

# Zoning Code and Comprehensive Plan Strategies for Climate Resilience: The Sustainable Development Code

A presentation by Jonathan Rosenbloom for the Prepared for Environmental Change Webinar Series

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## Development is coming

- 50-75 million people in U.S. population growth by 2040
- Will require approximately 90 billion *additional* sq. ft. of commercial/retail/ industrial space
- Will result in nearly ½ of all residential housing to be new (about 80 million units)
- Sources:
  - Arthur Nelson, *Planner's Estimating Guide: Projecting Land-Use and Facility Needs*
  - Jennifer M. Ortman and Christine E. Guarneri, *United States Population Projections: 2000 to 2050*, Table. 1

## Where will this growth go? What will it look like?

- Pursuant to existing development codes, land consumption outpaced population by 30-50%
- At the low end (30%), by 2030, 40 million undeveloped acres will be destroyed to accommodate new construction
- That is about the size of Indiana and Kentucky combined

## Already vulnerable infrastructure

*"[T]he Nation's infrastructure suffer[s] from chronic underinvestment, system failures and service shortfalls."* – National Infrastructure Advisory Council, *Water Sector Resilience Final Report and Recommendations* (2016).

*"[U.S. infrastructure] is in poor to fair condition and mostly below standard, with many elements approaching the end of their service life... [T]he system exhibits significant deterioration. Condition and capacity are of serious concern with strong risk of failure."* – 2017 Infrastructure Report Card, American Society of Civil Engineers (2017) (giving U.S. infrastructure a D+).

## Uncertainty

- Agriculture
  - *"Projected changes in precipitation, coupled with rising extreme temperatures . . . will reduce Midwest agricultural productivity to levels of the 1980s."*
- Forests

- *“threats from a changing climate are interacting with existing stressors such as invasive species and pests to increase tree mortality and reduce forest productivity.”*
- Human Health
  - *“climate change is expected to worsen existing health conditions and introduce new health threats.”*
- Biodiversity
  - *Climate change is contributing to species loss, including the extinction of the Karnerblue butterfly in northern Indiana*
- Community Vulnerability and Adaptation
  - *“At-risk communities in the Midwest are becoming more vulnerable to climate change impacts such as flooding, drought, and increases in urban heat islands.”*
- Source: U.S. Fourth Nat. Climate Assessment, *Chapter 21: Midwest*.

### Opportunity

- In 2017, Indiana ranked 8th among states in coal production and 2nd in coal consumption, after Texas.
- In 2018, coal fueled 69% of Indiana’s net electricity generation.
- Wind power provided about 5% of Indiana’s electricity generation in 2018, while solar, biomass, and hydropower combined accounted for slightly more than 1% of generation.
- Source: U.S. Energy Information Administration, *Indiana State Profile* (visited Dec. 3, 2019).

### Sustainable Development Code – screen shot from website

- [www.sustainablecitycode.org](http://www.sustainablecitycode.org)
- A menu of 32 subchapters: sustainability in development codes
  - Chapter 1: Environmental health and natural resources
    1. Climate change
    2. Low-impact development and stormwater management
    3. Sensitive lands and wildlife habitat
    4. Water supply quality and quantity
    5. Water conservation
    6. Solid waste management and recycling
    7. Urban forestry and vegetation
  - Chapter 2: Natural hazards
    1. Floodplain and river corridor land use
    2. Wildfire hazards and the wildland-urban interface
    3. Coastal hazards
    4. Steep slope hazards
    5. Hazard mitigation and resiliency
  - Chapter 3: Land use and community character
    1. Development patterns and infill
    2. Development densities
    3. Mixed-use
    4. Transit-oriented development
    5. Historic preservation and adaptive reuse
    6. Parking

- Chapter 4: Mobility and transportation
  1. Complete streets/safe streets
  2. Bicycle mobility
  3. Pedestrian mobility
  4. Public transit
  5. Autonomous vehicles and new technology
- Chapter 5: Community
  1. Housing affordability
  2. Housing diversity
- Chapter 6: Healthy neighborhoods and food security
  1. Community health and safety
  2. Food production and security systems
- Chapter 7: Energy
  1. Wind energy
  2. Solar energy
  3. Other energy generation systems
  4. District energy systems
  5. Energy conservation and efficiency

