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Climate Action and Transferable Development Rights

By Rick Pruetz, FAICP

Planners are on the front lines of climate action. Several communities use transferable development rights (TDR) to mitigate greenhouse gas (GHG) emissions by controlling energy-wasting sprawl, preserving resources needed for carbon sequestration, and conserving the carbon already embedded within historic landmarks. Others use TDR for climate change adaptation by protecting natural areas, safeguarding water supplies, and redirecting growth from places that are increasingly vulnerable to catastrophic events such as wildfires and sea level rise. As recommended by the American Planning Association and other organizations, communities should consider adding TDR to their climate action toolbox. The 10 TDR programs profiled in this article support these recommendations.

WHAT IS TDR?

TDR is a market-based way of implementing planning goals. Traditionally, TDR allows additional development potential in places where growth is wanted when developers pay for the reduction or elimination of development potential in places less suitable for growth.

A local government spells out the mechanics of its TDR program within its adopted land-use regulations. In a classic TDR code, the jurisdiction defines and/or maps the area where it wants less or no development, called the sending area, and those places where extra development is wanted, called the receiving area. Owners of sending- and receiving-area land are free to choose whether or not to take advantage of the TDR option offered by the dual zoning established by the TDR ordinance.

Sending-area property owners who decline to participate can continue to use their land in accordance with the underlying zoning. However, if they choose to participate, these property owners typically record a conservation easement that permanently reduces on-site development potential but continues to allow whatever land uses are consistent with the program's goals. In return for recording easements or transferring title to sending sites, the participating property owners are issued TDRs, which they sell to developers in the receiving areas. Compensation from the sale of these TDRs motivates sending-site owners to voluntarily participate.

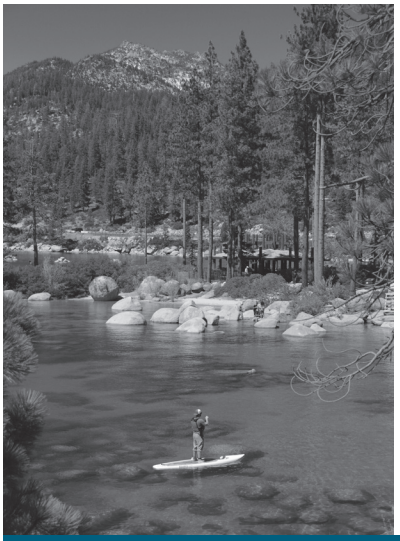
Developers of receiving-area property also have a choice. The ordinance allows a prescribed amount of development potential for developers who decline the TDR option. However, developers can choose to exceed this baseline by buying TDRs from sending area property owners. When a TDR program works, the extra development potential made possible by TDR generates sufficient additional revenue to motivate developers.

Although the logic is simple, TDR is more complex than traditional zoning and requires observance of important success factors. For example, developers must want to exceed baseline levels of development or they will have no reason to buy TDRs. Similarly, the TDR ordinance must be capable of producing a TDR value that is attractive to buyers and sellers. If TDRs cost too much, receiving area developers will not buy them and if sending area property owners do not feel adequately compensated, they will not sell TDRs. TDR ordinances can create a viable market by adjusting the number of TDRs available to sending sites and/or the additional development allowed per TDR to receiving sites. Consequently, by paying attention to local real estate economics, jurisdictions can create TDR programs that achieve important community goals at little public expense (Pruetz and Standridge 2009).

TDR AND CLIMATE ACTION

TDR was initially used to protect historic properties as part of the New York City Landmarks Preservation Law of 1968. Within a decade, cities and counties were also using TDR to preserve agricultural land and environmental resources. Over the intervening years, jurisdictions have adopted TDR to achieve a wide range of goals from encouraging the production of affordable housing and maintaining growth within infrastructure capacity to preserving rural character and implementing entire downtown plans.

Today, climate action is needed. A 2017 evaluation of 100 mitigation strategies estimated that one-third of the total GHG emissions calculated in the study could be accomplished by 25 strategies aimed at compact communities, planet-friendly food/fiber/biomass production plus the conservation of forests and wetlands (Hawken 2017). Another study found that 37 percent of the required CO_2 mitigation could cost effectively result from natural solutions including land conservation, restoration and management strategies that reduce GHG emissions and/or sequester carbon within wetlands, forests, farmland, and grasslands (Griscom et al. 2017). The International Panel on Climate Change reached similar conclusions in its 2019 special report: *Climate Change and Land* (International Panel on Climate Change 2019).



