Financing Resilience in Connecticut
Current Programs, National Models, and New Opportunities

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Resubmitted to the Sea Grant Law & Policy Journal, March 24, 2017

Abstract: Becoming resilient to the impacts of climate change and extreme weather in Connecticut has a price. To date, in Connecticut most of the dollars invested in resilient infrastructure have come from federal grants after a declared disaster, but grants alone will not cover the bill. This article reviews financing programs as an option for funding resilience. Existing programs in Connecticut for low-interest loans and special tax districts are already demonstrating that resilience financing is a real option. Using property assessed financing methods for clean energy and resilience, leveraging federal grant dollars to capitalize a resilience bank, and a new proposal for resilience bonds, offer models for potential resilience financing programs. But despite the significant potential gains to safety and solvency of investing in resilience, addressing challenges related to flood insurance, achieving neighborhood-scale resilience, and setting standards for resilient design and construction still remain. This article

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aims to educate Connecticut's decision makers about options for resilience financing and how to address these challenges.

I. Introduction

Over the last few years, the State of Connecticut has made significant commitments to becoming more resilient to the impacts of climate change and extreme weather, particularly in communities on coastal and inland waterways. In the wake of storms Alfred, Irene, and Sandy, Governor Malloy formed the *Two Storm Panel*[2] and the *Long-term Recovery Committee*[3] and the state legislature, led by Representative James Albis, formed the *Shoreline Preservation Task Force*.[4] With the passage of PA 13-179, *An Act Concerning the Permitting of Certain Coastal Structures by the Department of Energy and Environmental Protection*,[5] Connecticut codified the requirement that the state plan of conservation and development, municipal plans of conservation

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[2] Two Storm Panel, *Report of the Two Storm Panel* (January 9, 2012), *available at* http://portal.ct.gov/Departments_and_Agencies/Office_of_the_Governor/Learn_More/Working_Groups/two_storm_panel_final_report/.

[3] *Long Term Recovery Committee*, State of Connecticut (last modified February 1, 2016), available at http://www.ct.gov/ctrecovers/cwp/view.asp?a=4498&q=528634.

[4] Kevin E. McCarthy, *Report of the Shoreline Preservation Task Force*, Connecticut General Assembly 2012-R-0513 (January 11, 2013), *available at* https://www.cga.ct.gov/2012/rpt/2012-R-0513.htm.

[5] An Act Concerning The Permitting of Certain Coastal Structures by the Department of Energy and Environmental Protection, PA 13-179—sSB 1012 §§ 3-6.

and development, the civil preparedness plan and program, and the municipal evacuation or hazard mitigation plans must "consider" the risk of increasing erosion due to the sea level change scenarios from the NOAA OAR CPO-1 report.[6] In October 2015, Executive Order 50[7] created the *State Agencies Fostering Resilience Council* ("SAFR Council") charged with the creation of a statewide resilience roadmap. In January 2016, the Connecticut Department of Housing released $7 million in funding from Sandy recovery dollars for mitigation and resiliency plans to 10 municipalities and a council of government, 4 state agencies, a nonprofit, and the University of Connecticut.[8] As these planning efforts raise awareness of the challenges facing communities and start the design of solutions – ranging from home and road elevation to hardening critical infrastructure to living shorelines for mitigating coastal erosion (Figure 1) – the next question on many leaders minds might be "how do we pay for it?"

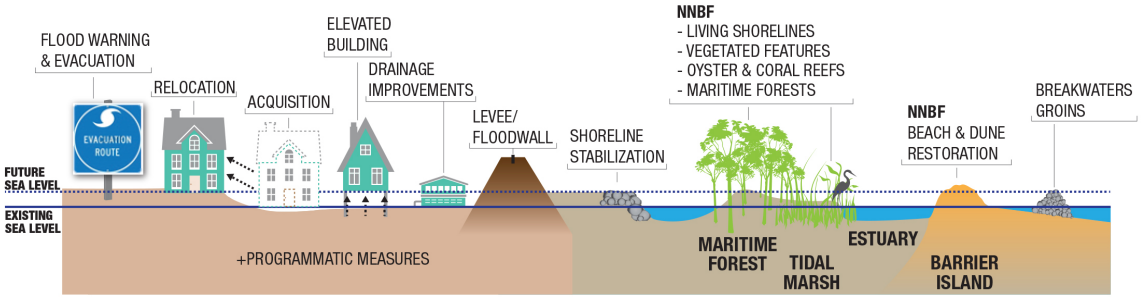

Figure 1. Coastal communities sea level rise and flooding adaptation measures needing federal, state or local funding or long-term financing. NNBF stands for Natural and Nature-based features.[9]

Today in Connecticut, virtually all disaster recovery and climate change adaptation projects are funded through grants from the federal government in response to natural disaster declarations

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[6] The NOAA OAR CPO-1 Report concluded that, "we have very high confidence (>9 in 10 chance) that global mean sea level will rise at least 0.2 meters (8 inches) and no more than 2.0 meters (6.6 feet) by 2100." See Parris et al., NOAA Climate Program Office, *Global Sea Level Rise Scenarios for the United States National Climate Assessment, NOAA Technical Report OAR CPO-1* (December 6, 2012), *available at* http://scenarios.globalchange.gov/sites/default/files/NOAA_SLR_r3_0.pdf.

[7] Executive Order No. 50 establishes the State Agencies Fostering Resilience Council ("SAFR Council"), which is responsible for strengthening the state's resiliency from extreme weather events. Executive Order No. 50 (October 26, 2015), *available at* http://portal.ct.gov/Departments_and_Agencies/Office_of_the_Governor/Press_Room/Executive_Orders/Executive_Order_No__50/.

[8] Connecticut Department of Housing, *Commissioner Klein Announces Federal Funding to Assist Disaster Recovery Efforts for Residents* (January 15, 2016), *available at* www.ct.gov/doh/lib/doh/sandy_planning_grants2.pdf.

[9] US Army Corps of Engineers, *North Atlantic Comprehensive Coastal Study: Natural & Nature-based Features* brochure (2015), *available at* http://www.nad.usace.army.mil/Portals/40/docs/NACCS/1_15_16_NNBF_Brochure-viewing-format.pdf.

under the Stafford Act.[10] The largest amount of funding comes from disaster recovery programs like the HUD Community Development Block Grant Disaster Recovery (CDBG-DR)[11] or FEMA Emergency Assistance.[12] For example, after Sandy, the state of Connecticut received a little over $159 million in CDBG-DR, but that payout left at least $158 million in documented unmet repair needs for housing and infrastructure damage alone.[13]

Projects that incorporate resiliency improvements into recovery rather than simple repair make that cost even higher. In the *Rebuild by Design* competition, the City of Bridgeport asked for over $290 million to develop citywide resiliency projects.[14] In the National Disaster Resilience Competition, the State of Connecticut requested nearly $115 million for two neighborhood-scale pilot projects and a regional resilience plan for New Haven and Fairfield counties[15] and was awarded $54.3 million to implement one of the pilots and the resilience plan.[16] Even with this recent grant, lingering recovery needs from Sandy remain and the question increasingly becomes where do communities turn to fund the long-term resilience projects that ongoing resilience planning efforts encompass? If a community was fortunate not to be hit by the storm and therefore has not received disaster recovery funds, but remains vulnerable to future storms, what are their options for funding the planning, designing, or construction of adaptation measures that improve resiliency to extreme weather, flooding, or future climate change? Financing programs are critical to answering that question.

In August 2013, the Connecticut Department of Energy and Environmental Protection (DEEP) invited a diverse group of stakeholders from Connecticut and the northeast region to discuss flood insurance affordability and the need to develop innovative financing methods to improve community resiliency in areas vulnerable to the impacts of climate change, sea level rise, and flooding.[17] The stakeholders included the authors of this article, academic, government, and private sector leaders from around the region. The stakeholders were involved in risk management research, coastal and riverine floodplain regulation, insurance, engineering,

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[10] Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. §§ 5121-5207 [hereinafter *Stafford Act*].
[11] Title I of the Housing and Community Development Act of 1974, 42 U.S.C. §§ 5301-5321.
[12] *Stafford Act, supra* note 10.
[13] *SAFR Connecticut Connections: NDRC Phase 1 Application* (2015), *available at* http://circa.uconn.edu/ndrc/pubs/FinalSAFRConnecticutConnectionsJune22.pdf.
[14] *Id.*
[15] *National Disaster Resilience Phase 2 Application* (2015), *available at* http://www.ct.gov/doh/lib/doh/ndrc_application.pdf.
[16] Connecticut was one of 13 winners – out of 40 finalists that included states, municipalities, and county governments – in the nationwide National Disaster Resilience Competition run by the Dept. of Housing and Urban Development to distribute the last $1 billion in recovery funds from P.L. 113-2. *See* Department of Housing and Urban Development, *National Disaster Resilience Competition Grantee Profiles* (January 2016), *available at* http://portal.hud.gov/hudportal/documents/huddoc?id=NDRCGrantProf.pdf.
[17] Personal Communication, Wayne Cobleigh with Macky McCleary, Deputy Commissioner, Environmental Quality, Connecticut Department of Energy & Environmental Protection, August, 2013

renewable energy and energy efficiency finance, and disaster recovery. That same year, new FEMA flood insurance rate maps that included additional homeowners and small businesses in the floodplains and notices of significant increases in their flood insurance premiums for those currently covered, garnered the attention of policy makers and the media.[18] The debate that ensued soon made it clear that Congress' attempts to address the financial instability of the National Flood Insurance Program (NFIP) in the Biggert-Waters Flood Insurance Reform Act of 2012[19] had become too politically controversial to implement.[20]

The 2012 NFIP reforms[21] sought to have insurance premiums reflect actuarial risk with a 25% increase in premium increase until that assessed rate is achieved.[22] But in 2014 Congress passed the Homeowners Flood Insurance Affordability Act[23] (HFIAA) that repealed or modified some of the more bitter pills, including repealing the implementation of actuarial rates at sale, restoring grandfathering of previous lower insurance rates if a home was assessed as being at a higher risk, and lowering rate increases to 5-15% per year for individual primary homeowners, rather than the 25% increase.[24] However, the 25% annual increase was maintained for commercial buildings and secondary homes.[25] The HFIAA also called for an affordability study led by FEMA with support from the National Academy of Science (NAS).[26] The release of two NAS reports in 2015[27] and 2016[28] fulfilled that mandate. The second report concluded that "policy analysis capacity and necessary data, however, currently are not available to complete a comprehensive

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[18] Jenny Anderson, *Outrage as Homeowners Prepare for Substantially Higher Flood Insurance Rates*, New York Times (July 28, 2013), *available at* http://www.nytimes.com/2013/10/13/us/cost-of-flood-insurance-rises-along-with-worries.html.

