



Section 3.0

Focus on the Community

Now that the Sustainability Planner's role and responsibilities within the DFO organization have been presented, the focus of this guide shifts to communities. Section 3.1 discusses what motivates communities to embrace the concept of sustainable development, describes different approaches to public involvement, and identifies local jurisdictional powers and authorities that can be tapped to implement sustainability. Section 3.2 *Elements of Sustainability* describes a range of recent initiatives that communities have used to create a more sustainable future for themselves.

3.1 Focus on the Community

Communities do not exist in a vacuum; a historical settlement pattern links them with the surrounding area, and the entire jurisdiction should be viewed in the political context of the region and the state. Conducting sustainability planning for towns and cities in the interior West, for example, is far different than working with communities in the Mid-Atlantic. The West places a greater emphasis on private property rights than on planning and land use regulatory approaches. In these situations, voluntary programs may work best. In other parts of the country, there may be more acceptance of land use planning and regulatory approaches; a precedent may already be set for state mandates for local comprehensive planning and zoning.

3.1.1 Community Motivation

What motivates communities to consider sustainable development or redevelopment initiatives? One strong desire in the aftermath of a disaster is to avoid a repeat occurrence of the same situation. The Sustainability Planner can use disaster resistance as a key element in gaining the public's support of a long-term recovery plan that incorporates sustainable initiatives.

Consider the following three elements in motivating the public toward a sustainability initiative:

- **Improving awareness** Residents are much more willing to accept the concepts and changes associated with sustainable redevelopment if they have been

Community Benefits of Sustainable Redevelopment

- Fewer damages incurred in the event of another disaster
- Economic gains through energy efficiency
- Improved environment
- Improved safety
- Preservation and restoration of natural resources
- More open space, parks, and recreational amenities
- Improved quality of life for the entire community

educated about them and made to feel a part of the process. Scheduling small meetings with key citizens is an effective tool to gain public support. Such meetings provide an opportunity to define sustainability and how it applies to the community. Local champions can sponsor or lead meetings to improve awareness of sustainability issues. Once in motion, the support of the public can provide powerful leverage for change. The goal of the Sustainability Planner is to place issues within the citizens' reach—move issues out of the abstract, and present them as tangible and practical alternatives.

- **Building partnerships** The Sustainability Planner builds public trust by helping the community draw upon experiences, resources, and policies already in place. Consider establishing a broad-based task force with representatives from all key sectors of the community (e.g., business leaders, civic associations, health care professionals, and representatives of the construction and housing sectors).
- **Defining benefits** To encourage public participation, the Sustainability Planner should clearly define the benefits of both sustainable redevelopment and the retrofitting of existing development. Explaining sustainability in terms of economic gains is a strong motivational message. For example, informing citizens of the long-term economic benefits of redeveloping with energy efficiency in mind can inspire them to look beyond immediate recovery needs. A sustainability initiative provides environmental protection, improves quality of life, and builds community goodwill.

3.1.2 Public Participation

The Sustainability Planner may be called upon to assist local officials in developing a comprehensive recovery strategy. Public participation in the recovery planning effort is essential. How a community structures community participation depends on its size, the capabilities of local officials to support a planning initiative, and the extent of involvement of citizen review boards and associations in setting community goals and policies.

Creating a task force of community leaders, representatives of local government agencies, and interested citizens is a common approach for structuring long-term recovery planning. Build on existing organizations or boards wherever possible, but do not be overly cautious in recommending a new task force or committee if you think it necessary. You might suggest standing committees to address specific recovery issues, such as housing, economic development, infrastructure, and hazard mitigation. Suggest a local champion to chair a task force or recovery committee. He or she should be prepared to make decisions, defuse controversial issues, and maintain momentum and enthusiasm.

Consider a large open community conference or workshop format, broken into smaller task groups, to quickly identify community needs, generate a future vision, or prioritize hazard mitigation approaches. Although public hearings and meetings are useful for disseminating information, they are not as useful for developing an overall recovery strategy. Far greater success can be achieved with small committees that reflect the wide range of community views and interests. Public meetings can then be held to

review the findings of these working groups and gain acceptance from the broader community.

Larger cities might want to consider building on capabilities that exist within their agencies and departments. A team of representatives from the planning, permitting, public works, and emergency management departments, among others, can be brought together to forge a recovery strategy. The coordinator should have access to the city's chief executive and establish a public forum to provide community feedback on the direction of the recovery strategy.

3.1.3 Community Long-Term Recovery Plan

An important decision facing the Sustainability Planner is whether to recommend a community-driven, long-term recovery planning process. A well-designed local planning effort can build a firm foundation for sustainable recovery. However, in situations where damages are not extensive, where political cohesiveness is absent, or where damages are dispersed over large areas, it may not be appropriate to implement a recovery planning process. It may be more effective for the Sustainability Planner to work with others in the DFO organization on a public education and outreach program targeted directly to affected residents.

