

An aerial photograph of a city street grid. A central park area is visible, featuring a baseball field and a circular plaza. The surrounding area is filled with buildings, trees, and streets.

Climate and Land Use Planning:

A Policy Guide for U.S. States and Territories

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Acknowledgements

We are grateful for expert contributions from many individuals. Mark Teschauer, senior policy advisor, Transportation and Cassandra Rose, policy advisor, Natural & Working Lands at the U.S. Climate Alliance, led this work with support from staff at Climate Resilience Consulting and Smart Growth America.

This guide was informed by interviews with 29 experts from academia, city and state governments, federal agencies, city and county associations, and environmental and conservation organizations, as well as guidance and direction from an advisory committee comprised of Alliance state staff. They include Kelly Blynn, Colorado Energy Office; Dunbar Carpenter, Massachusetts Executive Office of Energy & Environmental Affairs; Bronwyn Cooke, Vermont Department of Housing and Community Development; Judith C. East, Maine Department of Agriculture, Conservation & Forestry; Rachel Lamb, Maryland Department of the Environment; Dan Lawler, Washington Department of Ecology (formerly); Cody Meyer, Oregon Department of Land Conservation and Development; Bailey Recktenwald, North Carolina Office of the Governor (formerly); and Doug Scott, Illinois Commerce Commission. Staff across Alliance member government agencies and offices also provided valuable feedback and input during draft reviews.

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Published February 2025.

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Table of Contents

Abbreviations and Acronyms	4
Executive Summary	5
1. Introduction	8
2. Foundational Principles	11
2.1 Reduce Greenhouse Gas Emissions, Sequester Carbon, and Improve Climate Resilience	12
2.2 Protect Natural and Working Lands	15
2.3 Transform Systems to Build Social Equity	16
3. Policy Outcomes	18
3.1 Location-Efficient Development	19
3.2 Healthy and Resilient Natural and Working Lands	29
3.3 Climate-Resilient Development	34
4. Governance Strategies	41
4.1 Cross-Sectoral and Intergovernmental Planning	43
4.2 Data-Driven Planning and Decision-Making	50
4.3 Stakeholder Engagement and Partnership	55
Conclusion	60
References	61

Abbreviations and Acronyms

CFA	Climate-Friendly Areas
CFEC	(Oregon's) Climate Friendly and Equitable Communities
CRD	Climate-resilient development
DeIDOT	Delaware Department of Transportation
DOT	Department of Transportation
EV	Electric vehicle
FEMA	Federal Emergency Management Agency
GHG	Greenhouse gas
GW	Gigawatts
HMDRRI	(North Carolina) Hurricane Matthew Disaster Recovery and Resilience Initiative
LED	Location-efficient development
LMI	Low- and moderate-income
MBTA	Massachusetts Bay Transportation Authority
MiPlace	The Community Development Unit of Michigan's Economic Development Corporation
MPO	Metropolitan Planning Organization
MVP	(Massachusetts) Municipal Vulnerability Preparedness (Program)
NBS	Nature-based solutions
NWL	Natural and working lands
SC-GHG	Social cost of greenhouse gases
SGP	Sustainable Growth Policy (of Maryland)
SLR	Sea level rise
TDR	Transfer of development rights
TOD	Transit-oriented development
UGB	Urban growth boundary
VMT	Vehicle miles traveled
WSDOT	Washington State Department of Transportationland-urban interface
WUI	Wild-urban interface
ZEI	Zero-emissions infrastructure



Executive Summary

Land use planning is a powerful tool to help states meet their greenhouse gas (GHG) emissions targets and become more climate resilient. Lands and land use patterns play a significant role in managing GHG emissions and carbon sequestration. How lands are used and managed informs and affects decarbonization efforts and long-term climate resilience across nearly every economic sector.

The complex intersectional and interdisciplinary nature of land use policy means these decisions create widespread effects on the economy, environment, and society. State and territory (“state”) efforts to address climate change through land use policies offer significant co-benefits that can improve quality of life and well-being in communities and ecosystems. These co-benefits may include improved housing affordability and job accessibility, clean energy siting, clean drinking water, flood and coastal zone management, reduced wildfire risk exposure, access to open space and recreational opportunities, and an increased focus on equity.

This *Climate and Land Use Planning Guide* (“Guide”) will help states understand how they can use and manage lands in ways that support meeting cross-sectoral climate resilience goals and net-zero targets. The Guide provides policy recommendations for states and territories that build on a Land Use Planning Framework (“Framework”) grounded in three Foundational Principles designed to encourage systems thinking and collaborative action. Using these principles, states will better understand the implications of policy choices and actions, as well as how to overcome challenges they may face in implementing climate-resilient policies.

The three Foundational Principles of climate-aligned land use planning are:

- 1. Reduce GHG Emissions, Sequester Carbon, and Improve Climate Resilience:** Prioritizing emissions reductions, carbon sequestration, and climate resilience across all sectors in land use planning can help states realize their climate goals. Co-benefits of committing to these efforts can include enhanced quality of life in many communities.
- 2. Protect Natural and Working Lands (NWL):** Elevating protection of NWL in land use planning encourages more efficient land use by prioritizing development opportunities in existing communities and on already developed or disturbed lands. A dedicated focus on protecting NWL also helps ensure their consideration in land use planning across all sectors.
- 3. Transform Systems to Build Social Equity:** Focusing on social equity in climate and land use policies ensures that communities most vulnerable to climate change impacts are centered in policy decisions and climate actions. A social equity focus creates opportunities for states to address historical injustices stemming from past discriminatory land use policy decisions and practices, while avoiding perpetuation of these inequities.

Policy Outcomes for Land Use Planning

Building on these three Foundational Principles, the Guide also includes a suite of policies for states to consider to help meet their climate goals. Policy focus areas include:

- 1. Location-Efficient Development (LED):** LED helps ensure that the design and development of communities and infrastructure work together to reduce GHG emissions and avoid the conversion of NWL. LED includes considerations around infill and compact development, clean and renewable energy and infrastructure siting, and integrated transportation and land use planning. Through LED, states can expand access to affordable energy-efficient housing and lower-carbon transportation options, increase community resilience by avoiding development in high-risk areas, and address a wide range of social equity considerations. LED policies can help states:

- Leverage regulatory and legislative tools to remove barriers to location-efficient housing and infrastructure.
- Develop programs and policies to mitigate displacement.
- Encourage infrastructure siting in ways that minimize land conversion.
- Provide funding and other incentives for location-efficient housing projects and infrastructure.
- Integrate location efficiency requirements and considerations in local and regional planning.
- Support and link investments in transportation infrastructure and accessibility with climate and land use.

- 2. Healthy and Resilient Natural and Working Lands:** Preservation of NWL, including restoration, conservation, and protection from conversion to development, helps enhance their ability to deliver emissions reductions, carbon sequestration, and adaptation benefits while remaining ecologically functional and viable. Healthy NWL provide key climate services for communities and ecosystems, including carbon storage, flood mitigation, local food, improved air and water quality, connected habitat, and more. These lands also increase access to green spaces and ease disproportionate impacts of extreme heat, contributing to improved social equity outcomes. Healthy NWL policies can help states:

- Incorporate NWL and natural climate solutions into state planning and investments.
- Utilize zoning and nature conservation policies to realize NWL protection and restoration.
- Incentivize and fund programs to support private landowner and municipal conservation.
- Promote strategic land management and conservation to meet multiple climate goals.
- Maximize nature-based solutions (NBS) to climate risks.
- Support ecosystem resilience and habitat.

- 3. Climate-Resilient Development (CRD):** CRD helps ensure that communities and infrastructure are more resilient to a changing climate and extreme weather events. CRD integrates climate resilience considerations and requirements throughout

the development process, including urban planning, infrastructure development, natural resource management, and long-term disaster recovery. CRD policies can help states:

- Leverage land use policy to support climate resilience and preparedness.
- Reduce disparate outcomes of disaster recovery systems.
- Limit new development and siting of buildings and assets in high-risk areas.
- Consider community-centered relocation and managed retreat tools, programs, and policies to support high-risk communities.
- Leverage NBS for adaptation benefits.
- Integrate climate resilience in local and regional planning.

Governance Strategies for Land Use Planning

The Guide also offers Governance Strategies that can help states facilitate climate- and land use-informed decision- and policymaking. Recommended Governance Strategies focus on:

1. Cross-Sectoral and Intergovernmental Planning: Collaboration among government teams and leaders in various sectors helps identify land use policies and actions to address the climate crisis. Practices that foster collaboration lead to strategic alignment among a diverse group of leaders and experts, leveraging the specific expertise of each contributor to realize climate and land use policy outcomes. Cross-sectoral and intergovernmental planning strategies enable states to:

- Develop an actionable state-level framework around climate and land use.
- Support climate action in local and regional planning.
- Create flexibilities and opportunities for customizable local and regional government programs and requirements.
- Provide technical assistance and support to local and regional planning organizations and elevate regional programs.
- Integrate and coordinate climate and land use with housing and infrastructure policies.
- Establish forums for consensus-building and collaboration with interdisciplinary and intergovernmental partners.

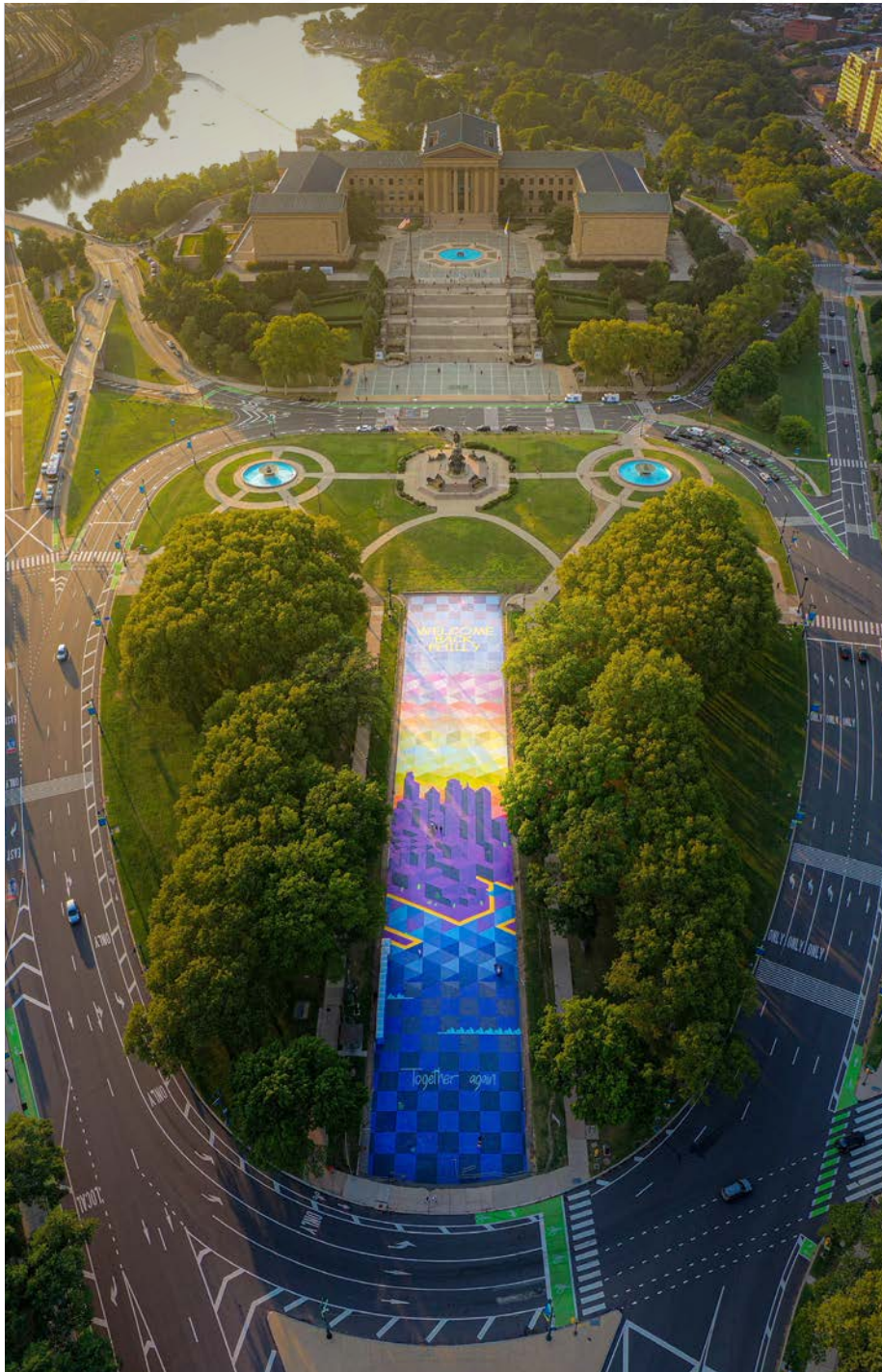
2. Data-Driven Planning and Decision-Making: Incorporating tools to project, measure, and evaluate the potential impacts of land use policy interventions can help states create decision frameworks to determine which policies can best support climate and land use efforts. Data-informed approaches include quantifying impacts and benefits (such as GHG emissions, non-GHG emissions, and co-benefits), using data to guide decision-making, and tracking progress over time to determine success. With data-driven planning and decision-making, states can:

- Foster a culture of developing policies and making decisions based on informed projections and demonstrated outcomes.
- Prioritize comprehensive emissions quantification methods and approaches, including for carbon sequestration.
- Leverage cost-benefit analyses and other impact quantification approaches.
- Incentivize or require data-driven land use decision-making at the local level.
- Establish or contribute to centralized open-source data platforms to promote transparency and accessibility to the public.
- Identify metrics and establish performance targets around climate, land use, and equity.

3. Stakeholder Partnership and Engagement: Establishing partnerships and engaging with stakeholders helps shape, advance, and communicate the benefits of climate and land use planning. Engagement strategies can help states connect stakeholders to these efforts, work through and address stakeholder concerns, and develop effective relationships with communities and other groups. Stakeholder partnership and engagement efforts help ensure that states can:

- Partner with Tribes, Tribal Governments, and Indigenous Peoples.
- Empower communities and build capacity.
- Support models of equitable local engagement and community understanding.
- Communicate the benefits of climate and land use planning outcomes to broad audiences.

Using the Foundational Principles, Policy Outcomes, and Governance Strategies detailed in this Guide, states can build on this Framework, which supports efforts to protect NWL, maximizes emissions reductions, and builds ecosystem and community resilience.



1. Introduction

Land use planning is a powerful tool to help states meet their greenhouse gas (GHG) emissions targets and become more climate resilient. Lands and land use patterns play a significant role in managing GHG emissions and carbon sequestration, and help communities strengthen their ability to prevent, reduce, withstand, and recover from climate-related impacts. The complex, intersectional, and interdisciplinary nature of land use policy means that these decisions have widespread effects on the economy, environment, and society. Additionally, state and territory (“state”)ⁱ efforts to address climate change through land use policy provide opportunities to address other policy challenges, such as housing affordability, clean energy siting, clean drinking water, flood and coastal zone management, wildfire risk exposure, access to open space and recreational opportunities, and equity, providing significant co-benefits that can improve quality of life and well-being of communities and ecosystems.

ⁱ While there may be instances where “state” is referring to an individual state, all other future instances of the words “state” or “states” moving forward are inclusive of “territory” or “territories” as well.

Terminology Used In This Guide

This Climate and Land Use Planning Guide (“Guide”) discusses land use and land management in the context of state and local planning processes. The phrase “land use” may evoke connotations of unsustainable or extractive practices among some communities and cultures in the United States. Some readers may instead prefer the term “land management” to emphasize a lens of reciprocity and responsibility for sustained care and management. Use of the term “land use” in this Guide is intended to refer generally to how states plan for the management, use, or disuse of lands to achieve climate goals, and aims to be inclusive of the preferred terminology in respective states.

This Guide offers a roadmap for understanding how land use planning and policies can facilitate the achievement of emissions reduction targets and climate resilience outcomes across all sectors. It leverages systems thinking to navigate the complex landscape of land use policy, illustrating different policy options and implementation strategies across sectors and throughout all levels of government. The Guide recognizes that while differing land use policy goals may create cross-sectoral tensions, states can use the approaches outlined here to help balance market and policy trade-offs; work with local and regional governing bodies toward shared goals; serve different constituent needs; create complementary cross-sectoral benefits to help avoid conflicts; and navigate land use implementation challenges and opportunities.

The policy options in this Guide are built on a Land Use Planning Framework (“Framework”) illustrated in Figure 1. The themes outlined in Figure 1 are addressed in this Guide. The Foundational Principles provide a Framework to foster systems thinking in climate and land use efforts.ⁱⁱ Each Foundational Principle informs the menu of options highlighted in the Policy Outcomes and Governance Strategies sections. The Policy Outcomes establish a vision for the long-term effects of intentional climate and land use policies. The Governance Strategies help refine this vision with state-level context, consensus-building, and examples of action.

ii The Foundational Principle, “Transform Systems to Build Social Equity,” is one of four U.S. Climate Alliance Member Commitments.

The Policy Outcomes section includes a suite of policies that can help states meet climate goals. Policy focus areas include:

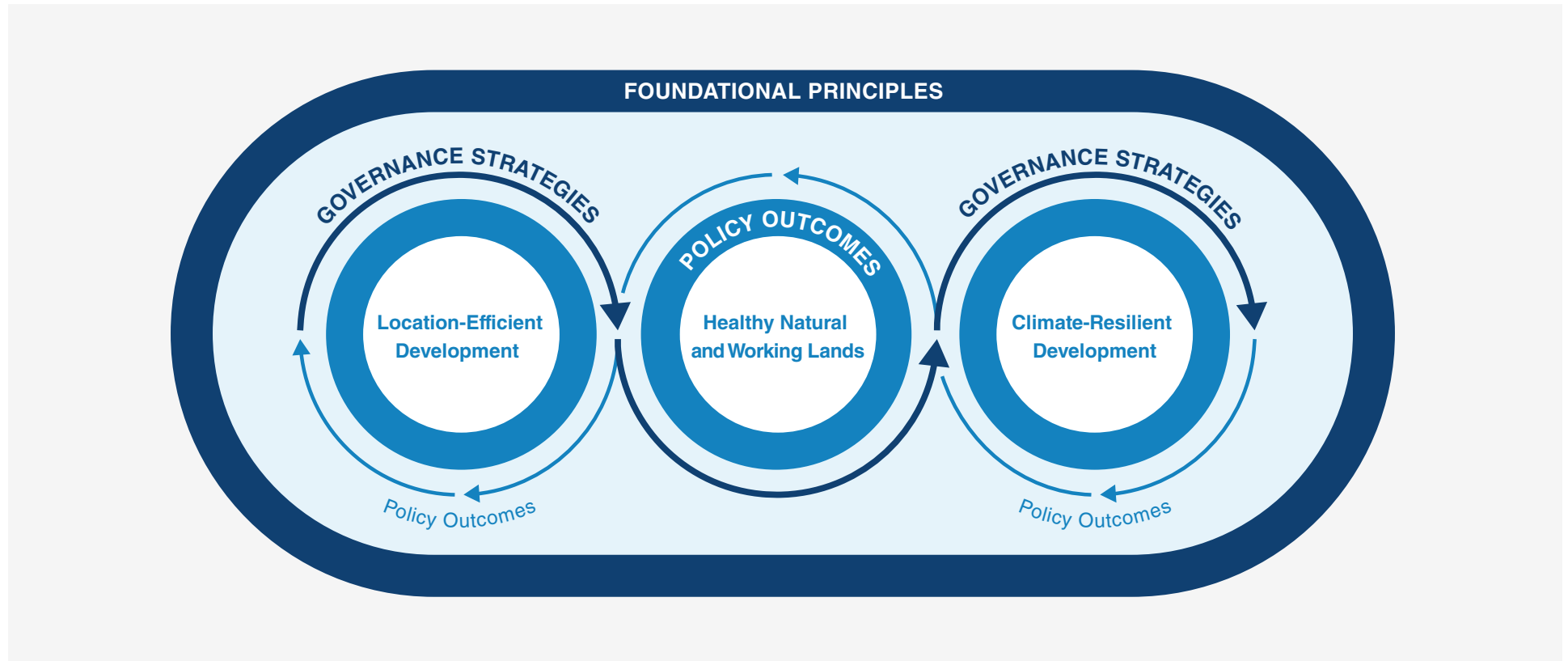
1. **Location-Efficient Development:** The design and development of communities and infrastructure in a manner that reduces GHG emissions while avoiding the conversion of natural and working lands (NWL).
2. **Healthy Natural and Working Lands:** Land use decisions that enhance the ability of NWL to deliver emissions reductions, carbon sequestration, and climate adaptation benefits while remaining ecologically functional and viable.
3. **Climate-Resilient Development:** The intentional design and development of communities and infrastructure to make them more resilient to a changing climate, reduce their exposure to extreme weather events, and help keep people safe from harm.

