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Change Narrative in Fictionalizing the Nuclear Disaster: Trauma as a Starting Point for Hope

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Prosperity at whose cost? Trading off hydropower against flood recession-linked livelihood and food security in Ethiopia's Lower Omo Valley

Authors: Kristofer Chan, Emma J. Tebbs, Dessalegn Tekle, David-Paul Pertaub, Edward G. J. Stevenson (King's College London, Department of Geography)

The search for affordable 'green' energy in the 21st century has rekindled enthusiasm for hydropower in the global South. Promoters celebrate the potential of hydropower to provide abundant energy, stable hydrological regimes (free from flooding or drought) and increases in food production through large-scale intensive irrigation. However, the costs to the environment and to local livelihoods in the very areas where dams are constructed receive short shrift in these calculations, with local communities and riverine ecosystems largely undervalued or ignored. As a case in point, we present our work from the Lower Omo – downstream of the Gibe III hydropower dam and the >100,000 ha Kuraz Sugar Development Project – in southwest Ethiopia. Here, transition to a 'regulated' hydrological system has created a cascade of socio-ecological problems, undermining local food security and damaging downstream environments. Through triangulation of satellite remote sensing and social surveys from owners of riparian plots, we estimate the potential nutritional loss to riparian communities from the loss of the annual flood of the Omo, which local people depended upon for flood recession agriculture, cattle raising, and fishing. We also present evidence of the wider environmental losses associated with the disruption to the socio-ecological system and the inevitable struggle to replace lost resources and adapt livelihoods to the new environmental regime. In seeking to promote solutions for a brighter shared futures, we emphasise recommended practices for identifying sustainable transitional futures and underline the importance of local participation in the decision-making process to ensure proper accounting of pre-existing livelihoods.

When Imaginaries Collide: Wood-Based Bioenergy Development in Forest-Dependent Communities in the U.S. South

Authors: Sarah Hitchner (Department of Anthropology, University of Georgia), John Schelhas (Southern Research Station, USDA Forest Service), and J. Peter Brosius (Department of Anthropology, University of Georgia)

A pro-bioenergy imaginary is a win/win vision in which wood-based bioenergy promotes energy independence, enhances forest health, strengthens local wood markets, mitigates climate change, and benefits rural communities. However, when this imaginary intersects with competing imaginaries on the ground, things can get messy. Bioenergy development requires that real, hard choices must be made and acknowledgment that these choices benefit some people, economies, and landscapes at the expense of others. Our research on wood-based bioenergy development in the U.S. South is grounded in ethnographic fieldwork conducted by cultural anthropologists in heavily-forested communities that are current (or former) sites of facilities that produce liquid cellulosic fuels and wood pellets for domestic and international markets. Our work draws linkages between issues of energy, landscape, climate, and race and is guided by a conceptual framework that connects ideas about imaginaries (visions of how things could be or ought to be), scale (spatial and temporal dimensions of bioenergy development and the dynamics and interplay between them), and translation (ways that various strains of discourse are used strategically to pursue different actualizations of imaginaries and the struggles that occur when actors try to make different perspectives mutually intelligible across difference). In local communities hosting wood-based bioenergy facilities, we see the collisions and entanglements of various narratives and imaginaries, as well as the reality of differential benefit distribution on different sub-populations, in a region where the forested landscape itself is deeply imbued with cultural meanings and sentimental attachments.

Hiking to save a Greek mountain: from pushing against green energy to instituting imaginaries

Author: Dionysia Mylonaki (PhD research with Department of Anthropology, Goldsmiths, Lecturer in Media Theory at University of Hertfordshire)

The present study delves into the modes of organising that activist groups have been establishing to mobilise resistance in the face of the challenges that renewable energy projects pose in the area of Agrafa, Greece. It takes place in the context of Greece's aspiration to meet the surpluses agreed with its lenders by extracting value from nature and achieving a state of increased and privatised participation in energy production, where Greece will be 'upgraded' to 'an energy gate' and 'a battery for Europe'. Fieldwork that took place primarily in the region of Thessaly unveiled the dubious relationship of the mountainous villages with modernity, as well as the continuous deruralisation, that make the activists' quest for the reinstitution of locality a difficult pursuit. Translocal and in-flux networks of resistance demand diverse groups to be constantly in motion, a tactic that is not only aiming to counterbalance depopulation for the purposes of opposing energy development but also to recreate locality and the conditions for a liveable life in the areas at stake.

li fal bieggafámu! Justice, indigenous rights and local futures in Norway's energy transition

Author: Ragnhild Freng Dale (Western Norway Research Institute)

With a world in need of transitioning to low carbon, renewable energy sources, development of new renewable energy infrastructure has increased across the globe. So also in Norway, where the past decade has seen the construction of several large-scale wind power plants, to meet a projected future energy demand for industry and export. The largest of these have been built on land used by indigenous reindeer herders, leading to loss of grazing areas and what the President of the Sámi Parliament has called 'green colonialism' – a term now also used in academic literature in the Nordic context (Normann 2021). Wind power is also increasingly controversial in the Norwegian public writ large, leading to questions of justice and fairness in terms of biodiversity and sustainable communities. This paper examines how a potential wind power development in East Finnmark raises questions of justice and ethics in Norway's energy transition. The Davvi project, where the developer has proposed between 100 and 267 wind turbines in a mountainous region far from existing infrastructure, has caused controversy over the impacts it would have on human and non-human lives and livelihoods. Several reindeer herding districts have rights in the area, which is also used for recreation, harvesting and fishing by indigenous and non-indigenous locals alike. Drawing on an on-going case study, this paper seeks to show how opposition is articulated in terms of other possible local and indigenous futures that build on their current relations with the land.

[Co-Existence: Negotiating Co-Existence](#)

Reconciliation and Decarbonization policy integration: Examining Canada's opportunities to implement UNDRIP in the Haida Gwaii energy transition

Author: Sarah Ozog (Resource and Environmental Management, Simon Fraser University)

In 2018, the People of the Indigenous territory of Haida Gwaii, through citizen declaration, committed to transform their remote community electrical systems to clean and renewable energy. In this study, I will undertake an assessment of pathways under which Haida Gwaii could achieve a decarbonized future. I aim to explore several potential net-zero pathways, analyze economic barriers, identify trade-offs, and provide insight into the multilevel policy solutions required for Haida Gwaii to achieve their vision. With approximately 10,000,000 litres of diesel burned annually, emissions on Haida Gwaii represent more than 50% of total remote community electricity emissions in the province of British Columbia and more than 5% of Canada's. This poses a particular problem but also an opportunity for various levels of government to solve given the multilevel government commitments to decarbonize remote communities, as well as legally implement the United Nations Declaration on the Rights of Indigenous Peoples. While integration of the two policy realms is expected to help manage the trade-offs normally required of a non-Indigenous state's sustainable energy transition, the effective governance mechanisms used to employ the integration of decarbonization policy and Indigenous rights may vary. Not only will the results of the study be used directly to support Haida decision making, but this evidence can be used to inform other Indigenous-led energy transitions in BC, Canada, and globally.

Conflicting Energy Sovereignities: The Construction of Lawlessness along the Line 3 Replacement Project in Minnesota, USA

Authors: Tiffany Grobelski (Department of Geography, Gustavus Adolphus College)

This paper considers conflicting practices and visions of energy sovereignty raised by the Line 3 Replacement Project underway in the US state of Minnesota. Canadian company Enbridge Incorporated, United States Government and Minnesota State regulatory actors, and pipeline resistance groups are each uniquely depicted by other actors involved in the issue as engaging in lawful/lawless behaviors. This paper traces how lawlessness is constructed--literally, in the perspective of citizens monitoring pipeline construction on the ground--and ultimately finds dissonance between various enactments of energy sovereignty. Such dissonance is rooted in the complex, multi-layered jurisdictional and administrative regulatory framework which implicates but does not reconcile the governance prerogatives of various public, private, or quasi public/private actors. These actors include: tribal nations, national and state government actors, private transnational corporations, public utilities commissions, environmental regulators, citizen scientists, and a multifaceted public concerned about both economic and environmental health. The case of the Line 3 Replacement Project illustrates how energy transitions necessarily and fundamentally involve contending with multi-scalar conflicts over energy sovereignty.

Reassessing the Energy in Energy Transition

Authors: Alex Putzer, Guilherme Pratti, Lorenzo de Marinis (Scuola Superiore Sant'Anna, Departments of Dirpolis and TeCIP)

We are losing ground in the race towards emission-neutrality. Even though substantial advancements in energy-efficient technologies have led to renewed optimism, their effects are hampered by a constant rise in energy demand. More than that, the focus on a lower per-capita energy use might even incentivize and greenwash unsustainable consumption. In this paper, we argue that a major reason for this counter-intuitive trend lies in an overly anthropocentric vision of energy itself. Therefore, in the first part, we explore the definitions of energy inside technological, legal, and environmental spheres. Rather than converted, generated, saved, or wasted, energy within a nature-based realm is virtually unaccounted for. Consequently, in the second part, in order to complement the predominant focus on the optimization of power infrastructures, we attempt a reassessment of the right to energy. By drawing inspiration from rights of nature literature, we hold that a human-exclusive perspective is insufficient, as it encourages ignorance towards the recognition of energy as an integral part of Nature. Following this path, we re-evaluate the claim about decoupling resource use as made by, among others, the European Green Deal. We conclude that the pursuit of energy-intensive innovations, like data centers for cloud computing or the massive deployment of intelligent systems enabled by the 5G technology, needs to be assessed more critically. Rather than inhibiting innovation, we propose a more balanced conceptualization of the right to energy, aimed at less consumption and meant to support an energy transition in every sense of the word.

'Change' Narrative in Fictionalizing the Nuclear Disaster: Trauma as a Starting Point for Hope

Authors: Inna Sukhenko (Helsinki Environmental Humanities Hub at the University of Helsinki, Visiting Fellow University of Jyväskylä)

The literary dimensions of 'nuclear energy' in 'nuclear fiction', regarded as a component of 'world energy literature' (Szeman, 2018) are under study in the aspect of researching the narrative tools of energy storytelling as a 'change narrative' (Mauch, 2019), emphasizing a trauma as a starting point for hope and energy awareness and distinguishing the fictional and factual components in narrating 'nuclear', which helps reconsider the stereotypes about 'nuclear', shaped by the nuclear past, on the way towards shaping unbiased perception of nuclear energy related issues how they are represented in fictional writings. Such perspective allows distinguishing socio-cultural dimensions of narrating 'nuclear energy' in the context of intermedial ecocritical perspective (Bruhn, 2020) with its focus on fiction as one of the media of transferring scientific knowledge. 'Change narrative' within 'literary energy narrative' frames (Goodbody, 2018) is regarded here under the contemporary energy humanities' agenda where fictionalizing nuclear is a response of the society to the current debates on energy transitions' and sustainable energy's challenges in the perspective of critical thinking of energetic history and future energetic scenarios. The figurations of shifting from 'nuclear phobia' and 'postapocalyptic narrative' to hope, survival and optimism are studied through the range of tools of 'change narrative' in U.S. nuclear fictional writings on the Chernobyl disaster, such as F.Pohl's Chernobyl (1987), A.White's Radiant Girl (2008), J.Reich's Bombshell (2013), T.Porter's Wild Girl of Chernobyl (2015), A.Blackmann's Blackbir Girls (2020) in the context of shaping public energy literacy/nuclear awareness via energy storytelling.

