

A CINEMATOGRAPHER AND THEIR DEVELOPING ROLE IN TACKLING CLIMATE CHANGE

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Abstract: Film production is a major contributor to global greenhouse emissions. A Screen New Deal, published by the British Film Institute in 2020, outlines that:

Data analysis shows that one average tentpole film production – a film with a budget of over US\$70m – generates 2,840 tonnes of CO₂, the equivalent amount absorbed by 3,709 acres of forest in a year. Within this, transport accounts for approximately 51% of carbon emissions, mains electricity and gas use accounts for around 34%, and diesel generators for the remaining 15% (British Film Institute, 2020, p. 4).

It is, therefore, vital that the key labour force on a film project, the production crew, become part of the solution instead of continuing to be part of the problem. At a time when the US industry aims to promote natural light, as evidenced by *Nomadland*'s BAFTA and Oscar wins, but where major carbon emissions continue to be generated by cinematographic practices, my work seeks to develop replicable working methods that can substantially reduce the environmental harms of the cinematography department.

In this short article, I will ask how I, as a practising cinematographer, can introduce change through my own practice. With reference and case study to my practice in the feature films *Mind-Set* (Murray, 2022) and *How You Look At Me* (Gonzalez, 2019).

INTRODUCTION

It is still the case that the film industry has a requirement to become more sustainable to provide social, environmental, and economic benefits, and the environment is still under the microscope, thanks to the success of BAFTA albert and other green initiatives. The film industry's hunger for energy and transport, and its desire to entertain and attract audiences with big spectacles, means it is a key contributor to global carbon emissions, especially if streaming services and production of the capture and consumption devices used within the industry and by the audience are included in the calculation.

Sustainability is also not a priority on set, as highlighted in the 2020 report *Green Matters, Environmental Sustainability and Film Production: An Overview of Current Practice*. "Everyone [in film production] is working under pressure. Everyone has to get their jobs done quickly and the set turned around quickly. The priority is being ready to shoot. Everything else is secondary to that" (British Film Institute, 2020, p. 9). This showcases how many of those working in the industry feel. Their environment is not suited to thinking about sustainability first if it means slowing down the pace of production.

As I'm a practising cinematographer, my research looks directly at cinematography's impact. I was introduced to the concept of New Naturalism in an article written for *American Cinematographer* by Benjamin B. My colleague had read the article and could see the similarities to how I describe my practice: favouring natural light, handheld, working with the environment, and searching for balance.

This was the moment my practice and research interests clicked, and I, therefore, decided to pursue

the issue with greater focus by undertaking a practice-based PhD as part of my role as a senior lecturer at the University of Lincoln.

This short article will expand on my previous paper presentations at the British Association of Film Television and Screen Studies annual conferences in 2023 and 2024 to include more details of my research progression. It will outline how I have developed my style as a cinematographer, how this style has impacted my work, and how I have embraced limitations and constraints. This has led me to New Naturalism and how it can impact decreasing cinematography carbon emissions.

DEVELOPING A STYLE

As a practicing cinematographer, I have shot four feature films as the Director of Photography. *Act/Or* (Barentz, 2015), shot in Budapest and released in 2015; *Writer's Room* (Gonzalez, 2017); *How You Look at Me* (Gonzalez, 2019); and *Mind-Set* (Murray, 2022), released in 2022. On reflection, what linked these four films and most productions I have been involved in is that they were all made on incredibly low or micro-budgets.

When investigating how my style has developed, I must first look at two of my latest feature films, and I will start by offering a case study of the film that kicked me off in the direction I headed, *How You Look at Me* (Gonzalez, 2019).

The film was shot in the spring of 2015, before I started my tenure as a lecturer at the University of Lincoln. It was filmed entirely on location in East

London and in a French mansion and its grounds. We shot the film almost entirely using natural and available light, and although we did have some LED lighting on standby, its use was minimal.

However, this was for budgetary reasons, and also safety, as the wiring in the French house was very old, and the concept of sustainability had yet to enter my mind.

We knew that we had no money to transport all the equipment or to rent additional equipment in France. I only had a few lights because I managed to persuade a company called Videndum (formerly Vitec) to loan them to me in return for writing a review for them. The screenplay itself did not have any form of sustainable message; it just happened that we were shooting natural light and available light because we needed to. The feature film was made in five weeks across two countries, including a complex international unit move after the first week.

