Kincentric Ecology and the Energy Transition; Achieving Net Zero Carbon Suggests Mainstreaming Nature Connectedness

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Abstract. The implementation of low carbon energy systems is of utmost importance to maintaining stable ecosystems and avoiding extreme climate change. However, many countries are failing to meet their emissions targets, global emissions of carbon dioxide have reached record levels and there is little evidence that the multiple 'climate action' resolutions are having any impact. The main proposition of this paper is that a partial cause of the environmental crisis is the construction of the human/nature or nature/society dualism. Alternatives to this dualism, broadly categorized as kincentricity, have existed historically, including *Ukama*, *Sumak kawsa*, *Pachamama* and *iwı´gara*, and are common to many indigenous cultures. These historical antecedents are reviewed and arranged according to a typology based on secular/spiritual vs. anthropocentric/ ecocentric. It is argued that the adoption of new meta-rule which reshapes the nature/society relationship and places kincentricity as a normative perspective through which future decisions on energy technologies and systems will be made, can play an important role in breaking the present destructive trajectory of the energy sector. The attainment of net zero carbon is not ultimately a technological change, it is a value-based transformation that invites the mainstreaming of kincentric ecology. The paper concludes with suggestions for further research, including the development of kincentricity indicators, and pedagogies for raising awareness of nature connectedness through the process of naturing.

1 Introduction

The climate crisis needs no introduction. Despite speeches upon speeches, reports upon reports, articles upon articles, levels of carbon dioxide continue to rise and the likelihood of reaching the 1.5°C target is becoming increasingly remote (Friedlingstein, Jones, O'Sullivan, Andrew, Bakker, Hauck, Le Quéré, Peters, Peters and Pongratz, 2022; United Nations Environment Programme, 2022). The persistent nature of the crisis suggests an alternative strategy, or at least a combination of strategies, both new and old, for the decarbonization of anthropogenic activity on the planet.

In this paper, the adoption of kincentricity in the form of a meta-rule, conceptualised as a broader version of kincentric ecology present across all of society, is proposed and discussed as a vital strategy for transformative change. Kincentric ecology as an alternative approach to shaping the relationship between humans and the environment is not new. Indeed, various configurations have been in place within indigenous cultures, covering a broad spectrum of practice and understanding, from spiritual to cultural and material (Salmón, 2000). These ontologies share a common feature, namely that nature must be treated with reverence and respect, it must be protected and preserved rather than exploited and harmed, a relationship which could be described as “environment as family” (Salmón, 2000).

Kincentricity as an axis for transformative change could be criticised as naïve and ignorant of a present context in which much of the world’s human population is already living in cities under circumstances that are almost completely divorced or alienated from nature. Similarly, the proposition that effective change will be possible through an awareness of the dualism and its replacement in educational curricula with kincentricity (Salmon, 2015), is equally devoid of historical precedence and an understanding of power relationships within society. Eco-feminists, for instance, argue that it is patriarchy, which prioritises dominance, control, and exploitation, that has led simultaneously to nature’s destruction and the oppression of women (Salleh, 2017). The solution to the climate crisis is to challenge patriarchy, and its intrinsic relationships of power, through political mobilisation and the reform of capitalism (Fraser, 2022).

However, the arguments in this paper for change through meta-rules are not alone in the literature. Similar arguments are presented in the articulation of the concepts of ‘Deep Transition’ (Kanger and Schot, 2019; Schot and Kanger, 2018), Ukama (Swilling, 2019 pp 35 - 72) and metatheory 2.0 (Marshall, 2015). Kincentricity, as discussed in the paper, is one possible ‘foundational meta-rule’. The paper begins with a review of the relevant literature, including the origin of the human/nature dualism, historical antecedents to kincentricity, and alternative perspectives on meta-rules for transformative change. The different perspectives and theories are then combined into a single framework which uses a two-dimensional typology based on anthropocentricity and secularity. Finally, the paper details how the human/nature relationship could be re-imagined and what this way of seeing/knowing would mean for the design/decarbonisation of energy systems.

2 Overview of Human/Nature Framings

2.1 Dualism and Its Origins

The human/nature dualism is the philosophical concept that separates humans and nature as two distinct entities. This dualism implies that humans are not a part of nature but rather exist outside of it .

According to this dualistic view, humans are seen as rational beings with free will, consciousness, and the ability to control and manipulate the environment around them. On the other hand, nature is often portrayed as irrational, chaotic, and driven by instinct rather than reason. Nature is also seen as something that humans must control or conquer, rather than coexist with and respect.

