Creation of an Energy Efficiency Program for Businesses

Int. 1515 Program Design

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Disclaimer

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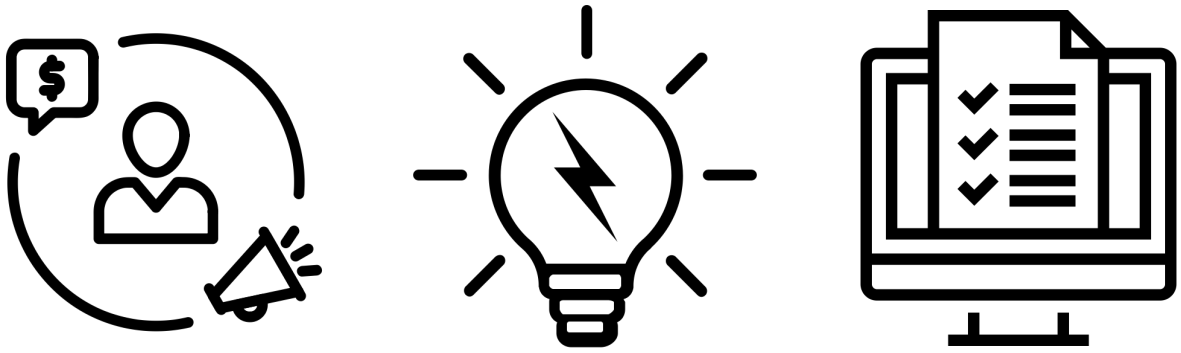
Executive Summary

New York City contributes to climate change as one of the largest municipal energy consumers in the world, in large part due to its aging infrastructure. Its geographic location leaves it vulnerable to the impacts of climate change, spurring local and state lawmakers to incentivize greenhouse gas reductions. If the city wishes to meet the emissions goals outlined in local, state, and international reduction agreements, significant efforts must be made to engage all building owners in energy efficiency campaigns. Int. 1515 proposes to engage a particularly difficult to reach constituency of small business owners by allowing them to apply incurred civil code violations towards energy efficiency measures. Our team conducted a management simulation to describe and analyze the feasibility of the proposed measure.



Int. 1515 helps achieve goals of the environmental protection and relief from civil fines for small businesses The legislation allows business owners to apply up to $3,000 annually in civil code fines toward energy efficiency measures approved by the Mayor or designated office. The legislation will likely attract small business owners as the set fine amount that can be applied is low and provides more of an incentive for engagement than it would for larger companies. These small business owners must interact with the city when fines are incurred, giving the government an opportunity to introduce owners to Int. 1515 and the monetary savings that accompany energy efficiency.

Our management simulation proposes that the Department of Small Business Services (SBS) will implement Int. 1515 given their staffing and operational requirements, and departmental goals. Due to this department's expertise in working with small businesses, the appointment of SBS will minimize organizational disruption and cost for both the program and

implementing agency. To staff the program, four new employees, an Operating Officer, Monitoring and Compliance Officer and two inspectors, will be hired. The remaining work will be distributed amongst current SBS positions.

The legislation execution is divided into four stages: awareness, execution, enforcement and evaluation. Awareness comprises of adding the program details on the back of the physical ticket business owners receive and on the online fine payment portal, as well as educating the courts of this program. A program website will provide business owners details such as eligibility, potential energy efficiency measures, and how to schedule an inspection. Initial inspections will be completed for fines over $500 with the goal of advising owners on the ideal energy efficiency measure for their building and within the incurred fine amount. Program participants are subject to a random post-inspection to ensure compliance of the energy efficiency measure. Data such as number of participating businesses, common efficiency measures implemented and rate of compliance will be collected throughout the process and evaluated to ensure optimal program execution. The estimated cost of the new employees and the first year of execution is estimated to cost approximately $600,000.

The hands-on approach proposed for implementing Int. 1515 removes the time and capital investment required from the business owners to start energy efficiency measures and places it on the government. We hope this will make the program attractive to business owners. Though Int. 1515 represents a small piece of New York City's budget and sustainability planning, it will help increase the city's energy resiliency.

1. Introduction

1.1 The Problem with High Energy Use

High energy use creates myriad problems for society - from local issues like air pollution and high electricity bills, to global problems like climate change. New Yorker City residents have already felt the effects of these problems, notably the increased severity of Superstorm Sandy, partially fed by rising and warming seas associated with climate change. Changes in the Earth's climate are already affecting New York City and New York State. Particularly vulnerable are the low-lying areas of the city of New York, the most populous metropolitan region in the United States.[1] Since the 1900s, the rate of sea level rise on New York's coast was more than double the rate experienced by the rest of the world.[2] Eroded beaches, increased coastal flooding, and permanent submersion of low lying areas are all consequences of higher water levels.[3] These changes in sea level are in part a result of an increased use of greenhouse gases (GHG), such as carbon dioxide and methane. Atmospheric carbon dioxide levels have increased by 40% since the late 1700s due to anthropogenic activities, including the burning of fossil fuels.[4] These fossil fuels require energy intensive extraction processes, which, in addition to the burning the fuel, releases significant amounts of GHGs.[5] The efficiency of processing and burning each fossil fuel varies, with coal significantly less efficient than natural gas, the source of 44% for New York City's energy.[6] However, natural gas produces high levels of carbon dioxide, unlike clean energy sources such as wind and solar energy, that produce no emissions.[7]

While the majority of GHG emissions in U.S. cities originate from the transportation sector, buildings emitted 73% of New York City's GHG emissions in 2014.[8] New York City's large stock of older buildings, among other factors, exacerbates the amount of GHG emissions buildings produced due to their relatively low energy efficiency, and energy efficiency is a term defined as the ability to use less energy to provide the same service or product. This scenario is corroborated by the Environmental Protection Agency, which reports that as much as 30% of the energy utilized in city buildings is wasted due to insufficient insulation, shoddy mechanical design, or poor consumer habits. The past two decades brought a surge in energy efficient technology development, which made this technology cheaper and more accessible to the general public. However, despite New York City's aim to reduce city emissions by

2050, only a fraction of small businesses have taken steps to improve the energy efficiency of their operations.

The combination of rising electricity prices and a recovering economy led small business owners in New York City to cite energy costs as their highest monetary concern.[9] Even with this financial pressure, few small businesses have taken advantage of state or private energy efficiency programs, suggesting a need to enhance the current approach. The time and cost required by business owners to seek out, evaluate, and adopt efficiency measures deterred their adoption. Moreover, competing priorities when running businesses and the high upfront costs efficiency measures require are additional barriers to adopting energy efficient technology.[10]

1.2 Solutions to the Problem

Government action is needed to encourage small business owners to capitalize on the benefits of implementing energy efficiency measures and contribute to GHG reductions in New York City buildings. Int. 1515, aims to overcome these barriers, through a penalty mitigation program focusing on energy efficiency. The proposed law incentivizes small businesses to adopt energy efficiency measures as an alternative to paying civil code violations incurred during the course of the year. Subsequently, as business owners experience cost savings from implementing energy efficiency measures, we believe they are most likely to adopt additional energy saving measures. Through Int. 1515, New York City aims to expand existing energy efficiency programs to include small businesses typically not targeted by ongoing energy efficiency measures designed for large corporate customers or landlords of entire buildings. After hearing concerns from a set of small manufacturers and business owners in his constituency of Queens where people felt burdened with trivial fines, Council Member Grodenchik proposed this bill as a measure to reduce fine burdens and bring energy savings to New York City's small businesses.[11]

1.3 Current Political Climate

Int. 1515 serves numerous aligned interests from various parties, including small business associations and Mayor de Blasio's overarching sustainability goals. Section 1.3 seeks to further understand the political background and climate during the legislation's proposal.