Black city, White city: what's in the colour?

Author: Leyla Sayfutdinova (Department of Social Anthropology, University of St Andrews)

In 2003, late President of Azerbaijan Heydar Aliyev, who is now often referred to as 'the Architect of the modern Azerbaijan', announced that the historical industrial part of Baku, known as 'Black city' will be transformed to become "a beautiful corner of Azerbaijan (<https://www.bakuwhitecity.com/az/page/1-on-soz>). This district operated as an industrial brownfield since the oil boom that began in Baku in 1870s, and housed multiple refineries, workshops, oil terminals and pipelines connecting them throughout its history. The name 'Black city' is a reference to the black smoke rising from the refinery pipes, as well as soot and oil stains from multiple pipelines connecting piers, refineries, and storage areas. The vision of transformation was formalized in 2010 with the adoption of the Baku White City Master Plan by the Head of City Administration. The plan, which is currently being implemented, envisions construction of 10 residential quarters, 350 ha of green space, a business center, a shopping mall, and extension of the underground. As 'Baku White city' has begun its operation, selling and renting apartments and office space, it remains a contested area where different visions of Baku's "Black city" heritage challenge the state's and developers' visions of 'grandeur,' 'prestige', 'eliteness', and 'luxury.' This paper will explore who and why promotes and contests different visions of the 'White' and 'Black' cities. It is based on the analysis of official documents, media publications and social media discussions, as well as interviews and personal observations (subject to fieldwork in October 2021).

De/Recarbonizing landscape: Relational landscapes of net-zero decarbonization in the Saaghii Naachii/Peace River region

Author: Douglas Robb (Department of Geography, University of British Columbia)

Decarbonization is a space-making process, embedded in landscapes where the biophysical, socionatural, and material dimensions of energy transitions intersect. However, contemporary discourses of net-zero decarbonization routinely overlook the landscape transformations required to offset carbon emissions. This creates a conceptual pitfall: the potential to misread and depoliticize strategies of putative decarbonization which may not, in fact, be carbon neutral—particularly when the cumulative effects of broader landscape transformations are considered. This paper queries narratives of decarbonization that arise alongside—and as a result of—simultaneous investments in fossil fuel production. I frame decarbonization as a socio-spatial phenomenon that materializes in variegated ways through the site-specific interplay between capitalist social relations and biophysical processes. In making this claim, I seek to bridge political economy with concepts of materiality and relationality which, I suggest, enable deeper theoretical engagement with the socionatural and ontological dimensions of the multifaceted processes of landscape transformation entailed by decarbonization. Drawing on a case study of the Saaghii Naachii/Peace River in the western Canadian provinces of Alberta and British Columbia, this paper illustrates the empirical impact of this theoretical framework by illustrating how a focus on landscape can help to problematize contemporary decarbonization agendas which, in some cases, obscure the cumulative environmental impacts and violent socionatural reconfigurations that arise in decarbonizing landscapes.

Energy, Time and Rhythm: Rhythms in Transition

Author: Gordon Walker (Lancaster Environment Centre, Lancaster University)

In this paper, I bring the concepts and tools of rhythm analysis to bear on the transitions in rhythms and in rhythmic relations that are intrinsic to stripping carbon out of energy systems. In the foundational rhythm analytic writing of Lefebvre and Regulier, energy is positioned centre stage in defining what rhythm is, but little engagement has followed in subsequent scholarship. In a recently published monograph (1) I propose a newly energised multidisciplinary rhythm analysis, which follows the temporal beats and pulses of energy flows in everyday life in order to open up the polyrhythmic and poly-energetic constitution of relations between social, technological, environmental and bodily rhythms. I argue that carbon-based energy systems can be conceived as vast dynamic and rhythmically constituted assemblages that draw the fossilized temporalities of carbon resources into tightly coordinated rhythms of commodification, combustion and consumption, with increasingly arrhythmic impacts on the expected repetitions of climate and environment. Much has to change in (poly)rhythmic terms, both in making sustainable energy systems and in pursuing modes of de-energisation in everyday life. It is argued that the governance of multi-sited transitions in rhythms is fundamental to living better with energy, within temporally recalibrated and de-carbonised techno-energy infrastructures.

1. Walker, G (2021) *Energy and Rhythm: Rhythm analysis for a Low Carbon Future*, Lanham: Rowman and Littlefield.

Social legitimacy and contestation at Asia's 'largest' solar park

Author: James Goodman, Gareth Bryant, Devleena Ghosh
Priya Pillai (Faculty of Arts and Social Sciences, University of Technology Sydney)

India's 2GW solar plant at Pavagada in the Southern state of Karnataka is said to be Asia's largest. It was initiated by government agencies and is delivered with the participation of a range of private players. Who bears the cost, who benefits, and how is it contested? This paper analyses national and Karnataka policy contexts, and reports on ethnographic engagement investigating the local impacts of the plant. Implications for understanding the emerging socio-ecological relations of renewable energy are debated. Renewable energy is substantially cheaper than existing fossil fuel energy and offers extensive returns. We seek to 'follow the surplus' across private, public and community players, and how associated social contestation affects the dynamics of energy transition.

Contestation, de-legitimation and disruptive generosity in the energy transition

Author: Jonathan Paul Marshall (Faculty of Arts and Social Sciences, University of Technology Sydney)

Without the processes of climate change, it is unlikely that there would be a speedy energy transition; it is probably not a spontaneous piece of creative destruction and does not provide an obvious new service, although it can be commandeered that way. Consequently the energy transition is easily hindered by both political and ethical struggles over legitimation and de-legitimation of the process. For example the Shire of Narrabri in NSW is a site of gas and coal mines and there is a three ways struggle between these mines, preserving agriculture and water, and attempts to start a renewable industry. People in support of gas not only attempt to legitimise gas but delegitimise Renewables, and vice versa. The same happens in the NSW Hunter Valley, and in Bega. This seems a general process of ethical and political struggle; people may have to de-legitimise a position in order to legitimise a position which seems opposed to it. The paper explores this struggle as part of the process of energy ethics, which stretches up from the locality to the State and Federal governments, and to general policies about climate change. It traces some of the processes of legitimation and delegitimation, and suggests that one way forward could be to follow people in Bega and practice a disruptive generosity which bypasses the conflict.

Living energy transition in a South Australian renewables region

Authors: Linda Connor (Department of Anthropology, University of Sydney), Lisa Lumsden University of Technology Sydney)

South Australia is the leading state in Australia's uneven path to energy transition. In a national electricity market dominated by coal-fired power, South Australia was 58.6% powered by renewable energy in 2020, from a 2006 base of zero renewables. Most renewable electricity is supplied by wind and rooftop solar. There is no coal power and gas, which is in decline, makes up the supply balance. With world class renewable resources, South Australia expects internationally competitive power prices will enable substantial economic growth. The potential to generate 500% of operational demand is a scenario being pursued with publicly funded transmission infrastructure upgrades, rooftop solar and battery schemes and favourable settings for large utility project investment by transnational energy corporations. Within this macro context, this paper reports on data from ethnographic research in the Upper Spencer Gulf, in South Australia. This is a socio-economically disadvantaged region of intensive utility scale renewables projects and a history of heavy industry employment and cyclical decline, intensified by the 2015/16 closures of the coal mine and power station generators. What has energy transition been like for the people living within this region? We analyse the mixed experiences, values and expectations of new energy industries among residents, organisations and agencies in the Upper Spencer Gulf and explore the complexities occurring at the local level.

Wind in the woods and solar on the fields: Socio-ecological changes and modes of co-existence in renewable energy production

Authors: Katja Müller (MLU Halle and University of Technology Sydney)

Germany's Energiewende has been slowing down as of late, despite the fact that the coal phase out has been scheduled and first power plants are being decommissioned. Phasing in to renewables in Germany has been accompanied by an increasingly complex process of approval that degrades immediate financial benefits for residents while fostering concentration of capital. I argue that the legitimacy of renewable energy in their increasing concentration of ever-larger and more expensive wind turbines and solar panels with the concomitant concentration of capital fosters changes in socio-ecological relations, leading to (strategically applied) reassessments of forest, wildlife and farmland. The perception of proximity to wind turbines and solar panels changed from one of co-existence to one of encroachment, diversifying notions of forests being the nest egg for farmers towards forests as carbon sinks, as wildlife habitats, and as loss-making deals. Likewise, (roof top) solar was seen as an extra income, rewarding investment, and independent energy solution, yet changes into (green field) solar panels being rivals for agriculture, increasing land grabbing, rent, and the bleeding of regions. Further socio-ecological changes concern human-animal relationships, which are instrumentalised according to goals. Rules for protecting wildlife are more extensive and – compared to those protecting human beings – less subject to political negotiations, leading to an unprecedented amount of monitoring, expertise and engagement with flora and fauna. Drawing on four years of anthropological research in Germany's state of Brandenburg, the contribution analyses the modes of co-existence and the related socio-ecological relations in a state that calls itself an "energy state" and ties the experiences on the ground to a macro level of finances and capital, technical advancement and infrastructural development.

Multi-scalar connections around lithium production in Argentina

Authors: Melisa Escosteguy, Walter Diaz Paz, Araceli Clavijo, Martín Iribarnegaray, Christian Brannstrom, Marc Hufty, Lucas Seghezzo (Instituto de Investigaciones en Energía No Convencional INENCO, Consejo Nacional de Investigaciones Científicas y Técnicas CONICET, Universidad Nacional de Salta UNSa)

Since lithium has become a critical element for the production of lithium-ion battery technologies aimed at mitigating climate change, its demand is expected to increase rapidly in the coming years. Currently, lithium compounds are mainly produced in four countries, with Argentina being the world's fourth largest lithium producer. In Argentina, lithium is extracted through evaporitic techniques from the salt flats located in the north of the country, in the Puna region. The Puna is home to indigenous and peasant communities whose livelihoods are often affected by lithium production. As a consequence, this region plays a growing role in the new dynamics of the global economy. In this paper we coded 650 documents and applied a multi-scalar analysis to explore the multiple connections between local, national and global stakeholders that are shaping lithium production in Argentina. We found that lithium appears as an ambivalent resource. It is a local resource since its production has concrete social and environmental impacts on the territories it is extracted from. But it is also global in that its production is mostly determined by exogenous and often transnational forces, actors, and policies. We argue that the identified multi-scalar connections have several impacts that put into question the fairness of the lithium production process in the current context of economic decarbonization. We conclude that moving towards more just and sustainable decarbonization processes will only be possible if all stakeholders, at all scales, can have a say in the lithium global production network.

Envisioning a Just transition amidst solar panels and lithium mines: Energy tensions in the Argentine Puna

Authors: Dr Ana Estefania Carballo, Dr Facundo Gonzalez, Dr Sebastian Abeledo & Dr Nuria Rodriguez (School of Geography, Earth and Atmospheric Sciences, Mining and Society, University of Melbourne)

The transition to renewable energy is deeply reconfiguring life in the Argentine Puna. The Puna de Atacama, a high plateau nested amongst the Andes mountains, is an extremely arid area with some of the highest levels of solar radiation in the world. Investment in solar energy is reconfiguring the life of many of the impoverished communities in the area, with the largest solar plant in the country - the 300 MW Cauchari project - inaugurated in 2020. While the plant is the main provider of solar energy to the national grid, many communities remain with unstable or limited access to electricity. To add to a complex energy picture, the Argentine Puna is experiencing a major lithium mining boom, responding to the increasing demand for lithium driven largely by its central role in enabling a renewable energy transition globally. Located amidst the 'Lithium triangle' that holds 60% of worldwide lithium reserves (USGS 2020), there are currently 52 lithium projects in the Puna region at various stages of development—up from only two projects in 2008. The paper unravels the tensions associated to envisioning a just transition for those living at the margins of the global push for renewables, yet, whose lives occur in an area that plays a crucial role in enabling it. Based on fieldwork conducted in the area, this paper focuses on the case study of Olacapato, a 300-inhabitants community, as they negotiate their lives with the lithium mines and the solar plant operating in their territory.

