Sustainable Community Development Code

A Code for the 21st Century

Beta Version 1.1

RMLUI
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Sustainable Community Development Code

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The sustainable community development code framework is sustainable at its core, multi-disciplinary in its approach, and contextually oriented. It fully encompasses environmental, economic, and social equity. It is innovative and distinctive by linking natural and man-made systems, incorporating useful features of other zoning systems (e.g.,performance, form, hybrid), and responds to regional climate, ecology, and culture.

Included in this first beta version are the following sections:

- Climate Change and Greenhouse Gas Reduction
- Community Health and Safety
- Food Production and Security
- Housing Affordability
- Housing Diversity
- Natural Hazards: Wildfires
- Renewable Energy: Solar
- Renewable Energy: Wind
- Water Conservation

Topics

The proposed topics to be covered in the Sustainable Community Development Code are listed below. Other topics are under consideration. Background research monologues have been prepared for many of these topics and are available online at www.law.du.edu/rmlui. Work is continuing on individual sections.

ENERGY

- Renewable Energy: Wind (small- and large-scale)
- Renewable Energy: Solar (including solar access)
- Renewable Energy: Small-Scale Hydropower
- Energy Efficiency and Conservation

HEALTHY NEIGHBORHOODS, HOUSING, FOOD SYSTEMS

- Community Health (including Crime Prevention Through Environmental Design)
- Affordable Housing
- Housing Diversity and Accessibility
- Food Production and Security
- Noise

ENVIRONMENTAL HEALTH AND NATURAL RESOURCES

- Climate Change
- Green Infrastructure
- Natural Resource Conservation/Sensitive Lands Protection (e.g., wildlife habitat, riparian/wetland areas)
- Water Conservation

MOBILITY

- Transit Oriented Development
- Mobility Systems (Complete streets, pedestrian sytems,etc.)
- Parking

NATURAL HAZARDS

- Floodplain Management
- Wildland-Urban Interface/Wildfires
- Coastal Hazards
- Steep Slopes

URBAN FORM/COMMUNITY CHARACTER

- Authentic Development Patterns
- Community Character and Aesthetics

Approach

The basic organization and approach to each topic is to examine relevant obstacles, incentives, and regulations. The first row of every topic identifies obstacles to achieving stated goals that might be found in a zoning code (e.g., bans on solar panels as accessory uses). The second row suggests incentives that might be created to achieve a goal (e.g., increased density in a multi-family development that installs green roofs). The third focuses on regulations that might be adopted to ensure progress in a particular area (e.g., mandatory water-conserving landscape standards).

Each row is divided into five columns. The first three columns suggest levels of effort for the three basic approaches noted above. For example, a good (bronze) level of effort in removing obstacles to small-scale wind turbines might be removing height limits on accessory structures in some residential districts. Up the scale, a silver level might be to prohibit private covenants in subdivisions that do not allow small-scale wind turbines. The highest level of effort (gold) could allow wind-turbines as a by-right use in many zone districts subject to specific performance standards related to issues such as noise. The fourth and fifth columns in each section provide key references and code examples/citation with hyperlinks.

Acknowledgements

A very special thank you to all of those individuals and organizations that have participated over the past year by freely giving their time and talent to this endeavor:

Primary Authors/Research Assistance (in alphabetical order)

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Other Contributors (in alphabetical order)

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Organizations

Association of State Floodplain Managers, Colorado Office of Smart Growth, Denver Regional Council of Governments, Denver Urban Gardens, Clarion Associates, PMC (California), University of Denver Sturm College of Law, Colorado Center for Sustainable Urbanism (University of Colorado), Meza Construction, Civic Results, Douglas County, Fehr & Peers Transportation Consultants, Front Range Economic Strategy Center, National Trust for Historic Preservation, University of Colorado School of Medicine, EDAW, Urban Drainage & Flood Control District, Tri-County Health Department, Rocky Mountain Land Use Institute, Denver City Council, Michael Baker Jr.(Massachusetts and Arizona), Lincoln Institute of Land Policy, Alliance for a Sustainable Colorado, City of Boulder, US Environmental Protection Agency, Model Forest Policy Program (Maryland), Colorado Governor's Energy Office.

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Climate Change and Greenhouse Gas Reduction

Introduction

Global warming is being accepted as a fact of life in most quarters. Tangible evidence seems to be accumulating on an almost daily basis—shorter winters, melting polar ice caps, rising sea levels, and deeper droughts. Greenhouse gasses are increasingly linked to global warming and are seen as a primary culprit.

Greenhouse gases are made up of carbon dioxide, methane, and nitrous oxides. They contribute to global warming by trapping radiation from the sun. The bulk of greenhouse gases emitted in the United States is associated with transportation (e.g., cars) and energy generation and usage.

Implications of Not Addressing the Issue

If current low-density, "sprawl" development patterns in many communities continue and expand, the ability to reduce VMTs in the future will be seriously hamstrung. Once development patterns are set, it is exceedingly difficult to affect travel patterns and preferences. Low-density development makes cost-effective mass transit nearly impossible.

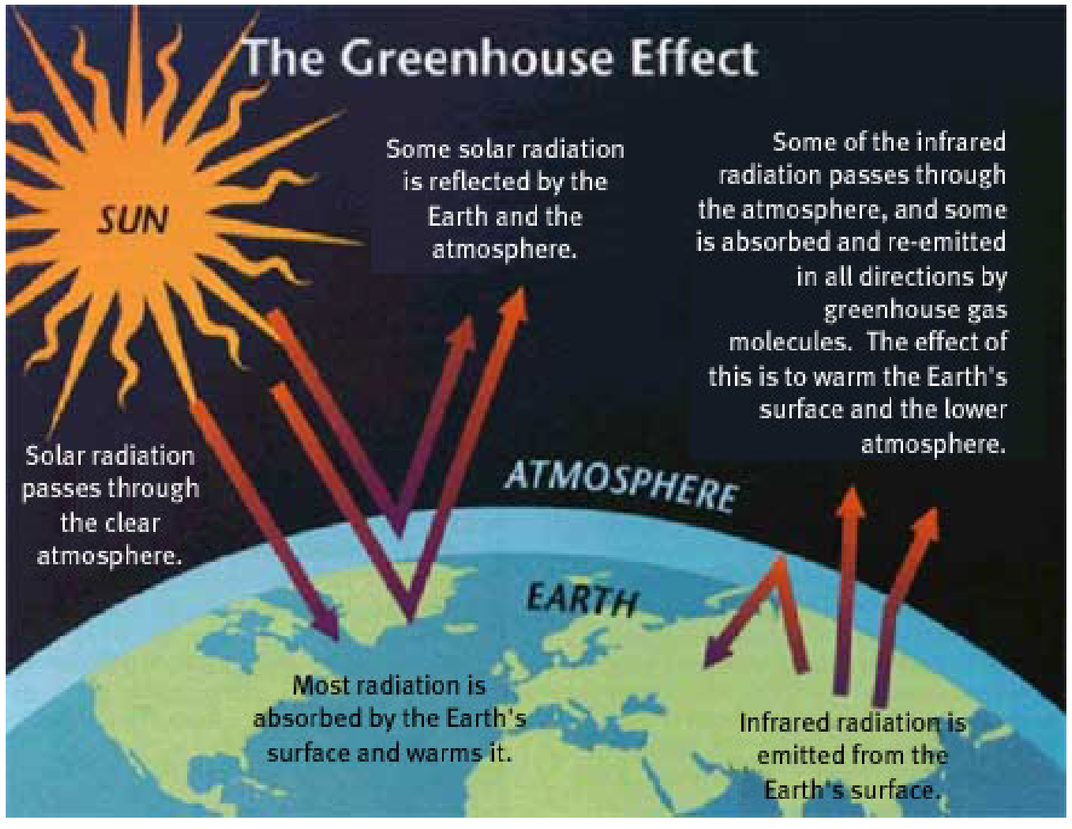
The same is true with preservation of mature trees that absorb huge quantities of greenhouse gases and sequester them for many years. If mature trees are needlessly cut to accommodate new development rather than new development being shaped to preserve these trees whenever possible, their destruction will actually release stored greenhouse gases (through burning or rotting), and it will take decades to replace them with smaller trees that absorb much less carbon dioxide in their early years.

Additionally, if communities do not take steps to accommodate and encourage alternative energy sources such as wind and solar, development patterns may be set that prohibit retrofitting in the future.

The Role of Land Use Regulations In Controlling Greenhouse Gas Generation

Land-use and zoning regulations can thus play an important role in helping to reduce greenhouse gas emissions through:

- Encouraging development patterns that allow less reliance on autos for mobility and result in reduction in vehicle miles traveled and corresponding greenhouse gas emissions.
- Preserving existing trees that can sequester carbon dioxide and require the planting of new trees.
- Promoting alternative energy generation such as solar and wind power that do not generate greenhouse gases as do oil, gas, and coal-fired power plants.

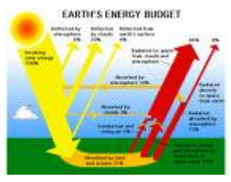


CLIMATE CHANGE AND GREENHOUSE GAS REDUCTION

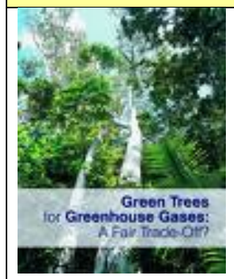
KEY STATISTICS AND FACTS:

- Greenhouse gases include carbon dioxide, methane, and nitrous oxides.
- The United States, with 4% of the world's population, emits almost 25% of global carbon dioxide each year—second only to China. Carbon emissions in the U.S. have increased about 20% since 1990.
- In the U.S., each person's direct emissions amount to 40% of this total—mostly from household energy and transportation. Total per person carbon emissions are about 16.5 metric tons (11.0 home; 5.00 auto; .5 air travel). 60% of transportation emissions come from fueling and driving autos.
- The average mid-size car emits 9.500 pounds of carbon dioxide annually.
- In the U.S., development is becoming more spread out--land consumed for development has increased at a rate of twice that of population growth between 1982 and 2002. During that period, per capita vehicle miles traveled (VMT) increased three times population growth.
- According to a study of 83 metro areas by Reid Ewing, residents in compact regions (Boston, Portland) drove about 25% less than those in sprawling regions (Atlanta, Raleigh).
- Residents in the most walkable neighborhoods drive 26 fewer miles per day than those in the most sprawling areas according to a report conducted in King County, Washington, by Larry Frank. A study for the City of Sacramento, CA, reported that a compact growth scenario would result in a 25% reduction in VMT/house/day.
- According to a study by Ewing, a doubling of development density can reduce VMTs by 5%. Other studies report a 5-15% reduction in VMT associated with mixed-use projects
- According to the Dept. of Energy, a 30-year old hardwood tree can sequester the equivalent of 136 pounds of carbon dioxide annually. About 70 such trees would offset the carbon dioxide emissions from one medium-size car.
- Planting a hectare of riparian forest can over the next 100 years offset the carbon emissions caused by 54,000 gallons of gasoline.
- Net carbon sequestration by forests, urban trees, and agriculture can offset 15% of total U.S. carbon dioxide emissions annually.

CLIMATE CHANGE AND GREENHOUSE GAS REDUCTION

		ACHIEVEMENT LEVELS				
		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
 	Remove Obstacles	▪ Allow mixed-use development by right in selected zone districts ▪ Permit solar and small wind turbines by right in selected zone districts (See Renewable Energy Section (solar access and wind power) of Model Code for citations.) ▪ Allow accessory units and live/work units by right in residential zone districts ▪ Allow live-work units in commercial and mixed-use districts to reduce VMT ▪ Permit small-scale recycling facilities in residential zone districts	▪ Allow larger recycling facilities in appropriate industrial and commercial zone districts ▪ Reduce parking requirements for mixed-use developments/in mixed-use districts ▪ Tailor development standards (e.g., landscaping, open space, parking) to encourage infill and mixed-use development (e.g., alternative open space such as plazas, community gardens, green roofs; reduced landscaped buffers with enhanced ornamental fencing) ▪ Reduce overly restrict height/setback requirements for small-scale wind turbines	▪ Require all single-family developments to include minimum % of accessory units ▪ Prohibit single-use developments/buildings in commercial zone districts (e.g., downtown) ▪ Prohibit urban level development (e.g., more than 1 unit/acre) outside defined urban service areas	▪ See itreetools.org for tools for protecting trees and urban forests. ▪ T. Litman, Parking Management Best Practices, American Planning Assn. 2006. ▪ See Smart Code mixed-use (transect) districts at http://www.smartcodecentral.org/ ▪ US Department of Energy methodology for calculating carbon sequestration by trees: ftp://ftp.eia.doe.gov/pub/oiaf/1605/cdrom/pdf/sequester.pdf	▪ Colorado Springs Mixed-Use Development Manual, http://www.springsgov.com/units/planning/Currentproj/CompPlan/MixedUseDev/I.pdf ▪ Santa Cruz, CA – accessory dwelling unit program http://www.ci.santa-cruz.ca.us/pl/hcd/ADU/adu.html. See Housing Affordability Section of Model Code for additional citations regarding accessory dwelling units. ▪ State of Oregon urban growth boundary regulations. http://www.oregon.gov/LCD/ruraldev.shtml
	Create Incentives	▪ Offer density/height bonuses for green roofs ▪ Give bonus points for green/cool roofs in commercial design standard point systems	▪ Reduce transportation impact fees for mixed-use and infill projects to reflect lower traffic generation ▪ Create density bonus and expedited processing incentives for infill and	▪ Encourage low-energy maintenance landscaping by giving additional landscaping credit.	▪ Chesapeake Bay Program urban tree canopy program http://www.dnr.state.md.us/forests/programs/urban/urbantreecanopygoals.asp	▪ Portland, OR, FAR bonuses for ecoroofs (City zoning code 33.510: http://www.epa.gov/hiri/resources/pdf/EcoroofsandGreenCityStrategies.pdf