Example Section: Climate change, chapter 1.1 – screenshot from website

- Remove code barriers
  - Best
    - Best: district heating and cooling zones
    - Renewable energy for historic buildings
    - Solar energy systems with wind turbines by right (circled option)
  - Better
    - Height and setbacks to encourage renewables
    - Local recycling centers
  - Good
    - Accessory dwelling units
    - Cluster/conservation subdivision in rural/urban areas
    - Live-work units
    - Mixed-use zoning
    - Tiny homes and compact living spaces
- Create incentives
  - Best
    - Limiting off property shading of solar energy systems
    - Property assessed clean energy program
    - Property tax exemptions for renewable energy systems
    - Renewable energy incentives
  - Better
    - Encourage infill development
    - Recycle, salvage, and reuse building materials
    - Recycling in multi-family and commercial buildings
    - Varying unit sizes within multi-family and mixed-use buildings
  - Good
    - Energy and water efficiency

- Green roofing
  - Pervious cover minimums and incentives
  - Priority parking for hybrid and electric vehicles
  - Transit-oriented development
- Fill regulatory gaps
  - Best
    - Alternative pedestrian routes to parking areas, neighborhoods, and businesses
    - Energy benchmarking, auditing, and upgrading
    - Require water efficient landscaping
    - Safe routes
    - Site and solar orientation
    - Third-party certification requirements
    - Tree canopy cover
    - Urban growth area
    - Urban service area
    - Vegetation protection areas
    - Zero net energy buildings
  - Better
    - Green zones
    - Limit solar restrictions in HOAs and/or CC&Rs
    - Maximum size of single-family residences
    - Native trees and removal of invasive trees
    - Open space impact fees
    - Parking maximums
    - Solar-ready construction
    - Varying unit sizes within multi-family and mixed-use buildings
  - Good
    - Green roofing
    - Parking in-lieu fees
    - Pervious cover minimums and incentives

#### [Introduction – screenshot from website](#)

These ordinances seek to increase renewable energy, specifically wind and solar, by permitting solar energy systems and wind turbines by-right in certain zoning districts. Currently, some local government codes contain districts that not only fail to protect solar energy systems and/or wind turbines, but also explicitly or implicitly (through height, setback, and other requirements) prohibit them in some neighborhoods (see Height and Setbacks for Wind and Solar brief for an ordinance removing and altering these restrictions). Local governments may enact ordinances to permit solar energy systems and/or wind turbines by-right in some zoning districts. Doing so eliminates zoning barriers and increases efficiency of installation. When considering these ordinances, local

governments should address use restrictions, which districts should allow solar energy systems and wind turbines by-right, height and set back requirements, design, quantity, minimum and maximum energy output of installations, landscaping requirements, permitting, and other concerns specific to the district. For purposes of permitting, local governments may consider permitting installations by-right or upon conditional permit approvals or some other mechanism for review, making it clear that the installations are permitted upon approval.

At the state level, California's legislature has stated that any type of covenant or zoning restriction that prohibits solar energy systems are void and unenforceable. Although the statute still allows for zoning restrictions, the CA Civil Code outlines that the restrictions cannot result in the addition of \$1,000 or more to the cost of solar installation nor can the restrictions limit the efficiency of the system by 10% or more. Florida's legislature passed similar legislation in 2008, expressly prohibiting ordinances which prohibit solar collectors. The statute further states that there can be no prohibition on solar collectors in the form of covenants, deeds, or other similar agreements. The statute allows the HOA or other homeowner entity to determine where the collectors may be placed.