Similarly, the Governance Strategies section includes approaches states can use to facilitate climate- and land use-informed decision- and policymaking. These strategies include:

1. **Cross-Sectoral and Intergovernmental Planning:** Establishing practices that foster cross-sectoral and intergovernmental collaboration around common goals to address the climate crisis through land use.
2. **Data-Driven Planning and Decision-Making:** Using tools to guide, measure, and evaluate the impacts and benefits of potential land use policy interventions and create decision frameworks to determine which policies best support climate and land use efforts.
3. **Stakeholder Partnership and Engagement:** Creating partnerships and working with stakeholders to shape, advance, and communicate the benefits of climate and land use planning.

Using the Foundational Principles, Policy Recommendations, and Governance Strategies detailed in this Guide, states can build on this Framework, which supports efforts to protect NWL, maximizes emissions reductions, and builds ecosystem and community resilience.

FIGURE 1 Framework for conceptualizing climate and land use planning in the Guide



**Foundational Principles
foster systems thinking.**

1. Reduce Greenhouse Gas Emissions, Sequester Carbon, and Improve Climate Resilience
2. Protect Natural and Working Lands
3. Transform Systems to Build Social Equity

**Policy Outcomes
establish a long-term vision.**

1. Location-Efficient Development
2. Healthy Natural and Working Lands
3. Climate-Resilient Development

**Governance Strategies
facilitate and realize policy outcomes.**

1. Cross-Sectoral and Intergovernmental Planning
2. Data-Driven Planning and Decision-Making
3. Stakeholder Partnership and Engagement



2. Foundational Principles

The Foundational Principles of land use planning in this Guide help encourage systems thinking and collaborative action around climate and land use policies. They inform recommendations for states to consider as they establish and move toward land use planning goals. Using these principles better positions states to understand the implications of various policy actions and to overcome challenges they may face in achieving long-term policy success.

2.1	Reduce Greenhouse Gas Emissions, Sequester Carbon, and Improve Climate Resilience	12
2.2	Protect Natural and Working Lands	15
2.3	Transform Systems to Build Social Equity	16

2.1 Reduce Greenhouse Gas Emissions, Sequester Carbon, and Improve Climate Resilience

Prioritizing emissions reductions, carbon sequestration, and climate resilience across all sectors is critical to land use planning that helps realize climate goals. Doing so can also provide significant co-benefits that enhance quality of life in communities. States may encounter trade-offs in realizing emissions reductions and resilience across sectors and in balance with other state goals. Systematic approaches to informed decision-making, cross-sectoral and intergovernmental collaboration, and stakeholder engagement can help facilitate achieving climate goals and objectives. The following are emissions benefits by sector, along with resilience benefits of integrating climate considerations into land use planning efforts.

Transportation

Location-efficient development (LED) policies provide for community design, development, and infrastructure investments that bring people, destinations, and services closer together. In practice, LED translates to more compact land development that enables and supports greater multimodal and lower-carbon transportation, such as active transportation, micromobility, and public transportation. This reduces the need for, and length of, car trips, which reduces vehicle miles traveled (VMT) and thus emissions.¹ Creating communities where people can live, work, shop, and access services within proximity, such as transit-oriented development (TOD), helps reduce reliance on cars, expand transportation choice, and provide opportunities to improve physical and mental health outcomes in the process.^{2,3,4}

LED policies also support and complement vehicle electrification efforts. Zoning and permitting reforms can facilitate faster deployment of electric vehicle (EV) charging

infrastructure. Shorter-range, light-duty EVs with a lower total cost of ownership may become a more practical EV option for consumers as driving distances decrease,⁵ helping make EV ownership more affordable and accessible while combating concerns around range anxiety. Reduced driving demand will also reduce the amount of needed materials and critical minerals for all types of light-duty vehicles,^{6,7,8} helping to avoid associated manufacturing and end-of-life processing emissions while increasing critical mineral availability for other battery applications (e.g., medium- and heavy-duty EVs, grid energy storage). Additionally, as more consumers adopt EVs, reduced driving demand from more compact development will decrease charging loads on power grids.⁹

Siting development and transportation infrastructure away from high climate risk areas also creates opportunities for more compact development in lower-risk areas, reducing transportation emissions and improving community resilience. Efforts to leverage nature-based solutions (NBS) can help increase access to natural amenities in more compactly developed communities, improving quality of life and providing opportunities to improve active transportation safety outcomes.^{10,11,12}

Power and Industry

Within the power and industry sectors, several states have established renewable energy standards, 100 percent clean energy goals, and programs for carbon capture and storage, along with hydrogen and biofuel production and transportation. These initiatives may include location efficiency considerations, such as how and where to site zero-emissions infrastructure (ZEI) to complement efforts to protect NWL and maximize benefits to ecosystems and communities. Such initiatives must balance these efforts

against the need to deploy these technologies at the rate required to meet climate and energy goals. Distributed energy resources, such as onsite solar, battery storage, and associated management systems, can encourage homeowners, businesses, and other facilities to produce and store energy onsite, reducing demand for grid electricity. These efforts help reduce the large-scale generation and transmission capacity needed to meet clean energy goals, as well as excess land consumption.

More compact development also encourages greater resource efficiency by reducing the emissions associated with manufacturing building and infrastructure materials such as concrete, steel, glass, and asphalt, as well as those from infrastructure operations and maintenance. Location-efficient communities require less infrastructure development for their maintenance versus location-inefficient communities where buildings are spread out and infrastructure requirements such as roads, water, sewer, and power are greater to serve fewer people on a per-mile basis.^{13,14,15} Similarly, co-located industrial facilities (industrial clusters), particularly those that support ZEI, can leverage shared infrastructure and resources, and increase process efficiencies, to help reduce emissions and advance decarbonization solutions.^{16,17}

Natural and Working Lands

Siting development away from areas at high risk for climate impacts and ecologically sensitive areas is highly complementary to advancing NWL sectoral goals. Limiting the conversion of NWL and encouraging development in strategic areas helps maintain natural carbon sinks, protect water sources and water quality, maintain floodplains, and preserve habitat for biodiversity. More compact development patterns and co-location of assets and facilities help reduce development pressure on NWL, particularly where development on already developed or disturbed lands is prioritized over greenfield development.ⁱⁱⁱ Transportation investments that better support compact development also reduce pressure to develop NWL for roadways and highways.¹⁸

Preserving and restoring NWL for their resiliency benefits enhances their ability to support carbon sequestration, habitat and species resiliency, biodiversity, and natural

resource-dependent industries such as farming, fishing, and forestry, as well as other intersectional goals. Natural areas help reduce energy and other resources required to treat drinking water sources. When conversion is unavoidable, prioritizing native plantings and vegetation cover advances emissions reductions and improves carbon storage in NWL. Additionally, maximizing NBS and increasing access to natural amenities in urban areas provides opportunities for physical exercise, social interaction, and quiet that improves quality of life and increases livability in more compactly developed communities.^{19,20}

Buildings

Location efficiency encourages energy- and resource-efficient building development. It reduces upstream emissions from materials because compact housing is often less material intensive,²¹ and can reduce operational emissions through more efficient building types, such as smaller housing units that consume less energy.²² Increasing opportunities for LED can provide communities with a mechanism to construct more buildings with stronger building codes and more efficient appliances. These opportunities offer health and safety benefits, increased energy efficiency, and the opportunity to support the Alliance goal of deploying at least 20 million heat pumps by 2030.²³ LED also creates opportunities for networked geothermal in building heating and cooling applications, which can be more energy efficient than conventional air-source heat pumps and reduce demand for additional grid generation and distribution.²⁴ Additionally, LED reduces water consumption by decreasing water use for lawn and landscape irrigation and reducing non-revenue water losses and associated wasted energy from leaking pipes.²⁵

Efforts to improve community resilience also offer energy-efficiency benefits for buildings. For example, urban tree planting provides a climate resilience function through evapotranspiration, which cools air and shades buildings, improving operations efficiency and reducing energy demand for cooling. Encouraging heat-resilient design in buildings can also improve building energy efficiency and weatherize homes.

ⁱⁱⁱ For purposes of this Guide, greenfield development is synonymous with the conversion of NWL (i.e., “greenfields”) to non-NWL uses.



Resilience

More compact development patterns reduce community climate exposure by decreasing the need for developments in areas that are highly susceptible to climate impacts, such as floodplains, wetlands, and the wildfire-prone wildland-urban interface (WUI).²⁶ Compact development, particularly with integrated green infrastructure, helps lessen the severity of extreme weather events on a regional scale and mitigate:

- Extreme heat and urban heat island effects, by decreasing the amount of developed land area that can absorb and amplify solar heat.²⁷
- Flooding severity, by decreasing the overall amount of impervious cover in watersheds and creating more permeable surfaces that can absorb, retain, and slowly release rain and floodwater.²⁸
- Declining water quality and quantity, by decreasing impervious cover and reducing stormwater runoff, as well as reduced pressure on green infrastructure.²⁹

Reducing car dependency and driving distances through more compact development can also mitigate urban heat island effects, since internal combustion engine vehicles radiate heat during and after operation.³⁰ Even when consumers drive more EVs powered by clean electricity, modeling suggests that a reduction in car dependency still contributes to reduced urban heat island effects.³¹ Additionally, siting power and industrial infrastructure away from high-risk areas, planning for climate-related disruptions, deploying hardening strategies like buried power lines, and mitigating risk in coastal zones when their development is unavoidable helps protect critical assets and investments built specifically for clean energy generation, distribution, and manufacturing. For example, planning for proper transmission siting and protection can reduce the need for public safety power shutoffs in conditions with increased wildfire risk, helping improve grid reliability when clean energy loads are added to transmission and distribution systems. These practices also protect community and ecosystem health by reducing the risk of unintentional releases of hazardous materials into the environment.

Improving the health of NWL contributes to improved resilience outcomes and mitigated risk. Wetlands can absorb energy and floodwaters to reduce adjacent and downstream flooding. As precipitation increases and sea levels rise, strategic NWL protection allows inland migration of coastal wetlands and preserves freshwater wetlands for their

hydrologic and habitat values, contributing to greater community resilience against storm surge force during extreme weather events. Natural areas also help protect water sources that may be in greater demand during drought. Healthy NWL practices such as regenerative and climate-smart agriculture improve the resilience of communities that depend on working lands protected through state land use policy decisions. NWL also ensure that residents have environments in which to recreate, which is important for mental and physical health.

At the community- and site-level, integrating natural features like native plantings, urban trees, and green roofs — and preserving natural drainage and stormwater pathways where possible — creates opportunities to increase resilience at smaller scales. Reducing impervious cover and the implementation of green infrastructure to avoid, reduce, or manage stormwater pollution helps to enhance water quality, protecting drinking water sources and supporting aquatic, marine, and terrestrial resources. Deploying heat-resilient design measures and technologies like heat pumps can achieve GHG emissions reductions and strengthen community resilience by making cost-effective cooling more available during heat waves. Because LED helps reduce water consumption, it empowers communities to better manage and conserve their water resources.

More compact development may also improve disaster response outcomes. Removing barriers to location-efficient and transit-oriented housing production helps people and communities displaced by natural disasters and mitigates housing affordability challenges after these disasters.³² Compact development can increase access to multimodal mobility options and increase redundancy in transportation networks, making communities less reliant on a single transportation mode or route in the network before, during, and after extreme weather events.³³ LED also makes it easier for community members to access critical services and resources such as cooling centers and resilience hubs, helping reduce their vulnerability.³⁴

2.2 Protect Natural and Working Lands

NWL are one of the most cost-effective and enduring solutions to the climate crisis. Framing climate and land use planning around their protection encourages more efficient use of land by prioritizing development opportunities in existing communities and on lands that are already developed or disturbed. Strategies such as LED can also help protect NWL by limiting greenfield development.

Protecting NWL preserves their climate benefits, and land use planning that prioritizes NWL maintenance helps protect communities from potential impacts associated with their conversion, including lost carbon storage, degraded ecosystem health and biodiversity, loss of access to nature and recreation, and less storage of floodwater and water filtration, among others. Protecting these lands to preserve their carbon, ecosystem, and extreme weather resilience services can also help communities and states reach their climate goals, protect built infrastructure, and reduce disaster recovery costs. As noted previously, climate-resilient development can advance efforts to protect NWL by leveraging their resiliency benefits and ability to mitigate impacts from extreme weather events.

Engaging state agencies, local and regional governments, Tribes, community partners, and other stakeholders with substantial interest in NWL in conversations about climate and land use policies offers opportunities to consider challenges and solutions for NWL protection across all sectoral planning processes. Preserving NWL not only supports efforts to achieve robust climate goals but also supports the health of native plant and animal species, promotes biodiversity, and strengthens ecosystems. Greater collaboration and decision-making frameworks across sectors and between levels of government can build a wider base of support for protecting NWL in a climate-aligned



manner. Intergovernmental and cross-sectoral coalitions can leverage comprehensive resources and policy tools to support climate and land use efforts that benefit NWL and achieve climate goals.

2.3 Transform Systems to Build Social Equity

A social equity focus in climate and land use policies helps ensure that communities most at risk from climate change impacts remain centered in discussions of the benefits of climate action. Communities of color and low-and moderate-income (LMI) communities are disproportionately exposed to climate risk and are overburdened by climate impacts in part because of discriminatory land use policies. Incorporating climate into land use policies creates opportunities for states to address historical injustices stemming from past discriminatory land use policy decisions and practices. It also helps ensure that future land use decisions do not further perpetuate these inequities. Designing policies with vulnerable communities in mind can lead to more sustainable and resilient climate solutions in the long term.

The current U.S. housing shortage has raised the profile of LED practices in many states interested in reducing barriers to housing development and increasing housing supply.^{iv} With greater housing development on less land, compact development creates conditions that allow increased affordable housing availability and production, particularly housing that is more energy efficient and thus more cost effective. LED also increases access to more affordable multimodal mobility options, giving those who cannot drive (due to disability, age, or other conditions or barriers) or cannot afford car ownership broader access to employment opportunities, as well as goods and services, even in rural communities.³⁵ LED also creates opportunities to reduce disparities in public

iv Several examples exist, but for illustrative purposes some of these include: Colorado Office of Governor Polis, “[More Housing Now: Governor Polis Signs Bills to Legalize ADUs and Create More Housing Near Transit](#),” May 13, 2024; Maine Office Of Governor Mills, “[Governor Mills Signs Bills to Address Maine’s Housing Shortage](#),” April 27, 2022; Maryland Office of Governor Moore, “[Governor Moore Signs Housing Legislation to Make Maryland More Affordable](#),” April 25, 2024; Washington Office of Governor Inslee, “[Washington “goes big” on housing in 2023](#),” May 8, 2023.

school performance and increase student access to higher-performing public schools.³⁶ With housing and transportation costs comprising about 50 percent of an average American household’s expenditures,³⁷ LED practices help reduce the cost of living for all households, particularly LMI households. These practices also begin to address historical injustices stemming from past discriminatory land use and zoning policy decisions.^{38,39} LED efforts that leverage robust stakeholder engagement can help alleviate gentrification pressure and improve quality of life in communities while avoiding displacement.⁴⁰ This can help preserve the cultural identity of communities and avoid negative impacts associated with potential relocation to less location-efficient places.

LED strategies provide an opportunity to transform energy systems to build equity and achieve multiple climate and social objectives. Distributed energy systems such as rooftop solar on LMI households, recently boosted in 23 Alliance member states by the Solar For All program,⁴¹ can reduce household energy costs while reducing the need for new power generation or distribution. Building renewable energy facilities on previously disturbed lands, such as abandoned mines or brownfields, helps maximize land efficiency and turn blighted lands into community assets. These building practices can also address environmental injustices, potentially creating new jobs and economic development opportunities in communities. Pairing such practices with community solar programs can help consumers save money on energy bills if they are unable to install solar panels on their roofs. Community benefits agreements in clean energy project development increase opportunities to support a just transition and other equity benefits to communities.



NWL and NBS can support and build social equity by providing access to green spaces and local food sources, improving water and air quality, supporting rural and natural resource-dependent jobs, and increasing community resilience by mitigating urban heat, flooding, and other climate impacts. Greater access to natural amenities and facilities like parks and green spaces is also linked with improved mental and physical health.⁴² Yet access to nature and its benefits is distributed unequally across race and income.⁴³ For example, neighborhoods “redlined” under racially discriminatory housing policies from the 1930s through the 1960s tend to have less urban tree canopy today and are more vulnerable to extreme heat events.⁴⁴ Policies outlined in this Guide can support state efforts to address these and other access and equity issues in land use. These may include programs and funds that support equitable access to NWL, alongside conservation and restoration programs such as Great Outdoors Colorado,⁴⁵ California’s Outdoor Equity Grants Program,⁴⁶ and the New Mexico Outdoor Equity Fund.⁴⁷ Protecting healthy NWL supports good water and soil quality and healthy drinking water for communities — particularly important issues in many disadvantaged communities.

While climate change affects all communities, LMI and disadvantaged communities bear a disproportionate share of these impacts and historically have fewer household and community resources to recover from disasters.⁴⁸ More climate-resilient development provides opportunities to address marginalization of LMI populations and disadvantaged

communities. These communities are often located in areas more prone to climate risk (such as floodplains), lack other protections afforded to more moderate- or higher-income communities (such as urban tree canopy), or are overburdened by poor air quality and pollution.