CLIMATE CHANGE AND GREENHOUSE GAS REDUCTION

		▪ Allow and encourage shared parking arrangements ▪ Give priority parking for vans, hybrid vehicles in parking standards ▪ Give increased landscaping credit for preserving existing trees	mixed-use developments ▪ Allow green roofs to qualify for open space credits ▪ Offer height increases, density bonuses, and flexibility regarding non-conforming use regulations for projects that remove impermeable surfaces from existing developments or reduce during redevelopment or use permeable pavement		▪ For general information on permeable pavement, see http://www.epa.gov/owow/nps/pavements.pdf and http://www.en.wikipedia.org/wiki/permeable_paving	▪ Landscaping credit for preserving existing trees: http://www.colleyville.com/files/Ch.%2004%20Landscaping%20and%20Buffering.pdf; http://www.ewgateway.org/pdffiles/library/wrc/TB-LandscapingRegs.pdf ▪ Austin, Texas, Development Code: Subchapter E: Design Standards and Mixed-Use, available online at http://www.ci.austin.tx.us/development/downloads/final.pdf
 	Enact Standards	▪ Require sidewalks in all developments and connections with adjacent sites ▪ Adopt historic preservation standards to protect existing structures (and energy they represent) ▪ Limit trees on southern sides of buildings in northern climates to preserve solar access ▪ Adopt regulations to protect larger trees ▪ Require provision of bicycle racks in all multifamily and commercial developments	▪ Require replacement of all trees removed during development on an inch/inch diameter basis or contribution to offsite tree fund ▪ Enact minimum density/intensity standards to encourage compact development ▪ Adopt pedestrian connectivity standards to reduce vehicle use ▪ Enact solar access ordinance (See Renewable Energy/solar access section.) ▪ Require bicycle fleets for all hotels, resorts ▪ Limit number of garages allowed on each residential lot (1-2 vs. 3-4) ▪ Limit impermeable surface areas and require use of permeable pavement in appropriate areas	▪ Require green roofs on all commercial and multifamily developments. ▪ Require low-energy landscaping. ▪ Enact limitations on house size ▪ Adopt minimum reforestation requirements for sites without vegetation. ▪ Establish mandatory carbon budgets/limits for new developments (emissions from added traffic, energy used in construction materials, future energy requirements) and offsets/impact fees ▪ Require minimum % of homes in subdivisions to be oriented for passive solar access (on an east/west axis) (See Renewable Energy/solar access section.) ▪ Require outdoor signage to be turned off when business is closed ▪ Require new developments to be carbon neutral	▪ American Planning Assn. PAS Report 446, Tree Conservation Ordinances. Zoning Practice July 2006, *Tree Preservation.* ▪ For a good discussion of a carbon offset measurement methodology, see Forest Guardians Carbon Offfset Program Description: http://www.fguardians.org/support_docs/document_carbon-calculation-methodology_2-07.pdf ▪ US EPA Personal Emissions Calculator: http://www.epa.gov/climatechange/emissions/ind_calculator.html ▪ U.S. Green Building Council, LEED for Neighborhood Rating System (See Green Construction and Technology chapter.), available online at http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222	▪ Aspen/Pitkin County Renewable Energy Mitigation Program. http://www.aspencore.org/sitepages/pid31.php; http://www.greenpowergovs.org/Solar4aspencode.html ▪ Boulder, Colorado, Solar Access Regulations, available online at http://www.bouldercolorado.gov/files/PDS/codes/solrshad.pdf. ▪ Maryland Forest Conservation Act/Regulations: http://www.dnr.state.md.us/forests/programapps/newFCA.asp ▪ Franklin, TN, connectivity 5.10.4) and tree protection regulations (5.3): http://www.franklin-gov.com/pdf/Franklin%20Zoning%20Ordinance-%20Effective%201-1-08.pdf ▪ Bicycle Level of Service Standards: http://sf-now.com/sf-bike/SFBC_LOS_Research.pdf; Florida DOT: http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/blos-art.pdf ▪ Fort Collins, CO, minimum density requirements in medium-density mixed-use zone district: http://www.ci.fort-collins.co.us/cityclerk/codes.php

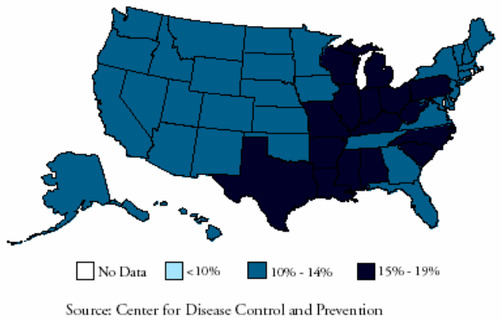
Community Health and Safety

Introduction

The warning signs are everywhere that Americans are becoming less and less healthy while they spend more and more on health care. Obesity is becoming a national epidemic, increasing in the majority of states in 2006 and especially among the young.[1] The links between obesity and high blood pressure and diabetes are disturbing. Air pollution is another major public health concern, with deteriorating air quality causing increasing respiratory problems in many cities. Safety is also a worrisome related issue. For example, the number of pedestrian-related injuries and deaths are at all time highs in many communities that are auto-oriented. Crime remains high in many communities.

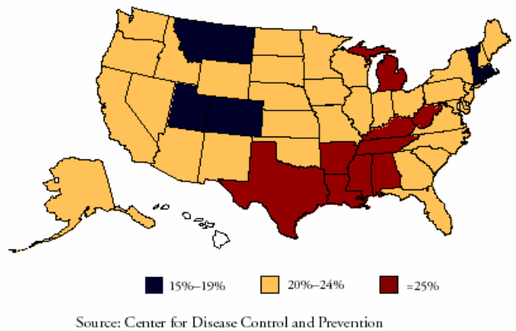
These issues historically have been identified with professions other than planning (e.g., public health). An increasing amount of research however is revealing how significant a role planning plays in contributing to these issues.

Map 1
Adult Obesity Rates, 1994



Source: Center for Disease Control and Prevention

Map 2
Adult Obesity Rates, 2004



Source: Center for Disease Control and Prevention

Implications of Not Addressing the Issue

We are learning that land use regulations, specifically zoning codes, are one of the most significant influences shaping the built environment in our communities. Public health officials and planners have known for some time that we have been building communities to be very friendly to automobiles, but much less friendly to pedestrians, walking, and active living. The ability to walk to work and shopping or have convenient and safe access to recreational activities has become extremely difficult if not impossible in many places.

Studies now are quantifying the problem. For instance, research has concluded that individuals who live in areas with more sprawl-like characteristics tend to have higher rates of obesity and higher blood pressure.[2] Another related issue is pedestrian safety. The result of building communities primarily for automobiles and not pedestrians has been the creation of very unsafe environments for walking. Studies have quantified that pedestrian fatalities are consistently higher in auto-friendly/pedestrian-unfriendly areas.[3]

It is reasonable to conclude that if zoning codes continue to encourage (and essentially require) the automobile-oriented development patterns that are contributing to this problem the planning profession will continue to contribute to the deterioration in national health prospects. In addition to the studies showing the relationship between the built environment and health, research is also showing an increasing demand for environments conducive to active living. While some communities have gotten on board with this idea, most have lagged behind.

Goals for Community Health and Safety

To further the goal of promoting active living environments, there are a number of steps communities can take in a zoning code. As with any land use regulation, one size does not fit all. That is why various tools have been presented as part of this report – from modest to aggressive.

The general goal is to promote active living – which put simply is integrating physical activity into our daily lives. Zoning codes can include provisions that advance this goal:

- Requiring pedestrian and bicycle connectivity between uses and developments.
- Providing safe and convenient multi-modal transportation options – making walking and bicycling safe and convenient between destinations and reducing vehicle miles traveled.
- Requiring recreational facilities corresponding to population needs. These facilities should also be safe and accessible for pedestrians and bicyclists.
- Minimizing onerous processes for desirable development (e.g., PUDs, variances, etc.)
- Encouraging the planting of trees that help reduce air pollution.

Whether it is design standards for subdivisions, requirements for dedication of park land, or even requiring health impact assessments for development there are a number of zoning code measures available that have been proven effective in a wide range of communities.

1 Amanda Gardner, Obesity Rate in U.S. Still Climbing, (Washington Post, August 30, 2007).

2 LEED ND Core Committee, Understanding the Relationship Between Public Health and the Built Environment, page 84, https://www.usgbc.org/ShowFile.aspx?DocumentID=1480.

3 Howard Frumkin, Urban Sprawl and Public Health, Public Health Report, (May-June 2002).

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COMMUNITY HEALTH AND SAFETY

KEY STATISTICS:

- Adult obesity rates rose in 31 states in 2006, with no states having a rate decrease.
- As of 2004, 60 percent of adults and 15 percent of children in America were overweight or obese.
- In 1960 America spent 5.1 percent of our gross domestic product on health care. By 2001, that number had nearly tripled to 14.1 percent, representing annual expenditures of $1.4 trillion.
- Research indicates that areas with sprawl-like characteristics equate to higher rates of obesity, body mass index (BMI), and higher blood pressure for those that live there.
- Cities that are more dense and walkable reliably have lower pedestrian fatality rates (e.g., Portland, OR, 1.89 pedestrian deaths per 100,000 population; Tampa, FL, 6.60/100,000).
- A recent study has shown that 46 percent of Americans would walk or bike to work or for errands if they had facilities that were “safe and convenient.” Yet only 9 percent of our trips are on foot, and 1 percent on bicycles.

		ACHIEVEMENT LEVELS (NOTE: HIGHER LEVELS GENERALLY INCORPORATE ACTIONS OF LOWER LEVELS)				
		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
  	Remove Obstacles	▪ Provide more by-right mixed-use districts and districts that encourage active living (without a need for a PUD process). ▪ Reduce off-street parking requirements for TODs, mixed-use projects.	▪ Adopt standards for bicycle facilities (e.g., bike parking) and pedestrian amenities (e.g., connectivity) in commercial areas (offices, retail) to encourage alternative transportation that may currently be difficult and unsafe. ▪ Provide alternative open space provisions for TODs, MU projects (e.g., indoor meeting space, rooftop gardens, plazas).	▪ Adopt local street specifications that incorporate "complete streets" principles that encourage walking and biking.	▪ Federal Complete Street Guidelines: http://www.fhwa.dot.gov/environment/bikeped/design.htm#d4. ▪ National Complete Streets Coalition: http://www.completestreets.org/howtogetto.html. ▪ Florida Dept. of Transportation, Multimodal Transportation Districts and Areawide Quality of Service Handbook: http://www.dot.state.fl.us/Planning/systems/sm/los/default.htm. ▪ Frumkin, Howard, et al. *Urban Sprawl and Public Health: Designing, Planning, and Building for Healthy Communities* (2004). ▪ Critser, Greg. *Fat Land : How Americans Became the Fattest People in the Land* (2003).	▪ Colorado Springs Mixed-Use Development Manual, http://www.springsgov.com/units/planning/Currentproj/CompPlan/MixedUseDev/I.pdf ▪ Florida Dept. of Transportation, Model Regulations and Plan Amendments for Multimodal Transportation Districts, http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/MMTDregs.pdf ▪ Cambridge, MA, and Davidson, NC, bicycle parking standards. ▪ Article 6, Cambridge Zoning Ordinance, http://www.cambridgema.gov/cdd/cp/zng/zord/index.html ▪ Section 10, Davidson Planning Ordinance (as amended) ▪ http://www.ci.davidson.nc.us/units/planning/ordinance/default.asp

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COMMUNITY HEALTH AND SAFETY

	Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
Create Incentives	▪ Provide expedited review when community health objectives are met (e.g., pedestrian orientation and connectivity). ▪ Provide landscape credit for tree preservation. ▪ Offer density bonuses for mixed-use/compact developments.	▪ Reduce parking requirements for developments that provide connectivity, walkability, bicycle facilities. ▪ Offer open space credit for improved recreational facilities (e.g., rec centers, tennis courts, paved trails) ▪ Provide open space credit/bonuses for preserving access to public lands or allowing public access/use of on-site trails.	▪ Offer credit towards meeting commercial/residential design standards when community health objectives are met (e.g, shower facilities in office buildings).	▪ *Local and State Examples of Planning and Designing Active Communities*, American Planning Association Advisory Service Report Number 543/544. ▪ *Integrating Planning and Public Health: Tools and Strategies to Create Healthy Places,* American Planning Association Advisory Service Report Number 539/540	▪ Austin, Texas, Development Code: Subchapter E: Design Standards and Mixed-Use, available online at http://www.ci.austin.tx.us/development/downloads/final.pdf.
Enact Standards	▪ Require or encourage parks/open space dedication or set aside with clear definitions of what qualifies (e.g., a trail rather than a detention pond). ▪ Establish parkland dedication fees for city park fund. ▪ Require sidewalks through parking lots; ▪ Require sidewalks on both sides of streets in urban/suburban areas. ▪ Limit waivers to sidewalk installation. ▪ Require pedestrian connections between adjacent developments and nearby public facilities such as schools. ▪ Enact standards to provide shade for pedestrians in hot climates; protect against ice/snow on sidewalks in northern climates. ▪ Limit parking in front of commercial buildings to enhance pedestrian experience. ▪ Require street trees between street and sidewalk.	▪ Reduce parking requirements (especially for mixed-use/transit oriented developments) and specify maximum # of parking spaces allowed (e.g., 125% of minimum). ▪ Require or encourage non-residential building amenities such as bike parking, convenient and visible stairs, and lockers/showers for those biking/walking to work. ▪ Require connectivity measures in subdivisions (restrict block lengths; prohibit cul-de-sacs unless pedestrian access provided through dead-end). ▪ Require health department review in referral process for larger developments. ▪ Establish safe school routes and require compliance in review process. ▪ Require maintenance of existing access to public lands	▪ Require pedestrian and bicycle levels of service (LOS) with non-residential development (similar to that of the vehicle level of service currently used). ▪ Adopt Crime Prevention Through Environmental Design (CPTED) principles into development standards. ▪ Require health impact assessments for larger developments. ▪ Prohibit fast food restaurants, especially near schools. ▪ Require mandatory use mix in TOD, PUD, and MU projects.	▪ *Local and State Examples of Planning and Designing Active Communities*, American Planning Association Advisory Service Report Number 543/544. ▪ Zelinka, Al, et al. *Safescape: Creating Safer, More Livable Communities Through Planning Design* (2001). ▪ U.S. Green Building Council, LEED for Neighborhood Rating System (See Smart Location and Linkage and Neighborhood Pattern and Design chapters), available online at http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222. ▪ National Safe Routes to School Program - http://safety.fhwa.dot.gov/saferoutes}	▪ San Diego Regional Planning Agency (SANDAG) - "Planning and Designing for Pedestrians, Model Guidelines for the San Diego Region." http://www.sandag.org/uploads/publicationid/publicationid_713_3269.pdf. ▪ Franklin, TN, Parkland dedication requirements and connectivity index for subdivisions. (Sections 5.5 and 5.10.4), ▪ Ingham County, MI, Health Impact Assessments, http://www.cacvoices.org/healthylifestyles/environmental/HIA ▪ Warner, NH, fast food restaurant restrictions, http://www.warner.nh.us/downloads/2007_zoning_ordinance_final.pdf ▪ Fort Collins, CO, Large Retail Establishment Design Standards (parking and pedestrian amenities). http://fcgov.com/cityclerk/codes.php. ▪ Smart Code Version 9.0 Mixed Use Zoning (Transect) Districts www.smartcodecentral.com.

