



IDEAS

ENERGY & ENVIRONMENT

POLICY OF THE YEAR NOMINEE

*Modernizing
Stormwater
Management Around
Mashapaug Pond*



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Who We Are

The Roosevelt Institute, working to redefine the rules that guide our social and economic realities, is home to the nation's largest network of emerging doers and thinkers committed to reimagining and re-writing the rules in their communities to create lasting change. Our members, organizing in 130 chapters in 40 states nationwide, partner with policy makers and communicators to provide them with clear, principled ideas and visionary, actionable plans. Our members are actively influencing policy on the local, state and national level – from introducing legislation on protections for LGBTQ youth to consulting with local governments on natural disaster flood prevention.

What You're Holding

Now in its eighth year, the *10 Ideas* series promotes the most promising student-generated ideas from across our network. This journal, which includes submissions from schools located from California to Georgia to New York, stands as a testament to the depth and breadth of our network of innovators.

Our *10 Ideas* memos are selected for publication because they are smart, rigorously researched, and, most importantly, feasible. We want to see these ideas become a reality.

How You Can Join

As you explore these ideas, we encourage you to take special note of the “Next Steps” sections. Here, our authors have outlined how their ideas can move from the pages of this journal to implementation. We invite you to join our authors in the process. Contact us on our website or by tweeting with us @VivaRoosevelt using the hashtag #RooImpact.

Thank you for reading and supporting student generated ideas.

Together we will design the future of our communities, from towns to countries and all that lies in-between.

Dear Readers,

Young people are incredibly important to the American political process. Millennials and Generation Z now make up the same portion of eligible voters as the Baby Boomer generation. This emerging generation is also the most diverse in our nation's history: Half of all eligible Latino voters in 2016 are between the ages of 18 and 35. We're told we can make the difference every election, and candidates and elected officials ask for our votes, time, and money—but they don't ask for our ideas.

Young Americans continue to transform our economy and culture. Now it's time for us to disrupt our political system.

The *10 Ideas* journals, one of our oldest and most competitive publications, elevate the top student-generated policy ideas from across the country. In this year's journals, you will find solutions to problems in places ranging from South Dakota to North Carolina to Oregon to New York. Whether seeking to make Pittsburgh an immigrant-friendly city or to reduce recidivism in the state of Massachusetts, the following proposals take a creative and locally focused approach to building opportunity for all.

Rooseveltians are also committed to turning their ideas into action. Whether that means meeting with decision-makers, writing opinion pieces in their local papers, or organizing actions in their communities, we intend to see the solutions we propose become reality.

Why? As the generation that will inherit the world shaped by today's decisions, we have the most to lose or gain. Involving the emerging generation in the policy process will lead to outcomes that benefit everyone. We believe it matters who rewrites the rules, and we have ideas for how to change them.

I hope you enjoy reading the proposals in this journal as much as we did.

Onward,

A handwritten signature in black ink, appearing to read 'Joelle Gamble', with a long, sweeping underline.

Joelle Gamble

National Director, Network, Roosevelt Institute

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Fighting Fire with Fire: Better Forest Fire Prevention in South Dakota

By **Brendan Clemente, Zachary Cendejas, and Lane Haskell,**
Notre Dame University

Thesis

South Dakota fire prevention is underfunded and restricted by U.S. Environmental Protection Agency (EPA) regulations. The South Dakota Forest Service should allow more logging near residential areas, prescribe more burning in remote forests, and petition the EPA to loosen regulations that restrict these methods.

Background and Context

Between 1985 and 1990, the U.S. spent about \$2.2 billion on fire suppression, the costly endeavor to control or extinguish forest fires. Between 2010 and 2015, it spent about \$9.5 billion.¹ Congress has funded this increase by diverting funds away from fire prevention methods.² In 1995, 16 percent of the U.S. Forest Service's budget went towards fire suppression. In 2015, fire suppression comprised 50 percent of the budget. If current trends continue, by 2025, it will comprise 67 percent of the budget.³

Reactively focusing funding on suppression has helped extinguish or control fires, but diverting funds away from preventative measures, such as thinning, has allowed forests to grow thicker, which allows fires to spread more easily.⁴ This, combined with climate change, which dries out forests and provides more fuel, has made the forest fires of today more destructive than in the past.⁵

EPA air quality regulations and the protection of wildlife areas called "protected activity centers" (PACs) exacerbate these problems by limiting the use of prescribed burning, a primary fire prevention method.⁶ This trend has created economic, environmental, and health challenges for the state of South Dakota. In 2012, South Dakota experienced more wildfires than all but seven states.⁷ That year, the White Draw Fire killed four people and destroyed 9,000 acres.⁸ More of the state's population is moving into residential areas that intermix with forests, called Wildlife Urban Interfaces (WUI), such as the Black Hills region where 29 percent of the state's population now resides.⁹

Policy Idea

The Black Hills Forest Service of South Dakota should pursue a policy

of active prevention of forest fires by contracting out limited logging opportunities in WUIs, and using funding from those contracts to finance prescribed burning in remote wilderness areas. Additionally, the South Dakota state government should petition the EPA to loosen both air quality restrictions and the regulation of PAC's to allow for more prescribed burning and management of naturally occurring fires.

Policy Analysis

The diversion of the forest service's budget to fire suppression results in insufficient funding for preventative measures. Preventative measures are also inhibited by EPA air-quality restrictions and PAC-zone regulations. These two factors result in wildfires that require increasing funds to suppress.

The proposed policy would contract limited logging opportunities to private parties in forests near residential areas and use this revenue to finance prescribed burns in remote forests. Prescribed burns lessen the chance of large, destructive fires by preventing the accumulation of debris and a heavy density of trees. At \$86 per acre, compared to \$1,000 per acre for mechanical thinning, they are the preferable method in remote areas.¹⁴ However, thinning must be used in forests near residential areas because it is low-risk and more precise.¹⁵ The policy mitigates this cost by contracting to private loggers. Additionally, the cost of logging is less than suppression near residential areas. Just south of South Dakota's Black Hills region, the Black Forest Fire near Colorado Springs, Colorado, for instance, burned 489 houses, killed two people, and cost \$420 million in insured losses.¹⁶

Petitioning the EPA to loosen air quality and PAC limitations on preventative burning will improve the environment because the forest fires they prevent damage the environment more than preventative

KEY FACTS

- ▶ Wildfires burn twice as much land area today as they did in 1970.¹⁰
- ▶ Each year, wildfires emit a total of 1.5 to 2.5 million tons of particulate matter. This is more than is emitted by better-known particulate matter sources such as fuel combustion, industrial processes or transportation.¹¹
- ▶ The six worst fire seasons since 1960 have all occurred since 2000.¹²
- ▶ Trends and projections of climate and fire responses suggest that new strategies to mitigate and adapt to increased fire are needed to sustain forests.¹³

burning does. Carbon emissions from forest fires are far higher than those from preventative burning.¹⁷ Additionally, environmental studies indicate that wildfires damage PAC zones more than unprotected areas. A study performed by the Society of American Foresters found that two 2007 wildfires in the Sierra Nevada, home to the California spotted owl, decimated the species' population in PACs designated to protect it. The owl population survived in unprotected areas where preventative burning lessened the fire's damage. While prescribed burning does some damage to species in PAC zones, those species will be better protected by taking measures to limit the threat of forest fires in their habitats. The escalating diversion of funds to wildfire management has taken funds away from the research and maintenance projects for which the Forest Service is chiefly designed. Allowing more preventative measures will lessen the need for fire suppression spending and allow the Forest Service to refocus on projects that sustain the environment.

