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Energy Ethics: Emerging Perspectives in a Time of Transition

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Comments, Debates, Reports and Interviews

Reviews

Energy Ethics
A Literature Review

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ABSTRACT

This article is intended as a broad review of contributions from the humanities and social sciences to the theme of energy ethics. Although not exhaustive and (unfortunately) limited to the English-speaking world, it surveys, describes and discusses several past and recent books and articles as well as interdisicplinary projects and conferences that are relevant to energy ethics broadly construed. The primary goals of this literature review are to provide some orientation to the readers of this Special Issue (vol. 6.1 and 6.2) and to stimulate more dialog, creativity and intellectual engagements concerning the emerging field of energy ethics.

Keywords: energy ethics; philosophy of energy; energy; literature review; anthropology of energy; energy ethnography; energy humanities; energy studies; petroculture; religion.

> *But the humanistic project of reframing energy as a social or human question has not advanced very far. Currently, new energy inputs such as wind power, solar power, biofuels, and so on are posited as the end game of the transition, but fundamental commitment to values, to satisfying social relations, and to our collective imaginaries are, at best, left to the margins of the discussion, if not erased from the conversation.*
>
> Petrocultures Research Group, After Oil [1]

* The majority of the work for this article was done while the author was still PhD candidate in the environmental ethics doctoral program at the University of North Texas (UNT), in Denton, TX, USA.

[1] Petrocultures Research Group 2016, 14.

1. Introduction

In the Editorial to the first volume of this Special Issue (6.1), I was honored to introduce all the contributions of this collective project. For this reason, I invite the readers interested in understanding the motivation and the goals of this SI as well as how the different pieces fit together to refer to that opening article (Frigo 2018a). This article presents examples of energy scholarship from five main areas, all of which relate to the overarching theme of energy ethics: social sciences such as anthropology and ethnography of energy, the emergent field of energy humanities, Christian religious studies, and ethics and philosophy of energy. In the final section, it will also mention some conferences and interdisciplinary projects related to energy ethics. The most important aspect to remember to fully appreciate the novelty and provocative character of many of these works is considering the fact that for more than two hundred years the study of energy has been the domain of the natural sciences and engineering. However, over the past three decades scholars, writers, and poets have gradually but persistently developed alternative narratives to explore the nuances of energy. Books and journals, policy work, international conferences, and interdisciplinary research projects have also expanded the scope and enlarged the audience that can benefit from these alternative accounts. The development of energy ethics (or broadly speaking, the philosophy of energy) depends on, and is indebted to many of these alternative accounts of energy. The overall goal of this literature review is to bridge the scientific modern energy paradigm (Frigo 2017) to the perspectives of social sciences and humanities. This integration attains a more holistic understanding of energy which has the potential, in turn, to positively influence practical ethics and public policies concerning the energy transition.

The engagement of humanities scholars and social scientists with energy issues has been primarily required by two facts. First, a growing awareness that concrete energy issues do not happen only theoretically or in the scientists' labs, but are practically entangled with ethical, economic and socio-political dimensions. What has slowly grown over the past decade or so is the recognition that energy plays a great role and impacts human life in a myriad of ways, many of which remain unsurprisingly outside of the approach of the physical sciences. For quite some time psychological, behavioral, ethical, and socio-political aspects of energy have been, for instance, ignored, dismissed, or not seriously taken into account. Of course, here I am particularly interested in philosophical and ethical dimensions, such as the moral values surrounding

personal and social issues and, more generally, concerning the energy transition.

Second, and related, over the past three or four decades, scholars in the social sciences and humanities have been challenging the monopoly of natural sciences in studying energy. Therefore, the key idea behind this review is to propose studies that are based on the methods and analyses of different scholarly traditions as well as non-academic practices, thus emphasizing alternative paths of inquiry through, at least to some extent, different media and outlets.

Yet, what is remarkable is that most if not all the intellectuals I will mention here have also assumed the notion or concept of energy elaborated by the natural sciences. Given that I just mentioned that these other disciplines have challenged the monopoly of natural sciences and engineering, this affirmation may sound confusing. But the fact is that even the sect of "heretical" intellectuals who challenged high-energy societies, the entanglement of technoscience and modern society, or the illusion and dangers of perpetual growth have, overall, assumed the ontology or paradigmatic outlook provided by technoscience. To put it differently, the novelty in their thinking lays in the *normative* side. These authors have indeed proposed alternative ways of envisioning the *moral* and *political* dimensions of the human-energy-nature relationship by suggesting, for instance, ideas of degrowth or frugality. But the point is that most social scientists, artists, and philosophers have implicitly adopted (knowingly or not) the *descriptive* account that I called the traditional energy paradigm (Frigo 2017). To my knowledge, the exceptions are, on the one hand and generally speaking, cultural anthropologists (because they often frame their studies within cultural relativism) and, on the other hand, a few intellectuals with a keen philosophical attitude. A formidable example of the latter group is Croatian-Austrian philosopher and sharp cultural critic Ivan Illich. In fact, Illich understood that, ontologically, the pre-modern meaning of energy differed from the scientific one:

> To get at the matter I must review briefly the core meanings of "energy", how it was transmogrified from human vigor to nature's capital. In Greek, the word "energy" is both frequent and strong. It might best be rendered in English as "being on the make", with all the shades this expression carries. In its Latin version, in actu, the term is of central importance in medieval philosophy, meaning form, perfection, act, in contrast to mere possibility. In ordinary English, the word first appears in the sixteenth century. For Elizabethans, energy means the vigor of an utterance, the force of an expression, always the quality of a personal presence. A hundred years later the word can qualify an impersonal impact: the power

> of an argument or the ability of church music to generate an effect in the soul. The term is still used exclusively for psychic effects, although only for those engendered by either a person or a thing. During the seventeenth century, the attempt got underway to quantify nature's forces. (2013, 108)

Despite this and a few other exceptions that I will reference below, there has not been a systematic attempt to challenge the metaphysical and ontological assumptions of the concept of energy developed by the natural sciences and applied through engineering. Therefore, a major implication of this literature review is to suggest that there is a need to conceptualize energy in more interdisciplinary and transdisciplinary ways.

In the context of western civilization, the beginning of concerted public moral concern for the broader implications of energy, and implicitly for the environment, sprang from events such as the Manhattan Project and the following discharge of the atomic bombs during WWII (Briggle and Mitcham 2012), the growing consciousness of aggravating environmental problems such as the detrimental effects of DDT (Carson 1962), and the multiple energy crises of the 1970s (Runyon 1973; Garrison 1987).

There are many textbooks that describe the evolution of energy use by humans, present analyses, and future prospects (McElroy 2010; Fay and Golomb 2012). There have also been attempts to write an entire cultural history of humankind based on the relationship of humans to energy (Smil 2017). A little known example of the latter is, for example, the book *Man and Energy* by chemical engineer Alfred R. Ubbelohde, who proposed a history of energy sources linked to the study of thermodynamics, suggesting a political arrangement à la Bacon (*New Atlantis*) in which most of the work is done by inanimate energy slaves (Ubbelohde 1955). In the initial chapter, emphatically entitled "Dominion over Matter through Energy" Ubbelohde describes the intricate and fascinating human dependency on energy throughout history, underlining also the fact that thermodynamic laws constitute physical limits, and may represent also ethical boundaries for humans. This and similar publications by scholars such as Vaclav Smil (1994; 1999; 2004; 2010c; 2014; 2017) explore the cultural history of humankind in connection to energy, resources, and civilization. This kind of work is surely interesting for this Special Issue because it advances the notion that human evolution is intrinsically linked to the use of different resources over time (Price 1995). However, in this article I will focus primarily on energy scholarship that has dealt with the theme of energy not only historically, but also somewhat *philosophically*. The following review shows that the present discussion about the philosophy of energy is not

taking place in the void but comes after more than five decades of work, a legacy on which also many of the contributions featured in this two volume Special Issue stand.