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The Tahoe Regional Planning Agency uses TDR to help preserve the clarity of Lake Tahoe.

While TDR isn't the only way for municipalities to use their zoning code to take action on climate mitigation or adaptation, it does have the distinct advantage of being primarily powered by private market forces (Nelson, Pruetz, and Woodruff 2012). Several organizations and agencies agree that TDR should be considered for GHG mitigation and climate change adaptation. The American Planning Association lists TDR as an option for preserving ecosystems and farmland in order to support local food production, reduce vehicle miles traveled (VMT) and sequester carbon in its Policy Guide on Climate Change (American Planning Association 2011). TDR is included as a way of relocating development potential away from vulnerable coastal areas to inland locations by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) (National Oceanic and Atmospheric Administration 2012). The South Florida Regional Planning Council, the California Coastal Commission, and Columbia Law School also list TDR as an implementation measure for managed retreat from rising sea levels (South Florida Regional Planning Council 2013; California Coastal Commission 2018; Siders 2013).

TDR AND COMPACT CITIES

According to a 2017 report for the United Nations Environment Program, compact urban form single-handedly cuts urban resource consumption in half, and forms the first of four levers capable of reducing negative growth impacts from 80 to 90 percent (International Resource Panel 2018). Many U.S. metro areas rely primarily on zoning and urban growth boundaries (UGB) to prevent and help control sprawl. In combination with these strategies, King County, Washington, and Montgomery County, Maryland, have also used TDR and similar techniques to create permanent greenbelts capable of redirecting growth into compact urban areas.

King County, Washington

In the two decades between 1998 and 2019, King County's TDR program curbed sprawl by protecting over 144,500 acres of forests, farms, and other open space. The preferred receiving areas for the development potential transferred from rural land under county jurisdiction are within Seattle and other incorporated cities with much lower per-capita GHG emissions.

King County manages a TDR bank that can buy TDRs when sending-site owners want to sell them and hold those TDRs until receiving-site buyers are ready to buy them. The bank facilitates transfers and allows King County to target the preservation of high-priority sending sites with important resource values and special significance to the cities that participate in the program. When the bank sells TDRs, the revenues are reinvested in further conservation, thereby creating a perpetual revolving fund for preservation. This is an important advantage over conventional conservation programs in which purchased development rights are simply retired rather than sold, consequently requiring additional public revenue to be secured before further preservation can be funded.

King County calculated that TDR and other strategies confined 98 percent of all development occurring between 2011 and 2015 within the UGB, achieving compact and efficient land uses with a corresponding reduction in VMT. In its 2015 *Strategic Climate Action Plan*, King County calls for continued use of TDR and other measures to steer growth into energy-efficient neighborhoods, reduce sprawl, sequester carbon in forests, farms, and other open space, as well as lower the impacts of climate change such as flooding. To increase the motivation to buy TDRs, developers of qualified receiving sites can now use TDR to reduce transportation improvement requirements because the permanent elimination of development potential can lower the need for these improvements. Furthermore, developers can use TDR to help meet the GHG emission targets established for new projects.

Montgomery County, Maryland

In its *Climate Protection Plan*, Montgomery County acknowledged the effectiveness of its TDR program in mitigating GHG emissions by permanently preserving a greenbelt surrounding a development corridor with compact, mixed-use, livable places that " . . . invite(s) people to walk or bike to work, to shop and to participate in community life without a long commute by car. The Agricultural Reserve should continue to be protected for food production, recreation and carbon sequestration" (Montgomery County 2009, ES-9).

Montgomery County's reliance on TDR for climate action is not surprising considering it has one of the most successful TDR programs in the country. The county launched this program in 1980 with a plan aimed at preserving a 92,000-acre Agricultural Reserve for multiple benefits including the elimination of urban sprawl, the protection of local food sources, the conservation of energy, the retention of rural lifestyles, and the confinement of future growth to corridors planned for the efficient provision of infrastructure and public services. So far, TDR has permanently protected more than 52,000 acres, and other conservation programs have boosted that total to over 70,000 acres, or more than 75 percent of the entire Agricultural Reserve.

