

There Is No Carbon-Neutral Production: Cinema and the Anthropocene

Kyle Stine

The Extreme Ice Survey (EIS) returned to headlines in April 2017 with the release of a series of short videos documenting the remarkable glacial retreat in Antarctica and Greenland from 2007 to 2015. The news release marked the project's ten-year anniversary since its founding by *National Geographic* photographer James Balog. In those ten years, the project has accumulated a trove of time-lapse images captured from automated cameras braving the elements in some of the world's most hostile environments and has popularized these images on a wide variety of platforms, including a TED talk, a PBS *Nova* documentary, and the feature-length film *Chasing Ice* (dir. Jeff Orlowski, US, 2012).¹ In Balog's words, the project responds to a sort of imagination gap in our understanding of the phenomenal changes taking place across the globe, or what Tom Cohen has cited as the absence of a suitable "climate change imaginary."² "You're not supposed to be able to witness things like this," Balog remarks in *Chasing Ice*, "Human beings don't generally get to see these massive features of the landscape changing and vanishing." In truth, the dynamism of a glacier melting escapes our temporal awareness, and it is for this reason that Balog's innovative time-lapse project is so "chillingly important," as one reviewer puts it.³



Figure 1. The Extreme Ice Survey tweets an article from the *Washington Post* on 3 April 2017.

Environmental documentaries such as *Chasing Ice*, in their efforts to make intelligible the interconnected systems affecting global climate change, collectively suggest that the ecological crises taking place throughout the world require what might be called a cinematic perspective to comprehend their magnitude.⁴ Time-lapse imaging, computer modeling, and satellite imagery, alongside traditional techniques such as long takes and montages, have become virtual necessities for representing the planetary scales of these transformations.⁵ Less considered, however, is the double bind that cinematic technologies rely entirely on the implicated systems of transportation and communication that produce the emissions and waste responsible for climate change. Several recent articles and industry reports indicate that the film industry's use of fossil fuels, its energy expenditures, and its various platforms of delivery contribute directly to the crisis. Brian R. Jacobson has recently laid out one of the more damning aspects of the film industry's carbon footprint and contributions to pollution, noting Big Oil's investment in filmmaking to cultivate goodwill toward petroculture.⁶ Taking this criticism further, I argue that despite the best intentions of the film industry, there is no such thing as a carbon-neutral production.



Figure 2. Trift Glacier in the Swiss Alps, 2006 (left) and 2015 (right). James Balog and the Extreme Ice Survey.

Scaling Up Our Imagination

Filmmakers seeking greener production practices work from a definition of “carbon neutrality” that might be described as local, in that it confines a film’s carbon footprint to its energy expenditures and emissions associated with filming and travel. Calculating a film’s environmental impact in this way makes sense for guiding environmental action because it accounts for practices over which filmmakers have control and can exercise decision. A significant limitation of this definition, however, is that the geological changes taking place today occur at scales beyond individual intention and decision. In two separate passages in his influential article “The Climate of History,” Dipesh Chakrabarty puts this in perspective:

The Anthropocene, one might say, has been an *unintended* consequence of human choices. . . . Clearly, nobody is in a position to claim that there is something inherent to the human species that has pushed us finally into the Anthropocene. *We have stumbled into it.*⁷

The role of media in the Anthropocene should also be thought within this problem of unintended consequences. In no sense can a single human being—or for that matter, any group capable of decisive action—be said to be, in Chakrabarty’s phrase, the head or hand wielding this “geological force.”⁸ Even those with great degrees of power stand largely impotent before the crises of the Anthropocene, to say nothing of the clutching ideological forces that prevent many people from ever addressing the problem in the first place. Certainly no one sitting in a movie theater or lounging on a sofa intends to produce climatological effects, no more than drivers intend to emit exhaust fumes as they parade down the highway. Yet

everything has a bigger impact when viewed through the lens of the global climate crisis, including cinema. As Chakrabarty puts it, the very thought of the human as a geological force confronts us with a test of imagination: "To call human beings geological agents is to scale up our imagination of the human."⁹ Insofar as we acknowledge that human beings live in complex media ecologies that define modern global connection and facilitate the economy of these geological forces, we must also scale up our imagination of cinema.

