Energy Ethics: Emerging Perspectives in a Time of Transition

Editorial

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1. Introduction

> *"E" is an algorithm, "energy" is a loaded word. "E" is meaningful only within a formula, "energy" is charged with hidden implications: it refers to a subtle something which has the ability to make nature do work.*
>
> Ivan Illich, *The Social Construction of Energy* (2015)

This special issue grapples with the timely and exciting theme of "energy ethics". It is a one of a kind publication bringing together 16 intellectuals from 10 different countries. It includes both young researchers and established scholars working in disciplines as different as anthropology, sustainability studies, public policy, theology and, of course, philosophy. Its cosmopolitan orientation and the diversity of its contributions offer a wide range of positions together with innovative approaches to the study of energy.

The goal of this collective project is threefold. First, it aims at exploring energy's multifaceted cultural and philosophical dimensions with a specific attention to ethics. For this reason, authors were given significant freedom of inquiry and yet, they have been invited to develop their original work in line with the scope and orientation of the journal. Second, the overall collection shows that the humanities in general, and ethics specifically, can fruitfully contribute to the energy discourse, bringing analytical acumen and reflective depth concerning the moral and socio-cultural implications of energy. Third, despite the fact that such unpredictable engagements with the topic of energy may sometimes appear unusual or challenging, they are aimed at sparkling further dialog across disciplines, enriching the debate about current energy transitions from fossil fuels to clean, renewable and sustainable sources.

Following the usual format of *Relations. Beyond Anthropocentrism*, this special issue is also published in two separated volumes. The present issue, vol. 6.1, will be followed in November 2018 by vol. 6.2. Besides this introduction, each edition contains five research papers, two comments, one interview and reviews. In the second issue, the "energy ethics" interview will feature philosopher of technology Carl Mitcham, one of the most influential contemporary thinkers on the topic of energy and ethics. The dialog with Mitcham – a tireless public intellectual internationally recognized for his efforts in bridging the gap between engineering and ethics – will help further engage the reader with the theme of energy and ethics from its inception in the early 1970s to its recent developments in China and beyond.

Since the present editorial serves both volumes, the second issue will not feature a separated introduction. Instead, vol. 6.2 will begin with a broad literature review of the most relevant antecedents in the study of energy and ethics. It will survey past and current scholarly literature in energy humanities, anthropology of energy and ethics of energy, including recent conferences and interdisciplinary projects. It will thus help the readers better orient themselves in this new area of intellectual engagement and hopefully intrigue some to explore further.

In the attempt to present the overarching narrative of this project and introduce the inspiring work of the authors – my patient companions in this one-year-long intellectual journey – this introduction ponders on the exciting opportunity to think *philosophically* about energy. Section 2 suggests an indirect reflection on energy inequality and injustice by presenting some implications of contemporary "energivorous" lifestyles, namely those surrounded by techno-science and addicted to fossil fuels. In section 3, I discuss how the modern and scientific concept of energy is a cultural construct emerged during the early Industrial Revolution (Wrigley 2010) through the work of several natural philosophers, later known as disciplinary scientists and engineers (Frigo 2017). Understanding the emergence of the scientific conceptualization of energy is pivotal to appreciate, evaluate and then challenge some key assumptions that lie at its basis. For instance, it is rarely appreciated that the energy discourse commonly depends on a rather specific understanding of the human-nature relationship that is tacitly assumed and taken for granted. In section 4, I will fully embrace the spirit of *Relations* and explore ways to think about energy as if humans were not the center and the measure of everything. Namely I will try to philosophize about energy beyond anthropocentrism. This part constitutes the core of the article and supports the thesis that it is time to update and reorient the energy concept in an ecocentric direction. I propose that an ecocentric philosophy of energy – or

an ecocentric energy ethic – can successfully integrate the understanding of energy produced by physics, chemistry and engineering with knowledge and insights drawn from ecology, inter-species energy justice and ecocentric environmental philosophy. I argue that an ecocentric energy concept would improve the human-nature-energy relationship, updating humans' understanding of the fundamental links between energy, ecology and ethics towards the actualization of strong sustainability (Neumayer 2013). Section 5 concludes the editorial and clarifies the significance of the project. Throughout the text I also have the honor to introduce the inspiring contents of this collection.

2. High energy societies and the conundrum of energy transition

> *The commonly accepted basis of our economy is the supposed possibility of limitless growth, limitless wants, limitless wealth, limitless natural resources, limitless energy, and limitless debt.*
>
> Wendell Barry, *Faustian Economics* (2008)

Starting in the Western world, modern societies have become high energy socio-political assemblages (Illich 2015). In many parts of the globe, humans are extremely *energivorous*, addicted to a commodious lifestyle based on abundant and intense power, the availability of which they expect and take for granted (Borgmann 1984). Contemporary lifestyles are based on sophisticated techno-scientific premises and are unthinkable without recurring to *ad hoc* socio-political and economic apparatuses that guarantee an enormous and steady input of resources into the system.