[19] Biggert-Waters Flood Insurance Reform Act of 2012, 126 Stat. 916 (codified as amended at 42 U.S.C. §§ 4001-4131 (2012)) [hereinafter *Biggert-Waters*].

[20] Annie Linskey, *Good News: The Government Will No Longer Make You Put Your House on Stilts*, BloombergBusinessweek (March 14, 2014).

[21] *Biggert-Waters, supra* note 19.

[22] Diane Ifkovic, *National Flood Insurance Program Changes – BW12 & HFIAA*, presentation to CT Climate Adaptation Academy (October 10, 2014), *available at* http://clear.uconn.edu/climate/docs/Ifkovic_DEEP.pdf. [hereinafter *Ifkovic NFIP Changes*].

[23] Homeowner Flood Insurance Affordability Act of 2014, Pub. L. No. 113-89 (2014) [hereinafter *HFIAA 2014*].

[24] *Ifkovic NFIP Changes, supra* note 22.

[25] *Id.*

[26] *HFIAA 2014, supra* note 23.

[27] National Academy of Sciences, Engineering, and Medicine, *Affordability of National Flood Insurance Program Premiums: Report 1* (2015), *available at* https://www.nap.edu/catalog/21709/affordability-of-national-flood-insurance-program-premiums-report-1.

[28] National Academy of Sciences, Engineering, and Medicine, *Affordability of National Flood Insurance Program Premiums: Report* 2 (2016), *available at* http://www.nap.edu/catalog/21848/affordability-of-national-flood-insurance-program-premiums-report-2.

analysis of affordability options,"[29] which represents challenges for the upcoming reauthorization of the NFIP in 2017.

With increasing flood insurance rates, albeit at a slower pace, and the big price tags of recovery, Connecticut has been looking at financing for resilience. Connecticut is already a leader in using finance to address climate change. Connecticut Green Bank's[30] innovative financing program for climate mitigation measures in the commercial real estate market has exceeded expectations. In 2014, Connecticut became the first state to create a low-interest loan program for home elevation, Shore Up Connecticut.[31] Financing was also listed as one of the priority research areas when the Connecticut Institute for Resilience and Climate Adaptation (CIRCA)[32] was created in 2014 as a partnership between the University of Connecticut and the Department of Energy and Environmental Protection.

This article aims to educate Connecticut municipalities, regulators, policymakers, and legislators on the need to collaborate on developing financing methods for resiliency, including innovative public-private partnership (P3) models, and adaption of existing public and private finance models for resiliency. These actions will proactively address flood insurance affordability and promote voluntary climate adaptation measures (Figure 1) to reduce and avoid future losses (to life, property/casualty, property tax, critical infrastructure and business continuity). Most importantly, Connecticut needs these financing methods in place prior to the next natural disaster when motivation to rebuild resiliently is high. Developing effective financing methods for resiliency now will benefit vulnerable residents, natural ecosystems, businesses, and government (local, state, and federal). Investments in the short-term will create taxpayer savings for disaster recovery costs and lead to more affordable flood insurance over the long-term.

The authors are not providing an endorsement of any one approach to financing resilience and there may be other opportunities that could be considered that are not reviewed here. Resilience financing is an emerging area of policy research and new ideas are put forward everyday. The authors hope that this article will serve as a starting point for a growing list of finance options for Connecticut and that the local talent in insurance, finance, science, and engineering can be leveraged to create a national and global model for innovative and sustainable resilience financing.

I. Resilience Financing Programs in Connecticut

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[29] *Id.*

[30] Connecticut Green Bank, CT Green Bank (2017), *available at* http://www.ctgreenbank.com/.

[31] Office of Governor Dannel P. Malloy, *Gov. Malloy Announces Launch of Program to Help Shoreline Homeowners and Businesses Prepare for Future Severe Weather and Flooding* (July 28, 2014), *available at* http://portal.ct.gov/office-of-the-governor/press-room/press-releases/2014/07-2014/gov-malloy-announces-launch-of-program-to-help-shoreline-homeowners-and-businesses-prepare-for-futur [hereinafter *Shore Up Connecticut Launch*].

[32] *Connecticut Institute for Resilience and Climate Adaptation*, University of Connecticut (accessed March 3, 3017), *available at* circa.uconn.edu.

The following section reviews existing low interest, affordable, state-run resilience financing programs in Connecticut, including Shore Up Connecticut, the microgrid grants and loan program, and the Connecticut Clean Water Fund. Finally, tax increment financing districts, a new opportunity for local government to capture the value of resilience projects and use that value to pay back an investment, is reviewed.

A. Shore Up Connecticut Low-interest Loans

Shore Up Connecticut was announced[33] in July 2014 as a low-interest loan program for small businesses and homeowners located in the FEMA Flood Zones VE and AE in Connecticut's coastal municipalities (Figure 2). The legislature authorized $25 million in bonding for the program, which was the first program in the nation that used non-federal resources to finance home elevations.[34] The program was created in part to fill a funding gap for residents who were not eligible or prioritized for disaster recovery services from federal resources. For homes, elevations of residential structures and utilities must meet the estimated 500-year recurrence interval storm event elevation plus one additional foot of freeboard in order to reduce the likelihood of future losses while the loan is being paid back.[35] Commercial property must be elevated to the 100-year floodplain reoccurrence interval storm event Base Flood Elevation (BFE) level elevation plus one foot of freeboard.[36] Additional and partial flood and wind protection measures, such as utility elevation alone and installing storm shutters, can also be financed, provided that they are part of an elevation project or evidence is provided that structural elevation is not feasible.[37] The terms of the loan are a 2.75% fixed interest rate with a 1% origination fee. The loan can provide between $10,000 and $300,000 in funds with a 15-year term.[38] There are no principal or interest payments for the first 12 months and the borrower must maintain property, hazard, and flood insurance for the life of the loan.[39]

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[33] *Shore Up Connecticut Launch, supra* note 31.
[34] *Id.*
[35] Shore Up Connecticut, *Project Information Form*, *Shore Up Connecticut: Connecticut's Shoreline Resiliency Loan Fund*, Housing Development Fund (2014), *available at* http://shoreupct.org/wp-content/uploads/2014/08/HDF-Form-with-attachments.pdf.
[36] *Id.*
[37] *Id.*
[38] *Shore Up Connecticut Launch, supra* note 31.
[39] *Id.*

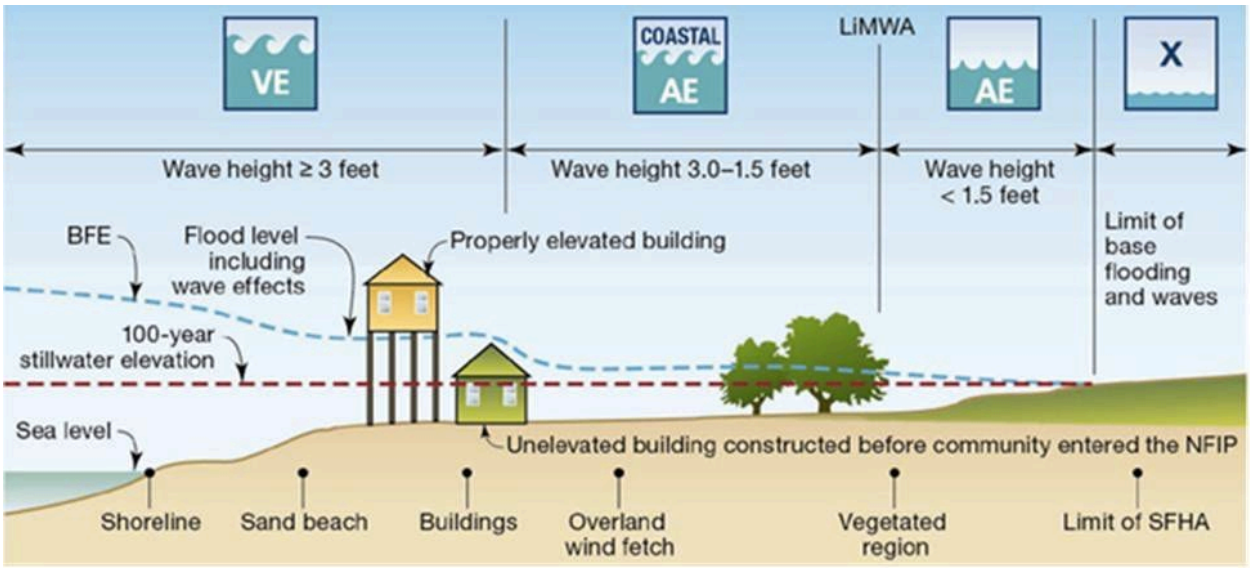

Figure 2. Coastal flood zones as delineated by FEMA and defined by their flood insurance rate maps (FIRM). The SFHA stands for the Special Flood Hazard Area and BFE is the Base Flood Elevation. FEMA FIRMs do not take into account future changes in climate or sea level.[40]

B. Microgrids Grants and Green Bank Financing Program

In its inaugural round in July 2013, the microgrids grants program provided $18 million in grants to nine projects across Connecticut.[41] This was the first statewide microgrids program in the United States[42] and was a direct response to widespread power outages in the state after storms Alfred and Irene,[43] and Sandy.[44] Microgrids have a local power source that can operate as part of the larger grid, but during power outages they can be disconnected from the grid and operate in "island" mode, providing power to critical infrastructure and emergency facilities.[45] Microgrids can be powered by renewable energy resources (solar panels, wind, hydro), fuel cells, batteries, or fossil fuels.[46] For example, one of the nine inaugural projects in the Town of Fairfield

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[40] Illustration from the Federal Emergency Management Agency as part of the *Coastal Flood Risk Study Process* (last updated November 5, 2015), *available at* https://www.fema.gov/coastal-flood-risk-study-process.