2. Social Sciences I: anthropology and ethnography of energy

In the English-speaking world, an explicit engagement of social sciences [2] with energy studies started in the 1940s, with the publication of Leslie A. White's *Energy and the Evolution of Culture* (1943). Although his cultural evolutionist position was later criticized, his famous article is one of the corner stones of anthropology of energy. According to White, "we see, on all levels of reality, that phenomena lend themselves to description and interpretation in terms of energy […] the whole cultural structure depends upon the material, mechanical means with which man articulates himself with the earth". From this assumption, White derives what he calls "*the* law of cultural evolution: *culture develops when the amount of energy harnessed by man per capita per year is increased; or as the efficiency of the technological means of putting this energy to work is increased; or, as both factors are simultaneously increased*" (338; italics in the original). White, however, does not derive any explicit moral consequence from his study of cultural evolution. Even though he mentions different stages of development, and social structural organization dependent on amounts of energies and type of technological advancement, his interest remains mostly on the descriptive and analytical sides.

Over the past decades, anthropologists and ethnographers of energy have been stressing a bottom-up approach aimed at making the different understandings of energy, sustainability, and nature produced in different cultural contexts visible. Other aspects that have been studied, that are important but will not be extensively considered here concern psychological, behavioral (Allcott and Mullainathan 2010), sociological (Mazur 2017), gendered (Gaard 2001; Winner 2003), economic (Georgescu-Roegen 1971, 1976) and political (Hughes and Lipscy 1979; Leggett 1991, 2014; Shaffer 2009; Verbeek 2011; Vanderheiden 2013; Burke and Stephens 2017; Do et al. 2018) dimensions of energy issues.

To understand the reasons why the perspectives of social sciences can benefit energy studies we can refer to a guest editorial of *Anthropology*

[2] Here, social sciences are intended in a narrow sense, essentially anthropology, ethnography, and sociology.

Today. In his "Why Energy Needs Anthropology" (2005) anthropologist Harold Wilhite asks why there is not such a thing as energy anthropology and makes the case for its implementation. He writes:

> There is hardly a place anywhere where consumption of energy is not straining the economic or environmental limitations of energy resources, as well as the economic and technical capacity to convert resources into usable energy. Given the centrality of energy in daily life everywhere around the world, and its significance in some of the more contested political debates of our times, one would expect it to be an important emerging subject for anthropology. […] Energy exists in many physical forms, and the ways of converting it into something useful have rightly been seen as the domain of engineering, physics and the other natural sciences. However, energy is of little use in and of itself. It must pass through a socio-technological system in order to reach the site of its intended use. (1)

Since energy "begins its social life as a limited resource requiring management", and given that over the 1990s and 2000s there was "a massive worldwide shift toward the market, through the privatization or deregulation" there is a need for a reflection about the "biography of energy" that goes beyond social sciences based on economics. Aware that climate change has been the springboard of much energy debate, Wilhite suggests that "new ways of thinking are called for, drawing on the bread and butter of anthropology, for example in understanding the ways in which family relations (kinship), gender, relations of production, meaning and morals are all mutually implicated in the uses of energy. This could also provide new thinking in energy policy" (2). After several calls to action such as this, since around 2010 there has been a boom of social sciences scholarship concerning energy. Some of the most important venues have been both specific journals such as *Energy Research & Social Science* (established in 2014) as well as multiple edited volumes. Many of the contributions in the anthropology of energy have focused specifically on "oil" (Love 2008; Reyna and Behrends 2008; Hitchcock 2010; Buell 2012; Huber 2012, 2013; Rogers 2015) and aspire to study energy systems as energy cultures (Pfister et al. 2017). Several scholars have also explored other important aspects of the human-energy-nature relationship, thus providing an interesting bridge to both energy justice and energy humanities discussed below. Consider some examples and four main collections of studies.

Cesare Marchetti (2003), for example, offers a historical perspective of human evolution through the lens of energy systems and according to the corresponding type of resource extracted from nature. Moving from the concern of energy crisis, Lynton K. Caldwell (1976) presents the links

between energy and the structure of modern social institutions that promoted a characteristic type of economic growth:

> The institutions of modern industrial society have been better adapted to promote this growth than to control or direct it. Even in societies where mechanisms of state planning should, in theory, enable government to deal rationally with the growth problem, ideological commitments to general growth have, in effect, prevented the problem from being addressed. (31)

Another interdisciplinary collaboration is that of sociologist Santander Cabrera and biologist Vicente Fuster who, in their "Energy and Sociality in Human Populations" (2002) attempt to characterize and define human populations from a thermodynamic point of view. These and other studies, such as the rich collection edited by Mogens Rüdiger (2008) show the potential of social sciences to offer alternative, non-dominant views about energy.

Anthropology and ethnography of energy are certainly in tune with the methods of other social sciences. However, they are typically characterized by a qualitative approach to research, rather than quantitative. In practice, this means that they favor data collection based on smaller groups samples and through techniques such as interviews and participative observation, utilizing "a long-time perspective in which context is crucial" (Nader et al. 2010). Laura Nader was one of the first intellectuals to stimulate the discussion about energy and anthropology. For instance, she proposed novel ideas regarding the interwoven realities of power and democracy presenting "four views of the future involving widely varying levels of energy consumption and life-styles" (Nader 1980). More recently, she edited with Leticia Cesarino and Chris Hebdon the riveting collection *The Energy Reader* (2010) which collects examples of anthropology of energy written by "physicists, philosophers, economists, engineers, businesspeople, historians, and more". In the introduction, the editors write:

> While Lawrence Summers once said that the third world is "underpolluted", a more ecological perspective would stress the planet as interlinked; we're all in this together. Furthermore, as the United States transitions from present sources of energy to future possibilities, paradigm shifts will occur. (1)

Interestingly, here the authors use the term paradigm too, indirectly endorsing the idea I indicated elsewhere (Frigo 2018b), namely that an ecological understanding of energy would constitute a sort of paradigm shift. The greatest merit of this collection is probably its interdisciplinarity, because it gathers

> paradigmatic points of view more colloquially called "mind-sets", found everywhere, whether in business, science, economics, technologies, or anthropology. When people refer to thinking in or out of a box they are referring to mind-sets or paradigms. Quite commonly, people discover their mind-sets when they come into contact with others at interdisciplinary meetings, leading to either frustration or expressions of "Ah-ha". (2)

For the sake of this review, the most provocative chapters are those found in *Part II: Mind-Sets – a Critical Perspective*. In chapter twelve therein, which is derived from another paper (Nader 1981) also entitled "Barriers to Thinking New about Energy", Laura Nader recalls her experience at an interdisciplinary NASA conference in Monterey, California, where she was invited as "the anthropologist". The idea behind the gathering was to "think freely" about different future energy scenario, but Nader noticed that

> it became quite clear that there were already boundaries around those scenarios. You were to think freely – within those boundaries. When you went beyond them, someone would tell you, "You're off the track". Finally, I told one fellow that we didn't know where the track was; that was why we were there. (9)

Nader recalls that all the interactions she had during this and other events were mostly with white males, either scientists and engineers. She also highlights a number of "taboos" that were not discussed (e.g. public safety always assumed within the design and never really debated) as well as other "basic" but essential assumptions that were worth discussing such as that "breeder reactors is the only way to go". A striking point for Nader occurred when she was asked to work in the Synthesis Panel to describe what life would be like in 2010:

> I was intrigued by how people were working on the project. In the first place, I'd never done any work with the future. As I've said, anthropologists study the past and the present; we don't study societies that don't exist, nor do we invent them. I soon learned that our humility was probably misplaced in this project, because economists don't mind inventing all kind of societies. When what they invent often happens, invention becomes self-fulfilling prophecy […]. (10)

Then, Nader challenged her team to think about a scenario that did not involve an increase in energy demand but would still maintain the same level of amenities, a hypothesis that sounded impossible to several members. But the point of the conversation is that the incredulous fellows concluded that it was impossible because they were assuming growth models only, thus begging the question: "what do people think is possible?" Nader concludes by suggesting that, indeed, the 70-to-70 quads

energy scenario she and few others suggested "is fairly easy to carry out, with little disruption in people's lives. Essentially what we focused on was technical efficiency. Cars get more miles to the gallon, refrigerators give the same service but use less electricity […] a lot of little things that added to a fair amount of saving with very little change".