The goal of recovery planning is to take advantage of the immediate opportunity to become more disaster resistant and to embark on a long-term path toward sustainability. The community, with technical assistance as necessary, should create a concise framework for long-term recovery. Given that the recovery plan is crafted during the disaster recovery process, it should briefly lay out the overall recovery strategy and identify immediate, short-term, and long-term action items. More detailed design and engineering plans for program implementation can follow. The sidebar outlines some important lessons learned from pilot recovery planning efforts undertaken over the past few years.

The Sustainability Planner should be aware that Federal environmental and historic preservation requirements must be considered if Federal funding is used to implement elements of the recovery plan.

Steps for Successful Recovery Planning

1. **Take advantage of the window of opportunity to develop an overall recovery strategy** Capitalize on the outside funding and technical assistance that become available after a disaster.
2. **Establish community goals and objectives** Unite the community behind agreed-upon goals and objectives.
3. **Consider the planning process as well as the plan itself** Structure the planning process so that it is open and participatory, but also quickly leads to agreement on a broad framework for recovery.
4. **Employ multi-objective planning** Look for opportunities to reap multiple benefits when incorporating hazard mitigation and sustainable redevelopment concepts into recovery efforts.
5. **Be flexible** Keep your options open and take advantage of unexpected opportunities.
6. **Realize that all sources of funding are fair game** Do not overlook nondisaster-related grant programs. If expertise is not locally available, seek experienced grant writing assistance from other sources, such as regional or state agencies and the private sector.
7. **Maximize community stakeholder involvement** Recruit local corporations, foundations, and nonprofit or civic organizations to participate in the planning process.
8. **Maximize the use of nontraditional partners** Solicit local nonprofit groups and organizations to supplement Federal and state agency support.
9. **Stay out of the weeds** Make sure that the recovery plan is brief. Prioritize immediate, short-term, and long-term recovery actions; allow detailed design, architectural, and engineering plans to follow.

Coordinate with the DFO environmental liaison or the regional environmental officer on National Environmental Policy Act (NEPA) compliance issues. The Federal entity responsible for coordinating NEPA among agencies, the Council on Environmental Quality (CEQ), is receptive to long-term recovery issues, and FEMA headquarters can work with you to bring them into the sustainability process on major disasters, if appropriate. Cultural resource issues are often addressed in NEPA compliance studies. However, the National Historic Preservation Act (NHPA) applies outside of the NEPA compliance process, and may require coordination with cultural resource specialists within the DFO and the SHPO.

3.1.4 Local Government Powers

It is the local jurisdiction that has the legal responsibility for planning and regulating land use. Five broad powers of local governments are highlighted in the sidebar.

To implement a sustainability initiative, local jurisdictions may consider comprehensive plans, zoning and subdivision ordinances, building standards, floodplain ordinances, capital improvement programs, property acquisition, or taxation and fiscal policies.

- **Comprehensive plans** Many states mandate that local jurisdictions periodically undertake a comprehensive planning process. A comprehensive plan is a general planning document that sets the overall pattern of future development. Normally, it does not prohibit particular development activities, but rather provides the justification for specific zoning districts. Land use planning is an ongoing process; comprehensive plans are prepared, adopted, and revised on a 5- to 10-year cycle. Community boards work with professionals on the planning staff to prepare draft plans, facilitate a public participation process, and present final recommendations to elected officials. Given the long lead times required for comprehensive planning, it is unreasonable to expect that this process can be effectively used in the immediate post-disaster recovery phase. However, the Sustainability Planner can recommend that an affected community consider incorporating a hazard mitigation component during its next cycle of the comprehensive plan update or

Local Government Powers

- **Planning** Although the degree of planning authority of a local jurisdiction is determined in part by state legislation, all local governments can use a planning process to educate, encourage participation, and reach consensus on promoting disaster resistance, livability, and sustainability.
- **Regulatory power** Local jurisdictions have the authority to regulate land use development and construction through zoning, subdivision regulations, building codes, design standards, and floodplain regulations.
- **Spending authority** The manner in which local jurisdictions use public funds can influence development in hazardous areas. One fiscal management tool that many communities embrace is the capital improvement program, generally a 5-year plan for funding improvements to public facilities.
- **Taxing power** If the private sector encourages development in hazardous areas, special taxing districts can be created to more equitably balance public investments. Preferential assessments can be used as incentives to retain agricultural and open-space uses in high hazard areas.
- **Acquisition** Local governments can acquire lands in high hazard areas through conservation easements, purchase of development rights, or the right of eminent domain.

if disaster damages are extensive – advise acceleration of the next update.