The Material Magnitude of the Specular Economy

Just over a decade has passed since Charles Corbett and Richard Turco, professors of environmental management and atmospheric and oceanic science at UCLA, delivered to the State of California's Board of Integrated Waste Management the first and only major report on film industry waste and pollution.¹⁰ The 2006 report summarizes the results of a two-year project on pollution levels and sustainability practices in the motion picture industry, using a broad definition of motion pictures that encompasses both film and television. Notably, the report focuses solely on production, not accounting for distribution or exhibition, thus addressing only part of the industry's fixed capital.¹¹

The authors compare the film industry to several other, non-entertainment industries: petroleum refining, aerospace, apparel, hotels, and semiconductors. As expected, petroleum was responsible for the most pollution, but the authors note with surprise that all five of the other industries were within a factor of two of one another. Among these five, motion picture production polluted the most when accounting for conventional pollutants such as carbon monoxide and greenhouse gas emissions from nitrous oxide, carbon dioxide, and methane. Moreover, the film industry led in the categories of energy consumption, hazardous waste, and fatalities.¹² It should be noted that these findings relate not to the industries worldwide but specifically to the Los Angeles area, with the motion picture industry's high pollution numbers correlating to its "sheer size" in the metropolitan area.¹³

The "sheer size of the industry" in Los Angeles makes it a significant contributor to local pollution even while not taking into account sectors besides production. These other sectors arguably contribute the most pollution globally if we consider the "sheer size" of exhibition, which over the

last fifteen years has averaged about 1.4 billion tickets sold per year,¹⁴ or the “sheer size” of distribution, which involves entire systems of air and ground transportation. Bill Tomlinson and M. Six Silberman extend this critique in arguing that even the supposed “free time” that we spend consuming media is not truly free; it is instead bought against the balance of our geological energy inheritance. The copious time devoted to media consumption—8.7 media hours per day, including 5.8 hours of television—arises out of the energy surplus of fossil fuels that has alleviated manual labor with machine work in nearly every economic sphere since the Industrial Revolution.¹⁵ My point in introducing these and subsequent critiques is not to diminish Corbett and Turco’s important findings but to suggest that, in a fundamental sense, carbon offsets cannot truly offset the wider impact of contemporary media.¹⁶ The reason I can say this but Corbett and Turco could not is because their report had to take the motion picture industry as a fact, whereas I am under no such obligation and can consider it counterfactually against an imagined world, such as the world that reigned for thousands of years before it, rather than comparing one industry practice to another, marginally less polluting practice.

The authors acknowledge that a significant part of film industry pollution disperses outside California, as is to be expected from an industry whose narratives take place across the globe and beyond. Yet the industries that facilitate travel and on-location shooting, though captured to a certain degree in the expense sheets consulted, are otherwise necessarily excluded, thus omitting much of the complex material inheritance that is the sine qua non of motion pictures. Within cinema’s material inheritance would have to be included such wide-ranging enterprises as chemicals processing, mineral refining, and metalworking, and all their attendant consumption of petroleum-based resources. More proximate industrial pollutants excluded from the report’s local delimitation include those entailed in celluloid film production. In this vein, Hunter Vaughan has called attention to the matter of water, specifically the millions of gallons of fresh water consumed by the Kodak film plant in Rochester, New York, throughout its history, and the millions of gallons of wastewater dumped into the Genesee River.¹⁷ Acknowledging the breadth of industry pollution presents one way of expanding our understanding of the systemic interconnectedness of the film industry with related industries and assessing the wider environmental costs that should factor into calculations of the industry’s carbon footprint.

A further way of broadening our perspective is to consider how the industries used for comparison in the report developed with and alongside motion pictures: how the leisure time of the movies, as noted by the Frankfurt School, restored workers for another long day at the job; how the distribution of movies and other audiovisual entertainment has driven the demand for electronics and semiconductors; and how cinema has from its beginnings promoted broader patterns of consumerism. In this regard, one could also note that besides in that other major motion picture sector in the nearby San Fernando Valley, characters always need apparel and often help sell apparel to those bodies filling theater seats each weekend. Tie-ins with merchandise, soundtracks, and product placement of all kinds—indeed the whole notion of synergy as a prevailing industry practice since the rise of New Hollywood—speak to this inability to separate the motion picture industry from related industries.