Similarly, in chapter 14, "Energy as it Relates to the Quality and Style of Life", Nader and Stephen Beckerman challenge the idea (also introduced by Illich and Smil) that increased energy consumption equals increased quality of life, concluding that one does not necessarily follow from the other. In the end, the interdisciplinary experience of this anthropologist shows that specific energy ethics (or philosophies of energy) depend on the cultural assumptions and disciplinarian attitudes underlying the conversation. It is in this sense that anthropology of energy is mostly concerned with what different actors think and experience regarding energy in different geographical, socio-economic and cultural contexts, also in relation to the benefits and burdens of energy projects, namely energy justice. However, the perspectives brought in by anthropologists are rarely normative, although they can of course provide the descriptive basis for those. Rather, the attempt is to look underneath the surface of contemporary energy debates, to gain a complex, hard look at the ideas and values which are fueling different peoples' understanding of energy and the environment. An important assumption is that how humans think about energy has an impact on the built environment and on their countless relationships with nature. Nevertheless, anthropologist do talk about ethics, just not as philosophers do. Anthropology of ethics challenges the disciplinary idea that ethics is most of all a theoretical study of morality, an approach strenuously defended for decades in academia. Scholars such as Jarrett Zigon and Michael Lambek have shown that morality can be successfully studied from the bottom up, as ordinary ethics (Zigon 2008; Lambek 2010) instead of top-down systems of ethics. Energy ethnographies present concrete lived energy experiences, clarifying the meaning of energy justice and sustainable energy in practice. The inclusion of more diverse understandings of energy is an important step to improve our thinking about what energy is for different groups of people and in the ecosphere.

In their introduction to a recent special issue entitled *Exploring the Anthropology of Energy: Ethnography, Energy and Ethics* Jessica Smith and Mette High write that

> Given this conceptual orientation of anthropology, our calling for attention to energy ethics does not involve the scholar making a priori assumptions about what constitutes a good life, a good community, a moral person and the like. This is not an exercise in which scholars impose their own moral

> views on to those we study. Rather, it is a call for us to be cognizant of the moral aspects of social life as it pertains to matters of energy. (2017, 4)

In the same collection feature several articles on the anthropology of energy, addressing topics as diverse as decolonization (Lennon 2017), aesthetics of electric transmission (Wuebben 2017), bacteria and bio-energy (Chatti et al. 2017; McLeod et al. 2017), blackouts (Kesselring 2017), off-grid living (Forde 2017), radioactive waste (Richter 2017), in contexts as different as United States, Zambia, India, or Wales.

Sara Strauss et al. edited another seminal collection of anthropological studies entitled *Cultures of Energy: Power, Practices, Technologies* (2013). The editors clearly summarize why anthropology can provide a fruitful outlook for a more inclusive study of energy:

> Energy is an area ripe for anthropological investigation in at least three ways: how people experience and utilize energies of various qualities (types), how we rely on its quantity (continued flow), and how we harness both qualities and quantities of energy to construct socially meaningful worlds. […] An anthropology of energy must shuttle back and forth among laws of physics, opportunities and constraints of ecological systems, and processes of culture; furthermore, these layers of reality are necessarily intertwined materially, rhetorically, and metaphorically. […] Because of the necessity of institutions to manage energy flows, and because of the necessity of energy flows to individual agency, an anthropology of energy is necessarily political. (11-2)

But it is the third reason stressed by the editors that really links to the philosophy of energy:

> […] although people realize at some level that "energy" drives our worlds, humans typically think about and experience energy according to what it does and how it enables our goals. As contributors to this volume demonstrate, energy never just "is", existing as some unmediated potentiality; it flows through socionatural systems via the nodes and switches in the social circuitry of power and meaning-making. People make sense of energy in a plethora of ways, from animistic veneration of the sun, wind, or other natural forces to commodity or machine fetishism. An anthropology of energy must therefore also analyze multiple, contested meanings. (12)

Moreover, the anthology presents a series of case studies and conceptual essays that explore "cultural conceptions of energy as it is imagined, developed, utilized, and contested in everyday contexts around the globe" (10). Moving from the work of Appadurai (1990), the volume "offers analyses of 'energyscapes' at local, national, and transnational levels". The conceptual threads of many of the contributions emphasize the ideas of "currents" and "flows" that are expressed, for instance, in

the metaphor of the "powerlines". The other two key themes are "transformations" and the "blurry cultural boundary between technology and magic, highlighting the multiple and simultaneous interpretations of energy and energy technologies that people in diverse societies hold" (11). The two most interesting chapters for this review are Stephanie Rupp's "Considering Energy: $E = mc^2 = (\text{magic} \cdot \text{culture})^2$", and "Multinatural Resources: Ontologies of Energy and the Politics of Inevitability in Alaska" by Chelsea Chapman.

Rupp moves from the hypothesis that New Yorkers rarely stop to think about energy and yet they "experience energy as a force that is ubiquitous yet invisible, uncontrollable yet indispensable" thus bearing assumptions and expectations about energy. Rupp argues "that lacking accessible technical knowledge for thinking about energy and its uses, New Yorkers turn to multiple and hybrid images – magical, spiritual, corporeal, social, political, as well as technical – to explain the forces that enable their everyday lives" (79). For Rupp, New Yorkers' discussions of energy reveal that

> city residents perceive energy through both formalist and substantivist models. Formalist models refer to quantifiable energy systems that provide the technical infrastructure on which high-energy, high-technology, information-saturated city residents depend. Substantivist models of energy are reflections on energy as a qualitative force that is socially embedded and mediated by people's relationships with each other and with the conditions of their daily lives. […] applying these theoretical frameworks to contemporary understandings of energy in New York City reveal a multiplicity of concurrent models that together shape how urban residents perceive and manage energy, the forces necessary to get things done. These models of energy – quantitative, rational, formalist on the one hand; qualitative, relational, substantivist on the other – are distinct but are complementary rather than contradictory. (80-1)

In chapter 14, Chapman uses the term ontology "to signal the presence of alternative and indigenous epistemic spaces in such conflicts as it indicates ways of knowing and acting toward energy sources that, like water, land, and wildlife, are all too often considered neutral and static commodities" (96). She proposes a dual framework to understand energy perceptions. On the one hand, "natural resources" have been mostly conceptualized in multinational ways "extracted and circulated among countries, metrics, economies, and other sorts of petro-capital alliance". On the other hand, indigenous Alaskans seem to understand them as "multinatural" phenomena:

> […] they are also multinatural in the ways that they exist in many natures, diverse cosmologies of resources, society, and environment. In Alaska,

> such curious hybrids – especially oil and gas – have a long and storied presence as a recurring gold rush, as sources of phenomenal wealth and indigenous empowerment and/or dispossession, and as harbingers of ecological collapse. These mythic narratives are underpinned by historical conceptions of what energy is and fields of knowledge of how it works that hover uneasily around the interactions of corporations, state and federal regulatory groups, tribal governments, scientists […]. (96)

Therefore, these examples of anthropology of energy take the cosmologies elaborated in contexts as different as New York City and Alaska seriously into account as possible path of inquiry to better understand how people make sense of energy in their situated experience. Besides anthropology tout court, the most recent and promising avenues of research in the social sciences are probably energy justice (Hall 2013; Heffron and McCauley 2017; Jenkins, McCauley, and Forman 2017; Sovacool et al. 2017; Jenkins 2018), energy transitions (Shaffer 2009), and energy democracy (Meadows 1991; Menser and Hayduk 2014; Morris and Jungjohann 2016; Fairchild and Weinrub 2017; Morris and Jungjohann 2017; Menser 2018).

