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# 'It's a Bird ... It's a Plane ... It's a Fusion Reactor': Representation of Energy in Superhero Movies

M. Mert Örsler  and Lutz Peschke 

## Introduction

Within the scope of the awareness that our planet is facing anthropogenic climate change, public engagement is understood as an integrative part of sustainable innovation processes. Carayannis, Barth, and Campbell (2012) described the media- and culture-based public as an equal system of knowledge production that contributes to and interacts with systems science, economy, and politics, as well as the natural environment of societies. However, this media- and culture-based public is not a homogenous system with a basic need of engaging with climate change; rather, it is a conglomerate of individuals with different opinions and motivations influenced by cultural trends and media portrayals. Although factual media increasingly associate news about droughts, floods, and melting polar ice and glaciers with the aspect of climate change, the term *climate change* itself reflects an abstract topic. Consequently, climate change generates neither any strong moral restraints nor increasing motivations for public actions (Markowitz and Shariff 2012). Alternatively, fictional media representations, such as movies, influence the perception of scientific truth. Investigating science fiction (sci-fi) blockbusters through the lens of adaptation theory, Seyfajehi and Kennedy-Karpat (2021) identified a shift from speculative fiction to factual science. Specifically, they identified a trend toward accurately adapting science with objective precision, which has an impact on the audience expectations and reception of sci-fi films. In contrast, it is argued that fictional movies are capable of addressing challenges and showing possible consequences of climate change as a result of scientific facts (Bilandzic and Sukalla 2019). How topics related to climate change are framed in fictional movies remains a crucial question to address for understanding its potential as a stimulator for public engagement. This paper focuses on the

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representation of clean energy in two superhero movies, Joss Whedon's *The Avengers* (2012) and Christopher Nolan's *The Dark Knight Rises* (2012). The analysis is motivated by two main aspects of clean energy: first, "affordable and clean energy" is Sustainable Development Goal 7 of the United Nations (United Nations 2015); second, energy plays a central role in the two genre movies, especially for the skills of the superheroes, but it is not directly addressed to the aspects of sustainability or climate change. However, it is assumed by the authors that blockbuster movies have a huge impact on public opinion formation and on the stimulation of public engagement with science and environmental issues.

Several different yet related terms refer to the entity of eco-friendly, green energy, and media plays a key role in what we know about them. The terms *clean energy*, *renewable energy*, and *sustainable energy* are nearly interchangeable; this type of energy traditionally means carbon-neutral sources, such as sunlight, waves, and winds, while occasionally incorporating fusion power. However, from the perspective of carbon-neutrality, clean and sustainable energy may also include conventional nuclear power, which bears the risk of proliferation of atomic weapons, disastrous accidents, and radioactive waste.

Media attempts to represent clean energy and other environmental issues and to shape and reshape environmental communication both pragmatically and constitutively. From a pragmatic perspective, the communication regarding which type of energy should be regarded as clean energy can be seen as an attempt by certain interest groups to change public perception. From the other perspective, constitutive environmental communication negotiates meanings, creates palpable feelings, and fosters particular ways of contextualization (Pezzullo and Cox 2018). The symbolic construction of the environment occurs through the whole range of media representations. Goodman et al. (2016, 677) argue that knowledge about the environment is communicated through "different forms of the *spectacle*" in "a progressively diverse mediascape". This paper focuses on the cinematic forms of the spectacle. According to Bilandzic and Sukalla (2019, 1070–1071), the mediascape consists of factual and fictional realms: factual media are primary sources to learn about the environment, whereas fictional media also change beliefs, intentions, and behaviors.

Fiction films, such as genre pictures, are especially effective on the spectators who are not well aware of environmental issues (Bilandzic and Sukalla 2019, 1072). However, as Mellor (2009, 135) indicates, "non-news factual genres" have been largely absent from environmental communication research. Although documentaries and other nonfiction forms receive sufficient attention, fiction films seem to be underexplored by the critical gaze of environmental communication (Lindenfeld 2010; Weik von

Mossner 2011). For Mellor (2009, 136–137), feature-length, genre films are “prominent media products” that operate as focal points for public discourses about science and the environment because these products are widely (and critically) received by the public. Echoing Mellor’s point about the lack of attention to fictional films in environmental communication studies, Ho and Kristiansen (2019, 433) state that “the field needs more studies that are comparable across types of media”. We respond to this need by examining superhero genre pictures in this article.