Talking Points

- ▶ Loosening EPA regulations regarding air quality and PACs that will allow for the use of prescribed burning will better protect air quality and endangered species.
- ▶ A policy of active prevention of forest fires through contracting out limited logging opportunities will reduce the threat of forest fires in WUIs.
- ▶ Revenue generated by logging contracts will contribute to fire prevention by financing prescribed burns in remote wilderness areas.
- ▶ Active fire prevention will promote the development of healthy forests and reduce the need for fire suppression.

NEXT STEPS

The institution responsible for implementing the proposed policy is the Black Hills Forest Service, which manages the forest and determines fire management policies. Key allies are citizens who live in the WUI of the Black Hills; the current policy of suppression jeopardizes their lives and homes. Other allies are park rangers and employees of the forest service who maintain the forest, and logging companies that will profit from additional selective logging opportunities. Key targets are employees of the supervisor's office, who administer the policies implemented in the Black Hills. The Black Hills Forest Service should work with these stakeholders to establish contracts with logging companies for selective logging as well as petition the EPA to remove restrictions that prohibit prescribed burns.

Oh Deer: Managing Deer Overpopulation in Western Pennsylvania with Birth Control

By Joseph Doyle and Aidan Semanco, *George Mason University*

Thesis

The destructive overpopulation of Western Pennsylvania white-tailed deer can be solved on a county level with the use of porcine zona pellucida (PZP). PZP is a natural immunocontraceptive (birth control), which can be administered via dart by sharpshooters already employed by the Pennsylvania Game Commission.

Background and Context

An overabundance of deer has been a major issue in the suburbs of Pittsburgh, Pennsylvania, leading to environmental and public health concerns. Deer in suburban areas lead to vehicular collisions, contributing to dozens of injuries and deaths among local citizens each year.¹ Deer carry ticks that spread dangerous illnesses such as Lyme disease. As well, deer pose a significant environmental threat. Deer prefer to eat leaves of young trees, damaging saplings and preventing trees from maturing. The loss of these trees prevents smaller animals and insects from thriving, resulting in an imbalance in the local food web in favor of the deer population.² Recently, local governments have implemented an ineffective and dangerous policy of paying sharpshooters and recreational hunters with bows and arrows per head of deer they kill in residential areas.

The root of white-tailed deer overpopulation is the predator-free habitat resulting from Pittsburgh's suburban sprawl. As edge dwellers, deer prefer to consume saplings, which are closer to the ground and have more tender leaves. After housing developments displace the trees in the deer's natural habitat, young decorative trees are planted; the deer thrive on these saplings.³ The decline of natural predators such as wolves and cougars in these areas as a result of overhunting and suburban development has greatly contributed to the overpopulation of white-tailed deer.⁴

The imbalance created by the decline of deer's natural predators demonstrates that overhunting causes a serious disruption to local ecosystems. There is currently no safe and effective solution being undertaken to address overpopulation of white-tailed deer in Allegheny County.

Talking Points

- ▶ Areas that have implemented the use of PZP have experienced a 20 to 30 percent decrease in deer population in the first year.⁵
- ▶ Hiring sharpshooters is not safe to the public and cannot guarantee painless death for deer.
- ▶ Culling of deer can lead to a reproductive rebound. After a cull, deer often birth more twins and triplets, which results in an overall increase in deer offspring.⁶
- ▶ The use of PZP would not cause an additional burden on taxpayers because the funds would be derived from the current deer management budget in Allegheny County.

Policy Idea

Allegheny County will begin a program of injecting 14,000 white-tailed deer annually with biodegradable PZP darts, which render deer infertile for 3 to 5 years. Trained professionals already employed by the Game Commission and volunteer sport hunters will administer the PZP darts. PZP injection will be repeated annually for 5 years, or until the deer population reaches a sustainable level. Fifty deer per square mile is recommended by experts at the University of Pittsburgh, a level equivalent to the deer population in the area before the suburban sprawl of Pittsburgh in the 20th century. After this goal has been reached, PZP injection will take place every four years. Estimates of the deer population after the first cycle of PZP will be analyzed as Allegheny County reviews the results of the immunocontraceptive injection program.

Policy Analysis

PZP implementation is dramatically safer and markedly more humane than culling. By eliminating the use of lethal weapons to cull white-tailed deer, residential areas in Allegheny County will be safer.

A 2012 survey concluded that 54 percent of residents in Allegheny County strongly or moderately supported birth control to control deer population. Seventy-one percent opposed trapping and killing.⁷ Trapping and killing

KEY FACTS

- ▶ Before the 2014 hunting season, upwards of 100,000 deer were reported to occupy Allegheny County.¹⁴
- ▶ Pennsylvania drivers have one of the highest rates of vehicular collisions with deer in the nation, ranked 4th out of 50 states and the District of Columbia.¹⁵
- ▶ There are more than 800 cases of Lyme disease in Allegheny County per year,¹⁶ and, in 2014, Pennsylvania had the most cases of Lyme disease in the country.¹⁷

exercises are more than just a threat to the community's safety; it is also a threat to civilians' wallets. The end cost of a sharpshooter killing one deer can be as high as \$1,000,⁸ compared to a \$17 dart of PZP, capable of lasting 5 years.⁹ The use of PZP would eliminate the cost of transporting and butchering deer carcasses. This policy would allow sharpshooters using PZP to earn \$200 to \$300 per deer as a result of spending less on transportation and butchering.