3. Social Sciences II: energy justice

Leaving aside for reasons of space energy transition and energy democracy literature, I briefly examine here only the conceptual matrix of energy justice and then explain how the concept differs, according to its founders, from both climate and environmental justice. In general, the relevance of this notion is demonstrated by the recent publication of two distinct journal special issues on it, *Energy Research & Social Science*, vol. 18, 2016 and *Energy Policy*, vol. 105, 2017.

The scholarship on energy justice seems to have flourished especially in the United Kingdom and Europe where several scholars have been actively working to establish the notion, clarify the orientation, and spread its adoption. A strong advocate for energy justice is energy scholar Benjamin Sovacool whose numerous publications offer an overall idea of the intersectional trajectories of philosophically relevant social science research. In his *Energy & Ethics: Justice and the Global Energy Challenge* (2013) Sovacool stresses the relationships between access to energy and resources, technologies, policies and the moral issue of justice. *Energy & Ethics* appears in dialog with another, more recent publication of Sovacool and Dworkin (2015) devoted to a comprehensive and comparative account of energy justice studies specifically. Both publications attempt to engage social sciences with ethics on the pivotal issues of poverty and

unbalanced access to energy and resources. They introduce the idea that energy injustices are so widespread that energy justice can become, by itself, an actual area of inquiry.

Two other recent articles compared in *Energy Research & Social Science* (Jenkins et al. 2016; Jenkins 2018) further expand on the theoretical foundations as well as on the "specialty" of energy justice. By drawing on the work of McCauley et al. (2013), Jenkins et al. open their "Energy Justice: a Conceptual Review" with a definition of energy justice:

> [… it] evaluates (a) where injustices emerge, (b) which affected sections of society are ignored, (c) which processes exist for their remediation in order to (i) reveal, and (ii) reduce such injustices. (175)

Then, they present the three types of justice that constitute the so-called "triumvirate of tenets": distributional, procedural, and recognition-based justices. *Distributional* justice investigates the cases in which energy production and consumption raise justice concerns. *Recognition-based* justice "moves researchers to consider which sections of society are ignored or misrepresented" and highlights cases of non-recognition and disrespect concerning, for instance, indigenous (Whyte 2017; de Onís 2018), aging, or disabled people. Finally, *procedural* justice "inspires researchers to explore the ways in which decision-makers have sought to engage with communities" and suggests, for example, mechanisms for the inclusion of communities and individuals affected by energy projects. Finally, Jenkins (2018) clarifies what differentiates energy justice from both climate and environmental ones. She outlines "three points of departure, which [she] argues increase the opportunity of success for the energy justice concept: (1) 'bounding out' [of environmental and climate justice] (2) non-anti-establishment [non-activist] pasts and (3) methodological strength" (118). Summarizing, Jenkins concludes that

> Energy justice is (1) more targeted in its topic of concern and systems focus, and therefore has increased potential for policy uptake, (2) unlike environmental and climate justice, is not the outcome of anti-establishment social movements, and (3) is backed by a strong methodological tradition which shows a range of both academic and policy-relevant applications. Each of these factors increases its potential for widespread applications. By implication, there should be a continued and fervent increase in energy justice scholarship and application. (120)

Although it is debatable whether energy justice really constitutes a separated area of inquiry, it is worth recognizing that, at least there is a growing awareness of the fact that ethical concepts can be relevant in the discussion about energy.

4. Energy studies

Besides anthropology/ethnography and energy justice, the other key area of scholarship that contributed significantly to a more profound discussion about energy's socio-political implications is what can be called "energy studies". Broadly construed, this field includes several scholars who are typically trained in the natural sciences, economics, environmental studies, geography, and energy policy. Among them, I highlight here the contribution of Vaclav Smil, whose prolific and pioneering work deserves a special recognition. Smil has devoted numerous articles and books to the theme of energy, contributing to the popularization of the topic (Smil 2006; 2008), and linking it in innovative ways to issues of sustainability and energy transition (Smil 2010b), resources availability and ecological footprint (Smil 2002; 2012), and even meat production (Smil 2013b). However, the two most interesting elements of Smil's scholarship may reside, first, in his attempt to deconstruct some "energy myths" and "soft energy illusions" (Smil 2010a), or what he otherwise calls "the infatuation of global energy" (Smil 2011) and, second, in his study of energy consumption thresholds related to quality of life. In *Energy at the Crossroads* (2003), for instance, he identifies specific amounts of annual per capita energy use in relation to key parameters that are significant to express minimal levels of human well-being. Applying his research to the 57 most populous countries, Smil begins by recognizing that

> All energy conversions undertaken by humans share the same raison d'être: they are just means toward a multitude of ends. All of the commonly used measures of energy use – be it conversion efficiencies, energy costs, per capita utilization levels, growth rates, consumption elasticities, or output ratios – are just helpful indicators of the performance and the dynamics of processes whose aim should not be merely to secure basic existential needs or to satisfy assorted consumerist urges but also to enrich intellectual lives and to make us more successful as a social and caring species. (97)

Smil is aware that the "assessment of average national quality of human life cannot rely on a single surrogate" and since "quality of life" is obviously a multidimensional concept, it

> embraces attributes of narrow physical well-being (these, in turn, reflect wider environmental and social settings) as well as the entire spectrum of human mental development and aspirations. Foremost in the first category is the access to adequate nutrition and to health care, as well as the capacity to address effectively a large array of natural and man-made risks […].

> The second key component of human well-being starts with the universal delivery of good-quality basic education and should obviously include the exercise of personal freedoms. (97)

Among several indicators, he suggests that "infant mortality and life expectancy are perhaps the two best indicators of the physical quality of life". Smil discusses several other indicators (civil rights or access to education, etc.) but overall concludes that

> annual per capita energy consumption of between 50-70 GJ thus appears to be the minimum for any society where a general satisfaction of essential physical needs is combined with fairly widespread opportunities for intellectual advancement and with the respect for basic individual rights. […and concludes that …] the quest for ever-higher energy use thus has no justification either in objective evaluations reviewed in this section, or in subjective self-assessments. (105)

The important fact to consider here, is that countries such as the United States or Canada consume almost three times the required minimal amount, with 285 GJ (6800 koe) and 318 GJ (7600 koe) annual per capita energy use respectively. Although debatable because of the risk of imposing imperialistic and/or Western standards of well-being, Smil's key point is that

> acceptable infant mortalities (below 30/1,000 live births) corresponded to annual per capita energy use of at least 30-40 GJ. But fairly low infant mortalities (less than 20/1,000 live births) prevailed only in countries consuming at least 60 GJ a year per capita, and the lowest rates (below 10) were not found in any country using less than about 110 GJ (fig. 2.10) [see, *fig. 1* below]. However, increased energy use beyond this point is not associated with any further declines of infant mortality, and the correlation for the entire data set of 57 countries. (98)

Following Smil's reasoning, I deliberately play devil's advocate claiming that both the parameters he indicated (life expectancy and mortality at birth), but perhaps even more significantly the overall quality of life is definitely not increased by energy consumption above 110 GJ/c/y. My home country of Italy, for instance, remains at about 104 GJ (2,400 koe) while maintaining an average life expectancy of 83.5 (US: 78.3) and infant mortality rate of 2.67 deaths per thousand live births (US: 5.58). Of course, this does not represent a competition between nations' well-being, but just a comparison between energy consumptions rates and the open-ended debate about quality of life as it relates to standards of living and other factors.