The present study aligns itself with some of the methodologic stand-points specific to approaching films in environmental communication research. According to Monani (2011, 142), the eco-critical analysis of films that are superhero based can proceed through “the material, the perceptual and the social”. The *material* highlights the applied resources in producing films, whereas the *perceptual* and the *social* underscore cinematic effects related to culture and public perception (Monani 2011, 143). Thus, this paper is situated in a conversation with the perceptual and the social. In contrast to the examples of cinema focusing on the environment, such as Ken Kwapis’s *Big Miracle* (2012) and Steven Soderbergh’s *Erin Brockovich* (2000), superhero films do not foreground environmental issues but still frame energy and “super power” in a significant way. The authors harness the concept of utopia because clean energy appears somewhat *utopian* in the realm of superheroes: renewable, sustainable energy is seemingly as promising for the future as carbon-neutral sources and as unharmed to the environment as conventional nuclear power. We question the symbolic construction of clean energy in superhero movies in the context of its impact on public engagement with science.

The concept of science communication has changed in the past 20 years. Schiele (2008) describes this change as a shift from a *deficit paradigm* to an *engagement paradigm*. In recent years, however, public engagement with science processes has been increasingly implemented in citizen science and co-creation practices. In citizen science projects, the public is engaged with science on a larger scale. The aim of public engagement is not limited anymore to acceptance, appreciation, and generation of trust in science. Citizen science concepts are based on the understanding that media- and culture-based public are knowledge producers on an equal level as that based on science, economy and politics (Cooper and Lewenstein 2016). The interaction of citizens and scientists enlarges the scientific knowledge and the reciprocal participation in knowledge by all involved (Bonney et al. 2014). The knowledge production of the media- and culture-based public is the core aspect of the Quintuple Helix Innovation model developed by Carayannis, Barth, and Campbell (2012). These authors state that the collaborative knowledge exchange between the systems of science, economy, public, and politics,

together with the consideration of the natural environment of societies as the fifth system of the Quintuple Helix, are prerequisites for sustainable innovation processes. In short, no sustainable innovation processes exist without an engaged public. The key question here is what role genre films play in the engagement process. According to Luhmann's approach, media are located in the system society. The function of mass media is to direct self-observation of the social system and provide a kind of background reality for all communication processes (Luhmann 2000, 97). If we correlate Luhmann's system society with Carayannis's system of media- and culture-based public, we find that media, such as films, construct reality in society as a whole. Consequently, media-based communication is a key to motivating as well as retaining participants in citizen science projects in one regard, and, in another regard, to exchanging information within the media-based public with an impact on knowledge circulation through all systems of the Quintuple Helix. Additionally, storytelling plays a significant role to reduce the abstract level of a scientific discourse and to translate it into an emotion-related narrative with societal relevance (Hecker et al. 2018). Peschke (2019, 34) understands storytelling as a catalytic function to reduce the distance between lifeworld and the abstract science world. As the eyes are involved in nearly all communication processes (Jamieson 2007, 11), the visual storytelling in movies is vital in the process of engaging with the public through science.

Kirby (2008) describes the culture of entertainment's dissemination of science as science communication. The study identifies a new role for science consultants in Hollywood, or the American film industry, as that of *boundary-spanners*, aiming to bridge the gap between entertainment and science cultures and redefining science communication as a form of intercultural communication. In this light, scientific experts emerge as *encoders*, selecting and developing relevant scientific information, translating it into the culture of entertainment, and integrating it into a popular cultural product (Kirby 2008). The installation of these boundary-spanners in the production line of a science-representing movie reveals the awareness of the culture industry regarding the importance of persuasive representation of science in films (Kirby 2008).

However, Shanahan (2017, 12) argues that science is not "conceptionally monolithic". Rather, some scientific topics are more negatively represented than the others; nuclear physicists are more often depicted as mentally unstable than, for instance, ecologists. Furthermore, *cli-fi* (climate fiction) films, a genre wherein climate disaster is the basis for an apocalyptic drama, such as *The Day After Tomorrow* (directed by Roland Emmerich in 2004), use the nuclear war as a stand-in for climate change. Schneider-Mayerson (2018) contends that that activists, authors, eco-critics and

environmental humanists appreciate the rise of cli-fi and its potential for pro-environmental narratives. Brereton (2005) also argued that the dystopian environment is increasingly foregrounded in sci-fi films (see also Seyfajehi & Kennedy-Karpat, 2021). Bilandzic and Sukalla (2019) found that works of fiction trigger behavioral intentions concerned with climate change mitigation. This narrative effect describes the audience's moral emotion of guilt, by which they are cognitively and emotionally involved with the film's narrative (Bilandzic and Sukalla 2019). As such, this paper argues that the framing of clean energy in fictional films influences the cognitive and emotional attitudes toward environmental issues. It emphasizes the capacity that superhero pictures have for public engagement with science because these blockbusters eventually contribute to popularizing environmental issues and scientific phenomena in daily life.

