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## **Energy justice in renewable energy projects: How learning about indigenous knowledge systems could inform systemic practice to respond to UNSDG7**

**Abstract:** This paper is aimed at organizations and researchers to urge them to adopt more systemic ways to deal with energy justice issues in renewable energy projects being built around the world to help with meeting the United Nations Sustainable Development Goal (UNSDG) 7. It will focus on solar and wind farms that have been reported in the literature on causing these issues. While these projects positively contribute towards achieving UNSDG 7 (namely affordable clean energy) they have also created a variety of justice issues which need to be addressed. While measures are being taken more recently to redress these issues, we make the case that the application of systemic thinking and practice could maximise the positives and minimise negative impacts of creating short term fixes without addressing the underlying root causes of the issues. We will show in this chapter, through two case studies of working systemically with indigenous populations, that could help in dealing with justice issues considering indigenous ways of knowing.

The paper has its genesis from an expert panel discussion at an ISSS meeting that created considerable interest from members of the society. The intent of this article is to explore the ideas further and urge systems scientists and thinkers to apply their knowledge and skills to improving energy justice around the world.

### **Introduction**

The article is structured as follows. After a brief background to the energy justice issues portrayed in the literature it will list issues that have been affecting the indigenous populations living in the regions where solar farms and wind farms are being built. Then we will discuss the value of conducting research with Indigenous leaders to learn more about indigenous knowledge systems with reference to ongoing engagement in Indonesia and Africa that have resulted in successful collaborations with indigenous communities using systemic approaches. Renewable energy projects are being built in Africa and Indonesia is mindful of the need to reduce emissions; bearing this in mind these studies demonstrate ways of learning with successfully with indigenous people to enhance an understanding of indigenous knowledge systems that protect living systems as they demonstrate ways of achieving a very low carbon footprint. This will be followed by a brief discussion and conclusions to propose a way forward to deal with energy issues and risks that will affect the global population by protecting the lungs of the planet and learning to support low carbon living from populations that are already demonstrating the way forward. It is hoped that an appreciation of relationality will encourage more systems scientist, thinkers and practitioners to work collaboratively with indigenous peoples to address this global concern.

### **Introduction to the issue**

Renewable energy generation using hydropower, wind, solar and other renewables have grown rapidly since 2000 and have received further impetus due to the UN SDG 7 that has set targets to be achieved by 2030 to 'ensure access to affordable, reliable, sustainable modern energy for all' (<https://sdgs.un.org/goals/goal7>). It is expected that by 2025 renewables will replace coal to be a primary energy source and will meet half the world's energy needs by 2050. As a reference renewable form only 20% share of net electricity

generation (Lovell 2019). While hydro power has been the major source of renewable by 2050 solar and wind will have equal share of the renewable energy generation. Lovell (2019) predicts that hydropower generation will drop from 62% of the share of renewables to 28% mainly due to resource shortage and environmental concern. In this article we focus on solar and wind power as they are reported to be causing energy justice issues and are likely to expand their share of renewable energy in the world.

Solar and wind farms can be treated as megaprojects as they cost billions of dollars and have capacities equivalent to electricity generation by non-renewable sources like coal and oil. As an example, the largest solar farm in India (Bhadla Solar Park) has the capacity of 2,245 megawatts and the largest in China (Huanghe Hydropower Solar Park) has a capacity of 2,200 MW. (<https://www.ysgsolar.com/blog/15-largest-solar-farms-world-2021-ysg-solar>). The largest wind farm in China (Gansu Wind Farm) can generate 20,000 megawatts while the largest in India (Jaisalmer Wind Park) is capable of generation 1600 megawatts. (<https://www.power-technology.com/analysis/feature-biggest-wind-farms-in-the-world-texas/>).

Renewable energy megaprojects like solar farms and wind farms are now able to deliver considerable amount of energy and take billions of dollars to build and comparable to large transport megaprojects in terms of costs and investment. Traditional megaprojects are known to create social displacement, bio geophysical displacement and environmental degradation (Gellert & Lynch 2003). Renewable energy megaprojects also create similar issues, but they also create issues of social justice which has been receiving a lot of attention recently (Sovacool2013; Sovacool & Dworkin 2014). These issues also occur in traditional megaprojects but have not received a lot of attention in the literature.

Examples of issues found in renewable energy megaprojects are shown in Table 1

**Table 1**  
**Classification of issues caused by renewable energy projects**

<b>Issues</b>	<b>Solar Farms</b>	<b>Wind Farms</b>
Political	Large actors favoured	National vs local perceptions on their impact
Economic	Large farms expensive compared to distributed smaller parks	Subsidies mask real benefit
Institutional	Lack of collaboration between institutions involved	Lack of open planning practices
Societal	Land acquisition using technology ignores local concerns	Fishers affected by offshore windfarms

Next, we briefly review the literature on energy justice issues and the impact they have on society causing issues of justice and fairness.

### **Brief Literature Review**

According to Harris (2019, p3) ‘Justice is about fairness, equity and impartiality and doing what is morally right’ and this is where the issues created by solar and windfarms result. In

unintended consequences to the society, especially vulnerable parts of our society due to the locations where these farms are being built as provide the sunlight and wind required to make these sources viable.

The types of justice issues that these renewable energy projects create are as shown in Table 2

**Table 2**  
**Types of Justice Issues**  
(Adapted from MaCauley et al. 2019; Newell et al. 2020)

Type	Explanation
Distributional	How costs and benefits of climate change are shared. How social good and bads are allocated spatially and temporally across society. Low carbon energy often ends up being installed on so-called ‘cheap ‘land’ often in areas associated with past social deprivation or adjacent to protected indigenous land.
Procedural	Processes for making decisions about impacts of and responses to climate change that are fair, accountable and transparent can be eroded by ineffective participation in decision making, inadequate consideration of alternate locations, in sufficient consultation on impact and insufficient respect for diverse cultures, norms and values.
Multispecies Recognition	Related to procedural and distributional justice but focuses on recognition of differences to protect equal rights for all whilst taking into account the implications of decisions on habitat. Where parts of a society suffer from the distribution of inequalities from energy systems (misrecognition, cultural domination, non-recognition and disrespect) due to decision makers overlooking the systemic impact on neglected sections of the society and the implications of organisational decisions ( at all levels ) that damage our shared habitat ( Higgins et al, 2013, Rayner, 2017, 2021).
Cosmopolitan	Applying justice universally good for people in all nations assuming that our ethical views apply everywhere, and one community may apply them on other communities viewing it as their moral responsibility. This could violate the universal declaration of human rights and insufficient recognition of the United Nations Declaration of the Rights of Indigenous Peoples (UNDRIP, 2008) Shiva (2012) stresses the problems associated with ‘monocultures of the mind’.
Inter-generational	Ability of current generations to meet their needs without compromising the ability of future generations to meet their own needs. Legacy passed to the next generation should preserve options; quality; and access for future generations of living systems.

Some examples of justice issues creating opposition to solar and wind farm developments have already been fiercely opposed by local communities. For example, in Kenya local people with the support of NGOs, sued the developers of the Lake Turkana Wind Power project slowing the project down and affecting its ability to get funding. (<https://renewablesnow.com/news/transmission-link-delays-launch-of-kenyas-310-mw-wind-farm-report-571467>).