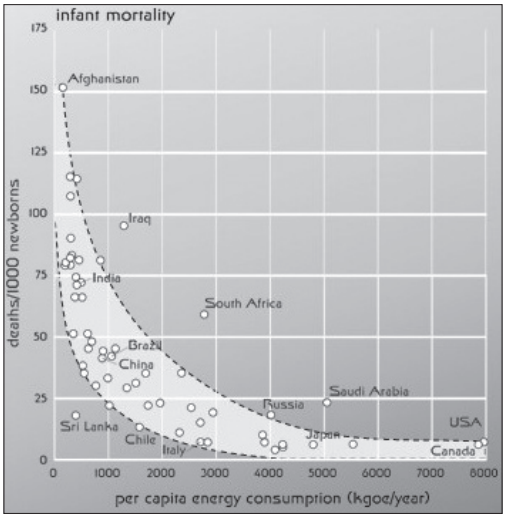

Figure 1. – Comparison of infant mortality with average annual per capita use of commercial energy. Plotted from data in UNDP (2001). Source: Smil 2003.

In conclusion, Smil's observations have inspired others to take a hard look at the relationships between amounts of energy fluctuating in ecological and social systems (production, consumption, distribution, and waste) in relation to individual and social wellbeing. The contribution of energy studies can definitely enrich energy ethics by complexifying the debate and adding nuances to how energy is actually part of human and ecosystemic life. The following three sections: energy humanities, ethics and philosophy of energy, and interdisciplinary conferences and projects, further explore paths of inquiry similar to the anthropology of energy.

5. Energy humanities

Writers, artists, and poets have been cultivating the innovative field of energy humanities especially over the past decade. Among other things, scholars in energy humanities (similar to those of environmental humanities) explore energy through poetry, novels, and essays, but also experiment with other media such as photography and film. Because they are both concerned with delving into the muddy waters of "energy cultures", there are many connections between anthropology/ethnography of energy and energy humanities. Even though there is no need to sharply

distinguish the two, energy humanities can be characterized as those contributions that do not necessarily employ specific scientific methods of inquiry. Rather they utilize the tools of investigative journalism, the literary acumen of novelists, or the mesmerizing charm of poetry. At times, they change the game altogether by refusing the written format and embark on innovative experiments through audio-visual and performative arts. The novelty of energy humanities resides, perhaps, in these uncommon, original attempts to talk about energy.

Paula Farca's *Energy in Literature* (2015) is one of the richest collections of energy humanities. This recent anthology collects 20th and 21st century poems, critical essays, and photos which show the connections between energy, society, and environment from the unusual but rich perspective of the humanities. Various contributions deal with different sources of energy, while others concentrate on issues of pollution, waste, or extractions. The most relevant essays tackle timely topics related to the interwoven dimensions of gender and ethnicity, or the ever-lasting (and debatable) tension between nature and culture.

Foundational work for the academic establishment of this field was done, among others, by Dominic Boyer and Imre Szeman (Szeman and Boyer 2017). Boyer directs the Center for Energy and Environmental Research in the Human Sciences at Rice University [3] and organizes with Cymene Howe and the scholars of the Center an annual workshop called *Energy Cultures* (at its 7th edition in 2018). Boyer and Howe also produce a blog and a weekly podcast that features energy scholars and artists. The other "founding father", Szeman, is based at the University of Alberta and is one of the leaders of the Petrocultures Research Group [4]. Together, they edited the second anthology in the field after Farca's (Szeman and Boyer 2017). The volume collects almost fifty pieces ranging from classics of literature to contemporary stories. Some contributions stand out in the third part, "Energy in Philosophy: Ethics, Politics, and Being" for they connect to the development of a philosophy of energy.

To get a further glimpse of energy humanities it can be useful to turn to the article "The Charge Against Electricity" by Mark Anusas and Tim Ingold. Here, the authors report a legal case in which electricity is charged with gross deception. This is the beginning:

> Electricity has become such a ubiquitous feature of modern life that most of us would have no idea how to manage without it. Interruptions in supply are experienced as unsustainable moments of crisis. The possibility that

[3] http://culturesofenergy.com/.
[4] http://petrocultures.com/.

> the supply of electricity might eventually run dry is every government's worst nightmare and underpins the global politics of energy. Do we blame electricity for having brought us to this state of dependency? Can we hold it responsible for the disempowerment of citizens, for the entrapment of their lives within a state-sponsored grid maintained by corporations? Or does it, on the contrary, hold the potential for emancipation? Is electricity guilty or not guilty? In what follows, we begin with the case for the prosecution. Then we present the case for the defense. You, our readers, are the jury, and we leave the verdict for you to decide. (540)

In this case, the authors wanted to create a fictional story that, nonetheless, implies some profound reflections on energy, from the commodious lifestyle afforded by an electrified built environment, to issues of public (dis)empowerment over energy production and distribution.

My reading of the energy humanities literature suggests that a theme that has gained traction is that of oil cultures or "the socio-cultural complexities and contradictions of petrocultures" (Petrocultures Research Group 2016). Moving from the work of LeMenager, Farca, Boyer, and Szeman, several other authors have written about this, conjugating ethnographic experiences, travels, and sometimes philosophical reflections. The only problem with this trend, highlights Christopher Jones (2016), is that oil is currently over-represented in the energy humanities, a state of affairs Jones describes as "petromyopia". Consider in this regard the online issue of August 2017 of *Technology's Stories* – the online platform of the Society for the History of Technology – gathers several of these interesting narratives. For example, Abby Spinak oil encounters in West Texas (2017) and Sarah Stanford-McIntyre's Latourian reflection "When Oil Was Modern" (2017).

6. Religious studies

Interestingly, the first (English) appearance of the expression "energy ethics" was in the title Dieter T. Hessel's book *Energy Ethics: a Christian Response* (1979). Even though it is difficult to determine whether Hessel coined the term himself or not, this publication is an example of the contribution of religious thinking to the theme of energy ethics, a trend that has re-emerged more recently in the work of more contemporary scholars. Hessel's book was the result of the work of a committee appointed in 1974 by the National Council of Churches of Christ (NCCC) "to study the moral and religious issues in the use of plutonium as a commercial nuclear fuel". Even though it was intended as a "sourcebook for discus-

sion in Christian churches" it represents an early example of the interests for energy issues that emerged during the 1970s in the wake of the energy crisis. In this edited volume, Hessel's contribution is an "analysis of the justice of energy politics from a biblical perspective".

More recently, Erin Lothes Biviano et al. (2016) focus on energy ethics from a religious standpoint, in the wake of Hessel's work. Their *Catholic Moral Traditions and Energy Ethics for the Twenty-First Century* aims at founding a Catholic energy ethics that pays "attention to current energy realities with scientific and technological precision, and can offer unique clarity about the specifically moral character of the problem" (Biviano et al. 2016, 1-2; see also Biviano 2018 in vol 6.1 of this Special Issue). "Clarity" for Biviano depends on the special alliance that Christian believers maintain they have with a god who gifted them the world as creation. From an environmental philosophy standpoint, this Christian approach to energy ethics is interesting in that it provides a counterargument to the "accusatory" stance of scholars such as Lynn White Jr. who saw in the Judeo-Christian teleology and metaphysics the primary causes of the ecological crisis because, "especially in its Western form, Christianity is the most anthropocentric religion the world has seen". White claimed that since both science and technology are blessed words in our contemporary vocabulary, we need to remember that both notions are culturally interlinked with religion and may perpetuate some of its teleological aims. First, historically, modern science is an extrapolation of natural theology and, second, modern technology is at least partly to be explained as an Occidental, voluntarist realization of the Christian dogma of man's transcendence of, and rightful mastery over, nature [5]. But, as we now recognize, somewhat over a century ago science and technology-hitherto quite separate activities-joined to give mankind powers which, to judge by many of the ecologic effects, are out of control. If so, Christianity bears a huge burden of guilt.

A final example of Catholic engagement with environmental and energy issues came in 2014 with the publication of Pope Francis' encyclical *Laudato Si'* (2015), which constitutes both a call for action and a theological and ecological vision [6]. But the strong positioning of the pontifex maximus was indeed anticipated and followed by several other activities

[5] For a similar exploration of the teleological nature of supposedly post-Christian ideologies, see the seminal work of philosopher of history Karl Löwith, *Meaning in History* (Lowith 1949).