Although *Homo sapiens* has always used the environment to survive (McElroy 2009, 2010; Pain 2017), it is especially over the last two centuries that a growing number of humans have extracted from nature larger amounts of fuels and materials, exploiting not only the work of other humans, but especially that of animals and the services of ecosystems at rates that many consider unsustainable (Heinberg 2003, 2015; Elliott 2007; Brown 2009; Meadowcroft 2009). The astonishing rate of population growth has brought humans from 1.6 billion in 1900 to more than 7.6 billion in 2018, an almost five-fold increase. In the span of just few decades a new animal has appeared, *Homo energeticus* who, through techno-scientific domination, reifies, commodifies and prices nature to serve its growing needs (Kowalsky and Haluza-DeLay 2013).

On this regard, Italian "human overpopulation" thinker Andrea Natan Feltrin tackles in his comment "Energy Equality and the Challenges of Population Growth" (second volume) the issue of energy equality in relation to human population growth. He argues that "going beyond the capitalistic myth of never-ending growth becomes a moral duty" if we are to attain a fair distribution of energies on a planet with limited resources.

An energy transition to renewables is currently happening worldwide. This seems to require the electrification of infrastructures and devices to attain the switch of entire systems (Meadowcroft 2009; Smil 2010; Grubler 2012; Araújo 2014) to potentially 100% renewable sources (Delucchi and Jacobson 2011; Jacobson and Delucchi 2011; Jacobson 2014; Jacobson et al. 2017). However, the opportunity of providing a reliable system 100% based on renewable sources has raised scientific controversies and feasibility doubts (Clack et al. 2017). An evolution of energy sources has always happened in the history of humanity (Fouquet and Pearson 2012), and in very different ways (O'Connor 2010), but current energy transitions imply unprecedented scales and must deal with the addiction to, and dependence on fossil fuels. But, of course, energy transition is not only a policy issue and actually implies and expects behavioral changes of millions of people too.

Dealing with a poignant example of such complex struggle, Italian anthropologist Alice Dal Gobbo's article entitled "Desiring Ethics: Reflections on Veganism from an Observational Study of Transitions in Everyday Energy Use"(second issue) adopts observational ethnographic methods to study everyday energy transitions in Northern Italy. Dal Gobbo presents empirical material to "reflect psycho-socially on the potentialities of veganism as an energy ethics of sustainability" and warns of the danger of adopting a plant-based diet as an abstract moral imperative rather than a situated and nuanced ethical choice.

Like any systemic transformation, energy transition implies risks. These derive from unpredictable factors, uncertainty or ignorance. Since decisions must eventually be made, it is pivotal to address the ethical implications of just and sustainable energy transitions. In the present issue, Bertrand Andre Rossert's article "Ethical Risk and Energy" explores the currently grey area between ethics and risk management, focusing specifically on the notion of ethical risk in relation to the energy sector. Rossert agrees that there is an urgent need for an energy ethics as a fundamental tool to evaluate risk and proposes both a theoretical clarification of key concepts and a strategic pathway for the creation of a "risk management checklist". He delves into the nuances of the notions of ethical violations, deterioration, and improvement offering a series of compelling and relatable examples.

An updated version of ethical risk (perhaps even a biocentric one) provides a richer understanding of uncertain situations often occurring in complex energy projects. Advocating for an energy ethics that begins with a risk approach, Rossert affirms that "when energy ethics is as developed as bioethics is today, then energy companies will be able to take it into account", thus leading to a significant improvement of energy ethics in practice.

During this transition toward alternative and more sustainable systems, it is important to understand the premises from which we are moving. In other terms, we need to make sense of what it has meant to live for more than 200 years embedded in petrocultures (Black 2012; LeMenager 2014; Petrocultures Research Group 2016) which have allowed unprecedented, incredible transformations as well as problematic consequences.

In the first article of this issue – "Ethics, Nafthism, and the Fossil Subject" – Finnish philosophers Tere Vadén and Antti Salminen highlight that the presumed human "victory over nature" – an emblem of modern Western thinking – is "supremely ironic" because its essential material conditions depend on fossil fuels, a very natural occurrence. Expanding a thread of thought they started in their book *Energy and Experience* (2015), here the authors point out that the ethics of modern subjects is detached, forgetful of its dependence on a specific energy regime. Vadén and Salminenhelp us understand humans' entanglement with fossil fuels through a compelling "nafthology" and argue that a post-fossil energy ethics should ultimately be a-subjective and based on non-modern premises.

It is nowadays commonly agreed among climate and energy scholars that transitioning away from fossil fuels is the prerequisite for a meaningful worldwide contribution to climate change mitigation (Stephenson 2017) and has the potential to bolster significant technological innovation (Stolten and Scherer 2013). However, we might wonder whether techno-scientific strategies are enough for energy transitions that will take into account also non-human life. The question is not trivial because, again, it concerns the underlying assumptions of individual and collective lifestyles, policies and political decisions as well as the actual existence and wellness of non-human beings, biotic communities and ecosystems. In the wake of several other contemporary thinkers in energy humanities and social sciences, I hold that energy transition is not only a technical affair. Hence, it should not be understood only as a human socio-technological and economic problem, but also at its core as an ecological and philosophical one. Transitioning to clean and sustainable systems is intertwined with other dimensions of individual, social and ecosystemic life. Culturally and philosophically, they imply metaphysical, psychological, sociological, behavioral, gendered, legislative and religious considerations. Ecologically, they take place within

complex ecosystems in which also other species require adequate space and resources to thrive.