This dualistic thinking has influenced many aspects of human culture and society, from the way we view ourselves and our place in the world to the way we interact with the environment. It has led to a belief that humans are superior to nature, and that nature exists only to serve human needs and desires.

However, this dualistic view has been challenged in recent years, as the interconnectedness and interdependence of humans and the environment have become more apparent. Many people now recognize the importance of working with nature rather than against it, and of recognizing that humans are a part of the natural world, rather than separate from it.

The origins of the human/nature dualism can be traced back to ancient Greek philosophy, particularly the works of Plato and Aristotle. Plato believed that the material world was inferior to the world of forms, which existed outside of space and time. He viewed the human soul as being separate from the body and the physical world and saw the physical world as an imperfect copy of the ideal world.

Aristotle, on the other hand, saw nature as a rational and purposeful system, but believed that humans were capable of transcending nature through their capacity for reason and virtue. He viewed nature as a resource to be used for human benefit, rather than something to be respected and protected.

This dualistic view was further developed during the Enlightenment, as scientific and technological advancements gave humans greater control over the natural world. The Enlightenment philosopher René Descartes famously separated the mind and body,

arguing that the mind was distinct from the physical body and could exist independently of it. This Cartesian dualism laid the foundation for the modern scientific worldview, which sees the natural world as a machine to be understood and controlled through reason and experimentation.

In summary, the human/nature dualism has its roots in ancient Greek philosophy and has been shaped and reinforced by cultural, scientific, and philosophical developments throughout history. Some of these cultural developments are now described.

2.2 Alternative Cultural Conceptualisations of the Human/Nature Relationship

2.2.1 Pachamama and Sumak Kawsay

The expression ‘Pachamama’ is used by the indigenous people of the Andes region in South America, particularly in the Quechua and Aymara cultures. It refers to the goddess or spirit of Mother Earth, who is believed to be the creator of all life and the source of all sustenance. In the Quechua language, "pacha" means "earth" or "world," while "mama" means "mother." Pachamama is thus seen as a maternal figure who nurtures and sustains all living beings on the planet, including humans, animals, and plants. She is also associated with fertility, agriculture, and the natural cycles of life and death (Stancioli, 2021).

Pachamama is honoured in various rituals and ceremonies throughout the Andean region, including offerings of coca leaves, corn, and other crops. These offerings are made to show gratitude for the blessings of nature and to ask for protection and guidance from Pachamama. More recently, the concept of Pachamama has gained broader recognition and is often used in environmental and ecological contexts to promote sustainable living and respect for the natural world (Humphreys, 2017).

The Quechua also use another expression, ‘Sumak Kawsay’, which can be translated as "Good Living" or "Living Well," but its meaning goes beyond simply living a good life. Sumak Kawsay is a concept that encompasses a holistic and sustainable way of life that is based on the harmonious relationship between human beings, nature, and the spiritual world. It recognizes that all living beings have inherent value and that their well-being is interconnected (Radcliffe, 2012).

This concept emphasizes the importance of community and collective well-being, rather than individualism and materialism. It also prioritizes the preservation of natural resources and the protection of the environment for future generations. Sumak Kawsay has gained recognition as an alternative development model that challenges the dominant paradigm of economic growth and consumerism. It has been incorporated into the constitutions of

several Andean countries, including Ecuador and Bolivia, as a guiding principle for public policy and decision-making.

2.2.2 Notions of Well-Being and Interconnectedness

The most fundamental claim of nature connectedness is that it is good for the planet and also for ourselves. To quote from the landscape artist Andy Goldsworthy (The Art Story, 2023)

> *"We often forget that we are nature. Nature is not something separate from us. So when we say that we have lost our connection to nature, we've lost our connection to ourselves."*

There are multiple references to nature connectedness and interconnectedness as a source of emotional and mental well-being throughout the literature (Pritchard, Richardson, Sheffield and McEwan, 2020). For instance, an important claim of environmental psychology is that identity is intimately connected to place or environment, and that the benefits of situatedness are heightened in a context that is close to nature (Burns, 2005). A growing alienation between individuals and the natural world has led to the higher levels of mental health and stress within society, and that the re-establishment of nature connectedness, as measured by the connectedness to nature scale, is essential to the recovery of human well-being (Mayer and Frantz, 2004).

A more detailed review of the work on the human benefits of nature connectedness is beyond the scope of this paper. Although important, its focus is primarily anthropocentric, with the main question being how closeness can improve human health, whereas the objective of my work is to understand how to improve prospects for the environment. Clearly, there is an interaction between the two sets of benefits (whether they accrue to people or directly to the environment), and if humanity can be persuaded that environmental conservation is important for its own survival, it will be a powerful incentive to protect ecosystem services. However, the rationale for protection should not be about services to humankind, it is about services *to* ecosystems (van de Water, Henley, Bates and Slotow, 2022).