In addition to curbing sprawl and protecting carbon-storing farmland, Montgomery County and the Montgomery Countryside Alliance are partnering on "Re-Leaf the Reserve," a campaign aimed at reforesting portions of the greenbelt to help reach the county's goals of an 80 percent reduction of GHG emissions by 2027 and a 100 percent reduction by 2035.

PRESERVING FORESTS FOR CARBON SEQUESTRATION

The world's 1.9 billion acres of temperate forests sequester about 0.8 gigatons of carbon per year. Regeneration of an additional 235 million acres of temperate forest could boost sequestration to an estimated 22.6 gigatons of carbon dioxide by 2050, making

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Montgomery County's TDR program has helped permanently protect an Agricultural Reserve that curbs energy-wasting sprawl.

this one of the most effective means of mitigating climate change (Hawken 2017). King County, Washington, targets forest preservation and restoration as essential to its GHG reduction goals. Woodlands also constitute a large proportion of the over 144,500 acres preserved to date by that TDR program. However, since King County is profiled above, this section offers the New Jersey Pinelands as an example of using TDR as a tool for carbon sequestration in forests and other natural areas.

New Jersey Pinelands

In order to meet the goals of its 2007 Global Warming Response Act, New Jersey is relying on forests and other natural carbon sinks to absorb up to 46 percent of its annual GHG emissions by 2050 (New Jersey 2017). The New Jersey Pinelands, created by the New Jersey Pinelands Protection Act of 1979, protects some of the largest unbroken forest tracts in the eastern United States.

In 1980, the New Jersey Pinelands Commission adopted a plan for protecting the New Jersey Pinelands, a 938,000-acre area in the southeastern quadrant of the state containing specialty agriculture and unique ecological features as well as upland and lowland forests. The plan required the seven counties and 53 municipalities within the planning area to conform their zoning to implement the plan. In 22 of these municipalities, the new zoning contains receiving sites for TDRs transferred from sending areas comprised of forested and agricultural lands elsewhere in the planning area. The scale of this interjurisdictional transfer system, the largest in the United States, was made possible by the commitment and support of the state of New Jersey. As of the end of 2019, 55,392 acres had been permanently preserved by the TDR program.

PRESERVING COASTAL WETLANDS FOR CARBON SEQUESTRATION

Wetlands hold roughly one-fifth of all the carbon on earth. Undisturbed coastal wetlands are particularly good at sequestration, with an ability to store five times more carbon over the long term than tropical forests. However, the planet has already lost over one-third of its mangrove forests. When these coastal wetlands are destroyed or degraded they release huge volumes of long-sequestered carbon (Hawken 2017). The Florida Everglades contain the largest mangrove forests in the continental United States. As an essential component of GHG mitigation strategy, National Science Foundation researchers warn that adequate freshwater flow must be maintained to assure the survival of healthy, carbon-storing mangroves in the Everglades (National Science Foundation 2016). As described below, Miami-Dade County adopted the East Everglades Ordinance to safeguard the natural flow of water to Everglades National Park as well as protect endangered species and safeguard the Biscayne Aquifer, the sole source of irrigation and drinking water for Dade County and the Florida Keys.

Miami-Dade County, Florida

Dade County adopted the East Everglades Ordinance in 1981 to safeguard critical environmental resources including overland freshwater flows that are essential to the coastal wetlands and other ecology of Everglades National Park. In management areas totaling 45,200 acres, the ordinance limits on site development to one dwelling unit per 40 acres and prohibits the construction of roads that would interrupt or divert the natural sheet flow of water. Alternatively, owners of land in these areas have the option of permanently restricting on-site residential uses and selling the resulting TDRs, which in this program are called severable use rights, or SURs. Developers can use SURs to achieve additional residential density in 19 zoning districts and to gain additional floor area in seven commercial zoning districts that serve as receiving areas within the county. As of 2015, the ordinance also allows incorporated cities to establish receiving areas for interjurisdictional SUR transfers. As of January 2016, 1,116 SURs had been transferred to receiving sites in the county, which represents almost one-quarter of the 4,700 SURs originally assigned to the sending area.