For example, one of the most interesting and yet quite rare perspectives on the ethics of energy is that of religion. Expanding her pioneering work on energy ethics from a Christian standpoint (2016), Erin Lothes Biviano contributes to this volume with her comment "Catholic Energy Ethics: Commitments and Criteria". In it, she lays the foundations for a theocentric theology of energy that is based on the "covenantal economy of creation and salvation", a proposal that acknowledges humans' privilege and addresses the irresponsibility for the implementation of an "integrated ecology of family, community, society, and earth".

Again, what is important to remember is that both cultural and ecological dimensions of the transitions are less visible than wind farms or Tesla Model 3 but, in my opinion, also essential to fully grasp their breadth and depth. If we ignore them by underestimating their influence or sweeping them under the rug as humanistic nuisance or unnecessary environmental alarmism, we run the risk of understanding only part of the story. As Janet Stephenson suggests, "to work effectively across disciplines, social scientists [and philosophers/ethicists] will need to learn something of what *energy* means, and physical scientists will need to learn something of what energy *means*" (Stephenson 2017). Environmental ethics, philosophy of technology, energy humanities and social sciences can help integrate the understanding of energy produced in the natural sciences toward a more holistic account.

In this special issue, three North American scholars specifically enlarge the boundaries of the energy discourse beyond anthropocentrism. In the first volume, Jacob Bethem's article "Life within Energy Policy" proposes to recognize and integrate the powerful and shared concept of "life" (value and sacredness of, reverence for) in energy policy. Moving from environmental philosophy, Bethem bridges his theoretical proposal to the case study of the Navajo Generating Station near Page, Arizona. In this way, he is able to show the possible concrete implications of a life-based philosophy of energy within a specific Native American struggle of moving beyond fossil while reimagining the community's future.

On a similar note, Matthew J. Burke's paper entitled "Mutually-Beneficial Renewable Energy Systems" (also in this volume) adopts "a relational view of energy futures, emphasizing and shifting attention toward the role of nonhuman elements of renewable energy systems to explore opportunities for rethinking renewable energy systems as processes for restoration and healing of human-nature relationships". Burke develops the rationale for his proposal addressing four areas: practice, ecology, ethics and culture. Then, he discusses several practical energy technologies with the goal

of not only avoiding or minimizing harm, but also supporting ecological enhancement and mutually-beneficial consequences for both human and non-human nature.

In the second volume, environmental philosopher Joseph M. Aloi brings us to the rural areas of West Virginia to delve into the intricacies and the trade-offs between the culture of coal extraction and food ethics. His "Coal Feeds My Family: Subsistence, Energy, and Industry in Central Appalachia" presents "the change in land-human relationships through the lens of food". Aloi analyzes and deconstructs the metaphor "coal feeds my family" and offers a nuanced description of a multifaceted energy reality in which the fossil economy based on the dead (coal) struggles to make sense of its disintegration. Meantime, communities are rediscovering their rich pre-industrial agricultural energy economy and land-based culture. These three articles contribute significantly to the development of a nuanced philosophy of energy that moves beyond anthropocentrism, one that acknowledges and accounts for essential ecological, economic and socio-cultural interdependencies. The relationship between economics, energy and human work is also discussed in Nora Ward's review of the book *Blood and Earth: Modern Slavery, Ecocide, and the Secret to Saving the World* by Kevin Bales. Connecting past and present types of slavery to the theme of energy, she discusses how "labor of human hands and human (and animal) bodies, occurring in conditions of coercion, poverty, and violence" still supplies "much of the raw energy for even the most advanced economies". So, current planetary imbalances of energy access and distribution are coupled with a system of exploitation. Ward highlights that "this kind of labor is not only destructive to the humans and human communities that it occurs in but also has devastating impacts on animals, plants, and wider ecological communities".

3. The modern and scientific energy paradigm

> *Paradoxically, the term energy, used for the preceding 300 years to designate the forcefulness of a face or the liveliness of a statement was first used to designate the "force of nature" precisely at the time when – in all the natural sciences – nature's vitality, its "Lebenskraft", was being systematically denied.*
>
> Ivan Illich, *The Social Construction of Energy* (2015)