Not only is culling more expensive, it is ineffective. When population suddenly decreases due to culling, more resources are available to the surviving population, creating ideal breeding environments. Long term, culling paradoxically perpetuates the overpopulation problem.¹⁰

If not addressed soon, the already unsustainable population of deer will continue to rise. Deer-related vehicular collisions, which have already risen to 3,000 annual crashes in Allegheny County alone, will also increase.¹¹ Lyme disease, caused by ticks specific to white-tailed deer, will be a growing threat to the citizens of Allegheny County.¹²

Deer overpopulation will wreak havoc on the local ecosystem. The hay-scented fern, which should cover less than 3 percent of the forest floor, now covers more than a third of Pennsylvania as a result of deer consuming its competitors. This imbalance has resulted in the hay-scented fern choking out other necessary plants and herbs in the Pennsylvania ecosystem.¹³

NEXT STEPS

Lobbying Allegheny county government officials will communicate that this policy is safer and more cost effective than current policy. It will be necessary to gain additional support from non-profits such as the Western Pennsylvania Humane Society, who will bolster the policy's legitimacy. The Humane Society is a national organization, which will garner widespread support in communities across the country. Allegheny county government officials will work with local legislators to propose this policy to the Pennsylvania Game Commission, who will train sharpshooters to safely dart deer. The Pennsylvania Department of Transportation will be a crucial stakeholder because they are responsible for dealing with the aftereffects of vehicular collisions with deer, including carcass disposal and emergency vehicle response.

Changing the Face of Nuclear Energy

By Max Kontorovich, *University of Michigan*

Thesis

Nuclear energy is the most cost-effective and expedient solution to the global energy crisis, but its development is inhibited by concerns about safety and waste management. The education system, specifically at the high school level, should increase awareness of clean and safe reactor models, in particular Molten-Salt Reactors (MSRs), in an effort to align public opinion with reality.

Background & Context

Nuclear energy is substantially cheaper than other competing forms of clean energy, so economics would predict a booming nuclear industry in the U.S. Further, political rhetoric and public opinion agree that the U.S. should push towards energy independence, and nuclear energy is a quick way to achieve that goal. Despite this, only a minority of Americans would like to see an increased reliance on nuclear energy. The two biggest concerns regarding nuclear expansion are safety and waste management.¹ These concerns have seriously slowed research and development of fourth generation nuclear reactors even though they run on existing waste and are “walk-away safe,” which means “that even if all power is lost and the coolant leaks and the operators flee the scene, there will be no meltdown of the core, no fire in the spent fuel rods, and no bursts of radioactive steam into the atmosphere.”²

Several nations, including Russia and China, have made significant steps in the development of modern nuclear technology.³ However, public opinion and government policy are much more closely tied in the U.S. than in China. Thus, moving forward with the development of the waste reducing and “walk-away safe” Molten Salt Reactor (MSR) model in the U.S. is highly contingent upon public opinion. To that end, it is important to change public opinion. The education system is the optimal tool to raise awareness of MSR technology as a safe, cheap, and clean energy source.

Talking Points

- ▶ In many states, nuclear energy is the cheapest base load power source
- ▶ MSR technology addresses the flaws of nuclear energy as it is safe and practically waste-free
- ▶ MSRs can run on existing waste, helping to rid the environment of radioactive material from previous generations
- ▶ Educating people on the benefits of MSR technology is the only way

to facilitate an industry-wide embracement of the safest and most pollution-free form of nuclear energy

The Policy Idea

MSR technology should be part of the Advanced Placement Environment Science (APES) curriculum. Due to the complexity of explaining the advantages of MSR technology, an advanced high school class is an appropriate time to introduce the concept. The APES course already covers nuclear technology of similar complexity.⁴ Technical exposure to MSR technology would help dispel myths about modern nuclear technology. As part of the APES curriculum, it would also reach a population of students with high potential to work in the energy sector where this increased exposure would make the largest difference.

Policy Analysis

When it comes to carbon free energy, it is abundantly clear that nuclear must play a major role in replacing coal and natural gas due to pricing alone. The Energy Information Administration (EIA) estimates the levelized cost of nuclear energy in 2020 will be \$95 per megawatt-hour, compared to solar at \$125 per megawatt-hour and offshore-wind at \$196.9 per megawatt-hour.⁵ On-shore wind and geothermal are competitive with nuclear, but the intermittence of wind⁶ and the low-availability of geothermal⁷ make them unsuited to become primary electricity providers on a national scale.

MSR technology addresses the two primary sources of hesitance about nuclear power: waste and safety. MSRs produce as little as 3 kilograms of high-level waste per year. A conventional nuclear power plant, by contrast, produces around 20 metric tons of high-level nuclear waste per year.⁸ For the same reason, MSRs can run on less enriched uranium, so no weapons-grade enrichment need ever be produced.⁹ MSRs are also extremely safe and by definition cannot have meltdowns. The ‘cooling plug’ feature allows them to be completely “walk-away safe”¹⁰, meaning the worst-case scenario

KEY FACTS

- ▶ Most people oppose nuclear energy because of concerns about waste and safety, but MSR nuclear technology addresses both concerns.
- ▶ MSR technology reduces nuclear waste by 98 percent, and can run on existing waste.
- ▶ MSR is completely “walk away safe,” and the chance of a meltdown is zero, even in theory.
- ▶ Because MSRs can run on less enriched uranium, no weapons-grade enrichment need ever occur for energy production.

is that the reactor stops producing energy. There is no threat of radioactive spills or casualties. The technology is straightforward to explain and simpler than traditional light-water reactors, whose design is already covered in APES. Putting MSRs in APES curriculum should not be controversial, because it is the only base load energy source that is safe, both fiscally and environmentally responsible, and can lead to energy independence.

NEXT STEPS

Should this technology be included in national curriculum, it should first be tested on a small set of students to ensure that it can be delivered in a captivating yet understandable way. One such set can be found in Ann Arbor's Huron High School APES class. I plan to reach out to Andrew Collins, the head of science at Huron, who has the potential to pilot this curriculum. While this would be slow, ideally a few schools could add this to their curriculum if it works at Huron, building up eventually to the state and national level. At the same time, I will be contacting the authors of the AP Environmental Science curriculum to initiate the process of incorporating MSRs into national curriculum. The larger goal of this policy is to change public opinion on nuclear energy by exposing the public to MSR technology, and while that process is slow, it has the potential to change the energy infrastructure.

Addressing Recycling Apathy: Furthering Extended Producer Responsibility

By Anna McAnnally, *College of William and Mary*

Thesis

To address the problem of Americans not recycling -- either because they do not feel it is worthwhile, or do not understand how to recycle -- federal legislators should further European-style recycling policies known as Extended Producer Responsibility (EPR) to hold producers more accountable for proper disposal of waste.