- **Zoning and subdivision ordinances** – These ordinances are the traditional site development tools that regulate the location, type, and intensity of new development. Various zoning techniques have been used across the nation to restrict development in high hazard areas. Some examples include floodplain regulations; setbacks from fault-lines, coastlines, and shorelines; hillside development regulations to reduce the risk of damage from landslides; and zoning overlay zones that apply additional development standards for sensitive lands. Great progress can be realized in moving toward a sustainable future by changing zoning and subdivision ordinances to encourage future development in areas of low hazard risk.
- **Building codes and standards** – Building codes and associated construction standards are important tools in implementing hazard mitigation. These regulations dictate the details of building construction and set structural standards for structures ranging from single-family dwellings to high rise office towers. There are several different building codes in use by local jurisdictions and the specific code adopted generally varies by region throughout the country. Many states have minimum building code standards that allow communities to adopt more stringent code requirements, although some states have passed legislation requiring the use of a specific building code. Following a disaster declaration, it is important to evaluate whether affected jurisdictions are using the most current version of the building code. A simple amendment to local regulations could require the most current mitigation construction standards for the reconstruction effort.
Small communities may be overwhelmed by requests for building permits and construction inspection, FEMA should encouraged them to ask for technical support and advice.
- **Floodplain regulations** – It is very important to note that the model NFIP floodplain ordinance is a minimum standard. Most of the communities that participate in NFIP simply adopt the model ordinance. The Sustainability Planner should encourage affected communities to strengthen their floodplain standards. Many jurisdictions have gone so far as to prohibit residential development within the 100-year floodplain. Many states have enacted more stringent floodplain management requirements than the NFIP criteria, so it is essential to coordinate with state floodplain management officials.
- **Capital improvement programs** – Although a local government’s spending authority can be a powerful tool to implement sustainability, it is often overlooked. Local public policies that support sustainability should be incorporated into the community’s capital improvement program. Locating schools, fire stations, and other public buildings, streets, and utilities outside of high hazard areas is an obvious worthwhile policy. When siting public facilities in hazardous locations is necessary, communities can incorporate hazard reduction measures into the design or require retrofits where economically feasible. Public facility siting is a key determinant for future privately financed growth, so a sustainable redevelopment policy would be that roads and public water/sewer lines should not be sited where they have the potential to encourage intensive growth in high hazard zones.

- **Property acquisition** – Another approach to sustainability is public acquisition of property in high hazard areas and restriction of development to uses that are less vulnerable to disaster-related damages. The purchase of development rights involves paying the difference between agricultural or open space value and the value of the land under its current zoning designation. FEMA is a strong supporter of voluntary acquisition programs that remove homes and businesses from harm's way. Outright acquisition of property, through the process of eminent domain, is the most expensive approach and may also have adverse political ramifications. Encouraging the use of conservation easements, which are often held by nonprofit organizations, is an inexpensive method of restricting development.
- **Taxation and fiscal policies** Taxation can be used to more equitably distribute the public costs of private development in high hazard areas by shifting more of the cost burden directly to owners. One incentive option is to provide tax breaks for reducing land use intensities in hazardous areas.

3.2 Elements of Sustainability

Establishing a sustainable community requires the integration of sustainable practices into the day-to-day decision-making of community institutions (e.g., planning commissions, public works and transportation departments). In many communities, the mechanisms to bring about change are in place, but the strategies—their applicability and the tools for their successful implementation—are not understood. This subsection builds upon the preceding discussion on local authorities by describing a range of innovative approaches that have been used by communities to implement sustainable development.

This subsection is devoted to three major elements of sustainability that are most applicable to sustainable redevelopment. The sustainability literature includes discussion of other elements, such as waste reduction and recycling, alternative energy sources, and climatic change. However, because it is unlikely that the Sustainability Planner, operating in a post-disaster scenario, would have the opportunity to influence these more national and global aspects of sustainability, this guide focuses on land use planning, housing, and infrastructure—which have the potential to yield discrete results.

During disaster recovery, the opportunity to initiate repairs, relocations, and redevelopment with sustainability as the focus is often overlooked. Sustainable redevelopment within the realm of emergency management is a valuable planning tool to avoid future damages due to natural disasters. The concepts described apply to the repair or restoration of damaged homes and public facilities, in addition to the major redevelopment that occurs in long-term disaster recovery.

3.2.1 Land Use Planning

Careful, comprehensive land use planning is essential for communities embarking on a sustainable development initiative. Comprehensive land use planning provides a firm foundation for this effort by considering the opportunities and constraints

inherent in the natural and physical environment. When promoting land use planning as part of a sustainable redevelopment initiative, the Sustainability Planner should advocate that communities incorporate a hazard mitigation element into the comprehensive plan. Simply put, if communities restrict future development in areas of high individual or multihazard risk and encourage more intensive development in areas of lower risk, they will have taken a significant step toward becoming sustainable. Although there is considerably more precedent for addressing flooding in natural hazards planning, a number of recent efforts have incorporated fire, landslide, earthquake, and high wind hazards into comprehensive planning.