1.3.1 Why Address Energy Use through Civil Penalty Mitigation?

Int. 1515 incorporates two legislative trends in New York City - civil penalty mitigation for businesses and reduction of the city's climate change impact. This section illustrates how these trends relate to the significance of Int. 1515 and the political climate it is being introduced in.

The Importance of Creating a Business Friendly Environment

Council Member Grodenchik was elected to represent District 23 in Queens, NY, on November 24, 2015, after a competitive primary race. Grodenchik represents one of the city's most ethnically and economically diverse neighborhoods,[12] only 33% of the district's households have incomes over $100,000.[13] One item on Council Member Grodenchik's agenda is to alleviate burdens for small business owners. Similarly, Mayor de Blasio has been placing small businesses at the forefront of his administration's priorities, declaring them "the heart" of the New York City economy.[14] This year, Mayor de Blasio's Office along with the NYC Department of Small Business Services assisted small businesses to employ more than half of New York City's private sector workforce.[15] A recent progress report announced a 40% reduction in fines received by small businesses since Mayor de Blasio took office in 2014. Thus, these developments align Int. 1515 with the overall goals for the city.

NYC Priorities in Tackling Climate Change Issues

The government of New York City estimates its population will grow to 9 million residents by 2040.[16] This presents immense social, economic, and environmental challenges that are currently being addressed by the Mayor's Office. Mayor de Blasio takes a strong stance on battling climate change and filling the federal void of U.S. climate change legislation, stating, "New York City is showing what cities around the world can do to reduce greenhouse gas emissions and combat the effects climate change head-on".[17] He supported this statement by earmarking billions of dollars from the city budget to support human resources and making sustainability a cornerstone of his administration. Various programs implemented by the Mayor's Office are discussed further in Section 1.4 "Related Programs and Policies".

1.3.2. What Changes are Needed in Order to Enact Int. 1515?

The Bill's Top Supporters and Opponents

One of the strong proponents of Int. 1515 is the Small Business Committee. Both Council Member Grodenchik and the Small Business Committee share the desire to reduce the burden of city agencies fines on small businesses. Additionally, Int. 1515 aligns with Mayor de Blasio's OneNYC., developing similar energy efficiency programs for small businesses. The Brooklyn Chamber of Commerce also provided support for Int. 1515 due to its benefits for small businesses. According to the Small Business Committee's council minutes on April 24, 2017, a representative of the Brooklyn Chamber Commerce stated that the legislation can create long-term energy savings and "create cooperative social responsibility".[18]

The Mayor's Office of Sustainability and New York City Department of Consumer Affairs (DCA) support the idea of energy efficiency improvements in buildings, but not through Int. 1515. The Mayor's Office of Sustainability is concerned that Int. 1515 could prove redundant to its own retrofit program. Despite the DCA supporting the overarching mission of the Small Business Committee to attend to the needs of small businesses and lessen their regulatory burdens, they have a number of concerns with Int. 1515. In particular, they believe Int. 1515 may result in the following unintended consequences:[19]

1. **Undermine Consumer Protection**. Penalty mitigation might undermine important consumer and worker protection laws and diminish the DCA's ability to effectively enforce these laws. The concern is that by allowing business owners to use the fines towards investments in their business, it downplays the seriousness of the violation and acts like a reward. This could weaken many key protections previously passed by the city council.
2. **Burdensome Process**. The Cure Law by the NYC Department of Consumers Affairs is Local Law 153 of 2013 that gives businesses the opportunity to cure first-time, signage-related violations.[20] The proposed penalty mitigation program could be more burdensome than the existing processes through the Cure Laws. Under the Cure Laws, the process is relatively simple: after receiving a curable violation, a business owner signs a letter stating that they will fix the violation within 30 days. They are then relieved from the incurred fine if this is the first time they have received that violation. This process has a high success rate with 92% of re-inspections showing compliance. In contrast, the DCA fears the penalty mitigation

program proposed by the package, which includes Int. 1515, would be difficult for small business owners to navigate.

3. **Increased Cost**. Businesses would be required to make capital improvements to demonstrate compliance, which would likely cost them far more than paying fines ranging from $25-250. This may lead to low participation rates and ultimately, undermine the program.
4. **Future Consequences**. Finally, businesses would be subject to future inspection, a situation most business owners would prefer to avoid. Therefore, paying a fine may be preferred to lingering inspections and associated fines for non-compliance.

Since the legislation's introduction in March, the bill has not been raised for consideration by the City Council.[21] However, Council Member Grodenchik's office has stated that they will re-introduce the bill at the start of the new legislative term on January 1, 2018 if it is not passed prior to the end of 2017.[22]

It is clear that in order for the bill to be enacted, Int. 1515 has to be considered a unique program instead of a redundant one. Thus, current opponents of the bill will have to be convinced that the funding and staff required to carry out this program is a good investment. If these issues can be addressed by the program's design, Int. 1515 would gain broader support and be more likely to be enacted to serve small business owners.

1.4 Related Municipal State Programs

Just as Int. 1515 does not exist in a political vacuum, many programs exist at the municipal and state level to move New York to a less energy intensive future. The following two sections summarizes actual ongoing programs and policies in New York State addressing sustainability and energy efficiency as well as how they relate to Int. 1515.

1.4.1 Overarching Sustainability Programs

OneNYC and Mayor de Blasio's 80 x 50 Objective for the New York City

OneNYC is an extensive program established in 2007 to address New York City's long-term challenges: the forecast of 9 million residents by 2040, a changing climate, an evolving economy, and aging infrastructure. The Mayor's Office of Sustainability is responsible for the

program's development and now shares responsibility with the Mayor's Office of Recovery and Resiliency to oversee its implementation.[23] One of the visions of OneNYC is to make New York City more sustainable through pursuing the following initiatives: improved air quality and water management, "zero" waste, and the 80 x 50 GHG reduction. Mayor de Blasio's 80 x 50 objective aims for an 80% reduction in greenhouse gas emissions from 2005 levels by 2050. By encouraging small businesses to adopt energy efficiency measures, Int. 1515 complements New York City's larger plan to decrease greenhouse gas emissions and contribute to reducing climate change impacts through long-term behavioral changes.[24]

New York State's Reforming the Energy Vision

"Reforming the Energy Vision" (REV), is a comprehensive New York State program introduced in 2015 by New York's Governor Andrew Cuomo. REV targets private sector markets to stimulate economic growth in communities across the state while protecting the environment and reducing New York's carbon footprint.[25] REV utilizes New York's energy plan as a comprehensive roadmap that coordinates every authority and agency involved in energy measures to advance the REV agenda.[26] The New York energy plan consists of policy recommendations and analyses to guide the state in implementing new energy technology and promoting the growth of a clean, innovative technology.[27] REV is centered around three strategic pillars to execute the clean energy objectives:[28]

1. The Public Service (PSC), Reforming the Energy Vision Regulatory Docket
2. New York State Energy Research and Development Authority (NYSERDA), Clean Energy Fund
3. New York Power Authority (NYPA), Investments in Innovative Solutions

The first pillar is responsible for transitioning clean energy to the core of investor utilities' business models and giving investors new opportunities for energy savings.[29] This is what Int. 1515 is trying to accomplish by bringing new energy-saving technology to communities that may take longer to enter the energy efficiency market. The second and third pillars use initiatives, such as NYSERDA's Small Commercial Energy Efficiency Program and NYPA's Energy Project Financing Program to provide low-interest loan options to help small businesses finance energy efficiency projects.[30] Since Int. 1515 does not involve discussions of financing options and tools for adopting energy efficiency measures, low-interest loan

options provided by these programs could potentially increase opportunities for small businesses to adopt energy efficiency measures along with the program of Int. 1515 as well.