[6] Franciscan perspectives on the human-nature relationship are also very relevant. See, for instance, Mizzoni 2008.

and events organized by the Vatican. The antecedents go back as far as the week of study retreat held in Vatican City on November 10th-15th, 1980, titled "Mankind and Energy: Needs, Resources, Hopes" (Pontifical Academy of Sciences 1982). A more recent example is the joint workshop organized on May 6th, 2014, by the Pontifical Academies of Sciences and Social Sciences. This event produced a trilingual report on *Sustainable Humanity. Sustainable Nature. Our Responsibility* (2014) in which several intellectuals presented their research and agreed on a final joint Statement entitled "Stabilizing the Climate and Giving Energy Access to All with an Inclusive Economy". In it, for instance, the participants state that

> Perhaps the greatest challenge lies in the sphere of human values. […] We need, above all, to change our convictions and attitudes, and combat the globalization of indifference with its culture of waste and idolatry of money. We should insist upon the preferential option for the poor; strengthen the family and community; and honor and protect Creation as humanity's imperative responsibility to future generations. We have the innovative and technological capability to be good stewards of Creation. Humanity needs urgently to redirect our relationship with nature by adopting the Sustainable Development Goals so as to promote a sustainable pattern of economic development and social inclusion. A human ecology that is healthy in terms of ethical virtues contributes to the achievement of sustainable nature and a balanced environment. Today we need a relationship of mutual benefit: true values should permeate the economy and respect for Creation should promote human dignity and wellbeing. (23)

But the encyclical also explicitly and repeatedly mentions "energy" in connection to its efficiency, conservation, equal distribution and access, and toward non-polluting forms. For example, in paragraph 26 Francis (2015) links climate change and energy issues by writing:

> There is an urgent need to develop policies so that, in the next few years, the emission of carbon dioxide and other highly polluting gases can be drastically reduced, for example, substituting for fossil fuels and developing sources of renewable energy. Worldwide there is minimal access to clean and renewable energy. There is still a need to develop adequate storage technologies. Some countries have made considerable progress, although it is far from constituting a significant proportion. Investments have also been made in means of production and transportation which consume less energy and require fewer raw materials, as well as in methods of construction and renovating buildings which improve their energy efficiency. But these good practices are still far from widespread. (24)

Finally, in the year following *Laudato Si'*, the Pontifical Council for Justice and Peace published the book *Energy, Justice, and Peace: a Reflection*

on Energy in the Current Context of Development and Environmental Protection (2016) which adds an ulterior clarification of the links between the topic of energy and those of justice and peace.

Unfortunately, I have not found literature from other religious traditions such as Islam or Hinduism engaged with the concept of energy. But again, this might be a further confirmation that energy itself is a rather contextualized concept. In any case, the Christian tradition has, on the one hand, assumed the traditional energy paradigm but, on the other, thought about the ethical implications of energy. Christian intellectuals have prioritized, understandably, the discussion of a more just redistribution of god-given resources rather than embarking on the development of an ecocentric outlook.

7. Philosophy and ethics

If we turn specifically to possible antecedents of a philosophy of energy, or more specifically to an ethics of energy, the examples become rarer and sometimes they are "under cover". By this, I mean that sometimes the work that has the more philosophical significance is not called directly "philosophy" and is therefore hidden under other labels.

But what is especially surprising is that there are very few metaphysical and ontological reflections explicitly devoted to energy, and even fewer that address the philosophy behind its conceptualization. The interest for this intersection appeared during the period of "energetics" studies at the turn of the 20th century. Non-deterministic, non-mechanistic perspectives flourished during this period too. We can look at the history of math, geometry, statistics, and physics but also at the work of philosophers, psychologists, and psychiatrists. Examples do not abound but can be found, for instance, in John G. Hibben's "The Theory of Energetics and Its Philosophical Bearings" (1903), Harold Chapman's "Matter and Energy" (1917), or Henri Bergson's *Mind-Energy* (1920). Another example is William James who, in his *The Energies of Men* (1907) grapples with the surprising resourcefulness of humans, not only in physical terms, but as "inner work" that allows men to move from higher to lower states and vice versa:

> Writing is higher than walking, thinking is higher than writing, deciding higher than thinking, deciding "no" higher than deciding "yes" – at least the man who passes from one of these activities to another will usually say that each later one involves a greater element of inner work than the earlier ones, even though the total heat given out or the footpounds expended by

> the organism, may be less. Just how to conceive this inner work physiologically is as yet impossible, but psychologically we all know what the word means. We need a particular spur or effort to start us upon inner work; it tires us to sustain it; and when long sustained, we know how easily we lapse. When I speak of "energizing", and its rates and levels and sources, I mean therefore our inner as well as our outer work. […] The first point to agree upon […] is that as a rule men habitually use only a small part of the powers which they actually possess and which they might use under appropriate conditions. […] Either some unusual stimulus fills them with emotional excitement, or some unusual idea of necessity induces them to make an extra effort of will. Excitements, ideas, and efforts, in a word, are what carry us over the dam. (11-6)

Another very influential philosophical perspective that has tackled energy issues especially in relation to the logic of domination is that of ecofeminism. Scholars such as Vandana Shiva and Maria Mies (Mies and Shiva 2014), Karen Warren (Warren 1990; 1997), Val Plumwood (Plumwood 1993; 2002), Carolyn Merchant (Merchant 1980; 2005), or Trish Glazebrook (Glazebrook 2004, 2005; Glazebrook and Kola-Olusanya 2011) wrote extensively about how a patriarchal mode of understanding nature has shaped the way (some) humans relate to the natural world. Moreover, ecofeminist scholars have extensively explored the interconnection between nature and motherhood (Roach 1996; 2003), ethics, energy, and climate change (Glazebrook 2011; Gaard 2015), and the specific situation of women dealing with energy and water issues (Gaard 2001). Finally, a recurrent theme in ecofeminist scholarship that is worth mentioning here, although it is not separated from those above, is that of (in)justice and inequalities which are often framed in terms of planetary North-South imbalances (Shiva 1988, 2003; Gaard and Gruen 2003; Seppälä 2016).

If we turn to ethics of energy, or energy ethics, the intellectual landscape becomes more nuanced. In this section, I mention some of the most relevant philosophical works and then offer some examples of a moral engagement with energy issues [7]. On the more theoretical side, an example is psychiatrist Stanley Jacobs who, aware of the risk of raising some controversial points about linking ancient Indian philosophy to the scientific study of energy, promotes in his "A Philosophy of Energy" (1989) a broadening of the definition of energy as

[7] I owe to Professor Carl Mitcham credit regarding the antecedents of an "energy ethics", through his LAIS Research Award Lecture titled, "From the Ethics of Energy to the Energy of Ethics" presented on November 28th, 2012. The works I refer to are those published and available in English.

> that from which the whole manifest universe arises, causal, subtle and physical. It can be experienced through its manifestations. It can be measured precisely in the physical world by scientific instruments, and measured precisely in the worlds beyond the physical by a direct knowledge of measure itself. (96)

Jacobs agrees that "there is potential energy, by virtue of position, kinetic energy by virtue of movement, and inertial energy by virtue of mass". But he argues that energy of inertia "that energy associated with the inertia of a body, by virtue of its mass, whether in a vacuum or resting on a surface – can also be thought of as the resistance of an object to movement, or to doing work". Since we know from experience that a "person who is self-motivated and 'raring to go' implies also that after intellectual work we have moved ideas around and in emotional work we have shifted certain feelings and attitudes around". Jacobs suggests a broader definition of energy that "includes both the capacity to do work, and the capacity to resist doing work", thus proposing that "the physical phenomena of energy are, perhaps, reflections of the more subtle, psychological ones". In this way, Jacobs does not really challenge the energy paradigm, but expands it to include human emotional life.

A second example of philosophy of energy is the provocative article of another psychiatrist, Stanley W. Jackson. In his "Subjective Experiences and the Concept of Energy" (1967), he aims at integrating the scientific conceptualization of energy. Jackson proposes that yet another factor, "man's subjective experience of effort, energy, or vigor, has *also* played a critical role in the origins and development of the concept of energy" (602; italics in the original).

