



# **TWO SHADES OF GREEN**

## **Reducing Building Operating Costs and Creating Healthier Homes**

### **Program Evaluation 2017**

PREPARED BY  
LOCAL INITIATIVES SUPPORT CORPORATION NEW YORK CITY

WITH ASSISTANCE FROM  
NEW YORK CITY DEPARTMENT OF HEALTH AND MENTAL HYGIENE  
TOHN ENVIRONMENTAL STRATEGIES

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## PROGRAM OVERVIEW

Two Shades of Green (TSG) integrates green, healthy, and cost-effective measures into existing affordable housing rehabilitation and property maintenance. TSG is a partnership between LISC New York City, the NYC Department of Health and Mental Hygiene, NYC Smoke Free at Public Health Solutions and several mission-driven developers of affordable housing. Between 2013 and 2015, TSG helped change property management practices in affordable housing portfolios totaling more than 4,000 apartments. Most significantly, TSG worked directly with owners to reduce operating costs and create healthier homes in 1,100 apartments.

### **The Need**

TSG was formed with a recognition of the complex factors impacting health in low-income families: low-income families suffer disproportionately from preventable health problems like asthma, toxic stress, and obesity because they live in poorly constructed and maintained housing; the neighborhoods they live in lack access to critical services and resources like health care and green spaces; and rising energy and water costs often strain the operating budgets of multifamily housing, resulting in deferred maintenance and poor indoor conditions. With the emerging consensus that smart property management can help create healthier living environments, and given LISC NYC's longstanding commitment to preserving the quality and sustainability of affordable housing, we assisted owners and operators of housing to find simple ways to improve their aging building portfolios with a focus on addressing potential health risks.

### **Core Program Elements**

To advance energy and water conservation measures and incorporate health components during rehabilitation, TSG provides services to affordable housing property owners and managers including:

1. Benchmarking to measure project performance pre- and post-retrofit;
2. Monitoring and selecting buildings with high energy and water use and/or deteriorating conditions;
3. Conducting building needs assessments that incorporate energy, water and health upgrades to ensure holistic needs are addressed;
4. Coordinating with available incentive programs;
5. Preparing financing packages to support retrofit work;
6. Providing guidance on retrofit specifications, vendors and/or health related programming; and
7. Delivering staff training and preparing operation and maintenance plans.

TSG provides technical support to help affordable housing owners integrate these health measures:

1. Safe and green pest control, which reduces exposure to toxic pesticides, seals holes to prevent pests from entering, and in doing so, conserves heat and reduces asthma risks;
2. Smoke-free housing, which reduces resident exposure to secondhand tobacco smoke and asthma risks, reduces fire risk, and decreases the cost of preparing units for new renters;
3. Active design, which increases resident physical activity through low-cost modifications and additions to buildings and surroundings; and
4. Green cleaning, which reduces exposure to harmful chemicals through the use of cost-effective, safe and environmentally friendly cleaning products.

TSG activities for each owner are shown below (Symbol ‘\*’ indicates that an activity was chosen by a CDC partner for TSG implementation).

	Bench- marking	Energy Project	Water Project	Smoke Free	IPM	Green Cleaning	Active Design
<i>Banana Kelly Community Improvement Association</i>	*	*	*	*	*	*	*
<i>Cypress Hills Local Development Corporation</i>	*	*	*	*	*	*	*
<i>HOPE Community</i>	*	*		*	*	*	*
<i>Mid-Bronx Desperadoes (MBD)</i>	*	*	*	*	*		
<i>West Side Federation for Senior &amp; Supportive Housing(WSFSSH)</i>	*	*	*		*	*	

### Report Purpose and Key Findings

This report summarizes the impact of the Two Shades of Green program piloted by LISC NYC, NYC DOH, Tohn Environmental Strategies and CDC partners. This report primarily focuses on TSG 2014-2015 activities; however, the overall impact numbers include the TSG pilot conducted with five CDC partners in 2013. Since 2013, TSG has impacted housing renovation, and property maintenance in over 1,100 affordable apartments and homes.