2.2.3 Iwígara

Iwígara is a term used by the Rarámuri, a group of indigenous people living Sierra Madres of Chihuahua, Mexico. The term refers to the "total interconnectedness and integration of all life in the Sierra Madres, physical and spiritual" (Salmón, 2000 p1328), and forms the basis for the concept of kincentric ecology.

Kincentric ecology is an ecological perspective that emphasizes the interconnectedness of all living beings and their relationship with the environment. It places particular emphasis on the role of kinship in shaping human interactions with the natural world. According to kincentric ecology, humans are not separate from nature but are instead a part of it. This perspective recognizes that all living beings, including humans, are interdependent and that the well-being of one is intimately tied to the well-being of all. Kincentric ecology emphasizes the importance of respecting and maintaining the relationships between humans and the natural world, and recognizes the importance of understanding the ecological, social, and cultural contexts in which these relationships exist. At its core, it emphasizes the importance of building relationships based on mutual respect and reciprocity between humans and the natural world. It encourages people to view nature not as a resource to be exploited, but as a complex system of interrelated beings with which we share a common destiny.

2.2.4 Ukama and Kincentric Ecology

Ukama is a term that describes an ethic of the relatedness of all things. It originates from the Shona people of Zimbabwe, and defines the concept that a person obtains her humanness through a relationality with animate and inanimate forms, both past and present. To quote from (Murove, 2009 p28):

> *"An ethic (Ukama) that arises from a civilisation sensitised to relatedness among all can only be an ethic about relatedness. Thus, in African ethics, relatedness is not restricted to human relations but extends to the natural environment, the past, the present and the future. This relatedness blurs the distinction between humanity and nature, the living and the dead …"*

Ukama is often linked to the analogous concept of Ubuntu or African humanism, which emphasises the importance of humanity towards others, and is rooted in the belief that the well-being of an individual is directly connected to the well-being of the community (Okaneme and Obioha, 2017). Ubuntu reflects the principle that all human beings are interconnected and that our actions should be guided by a sense of compassion, empathy, and respect for others.

However, Ukama goes beyond the Ubuntu ideas of relationality, since it includes the natural environment and the past. In this sense, Ukama is a secular construct which could be used to reshape the human/nature relationship, and particularly to instil greater respect for the natural world and live according to the principles of sustainability. An examples of its manifestation in African society, not necessarily relevant to present urbanised contexts, was a totemic system in which individuals took responsibility for the conservation of a specific species (Murove, 2005 p138). Similarly, African folktales included animals as characters, and humans were portrayed as part of nature, at times

a rather ignorant species which could learn a great deal from its environment, if only it had to humility and patience to listen and observe (Murove, 2005 p140)

Despite its obvious and profound consequences as an alternative to the distinctive individualism of modern capitalism, Ukama is relatively unknown and barely described in the literature. The earlier texts on African philosophy tended to focus on Ubuntu, which is a similar ethical concept but is restricted to the interrelatedness of people as opposed to nature connectedness (Okaneme and Obioha, 2017; Murove, 2005). It was only quite recently, following the doctoral work of Murove (2005), that the Shona concept of Ukama was noted and described within the academic philosophical and theological literature (Swilling, 2019; Le Grange, 2012; Murove, 2009).

Ukama and the concept of kincentric ecology, as introduced earlier in the paper, are closely related. The latter was defined in the literature some years ago (Salmón, 2000), but has not been widely adopted as an important step towards reframing human/nature relationships. In the Salmón (2000 p 1332) article, it is described as

> *"Kincentric ecology pertains to the manner in which indigenous people view themselves as part of an extended ecological family that shares ancestry and origins. It is an awareness that life in any environment is viable only when humans view the life surrounding them as kin."*

The overlap with Ukama is apparent from this definition. Both conceptualisations accord equal status to humans and all natural elements of an ecosystem, and urge humans to act with care and respect towards these systems. In this world view, the environment is not a resource to be exploited or harvested or destroyed, but a family of elements whose right to life are as important as human life and acknowledged as such in culture and behaviour.

In addition to these cultural framings of the human/nature relationship, which lie in opposition to the acceptance of dualism, are several more theoretical frameworks that propose alternative axes of change based on socio-political models. Some of these models are reviewed in the next section.

