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Sustainability in New York City's Film and Television Industry

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EXECUTIVE SUMMARY

New York's film and television industry is a significant contributor to both the state and local economies, creating over 1.2 million jobs in the last seven years, engaging with a variety of businesses from different sectors, and attracting hundreds of thousands of tourists every year. However, these economic benefits generate environmental and sustainability challenges.

Film and television productions are known to utilize a substantial amount of energy, generate solid waste, and source a considerable number of building materials. These can lead to increases in greenhouse gas (GHG) emissions, hundreds of tons of solid waste, and one-time use of production materials..

In meeting these challenges, sustainable filmmaking is a growing movement within the industry, and increasingly more productions are implementing sustainable practices on-set. On average, sustainable productions reduce 31% of their GHG emissions and divert 57% of their waste from landfill. Additionally, most New York productions source FSC-certified lumber exclusively for set construction.

As New York City works to achieve its sustainability goals under the OneNYC plan, it can also help the film and television industry address their sustainability challenges and contribute to the implementation of the City's short and long-term actions. The City can explore a few options: they can consider developing a new tax incentive for sustainable film and television productions to encourage the incorporation of more comprehensive sustainable practices on-set; and also consider supporting the establishment of a cross-production warehouse to motivate the reuse and recycling of set dressing, furniture, and other production materials.

While OneNYC mandates a wide variety of sustainability programs and projects, these two proposals would facilitate the expansion of sustainable practices in the film and television industry, reducing waste generation, decreasing GHG emissions, and perhaps even lessening

production costs over time. Such actions underscore the industry's potential contribution to achieving the City's short and long-term sustainability goals.

THE GROWTH OF FILM AND TELEVISION PRODUCTION IN NEW YORK CITY AND THE SUSTAINABILITY CHALLENGES FACED BY THE INDUSTRY

Since the era of silent films, New York has been a hub for film and television in the United States, and the film and television industry remains a significant contributor to New York's economy today. From 2009 to 2013, employment in the film and television industry in New York increased by 30%, as national employment in the industry increased by 6%.[1] Furthermore, since 2011, the industry has spent over $19.9 billion in New York and created over 1.2 million jobs.[2]

A major driver of this growth is New York's tax incentive program for the film and television industry. Established in 2004, the Empire State Film Production Credit was launched with an initial 10% tax credit (with a maximum of $25 million per year until 2008) for productions filmed in the State. In 2005 and 2006, small amendments were introduced to the program, but it was during its renewal in 2008 and subsequent expansions in 2009 and 2010 that film and television production dramatically expanded in New York. This growth coincided with increased industry employment rates within the State. Now, the current offering stands at a 30% tax credit for below-the-line crew,[3] with an annual cap of $420 million.

Approximately two-thirds of employment in the State's film and television industry takes place in New York City. Over 90% of production funding is expended in the City, and in Manhattan alone, the concentration of film and television production jobs is more than 3.5 times that of the

[1] "New York's Motion Picture Industry: A Statewide and Regional Analysis," New York State Department of Labor, June 2014, http://labor.ny.gov/stats/PDFs/New-York-Motion-Picture-Industry.pdf.

[2] "From Montauk to Buffalo, New York State Is Camera-Ready and Film-Friendly," Empire State Development (ESD), March 16, 2018, http://esd.ny.gov/industries/tv-and-film.

[3] "Below-the-line" is a term that usually refers to production crew that have no bearing in making the creative decisions for a film or television show. They are all other crew not involved in script and story writing, acting, producing, directing, and casting.

nation.[4] Many other sectors, such as catering, transportation, real estate, and construction, engage in film and television production, further stimulating the local economy.

The industry contributes significantly to the local and state economy, but with that growth film and television production present environmental and sustainability challenges. Energy use, waste generation, greenhouse gas (GHG) emissions, and one time use of production materials are among the challenges that arise from filming movies and television shows.

Energy Use and Greenhouse Gas Emissions

In 2006, researchers at the University of California-Los Angeles (UCLA) produced one of the first studies on sustainability in the film and television industry, and quantified the amount of GHGs emitted by producing movies.[5] The study estimated that a $50-million movie emits approximately 4,000 metric tons of carbon dioxide equivalent ($MtCO_2e$),[6] which is equivalent to the annual emissions of 857 passenger vehicles.[7] However, it is important to note that this number is no longer accurate due to inflation and new regulations that have led to the general decline of GHG emissions in the United States. Nevertheless, sustainability reports from a number of studios indicate that GHG emissions from the entertainment sector are still significant. For example, 21st Century Fox reported emissions for all of its properties as 211,733 $MtCO_2e$ for fiscal year 2016,[8] which is equivalent to the annual emissions resulting from driving 45,339 passenger vehicles.[9]

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[4] New York State Department of Labor, "New York's Motion Picture Industry."