[41] Department of Energy and Environmental Protection, *Microgrid Program*, (last updated August 2016), *available at* http://www.ct.gov/deep/cwp/view.asp?a=4120&Q=508780 [hereinafter *Microgrid Program].*

[42] Office of Governor Dannel P. Malloy, *Governor Malloy Announces Nation's First Statewide Microgrid Pilot* (Press release, July 24, 2013), *available at* http://www.ct.gov/deep/cwp/view.asp?Q=528784&A=4380 [hereinafter *Microgrid Announcement*].

[43] Office of Governor Malloy, Two Storm Panel, *Two Storm Panel Final Report* (January 9, 2012), *available at* http://portal.ct.gov/-/media/Office-of-the-Governor/Two-Storm-Panel/two_storm_panel_final_report.pdf?la=en.

[44] *Microgrid Announcement, supra* note 42.

[45] *Microgrid Program, supra* note 41.

[46] *Id.*

received funding for a 50 kW natural gas reciprocating engine, a 250 kW natural gas reciprocating engine, and 47 kW of PV solar to power the police station, emergency operations center, cell tower, fire headquarters, and a public shelter.[47] A project like the one in Fairfield offers the potential to increase resiliency during storms through emergency backup, but also to reduce emissions on a daily basis. In October 2014, Governor Malloy announced $5.1 million in funding for two additional projects,[48] bringing Connecticut's total microgrids projects to 11. In November 2016, the state bond commission approved $30 million in state bonds for additional new projects to be awarded.[49]

A partnership with the Connecticut Green Bank allows for financing components of the microgrid projects, including, onsite power generation, thermal energy distribution infrastructure, and end use facility improvements.[50] Microgrid applicants and grantees can use the Green Bank's financial programs, which utilize private capital, to further finance their microgrid projects. These programs include, Commercial Property-Assessed Clean Energy (C-PACE) and potential future applications of the CT DEEP's Lead by Example program for performance contracting in state buildings.[51] Indeed, Energy Savings Performance Contracts can also play a role.[52] Further grants, loans, and loan enhancements or power purchase incentives are available for onsite power generation from anaerobic digestion of wastes from wastewater treatment facilities and combined heat and power projects.[53]

C. Clean Water Revolving Loan Funds

The Clean Water State Revolving Funds were set up in 1987 in Connecticut.[54] The Connecticut Department of Energy and Environmental Protection administers the Connecticut Clean Water

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[47] *Microgrid Announcement, supra* note 42.
[48] Office of Governor Dannel P. Malloy, *Gov. Malloy: Microgrid Projects In Bridgeport and Milford Awarded $5 Million in State Funding to Harden Energy System* (October 8, 2014), *available at* http://www.ct.gov/deep/cwp/view.asp?Q=554662&A=4568.
[49] Office of Governor Dannel P. Malloy, *Gov. Malloy Advances Commitment to Storm Resiliency With Funding for New Microgrids* (November 14, 2016), *available at* http://portal.ct.gov/en/Office-of-the-Governor/Press-Room/Press-Releases/2016/11-2016/Gov-Malloy-Advances-Commitment-to-Storm-Resiliency-With-Funding-for-New-Microgrids.
[50] Department of Energy and Environmental Protection, *Microgrid Grant Program – Round 2: Frequently Asked Questions (FAQ) – Third Installment – Financing* (February 19, 2014), *available at* http://www.energizect.com/sites/default/files/uploads/FAQs%20-%20Round%202%20-%20Third%20Installment%20-%20Project%20Financing%20FINAL.PDF [hereinafter *Microgrid Grant Program Round 2 FAQs*].
[51] *Id.*
[52] Chris Lotspeich, *Stamford, Connecticut: a City on the Cutting-Edge of Sustainable Development*, NESEA blog (January 4, 2016), *available at* http://nesea.org/conversation/masters-blog/stamford-connecticut-city-cutting-edge-sustainable-development.
[53] *Microgrid Grant Program Round 2 FAQs, supra* note 50.
[54] Water pollution control revolving loan funds, 33 U.S.C. §1383.

Fund, but the US Environmental Protection Agency has oversight and regulatory authority over the programs.[55] A Congressional appropriation and a required match from the State provide the capital funding for the programs.[56] Connecticut allocates the funding as a mix of grants and loans. The mix is project dependent. All loans must be repaid back at a 2% interest rate over no more than 20 years.[57] The FY14-FY15 Priority List[58] called on municipal wastewater treatment plant planning applications to "consider" "assessment of the risk to existing wastewater infrastructure from climate change (rising sea levels, increased storm frequency and intensity and coastal flooding) and an evaluation of alternatives for remedial actions." According to the FY14-FY15 Priority List, planning funds are allocated on a 55% grant/45% loan basis. There were also two reserve programs for Construction of Resiliency Projects of $4 million per year allocated as 20% grant/80% loan to "mitigate the impacts of sea level rise."[59] Additionally, $20 million per year was allocated for a reserve for construction of green infrastructure for combined sewer overflow communities (CSO) with the opportunity to receive funding for demonstration projects as a 50% grant/50% loan.[60] In the FY 2016-2017 Clean Water Fund Priority List,[61] funding for these specific programs is no longer present, however, the report mentions that the bond authorizations for "$20 million in FY16 for a Long Island Sound stewardship and resiliency program; and $20 million in FY16 for a grant-in-aid program to encourage low-impact design of green municipal infrastructure to reduce non-point source pollution" are now available, but they will be administered separately from the Clean Water Fund. Furthermore, the CT DEEP now "requires" all Clean Water Fund projects to have an "energy audit," if they have not already signed an agreement for a complete upgrade.[62] The climate change assessment and evaluation of remedial actions also became a requirement for plants.[63]

D. Tax Increment Financing Districts

Tax increment financing (TIF) uses the future value to private owners or developers from local government improvements to a specific geographic area to finance the government's investment

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[55] Department of Energy and Environmental Protection, *Connecticut's Clean Water Fund* (accessed March 10, 2017), *available at* http://www.ct.gov/deep/cwp/view.asp?a=2719&q=325578&depNav_GID=1655.

[56] Department of Energy and Environmental Protection, *Clean Water Fund: Financial Assistance Programs, Municipal Water Pollution Control, State Fiscal Years 2014 and 2015* (July 7, 2014), *available at* http://www.ct.gov/deep/lib/deep/water/municipal_wastewater/final_fy2014_2015cwf_pl.pdf.

[57] *Id.*

[58] *Id.*

[59] *Id.*

[60] *Id.*

[61] Department of Energy and Environmental Protection, *Clean Water Fund: Financial Assistance Programs, Municipal Water Pollution Control, State Fiscal Years 2016 and 2017* (March 10, 2016), *available at* http://www.ct.gov/deep/lib/deep/water/municipal_wastewater/cleanwater_draftpriority_1617.pdf

[62] *Id.*

[63] *Id.*

in that area.[64] The local government captures that value through leveeing district-level taxes or fees on the private owners or developers in the TIF district. Although not yet widely used for this purpose, the principle of TIF districts could also be applied to public investments to reduce disaster risk to private landowners.[65] If an adaptation or resilience measure can increase the property value, then TIF could be used to finance the resilience project.

In 2015, the Connecticut General Assembly Public Act 15-57, *An Act Establishing Tax Increment Financing Districts*.[66] The relatively new statute[67] allows municipalities to establish tax increment districts to finance economic development projects through using real property tax revenue to repay the costs of the project, assessing the benefits to the property from the public improvements or issuing bonds backed by these revenue sources.[68] The Act requires that the district include property that is blighted, needing rehabilitation or conservation or is suitable for downtown or transit-oriented development.[69]

Although the tax increments district statute makes no specific mention of resiliency to climate change or the impacts of extreme weather, transit-oriented development[70] can be an element of a municipality's community resilience strategy. For example, the State of Connecticut put forward the concept of resilient transit-oriented development for its Phase 2 grant application for the National Disaster Resilience Competition,[71] which was recently awarded $54.3 million to

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[64] Richard Brugmann, *Financing the Resilient City: A demand driven approach to development, disaster risk reduction and climate adaptation - An ICLEI White Paper,* ICLEI Global Report (2011), *available at* http://resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/Frontend_user/Report-Financing_Resilient_City-Final.pdf.

[65] *Id.*

[66] An Act Establishing Tax Increment Financing Districts, PA 15-57—sSB 677.

[67] Conn. Gen. Stat. §§ 7-339cc to kk.

[68] An Act Establishing Tax Increment Financing Districts, PA 15-57—sSB 677, *Summary* (2015) *available at* https://www.cga.ct.gov/2015/sum/2015SUM00057-R01SB-00677-SUM.htm.

[69] *Id.*

[70] Conn. Gen. Stat. § 7-339cc(15) defines transit-oriented development as "the development of residential, commercial and employment centers within one-half mile or walking distance of a transit facility, including rail and bus rapid transit and services that meet transit supportive standards for land uses, built environment densities and walkable environments, in order to facilitate and encourage the use of those services. Transit-oriented development includes, but is not limited to, transit vehicles such as buses, ferries, vans, rail conveyances and related equipment; bus shelters and other transit-related structures; benches, signs and other transit-related infrastructure; bicycle lane construction and other bicycle-related improvements; pedestrian improvements such as crosswalks, crosswalk signals and warning systems and crosswalk curb treatments and the industrial, commercial, residential, retail and mixed-use portions of transit-oriented development projects."

[71] US Dept. of Housing and Urban Development, *HUD Awards $1 Billion Through National Disaster Resilience Competition: 13 states/communities to receive funding for resilient infrastructure and housing projects* (January 21, 2016), *available at* https://portal.hud.gov/hudportal/HUD?src=/press/press_releases_media_advisories/2016/HUDNo_16-006.

implement a pilot project in Bridgeport built on this concept.[72] Additionally, the December 2015[73] call for proposals from the Connecticut Office of Policy and Management *Responsible Growth and Transit-Oriented Development Grant Program*, included "projects that promote community resiliency in response to extreme weather events, and that are supportive of responsible growth and/or TOD"[74] as eligible activities.