Figure 1 shows the typical look of the film. There was much contrast inside the house because we relied solely on the available light shining through the windows into such an old and dark environment. We shot as much as we could outside around sunset to capture a beautiful golden look for the film.

I simply filmed in the back seat to capture the still of the actress with her head out of the car. This was typical of our overall shooting style, as we had no budget for hiring any specialised equipment.

Then, moving on to *Mind-Set* (Murray, 2022), which we shot in 2019, before the global pandemic, we filmed entirely in Lincoln, supported by a local crew of graduates, staff, and students, and with equipment provided by the University of Lincoln.

As a result, the production became, in effect, a student engagement project to provide an opportunity to prove what we can achieve with the skills, talent, and production facilities we have at the university.



Figure 1 HYLM (Gonzalez, 2019)

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We decided at the outset to shoot using only natural light and available light, especially as the film had a sustainability message embedded within the screenplay and featured many aspects impacting the environment, not just pollution but also our eating habits, the use of public and private transportation, and the overall impact of living in and out of London.

We knew we needed as much light as possible to succeed, so we shot during the summer solstice to have the best opportunity to produce the look we wanted.

The still in Figure 2 features an all-natural light shot, achieved by working out the exact time when the light would be shining through the window to give us the perfect opportunity to film the scene.

We estimated that at approximately five o'clock in the morning, we would have the ideal opportunity, so we had everyone arrive on set at 3.30 a.m. to prepare for the scene.

We ensured we finished early the day before and had a long break before doing anything else on the day we shot. That is the practice we developed to shoot our preferred style. We were there for an hour before the light came through to get this shot, which is a key shot at the film's climax.

Some LED lighting was used in the film. For example, Figure 3 is a scene set at night, which was shot during the day using blackout material behind the camera to achieve the look I was after.

During filming, I developed some core principles for how I should work in order to create the visual style I wanted to see in these films by incorporating as much natural light and available light as possible to shape the image.

Both films involved much handheld camera work, as there was no time to deal with unhelpful complexities or even put a tripod down.

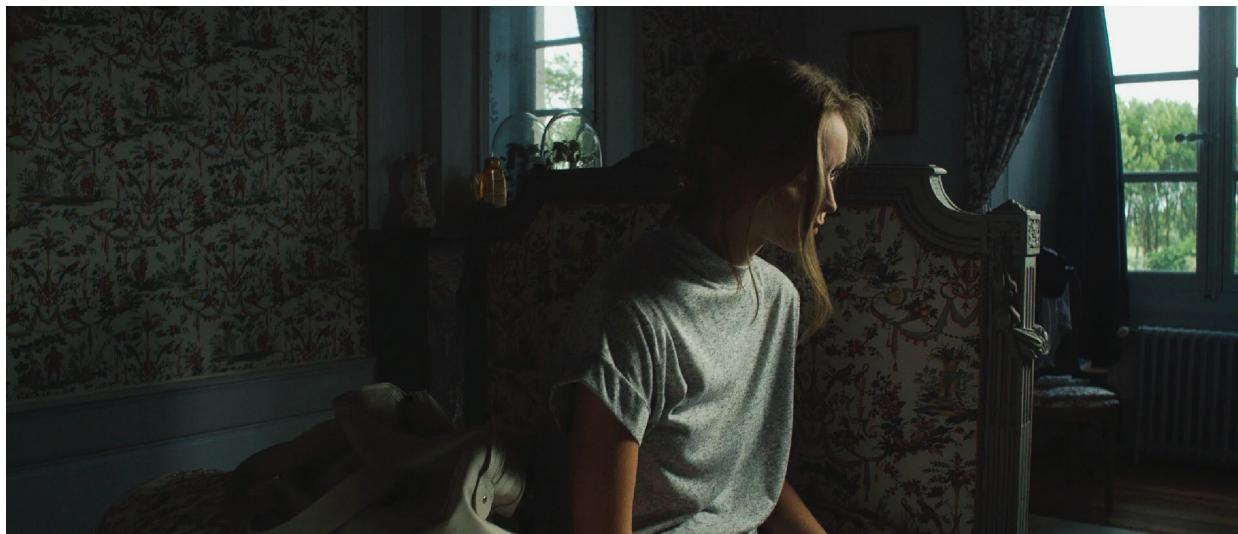


Figure 2 Mind-Set (Murray, 2022)

There were lots of guerrilla tactics; we got in and out and did not ask for permission.