Villagers whose lands have been acquired at the large solar farm in Charnaka in Gujarat in India have begun to resist acquisition as the government has started acquiring new land to expand the farm. As a villager states "We have led a tough life all these years and it is indeed good news that a project of this scale has come up in our village. (But) the government wants to expand the solar park and it wants our lands," says Gadhavi. "Some of the villagers have sold and gone away. We, who are left, have firmly refused to part with our lands." (<https://www.livemint.com/Politics/feKnOVKKTR3D4xUBAANYUL/Solar-boom-faces-challenges.html>)

The rights of Indigenous people to their land and habitat are of vital importance to protecting the lungs of the planet. Chief Raoni was nominated for the Nobel Peace Prize, because of his stand to protect the forests (Forsetto, 2020) and the importance of forests as habitat for wild creatures (Attenborough, 2020, Goodall, 2020, Donaldson and Kymlicka, 2011)

By taking land away from people for the purpose of creating wind farms or for protecting some species, rather than others, we are demonstrating a non-systemic way of thinking. Some examples of renewable energy projects that do not support social justice include the following:

- Wind power installation at Oaxaca in South Mexico where an indigenous population exports energy to industrial users in other parts of the country but paradoxically the local community who have lost land cannot afford the electricity.
- Wind power in Lake Turkana in Kenya is in an area with high levels of poverty and low levels of literacy, resulting in a massive influx of job seekers creating social issues (alcoholism, violence, prostitution) and land grabbing without adequate compensation.
- The large solar farm at Charnaka in Gujarat is built on land occupied by the marginalized Rabari community who are not low caste but have no land and very little education. Only written notices were given before acquiring land and only one consultation meeting was held.
- In Sierra Leone LPG produced by foreign conglomerates BP and Total promoted as renewable energy is rooted in an ideology crafted by politicians in a region where firewood was collected and used to provide energy for women and children. It is now considered as a problematic fuel along with charcoal burning creating a socio-economic cost for the community

One of the communities that seem to be facing the brunt of energy justice issues are indigenous populations around the world as the land that they occupy, and use seems to be most suitable to solar farms and wind farms due to the availability of more sunlight and wind necessary to drive turbines.

Table 3 (in attached as an Appendix) shows a list of such projects around the world and the issues they are causing. These issues are found to occur in both developed and developing countries.

*Note: Table 3 is attached as an appendix as it is very long and wide to help with the flow of reading.*

From what has been discussed so far it is clear that indigenous communities are among one of the vulnerable populations that have been affected by the rapid rise in the building of

renewable energy projects around the world and the energy justice issues being faced by them require some innovative thinking to understand indigenous ways of knowing

There is also a deeper issue. Indigenous people are living in ways that have demonstrated zero carbon living for centuries and they have much to teach so-called ‘developed’ societies and the sciences about how to live in a more re-generative manner to support living systems. Author 2 has been privileged to learn from working with Indigenous leaders over the years. Recently two projects with forest communities (Widianingsih and McIntyre-Mills et al (in progress), McIntyre-Mills, J.J, Makaulule M, Lethole, P., Pitsoane, E., Arko-Achemfuor, A, and Wirawan, R, and Widianingsih, I. (in progress) are cases in point which show that living elegantly and well with nature using a circular economy is possible and it is a goal to which Australia needs to strive as we face the challenge of redressing climate change and risks as detailed in the recent IPCC (2021) :

“Right now, inadequate global action means the Earth is heading towards catastrophic warming of over 2°C. ...We cannot afford to delay. Governments must slash emissions this decade and rapidly transition away from burning fossil fuels.”<sup>1</sup>

I think we need to fully appreciate that core aspects of life include food, water and energy within habitat. We need to learn more about indigenous knowledge systems demonstrate a respect and deep understanding of relationality which of course is what is required to ensure that better – more re-generative and sustainable decisions are made to protect living systems (Wadsworth 2011). Ironically, I think that the so-called developers need to learn from Indigenous people while we still have forests and wide tracts of unspoiled land, oceans and rivers which serve as the lungs and life force of our planet. This is what I have learned from Olive Veverbrants an Arrernte leader in Alice Springs who set an example by building a home off the grid using recycled materials, Peter Turner who stressed that as an Eagle Hawk he shares a totem given by his adopted mother which made him an advocate for protecting country, Adelaide Dlamini, an indigenous healer in Cape Town who explained to me the notion of relationality and responsibility stretching beyond living generations to include our ancestors and future generations, a message echoed by the Mphathe Makaulule, Pat Lethole, Chief Abah Ugi and Prof Ida Widianingsih, for example who are in a community of practice comprising academics and practitioners in the Limpopo Province of South Africa also linked through our research in West Java. The project management and engagement to enable a circular economy is supported by Rudolf Wirawan who is a computer programmer with whom we are working to develop pathways to wellbeing (based on stories from indigenous participants) that are informed by indigenous values and a sense of solidarity and kinship with nature.

We will address the importance of relationality and these projects. Meanwhile let us also bear in mind the several attempts by scholars to deal with energy justice issues that are presented briefly next.

Cadzilla & Mauger (2018) provide a series of steps that can help in alleviating justice issues as shown in Table 4

**Table 4**

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<sup>1</sup> [https://www.climatecouncil.org.au/resources/breaking-down-latest-ipcc-report/?gclid=Cj0KCQjwyMiTBhDKARIsAAJ-9VvUzHZokFV7-WIafInYMQes1RMwfdzxyNy-bYdjCq4w9738KFLIksMaAo1dEALw\\_wcB](https://www.climatecouncil.org.au/resources/breaking-down-latest-ipcc-report/?gclid=Cj0KCQjwyMiTBhDKARIsAAJ-9VvUzHZokFV7-WIafInYMQes1RMwfdzxyNy-bYdjCq4w9738KFLIksMaAo1dEALw_wcB)

**Dealing with Justice Issues**  
(Based on Cadzilla & Mauger 2018)

<b>Action</b>	<b>Outcome</b>
Take	Both social and environmental aspects when siting a project
Promote	Community-based renewable energy projects
Carry out	Proper environmental and social impact studies inserted io just promoting renewable energy as good energy
Encourage	Collaborative governance, public participation and transparency
Include	Marginalised population in deliberations

Benjamin Sovacool who has published widely in energy justice and codirects the Industrial Decarbonisation Research and Innovation Centre (IDRIC) at the University of Sussex proposed a framework to address energy issues shown in Figure 1

<i>Availability:</i> People deserve to get sufficient high-quality energy	<i>Affordability:</i> People should not pay more than 10% of their income towards energy	<i>Due process:</i> Observe due process and respect human rights in producing renewable energy	<i>Transparency:</i> Provide high- quality information in a fair and transparent manner for informed decision making
<i>Sustainability:</i> Energy resources should not be depleted rapidly	<i>Intragenerational equity:</i> People have the right to access energy service fairly	<i>Intergenerational equity:</i> Ensure future generations will enjoy a good life by not inflicting damage to the world through energy investments now.	<i>Responsibility:</i> Nations have the right to protect natural environment by minimizing energy related threats
<i>Resistance:</i> Injustice should be actively opposed		<i>Intersectionality:</i> Energy justice is linked to other forms of justice - socio- economic, political and environmental	

**Figure 1**  
**Framework to address energy issues**  
(Sovacool et al. 2017, p. 687)

Recently Sovacool et al. (2019) has suggested that we look at justice issues taking a whole systems view which is of interest to systems scientists and thinkers:

- A whole systems view extends the concept of energy justice beyond cost, carbon or efficiency to embrace wider objectives such as affordability, security and social sustainability considering both the ‘entire life-cycle and the wider contextual environment’ (McLaren 2012, p. 7).
- Use a relational approach that ‘prompts the need to ask systemic questions that cut across energy, geography and society including the patterns and scales of energy supply distribution and consumption’ (Broto et al. (2018, p.3)

- So, energy justice should go beyond the normative analytical framework and consider, not only vulnerability and exclusion, but also those that benefit disproportionately from transition processes
- We should therefore ask ‘*what*’ questions about the unjust impacts of energy systems with ‘*where*’ they are located; ‘*who*’ is most affected; and ‘*how*’ those injustices become embedded into procedures or mechanisms (Jenkins et al. 2016)

Sovacool et al (2019) suggest policy recommendations as shown in Table 5 to alleviate whole systems issues stating that dealing with spatial and temporal whole systems nature of energy justice is necessary:

**Table 5**  
**Policy Recommendations to recue energy justice issues from a whole systems point of view**

(Adapted from Sovacool et al. 2019)

Level	Policies
Micro	Use benefit sharing agreements to address distributive inequalities related to displacement or unemployment (Use local materials and labour and share benefits with communities)
Meso	Planners and governments should hold public referendums on the transition, solicit feedback and use policies to track or account for embodied emissions and lifecycle impacts
Macro	Agencies like International Energy Agency, International Renewable Energy Agency and Intergovernmental Panel on Climate Change should be involved to help to provide transparency about raw materials and waste streams in such a way that they meet international standards to protect multiple species and shared habitats

Sovacool et al (2017) also point out that many theories have been applied by western scholars to energy justice we seem to have ignored non- western views. Table 6 adapted from his paper shows the various ways of knowing that could contribute to alternate perspectives of energy justice