Owners participating in TSG instituted benchmarking and energy/water retrofits resulting in cost savings for energy and water, changed property management practices resulting in healthier buildings, and learned the value of collaboration between affordable housing and public health practitioners. Specifically:

1. Owners saw substantial declines in both energy and water use of over 30%, and related cost savings.
2. Owners reduced asthma risks through healthier property management practices that minimized exposures to pests, tobacco smoke, and harsh cleaning products. Such practices also reduced operating costs, particularly for green cleaning, with up to 50% savings in several properties.
3. Owners recognized the value of benchmarking to assess portfolio performance for energy and water use; 30% of the owners chose to expand benchmarking to their full portfolio, adding 130 buildings and 4,500 homes.
4. Green and healthy assessment tools informed more comprehensive renovation plans to reduce energy use, water consumption and building-related asthma risks.
5. Collaboration with the NYC Department of Health was critical in bringing technical expertise to owners around better pest control to reduce asthma risks, active design and program evaluation.

- 6. Engagement with NYC housing and health staff enabled TSG initiatives to become a core practice in some city housing programs.

## IMPROVED BUILDING PERFORMANCE AND CONDITIONS

The below results reflect activities for the 2014-15 TSG partners.

### Reduced Electric and Gas Energy Use

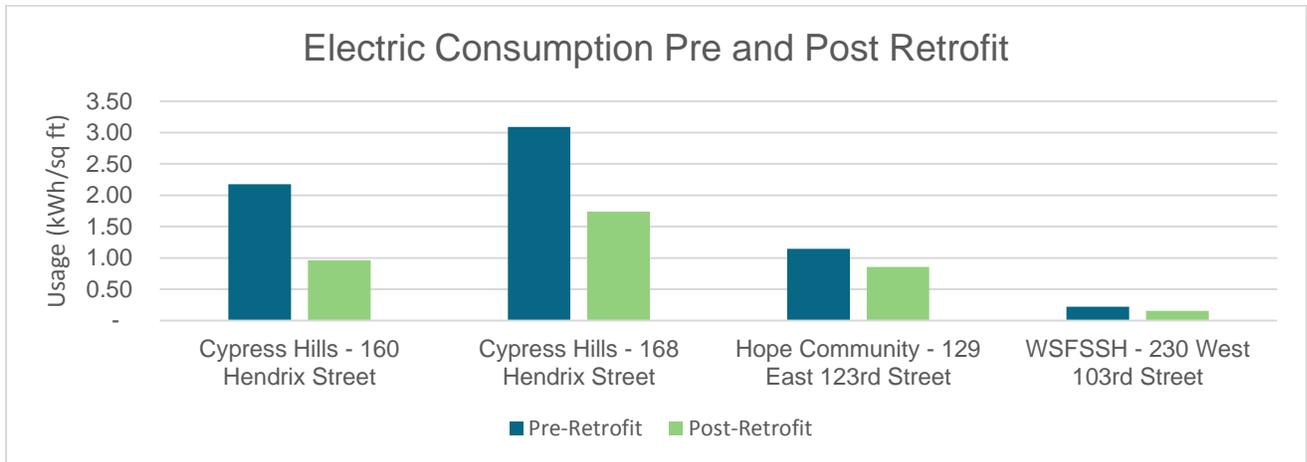
**Owners saw an average 36% reduction in electricity use**, after installation of equipment that included: energy efficient lighting, energy monitoring systems, and Energy Star appliances in common areas. Figure 1 below shows the declines for four owners that pursued electricity reductions.