3 Pathways to Transformative Change

3.1 Eco-Feminism

Eco-feminism is a social and political movement that seeks to address the interconnected issues of gender inequality, environmental degradation, and social injustice (Gaard, 2015). At its core, eco-feminism recognizes that the domination and exploitation of nature and women are deeply interconnected, and that both must be addressed to create a

more just and sustainable world. Eco-feminists argue that traditional patriarchal values, which prioritize dominance, control, and exploitation, have contributed to the destruction of the natural world, and have marginalized and oppressed women and other marginalized groups (Salleh, 2017; Shiva and Mies, 2014; Haraway, 1991; Plumwood, 1986). They point out that the impact of environmental degradation disproportionately affects women and other vulnerable populations, who are often the most dependent on natural resources for their livelihoods and well-being (Siwila, 2014).

Eco-feminists advocate for a more holistic approach to environmental and social issues, one that acknowledges the interconnectedness of all life and recognizes the value of diversity, cooperation, and empathy (Brisson, 2017). They also emphasize the importance of women's leadership and empowerment, as well as the need for greater representation of women and marginalized communities in decision-making processes related to the environment and social justice (Burke and Stephens, 2017).

Overall, eco-feminism seeks to challenge the dominant power structures and cultural norms that perpetuate environmental and social injustices, and to create a more equitable and sustainable future for all. Eco-feminists recognize that the current economic system, which prioritizes domination and dualism over social and environmental well-being, is a major contributor to climate change and other environmental problems (Burke and Stephens, 2018; Brisson, 2017). To address the climate crisis, they advocate for a more holistic approach that considers the interconnectedness of all life and recognizes the importance of social justice and gender equality (Mellor, 2018 pp1-13). They emphasize the need for a just transition to a more sustainable and equitable economy that prioritizes the well-being of both people and the planet (Brisson, 2017).

Some specific strategies that eco-feminists may advocate include:

1. Supporting women's leadership and empowerment: Eco-feminists recognize that women are often disproportionately affected by climate change and environmental degradation, and that they have a critical role to play in addressing these issues (Allen, Lyons and Stephens, 2019). They advocate for supporting women's leadership and empowerment, as well as increasing representation of women in decision-making processes related to the environment and climate change.
2. Promoting local, sustainable agriculture: Eco-feminists recognize that industrial agriculture is a major contributor to climate change and other environmental problems. They advocate for promoting local, sustainable agriculture practices that prioritize soil health, biodiversity, and the well-being of farmers and communities (Radel, 2009).

3. Investing in renewable energy: Eco-feminists emphasize the need to transition to renewable energy sources, such as solar and wind power, to reduce reliance on fossil fuels and decrease greenhouse gas emissions (Gaard, 2017).
4. Reducing consumption and waste: Eco-feminists recognize that overconsumption and waste are major contributors to environmental degradation and climate change. They advocate for reducing consumption and waste through measures such as recycling, composting, and reducing the use of single-use products (Radel, 2009).

Overall, eco-feminists seek to address the climate crisis through a more holistic approach that considers the interconnectedness of social and environmental issues, and prioritizes social justice, gender equality, and sustainability (Brisson, 2017).

3.2 Metatheory for Planetary Prosperity

A metatheory is a theory which attempts to consolidate several individual theories into a single thesis. Post modernism has tended to avoid such agglomeration, principally on the basis that knowledge is context-specific and that generalisations inevitably lack validity and even destroy useful detail. Critical realists, on the other hand, argue that integrative thinking is not only valid, but necessary, especially as a means of sensemaking within an increasingly complex and diverse world, overburdened with new information and perspectives (Hedlund and Esbjörn-Hargens, 2023). Moreover, metatheories will be essential in dealing with the climate crisis and develop an integrative response that can avoid its existential consequences (Huggel, Bouwer, Juhola, Mechler, Muccione, Orlove and Wallimann-Helmer, 2022).

In his synthesis of various metatheories, and his description of complex integral realism, Swilling (2019 p44) defines nine themes which are present within the underlying metatheories and form the basis for a single Metatheory 2.0 which could be used as the basis for re-establishing a flourishing, as opposed to a poisoned, planet. The themes include the acceptance of a realist, complex adaptive systems perspective, a rejection of the epistemic fallacy (Bhaskar, 1997), an advocacy for interdisciplinary research and an acknowledgement of the importance of context.

The relevance of these themes to transformative change is principally as a ‘way of seeing’ and understanding, with some of the more applied or practical aspects still being developed. Possible applications include the development of relational post-capitalism based on the principles of non-equilibrium economics, a strategic-relational and collibratory approach to governance and the pathways to just transition (Swilling, 2019 p68). Some of these outcomes are also addressed within the Deep Transitions literature, which is discussed in the next section.