Few topics are as important as energy. Indeed, energy is not so much a distinct topic as it is a thread woven throughout many of today's most pressing issues – from political economy to ecology to science and tech-

nology. As a result, there is no shortage of talk about energy. Especially since the oil crises of the early 1970s, one just needs to open a newspaper or scroll a webpage, to find a wide range of discussions that span from the energy costs of Bitcoin mining to surging wind development in West Texas, to talk of gas pipelines in southern Italy, the miracles of the Shale Revolution, or the promises of Tesla's Powerwall. Yet, no matter what the topic of conversation, I contend that the discourse is grounded on a problematic understanding of "energy", a *forma mentis* that has its deep roots in the modern worldview, and specifically in a flawed assumption about the human-energy-nature relationship. I call this assumed understanding "the energy paradigm", an account that has been produced by the natural sciences and has manifested in practice through the groundbreaking marvels of engineering [1]. In the discussion of such a paradigmatic worldview, I agree with Lynn White Jr. that what we do depends on what and how we think: "What people do about their ecology depends on what they think about themselves in relation to things around them" (1967). Similarly, the conceptualization of energy has had remarkable material consequences. I will explain that what we practically do in terms of power production, consumption, distribution and waste ultimately depends on what we think about energy. In this special issue, four authors directly challenge different aspects of the common understanding of energy. In very different ways, they suggest alternative outlooks which entail, overall, a profound reflection on several ingrained cultural assumptions that are worth unpacking.

Dutch philosopher of energy Robert-Jan Geerts – one of the few contemporary thinkers of techno-science who has engaged the theme of energy from an explicit philosophical perspective (Geerts et al. 2016; Geerts 2017) – offers in this first issue a theoretical challenge to a dominant reasoning of current energy transition discourse. His "Beyond Scarcity: Perspectives on Energy Transition" evaluates and criticizes the two usual notions of "boundless consumerism" and "eco-frugality" as they problematically relate to ideas of well-being and good life. Geerts considers both concepts somehow flawed because they share and move from the unappealing and unpopular idea of scarcity. Alternatively, he suggests that a third path is available, namely that of qualitative abundance. Instead of scarcity, qualitative abundance is based on ideas of prosperity and simplicity, hence it

[1] I use the term paradigm as a "pattern" or "characteristic way" of conceptualizing energy, and indirectly of *seeing* the non-human world. This interpretation bridges both Thomas S. Kuhn's "extended" or "global" meaning of scientific paradigm (Kuhn 1962; Kuhn 1969) and Albert Borgmann's idea of a "pattern of technology" represented by the devices which constitute the modern way "to take up with the world" (Borgmann 1984).

reframes the notion of a "good" energy system away from "too much or too little" and thus reshapes the lingo of the energy transition discourse.

The other three articles that challenge ulterior aspects of the energy paradigm will feature in the issue of November. French environmental cyclo-philosopher Damien Delorme challenges the common monopoly of the automobile transportation system in his exciting piece entitled "Contesting the Radical Monopoly: a Critical View on the Motorized Culture from a Cyclonaut Perspective". Delorme shares his six-months-longbike road trip across the United States following an imaginary *ligne verte* made of surprising intellectual and environmental encounters with both human and non-human animals [2]. His journey represents a decentering experience that affords "a critical outlook on the norms and usages brought by the engine culture". His paper proposes enriching our phenomenological experiences of energy through "autonomous movement that broadens our social imagination and contributes to face our current environmental crisis".

On a similar note, German philosopher Roman Meinhold moves away from mainstream considerations about energy as electricity or fossil fuels and focuses instead on neglected, yet crucial aspects of human energy. His article concerns the fundamental and often forgotten recognition that humans are active and moving beings. Meinhold deals with four types of human energy: interpersonal/social, movement, intellectual, and spiritual. His philosophical anthropology of energy merges phenomenology, virtue ethics, and a call for activity oriented toward wisdom. His proposal calls for a balanced and wise energy ethics that starts from within and requires practice.

Finally, Italian independent intellectual Federico Battistutta's comment, provocatively entitled "Energy of Ethics / Ethics of Energy" challenges the culture-nature dichotomy. He adopts insights from thinkers such as Luce Irigaray and Sigmund Freud to inquiry types of psychic and emotional energy that are not very well represented in the literature of energy and ethics but deserve indeed more attention in order to broaden our understanding of energy's ontology.

The work of these authors is in tune with, and seems to further support my claim that there is indeed a conception of energy that is prevalent and tacitly assumed in the energy discourse generally and in the context of energy transition specifically. This notion implies a great number of features typical of the modern period: a certain ideal of progress, assumptions of anthropocentrism linked to the commodification of nature, a strong reli-

[2] See his journey – Untaking Space: the U.S. Project – at: https://usproject2016.com/.

ance on the techno-scientific apparatus, a proactionary approach to risk assessment, free-market capitalism, individualistic and competitive values, and so on.

The scientific understanding of energy is a cultural construct produced in a very specific context, the Western, modern, and scientific world. Energy has been defined primarily by the natural sciences as a property of objects, that is the capacity of matter to do work. But this and other similar definitions stress only certain measurable, quantifiable and mechanistic properties of reality leaving outside everything else. I claim that the modern energy paradigm has been emphasizing anthropocentric ideas and instrumental values within the human-energy-nature relationship. Again, its norms, values, and principles derive from a scientific, mechanistic, quantitative, mathematized and even patriarchal approach that accounts only partially for the complexity of energy as a multi-faceted phenomenon [3]. Moreover, these characteristics make it not only obviously reductionist but ecologically and philosophically problematic too. The key point is that such modern and scientific understanding of energy has been taken for granted, becoming the "traditional" way in which most people think and act about energy. In practice, the most important implication is that this mentality has been having remarkable consequences (i.e. human population growth, technoscientific advancements but also devastation and ecocides), transforming planet Earth in dramatic ways. Especially over the past two centuries, energy practitioners (policy-makers, engineers, politicians, stakeholders) who have been operating according to this worldview have expanded built environments and at the same time drastically affected the non-human world and ecosystemic equilibria.