Transparent public processes to engage a range of state agencies, local and regional governments, and community partners on climate change and land use policies — and in developing equity-centered land use approaches — will help expand understanding of social equity’s value in realizing long-term decarbonization goals and community resilience. These strategies will also enable states to better measure the equity implications of their work and foster deeper engagement with decision-makers in LMI and disadvantaged communities. Intergovernmental planning can help encourage collaboration between non-traditional partners; for example, between social service-focused departments and infrastructure departments, elevating the visibility of equity considerations in governance. Additionally, these strategies help facilitate state efforts to ensure that the needs of LMI communities are addressed in land use planning and help empower these communities to realize climate and land use goals.



3. Policy Outcomes

Policy Outcomes reflect the results of implementing the climate and land use planning practices detailed in the Guide, in accordance with each Foundational Principle. For each Policy Outcome, this Guide provides:

Overview: A high-level overview of the policy outcome the approach seeks to accomplish.

Policy Options: Policies that states can adopt and implement to achieve specific climate and land use outcomes, along with examples of policy approaches states have used.

3.1	Location-Efficient Development	19
3.2	Healthy and Resilient Natural and Working Lands	29
3.3	Climate-Resilient Development	34

3.1 Location-Efficient Development

Overview

Location-efficient development (LED) addresses the siting, development, and design of communities and infrastructure in a way that reduces GHG emissions and avoids the conversion of NWL. This approach prioritizes development and siting outcomes that:

- Improve land use efficiency, including minimizing land areas required to support development through more compact development, infill development, or co-location, as well as use of existing assets and infrastructure.
- Improve resource use efficiency in the process by reducing the amount of energy, water, materials, and other infrastructure needed to support development.

While the terms “location efficiency” and LED may be more commonly understood in the context of community and urban planning, and subsequently in transportation-sector decarbonization efforts,⁴⁹ this Guide also applies the idea of location efficiency in ZEI efforts, such as clean and renewable energy infrastructure siting, given the similar barriers and approaches to implementing LED efforts. Given the scale of clean energy deployment needed to meet state climate and clean energy goals, states may need to prioritize ZEI expansion over the protection of NWL in some areas while also considering impacts such as consumer electricity affordability. The policy recommendations in this Guide can help states leverage their efforts and minimize the need for NWL conversion for clean energy and other ZEI siting.

Policy Options

3.1.1

Leverage regulatory and legislative tools to remove barriers to location-efficient housing and infrastructure

Zoning and land use decisions are often controlled at the local level. Yet states have legislative and regulatory authorities that can reduce or remove barriers to LED. States can consider a suite of legislative actions and zoning reforms to overcome these barriers. In the transportation sector, approaches to reducing barriers may include revising single family-only zoning by allowing up to a certain number of units on single-family lots or allowing accessory dwelling units as a permitted use in most residential zones. Other approaches include eliminating or reducing minimum parking requirements, and allowing housing development in non-residential zones such as commercial or office zones, adaptive reuse, or on properties owned by faith-based institutions. States could explore opportunities outlined in the American Planning Association’s *Equity in Zoning Policy Guide* to address barriers associated with lot and building dimensional standards, including minimum setbacks, maximum building coverage, maximum building heights, and minimum lot sizes to more readily allow the construction of affordable housing options in communities.⁵⁰ Vermont’s Act 47, the *HOME Act*,^v as an example, establishes a state-level minimum lot size requirement of at least five dwelling units per acre for residential lots located in areas served by municipal water and sewer infrastructure.⁵¹

v The HOME Act also includes several of the housing-related zoning reforms described in this section.

Reforms in existing communities and designated growth areas — such as those already served by water and sewer infrastructure — can further encourage infill development. States may choose to target reforms in strategic locations, such as allowing mixed-use or large multifamily housing development within a certain distance of public transportation stops or stations, or within a certain distance of a community’s central business district. Such reforms can include efforts to allow, or explore, building code changes that make it easier and more affordable to construct a wider range of multifamily buildings on a greater number of parcels, such as allowing single-stair multifamily buildings.⁵² States could also explore opportunities to translate the recommendations outlined in the U.S. Department of Housing and Urban Development’s *Eliminating Zoning Barriers to Affordable Housing Guidebook* into municipal practice.⁵³ Several states, including non-Alliance members, have leveraged these approaches, which serve as models to inform state-level efforts elsewhere.

For ZEI in the power and transportation sectors, state-level efforts may include streamlining permitting for electric vehicle charging infrastructure and renewable energy generation, preempting local regulation on certain types of renewable energy and battery storage project siting, designating EV infrastructure as allowable uses in zoning districts, and requiring EV make-ready infrastructure in new buildings. As an example, Michigan’s PA 233 creates a state certification process to streamline the deployment of renewable energy generation and storage projects.⁵⁴ This process preempts local regulation of these facilities while also supporting local government authorities where those authorities do not exceed state certification standards. As part of the state’s construction certification process, applicants seeking to build renewable energy facilities on undeveloped land must identify feasible alternative developed locations, such as vacant industrial property and brownfields, and indicate why they were not chosen. In Illinois, HB 4412,⁵⁵ which also preempts local regulation of commercial wind and solar energy facilities as part of facilitating implementation of SB 2408 (the *Climate and Equitable Jobs Act*),⁵⁶ allows local governments to regulate these facilities as long as regulations are not more restrictive than what is outlined in statute. New Jersey’s S3223,⁵⁷ which establishes numerical requirements and zoning standards for the installation of EV supply equipment and make-ready parking spaces, requires municipalities to adopt a model EV zoning ordinance developed by the state.⁵⁸

States could also streamline permitting approval processes for LED-compatible projects. For example, “by-right” approval processes do not require discretionary review (approval by a public body subject to public hearings and potentially subjective approval criteria) if they strictly conform to zoning or development regulation. By-right can be effective in supporting LED because it lowers development costs by streamlining permitting and increasing the pace of implementation. States can set by-right policies and regulations to establish consistent statewide thresholds and criteria that align with and support state climate mitigation and adaptation priorities. California’s AB 2011,⁵⁹ which allows the development of housing projects in areas zoned for office, retail, or parking uses, requires a ministerial review process (not subject to discretionary review) if projects meet specified objective site standards and affordability criteria. Additionally, states may consider other opportunities to streamline permitting for LED-compatible projects, such as in any state-specific environmental review requirements. Washington’s SB 5412 authorizes counties and cities to consider infill development or housing development in designated growth areas to be “categorical exemptions” under the State Environmental Policy Act and exempt these projects from completing an environmental review.⁶⁰ States could also set timelines for review, such as California’s AB 2221, which requires permitting authorities to complete review of accessory dwelling units within 60 days.⁶¹

Policymakers may also consider complementary policy, education, and awareness strategies to address community concerns and increase the likelihood of equitable outcomes using these regulatory and legislative tools. These opportunities help create buy-in in affected communities and can improve or refine policy approaches that accomplish similar goals.

3.1.2

Develop programs and policies to mitigate displacement

While more LED-aligned housing can improve overall housing affordability, it may create displacement pressure on LMI residents and businesses in localized areas, and result in the loss of existing affordable housing stock.⁶² Linking LED efforts with strategies to preserve housing affordability in existing communities can help states avoid these effects and realize more equitable outcomes. States can explore program funding opportunities,

and create guidance and develop resources for regional and local governments to better integrate these considerations into their work. One such example is the Washington State Department of Commerce's *Guidance to Address Racially Disparate Impacts*,⁶³ which provides guidance to communities in implementing new planning requirements in HB 1220,⁶⁴ and helps examine and address racially disparate impacts, displacement risk, and exclusion in housing policies and regulations. Similarly, states can establish and develop frameworks and metrics to assess displacement vulnerability at the state level. A white paper prepared for the California Air Resources Board summarizes the effectiveness of different anti-displacement strategies and offers guidance that other states may implement.⁶⁵ Other opportunities include deeper engagement with community members to inform community change,⁶⁶ along with the stakeholder and partner engagement strategies outlined in section 4.3, Stakeholder Engagement and Partnership, on page 55.

Establishing requirements and incentives for state grant and investment programs or exploring opportunities through other protections for displacement-vulnerable households are approaches states may take. States could establish funding requirements or scoring criteria in grant programs based on local government implementation of measures such as:

- Anti-displacement plans and policies.
- Inclusive zoning practices.
- Training programs that build capacity for local affordable housing developers.
- Data collection and monitoring and tracking systems.
- Rental and business protection programs.
- Tax exemptions for long-time homeowners in areas vulnerable to displacement.
- Support for community land trusts and community land banks.
- Other social support programs.

Tailoring requirements and incentives to target areas with higher displacement risks and challenges can help states protect these communities. States can also consider how to support local government implementation of any of these measures, particularly in lower-resourced areas, to improve access to such funding opportunities.

3.1.3

Encourage siting of infrastructure in ways that minimize land conversion

LED concepts can be applied to renewable energy siting such as wind farms, solar installations, hydroelectric facilities, geothermal plants, and transmission, as well as other infrastructure like carbon capture and storage facilities, through state siting frameworks that minimize negative impacts and maximize benefits for ecosystems and communities. Assessing environmental, social, economic, and technical factors and considerations helps ensure that renewable energy siting and transmission infrastructure supports and aligns with state land use and conservation priorities.

One such strategy involves leveraging existing assets and infrastructure to maximize generation and transmission capacity while minimizing the need to convert NWL. This can include deploying reconductoring, grid-enhancing technologies, co-location of infrastructure in existing rights-of-way, and identifying opportunities to install facilities on previously developed or disturbed lands, such as rooftops, landfills, brownfields, or abandoned mines. The latter set of policies can provide equity benefits by reducing household electricity bills, addressing environmental injustices, providing households with access to on-site energy generation and storage through decentralized solar during power outages, and creating new jobs and economic development opportunities. For example, New Jersey's A3352 requires newly constructed warehouses to be solar-ready buildings.⁶⁷ Pennsylvania's *Grid-Scale Solar Siting Policy Statement* prioritizes reuse and repurposing of previously impacted lands for hosting grid-scale solar development.⁶⁸ The state's Department of Environmental Protection, which conducted an *Assessment of Solar Development on Previously Impacted Mine Lands in Pennsylvania*,⁶⁹ has deepened its understanding of the challenges and opportunities associated with solar development on previously mined lands. Massachusetts also published a guide targeted to municipalities on developing solar photovoltaics on landfill sites.⁷⁰ Additionally, the Minnesota Department of Transportation (DOT) constructed a community solar garden on agency property at a former gravel pit site⁷¹ and worked with partner organizations on a feasibility study of co-locating high-voltage direct current transmission lines and broadband in highway rights-of-way.⁷² This feasibility study informed updates to statute to allow the construction, placement, and maintenance of high voltage transmission lines along highway rights-of-way.^{73,74}

Renewable energy technologies — such as offshore wind, solar-over-canal projects, micro hydropower projects in existing man-made waterways, and floating solar on man-made water bodies — may offer feasible alternatives to land-based generation infrastructure. States can also encourage agrivoltaics practices, which co-locate agriculture and solar energy production. These practices can keep active agricultural and farmlands in production, potentially increasing yields for some crops and supporting livestock grazing while increasing solar panel efficiency.⁷⁵ New York State has compiled resources and information on agrivoltaics best practices and applications for different agricultural practices.⁷⁶ Other opportunities include exploring the biodiversity of solar sites, as well as solar site management practices that provide biodiversity benefits. Minnesota’s Habitat Friendly Solar Program,⁷⁷ which was initially created through HF 3353,⁷⁸ supports the establishment of habitat for pollinators, songbirds, and other species, in addition to project co-benefits such as water management, grazing, and soil health.

Statewide analytical frameworks can help states identify suitable and unsuitable locations for infrastructure siting to avoid NWL conversion and minimize climate and other impacts. Strategies can include examining where conversion of NWL for ZEI may negatively impact equity and identifying opportunities to avoid NWL conversion unless environmental and equity impacts from these conversions are effectively mitigated. The Nature Conservancy conducted spatial modeling of potential future clean energy developments in a report and found it is possible to achieve net-zero goals nationally when expanding clean energy production while minimizing impacts to the environment and communities.⁷⁹ Their modeling also indicated that substantial clean energy expansion can be achieved with a 70 percent reduction in environmental and community impacts compared to a baseline “business-as-usual” scenario. Their report also found that there is no one-size-fits-all strategy for clean energy expansion, and that regional and state-level analyses are necessary to identify the most appropriate solutions for different regions.

Other opportunities for states to explore include supporting the deployment of networked geothermal systems for interconnected ground-source heat pumps for district and community-scale heating and cooling applications. Massachusetts has established safety guidelines for this type of infrastructure, funded its deployment, and required local gas distribution companies to evaluate non-gas alternatives rather than invest in new natural

gas infrastructure.⁸⁰ Through SB 1699,⁸¹ Illinois convened stakeholders and developed a *Thermal Energy Network Report*,⁸² which includes information on other state efforts and regulatory frameworks on this topic. In Connecticut, the state partnered with a regional nonprofit to explore workforce development approaches to supporting geothermal growth and technology deployment.⁸³

While siting practices offer opportunities to avoid converting NWL, rural residents and other affected communities may oppose efforts to site renewable energy and battery storage infrastructure. Opposition often reflects concerns about impacts to landowners’ livelihoods and property values, among other reasons. Incorporating engagement strategies such as those described in Section 4.3 Stakeholder Engagement and Partnership in the “Support models of equitable local engagement and community understanding” section on page 57 can help states better understand and address stakeholder issues and concerns that may arise during this work.

3.1.4

Provide funding and other incentives for location-efficient housing projects and infrastructure

States can support transportation decarbonization by implementing a range of funding programs, incentives, and tools that promote sustainable land use practices and foster community-centric development. Strategies include funding investments in areas with high potential for LED and that support the development of more equitable outcomes for affordable housing and transportation access. One example is Pennsylvania’s Department of Community & Economic Development, which manages the Transit Revitalization Investment District program initially established under HB 994.⁸⁴ This program, currently administered through the Municipal Assistance Program,⁸⁵ supports local government planning studies that facilitate TOD and community revitalization efforts. In Vermont, four state agencies^{vi} partner to manage the Better Connections Program, which provides technical assistance and funding to local communities for planning

vi These include the Vermont Agency of Transportation, Department of Housing and Community Development, the Department of Public Health, and the Department of Environmental Conservation.

efforts to increase multimodal transportation options that improve land use, water quality, public health, and economic vitality.⁸⁶ Connecticut's Municipal Redevelopment Authority, empowered through Public Act 23-204,⁸⁷ provides a mechanism for municipalities to receive financial assistance for development projects in housing growth zones or in areas encompassing transit stations or downtowns, if the local zoning regulations facilitate substantial new housing development. Additionally, states could provide funding to communities to support any infrastructure upgrades needed to more easily accommodate compact or infill development, such as the suite of funding opportunities offered through Massachusetts's Community One Stop for Growth application portal.⁸⁸

California's Prohousing Designation Program,⁸⁹ which incentivizes municipalities to pursue housing policy changes that encourage development of housing at all income levels, includes greater location-efficient housing development. Prohousing-designated communities can receive funding under the Prohousing Incentive Pilot program, as well as priority processing or funding points when applying for several state funding programs. Other states could leverage this approach for regional and municipal-level infrastructure investments and grants by providing priority processing or funding points tied to the presence of LED-friendly zoning and land use policies. These incentives may also promote energy-efficient and sustainable development practices, helping ensure that investments further contribute to creating vibrant, resilient, and affordable communities. Alternatively, states may establish requirements for funding programs that make potential applicants ineligible to receive funds if they have policies in place that restrict LED or housing production. As an example, the Massachusetts HousingWorks Infrastructure Program,⁹⁰ established through H.43 and part of the Community One Stop for Growth,⁹¹ limits eligibility for applicants with adopted housing moratoria or other restrictive bylaws that do not allow for at least a five percent increase in housing units over a single year. States may also consider supporting location-efficient housing through incentives or financing oriented toward the private and non-profit sectors. Colorado's HB24-1313⁹² created an affordable housing in transit-oriented communities income tax credit, which is awarded to qualified low-income housing projects located in state-defined transit-oriented communities.

For clean and renewable energy deployment, states have opportunities to incentivize siting in areas that avoid the conversion of NWL. Since electricity grids and land ownership vary substantially across the U.S., the best mix of clean energy technologies

will also vary regionally. Analyses like The Nature Conservancy's Power of Place provide a starting point for states to assess which technologies, land protection considerations, and incentives may be most appropriate for their area.⁹³ Illinois's Coal to Solar Energy Storage Grant Program,⁹⁴ created through the *Climate and Equitable Jobs Act*,⁹⁵ incentivizes the installation of energy storage facilities at five former coal plant sites. To support community solar, states may encourage project siting on already disturbed or degraded lands, or on existing development. Maryland's Community Solar Pilot Program,⁹⁶ for example, creates separate program capacity for systems built on brownfields, parking lots, or industrial areas. Incentive programs to support distributed energy resource deployment, such as Minnesota's Battery Storage Incentive Program, which funds battery storage systems that are paired with solar energy systems, are also options.⁹⁷ States could offer incentives to encourage clean energy projects with robust ratepayer benefits and community benefits agreements that increase buy-in for these projects and create more equitable outcomes. The U.S. Department of Energy has created a Community Benefit Agreement Toolkit,⁹⁸ which provides guidance and resources for interested state and local officials on encouraging and increasing these practices in clean energy project development efforts.

3.1.5

Integrate location efficiency requirements and considerations in local and regional planning

Since states enable local governmental land use and zoning authority,⁹⁹ they play an important role in establishing requirements for local and regional plans and zoning codes through legislation and regulation. States could require or otherwise encourage local and regional governments to integrate LED in their land use and transportation planning processes and documents. Such efforts can include requirements to prioritize development in existing communities, transit-rich areas, or in designated location-efficient areas; requirements to specifically reduce transportation-sector emissions by leveraging integrated transportation and land use planning; and establishing statewide land use goals around renewable energy production that municipalities must consider in their comprehensive planning efforts. States could also enable local government efforts by defining goals, requirements, and implementation starting points, and by offering

regulatory relief and resources such as tools and guidance, model codes and ordinances, and technical assistance to execute this work. For example, Vermont developed a zoning guide to expand housing opportunities in and around designated centers,¹⁰⁰ and provides funds to municipalities through the Bylaw Modernization Grants program, to implement best practices and help address the state's housing crisis.¹⁰¹ See page 44 for additional examples of support for climate action in local and regional planning.

3.1.6 Support and link investments in transportation infrastructure and accessibility with climate and land use

Land use and transportation are intrinsically linked. Changes in land development patterns affect transportation options and demand and can shift travel behavior and patterns. Investments in, and changes to, transportation infrastructure affect land values and influence land use development patterns. Transportation-related LED practices included in this Guide focus on creating conditions for greater multimodal transportation use. Yet including transportation planning considerations in broader climate and land use efforts helps ensure the latter's success. Efforts to support multimodal infrastructure and better link transportation and land use planning, in turn, support LED efforts.