3.3 Deep Transition

The concept of ‘Deep Transition’ has been proposed as a theory of change based on socio-technical literature and perspectives (Kanger and Schot, 2019; Schot and Kanger, 2018). In this approach, the important components of the change process are actors, institutions (used in the social science meaning of rules, customs, culture and laws used to govern behaviour) and technology, which interact in a dynamic and unpredictable or non-equilibrium and together constitute a socio-technical system (Kanger and Schot, 2019).

The theory identifies and defines four levels of institutions, beginning with rules, which are “humanly devised constraints that structure human activity and lead to a regular pattern of practice”, to meta-rules, regimes and meta-regimes (Kanger and Schot, 2019). A Deep Transition is a process which results in changes to all four levels of institutions, and particularly in a re-direction of rule-sets leading to a shared directionality (Kanger and Schot, 2019, Table 1). The process can take place sequentially, with the initial emergence of new rules, followed by their diffusion and alignment into rule-sets, then regimes and finally meta-regimes, where the latter are rule-sets adopted within multiple socio-technical systems.

The framework also applies a structural hierarchy, postulating that change takes place within three levels of socio-technical systems, where the latter are aligned with the levels as defined by the Multi-Level Perspective (MLP) (Geels, 2018), namely niche, regime and landscape. The Deep Transition is characterised as the adoption of new rule-sets within multiple regimes, leading at some point to profound transformation of the socio-technical landscape.

The structuration of Deep Transition theory and its conceptualisation of shared directionality are useful in understanding the proposed area of influence and transformation, as articulated in this paper. A revision of the framing of the human/nature relationship is at the level of a meta-rule, since it proposes kincentricity as a single rule (akin to a normative practice), operating across multiple socio-technical systems. Decisions on energy technologies or food production or systems of mobility or trade regulations would be subject to the same institutional rule or principle, namely that any decision must adopt as its starting point the objective of zero carbon emission or minimal environmental impact.

The discussion of the extent to which kincentricity could be incorporated into rule-sets for energy systems is taken further in Section 5 of this paper. In the next section, a typology of human/nature framings, which will be used in locating kincentricity as a secular and guiding principle for the Deep Transition, is presented.

4 Typology of Human/Nature Framings and Proposed Revision

In Section 2, a broad range of human/nature framings were introduced and discussed, and for each case, it was shown how these framings shape humanity's relationship with the natural world. Although interesting from an anthropological and historical perspective, not all the representations are appropriate as evidence-based arguments for the inclusion of kincentric ecology in science, technology and society studies, and particularly as a pre-condition for furthering the goals of sustainability and the attainment of net zero carbon emissions within the energy sector. The framings must now be characterised, arranged according to a typology and screened, so that only the most relevant can be put forward as valid for the objective of this paper.

Such a typology is now presented (see Figure 1). The system uses two property-based dimensions, arranged in a matrix format. The vertical axis considers the extent to which a specific framing is based on an anthropocentric ontology (view of the world) vs an ecocentric view, where the latter acknowledges that humankind is just one element of existence, and that a nature-centred perspective, in which all forms of existing, including inanimate elements, deserve equal status, should be adopted and practised. The horizontal axis reflects the degree of implied spiritually of a framing, such as whether nature is conceptualised as a 'Mother' or goddess and incorporated into religious belief or culture.