II. Model Programs for Finance

Although Connecticut has made great strides in developing resilience financing programs, there are other programs within the state and from neighboring New Jersey that could serve as models for additional future programs. These models include financing renewable energy and energy efficiency using a property assessment, leveraging recovery grant dollars to create a resilience bank, and tweaking catastrophe insurance bonds to create resilience bonds.

A. Connecticut Green Bank C-PACE Program

Connecticut's Commercial-Property Assessed Clean Energy (C-PACE) program was the first such statewide program of its kind and is now one of the most successful in the country. The program has been widely adopted by Connecticut municipalities. 125 out of 169 cities and towns have signed up to participate and $97 million in projects have closed as of September 2016.[75]

According to the Connecticut Green Bank, C-PACE uses a voluntary assessment on a property tax bill to finance energy efficiency and clean energy projects.[76] The assessment is used to spread the cost of the project over "the expected life of the measure" and the "repayment obligation transfers automatically to the next owner if the property is sold."[77] The capital invested by a C-PACE loan is secured by a lien on the property which in the event of default, provides the security for "low-interest, long-term capital to be raised from the private sector with no government financing required."[78] C-PACE is considered useable for multiple commercial business types: retail, manufacturing, office, agricultural, non-profit and faith institutions, as well

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[72] Rebecca French et al., *Safe Shores and Resilient Transit Corridors: Using Science, Design, and Stakeholder Partnerships to Address Connecticut's Coastal Vulnerabilities,* presentation at the 2015 American Geophysical Union Fall Meeting (December 14-18, 2015).
[73] Connecticut Office of Policy and Management, *Responsible Growth and Transit-Oriented Development (TOD) Grant Program – Request for Applications (RFA)*, RFA # OPM-IGP-20151209-RG-TOD (December 9, 2015), *available at* www.ct.gov/opm/lib/opm/secretary/rfp/opm-igp-20151209-rg-tod.pdf.
[74] *Id* at 1.
[75] Connecticut Green Bank Data Request (October 14, 2016).
[76] Connecticut Green Bank, *C-PACE Financing High Performance Building Upgrades* (*last accessed* April 12, 2016), *available at* http://www.ctcleanenergy.com/YourBusinessorInstitution/CommercialPropertyAssessedCleanEnergyCPACE/tabid/642/Default.aspx [hereinafter *C-PACE Financing*].
[77] *Id.*
[78] *Id.*

as many multi-family residential properties.[79] Applying the PACE model to 1-4 family residential properties remains a challenge, but there are proposals in the policy pipeline as described below.

B. Connecticut's Proposed R-PACE Program

The Green Bank revisited its PACE enabling statute during Connecticut's 2016 Regular Legislative Session. Originally passed in 2011,[80] 1-4 family residential PACE (R-PACE) financing was held up for years by federal policy uncertainty over lien seniority and survivability through property transfers. The 2016 proposed House Bill 5563[81] updates existing statute to make the Green Bank a central program administrator for operating an R-PACE program, removing the administrative burden from municipalities that were enabled to create their own programs, but none of which had launched them. The proposal subordinated the lien position to other debt on the property, specifically first mortgages and property tax obligations.[82] The change made transferability of the payment obligation – the R-PACE lien – the key long-term financing concept, rather than lien seniority.[83]

Lenders on mortgages backed by the government-sponsored enterprises Fannie Mae and Freddie Mac are accountable to the guidance of the Federal Housing Finance Agency (FHFA).[84] The FHFA has formally indicated - with the advent of a successful R-PACE program in California[85] - that the super seniority design of PACE-liens challenge the first-lien position of Fannie Mae and Freddie Mac mortgages – "one of [the Enterprises'] bedrock principles."[86] FHFA General Counsel Alfred Pollard has also indicated that the presence of PACE liens altogether is a type of seniority and would therefore throw PACE-encumbered mortgages out of compliance with FHFA standards.[87] While C-PACE programs have been very successful, R-PACE programs

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[79] *Id.*

[80] An Act Concerning The Establishment of the Department of Energy and Environmental Protection and Planning for Connecticut's Energy Future, PA 11-80—SB 1234 §100.

[81] An Act Concerning The Residential Sustainable Energy Program, H.B. No. 5563 [hereinafter *HB-5563*].

[82] *Id.*

[83] *Id.*

[84] Clean Energy States Alliance, *Residential Property Assessed Clean Energy - A Connecticut Program Viability Assessment*, *Report for the Connecticut Green Bank* (January 30, 2015), *available at* http://www.cesa.org/assets/Uploads/R-PACE-CT-Viability-Assessment.pdf at 3.

[85] *Id.* at 25

[86] Federal Housing Finance Agency, *Statement of the Federal Housing Finance Agency on Certain Super-Priority Liens* (December 22, 2014), *available at* http://www.fhfa.gov/Media/PublicAffairs/Pages/Statement-of-the-Federal-Housing-Finance-Agency-on-Certain-Super-Priority-Liens.aspx [hereinafter *FHFA Statement*].

[87] California Legislature, Assembly Banking and Finance Committee and Assembly Local Government Committee, *Keeping Up with PACE: A Joint Oversight Hearing on Residential Property Assessed Clean Energy (PACE) Programs June 9, 2016* (statement of Alfred Pollard, General Counsel of the Federal Housing Finance Agency) *available at*

across the country have been stifled by FHFA's prohibition of purchasing any mortgages with first-lien PACE-loans attached.[88] The Obama Administration had encouraged states to advance R-PACE policy, and the Federal Housing Authority (FHA) issued formal guidance supportive of their mortgage lenders working with PACE-encumbered properties to ensure consumers can access credit in sale or refinance scenarios.[89] The key barrier to policy implementation is with the banking industry serving loans backed by Fannie Mae or Freddie Mac, as banks tend to transact with portfolios of residential mortgages and have concerns about PACE-encumbered mortgages being returned to them after a sale due to FHFA non-compliance.[90]

C. A Model for Finance based on PACE: Property Assessed Resilience Financing

In 2011, Kunreuther and Michel-Kerjan[91] proposed that PACE could be used as a model for financing resilience projects through multiyear flood insurance contracts. In PACE, the retrofit project's lower energy use is tied to a tax assessment that reflects the increased value of the property. Much of that value is the resulting savings in energy costs.[92] If a resilience project were being financed, then the tax assessment could be combined with reduced flood insurance premiums to create the value to finance resiliency projects and repay that additional special assessment charge on the property tax bill.[93] The Kunreuther proposal, which was advanced by the Connecticut DEEP stakeholder group in 2013, is referred to here as Property Assessed Resilience (PAR). PAR is like PACE in that the financing contracts for resilience retrofit projects would be attached to a property, not the individual person(s) owning that property.[94] Insurance rates for the property with improved resilience could be lowered in recognition of the mitigation and resilience actions, therefore any PAR loans taken out to cover the cost of the flood loss control actions would be offset by the corresponding reduction in premiums for flood insurance.[95]

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https://www.fhfa.gov/Media/PublicAffairs/Pages/Pollard-Statement-before-California-Legislature-Keeping-Up-with-PACE.aspx.

[88] Strook & Strook & Lavan LLP, *A Tale of Two PACEs: Commercial Success vs. Residential Repose*, Strook Special Bulletin (March 15, 2013), *available at* http://www.stroock.com/siteFiles/Pub1306.pdf.

[89] The White House, Office of the Press Secretary, *Fact Sheet: Obama Administration Announces Clean Energy Savings for All Americans Initiative* (July 19, 2016), *available at* https://www.whitehouse.gov/the-press-office/2016/07/19/fact-sheet-obama-administration-announces-clean-energy-savings-all.

[90] Personal communication with Matthew Macunas, Legislative Liaison & Marketing Manager, Connecticut Green Bank (March 12, 2017).

[91] Howard Kunreuther and Erwann Michel-Kerjan, *People Get Ready: Disaster Preparedness,* 28 Issues in Science and Technology (2011).

[92] *Id.* at 6.

[93] *Id.* at 5.

[94] *Id.* at 6.

[95] *Id.* at 5.

PAR financing attaches home improvement resiliency costs to the property tax bill through a special public benefits assessment like PACE.[96] Such obligations, when secured to the property and assigned a lien position on the assessed property subordinate to the first mortgage and property tax, create a stable security interest for the investor or lender that conforms to guidance on the use of certain super priority liens from the Federal Housing Finance Agency.[97] This PAR obligation, like a PACE obligation,is transferrable and would transfer to subsequent property owners and would not need to be paid in full when a property is sold, l.[98] We propose that the public benefit is derived from (1) reduced future disaster recovery expenses to taxpayers, (2) market value preservation or increase of a resilience home improvement project to a homeowner, (3) improved property tax stability of the more resilient residential property that benefits the municipality, (4) lower flood insurance premiums for the property owner, (5) increased likelihood of the home owner's ability to pay their primary mortgage in the event of a natural disaster, and (6) increased Community Rating System (CRS)[99] score for any municipalities participating CRS program, potentially lowering flood insurance premiums for all others in that community.

At the time that the authors first outlined this article, PAR only existed as an idea, but that changed in the 2016 Connecticut legislative session. Although it was not included in the 2015 R-PACE bill, the 2016 House Bill 5563[100] and the 2017 Senate Bill 973 include resiliency improvements as eligible measures for R-PACE financing, including flood and hurricane resistant construction retrofits; water conservation; health and public safety measures like asbestos, mold and lead-based paint remediation; and renewable energy and energy efficiency improvements.[101] The Green Bank would work with private capital providers, and administrators with architect, engineer, and contractor networks, to set up an open-market platform.