**Table 6**  
**Non-Western theories and energy justice**  
(Adopted from Sovacool et al. 2017, p. 680)

Tradition	View of energy
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Ubuntu <sup>2</sup>	Use neighbourhood's efforts to promote energy efficiency and make decisions in the community about energy resources, because there is no longer time to waste ( Makaulule, 2013) <sup>3</sup>
Indigenous perspectives (Americas, Africa and Indonesia )	Cautious development of energy resources using long-term experience that prioritise cultural protocols avoiding dramatic transformation of ecosystems and instead using technology to protect living systems. Designs need to be informed by values that appreciate multiple species
Taoism (Confucius)	Respect due process in making decisions about energy, adhere to protecting human rights when carrying out energy projects (Similar to procedural and recognition justice)
Hinduism (Notion of Dharma)	Seek to minimise extent and distribution of energy externalities and offer affordable energy to access to help address poverty (Dharma expects fairness and could relate to distributive processes)
Buddhism (Notion of Dhama)	Respect current and future generations of sentient beings when making energy decisions and minimize harm to environment and society (Reflects intergenerational equity and the wellbeing of all sentient beings)

We pick up on Sovacool's work on using a systems approach and listening to non-traditions perspectives to present two case studies of work with indigenous communities in Africa and Indonesia to demonstrate that systemic praxis provides an alternate approach to address energy justice issues. Before that we point to Sovacool's reflections on how to consider energy justice issues from a life cycle perspective by thinking about these issues both temporally and spatially which also reflecting a holistic and long-term view of energy justice.

Figure 2 shows how a whole systems view can extend across space and time to enable a systemic view of the justice issues caused by renewable energy projects:

		Temporal		
		Production/Distribution Stage	Consumption Stage	Disposal /Recycling Stage
	Macro (Global)	Mineral extraction processes Transportation of materials Labour conditions Global supply chains	Rising energy demand Impact on other countries' policies	Rising global waste Geopolitical issues

<sup>2</sup> <https://www.youtube.com/watch?v=0wZtfqZ271w>

Obama on ubuntu for the Mandela Day lecture 2013 <https://www.youtube.com/watch?v=jiebOGRPPxg>

<sup>3</sup> Notion of ubuntu expressed by Bishop Desmond Tutu You is that we are human through relationship with others and our environment...we are interdependent. Obama stresses the dimensions of inclusion and generosity) <https://www.culturalsurvival.org/publications/cultural-survival-quarterly/there-no-longer-time-mphatheleni-makaulule-agency-and>

<b>Spatial</b>	Meso (National)	Increase in subsidies leading to raised taxes Carbon footprint of installations Diversion of funds from other sectors	Inequality of benefits Increase vulnerability and inequality	Waste Costs of disposal Recycling of old materials
	Micro (Local)	Disruption of ecosystems Loss of local jobs in old systems Health risk to workers in factories	Local pollution Exposure to local risks Urban-rural divide	Legacy and local pollution

**Figure 2**  
**Whole System Energy Injustice**  
**(Based on Sovacool et al. 2019)**

### Case Studies

The case studies are part of an ongoing research project undertaken as part of a community of practice supported by Adelaide University in Australia with communities in South Africa and Indonesia supported by University of South Africa and the University of Padjadjaran, in Indonesia. Both case studies draw on joint papers and our ongoing research as part of a wider program of research with indigenous leaders. Re-generative wellbeing requires remembering our kinship with other species, a systemic understanding that is demonstrated by indigenous researchers such as Chilsa (2017,2020), Harris, & Wasilewski (2004) and Mphathe Makaulule<sup>4</sup> has been eroded by dualistic thinking and practice in the sciences. Donna Haraway sums this up in her recent titles *Staying with the trouble: Making kin in the Chthulucene* (2016) and *Staying with the trouble for multispecies environmental justice* (2018). The difference is made by working with leaders who span academic organisations, NGOs, GOs and communities and who understand the principles of relationality rooted in indigenous knowledge systems ( Odora Hoppers, 2013). The members of the community of practice include policy researchers, sociologists, those with in-depth cultural and local knowledge which has resulted in their recognition as leaders. These indigenous leaders work with other members of the team with multidisciplinary skills to foster the setting up of an ongoing community of practice including organic farming and advanced computing skills.

#### *South Africa*

Currently the second author who acted as a discussant on the energy panel ) is working on case studies that show how indigenous communities in Venda South Africa and Ciptaglar, West Java are protecting the forest. The Nobel peace prize nominee for 2020 was Chief Raoni who stressed the need for peoples of the world to ‘stand together’ to protect the lungs of the planet. Belatedly some leaders are recognising that indigenous wisdom on zero emissions will be essential for our survival. In Venda we are working with Mphathe Makaulule on the promotion of a circular green economy linked with an ecological calendar. For more than two decades she has worked on preventing coal mines from being built in the sacred forests of the Limpopo Region. Similarly in Indonesia we have been learning from the Ciptaglar chief Abah Ugi how to protect the forest and their rice farming using diverse organically grown rice. Their rice production is higher and more reliable in drought years

than those growing genetically farmed varieties. The protection of forests and organic agriculture go hand in hand and to that end in South Africa we have registered with PGSA<sup>5</sup>, an organic farmer's organisation to help us learn more about organic farming methods and perhaps to achieve certification for some of the farmers. The community of practice is supported by a network based on sharing knowledge and supporting local communities. Our hope is that the learnings will be scaled up through an eco-village website and associated pathways to wellbeing software to map transformation from 'business as usual' and to help people to think through the implications of their decisions so that they take steps towards supporting wellbeing stocks ( Stiglitz et al 2010) and re-generative living (Wahl 2010) so that they care for multiple species. In Indonesia the 'One village, one product' (OVAP, Morihiko Hiramatsu—Governor of Oita prefecture, 1979; Yogyakarta, 2014) was applied by President Jokowi in 2008–2009 has also been inspirational.

It is hoped that we will be continue to work successfully to support and scale up the PGSA mission<sup>6</sup> on organic farming as well as justice for farm ( and other) animals and to operate in accordance with the principles set out in the ecocide law ( Higgins et al 2013) which stresses that peace depends on supporting a liveable habitat for all species to live undisturbed lives. It is admirable that many of these principles are already in practice in both of these communities.

### **A community of practice linking case studies**

The case studies have been detailed elsewhere<sup>7</sup> (Lethole, Makaulule, McIntyre-Mills, Wirawan. 2022 forthcoming, McIntyre-Mills et al (2021) McIntyre-Mills, Wirawan and Widianingsih, forthcoming and Widianingsih, McIntyre-Mills et al forthcoming ).

The communities are :

- Tshidzivhe Village in Venda with indigenous leaders who combine sustainable living with protecting the sacred forest. They are part of a community of practice inspired by Ocean View Organic Farm . The latter provided inspiration for setting up a co-operative.
- Chiptagler , a forest community in West Java which grows organic rice and has centred their life on sustainable living for possibly 600 years.

The communities share in common the desire to balance agricultural development with protecting the forests . The leader of the Venda project, Mphathe Makaulele ( winner of a Gaia Foundation award ) was in turn inspired by the Amazon leaders whom she visited to learn more about leadership .

The Tshidzivhe Village project in South Africa has set up a cooperative led by Indigenous women leaders is a work in progress action research project that explores why and how to achieve wellbeing by using narratives (using the oral tradition) and developing key themes to inspire the setting up of a social enterprise to market organic products. The village in Venda where the project is located has an oral tradition of passing on stories, songs and dances to protect their cultural and natural heritage. Pat Lethole and Mphatheleni Makaulule are custodians , leaders and researchers who work with the members of the community . As a result of our engagement and inspiration from the Organic farm co-op from whom we have learned they have formed a co-operative and registered it successfully. The aim is to develop partnerships with others in the community and in neighbouring communities and to

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<sup>5</sup> PGS body is PGS SA <https://www.pgssa.org.za/>

<sup>6</sup>

share the learning with others so that the local environment can be protected from development of coalmines and so that a circular local green economy can be created with the local community. Mphatheleni, winner of a Gaia award with a strong online presence has been working for decades to promote an ecological calendar which she uses as a basis for teaching within the community. Our hope is that together we will learn more about how to set up a community co-operative and how to support a circular, green economy in line with gender mainstreaming principles. We are also extending our community of practice by learning from an organic farmers network. Balancing the needs of people and the environment requires improving our understanding of multispecies relationships and creating opportunities for more sustainable living which is in line with the policy stressed by the South African Minister of forestry, fisheries and the environment, Barbara Creecy<sup>8</sup> stressed the need for a so-called ‘new deal’ for people and nature.”