This article concerns itself with what Moore (2015, 540) describes as the problematic messages that genre films provide for their audiences about the environment. In particular, this discussion explores clean energy, a recurrent theme in superhero blockbusters, through a case-study approach, using two films, *The Avengers* and *The Dark Knight Rises* – released in the same year (2012) and now among the most famous products of their genre.

### **Research on *the Avengers* and *the Dark Knight Rises***

Boundary-crossing, interdisciplinary research has examined multiple elements of the Batman franchise. Blackmore (1991) reads Frank Miller's graphic novel, *Batman: The Dark Knight Returns* (1986), which had inspired Nolan's Batman trilogy, and thus its last installment, *The Dark Knight Rises*, using Tocqueville's understanding of democracy. Tyree (2009) considers Nolan's reiteration of Batman/Bruce Wayne a highly symbolic text, loaded with sociopolitical messages that allude particularly to the counter-terrorism policies of the Bush administration. Treat (2009) connects the first and the second installments of the Batman trilogy with a broader cinematic trend that the author had identified – the rise of superhero films in the post-9/11 era. Wopperer (2011) places the Dark Knight in dialogue with the American War on Terror. Jonason et al. (2012) inquire into Batman's "Dark Triad" of personality traits in light of related psychology theories. Lisk (2013) investigates the Dark Knight's vigilantism and discusses the legality of his actions in view of the discipline of law.

*The Avengers*, especially one of the more famous Avengers, Iron Man Tony Stark, have been an object of much research. Spanakos (2011) indicates that Stark mounts a critique of conglomeration in various industries. Mirrlees (2013), but interprets Iron Man as an example of the fact that Hollywood cinema favors the intersections between military, industry, and

politics. McSweeney (2014) questions if the Avengers challenge the American War on Terror – or if they endorse it. Pheasant-Kelly (2016) also views Iron Man as a reflection of the War on Terror in cinema.

Thus, most research on *The Avengers* and the Dark Knight tends to place a special emphasis on the War on Terror, lacking other perspectives. The cinematic representation of sustainable energy and the related issues have not yet been a major part of the critical frame. The current study aimed to address this gap.

### **Energy, Superheroes and the Utopian Sensibility**

*The Avengers* and *The Dark Knight Rises* capitalize on the ambiguous, broader understanding of clean energy that includes conventional nuclear power. In the fictional realm of these two films, energy appears as one that possesses the *main* characteristic of unlimited sustainability, in one view, and a “super power” with destructive potential, in another. Clean energy is hence located between two opposite poles. Related to the Sustainable Development Goal 7 (Affordable and Clean Energy) of the United Nations General Assembly (2015), clean energy is eco-friendly energy but also suitable to create arms for the protection of the human society against enemies and villains. For that, the destructive potential is somehow accepted. That is, the two films transcend the ambiguity of reality through, in Richard Dyer’s words, the “utopian sensibility” of the entertainment genres (Dyer 2002, 26).

### **Utopia in the Context of Energy Policies, Crises and Turns**

*Utopia* describes an ideal society that has several definitions. Segal defined *genuine utopia* in three ways. First, it implies a radical improvement of conditions in terms of physical, social, economic, and psychological life. Second, it does not represent the conditions of certain societal groups but instead a one-world perception in which all geographical areas and societal classes are included. Third, genuine utopia stands for an ideal society as a superior concept worth aspiring to rather than based on a private or individual dream (Segal 2012, 5). The concept of the Western world in the 20th and 21st centuries is closely connected with the idea of the perfect world based on scientific and technological progress (Segal 2012). The World’s Fairs of the early 20th century in the United States, such as the 1893–1894 Century of Progress International Exposition in Chicago, the 1935 California-Pacific Exposition in San Diego, the 1939 Golden Gate International Exposition in San Francisco, and the 1939–1940 World of Tomorrow in New York City propagated an idealism supporting that the

United States would achieve utopian goals and standards in the near future (Segal 2012, 34). Science and technology presented themselves as having the power to shape not only the present but also the future, leaving the American technocracy movement of the 1930s and 1940s and embracing technological utopianism (Schwarz 2009). Science and scientific developments were widely understood as “a panacea for all the problems of society” (Segal 2012, 96). The zeitgeist of the early 1930s gave rise to superhero comic books, such as by DC and by Timely Comics, predecessors to Marvel Comics, in which scientists became superheroes with the help of biochemical and radioactive (self-)experiments and technological developments (Segal 2012).