Background and Context

Recycling reduces greenhouse gas emissions and diverts waste from accumulating in landfills. Since curbside recycling programs began in 1973, recycling has increased from six percent of waste to nearly a third of our individual waste.¹ However, in America, only about 28 percent of recyclable materials actually get recycled.² Often, waste does not get recycled is because consumers are unaware of what is, and is not, recyclable; bins are contaminated with non-recyclable materials, or recyclable materials are thrown in with garbage. Additionally, curbside recycling programs still do not exist in all cities, and even the programs that do exist do not always accept all recyclable materials.³ We see the consequences of this in our landfills and our oceans, where products alternately end up. A prime example of this is the growing mass of plastic bags in the Pacific Ocean, all of which could be recycled. EPR holds the producer of waste accountable for its sustainable disposal through two avenues: an emphasis on recyclable and compostable packaging, and fines. A certain degree of federal EPR has been adopted through policies regarding the proper disposal of batteries, thermostats, auto switches, electronics, and leftover paint.⁴ However, these policies are not nearly as comprehensive as the EPR policies implemented in European countries. The EPR legislation implemented in Sweden and Germany in 1990 requires producers to consider the ecofriendly nature of all packaging, taking into consideration biodegradability and recycling labeling. Thus, not only are more product packages recyclable and compostable, they are also more clearly labeled, resulting in a more universal understanding of recycling protocol. Corporations may feel that under this policy they must unfairly absorb all the cost of the EPR program while consumers face no additional cost. However, economic theory suggests that consumers will

share some of the financial burden when increased production costs are factored into the sale price of products.

Talking Points

- ▶ EPR holds producers accountable for their impact on the environment
- ▶ EPR helps facilitate a better understanding of the impact both producers and consumers have on the environment
- ▶ EPR has the potential to greatly increase recycling nationwide

Policy Idea

EPR is a federal policy that requires producers of products to design responsible and sustainable packaging, and pay for the disposal of the packaging.

Producers, rather than consumers, are responsible for sustainable waste

protocol.⁵ This means that the producers must construct packaging, which is as recyclable or biodegradable as possible, and is correctly labeled as such so that the consumer understands the proper way to dispose of the product.⁶ EPR legislation, as it is a federal program, could be passed through congress, but could also manifest as an executive order, as the program's enforcement falls to the EPA. The major effect of EPR is a greater degree of recycling, due to greater consumers awareness of how to properly dispose of waste through more appropriate labeling.⁷ The main industries affected by EPR legislation are packaged food companies, cleaning supplies companies, and auto part suppliers, but almost every industry would be affected by the legislation.⁸ The EPA must review and approve all materials used in packaging for products produced in the United States, an effort that should be funded by corporations. Approved packaging must contain only recyclable types of metals, plastics, and papers, unless the company has a valid need to construct the packaging using a different kind of material. Ideally, all packaging would be constructed from plastics one and two, aluminum, and paper, as those are the most easily recycled materials.⁹

EPR also includes requiring the companies to pay for the recycling programs, which collect their packaging. These payments would begin immediately upon implementation, and would also include a temporary tax

KEY FACTS

- ▶ EPR legislation would reduce American greenhouse gas emissions due to waste by up to 47 percent.
- ▶ EPR legislation would save Americans taxpayers 8 billion dollars per year, as local governments no longer have to provide funding for recycling programs.
- ▶ EPR legislation would reduce waste in landfills by 37 million tons of trash per year.¹⁹

on non-sustainable packaging, which would be lifted as new packaging was developed.¹⁰ In the United States, transitioning recycling responsibilities to the state may make this easier. In the time it takes to establish more expansive recycling programs in places where they do not already exist, a state run recycling program would enable recyclables to be shipped to a town which could process them.

Policy Analysis

Under current conditions, waste contributes to 36 percent of all greenhouse gas emissions.¹¹ After adopting a policy of EPR, Belgium's recycling rate increased to 91.5 percent, which is comparable to Germany's 88.1% and the Netherlands's 74.9 percent.¹² Assuming these rates are normative, the U.S. could assume an average recycling rate of around 84.8 percent after implementing EPR. Under these conditions, waste would only contribute 20 percent of the greenhouse gases in the United States, which would be a 16.6 percent reduction in waste-based greenhouse gases, the equivalent of 1,116 tons of carbon dioxide. Currently, Americans pay between \$30 and \$40 per capita for recycling programs.¹³ Under EPR, recycling costs per capita could be reduced to an average of \$10.58, saving a total of around \$8 billion per year. This is enough money to purchase and install a quarter of a million solar cell systems,¹⁴ 93 thousand wind turbines,¹⁵ or produce 5 billion gallons of ethanol fuel.¹⁶ Also, under EPR, more products will be biodegradable, and properly labeled for compost. Currently, 28 percent of our waste is biodegradable, but only about 1 percent gets composted.¹⁷ Other countries that have implemented EPR have seen an increase in composting. Under EPR, America could expect to see an increase in composting as well.

NEXT STEPS

First, curbside recycling programs should be expanded into all municipalities throughout the country to provide the proper waste management channels to all Americans. This will also ensure that EPR efforts are not wasted due to lack of accessibility. Lobbying local governments for better access to these programs is imperative. Ideally, the outcome of these efforts would be full recycling programs in every locality, so that every American has the ability to recycle all recyclable items through a curbside recycling program.

EPR legislation could be passed by Congress, but might also be passed via executive order since the program falls under the EPA. Traditionally, EPR legislation is implemented one industry at a time, beginning with the food packaging industry.¹⁸

Bioswale Implementation: Reducing Total Pollution Output into the Willamette River

By Max Morrison, *University of Oregon*

Thesis

To combat heightened water pollution levels in the Willamette River, Eugene, Oregon, should implement multiple biological infrastructure systems, called bioswales, along a portion of the river to increase the filtration of their stormwater runoff.

Background and Context

As a major water source for the Willamette Valley region of Oregon, the Willamette River contains over 16,000 miles of streams, providing water to five cities along its path with 17 other communities recognizing it as a quality water source for recreation and consumption.^{1,2} Pollution—in the form of pesticides, chemical solvents and fuels, harmful levels of mercury, among others—are a byproduct of the growth of these cities that rest along the river's path.

Moreover, with any urban growth, including that of Oregon cities in the 20th century, there comes a need for infrastructure that successfully drains water to major sources such as rivers and creeks to reduce flooding in urban areas. Storm water runoff in urban areas causes what is called nonpoint source pollution. Nonpoint source pollution includes any particulate matter from parking lots, lawns, and other land that drains into local water sources. With upwards of forty-five unique chemicals (twenty of which are current-use pesticides) found in the Willamette River, the Oregon Department of Environmental Quality labeled the river a threat to human and aquatic life. The river is Oregon's most toxic waterway.³

Talking Points

- ▶ Nonpoint source pollutants have a wide range of negative effects on both humans and aquatic life, including thyroid disorders, kidney and brain damage, birth defects and developmental complications, as well as endocrine and nervous system issues.^{4,5,6}
- ▶ As one of the nation's largest rivers by volume, the Willamette River crosses through or is adjacent to cities with a total population of 1.13 million people. It also serves as a major source of recreation and water consumption.⁷

- ▶ Bioswales are a form of green infrastructure that filter out harmful chemicals and sediment from storm water runoff by concentrating the flow through specific kinds of vegetation and particulate-eating microbes.