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COMMUNITY HEALTH AND SAFETY

POTENTIAL SUSTAINABILITY MEASURES:

- Commuting patterns - percent driving alone, walking, and bicycling for trips
- Community health indicators - obesity rates in adults and children, body mass index (BMI), and blood pressure
- Pedestrian and bicycle levels of service
- Pedestrian and bicycle accidents and fatalities
- Crime rates in public parks and recreation areas
- Healthy eating options (abundance of fast food restaurants vs. healthy eating restaurants)

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FOOD PRODUCTION AND SECURITY

KEY STATISTICS:

- In 1999, 31 million Americans (incld 12 million children) did not get enough food to eat on a daily basis.
- In 2005 for the first time, the U.S. imported more farm products by value than it exported.
- Every minute of every day, the U.S. loses 2 acres of farmland. At the same time, the number of small farms in urban areas is increasing at an unprecedented rate.
- The average item of food in the U.S. travels 1,400 miles to the dinner table.
- Of more than 10 million vegetable producers in U.S., 60% are in urban census tracts.
- Commercial urban agriculture produces 40% of total U.S. farm product on 10% of ag land.
- 86% of U.S. fruits/vegetables, 63% of vegetables, 35% of grain are produced in urban-influenced areas.
- Chicago has 70,000 vacant lots, Detroit 45,000, Philadelphia 31,000.
- 14% of Londoners grow food and produce 18% of the city's daily nutritional needs

SUSTAINABLE COMMERCIAL AGRICULTURE—LARGE-SCALE AND SUBURBAN/URBAN

		ACHIEVEMENT LEVELS				
		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
  	Remove Obstacles	▪ Permit broad range of agricultural uses by right in rural and semi-rural areas ▪ Allow farmers markets in commercial and mixed-use zone districts ▪ Require protection of irrigation ditches and maintenance access	▪ Tailor accessory and temporary use lists to support agriculture (e.g., allow farm stands, ag-related services such as welding shops, crop storage and processing) ▪ Adopt right-to-farm legislation to protect against nuisance complaints	▪ Allow small-scale farming uses/structures in suburban zone districts or create farming overlay zones with compatibility standards (e.g., limit certain herbicides and pesticides).	▪ City of Detroit, Supporting Urban Agriculture Study ▪ Daniels, Holding Our Ground: Protecting America's Farmland (1997)	▪ Dallas, TX, farmers market ordinance
	Create Incentives	▪ Permit/encourage conservation subdivisions in rural transition areas	▪ Provide density bonuses for cluster subdivisions that preserve high percentage of productive ag lands	▪ Adopt transferable development rights system to protect prime agricultural lands.	▪ Pruetz, Beyond Givings and Takings: Saving Natural Areas, Farmland..With TDRs (2003) (www.beyondtakingsandgivings.com) ▪ Ahrendt, Rural By Design. ▪ King County, WA, farmland preservation program (http://dnr.metrokc.gov/wlr/tdr)	▪ New Jersey Pinelands TDR program. (www.state.nj.us/pinelands/infor/fact/PDCfacts.pdf) ▪ Blaine County, Idaho, TDR ordinance.

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FOOD PRODUCTION AND SECURITY

		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
	Enact Standards	▪ Restrict incompatible uses in ag zone districts (e.g., prohibit non-ag commercial, low-density residential); ▪ Permit creation of voluntary ag land protection districts; ▪ Require riparian buffer strips to protect water quality; ▪ Enact wildlife friendly fencing standards	▪ Limit size of Planned Unit Developments in rural zone districts or prohibit; ▪ Adopt true large-lot agricultural zoning (e.g., 1 unit/80 acres or exclusive agricultural zones; ▪ Require cost of services studies for all developments in ag areas and fiscal mitigation; ▪ Adopt Concentrated Animal Feeding Operation (CAF0) regulations to address waste, odors, water quality, etc.	▪ Require new development to offset any ag land loss by purchasing and protecting ag land elsewhere in vicinity ▪ Create urban services boundary to restrict development outside of designated growth areas. ▪ Limit amount of prime/unique soils that can be present on a development site (e.g., 25% per LEED-ND).	▪ See American Farmland Trust, Cost of Community Services Studies (2002); ▪ American Farmland Trust, Saving American Farmland: What Works (1997) ▪ Richard Olson, Under the Blade: The Conversion of Agricultural Landscapes (1999). ▪ Colorado Division of Wildlife, Fencing With Wildlife In Mind. http://wildlife.state.co.us/ (search word "fencing") ▪ American Planning Assn. PAS Report No. 482, Planning and Zoning for Concentrated Animal Feeding Operations.	▪ Large-lot agricultural zone districts (Marin County, CA; Rocky and Waseca Counties, MN) ▪ Clark County, VA, sliding scale ag zoning. ▪ Oregon Exclusive Farm Use zone districts (e.g., Multnomah, OR-- http://www2.co.multnomah.or.us/Community_Services/LUT-Planning/urban/zonordin/efu/efu.html ▪ Davis, CA, farmland loss offset ordinance ▪ Blaine County, ID, restrictions on PUDS/CDs in rural areas. ▪ See LEED-ND SLL #5 (Agricultural Land Conservation). http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148

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FOOD PRODUCTION AND SECURITY

SMALL SCALE FOOD PRODUCTION AND URBAN AGRICULTURE

		ACHIEVEMENT LEVELS				
		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
  	Remove Obstacles	▪ Adopt resolution/zoning purpose statement supporting urban agriculture; ▪ Allow front-yard vegetable gardens in residential districts; ▪ Permit farmers markets in all commercial and mixed-use zone districts; ▪ Allow urban gardens as a permitted use in public parks/open space.	▪ Permit broad range of urban agricultural uses (e.g., fowl and animal raising) by right in suburban and urban areas with use conditions to ensure compatibility; ▪ Allow urban ag accessory structures such as pens, coops, storage sheds, etc.	▪ Permit urban gardens/urban ag spaces to meet residential open space set aside requirements; ▪ Identify urban ag contact in planning department; ▪ Override private covenants that prohibit small-scale agricultural uses	▪ City of Detroit, Supporting Urban Agriculture Study (model purpose statement); Community Food Security Coalition, *Urban Agriculture Report (2002)*	▪ Portland, OR 33.100.110 ▪ Madison, WI; Chicago IL urban ag/chicken regs.
	Create Incentives	▪ Offer density/intensity/ height bonuses for urban agricultural space/green roofs used for urban agriculture ▪ Offer extra credit for fruit trees as part of landscaping requirements	▪ Give open space and landscaping credit for preserving existing urban agricultural spaces or creating new ones. ▪ Allow limited commercial/home sales of food produced on site	▪ Give storm water management credit for providing ag land/open space on site.		▪ Portland, OR, green roof density bonus
	Enact Standards	▪ Require urban agricultural space as part of new residential developments; ▪ Require planting of fruit trees on residential lots/subdivisions as part of landscaping requirements	▪ Adopt urban ag compatibility standards to address type of fowl/animals, number, prohibited toxic chemicals, etc. ▪ Limit processing of plant/animal products in residential areas.	▪ Require new residential development to mitigate loss of open space by replacing with urban ag land; ▪ Require residential developments to purchase shares in a community supported agriculture program within region.		▪ See Detroit Model Ordinance; ▪ See LEED-ND NPD #16: farm/garden land dedication and improvement requirement and community supported agriculture standard.

POTENTIAL SUSTAINABILITY MEASURES:

- Average distance a food item travels (the lower, the better).
- Percentage of community demand met from agriculture within the community
- Average distance to healthy food
- Energy consumption to food production ratio

Local Strategies for Increasing Affordable Housing

Introduction

Dating back as far as the turn of the 20th century, local governments have struggled to provide affordable housing to households in need. Housing market economics often result in few affordable options available to those earning the lowest of incomes. Finding adequate and affordable housing in current real estate markets continues to be a challenge for many of our nation's households. The increasing expense of transportation, rising healthcare and childcare costs, increasing land values, and construction costs have cumulatively stretched household budgets and added to the affordable housing crisis. The size of lots and homes has increased over time, raising housing prices further. These increasing costs and stagnant wages have widened the housing affordability gap to include households earning moderate incomes. Even with the recent downturn in the housing market, many communities still provide few affordable housing options to their local workforce.

History has shown that meeting the demand for affordable housing requires a comprehensive approach that attacks the problem from all angles. Such an approach includes removing regulatory barriers, offering development incentives, implementing mandatory requirements, providing dedicated funding, and other initiatives that result in the development of affordable units. In addition, affordable housing approaches should address the need for access to affordable transportation options, to public and personal services, and to shopping and employment centers. Dense land use patterns that offer more mixed-use opportunities and smaller unit options can assist with lowering housing prices, reducing transportation costs, and providing access to needed amenities. Local land development regulations are one of the most effective ways create a more sustainable community framework that can meet local affordable housing demands. Over the years numerous regulatory tools and strategies have been developed to alter the way in which development is regulated and to increase affordable housing opportunities.

Implications of Not Addressing the Issue

Choosing to not address the demand for local affordable housing can have detrimental effects on a community's long-term sustainability and quality of life. One is that local employees suffer economic stress as housing prices are higher than household incomes can afford. These households often resort to living in smaller residences, or prolonging the purchase of a home. Some employees may have to move out of the area, or move to outlying areas of the community, choosing an alternative location where housing is more affordable. The inevitable consequences of locational substitution are increased commuting, diminished real incomes due to increased commuting costs, increased traffic congestion, higher road construction and maintenance costs. These choices also can result in deterioration of the social, economic, and political fabric of communities. When people live and work in different locations, it is difficult to foster a true sense of community and social activism. Collectively these phenomena do several things. First, they reduce the supply of labor, denying the community a critical component needed to ensure the long-term sustainability of the local economy. Second, they result in a general loss of community and identity. For these reasons, communities experiencing housing affordability problems commonly undertake initiatives to increase the supply of such housing at prices that local employees and their families can afford.

Goals for Affordable Housing

Communities have been using development regulations to foster the development affordable housing units for over 40 years. While, these standards have gone far with improving the problem, more can be done. This chapter offers numerous strategies for improving local affordable housing opportunities. The solutions are organized in two ways: first



by the type of regulatory solution (removing barriers, creating incentives, enacting standards), and second by the degree of potential success, ranging from good to best.

The goals of this chapter are to:

- Identify obstacles that impede the development of affordable housing;
- Recommend opportunities, such as by-right zoning of smaller lots and smaller units and mixed-use development, for the development of affordable housing in areas that are proximate to transit and needed services;
- Offer incentives that local governments can provide to developers, in the form of regulatory and fee relief and development review assistance, to increase the supply of affordable units; and
- Suggest regulatory provisions, such as inclusionary programs and linkage fees,that require new developments to mitigate the demand for affordable housing that their businesses create.

HOUSING AFFORDABILITY

KEY STATISTICS:

- In 2003, some five million working families had critical housing needs.
- Between 2001 and 2005, housing prices in the U.S. overall increased by at least 6 percent annually, more than twice the rate of inflation for that same period.
- The increase in housing prices has exceeded the rate of wage growth; in 2005 the ratio of housing prices to national incomes was the highest in at least twenty years.
- The National Low Income Housing Coalition estimates that the 2006 national "housing wage" needed to afford a two-bedroom rental unit was $16.31 per hour -- $3.00 more than the average renter earned per hour.
- In 2006, a household of three minimum wage earners that worked 40 hours a week for 52 weeks a year could not afford a two-bedroom unit at $848, the national average Fair Market Rent.
- Police officers typically earn less than is required to purchase a median-priced home in the majority of metropolitan areas.
- In 2005, one in every four renters age 50 and above paid 50 percent or more of their income on rent.

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INCREASING AFFORDABLE HOUSING OPPORTUNITIES THROUGH LOCAL REGULATORY TOOLS

Remove Obstacles	ACHIEVEMENT LEVELS (NOTE: HIGHER LEVELS GENERALLY INCORPORATE ACTIONS OF LOWER LEVELS)				
	Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
	▪ Remove barriers for constructing accessory dwelling units and elderly cottage housing units in residential districts. ▪ Remove prohibitions on certain building types (e.g, town homes, duplexes, single-room occupancy buildings) in residential zone districts and/or address unnecessary dimensional standards that act to prohibit these building types (e.g., minimum lot widths greater than 20 feet).	▪ Waive building permit caps for affordable housing projects. ▪ Waive/ reduce residential impact fees for affordable housing projects or provide for funding assistance to offset fees. ▪ Require accessory dwelling units to be rented to households earning low or very low area median incomes ▪ Permit manufactured/modular housing in all residential zone districts if meet all applicable residential design standards.	▪ Remove large minimum lot size regulations to allow for small lot residential development. ▪ Permit duplex and multi-family housing in more districts, or as special/conditional uses in all districts. ▪ Allow mixed-use developments, by- right, in appropriate locations near public transportation facilities.	▪ *Regional Approaches to Affordable Housing,* Meck, Retzlaff, Schwab (2003) ▪ *An Untapped Source for Affordable Housing,* van Hermert (2007) ▪ *Increasing the Availability of Affordable Homes,* Lubell (2006) ▪ Regulatory Barriers Clearinghouse, available online at http://www.huduser.org ▪ *Accessory Dwelling Units: Model State Act and Local Ordinance,* Public Policy Institute, Rodney Cobb and Scott Dvorak (2000)	▪ Santa Cruz, CA – accessory dwelling unit program http://www.ci.santa-cruz.ca.us/pl/hcd/ADU/adu.html ▪ Key West, FL – accessory dwelling unit program (rentals required to comply with income eligibility guidelines) http://www.keywestcity.com/category/?fCS=5-13 and http://www.municode.com/resources/gateway.asp?pid=10053&sid=9 ▪ Alachua County, FL - impact fee assistance program http://growth-management.alachua.fl.us/building/impactfees.php ▪ Albuquerque, NM – reduced or waived impact fees for affordable housing developments http://www.cabq.gov/council/impactfees.html ▪ Lincoln, NE – impact fee waiver http://www.lincoln.ne.gov/city/attorn/lmc/ti27/ch2782.pdf ▪ Austin, TX – Affordable, transit-oriented housing http://www.ci.austin.tx.us/ahfc/smart.htm ▪ Salt Lake City, UT – multi-family developments allowed by-right in non-residential districts http://www.ci.slc.ut.us/council/agendas/2006reports/Feb2006/020906Item3.pdf and http://66.113.195.234/UT/Salt%20Lake%20City/index.htm