The production was centred entirely on utilising what was available to us on the day and on working with our environment rather than fighting against it.

Moreover, this has become my core principle since I began considering it in 2015, and it has become more literal as my practice and research have progressed.

This style of shooting, its challenges, and how best to work with people and places to overcome any technical restraints or artistic limitations have become my obsession, especially on low-budget productions.

There were constraints that appeared to restrain me on paper, but in reality fuelled my vision and creativity. That has formed a big part of what I am as a cinematographer.

In their new book, *The Filmmaker's Guide to Creatively Embracing Limitations*, Pace and Strobbe (2023) outline that "... sometimes a limitation doesn't just create a new technology or advancement – sometimes what it does is help a filmmaker create a style that becomes their signature, an aesthetic that helps define who they are artistically" (Pace & Stobbe, 2023, p. 61).

To simplify, I created a style based on necessity rather than by design. I did not set out to do this. This was not what I used to discuss late at night at university, chatting with my peers and friends: "I cannot wait to use the sunlight to make films." The process is a result of the circumstances I found myself in, and it has been developed entirely through my experience of working on these low-budget and micro-budget films.



Figure 3 Mind-Set (Murray, 2022)

DISCOVERING NEW NATURALISM

My work at the University of Lincoln eventually led me to New Naturalism; with this discovery, my practice began evolving into research. However, up until now, I have been at sea trying to understand how best to translate my practice and interests into research.

My fantastic colleague Zeta Spyros, another cinematographer, sent me an article by Benjamin B. in the American Cinematographer magazine with an email saying, "This is everything you are about". It was an article about New Naturalism. The article encouraged me to undertake further research, but I found very few articles or ideas published discussing or promoting the concept. At least I had found a clear direction for my work.

The key principles of New Naturalism were developed by the director and cinematographer duo Terence Malick and Emanuel Lubezki, who first coined the phrase when they were shooting *The New World* (Malick, 2005) and *The Tree of Life* (Malick, 2011). Even though they did not create a manifesto as such, it was referred to as a form of dogma. They did not go as far as Dogma 95 with a full manifesto, however, but they had a set of rules that they used within a form of self-imposed creative restraint.

When writing for American Cinematographer, Benjamin B. described the key principles as exclusively shooting natural light during the day and using existing/available lighting in dark interiors at night. Therefore, New Naturalism does not restrict you to shoot day scenes exclusively; you can shoot at night using what is available.

Favouring backlight to create continuity between shots from different times and places also means

that if you only use one light, it's likely a backlight. It is a common cinematography practice that gives you depth and dimension in your image because you are shooting a 3D image, which you are displaying on a 2D plane. As Brown explains in *Cinematography: Theory and Practice*, "Whether projected on a screen or viewed on a monitor, film and video are two-dimensional: flat (3D is really just an illusion). A big part of our job is trying to make this flat art appear as three-dimensional as possible to give it depth and shape and perspective, to bring it alive as a real world as much as possible" (Brown, 2022, p. 267).

The backlight gives you that depth and separation instead of anything else lighting can produce. As Brown further emphasises, "By separation, we mean making the main subjects 'stand out' from the background. A frequently used method for doing this is a backlight" (Brown, 2022, p. 266). So, if you use one light, that is where you want to utilise it, in my opinion, and that of many other cinematographers.

The duo practised shooting wide-angle shots and including some very tight close-ups of the actors. I have been doing this for years because you can get something interesting from a close-up shooting at 24mm, which can be exciting when there is no money for production design. Benjamin

B. writes about how the duo looks for resolution, avoids filters, and seeks depth of field. Not just having everything super-shallow and tight, seeing off into the distance, and not putting filters in the way of the glass; however, I tend to disagree with this idea because, as I see it, if you do not control your image, the editor will. Which is why I like filters. But it makes sense, as when you put filters in front of the lens, you decrease the amount of light coming in. The duo

uses handheld and Steadicam to move the camera. They consistently desire to embrace serendipity, a willingness to stop everything to film a butterfly. Lastly, they acknowledge that all good dogmas are made to be broken upon occasion.