1.4.2 Competing and Complementary Energy Efficiency Programs

Int. 1515 is not the only proposed program for addressing energy efficiency. The following programs listed below have already been established to either reduce the burden of small businesses or assist small businesses in adopting energy efficient products:

NYC Department of Consumer Affairs (DCA) Small Business Relief Package

To achieve Mayor de Blasio's goal of reducing fines on small businesses, the DCA announced a Small Business Relief Package of two dozen reforms in July 2014.[31] The purpose of these reforms is to reduce the number and cost of violations for small businesses and expand outreach and education. While past fines have ranged from $1,000 to $10,000, these reforms include fines between $250 to $1,200.[32]

Mayor's Office of Operations and the Department of Small Business Services' Small Business First Initiative

In July 2014, Mayor de Blasio launched the Small Business First Initiative, with the Department of Small Business Services (SBS) and numerous other City agencies. Mayor de Blasio aimed to use this initiative as an opportunity for New York City to work closely with small business owners, advocates, neighborhood and community leaders, and elected officials. The initiative includes 30 specific and ambitious goals, which include proactive support for businesses needing education, one-stop hearing centers for business regulatory issues, improved coordination between the Department of Buildings and the Fire Department, and information updates in various languages.[33]

The Energy Star Program for Small Business

In 1992, the U.S. Environmental Protection Agency developed the Energy Star Program to provide a unified standard for identifying energy-efficient products. This voluntary labeling program is now universal and is estimated to have saved 2.5 billion tons of CO_2 emission since 1992.[34] Small businesses can join the Energy Star Small Business Network, which allows access to various tools and resources, including Energy Star Portfolio Manager, and the EPA's

online energy and water tracking tools.[35] These tools allow small business owners to measure and assess current energy performance, and list energy efficiency professionals to contact.

Some of these programs mentioned above could render Int. 1515 redundant and make implementation difficult, while others serve to complement the bill, such as the Energy Star Program. Furthermore, reducing these points of redundancies in Int. 1515 is a necessary step for the bill to become an effective program.

2. Program Design

Stepping back into the management simulation, the remainder of our analysis focuses on developing and operationalizing a program design that meets the goals of Int. 1515.

2.1 What are the Goals of this Program?

As stated previously , Int. 1515 focuses on increasing energy efficiency, particularly in small businesses, to contribute to the long term goal of GHG emission reduction in New York City. It aims to promote awareness of energy efficiency measures to a constituency that may have limited knowledge on the matter. This will facilitate communication concerning energy efficiency, not only for participating small business owners themselves, but to those that they interact with regularly. Therefore, our team proposes an implementation plan that will:

- Ensure small businesses as well as pertinent agencies engage in the program
- Execute the activities of the program effectively and efficiently
- Streamline evaluations so data collected by the program is properly analyzed and used iteratively.

2.2 What Energy Efficiency Measures are Included?

Int. 1515 allows businesses to apply accumulated civil fines of up to $3000 toward energy efficiency measures. This program is voluntary and if a business accumulates fines over $3000, they must pay the difference to the city.[36] If the business owner wishes to participate in the program, the legislation outlines possible measures that can be implemented.

Energy efficiency measures as described by the bill include:

- Building envelope improvements
- Lighting upgrades
- Energy efficient office equipment
- Energy efficient appliances
- Energy efficient refrigerated display case curtains or doors
- Double or triple pane windows
- Programmable thermostats
- For buildings that do not exceed 25,000 gross square feet: benchmarking, undergoing energy audits, and undertaking retro-commissioning measures

Energy efficiency measures not listed above, must be approved by the Mayor's Office or the offices or agencies designated by the Mayor upon the bill passing. The violations eligible for participation will be classified by the Department of Small Business Services (SBS), Sanitation (DSNY), Fire (FDNY), Health and Mental Hygiene (DOHMH), and Consumer Affairs (DCA). Business owners remain responsible for correcting all violations of the city's code and the process for doing so is a standard throughout the city.

2.3 How Should this Program be Implemented?

The program design our team created in this simulation acknowledges that Int. 1515 focuses on constituents unlikely to engage in energy efficiency activities without support from an external group.[37] Therefore, the design requires the municipal government to proactively support businesses in pursuing energy efficiency measures and technology. At all stages of the program, measures are in place to minimize the burden on business owners while meeting the legislative objectives. As such, our program implementation consists of four key stages: Awareness, Execution, Enforcement, and Evaluation for which brief outlines of each one are provided below:

1. **Awareness.** The first step would be to inform the potential participant about the program. This requires incorporation of program name and information onto the physical ticket received by businesses. Additionally, program staff must make courts reviewing these cases aware of the program. Outreach will be maximized via a website and inquiry center.

2. **Execution.** During this stage, the eligible business would apply to the program, purchase and install the energy efficiency measures selected. To facilitate this process, all steps will include governmental guidance, from being notified of the fine to assessing and buying the appropriate technology. Assistance could take the forms of a complementary assessment to help the business identify the most pertinent energy efficiency investment or through call center support. An online database of local energy efficient technologies vendors will be developed as well.
3. **Enforcement.** In order to ensure energy efficiency measures are being installed as required, the program will conduct random inspections on a select percentage of businesses following the installation of equipment. Additionally, receipt verification will be an ongoing strategy for verifying compliance of all participants.
4. **Evaluation.** An ongoing process of evaluation will be undertaken to track performance and effectiveness. Set measurements will define which performance information is relevant and should be collected in order to accurately report and analyze collected data.

3. Program Implementation

3.1 Who will Implement the Program?

Once Int. 1515 passes into local law, a department will be assigned to the program to develop the rules and regulations governing the legislation in question, and subsequently implement the program outlined in the bill.[38]

We evaluated the following three departments within the Office of the Deputy Mayor for Housing & Economic Development to determine the agency best equipped to implement the program:

1. Department of Consumer Affairs
2. Department of Housing Preservation and Development
3. Department of Small Business Services

The criteria developed utilized for the analysis included:

- Overall roles and responsibilities of the department

- Department divisions and their roles
- Organizational structure and staffing
- Current program and initiative portfolio

After careful evaluation of the three potential potential agencies, we determined that the Department of Small Business Services (SBS) would be the most suitable agency to house the program, given their staffing and operational structure and departmental goals. As an agency, SBS aims to build stronger business communities and improve commercial corridors through its five divisions: Business Services, Economic and Financial Opportunity, Neighborhood Development, Financial Management and Administration, and Workforce Development.[39] In addition, the staffing structure of the SBS includes the majority of professional positions needed for program implementation. The suggested staffing plan, which includes existing positions and new staff will be expanded upon in the next section (Section 3.2). The agency focuses on helping small businesses access capital for company improvement, as well as ensuring government efficiency in dealing with small businesses.