What does a sustainable community look like? Areas of high hazard risk and important natural habitat are used for open space and the preservation of natural resources. Residents have nearby access to trails, greenways, and parks. From the Sustainability Planner's perspective, the effective use of open space prevents development from encroaching on floodplains, active fault zones, and other hazard areas. Housing that can support a diversity of life styles and differing income levels is integrated with appropriate commercial development and employment centers to reduce commuting time. Higher density, mixed-use environments support the sustainable development objective of energy and resource conservation. Multimodal transportation systems favor pedestrian and public transit service. Reclamation and the reuse of energy are integrated into community infrastructure. While all of these characteristics may not be possible or appropriate for many communities, they can serve to stimulate creative thinking.

Incremental improvements in the sustainability of a community are achieved through sound land use planning and eventually lead to markedly improved settings for living, working, and recreation. Land use planning that promotes sustainability reverses urban sprawl, low-density growth, traffic congestion, the loss of open space, and high levels of energy consumption. Without question, promoting land use policies that avoid intensive development in the areas most vulnerable to natural hazards is at the top of any sustainability planning techniques list.

Characteristics of a Sustainable Land Use Plan

A land use plan for a disaster-resistant and sustainable community integrates the three fundamental elements of sustainability—economy, society, and environment.

- It promotes effective use of the community's financial resources. The plan should be based on a Benefit-Cost Analysis (BCA) of land use alternatives. For example, single-family residential developments on large lots typically create demands for services (schools, roads, utilities, police and fire protection, etc.) that exceed tax revenues.
- It provides for diversity. A sustainable development/redevelopment plan promotes the creation of places to live and work that meet the needs of a broad range of community residents. In many cities and municipalities, the people that provide basic and vital services—police, firefighters, schoolteachers, etc. cannot afford to live in the communities where they work.
- It incorporates sensitivity to the community's natural and physical resources. Preserving the integrity of ecological systems is the most important environmental indicator of sustainability. Limiting degradation of the

environment and preserving key natural systems—such as wetlands, floodplains, dunes, and active fault or landslide zones—also increase a community's resilience to natural hazards. Cultural and historical resources of a community are other important aspects of the environment and should be included in sustainable land use planning.

Recent Initiatives in Land Use Planning

Summarized below are several sustainability initiatives that may be applicable to land use planning in jurisdictions either recovering from or facing the high probability of a natural disaster.

Smart Growth

Smart growth refers to a development approach in which growth or economic progress is in balance with the environment and an improved quality of life. It is about building on existing assets, becoming less reliant on the automobile, and using land more wisely. Smart growth directs expansion to limited areas, while renovating older areas and preserving natural lands by modifying the designs of new development.

The smart growth concept encourages mixed-use development. It encompasses traditional neighborhood patterns where people walk or take public transit to shops and to work. Streets in such an area are narrow, laid-out in a grid, and in scale with neighborhood buildings—in contrast to a low-density, suburban sprawl pattern. Smart growth incorporates green space with commercial, retail, recreation, education, and housing interests. In suburban areas, smart growth development involves housing projects that are designed to conserve open space and farmland. In cities, smart growth projects redevelop underutilized or vacant property. This type of development can generate profits for developers while maintaining higher density in older urban areas—with overall savings on infrastructure costs. Smart growth fosters a higher quality of life for residents and decreases operating costs for local governments.

Currently, local, state, and Federal governments are responding to growing dissatisfaction with sprawl by enacting policies and laws to encourage smart growth. These laws direct the investment of tax dollars to areas of existing development, change zoning and building codes, and revise tax laws. Smart growth is a means of achieving economic, community, and environmental goals. The Sustainability Planner should consider the smart growth initiative as having many parallels with FEMA's sustainable redevelopment initiative. Information tools such as the smart growth website (www.smartgrowth.org) are a valuable resource for post-disaster sustainable development initiatives. State agencies spearheading the smart growth initiative are strong potential partners for a sustainable redevelopment initiative. For example, the State of Maryland has embarked on a major smart growth initiative that ties in with long-term efforts to preserve the quality of the Chesapeake Bay ecosystem.

Urban Growth Boundaries

An urban growth boundary is a land use-planning tool that demarcates urban and rural land uses to avoid a lower density sprawl development pattern. The most notable use of urban growth boundaries is a program developed in Oregon in the 1970s (see sidebar).

Urban growth boundaries are intended to encompass an adequate amount of developable land to efficiently meet projected growth requirements for 20 to 30 years, while protecting rural lands. Urban growth boundaries encourage:

- Development at higher densities
- Mixed-use development
- Infill development and redevelopment in urban areas
- Land use patterns that reduce the need for automobile travel.

The objectives of urban growth boundaries are to plan and promote the efficient use of urban land, to improve the efficiency of public facilities and services, and to preserve farm and natural lands outside the boundary. Over time, additional undeveloped land can be added to the boundary.

The Sustainability Planner should be aware of this planning technique, whether it has been applied in local communities, and whether local jurisdictions and residents consider urban sprawl to be a major development issue. Even if the concept of urban growth boundaries is not applicable to smaller, rural communities, the broader principle of concentrating development and proximity to services is valid. Temporary housing sites and larger redevelopment projects that are a part of an overall recovery effort should be proximate to existing development and important public facilities and services.