The project will be monitored to assess what works, why and how to enhance local creativity through the community of practice. We use Zoom, WhatsApp messaging and calls to enable local people to identify opportunities and we are exploring ways to support them so that they can market their products. They are invited to consider:

- What they have in material and non-material terms
- What they need
- What the turning points for better and worse are
- Barriers

The data collection focuses on narratives of what works why and how by engaging participants to reflect on how they can turn personal issues, resources and skills into public resources through pooling resources to support social enterprises in a co-operative. The user-centric design would enable the co-operative to grow through enabling people to find ways to help themselves and others. Stories from self-selected participants will be used to explore the specific socio-cultural, economic and environmental contexts of social enterprise and how best to support social engagement within a circular economy which is the focus of the research. Mphatheleni Makaulule is a custodian of the Lunde forest, known as a Makhadzi who is linked with the royal lineage who (along with other custodians). Mphatheleni explains that as a defender of the Venda cultural knowledge she shares stories and draws on the ecological calendar so that people learn that human beings are just a small part of the wider circle of life which they need to protect as custodians (see McIntyre-Mills, Makaulule et al, forthcoming). The custodians (along with their fellow villagers) share totemic kinship with nature (see Lethole et al, 2022 in Transformative Education, forthcoming which builds on “From Polarisation to Multispecies Relationships (2021) in which Lethole explains her responsibility and relationship implied by holding an elephant totem which is part of her identity (see Romm and Lethole, 2021, p. 88).

The significance of the Makhadzi is to perform the sacred rites of the forest and the value of sacred forest is vested in the Makhadzi’s position (who have a mediation role to play in making a spiritual connection between ancestors and their creator. Each sacred site has been identified by its totem which is linked to the biodiversity of the sacred forest (it is not a place of human activities like harvesting fruits, fetching wood and collecting medicinal plants). Its purpose is only for spiritual connection by custodians. The myths and taboos are linked to the protection and governance of biodiversity. The circular economy could be

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<sup>8</sup> Ninth People and Parks Conference in Sandton, South Africa <https://www.dailymaverick.co.za/article/2022-03-31-indigenous-communities-crucial-to-protecting-biodiversity-says-creecy/>

supported by institutional governance to better manage the global commons. Elinor Ostrom won the Nobel Peace Prize in 2009 for her empirical research on the rational choices made by groups of people who worked collaboratively to protect the common good. Her work showed that in some specific cases conditions for co-operation could be achieved and she argued that Hardin's (1968) thesis which he called "Tragedy of the Commons" is not inevitable.

### *Indonesia*

The Ciptaglar area is very different from these other projects in West Java in that the latter is more isolated and unlike the other areas has retained its Sumatran culture as well as a rice ecology that is governed by an ecological calendar. This forest community was set up by refugees from the Bantam province almost 600 years ago and has been widely documented. Their ecological calendar resonates with the calendar used by the Amazon leaders who taught Mphathe Makaulule who in turn has used this approach in Venda to teach her community to protect the sacred forest.

As detailed in a forthcoming paper with Sundanese indigenous leaders and academics ( see Widianingsih, I, McIntyre-Mills, J.J. Sumadinata, W.S., Rakasiwi, U.S. , Iskandar, G.H Wirawan, R ) based on on line engagement during the pandemic and in depth field work by Prof Ida Widianingsih and her colleagues and Chief Abah Ugi , prior to the pandemic and with whom we have co-authored

The community is organised in such a way that the forest is divided into three areas, the sacred, the area that can provide limited resources if harvested at the appropriate time and manner and smaller areas that are cleared and used according to a strict calendar involving the entire community and then rested for other months to allow for regeneration. When Abah Ugi ( chief ) , his wife and the leader of the rice rituals ( a woman) decide it is right , the rituals are followed by the community. The songs, rituals and local wisdom are taught in a local school supported by a local radio and TV station which they own and run. This education program and related research is supported by Universitas Padjadjaran and indigenous knowledge systems are recognised in terms of indigenous law so that school curricula include indigenous wisdom ( Komara et al, 2021). Abah Ugi has a diploma in electrical engineering and although the careful balance of the village remains unchanged , they introduce some new technology to serve the community and nature. They have a high regard for their own local knowledge and they do not commodify their rice by selling it. Everyone in the community works together to produce a rice crop that is carefully harvested and stored. The community also provides clear leadership roles for men and women and the leader has to co-lead with a wife. The community is conservative in terms of gender roles. It also appears to have a strict hierarchy in terms of leadership and perhaps access to other opportunities. I was told that all students who show potential are encouraged to study at university. The cultural roots lie in Buddhist and Hindu roots and they place nature and balance first in all their decisions. Local wisdom is carried through oral culture taught in the form of art, songs, dance and rituals. The rice goddess is worshipped.

In terms of participation, the community are actively involved in all aspects of life and group discussions are encouraged, but the final decisions on protecting the way of life are made by the chief, president and ministers. They also decide when the community should move , based on protecting the balance of nature.

*Reflections:*

The two communities demonstrate indigenous community leadership and a plea for us – those who value social and environmental justice to stand together, to use the phrase of Raoni, Nobel price nominee for 2021. The community of practice set up through these projects is based on shared values, ability to form long standing relationships and task orientation to test out ways to address the big issues of the day: poverty, climate change, habitat loss, food and water insecurity. The two case studies of forest communities demonstrate a way forward based on a respect for multiple species combined with a circular regenerative system. In the case of Venda, the community are not averse to developing markets and selling goods provided they do not in any way undermine the sustainability of the community. They have passed an ecocide law. In the case of Ciptegalar the community is open to new forms of technology provided they are used to protect their forest home and rice-based culture and conducted in harmony with their environment and which has been sustained for 600 years . Today their community provides an enviable standard of living in which the arts and technical and sciences flourish. Both communities are concerned to make a difference and to teach others how to live sustainably and well and they have leaders willing and able to embrace new technologies that protect their sacred forests. In our ongoing work learning together we are exploring the extent to which Ostrom’s 7 principles are being applied to protect the global commons. See Table 7.

**Table 7  
Ostrom’s Principles**

<b>OSTROM’S PRINCIPLES FOR MANAGING THE COMMONS</b>	
<b>Principles</b>	<b>Process</b>
<ul style="list-style-type: none"> <li>• Define clear group boundaries</li> </ul>	<ul style="list-style-type: none"> <li>• The neighbourhood/village/council area is the boundary But our engagement with habitat needs to be based on appreciating that we are part of a living system ( Wadsworth, 2008,2011). We need a 360 degree view informed by an ecology of mind ( Bateson , 1970, Nora Bateson, 2020).</li> </ul>
<ul style="list-style-type: none"> <li>• Match rules governing use of common goods to local needs and conditions.</li> </ul>	<ul style="list-style-type: none"> <li>• Stories are the basis for developing shared narratives to underpin contracts</li> </ul>
<ul style="list-style-type: none"> <li>• Ensure that those affected by the rules can participate in modifying the rules.</li> </ul>	<ul style="list-style-type: none"> <li>• Village level policy research based on story pathways and pathways to wellbeing software</li> </ul>
<ul style="list-style-type: none"> <li>• Make sure the rule-making rights of community members</li> </ul>	<ul style="list-style-type: none"> <li>• Village level policy research based on story pathways and pathways and ecological mapping (Makaulule, 2021<sup>9</sup>using local soft systems type applications</li> </ul>