3.2 How Should the Program be Staffed?

With the SBS as the proposed implementing agency, the integration of the program into the agency is unlikely to cause disruption in its current organizational structure. Since the elements of the program require a number of key functions such as project planning and management, monitoring and evaluation, financial management, IT management, and procurement, its placement within SBS means that the agency's human resources can be leveraged to ensure the successful implementation of the program.

Based on the current SBS organizational structure and the program's goals, we recommend staffing the program with the following key positions:

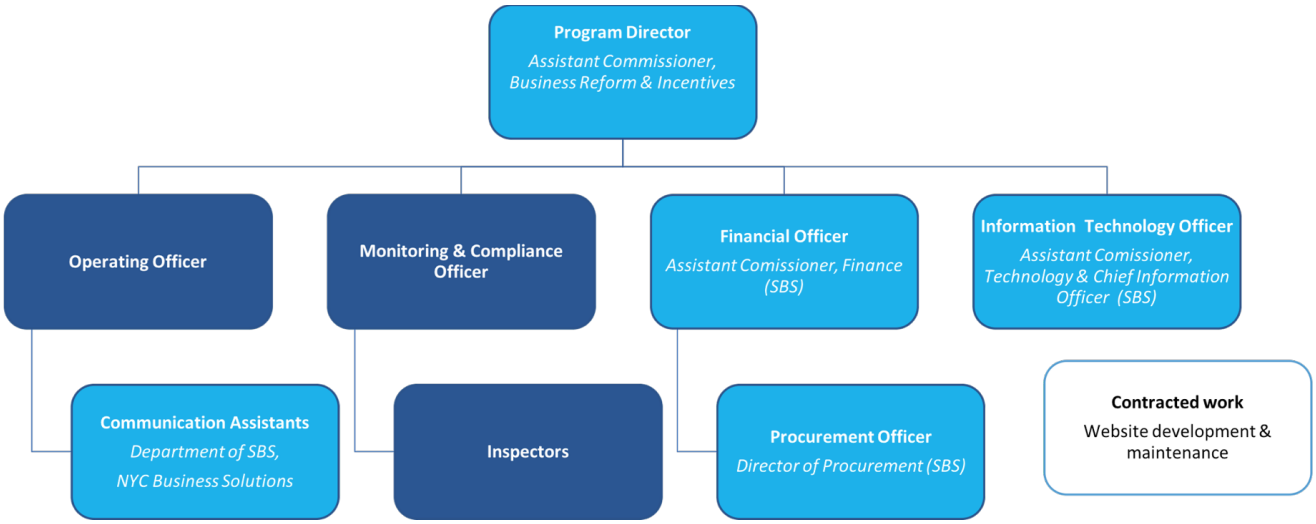


Figure 1. *Proposed implementation team of Int. 1515, including new positions (in dark blue) and the existing agency staff (in light blue), as well as the externally-recruited consultant (in white).*

The proposed organizational structure shows that more than half of the required staff already have positions in the SBS. Two new full-time positions, the Operating Officer and the Monitoring & Compliance Officer, would need to be created and hired for the program. Both are core functions that require a unique skill set, encompassing knowledge of business regulation, public program management, and energy efficiency, to manage the program's daily operations. The other supporting roles already exist within SBS. Detailed descriptions of the positions can be found below.

Core Staff Positions

1. **Program Director** will oversee the planning, implementation and ongoing evaluation of the program. To ensure continuity, the Director will oversee the development of a detailed implementation work plan for the program and subsequently lead its implementation. The Program Director should have prior knowledge of the program area, as well as the internal structure of the New York City authorities. This position can be carried out by the *Assistant Commissioner of Business Reform and Incentives.*
2. **Operating Officer** will process applications of businesses that want to participate in the program, determine their eligibility and accompany them in the process. The Officer will also oversee the online vendor database and will be responsible for developing a program awareness plan in consultation with the Program Director.

3. **Monitoring and Compliance Officer** will monitor and keep a record of program performance and identify any impediments to its successful implementation. The Officer will also ensure participating businesses are implementing energy efficiency measures correctly, by reviewing appropriate documentation and overseeing inspections.

Supporting Staff Positions

1. **Financial Officer** will oversee the program's budget and disbursement, and will ensure the fine conversion from government penalties into funds for the program. This role can be fulfilled by the *Assistant Commissioner of Finance* or one of SBS staff.
2. **Information Technology Officer** will oversee the technical side of the website and online vendor database development. The IT Officer will also provide ongoing technical maintenance and troubleshooting. This position would be best fit by the *Assistant Commissioner for Technology* or a member of his team.
3. **Procurement Officer** will oversee the procurement of a subcontractor for the development of the website and will also carry out a competitive bid to identify multiple suppliers of energy efficiency solutions for the online vendor database. This position should be carried out by the office of the *Procurement Director*.
4. **Communication Assistants** will answer initial phone and email inquiries from small businesses and raise awareness about the program though directives given by the Operating Officer. This role can be fulfilled by existing SBS personnel.
5. **Inspectors** conduct two inspections: 1) an initial inspection of the business to help select an ideal energy efficiency solution, and 2) a second "random" inspection of 5-10% of businesses to ensure compliance.

A contractor to ensure the timely development and seamless operation of the program's website will be recruited from the City Bidding List. A short-term, fixed price contract with a milestone-driven payment schedule will be chosen for website development while a more flexible long-term contract with a recurring variable fee will be chosen for website maintenance. Both the Procurement Officer and Operating Officer will oversee the bidding and contracting process.

Based on these recommendations, the reorganization required to implement the program will have a relatively minor impact on the department's daily operations. The proposed staffing

structure capitalizes on the existing competencies of the Department of Small Business Services, which makes it the most effective and cost-efficient means to implement Int. 1515.

3.3 How Should the Program Design be Operationalized?

3.3.1 Ensuring Public Awareness

This first step works to ensure the incorporation of program information into the existing fine payment system. For paper citations served by city officials to business owners, the typical choices for fine resolution are: (1) Pay by Mail, (2) Pay Online, and (3) Dispute a Fine. A fourth option, Energy Efficiency Option, would be added under the existing options with two subcategories: "Learn More Online" and "Contact with Questions." Selecting the "Learn More Online" option links the business owner to the Small Business First Department online portal. This system allows people to access information and conduct transactions related to their fines. Expanding upon an already established website will make accessing information about this new program as smooth as possible for business owners who are already familiar with the City's online fine payment system.

The "Contact with Questions" option provides business owners with the phone number of the SBS. Once contacted, a city official will describe the program and assist with transitions to the execution stage. The final element of this stage is for the SBS to work with New York city courts to ensure judges provide basic information about the Energy Efficiency Option to business owners who are looking to dispute their fine. At a minimum, judges should know that the program exists and the court should provide owners with the required next steps.