Since this Special Issue concerns energy and ethics, it is important to recall that the modern energy paradigm has its roots in the scientific attempt, starting in the 18th century, to "make sense" and name various phenomena related to, for example, heat exchanges, magnetism, light, electricity. The study of these phenomena was accompanied by the idea of improving the efficiency of different engines (e.g. steam, internal combustion), and hence the productivity of machines. Therefore, the study of energy bears the weight of its initial aim, namely improving the efficiency of machines. As Vaclav Smil has put it,

> Theoretical energy studies reached a satisfactory (though not a perfect) coherence and clarity before the end of the nineteenth century when, after

[3] For the sake of focus, in this article I will not delve into the last of these characteristics. One of the most thorough account of the relationships between patriarchy, control of nature and the scientific revolution is Merchant 1980 (see also Merchant 2006).

> generations of hesitant progress, the great outburst of Western intellectual and inventive activity laid down the firm foundations of modern science and soon afterwards developed many of its more sophisticated concepts. The ground work for these advances began in the seventeenth century, and advanced considerably during the course of the eighteenth, when it was aided by the adoption both of Isaac Newton's (1642-1727) comprehensive view of physics and by engineering experiments, particularly those associated with James Watt's (1736-1819) improvements of steam engines. (2006, 13)

The Western conceptualization of energy has depended on the scientific control of the forces of nature through mathematical language and the application of the scientific method: a rather homogeneous conception of energy emerged, which has become predominant and has been reigning substantially unchallenged in educational settings and policy-making. The blooming of the Industrial Revolution, a tremendous population expansion, the diffusion of ideas of progress and human exceptionalism have increased human hubris, individualism and greed, with the support of *ad hoc* socio-economic and ethical theories (Moncrief 1970). These views are so deeply ingrained that they have become normalized, and consequently invisible.

Another article in this first issue helps us better understand and indirectly appreciate the implications of the Western conceptualization of energy. In his "Renewable Energy Issues in Africa Contexts", Nigerian philosopher Diana-Abasi Ibanga provides an intriguing analysis that begins by criticizing the Western approach as inappropriate or inadequate to fully understand African energy dynamics. Drawing from sources as rich and diverse as Braai filosofie, Bantu and Annang languages, Ibanga develops an "African-specific understanding of the complex nexus of human-environment-posterity" and suggests principles and guidelines for ethical energy transitions and investment decisions broad enough and still peculiar to the African continent.

An ulterior challenge to the modern and scientific energy paradigm comes in this issue through the comment by anthropologist Deepti Chatti. In her "Cows, Cookstoves, and Climate Change: a Non-Anthropocentric View of Household Energy Use in the Rural Indian Himalayas", Chatti shows how cows, cookstoves and climate change are interconnected in the worldview and in the livelihood of people in the rural Indian Himalayas. The real risk of imposing technological artefacts such as "improved LPG cookstoves" must deal, on the one hand, with the unequal adverse impacts of household burdens on the health of children and women. On the other hand, it faces the existence of profound, complex multi-species entanglements between humans and cows, which also entail a specific gendered

care and responsibility for both human and non-human beings. Chatti's comment thus contributes to a more complex understanding of energy in non-Western contexts and to the articulation of a more inclusive energy ethics.

Going back to my discussion regarding the modern scientific energy paradigm, I argue that it is problematic for several reasons but, first of all, because of its manifest anthropocentrism. The problem of an anthropocentric energy paradigm is not limited to fossil fuels and their socio-environmental implications. Even current transitions to renewable energy sources perpetuate the energy paradigm, that is, they largely fail to account for the non-human world. Moreover, as mentioned above, this notion of energy emphasizes instrumental, mechanistic, and quantitative properties of nature which are assumed in the study, management and consumption of the natural world. Energy projects and policies are focused on maintaining or expanding the current production of power, or extending its distribution, for more human consumption. Questioning the deeper assumptions of such doings, evaluating alternative directions and addressing the related ecological consequences are only minor preoccupations.

In the meantime, there are dramatic issues of energy poverty and access worldwide and, of course, it is still essential to provide basic access to electricity to more than one billion people. It is important to clarify upfront that criticizing the anthropocentric nature of the traditional energy paradigm does not conflict with issues of human justice and equity. In fact, although the discourse of energy justice that emerged during the past decade has been tackling these issues, it has also been substantially human-centered. Yet, even though there is much good in the ongoing transitions to renewables and in the concerns of energy justice scholarship, they are both still problematically focused on humans and consider everything else as secondary, if at all.