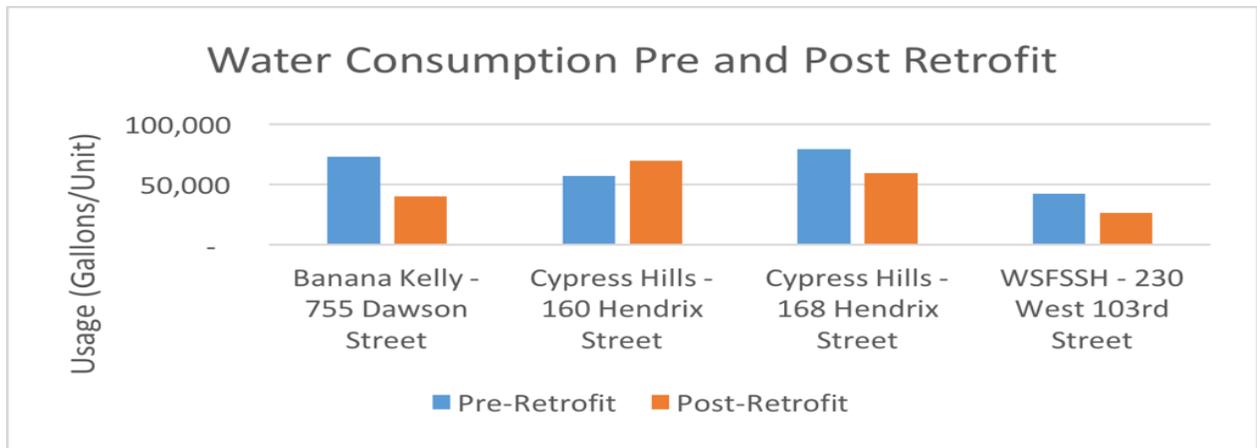
**One owner experienced a 47% decline in gas use**, after installation of energy efficient gas boilers and window replacement.

### Reduced Water Use and Fewer Leaks

**Owners saw an average 30% decline in water use, saving 2.6 million gallons/year post retrofit.** One Cypress Hills Local Development Corporation property (160 Hendrix Street) experienced an increase in water use because of substantial increases in occupancy post retrofit.

**Surveys documented a 65% drop in the number of tenants reporting leaks after rehab work was completed in one property that tracked tenant responses.**





**Reduced Asthma Risks (Exposure to Indoor Allergens) with Improved Pest Management Practices**

Working in conjunction with the NYC DOH, owners pursued integrated pest management (IPM) strategies and repaired leaks. Living with cockroaches, mice or moisture/dampness problems has been shown to increase asthma risks.

**All owners implemented enhanced IPM contracts with their pest management firms.** DOH reviewed all pest control contracts and provided feedback on how to improve services by identifying problems pro-actively and locations where less toxic pesticide application could be adopted. Owners integrated pest proofing into their work. These strategies included treating pest conditions prior to rehabilitation, using pest resistant materials, and paying special attention to caulking and sealing in pest prone areas like kitchen and bathroom and garbage areas.

**There was an 82% reduction in frequent sighting of cockroaches, 90% reduction in sightings of mice, and a 79% decline in tenants reporting use of illegal and potentially dangerous pesticides** in a property where IPM strategies were implemented during building renovations.

**Owners changed practices to coordinate maintenance staff activities and pest management services.**

- 80% of buildings integrated pest proofing measures into their renovation activities, including:
  - Filled cracks and crevices using sealants.
  - Integrated use of non-toxic pesticides in wall voids during renovation.
  - Involved pest management firms during renovation.
- 60% of staff completed training on how to improve operational and maintenance practices.
  - DOH building assessments identified pest conditions indicative of poor services by pest management companies. DOH communicated this to CDCs. As a result, CDCs either negotiated with current firms to improve practices or elected to hire new contractors.
  - DOH supported staff training on identifying pest activity and strategies to reduce pest harborage during unit turnover.

**Improvement in pest management practices resulted in almost tripling the percentage of tenants rating building pest management as good to excellent**, in one property that tracked tenant responses.

## REDUCED BUILDING OPERATING COSTS FOR 2014-15 PARTNERS

### Reduced Energy Costs

Electric energy costs declined by more than \$100/apartment/year for most owners. Gas heating costs declined by over \$700/apartment annually, in the one property that installed new boilers and windows.

### Reduced Water Costs

Water savings ranged from \$300 to \$1,100/apartment/year. One CDC saved \$50,000 annually and reported a 17-month payback for kitchen and bathroom renovations that included water-conserving toilets, showerheads, faucet aerators, and washing machines. The project also upgraded water pumps to more efficiently get hot water to apartments and replaced old existing copper piping, the source of water leaks.