The role of cinema in driving consumer desire calls for a reversal in our understanding of the inputs of climate change: it is not the material pollutants that are the greatest danger but the seemingly immaterial desires that drive them. The oft-repeated line “trade follows film” speaks to the intricacy of these interrelationships between film and other industries. For Bernard Stiegler, these words encapsulate a phenomenon that twentieth-century advertising makes especially clear, what he calls the “functional dimension” of the culture industries.¹⁸ Historically, the dictum signified the force of media products in shaping consumer desires, a phenomenon sometimes called “Americanization.” What the phrase means for Stiegler is that cinema, as a technology for producing desires, catalyzes consumption—and thus, we might add, feeds the wider economy of carbon emissions. Guy Debord’s famous reworking of Karl Marx’s opening to *Capital* helpfully expresses this transformation in which “spectacle” becomes the motive force of capitalist production: “The whole life of those societies in which modern conditions of production prevail presents itself as an immense accumulation of spectacles. All that once was directly lived has become mere representation.”¹⁹ Today, the specular economy demands the expansion of fossil fuel consumption as much as it relies on it as an energy source.



Figure 3. John Gerrard, *Farm* (Google Data Center in Pryor Creek, Oklahoma), 2015

The Cinematic Internet

Finally, there is the issue of how people get their media today. The crux of arguments about “the end of cinema” is that digital media have transformed cinema into something radically different. Increasingly, the argument must be reversed because it is now digital media and the Internet that are reshaped, having shifted from being largely textual to being dominated by the cinematic. According to Sandvine’s Internet traffic metrics, entertainment purveyors such as Netflix, Amazon Prime, and HBO Go, as well as user-generated sites such as YouTube, now account for 67.35 percent of aggregate peak period traffic.²⁰ Add to this the burgeoning video surveillance industry, and it is hard to dismiss the idea that the Internet is becoming increasingly cinematic.

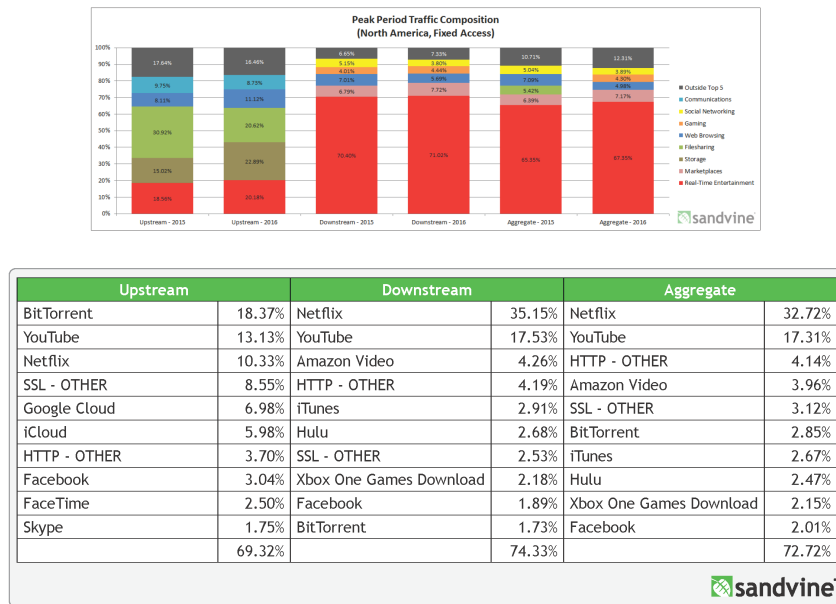


Figure 4. Sandvine Internet Traffic Metrics, Peak-Period Traffic 2016 (above) and Top 10 Peak-Period Applications 2016 (below)

The environmental costs of this increasingly cinematic Internet are substantial. As Jennifer Gabrys notes, a palpable tension arises between the scale of electronics waste and our everyday experiences with these “seemingly immaterial information technologies.”²¹ In the backdrop of bright screens and sleek interfaces lies a world of teeming materiality. Whether from electronics manufacturing, whose chemical effluence Edward Burtynsky has strikingly documented in his book *Manufactured Landscapes*, or from data processing, whose physical architectures John Gerrard has documented in his installation “Farm,” the material flows of information leach into the ground and emit into the skies.²² Nicole Starosielski, in her work on media infrastructures, describes how the tremendous heat generated by microprocessors necessitates battalions of whirring fans whose mechanical movements amplify the energy required to power data centers.²³ Additionally, the electronic devices designed to manage and monitor energy use in these systems cannot do so without consuming energy and thus contributing to emissions. As Gabrys writes, “Electronics are developed to achieve environmental targets, and along the way, electronics generate new environmental problems.”²⁴ Similarly, while cinema is tasked with informing the public of the perils of climate change, along the way, cinema adds to climate change.

