the site design be improved to enhance the educational potential of the site?

**Being an Urban Ecovillage**

1. How defined are your boundaries? How open or closed are you to neighbors? What is the right balance of inward- or outward-facing?
2. Has it been harder to create a new culture due to being inside of mainstream society?
3. What zoning or regulatory barriers or opportunities were dealt with?
4. How has race, diversity, and class been a part of the history of the ecovillage? What about environmental justice?
5. What opportunities or challenges were faced by the reuse of buildings or materials on site?

**XI. Appendix D: COMMUNITIES Project with Rafi Segal**

This project was completed in the Spring of 2016 in the MIT Architecture Workshop, “COLLECTIVES” with Rafi Segal. It explored the architecture of collective impacts, and I explored the Shakers religious community.

**THE SHAKERS OR THE SHAKEING QUAKERS OR THE UNITED SOCIETY OF BELIEVERS IN CHRIST’S SECOND AWAKENING**

---

**FIGURE 23- A MONTAGE OF THE SHAKERS. NEW LEBANON, NY.**

**IDEOLOGICAL BACKGROUND**

**WHY**
Escape from persecution
Separate themselves from the world to reach purity

**WHEN**
Began in 1774
Climaxed in 1840s
Declined in 1870s
Still present today

**WHO**
Began with 9 people led by Ann Lee
Climax of 6,000 people with 19 communities
Currently only 12 people

**LEGACIES**
Art, furniture, architecture, and crafts
Packaged seeds, circular saw, brimstone match, flat broom, clothespin, wheel-driven washing machine, metal pens, new type of fire engine, the revolving oven and many others.
One of the most successful religious utopian experiments
Widely studied

**IDEOLOGIES**

Equality of all men
Equality of genders
Shared land and assets. None poor and none rich, all comfortable.
Purity and perfection
through purity of self
through celibacy
through separation from the world
Humility
Consecration of labor + Hard work
Efficiency
Simplicity
Peace
Confession of sins

“Lustful gratifications of the flesh” were the “source and foundation of human corruption.”
Live a life like Jesus, very unlike the life of the world.
Separation from the world’s loves, lusts and from its bad and its good

**ECONOMY AND SOCIETY**

**SOCIAL PRINCIPLES**

Millenial Laws of 1821
Stringent laws of communal property ownership. “All who believed were together and had all things in common; they would sell their possessions and goods and distribute the proceeds to all, as any had need”
“No member may go out of the family wherein they live, to any other family, on an errand, or on a visit, without liberty of the Elders.”
Brothers and sisters might not lend things to each other, give private gifts to each other, go to each other’s shops, or even pass each other on the stairs
Limited architectural forms and colors
Guided Trustees as to how much interaction with the outside world was necessary
“It is not good order for Believers to attend theaters, or shows, to gratify an idle curiosity”
Shaker organization techniques left little to individual discretion or chance.
Time was strictly controlled in order to establish private space for the brothers and sisters

**SOCIAL STRUCTURE**

<table>
<thead>
<tr>
<th>The Ministry</th>
<th>Direct and coordinate individual communities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gender balanced governance</td>
</tr>
</tbody>
</table>
Ministers | Overall spiritual and temporal guidance
---|---
Elders + Eldresses | Two of each sex. Spiritual leaders. Overseers of Family communal life. Appointed their own successors
Deacons + Deaconesses | For each department, trade, and business within each Family
“Office Deacons” or “Trustees” | Specialized in affairs of money with “the world’s people.” These were people who were perfected already and so would not be tainted by outsiders
“Church Families” | The leading group in each community. “Families” Lived, worked, and prayed together within the community. About 100 persons each. Strict segregation of the sexes. Separation of existing families into different Families and Children’s home. Each Family designed to be a self-sufficient farm and business.

From 1772 - 1821 there were single leaders of the Ministry, and after 1821 there were nuclei of Elders and Eldresses. Social cohesion was mostly the result of a shared commitment to Shaker values and beliefs. Shaker newspaper to distribute between communities.

**ECONOMIC STRUCTURE**

Began as self-sufficiency and then led to profit off of surplus. The Shakers became a multistate corporation headed by the four ministers in New Lebanon society in NY.

**TRADES:**
- Agriculture
- Food products
- Animal Husbandry
- Apiary
- Horticulture
- Medicinal Herbs (1st large producer)
- Furniture making
- Crafts
- Textiles + Weaving
- Metalworking
- Seed packaging
- “put your hands to work and your hearts to God”
- “… do all your work as though you had a thousand years to live and as you would if you knew you must die tomorrow”

**URBAN CONTEXT AND AESTHETICS**
COMMUNITY PLAN
SIMPLICITY + EFFICIENCY
Absence of private homes.
“Family order” determined the layout of the community
Each “Family” had its own residence and service buildings such as a barn, laundry, and workshops.
The “Church” Family living block was where the outside world interacted with the community. This was the location of the Meetinghouse, school, and Trustees and Trusteeses’ Office.
Trustees Office was located separate from the village, as this was where interactions with the outside world happened.
Meetinghouse, focal point of society, was one of the first buildings to be raised.
Clustering of dwellings and service buildings to create balance of activity and privacy and to make optimum use of the surrounding land.
The Shakers produced their space by regulating the appearance of the villages – by conforming the village layout and architecture to the precepts of their theology and by reinforcing the tenets of their theology by restricting contact between the sect’s members and citizens of the world at large.

FIGURE 24- A SECTION OF THE SHAKERS’ NEW LEBANON, NY SETTLEMENT
CIRCULATION

Highly controlled form of movement
Narrow sidewalks as a metaphor for the linearity of life and being on life’s path.
“God is moving the world toward the end that He has planned for.”

MEETINGHOUSE

Shakers worshipped in meetinghouses painted white and unadorned; pulpits and decorations were eschewed as worldly things. In meeting, they marched, sang, danced, and sometimes turned, twitched, jerked, or shouted. The earliest Shaker worship services were unstructured, loud, chaotic and emotional. Shakers worshipped in meetinghouses painted white and unadorned; pulpits and decorations were eschewed as worldly things. They would march to the Meetinghouse in a line of two, with Elders in the front, brethen and then sisters.

DWELLINGS

Size of the Family and separation of the sexes created a unique residence. Two entrances, two hallways, and two stairways

AESTHETICAL IDENTITY

Forms and colors of the buildings were ordained by the Millennial Laws:
“odd or fanciful styles of architecture may not be used among Believers... the meetinghouse should be painted white without, and of a bluish shade within... barns and back buildings, as wood houses etc. if painted at all should be of a dark hue... unless they front the road or command a slightly aspect.”

“Beadings, mouldings and cornices, which are merely for fancy, may not be made by Believers”

Shakers “should not deviate widely from the common styles of buildings”

Gain respect with neighbors + attract new Believers

The aesthetics were economics of equal distribution. “The divine man has no right to waste money upon what you would call beauty, in his house or his daily life, when there are people living in misery.” However, the aesthetics changed as prevailing tastes appreciated functional design and fine craftsmanship.

Create God’s kingdom on earth through perfection.

INTERIORS

austerity + simplicity

The interiors were spare, well-portioned, and perfectly maintained in accordance with every detail prescribed by the Millennial Laws.