Mining Indigenous Territories: Consensus, Tensions and Ambivalences in the Salar de Atacama

Authors: Marc HUFTY, Mauricio LORCA, Manuel OLIVERA, Melisa ESCOSTEGUY, Jonas KOPPEL, Morgan SCOVILLE-SIMONDS (Graduate Institute of International and Development Studies)

While lithium is of recent interest due to its potential role in transitioning away from fossil fuels, the history of lithium mining in Chile's Salar de Atacama (SdA) is relatively long. Employing historical and ethnographic methods, we examine how mining, territory, and indigeneity co-produce each other in the particular social and material context of the SdA. We draw on studies in anthropology and geography to escape simplistic images of Indigenous peoples' reactions to mining as reflecting victimhood, resistance, or strategic pragmatism and show instead how individuals and groups organize and express themselves in ambivalent ways, maintaining complex relationships with both mining and the territory. According to informants, struggles around territory in the SdA are about concerns over water scarcity, the survival of the wildlife of this unique ecosystem, and continuity and change in particular lifeways more broadly. Recent agreements between mining companies and local communities may benefit some, while also generating inter- and intra- community tensions over these issues. More broadly, through these processes, we find that mining shapes what "indigenous" itself means and who can claim this subject position, while Indigenous mobilization in turn shapes how mining is perceived and carried out. Together, mining and Indigenous mobilization produce a particular kind of territory, pervaded by diverse lines of both consensus and tension. Rather than contradictions, the ambivalent positions Indigenous peoples maintain become comprehensible when considering, ethnographically and historically, the particular places and lifeworlds they inhabit, and the asymmetrical patterns of constraint and opportunity they face.

Staying with the double-bind: Narrative Relations Between Energy Transition and Lithium Extraction

Author: Jonas Köppel and Morgan Scoville-Simonds (Graduate Institute of International and Development Studies)

Lithium is crucial for proliferating batteries that fuel the shift towards electric transportation and renewable energy. What, we ask, can it tell us about the relations between places in the global North, where it is consumed to power a "greener" future, and the sites of extraction in the global South? We explore this question by analyzing how different narratives about lithium tell such relations, paying particular attention to how unequal subject positions are remade across deep trenches of political economy and ecology. Unpacking three predominant narratives, we find that they amount to a double-bind by offering a selection of impossible choices between contradictory interests. Based on ethnographic research and informed by theories of scale we seek ways out of this impasse by offering localized counter-narratives from a site of extraction at the Uyuni salt flat in Bolivia. What, we ask, might listening to people who have little choice but to keep living with these contradictions tell us about the ethical issues at stake in mining the energy transition? In contrast to the universalizing language of predominant narratives, here lithium is thickly embedded in particular lifeworlds, caught up with the inevitable ambivalence of making and remaking livable places on earth. To better grapple with the contradictory energy transition we suggest to tell more such stories that, each time, make us think anew about how the places, peoples, and futures of this world are tangled up.

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Fuel Stories: Visualising infrastructural inequalities

Author: Elaine Forde (Humanities and Social Sciences, Swansea University)

This paper explores the Fuel Stories research project. This visual elicitation project sought to develop a model for community engagement with energy that was both participatory and could elicit ingrained or culturally-held practices around energy use. The purpose of the project was twofold, firstly to gather energy ethnographic data, but also to understand more about the appetite for community energy in under-represented areas. As such, apart from the theme “energy”, Fuel Stories employed an open-ended research process. Workshops and pop-ups fused narrative research and focus group techniques with live analysis and graphic recording on the spot, to create both a visual record of a given community’s Fuel Stories and a tool for visual elicitation. Fuel Stories took place in four locations in South Wales and Bristol. This paper compares the data gathered, and explores how infrastructural inequalities between different contexts have shaped specific energo-social relationships. The paper sets out the next steps for the fuel stories project, and examines some of the issues with doing community engagement work on energy. The paper asks why community voice is becoming an important way to understand and inform the prospect of widespread energy transition, and where participatory projects like Fuel Stories can intervene?

Does Community Ownership Affect Support and Perceived Justice of Wind Energy? Three Case Studies From The Highlands and Islands, Scotland

Author: Jessica Hogan (Geography and Sustainable Development, University of St Andrews)

Worldwide, countries have turned to renewables in order to meet international climate change agreements. However, many benefits from natural resource-based activities tend to pass quickly out of local areas and into the hands of external shareholders, described as ‘leaky bucket’ economics. While research has shown that community energy can be an effective solution, the term is ambiguous and potentially misleading. For example, the Scottish Government surpassed their 2020 target of 500MW community renewables five years early by including developments termed ‘locally owned’, such as those developed by for-profit rural businesses. Community owned, where all benefits go to the community, were only a minority of the total, about 70MW. We, therefore, argue that the way ‘community energy’ is defined is critical to ensuring a just transition for rural areas. To test this argument, we used a mail-out survey in Scotland to compare communities’ attitudes towards local onshore wind developments, sampling each of the community benefit schemes described by the Scottish Government: (1) community ownership; (2) shared-ownership (i.e. cooperative); and (3) community benefits (i.e. for-profit business which provide money to a community fund). One-way ANOVAs identified the mean differences between the communities’ attitudes towards the wind developments. Data revealed that, on average, those with full or shared ownership tend to support the wind development more, feel more involved, perceive more benefits that are fairly distributed, perceive less risks, and support their own benefit schemes. These results support the contention that community ownership may positively influence support and perceived justice of wind developments.

Community-led Life Cycle Assessment

Author: Sahar Navabakhsh (Institute of Environmental Design and Engineering, University College London)

In line with the UK Government's Net Zero Pledge, decision-making on the regeneration of housing estates is triggered by reductions in CO₂ emissions (CO₂e). Life Cycle Assessment (LCA) is the methodology used for calculating the lifetime environmental impacts of products/processes. The current practice of building LCA mostly only includes the Global Warming Potential impact category. The variable system boundaries, data inventories, and assessment methods; and the inaccuracy of the energy models upon which energy consumptions are estimated, can produce considerably variable LCA results. Conducting an LCA, from scope definition to interpretation, is a process requiring specialist skills, and the outcomes are ambiguous for many stakeholders and are interpreted subjectively. In addition to methodological and procedural uncertainties, financial factors as key performance metrics for clients, overshadow the wider environmental and social impacts of the schemes, leaving the communities unempowered. To reflect the priorities of the communities in option appraisals based on CO₂e, this paper presents a participatory framework where the community collaborates in the process of collection and analysis of data. The applicability of this framework is examined in the case study of a housing estate in South West London. Surveys, interviews, knowledge exchange, and co-design workshops were undertaken with the community members and the design team, who have assisted in modelling and implementing the framework. Findings show the effectiveness of coupling a participatory approach with LCA in influencing the Community Plan by considering low-carbon building systems and elements, and in empowering the community and ensuring inclusivity and equity.

Powering Blockchain-based Renewable Energy Trading by Regulating Energy Prosumers

Authors: Karisma Karisma, Dr.Pardis Moslemzadeh Tehrani (Faculty of Law, University of Malaya)

The advent of blockchain-based energy trading and the changing landscape from centralized to decentralized energy generation and distribution have facilitated the democratization, decarbonization, and digitization of the energy sector. The adoption of blockchain-based energy trading can address the element of decentralization envisaged in the Paris Agreement. Prosumers play an active role in the blockchain-based renewable energy (RE) sector by contributing to the energy supply chain. An energy prosumer generates energy from RE sources and trades surplus energy with interested participants on the grid. By restructuring regulations, prosumers as active market participants can be integrated within the energy ecosystem. The starting point is by addressing the legal barriers which hinder RE prosumerism. This study provides an insightful discussion on the elements that may be integral to the legal framework. Firstly, legal instruments should provide for the recognition of prosumers. The legal construct of the prosumer concept eliminates ambiguity and ensures inclusivity in the energy ecosystem. Secondly, the legal framework should delineate prosumers' roles, rights, and responsibilities in energy generation, distribution and supply chain. Prosumers should not be unjustly subjected to similar legal obligations, such as licensing and taxation requirements as that imposed on energy producers. Thirdly, a succinct regulatory framework should include incentives and remuneration schemes to encourage prosumers to actively participate in the blockchain-based RE market. The empowerment of prosumers can enhance energy accessibility and sustainability.

Social Justice in the Electropolis. Energy Transition and Thermal-Material Culture in Chongqing (People's Republic of China)

Author: Madlen Kobi (Academy of Architecture, Università della Svizzera Italiana)

In 2020, Xi Jinping made ambitious commitments to bring China's coal emissions to peak before 2030 and to make China "carbon neutral" by 2060. The country's energy supply heavily builds on coal which in 2018 accounts for around 67 percent of the share in the national electricity mix. The cooling and heating of urban buildings is one of the main energy consumers. This paper draws the contours for reconsidering the potentials and obstacles of the electropolis as an electrified, carbon-free city of the future. By discussing the environmental and socio-political implications of the Heating Divide (a policy from the 1950s that provides heating infrastructure only to the north of the country) I discuss the impacts of national energy governance on everyday thermal comfort. The paper builds on ethnographic, historical and policy-related data from Chongqing, a metropolis with roughly eight million inhabitants located in Southwest China, to discuss how electricity has become indispensable for indoor climate control in winter due to deficiently insulated buildings and non-existent heating networks. The well-off install underfloor heating or turn on an electric heater, but those with little financial means have to rely on non-electric means of climate control such as quilted pajamas, blankets or going for a walk outdoors. Despite cold winter temperatures, the government is unwilling to install a heating network as its energy consumption would far exceed the punctual energy use now generated by small electric heating devices and endanger the national carbon reduction goals.

Hydropower's new techno-political regime? 'New actors', shifting alliances, and deflecting discourses

Author: Udisha Saklani (Department of Geography, University of Cambridge)

World over, we are witnessing the quiet re-emergence of large hydropower projects, which were successfully resisted and abandoned in the past due to civil society activism. Despite increasing evidence of rising social, ecological, and financial costs of projects, large dams are back on the agenda of international donor agencies and governments of the Global South. This paper explores this puzzle in Nepal, where the controversial Arun-III project has been revived after more than a decade-long suspension, with the support of new actors, modalities, and practices. A qualitative examination of discourses and strategies reveals the chaotic reality of decision-making and outcomes and demonstrates how energy infrastructure projects are being increasingly legitimized using new narratives of economic prosperity, which are linked to ideas of regional economic 'connectivity' and revenue generation. In doing so, the new regime has altered the social and cognitive bases of problem definition and mobilized support for large dams around specific storylines. The paper analyses the Arun-III protest movement in Nepal in the 1990s, highlighting the rich diversity and intersection of framings that ultimately contributed to the project's delegitimization. It then turns to the more recent configuration of new actors, modalities, discourses, and techniques that have successfully enabled the project's revival against the backdrop of a changing socio-economic and (geo) political reality. In analyzing Arun-III's stop-start trajectory, the paper draws attention to the rapidly evolving, multi-scalar, and complex web of domestic and transnational actors, materials, discourses, and events that are driving the new wave of energy transitions in emerging hydropower nations.