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HOUSING AFFORDABILITY

	Bronze (Good)	Silver (Better)	Gold (Best)	Reverences/Commentary	Code Examples/Citations
Create Incentives	▪ Offer expedited review/permitting process for affordable housing projects. ▪ Provide permit expeditor / ombudsman to assist with review of affordable housing projects. ▪ Allow small-lot (less than 6,000 sq. ft) developments in more zone districts with compatible design standards.	▪ Reduce parking requirements for affordable housing to reflect evidence of reduced need. ▪ Do not count accessory dwelling units against permitted density in residential zone districts. Allow in commercial zone districts if parking adequate.	▪ Provide density bonuses when incorporating affordable or workforce housing products in a development.	▪ Affordable Housing and Smart Growth: Making the Connection, Smart Growth Network and Danielle Arigoni (2001) ▪ "Incentive Zoning: Meeting Urban Design and Affordable Housing Objectives," APA PAS Report. Marya Morris (2000). ▪ www.knowledgeplex.com	▪ Tallahassee, FL – bonus density http://www.talgov.com/planning/af_inch/af_inchouse.cfm ▪ Austin, TX – expedited review http://www.ci.austin.tx.us/ahfc/smart.htm ▪ Tucson, AZ – streamline of development review http://www.tucsonaz.gov/dsd/CDRC Rezoning/cdrc r ezoning.html ▪ Orlando, FL – affordable housing development expeditor http://www.cityoforlando.net/executive/communications/news/2005/05_06_30_housing.htm ▪ Palm Beach County, FL – waiver of development standards and bonus densities (Section 5.G.1) http://www.pbcgov.com/epzb/ACommon_asp_html/EpzbHome.htm
Enact Standards	▪ Impose inclusionary housing requirement on residential development to construct or pay a fee-in-lieu for affordable units. ▪ Allow accessory dwelling units by-right in all residential zone districts subject to reasonable size, parking, and other development standards.	▪ Require linkage fees for non-residential development to construct or pay a fee-in-lieu for affordable units necessitated by development. ▪ Require accessory dwelling units for all residential units or a percentage of units in a new subdivision. ▪ Require a variety of unit sizes in multi-family buildings.	▪ Enact a comprehensive regulatory program that requires both residential and non-residential development to construct or pay a fee-in-lieu for affordable units.	▪ *Solving America's Shortage of Homes Working Families Can Afford: Fifteen Success Stories*, ULI. (2005) ▪ American Planning Association's Model Inclusionary Ordinance http://www.planning.org/smartgrowthcodes/pdf/section44.pdf ▪ "The Inclusionary Housing Debate: The Effectiveness of Mandatory Programs Over Voluntary Programs, Part 1," *Zoning Practice.* Nicholas Brunick (2004).	▪ Aspen/Pitkin County, CO – comprehensive regulatory program http://www.aspenpitkin.com/pdfs/depts/38/coaspent26-400.pdf ▪ Islamorada, , FL – comprehensive regulatory program http://www.islamorada.fl.us/newsite/ordinances/0723.pdf ▪ Montgomery County, MD – Moderately Priced Dwelling Unit and Workforce Housing Unit requirements http://www.montgomerycountymd.gov/dhctmpl.asp?url=/content/DHCA/housing/housing_P/housing_p.asp ▪ San Diego, CA – inclusionary affordable regulations http://www.sdhc.net/giinclusionaryhousing.shtml ▪ Teton County, WY – inclusionary housing requirement and affordable housing PUD http://www.tetonwyo.org/plan/nav/100141.asp

POTENTIAL SUSTAINABILITY MEASURES:

- Measuring the supply of units, by affordability ranges, available to meet existing and future demand.
- Use of national indices, such as the National Association of Homebuilders/National Association of Realtors Index, National Low Income Housing Coalition Housing Wage Index, and Center for Housing Policy Paycheck to Paycheck Model to identify local housing needs and track success of local programs.
- In-depth housing needs analysis that evaluates demographics, regional housing tenure data, and economic parameters to identify where gaps in housing exist.

Local Strategies for Increasing Housing Accessibility and Diversity

Introduction

America's face is changing. The last few decades have seen an evolution in the demographic makeup of U.S. households, and these households now require new housing options to meet their basic needs and changing lifestyles. The increase of aging baby boomers, empty nesters, childless couples, and grandfamilies[4] requires communities to reassess the type, location, and design of housing that is available to these households. They have need for smaller homes that require less maintenance, are located in closer proximity to services and community interaction opportunities, and are designed to address the physical limitations of aging and disabled persons. In addition, the nation's minority population has increased significantly in recent years; a trend that is expected to continue. Combined, the increase in these households and the fact that many of them fall into the lower income tiers of our economy makes it difficult to create equitable communities. Prevalent development patterns cluster housing by type and price points and typically do not provide a diversity of units within developments. The physical separation of households by income levels results in an imbalance in opportunities and ultimately affects the long-term success of low-income families and children, and in-turn, the quality of life for all.

A diversity of local housing opportunities is now needed to maintain a sustainable quality of life. The American Dream of owning your own home hasn't changed, but the one-size-fits-all typical suburban single-family home found in a homogenous neighborhood is no longer the only solution for meeting demand. Some developers are interested in meeting the new demand of these households, but are unable due to outdated zoning and design standards. Development regulations need to keep pace with the changing needs of communities to foster the development of a broad array of housing options. Many communities have started to address these needs and provide new opportunities, incentives, or mandatory regulations to this end. Some communities urge new developments to offer a mix of housing unit types, sizes, and price points. Some encourage units to be designed to provide access to a range of ages and physical abilities. And others ensure that developments provide for more sustainable commuting patterns and community engagement opportunities by locating housing proximate to public transportation, employment centers, and needed services.

Implications of Not Addressing the Issue

Communities that do not address these changing housing needs will find that their citizenry will be forced to live in inadequate housing or to relocate to an area that can provide needed amenities and proximity to services. Elderly residents may find it necessary to spend fixed income wages to retrofit their home to provide better handicap accessibility. Young families may find limited housing opportunities for raising families in urban areas and may relocate to find adequate housing elsewhere. Communities may again become segregated, this time by socio-economic status, creating new community challenges. In general, when housing needs are not met, it affects the overall quality of living

[4] Grandfamilies are households of grandparents raising their grandchildren. This type of household is on the rise. According to the 2005 American Community Survey conducted by the U.S. Census Bureau, there are over 6 million children living in "grandfamily" or "kinship care" households in the United States.

in a community. Providing housing options to a diversity of households improves their quality of life, and development regulations need to provide the framework to affect this change. This is but another step in changing the way communities are developed to create long-term, sustainable community environments.

Goals for Housing Diversity and Accessibility

The goals for this chapter are to:

- Raise awareness on the changing housing needs facing our nation's communities;
- Offer methods to create more diverse housing opportunities by removing regulatory barriers from local development regulations;
- Identify incentives for developers to encourage development of a full range of housing options to meet local demands; and
- Suggest mandatory requirements to create more diverse and inclusive housing communities.

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HOUSING DIVERSITY AND ACCESSIBILITY

KEY STATISTICS:

- America's population is growing older. In 2000, 12% of Americans were over 65. This age group is expected to rise as high as 20-25% of the total population by 2030. The physical abilities of these people will likely decline over this period.
- The average household size is shrinking. There are now more households of married couples without children and single person households than any other types, including married couples with children.
- According to the 2005 American Community Survey, there are over 6 million children living in "grandfamily" or "kinship care" households in the U.S., half of which are cared for solely by their grandparents.
- In 2007, the nation's minority population reached 100 million – approximately one third of the total U.S. population.
- Many families can not provide adequate housing in urban areas where the primary form of housing is small units with two or fewer bedrooms.

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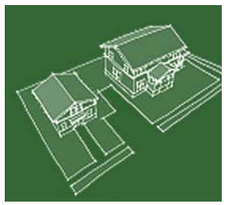
INCREASING DIVERSITY AND ACCESSIBILITY OF HOUSING THROUGH LOCAL REGULATORY TOOLS




No-Step on Slab

	ACHIEVEMENT LEVELS				
	Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
Remove Obstacles	▪ Revise zoning definition of family if it is an obstacle to allowing non-traditional families (e.g., family is 4 or fewer unrelated individuals) ▪ Allow accessory dwelling units and elder cottages in residential districts by-right or through conditional use permit. ▪ Reduce parking requirements for senior housing and transit-oriented-development housing.	▪ Allow for development of group homes and co-housing by-right or with conditions. ▪ Remove large minimum lot size regulations to allow for small lot residential development. ▪ Create mixed-use zone districts that allow a variety of housing types (apartments, townhouses, duplexes, etc.)	▪ Permit duplex and multi-family development in more districts, or as a conditional/special use in all residential districts.	▪ *Smart Growth in Action: Accessory Dwelling Unit Development Program*, Santa Cruz, California. ▪ *Creating Senior-Healthy Communities: Removing Regulatory Barriers*, Denver Regional Council of Governments (2007) ▪ Federal Fair Housing Act prohibits discrimination based on familial status.	▪ Santa Cruz, CA – accessory dwelling unit program http://www.ci.santa-cruz.ca.us/pl/hcd/ADU/adu.html ▪ Fort Kent, ME – elder cottage housing http://www.fortkent.org/fkzoneord.php#_Toc136926020 ▪ San Francisco, CA - downtown parking requirements reduced/eliminated to increase TOD units http://www.spur.org/documents/980401_report_01.shtm ▪ Fort Myers, FL – reduced downtown minimum parking requirements ▪ Nashville, TN – parking requirement reduction when proximate to transit ▪ Salt Lake City, UT – multi-family developments allowed by-right in non-residential districts http://www.ci.slc.ut.us/council/agendas/2006reports/Feb2006/020906Item3.pdf and http://66.113.195.234/UT/Salt%20Lake%20City/index.htm

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HOUSING DIVERSITY AND ACCESSIBILITY

		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples
	Create Incentives	▪ Expedited review and waiver of fees for development of a diversity of units, or units with visitability or universal design features.	▪ Reduction in selected development standards (parking, setbacks, etc.) when providing a diversity of units types or use of visitability[5] /universal design features.	▪ Provide density bonuses when incorporating a variety of housing products in a development.	▪ "Visitability: A New Direction for Changing Demographics," *Practicing Planner.* (2004)	▪ Fort Collins, CO – "Practical Housing for All" standards that encourage use of universal design concepts http://fcgov.com/pha/
	Enact Standards	▪ Require residential units in urban areas to include family-friendly amenities, such as parks and play grounds on site. ▪ Require variations in lot sizes and densities in larger developments. ▪ Require minimum densities in larger residential developments.	▪ Require a percentage of units within urban developments to include 3+ bedroom units. ▪ As a planned unit development compensating community benefit, require mix of housing types. ▪ Require variation in multifamily building size/footprint to encourage different unit sizes and configurations.	▪ Implement a mandatory development points system for incorporating community objectives such as a range of housing types, development of affordable units, and using visitability design standards. ▪ Require certain number of units to be "adaptable" or include visitability or universal design standards. ▪ Require a mix of housing types within residential developments.	▪ "Living First in Downtown Vancouver", *Zoning News,* Beasly. (2000) ▪ *A Blueprint for Action: Developing a Livable Community for All Ages,* National Association of Area Agencies on Aging and Partners for Livable Communities.	▪ Parramatta, Australia – Mandatory mix of units by number of bedrooms and "adaptable" features (i.e., easy conversion of home design to meet elderly/disabled needs) http://www.parracity.nsw.gov.au/__data/assets/pdf_file/0014/2228/DCP2001.pdf ▪ Vancouver, British Columbia – design guidelines for high-density housing aimed at families and children. http://www.city.vancouver.bc.ca/commsvcs/guidelines/H004.pdf ▪ Fort Collins, CO, minimum residential density requirements. ▪ Chapel Hill, NC – required mix of housing sizes in Planned Developments http://www.townofchapelhill.org/index.asp?NID=1165 ▪ St. Lucie County, FL – Towns, Villages and Countryside Overlay - requires mix of units types

POTENTIAL SUSTAINABILITY MEASURES:

- Calculating the number of accessory dwelling units, elder cottages, and other senior housing units available and comparing with demand.
- Calculating the number of multi-family housing units and number of bedrooms per unit in urban areas.
- Calculating the number of new homes implementing visitability and universal design standards.
- Calculating the number of intergenerational housing development units available.
- Conducting a housing needs assessment.
- Calculating the housing diversity in a community using the LEED-ND Housing Diversity Measurement or similar index

[5] Visitability is a design approach driven by the principle that all new homes of all types should be designed and built with basic levels of access. The intent is for the disabled to be able to "visit" and access the homes of their non-disabled peers and for disabled persons to be given the capacity to continue residing in their own homes. Basic features of Visitability include one-level, no step entrances; accessible doorways; and a bathroom on the entry level floor. It does not entail comprehensive accessibility within the residence.

Wildfire Hazard in the Wildland-Urban Interface

Introduction

Wildfire is a natural hazard that occurs throughout a variety of regions in the United States. Wildfire severity and frequency may depend on a host of factors, not limited to a region's topography, fire history, forest management practices, weather patterns and fuel type. Many ecosystems—including southwestern California chaparral, Midwest tallgrass prairie, and various pine stands of the Southwest, Rocky Mountains and Southeast—depend on fire for natural biological functions.[6] In addition to ecosystem benefits, however, wildfire acts as a risk to communities by jeopardizing personal safety and property, threatening watersheds, crippling infrastructure, prompting erosion and landslides, temporarily displacing residents, impacting recreation and tourism opportunities, and leading to other destructive outcomes. These economic, ecologic, and social risks can be exacerbated through land use and development decisions that allow increased growth in areas prone to wildfire—the area known as the wildland-urban interface, or WUI.

It is common for many communities to perform wildfire mitigation in the WUI. These techniques, such as thinning trees on private and public lands, maintaining forest health through appropriate management, and requiring non-flammable building materials, will reduce wildfire risk to existing and future homes and residents in the WUI. Such programs should not, however, overshadow a broader discussion on the consequences of allowing continued growth in fire prone areas. Fire suppression costs consume more than $1 billion from the federal budget on an annual basis, most of which is devoted to putting out fires in the WUI.[7] Given the predicted increase in wildfire severity and occurrence due to climate change, municipalities would be prudent to consider fire suppression costs as part of their long-term sustainability goals. Growth management decisions that steer development away from high and extreme fire hazard areas will ultimately give communities an economic advantage.

The Role of Regulation

Regulations for subdivision access, driveway and turnaround dimensions, structural requirements, and defensible space[8] around a home are typically contained within a community's zoning and building code or in a separate wildfire hazard ordinance. These regulations apply to new development, and may be adjusted according to a parcel's hazard ranking. Most communities also require that remodels and additions (e.g. decks, sheds, etc.) comply with wildfire mitigation requirements.

It is difficult, however, to address those homes that existed prior to adopted regulations. In this case, community leaders must rely on voluntary measures and education in order for mitigation to occur. Since the Healthy Forest Restoration Act (2003), many communities have written Community Wildfire Protection Plans. These are comprehensive approaches to guide decision makers, homeowners, and fire officials in designing better approaches toward mitigating wildfire risks. Other voluntary programs, such as the Firewise Communities program, go a long way in helping communities understand and address wildfire risk.



Other challenges in reducing wildfire risk include varying perceptions of risk. A good deal of research indicates that homeowners often underestimate their individual risk to wildfire.[9] This can lead to resistance to regulations on private property or decisions to live in areas that are prone to recurring wildfires. Additionally, a lack of financial resources for performing mitigation such as tree thinning or roof replacements, may inhibit well-intentioned homeowners.