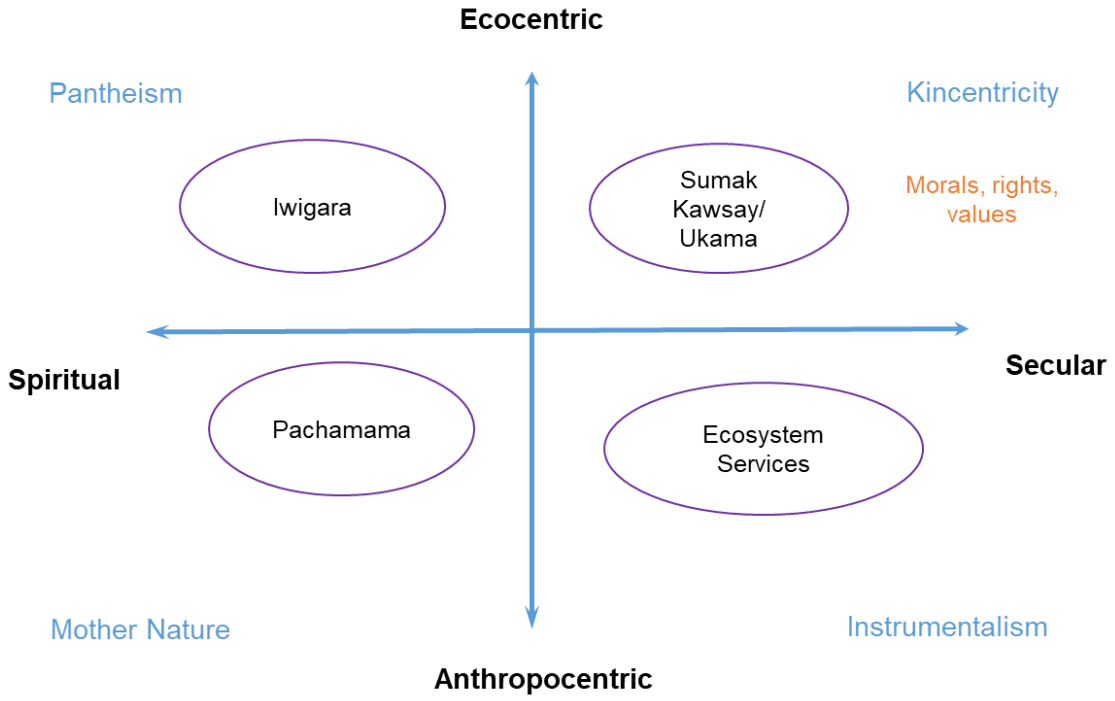

Figure 1: Typology of nature framings

The two axes demarcate four quadrants which are labelled ‘Pantheism’, ‘Mother Nature’, ‘Instrumentalism’ and ‘Kincentricity’, listed in anti-clockwise order beginning with the top left. Examples of beliefs and practices within each quadrant are also included in Figure 1. For instance, the secular/anthropocentric conceptualisation of the human/ nature relationship, broadly categorised as instrumentalism, values the environment only in respect of its ability to support human existence, such as the provision of food, medicines, mineral resources and even entertainment.

The spiritual quadrants will not form part of this analysis and discussion since these conceptualisations are essentially phenomenological and relate to belief systems. Moreover, although religious beliefs strongly influence individual behaviour and can be a powerful force for change, the potential for the capture of devotees by powerful institutions, and hence their subversion to serving the narrow interests of these institutions, rather than the pursuit of their spirituality, obviates against any consideration of these quadrants as a route to value-based transformation (Klocek and Hassner, 2019). Instead, this paper focuses on the secular quadrants, where the agents of change are the instruments of morals, rules, rights and meta-rules.

Moreover, treatment of the environment simply as a crucible of resources, to be extracted and used in the form of ecosystem services, is counter to the ideals of kincentricity. This contradiction rules out any consideration of the ‘Instrumental’ quadrant in Figure 1, leaving only the fourth quadrant, labelled as ‘Kincentricity’.

The typology of Figure 1 is useful, then, in screening proposed human/nature framings as may be used in re-directing this critical relationship. It highlights that calls for the redefinition of the human/nature relationship have been made from various actors, including spiritual leaders, environmental groups, advocacy agencies and political leaders (Tymieniecka, 2013). Although the perspectives of ‘Pantheism’, ‘Mother Nature’ and ‘Instrumentalism’ may be valid in other contexts, within the cadre of literature relevant to sustainability transitions, I argue that only ‘Kincentricity’ is a valid approach, since it does not require conscription to religion or belief in the supernatural, or the assumption that nature only exists to serve human interests. In other words, the principle of kincentricity, which is a secular, ecocentric perspective of the human/nature relationship, is proposed as the most appropriate basis on which morals, rights, rules and principles could be reconstructed to achieve the necessary directionality, as outlined in the Deep Transition framework.

5 Linking Kincentric Ecology to Energy Transitions

5.1 Kincentricity as a Meta-Rule

This paper adopts an argument that is already well-documented in the literature, namely that an important cause of environmental destruction is the exploitative relationship between humans and nature. It also agrees with the perspective that changing this relationship requires a fundamental change to meta-values, as defined and explained within the theory of Deep Transition.

In the next step of the argument, the paper suggests that kincentricity could form the basis through which the human/nature relationship is reconstructed, and that this would lead to net zero for energy systems by providing a valuable compass through which such decisions are taken. As yet, there is no direct evidence to support this proposition or claim. Kincentricity could be, perhaps should be, adopted as a meta-rule, but whether this step will change the design of energy systems remains an important question.

In answering this question, it is noted that decisions on energy systems and energy futures are frequently taken by individuals, who act within their own ontological and axiological assumptions (Dubois, Sovacool, Aall, Nilsson, Barbier, Herrmann, Bruyère, Andersson, Skold and Nadaud, 2019). Moreover, meta-rules are both the product of individual actions and institutional structures, in the way suggested by Gidden's structuration theory (Whittington, 2010). It is therefore not unreasonable to suggest that kincentricity as a meta-rule could change over time the design of energy systems and hence their decarbonisation.