A Technology of Detachment: the promise of renewable energy at the El Quimbo hydroelectric power plant in South Colombia

Author: Cornelia Helmcke (School of Geography and Sustainable Development, University of St Andrews)

Taking energy justice and infrastructural violence as a framework (in line with Theme 4: Fairness), this paper analyses a large-scale hydroelectric dam project in Huila, South Colombia (El Quimbo), and the environmental conflict it caused. The paper argues that instead of acting as a “technology of engagement” that extends vital infrastructure into marginalised territory, the dam functioned as a “technology of detachment” that destroyed social and physical infrastructure in place, fragmented territory and marginalised the affected populations further. While localised marginalisation can be considered an unintentional side-effect of a project which otherwise serves the “greater good”, the concept of infrastructural violence sees purpose behind these impacts (Rodgers and O’Neill 2012). Powell (2010) shows in her work *Landscapes of Power*, how energy infrastructure development in the Navajo territory (First Nation, US) is used to create not only new “objects”, economies and markets, but also new modes of production, knowledge, relation and identity. Energy development meant in this case the forceful assimilation of local cultures to the capitalist project of the state, as also described by Dunlap (2018). Governments use infrastructural objects as tools for social engineering, subjugating their population to control and discipline in line with their biopolitical project (Gupta 2018:65). The proposed paper, in a first instance, analyses how far this subjugation was visible in the El Quimbo dam case, and in a second instance, critically reflects on the promises of renewable energy and on how technologies of detachment can potentially turn again into technologies of engagement.

Energy Inequalities and Humanitarian Energy: Policy Proliferation, Definitional Differences, and Institutional Inaction in Sustainable Energy for Refugee Communities

Author: Dr Sarah Rosenberg-Jansen (Global Platform for Action on Sustainable Energy, UNITAR)

Worldwide there are now over 80 million forcibly displaced people, the vast majority of whom have very little access to energy. The majority of refugees in camps live without access to reliable electricity or modern cooking solutions, and displaced families and businesses paying exorbitant costs for basic energy services. Refugees are being left behind in the transition to renewable solutions and there is limited discussion of climate or energy justice within the humanitarian energy sector. Substantial energy inequalities exist within refugee camps. Currently, Sustainable Development Goal (SDG 7) to ensure access to affordable, reliable, sustainable and modern energy is unlikely to be met for displaced people by 2030. The UN system, including the UN High Commission for Refugees (UNHCR) and the International Organisation for Migration (IOM), have started initial programming to provide renewable and sustainable energy for refugee communities and to reduce their own emissions. However, the global governance of humanitarian energy is a hotly contested topic, with a huge number of institutions and actors spread across the national, regional, and international levels. When the two fields of humanitarian aid and sustainable energy policy meet, such complexity in governance becomes compounded. Definitional differences and fundamental divisions emerge. Regimes within regimes swirl and interweave, creating a messy, undulating set of realities and responsibilities. Our paper investigates how and why this is the case, identifying key institutions within the governance regime surrounding humanitarian energy, and explaining the implications of different definitions for the sector.

Status Symbols in Social Space: Inflated Lives, Clean Tech Privilege, and Electric Cars in Washington State

Authors: Jean Léon Boucher & Walter Mérida (School of Law and Government, Dublin City University)

In this study, we analyze policy and the socio-spatial distribution of electric vehicles (EVs) in Washington State. We examine EV penetration in relation to zip code variables, like social demographics and population density. Data was acquired from the US Census and Washington State's vehicle registry (N = 576). After regression and geographic analyses, we find that median income, an Inflated Life Proxy (ILP), and education have the highest associations with EV concentrations. The ILP was constructed by dividing zip code median home values by median incomes. We also find associations between EV penetration and the distribution of broadband internet. As the highest EV adoption shares are found in areas of the highly educated and affluent—a clean tech privilege—we argue that, despite state and federal incentives, EV diffusion in Washington State has not progressed beyond early adoption. As the association between greater household income and greenhouse gas emissions is well established, we urge decision makers to cultivate social policies towards greater economic moderation and equality, generally. If only consumers with a clean tech privilege are adopting EVs, then current emission reduction strategies may be annulled by the otherwise high carbon lifestyles of the affluent.

The just transition to electric mobility in the semi-peripheries of Europe: examining the national and urban scales in Poland

Author: Aleksandra Lis (Adam Mickiewicz University in Poznań, Department of Anthropology)

Transition to electric mobility has progressed quickly over the last ten years, but its pace has not been even across various economic contexts. While some of the North European countries have become leaders in EV adoption, like Norway or the Netherlands, countries in Eastern Europe are still lagging behind. This paper approaches the transition to electric mobility in Poland from the justice perspective. First, it examines this project at the national scale - as a recent strategy of the national government announced in 2016. Second, it examines this transition at an urban scale - as a project which turns into practice of city dwellers in the studies city of Poznań. What does justice mean at these different scales? How and who articulates ethical claims regarding the justice dimension of this transition project? Based on document analysis, expert interviews and an expert workshop, the paper attempts at conceptualizing what a just transition to electric mobility could mean at the national and urban scale in Poland.

Framing transport justice through the eyes of fare-free public transport activism

Authors: Christine Milchram and Fabio Hirschhorn (Karlsruhe Institute of Technology, Institute of Technology Assessment and Systems Analysis)

In the transformation to sustainable energy systems, cities must develop conditions to support environmentally friendly transport modes. A key challenge is to develop attractive public transport and promote a modal shift away from cars, while ensuring citizens' access to, e.g., job opportunities, education, and health services. Thus, there is growing interest in issues of transport accessibility and social inclusion under the label of "transport justice". The majority of this work emphasizes distributional (in)justice – the allocation of benefits (resources and opportunities) and burdens. This narrow focus reflects the predominance of utilitarian perspectives, of engineering and economics, and of quantitative models in transport research. It disregards procedural and recognition justice dimensions – concerning participation in and influence on decision-making, respecting views of all affected groups – which are well-established notions in the literature on environmental and energy justice. In this paper, we propose that understanding the visions of a just public transport system that exist in civil society is central for a comprehensive conceptualization of transport justice. We examine activist movements promoting fare-free public transport, another understudied, yet key issue for transport justice debates. Free transportation can facilitate social and political transformation, addressing social exclusion and transport poverty. Drawing from environmental and energy justice, as well as political framing theories, this study analyzes citizen initiatives across the Global South and Global North. It reveals how these groups frame their role and goals vis-à-vis different dimensions of transport justice, and whether justice, expressly or implicitly, is a constitutive element of fare-free public transport activism.

Whither carbon states in a zero carbon world?

Author: Matt Wilde (School of Geography, University of Leicester)

Since 2014, over five million people have left Venezuela amid a deep and seemingly intractable crisis characterized by hyperinflation, political turmoil and humanitarian emergency. Accounts of the crises that afflict carbon-exporting states in the global south often use the so-called “resource curse” as an explanatory tool. Such approaches have rightly been criticized for a lack of attention to the wider geo-historical and geo-political contexts in which crises such as Venezuela’s take place, and for reductive notions of “economic development” and “good governance”. Yet to date an alternative theoretical framework for thinking through the challenges that face carbon states in a (desired) zero carbon world has yet to emerge. In this paper, drawing on my own ethnographic research in Venezuela as well as contemporary anthropological approaches to resources and ethics/morality, I attempt to sketch out the beginnings of an alternative way of thinking about carbon states. What, I ask, does the transition to net zero as a moral imperative and a political paradigm mean for states that (for better or worse) continue to depend on fossil fuel exports as a development model? What should carbon states in the global south be demanding by way of mitigation in the drive towards net zero? What wider social, political and ethical possibilities might be opened up or foreclosed for countries that continue to live and die by the rise and fall of global commodity prices?

Shades of green: Narratives of transition in the energy-extraction landscape of Mozambique

Author: Angela Kronenburg García (Department of Historical and Geographic Sciences and the Ancient World, University of Padua), Nikkie Wiegink (Department of Cultural Anthropology, Utrecht University)

In this paper, we explore how the energy transition as a global narrative is shaping the extractive landscape of Mozambique. The energy transition narrative calls for a shift away from fossil fuels towards a low-carbon future and aligns with a larger discourse on the “green economy” (Symons 2018). We wonder what the politics are of this global narrative as it translates into Mozambican contexts. Rather than focusing on one extractive industry we “study through” the energy transition narrative by exploring how it shapes, and is mediated by, three different industries all present in Mozambique: coal mining, Liquid Natural Gas (LNG) extraction, and graphite mining. We consider the different ways in which the energy transition narrative translates in relation to each of these sectors, resulting in disinvestment of coal mining by large multinationals; portrayal of LNG as a “transition fuel”; and graphite as a “green mineral”. We identify three themes that cut across these sectors and allow for comparative analysis: 1) future orientations in the relation to the energy transition; 2) extractive booms and busts; 3) experiences of dispossession and displacement by people living in the surroundings of extractive projects. The data presented in this article derives from ethnographic fieldwork of both authors in and on extractive projects in Mozambique.

‘Realist Sustainability’ in People v Arctic Oil

Authors: Suryapratim Roy and Alexandru Gociu (School of Law, Trinity College Dublin)

In December 2020, the Norwegian Supreme Court gave its decision in *People v Arctic Oil*. The case revolved around whether licensing decisions that do not account for emissions from oil exploration violate Art 112 of the Norwegian constitution that grants the right to a clean and healthy environment. The majority judgment recognized the role of constitutional law with respect to extraterritorial emissions from oil exploitation, but felt the stage of exploration too premature to cancel licenses. The minority decision, however, found the issuance of exploratory licenses unconstitutional for non-compliance with the European Union (EU) Strategic Environmental Assessment Directive and the European Economic Agreement between Norway and the EU. The development of legal principles over the lifespan of the case is also worth noting. While this case has been analysed with respect to the rights-based arguments for appreciating the climate impacts of energy policy, it has not received treatment on the questions of obligations for combustion emissions under constitutional law, and discretion of the state on appreciating socio-economic considerations in devising energy policy. Both of these considerations – extraterritoriality of constitutional protections and separation of powers – maybe tempered by appreciating Norway’s endorsement of a ‘realist sustainability’. This paper charts the constitutional interaction between welfare-based energy choices and international climate commitments in *People v Arctic Oil*, situates the case within a political history of Norwegian energy policy, develops the concept of ‘realist sustainability’, and assesses whether some aspects of the judgement are ‘diffusible’ for decisions on oil exploration and exploitation in other jurisdictions.

Resistance, Conflict, and Post-Oil Futures in Irish Science Fiction

Author: Josephine Taylor (Royal Holloway University of London)

The Corrob gas field project is located off Erris Head in County Mayo, West of Ireland. Director Risteard Ó Domhnaill recorded the events and controversy the gas drilling field provoked within the local community in the documentary *The Pipe* (2010), revealing what happens when people stand up to big oil companies such as Royal Dutch Shell. The process resulted in what is arguably an operation of neo-colonial power, a process of uneven corporate development in which the environmental devastation is primarily distributed to the semi-periphery whilst the benefits accrue to economic and consumer centres. This paper will address the possible conflict and vulnerability of the post oil age by exploring Irish science fiction which responds to the legacies of colonial rule, histories of extraction, and the “geopolitical strife in Ireland” over land (Gladwin 2014: 56). Kevin Barry’s *The City of Bohane* (2011) will centre in my analysis as a text which responds to anxieties over resource wars and the collapse of energy regimes. The entropy of the post-oil age in *The City of Bohane* captures the ways in which SF can be a means of not only understanding energy histories, past and present, but also energy futures.