California DOT's *California Transportation Plan 2050* highlights the importance of such integrated planning.¹⁰² The plan notes that by combining more efficient land use strategies with transportation-related strategies, greater VMT reduction benefits can be achieved than by individual VMT reduction strategies. While transportation agencies may not typically have a leading role in land use decisions, their decisions can affect where and how land is used and developed. Minnesota DOT recognized this in its *2022 Statewide Multimodal Transportation Plan* and identified a series of actions to support integrated planning,¹⁰³ as have other state DOTs seeking to support investments in multimodal infrastructure. For example, the Oregon DOT, in partnership with the Department of Land Conservation and Development, manages the Transportation and Growth Management Program to help local governments across Oregon plan long-term, sustainable growth in their transportation systems.¹⁰⁴ The program, primarily funded through federal transportation dollars, provides grants to support planning efforts that link land use and transportation.

Public transportation service in general creates a "land use effect" that can encourage more LED. Research from the Transportation Research Board found that U.S. cities would need to consume 37 percent more land area to house their populations if public transportation service was nonexistent.¹⁰⁵ Essentially, public transportation service confers enough accessibility benefits to encourage households and businesses to locate nearby, encouraging more compact development, as noted in a 2009 study by the Metropolitan Transportation Authority, a public benefit corporation of New York State, which evaluated the emissions benefits of the Authority's service.¹⁰⁶ Supporting public transportation through investments in system operations, service improvements, or expansions could create new opportunities for transit-oriented development (TOD) and encourage more efficient use of land and lower carbon mobility options. Additionally, states could consider supporting TOD in conjunction with these investments, improvements, or expansions in public transportation service, such as the coordinated efforts across four different Maryland agencies^{vii} to help local governments realize their TOD goals,¹⁰⁷ and North Carolina's *S-Line TOD Study* and ongoing Mobility Hub Plan development for the intercity passenger rail S-Line Project.¹⁰⁸

States could explore opportunities to leverage land use policies to advance transportation safety and reduce the exposure, likelihood, and severity of crashes, such as the integration of a Safer Land Use Planning element in Washington's Safe System Approach to allow people to get where they want to go using any mode of travel, including walking, rolling, and transit.¹⁰⁹ Efforts to promote safe walking and bicycling environments in and around transit station areas can encourage more people to safely access amenities and transit service and reduce car travel between destinations. In smaller and more rural communities that may not have the same high-capacity transit service as larger communities, supporting bicycle and pedestrian infrastructure upgrades and accessibility can complement LED efforts by creating safer and more welcoming environments for people to walk and bike, rather than drive, between destinations. In Delaware, SS 2 for SB 130,¹¹⁰ which created a process for local governments to work with the Delaware DOT (DeIDOT) to establish Complete Community Enterprise Districts that foster more compact development, also required DeIDOT to make transportation improvements in districts to support active and public transportation use.

vii These include the Maryland Department of Housing and Community Development, the Department of Planning, the Department of Transportation, and the Department of Commerce.

Other approaches for consideration include multimodal accessibility analysis or Complete Streets policies and programs to foster transportation networks that better align with LED frameworks. For example, the Washington State DOT (WSDOT) measures multimodal accessibility in its work.¹¹¹ The state's HB 1071 established a Complete Streets Grant Program, administered by WSDOT, that encourages local governments to adopt their own Complete Streets ordinances.¹¹² In addition, SB 5974 requires WSDOT to include Complete Streets elements in all state transportation projects with a budget greater than \$500,000.¹¹³ In 2014, Virginia enacted HB 2,¹¹⁴ which established a new SMART SCALE transportation project prioritization framework for the Virginia DOT that includes criteria around land use coordination.¹¹⁵ These criteria score transportation projects higher if they facilitate pedestrian access to a variety of destinations. Similarly, the California DOT's System Investment Strategy, which updated the department's project evaluation and nomination process to better identify and promote multimodal, climate-friendly projects in funding decisions, includes scoring criteria around land use and NWL that allow projects to score more highly if they facilitate more non-single occupancy vehicle travel in certain jurisdictions or create new high-quality transit areas across the state.¹¹⁶

Multimodal transportation projects can complement LED efforts; however, roadway capacity expansion projects are more complementary to auto-oriented development and run counter to LED efforts, especially since more dispersed settlement patterns generally require more roadways.¹¹⁷ Impacts vary among project types, yet roadway capacity expansions primarily serve cars and generally increase car mobility, consuming more land in the process and making them less aligned with LED frameworks. States can evaluate whether these capacity expansions support LED and climate goals more broadly in relation to the costs they incur and benefits they provide. Colorado's GHG Transportation Planning Standard,¹¹⁸ which implements provisions from SB21-260,¹¹⁹ and Minnesota's Transportation Greenhouse Gas Emissions Impact Assessment Technical Advisory Committee,¹²⁰ which implements provisions from HF 2887 and HF 5247,^{121,122} provide approaches states can consider as part of these efforts.

Case Study

Enabling Transit-Oriented Community Development in Massachusetts



The Massachusetts Bay Transportation Authority (MBTA) Communities program,¹²³ established through Chapter 358,¹²⁴ created multifamily zoning requirements for “MBTA communities” located near MBTA transit stations. Administered by the Executive Office of Housing and Livable Communities, the program fosters dense, transit-oriented residential development by requiring that MBTA communities establish at least one zoning district that permits multifamily housing by-right within a half-mile of a transit stop, such as commuter rail, subway, ferry, or bus. These districts must also have a minimum density of 15 units per acre, with all housing required to be suitable for families with children (no restrictions on age, number of occupants, number of bedrooms, or bedroom size). Failure to comply can make communities ineligible for funds from the Housing Choice Initiative, the Local Capital Projects Fund, or the MassWorks Infrastructure Program, and may reduce their ability to receive funding under other discretionary grant programs.

The Executive Office is currently updating its guidelines and has been working with communities to provide flexibility and alternative pathways for compliance, recognizing that not every community has the same housing supply issues, or the same development needs and capacity.

Case Study

Planning for Climate-Friendly and Equitable Communities in Oregon



In 2022, Oregon's Land Conservation and Development Commission approved the Climate-Friendly and Equitable Communities (CFEC) rulemaking,¹²⁵ which helps realize the directives in Executive Order 20-04,¹²⁶ as well as the state's statutory GHG policy and goals from HB 3543.¹²⁷ Managed by the Department of Land Conservation and Development, CFEC builds on prior regulatory efforts and requires communities in the state's eight most populated metropolitan areas to update their transportation and land use planning processes by requiring the zoning of climate-friendly areas (CFA). In a CFA, residents, workers, and visitors can meet most of their daily needs without having to drive. These areas generally feature mixed-use development that contains a diverse mix of housing, jobs, businesses, and services served by high-quality pedestrian, bicycle, and transit infrastructure. CFEC also includes requirements around reducing parking rules, improving planning for transportation options, and requiring transportation projects to collectively meet climate and equity goals.

CFEC also requires communities to integrate equity considerations into their CFA planning processes through actions such as extensive community engagement and equity analyses to minimize displacement of underserved populations. The Department offers technical assistance and grants to local governments to facilitate implementation and compliance. Assistance for communities beginning this process includes a *CFA Methods Guide*,¹²⁸ as well as an *Anti-Displacement Toolkit*.¹²⁹

Case Study

Balancing Solar Photovoltaic Deployment and NWL Protection in Massachusetts



Photo Credit: National Renewable Energy Lab, DOE InSPIRE

The Massachusetts *Technical Potential of Solar Study*,¹³⁰ released in 2022, established a framework for determining suitable locations for solar photovoltaic deployment while minimizing deployment in NWL. As many as half of existing ground-mounted solar panels in Massachusetts are located on former NWL. With an estimated 27 to 32 gigawatts (GW) of solar energy needed to meet statewide decarbonization targets, continued solar deployment in this manner would result in significant loss of natural carbon sinks and biodiversity.

This study assessed future solar development needs, site selection criteria, and potential impacts on forested lands. Parcels were graded based on stakeholder criteria to determine their suitability for solar development. Considerations included agriculture,

biodiversity, other ecosystem services, embedded carbon dioxide, proximity to electric infrastructure, and slope and aspect. The study found that 152 GW of all technical solar potential is highly suitable, according to site selection criteria. When evaluating potential, 52 GW was identified as the most suitable per selection criteria, indicating that 100 percent of needed solar could potentially be sited on the most suitable parcels.

3.2 Healthy and Resilient Natural and Working Lands

Overview

Healthy NWL provide a variety of key climate mitigation and adaptation services to communities and ecosystems, including carbon storage, flood mitigation, local food, improved air and water quality, habitat support, and more. NWL span a wide range of natural and managed environments, including forests and woodlands, grasslands and shrublands, croplands and rangelands, wetlands, and urban green spaces. NWL are essential to achieving net-zero and other climate goals because they naturally store carbon in plants and soils, provide carbon sinks, and protect and enhance the well-being of communities, economies, and ecosystems. According to the United Nations Environment Program, “By working with nature, we have the potential to reduce emissions by more than a third of what is needed by 2030... without nature, we will not be able to achieve 1.5°C... by 2050.”¹³¹

Recent patterns of human development are a major threat to NWL — between 2001 and 2017, the U.S. lost an estimated one football field or about 1.32 acres — of natural land to roads, buildings, pipelines, and other development every 30 seconds.¹³² Housing development in the WUI, where houses are in close proximity to undeveloped wildlands, grew by 41 percent from 1990 to 2010 and covered 9.5 percent of the contiguous U.S. land area.¹³³ This development increases the likelihood of human-caused wildfire ignitions and vegetation loss. In addition to development stressors, stress from climate change also directly affects the capacity of NWL to provide benefits such as:

- Sequestered and stored carbon.
- Habitat for native, rare, endangered, and other species of concern.

- Clean water and clean air.
- Protection from extreme weather such as flood and drought.
- Resources such as wood and food.
- Economic, cultural, and recreation opportunities.

Future climate impacts and continued development will affect the ability of NWL to provide ecosystem services, cultural and economic benefits, carbon sequestration and mitigation potential, and to support community resilience. States have an opportunity to evaluate the critical role of NWL and incorporate strategies for their protection and management through land use planning across all sectors. States also have opportunities to enhance collaboration on land use and management with Tribes, the original stewards of U.S. lands, including options for co-management and increased access to ancestral lands. See section 4.3, Stakeholder Engagement and Partnership on page 55 for additional details on partnering with Tribes, Tribal Governments, and Indigenous Peoples.

Land use planning that enhances contributions of NWL to climate goals prioritizes outcomes that maintain, enhance, and restore the ability of NWL to:

- Sequester carbon and reduce emissions and warming.
- Support ecosystem and community resilience.

Policy Options

3.2.1

Incorporate NWL and natural climate solutions into state planning and investments

States could develop NWL strategies that chart a clear, consistent vision of the role of NWL in achieving state climate mitigation and adaptation goals. This vision can guide agencies and sectors on state land use planning and investments. Such strategies may identify and define NWL types, as well as identify key opportunities to facilitate and focus land-specific and targeted goal setting and investments. For example, many Alliance members have established conservation targets of 30 percent by 2030 via legislation or executive order. Some states have begun to set goals as far out as 2040 or 2050, such as the 40 percent conservation by 2040 goal outlined in SB 470, the *Maryland the Beautiful Act*.¹³⁴

Once broad conservation or NWL targets are established, states may consider developing more detailed NWL sector goals tailored for different land types. For example, as part of its AB 1757 implementation,¹³⁵ California recently established 81 NBS climate targets for 2030, 2038, and 2045 for its eight land area types, with actions identified for nearly 45 state agencies to support NWL sector contributions to carbon neutrality.¹³⁶ In Massachusetts, Executive Order 618 directs state agencies to develop biodiversity targets for 2030, 2040, and 2050, including coastal and marine biodiversity conservation.¹³⁷ Several Alliance members have also established numerical tree planting goals and incentive programs.¹³⁸

States can also consider incorporating NWL conservation, restoration, and improved land management goals into state projects, protecting existing carbon stocks and increasing carbon sequestration and storage on NWL while also achieving other state land use planning goals. In North Carolina, Executive Order 305,¹³⁹ which established a “no net loss” policy for forested lands and wetlands and a native plant policy for all state cabinet agencies and state-owned projects, built on recommendations from the state’s 2020 *Natural and Working Lands Action Plan*.¹⁴⁰ Several states, such as Maine,¹⁴¹ North Carolina,¹⁴² and Washington,¹⁴³ have established in-lieu fee or

mitigation banking programs that support NWL, including providing grant funding to entities such as municipalities, Tribes, and non-profit organizations for restoration and conservation projects. The Massachusetts Climate Forestry Committee also published a comprehensive work plan, *Response to the Report of the Climate Forestry Committee*,¹⁴⁴ outlining strategies to protect and manage forest lands while prioritizing efforts to address climate change impacts — including through increasing the amount of conserved forest land and prioritizing projects to optimize carbon management. Other strategies are highlighted in a report from the Center for American Progress and the National Caucus of Environmental Legislators,¹⁴⁵ which details state efforts to leverage existing programs, such as the Land for Maine’s Future Program and New Mexico’s Land of Enchantment Legacy Fund,^{146,147} that provide funding to support conservation initiatives and further reinforce the importance of climate and land use planning to preserve natural and recreational values.

3.2.2

Utilize zoning and nature conservation policies to realize NWL protection and restoration

Beyond dedicated conservation funding and programs, states can consider enabling measures that limit development in NWL, facilitating their protection and conservation. This can include setting urban growth boundaries (UGBs), controls that prevent urbanization of NWL adjacent to existing development. In practice, UGBs demarcate a boundary around an urban area that facilitates development inside the boundary, but limits development outside. UGBs may be amended to accommodate population growth in an area but otherwise discourage the practice of “leapfrog development” in which developers build over vacant land adjacent to existing development, fragmenting NWL and habitat. Oregon’s UGB program,¹⁴⁸ initially created under SB 100,¹⁴⁹ is an example of this approach. It requires Oregon cities to develop UGBs that can accommodate 20 years’ worth of expected population growth. Other states have taken different approaches to implementing UGBs, such as California, which requires the creation of Local Agency Formation Commissions to establish urban growth requirements at the county level.¹⁵⁰

Another approach states can take to protect NWL is facilitating transfer of development rights (TDR). In practice, TDR creates conservation easements on NWL by allowing developers to buy the development rights from landowners in “sending areas” and use these rights to increase development intensities in “receiving areas.” This incentive allows private landowners to earn additional income from their lands without the need to convert them, while also allowing developers to build in urbanized areas more intensely, which may complement LED efforts. States can enable TDR efforts by allowing counties and municipalities to establish their own programs. For example, Maryland enables TDR through its state-level land use codes, and its Department of Planning provides outreach, education, technical assistance, and analysis support to local governments on these programs.¹⁵¹ Delaware, which enables TDR through the Aglands and Forestland Preservation Programs,^{152,153} has permanently preserved over 155,000 acres of farm and forest lands. TDR can also be leveraged for resilience purposes, as discussed in the Climate-Resilient Development section, starting on page 34.

Finally, states could establish statewide requirements mandating the preservation or creation of vegetated buffer zones around riparian, coastal, lake, and wetland areas. These requirements may include setback regulations that restrict construction within specified distances from water bodies, often coupled with clearing restrictions. Additionally, states may consider providing financial incentives to promote the restoration of natural buffers. These measures aim to protect and enhance the ecological integrity of sensitive water-related environments across the state. Examples of development buffers include:

- **Delaware’s Buffer Incentive Program in the Chesapeake Bay Watershed:** This program offers incentives for agricultural and urban landowners in the Chesapeake Bay watershed to install forest buffers.¹⁵⁴
- **Maryland’s Conservation Buffer Initiative:** This effort pays farmers and landowners to plant forest and grass buffers in riparian corridors and limit stream access for livestock.¹⁵⁵
- **Minnesota’s “Buffer Law,”¹⁵⁶ initially established by SF 5:** This law requires a 50-foot vegetation buffer along lakes, rivers, and streams.¹⁵⁷
- **North Carolina’s Riparian Buffer Protection Program:** This program and its riparian buffer requirements cover certain watersheds and require undisturbed forest buffers around streams, lakes, and other waters.¹⁵⁸

3.2.3

Incentivize and fund programs to support private landowner and municipal conservation

Tax incentives for local landowners can help conserve land and maintain natural or working landscapes. These incentives often include transferable tax credits for donated properties or easements, which can be sold to benefit landowners immediately. States can also allow landowners to claim property tax reductions or exemptions for lands that provide conservation and open space value. The specifics of these incentives, such as eligibility criteria and benefit levels, vary widely across states. States can adjust these programs to maximize conservation impact while considering potential impacts on local tax revenues. Examples of incentives include:

- **Colorado’s HB21-1233:** This law increased the state’s Conservation Easement Credit from 50 percent to up to 90 percent of the donated value of a landowner’s easement.¹⁵⁹ As noted in the Center for American Progress and National Caucus of Environmental Legislators report,¹⁶⁰ there was a significant increase in interest from landowners in leveraging the credit on their properties within months of the legislation’s enactment.
- **Hawai’i’s Watershed Partnership Program:** This program provides technical and financial support to voluntary alliances of public and private landowners for the implementation of watershed management plans.¹⁶¹ These voluntary alliances are committed to the common value of protecting forested watersheds for water recharge and other ecosystem services through collaborative management. Over 70 public and private landowners and partners, including the state’s Department of Land and Natural Resources, are involved in Watershed Partnerships and manage more than two million acres.
- **Vermont’s Act 146:** This act expanded the eligibility of the state’s Use Value Appraisal, a “current use” tax incentive for landowners who choose to let forest parcels with ecologically significant traits grow old and remain unharvested.^{162,163} The incentive allows landowners to have their land appraised at its current use value, rather than fair market value, as a way for landowners to receive property tax savings. The allowances recently changed to include working farm and forest land in the incentive program.

- **Wisconsin's Managed Forest Law Program:** This program is open to all private owners of Wisconsin forested land and encourages sustainable forestry on private woodland.¹⁶⁴ In exchange for following sound forest management, the landowner pays reduced property taxes.

States can consider the creation and use of designation programs with commensurate incentives to encourage NWL conservation. For example, Hawaii's Act 183 established the Important Agricultural Lands designation,¹⁶⁵ which sets up a designation process for important agricultural lands across the state to conserve the state's agricultural land resource base and assure the long-term availability of agricultural lands for agricultural use. The Act notes that certain incentive programs must provide preference to important agricultural lands to enhance their agricultural viability, and provides a process for private landowners to voluntarily designate lands as important agricultural lands.

3.2.4

Promote strategic land management and conservation for multiple climate objectives

Management and conservation of NWL can achieve several objectives that complement emissions goals, such as equity, economic opportunity, carbon sequestration, habitat connectivity, community resilience, sustainable food production, and more. By preserving and enhancing the sustainability of natural resources, strategic land management fosters local economic growth. Jobs in forestry, agriculture, and conservation directly benefit from such practices, while well-managed lands also attract tourism and recreational activities that contribute to the economic vitality of communities. Several Alliance members are prioritizing NBS, leveraging NWL in policies and programs that support community resilience, just transition and equity, renewable energy production, and land use planning.