3.3.2 Executing Program Activities

To effectively execute the program, two inspectors will be hired and they will visit participating businesses to evaluate their needs and capabilities. During the inspection, the inspector will suggest replacements or upgrades (equivalent to their fine amount) that will maximize energy savings. The business owner has the option to accept these suggestions or to work with the inspector to find the best option if the initial suggestion is not chosen. The inspector would input the selected technologies into an electronic database that will be accessed by the inspector's tablet. The business owner can look through the inspector's

selections and select one or more to use in their business. The owner can decide to purchase while the inspector is still on site, or, if they would like time to review their options, they can purchase equipment after the inspection. In this case, they would log into the online vendor database to make their purchase on their own within 30 days. A receipt of the purchase must be sent to the program to confirm purchase if it is not done with the inspector present. When received by the program, a staff member will input both the equipment replaced and the equipment bought. This data will also be linked to business owner's account number and total expenses for the business automatically calculated.

Pre- and Post-installation inspection visits are conducted only for businesses applying more than $500 of fines towards energy efficiency measures as they will require more assistance identifying and selecting the best energy efficiency technology. Businesses applying less than $500 in civil fines will be able to visit the electronic database of potential technology but will choose what they think is the best product for their businesses. Similarly, they will be required to send receipts to the program for verification and linkage to their account number, but are not required to have a post-installation inspection.

3.3.3 Enforcing Compliance

The enforcement stage includes a random post-installation inspection for up to 10% of all the participating businesses regardless of the amount applied towards energy efficiency measures. During the inspection, a city representative will tour the business at a time scheduled by the city with the owner. If there is a discrepancy, the owner will have between 30 and 60 days to correct it, at which time an inspector will return and re-evaluate. If the discrepancy is not corrected, the owner must pay double the amount of the aggregate fines. The inspector will also ensure measures are installed properly. If they are not, the inspector will assist as able or arrange for a technical representative visit. When a proper installation is verified, the inspector will provide the owner with a placard

Figure 2. *A business displays its Department of Health sanitation rating. A similar placard would be given to businesses participating in Int. 1515.*

displaying "Energy Efficiency Program Participant" to display prominently in her business. The idea of this placard is similar to the restaurant grades received by restaurants from the Department of Health (*Figure 2*).

3.3.4 Evaluating the Program Design

In order to measure the success of Int. 1515, the initial year of operations will focus on data collection. As this is a pilot program, no similar programs exist that would allow us to derive benchmarks and associated levels of success. There are no initial targets set to measure performance, with the exception of post-inspections defined under the enforcement section. The first year of the program will be an iterative process of measurement, data collection, reporting, and feedback. Additionally, the performance information is defined as relevant under the measurement portion. This step will also define what data should be collected about the inputs, processes, and impacts of the program. The collection stage specifies the methods by which this information is collected, focusing who collects the information, how it is collected, and its frequency, storage, and retrieval. The reporting component defines how the performance measures are presented, to who, and in what form.

The entire evaluation process is outlined in Section 4, Measuring the Success of the Program.

3.4 How Much will the Program Cost?

The program will require funding for the creation of the two new core management positions, recruitment of two inspectors, and for contracting the program's website. Given the specialist nature of these roles, costs incurred may be significant. Nevertheless, the proposed staffing structure in Section 3.2 capitalizes on the existing competencies of the Department of Small Business Services, making it the most efficient and cost-effective to successfully carry out Int. 1515.

The budget overview below includes the cost incurred, for each section listed in the chart, during the first year of the program (*A full budget is detailed in Appendix A: Line-item Budget*):

Expenses	
Personnel + Benefits	**$ 416,699.00**

Expenses	
Training	$ 5,000.00
Contractor	$ 42,400.00
Vehicles	$ 70,040
Equipment	$ 13,742.00
Contingency Fund	$ 45,657
Total Program Costs	$ 593,538

In determining how to allocate funds for the program and on a line-item basis, our team made the following assumptions:

1. Existing staff will receive no increase in salary. Existing salaries, including the time dedicated to this program, will be covered by their agency of employment.
2. Office space will be supplied in SBS offices.

An explanation for the expenses listed in each budget section is provided below.

Personnel

The program's personnel includes both core and supporting staff. For the program, three new permanent positions will be created, with suggested salaries based on the current New York City government pay scale, which is subject to change (*Appendix A: Salary Table NY-17*).[40] Inspectors will receive a $60,000 annual salary, while both the Operations Officer and the Monitoring and Compliance Officer will receive $62,400 annually. These salaries are prorated to reflect the hiring period which will reduce their employment by three months. Fringe benefits include the costs associated with hiring an employee that are not directly expressed in their salaries, such as a healthcare plan, pension plan, compensation, and vacation leave. These costs are expressed as a rate based on employee class and salary, and per the New York State Office of Comptroller Guide to Financial Operations for 2017-2018, the total fringe benefit rate used is 61.48%.[41]

Training

Both the core and supporting staff must be educated on the program, energy efficiency and

their role. This cost of training staff is expected to be minimal due to the availability of numerous training programs through the New York State Energy Research and Development Authority (NYSERDA), such as the Energy Codes Training and Support Initiatives,[42] as well as the Clean Energy Workforce Development program.[43] However, an amount of $5,000 has been allocated to accommodate internal training and capacity building for inspectors, as well as potential training opportunities to expand inspector skill sets.

Contractor

A subcontractor for the development and maintenance of the program's website will be selected on a competitive basis from the City Bidder's List.[44] The contract will involve two phases, which are website development and website maintenance:

1. **Website Development:** a short-term fixed-price contract will be signed with the subcontractor that offers to execute the predefined project at the lowest cost. For the purposes of the program's budget, this cost is estimated based on the average hourly rate of website developers in the Northeast ($100-$200).[45] The team is expected to include the following: one project lead ($175/h, 40 hours), a front-end developer and a back-end developer ($150/h, 140 hours), and possibly several other supporting developers and/or designers ($100/h, 40 hours). An additional $3,200 would be budgeted for overhead expenses, bringing the total cost of the contract to $35,200.
2. **Website Maintenance:** a longer-term retainer agreement would be signed with the same company to ensure seamless operation of the website throughout the duration of the program. The contract entails a minimum recurring monthly fee of $600, which would cover a limited number of hours that could be spent fixing technical issues and making minor updates. An hourly rate of $100 would apply if further maintenance is required, however, the total cost of maintenance due to technical problems would be capped at $5,000/year. Should the need arise, this extra cost will be financed by the contingency fund.