In addition, utopia at that time was associated with atomic energy. Otto Hahn and Fritz Straßmann discovered nuclear fission in 1938. Based on this discovery, the United States launched the Manhattan Project, a research project that developed the first nuclear weapons during World War II. Nuclear physicist Robert Oppenheimer was the director of the Los Alamos Laboratory in New Mexico, where these nuclear bombs were developed (Gilpin 1962, 3).

The ambivalence toward nuclear power is reflected in the superhero comics of the 1940s until the 1980s. In Marvel Comics until 1953, nuclear power appears often as atom bombs in the hand of villains threatening the world with a nuclear war. After 1953, atomic explosions and spider bites provide superheroes like Hulk and Spiderman with super power(s) (Szasz and Takechi 2007).

This nuclear power hype stopped in the 1970s after the U.S. energy crisis, which revealed that scientific and technological progress is not an infinite process (Lifset 2014). Additionally, awareness was increasing of environmental problems caused by technological progress, including the unsolved problem of nuclear waste management (Pajo 2016). These events initiated a utopian turn in which conventional nuclear energy played hardly any role. Instead, people began to believe that renewable energies were needed to combat environmental problems and climate change (Hagen and Pijawka 2015; Khambalkar et al., 2010; Kim et al., 2020). This belief inspired the vision of fusion reactors to produce clean energy. Although the concept created much excitement and many scientists have attempted to achieve fusion at room temperature, called *cold fusion*, this goal has not been achieved to date (Lewenstein 1992).

### **Energy Sources in *the Avengers* and *the Dark Knight Rises***

Some of the key plot devices in *The Avengers* and *The Dark Knight Rises* are particularly clean energy providers. The reactors generating their own



fuels are one category of a renewable energy source, along with other traditional renewables such as geothermal energy and wind power, as defined by the Brundtland Commission (UN General Assembly 1987). For example, now under construction in southern France, ITER, meaning *the way* in Latin, is likely to become the Earth's largest fusion power provider – with the premise to generate eco-friendly energy that may eliminate dependency on non-renewables. Aiming to produce no long-life radioactive by-products, compared with nuclear power plants with fission reactors, this megaproject was initiated in 2005 and is scheduled for its first fusion power production in 2025. Batman's fusion reactor, Iron Man's arc reactor, and the Tesseract in *The Avengers* are clean reactors that generate their own fuel, overlapping with the shared understanding of what a renewable energy provider does.

The three reactors in *The Avengers* and *The Dark Knight Rises* are extremely powerful, high-technology sustainable energy sources. Batman's fusion device has the capacity to eliminate Gotham City's dependence on fossil fuels, and Iron Man's reactor produces all the power supply needed for Stark Industries' buildings. However, the Tesseract is a more mystical energy source, with an intertextual connection to the Nordic epics. Insofar as Nick Fury – one of *The Avengers*' supporting characters – has a (secret) plan to manufacture weapons of mass destruction by using this energy source, it can be considered a sort of reactor that is capable of producing its own fuel.

These three reactors have a history of appearance in cinema, especially in the Marvel Cinematic Universe. The arc reactor, designed to use palladium, a key chemical element of the cold fusion experiments of the late 1980s, first appears in Jon Favreau's *Iron Man* (2008). In Favreau's *Iron Man 2* (2010), Tony Stark designs a cleaner and smaller version of the reactor as a power source and weapon for his Iron Man suits. The Tesseract at first manifests itself in the post-credit scenes of Kenneth Branagh's *Thor* (2011) wherein it is a blue, shining cube. This cube also shows up in Joe Johnston's *Captain America: The First Avenger* (2011); after finding the Tesseract in Norway, Johann Schmidt/Red Skull intends to mobilize it as a weapon of mass destruction during World War II.

Among these three energy sources, the one in *The Dark Knight Rises* is directly a renewable source, insofar as that it is a fusion reactor. For Miranda Tate, an antagonistic supporting character of the film, this reactor is “the world's best chance for a sustainable future”. Moreover, the film places a particular emphasis on the developer of the reactor, Wayne Enterprises, which is Bruce Wayne's green company that manufactures high-tech items. In the film, Wayne Enterprises appears as the manufacturer of the fusion reactor.