PRESERVING AND RESTORING FARMLAND FOR CARBON SEQUESTRATION

Farmland and farming can provide net GHG mitigation with techniques that build deep, carbon-capturing soils and employ sequestration-maximizing crops such as regenerative agriculture, fertilizer management, tree intercropping, conservation agriculture, and managed grazing (Hawken 2017). The American Farmland Trust advises that farmland protection is a critical companion to regenerative agriculture in the fight against climate change since the United States continues to lose 1.5 million acres of farmland every year (American Farmland Trust 2020). The profile below of Boulder County, Colorado, explores the county's success in farmland preservation through TDR.

Boulder County, Colorado

Boulder County, located 15 miles northwest of downtown Denver, preserves over 104,000 acres of resource lands protected using grant funding plus sales and property tax revenues as well as four main regulatory techniques including TDR. After starting with a fairly traditional TDR program in 1989, Boulder County added an interjurisdictional process in 1995 in which intergovernmental agreements establish procedures for individual cities and towns to accept TDRs transferred from specified county sending sites with farmland, environmental, or other features that are of special interest to these incorporated jurisdictions. For example, in a 1995 Intergovernmental Agreement, Boulder City agreed to accept up to 250 TDRs transferred from sending sites under county jurisdiction as one of many implementation measures that ultimately resulted in the impressive greenbelt surrounding the city.

In its 2018 *Environmental Sustainability Plan*, Boulder County adopted a target of reducing GHG emissions 45 percent below 2005 levels by 2030 using various strategies including farmland preservation and the exploration of increasing carbon sequestration through regenerative agriculture. In its 2019 Sustainability Accomplishments update, Boulder County reported launching carbon sequestration pilot programs using remediation practices on degraded rangeland.

PRESERVING HISTORIC STRUCTURES WITH TDR

As reported by the National Trust for Historic Preservation, energy is consumed in the process of demolishing an existing building and hauling the waste away as well as extracting raw materials, fabricating construction components, delivering them to the site and finally assembling the new building. Due to the energy embedded in existing buildings, it can take from 10 to 80 years for the operational savings of a new, energy-efficient building to offset the climate-changing

impacts of the demolition and construction (National Trust for Historic Preservation 2011).

At least 28 US cities, including San Francisco, use TDR primarily or entirely to preserve historic landmarks. These programs may not list GHG mitigation as a purpose, but they nevertheless help cities achieve climate action goals by giving the owners of historic buildings an added incentive to save, rehabilitate, and reuse their landmarks.

San Francisco

In 1985, San Francisco designated 253 buildings as historically significant and made it difficult, if not impossible, for the owners to demolish or alter them. However, owners of landmarks can record a certificate of transfer permanently reducing the development potential of sending sites and sell the unused floor area, which is calculated as the difference between the floor area of the landmark and the maximum floor area that would otherwise be allowed without the historic building designation. Developers of receiving sites in the downtown's C-3 zone can buy this certified floor area and use it to exceed the floor area maximum applicable to buildings that do not use the TDR option. As of 2013, 112 landmarks had been certified, representing 5.3 million square feet of floor area and 2.7 million square feet of floor area had been transferred to 32 receiving site projects.

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San Francisco's TDR program preserves historic landmarks and their embedded carbon.

TDR AND CLIMATE ADAPTATION

Almost 40 percent of the U.S. population lives in a coastal area vulnerable to sea level rise (Lindsey 2019). "Sunny-day flooding" affects Miami up to 20 times a year, prompting voters to pass a $400 million bond to implement various resiliency measures including raising the elevations of roadways. Some public officials in Florida admit that managed retreat from lower coastal areas is ultimately inevitable but delay taking action (Butler, Deyle, and Mutansky 2016). Three California jurisdictions passed TDR programs decades ago aimed partly at reducing development on vulnerable coastal bluffs and beaches.

Climate change is also increasing the risk of wildfire due to high temperatures, low humidity, low rainfall, and high winds (Science Daily 2020). Building codes and vegetation controls can provide some protection to homes in fire-prone areas. But reducing development in the wildland-urban interface not only reduces risk but can also help shape compact communities and maintain various ecosystem services such as habitat preservation.

In addition to reducing human exposure to increased risk, communities are using TDR to protect natural resources threatened by climate change, such as wildlife and biodiversity. Beneficial management approaches for adaptation include maintaining, improving, and connecting diverse landscapes. Over 150 U.S. TDR programs are at least partly designed to preserve environmental resources, including in San Luis Obispo County, California, where a TDR bank turned a modest loan into a revolving fund that succeeded in securing a preserve for a rare tree species.