Goals for Reducing Wildfire Risk in the WUI

There is no one approach that will satisfy wildfire risk for every community. It is important that planners and decision makers consider wildfire hazard from multiple angles that mitigate risks and keep people out of harm's way. Further, a blend of voluntary, education, and regulatory measures are best implemented when a variety of stakeholders, including homeowners, fire fighters, planners, foresters, engineers, and developers, are involved.

The primary goals of this chapter are to:

- Help the reader understand that wildfire threat is present in many regions throughout the United States;
- Underscore how economic, social, and ecologic impacts of wildfire are further exacerbated by continued uncontrolled growth in the WUI;
- Provide examples of regulatory approaches and enforceable mitigation techniques that reduce wildfire risk to people and property; and
- Show that limiting the extent of the WUI through growth management restrictions can dramatically decrease risk exposure and economic loss brought on by wildfires.

Image sources: (from left to right) http://www.maj.com/gallery/the-girl-next-door/pictures/Other/wildfire_2007.jpg; http://www.healthline.com/blogs/outdoor_health/uploaded_images/wildfire-702922.jpg; http://oregonstate.edu/dept/ncs/photos/wildfire.jpg

6 National Interagency Fire Center: Communicator's Guide to Wildland Fire (web resource: http://www.nifc.gov/preved/comm_guide/wildfire/fire_6.html. Accessed April 10, 2008).

7 Headwaters Economics, 2007 (web resource: http://headwaterseconomics.org/index.php)

8 Defensible Space is the designated area surrounding a building or buildings that will be subject to fuel modification measures intended to reduce fire-spread potential between the structure and adjacent vegetation.

9 Steelman, Toddi. 2006. Addressing the Mitigation Paradox at the Community Level. In Wildfire Risk: Human Perceptions and Management Implications, edited by W. E. Martin, C. Raish, and B. Kent, Washington DC: RFF Press, 64-80.

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NATURAL HAZARDS/WILDFIRE

KEY STATISTICS:

- Only 14% of forested western private land adjacent to public land is currently developed for residential use. Based on current growth trends, there is tremendous potential for future development on the remaining 86%.[10]
- During five of the last eight years, the Forest Services' wildfire suppression expenditures have topped $1 billion, and total federal wildland suppression expenditures have been more than $1.4 billion.[11]
- A recent study by the Office of Inspector General found that the bulk of US Forest Service (USFS) fire suppression costs were spent on the protection of private property built in the WUI.[12]
- Two factors that are the primary determinants of a home's ability to survive wildfire are the home's roofing material and the quality of the "defensible space" surrounding it.[13]
- Climate change calculations show that the wildfire season in the western United States during the past 30 years has expanded some 78 days. Substantial fires—those that burn more than 1,000 hectares—have gone from burning an average of nearly 8 days to burning for 37 days. Between 1987 and 2003, fires burned nearly seven times the area of western–U.S. forests as they did from 1970 to 1986.[14]

WILDFIRE IN THE WILDLAND-URBAN INTERFACE (WUI)

		ACHIEVEMENT LEVELS				
		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
	Remove Obstacles	▪ Examine and reduce code barriers that prohibit residents from tree removal – a necessary action to thin property and create defensible space. ▪ Address/override private community covenants (HOAs, CC&Rs) that require fire-prone materials such as wooden siding or roofs.	▪ Require developers to remove trees prior to building subdivision, thereby reducing opportunity for homeowners to become attached to the trees and resist removal. ▪ Require replacement of trees in non-hazardous locations or contribution to community tree fund.	▪ Hold homeowners responsible for wildfires started on their private property and escaping to surrounding forests.	▪ A risk that communities can face is those absentee homeowners who purchased lots and have not yet developed their property, and/or have allowed hazardous fuels to accrue. It is important to address these fire risks, especially in consideration of surrounding neighbor who have performed mitigation. ▪ In order to overcome differences between fire fighter street width standards and new urbanist design approaches, the state of Oregon convened a stakeholder group to identify with a set of statewide design guidelines that would satisfy both safety issues and retain community design goals: Neighborhood Street Design Guidelines http://www.oregon.gov/LCD/docs/publications/neighstreet.pdf	▪ Requiring that clearing and mitigation techniques be done on a subdivision-wide scale and incorporated into the overall design rather than lot by lot ensures that landscape scale mitigation captures areas around subdivisions and in open space areas are treated in addition to simply around individual buildings. (Douglas County, CO: http://www.douglas.co.us/community/planning/documents/ZR-Section17.pdf) ▪ Australia promotes a different model of bushfire (i.e. wildfire) prevention and suppression than the United States by emphasizing personal risk and responsibility ("If you own the fuel you own the fire") and encouraging a shelter-in-place system where residents who are adequately protected can stay in place during a wildfire. Australia's Rural Fires Act (New South Wales) gives the rural fire service the power to order removal of hazardous fuels across both public and private lands; homeowners can be fined if they fail to perform hazardous fuel reduction http://www.austlii.edu.au/au/legis/nsw/consol_act/rfa1997138/

10 Headwaters Economics; URL: http://headwaterseconomics.org/index.php (2007)

11 Gebert, Krista. "Wild fire suppression costs." Posted September 22, 2007. URL: Montana Business Quarterly. http://www.allbusiness.com/government/government-bodies-offices-regional-local/5514677-1.html

12 OIG (Office of Inspector General). 2006. Audit Report: Forest Service large fire suppression costs. Report No. 08601-44-SF

13 Colorado State University Extension; URL: http://www.ext.colostate.edu/Pubs/natres/06302.html (2007)

14 Milius, Susan. Wildfire, Walleyes and Wine. Week of June 16, 2007; Science News Online. Vol. 171, No. 24 , p. 378 URL: http://www.sciencenews.org/articles/20070616/toc.asp

NATURAL HAZARDS/WILDFIRE

		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
	Create Incentives	▪ Coordinate water access among firefighters, engineers, and wildfire mitigation plan requirements for the placement and regulation of cisterns and other water storage tanks. ▪ Offer vegetation management plan assistance preparation to homeowners.	▪ Allow community cisterns in lieu of individual cisterns where lots do not allow easy access or include placement of dry hydrants that allow communities to avoid costly infrastructure improvements. ▪ Decrease allowable densities in fire-prone areas. ▪ Provide a density bonus for cluster developments if lots located outside fire-prone areas.	▪ Link the site plan review and approval process with wildfire mitigation plans by tying final approval with the certificate of occupancy and/or building permits. ▪ Tie insurance programs with wildfire mitigation plans. ▪ Adopt a TDR system that transfers development rights out of fire-prone areas. ▪ Provide a tax incentive for wildfire mitigation.	▪ Creating greater links between the comprehensive planning process and regulations will ensure implementation of wildfire mitigation and protection goals. Alachua County, Florida's Comprehensive Plan (adopted 2005) added a section in their plan to address Wildfire Mitigation LDRs and as of February 2008 incorporated this language into their LDRs. ▪ Rick Pruetz, FAICP, has prepared TDR studies and ordinances for communities throughout the US. His book *Beyond Takings and Givings* features TDR examples and explanations: http://www.beyondtakingsandgivings.com/beyond.htm ▪ Firewise Communities program helps communities address wildfire risk by educating homeowners and decision makers about issues such as emergency vehicle access, structure design, and fuels build-up, to reduce fire hazard risk to people and structures. Firewise also brings together a variety of stakeholders to ensure implementation and long term success of mitigation efforts: http://www.firewise.org ▪ Community Wildfire Protection Plans (CWPPs) are a mechanism for communities to receive grant money for mitigation projects. CWPPs must follow specific criteria in accordance with the Healthy Forest Restoration Act (2003): http://www.healthyforest.info/cwpp/	▪ Subdivision layout and wildfire mitigation is more effective when tied to the applicant approval process. This ensures that the work will get done prior to residents moving in. Standard language includes: "Prior to obtaining a permit for construction, the builder must comply with the Vegetation Management Plan requirements for defensible space within 30 feet of the structure (Zones 1 and 2). Implementation of defensible space standards from 30 to 150 feet of the structure (zone 3), are required prior to the issuance of an Occupancy Permit. (Prescott,Arizona:http://www.cityofprescott.net/_d/veg_mgt_review.pdf) Non-compliance with the WUI Code results in a hold on the construction permitting process. ▪ Insurance companies are using Prescott Fire Department's inspection reports for individual homes to evaluate wildfire risks; the level of risk determined may affect insurance rates and availability. Homeowners are given two years to comply with the risk reduction recommendations. ▪ The State of Florida's Model Wildfire Mitigation Ordinance requires local governments to grant a one-time ad valorem tax exemption to all improvements to real property made by or for the purpose of wildfire mitigation and completed in accordance with the wildfire mitigation plan.

NATURAL HAZARDS/WILDFIRE

		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
	Enact Standards	▪ Ban wood-shake or cedar shingle roofs. ▪ Require defensible space on new homes located in high risk areas. ▪ Require fire-resistant materials roofing, building materials. ▪ Require multiple access/evacuation routes for fire-prone subdivisions. ▪ Require provision of on-site water storage for adequate fire fighting capacity. ▪ Require fire-resistant landscaping. ▪ Ensure access by requiring proper maintenance of roads, driveways, and house addresses and street signs.	▪ Adoption of a local or county level wildfire hazard overlay zone to identify high risk areas. ▪ Require defensible space on remodels and additions (in addition to new structures). ▪ Prohibit development on steep slope areas (30%+) where safe fire-fighting access is difficult. ▪ Require sprinkler systems or added water resources for homes over a certain size to ensure availability for fire fighting; equip passive water sources (e.g.. swimming pools) with appropriate pumps for emergency use. ▪ Link driveway permits to wildfire mitigation to ensure proper driveway and roadway standards for access and turnarounds, ingress and egress (for evacuation) are met.	▪ Address seasonal home ownership and vegetation maintenance by requiring fuel management. ▪ Restrict/prohibit development in high-hazard fire areas. ▪ Add wildfire suppression capital costs (e.g., equipment) to fire impact fees. ▪ Require development agreements for major subdivisions that provide for local recoupment of fire-fighting expenses due to location in fire-prone areas. ▪ Allow the Chief Building Official to impose any further site constraints or mitigation requirements to ensure fire fighter safety and further protection of life and property in the WUI.	▪ The American Planning Association PAS Report Planning for Wildfires (Schwab and Meck, 2005) highlights progressive WUI guidelines, ordinances, regulations, and provides an example Fire Danger Rating System and Fire Hazard Severity Form. ▪ The USDA provides a national database of state and local wildfire hazard mitigation programs, including regulatory, community, education, insurance, and other planning approaches toward nonfederal policies www.wildfireprograms.usda.gov ▪ The National Fire Protection Association has issued NFPA 299: Standard for Protection of Life and Property from Wildfire. ▪ The International Code Council has a Wildland-Urban Interface Community Planning Tool Kit, which includes a model 2006 International Wildland-Urban Interface Code. ▪ The Colorado State Forest Service publication "Creating Wildfire-Defensible Zones", No. 6.302 is a helpful guide with illustrations and explanations of defensible space for homeowners, foresters planners, and fire officials. http://www.ext.colostate.edu/Pubs/natres/06302.html	▪ On January 1, 2008 California adopted a new Fire Hazard Risk Map for the State Responsibility Areas (SRA) and new building codes designed to make buildings located in Fire Hazard Severity Zones (FHSZ) fire-resistant. Ignition resistant standards for homes and businesses include: Decks enclosed with ignition resistant material to within six inches of the ground; eaves protected on the exposed side with ignition resistant material; roof built to Class A fire resistant standards in state responsibility areas and in very high Fire Hazard Severity Zones in local responsibility areas; all under-floor areas enclosed; dual-paned tempered glass for all exterior windows; ignition-resistant materials for exterior doors; all exterior vents designed to prevent ember intrusion. ▪ The Santa Barbara Fire Department Ordinance #5257, High Fire Hazard Area Requirements, establishes minimum brush clearance standards for properties located within the City's high fire hazard areas: vegetation within these areas must be maintained to create an effective fuelbreak by thinning dense vegetation and removing brush and combustible growth from areas within 100 feet of all buildings. A vertical clearance of 13.5 feet within 10 feet of driveways and streets is also required; annual vegetative treatments for grasses, trees, and shrubs and methods of debris disposal are also specified. Special considerations include increased distance of defensible space on slopes greater than 20 percent and permit requirements for removal of trees over four inches in diameter. The ordinance also recommends residents visit the City's Firescape Demonstration Garden. ▪ The amended Building Code regulations for Eagle County, CO establishes “minimum design and construction standards for the protection of life and property from fire within the Urban/Wildland Interface. The ordinance applies to "all new building construction, exterior modification to existing buildings, and/or additions that increase a building's footprint or number of stories in moderate, high and extreme hazard zones." Construction specific requirements will be enforced based on a site’s assigned Hazard Rating.

NATURAL HAZARDS/WILDFIRE

		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
	Enact Standards				▪ Several states or municipalities, including Oregon, Florida, Wisconsin, Boulder County (CO) have created an urban growth boundary or similar growth management mechanism for limiting resident migration into the WUI. Source: Paterson, Robert. 2007. Wildfire Hazard Mitigation as "Safe" Smart Growth In *Living on the Edge: Economic, Institutional and Management Perspectives on Wildfire Hazard in the Urban Interface*, Edited by R. Kennedy and A. Troy, New York: Elsevier Ltd.	▪ As part of their Wildfire Regulations (adopted 1/21/03) Eagle County, Colorado requires that Defensible Space be performed for all moderate, high, and extreme hazard areas. Defensible space shall extend a minimum of 70 feet or to the property line for flat lots, and a minimum of 210 feet on the downhill side for lots with a slope of over 40%. The defensible space regulations require that slash and flammable debris be removed from the defensible space zone, and that all trees and shrubs within 15 feet of the structure be removed. Trees and shrubs over 5 feet tall must have an average crown spacing of 10 feet. Groupings of trees are allowed, provided their crowns are at least 10 feet from the structure. Trees remaining in the defensible space must have branches pruned to a height of 10 feet, but not more than 1/3 of the tree height, and ladder fuels removed. http://www.eaglecounty.us/emergency/wildfires/maps/WildfireRegs.pdf ▪ The City of Palm Coast (Florida) Ordinance No. 2001-11 deems properties with excessive fuel/ hazardous vegetation on undeveloped lots located within 30 feet of adjacent structures as a public nuisance. Failure to comply with standards may result in fines or misdemeanor charges. http://www.municode.com/resources/gateway.asp?pid=13605&sid=9

Site Design Strategies for Solar Access

Introduction

A great deal of attention has been placed on the role of sustainable building design and construction techniques in recent years. Many communities have adopted standards that encourage or require compliance with programs such as The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™. The LEED system has become the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. The program encourages the use of products and techniques to promote sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.[15]

Much less emphasis, however, has been placed on the role of site planning in a sustainable design program—and more specifically, on site design for solar access. The incorporation of both active and passive solar techniques are highlighted in any discussion of green building design, yet in order for either approach to be viable, they must have unobstructed solar access for a certain period of each day. Without careful consideration during the planning stages of a new neighborhood, future opportunities for the installation of active or passive features can be dramatically reduced or even eliminated altogether.