[5] UCLA Institute of Environment, "Sustainability in the Motion Picture Industry," November 2006, p. 14, http://www.environment.ucla.edu/perch/resources/mpisreport.pdf.

[6] This is the standard unit of measurement for greenhouse gases. CO_2e is a standardized representation of greenhouse gas emissions that is equivalent to one-unit mass of carbon dioxide based on its global warming potential.

[7] "Greenhouse Gas Equivalencies Calculator," United States Environmental Protection Agency (EPA), last updated September 2017, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

[8] "Sustainability," 21st Century Fox, https://impact.21cf.com/sustainability.

[9] EPA, "Greenhouse Gas Equivalencies Calculator."

Most of these emissions come from the use of traditional energy sources. Set lighting and heating/cooling are responsible for much of the energy consumption when productions film in sound stages. When shooting on location, diesel fuel generators are often utilized to power trailers as well as the physical set. Transportation is also a factor in emissions caused by filming —productions fly cast and crew to various locations and transport sets and costumes from one end of the city to another. Tight filming schedules require multiple vehicles and trips, contributing to fuel consumption.

There is, however, a shift toward more energy-efficient filmmaking. Set lighting traditionally uses incandescent tungsten, HMI,[10] and fluorescent light bulbs, but the vast improvement in LED lighting technology has also permeated the industry. Many productions are beginning to shift to LED. For instance, Netflix's *Unbreakable Kimmy Schmidt*,[11] which is set and filmed in New York City, only utilized LED lighting packages on all stages. The use of renewable energy for power generation when filming on location has not seen the same success as LED lighting due to issues with supply and storage.

For New York, a significant limitation to decreasing the energy consumption of film and television productions is the available filming infrastructure. The City has been one of the industry's major hubs since the early 1900s, with Kaufman Astoria being the first production studio to be built in New York City in 1920. Some of the older sound stages are excellent targets for enhanced energy efficiency measures.[12] As productions require a large amount of set lighting and continuous temperature regulation, older infrastructure can contribute to high energy consumption patterns in the industry, especially in New York City.

[10] Hydrargyrum medium-arc iodide (HMI) bulbs

[11] "TV Production," Green is Universal, NBCUniversal, http://www.greenisuniversal.com/learn/about-us/tv-production/

[12] This is based on anecdotal information provided by stakeholders we interviewed who have experienced working in multiple soundstages across New York City.

Waste Generation and Materials Sourcing

Solid waste is another sustainability challenge facing this industry. Film and television sets generate waste from food, construction, and set dressing. To address the water needs of cast and crew, thousands of water bottles are consumed throughout filming. When productions wrap up and strike a set, tons of these materials are discarded. Recycling plastics and materials from sets, along with composting excess food is not yet a standard industry practice.

California has avoided the issue of on-set recycling and reuse because of the availability of warehouses for storage. While many of the Los Angeles-based television shows and movies are filmed in sound stages that are not owned by the major studios, there is a lot of capacity to store sets, furniture, and costumes, whether they be on studio-owned facilities or privately owned warehouses. In New York City, however, both the high cost and scarcity of warehouse space makes it cost-prohibitive for studios, particularly smaller ones, to implement a similar system. Often, throwing away old sets, furniture, and costumes is the cheapest and most logistically manageable option for New York productions for the short-term.

Material sourcing can also be an issue when discussing sustainable filmmaking practices. Constructing sets and assembling set dressing require hundreds of tons of wood in the City. The international community has been attempting to increase the sustainability of the world's wood supply since the 1992 Earth Summit in Rio de Janeiro, Brazil with the creation of the Forest Stewardship Council (FSC). Through the FSC, businesses and manufacturers can purchase wood that originates from forests managed through "environmentally sound, socially beneficial, and economically prosperous" means.[13] The New York City's film and television industry is a pioneer in the use of FSC certified wood, and additional use of this wood could be encouraged by New York City's government.

[13] "Mission and Vision," Forest Stewardship Council United States, https://us.fsc.org/en-us/what-we-do/mission-and-vision.