North Carolina established the NC Resilience Exchange,¹⁶⁶ an interactive online platform to help local and state leaders access location-specific information on climate resilience and NWL. As a full-service tool for North Carolina communities, the Exchange offers funding opportunities, a directory of experts, interactive mapping tools, model ordinances, example projects, success stories, and other resources. The site also

includes a focus on NWL-based solutions that can help communities contribute to realizing the goals identified in Executive Order 305,¹⁶⁷ and in the *Natural and Working Lands Action Plan*.¹⁶⁸ North Carolina's Wildlife Resources Commission has also established the Green Growth Toolbox,¹⁶⁹ a technical assistance tool designed to help communities conserve high-quality habitats as communities and developers build new homes, workplaces, and shopping centers.

In Maryland, a series of legislation has supported the state's forestry efforts. SB 549, the *Sustainable Forestry Act of 2009*,¹⁷⁰ conveyed the importance of Maryland's forests to the environmental and economic well-being of the state. HB 706 subsequently established a net-zero forest loss goal and required Maryland counties to develop regulations mitigating forest loss.¹⁷¹ Updates via SB 526 in 2023 reinforced this legislation and aimed to subsequently improve forest conservation standards for developers and local governments.¹⁷²

Several Alliance states also directly support more equitable access to natural and working landscapes, including farmland, urban and community forests, community greenspace and parks, and working waterfronts, for a variety of uses including work, play, cultural identity, and quality of life. Maryland's Greenspace Equity Program¹⁷³ awards grants to underserved communities to create, preserve, and improve public greenspace, public health, and community livability. Massachusetts's Greening the Gateway Cities Program,¹⁷⁴ a state-led collaboration between multiple Commonwealth agencies, the U.S. Forest Service, and local community organizations, is designed to reduce household heating and cooling energy use by increasing tree canopy cover in urban residential areas. The program targets the parts of communities that have lower tree canopy, older housing stock, higher wind speeds, and a larger renter population. In addition, plantings are concentrated in Environmental Justice neighborhoods to benefit those most in need. Maine established the Working Waterfront Access Protection Program,¹⁷⁵ a grant program that provides strategic funding to assist commercial fisheries businesses, co-ops, municipalities, and other interested parties, to protect access to waterfront areas in the face of rising demand for coastal waterfront properties, through a covenant requiring properties cannot be developed in ways that are not in alignment with commercial fishing activities.

3.2.5

Maximize nature-based solutions in urban areas

Urbanized areas can achieve strong benefits from the inclusion of natural systems, processes, and spaces within their boundaries. This can make communities more livable, enjoyable, and attractive places while addressing systematic inequities such as those related to access to green spaces and tree canopy. Promoting urban agriculture and community gardens helps increase access to healthy outdoor spaces while providing a mechanism to address food insecurity and opportunities to create biodiverse habitats for pollinators and other species. Urban forestry programs also help increase carbon sequestration, improve air quality and human health, increase recreational and educational opportunities, and reduce heat island impacts. Native planting efforts create urban wildlife and pollinator habitat, improve human health, and reduce stormwater runoff. Water quality is enhanced by reducing impervious surfaces and implementing green infrastructure to manage stormwater pollution, protecting drinking water sources and supporting aquatic, marine, and terrestrial ecosystems.

States can consider setting explicit goals to maximize nature-based solutions in urban areas. A key part of Maryland's five million native tree planting goal by 2031 is supporting tree equity through targeted planting of at least 500,000 native trees in underserved urban communities.¹⁷⁶ California established a goal in statute of 10 percent increase in tree canopy cover in urban areas by 2035¹⁷⁷ and incentivizes urban forestry and community greening projects through two hallmark grant programs: CAL FIRE's Urban and Community Forestry Program (including the Green Schoolyards Program)¹⁷⁸ and the California Natural Resources Agency's Urban Greening Program.¹⁷⁹

The U.S. Forest Service's Urban and Community Forestry Program,¹⁸⁰ which received an infusion of \$1.5 billion in Inflation Reduction Act funding in 2022, focuses on tree planting and related activities in urban areas, prioritizing disadvantaged and overburdened communities. Nearly every Alliance state benefited from this funding opportunity, with 100 percent of grant benefits flowing to disadvantaged communities.

3.2.6

Support ecosystem resilience and habitat

Policies focused on conserving, improving, protecting, and restoring wildlife corridors and connections can help promote greater ecosystem connectivity and facilitate wildlife adaptation to environmental changes. Preserving habitats for a wide range of native plant and animal species is critical for promoting biodiversity and maintaining ecosystem health. By prioritizing wildlife corridors and connectivity, states can ensure the survival of species that rely on these fragile ecosystems. This focus on biodiversity is essential for sustaining the balance of natural resources that communities and economies depend on. States can consider the approaches outlined in a Wildlands Network and National Caucus of Environmental Legislators report outlining different state approaches toward improving and maintaining habitat connectivity.¹⁸¹

The Land for Maine's Future conservation grant program awards bonus points for projects that increase the resiliency of plant and wildlife communities to persist in a changing climate.¹⁸² States can protect connectivity where habitat remains intact through permanent conservation and adaptive management and by minimizing or mediating existing connectivity barriers by avoiding further habitat fragmentation. States may also consider planning and programming that uses economic calculations to justify preserving high-quality farm and forest land for continued production of forest and food.

3.3 Climate-Resilient Development

Overview

Communities in every Alliance state experience increasingly frequent climate-related disasters that can outstrip the pace of proactive hazard mitigation and resilience planning.¹⁸³ Settlement patterns, location-inefficient development, affordable housing shortages, and expanding climate hazard areas are among the land use factors that contribute to people living in or being unable to move away from high-risk areas such as floodplains, coastal zones, and the WUI. Resilience and disaster policy, planning, and recovery occurs at the nexus of complex state, federal, Tribal, and local decision-making processes. Developing stakeholder and decision-making processes that encourage collaboration among all levels of government can foster more coordinated, equitable, and climate-resilient development (CRD) in local communities.

CRD is the process of planning, designing, and implementing policies, strategies, and projects that enhance the ability of communities and infrastructure to withstand and adapt to the impacts of climate change and maximize the resilience of NWL ecosystems. CRD integrates climate resilience considerations and requirements into various aspects of development, including urban planning, infrastructure development, natural resource management, and long-term disaster recovery. Climate resilience looks different in different contexts since every state — and regions within each state — face different climate hazards, risks, vulnerabilities, and opportunities.

Policy Options

3.3.1

Leverage land use policy and building codes to support climate resilience and preparedness

Vulnerability to climate change is shaped by social, economic, historical, and political factors, creating uneven impacts on populations. Climate change is a force multiplier, exacerbating existing inequities and often disproportionately impacting communities and populations with the least capacity to prepare for, respond to, and recover from climate change impacts.

States could better prepare communities for extreme weather events and climate impacts through land use policy. For example, *Arizona's Extreme Heat Preparedness Plan*,¹⁸⁴ resulting from Executive Order 2023-16,¹⁸⁵ discusses the role of re-greening public spaces with natural and artificial shade as part of reducing vulnerability. Additionally, Vermont enacted Act 121 (*Flood Safety Act*) to reduce development in flood hazard areas in river corridors and establish a net gain policy for wetlands in the state through protection and restoration of existing or previous wetlands.¹⁸⁶ The legislation addresses NWL goals by requiring the amendment of Vermont Wetland Rules by July 2025; changes will require activities that disturb wetlands to achieve a 2:1 ratio of restoration, enhancement, or creation of new wetlands to wetland loss. The Flood Safety Act also establishes outreach requirements with environmental justice populations in developing these rules.

Building codes can play an important role in preparing communities for extreme weather events and climate impacts. California requires property owners living in a “State Responsibility Area” to follow defensible space requirements to protect buildings from igniting during wildfire events.¹⁸⁷ To support these efforts, the California Wildfire Mitigation Program enhances community resilience to wildfires by providing financial assistance to homeowners for home hardening and mitigation strategies.¹⁸⁸ The Program uses a scoring methodology that considers applicants’ present wildfire risk, likely future wildfire risk when taking into account the effects of climate change, and vulnerability to wildfires due to health or socioeconomic conditions. Oregon created maps of wildfire hazard zones and the WUI,¹⁸⁹ which designate all of Oregon’s 1.9 million property tax lots into wildfire hazard zones, to help protect these communities from wildfire. Developed after a two-year community engagement process, the maps are intended to educate Oregon residents and property owners about their wildfire hazard, assist in prioritizing fire adaptation and mitigation resources for the most vulnerable locations, and identify where defensible space standards and home hardening codes will apply. Property owners with tax lots designated as both high wildfire hazard and within the WUI received a packet of information about their property’s designation and an appeals process. (See section 4.3, Stakeholder Engagement and Partnership on page 55 for more information about stakeholder engagement practices.) Exploring opportunities to support hazard mitigation efforts through building codes for other climate risks could increase climate resilience and preparedness.

Improved social equity can be a primary outcome of land use development and protection of NWL, especially if state and local planners pursue community input and support. This includes drawing upon the knowledge of those with lived experience of climate impacts, including communities historically excluded from, and negatively impacted by, land use decisions. For example, states can encourage strategic conversations about various tactics — including land acquisition, restrictive zoning, and establishment of conservation easements of floodplains — to avoid unnecessary economic and human costs of frequently flooded areas, enhance access to outdoor recreation, and reduce heat exposure. They can also foster climate-resilient recovery plans to institute new zoning and building standards that begin after a certain disaster threshold is met. Additionally, states can identify and acknowledge future vulnerabilities, as did Maine’s LD 1572,¹⁹⁰ which recognized how sea level rise (SLR) will disrupt livelihoods and the need to measure future SLR impacts in state, regional, and local planning efforts.

3.3.2

Reduce disparate outcomes of disaster recovery systems

Underlying socioeconomic factors that contribute to climate vulnerability in land use decisions and planning also affect disaster response and recovery processes and programs. As administrators of disaster-recovery funding and technical assistance programs, states have an opportunity to play a key role in reducing inequitable impacts and outcomes after disasters. States can work with federal partners at the Federal Emergency Management Agency (FEMA) and the Department of Housing and Urban Development to continue FEMA’s adjustments to cost-benefit analysis.¹⁹¹ These adjustments can yield more benefits for mitigation projects in underserved communities, such as rural and communities of color that have traditionally received less FEMA funding pre- or post-disaster.

States could also support communities with pre-disaster planning and preparedness — including providing financial and technical assistance to better align long-range land use and emergency response and recovery plans with climate resilience, adaptation, and mitigation strategies. Rural communities with less local government or institutional capacity may have fewer resources to work with state and federal funders to obtain pre-disaster mitigation funding, disaster aid, and post-disaster recovery-related services. For example, Maine’s Community Resilience Partnership,¹⁹² through its Community Action Grant program,¹⁹³ assists communities with climate planning and implementation projects and directs technical assistance. The grant program does not require a local match for activities that contribute toward goals in the state’s climate action plan and requires less match for towns with smaller populations for other community-defined climate and energy implementation priorities. The Partnership also provides direct technical assistance to towns through regional coordinators who help to identify and apply for grant funding to support community resilience projects, which is particularly beneficial to smaller, rural communities. Additionally, Wisconsin recently created a Pre-Disaster Flood Resilience program¹⁹⁴ aimed at identifying flood vulnerabilities and options to improve flood resiliency, as well as specifically restore hydrology to reduce flood risk and damages in flood-prone communities.

3.3.3

Limit new development and siting of buildings and assets in high-risk areas

States are taking a range of approaches to limit development in areas at high risk of climate impacts. For example, New Jersey's Inland Flood Protection Rule defines areas at most significant risk for inland flooding, ensuring that new and reconstructed assets in these areas are designed and constructed using the best available climate-informed precipitation data.¹⁹⁵ Maine has established a statutory requirement to consider future sea level rise projections, also established by statute, in environmental permitting for proposed development and solid waste facilities.¹⁹⁶ Vermont's Flood Safety Act amends multiple provisions related to river corridors, flood hazard areas, wetlands, and dams to provide general protections to river corridors throughout the state, as opposed to the previous municipality-centered structure.¹⁹⁷ The Act aims to protect communities from worsening precipitation and floods by preventing development in meander pathways and floodplains, strategically removing derelict dams, and increasing floodwater storage via floodplains and wetlands along rivers.

States could also explore ways to support local efforts to limit development in high-risk areas by providing tools and resources to municipalities, such as guidance or model laws to limit new development in sensitive areas. For example, the New York Department of State's *Basic Land Use Tools for Resiliency* provides local governments with a suite of model laws they can adopt to address resilience through land use, subdivision ordinances for flood-prone areas, and ways to limit impermeable surface and protect woodlands, among other tools.¹⁹⁸ States can establish similar requirements for projects undertaken by a state agency, or for projects otherwise funded using state financing. Puerto Rico's executive order OE-2023-009 directs the state to develop a plan to locate new infrastructure works not dependent on or for the enjoyment of the sea outside of coastal zones to the extent that this is possible, feasible, and fiscally viable.¹⁹⁹ States could also leverage TDR, as illustrated by Maryland's HB 233 and Hawai'i's HB 1436,^{200,201} to support efforts that direct more development away from higher-risk areas to lower-risk areas.

3.3.4

Consider community-centered relocation and managed retreat tools, policies, and programs to support high-risk communities

A changing climate creates major challenges for communities and key infrastructure directly or repeatedly affected by extreme weather; in some instances, voluntary community-driven relocation programs can support those highly exposed to climate risk.

Initial steps may involve consideration of policies that mitigate future needs for relocation by limiting development in high-risk areas. Longer-term, states can consider supporting relocation to minimize potential future displacement of communities and infrastructure located in or near high-risk areas such as along coastlines, floodplains, or the WUI.

While community relocation to less exposed areas could mitigate property loss, loss of life, and other bodily and physical harm, considerations include:

- Fiscal impacts to highly exposed communities in the process of relocation, along with social, psychological, and economic impacts to moving individuals and receiving communities.
- Land acquisition costs associated with purchasing highly exposed land from landowners.
- Engagement processes that increase community understanding of impacts from future climate risks, alongside processes for new community siting, design, or relocation.

To advance social equity outcomes through strategic relocation, states could use clear social equity principles, policies, and metrics in program design, as well as form partnerships with regional and local entities to ensure application of equity-first approaches. The U.S. Climate Resilience Toolkit,²⁰² managed by the National Oceanic and Atmospheric Administration, includes a Managed Retreat Toolkit that states can leverage when evaluating approaches to relocation.²⁰³ Hawai'i has also assessed the feasibility and implications of relocation strategies for vulnerable coastal areas.²⁰⁴ Massachusetts launched the ResilientCoasts Initiative in 2023, a state-municipal

collaboration and multipronged approach to identify regulatory, policy, and funding mechanisms in addressing coastal resilience issues, including SLR through NBS. The Initiative notes the role of relocation as part of this effort.²⁰⁵

North Carolina, working in partnership with the University of North Carolina at Chapel Hill and North Carolina State University,²⁰⁶ provided technical and funding support to local communities through the Hurricane Matthew Disaster Recovery and Resilience Initiative (HMDRRI).²⁰⁷ The HMDRRI team assembled and deployed an interdisciplinary group of university faculty, students, and other experts to address both community and state-level recovery needs. The town of Princeville, the oldest community in the U.S. founded by formerly enslaved people, worked with HMDRRI on a three-part relocation approach to comprehensively evaluate opportunities for facilitating the transition of residents and critical infrastructure and services out of the 100-year floodplain by making investments in higher ground receiving areas.

3.3.5

Leverage nature-based solutions for adaptation benefits

According to FEMA, NBS “are sustainable planning, design, environmental management and engineering practices that weave natural features or processes into the built environment to promote adaptation and resilience.”²⁰⁸ In some cases, NBS can be more cost effective than traditional engineered approaches because they mitigate the need for infrastructure upgrades or repairs and other human interventions. Prioritizing these solutions in land use planning at different scales can help states realize resilience benefits, ranging from site-specific interventions in more urban communities to landscape-wide approaches across all areas. For example, with inland flooding and urban heat islands, low-impact development interventions like green infrastructure applied in a variety of contexts can be particularly effective in urbanized areas to create more pervious cover that absorbs and slowly releases runoff and create more natural areas that decrease outdoor air temperature. Delaware recently partnered with the University of Delaware and a local community nonprofit to conduct a neighborhood-scale urban heat mapping study in Wilmington to identify the impacts of land cover on local temperatures and develop a predictive temperature and heat index model.²⁰⁹

The state will use the results of this study, part of a larger federally-funded urban heat island mapping campaign,²¹⁰ for existing programs and planning processes, including initiatives in land use planning, public health, energy efficiency, resilience, climate change mitigation, climate preparedness, emergency management, urban forest management, equity and social justice, and community partnerships and engagement. At the landscape level, protection of wetlands and riverine landscapes can realize similar benefits at a larger scale. For island communities in particular, natural buffers along coasts improve ecosystems on land and in the ocean and can help protect infrastructure and reduce disaster recovery costs.

Leveraging funding through the Clean Water, Clean Air and Green Jobs Environmental Bond Act,²¹¹ New York provides support to flood-prone communities under the Green Resiliency Grant program to improve stormwater infrastructure largely through NBS at both local and regional scales.²¹² The program supports stormwater retention and urban forestry programs locally, including through “street trees” — trees planted within street and road rights-of-way — among other activities, along with efforts to restore natural landscape features such as floodplains, riparian buffers, streams, and wetlands that improve water quality and mitigate climate change effects.

In North Carolina, HB 1087 created the Natural Infrastructure Flood Mitigation Program to address chronic flooding in the state using NBS, including wetland creation and stream restoration.^{213,214} The program is currently in a pilot phase and, once expanded, will focus on NBS to protect critical infrastructure from flooding at the watershed scale. The state DOT also partners with nongovernmental organizations to build living shorelines as a NBS to protect transportation infrastructure and create salt marsh habitat and corridors.²¹⁵

Additionally, leveraging NBS for resilience provides co-benefits and contributes to other climate efforts. These can be similarly leveraged to protect NWL for their ability to naturally sequester carbon and create habitat for biodiversity. NBS also create opportunities for active recreation, particularly bicycle paths and waterfront public parks, that can improve quality of life in communities and facilitate the use of lower-carbon transportation modes.

3.3.6

Integrate climate resilience in local and regional planning

While zoning and land use decisions are often controlled at the local level, states have legislative and regulatory authorities to set requirements for local and regional plans and zoning codes through regulation. States can require or otherwise encourage local and regional governments to integrate CRD in their planning processes and documents. They can also activate local government efforts by defining goals, requirements, and starting points for implementation, and by offering regulatory relief and resources in the form of tools and guidance, financial incentives in state grant programs, model codes and ordinances, or technical assistance to execute this work. These may include:

- Requirements for integrating climate adaptation into existing planning processes, including local government comprehensive plans, metropolitan planning organization (MPO) long-range transportation plans, and hazard mitigation plans.
- Requirements for developing climate vulnerability assessments and their use in designating growth areas.
- Financial incentives or reduced match requirements for infrastructure proposed outside of risk-prone areas.
- Establishment of design standards or adaptation goals, policies, and objectives in planning documents.
- Requirements to use certain datasets, tools, or processes to evaluate the exposure of future development or infrastructure to long-term climate risk.