<sup>9</sup> Source Makaulule, 2021 and <https://www.youtube.com/watch?v=IszP5Uq-X50>

are respected by outside authorities.	<ul style="list-style-type: none"> <li>We are at this stage trying to collect stories to help scale up decision making</li> </ul>
<b>Working towards the next steps</b>	
<ul style="list-style-type: none"> <li>Develop a system, carried out by community members, for monitoring members' behaviour.</li> </ul>	<ul style="list-style-type: none"> <li>Influence maps using soft systems style mapping to show ecological relationships to be demonstrated through more formal tools such as Qualtrics and SPSS (Wirawan and McIntyre-Mills et al in progress)</li> </ul>
<ul style="list-style-type: none"> <li>Use graduated sanctions for rule violators.</li> </ul>	<ul style="list-style-type: none"> <li>Evidence of progress and protection of the commons or the need for more effort to be demonstrated by block chain (Wirawan and McIntyre-Mills et al, in progress)</li> </ul>
<ul style="list-style-type: none"> <li>Provide accessible, low-cost means for dispute resolution.</li> </ul>	<ul style="list-style-type: none"> <li>Work through problem solving using face to face negotiations and pathways to wellbeing</li> </ul> <p><i>In a priori terms</i> we need to be guided by an approach rooted in a respect for relationships and through de-colonising the mind. Values matter quite literally as they shape our policies, designs and landscape. The rights of indigenous people (UNDRIP, 2007) to protect habitat could be further supported through forms of democratic engagement, as suggested, for example by Christakis and Harris (2004) and in several joint papers with those who have supported by global Agoras over the years. A design of inquiry approach (Churchman, 1971, Ulrich and Reynolds, 2011, Midgely, 2014) needs to be informed by working with the involved and affected, including multiple species (Harris &amp; Wasilewski, 2004, Chilisa, 2017, Romm and Lethole, 2021, McIntyre-Mills, 2021, McIntyre-Mills, Lethole et al, 2021, Addae and McIntyre-Mills, 2022, McIntyre-Mills and Makaulule et al, forthcoming).</p> <p>Rights and responsibilities need to be extended to include solidarity with other species</p> <p><i>In a posteriori terms</i> we need to ensure that indicators are developed and monitored to ensure that we protect wellbeing and living systems.</p>

Sources : (adapted from McIntyre-Mills, J.J, Makaulule M, Lethole, P., Pitsoane, E., Arko-Achemfuor, A, and Wirawan, R, and Widianingsih, I. (submitted) Ecocentric living : a way forward towards zero carbon . A conversation about Indigenous law and leadership based on custodianship and praxis. Submitted to *Systemic Praxis and Action Research and Ostrom Managing-the-commons/* <https://earthbound.report/2018/01/15/elinor-ostroms-8-rules-for-managing-the-commons/>

Ostrom's research (1992, 2008 and 2014) demonstrates that people can and do share resources under certain circumstances, these are summarised as principles which relate to setting clear boundaries and clear rules, appropriate decision-making processes and monitoring linked with appropriately applied sanctions and processes. Ostrom also stresses



that the local community rights need some recognition by wider government and that the local systems need to be nested within layers of governance.

The challenge which we face is *what* motivates people to change their thinking and practice and how can learning organisations and communities motivate people to move from business as usual towards supporting wellbeing stocks (Stiglitz et al 2010 ) and enthusiasm for managing the commons

## Conclusions

If we are to have a hope of achieving zero emissions we will need to learn that the current way of life is unsustainable and that systemic thinking is not a new discovery. It is rooted in indigenous wisdom , spirituality and the views held by many world religions ; it is also recognised by the many thinkers and practitioners who understand the implications and physics of relationality and the implications of ignoring this wisdom. As systemic practitioners we need to be mindful of the dangers of ‘misdirected systems’ (Ackoff and Pourdehnand, 2001) that have been ‘doing the wrong things’ to the extent that we are destroying the planet (Attenborough, 2020). The time to apply systemic thinking and practice is overdue by remembering our relationality as a strand in a dynamic living system.

The latest IPCC report also stresses:

“Right now, inadequate global action means the Earth is heading towards catastrophic warming of over 2°C. .... We cannot afford to delay. Governments must slash emissions this decade and rapidly transition away from burning fossil fuels.”

The latest IPCC reports<sup>i</sup> can be served well by learning from Indigenous communities. For instance, the latest IPCC report based on the findings of the Glasgow summit<sup>ii</sup> stresses:

“The need for deep and rapid cuts to emissions is even clearer than before..”

## References

- Addae, D and McIntyre-Mills, J.J. (2021)Balancing Individualism and Collectivism: A Conversation on Afrocentricity in Olivia Tiwaa Adwoa Kwapong, David Addae, and John Kwame Boateng (editors) Development Education in Africa, Springer Nature, Cham. Switzerland ( accepted and forthcoming)
- Ackoff, R. L., & Pourdehnand, J. (2001). On misdirected systems. *Systems Research and Behavioural Science.*, 18(3), 199–205. <https://doi.org/10.1002/sres.388>
- Attenborough, D. 2020 Life on our Planet <https://www.youtube.com/watch?v=64R2MYUt394>
- Agostini, C. A., Nasirov, S., & Silva, C. (2016). Solar PV planning toward sustainable development in Chile: challenges and recommendations. *The Journal of Environment & Development*, 25(1), 25-46.
- Bateson, G. (1972). *Steps to an ecology of mind*. New York: Ballantine.
- Bacchiocchi, E., Sant, I., & Bates, A. (2022). Energy justice and the co-opting of indigenous narratives in US offshore wind development. *Renewable Energy Focus*, 41, 133-142.
- Broto, V. C., & Baker, L. (2018). Spatial adventures in energy studies: An introduction to the special issue. *Energy Research & Social Science*, 36, 1-10.
- Checkland P and Scholes J (1991). “*Soft Systems Methodology in Action*”. Chichester: Wiley.



- Chilisa B (2017). “Decolonizing Transdisciplinary Research Approaches: An African Perspective for Enhancing Knowledge Integration in Sustainability Science.” *Sustainability Science* **12**(5): 813–
- Chilisa B (2020). *Indigenous Research Methodologies* (2nd ed.). London. Sage.
- Christakis, A. N., & Harris, L. (2004). Designing a transnational indigenous leaders he context of globalization: Wisdom of the people forum. *Systems Research and Behavioral Sciences*.
- Churchman, C. W. (1971). *The design of inquiring systems*. New York: Basic Books.
- Caldazilla, P.V. & Mauger, R. (2018) The UN’s new sustainable development agenda and renewable energy: the challenge to reach SDG 7 while achieving energy justice, *Journal of Energy & Natural Resources Law*, 36(2), 233-254
- Donaldson, S., & Kymlicka, W. (2011). *Zoopolis: A political theory of animal rights*. Oxford:Oxford University Press.
- De Waal, F. (2009). *The age of empathy: Nature’s lessons for a kinder society*. New York: Harmony Books.
- Donaldson, S., & Kymlicka, W. (2011). *Zoopolis: A political theory of animal rights*. Oxford: Oxford University Press.
- Fuentes, A. (2020). Commentary: other animals as kin and persons worthy of increased ethical consideration. *Cambridge Quarterly of Healthcare Ethics*, 29(1), 38–41. <https://doi.org/10.1017/S0963180119000744>
- Gagliano, M., Abramson, C. I., & Depczynski, M. (2018). Plants learn and remember: let's get used to it. *Oecologia*, 186, 29–31. <https://doi.org/10.1007/s00442-017-4029-7>
- Forsetto, R. ( 2020) Chief Raoni, Nobel Peace Prize nominee, presides over historic meeting with over 600 indigenous leaders in Brazil, on 5 February, 2020
- Gellert, P. K., & Lynch, B. D. (2003). Mega-projects as displacements. *International Social Science Journal*, 55(175), 15-25.
- Goodall, J. (2020). <https://www.cnn.com/videos/us/2020/03/19/coronavirus-jane-goodall-acfcfull-episode-vpx.cnn>.The hope documentary <https://www.youtube.com/watch?v=nKir4OvgLo>
- Caldazilla, P.V. & Mauger, R. (2018) The UN’s new sustainable development agenda and renewable energy: the challenge to reach SDG 7 while achieving energy justice, *Journal of Energy & Natural Resources Law*, 36(2), 233-254
- Checkland P and Scholes J (1991). “*Soft Systems Methodology in Action*”. Chichester: Wiley.
- Chilisa B (2017). “Decolonizing Transdisciplinary Research Approaches: An African Perspective for Enhancing Knowledge Integration in Sustainability Science.” *Sustainability Science* **12**(5): 813–
- Chilisa B (2020). *Indigenous Research Methodologies* (2nd ed.). London. Sage.
- Christakis, A. N., & Harris, L. (2004). Designing a transnational indigenous leaders he context of globalization: Wisdom of the people forum. *Systems Research and Behavioral Sciences*.
- Churchman, C. W. (1971). *The design of inquiring systems*. New York: Basic Books.
- Donaldson, S., & Kymlicka, W. (2011). *Zoopolis: A political theory of animal rights*. Oxford:Oxford University Press.
- De Waal, F. (2009). *The age of empathy: Nature’s lessons for a kinder society*. New York: Harmony Books.
- .Fuentes, A. (2020). Commentary: other animals as kin and persons worthy of increased ethical consideration. *Cambridge Quarterly of Healthcare Ethics*, 29(1), 38–41. <https://doi.org/10.1017/S0963180119000744>
- Forsetto, R. ( 2020) Chief Raoni, Nobel Peace Prize nominee, presides over historic meeting with over 600 indigenous leaders in Brazil, on 5 February, 2020
- Gaeliano. M.. Abramson. C. I.. & Denczvnski. M. (2018). Plants learn and remember: let's get used to it. *Oecologia*, 186, 29–31. <https://doi.org/10.1007/s00442-017-4029-7>
- Gellert, P. K., & Lynch, B. D. (2003). Mega-projects as displacements. *International Social Science Journal*, 55(175), 15-25.