Surprisingly, the discussion on meta-regimes and meta-rules includes little detail as to what new rulesets are required or how they may emerge (Kanger and Schot, 2019). The literature argues for the imperative of such changes, but initiatives on transformative innovation policy are mostly at the experimental stage (Lundvall, 2022). The literature has focussed on the historical precedence and the present imperative for fundamental change. In this exploratory paper, it is argued that one element of the Deep Transition meta-rules could be kincentricity.

Such a proposition is now placed within a discursive space as a possible strategy. The idea is supported by similar claims, including the work of the eco-feminists and the meta-theorists, as reviewed in the earlier sections, which argues for a more holistic approach to environmental and social issues, one that acknowledges the interconnectedness of all life, as a means of overcoming environmental destruction and achieving equality.

Clearly, the beginning point for any reconstruction of the human/nature relationship is to abandon the dualism. It is apparent that this model has led to gross violations against nature, and the justification thereof (Jeffery, 2021). It is necessary to reshape the relationship as a socio-technical imaginary that conceptualises and treats 'nature as family', in accordance with the concept of kincentricity (Salmón, 2000). In the next section, I discuss how kincentricity as a meta-rule could be mainstreamed, and what implications such a decision would have for research and teaching.

5.2 Kincentricity as a Pathway to Net Zero

The most important step in mainstreaming kincentricity will be to validate the claim that kincentricity as a meta-rule will change human behaviour towards the environment and particularly in the design of energy systems. Without this evidence, the central argument of this paper remains speculation.

As part of this validation, two research areas are proposed, as detailed in the sections that follow.

5.2.1 Validation of Kincentricity and the Development of Indicators

Kincentricity refers to a form of the human/nature relationship in which nature is treated as family, and accorded the same status in terms of loyalty, respect, love and kinship. This definition is easy to visualise, but its practical application in the form of actualisation and behavioural change is more difficult. Previous studies have considered this problem, although only in the context of nature connectedness rather than kincentric ecology (Restall and Conrad, 2015). Such studies have explored questions such as how nature connectedness can be measured (Mayer and Frantz, 2004), whether environmental awareness is heightened by developing nature connectedness, and the extent of the link between a sense of well-being and the extent of nature connectedness (Schultz, 2002).

Similar questions still need to be answered for kincentricity, and the construct itself needs to be validated as a universal measure of the human/nature relationship. Is there a universal understanding of the term? Is there a measure of kincentricity which provides a reflection of its extent? Does the acceptance of kincentricity lead to a new world view in which respect and protection of nature becomes normative?

The phenomenon of therianthropes has been proposed as a possible measure of kincentricity (Walwyn, 2022a). Therianthropes are human/animal figures which have been variously interpreted depending on the ideological assemblages of the viewer, and these interpretations serve to surface the perspectives in a rather unsuspecting way. For instance, the earliest interpretations of such images in rock art from South Africa, the rock art historians have described these images as 'hunters dressed up as animals'

(Tongue, 1909). More recently, the images are considered to be the visualisations of shamans who have partially transformed into animals as a means of acquiring their potency (Ouzman, 2000).

In the author's own perspective, the images are a direct representation of nature connectedness. The merging of humans and other life forms in art is a depiction of the interconnectedness of species. Branches can become fish, tree trunks can be formed into sea lions, sticks into antelopes, and antelopes into humans (see Figure 2). Given this multiplicity of interpretations, all of which reflect a background set of ideological assumptions, it is conjectured that the interpretation of therianthropes could be used as a measure of kincentricity. Further research on the validation of this application is now required.

Figure 2: Therianthropes in San art

5.2.2 Pedagogies for Nature Connectedness

Previous work on the level of comprehension within a cohort of post-graduate students has shown that there is little shared understanding of the core concepts of Ukama, nature connectedness and interrelatedness (Walwyn, 2022b). The concepts are undeveloped, even within students who claim to lead nature-connected lives. This gap in understanding suggests that the adoption of kincentricity a normative perspective of the human/nature relationship will be difficult to accomplish without its inclusion in the curricula at all levels of the educational system, from early childhood education to universities and graduate colleges, and, indeed, within all discursive spaces.

Discursive spaces are locations and opportunities within which new ideas are introduced, debated and new knowledge is acquired. The extent to which such spaces 'work' depends on the discursive power or ability of the idea originator, and the cognitive flexibility of the recipients or students. The interplay between ability and flexibility as a formative mechanism is illustrated in Figure 3 (Walwyn, 2022b).