New Jersey's SB 2607 establishes land use planning requirements for municipalities to include a climate change-related hazard vulnerability assessment as part of their comprehensive planning efforts, along with measures that mitigate reasonably anticipated natural hazards.²¹⁶ The legislation also requires the state's Department of Environmental Protection to provide technical assistance to municipalities in preparing these vulnerability assessments upon request.

See page 44 for additional examples of support for climate action in local and regional planning.

Case Study

Supporting Community-Centered Relocation through the New Jersey Blue Acres Program



New Jersey's Blue Acres program is an example of a state-level program that supports relocation efforts.²¹⁷ Established in 1995, Blue Acres identifies and acquires residential properties prone to persistent and routine flooding from owners who are willing to voluntarily sell their property to the state. Blue Acres expanded in response to Hurricane Sandy in 2012 and has resulted in the purchase of over 1,200 properties since its inception. It also provides resources to local governments to transform vacant flood-prone properties into community amenities and optimize floodplain functionality. The program focuses on local government partnership to prioritize comprehensive neighborhood-scale buyouts, rather than working with individual property owners on a case-by-case basis. This helps create more equitable outcomes for low-income property owners in these areas.

The program also encourages local governments to transform vacant flood-prone lands into community assets while enhancing floodplain functionality. Blue Acres emphasizes cooperative efforts, bringing together flood-impacted homeowners and local governments to prioritize climate resilience planning that includes neighborhood-level buyouts, rather than focusing solely on buyouts as an episodic, post-flood recovery tool. This collaborative approach fosters more meaningful community resilience and leads to more equitable outcomes for low-income property owners in flood-prone areas.

Case Study

Weaving Climate Adaptation into Vermont's Community Investment Program



Vermont's Community Investment Program (formerly the State Designation Programs),²¹⁸ originally established by Act 120 in 1998 and built upon through subsequent legislation,²¹⁹ aims to revitalize communities by promoting compact development patterns, reducing car dependency, and protecting surrounding forests and working lands. The program guides development toward LED in and around historic centers by offering benefits to municipalities and property owners, such as tax credits, grant funding, priority consideration for state investments, and easier permitting for housing. In turn, those benefits fund and fuel revitalization, growth, livability, infrastructure, and other essential work.

The Program has evolved over the years to address different community needs and challenges across the state. Act 182, passed in 2022,²²⁰ tasked the state with proposing

recommendations on how to reform the program to even more explicitly address equity, climate action, and other efforts to better support program goals around NWL protection through compact development. The effort, Designation 2050, resulted in a report detailing these recommendations and reforms, which aim to more directly align program offerings and benefits with climate adaptation by offering technical assistance, grants, and other incentives for resilient community design.²²¹ Act 181, enacted in 2024,²²² implemented these recommendations with key reforms, including improved compatibility of designation boundaries with local and regional plans, lower-barrier access for lower-capacity communities, and a revised board with greater focus on cross-government and cross-agency collaboration in housing, infrastructure, and administrative capacity.



4. Governance Strategies

Governance Strategies are different approaches that governors’ offices and other executive branch entities can use to realize climate and land use outcomes. They include tools and engagement frameworks states can consider using to facilitate interagency collaboration, stakeholder engagement, and decision-making around climate and land use planning.

4.1	Cross-Sectoral and Intergovernmental Planning	43
4.2	Data-Driven Planning and Decision-Making	50
4.3	Stakeholder Engagement and Partnership	55



For each Governance Strategy, this Guide provides:

Overview: A high-level overview of what each strategy seeks to accomplish.

Strategies: Options states can consider adopting and implementing to advance climate and land use planning efforts. These universally applicable strategies can help states advance a range of sectoral decarbonization and resilience efforts as described in the Policy Outcomes section. Each strategy highlights examples of state implementation and identifies potential practices states can consider implementing to help realize climate and land use outcomes.

State-Enabled Municipal Authority on Land Use Planning and Zoning

States delegate some of their powers to municipalities and counties to enable effective governance at the local level. Since these powers, including zoning and land use planning, are state-enabled, states have an interest in ensuring local governments use these tools in ways that align with statewide goals and do not impose externalities on other jurisdictions in the state.²²³ States similarly grant municipalities the power to regulate land use at the local level, typically through zoning enabling acts. How states delegate power, including in land use, varies by state, but is typically generalized by:

- **Dillon Rule:** Municipalities have only powers expressly delegated to them by the state.
- **Home Rule:** Municipalities can exercise any power so long as it does not conflict with federal or state laws, or with the terms of their charter.

States often use a mixture of these two rules, where aspects of Home Rule may apply in one context, but Dillon Rule applies in another. Neither rule necessarily limits or enhances a state's or local government's ability to align land use planning and zoning decisions with climate and land use goals, but each may require different approaches.²²⁴ Given this complexity, states should consider determining the extent to which Dillon Rule or Home Rule applies to local governments around zoning and land use regulation as part of determining how best to collaborate with them in realizing climate and land use outcomes.

4.1 Cross-Sectoral and Intergovernmental Planning

Overview

Cross-sectoral planning involves building capacity and fostering collaboration between different state government agencies and staff, each of whom may have distinct sets of sectoral and subject matter expertise. Intergovernmental planning helps foster collaboration between state and local or regional governments. Both cross-sectoral and intergovernmental planning enable better alignment across government entities around climate and land use planning. Each also leverages respective areas of expertise and authority to help realize climate and land use policy outcomes.

Strategies

4.1.1

Develop an actionable framework around climate and land use at the state level

Establishing actionable climate and land use frameworks at the state level guides alignment and collaboration across government and sectors. Such frameworks define the strategies, goals, actions, and authorities needed to effectively achieve goals. Examples of actionable frameworks include:

Colorado's Executive Order D 2023 014: This framework, established through executive action, defines strategic growth goals for the state, including a goal to incentivize efficient development patterns that align with the state's climate and air quality goals.²²⁵ It directs a wide range of agencies to inventory their policies, plans, procedures, and rules for programs that support growth-related activities. It further directs these agencies to report to the governor's office on how these programs can best support the state's strategic growth goals. Finally, it directs the creation of a cross-department working group to facilitate best practices and discussion on identifying and aligning programs with the strategic growth goals of the state.

Maryland's Sustainable Growth Subcabinet: This entity implements the state's Sustainable Growth Policy (SGP),²²⁶ recommending changes in state law, regulations, and procedures to the governor that are needed to support the SGP.²²⁷ Initially created in 1998 through Executive Order 01.01.1998.04,²²⁸ the Smart Growth Subcabinet, as it was then known, was subsequently enacted in statute in 2002 through SB 204.²²⁹ Updated through legislation during the interim years, the Subcabinet is led by the state's Planning Secretary and comprised of several senior agency and governor's office representatives. It provides a forum for state agencies to coordinate activities and work with local jurisdictions in realization of the SGP. The Subcabinet is also responsible for developing annual reports to the governor on its progress in implementing the SGP, and for ensuring progress in meeting other legislative requirements, such as the land conservation goals outlined in the Maryland the Beautiful Act.²³⁰

States could establish similar frameworks for more specific policy areas within climate and land use planning. For example, Hawai'i's Transit-Oriented Development Council,²³¹ established by Act 130,²³² is an interagency council that coordinates effective and efficient TOD planning statewide. It includes representation from a range of state agencies and all counties, aiming to facilitate consultation and collaboration between the state and counties on smart growth and TOD initiatives.

4.1.2

Support climate action in local and regional planning

Incentivizing or legislating the inclusion of climate change and land use considerations into local and regional planning efforts may benefit states. Such incentive programs can include direct technical assistance or training, funding, and establishing public climate data and planning tools. Legislative approaches can help establish clear but flexible requirements that local and regional governments must incorporate climate mitigation and adaptation policies, strategies, and actions as part of their long-range comprehensive planning efforts.

Massachusetts established the Municipal Vulnerability Preparedness Program (MVP),²³³ part of Executive Order 569, *Establishing an Integrated Climate Change Strategy for the Commonwealth*.²³⁴ The MVP Program supports cities and towns in Massachusetts in beginning the process of planning for climate change resiliency and implementing priority projects. The state awards communities with funding to complete vulnerability assessments and develop action-oriented resiliency plans. Communities that complete the MVP program are certified as MVP communities and are eligible for MVP Action Grant funding and other opportunities. To help achieve the resilience goals of its four-year climate action plan, Maine established the Community Resilience Partnership,²³⁵ which provides grants and technical assistance with fundraising and project development to municipal and Tribal governments and unorganized territories. The Partnership helps incentivize community planning and actions that reduce carbon emissions, transition to clean energy, and increase community resilience to climate impacts. Communities must identify priority climate action areas to enroll in the Partnership and, once enrolled, must report on progress every two years to remain enrolled.

California's SB 1035,²³⁶ which helps ensure consideration of climate change at the local level, requires local governments to incorporate climate adaptation into existing comprehensive planning processes. Local governments have flexibility on which local planning process or document to use to meet these requirements,^{viii} but they must conduct climate vulnerability assessments, develop a set of adaptation goals, policies and objectives, and include a set of feasible implementation measures. Minnesota's HF 2887 updated comprehensive planning requirements for local government land use plans, which are required to include a GHG emissions and VMT inventory and projections. This inventory and projections must include emissions sources from transportation, land use, energy use, solid waste, and — where available and applicable — livestock and agriculture.²³⁷ These plans must also include the estimated impact of strategies, including efficient land use and compact growth, that reduce or naturally sequester GHG emissions across sectors.

The American Planning Association publication, *2022 Survey of State Planning Laws*,²³⁸ provides a framework for understanding approaches to state-level hazard mitigation planning, climate action planning, and resilience planning activities and requirements. While it may no longer reflect current practice and statute in the states surveyed, it provides a starting point to help states understand their own activities and requirements, reference practices in other states, and identify opportunities for additional activities and requirements they could implement.

4.1.3

Build in flexibilities and opportunities for customizable local and regional government programs and requirements

States may choose to design programs and requirements that set a floor for statewide action, while also providing local and regional governments with the flexibility to exceed minimums with local requirements — or to customize program elements to better meet unique needs in their jurisdictions. Vermont's HOME Act requires multifamily housing of

viii Including through a comprehensive plan, local hazard mitigation plan, or a standalone climate adaptation plan or an integrated approach where the local hazard mitigation plan addresses climate adaptation and is referenced in the comprehensive plan's safety and land use elements.

up to four units as a permitted use on residential lots serviced by municipal sewer and water infrastructure.²³⁹ However, the HOME Act also allows for more intense housing development if a municipality specifically requires multifamily housing to have more than four units. This flexibility allows for a gentler level of housing development that could be better suited to a smaller, more rural municipality, but does not override the needs of more urbanized municipalities where greater levels of development intensity are already permitted.

Regarding LED, the Massachusetts Community One Stop for Growth,²⁴⁰ an application portal, provides an example of a state program that facilitates access to state funding. With one application, the portal allows eligible applicants to apply for 12 separate grant programs that make targeted investments based on a development continuum.²⁴¹ This flexibility helps save communities time and research in developing and preparing applications and offers opportunities for the state to support local governments in their applications through guidance and partnerships, helping to streamline efforts to advance climate and land use planning.

4.1.4

Provide technical assistance and support to local and regional planning organizations and elevate regional programs

By working closely with regional governments, including MPOs and regional planning organizations, states can align efforts and funding, and provide clear guidance and financial resources that support local governments and facilitate collaboration on land use planning and decision-making. States can also emphasize the importance of regional climate resilience programs, encouraging regions that are not represented by a MPO or other formal government entity to self-organize and collaborate to define and address their unique climate and land use challenges and opportunities. Working with local and regional governments, states have opportunities to illuminate the economic and fiscal co-benefits of climate and land use, tying climate considerations to economic opportunities to generate support and understanding.

For example, Michigan's Economic Development Corporation, through its Community Development unit (MiPlace),²⁴² provides economic development services and programs to attract and retain talent in Michigan communities. MiPlace provides technical assistance through its Redevelopment Ready Communities program,²⁴³ which supports LED efforts like zoning reforms and has regional community development managers who provide personalized support and guidance to communities across 10 regions. Another MiPlace resource,²⁴⁴ which helps communities evaluate how their zoning codes may be limiting development opportunities, also includes recommendations on streamlining processes for housing development and construction, including schematic designs for duplexes and fourplexes that municipalities can adopt and offer as pre-approved for developer use.

Additionally, Pennsylvania DOT provides free planning assistance through Connects Assistance,²⁴⁵ its program to help local governments better integrate land use and transportation planning. This effort supports the agency's efforts to improve multimodal coordination and complementary development as part of better managing transportation costs.²⁴⁶ Other states can also consider developing guidance and model codes or ordinances to help in their work. As noted in the Climate-Resilient Development section on page 36, "Limit new development and siting of buildings and assets in high-risk areas," the New York Department of State offers *Basic Land Use Tools for Resiliency*,²⁴⁷ which provides local governments with a suite of model laws they can adopt to address resilience through land use.

State university systems can be particularly effective in supporting climate and land use efforts with technical expertise and staff resources. Also noted in the Climate-Resilient Development section on page 36, "Consider community-centered relocation and managed retreat tools, programs, and policies to support high-risk communities," North Carolina partnered with the University of North Carolina at Chapel Hill and North Carolina State University to provide technical and funding support to local communities through the HMDRRI, which facilitated disaster recovery and resilience planning efforts.²⁴⁸ Similarly, Delaware's DOT provides support to the University of Delaware to manage the Delaware Complete Communities Toolbox,²⁴⁹ which builds local government capacity around practices that can better realize integrated transportation and land use planning.

Lastly, states can establish local-level board and commission education requirements to provide greater capacity to understand and address land use issues in communities. For example, Rhode Island's H7023 established training and education requirements for local planning board or commission members on the effects of development in floodplains and the effects of SLR.²⁵⁰ Additionally, Connecticut's Public Act 21-29 established training requirements for planning and zoning commission members, including affordable and fair housing policies and the impact of zoning on the environment, agriculture, and historic resources.²⁵¹

4.1.5 Integrate and coordinate climate and land use with housing policies

LED and CRD are complementary in providing climate benefits and addressing housing shortages. States have an opportunity to closely integrate and coordinate climate and housing policies. As noted in the Cross-Sectoral and Intergovernmental Planning section on page 43, "Develop an actionable framework around climate and land use at the state level," Colorado's Executive Order D 2023 14,²⁵² which orients state agencies toward more climate-aligned decision-making around land use, also creates a cross-department working group to facilitate best practices around identifying and aligning programs that support the state's strategic growth goals and efforts to increase statewide housing availability and affordability. Arizona's *Extreme Heat Preparedness Plan*,²⁵³ which established longer-term recommendations for extreme heat preparedness in the state, includes five recommendations related to addressing extreme heat risk and vulnerability through safe and affordable housing policy.

States can consider opportunities to link or establish formal collaborative frameworks across state agencies and programs around climate, land use, and housing. For example, Maryland's Memorandum of Understanding between its state DOT and Department of Housing and Community Development to accelerate the construction of development that catalyzes dense, mixed-use, and mixed-income development within a half-mile of transit stations.²⁵⁴ It specifies areas for collaboration between the two departments, including legislative proposals, application development and funding consideration, housing and

transit advocacy, and partner outreach. It also gives priority to transit-adjacent sites and state DOT joint development projects in funding programs that the Department of Housing and Community Development oversees.

Additionally, states can consider efforts to link residential building weatherization and decarbonization, affordable housing development that is accessible to affordable and convenient transit service, and housing resilience as part of comprehensively promoting housing affordability and security through climate programs. For example, H.4997 in Massachusetts authorized funding for a wide range of programs to counter rising housing costs caused by high demand and limited supply, including efforts that not only advance LED outcomes, but support increased housing resilience and the construction, rehabilitation, and modernization of housing, including energy efficiency and electrification decarbonization measures.²⁵⁵

4.1.6 Establish forums for consensus building and collaboration with interdisciplinary and intergovernmental partners

State governments have opportunities to leverage their unique convening ability to bring together a wide range of intergovernmental and interdisciplinary actors, including those from outside government, to facilitate greater collaboration and consensus-building opportunities on climate and land use topics. States could consider how they can raise awareness of climate and land use, and begin and continue conversations on these topics. These approaches can help states identify solutions and demonstrate support to decision-makers on which actions to implement in advancing climate and land use goals.

Establishing commissions and task forces to study land use issues, propose policy recommendations, and facilitate dialogue among stakeholders can help states work through complex topics. These commissions and task forces may include experts and representatives from state and local government agencies, civil society, the private sector, and individuals and groups with an interest in specific land use issues. States can draw inspiration from existing jurisdictional and cross-sectoral climate and land use

planning processes to establish new comprehensive processes that are transparent to stakeholders and the public.

For example, Maine's LD 609, passed in 2021,²⁵⁶ established a commission to study how zoning and land use restrictions affect the state's ability to increase housing opportunities. The commission, which represented a wide range of stakeholders engaged in zoning and land use decision-making, held several public meetings and issued a final report with its recommendations to the state legislature. The report tallied votes from commission members to indicate their approval of the recommendations, which provided the legislature with context regarding consensus on specific issues. Nearly all recommendations received unanimous or near unanimous consent,²⁵⁷ and formed the basis of LD 2003 (2022),²⁵⁸ which reformed the state's zoning and land use policy to help realize more opportunities for housing development and LED.

States could identify opportunities for continuous engagement with local and regional governments on climate and land use programs. After enacting a suite of land use and housing-related legislation in 2024, Colorado developed a website,²⁵⁹ which shared updates and provided notifications for future engagement opportunities on land use and housing legislation. Given the role of local government in implementing legislative requirements, the website helped local governments more easily track engagement opportunities and comment opportunities on draft materials to help shape and inform state efforts.