D. Energy Savings Performance Contracts

Owners of properties with large energy usage can hire an Energy Services Company (ESCO) and an Owner's Representative to help assist the owner in procuring financing, installation, operation and maintenance of building retrofits involving onsite energy generation, energy efficiency and water conservation related capital improvements.[102] The ESCO can access long-term financing methods such as Tax-Exempt Lease Purchase (TELP) commercial loans or bonds for these projects with limited or no upfront costs to the owner.[103] Cash flow to the ESCO from the energy savings can pay down the financing over the term of the TELP (Figure 3).[104] These programs are

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[96] *C-PACE Financing, supra* note 76.
[97] *FHFA Statement supra* note 86.
[98] *C-PACE Financing, supra* note 76.
[99] Federal Emergency Management Agency, Community Rating System (last updated March 7, 2017), *available at* https://www.fema.gov/community-rating-system.
[100] *HB-5563, supra* note 81.
[101] *Id.* §1a-1. *https://www.cga.ct.gov/2017/TOB/s/2017SB-00973-R00-SB.htm*
[102] Lotspeich, *supra* note 52.
[103] *Id.*
[104] *Id.*

referred to as Energy Savings Performance Contracts (ESPCs).[105] ESPCs can help municipalities and institutions like hospitals and first responders to make their public building, storm shelters and emergency management command centers more resilient. The City of Stamford, Connecticut is using an ESPC to construct a microgrid at its Government Center.[106]

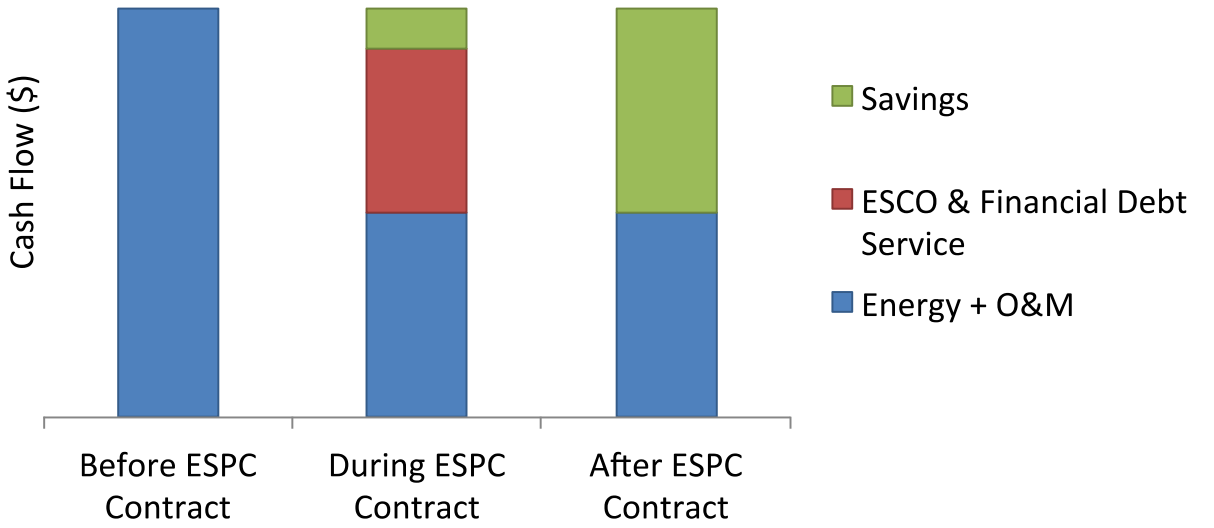

Figure 3. Conceptual framework for energy savings performance contracts (ESPC) where energy costs are high before the contract, during the contract energy costs go down and the difference pays back the investment with some savings coming back to the property owner, and after the contract all of the savings returns to the property owner.[107]

E. New Jersey Energy Resilience Bank

The New Jersey Energy Resilience Bank[108] intends to fund "distributed energy resource" (DER) technologies that can operate in island mode with black start capabilities, both of which allow for operation of critical facilities during power outages to the grid. According to the Bank's program

[105] *Id.*
[106] *Id.*
[107] Figure modified from Satish Kumar, *IPMVP—from a DOE-Funded Initiative to a Not-for-Profit Organization*, 3 Environmental Energy Technology Division News, Lawrence Berkeley National Lab, n.3 (2002)
[108] State of New Jersey Board of Public Utilities, *NJ Energy Resilience Bank Now Accepting Applications: Critical Facilities Can Begin Process to Secure Resilience Grant Funds* (October 20, 2014), *available at* http://www.state.nj.us/bpu/newsroom/announcements/pdf/20141020_erb_press.pdf [hereinafter *NJ Energy Resilience Bank Announcement*].

guide,[109] DER technologies include combined heat and power systems, fuel cells, natural gas micro turbines, and renewable fuels such as methane digesters, solar panels with off-grid inverters and storage systems. All resilient energy systems in the program require resilience to flooding through elevation above FEMA base flood elevation.[110] The program guide encourages the use of additional tools for assessing flood risk due to sea level rise, including the NOAA Sea Level Rise tool for Sandy Recovery and Rutgers University's Sea Level Rise viewer.[111] Emergency generators and fossil fuel storage for those generators are not considered eligible projects.[112]

New Jersey received $200 million in funds from the Department of Housing and Urban Development (HUD) Community Development Block Grant-Disaster Recovery (CDBG-DR) program for Sandy that provide the capital for the Energy Resilience Bank.[113] CDBG-DR funding rules stipulate, however, that funding may only be used for public, non-profits, and small businesses.[115] Priority for funds must be for low-moderate incomes (LMI) areas[116] and for those most-impacted by the disaster.[117] The small business definition resulted in the limited use of these funds for energy resilience because for-profit entities or a mix of for-profit and non-profit entities provide many utilities and critical services.[118] As a result New Jersey decided to apply for a waiver from HUD from the small business rule. On August 25, 2015, New Jersey was granted the waiver[119] allowing for-profit applicants to apply for funds, if they provide critical public services and meet the following conditions of HUD. The Bank must provide preferential treatment to LMI areas and populations in its scoring methodology, require an equity contribution for for-profit critical facilities, and establish a mix of financing terms (loan, forgivable loan, and/or grant) for each assisted for-profit facility to safeguard against the potential over subsidization of for-profit facilities.[120] The Energy Resilience Bank currently has

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[109] State of New Jersey Board of Public Utilities, *New Jersey Energy Resilience Bank Grant and Loan Financing Program Guide,* (October 14, 2014), *available at* http://www.state.nj.us/bpu/pdf/erb/Final%20ERB%20Program%20Guide.pdf.
[110] *Id.*
[111] *Id.*
[112] *Id.*
[113] *NJ Energy Resilience Bank Announcement, supra* note 108.
[115] Community Development: Activities Eligible for Assistance, 42 U.S.C. §5305(a)
[116] Housing and Urban Development: Community Development Block Grants: Eligible Activities, 24 C.F.R. §570.200.
[117] Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1974, 42 U.S.C. §5121 *et seq.*
[118] Additional Clarifying Guidance, waivers, and Alternative Requirements for Grantees in Receipt of Community Development Block Grant Disaster Recovery Funds Under the Disaster Relief Appropriations Act, 80 FR 51589 §2-2 (August 25, 2015).
[119] *Id.*
[120] *Id.*

funding available for water and wastewater treatment facilities[121] and hospitals or other related healthcare facilities.[122]

F. Resilience Bonds

Modeled after catastrophe bonds ('cat bonds'), resilience bonds may provide funding for large-scale resiliency projects. Re:focus partners, llc described the concept of resilience bonds in a 2015 report[123] in cooperation with RMS and Swiss Re, with funding provided by the Rockefeller Foundation, one of the foundations championing resilience policy and planning.

Cat bonds are financial instruments designed to help reduce the economic disruption of financial losses experienced by businesses and governments when a disaster reaches a predetermined financial threshold or a physical threshold such as storm surge height of 10 feet or greater above a elevation datum during the bond term which may be three to five years.[124] In effect cat bonds are used as insurance after a triggering event such as a hurricane, flood, earthquake or typhoon strikes.[125] A sponsor issues the bond and pays investors a coupon, much like an insurance premium.[126] Also, similar to traditional insurance, if an agreed upon trigger event occurs, those who hold the bond pay a previously set amount. If the trigger event does not occur over an established time period, no payment from the investor to the sponsor is required. Therefore, there is potential for a significant payout for either the sponsor or the investor. Typically bonds issued for inherently riskier hazards, those more likely to occur, pay higher coupon values. However, when risk can be diminished the bond investment may be more valuable as investors are less likely to have to pay the triggered amount.[127]

A resilience bond differs from a catastrophe bond in that resilience bonds anticipate the risk reduction of resiliency projects.[128] Cat bond coupon pricing is set by expected outcomes generated by catastrophe models.[129] These models determine the risk level of the particular hazard(s) covered by the bond. In a resilience bond, the coupon price is determined pre- and

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[121] State of New Jersey Board of Public Utilities, *ERB Funding Round 1: Water and Wastewater Treatment Facilities*, New Jersey Energy Resilience Bank (October 15, 2015), *available at* http://www.njeda.com/pdfs/ERB/ERB_WWWTF_Funding_Program_Guide_10_15_15.aspx.

[122] State of New Jersey Board of Public Utilities, *ERB Funding: Hospitals and Related Healthcare Facilities*, New Jersey Energy Resilience Bank (October 15, 2015), *available at* http://www.njeda.com/pdfs/ERB/ERB_HospitalsFundingProgramGuide_10_15_15.aspx.

[123] Shalini Vajjhala and James Rhodes, re:focus partners, llc., *Leveraging Catastrophe Bonds - As a Mechanism for Resilient Infrastructure Project Finance*, RE.bound Report (December 9, 2015), *available at* http://www.refocuspartners.com/reports/RE.bound-Program-Report-December-2015.pdf.

[124] *Id.* at 2-3.

[125] *Id.* at 3.

[126] *Id.* at 31-33.

[127] *Id.* at 31-33.

[128] *Id.* at 34.