Climate change is also causing uncertainty in the quantity and quality of water needed for households, business, agriculture, and the environment. At least nine U.S. TDR programs are largely aimed at protecting water, including the Tahoe Regional Planning Agency, California/Nevada, which uses a multijurisdictional TDR program within a 207,000-acre planning area to help safeguard the clarity of Lake Tahoe.

The municipalities discussed below, Ocean City, Maryland; Pitkin County, Colorado; Palm Beach County, Florida; and communities surrounding the Long Island Central Pine Barrens are each using TDR in combination with a wide variety of other planning and zoning strategies to adapt to existing and potential future climate change impacts.

Sea Level Rise Adaptation through TDR in Ocean City, Maryland

Ocean City occupies a barrier island on Maryland's Atlantic coast. In its highly exposed location, this resort community has been battered by numerous storms and the entire town would be inundated if hit by a Category 3 hurricane. In 1972, the town established a build-to line to prevent development of the most vulnerable land. In 1993, a partnership of federal, state, and local agencies developed a plan to improve the town's defenses against coastal storms and the compounding effect of sea level rise. This plan incorporated a multifaceted strategy that included beach replenishment and restoration of vegetated coastal dunes. However, implementation of this plan required the town to acquire easements on or ownership of the privately owned oceanfront land. Traditional acquisition funded by local taxes would have generated substantial bills for a community with a year-round population of 7,000 people.

Instead, Ocean City adopted a TDR program that issues one TDR for every 500 square feet of beachfront land in the beach transfer sending overlay zone when the owners grant easements or transfer ownership to the public. The receiving area is the beach transfer receiving (BT-R) overlay zone, which covers inland areas designated in the comprehensive plan as appropriate for relatively high-density development. In the BT-R zone, baseline density can be exceeded by up to 25 percent when developers retire one TDR for each additional hotel room or two TDRs for each additional multiple-family residential dwelling unit. More than 400 TDRs were transferred as of 2013, saving Ocean City millions of dollars in land acquisition expenses and costing the town almost nothing other than program administration (Schechtman and Brady 2013).

Adapting to Increased Wildfire Risk in Pitkin County, Colorado

Pitkin County, which includes the upscale ski resort town of Aspen, expects wildfires to increase in frequency, size, and intensity over the coming years due to climate change. To reduce vulnerability to wildfire across the county and achieve many other

goals, Aspen and Pitkin County sought to minimize sprawl by confining urban development to a UGB adopted in 2000. To further limit human exposure to these risks, the *Hazard Mitigation Plan* reports that the county's TDR program complements the UGB by encouraging the relocation of development from hazardous zones and other rural areas into places that are closer to urban services and infrastructure.

Pitkin County's TDR program was initially launched in 1996 with the creation of the county's Rural and Remote (RR) zone. As the zone's name suggests, this zone is characterized by sparse development, a lack of utility districts, limited or no availability of traditional county emergency services, and the presence of natural hazards. Minimum lot size in the RR is 35 acres and cabins are restricted to 1,000 square feet of floor area. However, owners in the RR zone can choose to restrict further development by covenant and sell one TDR for every full 35 acres or legal parcel smaller than 35 acres. Over the years, Pitkin County added the TDR option for sending sites in several other rural districts and under various scenarios, including relief for properties constrained by habitat, steep slopes, and geologic hazards as well as wildfire vulnerability. Generally, owners of qualified sending area land who choose to participate can sever and sell TDRs for prices that ranged from $115,000 to $318,000 per TDR between 2007 and 2019.

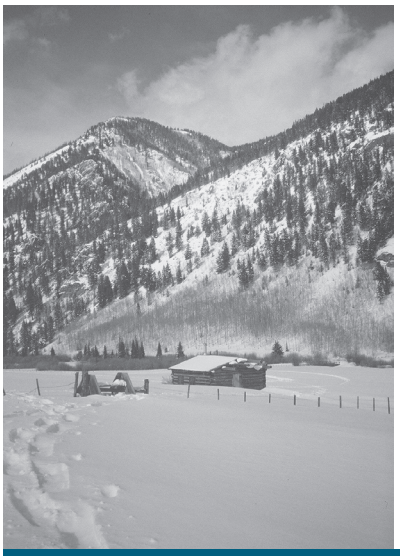
Receiving area homebuilders can use these TDRs to exempt a new residential unit from the limitations of the county's Growth Management Quota System, which applies to all development within unincorporated Pitkin County. In addition, TDRs can be used for exemption to floor area maximums otherwise applicable to individual residential dwelling units. The maximum floor area is 5,750 square feet per residential dwelling unit, which can be exceeded at the ratio of 2,500 square feet of additional floor area per TDR. Despite the high cost of TDRs, 82 percent of the 254 TDRs extinguished so far have been used to exceed the floor area threshold and the program has preserved 8,879 acres.