Revisiting recognition justice in energy justice

Author: Nynke van Uffelen (Faculty of Technology, Policy and Management, TU Delft)

The energy transition must be just, stressing the importance of protecting vulnerable groups from injustice. In the field of energy research, energy justice is often divided in three tenets: distributive, procedural and recognition justice. Recognition justice has a distinct status compared to the other two since it gives special attention to the most vulnerable. Also, recognition justice seems to provide an explanation for energy controversies where mere procedural or distributive analyses fall short. However, some remarks can to be made concerning the way the recognition justice concept is understood in the energy justice literature. First, many different definitions of recognition justice circulate. Second, recognition justice often seems to blend conceptually with the procedural justice component, which leads to confusion in research practices. If people feel misrecognised in the decision-making process, it is unclear which tenet is being analysed. Third, it is unclear how the recognition justice concept can be operationalised and measured. These three issues hinder the effectiveness and clarity of energy justice frameworks, since it might lead to overlooking injustices or failing to analyse them properly, which hinders the development of more just energy systems. To solve these issues, inspiration can be found in the critical theory of philosophy where thoughts on justice as recognition have its roots. Drawing from the works of philosophers such as Nancy Fraser and Axel Honneth, a new conceptualisation of recognition justice is proposed that can be used in energy justice analyses, based not on analysing distributions or procedures but on experiences of misrecognition.

Less struggle and more thrive: How far can justice take us in guiding and understanding energy transitions?

Author: Aimee Ambrose (Energy Policy, Sheffield Hallam University)

Historic energy transitions have failed to achieve fairness. They have been undertaken in a top down, technologically driven manner which has prioritised not those most in need but those who can pay. Oral histories research in the UK and Sweden has revealed that although some liberation was achieved by transitions from burning solid fuels to district heating and gas central heating, freeing women from the labour of maintaining the 'home fires', some things were lost including control over heating costs. There have also been unexpected cultural implications, with communities resisting the transition due to cultural allegiances to fossil fuels and the undermining of so-called 'petromasculinities' that accompanies transitions away from fossil fuels may have given rise to far-right movements which endanger women (Dagget, 2019). Fairness in energy transitions is, of course, paramount, as is the need to benefit those most in need, first. And certainly, the debate around just transitions has moved on beyond a focus on simply compensating for economic losses. However, there remain many limitations associated with established conceptualisations of energy justice which focus more on the struggle and less on thriving and the potential for life enhancing outcomes, are conceived from a narrow viewpoint and often relegate or overlook the cultural implications. With reference to examples from historic transitions, we consider how far current conceptualisations of energy justice can take us and how the concept might usefully evolve to reflect a broader set of perspectives and take account of new understandings of the plethora of ways in which energy transitions interact with our lives and the many attendant risks and opportunities.

Low-carbon energy, sustainable development, and justice: a social perspective on renewable energy transitions in Vietnam

Author: Giuseppina Siciliano (Centre for Development, Environment and Policy, SOAS), Linda Wallbott (Institute of Political Science, Technische Universität Darmstadt), Frauke Urban (Department of Industrial Economics and Management, KTH Royal Institute of Technology), Anh Nguyen Dang (Vietnam Academy of Social Sciences), Markus Lederer (Institute of Political Science, Technische Universität Darmstadt)

It is increasingly recognized that the transition to a post-carbon economy needs to be green, sustainable and socially inclusive, with the Paris Agreement referring to the ‘imperatives of a just transition’ (United Nations, 2015), the Agenda 2030 for Sustainable Development to the achievement of clean and modern energy access for all by 2030 (United Nations, 2018) and the EU vowing to ‘leave no one behind’ (European Commission, 2019). Just transitions need to consider the equitable provision of energy for all, the implications on the poorest and marginalized people, the complex multidimensionality of human needs and priorities. This paper offers a social perspective on the multidimensional and complex aspects of low-carbon energy transitions based on people’s priorities and their linkages with sustainable development and energy justice. We analyze the importance that different actors, such as affected people, governmental actors, and non-governmental organizations (NGOs), give to sustainable development and energy justice aspects associated with renewable energy transitions in Vietnam. We draw our analysis from original data collected during field research and interviews completed in 2018 with different actors that have been concerned or affected by renewable energy transitions in Lam Dong province in the Central Highlands of Vietnam. The paper shows that linking social priorities to energy justice provides a useful contribution for energy policy makers toward a better understanding of how different segments of society prioritize and perceive low-carbon transitions for the achievement of socially just energy decisions.

Achieving energy justice in project development in Colombia

Authors: Jose Vega and Raphael Heffron (Centre for Energy Petroleum Mineral Law and Policy, University of Dundee)

As the climate urgency intensifies the need for profound changes in energy systems and political attention increasingly shifts to promote the up-scaling of renewable energy infrastructure, achieving a just transition has undoubtedly become one of the major challenges of our time. In the case of Colombia, the energy transition has its spearhead in La Guajira region for its untapped and top-class wind resources, it will host a considerable number of wind energy projects in the current decade alongside new transmission infrastructure. Yet, how this transition is done and at the extent of what are serious interrogations to consider given the region’s delicate extractive-based economy, poor socioeconomic performance and a large indigenous population suffering from long-standing marginalisation. This research uses energy justice theory as a relatively new investigative field aiming to provide better assessment of issues regarding processes and outcomes in frontline communities of energy developments taking a proposed transmission line as case study. Findings reveal that issues driving community opposition transcend the often-cited NIMBY phenomenon toward a complex network of fairness perceptions framed in the communities’ particular socioeconomic context, rendering recognition justice as an underpinning force of a just transition. As a first approximation to the renewable energy developments in La Guajira from an energy justice lens, findings of this study provide evidence and support the notion that the ongoing energy transition is not a question of technical or economic feasibility anymore, but a question of public acceptance heavily underpinned by justice concerns.

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Just Transition: innovating an end-user energy demand segmentation for housing and transport through the lenses of efficiency, sufficiency and excess

Authors: Alexandra-Elena Vitel, Dr Kate Pangbourne, Prof Jillian Anable (Institute for Transport Studies, University of Leeds)

This contribution introduces steps towards an innovative conceptual framework for understanding householders' energy use which 1) combines use of energy for domestic purposes (heating, lighting, powering gadgets, etc) with the use of energy for personal transport and 2) uncovers attitudes towards efficiency, sufficiency, and excess. Our goal is to segment households using these factors in order to identify how policy actions might be more justly targeted. Our rationale is founded on the urgency of pursuing an energy transition away from fossil fuels, in which in the UK at least electrification is seen as key, yet subject to end-user technology adoption. Since there are inequalities in the existing energy system for both housing and transport (i.e., fuel and transport poverty), the social challenges inherent in the current energy transition pointedly open conceptual space for the ethical ideas of energy end-users regarding their own efficiency, sufficiency and excess in view of policy goals based on efficiency and decarbonisation, because it is evident that some people have a net deficit of energy use whereas others might be described as profligate, and the difference can be correlated with income. Furthermore, within this space, narratives of where the responsibility for energy transition lies are varied. Diverging visions of what achieving a lower carbon energy system involves in relation to supply, demand, and the intricacies of consumer uptake of new technologies can be a source of action gaps between stated attitudes and actual behaviour at both the political and personal level.

What is the role of energy demand reductions in the transition to net-zero? A comparative analysis of expert views in the UK, the Netherlands and Germany

Author: Colin Nolden (Environmental Change Institute, University of Oxford)

A wide range of organisations such as the International Energy Agency and Bloomberg New Energy Finance has recently published national or international energy transition scenarios to achieve net-zero by 2050. However, many of these scenarios suggest significant increases in energy demand and focus narrowly on reducing greenhouse gas emissions. Scenarios that seek to address climate and development goals synergistically, on the other hand, suggest that energy demand reduction, for example by improving energy-service efficiency, should be prioritised to increase the flexibility and speed of both end-use and supply-side decarbonisation, lower pollution and reduce systems costs. Such low energy demand scenarios build upon evidence suggesting that energy demand reductions have contributed more to carbon emission reductions than the combined effects of deploying low-carbon generation technology. This paper analyses surveys undertaken among energy experts and stakeholders in the UK, the Netherlands and Germany to shed light upon the role of energy demand in energy policymaking with a particular focus on a just transition to net-zero. It largely confirms the hypothesis that energy demand appears to receive less policymaking attention than energy supply, even where demand side change could secure similar policy objectives more cost effectively. However, significant differences exist between countries and the professions of energy experts and stakeholders when it comes to desired future pathways. Despite these differences there nevertheless appear to be no-regrets/low-risk options which suggest that different approaches to reaching net-zero can co-exist without one necessarily crowding out the other.

Inequitable access to distributed energy resources due to grid infrastructure limits in California

Authors: Anna M. Brockway, Jennifer Conde, Duncan Callaway (Energy & Resources Group, University of California, Berkeley)

The clean energy transition has the potential to both alleviate and accentuate existing inequities in our society. The social dimensions of these changes are of widespread concern and significance. Other researchers have shown that persistent inequities already exist: household adoption of solar photovoltaics (PV), electric vehicles, and other distributed energy resources (DERs) is skewed by racial and income groups. We demonstrate that the electricity grid itself may soon constrain the growth of DERs in ways that exacerbate existing inequities. To do so, we analyze grid limits to new DER integration across California's two largest utility territories. We find that grid limits reduce access to solar PV to less than half of households served by these two utilities, and may hinder California's electric vehicle adoption and residential load electrification goals. We connect these results to demographic characteristics and find that grid limits also exacerbate existing inequities: households in increasingly Black-identifying and disadvantaged census block groups have disproportionately less access to new solar PV capacity based on circuit hosting capacity. In this work, we connect the equity aspects of the clean energy transition to technical infrastructure limits, and illuminate the need for equity goals to be an input into designing policies for prioritizing grid upgrades.

Energy planning through energy practices, vulnerabilities and justice principles

Author: Sebastian Gomez (The Bartlett Development Planning Unit, University College London)

The research identifies the vulnerabilities that are linked to energy practices like household and community activities such as cooking, lighting, and others at the city level and of the urban poor, identifying some possible solutions and SMART indicators through a case study on Lima, Peru. Hence, I propose the Matrix of Energy Vulnerabilities and Indicators -MEVI- based on three tools that contribute to understanding the challenges and the complexity that the city has to overcome in order to reach solutions for a just energy transition based on the concepts of social, environmental, energy, and climate justice. Additionally, MEVI suggests indicators that aim to build social, human, environmental, physical, and financial capitals from an energy transition perspective. As a result, the research contributes to energy studies and ethics debates, adding a new tool or analytical framework that allows us to organise the energy planning processes and understand that energy practices can be seen through the identification of the vulnerabilities and their transformation into measurable indicators. This is useful to be applied to different contexts, projects or interventions of energy development for multilateral, public, and private stakeholders that aim for the consecution of affordable and clean energy (SDG 7) through justice principles and the recognition of the vulnerabilities in relation to energy. Finally, the research recognises that the energy process and the construction of the MEVI need the active participation and involvement of the communities.