Vehicles

The two inspectors will require vehicles to easily access the locations of small businesses and to transport equipment, and it is the most effective to purchase two vehicles for usage. The vehicles will act as a benefit to the inspectors as they will remain in possession of the

inspectors during and after work. Thus, the inspectors will be held responsible for parking and looking after the vehicles. Additionally, as they will be working to promote an energy efficiency program, it is optimal to purchase two compact electric vans, and the best compact electric van to purchase is the Nissan e-NV200, which will soon be released in the U.S. at $35,000 per vehicle.[46] Furthermore, an annual inspection of each vehicle must be taken into account and according to the Department of Motor Vehicles in NYC, this will cost around $20 per van.[47]

Equipment

The inspectors will require equipment to carry out the pre-and post-retrofit inspection, and it includes both energy specific and general equipment. For instance, laptops included are laptop/tablet hybrids, which can be used both in the field and at the office. All equipment selected is based on recommendations by professionals in the energy retrofit field to best identify air gaps, moisture intrusion, and inefficient appliances (*See Appendix A for the full list of equipment*). The expenses listed utilized in the line-item budget are the average market price. By targeting these three issues that contribute to energy loss for a business, the inspectors will be able to make well-informed recommendations to small business owners and be able to verify successful equipment installation.

Contingency

Lastly, a contingency fund will be set aside for unforeseen program costs. The amount set aside in the budget is calculated using one month's worth of the total cost to run the program.

3.5 What is the Implementation Timeline?

Our team developed an implementation plan that delineates the tasks required during the first year of program operations. Created upon the goals and program design of Int. 1515, the implementation timeline, or master calendar, spans from January to December 2018 and includes tasks and subtasks in five required schedules of the program implementation process: Hiring, Training, Program Awareness and Campaigning, Inspection, and Website Development.

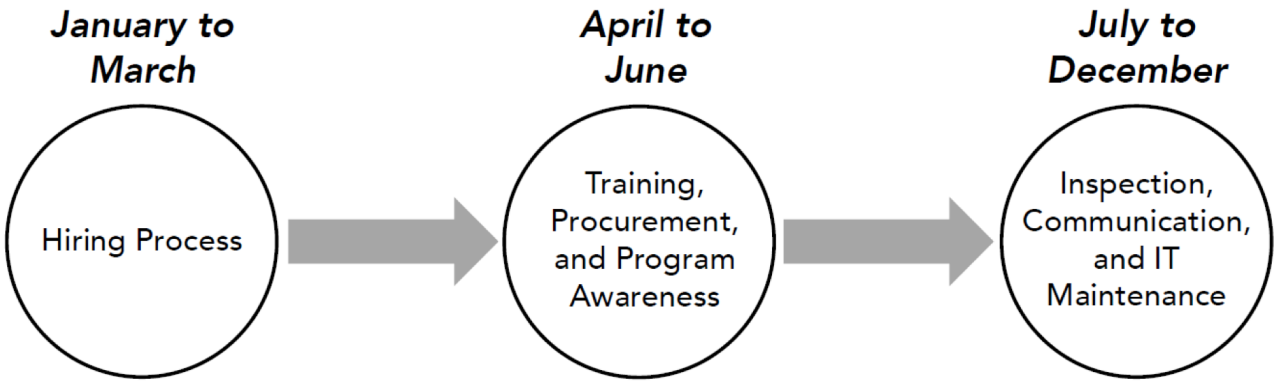


Figure 3. *Summary of Master Calendar: January to December 2018*

Overall, the master calendar can be summarized into three implementation steps. The first phase is hiring the following program staff positions: Operating Officer, Monitoring and Compliance Officer, and two Inspectors. This takes place from January to March. During the second phase, from April to June, these hired staff members will be trained and begin their duties to increase the program's awareness and to purchase equipment and vehicles necessary for inspection. For approximately two months, core staffs go through steps of proposals, evaluations, and contract negotiations in order to get approvals for attaining equipment and vehicles. In May, an IT contractor must also be procured so that the website development can be completed during the month of June. Finally, the last phase begins in July when the website is completed and business owners can start applying for the program. This phase continues for remaining six months of the year. During this stage, the program's website enters the maintenance phase, and inspectors can begin making site visits and inspections. All required steps for implementation can be found in *Appendix B: Master Calendar*.

4. Measuring the Success of the Program

A part of the evaluation stage of the program design, this proposed performance management system allows for ongoing monitoring of the program's efficiency, effectiveness, and impact on energy consumption while highlighting key areas for improvement in order to ensure long-term success.

4.1 How will Program Success be Measured?

Output measurements will gauge the success of Int. 1515 in meeting its goal of reducing energy consumption and overall GHG emissions. To measure output, the following indicators will be tracked:

1. The number of businesses participating;
2. Average amount of money spent per business;
3. Number of devices replaced, and;
4. Types of technologies and energy efficiency measures implemented

A final aspect of this measurement includes the overall effect of the bill on saving energy and reducing GHG emissions. To determine this, individual energy savings from each business will be extrapolated by recording the energy usage of new appliances installed as part of the program (in BTU or another metric) subtracted by energy usage of original appliance, where the difference equals energy saved. Additionally, total energy savings will be extrapolated by adding each participating business's energy savings together. If the same measures are adopted by multiple businesses, these energy savings can be multiplied by the number of participating businesses.

The process will be assessed by collecting feedback internally from small business owners involved and incorporating this feedback into future operations.

4.2 How will Data be Collected?

The collection process will gather information through a number of sources at different points of time during participation in the program. It will be collected on a quantitative and qualitative basis to further understand program engagement and participation. Quantitative data will be collected and compiled from sources such as unique webviews, online sign-ups for the programs by businesses, information on fine value, equipment replaced, and the total cost of new equipment.

Program inspections scheduled throughout the program allow for in-person data collection. After initial data is collected, the first in-person data will be collected during the pre-inspection appointment. During this meeting, the business owner will also answer a short questionnaire administered through the tablet, assessing general knowledge, awareness, and

comprehension of energy efficiency measures and implementation. The last collection stage takes place six months after implementation of energy efficient measures and participation in the program. During this stage, program participants will be prompted via text message and email to provide feedback on the program. This will be in the form of a post-survey that will ask business owners to rate the ease of the process on a scale of 1-5 as well as inspector helpfulness, competence, and responsiveness. The post-survey will re-ask general energy efficiency and conservation concepts to measure whether the program is successful in raising awareness for small businesses.

4.3 How will Progress be Reported?

Reporting of the program's progress is the responsibility of the inspectors, Operating Officer, MCO, and Program Director. The Operating Officer oversees business requests to participate in the program and is responsible for initially entering the name and ID number of each business into the performance database. The MCO is responsible for interpolating the energy savings and avoided greenhouse gas emissions based on the old technology vs. new technology for each business and creating and delivering a quarterly report of these savings along with performance management indicators listed below to the Program Director. Finally, the Program Director will disseminate the quarterly reports to the relevant entities such as the Mayor and PlaNYC.