Infill Development

Infill development promotes the development of vacant or underdeveloped parcels or the reuse of abandoned structures. It is best applied in older urban centers where there has been a slow exodus of residents, businesses, and industries. Promoting infill development generally requires that local governments adopt regulations and policies to encourage redevelopment in areas of urban decay.

Infill development is a sound planning approach that has beneficial implications for sustainability. It encourages compact dense development, reduces the need for continued sprawl, and provides economic development and quality of life improvements that are desperately needed in many urban areas. In recovery situations where a community might be evaluating new locations for housing for flood or other hazard victims, for example, the Sustainability Planner should be sure to encourage the consideration of infill development.

Minimum Density Zoning

Minimum density zoning (MDZ) is a land use planning tool that requires development densities to stay above a certain level by mandating average or maximum

Oregon, Urban Growth Boundaries - Adopted in 1979, the Metro urban growth boundary in Oregon is a 364-square-mile area that includes 24 cities (Oregon's Metro Website). Other areas such as Santa Clara, California, and King County, Washington, have followed Oregon's example and established urban growth boundaries in their jurisdictions.

Oregon's Metro has an official responsibility for managing the region's urban growth boundary. With such accountability, the Metro must:

- Coordinate between regional and local comprehensive plans and adopt a regional urban growth boundary.
- Require consistency of local comprehensive plans with statewide and regional planning goals.
- Plan for activities including transportation, water quality, air quality, and solid waste.

lot sizes. Traditional zoning requirements normally stipulate a minimum lot size, but do not regulate the upper limits of residential lots. MDZ is useful in residential areas dominated by single-family detached homes or multifamily developments. It is not likely to be appropriate in rural areas.

Because residential development often occurs at densities lower than those called for in a comprehensive plan, MDZ seeks to use land more efficiently by requiring development to be at or near planned densities in both residential and commercial areas. The Sustainability Planner should use caution in recommending MDZ. Although it addresses some of the environmental, social, and aesthetic problems associated with suburban sprawl, widespread misconceptions about increased density often prevent communities from adopting compact land use strategies. MDZ may be perceived as too intrusive and, perhaps, be considered only in those states with a strong precedent of community planning and land use regulation.

Transportation

Land use and transportation are intrinsically related. Land use patterns and population density dictate the nature and orientation of the transportation network. As transportation improvements are made, they can alter the land use pattern by attracting new residents and businesses. Land use plans that focus on sustainable development encourage compact and mixed-use strategies, along with policies to foster alternative transportation modes that help reduce reliance on the automobile. Advances in alternative transportation gradually reduce the high public cost of building, maintaining, and repairing roads, overpasses, and bridges—infrastructure that is often damaged in a natural disaster.

Communities should review transportation plans and policies before undertaking sustainable development or redevelopment plans. Transportation efficiency in land use planning is achieved by:

- Revising road standards and development to give people more transportation options, such as walking, riding the bus, or bicycling.
- Encouraging changes in development patterns, so that jobs, schools, housing, and shopping are closer together.
- Providing higher quality public transit in both urban and rural settings.
- Identifying opportunities to encourage more sustainable transportation planning. For example:
 - A flooding disaster might provide the opportunity for adaptive reuse of an old railway right-of-way for a foot or bicycle path (National Park Service Rails-to-Trails Program).
 - A floodplain acquisition program might incorporate a stream corridor park with walking paths that link recreational parks with the downtown business district.
 - Incorporating alternative transportation modes into redevelopment as part of a long-term disaster recovery plan.

Brownfields Development

Brownfields are vacant, abandoned, or underutilized industrial and commercial facilities where the redevelopment potential is adversely affected by environmental

contamination. These sites are usually found in urban areas and were previously industrial or commercial use facilities that generated or handled hazardous wastes.

Brownfields can be reclaimed if cost-effective hazardous waste remediation measures are available to address potential public health issues. Many businesses have taken advantage of local incentives for redeveloping brownfields, which in turn brings new revenue and jobs to the local community. This type of redevelopment requires a strong partnership between the public and private sectors. Successful brownfields redevelopment has provided a foundation for revitalizing neighborhoods, creating jobs, and restoring green space in urban areas. EPA administers the Brownfields Economic Redevelopment Initiative.

The Sustainability Planner should be aware of potential problems that may arise with brownfields. Recovery redevelopment projects must be able to move quickly from the design concept through detailed engineering to construction. If hazardous waste remediation is under discussion or incomplete, the site should not be considered for potential relocation projects because of time constraints. Even with the fast track procedures available for brownfields, negotiations over cleanup levels and remediation techniques can be extensive.

3.2.2 Housing

After a disaster, the temporary or permanent relocation of families can affect the social and economic foundation of the community. The cost of replacement housing to individuals and to society can be staggering. Relationships with neighbors, coworkers, and classmates may be strained or severed, and the business community may lose access to significant human and economic resources. To provide for a sustainable community, municipalities must seek innovative ways to ensure that new housing developments as well as replacements for homes lost to natural disasters are planned and built in a sustainable manner.