#### Examples – screenshot from website

- Bedford, NY  
The Town of Bedford, New York allows solar energy collectors by-right in all districts. The solar energy collectors are designated as accessory buildings and structures and must comply with the building requirements and setbacks for accessory buildings and structures. However, to maximize the efficiency of solar energy collectors, the collectors do not have to follow standard height limitations as set in the code. The ordinance states that the solar energy collector does not have to comply with the maximum height standard, but the collector must not be fifteen feet above the roof nor can the collector cover more than 10% of the total roof area.
- Stoughton, WI  
The City of Stoughton, Wisconsin in early 2018 enacted a local ordinance that allows solar energy production, by-right, in every zoning district. Permitted districts include Agricultural, Residential, Office, Business, Industrial, and institutional. The solar systems must comply with regulations and limitations set forth for installations in the respective districts, including height and setback, but are allowed by-right within these districts. The City also mandates that wind systems will be allowed in each district listed above. But on a conditional basis conforming to setback and height requirements. The setback requirement for the wind systems require them to be back from the property line at least 1.1 times their height. The height requirement falls into three categories: for properties

under two acres. the system may be up to 60 feet. for properties between two and five acres the system may be up to 100 feet, and for properties over five acres the system may be up to 150 feet.

#### Additional examples – screenshot from website

- Bethany: Beach, DE, Zoning Code, \_§ 484 (2010): permits the use of solar energy systems in all districts subject to minimal regulations.
- Cleveland, OH, Zoning Code, \_§ 354A (2009): permits wind energy facilities by-right.
- Minneapolis, MN, Zoning Code §§ 535.690, 535.820 (2007): permits the production of both wind and solar energy in all zoning districts.
- West Lake Hills, TX Code of Ordinances § 22.03.009 (2011): allows the use of solar energy devices in all zones.
- Schaumburg, IL Code of Ordinances § 154.70 (2018): permits small scale wind and solar as accessory use in most zoning districts.

#### Additional resources – screenshot from website

- Local Renewable Energy Benefits and Resources, Environmental Protection Agency (Apr. 19, 2019 ), <https://www.epa.gov/statelocalenergy/local-renewable-energy-benefits-and-resources#one>
- Khagendra P.Bhandari et al., Energy payback time (EPBT) and energy return on energy invested (EROI) of solar photovoltaic systems: A systematic review and meta-analysis, Renewable ,and Sustainable Energy Reviews Vol. 47, 133-411 (July 2015), <https://www.sciencedirect.com.proxyiub.uits.iu.edu/science/article/pii/S136403211500146X>.

#### § 154.70 – Renewable Energy – screen shot from prema.cc/5UY5-5YMK

- Solar Energy Systems.
  - Intent: The intent of these standards is to allow for the safe and effective development of solar energy systems that reduce the onsite consumption of fossil fuels or utility supplied electric energy throughout the Village of Schaumburg. These regulations are intended to encourage the use of local renewable energy resources and promote sustainable building design and management practices in residential, commercial and industrial buildings.
- General Requirements:
  - Accessory Structure: Solar energy systems are permitted as accessory structures as detailed in this section.
  - On-Site Use: Energy produced through the solar energy system shall be utilized on site; however, the energy output may be delivered to a power grid to offset the cost of energy on site.
  - Utility Provider Notification: Written evidence must be provided at the time a building permit is requested that the utility company has been notified of the customer's intent to install a solar energy system.
  - Glare: Installation of the solar collection system shall not adversely impact adjacent properties. A solar collection device or combination of devices shall be designed and located to avoid glare or reflection onto adjacent properties, businesses, residential homes and adjacent roadways and shall not interfere with traffic or create a safety hazard. All solar energy systems using a reflector to

enhance solar production shall minimize glare from the reflector that impacts adjacent or nearby properties.

- Emergency Disconnect: An external disconnect switch, readily accessible by emergency responders, and which is clearly identifiable and unobstructed, shall be provided to disconnect power at the solar panel.
- Tree Removal: Tree removal shall be minimized.
- Special Use: Additional height may be requested through the special use process outlined in section 154.44 of this chapter.
- In reviewing the request for additional height, such factors as height of the system in relationship to existing and potential structures, manmade or natural, and their impact on the system's efficacy shall be considered.
- Arrangement: Where feasible, solar collector units shall be consolidated into array groupings located toward the center of the roof, rather than situated in a disjointed manner.