In order to ensure that the concept of sustainability encompasses the entire development site, not just what falls within the building envelope, additional steps must be taken. A pilot program recently kicked off by the U.S. Green Building Council (USGBC) entitled LEED for Neighborhood Development or LEED ND[16], represents an important step towards broader consideration for solar access. For now, however, the application of these provisions is limited primarily to the individual developers who choose to use them. Zoning regulations play a significant role in the implementation of solar energy technologies at the local level, defining where, how, and when they may be used. Many communities have recognized the importance of addressing solar access within their zoning regulations and have taken steps to define the degree to which solar will be allowed, encouraged, or even required.

Implications of Not Addressing the Issue

The implications of *not* establishing provisions for solar access at the local level can be significant. At the most basic level, the opportunity for a community to reduce its energy consumption is diminished substantially. Without provisions in place to ensure solar technologies are allowed and that access to them is protected, they become more difficult and more costly to implement—and thereby may be passed over by all but the most "green" developers and homeowners. Choosing not to establish solar access provisions may also be costly to local governments as staff time needed to process variances and other requests increase.

On the other hand, establishing solar access provisions can be beneficial at a variety of levels. At a site planning level, organizing new development to achieve proper solar orientation can improve the energy efficiency of buildings on the site at little or no additional cost. When combined with other sustainable building techniques, the benefits of requiring and/or protecting solar access can be dramatic. For example, placing a building's long face on an east-west axis with a large percentage of its windows on the south side can reduce fuel consumption by up to 25%.[17] In its Solar Access Design Manual, the City of San Jose, California states that it found that proper solar orientation of new homes built in the San Jose area produced total energy savings of 11 to 16.5 percent—with up to 40 percent savings from space cooling.[18] In addition to promoting a measurable reduction in energy usage, solar access provisions can also help



ensure that the conversion of homes from traditional energy sources to solar energy over time can be accomplished relatively easily. Homes that are pre-designed to accommodate solar devices, not only from a site planning standpoint, but from a plumbing, wiring and structural standpoint as well can make future installations much easier and less costly.

Goals for Solar Access

While numerous examples of local governments adopting regulations to protect solar access opportunities are cited in this chapter, there is much yet to be done. This section outlines specific strategies and actions to be taken by communities wishing to take their policies to the next level. A range of examples are provided to help illustrate how the strategies can be adapted to a range of situations depending upon the level of policy commitment, available staff resources, and political environment.

The primary goal of this chapter is to:

- Remove regulatory obstacles and streamline processes for the installation of solar technologies;
- Implement protective regulations to ensure that property owner investments in solar technologies are protected;
- Preserve the opportunity for increased use of solar technologies in the future;
- Provide incentives for the use of solar technologies in new construction and in the renovation of existing homes; and
- Promote an overall reduction in energy usage.

15 U.S. Green Building Council, LEED Rating Systems, available online at http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222 (last accessed December 21, 2007).

16 U.S. Green Building Council, LEED Rating Systems, available online at http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148 (last accessed December 21, 2007).

17 Guide: Putting Renewable Energy to Work in Buildings, available online at http://www.ucsusa.org/clean_energy/energy_efficiency/putting-renewable-energy-to-work-in-buildings.html (last accessed December 21, 2007).

18 City of San Jose, California. Solar Access Design Manual

Photos: Left and right, "Taking the Lead in Building Production-Style Solar Homes", by Peter Hildebrandt, available online at http://www.distributedenergy.com/de_0503_taking.html (last accessed December 21, 2007); Center, U.S. Department of Energy, Building America Best Practices Series, High-Performance Home Technologies: Solar Thermal and Photovoltaic Systems, available online at http://www.eere.energy.gov/buildings/building_america/pdfs/41085.pdf (last accessed on December 21, 2007.)

RENEWABLE ENERGY

KEY STATISTICS:

- About 9 percent of electricity in the U.S. is generated from renewable sources.
- Most electricity in the U.S. is generated by burning nonrenewable fossil fuels.
- Proper solar orientation of new homes built in the San Jose area produced total energy savings of 11 to 16.5 percent—with up to 40 percent savings from space cooling.
- Placing a building's long face on an east-west axis with a large percentage of windows on the south side can reduce fuel consumption by up to 25%.
- Between 200,000 and 250,000 U.S. homes and businesses have solar panels today, a number that has increased by more than 40 percent a year since Congress passed a federal tax credit for solar energy in 2005.

SITE DESIGN STRATEGIES FOR SOLAR ACCESS

		ACHIEVEMENT LEVELS				
		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
	Remove Obstacles	▪ Identify limiting provisons (e.g. accessory structure limits, historic district regulations) and craft exceptions to permit solar energy devices. ▪ Prohibit solar restrictions in private CC&Rs in subdivision regulations	▪ Allow modest adjustments to side, front and/or rear yard setback requirements (or other conflicting regulations) that allow applicants to meet solar access requirements.	▪ Override private covenants restricting solar devices. ▪ Allow solar panels as a by-right accessory use except in special districts (e.g., historic districts).	▪ In the last five years, advances in technology have resulted in photovoltaic systems that can be installed in some roofing systems to make them nearly invisible—providing an alternative to tradition panels in areas where aesthetics are of significant concern (e.g. historic districts). See US Department of Energy, Building America Best Practices for High-Performance Technologies: Solar Thermal & Photovoltaic Systems, available online at http://www.eere.energy.gov/buildings/building_america/pdfs/41085.pdf. ▪ The LEED ND pilot program incorporates a section on Solar Orientation intended to, "achieve enhanced energy efficiency by creating the optimum conditions for the use of passive and active solar strategies." The section is one of twenty potential credits under the section entitled Green Construction & Technology, available online at http://www.usgbc.org/ShowFile.aspx?DocumentID=2845.	▪ Los Angeles, Historic Preservation Overlay, available online at http://www.dsireusa.org/documents/Incentives/CA04R.htm. ▪ Fort Collins, Colorado Land Use Code, Solar Access, Orientation, and Shading, available online at http://fcgov.com/cityclerk/codes.php. ▪ Gresham, Oregon Development Code, Solar Access Standards, available online at http://www.ci.gresham.or.us/departments/planningServices/dp/code.asp#code. ▪ Multnomah County, Oregon Solar Access Provisions for New Development, available online at http://www2.co.multnomah.or.us/Community_Services/LUT- Planning/urban/landdiv/ld_nav.html. ▪ City of Berkeley, California, Energy Conservation Requirements (links to multiple zoning provisions provided), available online at http://www.ci.berkeley.ca.us/sustainable/buildings/RefGuide/2%20energy%20conservation/2.4SolarThermalandRenewableEnergySystems.html . ▪ Teton County, Wyoming, Solar Access Regulations, available online at http://clerk1.state.wy.us/plan/docs/ComprehensivePlan/Resolutions/Solar.pdf (last accessed December 21, 2007.)

DRAFT Sustainable Community Development Code Framework

RENEWABLE ENERGY

		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
	Create Incentives	▪ Reduce/eliminate permit fees for the installation of solar devices on an existing structure.	▪ Reduce building permit fees for projects that incorporate solar concepts in the overall design. ▪ Provide staff assistance to homeowners to orient new homes for solar access.	▪ Allow applicants to "earn" additional density or height by incorporating solar concepts into a project's overall design.	▪ Database of State Incentives for Efficiency and Renewables (DSIRE), available online at http://www.dsireusa.org/. ▪ The City of Tucson offers a tiered Solar Fee Incentive Waiver for new construction and renovation, available online at http://www.tucsonaz.gov/dsd/Permit_Review_/Solar_Fee_Incentive_Waiver.pdf ▪ The City of Oakland, CA expedited its solar energy use through a 2001 initiative that waived design review requirements for installation of solar production facilities. The initiative expired in 2003; however, the city is evaluating the impact of this ordinance and evaluating the feasibility of its continuance. ▪ A range of articles and other materials on renewable energy are available in the American Planning Association's February 2008 PASInfoPacket entitled Planning and Zoning for Renewable Energy, available online at http://www.planning.org/pas/member/pdf/EIP18RenewableEnergy.pdf	▪ Eagle County, Colorado Efficient Building Code, available online at http://www.eaglecounty.us/uploadedFiles/commDev/Building/ECOBuildweb(3).pdf. ▪ Austin, Texas, Development Code: Subchapter E: Design Standards and Mixed-Use, available online at http://www.ci.austin.tx.us/development/downloads/final.pdf. ▪ Pullman, Washington, Development Code, Planned Residential Development: Section 17.107, available online at http://www.pullman-wa.gov/Content/WYSIWYG/CityCode/ZoningCode/17.107_Planned_Res._Dev.pdf
	Enact Standards	▪ Require key features of a development plan to have access to sunshine. ▪ Enact regulations to preserve solar access.	▪ Require variation in width of lots to maximize solar access. ▪ Include solar access as optional/required standard in residential/commercial design guidelines. ▪ Establish a tree dispute resolution process and criteria by which property owners may resolve issues regarding the obstruction of solar access to a property by a tree or trees on a neighboring property.	▪ Require minimum percentage of solar-oriented lots in new developments. ▪ Require minimum percentage of energy in new developments to come from solar.	▪ State of New Mexico Solar Collector Standards Act. ▪ US Department of Energy, Building America Best Practices for High-Performance Technologies: Solar Thermal & Photovoltaic Systems (See link above.) ▪ Guide: Putting Renewable Energy to Work in Buildings, available online at http://www.ucsusa.org/clean_energy/energy_efficiency/putting-renewable-energy-to-work-in-buildings.html	▪ Fort Collins, Colorado Land Use Code, Solar Access, Orientation, and Shading. (See link above.) ▪ Portland, Oregon, Solar Access Regulations, available online at http://www.portlandonline.com/shared/cfm/image.cfm?id=72542. ▪ Teton County, Wyoming, Solar Access Regulations, available online at http://clerk1.state.wy.us/plan/docs/ComprehensivePlan/Resolutions/Solar.pdf

DRAFT Sustainable Community Development Code Framework						
RENEWABLE ENERGY						
		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
	Enact Standards		▪ Require buildings to be solar ready. Key considerations for solar readiness include: orientation for solar exposure, wiring, plumbing, and roof structures pre-designed to handle solar collectors.		▪ U.S. Green Building Council, LEED for Neighborhood Rating System (See Green Construction and Technology chapter.), available online at http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222.	▪ Ashland, Oregon, Municipal Code, available online at http://www.dsireusa.org/documents/Incentives/OR06R.htm. ▪ City of San Francisco, California, Tree Dispute Resolution Ordinance, available online at http://www.municode.com/content/4201/14142/HTML/ch016_1.html. ▪ Berkley, California, Energy Conservation Requirements, available online at http://www.ci.berkeley.ca.us/sustainable/buildings/RefGuide/2%20energy%20conservation/2.4SolarThermalandRenewableEnergySystems.html. ▪ Boulder, Colorado, Solar Access Regulations, available online at http://www.bouldercolorado.gov/files/PDS/codes/solrshad.pdf. ▪ San Luis Obispo, California, Municipal Code: Section 16.18.170, Easements for Solar Access, available online at http://www.codepublishing.com/ca/sanluisobispo/ ▪ Prairie du Sac, Wisconsin, Land Use Regulations, Chapter 8: Solar Access, available online at http://www.prairiedusac.net/vpds/Ordinances/Title%2010%20-%20Land%20Use%20Regulations/Chapter%2008%20-%20Solar%20Access.pdf ▪ Clackamas County, Oregon, Zoning and Development Ordinance, Solar Access Ordinance for New Development, available online at http://www.clackamas.us/docs/dtd/zdo/ZDO1017.pdf

Renewable Energy: Wind Power

Introduction

As fossil fuel prices rise and climate change looms, interest in renewable energy is increasing. Wind is an abundant resource in much of the U.S. Wind energy could reliably supply at least 20 percent of the nation's electricity, perhaps more. By the end of 2007 wind turbines supplied approximately one percent of all U.S. utility power generation. Wind power development is expanding in the U.S., and technologies are being developed and improved, increasing the ability to harness wind in a variety of rural and urban settings. Wind power technology has diversified in the last decade, with turbines of more sizes and configurations, of quieter and more efficient design. The range of new turbines types enable wind power to be harnessed in a much wider variety of settings than ever before.

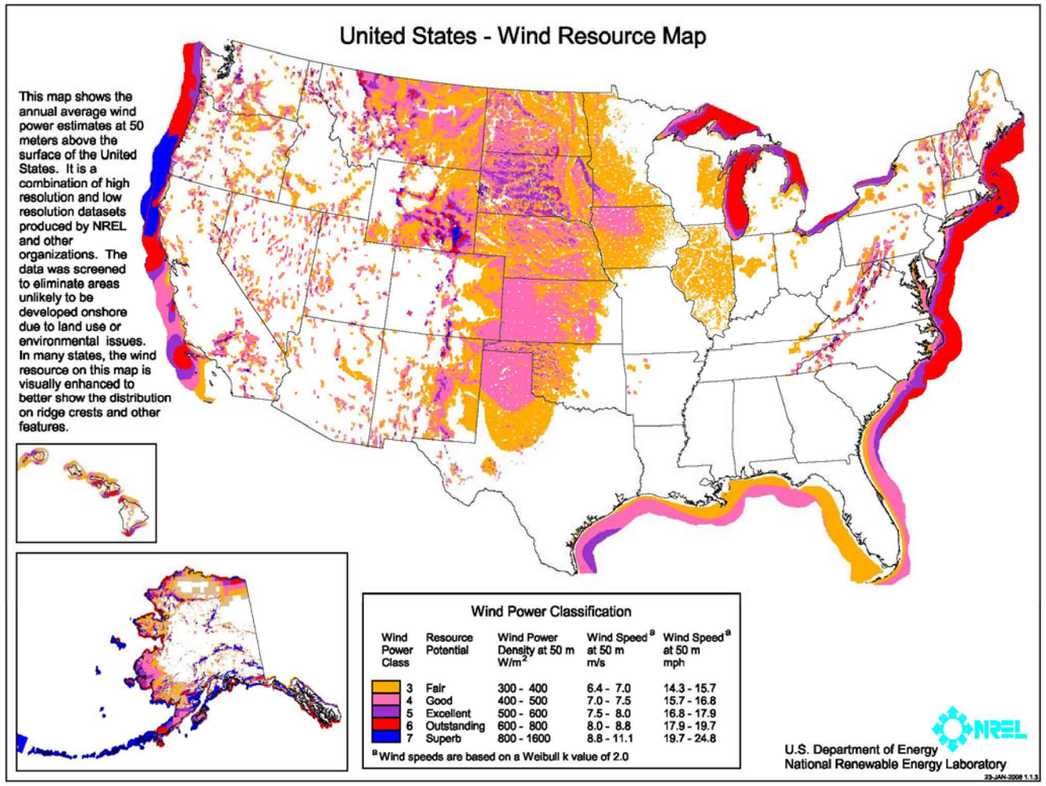
As citizens' interest in sustainability and energy alternatives increases, many local governments that have never processed an application for a wind turbine (a.k.a. Wind Energy Conversion System, or WEC) permit will be asked to review one. Most are unprepared, lacking standards that can ensure safe installation in compatible locations. This can result in lengthy, costly public review processes that yield mixed results, while exaggerated fears can lead to adoption of zoning or permitting standards that drive up costs and reduce the efficiency of WECs.