[129] *Id.* at 33.

post-resilience project implementation.[130] With a resilience project in place, the risk of the hazard hitting the trigger event is assumed to decrease, and the coupon price is therefore reduced, freeing up the difference in value to be used for the implementation of the resilience project.[131] The model could also be thought of as a rebate to invest in resilient infrastructure projects.[132]

Resilience bonds are structured like catastrophe bonds where a sponsor(s) partners with a bond issuer.[133] The bond issuer creates the bond parameters, accepts premium payments from the sponsor and pays coupons to the investors.[134] They may also pay rebates for resilience project execution. There is no one-size-fits-all resilience bond format, each must be tailored to meet the specific situation.[135]

The authors of the report argue that resilience bonds can provide a variety of benefits to meet recovery and resilience needs, including rapid response funding in the wake of a disaster, a more affordable insurance model (for example, in 2013 the MTA secured $200 million in catastrophe bond coverage[136] for an affordable alternative to traditional insurance), a path for meeting regulatory insurance compliance obligations, an incentive for performance based design for risk reduction, and a way to monetize success for future public investment in resilience.[137]

IV. Opportunities and Challenges for Financing Resilience

This article has now reviewed current programs and potential programs, but questions remain as to why should Connecticut make the investment in resilience financing and what barriers and challenges need to be overcome to implement programs. The return on investment for resilience is obvious in theory, but less obvious to quantify and monetize. However, studies have shown how one might attach that problem. Appropriately utilizing flood insurance as a monetization tool, creating financing programs that result in resilience at the neighborhood scale, and making standards for resilient building are also all challenges that must be addressed.

A. Opportunity: Return on Investment for Resilience

Investing in resilience measures can have significant financing gains. For example, by the end of fiscal year 2016, the Connecticut Green Bank estimates that an expected $1 billion in private

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[130] *Id.* at 34.
[131] *Id.* at 34-38.
[132] Shalini Vajjhala, *Financing infrastructure through resilience bonds*, (December 16, 2015), *available at* http://www.brookings.edu/blogs/the-avenue/posts/2015/12/16-financing-infrastructure-through-resilience-bonds-vajjhala.
[133] Vajjhalla and Rhodes, *supra* note 123, at 47.
[134] *Id.* at 47.
[135] *Id.* at 31.
[136] *N.Y. MTA buys insurance protection for future 'Sandy' storms,* Metro Magazine (July 31, 2013), *available at* http://www.metro-magazine.com/management-operations/news/290796/n-y-mta-buys-insurance-protection-for-future-sandy-storms.
[137] Vajjhala, *supra* note 132.

investment will be attracted to Connecticut for clean energy projects.[138] The Green Bank's ratio has been $5 in private investment for every $1 in government funding. The multiplier ratio is projected to increase to 10:1 in 2016.[139] The Green Bank estimates that the multiplier for private investment to public investment in climate change adaptation and resilience projects may need to be 50:1 or 100:1.[140]

In Section II.C. of this article, the property assessed resilience (PAR) finance model was evaluated in Connecticut to incorporate a community benefit assessment derived from improving building resilience and reaping the cumulative community benefits from insured and uninsured loss avoidance (or taxpayer savings) in future natural disasters, municipal property tax stability during and after future storm events, and NFIP financial stability.

In January 2013, FEMA Region VI conducted a loss avoidance study of southeast Louisiana on 95 properties that were elevated above base flood elevation (BFE) post Hurricane Katrina in 2005 and then experienced Hurricane Isaac in 2012.[141] The conclusion was that one flood event over that 7-year period already demonstrated an average losses avoided ratio of 0.81,[142] where a ratio greater-than-one would have meant that the project mitigation benefits already exceeded the mitigation costs. Given that home elevation projects have an expected useful life exceeding 30 years and the storm prone history of southeast Louisiana, the cost of elevation or mitigation could have a significant positive return on investment over the next 22 years.[143]

Understanding the payback that the above example shows can be challenging for decision makers. FEMA recognized this need and in 2015, they funded a research study by Fatemech Orooji and Carol Friedland of Louisiana State University[144] to examine the behavioral economics and budgetary decision-making process of consumers posed with an opportunity to invest in a wind resistant retrofit for their homes. The *Wind Hazard Mitigation Framework*, as they called it, has the potential to serve as a return on investment worksheet to help consumers

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[138] Personal communication with Matt Macunas, Connecticut Green Bank (April 9, 2016).
[139] *Green Bank model copied across nation, globe*, HartfordBusiness.com (September 7, 2015), available at http://www.hartfordbusiness.com/article/20150907/PRINTEDITION/309049958/1004?utm_source=enews&utm_medium=HBJ%2BToday&utm_campaign=Tuesday.
[140] Personal communication with Brian Garcia, President and Chief Executive Officer, Connecticut Green Bank (September 9, 2015).
[141] John E. Bourdeau et al, Federal Emergency Management Agency, *Loss Avoidance Study, Southeastern Louisiana, Hurricane Isaac 2012, Region 6 DR-4080-LA* (January 2013), *available at* https://www.fema.gov/media-library-data/20130726-1910-25045-6260/las_study__southeastern_louisiana.pdf.
[142] *Id.* at 2.
[143] *Id.* at 2.
[144] Fatemeh Orooji, *Risk-Based Wind Loss and Mitigation for Residential Wood Framed Construction*, Electronic Thesis & Dissertation Collection etd-04082015-130239 (March 24, 2015), *available at* http://etd.lsu.edu/docs/available/etd-04082015-130239/.

make informed resilience investment decisions and provides underwriters with the ability to calculate the benefit-cost of a resilience loan.[145]

B. Challenge: Underinsured Properties

FEMA has been challenged to persuade homeowners of the value of investing in NFIP insurance. In Connecticut only 20-23% on average of eligible properties have flood insurance policies and that number dropped between 2013 and 2015.[146] A number of factors may contribute to the low levels of insured properties in the State, including increasing premiums and older homes with no mortgages and therefore no requirement to have flood insurance.[147] The payments for financing resilience can be based on insurance savings.[148] Without the prospect of savings from lower insurance premiums there may be little motivation to make a resilience investment despite the real risk of flooding to the property. The 1% annual chance flood event is estimated to occur at a probability of 51% over the average 70-year useful lifespan of a single family located in the Special Flood Hazard Areas (Figure 2).[149] With increasing sea levels, today's 1% annual chance flooding event will occur more frequently in the future.[150] Educating homeowners about these issues may increase demand for resilience projects and potentially new ways to fund them through financing. In Old Saybrook, Connecticut, for example, the Town formed the Sea Level Rise and Climate Adaptation Committee (SLRCAC).[151] After becoming educated about the impacts of sea level rise and storm surge on their Town now and in the future, the Committee made recommendations to the Town Selectman that included budgeting for design and construction of physical solutions to address the challenges that Old Saybrook will face.[152]

C. Challenge: Providing Resilience at the Neighborhood Scale

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[145] *Id.*

[146] Jan Ellen Spiegel, Flood Insurance Hikes Arriving at a Waterfront Near You, CT Mirror (May 4, 2015), *available at* http://ctmirror.org/2015/05/04/flood-insurance-hikes-arriving-at-a-waterfront-near-you/.

[147] *Id.*

[148] Kunreuther and Michel-Kerjan, *supra* note 91, at 5.

[149] James F. O'Connell and Stacey Justus, *Model Coastal Floodplain Development Bylaw: Effectively Managing Coastal Floodplain Development* 9 (December 14, 2009), *available at* http://www.floods.org/ace-files/documentlibrary/State_Local%20Resources%20and%20Tools/Best%20Practices/Sea_Grant_Coastal_Floodplain_Bylaw_Model_12_14_09.pdf.

[150] US Army Corps of Engineers, *North Atlantic Comprehensive Coastal Study Final Report* (January 2015) *available at* http://www.nad.usace.army.mil/Portals/40/docs/NACCS/NACCS_main_report.pdf at 34.

[151] Sea Level Rise Climate Adaptation Committee Town of Old Saybrook, *Report of Findings from a Study of the Effects of Sea Level Rise and Climate Change on Old Saybrook, Connecticut* (December 2015), *available at* http://www.oldsaybrookct.org/Pages/OldSaybrookCT_CC/slrcac2/SLRCAC_Resources/SLRCAC%20Report%20of%20Findings.pdf.

[152] *Id.*

Financing models that work on a property-by-property basis face the challenge of not being able to improve resilience for an entire neighborhood or area that faces a shared risk. For example, if $25 million in approved bond funds was made available to Shore Up, then the loan program could fund approximately 200 home elevations with an average loan of $125,000.[153] Unfortunately, more than 32,000 homes in the state lie within the FEMA FIRM 100-year floodplain.[154] This program was a great step forward and the first of its kind in the nation, but at its initial approved funding level, Shore Up loans would be a drop in the bucket. Without additional funding and motivation by all homeowners to use the Shore Up program, Connecticut will have large gaps in home elevation within neighborhoods (Figure 4). Affordability of the program is also an issue that needs to be addressed. Even with a low interest rate taking on a loan may not be possible for low or moderate-income property owners. Herbert et al. [155] found that low income households may not have the cash on hand for down payments and closing costs, cannot pay down debts, have low credit scores, and may also be subject to higher borrowing costs. Moreover, home and commercial property elevation alone does not address the infrastructure needs that make an entire neighborhood resilient. Programs like Shore Up could be paired with a TIF district for elevating the roads or instituting a flood protection strategy. A revolving loan fund project to finance a resilient wastewater utility could be added as well. There are many combinations that could apply, but the point is that in isolation none of these programs will address the entire problem.

Figure 4. Two houses in the coastal municipality of Old Saybrook, Connecticut. The house on the right is in the process of being elevated.[156]

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[153] *Shore Up Connecticut Launch, supra* note 31.

[154] *Connecticut's 2007 Natural Hazards Mitigation Plan*, Department of Environmental Protection, Inland Water Resources Division 2-36 (2007).

[155] Christopher E. Herbert et al, Joint Center for Housing Studies of Harvard University, *Critical Housing Finance Challenges for Policymakers: Defining a Research Agenda* (2012).

[156] Photo courtesy of Rebecca French taken in the fall of 2014 on a tour of the Town of Old Saybrook Connecticut's shoreline.