#### SDC: four ways to think about local climate action

- Increasing renewable energy production
- Increasing efficiency and reducing energy load
- Increasing sinks
- Maintaining systems

#### Climate change chapter 1.1: increasing renewable energy production

- This slide is a screenshot of the following page:  
<https://sustainablecitycode.org/chapter/chapter-1/1-1/>
- It has arrows pointing to all the ideas pointing to actions that relate to increasing renewable energy production. This term can be searched on the website. The actions are:
  - Renewable energy for historic buildings
  - Solar energy systems and wind turbine by-right
  - Height and setbacks to encourage renewables
  - Limiting off property shading of solar energy systems
  - Property assessed clean energy program
  - Property tax exemptions for renewable energy systems
  - Renewable energy incentives
  - Priority parking for hybrid and electric vehicles
  - Site and solar orientation
  - Zero net energy buildings
  - Green zones
  - Limit solar restrictions in HOAs and/or CC&Rs
  - Solar-ready construction

#### Zero net energy buildings

- Requirements of 2-10 watts per square foot, can be less in shown less energy is needed
- Requirements of solar ready area
- Efficiency requirements
- May apply to residential, commercial, and/or multi-family

## Climate change, chapter 1.1: increasing efficiency and reducing energy load

- This slide is a screenshot of the following page:  
<https://sustainablecitycode.org/chapter/chapter-1/1-1/>
- It has arrows pointing to all the ideas pointing to actions that relate to increasing efficiency and reducing energy load. This term can be searched on the website. The actions are:
  - District heating and cooling zones
  - Local recycling centers
  - Accessory dwelling units
  - Cluster/conservation subdivision in rural/urban area
  - Live-work units
  - Mixed-use zoning
  - Tiny homes and compact living spaces
  - Encourage infill development
  - Recycle, salvage, and reuse building materials
  - Recycling in multi-family and commercial buildings
  - Varying unit sizes within multi-family and mixed-use buildings
  - Energy and water efficiency
  - Green roofing
  - Pervious cover minimums and incentives
  - Priority parking for hybrid and electric vehicles
  - Transit-oriented development
  - Alternative pedestrian routes to parking areas, neighborhoods, and businesses
  - Energy benchmarking, auditing, and upgrading
  - Require water efficient landscaping
  - Safe routes
  - Site and solar orientation
  - Third-party certification requirements
  - Tree canopy cover
  - Urban growth area
  - Urban service area
  - Vegetation protection areas
  - Zero net energy buildings
  - Green zones
  - Maximum size of single-family residences
  - Parking maximums
  - Varying unit sizes within multi-family and mixed-use buildings
  - Green roofing
  - Pervious cover minimums and incentives

## Maximum size single-family residence

- Heights over a certain dimension count more toward floor-area-ratio (ex. Areas with 14-foot ceilings count double square footage)
- Setting a smaller limit on square footage (ex. Max square footage at 2,200)
- Limiting footprint on lot (ex. 20% of lot)

### Climate change, chapter 1.1: increasing sinks

- This slide is a screenshot of the following page:  
<https://sustainablecitycode.org/chapter/chapter-1/1-1/>
- It has arrows pointing to all the ideas pointing to actions that relate to increasing sinks. This term can be searched on the website. The actions are:
  - Cluster/conservation subdivision in rural/urban area
  - Green roofing
  - Pervious cover minimums and incentives
  - Require water efficient landscaping
  - Tree canopy cover
  - Urban growth area
  - Urban service area
  - Vegetation protection areas
  - Zero net energy buildings
  - Green zones
  - Native trees and removal of invasive trees
  - Open space impact fees

### Expand tree canopy cover

- Set canopy targets, such as increase by 40% by 2030
- Establish “tree save areas” requiring setback
- Offer incentives for expansion of tree save area
- Afforestation requirements (ex. Minimum coverage such as 15%)
- Replanting of 10 trees for every one removed

### Climate change, chapter 1.1: maintaining systems

- This slide is a screenshot of the following page:  
<https://sustainablecitycode.org/chapter/chapter-1/1-1/>
- It has arrows pointing to all the ideas pointing to actions that relate to maintaining systems. This term can be searched on the website. The actions are:
  - Limiting off property shading of solar energy systems
  - Third-party certification requirements
  - Limit solar restrictions in HOAs and/or CC&Rs

### Contact information

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