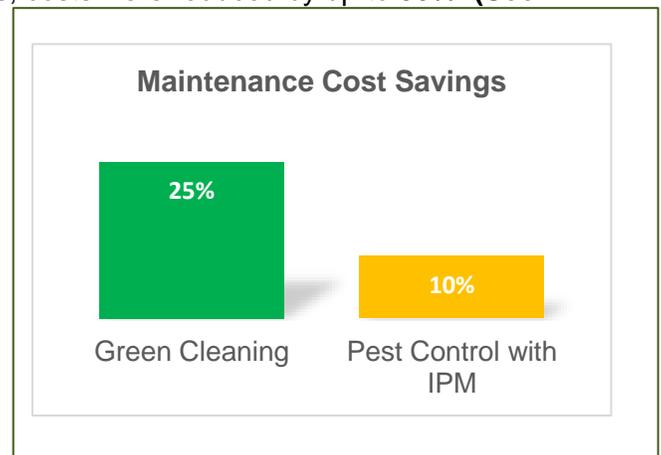


### Lower Maintenance Cost with Asthma Friendly Practices

After switching to green cleaning, one CDC partner reduced its cleaning costs by 25% on average across its portfolio. In several of its properties, costs were reduced by up to 50%. (See [TSG Green Cleaning Case Study](#))

Pest control costs declined by 10% after transitioning to IPM in one property that tracked cost savings.

Owners anticipated reductions in unit turnover costs after implementing smoke free housing policies. Such turnover costs could decline by an estimated \$500-\$1500 per smoking unit, because apartments may no longer require added cleaning, priming before painting, or replacement of smoke or burn damaged flooring or appliances. (See [TSG Smoke Free Case study](#))



## FEWER ASTHMA RISKS AND IMPROVED RESIDENT HEALTH

The below results reflect activities for the 2013 and 2014-15 TSG partners.

**Fewer Asthma or Respiratory Risks** 1 in 8 adults in NYC report having had asthma during their lifetime. Asthma is the leading cause of hospitalization for NYC children ages 1-4 and 5-9 years. Asthma rates are twice as high among children living in the poorest NYC neighborhoods compared with children living in the wealthiest NYC neighborhoods.

Numerous studies have demonstrated that reducing exposures to pests (especially cockroaches), tobacco smoke, and moisture makes it less likely that tenants will experience asthma attacks.<sup>1</sup>

*“We are confident that buildings with fewer pests, tobacco smoke, and moisture problems are healthier, particularly for those with asthma and allergies. Our site visits documented substantial reductions in housing conditions conducive to pests, a key asthma trigger, in TSG sites where owners used robust IPM practices”* explained Deborah Nagin, DOH.

Two Shades work between 2013-15 helped

- ✓ 2,885 residents live with fewer pests
- ✓ 1,100 residents live in smoke free homes
- ✓ 2,275 residents live in housing with healthy cleaning practices

**Fewer Pest Problems** All participating buildings transitioned to use IPM, improving pest management practices and reducing pests.

**Less Exposure to Tobacco Smoke** 280 apartments in 16 buildings became smoke free, reducing asthma risks and exposures for families that can also result in: cancer, cardiovascular risks, and Sudden Infant Death Syndrome (SIDs). Based on their TSG experience, one CDC chose to adopt smoke free policies across its entire portfolio. Other owners are also working to move towards smoke free portfolios.

**Less Exposure to Harsh Cleaning Products** 16 TSG buildings transitioned to green cleaning products and one CDC transitioned its full portfolio to green products, reducing asthma triggers.

Switching to greener, less toxic cleaning products made it easier for me to breathe in my apartment. *Building Super, St. Nicks Alliance*

**Greater Resident Engagement** Owners held health and wellness fairs, tenant meetings on smoke free housing and green cleaning, and worked with residents to help control asthma triggers and improve wellness.

**Better Overall Resident Health:** In a building with TSG-supported renovations, including energy and water upgrades, smoke free housing and IPM practices, the percentage of residents who rated their health as good to excellent increased from 62% before the renovation to 88% after the renovation.

Enhanced staff capacity on green and healthy practices

**Owners embraced benchmarking to track energy and water use and costs.** Owners used WegoWise software as a tool to better understand building performance.