The quarterly report presents the collected data described in the measurement and feedback sections and will include, but not limited to the following metrics:

1. Number of new businesses enrolling each month
2. Daily schedules of inspectors - specifically when schedules begin to reach capacity
3. Businesses that cannot schedule a pre-installation appointment within 30 days of enrollment due to high program enrollment/low staff capabilities
4. Number of businesses that schedule appointments but cancel them or are not available when inspectors arrive
5. Number of times inspectors are late to appointments
6. Individual and average time inspectors spend driving to each appointment
7. Percent of participating businesses that actually receive post-installation inspections (compared with 5-10% goal)

8. Number of participating businesses found delinquent during post-installation inspections, including nature of delinquencies
9. Number of businesses that fail to receive their orders, receive their orders late, or receive the wrong orders
10. Problems reported by inspectors regarding electric vehicle charging and range, and;
11. Number and nature of complaints and misunderstandings reported by businesses
12. Energy savings as calculated by the MCO based on old technology vs. new technology measures
13. Greenhouse gas emissions savings calculated from energy savings and energy source

4.4 How will Feedback Be Provided?

The data collected and reported on under the performance management system informs the Program Director and the Commissioner of the SBS of trends in enrollment, logistics, and compliance. The Program Director maintains continuous oversight and will make non-budget adjustments to the program as justified by the growing data pool. If budget-related adjustments are needed, the Program Director will make recommendations to the Mayor who makes all budget-related decisions. For example, data may show that inspectors are often late for appointments. If the Program Director determines inspectors are following their assigned procedures, scheduling, dispatch, or staffing changes may be required. If data shows enrollment well beyond the capacity of the initial staff and funding, the Program Director and Commissioner of SBS may recommend a program-wide expansion of services, likely requiring new or amended legislation.

5. Conclusion

This report reflects two semesters of broad and deep analysis, across multiple disciplines including environmental science, public policy, data analytics, finance, and personnel management. In order to address the issue of energy efficiency in New York City, the our team recommends the engagement of all citizens in energy efficiency measures, including hard-to-reach small businesses. Capitalizing on interactions with constituencies that do not usually communicate with the government should be prioritized and produced through new policies. Int. 1515 demonstrates an innovative way to create this connection with the 200,000

small businesses in New York City, many of which only interact with the government when they receive fines. The city must carry the burden of contacting these businesses through a hands-on approach, requiring the dedication of municipal labor and time. Despite the program's relatively small proposed budget, its implementation has potential to spur both monetary and energy savings for small businesses. With the implementation of this bill, business owners may also spread their new knowledge of energy efficiency to other companies and implement these measures in their homes, further decreasing New York City's total energy expenditure and moving it towards a more sustainable future.

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Appendices

Appendix A: Line-item Budget

This provides a breakdown of the program's expenses during the first year of operation.

Expenses			
	Full Time Annual Salary	**%FTE**	**Expense**
Personnel			
Operating Officer	62,400	0.75	$ 46,800
Monitoring and Compliance Officer	62,400	0.75	$ 46,800
Inspector 1	60,000	0.8	$ 48,000
Inspector 2	60,000	0.8	$ 48,000
Program Director	150,000	0.125	$ 18,750
Financial Officer	150,000	0.125	$ 18,750
Information Technology	150,000	0.125	$ 18,750
Procurement Officer	85,000	0.125	$ 10,625
Communication Assistant	42,000	0.0375	$ 1,575
		Total Personnel	$ 258,050
Fringe Benefits	**% of Salaries**		**Expense**
		0.6148	$ 158,649
		Total Personnel + Benefits	**$ 416,699.14**
Training Costs	**Expense**		
Inspector 1			$ 2,000
Inspector 2			$ 2,000
Internal training for other staff			$ 1,000
		Total Training	**$ 5,000.00**
Vehicles	**Unit Cost**	**Expense**	
Electric Compact Vans	$ 35,000		$ 70,000
Van Inspection	$ 20		$ 40

Expenses		
	Total Vehicle	**$ 70,040.00**
Equipment	**Unit Cost**	**Expense**
Laptops	$ 460	$ 920
Infrared Cameras	$ 500	$ 1,000
Blower Door Equipment	$ 3,000	$ 6,000
Pressure and Flow Gauge	$ 1,085	$ 2,170
Gas Leak Detector	$ 209	$ 418
Carbon Monoxide Detector	$ 450	$ 900
Combustion Analyzer	$ 575	$ 1,150
Flashlight	$ 15	$ 30
Ladder	$ 360	$ 720
Tape Measure	$ 17	$ 34
Moisture Meter	$ 200	$ 400
	Total Equipment	**$ 13,742.00**
	Total Direct Program Costs	**$ 547,881.14**
Contingency Fund		**$ 45, 656.76**
	TOTAL Program Budget	**$ 593,537.90**

Salary Table 2017-NY
Incorporating the 1% General Schedule Increase and Locality Payment of 31.22%
For the Locality Pay Area of New York-Newark, NY-NJ-CT-PA
Total Increase: 2.58%
Effective January 2017

Annual Rates by Grade and Step (in USD)

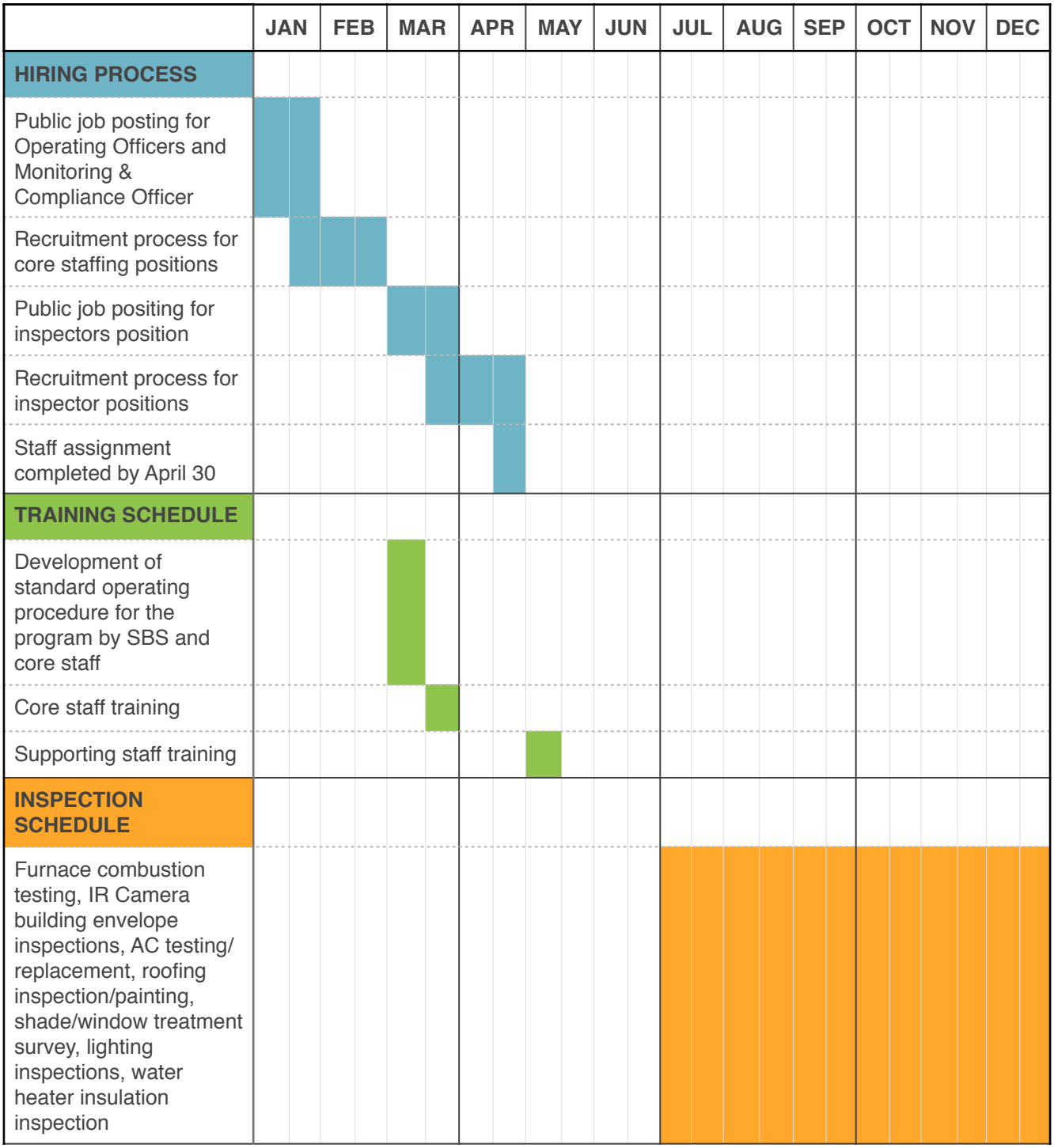
Grade	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10
1	24,310	25,123	25,932	26,736	27,544	28,017	28,816	29,623	29,654	30,405
2	27,332	27,983	28,888	29,654	29,988	30,870	31,751	32,633	33,515	34,397
3	29,822	30,817	31.812	32,806	33,801	34,796	35,790	36,785	37,780	38,774