Building on the Industry's Sustainability Leadership

Productions that incorporated sustainability practices on-set such as Sony Pictures' *The Amazing Spider-Man 2* and CBS's *Madam Secretary* were driven largely by individuals with the authority to make physical and financial production decisions.[14] The Producers Guild of America (PGA) approved the PGA Green as a national committee in 2009, and in 2010 the Green Production Guide was developed "to provide a new resource for film, television, and commercial professionals looking to reduce the environmental impacts and carbon emissions of film and television production."[15] PGA Green has also developed the Production Environmental Accounting Report (PEAR) carbon calculator, a significant tool for productions to calculate their environmental impact. The Guide's Production Environmental Accounting Checklist (PEACH) functions as an application to the Environmental Media Association (EMA) Green Seal, "a recognition program honoring progress on sustainable production"[16] and "is based on the self-assessment by the production company on how well it complies with the [p]rogram criteria developed by EMA and the sustainability departments of major studios."[17]

While some productions have adopted sustainability practices, the use of these methods is only slowly taking hold in this industry. Training, education, and financial incentives are all needed to increase use of these techniques. The producers that have successfully utilized these techniques could be recruited to lead workshops with colleagues who might consider adopting them.

[14] This is based on anecdotal information provided by stakeholders who have worked on film and television productions as producers, department heads, or crew.

[15] "PGA Green History," Green Production Guide, http://www.greenproductionguide.com/about-pga-green/pga-green-history/

[16] "EMA Green Seal," Environmental Media Association, https://www.green4ema.org/ema-green-seal/

[17] Ibid.

INDUSTRY CONTRIBUTION TO NEW YORK CITY'S SUSTAINABILITY GOALS

New York City is known for its innovative approach to addressing urban issues, and sustainability is not exempt. In 2015, Mayor Bill de Blasio launched *One New York: The Plan for a Strong and Just City* (OneNYC). In this plan, the Mayor detailed the City's priorities to address the sustainability, resiliency, and equity challenges of a growing city, and laid out the City's long-term actions to fight the impacts of climate change. Two years later, Mayor de Blasio signed Executive Order 26, the Climate Action Executive Order, declaring New York City's commitment to the principles and goals set forth in the Paris Agreement. He also directed city agencies to work with the Mayor's Office of Sustainability "to create a citywide plan...to advance the Paris Agreement's goal of limiting global temperature increase to 1.5C above pre-industrial levels."[18]

Released in October 2017, *1.5C: Aligning New York City with the Paris Climate Agreement* (Climate Action Plan) built on the City's 2016 report on reaching its goal of reducing 80% of GHG emissions by 2050, and laying out "the pace, scale, and impact of actions across the built environment that are necessary to bring NYC's actions in line with Paris Agreement's 1.5 degree Celsius outcome."[19] The plan highlights key actions rooted in OneNYC, including near-term commitments for 2020 and the necessary investments being made for the operationalization of these actions. The Climate Action Plan's findings suggest that by 2030, near-term actions have the potential to reduce 10 million $MtCO_2e$, remove 500,000 pounds of $PM_{2.5}$ emissions annually, and result in benefits such as economic innovation, health and wellbeing, affordability, and quality jobs for New Yorkers.[20]

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[18] "Climate Action Executive Order," The City of New York Office of the Mayor, June 2, 2017. http://www1.nyc.gov/assets/home/downloads/pdf/executive-orders/2017/eo_26.pdf

[19] "1.5°C: Aligning New York City with the Paris Climate Agreement," Mayor's Office of Sustainability, https://www1.nyc.gov/site/sustainability/codes/1.5-climate-action-plan.page

[20] "1.5°C: Aligning New York City with the Paris Climate Agreement," C40 Cities, September 2017, p. 8, https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/1point5-AligningNYCwithParisAgrmt-02282018_web.pdf

Under the Climate Action Plan, *NYC Film Green* is highlighted.[21] NYC Film Green is the first sustainability program in the country for the film and television industry managed by a government agency. This program is voluntary, and provides sustainable film and television productions with the opportunity to be recognized for their efforts in reducing their environmental impact. Its mention in the Climate Action Plan is an acknowledgment that the film and television industry can contribute to the execution of the plan and the achievement of the City's sustainability goals. This is because sustainable practices on set are relevant to two goals under OneNYC's sustainable city vision:

1. NYC's greenhouse gas emissions will be 80% lower by 2050 than in 2005 (80 x 50).
2. NYC will send zero waste to landfills by 2030.[22]

Several productions that incorporate sustainability initiatives on-set can provide a preliminary illustration of how the industry can contribute to achieving OneNYC's goals. Figure 1 (below) reports the total and average data on waste diversion and carbon emission reductions collected from nine productions filmed in New York City participating in NYC Film Green.[23]

[21] C40 Cities, "1.5°C," p. 38.