The current key player within New Naturalism is Emmanuel Lubezki ASC, AMC, as we have mentioned. *The Revenant* (Iñárritu, 2017) was a big-budget practice in shooting just natural light and just on location, though much post-image manipulation was involved in achieving a highend look. It is still an example of a commercially successful natural light movie. Then there is Joshua James Richards, known for *God's Own Country* (Lee, 2017), *The Rider* (Zhao, 2017), but mainly for *Nomadland* (Zhao, 2020), a film that won the Best Cinematography BAFTA in 2021 and was nominated for the Best Cinematography Oscar in 2021. It was shot entirely with natural and available light. Benjamin B.'s work on New Naturalism focuses on Joshua James Richards's work with Chloe Zhao as the director of *Nomadland* (Zhao, 2020). Lubezki and Richards practise by choice, shooting exclusively with natural and available light. This is something I did through necessity.

In this article, I have looked at my practice and how it developed into a style that started much earlier than *How You Look at Me* (Gonzalez, 2019). It started when I was a child, and I started shooting with the family camera. I have explored the concept of New Naturalism, and hopefully, it is clear how I am beginning to link the two. But how has this led to research?

THE ENVIRONMENTAL COST OF CINEMATOGRAPHY

The environment has been a subject of interest to me for a long time. I teach the BAFTA albert certification course to my students at the university. I stress the importance of staying within the 1.5-degree target each year, but unfortunately, we surpassed it in 2023, with the planet warming by 1.5 degrees (BBC, 2023). This connection between my teaching and my research interests seemed quite natural. In 2020, the BFI conducted a study:

Data analysis shows that an average tentpole film production – a film with a budget of over US\$70m – generates 2,840 tonnes of CO₂, the equivalent amount absorbed by 3,709 acres of forest in a year. Within this, transport accounts for approximately 51% of carbon emissions, mains electricity and gas use accounts for around 34%, and diesel generators account for the remaining 15% (British Film Institute, 2020).

The British Film Institute (BFI) has identified critical areas impacted by cinematography. Film production involves transporting a significant amount of equipment, and adopting local sourcing of equipment and materials can help reduce carbon emissions. However, the worldwide movement of film and TV productions results in a substantial environmental impact. Cinematography requires large equipment, personnel, and transport, contributing to this impact.

Meanwhile, mains electricity is commonly used for lighting, as well as diesel generators when mains is not an option. These generators are rarely used on set for any other department, though they are often used at unit bases. Even studios like the Arri Virtual Production Studio in Uxbridge use generators.

One key strategy to address film production's environmental impact is the shift to digital. Vaughan and Kääpä (2023) underscored the ongoing transition to sustainable digital practices in their report, *Sustainable Digitalisation: Ensuring a Sustainable Digital Future for UK Film and Television*, emphasising the positive environmental impact and providing policy recommendations. However, they noted a missed opportunity to address cinematography's impact on CO₂ emissions, a significant contributor amid the debate between traditional film and digital cinema. The report's policy recommendations – Life Cycles, Production Cultures, and Energy Futures – though not mentioning cinematography directly, are relevant, with cinematographers identified as critical stakeholders.

The proposed "Charter for Sustainable Digital Work" includes five key principles, such as ensuring equal demographic representation in digital workforce training and hiring, deploying digitalisation for social benefits, conducting community assessments to prevent harm from digital infrastructure, establishing a task force for digital technologies, and conducting life-cycle assessments to minimise unethical labour practices and environmental destruction (Vaughan & Kääpä, 2023, p. 25). Notably, principle three addresses cinematography practices, highlighting the environmental impact of lights and generators used on location, with studios like Arri Virtual Production Studio in Uxbridge utilising generators despite being in a major city.

Cinematography has a significant environmental impact due to the frequent use of diesel generators. The department's transportation-heavy nature, from micro-budget to studio feature films, and the shift to digital technology have kept its energy consumption high. The lack of explicit mentions in essential

reports, such as the one published by the Minderoo Centre for Technology and Democracy (2023), indicates a significant misunderstanding of the art form's impact. Therefore, I am confident in the safety of the statement that cinematography is a leading contributor to global carbon emissions.