Additionally, by partnering with their public university systems and private universities, states can convene local and regional governments around climate and land use planning efforts. In Maryland, the executive director of the University of Maryland's National Center for Smart Growth,²⁶⁰ who serves as an ex-officio member of the state's Sustainable Growth Subcabinet, works with the state to organize sustainable growth programs and educational activities, such as the Smart Growth Summit.²⁶¹ The Summit provides opportunities for the state to engage with local governments on growth policy and creates a forum for state and local officials to discuss how the state can better realize its growth goals and objectives. Additionally, Connecticut partners with the University of Connecticut on the Connecticut Institute for Resilience and Climate Adaptation to increase the resilience and sustainability of communities vulnerable to the growing impacts of climate change on the natural, built, and human environments.²⁶²

Case Study

Integrating Climate Considerations in Local Comprehensive Planning in Washington



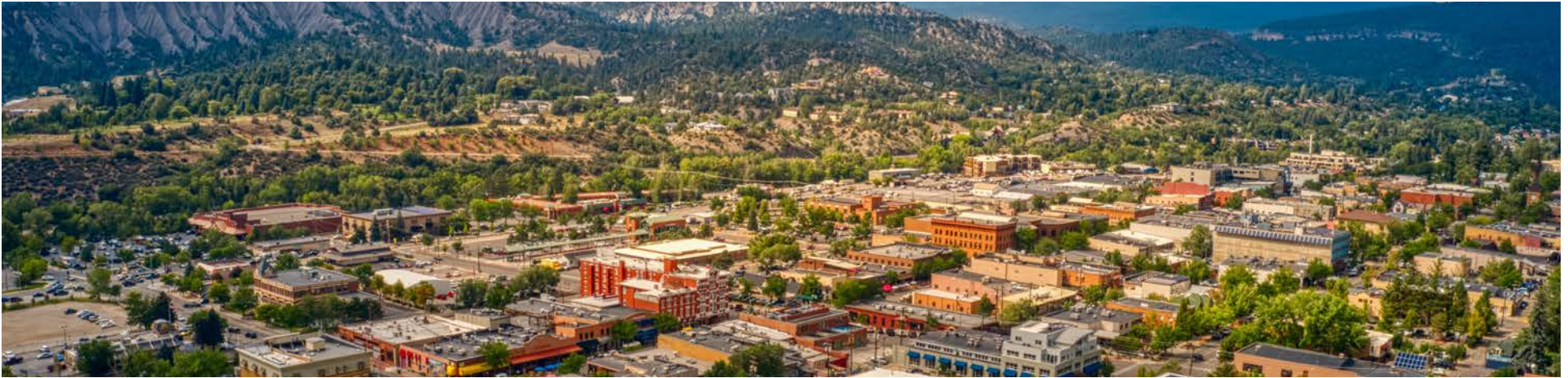
In 2023, Washington enacted HB 1181,²⁶³ an amendment to the Growth Management Act of 1990.²⁶⁴ This series of state statutes requires fast-growing cities and counties to develop a comprehensive plan to manage population growth. Today, the Growth Management Act outlines 15 planning goals to act as the basis of all comprehensive plans, and requires local comprehensive plans for counties and cities with populations greater than 6,000 to include sub-elements with climate resilience and GHG emissions reduction actions.

These two sub-elements must maximize economic, environmental, and social co-benefits and prioritize environmental justice to avoid worsening environmental health disparities. Additionally, HB 1181 introduces guidance for identifying locations of green infrastructure and urban and community forests, integrating strategies for reducing wildfire risks, and addressing the impact of SLR and increased storm severity.

HB 1181 highlights equity by emphasizing the need for development that does not create or worsen environmental health disparities. It also stresses the importance of involving historically overburdened communities in developing climate policies. Compensation and increased accessibility for authentic participation is highly encouraged in the form of paid stipends, food, childcare, and translation services. Intermediate Climate Element Planning Guidance,²⁶⁵ along with a Climate Menu of Measures,²⁶⁶ are available to help cities and counties address climate change in their comprehensive plans.

Case Study

Leveraging Local Planning to Grow Housing, Promote LED, and Protect NWL in Colorado



The Colorado Housing Needs Assessment, enacted through SB24-174,²⁶⁷ aims to create a structured approach for statewide, regional, and local housing needs assessments to address the state's rapid population growth, inadequate housing supply, and housing affordability challenges. It mandates that municipalities follow planning requirements that encourage infill development, facilitate diverse housing types, and promote housing development near transit stations. This approach not only recognizes how LED can support state housing and climate goals, but also protects NWL and supports local government and MPOs in maintaining connectivity to open space, wildlife habitat, and other priority landscapes.

Key elements of this approach include methodologies for municipalities to conduct housing needs assessments and create action plans, technical assistance to facilitate

compliance, and incentives to governments that are fully compliant with assessment and planning requirements. The bill also provides local governments with access to datasets and web-based platforms to facilitate assessment and planning efforts, along with other resources and guidance to mitigate displacement.

4.2 Data-Driven Planning and Decision-Making

Overview

Data and decision-making tools can help states measure and evaluate the impacts of potential land use policy interventions and identify which approaches to consider. This process may involve quantifying impacts and benefits such as GHG emissions and non-GHG emissions, applying data in decision-making processes, managing and maintaining accurate data, and tracking progress over time to ensure success.

Strategies

4.2.1

Foster a culture of data-driven policy development and decision-making

States can help create a culture of data-driven policy development and decision-making within their agencies. One approach is to require state use and application of datasets generated from climate and land use planning activities to inform decision-making. For example, Delaware's Executive Order 42,²⁶⁸ which requires state department and agency use of accompanying maps from its *2020 Strategies for State Policies and Spending* document,²⁶⁹ helps inform state policy around land use and guide relevant policy and infrastructure decisions.

States could use analytical frameworks that weigh the climate benefits of different land uses across sectors, including scenario planning to evaluate different policy options and outcomes. Such efforts can inform the development of actionable frameworks around climate and land use at the state level. The *Oregon Statewide Transportation Strategy*,²⁷⁰ which leveraged scenario planning to identify a variety of effective GHG emissions reduction strategies in transportation, also accounted for urban land use patterns. States could leverage approaches like these in market analyses that evaluate how LED policies encourage greater infill housing development and discourage greenfield development. A study prepared for the Colorado Energy Office found that land use policies similar to those adopted in 2024 by the state legislature, plus additional policies that could be considered, would significantly impact the type and location of new housing in ways that reduce the GHG pollution associated with new development, both from buildings and transportation, while also avoiding development in the WUI.²⁷¹

Creating land use-related data frameworks can also provide states with a consistent foundation for tracking progress toward goals. Many Alliance members already track data and progress toward wider climate mitigation and resilience goals via publicly accessible tools or regular reports.²⁷² Such tools and reports can provide a model for land use data frameworks. These frameworks can be designed to minimize reporting and tracking efforts by local jurisdictions, making it easier to monitor and evaluate progress. Establishing processes for regularly updating and maintaining data helps ensure its accuracy and relevance over time. These processes may involve periodic reviews, data quality checks, and mechanisms for feedback and corrections from users.

As part of creating frameworks for land use data, states could incorporate data collection and reporting from local and regional governments to better facilitate planning efforts and collaboration to improve data quality and reporting for state use. For example, Maryland's Department of Planning works closely with local governments around data collection efforts to help implement various aspects of the state's SGP,²⁷³ including tracking progress toward an aspirational compact development goal (see the Data-Driven Planning and Decision-Making section on page 54, "Identify metrics and establish performance targets around climate, land use, and equity," for information about this goal) and working with local governments to ensure that regular dataset updates occur to help the state better track progress toward meeting its goals.²⁷⁴

4.2.2

Prioritize comprehensive emissions quantification methods and approaches, including for carbon sequestration

When seeking to effectively and comprehensively quantify GHG emissions impacts associated with climate and land use efforts, states could adopt approaches that consider the contexts of land development. These considerations are particularly relevant when evaluating NWL impacts, as these can vary by lands' ecosystem contexts and prior uses. Land development has varied impacts on emissions across sectors, as outlined in the Foundational Principle section on page 12, "Reduce Greenhouse Gas Emissions, Sequester Carbon, and Improve Climate Resilience," with more LED-aligned land use patterns making more efficient use of land, reducing VMT, reducing material and resource consumption, and creating more efficient development.

States could prioritize developing and using tools that holistically capture these GHG impacts. Ideally, quantification efforts will support scenario planning to allow for informed decision-making that compares trade-offs associated with different land use scenarios and facilitates communication of benefits. The California Air Pollution Control Officers Association created a *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*.²⁷⁵ This Handbook is a sketch-planning tool that provides policymakers with the magnitude of emissions reductions associated with implementing different climate and land use practices at

the project level. Most of the Handbook's measures leverage generalizable elasticities that can be applied in other communities. It also includes a method to assess potential benefits of different climate vulnerability reduction measures, as well as measures that can be implemented to improve health and equity, that can be applied in other analyses (see Section 4.2.3, "Leverage cost-benefit analyses and other impact quantification approaches").

Another approach states can reference in their GHG quantification methods is an analysis conducted by RMI in its *Why State Land Use Reform Should Be a Priority Climate Lever for America* publication.²⁷⁶ This analysis estimated the avoided emissions associated with encouraging more development in the 10 percent of neighborhoods in each state that currently have the lowest VMT per capita. It quantified these avoided emissions in the context of direct reductions from reduced driving, indirect reductions from vehicle lifecycle production, and non-transportation sector pollution avoidance, including building energy efficiency, fewer construction materials, and the preservation of natural land sinks otherwise lost to development. Such a comprehensive lens can provide states with a potential framework for approaches to assessing GHG impacts of different climate and land use efforts.

Another approach states can reference is Oregon's *Opportunities to Reduce Greenhouse Gas Emissions Caused by Oregon's Consumption*,²⁷⁷ which used a consumption-based emission inventorying approach to evaluate the global emissions Oregonians caused via consumption of materials, energy, and services. This report discusses smart growth, including how more walkable neighborhoods can help reduce consumption-based emissions by reducing transportation emissions, embodied carbon in infrastructure and buildings, operational energy use, and household consumption.

4.2.3

Leverage cost-benefit analyses and other impact quantification approaches

States can quantify the larger suite of impacts associated with climate and land use policies and practice beyond GHG emissions. Developing new — or leveraging existing

— modeling frameworks that comprehensively quantify all costs and benefits associated with land development and conversion enables informed decision-making and effective climate action. Cost-benefit analyses, for example, help establish financial justification for protecting NWL, given their ecosystem services. These analyses also help justify advancing LED and CRD efforts, versus less efficient and protective development patterns, and inform policy approaches states can take to better realize climate and land use outcomes. Developing cost-benefit analyses that account for these benefits, particularly against baseline business-as-usual scenarios that do not account for regulatory or programmatic changes, communicates the value of climate and land use planning beyond GHG emissions reduction benefits to a wide range of stakeholders. During development of its 2020 state climate action plan,²⁷⁸ Maine conducted a suite of analyses that quantified GHG emissions reduction estimates for a range of transportation, buildings, and energy sector policies; economic analysis of potential GHG mitigation and climate adaptation policies; and a “cost of doing nothing” analysis of economic impacts, job losses, and ecosystem services losses in NWL if the state took no action to reduce GHG emissions or improve climate resilience.²⁷⁹

Development of NWL can lead to losses of soil carbon, flood protection, and habitat. These lands provide critical ecosystem services, the value of which can be quantified and integrated into investment decisions. Preservation and restoration of NWL can be cost-effective approaches to reduce carbon emissions and the risks associated with natural hazards and adaptation. Tracking the Benefits of Natural and Working Lands in the United States: Dataset Evaluation and Readiness Assessment, a joint publication of the U.S. Department of Agriculture, A Community on Ecosystem Services, and Duke University’s Nicholas Institute,²⁸⁰ presents datasets states can leverage, to help quantify these benefits in a climate and land use context. The National Oceanic and Atmospheric Administration also published a resource to provide guidance on approaches for measuring the value of ecosystem services in a coastal management context.²⁸¹ Additionally, the U.S. Environmental Protection Agency’s Green Infrastructure Cost Benefit Resources website has tools for evaluating investments that facilitate green infrastructure deployment.²⁸² Cost-benefit analyses help inform community discussions, including quantifying how communities are protected from both short-term and long-term losses when they move out of a hazard zone, and how ecosystem services and natural resource assets may expand.

Numerous non-GHG emissions benefits are associated with pursuing more compact development patterns and climate and land use efforts generally. The Victoria Transportation Policy Institute’s white paper, *Understanding Smart Growth Savings*,²⁸³ provides an overview of these benefits, including but not limited to fiscal, public health, and economic benefits. While this white paper is largely focused on impacts resulting from implementation of more LED-oriented policies, states can consider these impacts to inform their own cost-benefit analyses across a range of climate and land use efforts. States can also work with other subject matter experts and economists to identify ways to build robust analytical frameworks that account for the multiple impacts and benefits associated with climate and land use programs. For example, a report prepared for the Vermont Agency of Transportation found that focusing future growth in areas with low VMT and following smart growth development principles could not only be effective in reducing GHG emissions, but also realize several co-benefits such as improved traffic safety, improved public health, reduced maintenance costs, and avoided infrastructure development.²⁸⁴

States can also consider ways to account for costs and benefits as part of local government planning efforts. For example, Maryland explored fiscal implications of new road development in different growth scenarios, finding that more LED-oriented growth patterns could provide cost savings across the state.²⁸⁵ Colorado’s SB24-174 established a requirement to account for long-term fiscal impacts associated with providing infrastructure to new development as part of comprehensive planning efforts for local and county governments.²⁸⁶ The *Rationale for Smart Growth Fiscal Impact Assessment Guide and Model Fiscal Impact Assessment Ordinance*,²⁸⁷ produced by Smart Growth America, provides a framework to help illustrate fiscal impacts and presents a model ordinance for local governments to adopt. States may also consider approaches to quantify other impacts and benefits, such as in public health, equity, and addressing climate vulnerability, as outlined in the California Air Pollution Control Officers Association’s Handbook.²⁸⁸

Leveraging the social cost of greenhouse gases (SC-GHG) in this quantification can help states calculate the economic benefit of GHG emissions reductions that result from climate and land use efforts. States can find guidance in the U.S. Climate Alliance’s *Social Cost of Greenhouse Gases: A Guide for State Officials*,²⁸⁹ which includes approaches for SC-GHG implementation in a land use context. Regarding LED, the guide specifically notes:

“Insofar as these sorts of land use decisions’ emissions impacts are quantifiable, then the SC-GHG can help inform relevant decision-makers. Monetizing those emissions’ harms using the SC-GHG renders the harms comparable to other impacts that bear on the decision, like the degree of economic stimulation, consumer benefit, or tax revenue a decision would generate. In that sense, the SC-GHG can help enable apples-to-apples comparisons of a decision’s harms and benefits.”

Using the guidance outlined in the *Social Cost of Greenhouse Gases: A Guide for State Officials*, states can highlight the avoided emissions that may result from avoided NWL conversion and other emissions reductions associated with climate and land use efforts.

4.2.4

Incentivize or require data-driven land use decision-making at the local level

As part of local and regional planning requirements, states can incentivize or require the use of state datasets, methodologies, or tools, allowing the use of locally available data as appropriate. For example, as part of the implementation of HB 1181 in Washington, the state’s Department of Commerce provided GHG emissions inventories for the 11 counties required to create a GHG sub-element as part of their comprehensive plans, which helps these counties identify appropriate measures to help reduce their GHG emissions in compliance with the law.²⁹⁰

Exploring opportunities to require the use of maps or mapping resources can help states ensure that local land use decisions assess more accurately the regional implications — including impacts and benefits — of growth, development, and conservation. Requiring the use of regional and state datasets and mapping tools also creates alignment and consistency across jurisdictions in their analyses. Several states have provided accessible data and decision-support tools,²⁹¹ which help identify the drivers of vulnerability in their states and draw from national climate risk and vulnerability indexes, such as the FEMA National Risk Index.²⁹²

4.2.5

Establish or contribute to centralized, public open-source data platforms to promote transparency and accessibility

Data platforms that aggregate land use data across sectors can be valuable tools to help states understand the extent of issues or challenges at the state level and can help local and regional governments and other groups in their own climate and land use efforts. To provide relevant information for land use policy development and decision-making, states could develop centralized land use data platforms that detail general land use data across all jurisdictions. Many Alliance members already offer access to state-hosted geospatial data on state agency websites or centralized geographic information systems platforms, which provide states opportunities to build on existing platforms to make relevant data available for land use planning. One such example is Vermont’s Open Geodata Portal,²⁹³ which includes spatial information on land cover, transportation, utilities, demographics, and climate hazards. Additionally, agencies from Maine, Michigan, New York, and Vermont have collaborated with the National Zoning Atlas to compile and map zoning data across jurisdictions to foster understanding of how lands are zoned,²⁹⁴ which states could leverage as part of their own efforts.

Standardized and internally consistent data collection methods, formats, and metadata can help states facilitate land use data sharing and interoperability for all data and data platforms they create. Collaboration with stakeholders, including local and regional governments, academic institutions, non-governmental organizations, and community groups, can help ensure that land use data collection efforts align with the needs of various sectors and user groups, especially in communities often undercounted or underrepresented in national and state datasets. These efforts can improve the collection, management, and dissemination of data on climate policies and land use planning, facilitating informed decision-making and promoting transparency and accountability in project and program planning, implementation, and evaluation.

States could also consider investing in the development and maintenance of data platforms, as well as in the training and hiring of staff to update and manage them. Efforts to promote accuracy at all scales, including the project level, help facilitate more informed decision-making. For states with smaller data teams and limited budgets, the costs of

building, maintaining, and staffing robust data platforms may be prohibitive. However, states can explore partnerships with academic institutions or research groups to help fill gaps. The U.S. Department of Agriculture's Hatch Multistate Research Fund,²⁹⁵ for example, supports universities and state agencies across the western U.S. in producing directly comparable data, collected with standardized techniques, at a regional scale to inform climate and land use policies. These data have been used to support drought mitigation planning by the Navajo, Hopi, and White Mountain Apache Tribal governments, storm hazard reduction through modeling by California universities and state and local governments, and wildfire management and real-time response by Nevada fire managers.²⁹⁶

4.2.6

Identify metrics and establish performance targets around climate, land use, and equity

States can advance social equity outcomes in land use planning, development, and conservation decisions by integrating equity-based metrics and performance targets in the evaluation of climate and land use policies. Setting metrics using a “SMART” format — specific, measurable, achievable, relevant, and time-bound — to advance social equity outcomes in land use planning, development, and conservation decisions can aid this effort. Such metrics provide a framework to drive alignment and consistency across all scales of governments, especially with Tribal, regional, and local governments. These frameworks also can help guide investments, including equipping, monitoring, and evaluating programs to address landscape-scale management questions. Examples of such frameworks include:

- **California Natural and Working Lands Climate Smart Strategy:** This strategy outlines a clear state roadmap for monitoring and tracking nature-based climate solutions, including those around social equity outcomes of NWL conservation, restoration, and protection of NWL activities and efforts.²⁹⁷ These encompass social justice and equity indicators such as the number of acres managed, co-managed, transferred to, and owned by California Native American Tribes; acres of community co-managed or owned properties managed for climate benefits; and number of NBS implemented in climate-vulnerable communities.

- **Guam Green Growth Initiative:** Established through Executive Order 2019-23,²⁹⁸ the Guam Green Growth Initiative aims to cultivate an ecosystem for transformative action to achieve a more sustainable, prosperous, and equitable future for the island.²⁹⁹ The Initiative's action framework identifies goals, objectives, metrics, and other actions to help achieve the goals of the Executive Order. The Framework identified a series of objectives leveraging the “SMART” format to address topics such as land conservation, relocation of critical infrastructure away from flood or low-lying areas, and housing resilience, and reports on progress to the public via a dashboard website.
- **Maryland Compact Development Statistic:** Maryland established and realized an aspirational compact development goal of 75 percent between 2011 and 2020 and seeks to maintain this performance between 2024 and 2045.³⁰⁰ Using the formula, the Statistic prioritizes more multifamily housing development and more single-family housing development on smaller lots in the state's designated growth areas.
- **Oregon Transportation Emissions Website:** As noted in the section on page 50, “Foster a culture of data-driven policy development and decision-making,” Oregon developed a Statewide Transportation Study as a roadmap for decarbonizing the transportation sector.³⁰¹ To continue this effort, the state developed the Oregon Transportation Emissions website to communicate the performance management approach the state developed to measure progress in meeting emissions reduction goals, including those related to land use, such as compact mixed-use areas and parking reform and management.³⁰² The website reports on progress and provides transparency.