- Goodall, J. (2020). <https://www.cnn.com/videos/us/2020/03/19/coronavirus-jane-goodall-acfcfull-episode-vpx.cnn>. The hope documentary  
[https://www.youtube.com/watch?v=n\\_Kir4OvgLo](https://www.youtube.com/watch?v=n_Kir4OvgLo)
- Harris, P.G. (ed.) (2016) *Ethics, Environmental Justice and Climate Change*, Cheltenham: Edward Elgar Publishing.
- Harris, L. D., & Wasilewski, J. (2004). Indigeneity, an alternative worldview: Four R's (relationship, responsibility, reciprocity, redistribution) vs. two P's (power and profit). Sharing the journey toward conscious evolution. *Systems Research and Behavioral Science*, 21(5), 489
- Haraway, D. (2016). *Staying with the trouble: Making kin in the Chthulucene*. Durham, NC: Duke University Press.
- Haraway, D. (2018). Staying with the trouble for multispecies environmental justice. *Dialogues in Human Geography*, 8(1), 102
- Odora-Hoppers C (2013), "Community engagement, globalization, and restorative action: Approaching systems and research in the Universities." *Journal of Adult and Continuing Education* 19(2) Autumn 2013: 94-102.
- Higgins, P., Short, D., & South, N. (2013). Protecting the planet: A proposal for a law of ecocide. *Crime Law Soc Change*, 59, 251–266. <https://doi.org/10.1007/s10611-013-9413-6>.
- Jenkins, K., McCauley, D., Heffron, R., Stephan, H., & Rehner, R. (2016). Energy justice: A conceptual review. *Energy Research & Social Science*. 11. 174-182.
- Komara.E. . Kusvadi. Y. Melivani .N. (2021) Integration of Local Wisdom Values of Seren Taun Traditional Ceremony in Social Science Lesson as Learning Model of Ethnopedagogy in SMPN 1 Nagrak District of Nagrak Regency of Sukabumi. *Ilkogretim Online - Elementary Education Online*. 2021; 20 (3): pp. 366-375 <http://ilkogretim-online.org> doi: 10.17051/ilkonline.2021.03.35
- Lethole, P. Makaulule, M. McIntyre-Mills, J. and Wirawan, R. Chapter 18: Aa!!Venda women and social enterprise: Stepwise progress to regenerative and sustainable living by In McIntyre-Mills, J and Corcoran-Nantes ( Eds) *Transformative Education for Re-generative Development: Pathways to Sustainable Environments*, Springer , forthcoming
- McCauley, D., Ramasar, V., Heffron, R. J., Sovacool, B. K., Mebratu, D., & Mundaca, L. (2019). Energy justice in the transition to low carbon energy systems: Exploring key themes in interdisciplinary research. *Applied Energy*, 233, 916-921.
- McIntyre-Mills, J.J. Lethole, P.V, Romm, NRA, Makaulule, M and Wirawan, R. (2021) 'Re-designing education for regeneration and wellbeing: Exploring the potential of digital engagement' in Alain L. Fymat (Editor) *The COVID context Society for the Advancement of Science in Africa ,proceedings from 2020, 7th annual conference:COVID-19: Perspectives across Africa* ( accepted and forthcoming)
- McIntyre-Mills, J.J, Makaulule M, Lethole, P., Pitsoane, E., Arko-Achemfuor, A, and Wirawan, R, and Widianingsih, I. (submitted) *Ecocentric living : a way forward towards zero carbon . A conversation about Indigenous law and leadership based on custodianship and praxis*. Submitted to *Systemic Praxis and Action Research*
- McIntyre-Mills, J. 2021 The importance of relationality: a note on co-determinism, multispecies relationships and implications for Covid 19. *Systems Research and Behavioral Science*, 1–15. <https://doi.org/10.1002/sres.2817>
- McIntyre-Mills, J. (2021)Chapter 3 'From old to new taxonomies of rights, relationships and responsibilities to protect habitat', *From Polarisation to Multispecies Relationships in the Age of Mass Extinctions* , Springer Nature Singapore, pp.31-54.
- McIntyre-Mills, J. (2021)Chapter 5: McIntyre-Mills, J: *Consciousness for Balancing Individualism and Collectivism*'. in McIntyre-Mills, J.J. and Corcoran Nantes, Y. 'From

- Polarisation to Multispecies Relationships in the Age of Mass Extinctions’ Springer Nature Singapore.pp67-86.
- McIntyre-Mills, J.J 2021 Communication and culture : a multispecies endeavour within a shared habitat Year book for International Systems Sciences, Systems Research and Behavioural Science ,1-14 <https://doi.org/10.1002/sres.2810>
- McIntyre-Mills, J. (2021)Chapter 9 : Social engagement to redress the banality of evil and the frontiers of justice: Limitations of the social contract to protect habitat and why an international law to prevent the crime of ecocide matters From Polarisation to Multispecies Relationships in the Age of Mass Extinctions , Springer Nature Singapore.pp.141-172.
- McLaren, D. P. (2012). Justice and low carbon energy transitions. *A review and synthesis of work undertaken by InChlESEV*.
- Mejía-Montero, A., Lane, M., van Der Horst, D., & Jenkins, K. E. (2021). Grounding the energy justice lifecycle framework: An exploration of utility-scale wind power in Oaxaca, Mexico. *Energy Research & Social Science*, 75, 102017.
- Newell, P., Srivastava, S., Naess, L. O., Torres Contreras, G. A., & Price, R. (2020). *Towards transformative climate justice: key challenges and future directions for research*. Institute of Development Studies.
- Ostrom, E. (2014). Elinor Ostrom Nobel Prize in Economics Lecture. <https://www.youtube.com/watch?v=T6OgRki5SgM>
- Pauli, G. (2010). The blue economy: Report to the Club of Rome. Paradigm Publications.
- Rayner, A. (2017). *Natural Inclusion* in McIntyre-Mills, J.J , Romm, N. and Corcoran-Nantes, Y Balancing Individualism and Collectivism: Social and Environmental Justice. Springer: Cham. pp 461-470
- Rovelli, C. 2021 Relational Interpretation of Quantum Mechanics and Alexander Bogdanov’s Worldview’ by Carlo Rovelli <https://stream.syscoi.com/2021/05/05/the-centre-for-systems-studies-two-even-celebrating-the-life-and-contribution-of-alexander-bogdanov-the-annual-mike-jackson-lecture-2-june-with-carlo-rovelli-and-seminar-on-3-june-both-online/>
- Shiva, V. (1989). *Staying Alive: Women, ecology and survival in India*, Zed Books. London
- Shiva, V. (2012) *Monocultures of the Mind*. Third World Network. Penang.
- Renkens, I. (2019). The Impact of Renewable Energy Projects on Indigenous Communities in Kenya: The Cases of the Lake Turkana Wind Power Project and the Olkaria Geothermal Power Plants.
- Romm, N and Lethole, N ( 2021) Prospects for Sustainable Living with Focus on Interrelatedness,Interdependence and Mutuality: Some African Perspectives pp 87-114
- Sovacool, B.K. (2013). Energy and ethics: Justice and the global energy challenge, Basington: Palgrave Macmillan