Ideally, housing developments in a sustainable community should do more than just provide shelter. Sustainable structures should use a minimum of nonrenewable energy, produce a minimum of pollution, and cost a minimum of energy dollars, while increasing the comfort, health, and safety of the people who live and work in them. Implicit in this definition is the concept that sustainable housing should be resistant to the risk of damages from natural disasters.

Sustainable housing is important to the long-term viability and prosperity of communities. On a basic level, sustainable housing provides the community with:

- A source of reliable, cost-effective shelter for residents with minimal environmental impacts
- A diverse and consistently available workforce to help drive regional economies
- A predictable consumer base for local businesses

Sustainable housing can take many forms, but a few basic characteristics are universal:

- Durability, energy efficiency, and cost effectiveness
- Environmental sensitivity in siting
- Diverse opportunities for residents.

The design and construction of sustainable housing must strike a balance between incrementally higher costs for initial construction and anticipated reductions in long-term maintenance, energy and utility costs, and the likelihood of damage due to natural

disasters. The long term costs of physical or environmental reparations or the loss of environmentally sensitive areas far outweigh the initial costs of well-sited housing development. In keeping with the strategies of sustainable development and the opportunities presented by disaster recovery, housing alternatives should consider the ages, income levels, family sizes, and transportation requirements of all residents. If available, the Sustainability Planner should review any recent housing surveys or recommend that a housing survey be conducted to understand market trends and future needs.

Initiatives in Sustainable Housing

Affordable Housing

Natural disasters can strike communities and neighborhoods of any socioeconomic status. However, it is frequently those at the lowest end of the economy that suffer the most. Their loss is often more traumatic because they do not have the resources to recover (e.g., insurance, savings, and investments).

Communities must consider lower income housing needs when evaluating long-term recovery alternatives. Many families may not be able to afford market rate houses, even with substantial financial support from recovery agencies.

Affordable housing may be realized through new uses of property previously set aside for standard single-family homes or institutional, commercial, or industrial purposes. In a society with a growing population of elderly and single-parent headed households, single-family homes may not necessarily be the best use for a property. New land use principles suggest that communities with greater density thrive, given the proper planning and design considerations.

Redevelopment

The adaptive reuse of buildings that have outgrown their original purposes is another housing initiative that moves a community closer to the goals of sustainability. Creative redevelopment of abandoned warehouses, for example, can spark further reinvestment in low-income areas. A recent trend in real estate development is to convert old warehouses into interesting loft-style apartments and condominiums. Redevelopment to create new housing options represents the ultimate in recycling.

Smart Building

What does it mean to build smart? Sustainable development and redevelopment are also known as green building or building smart. Homes that incorporate energy-efficient technologies are typically more comfortable, have lower utility bills, and have minimal impact on the environment. In a typical U.S. home, heating and air conditioning account for about 44 percent of energy use - the largest energy expense in most homes. Home heating is also one of the largest contributors to residential pollution. Homes that are built using smart fundamentals incorporate technologies known to save and conserve energy, while reducing pollutant emissions. Following a disaster, communities should make every effort to incorporate smart development concepts into their housing recovery plans.

Special Considerations Following a Disaster

Disaster Resistant Housing

Unfortunately, the United States faces a number of potential natural disasters that can adversely affect housing—earthquakes, hurricanes, tornadoes, and floods are the most common. Following any natural disaster in which housing is damaged or destroyed, a community is faced with difficult decisions on how to recover. There is often a push, especially by homeowners, to quickly repair, rebuild, and move on with their lives. However, a disaster in which many residential structures are damaged or destroyed presents unique sustainable redevelopment opportunities that can be addressed through the recovery process.

The community must thoroughly assess housing needs based on the unique characteristics of its population. In addition, it must consider relocating or retrofitting structures located in high hazard areas.

Retrofitting

Homes in the 100-year floodplain that are not substantially damaged can be repaired. (Substantial damage, as defined by NFIP, means that the cost of the improvements or repairs is more than 50 percent of the market value.) When homeowners start to make plans for repairing and replacing damaged structures, all efforts should be made to incorporate energy efficiency into the process. The homeowner faces fewer damages the next time a disaster occurs and also benefits from lower utility bills. The community as a whole is enhanced by the reduction in pollutants, as well as by improved, healthier housing stock and homes that are repaired and brought up to the newest building codes may help to increase the value of other residential property.

Replacement Housing

In situations where homeowners must totally replace their homes, sustainable redevelopment or smart building should be a crucial consideration. Replacement housing offers an opportunity to redevelop an area with a comprehensive sustainable concept from the very start. Communities should make a concerted effort to educate their citizens on how to build smart. FEMA and DOE officials can often provide technical assistance to area planners and residents. State emergency management staff may also provide information on sustainability or identify other state agencies with responsibility for energy conservation. DOE is an excellent resource for smart or green building initiatives (see Appendix C). In the aftermath of several recent disasters, DOE specialists on sustainable development provided direct technical assistance to affected communities.