A transition to a truly just and sustainable energy future requires a change in mindset – about the human-energy-nature relationship – and not only a change in policies or technologies. Because I maintain that energy transitions should be just also in inter-species terms and ecologically sound, I suggest that a more inclusive and non-anthropocentric account of energy is needed.

4. Toward a philosophy of energy beyond anthropocentrism

> *I follow the guidance of Nature […] Not to stray from Nature and to mold ourselves according to her law and pattern – this is true wisdom.*
>
> Seneca, *On the Happy Life* (about 58 C.E.)

Some antecedents of the type of reasoning I will outline here began in the mid-1970s in the field of environmental philosophy and ethics. Ecocentrism is a philosophical position that acknowledges and promotes the moral centrality and worth of all the species and the inanimate beings that live within different ecosystems of which humans are also considered an essential part. Non-human beings can be understood individualistically (each singular entity) or as part of communities (plants), populations (animals), ecosystems, eco-regions, or even the entire Earth (Eckersley 1992; Callicott 2013). Although it has been accused of being excessively radical and even indicted for eco-fascism, ecocentrism need not be misanthropic. Indeed, the vast majority of ecocentric positions typically argue not against humanity, but rather against the centrality or primacy of human beings, and advocate for a reshaping of the human-nature relationship in less hierarchical ways. Generally speaking, ecocentrism derives metaphysical and moral implications from the knowledge and insights of the ecological sciences (Callicott 1986). Since its emergence in the early 1970s, ecocentrism has branched out into several versions, or philosophical positions. Some of the most influential and "classic" references are North American scholars Holmes Rolston III (1988; 1991) and John Baird Callicott (1989; 1999), along with Norwegian philosopher Arne Naess (1973; 1989), the father of the "Deep Ecology" movement.

Here, I embrace an ecological definition of energy à la Aldo Leopold, the conservationist and writer who, in "The Land Ethic" proposed the idea that the very functioning of nature depends on the circulation of a "fountain" of solar radiation flowing through the land:

> Plants absorb energy from the sun. This energy flows through a circuit called the biota, which may be represented by a pyramid consisting of layers. The bottom layer is the soil. A plant layer rests on the soil, an insect layer on the plants, a bird and rodent layer on the insects, and so on up through various animal groups to the apex layer, which consists of the larger carnivores. […] Land, then, is not merely soil; it is a fountain of energy flowing through a circuit of soils, plants, and animals. Food chains are the living channels which conduct energy upward; death and decay return it to the soil. The circuit is not closed; some energy is dissipated in decay, some is added by

> absorption from the air, some is stored in soils, peats, and long-lived forests; but it is a sustained circuit, like a slowly augmented revolving fund of life. (1949, 182-4)

This deliberately broad description, for instance, integrates, rather than oppose, the mechanistic definition of physics that reduces energy to the "capacity of doing work", transforming nature into something to be used for the needs of humans. It is important to consider that thinking about energy from the perspective of environmental philosophy accomplishes two important goals. First, it enriches our understanding of energy in its conceptual and cultural dimensions. Second, and related, the proposal of an ecocentric outlook reshapes and reevaluates our relationships to the planet and its other (in)animate non-human beings. An ecocentric perspective can shed light on the theoretical frameworks of the energy discourse, the soundness of its reasoning and the ecological, ethical and socio-political implications of its practical developments in energy policies and projects.

4.1. *Anthropocentrism vs ecocentrism*

Environmental philosophy typically recognizes several possible ethical positions: strong anthropocentrism, weak anthropocentrism, sensiocentrism, biocentrism and ecocentrism. An ecocentric account of energy directly challenges the anthropocentric nature of the modern energy paradigm. Surely enough, ecocentric positions have been developed by several scholars in the field of environmental philosophy while others have criticized such "centric" lingo altogether (Samuelsson 2013). Ecocentrism should be understood as among the most radical philosophical positions that emerged during the environmental movement that started in Western countries in the 1960s. In a sort of parallel with the so-called second wave of feminism and the civil rights movement, environmental activism and scholarship initially aimed at changing and moving beyond cultural narratives which had been supporting oppression – of women, of minorities, and of nature.

In particular, ecocentric thinkers have derived the most radical philosophical implications from the findings of the ecological sciences and environmental studies (Frigo 2016). Accordingly, ecocentrists typically start by posing a great ontological and metaphysical challenge: re-defining and re-positioning human beings and their role within ecosystemic functioning rather than considering mankind at the top of the ecological hierarchy. It goes without saying that, if taken seriously, the consequences of this change of perspective would be groundbreaking for both human and non-human beings. It has been argued that humans, thanks to their ability to work in

groups, organize, cooperate, and eventually develop techno-science have progressively occupied the top ranks of the food chain. But, ecologically speaking, humans are not "top predators" and "dominators" but rather omnivorous animal somewhere in the middle of the food/energy pyramid. An ecocentric perspective challenges the idea that the Earth is necessarily destined to become a "human planet" as the ecomodernists envision. By limiting human hubris, ecocentrism decenters humans and thus provides a paradigm shift similar to that occurred in 16th century astronomy from geocentrism to heliocentrism.