Energy culture: the unseen dimension of energy efficiency policies in south Chile

Author: Alejandra Cortes Fuentes (Faculty of Architecture and Planning, Universidad de Chile)

Energy efficiency interventions in existing dwellings have been identified as key policies to reduce energy poverty and mobilise countries to a fair and just energy transition. In the European Union, these policies have been mainly oriented to reduce fossil fuel reliance, mitigate climate change, achieve carbon emission reductions and tackle energy poverty. However, while numerous studies on residential energy efficiency interventions seek to address occupant behaviour, energy consumption and buildings' energy performance, domestic energy culture remains relatively un-researched and therefore poorly understood. Culture can operate as both a barrier or an enabler to low-carbon transitions, which is often unacknowledged. In southern Chile, energy efficiency interventions have been firmly oriented to reduce pollutants emissions from residential firewood combustion used for heating and cooking. Although energy efficiency programmes are not policies declared to alleviate energy poverty, they can mitigate this situation in social housing households. Notwithstanding their importance, energy efficiency policies in Chile do not consider households' energy poverty condition regarding, among others, the lack of equitable access to energy services and the cultural aspects of firewood use and preference, becoming a barrier to overcome the environmental problem. This paper will discuss the background and research context that allow a better understanding of the structural and institutional factors in which energy poverty is rooted in Chile and highlights the need to address the cultural dimension of energy use in the country. The sociocultural, economic and political backdrop of energy poverty is discussed for reflecting on more effective and responsive local solutions.

Energy poverty and the transition to sustainable energy: Perspective from the Philippines

Authors: Tayag, Christian Roice Dela Cruz and Lopez, Neil Stephen Angosta (Mechanical Engineering Department, De La Salle University)

Energy poverty in developing countries has been a long running concern. While it is an obvious dilemma, it is challenging to address as current metrics to measure it do not provide a clear picture of the problem. In this paper, the Lorenz curve and Gini coefficient are used to evaluate the distribution of different household energy sources such as electricity, LPG, kerosene, fuelwood, charcoal, and other fuel types in the Philippines. Energy expense data, as well as the households' income and socio-economic identifiers are extracted from the 2015 Family Income and Expenditure Survey (FIES) Report published by the Philippine Statistics Authority (PSA). To translate energy expenses to consumption, historical costs available from public records and corresponding calorific values are used. From there, Lorenz curves and Gini coefficients produced for different energy sources are compared for different regions in the Philippines. Furthermore, as the transition to sustainable energy technologies can compound energy poverty issues in developing countries due to exorbitant investment costs, the authors attempt to analyze the impact of each sustainable energy technology considering their levelized costs. To conclude, the authors reflect on the repercussions of the sustainable energy transition to energy poverty in the Philippines and provide policy insights on how to improve energy accessibility in the country.

Enforced Commensuration – An Unjust Energy Transition on the APY Lands

Author: Liam Grealy (Department of Gender and Cultural Studies, (University of Sydney))

Originally scheduled for 1 July 2021, the introduction of prepayment meters and a user pays system across the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands has been deferred until 1 July 2022. This delay reflects tacit acknowledgement by South Australia's Department of Energy and Mining that such reforms will negatively impact Anangu residents' energy security. Yet plans to proceed continue, subject to a regulatory review and a revised Prepayment Customer Protection Policy. Residents of remote APY Lands communities in northwest South Australia have not previously been charged for electricity. The proposed reforms emphasise this now exceptional status and an apparent need to make APY Lands energy provision commensurate with other parts of remote Australia. Across the border, Aboriginal people in remote communities and town camps in the Northern Territory have been subjected to a similar prepayment regime with deleterious results. Data from energy provider Jacana demonstrates the regularity and longevity of 'self-disconnections' as residents exhaust the pre-purchased credit that powers their homes. What sort of transition is envisioned by these reforms? This paper considers their justifications, progress, and likely impacts for residents. These are contextualised in relation to the recent installation of a community solar plant and the impact of other infrastructural and policy legacies on the potential for greater energy sovereignty. At the household level, I also consider the work of the housing provider, Housing SA, to provide housing health hardware that mitigates increasing heat in the region, in the context of this policy-induced energy insecurity.

Uncovering the dimensions and distribution of energy insecurity in the United States

Authors: Cristina Crespo Montañés, Duncan Callaway (Energy and Resources Group, University of California Berkeley)

Exacerbated by the COVID-19 pandemic, household energy insecurities are on the rise in the United States. Given their nefarious impacts on health, it is crucial to acknowledge and address household experiences of energy deprivation. Prior research has proposed frameworks and metrics to capture different dimensions of energy insecurity: quantifying energy efficiency or affordability, as well as understanding the strategies employed by households to cope with insufficient, inadequate or unaffordable energy services. Yet, deriving such metrics at the micro-scale is challenging, since high resolution energy consumption data is mostly unavailable. In this study, machine learning methods are employed to predict household energy usage, energy efficiency and the prevalence of coping strategies at the neighbourhood scale. We use public data from the Energy Information Administration and the US Census to compute ten indicators that evaluate the different dimensions of energy insecurity in 96% of US neighbourhoods. Analysing the underlying demographics reveals the racialized and gendered distribution of energy insecurities: we find that Black and female-led households live in more inefficient housing, while Asian households show higher rates of resorting to energy under-consumption as a coping mechanism. These inequities in energy insecurity across demographic groups remain after accounting for income and home ownership levels. This study unveils who gets counted as energy insecure when different physical, behavioural and economic indicators are used, proposing a holistic understanding of the phenomenon beyond affordability discussions. Its results can be used to influence the spatial prioritisation and eligibility criteria of energy efficiency investments and bill assistance programs.

Exclusive discourses about energy transition: exploring the boundaries of social and cultural change in Sulcis

Authors: Apostoli Cappello, Valentina Rizzoli, Laura Norton, and Mauro Sarrica (Roma University)

This contribution aims to discuss how energy transition discourses are used as inclusive or exclusive rhetorics, and by which actors. A former Italian coal region (Sulcis Iglesiente, Southern Sardinia) is presented as a case study. Already with the expansion of coal mines across the 19th and 20th century, and with the subsequent closure of mines and industries from the 1970s, the Sulcis area has experienced protracted economic crises coupled with mechanisms of disempowerment, and deprivation of agency and ownership. Drawing upon methodological and theoretical frameworks from political anthropology and social psychology, we examine how competing views of energy transition are claimed, contested and imposed across different levels. Ultimately, we expect that energy discourses are used in Sulcis to replicate, in new ways, cultural and structural forms of violence. In this study we triangulate a lexicometric analysis of national, regional and local press with semi-inductive interviews with locals. Results show that the transitions proposed at the institutional level convey contents related to economy and employment. At the same time, the energy discourse frame local communities as passive and dependent on decisions or technologies coming from “the outside”, in various complementary forms. Results also show a lack of voice from local communities, who are not actors of the transition, they are conflictual at most. Figures that embody environmental, political or individual change are also absent. Results are discussed reflecting on the importance of involving local voices that accompany transitional political projects in the view of social and cultural change

Democratic inclusion or financial expropriation? Challenges of green transition in Greek coal-communities

Author: Theodora Vetta (Social Anthropology, University of Barcelona)

What does green transition mean to coal-dependent regions? Among the EU countries, Greece announced one of the most radical decarbonization strategies, implying the sudden suspension of all existing lignite-based power plants by 2023, mainly located in the north region of Western Macedonia. On the one hand, this immense de-industrialization will dramatically impact an already environmentally degraded and economically -declining region; on the other hand, the so-called Master-plan for EU’s Fund of Just transition brought to the surface historically-bounded political struggles over redistribution. In this paper I will map the ongoing green-transition initiatives, focusing particularly on mega/petty projects of solar energy production within and around the soon-to-be-obsolete coal mines. Despite the social agitation, the contested notions of fairness, and growing claims of inclusion, the suggested bottom-up “green solutions” seem to be based on financial logics and practices of shareholding value, rents, and indebtedness. Such practices and ethics risk further the commoditization of energy and financial expropriation of households, challenging the proclaimed Just character of such transition.

“Those days when gas was gas”: fabrication of LPG narratives during a process of technological empowerment

Author: Serena Saligari (Department of Public Health, Policy and Systems, PhD Candidate in Social Anthropology, University of Liverpool)

In the last decade, Kenya’s government enacted several policies to favour the transition to Liquefied Petroleum Gas (LPG) and promote clean cooking. The government has liberalised the licenses for LPG sale; expanded import and storage facilities; improved the distribution network for gas bottles; and allowed for a 16% VAT exemption between 2016 and 2021. Gas retailers have since mushroomed and the price of LPG has dropped making it available and more affordable. The use of LPG increased from 3.5% in 2006 to 24.4% in 2020. With this, a discrediting, vernacular narrative has also emerged: gas bottles are said to be unsafe, fake, and not properly refilled; some gas companies are reputed to be blending LPG with other substances; consumers speculate over the nature and safety of gas container seals. People have turned into LPG connoisseurs able to judge gas quality by the colour of its flame. Whether these accounts are true or false, they reflect a set of interesting dilemmas on clean-air interventions, with historical gas users bemoaning “those days when gas was gas”: an exclusive but precious and reliable item. This paper is based on ethnographic fieldwork in Eldoret, Kenya. It discusses the transition of LPG from a luxury commodity to an everyday consumable as being marked by a loss of trust. In particular, it explores the roots of these narratives, while investigating the role played by the profound socio-economic, political, and material contradictions of Kenyan society in shifting the value attributed to gas when it became easily available.

The Uncommon Sense of Biogas: Waste, Ethics, and Good Energy in Off-Grid Tanzania

Author: Kristin D. Phillips (Department of Anthropology, Emory University)

This article analyzes the convergence of two key global energy projects -- energy access and energy transition -- in the emergence of household biogas technologies in Tanzania in order to theorize energy ethics in a postcolonial world. Household biogas is an off-grid energy technology that can convert human, animal, and agricultural waste into fuel. Its production and propagation offer key insights into anthropological conceptualizations of energy, ethics, and infrastructure. Specifically, this article asks: how do different ideas about what is ‘good energy’ animate the politics and implementation of biogas in Tanzania? I argue that people assert and think through their own notions of good energy by engaging ethical registers of energy. I theorize these ethical registers and identify three that drive the narrativization of biogas and allow people to talk about what good energy means to them across unequal relationships, postcolonial histories, and entangled ethical projects. I conclude by reflecting on the materiality of energy properties present in these ethical registers and the significance of their aestheticization for ethical life.

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Post-growth care work for the future of just transitions

Author: Matthew Burke (Rubenstein School of Environment and Natural Resources, University of Vermont)

A just transition aims to reconcile environmental and social concerns especially for fossil-fuel dependent areas. Yet even under the best conditions, we can expect ongoing shocks and events including severe storms, blackouts, supply disruptions, pandemics, and financial instabilities to shape the implementation of just transition agendas. Departing from conceptions of an orderly transition, these multiple, overlapping crises imply that just transitions can no longer assume a broader context of endless economic growth and ecological stability. In concept and practice, just transitions must directly account for and anticipate such profound uncertainties regarding the social and ecological context in which such projects are planned and implemented, while breaking from growth dependence. This paper argues that the future of just transitions must center on essential care work to better ensure well-being with or without economic growth. The essay first examines the diversity of perspectives on the meaning of just transition, to help articulate a more transformative approach to just transitions under conditions of economic instability. The article then demonstrates a broadening of understandings of just transitions, spanning from those more narrowly focused on immediate worker- and sectoral supports to those aiming for more fundamental and lasting transformations of economies and societies. Given the extreme social, economic, and ecological uncertainties of our time, the paper lastly proposes temporally overlapping agendas for policies, strategies, and institutions of just transition organized around post-growth care work. As a core contribution, the article offers a set of criteria to help guide transitions beyond fossil fuel and growth dependence.