Acquisition

Acquisition is often a key element of FEMA's hazard mitigation strategy for large flood disasters. It is one of the many options a community might explore in dealing with repetitive flooding damages. Through the Hazard Mitigation Grant Program (HMGP), FEMA provides mitigation funds for the state to acquire properties in the floodplain. In most cases, damaged structures are demolished, though some may be relocated. The acquisition program allows homeowners to escape the dangers of the flood zone by providing preflood fair market value for their damaged homes. It is

Valmeyer, Illinois Relocation

After the flood of 1993, over 90 percent of the buildings in Valmeyer, Illinois, were damaged beyond repair. Over 2,500 people in Valmeyer and the surrounding countryside were left without homes, and many moved into a trailer village set up by FEMA. The county took immediate action and developed several options for recovery. The citizens of Valmeyer chose to relocate their community to a nearby 500-acre parcel on a bluff overlooking the river.

Valmeyer was the first community to benefit from the Working Group on Sustainable Redevelopment, a group that came together in the aftermath of the flood. Using funds from DOE's Office of Energy Efficiency and Renewable Energy, a team of national experts helped incorporate sustainable technologies into the design and construction of a new town. The team organized several community planning sessions and offered workshops on passive solar design and ground-source heat pumps. These initiatives paid off through energy-efficient home construction, resource-efficient institutions, and future renewable energy development. The new homes offered better insulation, energy-efficient windows, low-flow showerheads, water conserving toilets, and efficient heating and cooling systems.

beneficial to the community because it permanently removes structures from the floodplain and allows the area to return to a natural state. Many communities have experienced considerable savings in disaster damages following an acquisition project simply because fewer structures are vulnerable.

Relocation

Relocation may refer to the physical relocation of a home to a property outside of the floodplain or to the removal of citizens from a disaster-prone area. If a home is not substantially damaged and is structurally sound enough to withstand relocation, the property owner is typically offered fair-market value for the property. The homeowner is then given financial assistance for the actual costs of moving the home to a new site, including site preparation (foundation, water, sewer, and utilities). Alternatively, a community may choose to relocate all or part of its citizens to a completely new site; such was the case with Valmeyer, Illinois (see sidebar, p. 3-13).

Relocation cannot be undertaken without substantial help from outside sources. Although it provides a golden opportunity to implement sustainability strategies, it requires substantial funding, comprehensive planning, and technical assistance from Federal and state resources.

3.2.3 Public Infrastructure

Shelby County, Tennessee, is located within the New Madrid fault system. Memphis Light, Gas, and Water owns and operates the supply system that provides water to the area. The company has initiated a seismic retrofit project to protect its pumping station and enhance the survivability of connections between the water distribution lines. At a total project cost of \$968,800, retrofit plans include:

- Reinforcement and anchorage of masonry walls.
- Strengthening of steel frames.
- Improved connection of a concrete wall and roof.
- Secured anchorage of pipes and valves.
- Bracing of pipeline.
- Bracing of sewer treatment and control equipment.
- Protection of an overhead crane.

The estimated cost to replace the pumping station in the event of a large earthquake is over \$17 million. Each day the station is not in service costs an additional \$1.4 million. The total estimated savings from this retrofit project are estimated at \$112 million.

Public infrastructure includes potable water supplies, sanitary sewer services, power distribution, cable and telephone, and transportation systems in addition to public services such as hospitals, schools, and communications. Immediately following a disaster, emergency management professionals and community leaders think first of health and safety issues. Is there electricity? Are the roads passable? Can medical assistance be reached? Is the water safe to drink? The answers to these questions greatly influence emergency management strategies and community response.

How is sustainable public infrastructure incorporated into an immediate disaster recovery process? Outlined below are some options for water, sewer, and energy systems.

Water

The United States is abundant in lakes and rivers, yet in many regions water resources are in critical supply. Even the Pacific Northwest has begun to feel the pinch as drier seasons coupled with urban growth strain water supply and distribution systems. To protect valuable water supplies, communities need to make an effort before disaster strikes to prevent them from being damaged or contaminated. Shelby County, Tennessee has instituted a plan to protect water distribution systems (see sidebar).

At the very least, communities in known disaster-prone areas should make prior arrangements to have emergency water

available for schools, hospitals, and fire departments. Emergency managers can help plan for a sustainable water supply by designating emergency water storage facilities and developing mutual assistance agreements with neighboring communities.

Wastewater Collection and Treatment

Conventional wastewater treatment technologies can be major environmental polluters because of effluent discharges or sludge byproducts. A disaster situation can further exacerbate the environmental damage from poorly designed sewage infrastructure and inadequate wastewater treatment plants (WWTPs).