Indeed, the energy needs of digital media are insinuated into even the activist environmental films meant to address the crisis.²⁵ The EIS website notes that the camera setup used for its time-lapse images is “green” in the sense that it uses solar energy.²⁶ But at the level of the climate crisis, there is simply no way to dissociate the project’s use of high technology from the systems of manufacturing, transportation, consumption, and waste that facilitate them. To say that technologies are merely tools and that their value or detriment depends on how they are used merely sidesteps the problem. If Balog’s photographs are truly indications of what many believe they are, then even “best practices” require intensive scrutiny. The connection can hardly be denied when EIS boasts of helicopters that “cost up to \$8,500 an hour to charter” and whose energy needs, the website neglects to mention, are scarcely modest. The point is not to criticize Balog’s efforts or any similarly well-intentioned efforts but to try to maintain some fidelity to the magnitude of the predicament. However one measures it, the relationship between the ecological crisis and cinematic representation cannot be thought of as a one-way street leading from progressive films toward progressive ecological change.

Notes

- 1 I use the anthropomorphism “braving the elements” to describe the automated work of these cameras and also to draw attention to the level of specialization required for cameras that do not freeze in these arctic climates. The EIS project went to great lengths to ensure the durability of its media. See the project’s website for more: extremeicesurvey.org/about-eis/.
- 2 Tom Cohen, “Murmurations—Climate Change and the Effacement of Theory,” in *Telemorphosis: Theory in the Era of Climate Change*, vol. 1, ed. Tom Cohen (Ann Arbor, MI: Open Humanities Press, 2012), 18.
- 3 Stephen Whitty, “‘Chasing Ice’: A Chilling Picture of Climate Change,” *Plain Dealer* (Cleveland, OH), 7 December 2012.
- 4 Several books and edited collections deserve mention in connection with the tradition of environmental documentary. See, from most recent: John A. Duvall, *The Environmental Documentary: Cinema Activism in the 21st Century* (New York: Bloomsbury, 2017); Stephen Rust, Salma Monani, and Sean Cubitt, *Ecocinema Theory and Practice* (New York: Routledge, 2013); Robin L. Murray and Joseph K. Heumann, eds., *Ecology and Popular Film: Cinema on the Edge* (Albany: State University of New York Press, 2009); Gregg Mitman, *Reel Nature: America’s Romance with Wildlife on Film* (Cambridge, MA: Harvard University Press, 1999).
- 5 For more on the relationship between scientific imaging and ecology, see Gregg Mitman and Kelley Wilder, eds., *Documenting the World: Film, Photography, and the Scientific Record* (Chicago: University of Chicago Press, 2016).