Climate Adaptation and Biodiversity in Palm Beach County, Florida

Florida lists conservation and restoration as strategies for protecting ecosystems and species from the effects of climate change (Florida Fish and Wildlife Conservation Commission 2016). In the 1990s, the voters of Palm Beach County on Florida's Atlantic Coast approved two bond referenda for a total of $250 million which acquired 35 natural areas that featured every ecosystem in the county. In traditional land acquisition programs, any additional preservation would require further approval from the voters. But Palm Beach County used its TDR program to sever 9,000 TDRs from these sending sites and hold them in a TDR bank for resale and use on county receiving sites. The bank sells its TDRs according to a legislated percent of median county real estate sales prices for several categories of housing. For example, in 2019, the median sales price of a single-family home was $350,000, which at the legislated fraction of 10 percent resulted in a price of $35,000 for each TDR sold by the county. During real estate booms, TDR sales can annually generate several million dollars for the county, with all proceeds earmarked by the county code for maintenance and expansion of the 31,000-acre preserve system.

Climate Adaptation and Water Quality in the Long Island Central Pine Barrens

The Central Pine Barrens region area includes 106,500 acres of ponds, marshes, and forests surrounding and constituting critical water resources for Long Island, New York. To protect this area, New York State, Suffolk County, and the three towns that encompass the Central Pine Barrens area adopted a plan in 1995 designating a Core Preservation Area to be permanently protected using both tax-funded acquisitions and a TDR program called the Pine Barrens Credit Program. This program requires the three towns to create receiving areas outside the core capable of accommodating 2.5 times the number of Pine Barrens Credits (PBCs) allocated to sending areas within each town. PBCs can often be used at receiving sites to allow additional nonresidential development intensity as well as extra residential density. For example, under a county health code, developments can double the daily sanitary sewage flow limits by redeeming PBCs. In some receiving areas, PBCs can also be transferred to planned development districts for tourism facilities, senior housing, medical centers, and commercial uses. As of January 1, 2020, this program had permanently preserved 988 parcels with a total value of $53.5 million in private sales.



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TDR helps Pitkin County, Colorado, reduce development in remote areas vulnerable to wildfires and other hazards.

CONCLUSION

Planners can mitigate GHG emissions by curbing sprawl and preserving farmland, forests, wetlands, and coastal areas capable of sequestering carbon. The preservation, rehabilitation, and reuse of historic landmarks also conserves the carbon already embedded within existing buildings. Protection of resource lands often has the added benefit of reducing exposure to floods, wildfires, sea level rise, and other hazards accelerating due to climate change. Furthermore, conservation helps communities adapt to climate change impacts on ecosystems, habitat, watersheds, and aquifer recharge areas.

Traditional methods of accomplishing these goals typically require taxation, which is often unpopular with voters and the object of fierce competition. Conversely, TDR uses development proceeds to pay for preservation. Nevertheless, only a small fraction of jurisdictions use TDRs despite the fact that several agencies and organizations suggest consideration of TDR for climate action including the EPA, NOAA, and the American Planning Association. As illustrated by the programs profiled in this article, TDR can be a valuable tool for climate action.

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Rick Pruetz, FAICP, is a planning consultant specializing in the implementation of community goals using TDR. He has prepared or assisted with the preparation of TDR studies and ordinances for over 30 communities. He has written three books on TDR and was one of three coauthors of *The TDR Handbook: Designing and Implementing Transfer of Development Rights Programs* (Island Press 2012). He also wrote *Lasting Value: Open Space Planning and Preservation Successes* (APA 2012). Pruetz maintains the website SmartPreservation.net, which features profiles of over 300 TDR programs. He has a Master of Urban Planning degree and 41 years of planning experience including 14 years as the city planner of Burbank, California.

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