Policy Idea

To combat the point and nonpoint source pollution along a nine-mile stretch of the Willamette River, Eugene should create and implement a bioswale filtration system project. Eugene's effort to reduce pollution in the Willamette River through green infrastructure will serve as a model to other cities along the river's 187-mile path.

Policy Analysis

Bioswales accumulate storm water runoff and reduce drainage speed, which allows suspended particulate matter to be filtered through dense vegetation at the bottom of the bioswale. Harmful chemicals are digested by microbes housed within the soil surrounding these plants. Water processed by a bioswale is significantly cleaner than untreated storm water runoff. A University of Oregon case study conducted in 2006 by Hannah Cooley and Stephanie Young explored the effectiveness of a bioswale in downtown Springfield, Oregon. By studying the levels of toxins in the water before and after filtration, the team found that there was an 86.7 percent reduction in total suspended solids that included lead, cadmium, chromium, and petroleum measurements.⁸

The cost-effectiveness of a bioswale filtration system is also attractive to local and state governments. According to Claudia Copeland, a Specialist in Resource and Environmental Policy at the Congressional Research Service, "green infrastructure is 5 percent to 30 percent less costly to construct and about 25 percent less costly over its life cycle than traditional infrastructure." The Natural Drainage Project in Seattle, Washington,

KEY FACTS

- ▶ Oregon's Department of Environmental Quality reports upwards of 45 chemicals in the Willamette River, which officially tops the list of Oregon's most toxic waterways.¹¹
- ▶ With a lifespan of 25 years, a 900-square-foot bioswale has an annual cost of only \$600 including installation and maintenance.¹²
- ▶ As biological filtration infrastructure, bioswales can remove upwards of 90 percent of total suspended solid particulate matter, metals, organics, and bacteria in water runoff compared to non-filtered storm water.¹³

showing cost savings equivalent to \$100,000 per square block, and New York City's \$187 million investment in green infrastructure in 2012 deferred approximately \$2 billion in capital costs compared to traditional construction.⁹¹⁰

Bioswale implementation at multiple sites along the Willamette River is a smart short- and long- term economic investment.

NEXT STEPS

Organizations responsible for the proposed policy include the City of Eugene Parks and Recreation Department and the Eugene Water and Electric Board. These institutions should provide the overarching expertise and support network vital to the creation and quality of the project.

This policy needs the support of legislators such as Mayor Kitty Piercy and Eugene State Senator Chris Edwards, chair of The Senate Environment and Natural Resources Committee, the University of Oregon's Sustainability Director Steve Mital, and groups such as the City of Eugene Park Stewards. These individuals and groups will help garner support for the project through lobbying city legislators and engaging communities in the Eugene area that have connections to the river.

In Hog (Farm) Heaven: Improving Hog Waste Management in Rural North Carolina

By Thomas Poston, *Wake Forest University*

Thesis

North Carolina should require existing industrial hog farms to implement waste-to-energy technologies to cut greenhouse gas emissions, reduce nutrient pollution, and protect the environmental and public health of some of the state’s most marginalized communities.

Background and Context

Concentrated animal feeding operations (CAFOs)—indoor factory farms raising thousands of hogs each—first appeared in North Carolina in the 1970s.¹ Today, with annual revenues of \$8 billion, North Carolina’s hog production ranks second nationally.² More than 90 percent of the state’s 2,000 CAFOs are clustered in the rural east, home to large low-income and minority populations.^{3,4}

Most CAFOs store their waste in open-air pools the size of football fields, called lagoons.⁵ The untreated waste, containing nutrients, pathogens, and toxins, is sprayed onto croplands as fertilizer via sprinklers (the “sprayfield” system), which erodes air quality and pollutes nearby watersheds.⁶ Living near these CAFOs has serious health consequences. Symptoms such as skin and eye irritation, respiratory difficulty, and anxiety have all been linked to proximity to lagoons and sprayfields.^{7,8} The consequences are especially severe given the socioeconomic disadvantages these communities already face.⁹

A 2007 state law banned lagoons on future farms, but allowed existing farms to continue using lagoons and sprayfields.¹⁰ In 2014, after the North Carolina Department of Environment and Natural Resources (now the Department of Environmental Quality) renewed permits yet again without requiring improved waste-management systems on all hog farms, environmental justice advocates filed a civil rights complaint with the EPA, noting the geographical correlation between CAFOs and communities of color. The EPA opened an investigation in 2015, boosting public awareness and creating new impetus for reform.¹¹

Talking Points

- ▶ Prevailing CAFO waste management practices threaten the environment, erode public health, and unjustly affect the poor and people of color in eastern North Carolina.
- ▶ Implementing waste-to-energy technology (which generates electricity using hog waste, a renewable biomass) on hog farms reduces greenhouse gas emissions, protects watersheds, and eliminates the most harmful health impacts of CAFOs.
- ▶ Requiring all (including existing) CAFOs in North Carolina to implement waste-to-energy technology protects marginalized communities and holds the industry accountable for the negative externalities of its activities.
- ▶ Hog farm operators can benefit from waste-to-energy technology by selling the renewable energy their systems produce back to their utility providers.

The Policy Idea

Rather than allow existing hog farms to continue with harmful waste management practices, North Carolina should mandate that all hog farms in the state abandon the lagoon-and-sprayfield model and implement waste-to-energy technology, which converts hog waste into renewable energy. Farms that fail to implement waste-to-energy technology should face penalties such as fines or, if necessary, the revocation of DEQ permits. The timeline set for implementation may vary based on each farm's size and location.

Policy Analysis

Existing regulations require only new farms to forego lagoons in favor of

KEY FACTS

- ▶ North Carolina hog CAFOs are nearly 10 times more likely to occur in communities in which greater than 12 percent of the population lives in poverty and in which nonwhites make up more than 10 percent of the population.¹⁹
- ▶ Five contiguous counties in eastern North Carolina are home to over 7.5 million hogs.²⁰
- ▶ A large CAFO, housing as many as 800,000 hogs, can generate more than 1.6 million tons of manure per year, or 1.5 times the waste produced annually by the population of Philadelphia.²¹
- ▶ Waste-to-energy systems reduce emissions of methane, which is 21 times more potent a greenhouse gas than carbon dioxide.²²

“environmentally superior technologies” (ESTs). The state’s voluntary Lagoon Conversion Program, which offers cost-sharing opportunities for existing farms, has been ineffective due to lack of interest. As of October 2014, only two farms had fully implemented a Lagoon Conversion Program contract.¹²