- 6 Brian R. Jacobson, "Big Oil's High-Risk Love Affair with Film," *Los Angeles Review of Books*, 7 April 2017, lareviewofbooks.org/article/big-oils-high-risk-love-affair-with-film/.
- 7 Dipesh Chakrabarty, "The Climate of History: Four Theses," *Critical Inquiry* 35, no. 2 (2009): 210, 217. Emphasis mine.
- 8 Chakrabarty, "Climate of History," 206.
- 9 Chakrabarty, "Climate of History," 206.
- 10 Charles Corbett and Richard Turco, *Sustainability in the Motion Picture Industry* (November 2006), Contractor's Report to the Board of Integrated Waste Management of the State of California, personal.anderson.ucla.edu/charles.corbett/papers/mpis_report.pdf. Corbett has written an additional piece based on the same research: See Corbett, "Reuse and Recycling in the Motion Picture Industry," in Mark E. Ferguson and Gilvan C. Souza, *Closed-Loop Supply Chains: New Developments to Improve the Sustainability of Business Practices* (Boca Raton, FL: Auerbach Publications, 2010), 161–80.
- 11 For instance, projecting total greenhouse emissions for feature film production at 898,160 tons, the authors note: "This estimate is clearly extremely rough and possibly an underestimate; for instance, it is possible that the methodology used by Future Forests only counts GHG emissions that are directly caused by a project, not the indirect emissions associated with office space for ancillary services and other indirect emissions." Corbett and Turco, 14.
- 12 Corbett and Turco, *Sustainability in the Motion Picture Industry*, 11.
- 13 Corbett and Turco, *Sustainability in the Motion Picture Industry*, 7.
- 14 According to *The Numbers*, accessed 10 April 2017, www.the-numbers.com/market/.
- 15 Bill Tomlinson and M. Six Silberman, "The Cognitive Surplus Is Made of Fossil Fuels," *First Monday* 17, no. 11 (5 November 2012), firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/viewArticle/4120/3356. The authors draw their media consumption figures from a report by Ball State University.
- 16 However, I share Gil Branstion's stance on buying carbon offsets on both counts: "It is not enough to advertise 'carbon neutrality' as alibi for the expenditures of energy in a film's making, though Emmerich did this for [*The Day After Tomorrow*], to his credit." See Gil Branstion, "The Planet at the End of the World: 'Event' Cinema and the Representability of Climate Change," *New Review of Film and Television Studies* 5, no. 2 (August 2007): 225.
- 17 Hunter Vaughan, "500,000 Kilowatts of Stardust: An Ecomaterialist Reframing of *Singin' in the Rain*," in Nicole Starosielski and Janet Walker, eds., *Sustainable Media: Critical Approaches to Media and Environment* (New York: Routledge, 2016).
- 18 Stiegler attributes these words to a Senator McBride in 1912, attempting to correct Godard's citation of a nonexistent Senator MacBridge in *Histoire(s) du cinéma*. Neither attribution seems to be correct. Janet Staiger notes that the "trade follows film" motif likely appears first in film industry trade publications around 1911. See Bernard Stiegler, *The Decadence of Industrial Democracies*, trans. Daniel Ross and Suzanne Arnold (Malden, MA: Polity, 2011), 107; Janet Staiger, "Combination and Litigation: Structures of US Film Distribution, 1896–1917," *Cinema Journal* 23, no. 2 (1984): 52. And for an account of Godard's citation, see Karla Oeler, "The Housemaids of JLG," *Critical Quarterly* 51, no. 3 (October 2009): 37.
- 19 Guy Debord, *The Society of the Spectacle*, trans. Donald Nicholson-Smith (New York: Zone, 1995), 12.

- 20 The full *Global Internet Phenomena Report* can be viewed on Sandvine's website in two volumes, one for North America and Latin America and another for Africa, Asia-Pacific, and the Middle East. All figures listed here are for North America: www.sandvine.com/trends/global-internet-phenomena/. Nota bene: free registration is required to view the report.
- 21 Jennifer Gabrys, *Digital Rubbish: A Natural History of Electronics* (Ann Arbor: University of Michigan Press, 2011), 1. See also Jussi Parikka, *A Geology of Media* (Minneapolis: University of Minnesota Press, 2014).
- 22 See Edward Burtynsky, *Manufactured Landscapes* (New Haven, CT: Yale University Press, 2003) and John Gerrard, "Farm," accessed 18 February 2018, www.johngerrard.net/farm.html.
- 23 See Nicole Starosielski, "Thermocultures of Geological Media," *Cultural Politics* 12, no. 3 (2016): 293–309; and Starosielski, "The Materiality of Media Heat," *International Journal of Communication* 8, no. 5 (2014): 2504–8.
- 24 Jennifer Gabrys, "Powering the Digital: From Energy Ecologies to Electronic Environmentalism," in Richard Maxwell, Jon Raundalen, and Nina Lager Vestberg, eds., *Media and the Ecological Crisis* (New York: Routledge, 2014), 5.
- 25 Murray and Heumann concur: "Discussions about the film industry itself and its impact on the environment are all but erased in explorations of environmental films. Onscreen, eco-films articulate environmental messages as powerful as the anti-global warming manifesto *An Inconvenient Truth*, yet the environmental impact of the film industry and its Los Angeles setting is all but ignored." See Murray and Heumann, *Ecology and Popular Film*, 1–2.
- 26 "About: Extreme Ice Survey," accessed 20 April 2017, extremeicesurvey.org/about-eis/.

Kyle Stine is a 2016–2017 Lemelson Fellow at the Smithsonian's Lemelson Center for the Study of Invention and Innovation and formerly a Media@McGill postdoctoral fellow at McGill University. He currently teaches in the Department of Media and Communication Studies at the University of Maryland, Baltimore County.