D. Challenge: Setting Appropriate Building Codes for Resilience

Financing resilience will require predictable and uniform building construction standards and codes and guidance for efficient loan underwriting. The Department of Homeland Security published a report, *Including Building Codes in the National Flood Insurance Program, Fiscal Year 2013 Report to Congress*, as an impact study for the proposed Biggert-Waters Flood Insurance Reform act of 2012.[157] In this report the agency concluded that, "the overall impacts of including building code as part of NFIP would be positive in helping to reduce physical flood losses and other hazard losses."[158] In addition:

- 22 states, (including Connecticut), mandate local enforcement of statewide building codes.[159]
- 28 states have a partial or complete code adoption and enforcement shared between state and local levels. (Connecticut has a single statewide code.)[160]
- The benefits to communities that initially incur the costs associated with establishing building departments to perform permitting and inspection include: generally increased property values, reduced losses during flood and other hazard events, which reduce insurance rates over a 5- to 10-year period, and a more actuarially sound NFIP and insurance industry.[161]
- The most significant benefits would likely arise from the required added elevation above base flood elevation levels (freeboard) for dwellings in certain special flood hazard areas (such as coastal A and V zones).[162]
- The reduction of NFIP insured losses would lower actuarially rated insurance premiums for those code compliant structures, making insurance more affordable, attracting more participation in NFIP, enhancing the financial soundness, and reducing the subsidy needs of the NFIP.[163]
- The statutory enforcement authority of building officials would increase code compliance by builders and designers of new structures and substantially damaged or substantially improved structures as part of the NFIP.[164]

The general concern with enforcing the nationally recognized building codes was the regulatory and financial impacts on communities that do not already have the enforcement programs in place because they have not yet adopted the national building codes.[165] The report found

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[157] Department of Homeland Security, Federal Emergency Management Agency, *Including Building Codes in the National Flood Insurance Program* iv-v (January 2013), *available at* http://www.fema.gov/media-library-data/1385728818014-f08e55ee83590650103995b2c66e2285/Incl_Bldg_Codes_NFIP2.pdf.

[158] *Id.* at iv.

[159] *Id.* at v.

[160] *Id.* at v.

[161] *Id.* at v.

[162] *Id.* at v.

[163] *Id.* at v.

[164] *Id.* at v.

[165] *Id* at 10.

however that these costs could be offset by the collection of permit fees and reimbursement from the federal government and the net economic benefit over time.[166]

Nationally recognized building codes applicable to flood resistant design and construction include: NFIP minimum requirements American Society of Civil Engineers (ASCE) 24, Flood Resistant Design and Construction, as a reference standard in the International Residential Code and International Building Code® (IRC, IBC or I-Codes).[167] In addition ASCE/SEI 7-10, *Minimum Design Loads for Buildings and Other Structures*, "provide requirements for general structural design and includes means for determining dead, live, soil, flood, snow, rain, atmospheric ice, earthquake, and wind loads, as well as their combinations suitable for including in building codes and other documents."[168] The International Mechanical Code, International Plumbing Code and International Fuel Gas Code also include codes for design for flooding per ASCE 24.[169]

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[166] *Id* at 10.

[167] Flood Resistant Design and Construction Committee of the Codes and Standards Activities Division of the Structural Engineering Institute of ASCE, *Flood Resistant Design and Construction, ASCE/SEI 24-14* (2014).

[168] Flood Resistant Design and Construction Committee of the Codes and Standards Activities Division of the Structural Engineering Institute of ASCE, *Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-10* (2013).

[169] Federal Emergency Management Agency, *Engineering Principles and Practices for Retrofitting Flood-prone residential structures, FEMA P-259* 2-13 (January 2012), *available at* http://www.fema.gov/media-library-data/20130726-1506-20490-2593/fema259_complete_rev.pdf.

Figure 5. Helical pile foundations installed by GZA for elevated residence in Milford, Connecticut to withstand 100 mph wind load and 500-year occurrence interval storm flood elevation plus one foot freeboard.[170]

The Connecticut State Building Inspector, State Fire Marshal and the Codes and Standards Committee are currently conducting a code review process to adopt the 2018 State Building and Fire Safety Codes based on the 2015 editions of the International Code Council (ICC) and National Fire Protection Association (NFPA) documents.[171] The process was initiated in January 2017 and will be complete in July 2017.

ASCE 24-14 is a referenced standard in the 2015 International Building Code® (IBC) and the 2015 International Residential Code® (IRC).[173] Building and structures within the scope of the IBC proposed to be constructed in flood hazard areas must be designed in accordance with ASCE 24-14.[174] The IRC requires dwellings in floodways to be designed in accordance with ASCE 24-14 and includes an alternative that allows communities to require homes in any flood

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[170] Photo courtesy of James Davis, GZA GeoEnvironmental.
[171] Connecticut Department of Administrative Services, *Building and Fire Safety Code Adoption* (last modified March 8, 2017), *available at* http://www.ct.gov/dcs/cwp/view.asp?a=4447&q=523368.
[173] Federal Emergency Management Agency Building Science Branch, *Highlights of the ASCE 24-14 Flood Resistant Design and Construction* (reviewed July 2015), *available at* https://www.fema.gov/media-library/assets/documents/14983.
[174] *Id.*

zone to be designed in accordance with ASCE 24-15.[175] Highlights of ASCE 24-14 that complement the NFIP minimum requirements include: Building Performance; Flood-Damage Resistant Materials; Utilities and Service Equipment and Siting Considerations.[176]

The Federal Emergency Management Agency (FEMA) has worked since 1998 to include flood provisions into the International Building Codes.[177] The flood provisions of the 2015, 2012, 2009, and 2006 editions of the I-Codes are consistent with the minimum requirements of the NFIP for buildings and structures.[178] The Design Flood Elevation (DFE) term used in ASCE 24 and ASCE 7 is defined as the Base Flood Elevation (BFE), which is the height of the corresponding water level on the 100-yr Flood Insurance Rate Maps (FIRMs) flood event plus any additional elevation above that BFE as established by a regulatory authority, and represents a level of flood protection exceeding the BFE.[179] Most NFIP communities adopt the FIRM as their regulatory DFE, making the DFE and BFE the same, but the DFE will always be the BFE or higher.[180] The DFE has become integrated into land use permitting requirements and a design basis for new buildings and structures, as well as a standard for elevating buildings and structures substantially damaged by floods subject to insurance under the NFIP.[181]

FEMA's Building Science Branch reports that using ASCE 24 for design for dwellings in coastal high-hazard areas (Zone V), where wave heights of over three feet are expected during the base flood, has several benefits,[182] which include:

- Foundation designs must account for erosion and scour
- Pile design specification details are provided
- Requirements are provided for elevated structures in relation to the orientation of the lowest horizontal structural member to be one foot above the elevation of a wave crest that could impart a load during the base flood

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[175] *Id.*
[176] *Id.*
[177] Building Science Branch, FEMA Federal Insurance and Mitigation Administration, *Flood Provisions of the International Code Series: Higher Standards and More Specific Requirements than the Minimum Requirements of the National Flood Insurance Program* (June 2013), *available at* https://www.fema.gov/media-library-data/20130726-1921-25045-5477/icodes_asce24_higherstnds_paper_060713.pdf at 1. [hereinafter *Flood Provisions of the International Code Series*]
[178] *Id.* at 1.
[179] *Id.* at 1-2.
[180] *Id.* at 2.
[181] Christopher P. Jones et al., American Institutes for Research, *Evaluation of the National Flood Insurance Program's Building Standards* (October 2006), *available at* http://www.fema.gov/media-library-data/20130726-1602-20490-5110/nfip_eval_building_standards.pdf.
[182] *Flood Provisions of the International Code Series, supra* note 177, at 7-8.

Concerns with the use of FEMA's FIRMs as a design basis elevation is that only past flood and hurricane events are evaluated and maps may be updated infrequently.[183] In addition, FEMA does not currently evaluate the impact of sea level rise or future climate change impacts when establishing the BFE.[184]

The 2016 State Building Code adopted on October 1, 2016 is considered rigorous in respect to flood and wind hazards protection by combining several international building codes, including the 2012 International Building Code (IBC).[185] The current State Building Code meets the minimum requirements of the National Flood Insurance Program (NFIP). Since the first state building code was adopted in 1970, periodic revisions have generally increased the level of protection required for flooding and wind protection in coastal hazard areas.[186] Structures built before 1970 (pre-existing structures) are considered at the highest risk of damage from coastal hazards such as flooding, wind, and precipitation.[187] Structures built between 1970 and 1990 are also at high risk of flood and wind damage, because 1990 was the first year the state code included provisions from international building codes.[188] Of all the coastal structures in

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[183] According to FEMA's website: "Each year, FEMA initiates studies and restudies of flood hazards in communities across the U.S. for the creation, as well as the revision, of community flood hazard maps. Because of funding constraints, however, FEMA can study or restudy only a limited number of communities each year. As a result, FEMA prioritizes study and restudy needs based on a cost-benefit approach whereby the highest priority is given to studies where development is greatest and where the maps are most outdated." Federal Emergency Management Agency, *Flood Map Revision Processes* (last updated January 11, 2017) *available at* https://www.fema.gov/flood-map-revision-processes#1.

[184] According to FEMA's website: "FEMA maps coastal flood hazards based on existing shoreline characteristics, and wave and storm climatology at the time of the flood study. In accordance with the current Code of Federal Regulations, FEMA does not map flood hazards based on anticipated future sea levels or climate change. Over the lifespan of a study, changes in flood hazards from sea level rise and climate change are typically not large enough to affect the validity of the study results." Federal Emergency Management Agency, Coastal Frequently Asked Questions: How is FEMA accounting for sea level rise and climate change on the FIRMs? Does sea level rise/climate change affect the FIRMs? (last updated August 17, 2016) *available at* https://www.fema.gov/coastal-frequently-asked-questions#How is FEMA accounting for sea level rise and climate change on the FIRMs? Does sea level rise/climate change affect the FIRMs?.

[185] International Code Council, *Updated Building Code Adopted Statewide in Connecticut* (November 21, 2016), *available at* http://das.ct.gov/images/1090/NR_Connecticut_Codes_Final.pdf.

[186] Joel Johnson, State of Connecticut Department of Environmental Protection, Office of Long Island Sound Programs, *Coastal Hazards in Connecticut, The State of Knowledge* (2010), *available at* http://www.ct.gov/deep/lib/deep/long_island_sound/coastal_hazards/ct_coastal_hazards.pdf at 17.