Loyd Ray Farms, a CAFO in Yadkin County offers a model of EST implementation.¹³ The farm installed a waste-to-energy system that captures the methane generated by hog waste, uses it to power a turbine that creates electricity for use in the farm’s facilities, and recycles the leftover wastewater.^{14 15} During its first fifteen months of operation, the system produced an average of 25 megawatt-hours of electricity monthly, reducing the farm’s greenhouse gas emissions by 2,087 million metric tons of carbon dioxide equivalent.¹⁶

This waste-to-energy technology is more expensive than the primitive lagoon-and-sprayfield system, but requiring farms to make the additional investment internalizes the costs of their waste, which are otherwise borne unjustly by already-marginalized communities in the form of higher health expenditures, lower property values, and decreased quality of life. That being said, waste-to-energy technology also entails a significant economic upside for farms.¹⁷ Because North Carolina’s Renewable Energy Portfolio Standard requires utility providers to meet a portion of their energy needs by generating or purchasing power from renewable energy facilities, farms may sell renewable energy credits from their waste-to-energy systems back to their utility providers for additional revenue.¹⁸

NEXT STEPS

North Carolina’s General Assembly and Department of Environmental Quality should mandate, via legislation and regulation, the use of waste-to-energy technology by all hog CAFOs in the state. The ardent support of environmentalists and civil rights groups in the state will be essential to the success of the policy, but the most effective coalition will also include organizations with heavily rural membership, such as veterans’ advocacy groups, which hold significant influence over more conservative lawmakers, and through which we might target key representatives and senators from rural, eastern districts. Similar CAFO regulations could be pursued at the federal level, most likely through the EPA, which could potentially provide recourse if state-level efforts fail. The EPA continues to investigate possible civil-rights violations in North Carolina. Eventual nationwide implementation of waste-to-energy systems would be ideal, and would contribute significantly to meeting national emissions reduction targets and ensuring socioeconomic justice.

Modernizing Stormwater Management Around Rhode Island's Mashapaug Pond

By Carley Przystac and Julian Del Prado,
University of Massachusetts-Amherst

Thesis

The Rhode Island Department of Transportation (RIDOT) should install bioretention media in the area surrounding Mashapaug Pond to reduce total levels of aquatic nitrogen and phosphorous and to keep pace with an increasing amount of stormwater pollution resulting from rapid urban development.

Background and Context

Mashapaug Pond was listed on The Rhode Island Department of Environmental Management (RIDEM)'s 2006 303(d) list of impaired waters for hypoxia, nutrients, and pathogens in response to requirements of the Federal Clean Water Act (CWA). In October 2015, RIDOT signed a Consent Decree after the U.S. Environmental Protection Agency (EPA) filed a complaint alleging that RIDOT had violated standards set forth in the CWA.¹

Indigenous people created a cultural center at Mashapaug Pond before the area was colonized by European settlers. The area has become increasingly developed. By 1960, the Huntington Business Park construction replaced gardens and lawns with commercial buildings and pavement.² This increase in impervious cover had serious consequences for the area's stormwater management.

Bioretention strategies are a type of low-impact development recognized as a best management practice in urban environments by environmental engineering professionals.³ Increasing the bioretention area around Mashapaug Pond will allow for natural stormwater treatment. Further, water treated in bioretention systems will not need to be transported to a treatment plant for pollutant removal, leading to cost savings. The Environmental Justice League of Rhode Island has already implemented small-scale green infrastructure projects in the area, which treats 2.6 million gallons of stormwater annually.⁴ This should be expanded to increase the volume of water treated by the system.

Talking Points

In a 2007 Total Maximum Daily Load (TMDL) report, RIDOT identified stormwater runoff as the most significant source of phosphorous to Mashapaug Pond.⁵

Bioretention is a low-impact development strategy requiring little maintenance and supplements existing storm drains by converting surface water flow to groundwater.

The creation of bioretention areas around Mashapaug Pond provides a buffer zone to slow stormwater flow, while reducing phosphorous levels in the water by promoting nutrient uptake before discharging water into the pond.

Policy Idea

RIDOT and local property owners should construct bioretention facilities around Mashapaug Pond to slow the flow of stormwater into the pond and to aid in filtering out dangerously high levels of nutrient contamination currently causing an explosion of bacterial growth in the pond. By cleaning up Mashapaug Pond, subsequent water bodies, including Narragansett Bay, will benefit from decreased pollutant input. A reduction in current pollutant levels may also lead to a re-opening of the pond to fishing, swimming, and other recreational activities to allow greater community enjoyment of this natural area.

Policy Analysis

Eutrophication of Mashapaug Pond from high phosphorous loading is causing excessive algal and bacterial growth, and the death of aquatic organisms. As a result, the pond has been closed to swimming and other recreational activities.⁶ These restrictions negatively affect residents of surrounding neighborhoods in Providence and Cranston.

Bioretention areas are a low-impact development strategy well suited to urban areas. A vegetated infiltration basin is an example of a bioretention strategy. A basin has been constructed at J.T. Owens Park near Mashapaug

KEY FACTS

- ▶ Rhode Island has an average impervious surface cover of 12 percent¹⁰, compared to a national average of approximately 4 percent.¹¹
- ▶ In more urban areas, such as Mashapaug Pond's watershed, impervious surface cover is closer to 61 percent.¹²
- ▶ Rhode Island has identified stormwater as the most significant input of phosphorous into Mashapaug Pond.¹³

Pond. At first glance, this project may appear to be gardens constructed in a depression. Those gardens, though, treat approximately 2.6 million gallons of stormwater runoff per year, remove 6 pounds of phosphorous, and prevent sediment and bacteria from reaching the pond, while reducing flooding and erosion.⁷ The expansion of sites such as this will allow for better stormwater treatment, improving the water quality of Mashapaug Pond and the surrounding areas.⁸

Maintenance requirements of bioretention systems are relatively low and mostly comprise aesthetic improvements. Examples of routine maintenance include: removal of trash, pruning, mulching, and mowing. Training for system maintenance is relatively easy, and can likely be completed with existing staff. Specific maintenance requirements are dependent on the system design.

The EPA has compiled a list of relevant green infrastructure funding opportunities. Because of green infrastructure's far-reaching impacts and the non-point sources of the pollution that it combats, projects can be funded without the use of city or state funds. Examples of funding sources available to bioretention projects include: the EPA Clean Water Act Nonpoint Source Grant, the EPA Clean Water State Revolving Fund, and energy efficiency tax credits and rebates.⁹

NEXT STEPS

RIDOT would be largely responsible for implementing changes in land use surrounding highways and impervious roads because they own the land adjacent to these impervious surfaces. Many community groups—including the Environmental Justice League of Rhode Island, the Urban Pond Procession, and Groundwork Providence—are already engaged in activism and education surrounding Mashapaug Pond pollution. Local community groups, RIDOT, and RIDEM are expected to support this policy because it comes at a low cost to them and helps to solve the long-term issue of stormwater pollution in Rhode Island. RIDOT and RIDEM should take a leadership role when applying for grants and in project management, in partnership with the cities of Providence and Cranston. Local colleges and universities are encouraged to assist with monitoring and evaluation when possible, to both provide project support and to increase young professional's knowledge of system design and effectiveness.