"Large" or utility-scale WECs can be 400 feet tall or more, and may be rated to produce as much as 2 MW each. Each MW of utility wind power is enough to power 240-300 homes. "Small wind" refers to wind power generated by WECs rated 100 kW or less, which are generally smaller than 120 feet tall, and are typically used to power farms, homes, or businesses.[19] In steady, moderate winds, a single small WEC of 5-7m rotor diameter can power one or more homes.

The U.S. Department of Energy (DOE) and National Renewable Energy Laboratory (NREL) have mapped the wind resources in the U.S. (See map this page.) and provide state-level wind resource maps for most states. More than half of the U.S. experiences Class 3 wind or better, which is sufficient to power small WECs, at 50m elevation. Typically, utility wind is developed where winds are Class 4 or better. The electricity production potential of a WEC depends on both the design, and on access to steady, non-turbulent wind. The best wind is found at least twice as high and at least 300 feet away from obstructions, such as buildings or trees, and in areas with relatively flat topography.

A U.S. household with average energy demand (10,565 kWh, according to the Department of Energy) that uses the typical mix of U.S. utility energy emits 16,376 pounds of carbon per year. In 2000, the U.S. E.P.A estimated the annual carbon emissions of an average U.S. passenger car at 11,450 pounds per year. Thus, on average, each home that is powered 100% by wind, which emits no carbon, reduces emissions equivalent to taking 1.4 cars off the road. Wind power has other benefits as well, such as reducing dependence on foreign oil, providing dispersed back-up energy in the event of grid failures, and better air quality.

Zoning and permitting standards are often one of the biggest costs of, and impediments to, WEC installation. Conversely, well-written and reasonable standards can encourage installation of WECs.



Goals for Wind Power

Goals for wind power elements of a sustainable community development code should be to:

- Provide clear standards to protect neighbors from potential nuisance impacts of WECs (Insure that one man's turbine is not another man's migraine!).
- Create a predictable environment for those that invest in WECs, in terms of zoning and permitting review time and cost, and access to the wind source over time.
- Limit development permitting requirements (such as studies, certifications, etc.) to the minimum necessary for rigorous review, and scale them for small versus large WECs.
- Avoid overly restrictive, unnecessary provisions – such as low height limitations – that substantially reduce the effectiveness of WECs, which discourages investment in them.

[19] Watts (W) are units of power. A kilowatt (kW) is 1000 watts, and megawatt (MW) is 1000 kW. WECs are generally rated for their maximum power output capacity under normal wind conditions (as defined by the manufacturer). Energy production and use are commonly expressed in kilowatt hours (kWh), meaning a kilowatt of power used continuously for an hour.

RENEWABLE ENERGY

LARGE-SCALE WIND ENERGY CONVERSION SYSTEMS

KEY STATISTICS:

- Approximately one percent of U.S. energy was supplied by WECs as of 2007.
- The theoretical wind energy potential of North Dakota is equivalent to 25 percent of U.S. energy demand. [20]
- Estimates vary, but many studies suggest that WECs could reliably provide 20 to 40 percent of nationwide energy needs.
- Utility -scale wind power generation typically requires Class 4 or Class 5 winds.
- Typically, each MW of electricity capacity from a wind farm can power 240-300 homes.[21] Thus, a wind farm of 50, 1.8 MW wind turbines operating at full capacity could power more than 20,000 homes.
- Large scale wind is defined as a WEC that produces 1000 kWh annually; many modern wind farm WECs are 250 to 400 feet tall and are rated at 1.5 to 1.8 megawatts.

		ACHIEVEMENT LEVELS (NOTE: HIGHER ACHEIVEMENT LEVELS GENERALLY INCORPORATE LOWER LEVELS)				
		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
 	Remove Obstacles	▪ Repeal any outright ban on WECs. Instead, regulate to manage impacts. ▪ List WECs as an exception to general height limits. ▪ Identify areas that are suitable for large-scale WEC facilities in local plans and land use maps. ▪ Identify areas that are off-limits to WEC facilities due to scenic, natural, and other values. Avoid the still-borne project syndrome.	▪ Allow large-scale WECs as a special use subject to performance standards to speed, and reduce costs, of permitting. Enumerate specific standards vs. case-by-case negotiation. ▪ Do not allow rejection of WEC facilities on aesthetic grounds except in specially designated areas.	▪ Allow large-scale WECs as a by-right use subject to performance standards to speed, and reduce costs, of permitting. ▪ Allow energy produced by a large WEC on one property to be used off-site by property owners who record formal agreements (this is known as “community wind”).	▪ Some states (e.g., CA, NV, WI, NJ, and MI) have passed legislation that restricts local control of WECs to ensure that local regulations are designed to address impacts rather than prohibit WECs. ▪ The National Renewable Energy Laboratory (NREL) and U.S. Department of Energy (DoE) provide state wind resource maps that help assess typical wind in a local area. http://www.nrel.gov/wind/resource_assessment.html ▪ A single, large WECs is more cost effective than many small WECs.	▪ The American Wind Energy Association offers an excellent siting guide for large-scale wind. http://www.awea.org/sitinghandbook/ ▪ Integrating wind power into traditional utility systems has unique challenges. National Renewable Energy Laboratory’s provides a range of integration studies and resources. http://www.nrel.gov/wind/systemsintegration/ ▪ Site-specific assessments are necessary to determine local wind capacity. NREL offers a wind resource assessment handbook. http://www.nrel.gov/wind/pdfs/22223.pdf ▪ Hull, MA has installed two large WECs as part of the municipal utility system. Each is freestanding, and is not part of a wind farm. http://www.hullwind.org/

[20] American Wind Energy Association. *How much energy can wind realistically supply to the U.S.?* http://www.awea.org/faq/wwt_potential.html
[21] American Wind Energy Association. *Wind Industry Statistics.* http://www.awea.org/faq/wwt_statistics.html

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RENEWABLE ENERGY

	Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
Create Incentives		▪ Lower or eliminate zoning and permitting fees for utility WECs.	▪ Map local areas where wind resources and current uses are compatible with utility wind development, and list utility WECs as a by-right use in these areas.	▪ The cost of developing wind power is comparable to more traditional utility power. In some places, voters have required utilities to develop sources of renewable energy.	
Enact Standards	▪ Adopt standards for utility-scale WECs vs case-by-case negotiation. ▪ Adopt setback standards for wind farms of at least 1000 feet. ▪ Exempt utility WECs from district height limitations. ▪ Adopt noise standards that regulate the noise level at the property line and protect nearby residents. ▪ Do not restrict WECs from ridgelines or other prime wind access areas. ▪ Adopt standards for minimum ground clearance for the rotor blades. 30 feet is a typical minimum.	▪ Allow complementary uses of the land around WECs, such as agricultural uses. ▪ Require soils studies to ensure stability adequate for the heavy loads of large WECs. ▪ Require shadow and noise modeling to ensure that flickershadow or vibro-accoustical effect will not degrade property values on nearby residences. ▪ Restrict agricultural uses around wind farms that attract birds (such as grain crops) or rodents (which, in turn, attract birds).	▪ Zone areas with ideal utility wind power conditions (undeveloped areas with Class 4 or 5 winds near the power grid) for uses that are compatible with wind farm development. ▪ Map areas with endangered bird species or major bird migratory corridors and restrict wind farm development in these areas. ▪ Require utility companies to restore vegetation disturbed by turbine installation.	▪ Setbacks of 1000-1500 feet are generally accepted as adequate to address risk of “ice throw,” “flickershadow,” or “vibro-accoustical” effects. Studies of sound and shadow effects are appropriate if setbacks are smaller. ▪ Without actual nuisance impacts (e.g., noise, flickershadow, etc.), studies show no evidence that being within view of a wind farm depresses property values. http://www.crest.org/articles/static/1/binaries/wind_online_final.pdf ▪ Avian impacts from turbines are typically very limited outside of major migration corridors. The Audubon Society endorses well-sited wind turbines. http://audubonmagazine.org/features0609/energy.html	▪ Many states offer model WECs ordinance language. Two examples that focus on utility wind facilities are Pennsylvania http://www.depweb.state.pa.us and Massachusetts. http://www.mass.gov/doer/ ▪ Many local WEC ordinances in counties and rural areas focus on large, utility WECs. Two examples are Manitowoc County, WI www.co.manitowoc.wi.us/ and AntisTownship, PA, which requires a minimum WEC size of 2 MW. www.antistownship.org

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SMALL-SCALE WIND ENERGY CONVERSION SYSTEMS

KEY STATISTICS:

- Small-scale wind is typically defined as WECs rated to produce electricity at a rate of 100 kW or less.
- In moderate (class 3) winds, a small WECs with rotor diameters between 4 and 7 meters generates, on average, enough electricity to power one average U.S. home.
- More than half of the U.S. experiences winds of class 3 or better at an elevation of 50 meters.
- Every average U.S. home powered by 100 percent wind energy avoids carbon emissions equivalent to removing 1.4 average U.S. passenger cars from the road.[22]

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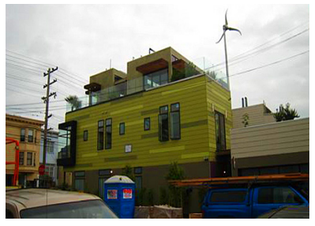
		ACHIEVEMENT LEVELS (NOTE: HIGHER ACHEIVEMENT LEVELS GENERALLY INCORPORATE LOWER LEVELS)				
		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
  	Remove Obstacles	▪ Repeal any outright ban on small WECs. Instead, regulate to manage impacts. ▪ Explicitly list small WECs as an exception to general height limits. ▪ Explicitly list roof-mounted WECs as an exception to screening requirements for rooftop electrical and mechanical systems.	▪ List small-scale WECs as a conditional use in non-residential and large-lot residential districts. ▪ Scale performance standards and permitting requirements to be appropriate for small WECs, do not treat as large WECs. ▪ Preempt home owner association covenants where they contain general prohibitions - such as on accessory structures - that inadvertently prohibit small WECs.	▪ Allow small WECs as a by-right use subject to performance standards to speed and reduce costs of permitting. ▪ Allow small turbines in a wider range of zone districts including industrial, urban, commercial, large-lot residential, and suburban zone districts.	▪ Wisconsin state law prohibits municipalities from placing restrictions on WECs except to protect or preserve public health or safety, and where cost does not significantly increase or efficiency decrease. A special exception is provided that WECs may be excluded from a scenic byway of state-wide importance. www.renewwisconsin.org	▪ The zoning regulations of the Town of Nevada, IA, allow small WECs by right in the industrial districts and by special use permit in all other districts, subject to performance standards. WECs are exempt from the general height restricts of the zone districts, but height is limited through a use standard. http://www.ci.nevada.ia.us
	Create Incentives	▪ Give credit for on-site WECs in any green-building or performance-based development review points system. ▪ Lower or eliminate zoning permitting fees for small WECs.	▪ Rather than limit power generation to on-site use only as is often done in defining small utility/power generation facilities, allow some excess production, as long as on-site use is the primary purpose and the production is non-commercial.	▪ Protect wind access for existing WECs to increase predictability for those who invest in installation. ▪ Encourage net metering caps of not less than 5MW, if at all, to encourage development of distributed energy generation.	▪ Some communities restrict power generation to "on-site use," eliminating the potential community benefit of excess clean energy to help balance community impacts. A better approach is a limit overall system size for distributed generation, net metering, and/or grid interconnection, such as to 5MW. ▪ The LEED Neighborhood Certification includes credit for on-site energy generation. http://www.usgbc.org/	▪ Eagle County, Colorado http://www.eaglecounty.us and Marin County, California, http://www.co.marin.ca.us are examples of communities with performance-based permitting systems that award points for producing wind energy. ▪ Some states and utilities offer incentives. The state of Oregon offer a residential tax credit for wind turbines of $2 per kWh produced during the first year, up to $6,000. www.oregon.gov/ENERGY/

[22] Heller, E. *Wind and Solar Energy Production and the Sustainable Development Code*, RMLUI Symposium. 2007. http://www.law.du.edu/rmlui/

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		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
   	Enact Standards	▪ Adopt standards that are scaled for small versus large WECs. ▪ Adopt setback standards for WECs of 1.1 - 1.5 times the total turbine height (support structure height + rotor radius). ▪ Exempt WECs from district height limitations, similar to flagpoles or cell towers. Allow WECs to be placed at least 25-35 feet higher than structures or tree line within 300 feet of turbine. ▪ Define small WECs according to the industry standard of 100 kW or less. ▪ Require one "Danger High Voltage" sign. Only require fencing or anti-climbing features as for similar attractive nuisances (i.e, swimming pools, cell towers). ▪ Adopt noise standards that regulate the noise level at the property line. ▪ Require undergrounding of transmission lines from the WECs to the user or power grid to the maximum extent feasible. ▪ Allow one WEC per lot. Instead of minimum lot size, allow one turbine on any lot that can meet setback and other standards, regardless of lot size. ▪ Do not require screening of WECs, which reduces their efficiency and cost-effectiveness.	▪ Adopt standards that allow for alternative compliance, such as: ▪ …setback standards that may be decreased if a building inspector certifies correct installation or if neighbors record waivers. ▪ …climb-ability standards that do not require fencing if there are no climbable features below 12 feet above ground level. ▪ Adopt height standards for buildings in all urban districts, to provide predictability about obstructions and wind turbulence for property owners that are considering installing a WEC. ▪ Adopt standards for minimum ground clearance for the rotor blades. 30 feet is a typical minimum. ▪ Require proof of approval of a grid connection from the local utility to enable net metering. ▪ Restrict small WECs in limited historic, scenic, or other special character areas where their visual impact is unacceptable to community members. ▪ Do not restrict WECs from ridgelines, or require that they be lower than mature trees, which reduces their efficiency and cost-effectiveness.	▪ Map areas with the best wind potential and restrict new uses to those that are locally acceptable in conjunction with small turbines. ▪ Require that new developments of high energy consuming uses generate on-site energy using renewable resources such as geothermal, solar, or wind. ▪ Optimize wind access with height standards that allow WECs to be twice as tall as surrounding structures and mature trees. ▪ Allow rooftop WECs and exempt from screening requirements for rooftop electrical systems. ▪ Avoid requiring "camoflage" of WECs in tree colors. The factory color of most turbines, matte grey, is best for blending into a range of sky conditions. http://www.nationalwind.org/ ▪ Allow energy produced by a small WEC on one property to be used off-site by neighbors who record formal agreements.	▪ Small turbines do not have "ice throw," "flickershadow," or "vibro-accoustical impacts; Siting or environmental impact studies need not be required for small WEC permitting. http://www.awea.org/smallwind/sagrillo/index.html ▪ Bird kill from small WECs is extremely limited: less than the kill rate of a house cat or sliding glass door. http://audubonmagazine.org/features0609/energy.html ▪ Restrictive height limits expose small WECs to much greater wind turbulence, which dramatically deteriorates performance and longevity, undermining cost effectiveness. The DoE's Windpowering America program offers a web presentation on the importance of tower height. www.eere.energy.gov/windandhydro/windpoweringamerica	▪ Many states offer ordinances for municipalities. The draft Wisconsin http://www.doa.state.wi.us and Michigan models http://www.michigan.gov are examples that include standards specifically for small WECs. ▪ The Centennial, CO zoning ordinance allows small WECs by right in any zoning district with just a building plan check, and includes simple, clearly written standards to address potential impacts. http://www.centennialcolorado.com/ ▪ Chicago, IL allows rooftop WECs as a permitted accessory use, subject to setbacks and noise limitations. http://egov.cityofchicago.org ▪ Duluth, MN allows a WEC, up to 130 feet tall, as a permitted accessory use on lots in suburban, commercial, and industrial districts. http://www.ci.duluth.mn.us/city/mainpage/ ▪ Henderson, NY allows rooftop WECs as a permitted accessory use in all districts, small WECs as a special use in business districts and some residential districts, and wind farms as a special use in some districts. http://townofhendersonny.org ▪ Camden County, NC wind ordinance setbacks are based on the height of the WECs. Smaller setbacks are allowed with a wind easement from an adjacent property owner. Permits for large WECs require an acoustical study, but not for small WECs. http://www.camdencountync.gov/