More recently, praiseworthy attempts have been made to delineate a philosophy of energy (Geerts et al. 2016, 2017a; Geerts 2017b, 2018). In "Towards a Philosophy of Energy" Geerts et al. (2016) attempt to establish the field of philosophy of energy by locating it amongst

> its theoretical neighbors and identifying its roots and ancestors. We compare and contrast the philosophy of energy to these fields, and defend the position that this indeed entails a distinct niche that comes with its own specific perspective that is not, and cannot be, adequately addressed by any other field. (107)

The authors suggest that there are at least three philosophies of energy which, altogether, contribute to a "fully-fledge philosophy of energy". First, the inquiry into the natural phenomenon of energy. Second, a critique of the functioning of energy in society. And third, the philosophy of technology in its "empirical turn". But referring to qualitative energy

paradigms is key because the authors affirm that it would be very relevant to determine whether an overarching philosophy of energy could reconnect "two apparently disjointed conceptions of energy", that is the traditional energy paradigm and the "non-exact phenomenon of 'life energy'". In fact,

> the scientific understanding of energy has enabled society to plug into ever increasing amounts of energy in various forms, but it fails to say much about the *effects* of these developments on society. […] Something similar holds for inquiries into life energy: they are silent on energy external to the body. However, while this is not problematic in itself, should we seek to gauge what is changing in energy transition, a static understanding of energy falls short of the mark. (110)

After a dense discussion of the contributions of Mumford, Bataille, and Heidegger, Geerts et al. clarify the empirical turn that took place in philosophy of technology toward the end of the first decade of the 21st century (Brey 2010; Verbeek 2011):

> From grand critiques on technology in general, attention has shifted towards the ways in which particular technologies – say, pre-natal ultrasound or Skype – lead to new moral problems, or new conceptions of proximity. This focus on artifacts has proved very useful in providing clarification and guidance in an increasingly complicated technological lifeworld. (118-9)

Furthermore, the researches of Science, Technology and Society (STS) studies point out that science is not a value-free endeavor (Douglas 2009) and that devices and systems (e.g. pipelines, dams, transmission lines, power plants) do not happen in the void but incorporate cultural and societal preferences and values, a "morality" of their own (Winner 2003; Verbeek 2011, 2013). Nevertheless, the authors disagree with the use of such approach in relation to energy technologies because of "the way the energy aspects of our daily practices tend to get hidden from sight by the artifacts we adopt and use". Instead they propose a systemic view "because only at the systemic level can we fruitfully distinguish between different energy practices". Moving from this systemic perspective, they make a distinction between an understanding of energy as potentiality, which is static, and one as flux, characterized by its dynamicity, highlighting that the difference is crucial because it "revolves around whether or not humanity *controls* it". Finally, applying the twin concept of flux/dynamic and potential/static to the electric grid, Geerts et al. point out that the electricity is typically conceptualized as potentiality/static, where it is actually in flux. The conclusion, then, is that "the formerly unprob-

lematic misconception of electricity as potentiality becomes an issue when intermittent renewable sources become more significant in the energy mix". In times of energy transition from fossil fuels (potential) to renewable sources (flux) "technological solutions can go a long way, but still need some help from consumers". Therefore, consumer awareness of the fluctuating nature of renewable energy becomes the key premise for their active participation and cooperation, thus showing "how a brief philosophical exploration of a rather specific issue to energy transition quickly leads onto fundamental questions regarding the functioning of energy in society".

Another important contribution is that of philosopher Mario Bunge, who writes about the metaphysical dimensions of energy in his "Energy: between Physics and Metaphysics" (2000). Furthermore, at the crossroads of ethnography and philosophy of energy lies the article "Vital Energy" by Stephen Gudeman (2012) which offers a reflection on the concept of "vital energy" as a current of "strength" or "force". This idea is central to the economies of Panama and Colombia and "connects all activities in the local economies and establishes relationships, from kin to strangers" (57).

On a very different note, Finnish philosophers Tere Vadén and Antti Salminen (2007) identify the connections between the nature of modernity, the addiction to fossil fuels, and the socio-political structure in which most humans are embedded:

> The fact that fossil energy is in a blind spot of social thought is in itself remarkable, as many of the experiential characteristics of modernity are directly connected to fossil fuels. The experience of speed and acceleration, celebrated by futurists and modernisers, fascists and communists alike, is derivative of the use of fossil fuels. Many commentators have lauded an independence from or even a victory over nature. Ironically, the impression of independence is made possible by a unique natural endowment, namely, amassed high quality hydrocarbons. This ironical twist gives modernity its characteristic epistemologically delusional nature. (51)

In subsequent work, the same authors analyzed what human existence means in the neoliberal, capitalistic age of fossil fuels by offering an "experiential, phenomenological, and therefore politico-economical view on oil", a "nafthology" capable of investigating both its material and theoretical dimensions (2015; see also Vadén and Salminen 2018).

Luckily, reflections that grapple explicitly with energy issues from a moral perspective are not as rare as those on the metaphysical and ontological aspects (Mitcham and Rolston 2013; Sovacool 2013; Briggle 2015; Heckel 2015; Meinhold 2016). Most of the work has been devoted to energy in connection to the concept of equity (Illich 1974), responsibility

(Dernbach and Brown 2009; Shirani et al. 2013), the fundamental problem of obligations toward future generations (Wenz 1983; Parfit 2010; Jamieson 2014), and the capability approach in relation to clean energy as one of the 17 Sustainable Development Goals (Hillerbrand 2018).

All-around theorist Ivan Illich wrote about "energy and equity" stressing that a precise moral concern for higher energy consumption on a planet with limited resources arises in relation to incomparable privileges in the access of resources (Illich 1974; 2013). Probably also as a consequence of his religious background, Illich was concerned with the actual practice of morally virtuous energy choices. In this sense, he was one of the first intellectuals to show that choices that are made regarding how we organize spaces and infrastructures, that is ultimately utilizing energy, depend on specific socio-historical and geographic assumptions, and may have morally relevant consequences. His famous discussion of "how energy is used to move people" proposes the comparison between bicycles and cars, and it represents an exemplary, provocative attempt to apply moral philosophy to energy issues. For instance, regarding traffic issues Illich affirms that

> There are two roads from where we are to technological maturity: one is the road of liberation from affluence; the other is the road of liberation from dependence. Both roads have the same destination: the social restructuring of space that offers to each person the constantly renewed experience that the centre of the world is where he stands, walks and lives. […] A concrete analysis of traffic betrays the truth underlying the energy crisis: the impact of industrially packaged quanta of energy on the social environment tends to be degrading, exhausting and enslaving, and these effects come into play even before those which threaten the pollution of the physical environment and the extinction of the race. The crucial point at which these effects can be reversed is not, however, a matter of deduction, but of decision. (75-6)

If we turn to academic philosophy, we discover that professional ethicists have devoted very little space to the themes of energy and ethics, where most of the contributions come from the field of environmental ethics. Rather than looking at energy in a technical sense or attempting to understand how nature ends up in built environments, traditional environmental philosophy and ethics have focused more on ideas and practices related to nature, environment, and resources. Two interesting examples of this kind of approach are Peter S. Wenz's paper "Ethics, Energy, Policy, and Future Generations" (1983), which explores the intertemporal dimension of an ethical approach to energy policy and Dale Jamieson chapter "Energy, Ethics, and the Transformation of Nature" (2014).