Ecocentrists maintain that also modern humans are still dependent on the ecosystems of which they are part and, paradoxically, still know so little about. Ecocentrism borrows from ecology the notion that, in each ecosystem, there is a myriad of different beings who are constantly born or formed, live, die, decay and are cyclically transformed in nutrients by decomposers as part of the biosphere functioning. Simply put, these are animals (top predators, carnivores, omnivores, herbivores), primary producers (plants), decomposers (fungi) or detritivores (earthworms, woodlice, and sea cucumbers), minerals, soils, waters, airs [4]. In this worldview, humans do not occupy a special place, yet they are considered "special animals" in the sense that their power to dramatically change nature is acknowledged.

Despite the "convergence hypothesis" of philosopher Bryan G. Norton (1991, 237-243) – "the view that if we have a suitably sophisticated anthropocentrism, then in practice, anthropocentrism and nonanthropocentrism will converge" (McShane 2007) – when it comes to policymaking, the policy interests of anthropocentrists and nonanthropocentrists do not ultimately nor obviously converge.

In both anthropocentric and ecocentric perspectives exergy is limited. But for the former, useful energy is primarily destined to benefit humans, while the latter posits that also the non-human world deserves the amounts necessary for its flourishing. Moreover, an ecocentric view suggests that there may exist immaterial, spiritual, or relational forms of energy that fall through the cracks of the old paradigm because they are not epistemologically relevant or objectively measurable (they are non-quantitative and therefore non-mathematizable). However, these other more qualitative "dimensions" are relevant and should become part of the current energy debate.

Since humans have the possibility to become keenly aware of their power, they can also decide to follow the ecocentric philosophy of energy

[4] I intentionally borrow from Leopold the use of plurals for all these different beings. See his essay "The Land Ethic" in Leopold 1949.

and live in ways that are compatible not only with their own survival and growth, but also with the preservation, flourishment, and wellbeing of other non-human beings. If we conceive the fluxes of energy throughout the ecosphere in this inter-dependent and relational way, we begin to better understand the alternative outlook provided by ecocentrism.

The type of ecocentrism that I embrace here does not equalize humans with any other beings, but rather attempts to take into account the wellbeing of the non-human world as well. It considers humans "special animals" who possess a tendency to become an invasive species. As a disclaimer for possible accusations of eco-fascism, I immediately clarify that humans, in this perspective, are still relevant yet not central. They are not put on a pedestal or glorified as the conquerors of nature. Instead their power is acknowledged upfront and, because of it, they are recognized in the role of ecological companions, or co-inhabitants rather than managerial stewards/guardians or mere exploiters (de Groot et al. 2011). But this re-positioning of humans in the ecosphere goes hand in hand with the recognition of the limitedness of key environmental/energy factors, such as space and exergy (or useful energy). In a world currently hosting more than 7.6 billion people and counting, in the future there will inevitably be less available resources and space not only for humans, but also for all other beings who are present in a specific ecosystem.

4.2. *The balance between instrumental and intrinsic values*

We have seen that the old energy paradigm taught humans to dominate nature and extract from it anything that may benefit them. But I also clarified that humans need to use some parts of nature to survive, likewise other biotic organisms. So, the second characteristic of an ecocentric philosophy of energy follows the realization that there are ecological and thermodynamic (broadly understood) thresholds. The key point is that they make it physically impossible to instrumentalize all nature for the benefit of some humans and the detriment of everything else. These are limitations inherent to the functioning of the ecosphere as well as the technosphere (all machines have efficiency limits), affecting both humans and other beings for they all share, eventually, ecosystemic energy. This is either coming into the system as solar radiation or is already present on the planet in the form of converted solar radiation (e.g. fossil fuels).

To better understand the instrumentality of the energy paradigm let's use the example of a deontological theory and turn to Kant's second formulation of the Categorical Imperative, known as the "Formula of

Humanity" [5]. In his *Groundwork of the Metaphysis of Morals* (1785), Kant wrote: "The practical imperative will thus be the following: So act that you use humanity, in your own person as well as in the person of any other, always at the same time as an end, never merely as a means" (Kant 2011, 87). Since I propose that the energy paradigm should combine instrumental and intrinsic value (rather than focusing only on the former), the Kantian deontological principle can be expanded to include non-human animals as well as inanimate beings. The re-formulation would be: "So act that you use nature, in your own person as well as in the person of any other (in)animate being (living and non-living), never as an end, and as little as possible as a means". This extended definition takes into account the non-human world *also* in an intrinsic way. It recognizes that some reasonable use of nature for human ends is inevitable, but it points to the precautionary principle of non-action whenever the consequences are unclear or possibly dangerous (Kriebel et al. 2001; DeFur and Kaszuba 2002; Cooney 2004; Sandin 2004; COMEST 2005). Moreover, this formulation would be in tune with traditional conservation (Pinchot 1910; Callicott et al. 1999), radical conservation (Adams 2006) as well as preservation (Muir 1911; Howard et al. 1991). It would imply, and thus prescribe, that when basic human needs have been met there is no need for any ulterior instrumentalization of the non-human world. Energy-nature should not merely or solely be conceptualized as a means, but rather the recognition of intrinsic value should become a priority, leading to actions aimed at preservation and ultimately protection (Norton 1986; Meyer 1997).