[22] The City of New York Office of the Mayor, "One New York," p. 161.

[23] This data was provided by stakeholders on the basis of anonymity and confidentiality.

Average Emissions Reduction (MtCO2e) of Sustainable Productions in New York City

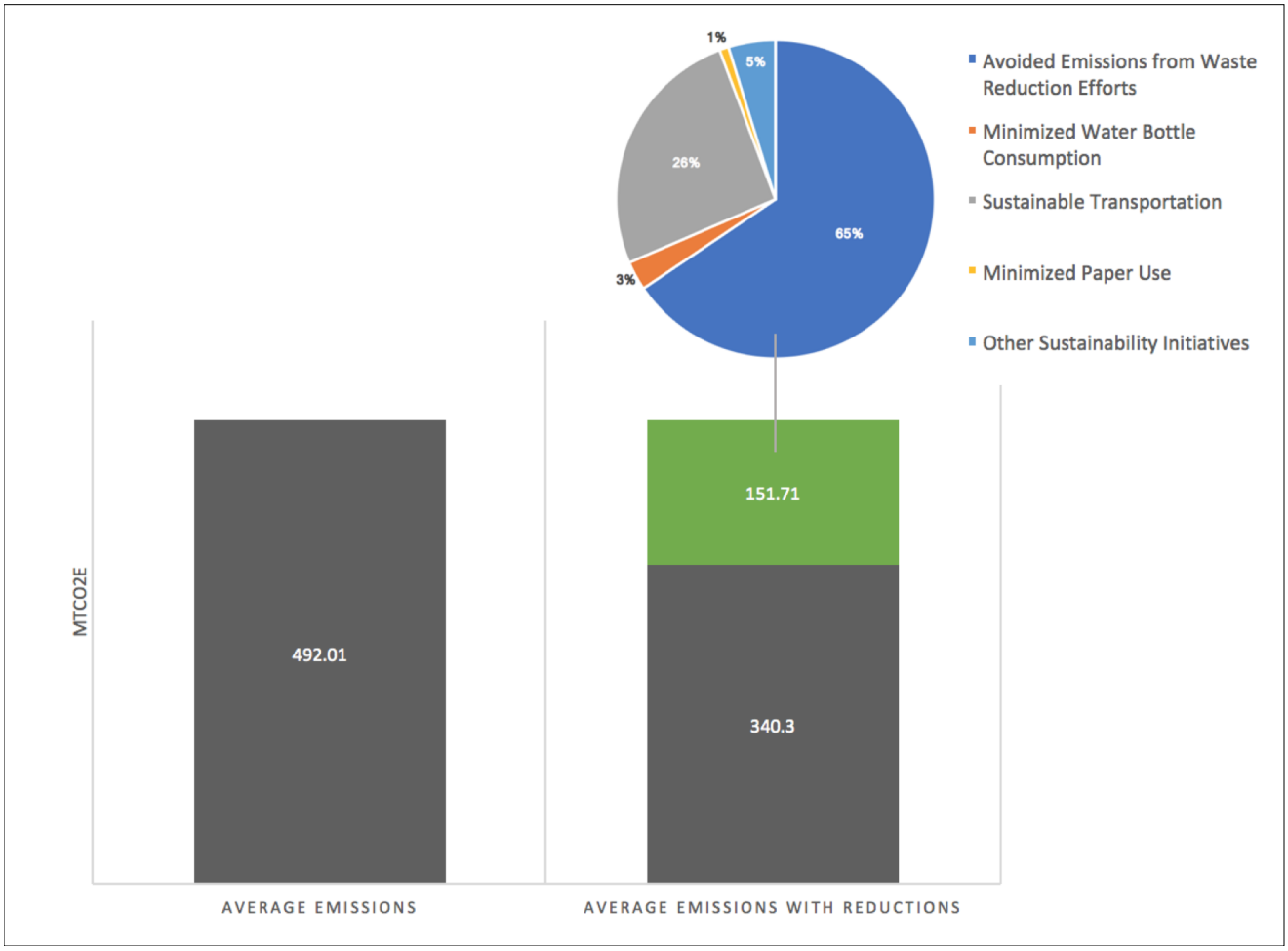
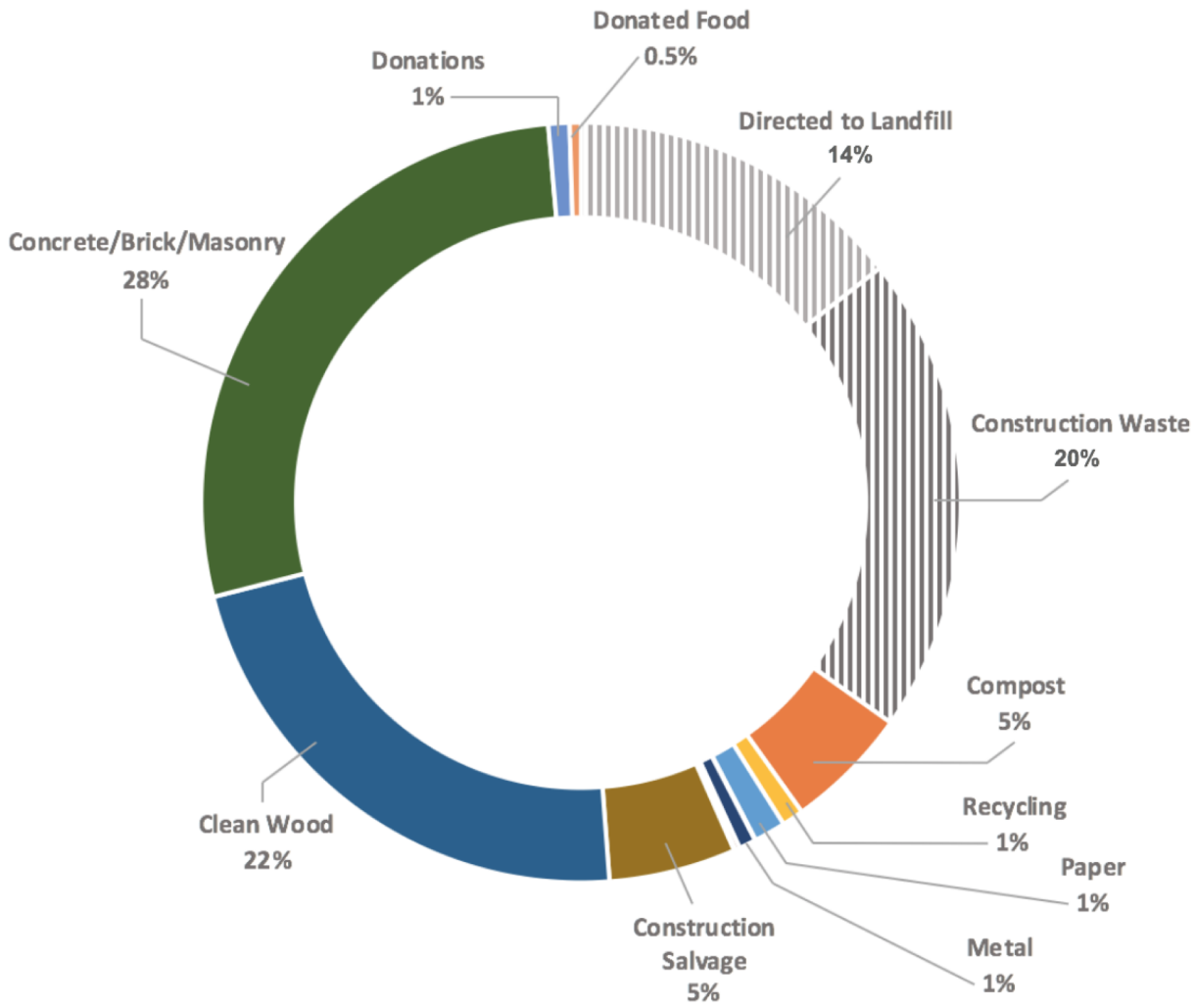