**Benchmarking informed a broader portfolio analysis to identify high energy and water use and improve property management.** For example, benchmarking data showed high water use in one property, prompting a tenant outreach plan and aggressive apartment inspection and repair strategy focusing on water waste and leaks. After working with TSG, 30% of owners chose to expand their benchmarking to their full portfolios, adding 130 buildings and approximately 4,500 apartments.

**TSG supported improvements in maintenance practices around green cleaning and pest control.**

The transition to green cleaning identified opportunities to reduce toxins and save money through more efficient portfolio bulk purchasing. Green cleaning vendors modified cleaning protocols to be more effective, using fewer products with better results.

We took a hard look at our pest control services and now ask more from our contractor.

*Derrick Lovett, President/CEO,  
MBD Community Housing Corp.*

The transition from traditional pest control services to IPM offered building owners an opportunity to get ahead of pest problems instead of addressing the pests once they are on the property, which can help owners save money. Owners also used the [NYC IPM Tool Kit](#) to incorporate pest exclusion and trash management strategies into renovation projects to help prevent pest infestation. For example, one owner included IPM pest exclusion strategies such as adding diatomaceous earth to wall voids and sealing penetrations to help “pest proof” the property during a renovation.

**Green cleaning and IPM training help staff embrace new approaches** to building maintenance. Green cleaning training provided useful information explaining the benefits of the new products, protocols for preparation and cleaning, and the myths and realities of green products. Post implementation staff surveys documented that employees recognized that green cleaning products could reduce respiratory and skin irritation, created fewer environmental risks, and are typically more cost-effective than traditional cleaning products. Building owners confronted pre-existing misperceptions of green cleaning products. In one case, residents and senior property management staff felt the new products did not “smell clean” and questioned if they were working. After outreach, training, and an in-house test comparing areas cleaned with the new green products versus traditional products, both staff and residents recognized that the green products were effective and healthier for all involved. (See [Green Cleaning Case study](#))

The green products clean better and tenants are happier.

*Training attendee*

Working with the DOH, owners learned more about IPM strategies, calibrating their expectations for effective service and aligning pest and maintenance activities. One important change was a greater understanding among maintenance staff about their role in sealing up holes to prevent

pest entry and the importance of trash management. In one property, a breezeway was installed to help tenants take their trash out in bad weather, rather than leaving in the hallway of the building.

Controlling pests, which trigger asthma attacks, is a priority. We have changed our pest contracts and policies to get better services from our pest vendor and are seeing fewer pest problems. Residents feel the difference.  
*Nellie Plumey, Director of Operations, Hope Community*

## STRATEGIES TO SUSTAIN TWO SHADES OF GREEN HEALTHY AND GREEN PRACTICES

TSG partners and owners identified lessons that could help to bring this work to scale.

### Building Owners

1. **Focus on rehab opportunities to introduce new practices; owners can then bring such changes to the larger portfolio.** Rehabilitation is a significant opportunity to undertake physical improvements and changes in management practices – e.g., IPM, green cleaning, smoke free housing.
2. **Support dedicated staff time for green and healthy practices, which can yield substantial benefits in both early experimentation and sustainable adoption.** There is a greater likelihood of success when owners have dedicated staff available to coordinate and promote these practices.
3. **Review pest and cleaning contracts and practices annually with vendors and all staff involved to ensure that everyone understand expectations and responsibilities.** Having longstanding contracts without reevaluation can lead to missed opportunities to identify and adopt green and healthy practices. Encourage close working relationships among vendors and maintenance staff to help facilitate implementation of vendor suggestions to improve building maintenance outside of their scope of work.
4. **Embrace impactful resident-led engagement strategies to support the uptake of new practices.** Tenant outreach and resident driven engagement around green cleaning helped to ease the transition. Resident concerns over asthma created opportunities to engage owners on building maintenance practices that can reduce asthma risks (IPM, smoke free housing, green cleaning) and renovation opportunities to mitigate moisture and pest entry.