To elevate resilience, states can consider leveraging the recommended indicators and metrics, along with an approach for developing these recommendations, in the University of Minnesota's *Tracking for Impact: Development of Climate Resilience Metrics for Minnesota*, a report for the Minnesota Pollution Control Agency.³⁰³ The state partnered with the university to develop metrics and indicators the state can use to monitor and assess its progress in increasing community and landscape resilience. These recommendations reflect the initiatives of the Minnesota Climate Action Framework's resilient communities goal,³⁰⁴ and provide approaches to measure and track progress in building capacity for climate-smart communities, expanding and protecting healthy community green spaces and water resources, and creating more resilient buildings, infrastructure, and business.

4.3 Stakeholder Engagement and Partnership

Overview

The cross-cutting and multisectoral nature of land use planning and climate work requires collaborative action in developing and implementing climate-informed land use policy. Collaboration across state government agencies, local and regional governments, and other stakeholders can result in workable policy solutions that achieve complementary climate-aligned goals.

Stakeholder engagement and partnership requires working with communities, businesses, and other groups and individuals engaged in, or impacted by, climate and land use decision-making. Given the complexities of this work, this Guide will not offer strategies for engaging every stakeholder type; rather, the Guide provides general approaches states can use to engage and partner with various stakeholders. Since communities are most familiar with the challenges they face and have extensive local knowledge, state engagement with communities is critical to identifying effective and implementable solutions. The strategies in this Guide can help states involve stakeholders in climate and land use efforts, work through and address stakeholder concerns, and develop effective partnerships with communities and other groups.

Strategies

4.3.1

Partner with Tribes, Tribal Governments, and Indigenous Peoples

As the original stewards of the land that is now the U.S., Tribal nations and communities are critical partners for states seeking to enact ambitious climate action. Many Tribal nations and communities are leading climate adaptation and mitigation actions, guided by Indigenous Knowledge and values,³⁰⁵ including protecting natural lands and waters from pollution and degradation, preserving biodiversity through the revitalization of endangered species, and developing resilience to climate change.

Strong partnerships with Tribes, Tribal Governments, and Indigenous Peoples on greenhouse gas mitigation and climate resilience offer states opportunities to respectfully incorporate Tribal and Indigenous science, Traditional Ecological Knowledge, and Tribal expertise into climate and land use policies, programs, and investments. Shared actions around land use and conservation, natural resource management, and stewardship also encourage Tribes and Tribal communities to co-own climate and land use decisions. States can leverage official visits to Tribes and Tribal ancestral lands to illustrate and recognize the application of Traditional Ecological Knowledge and Indigenous land management practices: Governor Tim Walz was the first governor in state history to visit all federally recognized Tribal Nations who share geography with Minnesota on their lands,³⁰⁶ and in 2024, Governor Tina Kotek visited all of Oregon's

nine federally recognized sovereign Tribal nations, including a visit with the Cow Creek Band of Umpqua Tribe of Indians that highlighted the tribe's ecocultural forest and fish management.³⁰⁷

California's EO N-15-19,³⁰⁸ which established the Truth and Healing Council,³⁰⁹ provides an avenue for California Native Americans to clarify historical records and provide their historical perspective on the troubled relationship between Tribes and the state. As part of collaborative and consultative work with the Council, the state has developed several programs and initiatives, such as the Tribal Nature-Based Solutions Grant Program,³¹⁰ which supports the return of ancestral land to Tribal stewardship and Tribal initiatives that benefit communities while helping to achieve the state's climate and conservation goals. California also created a grant program, the Tribal Capacity Building Pilot Program, to provide funding and technical assistance to California Native American Tribes, enhancing their staff capacity to advance Tribes' climate-related work.³¹¹ Washington's Tribal Climate Resilience Grant Program, co-designed with Tribes in the state, provides flexible funding through the Climate Commitment Act to address Tribes' climate resilience needs across all stages of project development and implementation.³¹²

Additionally, Michigan, Minnesota, and Wisconsin have explored and initiated efforts to work with Tribes to support Manoomin^{ix} cultivation and preservation, which is threatened by climate change and also provides several ecosystem services that enhance NWL health. Two Minnesota Executive Orders, 18-08 and 18-09,^{313,314} established a Governor's Task Force on Wild Rice, which published recommendations on addressing challenges associated with protecting wild rice.³¹⁵ Michigan state agencies are partners in the Michigan Wild Rice Initiative,³¹⁶ which is developing a Statewide Tribal-State Manoomin Stewardship Plan.³¹⁷ The Wisconsin Department of Natural Resources is partnering with Tribal Nations and the Great Lakes Indian Fish & Wildlife Commission to expand and accelerate research and resilient strategies for Manoomin beds in Wisconsin waters, and develop educational and awareness materials for Wisconsinites using lakes and ponds with Manoomin beds to better protect this resource.³¹⁸

ix The Ojibwe word for what is commonly known as wild rice. See: <https://seagrant.wisc.edu/manoomin/background/>. Given the common use and spelling of Manoomin by the state agencies referenced in this paragraph, the Guide also uses Manoomin. The Dakota word for wild rice, *Psin*, is sometimes used by other state and government agencies such as those in Minnesota where appropriate. See: <https://www.eqb.state.mn.us/sites/eqb/files/documents/FINAL%20Governor%27s%20Task%20Force%20on%20Wild%20Rice%20Report%20January%203%202019.pdf>.

Recent federal uniform standards on consultation with Tribes and Native Hawai'ian communities — as well as co-stewardship agreements and expanded grant programs — that support Nation-to-Nation cross-sectoral collaboration on transportation, renewable energy, infrastructure, land management, and climate-ready workforce development can serve as models for states' work.³¹⁹ The U.S. Departments of the Interior and Agriculture have also established the Tribal Homelands Initiative, which focuses on improving federal stewardship of public lands, waters, and wildlife through bolstering the role of Tribal communities in federal land management.³²⁰ Through this initiative, the U.S. Forest Service has established an action plan for implementing more than 140 co-stewardship agreements, established policy adjustments to incorporate Indigenous Knowledge in management of forest lands, and several other policy changes to support greater Tribal capacity and co-stewardship of public lands.

4.3.2

Empower communities and build capacity

States could support community-based organizations through capacity building and technical assistance programs that enable community-led efforts and cross-sectoral partnerships to help realize climate and land use outcomes. One example of such support involves establishing criteria in state land use planning and grant programs, as does California's Transformative Climate Communities grant program,³²¹ which requires strong partnerships with local community groups as part of grant scoring criteria. Another mechanism includes enabling community-based organizations to support climate and land use efforts, whether through financing or other approaches that remove barriers to community-led projects. For example, states can evaluate whether the support they provide to organizations, such as community development corporations, enables them to leverage their community-based expertise in advancing climate and land use planning. The New Jersey Department of Environmental Protection's Community Collaborative Initiative,³²² a collaborative effort between the department, local governments, and community organizations to transform New Jersey's environmental justice communities into centers for environmental endeavors, economic progress, and sustainable development, has embedded liaisons in 12 underserved communities. They help find and leverage resources and facilitate innovative and multiple-use solutions to better support communities.

States may also support land trusts to provide communities and organizations with mechanisms to develop permanently affordable housing and conserve lands. A working paper from the Lincoln Institute of Land Policy,³²³ for example, explores how community land trusts traditionally oriented around affordable housing and conservation land trusts — traditionally oriented around land conservation — could collaborate to support each other's goals. The paper also discusses various state programs facilitating collaborative land trust efforts, highlighting the approach of the Vermont Housing & Conservation Board.³²⁴

Additionally, state financing mechanisms can facilitate other types of community-based development. Michigan's PA 264, the Michigan Invests Locally Exemption Act,³²⁵ enables crowdfunding of projects and businesses from nonaccredited investors in the state, capped at \$10,000 per investor. The Act's provisions were credited in enabling community-based financing for the construction of a cooperatively owned 47,000-square foot mixed-use building featuring affordable housing units in downtown Traverse City, a popular tourist destination experiencing development pressure and loss of affordable housing.³²⁶

4.3.3

Support models of equitable local engagement and community understanding

States can help increase participation in climate and land use processes from low-income populations and communities of color who have most often been historically marginalized by land use policies, whether in state-led efforts or in projects that states fund. When engaging communities on climate and land use efforts, states could scope and implement strategies that recognize and acknowledge the community's time and expertise through stipends or other support during community engagement exercises, such as childcare and meals. By exploring these engagement models, states can create robust and coordinated approaches to advancing state climate and land use vision and strategies, support regional and local implementation, and invest in and create enabling conditions to gain community support for land use planning, development, and conservation decisions.

For example, Colorado's HB22-1304,³²⁷ which established the state's Strong Communities Grant Program,³²⁸ incentivizes the adoption of transformational practices, programs, and policies to support sustainable development patterns and affordable housing. One of the program's core objectives is to remedy historical and persistent inequities in housing choice. The Department of Local Affairs, which manages the program, developed guidance for potential applicants on how the Department would evaluate considerations like inclusive engagement in applications.³²⁹ This guidance includes details about elements of equitable meetings, including holding community meetings in locations that are welcoming, promoting meetings in multiple languages, offering language interpretation, providing childcare upon request, and compensating attendees. It also acknowledges the value of working with community navigators and cultural brokers in engagement processes.

States could explore ways to support models of authentic engagement with local communities around climate and land use efforts. These models help create shared understanding of benefits and impacts to communities, respond to and address community concerns, refine approaches to address impacts and concerns, and potentially increase stakeholder support throughout the process. These engagement models may include:

- Early and frequent engagement with impacted communities and stakeholders.
- New opportunities for communities and stakeholders to provide feedback, and for officials to show how feedback has been integrated into policies, programs, and projects.
- Increased direct engagement and relationship building, including through pop-up engagement events where appropriate.
- Leveraging multiple types of media to disseminate and receive information, including opportunities for virtual engagement.

While not a climate and land use-specific resource, the Minnesota Department of Administration's Office of Collaboration and Dispute Resolution assists state and local governments in designing and delivering meaningful public engagement, offering a Public Engagement Resource Library to aid in this effort.³³⁰ The office also developed a *Deliberative Public Engagement Handbook* to assist in its engagement efforts.³³¹ States can leverage this or similar resources for climate and land use efforts.

Regarding solar, wind, or battery storage infrastructure deployment, states can explore the following resources for ways to support, implement, or advance recommendations:

- Assessment of Renewable Energy Siting and Permitting Policies from the Clean Air Task Force, NRDC, and The Nature Conservancy: See the section on “Recommended Best Practices During Renewable Permitting Process.”³³²
- Community Centered Solar Development (CCSD) Study Interviews from the Lawrence Berkeley National Laboratory: See findings outlined in RQ3 and RQ4.³³³
- Lessons Learned: Community Engagement for Wind Energy Development in Michigan from the Wind Energy Stakeholder Committee, Michigan Department of Environment, Great Lakes, and Energy: See the full document for recommendations and best practices.³³⁴
- SOLAR@SCALE: A Local Government Guidebook for Improving Large-Scale Solar Development Outcomes from the American Planning Association and the International City/County Management Association: See discussion on “Fostering Authentic Public Participation.”³³⁵

Leveraging these and other engagement practices helps create understanding in communities around issues that could impact subsequent climate and land use efforts. For example, states can foster conversations with communities around rebuilding transportation assets after recurring flooding events to engage on concepts such as climate risk, land use planning, and resilience. These opportunities can also provide a way for states to discuss adaptation strategies — such as NBS — that can be applied in other contexts, including in more intensely developed or populated communities to mitigate flood risk there.

Finally, states can leverage storytelling and visual media, such as photos and videos of communities, facilities, and landscapes, to illustrate climate and land use outcomes in practice and help assuage concerns regarding policy impacts. For example, Washington’s EZview tool provides links to photo libraries of LED-compatible housing typologies that local governments can use as part of their Housing Action Plan development efforts.³³⁶ Vermont’s Homes for All Toolkit,³³⁷ which provides guidance to housing developers, investors, and local governments in supporting location-efficient housing development, offers visual examples of infill housing where design complements Vermont’s existing

architectural styles. Tools such as these can help states respond to community concerns about visual impacts resulting from these and other climate and land use efforts. Using similar practices, such as visual renderings or images of actions taken elsewhere, helps illustrate what climate resilience, NWL practices, or ZEI infrastructure deployment efforts may look like in communities to help mitigate concerns.

4.3.4

Communicate the benefits of climate and land use planning outcomes to broad audiences

States play a crucial communications role in helping stakeholders outside of government understand the long-term implications of climate and land use planning. Leveraging cost-benefit analyses (see section 4.2 on page 50, Data-Driven Planning and Decision-Making) can provide states with a starting point for quantifying and communicating the benefits of climate and land use planning for a wide range of audiences. States can also consider using language presented in the Policy Outcomes chapter to help frame the benefits of implementing climate and land use policy to different stakeholder and community groups. These efforts can also emphasize the role climate and land use planning can play in supporting state efforts to address the climate crisis and other state policy challenges.

Providing simple messaging resources for local decision-makers to help communicate the rationale and need for implementing climate and land use policies and to address community concerns and questions about these policies can help states strengthen engagement. Colorado’s *Land Use and Climate Fact Sheet* helps communicate these benefits through multiple lenses, describing how the state’s strategic growth efforts support improved climate, public health, environmental, economic, and equity outcomes.³³⁸ States can also design and compile resources that local decision-makers and other stakeholders can leverage in their own benefits communication work. In addition to providing guidance on implementation, Oregon’s CFEC program,³³⁹ which provides resources about climate and land use planning to local governments, helps describe how regulations will facilitate state efforts to meet climate and equity goals. Resources also explain the benefits of different CFEC elements — particularly around parking — using plain language text,³⁴⁰ case studies,³⁴¹ and storytelling.³⁴²

Different framing approaches to communicate climate and land use planning co-benefits to audiences who may not respond as readily to climate-oriented framings may also be used. These approaches can be particularly effective when they discuss quality-of-life benefits for communities. The Wisconsin Department of Health Services' former Livable Communities grant program,³⁴³ for example, discussed LED benefits through a public health lens, noting ways in which communities that employ LED practices support social connection, make communities more livable for older adults and people with disabilities, enhance personal independence, and facilitate aging in place. Regarding economic development, the MiPlace program, established through Michigan's Economic Development Corporation,³⁴⁴ provides technical assistance to help communities become more attractive for development projects that create places where people want to live, work, and invest (as discussed in the Cross-Sectoral and Intergovernmental Planning section on page 45, "Provide technical assistance and support to local and regional planning organizations and elevate regional programs"). Many of the MiPlace resources leverage LED practices to support economic development and placemaking^x activities, helping to communicate their value and benefits to communities across the state. Additionally, North Carolina's *Natural and Working Lands Action Plan* recognizes how NWL create economic opportunities for agri-business, recreation, and tourism.³⁴⁵

When communicating about LED, using language focused on expanding transportation and housing choice can help states communicate a need for climate and land use policies and address consumer and public demand for expanded choices. For example, the National Association of Realtors found that Americans largely prefer walkable communities over those that require driving for commuting and meeting other daily needs in its 2023 *National Community and Transportation Preferences* survey.³⁴⁶ Yet Smart Growth America's 2023 *Foot Traffic Ahead* report found that such walkable communities are in short supply.³⁴⁷ The Pew Charitable Trusts also found that a large majority of Americans favor policies to enable more housing, particularly near public transportation, job centers, schools, and other amenities.³⁴⁸ Appendix E of California's 2022 *Scoping Plan* uses a policy framework to make this connection to advancing sustainable and

equitable communities by noting public interest in changes to land use and transportation planning to help people drive less.³⁴⁹ States can consider leveraging these and other similar findings to illustrate the need for LED-compatible policies that help close this gap and increase access to more affordable and lower-cost housing and multimodal transportation choices in communities.

As discussed in the Cross-Sectoral and Intergovernmental Planning section on page 46, "Integrate and coordinate climate and land use with housing policies," linking housing and climate policy is a highly complementary approach, particularly when doing so helps address the nation's housing shortage and the increasing costs of housing. Communicating the role of more energy-efficient housing in promoting housing affordability and reducing climate vulnerability to extreme weather events can also be a sound strategy; for example, as in the case of extreme heat as outlined in Arizona's Extreme Heat Preparedness Plan.³⁵⁰ Leveraging these benefits when communicating with stakeholders can help create additional momentum and support for such efforts. Framing energy-efficient housing efforts in the context of increasing access to affordable, healthy, and comfortable housing can create support across a wide range of stakeholders for climate and land use efforts.

NWL messaging can focus on how efforts to support healthy NWL create opportunities for outdoor recreation that can improve public health outcomes and support economic development activities in communities. Individuals who hunt, fish, or forage for sport or subsistence may be receptive to messages around NWL efforts that protect and improve habitat health for wildlife and help preserve cultural practices. Farmers and ranchers may be receptive to messages around NWL efforts that help protect their lands and livelihoods from urbanization, helping to minimize conflicts that may stem from the urban-rural divide. Oregon's SB 100,³⁵¹ along with Vermont's Act 250 Program,³⁵² grew from recognition of the need to protect each respective state's agricultural lands and the natural and cultural value of its landscapes.

x Per the Project for Public Spaces, "Placemaking inspires people to collectively reimagine and reinvent public spaces as the heart of every community. Strengthening the connection between people and the places they share, placemaking refers to a collaborative process by which we can shape our public realm in order to maximize shared value. More than just promoting better urban design, placemaking facilitates creative patterns of use, paying particular attention to the physical, cultural, and social identities that define a place and support its ongoing evolution." See: <https://www.pps.org/category/placemaking>



Conclusion

Land use planning is a powerful tool to help states meet their GHG emissions targets and become more climate resilient. Lands and land use patterns play a significant role in managing GHG emissions and carbon sequestration, as well as in the ability of communities to prevent, reduce, withstand, and recover from climate-related impacts. The complex, intersectional, and interdisciplinary nature of land use policy requires similarly intersectional and interdisciplinary approaches to address climate change challenges.

Addressing these challenges holistically through land use also provides an opportunity to focus on other policy concerns such as housing affordability, public health, economic development, access to open space and recreational opportunities, and social equity. Climate and land use planning can provide significant co-benefits that can improve the quality of life and well-being of communities and of ecosystems. While approaches to address climate impacts through land use policy must be tailored to the unique challenges and opportunities that exist in each state, states have multiple policy levers available to address climate change and realize these co-benefits.

State policymakers can begin to map out how to help advance their climate goals through land use by considering the recommendations provided in this Guide. The highlighted Policy Outcomes of realizing more location-efficient development, healthy NWL, and climate-resilient development, along with the Governance Strategies recommendations, can help states achieve effective and inclusive transformations. With growing interest in land use across the country, states are in a prime position to help accelerate climate action through land use. There is no time to waste.



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