In most U.S. cities, gravity sewers rely on the force of gravity to guide sewage down gently graded conduit systems until reaching a pumping station or WWTP. Treatment facilities are located at low elevations within the watershed, most often in or near designated floodplains. WWTPs are, therefore, often subject to flooding, which can damage facilities and discharge untreated waste into surface waters. Many smaller rural communities rely on lagoons for sewage treatment. Lagoons are often overtopped by flood waters, which creates severe water quality problems downstream. In older metropolitan areas and in smaller rural systems, stormwater and sewage may flow into a combined conduit system. During heavy rains, these systems can overflow, sending raw sewage directly into rivers and streams. WWTPs are overburdened with the sheer volume of waste to process during storms, and deluged facilities often sustain pump submersion and failure.

Several promising new technologies for sewage treatment have been implemented in WWTPs across the nation. Created wetlands have been used to assist in the storage and purification of wastewater. In communities where sewer and storm sewers are combined, substantial investments have been made to separate these systems. Another sustainable strategy is the repair or replacement of older sewer drains that allow infiltration of water, thereby reducing the overall capacity of the system. A sound hazard mitigation approach for pumping stations and WWTPs involves floodproofing and retrofitting. Levees or berms can be placed around WWTPs to provide protection from the 100-year storm event. Retrofitting pumping stations includes the elevation of pumps above 100-year flood levels. These improvements offer the opportunity to implement energy-efficient technologies.

Energy

Energy production is big business. The consumption of energy fuels our economy just as it fuels cars, heats and cools homes, and lights office buildings. Yet, consider the price of energy consumption on a local, regional, national, and global scale.

Environmental impacts include depletion of the ozone layer, acid rain, smog, climate changes (which can result in rising sea levels and changes in weather patterns related to drought or flooding), and other forms of global degradation. Our addiction to energy is manifested in congested roads, urban sprawl, and excessive expenditures for heating, cooling, lighting, and ventilation.

Two major sustainable development approaches in the field of energy are conservation and the use of clean, renewable energy sources. Reducing consumption is more cost-effective and practicable than increasing supply. By increasing efficiency, the same amount of electricity can serve more users without expanding power plant capacity. Efficiency is applicable to each of the critical elements of sustainability—land

In Portland, Oregon, energy planning became an integral part of comprehensive urban improvements. The benefits include cost savings, reduction in air pollution and traffic congestion, enhancement of quality of life, and stimulation of the local economy. Under Portland's energy policy, the city is improving energy efficiency in municipal buildings, residential buildings, commercial and industrial facilities, and transportation. The program also requires increased recycling, decreased waste, and development of telecommunications as an energy-efficiency strategy (DOE/EREN website).

use, housing, and infrastructure. Approximately 35 percent of all U.S. energy needs are supplied by electrical power. About two-thirds of this electricity is used in residential and commercial buildings, and one-third is used in industrial processes.

Alternative and renewable energy includes those forms of energy that cannot be depleted or that are quick to regenerate—such as solar, wind, hydro, geothermal, biofuels, ocean energy, and hydrogen power. Fossil fuels like coal, oil, and natural gas are depleted 100,000 times faster than their rate of development. Oil currently provides more than 40 percent of the nation's primary energy and 97 percent of its transportation energy.

What sustainable redevelopment issues regarding energy might arise in a post-disaster scenario? What should a community consider about energy efficiency? Disasters provide a unique opportunity to reflect on how things have been done in the past and how they could be improved to move toward the goal of sustainability. Smart building guidelines are a good place to start.

Communities should encourage their citizens to build or rebuild homes to a higher energy-efficiency status. If building materials and contents must be replaced, why not replace them with components that will reduce overall energy consumption and expense? A few

examples of sustainability redevelopment in terms of energy conservation are:

- High R-value insulation in walls and ceilings for major home repair or replacement.
- Underground power lines, which are not as susceptible to damage from winds, rain, or ice storms.
- Historical architectural designs that take advantage of naturally occurring shade areas and cross-ventilation.
- Keeping a structure's size in scale with its use to ensure that there is no excess space to heat and cool.
- Retrofitting heating, ventilation, and air conditioning (HVAC) systems.
- Double- or triple-paned windows.
- Development and use of alternative fuels to gasoline, such as biodiesel, electric fuel, ethanol, hydrogen, methanol, natural gas, propane, P-series, and solar fuel.
- Energy-efficient water heaters, refrigerators, dishwashers, showerheads, and fluorescent lighting. EPA's Energy Star program rates new appliances for their energy efficiency.

3.3 Summary

The implementation of sustainability concepts in conjunction with disaster recovery is still in its infancy. For sustainability to be institutionalized within the overall recovery process, there must be ongoing communication between local, state, and Federal planning and emergency management professionals—particularly in terms of sharing success stories of disaster recovery and sustainable redevelopment. As disaster recovery plans are developed, each component or step along the way is an opportunity to choose a more—rather than a less—sustainable direction for the future. The tools, programs, and references included in this guide provide the information and examples to achieve a sustainable recovery.