- Sovacool, B. K., Burke, M., Baker, L., Kotikalapudi, C. K., & Wlokas, H. (2017). New frontiers and conceptual frameworks for energy justice. *Energy Policy*, *105*, 677-691.
- Sovacool, B. K. & Dworkin, M.H. (2014). *Global Energy Justice*, Cambridge: Cambridge University Press
- Sovacool, B. K., Hook, A., Martiskainen, M., & Baker, L. (2019). The whole systems energy injustice of four European low-carbon transitions. *Global Environmental Change*, *58*, 101958.
- Stiglitz J., Sen, A., & Fitoussi, J. P. (2010). *Mis-measuring our lives: Why the GDP doesn't add up*. New York: The New Press.
- Stiglitz, J. (2011). Of the 1%, by the 1%, for the 1%. <https://www.vanityfair.com/news/2011/05/top-one-percent-201105#>
- Ulrich, W., & Reynolds, M. (2010). Critical systems heuristics. In M. Reynolds & S. Holwell (Eds.), *Systems approaches to managing change: A practical guide* (pp. 242–292). Springer: London.
- Toenseng, G.C. (2018). Massachusetts tribes unhappy with energy project, *Indian Country Today*, Available at <https://indiancountrytoday.com/archive/massachusetts-tribes-unhappy-with-energy-project>
- United Nations Declaration of the Rights of Indigenous Peoples (2008). <http://www.ohchr.org/wa>
- Thiong'o N. (1998) Decolonising the Mind. *Diogenes*. 46(184):101-104. doi:[10.1177/039219219804618409](https://doi.org/10.1177/039219219804618409)
- Wadsworth, Y. 2008. “Systemic human relations in dynamic equilibrium,” *Systemic Practice and Action Research*, 21(1): 15-34.
- Wadsworth, Y. (2010). *Building in Research and Evaluation: Human inquiry for living systems* (1st ed.). Routledge. <https://doi.org/10.4324/97810031115090>
- Wahl, C (2019). Sustainability is not enough in In Dabelko, G.D and Conca, K. *Green Planet Blues : Critical Perspectives on Global Environmental Politics*, edited by Taylor & Francis Group, 2019. ProQuest Ebook Central, <http://ebookcentral.proquest.com/lib/flinders/detail.action?docID=5892383>.
- Wahl, C. (2016) *Designing regenerative cultures*. Triarchy Press
- Widianingsih, I, McIntyre-Mills, J.J. Sumadinata, W.S., Rakasiwi, U.S. , Iskandar, G.H Wirawan, R Indigenous Sundanese leadership: eco-systemic lessons on zero emissions A conversation with Indigenous leaders in Ciptagelar, West Java. Submitted to Systemic Praxis and Action Research
- Yenneti, K., & Day, R. (2016). Distributional justice in solar energy implementation in India: the case of Charanka solar park. *Journal of rural studies*, *46*, 35-46.
- Higgins, P., Short, D., & South, N. (2013). Protecting the planet: A proposal for a law of ecocide. *Crime Law Soc Change*, *59*, 251–266. <https://doi.org/10.1007/s10611-013-9413-6>.
- Jenkins, K., McCauley, D., Heffron, R., Stephan, H., & Rehner, R. (2016). Energy justice: A conceptual review. *Energy Research & Social Science*, *11*, 174-182.

- Komara, E., Kusyadi, Y., Meliyani, N. (2021) Integration of Local Wisdom Values of Seren Taun Traditional Ceremony in Social Science Lesson as Learning Model of Ethnopedagogy in SMPN 1 Nagrak District of Nagrak Regency of Sukabumi. *Ilkogretim Online - Elementary Education Online*, 2021; 20 (3): pp. 366-375 <http://ilkogretim-online.org> doi: 10.17051/ilkonline.2021.03.35
- Lethole, P., Makaulule, M., McIntyre-Mills, J., and Wirawan, R. Chapter 18: Aa!!Venda women and social enterprise: Stepwise progress to regenerative and sustainable living by In McIntyre-Mills, J and Corcoran-Nantes (Eds) *Transformative Education for Re-generative Development: Pathways to Sustainable Environments*, Springer, forthcoming
- McCauley, D., Ramasar, V., Heffron, R. J., Sovacool, B. K., Mebratu, D., & Mundaca, L. (2019). Energy justice in the transition to low carbon energy systems: Exploring key themes in interdisciplinary research. *Applied Energy*, 233, 916-921.
- Meadows, D., & Randers, J. (1992). *Beyond the limits: Global collapse of a sustainable future*. Earthscan Publications.
- McIntyre-Mills, J.J., Lethole, P.V., Romm, N.A., Makaulule, M. and Wirawan, R. (2021) 'Re-designing education for regeneration and wellbeing: Exploring the potential of digital engagement' in Alain L. Fymat (Editor) *The COVID context Society for the Advancement of Science in Africa*, proceedings from 2020, 7th annual conference: COVID-19: Perspectives across Africa (accepted and forthcoming)
- McIntyre-Mills, J.J., Makaulule M., Lethole, P., Pitsoane, E., Arko-Achemfuor, A., and Wirawan, R., and Widianingsih, I. (submitted) *Ecocentric living : a way forward towards zero carbon . A conversation about Indigenous law and leadership based on custodianship and praxis*. Submitted to *Systemic Praxis and Action Research*
- McIntyre-Mills, J. 2021 The importance of relationality: a note on co-determinism, multispecies relationships and implications for Covid 19. *Systems Research and Behavioral Science*, 1–15. <https://doi.org/10.1002/sres.2817>
- McIntyre-Mills, J. (2021) Chapter 3 'From old to new taxonomies of rights, relationships and responsibilities to protect habitat', *From Polarisation to Multispecies Relationships in the Age of Mass Extinctions*, Springer Nature Singapore, pp.31-54.
- McIntyre-Mills, J. (2021) Chapter 5: McIntyre-Mills, J.: Consciousness for Balancing Individualism and Collectivism'. in McIntyre-Mills, J.J. and Corcoran Nantes, Y. 'From Polarisation to Multispecies Relationships in the Age of Mass Extinctions' Springer Nature Singapore. pp.67-86.
- McIntyre-Mills, J.J. 2021 Communication and culture : a multispecies endeavour within a shared habitat Year book for International Systems Sciences, *Systems Research and Behavioural Science*, 1-14 <https://doi.org/10.1002/sres.2810>
- McIntyre-Mills, J. (2021) Chapter 9 : Social engagement to redress the banality of evil and the frontiers of justice: Limitations of the social contract to protect habitat and why an international law to prevent the crime of ecocide matters *From Polarisation to Multispecies Relationships in the Age of Mass Extinctions*, Springer Nature Singapore. pp.141-172.