Although classrooms, lecture theatres and virtual teaching platforms are framed as discursive arenas in which students assemble with an open mind to learn new ideas and concepts, to acquire new knowledge and to be challenged in respect of their world views, in practice radical revision of their normative assumptions about the nature of the world is unlikely to take place. Teachings at this level need to take place from an early age, where personal ontologies are still being shaped and consolidated.

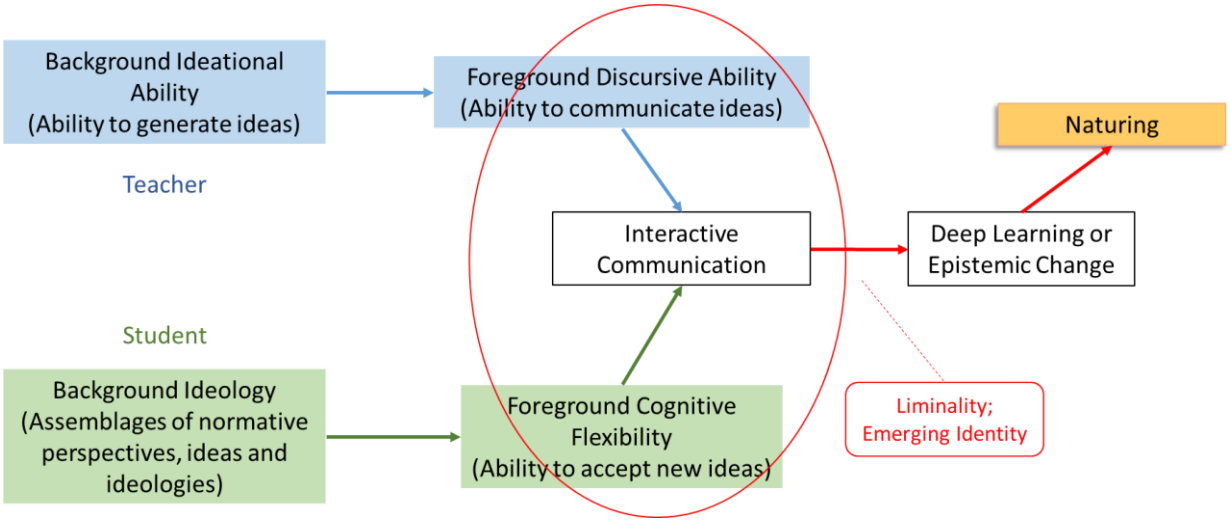

Figure 3: Discursive ability and cognitive flexibility

Borrowing from the language of gender studies, where gendering is used to refer to the process of socialisation according to the dominant gender norms (Butler, 2004), naturing is defined as the process which results in the development of kincentricity as the dominant form of the human/nature relationship. Such a strategy for embedding kincentricity as a meta-rule needs further exploration and research. What are the suitable pedagogies for communicating nature connectedness to young minds? How can kincentricity become a visceral experience as opposed to an abstract concept? How can naturing be both introduced and sustained within a new global culture?

Ultimately, a necessary outcome of naturing is that it becomes performative, that its adoption as a meta-rule results in changes to human behaviour. Further research on how naturing can lead to energy transitions is now required.

6 Conclusion

In summary, it is noted that this is a conceptual and exploratory paper which looks at how a reframing of the human/nature relationship could lead to net zero outcomes. The central proposition of this paper is that a major barrier to the sustainability transition of socio-technical systems is the persistence of a human/nature dualism, which rationalises and justifies the ongoing destruction of the environment in the pursuit of its resources. It is therefore proposed that an important pathway to transformative change, and by implication to the attainment of net zero or low carbon energy systems, would be the adoption of kincentricity as a fundamental meta-rule.

The concept of kincentricity, as a means of defining the human/nature relationship, is not new. It has existed in similar forms within indigenous cultures, including that of the Shona people in Zimbabwe, where it is articulated as Ukama. However, not all of these framings are considered to be applicable as a meta-rule for guiding the normative framework within which existing socio-technical systems, such as those for energy production, are changed, or new ones developed. The paper defines a new typology for human/nature framings and identifies a specific category of relationships which are considered to be relevant as a meta-rule.

The implications for further research of the formulation and adoption of kincentricity as a meta-rule, and how it could over time become part of meta-regimes, are also discussed in the paper. Two different areas of focus are suggested, namely validation of metrics for kincentricity and more effective pedagogies for nature connectedness.

Finally, it is acknowledged that sustained efforts, and eventual success, to implement sustainable energy generation and consumption will require, *inter alia*, economic, political, technological, and value-based strategies. The inclusion of kincentricity within this broader portfolio of theories, is presented as just one of multiple necessary initiatives and changes.

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