In *The Avengers* and *The Dark Knight Rises*, fusion power and nuclear fission bear close resemblance to each other. Similar to nuclear power plants, the initial locations of Tony Stark's arc reactor and Bruce Wayne's fusion device are nearby water supplies. Furthermore, Wayne's device can be transformed into a conventional atom bomb. The Tesseract is the most portable energy source among the three. *The Avengers* and *The Dark Knight Rises* unsurprisingly do not offer any detailed explanations of how the three reactors produce energy.

### **Results and Discussion: *The Avengers* and *the Dark Knight Rises* From a Critical Environmentalist View**

The two films portray a set of references to a specific clean, sustainable future. In addition to the focal points of cinematic experience like larger-than-life characters, capitalistic underpinnings have become another characteristic of superhero movies. These genre pictures, as Tasker (2015) indicates, demonstrate the commercial modus operandi of contemporary Hollywood productions. The sustainable environment that *The Avengers* and *The Dark Knight Rises* represent is thus intrinsically entwined with commodification and consumption.

In the case of the two films, *technopia* is a key thematic element. This concept refers to a hyper-capitalist viewpoint, antagonistic to the environment, in which economic, scientific, and technological progress demands the domination of nature (Rutherford 2004). *The Avengers* and *The Dark Knight Rises* reveal technopia through the framing of clean energy and environmental issues.

The two films portray clean energy as an expensive enterprise that requires close interest and continuous support from multi-billionaires to actualize its potential. This portrayal is manifest in the early sequences of both movies. *The Dark Knight Rises* implies Bruce Wayne's personal involvement with a fusion reactor: Wayne fanatically supports the promising energy reactor. Wayne Enterprises is on the brink of bankruptcy due to Wayne's insistence on the research and development of this reactor; the corporation has a special subdivision specifically devoted to the reactor, with its own budget. Likewise, Tony Stark is an extremely wealthy businessman, and closely and personally interested in the developmental phase of the arc reactor. Stark personally funds the cost of scientific studies necessary to develop the reactor. As such, renewable energy in the two films is intimately linked with an exorbitant tech business, a capitalist enterprise that leads the research required to design reactors.

The technopian representation of clean energy toward the contemporary corporatization of renewable resources frames sustainable energy as

threatening. In *The Avengers*, the second act discloses that Fury succeeds in integrating the Tesseract's renewable energy into weapons of high destructive power. Therefore, the Tesseract, represented as a key to the clean future, is also capable of bringing mass destruction. Later in the film, the Tesseract creates a global catastrophe when it opens up an interstellar portal that enables an alien invasion force to land on Earth. Similarly, in the third act of *The Dark Knight Rises*, the fusion reactor – produced to reduce Gotham's dependency on non-renewables – is fully transformed into a weapon of mass destruction. As such, the two films portray renewable energy as a two-edged sword. Both *The Avengers* and *The Dark Knight Rises* depict clean energy in an extreme manner. In one regard, it has the potential to revolutionize the way people consume energy, leading to an environment-friendly future; in another, it is ultimately capable of causing a catastrophe. Associating clean energy with mass destruction declares renewable energy as a threat to the future of humanity. Tasker (2015, 187) points out that “scientific realities” are necessary yet “hazardous elements” with which superheroes “experiment”. Hence, the technopian underpinnings of renewable energy that the two films portray serve to code sustainable power as an unsafe, unreliable source of energy.

Moreover, the two films present only hypothetical solutions to environmental problems, not stated explicitly nor directly. *The Avengers* and *The Dark Knight Rises* do not elucidate such issues, merely alluding to them in dialogue and indirectly mentioning the need for renewable energy. A line spoken by Fury in *The Avengers*, for example, states: “The Tesseract could be the key to unlimited sustainable power; that is something the world sorely needs”. The two films also depict ordinary, guiltless, moral citizens largely in need of help and safeguarding. Such a depiction outlines the superheroes' formulaic tasks, clearly defined and motivated by the narratives of the genre, wherein citizens need protection from the destruction that would be brought about by the supervillains. In other words, the two films present superheroes as the solutions to the issues of the environment rather than as elucidating the problems. At the same time, portraying the hypothetical solutions, *The Avengers* and *The Dark Knight Rises* never accuse the bystander of being – even partially – responsible for environmental issues.