Finally, a recent interdisciplinary example that summarizes the approaches of both anthropology and philosophy of technology to the theme of energy ethics can be found in the work of Carl Mitcham and Jessica Smith "Energy Constraints" (Mitcham and Rolston Smith 2013). Their article offers an overview of the area of energy ethics according to the perspectives of both anthropology of energy and philosophy of energy. In line with what I argued above, they also suggest that

> the historico-philosophical analysis of the concept of energy in the West from Aristotle to Einstein further suggests the need for much more careful analysis than is usually found in talk about energy policy and politics. Aristotle's energia or active reality is only remotely related to the energy of early modern natural philosophy and mechanics. (316)

In the core of the article, Mitcham and Smith turn to ethics proposing "type I and type II energy ethics as a framework for advancing public debate about energy" which, they claim, "can easily modify common productive, economic, environmental, and political attitudes toward energy". Type I energy ethics is based on the belief that there is a linear relation between energy and culture and "it necessarily assumes that energy production and use is a fundamental good". Further developing the reasoning of Illich in his *Energy and Equity* (1974), the authors propose that "skepticism with regard to such a linear relationship is the foundation of a type II framework". The type II energy ethics resembles both Illich's and Smil's approaches, in that it assumes that "beyond a threshold abstractly defined as that between enough and too much, energy production and consumption begins to undermine the abilities of people to lead their own lives" (317). Interestingly, type II energy ethics can adapt to different ethical theories:

> Energy is argued to be at most a qualified rather than an unqualified good; as perhaps necessary, but only up to a point, beyond which it can in multiple ways become counterproductive. In the form of a consequentialist or utilitarian argument, after crossing a certain threshold, increasing energy production and use reduces the quality of life. In teleological terms, stabilized or balanced energy use by humans is more natural than unrestricted increases. From a deontological perspective, humans are rationally obligated to limit not only their utilizations of energy but its production as well. Historically there are clearly questions to be raised about whether the grand narrative of human change can be characterized as simply one of progressive energy development. And surely there are instances in which energy is ugly – ugly even in its sublimity. (318)

This seminal for the recent study of energy and ethics ends with three provocative questions which are also a call for ulterior engagements of both anthropology and philosophy:

> Could it not be that energy production and use, when examined from the limited perspectives of economics and politics, is itself a constraint on leading the good life? Do not both anthropology and philosophy suggest that life is more than energy production and use? Are there not other perspectives from history to art, poetry, psychology, and religion that could further de-constrain and enrich the way people think about energy? (318)

In another article in this volume (6.2.), a recent interview with Carl Mitcham expands and offers an update on his ideas about energy and ethics (Mitcham and Frigo 2018).

These are just some examples of the initial engagement of philosophy and ethics with the topic of energy. It can surely be affirmed that the work and insights of these intellectuals, among others, represent the basis for contemporary debates. What clearly emerges from these early works is the realization of the moral consequences of the finitude of resources, as well as a conceptual challenge to think energy in relation to justice, equality, equity, and responsibility, for both present and future generations.

8. Conferences and interdisciplinary projects

In this last section, I mention seven important public occasions in which the conversation about energy departed from a disciplinarian setting and opened up to favor a broader discussion. For example, Philosophy of Technology and Science, Technology and Society (STS) studies have been discussing the theme of energy broadly, focusing mainly on engineering's demand for ethics in its educational curricula. The following are instances of interdisciplinary work that began the dialog that this Special Issue aims to continue.

First, from a more pedagogical standpoint, philosopher Douglas MacLean created in 1982 a "model course" entitled "Ethics and Energy" at the Center for Philosophy and Public Policy at the University of Maryland which was the first university class aimed at merging ethics and energy issues (MacLean 1982). More recently, two MIT scholars, Nathan Lee and Lucas Stanczyk, promoted a course entitled "The Ethics of Energy Policy", started in fall 2015. [8]

The second contribution is UNESCO's World Commission on the Ethics of Scientific Knowledge and Technology (COMEST). The head of this organization, James Peter Kimmins, edited in 2001 a study entitled

[8] http://energy.mit.edu/news/morals-matter-new-class-explores-energy-and-ethics/.

The Ethics of Energy: a Framework For Action which was the result of the work of the COMEST sub-commission on the Ethics of Energy that gathered in Paris in November 2000 (Kimmins 2001). COMEST's contribution to energy ethics can be found in the central, formidable section entitled *The Ethical Challenge of Energy*:

> Linking ethics inextricably to energy requires this type of universal vision, one that seeks to arrive at practical action that is responsive, flexible and participatory. The complexity of energy issues […] shows that all potential solutions to individual energy questions involve a social cost, an ethical dilemma and an impact on the way other problems are resolved. Thus, they can only be looked at within a broader consideration of the functioning of the world system of which energy is but one intimately woven component. […] Ethics play an important role in issues of development for the future by clarifying values at stake in policy decisions and giving moral reasons for alternative courses of action. Environmental and development questions are loaded with moral implications that need to be understood and carefully weighed before intelligent choices are made. This should help resolve value conflicts that thwart ecological conservation and development projects. (33-5)

Kimmins also writes that "with the help of ethics, a new social paradigm should evolve that would promote sustainable development with the maintenance of cultural diversity, social justice and equity" thus also highlighting the fact that a change of mentality is overdue.

Third, the Conference *Ethics, Energy and the Future: Technology for a Sustainable Society* organized in June 2010 by S. Matthew Liao at Delft University of Technology in the Netherlands was probably the first institutionally organized event that explored the links between ethics and energy in the field of STS. The goal of this gathering was to develop guidelines for a "sustainable ethics for future energy systems". This conference was part of an overall project pursued at the 3.TU.Centre for Sustainable Energy Technologies (now 4.TU.) aimed at "(i) the analysis of the notion of sustainability in the context of the discussion of future energy systems, (ii) the development of a normative framework (a sustainable ethics) for the moral evaluation of sustainable energy systems, and (iii) recommendations for the use of such an assessment framework in R&D processes" [9].

A fourth example is *Energy Ethics in Science and Engineering Education*, a cutting-edge project that the National Academy of Engineering

[9] http://ethicsandtechnology.eu/research-projects/a_sustainable_ethics_for_future_energy_systems/.

and Arizona State University developed between 2011 and 2014. According to NAE's *Outcomes Report*, the project's findings

> indicate that choices to develop or reorient energy technologies entail ethical and societal commitments that go beyond those that can be captured in cost-benefit analyses. They involve issues of justice as well as community life, so the choices should attend to questions of public participation and engagement, particularly how to include those persons and groups who are less influential. Design decisions that scientists and engineers make, and alternative energy pathways that can be selected, will influence the answers to these social and ethical questions so they need to be accounted for in these decisions. These findings influenced the educational framework and materials developed in the project. The project introduces energy systems as complex socio-technological systems and introduces ethical approaches to the analysis of these systems and system transitions. [10]

Fifth, the first conference explicitly entitled *Energy Ethics* – although particularly from an anthropological perspective – was organized on March 17th-18th, 2016, by Mette High and Jessica Smith at the University of St. Andrews, Scotland [11]. During April 2nd-5th, 2017, publishing company Elsevier organized the First International Conference on Energy Research and Social Science *Energy for Society* in Melia Sitges, Spain [12].

The sixth example is a personal one because at the Public Philosophy Network (PPN) Conference held in Boulder, CO in February 2018 I myself organized a workshop on the *Philosophical and Ethical Contributions to the Sustainable Energy Discourse* (Frigo 2018b).

Finally, on September 12th-13th, 2018, the conference *Energy Justice and the Capability Approach – Interdisciplinary Perspectives*, held at Malmö University, Sweden and organized by Anders Melin, gathered renowned scholars such as R. Day, S. Gardiner, R. Hillerbrand, G. Walker, K. Jenkins and B. Taebi who explored the potential of the capability approach for conceptualizing and studying issues of energy justice. In conclusion, these and other writings, courses, conferences, workshops, and projects aim at expanding the interdisciplinarity of the energy discourse and have been instrumental in both enlarging the audience interested in energy issues and stimulating alternative ways of thinking about energy.

[10] https://www.nae.edu/EnergyEthics.aspx.
[11] http://energyethics.wp.st-andrews.ac.uk/.
[12] https://www.elsevier.com/events/conferences/international-conference-on-energy-research-and-social-science.

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