[187] *Id.*

[188] *Id.*

Connecticut, structures built since 2005 are likely to have the best protection from flood and wind damage due to hurricanes and winter storms.[189]

New building codes and designs and construction methods for flood resistance and resilience will require consumer outreach, consumer protection, and training programs for inspectors, design professionals and contractors. There are several professional training and guidance resources available. FEMA's Building Science Branch of the Risk Reduction Division at FEMA's Federal Insurance and Mitigation Administration (FIMA) has a helpline and online resources.[191] The Insurance Institute for Business & Home Safety® (IBHS) also provides online resources.[192]

IBHS studies and reports address FORTIFIED Home™ [193] program for hurricane, high-wind and hail prone areas. FORTIFIED Home™ Technical Guides and training programs are offered to inspectors, design professionals and contractors.[194] IBHS also has a FORTIFIED Commercial Standards program.[195] Both the residential and commercial standards include Bronze, Silver and Gold designations for addressing budgetary and inspection constraints to meet three tiers of storm resilience goals. IBHS publishes Technical Requirements for Hurricane and High-Wind/Hail Construction Methods[196,197] that have been field tested in IBHS's building testing facility, which simulates hurricane force winds. IBHS also rates building materials as FORTIFIED.[198] IBHS has collaborated with DHS to pilot a Resilience STAR designated homes using IBHS construction standards.[199]

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[189] *Id.*
[191] *Building Science*, Federal Emergency Management Agency (last updated November 12, 2015), *available at* http://www.fema.gov/building-science.
[192] *Insurance Institute for Business & Home Safety (IBHS)* (2016), *available at* www.disastersafety.org.
[193] *Fortified Home*, Insurance Institute for Business & Home Safety (2017), *available at* https://disastersafety.org/fortified/.
[194] *Id.*
[195] Insurance Institute for Business Home & Safety, *Fortified Commercial* (2016), *available at* https://disastersafety.org/fortified/commercial/
[196] International Institute for Business Home & Safety, *Hurricane Standards* (2012)*; High Wind & Hail Standards* (2015); *and High Wind Standards* (2015), *available at* https://disastersafety.org/fortified/resources/#standards.
[197] International Institute for Business Home & Safety, *Commercial: Technical Requirements Summary: Hurricane* (2016); *Commercial: Technical Requirements Summary: High Wind & Hail* (2016), *available at* https://disastersafety.org/fortified/commercial/.
[198] International Institute for Business Home & Safety, *FORTIFIED Search Tool* (2017), available at http://disastersafety.approvalzoom.com/portalsearch.php.
[199] Insurance Institute for Business Home & Safety, *New Resilience STAR Home Program Uses IBHS Construction Standards* (December 5, 2013), *available at* https://disastersafety.org/ibhs-news-releases/new-resilience-star-home-program-uses-ibhs-construction-standards/.

American Society of Civil Engineers (ASCE)[200] provides technical training on Floodplain Management and NFIP, develops standards ASECE 7 and ASCE 24 for continuing education for maintaining Professional Engineer licensure.

The U.S. Green Building Council recently introduced resilience credits for LEED that are in the pilot stage right now.[201] There are three credits available: Credit 1 - Assessment & Planning for Resilience; Credit 2 – Design for Enhanced Resilience; and Credit 3 – Design for Passive Survivability.[202] Under Credit 2, a building designed for resilience to flooding must follow ASCE 24-14, the lowest occupied floor must be 5 feet above the FEMA BFE or dry floodproofing for commercial buildings, sewers must contain backflow preventers, and mechanical and electrical equipment must be protecting as per FEMA 55 guidelines.[203]

Consistent with Connecticut's policy leadership on initiatives to address the challenges posed by climate change, Governor Dannel P. Malloy announced on April 22, 2016 a new Executive Order No. 53[204] in which he is directing state agencies to develop new building code standards and training programs for builders and inspectors that will better protect residential and commercial structures from damage caused by flooding and high winds. The Governor is instructing the Department of Administrative Services (DAS), the Department of Energy and Environmental Protection (DEEP), and the Connecticut Insurance Department (CID) to work with the State Building Inspector to ensure that the next revision to the State Building Code reviewed previously includes standards that increase the resiliency of new and renovated homes and commercial buildings.[205]

Executive Order No. 53 directive will accelerate updating the State Building Code to address resiliency through evaluating the numerous international, federal and state standards and guidance summarized herein by the authors. Through collaboration by public officials and technical experts in wind and flood resistant design and construction in establishing a new State Building Code, the public will benefit by avoiding costly and repetitive property and casualty and disaster recovery losses, whether those losses are insured or uninsured. Taxpayers will also benefit by reducing the budgets they contribute to fund NFIP insured losses in Connecticut over the life span of these new and renovated buildings. Future economic losses will be mitigated when residential and commercial buildings throughout Connecticut are designed, constructed

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[200] *American Society of Civil Engineers* (2015), *available at* www.asce.org.
[201] Alex Wilson, *LEED Pilot Credits on Resilient Design Adopted* (November 13, 2015), *available at* http://www.resilientdesign.org/leed-pilot-credits-on-resilient-design-adopted/.
[202] *Id.*
[203] *Id.*
[204] Office of Governor Dannel P. Malloy, *Gov. Malloy Signs Order Strengthening State Building Code to Limit Storm Damage as a Result of Climate Change*, (April 22, 2016), *available at* http://portal.ct.gov/Departments and Agencies/Office of the Governor/Press Room/Press Releases/2016/04-2016/Gov Malloy Signs Order Strengthening State Building Code to Limit Storm Damage as a Result of Climate Change/.
[205] *Id.*

and inspected in compliance with a State Building Code that results in more residential and commercial buildings that are less vulnerable to the impacts of flooding, extreme wind conditions, severe weather, sea level rise and climate change.

V. Conclusion: How Policy Can Motivate Resilience Financing

This article began with a description of how the federal government is currently paying out hundreds of millions of dollars to Connecticut – and in neighboring states, billions of dollars – to recover from Sandy. But that model may change. Currently, when a State is declared as a Presidential major disaster, FEMA provides Public Assistance,[206] but the Agency is now considering a disaster deductible in a Supplemental Advance Notice of Proposed Rulemaking.[207] Under the current Public Assistance program, FEMA provides a 75% federal cost share of the cost of recovery for public facilities damaged by a storm.[208] Under a disaster deductible policy, the State of Connecticut would commit funds up front before FEMA would provide any financial assistance for recovery under the Public Assistance program.[209] The Notice from FEMA calculated Connecticut's deductible as $20.85 million, although FEMA would phase this amount in over five years.[210] The deductible would start at $5.04 million in year one.[211] FEMA would allow states to satisfy their deductible through a credit system. The goal of the credits are to "incentivize States to dedicate resources on activities that are demonstrated to promote and support readiness, preparedness, mitigation, and resilience. Such activities could include adopting and enforcing building codes that promote disaster resilience, funding mitigation projects, or investing in disaster relief, insurance, and emergency management programs."[213]

FEMA gave particular weight to the credits for investment by states in mitigation projects, providing a $3.00 credit for every $1.00 spent.[214] The $2.00 in savings that the State of Connecticut would gain on their investment in mitigation versus other options to meet the deductible, not only strongly incentives this option for credits, but that savings could also be used to pay back the investment in the resilience project. By establishing the 2:1 return on investment ratio, FEMA has also established the market value of a qualifying resilience project for States. For example, under the $20.85 million deductible, an investment of $6.95 million

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[206] FEMA administers the Public Assistance program under Section 406 of the Stafford Act to "make contributions—(A) to a State or local government for the repair, restoration, reconstruction, or replacement of a public facility damaged or destroyed by a major disaster and for associated expenses incurred by the government." 42 U.S.C. 5172(a)(1)(A)

[207] Federal Emergency Management Agency, *Establishing a Deductible for Public Assistance Program*, 82 FR 4064 (January 12, 2017), *available at* https://www.federalregister.gov/d/2017-00467 [hereinafter *FEMA Disaster Deductible*].

[208] The Federal share for FEMA public assistance "shall be not less than 75 percent of the eligible cost of repair, restoration, reconstruction, or replacement" of a public facility." 42 U.S.C. 5172(b)(1)

[209] *FEMA Disaster Deductible, supra* note 207.

[210] *Id. at* K(Table 11).

[211] *Id. at* K(Table 11).

[213] *Id* at II.

[214] *Id.* at V(G)(3).

dollars leads to a savings of $13.9 million. That savings pays the State back for its investment in mitigation projects two times over. FEMA also proposed a higher incentive for creating tax incentives relative to other credits – $2.00 in credit for every $1.00 spent on administering a tax incentive program and any lost tax revenue.[215] FEMA notes that these tax incentives could provide an income tax credit for home elevation, for example.[216] This type of tax savings could again be used for financing. For example, that tax savings could be used by the home owner to pay off the cost of a private loan for the construction, thereby leveraging public investment to attract private investment.

Even without the incentives for investment that this FEMA proposal outlines, the State of Connecticut's recovery and resiliency needs cannot be completely covered by federal grant dollars alone now or going forward. Resilience financing can be part of the solution, but in order for financing programs to work effectively and proactively, public policies encouraging resiliency investments need to be in place that monetize the value that comes with implementing a qualifying resilience project, as one that demonstrates measurable and cumulative social welfare, public safety and financial returns on investment. This monetizing capacity for preventing economic losses to property, increasing real estate market value and stabilizing property tax is what the FEMA disaster deductible credit, lower insurance premiums, and increased property values all have in common. The multiple financing mechanisms described in this article all hinge on creating an equitable method to pay back these long-term investments in our future welfare. The federal government can play a role here as can States, but without loss prevention policies, insurance and funding programs being integrated to incentivize investing in resilience, a State's disaster recovery unmet budgetary needs will increase. As the climate changes and the seas rise, those unmet costs increase even more. With a track record of innovation and success from the Connecticut Green Bank, the launch of Shore Up as the first residential elevation loan program of its kind nationwide, the creation of the Connecticut Institute for Resilience and Climate Adaptation as a resource for program evaluation and impact, State agencies committed to resiliency through SAFR, and new R-PACE legislation under review, Connecticut is on the right track and is leading the way in creating methods for financing resilience that can become model programs for the country.

[215] *Id.* at V(G)(6).
[216] *Id.* at V(G)(6).