Energetically speaking, the worldview of modernity pictures scarcity as a temporary inability to obtain more, and it sees limits as chains that constrain an absolute freedom towhich modern humans are somehow entitled. The *ab-solutus* character of the human-nature relationship is key in understanding the modern energivorous lifestyle. As it will appear more clearly, researching the ontological and axiological dimensions of energy is the first step towards a philosophy of energy that can help improve praxis – energy ethics – that is our practical relationship to energy as it is linked to energy policies, personal choices, preferences and political decisions making.

[5] It should be clarified that my "extension" of Kant's deontological principle is appropriate only if, accordingly, the notion of agency is expanded beyond humans.

4.3. *A holistic and more qualitative view of energy*

Contrary to the mechanistic view of energy promoted by the traditional energy paradigm, an ecocentric philosophy of energy offers a holistic account. Energy has been understood in multifaceted ways, and in its most material form as fuels and geo-chemical compounds, bio-chemically as the flux of nutrients within organic and inorganic life, metabolically as the transformation of food into movement and heat. However, there are other types of non-quantitative energies that people (and perhaps also other beings) can experience. Since these phenomena are not reducible to a quantitative and therefore measurable form, the traditional energy paradigm has disregarded or tacitly ignored them.

But isn't it true that we often speak about a particularly energetic atmosphere in a room, of a special energy in a relationship, or the energy that one can perceive while meditating alone in the middle of a forest? Neuroscience may attempt to reduce also these phenomena to "states of the mind" related to specific chemicals and electric impulses in the brain, but that explanation would be, again, a form of reductionism dependent on a mechanistic and quantitative view. However, other areas of human knowledge are sometimes capable of intercepting these phenomena. In this regard, anthropology and ethnography of energy offer powerful lenses to appreciate a more qualitative side of inquiry. Another big part of human creativity that has been pushed out of the energy discourse are the humanities such as literature and poetry. For this reason, I argue that an ecocentric philosophy of energy and ethics would consider forms of expression such as poetry as qualitative sources of an understanding of energy, as much as the laws of thermodynamics are used to explain energy quantitatively. For example, we can find examples of this kind of work in the emerging field of energy humanities, but also in the poems ofintellectuals such as Ralph Waldo Emerson and Henry David Thoreau. Let me conclude this section with one of Thoreau's poems, *Nature*, which perfectly merges the theme of intimate connection with the environment with a call for human humility:

O Nature! I do not aspire
To be the highest in thy choir, -
To be a meteor in thy sky,
Or comet that may range on high;
Only a zephyr that may blow
Among the reeds by the river low;
Give me thy most privy place
Where to run my airy race.

In some withdrawn, unpublic mead
Let me sigh upon a reed,
Or in the woods, with leafy din,
Whisper the still evening in:
Some still work give me to do, –
Only – be it near to you!
For I'd rather be thy child
And pupil, in the forest wild,
Than be the king of men elsewhere,
And most sovereign slave of care;
To have one moment of thy dawn,
Than share the city's year forlorn.

Finally, borrowing Leopold's ecocentric perspective, it can be said that an ecocentric philosophy of energy "enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land" (1949, 173). In the meantime, it at least decenters human beings and "charges" them with the role of being the responsible co-inhabitants, companions, and tutors of the non-human world.

5. Conclusion: the significance of this project

Energy is one of the most debated topics in contemporary public discussions and it is the subject of an increasing amount of theoretical and applied research that is carried out especially by the STEM disciplines. Historically speaking, the energy discourse has indeed mostly relied on the expertise of techno-science. Its operative arm, engineering, has played a predominant role in deciding how to tackle and overcome issues related to energy production, accessibility, distribution, consumption, and waste. This means that for more than two hundred years the study of energy and its countless applications (and by a large extent also energy transition!) have been the domain of the natural sciences and engineering. This fact may appear obvious to many but, again, it depends on an underlying, invisible philosophy of energy that has been taken for granted. This understanding affects not only the thinking (or thoughtlessness) of people but what they do in both the private and public spheres. Humans' energy-related past and present practices, those being individual actions, social choices, or public policies fundamentally depend on the traditional energy paradigm but can be enhanced through the development of a radical ecocentric philosophy of energy provide the theoretical foundations for ecologically sound and just energy transitions.

Besides the three goals mentioned in the beginning, I think that the significance of this Special Issue resides in the attempt to offer compelling reflections that break the disciplinary model of "purified" academic philosophy (Frodeman 2010; Frodeman and Briggle 2016). Developing new ways of tackling real world problems demands philosophers and social scientists to get out of their comfortable dens. It requires them to become familiar with other branch of knowledge while preserving their curious and inquisitive attitude, methodology, and epistemological autonomy. Hopefully the pages of these two volumes will shed some light on what it is like to philosophize about energy, with passion and enthusiasm, in a time of transition.

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