Combine this with the inevitable neglect of sustainable practices, or them falling down the priority list when a film's priority is always speed of production, as highlighted in the quote earlier in this article from the 2020 report *Green Matters, Environmental Sustainability and Film Production: An Overview of Current Practice*. Moreover, scholars are overlooking cinematography directly, such as the report by Vaughan and Kääpä, despite sustainability being a positive step forward for the whole industry to embrace and drive change.

Cinematography needs those who practice the art form to open their eyes to their impact and possibly make changes, not only to how they practise but also to what they practise. The art form itself needs consideration, especially when improvements to reflective equipment, such as the Lightbridge Cine Reflectors, can precisely reflect light with little exposure loss by shooting with natural or available light and augmenting this with a single light source which is bounced using reflectors to create multiple light sources.

The art and practice of cinematography can evolve to one that does not require the transportation, electrical and generator needs of the past. The transition to digital with cameras such as the Arri Alexa 35 with 17 stops of dynamic range means less light is needed to maintain a pleasant contrast ratio (Arri, 2024). A single light source, reflected, could replace a scene with 5+ lights, especially in low-budget/indie

filmmaking, which is the more natural environment for sustainable and out-of-the-box thinking when it comes to cinematography.

A positive by-product of practising this expanded form of New Naturalism is that it allows actors and crew space. Fewer lights mean more space. The reflectors do not need cables and can be far more easily rigged to ceilings or walls, which means fewer health and safety considerations and addressing the earlier quote about the priority on a set as being ready to shoot. They can be set up faster and adjusted quicker than multiple light sources.

Clare and Smith (2020) discussed the efficiency of using a single light source, natural and available light, and reflectors in the article *Reflecting on Reflectric*, published in the magazine ZERB. They emphasised that these methods are less time-consuming to set up and work primarily with reflective light, which can “reproduce convincing ‘sunlight’ through the firstfloor window of a house without the need for a cherry-picker or generator” (p. 65). This approach not only supports the positive environmental impact by eliminating the need for additional equipment but also showcases the speed of setup. Which, in turn, positively impacts the transport needs of the production.

CONCLUSION

Over many years I have shot in a restricted style due to necessity and not design. However, this has not limited the success of the projects I have shot as cinematographer. I shot the award-winning film *Mind-Set* (Murray, 2022) which won Best Feature Film at the Manchester International Film Festival in 2022. Peter Bradshaw gave the film a positive

4-star review in *The Guardian*. Other award-winning major films, such as *Nomadland* (Zhao, 2020), showcase it is possible to make a commercially viable and industry-recognized film featuring sustainable cinematography at its core via the style of New Naturalism.

Concerning the BFI’s 2020 study directly, how can New Naturalism impact the carbon emissions of film production? Less equipment means less transport. The standard shoot has a lighting truck, grip truck, and camera truck at a minimum. Less electricity is required due to reduced lighting features, and there should be no diesel generators unless another department, for some reason, wants one. Therefore, I can construct a hypothesis to test and examine. We can predict at least a third reduction by removing and replacing the lighting truck with just the camera and grip trucks regarding transport. I believe the reduction will be even more substantial when examined in practice.

The mains electricity is more difficult to quantify currently, without further research. However, New Naturalism should reduce diesel generators to zero. I predict that a film project can expect at least a 32% reduction of all the cinematographer’s direct emissions through New Naturalism. To develop this further, I will be looking at a practical way to test it and encourage cinematographers to continue making award-winning films and still embrace this kind of limitation, as I and others have done so in the past and have this key sustainable benefit.

When observing the climate issue through the lens of creativity, especially via creative restraints, an exciting prospect emerges for cinematographers to embrace the challenge and do what they do best: be creative. Be creative and overcome the challenges

by reducing their need for power and finding balance within their work.

I will finish with one last quote from my former PhD supervisor, Professor Mette Hjort, who unfortunately left the University of Lincoln in June 2024 to return to Hong Kong and take up a chair professorship at the Education University of Hong Kong.

The twin factors of limited resources and a consistent emphasis on the cultural, social and political contributions of film making create a fertile environment, I contend, for the emergence of sustainable filmmaking practices (Hjort, 2022).

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