Urban Agriculture: A Solution to Food Deserts

By Joshua Sacks and Emily Bramhall,
The College of William & Mary

Thesis

Richmond, Virginia, is a densely populated food desert. The city should adopt an urban agriculture initiative to supply fresh produce by incentivizing, through tax breaks, the use of vacant lots as farms.

Background and Context

More than 23 million Americans live in areas designated as food deserts.¹ As defined by the U.S. Department of Agriculture, food deserts are “urban neighborhoods and rural towns without ready access to fresh, healthy, and affordable food.”² These neighborhoods are more prominent in communities of concentrated poverty. Of the 23.5 million people living in food deserts, 11.5 million live in low-income households.³ Food deserts either lack traditional food retailers or the only easily accessible food sources are fast food restaurants and convenience stores that provide almost exclusively pre-packaged and nutritionally deficient foods. A diet consisting mainly of these kinds of foods can lead to higher rates of obesity, diabetes, and other diet-related illnesses, treatment of which accounts for 70 percent of U.S. health costs annually. Many of the impoverished residents of food deserts depend upon public health care programs (Medicaid, SCHIP, and Medicare), meaning the cost of treating these illnesses falls on taxpayers.⁴ In Richmond, 22.8 percent of the urban population lives in a state of food insecurity. This is compared to 12.7 of the population in Virginia and 14.9 in the U.S.⁵ There are currently movements to address the existence of food deserts within the city, such as bringing in produce from surrounding farms to sell at convenience stores in poor areas. These efforts, while well intentioned, have been too small to have a significant impact.⁶

Talking Points

- ▶ Urban agriculture will bring fresh produce to areas of Richmond that lack access to fruits and vegetables due to the absence of conventional grocery stores.
- ▶ Minimum of three-year leases of vacant lots will allow farmers to grow and sell food to make a profit.
- ▶ Property-tax exemptions will encourage private landowners to lease their land to farmers and farm cooperatives.

- ▶ To help ensure access to the produce by food desert residents, urban gardens will be required to accept WIC vouchers and SNAP for the purchase of produce.

Policy Idea

Following the framework of the D.C. Urban Farming and Food Security Act of 2014, Richmond should combat food insecurity by repurposing vacant lots for urban agriculture to make fresh produce available for purchase by food desert residents. This initiative would also provide an economic boost for both landowners and local farmers. Landowners that lease their land to farmers and farm cooperatives will receive a property-tax abatement, and farmers who work on the land will be able to sell their food for profit.^{7,8}

Policy Analysis

Due to the commercial nature of leasing land to farmers, nonprofit organizations that attempt urban agriculture efforts such as this risk losing their status as a tax exempted 501(c) 3 and therefore the ability to operate.⁹ Our proposed act would circumvent this concern by extending property tax abatements to private landowners who choose to lease their land to farmers. Farmers will be able to sell the food they grow with a three-year minimum lease to allow them to profit, creating a further incentive to use the land for urban agriculture.

The use of vacant lots requires farming techniques that function within small plots of land, raising the concern of small yields. However, existing agricultural undertakings have proven the efficiency of urban agriculture. In New York City's community gardens, urban plots produced an average of 1.2 pounds per square foot with a half-acre plot, providing enough fruits and vegetables for almost 150 people per year.¹⁰ Additionally, farms in urban areas are in close proximity to large consumer bases, making direct marketing from the farmer to the community possible. This arrangement is the most efficient way to get produce into the homes of community residents.

KEY FACTS

- ▶ Twenty-three percent of Richmond, Virginia, residents live with food insecurity.
- ▶ Richmond is the largest food desert in the country for a city of its size.
- ▶ A half-acre plot of land can provide enough produce for about 150 people per year.

Evidence indicates a positive relationship between healthy food access and fruit and vegetable consumption among low-income families.¹¹ Private urban agriculture will use otherwise vacant lots to bring fresh produce to families living in food deserts, allowing them to lead healthier lives.

NEXT STEPS

Richmond should identify plots of vacant land that would be suitable to lease to farmers and recruit these landowners for the program. The city should then alter zoning ordinances and designate the plots as agricultural land for urban agriculture for three years, with an option for renewal. Tax breaks on the land will incentivize landowners to lease the land. Requiring a three-year minimum lease will allow farmers to be confident in their ability to profit from cultivating the land. To ensure that the produce benefits the residents of food deserts, contracts for leasing the land will stipulate that the produce must be sold within the city limits of Richmond, and that the farmers must accept WIC vouchers and food stamps.

Reducing Cigarette Litter in New York City with Public Ashtrays

By Samuel Schaffer, *University of Georgia*

Thesis

Cigarette litter is harmful to the integrity of New York City's urban environment. The city should place ashtrays on commercial street corners to alleviate cigarette litter in the city while also revitalizing the health and safety of New Yorkers and their property.

Background and Context

On average, between 14 and 17 million cigarettes are littered in New York City per day.^{1,2,3} In one year, this adds up to roughly 6.2 billion cigarette butts disposed of improperly in the city alone. Besides the well-known health risks associated with smoking cigarettes, tobacco product litter poses a severe threat to the environmental integrity of the city by leaching toxins and causing fires. In New York's unique urban environment, cigarettes do not biodegrade easily, thus cigarette litter compounds upon cigarette litter.⁴ The consequences of improper cigarette disposal are property fires, accidental poisonings, and water pollution.^{5,6,7} Smoking culture encourages smokers to cast cigarettes on the ground when there is no ashtray, despite the fact that cigarette litter is illegal.⁸ On the streets of New York, extinguishing a cigarette underfoot is extremely common. Of course, cigarette litter is not unique to New York; any city with smokers must face the consequences of cigarette butt litter. However, New York is well positioned to implement change because a policy shift would encompass millions of city residents in a compact, dense area. Past policy efforts nationwide have largely focused on smoking cessation—rather than smoking-related litter—through increased taxes and smoking bans, yet the litter persists.^{9,10} New York City must address this public health and environmental crisis by facilitating ashtray placements on city streets to keep the community and environment safe. These ashtrays may be standalone or attached to refuse bins.