- McLaren, D. P. (2012). Justice and low carbon energy transitions. *A review and synthesis of work undertaken by InCluESEV*.
- Mejía-Montero, A., Lane, M., van Der Horst, D., & Jenkins, K. E. (2021). Grounding the energy justice lifecycle framework: An exploration of utility-scale wind power in Oaxaca, Mexico. *Energy Research & Social Science*, 75, 102017.
- Newell, P., Srivastava, S., Naess, L. O., Torres Contreras, G. A., & Price, R. (2020). *Towards transformative climate justice: key challenges and future directions for research*. Institute of Development Studies.
- Ostrom, E. (2014). Elinor Ostrom Nobel Prize in Economics Lecture. <https://www.youtube.com/watch?v=T6OgRki5SgM>
- Pauli, G. (2010). *The blue economy: Report to the Club of Rome*. Paradigm Publications.
- Rayner, A. (2017). *Natural Inclusion* in McIntyre-Mills, J.J , Romm, N. and Corcoran-Nantes, Y *Balancing Individualism and Collectivism: Social and Environmental Justice*. Springer: Cham. pp 461-470
- Rovelli, C. 2021 Relational Interpretation of Quantum Mechanics and Alexander Bogdanov's Worldview' by Carlo Rovelli <https://stream.syscoi.com/2021/05/05/the-centre-for-systems-studies-two-even-celebrating-the-life-and-contribution-of-alexander-bogdanov-the-annual-mike-jackson-lecture-2-june-with-carlo-rovelli-and-seminar-on-3-june-both-online/>
- Shiva, V. (1989). *Staying Alive: Women, ecology and survival in India*, Zed Books. London
- Shiva, V. (2012) *Monocultures of the Mind*. Third World Network. Penang.
- Renkens, I. (2019). The Impact of Renewable Energy Projects on Indigenous Communities in Kenya: The Cases of the Lake Turkana Wind Power Project and the Olkaria Geothermal Power Plants.
- Romm, N and Lethole, N ( 2021) Prospects for Sustainable Living with Focus on Interrelatedness, Interdependence and Mutuality: Some African Perspectives pp 87-114
- Sovacool, B.K. (2013). *Energy and ethics: Justice and the global energy challenge*, Basington: Palgrave Macmillan
- Sovacool, B. K., Burke, M., Baker, L., Kotikalapudi, C. K., & Wlokas, H. (2017). New frontiers and conceptual frameworks for energy justice. *Energy Policy*, 105, 677-691.
- Sovacool, B. K. & Dworkin, MH. (2014). *Global Energy Justice*, Cambridge: Cambridge University Press
- Sovacool, B. K., Hook, A., Martiskainen, M., & Baker, L. (2019). The whole systems energy injustice of four European low-carbon transitions. *Global Environmental Change*, 58, 101958.
- Stiglitz J., Sen, A., & Fitoussi, J. P. (2010). *Mis-measuring our lives: Why the GDP doesn't add up*. New York: The New Press.
- Stiglitz, J. (2011). Of the 1%, by the 1%, for the 1%. <https://www.vanityfair.com/news/2011/05/top-one-percent-201105#>

- Ulrich, W., & Reynolds, M. (2010). Critical systems heuristics. In M. Reynolds & S. Holwell (Eds.), *Systems approaches to managing change: A practical guide* (pp. 242–292). Springer: London.
- Toenseng, G.C. (2018). Massachusetts tribes unhappy with energy project, *Indian Country Today*, Available at <https://indiancountrytoday.com/archive/massachusetts-tribes-unhappy-with-energy-project>
- United Nations Declaration of the Rights of Indigenous Peoples (2008). <http://www.ohchr.org/>
- wa Thiong'o N. (1998) Decolonising the Mind. *Diogenes*. 46(184):101-104. doi:[10.1177/039219219804618409](https://doi.org/10.1177/039219219804618409)
- Wadsworth, Y. 2008. “Systemic human relations in dynamic equilibrium,” *Systemic Practice and Action Research*, 21(1): 15-34.
- Wadsworth, Y. (2010). *Building in Research and Evaluation: Human inquiry for living systems* (1st ed.). Routledge. <https://doi.org/10.4324/9781003115090>
- Wahl, C (2019). Sustainability is not enough in In Dabelko, G.D and Conca, K. *Green Planet Blues : Critical Perspectives on Global Environmental Politics*, edited by Taylor & Francis Group, 2019. ProQuest Ebook Central, <http://ebookcentral.proquest.com/lib/flinders/detail.action?docID=5892383>.
- Wahl, C. (2016) *Designing regenerative cultures*. Triarchy Press
- Widianingsih, I, McIntyre-Mills, J.J. Sumadinata, W.S., Rakasiwi, U.S. , Iskandar, G.H Wirawan, R Indigenous Sundanese leadership: eco-systemic lessons on zero emissions A conversation with Indigenous leaders in Ciptagelar, West Java. Submitted to Systemic Praxis and Action Research
- Yenneti, K., & Day, R. (2016). Distributional justice in solar energy implementation in India: the case of Charanka solar park. *Journal of rural studies*, 46, 35-46.

**Table 3**  
**Energy Justice and Indigenous Communities**

<b>Continent</b>	<b>Country</b>	<b>Reference</b>	<b>Community (ies)</b>	<b>Issues</b>	<b>Context</b>
Africa	Mozambique	Broto et al. (2018)		Energy sovereignty Socio ecological responsible relationships Self-determination in relation to business and technologies Participation in decision making and innovation	Renewable energy projects funded by FUNAE (Fundo de Energia) state energy body responsible for rural energy who have taken several initiatives to improve energy supply and distribution including Mocuba Solar Plant.
	Kenya	Renkens, I. (2019). Calzadella & Mauger (2018)	Samburu Turkana Rndille El Molo	LTWP failed to recognise affected communities as indigenous. Insufficient consultation and unsatisfactory compensation Newcomers created social issues Employment of low-skilled limited to construction period No compensation when moved from lands Reduced access to land and mobility Inadequate compensation <i>Distributive</i> Local do not benefit from the power as it will supply a grid far away Massive influx of job seekers creates social impact <i>Procedural</i>	Lake Turkana Wind Power (LTWP) Projects



				Lack of information to participate in the project and contribute positively	
	Kenya	Renkens (2019)	Massai	Involuntary relocation having a negative impact on way of life Disconnection from social, economic and cultural roots Affected practice of pastoralism due to limited compensation of land Risk to food security as help is limited upon resettlement	The Olkaria Geothermal Project
Asia	India	Calzadilla & Mauger (2018) Yenneti & Day (2016)	Rabari Community	<i>Distributive</i> Lost access to land. Worsened living conditions to poorer part of the society Had to work for low wages in construction	Solar Farms
North America	USA	Bacchiochi et al. (2022) Toensing (2018)	Aquinnah Wampanoag Tribe	<i>Distributive</i> Affect rich biodiversity of Nantucket Sound <i>Procedural</i> Process and procedures lacking consultation Representation in public fora <i>Recognition</i> Effect on indigenous people's religious, cultural and spiritual value land and identity	Offshore wind energy Capewind energy project Vineyard Wind LLC
South America	Mexico	Mejia-Montero et al. (2021) Calzadella & Mauger (2018)	Oxaca – Juchitan & Union Hidalgo Zapotecs & Ikoots	<i>Distributive</i> Hardship on local population Unequal distribution of financial incentives and carbon credits <i>Recognition</i>	Utility Scale Wind power projects  Effect on Fauna (Bird population) and reduction of ingredients for herbal

				<p>Casting them as ignorant people obstructing progress  Prevented from participating in the project  <i>Procedural</i>  False assemblies to sign off documents.  Local communities not invited to critical meetings  Agreements in Spanish (which is not used by some local people)  <i>Cosmopolitan</i>  Uneven distribution of benefits  Affected traditional economic activities</p>	<p>medicine due to clearance forests and vegetation  Effect on underground water systems</p>
	Chile	Calzadilla & Mauger (2018) Agostini et al. (2016)	Did not specify the community but these are 10 indigenous communities	<p><i>Distributive</i>  Inadequate compensation  <i>Procedural</i>  Lack of adequate consultation  <i>Recognition</i>  Chile is the only country in Latin America that does not recognise indigenous people in its constitution</p>	Solar Park

<sup>i</sup> [https://www.climatecouncil.org.au/resources/ipcc-sixth-assessment-report-explained/?atb=DSA01c&gclid=Cj0KCQjwz7uRBhDRARIsAFqjulkHXfoVyCQrgnFbo8QE0mIT-wtAx6b1hBivnERaWPPxXsfP2cwiw0aAoPUEALw\\_wcB](https://www.climatecouncil.org.au/resources/ipcc-sixth-assessment-report-explained/?atb=DSA01c&gclid=Cj0KCQjwz7uRBhDRARIsAFqjulkHXfoVyCQrgnFbo8QE0mIT-wtAx6b1hBivnERaWPPxXsfP2cwiw0aAoPUEALw_wcB)

<sup>ii</sup> [https://www.climatecouncil.org.au/resources/ipcc-sixth-assessment-report-explained/?atb=DSA01c&gclid=Cj0KCQjwz7uRBhDRARIsAFqjulkHXfoVyCQrgnFbo8QE0mIT-wtAx6b1hBivnERaWPPxXsfP2cwiw0aAoPUEALw\\_wcB](https://www.climatecouncil.org.au/resources/ipcc-sixth-assessment-report-explained/?atb=DSA01c&gclid=Cj0KCQjwz7uRBhDRARIsAFqjulkHXfoVyCQrgnFbo8QE0mIT-wtAx6b1hBivnERaWPPxXsfP2cwiw0aAoPUEALw_wcB)