### Government

5. **Support benchmarking software to give owners an opportunity to test this new tool and adopt it portfolio wide.** Property specific experience with benchmarking software was positive and led 30% of owners to pay for such software for their entire portfolio.
6. **Pre-qualify green cleaning, IPM, and benchmarking vendors to facilitate adoption of new practices.** Owners had limited capacity to screen and select new contractors. Expertise offered by LISC and DOH was critical in locating qualified firms. For example, green cleaning implementation improved significantly after LISC selected Crown Janitorial to

provide such services. TSG worked with WegoWise to provide benchmarking software enabling owners to move forward without having to review other options. Although DOH provided detailed reviews of pest vendor contracts and scopes of work, the program could have benefited by selection of recommended IPM vendors.

7. **Offer resources and regulatory incentives to demonstrate innovative green and healthy building upgrades and management practices, which can then become sustainable.** One of TSG's goals is to create incentives and resources to integrate green and healthy upgrades during the time of affordable housing rehabilitation. In the process of developing and implementing TSG, it is apparent there are limited existing resources, policies, programs, and incentives available to incorporate health interventions, alongside energy and water retrofits with affordable housing financing programs, incentives and tools.
8. **Incorporate healthy housing principles into existing property assessment and management practices.** Opportunities exist to bring a health lens to existing practices such as Physical Needs Assessments, energy audits and annual inspections. The city and state of New York added health into their green physical needs assessment with assistance of LISC and the TSG program. The tool, Integrated Physical Needs Assessment is an effort to integrate the evaluation of energy efficiency, water conservation and health upgrade opportunities to the standard Property Needs Assessment process. Energy auditors and capital needs assessors attended TSG training and embraced the health perspective and felt they could easily include such observations and recommendations into their practice. Enhancing the capacity of the existing building workforce is a winning formula. Such trends are emerging nationally, with the Building Performance Institute's new Health Homes Evaluator credential for those already BPI certified for energy auditing.

### **Philanthropy and Intermediaries**

9. **Create communities of practice to facilitate peer learning and connections.** Owners valued the community of practice created by the TSG team, allowing them to learn from each other and share best practices.
10. **Work with city health and housing agencies to: secure sustainable policy and program changes, utilize government resources to support early experimentation among affordable housing owners, and develop enhanced evaluation tools to track health-related housing conditions.** Partnerships with City agencies and nonprofit organizations were key to TSG's success. Collaboration with the NYC's Housing and Preservation Department (HPD) enabled the TSG team to translate owner experiences into sustainable changes in city housing programs (e.g., HPD now requires DOH health training for owners, architects, and contractors receiving substantial rehabilitation funds). DOH's ability to provide owners assistance on IPM proved invaluable and support provided by NYC Smoke Free was critical as owners pursued such policies. The health evaluation protocols developed by DOH proved more challenging to implement than originally envisioned and new approaches to gather resident feedback or systematically document changes in housing-based asthma exposures across properties are needed.
11. **Explore new strategies to support healthy housing measures targeted to tenants with uncontrolled asthma who are impacted by housing related asthma triggers. Health care partners can play a key role in supporting such strategies.**

## ACKNOWLEDGEMENTS AND PARTNERS

We would like to acknowledge our generous funders who make our Two Shades of Green initiative possible: State Farm and Wells Fargo & Co.

Our Community Development Corporation (CDC) partners are essential to our TSG program's success. Over the past 40 years in partnership with LISC New York City, CDCs have developed and preserved over 40,000 affordable homes and apartments. CDCs also serve as a vital link between low- and middle-income families and critical services that improve the health, safety and quality of life for New York City residents.

Our CDC partners for TSG are: Bridge Street Development Corporation, Banana Kelly Community Improvement Association Inc., Cypress Hills Local Development Corporation, Belmont Arthur Avenue Local Development Corporation, Fifth Avenue Committee, Hope Community Inc., IMPACCT Brooklyn, MBD Community Housing Corporation, St. Nicks Alliance and West Side Federation for Senior and Supportive Housing.

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<sup>i</sup> Centers for Disease Control, 2010, CDC Task Force, Findings and Rationale Statements for Children and Adolescents with Asthma: Home-Based Multi-Trigger, Multicomponent Environmental Interventions, <http://www.thecommunityguide.org/asthma/rchildren.html>