Water Conservation

Introduction

Worsening drought, population growth, and record wildfire seasons in recent years have called sharp attention to the need to make more efficient use of our water supply. While states and communities in the arid Southwest have understandably led the charge in improving municipal water efficiency through regulations, even cities on the water-rich Great Lakes like Chicago have found themselves exceeding their water allowances and developing efficiency strategies[23]. For municipal water providers, water availability is a three-part equation of water supply (surface and ground plus storage), water treatment capacity, and water distribution capacity. Each part of the equation poses costs and challenges to communities in the form of acquiring adequate water rights and investing and maintaining the treatment and distribution infrastructure. In the next 20 years, the US will add approximately 53 million more people and will have to rise to the challenge of meeting their drinking, bathing, irrigation, and commercial processing needs with a finite supply of fresh water.

This section reviews a range of tools from managing peaks in demand to recycling gray water for irrigation. Models are drawn from a variety of communities across the US including Arizona, California, Minnesota, Florida, and Massachusetts as well as organizations such as US Green Building Council's Leadership in Energy and Environmental Design (LEED) program and the National Association of Home Builders (NAHB) Model Green Home Building Guidelines. The regulations are divided into the following ordinance categories:

- Efficient Landscaping;
- Water Use/Waste;
- Water Harvesting; and
- Greywater Recycling.

It is worth noting that the vast majority of communities with water conservation ordinances in place couple those regulatory tools with a variety of educational materials and financial incentives to promote additional efficiency. Education campaigns target everything from everyday options for reducing waste to introducing new technologies or practices such as rain gardens or rainwater harvesting. Incentives are often in the form of rebates that facilitate efficiency updates to existing buildings such as rebates for installing water efficient appliances, toilets, faucet aerators, and shower heads as well as in the landscape through such means as turf removal credits and free or discounted rain sensors for irrigation systems. These programs help promote the adoption of new technologies and practices and help improve efficiency of existing development not impacted by many of the regulatory tools. Any community interested in improving water efficiency should consider education and incentive tools in conjunction with regulations as part of their overall strategy.

Implications of Not Addressing the Issue

Failing to establish water conservation provisions at the local level can have significant impacts on the future growth, economy, and food supply of a community. Water is essential to life and as such one can argue that communities will have to improve their performance sooner or later. However, the implications for waiting are costly. Communities that have embraced water conservation measures have enjoyed significant reductions in overall water consumption for both residential and non-residential development.

Southwestern communities, whose long relationship with water conservation measures has allowed for analysis, have enjoyed marked improvements since implementing conservation ordinances. From 1994-2005 Albuquerque, NM, decreased system-wide per capita use from 250 g/d to 173g/d while Tucson, AZ, reduced consumption from 169 g/d to 156 g/d. Improvements can also be more immediate. In only three years, the Las Vegas Valley brought their per capita consumption down from 283 g/d to 256 g/d. Reducing demand on the water supply system helps to extend the life of existing infrastructure, eliminate or prolong the need for system capacity upgrades for treatment, distribution, and storage, and enhances a community's ability to deal with a drought.

Goals for Water Conservation

The primary goals of the tools discussed in this section are to:

- Reduce community per capita water use while retaining attractive landscapes;
- Enable communities to meet future needs of their growing populations;
- Protect ground and surface water supplies from unsustainable depletion;
- Eliminate unnecessary waste in water use practices;
- Reduce wastewater treatment volume and associated municipal expenditures; and
- Promote the increased use of harvested and recycled water for irrigation needs.

23 City of Chicago, Chicago's Water Agenda, 2003, Mayor Richard M. Daley

WATER CONSERVATION

KEY STATISTICS:

- The population of the US is anticipated to increase by 53 million people by 2020.
- Ninety percent of all drinking water in the US is pumped from groundwater supplies and most communities have witnessed falling water tables--use is exceeding the recharge rate.
- Global warming forecasts foresee steadily increasing temperatures worldwide, with more extreme storms, increased drought in some locations and increased flooding in others.
- Landscape irrigation accounts for approximately 51 percent of all domestic water consumption in the U.S.
- There is a high level of variability in per capita water consumption between municipalities in comparable climatic zones (e.g., in 2005 the average single-family residential water consumption in Tucson, AZ, was 114 gpcd compared to 174 in Las Vegas, NV) indicating the potential for more efficient consumption patterns.

WATER CONSERVATION: REDUCE OUTDOOR WATER USE/WASTE

Efficient Landscaping		ACHIEVEMENT LEVELS				
		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
 	Remove Obstacles	▪ Identify limiting ordinances (e.g., CC & Rs) that require the use of turf in lawns and common areas and craft exceptions to the limiting ordinances. ▪ Permit rain gardens, drainage swales, and similar facilities by right.	▪ Allow attractive hardscaping alternatives to landscaping requirements (e.g., ornamental gravel, mulch).	▪ Override private covenants and restrictions that require turf grass or limit water-conserving landscaping.	Wisconsin Department of Natural Resources, Rain Gardens: A how-to manual for homeowners (2003)	▪ Las Vegas Valley communities served by Southern Nevada Water Authority including Boulder City, Henderson, North Las Vegas, Clark County, Las Vegas (multiple ordinances) ▪ Tucson, AZ (Water Waste and Tampering Ordinance – Ordinance 6096, Plumbing Codes – Ordinance 7178, Emergency Water Conservation – Ordinance 8461), available online at http://www.ci.tucson.az.us/water/ordinances.htm ▪ U.S. Green Building Council, LEED for Neighborhood Rating System (See reduced water use credits, p.101.), available online at http://www.usgbc.org/ShowFile.aspx?DocumentID=2845 ▪ Bernalillo County, NM Water Conservation Ordinance – http://www.bernco.gov/live/departments.asp?dept=7242 ▪ Numerous ordinances for Washington State communities available online at: http://www.mrsc.org/Subjects/Environment/water/wc-sprink.aspx ▪ Lawn Requirements, Andover, MN (building code) Topsoil and and Sodding, Prior Lake, MN (subdivision code) both available online at
	Create Incentives	▪ Grant extra landscaping credit for rain gardens.	▪ Accelerate permitting for developments meeting LEED-ND water conservation standards. ▪ Give extra landscaping credit for protection of native plants on site. ▪ Give bonus points in design review systems for water conservation/water harvesting.		More information on rain gardens and sample garden plans available online at http://www.raingardens.org/Index.php	
	Enact Standards	▪ Include optional low-water landscaping/plant list as part of landscaping code. ▪ Enact regulations to limit the percent of the total landscaped area of new development that can be planted with ornamental turf. Provisions vary by community and residential/non-residential use type, with non-residential uses having more stringent anti-turf regulations	▪ Require all new commercial and multi-family development to use Xeriscape principles and low-water plants from established plant list in landscaping. ▪ Require all new single-family development to use low-water plants from established plant list in landscaping. ▪ Require installation of rain sensors on irrigation systems.	▪ Require use of on-site or municipal recycled /harvested water for non-potable uses.	Albuquerque, NM enjoyed a 35% decrease in single-family residential daily per capita water consumption after adopting water-efficient landscaping provisions.	

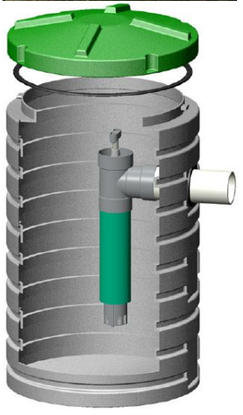
WATER CONSERVATION

		(0-30% maximum turf coverage) than single-family residential uses (25-40% maximum turf coverage). ▪ Require drip irrigation systems to be installed in all new development. ▪ In climatic regions where turf is appropriate, create a minimum topsoil depth and seeding volume for turf in new residential and non-residential developments to ensure healthy root growth. ▪ Establish minimum street tree planting and replacement requirements. Trees should be selected as appropriate to the region (e.g., native trees or pest/disease resistant non-native tree species with water requirements that match natural precipitation levels of the region).	▪ Restrict the use of water features in the landscape. Exceptions may be granted to golf courses (up to some maximum allowance after which overuse penalties apply) and certain pubic uses.			http://www.metrocouncil.org/environment/Watersupply/conservationtoolbox_programs.htm
Water Use/Waste		ACHIEVEMENT LEVELS				
		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
	Remove Obstacles	▪ Update building code to be in full compliance with the US Energy Policy Act of 1992 (EPAct).				▪ Las Vegas Valley communities served by Southern Nevada Water Authority including Boulder City, Henderson, North Las Vegas, Clark County, Las Vegas (multiple ordinances) ▪ Santa Monica, CA (No Water Waste Ordinance), available online at http://www.smgov.net/EPD/residents/Water/waste_ordinance.htm ▪ San Francisco, CA (Residential Water Conservation Ordinance) , available online at http://www.sfgov.org/site/uploadedfiles/dbi/Key_Information/19_ResidEnergyConsBk1107v5.pdf ▪ Austin, TX, Water Use Management Ordinance, available online at http://www.ci.austin.tx.us/watercon/waterordinance.htm
	Create Incentives	▪ Allow increased density in exchange for reduced water use in multi-family developments.		▪ Large Customer Mandatory Water Conservation Plan – require large water users (e.g., those consuming more than 50,000 gpd) to submit a long-range water conservation plan that addressed both indoor and outdoor water use. Clearly define enforcement methods and associated penalties in the ordinance.	Western Resource Advocates, Water in the Urban Southwest (2006)	
	Enact Standards	▪ Prohibit landscape watering between 11 am and 7 pm during hot and dry months (as defined by local temperature and precipitation patterns).	▪ Regulate days of the week watering is allowed (e.g., alternate days by even v. odd street numbers). ▪ Restrict watering on steep slopes.	▪ Regulate water-wasting outdoor activities such as hosing down pavement, buildings, or equipment unless runoff is returned directly to a stormwater drain.		

WATER CONSERVATION

			▪ Require installation of water meters on all new construction or rehabilitation.	▪ Regulate wasteful residential irrigation practices such as misdirected spray heads, runoff into driveway or adjacent lots, and broken or leaking sprinklers. ▪ Require all new and renovated car washes to install water recycling systems.		▪ Flagstaff, AZ http://www.flagstaff.az.gov/index.asp?nid=104 ▪ Shrewsbury, MA http://www.shrewsbury-ma.gov/sewerwater/publicnotice.asp#conservation

WATER CONSERVATION: REDUCE DEMAND ON WATER TREATMENT AND DELIVERY SYSTEMS*

Rainwater Harvesting /Greywater Recycling		ACHIEVEMENT LEVELS Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
 	Remove Obstacles	▪ Identify limiting regulations and private covenants (e.g., homeowner association CC & Rs) and craft exceptions that include rainwater harvesting tanks. ▪ Where water law allows, repeal any ban on the ability of development to have on-site rainwater harvesting systems. ▪ Work with legislators to update state law where current regulations completely or effectively prohibit greywater recycling. Arizona is commonly regarded as the best example of statewide legislation for greywater recycling.	▪ Allow above- and below-ground water storage tanks as a conditional use except in special districts (e.g., historic districts) or locations where water law prohibits on-site retention of rainwater. ▪ Require the installation of recycled water distribution infrastructure in all new development so recycled water use is an option for irrigation.	▪ Allow water storage tanks as a by-right accessory use except in special districts (e.g., historic districts) or locations where water rights law prohibits on-site retention of rainwater.	Tucson Water, Water Harvesting Guidance Manual (2005) Texas Water Development Board, The Texas Manual on Rainwater Harvesting (2005) Lighthouse, BC Green Building Code Background Research: Greywater Recycling (2007) http://www.housing.gov.bc.ca/building/green/Lighthouse%20Research%20on%20Greywater%20Recycling%20Oct%2022%2007%20_2_.pdf Arizona State law on greywater recycling with further analysis and state-by-state comparative discussion available online at http://www.oasisdesign.net/greywater/law/index.htm#arizona	(FL) Palm Beach County Reclaimed Water Ordinance (Ord. No. 97-12, § 1, 5-20-97) available online at http://www.municode.com/resources/gateway.asp?sid=9&pid=10323
	Create Incentives	▪ Reduce/eliminate permit fees for installation of water storage tanks. ▪ Revise plumbing and building code requirements to ensure allow for greywater recycling systems.	▪ Offer credits to residential and commercial developments that install water harvesting systems. ▪ Eliminate permit requirement for greywater recycling systems for small residential systems.			

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WATER CONSERVATION						
		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	
	Enact Standards	▪ Create specific screening requirements to apply to this use appropriate to the use context ▪ Require subdivision design to include water harvesting for landscape irrigation. ▪ If desired, local jurisdictions can further refine the list of system size and design requirements for different capacity systems and associated standards above those established in applicable state law.		▪ Require specified percentage of irrigation water in a development to come from grey water or harvested rainwater.	Florida currently has a water recycling capacity of 1.1 billion gallons/day, over half of its total wastewater treatment capacity. Florida Department of Environmental Protection, Florida Water Conservation Initiative (2002)	