Figure 1. *This figure illustrates the average emissions reduction (in MtCO2e) of nine sustainable productions filmed in New York City, along with the reductions share of various sustainability initiatives on set.*

On average, sustainable productions reduce 31% of their emissions through increasing waste diversion, reducing water consumption, improving public and shared transportation systems, minimizing paper usage, and other sustainability initiatives. This percentage amounts to an estimated 152 $MtCO_2e$ reduced per production, which is equivalent to the emissions of 33

passenger vehicles driven for one year.[24] If all New York City productions adopt GHG emissions reduction practices on-set, the industry would reduce over 45,600 $MtCO_2e$,[25] or the amount of emissions 9,764 passenger vehicles produce in one year.[26]

Average Percentage of Waste Produced by Sustainable New York City Productions



[24] EPA, "Greenhouse Gas Equivalencies Calculator."

[25] Based on an average of 300 films produced in New York City every year.

[26] Ibid.

Figure 2. *This table illustrates the average percentage of waste produced by nine sustainable productions filmed in New York City since 2016. Only construction waste and items directed to landfill were not diverted.*

As indicated in Figure 2 (above), sustainable productions divert an average of 57% of their waste stream by using a variety of methods—such as composting, recycling, donating food, and salvaging construction materials. This amounts to an average of 84 tons of waste diverted per production, which is equivalent to around nine 30-yard dumpsters. If all New York City productions adopt sustainable waste practices on-set, the industry would divert over 25,000 tons of waste from landfill.

The waste diversion rates and their equivalent tonnage, along with the potential carbon emissions reduction are noteworthy, illustrating that the film and television industry can make an important contribution to achieving the City's sustainability vision under OneNYC by implementing sustainability practices on-set.

It is important to note that productions in New York City rarely have control over emissions from utilities. This is because productions lease sound stages, which are operated and maintained by companies or individuals that are independent of the productions.

Under the 80 x 50 goal, actions are being carried out to reduce carbon emissions from buildings by 30% by 2025 from a 2005 baseline. To achieve this, a group of new regulations called the *Greener, Greater Buildings Plan* (GGBP) was enacted, targeting energy efficiency in large existing buildings and designed to provide decision-makers with up-to-date information on cost-effective energy efficiency measures.

Qualified production facilities (QPF)[27] in New York City—whose areas range from 11,000 to above 280,000 square feet—are required to comply with the GGBP by the indicated years.

[27] QPFs are sound stages with a minimum of 7,000 square feet contiguous production space that is soundproof with a noise criteria of 30 or better, with sufficient heating and air conditioning, incorporates a permanent grid and sufficient electric supply, and is column-free with a clear height of at least 16 feet under the permanent grid.

Once compliant, productions filmed in sound stages are likely to reduce their energy consumption due to these energy efficiency measures. A sample case study would be 20th Century Fox's major retrofit of their California studios through the federal Department of Energy's Commercial Building Partnerships (CBP) Program in 2013 (see Table 1, below). A total of 265,000 square feet of sound stages and cooling plants were retrofitted with appropriate energy-efficient designs and technologies.

RETROFIT	ENERGY SAVINGS	ANNUAL KWH SAVINGS	GHG REDUCTIONS ($MtCO_2e$)
Large sound stage	28%	211,000	157
Medium sound stage	22%	62,000	56
Central cooling plant	50%	1,040,000	774
	TOTAL	***1,313,000***	***977***

Table 1. *This table illustrates the energy savings (in kWh) and emission reductions (in MtCO2e) from 20th Century Fox's sound stages retrofit in 2013.*[28]

By retrofitting its sound stages and cooling plants, 20th Century Fox's annual emissions reduction will be 977 $MtCO_2e$, which is equivalent to the annual emissions of 209 passenger vehicles.[29] With a combined square footage of 1.2 million,[30] retrofitting New York City sound stages through GGBP will have significant emission reductions and energy savings potential for the City.

Through these on-set practices and changes to physical infrastructure, the film and television industry can play a crucial role in achieving the City's long-term goals and objectives for reducing emissions and diverting waste.

[28] "Fox Studios Case Study," US Department of Energy (DOE) Building Technologies Office, October 2013, https://impact.21cf.com/sites/default/files/mt/case-studies/DOE%2020th%20Century%20Fox%20Case%20Study.pdf

[29] EPA, "Greenhouse Gas Equivalencies Calculator."

[30] "Sound Stage Production Report," Film L.A. Inc, November 2017, p. 9 https://www.filmla.com/wp-content/uploads/2017/11/sound-stage-study-v3-WEB.pdf

ENCOURAGING THE INDUSTRY TO BE MORE SUSTAINABLE

New York City's short and long-term goals and investments in sustainability and climate action provide a promising context for more robust action on making the film and television industry more sustainable. The following options can be explored to inspirit the implementation of these practices in productions.

Develop a Tax Incentive Measure for Sustainable Productions

The State of New York currently offers film and television productions a 30% tax credit on below-the-line crew members, with an additional 10% for productions who film in upstate New York. The credit has an annual cap of $420 million, and last year was renewed until 2022. Numerous industry leaders support this tax credit program, and business owners who frequently engage with film and television productions lobbied for its renewal in early 2017.