This portrayal speaks to the broader questions of environmental action. The two films imply that the solutions to the issues of the environment come from the industry, but it is also the likely cause of such problems in the first place. Ingram (2015, 23) regards the technopian points of view represented by Tony Stark and Bruce Wayne as “mainstream environmentalism” in which environmental problems “need to be” solved only by industry. The saviors who propose the solutions are wealthy white men from the upper class. The two protagonists of *The Avengers* and *The Dark*

*Knight Rises* are promoted as important as the proposed inventions themselves.

Furthermore, the cliché thematic conflict of literary classics – human versus nature – informs the narratives of these films. Featuring the destruction of nature, the two films normalize the preventable environmental catastrophes as an inevitable part of everyday life. Superheroes destroy the rare appearances of natural settings in the two films. In the first act of *The Avengers*, the brief fight scene involving Captain America, Iron Man, and Thor takes place in a forest, ending with the forest largely damaged by the fight. During the climax of *The Dark Knight Rises*, an ocean is used as the setting where Batman destroys the fusion reactor-turned-atomic bomb. The sequence justifies the pollution of the ocean by nuclear waste because Gotham is protected from a catastrophe.

Thus, while staging clean energy as a destructive power source, both *The Avengers* and *The Dark Knight Rises* associate conventional nuclear energy with a better future. Iron Man, in the closing moments of *The Avengers*, for example, shoulders an atom bomb of the arms industry to defeat the alien invasion force brought to the Earth by the Tesseract. This action implies a dichotomy between clean energy – the Tesseract – and nuclear power, the bomb. The dichotomy frames renewables as evil, whereas conventional nuclear energy embodies protection from them. In this context, it connects nuclear power to positive implications related to a better future and salvation.

## Conclusion

The cinematic codes of science communication in *The Avengers* and *The Dark Knight Rises* best manifest themselves in their reinvention of clean energy with the utopian codes of high-tech reactors. This reinvented renewable energy in these films is an unlimited, futuristic power source that relies on highly advanced industries whose ambition for sustainability is beyond traditional green energy goals. Making loose yet determined references to the scientific promise of fusion power, the two films display sustainable energy as a source of “super power” for industrial cities and even superheroes themselves. Despite the high potential, however, this reinvented clean energy is unsafe to produce and use because of its capacity for destruction and weaponization.

The symbolic reconstruction of clean energy is further intertwined with capitalistic motives in these films. They characterize sustainable energy through its relevance to the capitalist system, portraying nature that is the resource for business. Therefore, sustainable energy providers in the two films are the products of bureaucratically governed, top-down, and

individualist enterprises rather than collective political action – resembling the production formulas of contemporary technology giants. Despite allusions to the issues related to the environment, the two films thus advocate a heightened abuse of ecosystems.

This anti-environmentalist stance is also reinforced with the absence of a proper gesture toward environmentalism. Informed by genre conventions, the ordinary citizen is not even conscious of environmental problems, including the need for clean energy that superheroes and their allies well recognize. Hence, the only active powerhouse that engages with energy issues is the superhero who is also a business leader and an industrialist. Yet these magnates are occasionally directly responsible for the destruction of the environment itself.

Moreover, *The Avengers* and *The Dark Knight Rises* reveal a fraught relationship between the reinvented clean energy and conventional nuclear power. The fusion energy of superheroes is either insufficient to protect the world from threats, compared with conventional nuclear power, or becomes a threat when reverse-engineered. In both cases, the camera does not show the environmental impact of atomic energy in use, deflecting the attention away from the possible spread of radioactive by-products and waste. In the blockbusters, the reinvented sustainable energy is ultimately subordinated to conventional nuclear power.

This analysis of *The Avengers* and *The Dark Knight Rises* underscores that popular genre pictures such as superhero films are relevant to environmental communication research, insofar as they touch on issues such as energy and sustainability. Blockbusters like the ones in question here are inevitably the arbiters of media consumption, shaping and reshaping continuously the way the citizens of the global village engage with cultural products and communication technologies. As the great flagships of contemporary franchises, the two films that enjoy an immense fandom and a worldwide following also contribute to perpetuating the confusion over such issues in their fans' worlds. Given the absence of these movies from the critical gaze of scholarly discussions in environmental communication, further research about superheroes in relation to various cultural or scientific contexts may be anticipated for the near future. The superheroes who acquire their superpower through experiments, together with those whose origin stories have (recently) been altered, may especially possess an even greater potential in that regard. The possible directions for this research would expand the horizon of scholarship on environmental communication and beyond.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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