Talking Points

- ▶ Cigarette litter is a safety hazard that can ignite fires and poison young children and pets.¹¹
- ▶ Cigarettes are the most littered item in the U.S.¹²
- ▶ Since 1986, the Ocean Conservancy has collected more than 55 million cigarettes during ocean clean-up activities, making cigarette litter the most pervasive litter found at sea year after year.¹³

Policy Idea

The New York City Department of Sanitation (DSNY) already employs a “request a receptacle” feature online that allows city residents to request a trashcan for a commercial street corner. However, no such program exists for cigarette receptacles. DSNY should make cigarette receptacles available for

placement because accessible ashtrays have been proven to reduce the amount of cigarette litter in public locations.¹⁴

Policy Analysis

Reducing cigarette litter is dependent on changing smokers' behavior. Smokers report that they are more likely to take advantage of receptacles when accessible, and receptacles placed in urban environments have been found effective in reducing cigarette litter.¹⁵ Currently, about \$1.2 million of DSNY's annual budget is allocated for trashcan maintenance; a portion of this fund should cover the placement and maintenance of cigarette receptacles in the city.¹⁶ Alternate policy

options include a large-scale public awareness campaign. However, an awareness campaign has steep financial costs for citywide ad placement. Considering the average cost of a cigarette receptacle may be around \$100 (some NYC composting bins are as cheap as \$23), providing 500 cigarette receptacles, for example, would only cost \$50,000, a manageable expense for a city the size of New York.¹⁷ The DSNY budget topped \$1.4 billion in 2014; \$50,000 is a mere .0036% of this total.¹⁸ Other large cities, such as San Francisco, have estimated that annual cigarette clean-up costs more than \$10.7 million. New York has a much larger population than San Francisco and may have even higher clean up expenses that may be alleviated with this receptacle policy.¹⁹ The number of cigarette receptacles placed will influence the reduction in cigarettes littered. Five hundred ashtrays placed in highly trafficked pedestrian areas of the city would divert more than 8.5 million cigarettes from litter every single day.²⁰ This is a 47 percent improvement from the status quo.

KEY FACTS

- ▶ 500 cigarette receptacles placed on New York City street corners may reduce cigarette litter by 8.5 million butts per day.
- ▶ Receptacles are cheap and easily serviced by existing municipal sanitation workers.

NEXT STEPS

Implementing a cigarette receptacle placement program should be relatively easy as the New York Department of Sanitation already maintains a budget for the placement and maintenance of public waste receptacles. The department's duties can expand to service cigarette bins in conjunction with public trashcans. The costs associated with servicing these ashtrays may even be cheaper and more time efficient than the cost of sweeping the streets to remove litter. All New York City residents who smoke, as well as commuting professionals and tourists alike, can use public cigarette bins, thus keeping cigarette butts off of the sidewalks and streets. Options to consider in the future include cigarette recycling and reprocessing once the majority of cigarettes are routinely disposed of in the correct receptacles.

On-Bill Financing: Lowering the Upfront Cost of Energy-Saving Home Upgrades

By Andrew Smalley, *University of Denver*

Thesis

To provide effective relief for homeowners facing the high upfront costs of home energy retrofitting improvements, the state of Colorado should expand on-bill financing. On-bill financing allows homeowners to pay the costs of home energy upgrades via small installment added to utility bills over time.

Background and Context

Energy-efficient home renovations represent potential savings for homeowners and reduction of environmental impact. Unfortunately, these renovations are expensive. Energy efficient equipment remains more expensive than traditional, less efficient appliances and systems.¹ This price discrepancy is widespread and found in nearly all markets and building types.

This issue impacts millions of homeowners who cannot afford the upfront costs of energy upgrades that would reduce their spending in the long run. While recent price trends show energy efficient products such as residential solar are becoming cheaper², most efficient energy systems involve more advanced technology, which drives prices higher. These prices remain higher because of the high cost associated with new technologies.

Current efforts to support energy efficient upgrades primarily rely on tax-credits. These credits cover some of the cost of home renovations ranging from solar panels to geothermal systems.³ Tax credits help reduce the cost of some improvements, but their narrow scope and temporary nature limit their effectiveness. Additionally, tax credits create a burden on the state and are opposed by many Conservatives who see the measure as market interference.⁴

Talking Points

Upgrades to a home such as solar panels, better home insulation or more efficient appliances can substantially reduce energy usage and cost to homeowners.

On-bill financing spreads the cost of home energy efficiency upgrades out

over longer periods of time, reducing their high upfront costs.

On-bill financing applies the cost of the renovations to the homeowners' monthly electrical bill and is paid to the utility. On-bill financing can be combined with rebates and other tax incentives to dramatically reduce the high cost of home energy upgrades such as solar.

Policy Idea

The state of Colorado should introduce on-bill financing programs that aims to reduce the high upfront costs of home renovations by dispersing cost via small installments that are paid on a homeowner's utility bill. On-bill financing creates a payment plan to help homeowners pay off their energy-efficient home improvements.⁵ Since home energy use varies from month to month and the new renovations will lower use over time, the payment structure can be set up to avoid massive increases on a homeowner's bill.

Policy Analysis:

With proper implementation, on-bill financing has tremendous potential to save consumers money and reduce environmental impact by boosting home energy efficiency. By dispersing the cost of renovations over a longer period of time, homeowners see only a modest and manageable increase in their expenses. This means more homeowners will be able to afford substantial renovations on their homes.⁶ When combined with rebates and tax credits, on-bill financing makes energy efficient home upgrades drastically more affordable.

On-bill financing also leverages the relationship between ratepayers and utilities to create an affordable payment structure to finance home upgrades and ensure repayment.⁷ Under this system, the utility would pay the upfront costs of the renovations and then bill the homeowners monthly for the cost of the renovations.

KEY FACTS

- ▶ In 2014, residential and commercial buildings consumed 41% of all energy consumption in the United States.⁹
- ▶ As much as 50 percent of energy and water used in buildings is wasted because of inefficient technology.
- ▶ Ratepayers nationwide could save \$64 billion a year through home energy efficiency upgrades.
- ▶ Twenty-three states have already begun implementing some form of on-bill financing to reduce the cost of energy efficient upgrades.

The Center for American Progress estimates that ratepayers nationwide could save up to \$64 billion a year with substantial home energy upgrades funded by on-bill financing.⁸ In Colorado, where a few utilities have already started offering on-bill financing, the potential for savings is vast.

The main challenge to this policy is that utility companies must comply with local lending laws. Utilities would have an incentive to undertake this action because it would allow them to ensure strong relationships with customers while improving efficiency. Additionally, consumers would need to be educated on what improvements can best increase energy efficiency depending on their home. However, these issues would be easily manageable with prudent oversight and planning. On-bill financing represents a very low cost policy change that has a substantial impact on homeowners.

NEXT STEPS

To implement this policy on the statewide level in Colorado, it should be enacted by the State Legislature. Previous efforts have failed in the state legislature, but, this time, the policy should have the combined support of utilities, homeowners and traditional allies, such as environmentalists. Utilities and homeowners will need to be educated about how on-bill financing serves their interests and their bottom line.

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