Film and television production in the State increased by 30% from 2009 to 2013, which coincides with the film tax credit program's expansions to its current form from 2008 to 2010. From 2013 to 2016, the tax credit program's return on investment increased from 1.09 to 1.15.[31] This means that for every $1 the State pays to incentivize the film and television industry, the State recoups its $1 investment and gains $0.15. From that amount, New York City receives $0.53, other jurisdictions receive $0.11, and the State receives $0.51.[32] This is an indication that tax incentives attracted business to the City and State, helping increase economic activity.

[31] "Economic Impact of the Film Industry in New York State - 2015 & 2016," Empire State Development (ESD) and Camoin Associates, January 2017.

[32] Ibid.

Stakeholders report that tax incentives are major motivators for this industry, and that financial impacts drive many decisions when it comes to the logistics of a production—the cheaper and easier option will likely be chosen. Thus, productions move based on the size and availability of incentives and are deterred by additional costs. Introducing a tax incentive measure that targets the implementation of sustainable practices on-set could encourage more studios to shift to sustainable filmmaking.

In addition, a tax incentive for sustainable productions could make these practices more accessible to smaller, independent films who would otherwise not have the financial capacity to integrate sustainable operations, thereby facilitating a quicker and more comprehensive transition to sustainable practices for the City's film and television industry.

Providing the film and television industry with an incentive to implement sustainable practices can also augment production savings. Figure 3 (below) provides the breakdown of average expenses and savings incurred from sustainable practices on nine productions in New York City.

Breakdown of Average Expenses and Savings of Nine Sustainable Productions in New York City