“Greening” Finance: Sustainability Work and Hunt for Non-Financial Data

Author: Ainur Begim (International Business, NTNU)

Long championed by climate activists, the idea that the climate change is a profound threat to global prosperity has gained important momentum in the wake of the COVID crisis. Governments and companies around the world are devising ambitious plans for energy transitions and conjuring visions of net-zero futures. In these blueprints, the finance sector figures as an important enabler by moving the flow of capital away from fossil fuels toward “green” projects and sustainable solutions. Many financial institutions embraced the sustainability agenda, incorporating environmental, social, and governance (ESG) issues in financial decision making and decarbonizing their portfolios. Drawing on fieldwork in Norwegian investment firms, I trace the everyday sustainability work of portfolio managers as they educate themselves about the climate change, biodiversity, and water management; collaborate with governments and other financial institutions to develop standards and disclosure mechanisms to make more ESG data available; and ultimately seek to harness “non-financial” data and knowledge to beat competition and earn profit. My interlocutors single out ready to use quantitative data or a lack thereof as the single most important challenge in doing sustainability work (cf. Merry 2016). This preoccupation with non-financial data, I argue, suggests a major paradigm shift within finance – an attempt to push beyond the limits of what is financial (data, analysis, practice). At the same time, the ways financial practitioners organize and analyze non-financial data – modeling it on the way they work with traditional financial data – might preclude the radical potential of using finance to solve the climate crisis.

The Future of Divestment: Proliferations of Counter-Hegemonic and Post-Extractive Divestment Movements

Authors: Gareth Gransauil, Evelyn Austin, Guy Brodsky, Shadiya Aidid and Truzaar Dordi (Department of Health Sciences, Lakehead University)

Fossil fuel divestment has quickly become the largest divestment campaign in history, drawing attention to the large discrepancy between national climate commitments and the continued support of the fossil fuel industry. Although divestment has grown from a niche movement into a global force, fossil fuel production and emissions continue to escalate rapidly. Our question is: what's next for the divestment movement? We propose a conceptual framework that identifies two future waves of divestment leadership in which new public pressure campaigns advocate for the managed decline of both fossil fuel production and resource extraction as a whole. To scale down fossil fuel production, we argue that divestment organizers must target banks and insurers that finance the industry, apply pressure to carbon intensive demand-side sectors, and use litigation against funds that fail to divest as a matter of fiduciary duty. Further into the future, we envision divestment campaigns that aim towards a post-extractive future by targeting firms that engage in environmentally damaging and unjust behaviours. This could include divestment from firms that are involved in destructive mining activities, contribute to overconsumption, abuse predatory debt or arbitration processes to acquire resource concessions, or contribute to Indigenous rights violation, among others. This paper offers actionable suggestions for current and future organizers, and frames the fossil fuel divestment movement as one that will evolve into a multiplicity of new campaigns which will be vital in the transition towards a post-growth economy.

The impacts of climate change mitigation on work for the Austrian economy

Author: Maja Hoffmann (Department for Socioeconomics, Vienna University of Economics)

To ensure climate change mitigation in line with remaining carbon budgets, industrial societies must phase out fossil fuels, reach zero greenhouse gas emissions, and achieve a structural transformation towards a post-fossil economy based entirely on renewable energy (RE) – within little more than one decade. Industrial societies are structurally work-centred and work-dependent, however, the implications of this energy transition for work are poorly studied. We analyse the impacts of climate change mitigation on work using the Austrian national economy as a case study. We address two main questions: (1) Which fields of work are susceptible to impact from climate change mitigation in the short term?, and (2) Which fields of work can/cannot be reorganised on the basis of existing RE technologies? We conduct a secondary data analysis, investigating all NACE-classified branches of economic activity; the respective number of persons employed, carbon dioxide emissions, fossil fuel use, and the potential for RE deployment, complemented by expert interviews and a literature review in interdisciplinary sustainability research. The implications for work are far more substantive than the literature usually suggests. The potential for deployment of RE technologies is limited across a considerable number of economic activities which are dependent on the properties of fossil fuels, and cannot be upheld at the present scale of energy consumption. A substantial reduction of work is required, and the remaining work needs to be re-organised on the basis of decentralised, locally specific, intermittent and less concentrated RE sources. It would also be helpful to rethink the social value and purpose of work, and the modern work ethic more fundamentally which regards work and productivism as ends in themselves. A related dilemma to be overcome concerns the structural dependencies on work in modern industrial society.

‘Clean Oil’? Energy Elites, Prosperity, and Energy Transitions in Norway

Author: Anna Rauter (Department of Social Anthropology, University of St. Andrews)

Energy transitions have been referred to as a “wicked process” involving a variety of stakeholders with conflicting interests (Komendantova 2021: 1). This ‘wickedness’ can be attributed to inherent ‘energy dilemmas’; rising carbon emissions leading to mounting climate change concerns, coupled with increasing energy demand. While this calls for low-carbon, sustainable and just energy supply, hydrocarbons prevail. In Norway, despite significant push from industry, policy, and publics towards renewable energy futures, oil and gas production persists. In this paper I analyse why and how the leaders and experts of Norwegian energy companies – energy elites – continue to promote hydrocarbons in a context where renewable energy transitions are proliferating. First, I examine how some energy elites nourish a perceived dependence on fossil fuel production by highlighting the interconnections between Norwegian oil wealth, national welfare and notions of ‘the good life’. Then I show how energy elites create a space for future hydrocarbon production by advancing the notion of Norwegian ‘clean oil’; oil extracted with low carbon emissions through the use of technology such as Carbon Capture and Storage (CCS) and the electrification of oil platforms. This paper critically discusses the resource curse literature which paints Norway akin to an ‘oil utopia’ – where the ‘successful’ exploitation of hydrocarbons is linked to a thriving welfare state. Considering the increasing urgency of climate change requiring transitions towards renewable energy, I problematise depictions that portray Norwegian hydrocarbon production as ‘successful’. Instead I argue that narratives of an oil-financed ‘good-life’ work to slow down energy transitions.

A Requiem for Carbon Capitalism? Fossil Fuels, Renewables and the Challenges of Energy Transitions

Author: Sandy Brian Hager (Department of International Politics, City, University of London)

One of the most formidable obstacles to a low-carbon energy transition is the entrenched power of the fossil fuels sector. Yet in recent years, and especially since the onset of the Covid-19 pandemic, there has been cause for optimism that the dominance of the fossil fuels companies might be waning due to stubbornly low oil and gas prices, concerns over climate change, as well as technological breakthroughs in renewable energy technologies. But just how bad is the outlook for fossil fuels companies? And what does their apparent decline mean for the transition toward a more sustainable energy regime? In this paper, I present research that charts for the first time the financial performance of the fossil fuels sector on a global scale. My research shows that the share of oil, gas and coal companies in global profit and capitalization has steadily decreased over the past half century, while that of alternative energy companies has jumped since 2018. But despite falling distributive shares, what I also find is that the overall magnitude of oil, gas and coal profit and capitalization currently dwarfs that of the alternative energy companies. The key message of the paper is that optimism about the decline of fossil fuels needs to be tempered with sober recognition of their continued dominance of the energy landscape. It follows that bold and creative public (i.e. government-led) initiatives are required to spearhead a low-carbon energy transition, compensating for severe private imbalances of power between the fossil fuels and alternative energy sectors.

Oil, transitions, and the blue economy in Canada

Author: Leah Fusco (Memorial University of Newfoundland)

Canada is currently developing a blue economy strategy in pursuit of a sustainable and equitable ocean economy. Yet, its approach to accomplishing this will include the development of offshore oil. This paper examines the contradictions and implications of including oil in Canada's blue economy by looking at the case of Newfoundland and Labrador (NL), the only province in Canada with a mature offshore oil industry. While a decade ago, NL's offshore oil industry was framed and promoted in terms of its contribution to advancing offshore oil exploration and development in other harsh and cold environments, it is now framed for its contributions to global energy transitions. This is based on the argument that realistically, the world will continue to need oil as it transitions away from oil and thus by developing NL's "clean" oil (oil that produces fewer GHG emissions than other places), the province is contributing to global GHG emissions reductions. Consequently, there has been a significant emphasis in the province on innovations and technology to decarbonize offshore oil production. What gets ignored with this approach, however, are the multi-scalar impacts and contradictions. By focusing only on regional oil production, the responsibility for reducing GHG emissions and dealing with impacts is displaced and pushed to other places and times -- to where the oil is consumed and to those places that experience the greatest impacts of climate change.

Regional Energy Transition with Nuclear Technology in the Persian Gulf by 2030

Author: Asieh HAIERI YAZDI (Centre of Energy, Petroleum, and Minerals Law and Policy, University of Dundee)

The Persian Gulf seems ready for significant growth in nuclear electricity. The first main 1000 MWatt-nuclear reactor was constructed by Iran in Bushehr on the Northern coasts of the Gulf in 2011 after many years of construction. Ten further units are planned/under construction for powerplant near the coasts of the Persian Gulf and Gulf Oman. Saudi Arabia has announced plans to provide 15% of electric power from nuclear power plants by 2040. The United Arab Emirates has two nuclear reactors in operation and two under construction in Barakah nuclear power plant, the two first units are put into operation in August 2020. It is the essential point that all the states skillful commercialised in civil nuclear power have the parallel capabilities to access nuclear weapons capabilities. For decades, all the states in the region have allegedly supported the resolutions of the United Nations General Assembly to demand the creation of a zone free of nuclear weapons and other Weapons of Mass Destruction. Concerning external geopolitical conflicts and various types of domestic energy governance, the nexus of security, environmental, and social considerations seem controversial. The research helps to explain the reasons leading countries to cooperate or conflict and describe their interests in social justice, environmental justice, and energy justice and the role of major actors in the establishment of a pattern of conflict or cooperation in bilateral relations can be identified. This is particularly the case when addressing whether energy is perceived as a security instrument or facility for social justice.

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Japan's leadership in promoting Clean Energy Technology in Asia

Author: Nanda Kumar Janardhanan (Climate and Energy, Institute for Global Environmental Strategies)

Closing the mitigation gaps in various energy consuming and producing sectors in developing countries demand greater collaboration and support by the countries with advanced technologies. However, traditional models of technology transfer largely limits the recipient country's involvement in the conceptualisation to manufacturing, which is critical in ensuring the customisation of the product to the local conditions. In order to build effective climate mitigation initiative mechanism technology donor (source) and recipient (host) countries can partner together throughout the stages from conceptualisation to production and scaling up. This paper examines the possibilities of co-innovation between Japan and the developing Asian countries, aimed at jointly innovating, manufacturing and scaling up by pooling in the knowledge and resources of both players, and thereby bringing faster and efficient solutions to help climate mitigation agenda.

