Sustainability and eco-friendly movement in movie production

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Abstract. These days, environmental issues become a grand theme of a blockbuster film and earn much profit for its popularity. However, does the movie with environment themes also apply a green production conducted to minimize environmental impact? The movie industry is reported as one of the most significant contributors to the carbon footprint. Film with budget estimated over $70m can produced 2,840 tonnes of CO2 and it’s equivalent of 11 times trip from moon to the earth. This paper explores the emerging phenomenon of sustainability and eco-friendly movement in film production by collecting data from movie production and sustainability reports from various industries contributing to filmmaking production. Instead of ruining the earth, the green production movement already moves and is supported by the university, nation, and community planning to reduce emissions to net zero before 2051. Researchers hope this paper will elaborate on how green production becomes valuable lessons for filmmakers to produce a green film using 5 keys area that have been identified to reduce emissions. And understand why it is essential and beneficial for society and industry to oversee environmental initiatives on-set.

1. Introduction
Films convey knowledge and notion. They show us places and manner of living we might not otherwise know [2]. The film was initially created in 1805 and was recognized as a powerful medium to send messages visually. According to Effendy [1], the film is an audio-visual communication medium to convey a message to people who gather in a particular place. Film has a persuasive ability, making statements, and it has its capacity to deliver a message as an instrument of communication. Based on that idea, films atoning to impact viewers and be used widely as a communication tool through the story using character and plot to engage the viewer's minds and emotions. In the late 19th century, the first cinema emerged thanks to Thomas A. Edison and William Dickson in 1891 technological advancement that discovered Kinetoscope shown in figure 1. Kinetoscope's a pioneer machine that, in the future, is named a motion picture projector. In virtue of these technological developments, apogee, motion picture entertainment industry emanates.

Furthermore, it has become a business to produce and distribute a film. In 1914, national film industries were established and dominated by Europe, Russia, and Scandinavia. The film becomes longer with breathtaking visuals and stories to produce. As many viewers paid to watch a movie, the industry proliferated, and money is invested more in production, distribution, and exhibition.
Commonly in the modern era, there are seven stages of film production used globally and professionally. It starts with developing the concept and story, then proceeds for funding. Then it continues with the most critical part, pre-production. Usually, it takes 6-12 months to prep before they start production or filming. After they finish shooting the movie, it runs on editing or postproduction. The final step is to market and distribute the film. Production of a feature film takes adequate time to prepare. Most movies that we see in theaters were a work of experts and well organized. According to rules and eligibility from The Academy of Motion Picture Arts and Sciences known as Oscars from addendum October 6th, 2020, feature films running time is longer than 2,400 seconds (40 minutes) or longer. The average film feature is 100-120 minutes lengths, and it takes 45-60 days of shooting. Moreover, for pre-production, on average, it will take 8-12 weeks. Continue with postproduction; it can take between 10-20 weeks.

Feature film means large scale production and involved thousands of professional crew film and actress or actor on set. Unfortunately, they will leave their carbon footprint while shooting on location. As we produce a film, we generate waste and emissions. Each year, the amount of CO2 is represented by carbon footprint, and we can contribute to climate change by reducing the hike. Climate change is a big issue for numerous businesses around the world. Greenhouse gases that accelerate anthropogenic global warming are produced by industrial activities that depend upon fossil fuel energy [5]. Lighting equipment used in film sets, generator, not to mention a mountain of plastic water bottles, a pile of photocopiers, gasoline, and other waste material, can be found in the film industry's environmental footprint.

As a favorite location for large scale production, London has contributed to record-breaking production spend levels. British Film Institute stats published in July 2020; reporting a total spend on film production in the United Kingdom during 2020 was £699 million a 57% decrease 2019. Film were planned to start production but were postponed due to pandemic Covid-19. It would have been the largest production spend in the United Kingdom ever reported if it goes along with the schedule. Production spends would have risen from £699 million to £1.87 billion [3]. Considering this enormous production in the United Kingdom, a consortium with 12 largest production led by British Academy of Film and Television Arts (BAFTA) encouraging sustainable movie production to reduce emissions net to zero by 2050. Besides the United Kingdom, the oldest America film industry in Los Angeles so called Hollywood; birthplace for many production and studio companies that often produce big and small film production. Selectusa.gov, an official website for The International Trade Administration in the USA, release a report. Filmed entertainment (motion pictures, television, and video) in 2019 are expected to gain $96 billion. While on the other hand, UCLA Sustainability from the University of California Los Angeles also reported the motion picture industry is considered the most significant contributor to greenhouse gas emissions [6].
2. Method
In this paper, the researcher using secondary data from government regulation, government census reports, institution annual report that weren't generated by the researcher. Secondary data in this research also includes books, private sources, academic journals, news, and websites. The researcher used this data as a source of information to observe, develop ideas, examine the validity, evaluate the state of knowledge, and make a hypothesis as a conclusion.

3. Results and Discussion
A survey held by Southern Cross University in 2019 reported that out of 913 people surveyed, 93% indicated a general concern for the environment. 87% of them make an effort to live an eco-friendly lifestyle, while 83% claimed to recycle. It is a good sign, how well people concern about environmental issues. The sustainability movement can build on people’s understanding and motivation to protect our environment. Film is a powerful tool to convey messages often used as media to engage people to make a difference for their environment. We might have seen many movies that brought issues to environmental topic. The environmental film produces in various genres, mostly in a documentary, but there is also a massive list for fiction movies about this matter. It is such a relief knowing many people paying attention to this environmental issue, but how can we contribute to the environment while producing a film in the movie industry?