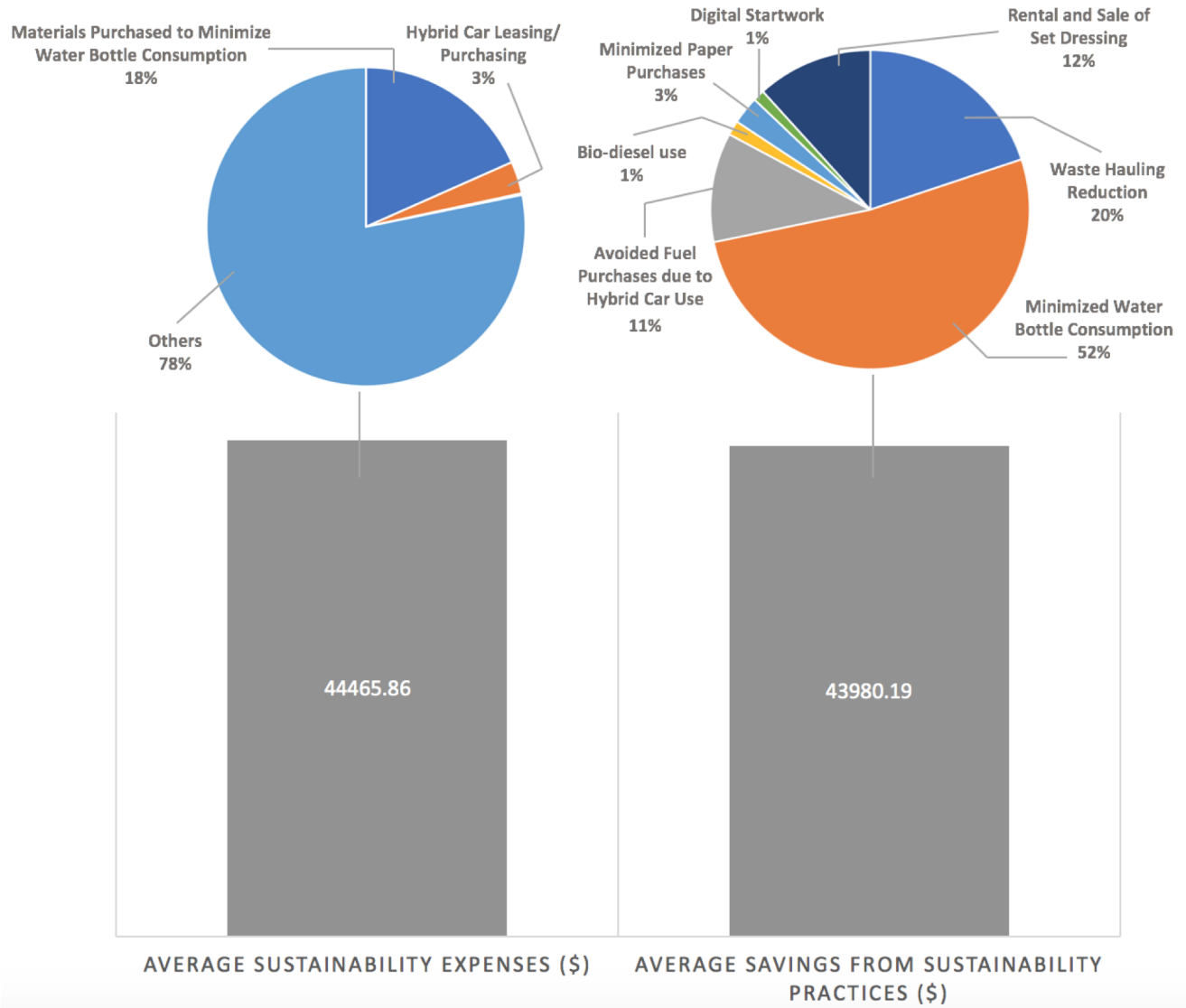


Figure 3. *This figure illustrates the breakdown of expenses and savings incurred through implementing sustainable practices on nine productions. Productions spend an average of $44,500 to implement sustainable initiatives on-set. However, these initiatives save them an average of $44,000.*

For infrastructure, sound stages can also benefit financially from becoming more sustainable. In the 20th Century Fox case study mentioned above, the studio invested an estimated $1.02 million in retrofits. The cost savings are reported in Table 2 (below).

RETROFIT	IMPROVEMENT COST	ANNUAL ENERGY COST SAVINGS	SIMPLE PAYBACK YEARS
Large sound stage	$ 504,000.00	$ 27,900.00	18
Medium sound stage	$ 100,500.00	$ 8,000.00	4
Central cooling plant	$ 417,000.00	$ 145,000.00	3
TOTAL	***$ 1,021,500.00***	***$ 180,900.00***	

Table 2. *This table illustrates the costs associated with 20th Century Fox's sound stage retrofit, along with its energy cost savings and payback years.*[33]

As studios in New York City are legally mandated to update their buildings in accordance with current New York City Energy Conservation Code standards, retrofitting older sound stages is both a legal and financial benefit to studio owners. The relatively quick payback and high annual energy cost savings, as shown in the table above, illustrate the lower economic hurdles for large sound stages to become more energy efficient.

This data indicates that by implementing sustainable practices—such as eliminating bottled water on-set, using hybrid transportation, recycling paper, renting set dressing and donating sets/props to other productions after a show's completion—productions will observe that these practices will ultimately pay for themselves. The introduction of a tax incentive would increase production savings, therefore making sustainable filmmaking more attractive. Furthermore, it could drive studios to make long-term investments to improve their infrastructure, which would be beneficial to the City's goals as it would increase energy efficient.

[33] DOE, "Fox Studios Case Study."

Establish a Cross-Production Warehouse in New York City

The high cost of real estate in the City has made it cost-prohibitive for most studios to operate a warehouse to reuse set dressing from completed productions in the area. Thus, the City could establish a cross-production warehouse, available for use by all movies and television shows filmed in the City, to encourage the reduction of set waste. An example of such a warehouse would be NBC's 90,000 sq. ft. property in Bethpage, New York where a management team processes set decoration, props, wardrobe, production expendables, and office supplies from completed productions, to be reused on their shows currently in production in New York.

While it may be challenging for the City to construct and manage such a warehouse, the City could base their business model off existing organizational models, such as the warehouse managed by NBC or even a non-profit store for used film and television items such as the Big Reuse.[34] Furthermore, the New York Department of Sanitation's (DSNY) DonateNYC program has already established relationships with certain organizations and could be a potential starting point for the development of a similar system specifically targeting the film and television industry.

A private-public partnership for a cross-production warehouse should be explored, where the City provides the space for the warehouse through the collaboration of relevant departments and offices, and the private entity can manage its operations, liaising with participating productions. By providing productions access to this warehouse, they may be more inclined to recycle and reuse their set dressing and furniture rather than dispose of them.

[34] Big Reuse, http://www.bigreuse.org/

MOVING FORWARD

Many working parts go into producing a film or television show, and all these parts must be engaged to effectively implement sustainable practices without causing disruption that would affect healthy economic activity. Private and public interests must be carefully balanced to achieve the objectives in a just and equitable manner.

The ultimate goal of this study is to provide options to increase sustainability for the film and television industry. These options attempt to address the sustainability challenges throughout the industry, laying the groundwork for more robust and ambitious plans on the path toward more environmentally sustainable film and television production in New York City.