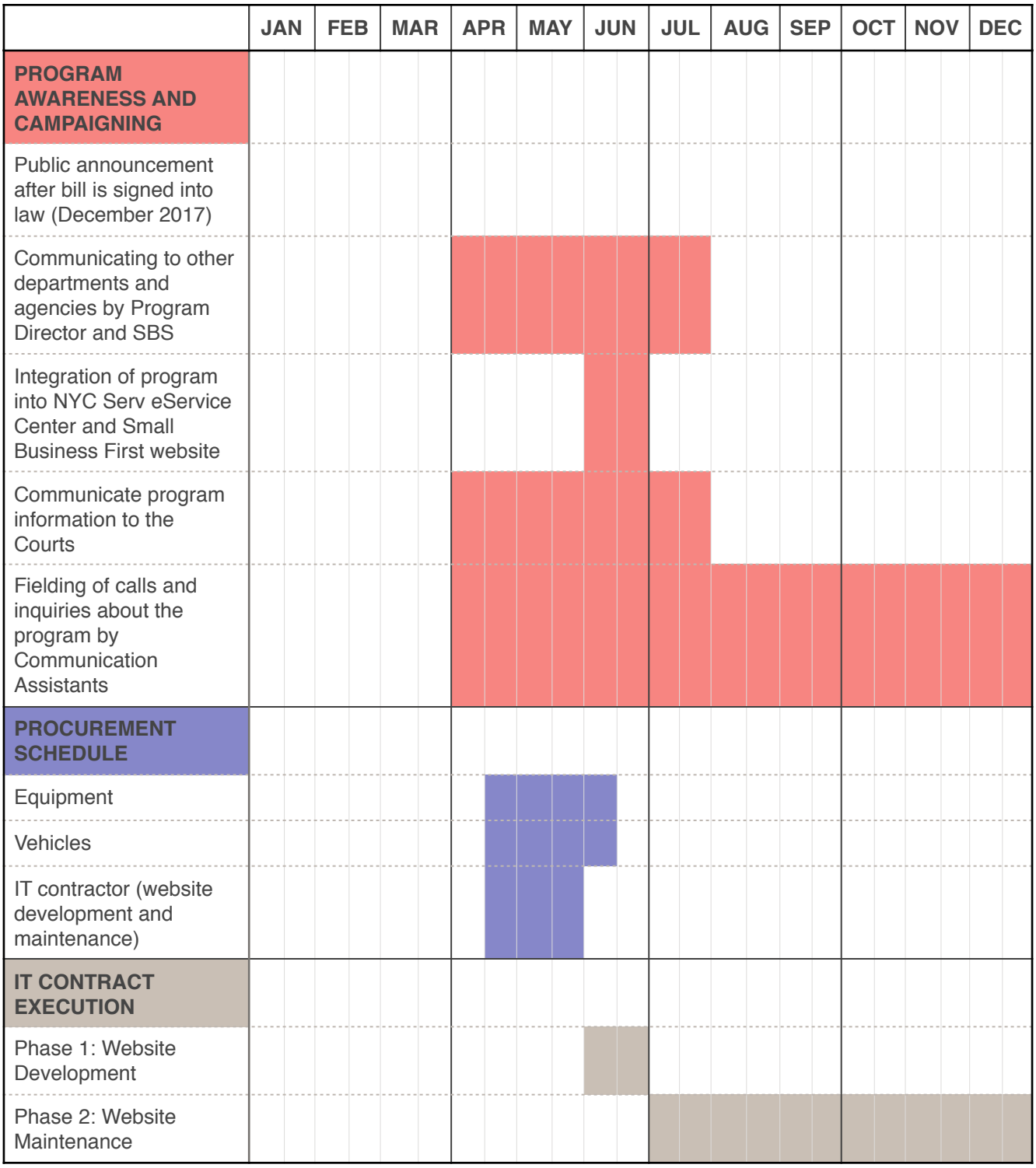
Grade	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10
4	33,479	34,595	35,710	36,826	37,941	39,056	40,172	41,287	42,402	43,518
5	37,457	38,706	39,995	41,204	42,454	43,703	44,952	46,201	47,450	48,700
6	41,753	43,145	44,537	45,930	47,322	48,714	50,106	51,499	52,891	54,283
7	46,398	47,945	49,492	51,039	52,234	54,133	55,681	57,228	58,775	60,322
8	51,384	53,097	54,809	56,522	58,234	59,947	61,659	63,371	65,084	66,796
9	56,754	58,646	60,538	62,431	64,323	66,215	68,107	69,999	71,892	73,784
10	62,500	64,584	66,668	68,751	70,835	72,919	75,003	77,087	79,170	81,254
11	68,666	70,955	73,243	75,532	77,820	80,108	82,397	84,685	86,974	89,262
12	82,304	85,048	87,791	90,535	93,279	96,023	98,767	101,510	104,254	106,998
13	97,869	101,131	104,393	107,656	110,918	114,180	117,442	120,704	123,966	127,228
14	115,652	119,507	123,363	127,218	131,073	134,928	138,784	142,639	146,494	150,349
15	136,038	140,573	145,108	149,643	154,178	158,713	161,900	161,900	161,900	161,900

Rate limited to the rate for level IV of the Executive Schedule (5 U.S.C. 5304 (g)(1)).

Appendix B: Master Calendar

This provides a graphic display of the Proposed Master Calendar from January to December 2018 of Int. 1515 Energy Efficiency Bill.




JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
PROGRAM AWARENESS AND CAMPAIGNING
Public announcement after bill is signed into law (December 2017)
Communicating to other departments and agencies by Program Director and SBS
Integration of program into NYC Serv eService Center and Small Business First website
Communicate program information to the Courts
Fielding of calls and inquiries about the program by Communication Assistants
PROCUREMENT SCHEDULE
Equipment
Vehicles
IT contractor (website development and maintenance)
IT CONTRACT EXECUTION
Phase 1: Website Development
Phase 2: Website Maintenance