It's challenging to deal with an inelastic amount of resources to reduce film production's environmental footprint [4]. Throughout the production of any motion picture, CO2 rise by the vehicles and tools used: cars, trucks, limos, generators, air travel, trailers, and various machinery [6]. Figure 2 show the poster film *The Day After Tomorrow* released by Twentieth Century Fox in 2004. It is a disaster movie that shows how climate change can damage the earth and become the most commercially successful movie. Why is it important to discuss this movie? We all know the environmental issues; we know what happened if we do not take action. According to this film, earth led to extreme weather worldwide because of the North Atlantic thermohaline circulation system and welcoming a new ice age. *The Day After Tomorrow* is an excellent example of sustainability and Eco-friendly filmmaking, and it delivers an ecological message. *The Day After Tomorrow*’s director and co-writer, Roland Emmerich, is curious about how he could prevent filmmaking from contributing to global warming. It would be ironic if he directs a film about climate change and environmental issues, but the whole process did not promote those issues.

![The Day After Tomorrow poster](Image)

Figure 2. Poster “The Day After Tomorrow” (Pic source: 20th Century Fox).

To commit his environmental conservation, he contracted with Future Forests, a green company that helps make his film carbon neutral. Future Forests estimated the production of this film would generate 10,000 tons of CO2. Future Forests estimates that *The Day After Tomorrow* greenhouse gas emissions are 22.02 tons per year and requires 30 trees to offset those emissions. Future Forests charged *The Day After Tomorrow*, around $229,000, by planting forests to offset a portion of film production CO2 emissions or enough for them to become completely carbon neutral [6].
Being a global centre for green film production will be a successful selling point for every film industry [4]. How this sustainable and eco-friendly filmmaking production beneficial for industry and society? Another sample from the movie The Amazing Spider-Man, 2’s green production success story shown in figure 3. During the production, Sony Picture hires an eco-manager and reclaimed they reuse almost 50 tons of material for their next movie productions. And due to reuse material programs during whole production, they prevented approximately 193,000 mineral water becoming waste [10]. By going green and apply prevention on 5 keys production area, Sony Pictures saved an estimated $400,000.

How can we know for sure that our production is green? Despite the indication that producing sustainable movies can spring money and make a good fortune, it's still an uncertain notion of managing sustainable production. However, the Greenfilm.com from Italy designed a rating system to help a filmmaker wishing to work environmentally friendly and by using the Greenfilm.com system, it’s guiding producers to work as far as possible in an environmentally sustainable manner. The audio-visual industry has a strong power of communication and should be at the front in promoting respect for the environment. The most effective way of doing this is to offer audio-visual producers a clear and defined instrument for improving their work's sustainability and a certificate that declares the merit of doing so [9]. In April 2009, the greater London authority published a Green Screen Guide. A guideline to inspire change and make a difference in filmmaking. The Green Screen Guide focuses on production, and there is the potential to expand this to the distribution, exhibition, or sales of films and programs. Green Screen Toronto also published a handbook in 2009 to support green practice in filmmaking because of the impact of the production phase from television series and film features.

Wearealbert.org or Albert, the screen industry authority on environmental sustainability, was founded in 2011 in the United Kingdom. Funding by industry and allows them to make a carbon calculator that estimates screen art production's environmental impact. Albert also provides resourceful information for the green supplier on their website. Moreover, to introduce sustainable production techniques, Albert conceives a sustainable production certification to ensure that a film that passed their qualification will earn a one to three-star certification from Albert. 1917 shown in figure 4, an award-winning academy film produced and directed in 2019 by Sam Mendes. 1917, it is a big scale production shot in 12 key locations. It was involving a lot of workforce and tools that carrying a large carbon footprint. However, to commit a green production, the production team in 1917 avoided unnecessary flights using train travel, utilizing waste vegetable oil to source the generator, practicing reusable utensils and bamboo-based materials. 1917 became the first feature film in the United Kingdom; it achieved the highest award for sustainable production from Albert and became an inspiring example to other production [11]. It is impressive how major film studios like Sony, Universal, and 20th Century Fox applied a green production vigorously and inspired other studios to follow their footprint.
4. Conclusion
Climate emergency is an existential issue for all of us and its unavoidable how movie industry globally contributes significant emissions per year and the. However, the film industry began to step up to address this environmental issue sincerely by practicing a green production. Most of production choose a low emission vehicle; to lower average 60% of carbon dioxide (CO2). Furthermore, merely using a rechargeable battery will reduce costs and suitable for financial benefit. Researcher highlighted there are 5 keys area produced a highest carbon footprint and it’s been identified in every report from sustainable production. To reduce emissions, filmmaker should pay attention in (1) a production material, (2) studio building and facilities, (3) production planning, (4) sites and location, (5) energy and water use. And also, in order to have a success rate practicing green production, a film production need to hire a certified eco-manager/supervisor who is capable to oversee the whole system of green production.

Researcher hope any filmmaker can try to use and apply this 5 keys area in sustainability filmmaking to respecting the environment and improving to produce short film, feature, documentary and series. By reusing materials to build set, repurposing building for future production or donate the material. Go paperless, in production planning. Decrease inefficient meeting, and always keep a production report for future studies.

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