Runaway Climate Change and Lagging Education Systems: Frictions and Teacher Innovations in Educating for Just Energy Futures

Author: Lynette Shultz (Dept of Educational Policy Studies, University of Alberta)

Motivated by injustices associated with causes and consequences of climate heating, youth mobilized a global climate movement in 2019 and 2020, culminating in a series of school strikes for climate, along with Indigenous youth movements against unjust energy projects in states such as Canada, Thailand, Norway, and across Latin America. Despite young people's activism for just energy futures, the topic remains marginal in formal education (Siegener & Stapert, 2020; Busch, Henderson & Stevenson 2019). This paper draws on a 7-month collaborative education project on "Energy Futures," which engaged high school teachers in 21 countries to support their students in developing the energy literacy needed to engage in just and sustainable energy futures (Mookerjee, 2019; Szeman & Boyer, 2017; Wilson, 2018). Drawing on interviews with participant teachers, this paper addresses: how might education systems better support teachers in educating for just energy futures? Teachers face the contradiction of education designed as individual capacity building in relation to an issue that demands global social analysis and collective responses. However, this project showed teachers' capacity to create innovative pedagogical interventions, learn alongside their students, and work outside traditional school and education structures to support student learning. The frictions, innovations, and additional labour conducted by teachers in carrying out the Energy Futures project may inform education policy makers, teacher trainers, and curriculum developers in better supporting education for just energy futures. We analyze these results and make recommendations drawing on Fricker's (2007) ethics of knowing and epistemic injustice as key to energy and future literacies.

Subsea Networks, Alternative Coastal Energy Futures, and Equitable Climate Resiliency

Authors: Hunter Vaughan (Senior Research Associate, Minderoo Centre for Technology and Democracy, University of Cambridge), Nicole Starosielski, Susanna Kass (Media Studies, University of Colorado Boulder)

This multi-authored talk will bring together experts in renewable energy futures, STS and media infrastructure studies, and environmental justice to address the increasingly crucial connection between rapidly growing information and communications technology (ICT) infrastructures and energy use and access in an era of accelerated anthropogenic climate change. The carbon footprint and energy dependency of ICT around the world has become the central object of much scholarly inquiry, popular journalism, and industry reportage, often generating contradictory conclusions regarding the relationship between technological efficiency and energy consumption; whether in defense or with caution of ICT growth, recent studies have tended more and more to couple this analysis with underlying but vague arguments about the sources and systems of energy that power these global networks and individual devices. In this talk we will focus specifically on this relationship through the lens of an often ignored and understudied part of the global internet: subsea telecommunications networks, and the potential for coupling these proliferating infrastructures with alternative energy futures as a path to support coastal climate resiliency and communications and energy equity for underrepresented and marginalized communities. Looking at unique localized case studies (eg. Puerto Rico) and larger regional networks (eg. the 2Africa cable system encircling the African continent and partially funded and laid by Facebook), we will survey the energy demands of these networks and propose alternative and renewable energy possibilities based on local climate and ecosystem specificities, distinct social needs, and regional law and policy mandates across ICT and energy sectors.

Deliberating The Climate Emergency: Closing Off, Opening Up and the Collingridge Dilemma

Author: Nick Pidgeon (Psychology, Cardiff University)

The climate and biodiversity emergency has become a rallying cry for the sustainability movement worldwide, and novel energy technologies are one of the imagined responses to this. This paper explores temporal dilemmas and potential unintended consequences of climate urgency discourse. In discursive terms the concept of climate emergency might unintentionally act to legitimise otherwise environmentally damaging and ethically unacceptable options while at the same time ‘closing off’ (in Stirling’s terms) consideration of what otherwise might be more sustainable solutions. In the NERC-Sciencewise ‘Experiment Earth’ public dialogue on geoengineering held in 2010 for example, a ‘future climate emergency’ was the discourse used by scientist witnesses in their attempts to persuade reluctant public participants that future planetary solar radiation management might one day be needed. Fast forward to 2021 and we see a range of less esoteric options for climate engineering emerging, including large-scale carbon dioxide removal with bioenergy (BECCS). Recent findings from public deliberative research on attitudes to such carbon removal technologies conducted in the UK and US reveal a critical temporal dilemma. Technologies such as BECCS are seen as unable to provide a sustainable long-term solution to climate change, while deployment is equally viewed as being too slow to materially affect the current crisis: arguments which contain echoes of the longstanding ‘Collingridge Dilemma’ developed within Science and Technology Studies. The paper argues that similar temporal dilemmas are likely to lie at the heart of many proposed new energy technology options for addressing climate change.

Energy access devices and the urgency to adapt – Perceptions of off-grid solar technology in India and Kenya

Author: Matthias Galan (Institute for Ecological Economics, Vienna University of Economics and Business)

The emergence of smart energy access is still mostly discussed in the context of societies in the Global North. This is the case even though the Global South is both the site of experimentation with smart energy systems (i.e., Solar Home Systems, Mini-Grids) and the site of the most severe impacts of the current climate crisis. The paper looks at the question of how to conceptually grasp the emergence of such innovations in two prominent energy systems of the Global South, Kenya, and India. The aim of the study is to understand energy sector expert perspectives on tensions arising from making energy access devices smart while facing the pressure of increasing energy demand and adapting to the impact of the climate crisis. To this end the paper proposes the reinterpretation of the concept of ‘devicification’ which was earlier used to grasp the emergence of smart devices in the Global North. Devicification is understood as the process of establishing interconnected devices in India and Kenya as a co-evolution of efficient appliances, ICTs, and off-grid solar energy access. The study is based on 39 expert interviews and participatory observations in India and Kenya. Drawing on this explorative expert perspective, the study finds that the concept of devicification allows to understand how smart devices pose both a new challenge to energy ethics (i.e., energy use surveillance and data protection in vulnerable groups) and offer emancipatory potential to the users of such devices (i.e., e-health services, e-learning).

Solar India: the charisma of ambitious innovation

Authors: Kirsten Campbell (Department of Environment & Geography, Loughborough University), Melinda Barnard-Tallier (Department of Anthropology, Wits University)

This paper explores the role of charisma in the development, mobilisation and materialisation of ambitious renewable energy projects in South Asia. It is based on ethnographic work at the site of one of India’s first “smart” solar micro-grids, installed in a tiger reserve in Odisha in Eastern India, and at the world’s first solar-powered airport in Kochi, Kerala, in South India. While these projects took place in contrasting contexts and with divergent aims, we frame these within similar technology-driven narratives of innovation, prosperity and sustainability through development. We explore questions of how these supposedly transformational projects continue to coalesce and advance in the face of resistance, catastrophe and seemingly contradictory logics. We seek to understand the subjective holding power that these projects yield in the minds of their advocates and the ways that this is deconstructed by their detractors. Through acknowledging the time, effort and money invested in these endeavours, we explore the role of charisma in animating specific imaginations of renewable futures in these spaces. We embed our analysis within discourses on how the modern Indian state should look and visions of how technology and infrastructure can impact its place in the world. We critically examine the role of this charisma in galvanising ambitious innovation to advance targets for sustainable futures and the disempowerment which result from it.

Solar batteries as analytic devices: Recognising dependencies in India's Sundarbans

Author: Silvia Pergetti (Social Anthropology, University of Edinburgh)

Charging and discharging, now full and then empty, now working and then flat. Wet-cell, lead-acid, solar batteries are central yet often overlooked parts of off-grid solar energy infrastructure. Constantly oscillating between charge and discharge, batteries dictate the rhythm of an uncertain existence resting on fragile arrangements and delicate dependencies. Such dependencies both impose limits and help go beyond them, in the very same way as batteries with limited capacity expand the limit of the sun not shining at night. This paper zooms in on solar batteries as a key feature of five DC solar mini grids on an island of India's Sundarbans. Against the grand vision for a bright energy future that the mini grids are supposedly encoded with, solar batteries are hardly capacious enough to grant an illuminated passage from dusk to dawn. The paper thus recentres our imaginations of energy futures on those bits and pieces that make energy infrastructure tangible. Taking solar batteries as an analytic device, we should see the possibilities opened up by specific energy technologies not as endless and revolutionary but as limited and incremental, depending for their realisation on conditions, collateral changes, collaborations.

Solar Energy at the Museum of the Future

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This paper deals with an energy collaborative and associative project: the inclusion in 2018 of a village solar thermodynamic water pump model, a reproduction of the first "Sofretes pump" installed in Senegal in 1978, in the famous Parisian Museum of Arts and Crafts (Musée des arts et métiers). The project was confronted with many epistemological, practical and museographical problems. All of them were significant of the "energopolitics challenges" of the history and awareness about renewable energies, and specially here about what we can call "Solar-T energy", Thermal and Thermodynamic Solar energy. Strangely, the presence in the museum of the first modern solar mechanical device in the world, the solar motor of Augustin Mouchot (1878), didn't facilitate the success of the project. Like in many places, the museum curators remain on a very traditional understanding of the history of energy techniques. Solar-T has no place in this kind of official story, and especially small powers and energies for developing countries. In many ways, this experience of scientific and museographical activism for a "real" history of the potential of solar energy fits with the work of Laura Watts in Orkney Islands and marine energy prototypes (2018). Like her, we'll question the interaction between academic history of technics, opening up knowledge and imaginations for the general public, and commitment in associative and voluntary collaboration for the preservation of materials that demonstrate neglected energy alternatives. We'll illustrate our point with a lot of visual elements.

Open to a World of Possibilities?

Author: Johannes Hollenhorst (Sociology, London School of Economics)

The acknowledgement of human induced climate change has started to undo carbon cultures. While the use of coal, oil, and gas is still on the rise globally, first former centres of energy extraction are reimagining and reorganizing their future. This article presents how this process of transition is taking place in Aberdeen, the self-declared energy capital of Europe. Since 2013 and with the beginning acknowledgement of the immanent end of hydrocarbons as main source of energy, Aberdeen City Council has cooperated with the local oil and gas industry and an EU-wide network of partners to develop strategies and infrastructure projects for a local hydrogen economy. Based on ethnographic fieldwork and semi-structured interviews, I argue that this approach to the technological reinvention of the city is contingent on the infrastructural and organizational legacies of the carbon era and misses realizing the full potential that hydrogen offers to the larger Aberdeen City Region. These carbon continuities and their entailing perpetuation of established networks of power are analysed with a focus on plans to turn parts of the historically marginalised Torry neighbourhood into an Energy Transition Zone (ETZ). Designed to establish the city as a global centre of excellence for hydrogen, decentralized and community owned forms of hydrogen production are as much erased from Aberdeen's future as the citizens' demand for participation in the making of this future. Exploring these foreclosed possibilities, the article concludes by spelling out some of the virtual hydrogen worlds that could materialize as alternative futures.

A multi-level perspective on the domestic hydrogen transition: Socio-technical barriers and energy justice challenges

Author: Joel Gordon (Department of Energy and Power, Cranfield University)

Developing a global 'hydrogen economy' where hydrogen becomes a universal energy carrier is emerging as one of the linchpins of the renewable energy transition agenda. However, the environmental credentials and ethically acceptable of some national hydrogen transition pathways are compromised, at least in the short-term, by divergent production options which may counteract the energy transition discourse. Principally, 'blue' hydrogen produced via steam methane reformation (SMR) with carbon, capture, utilisation and storage (CCUS) may enable the production of 'green' hydrogen via electrolysis from renewable sources, however, the former remains dependent on large quantities of natural gas and presents risks of CO₂ leakage and upstream methane leaks, while targeted rates for CO₂ capture remain tentative. Ultimately, blue hydrogen production may remain environmentally, if not politically contentious, since it cannot compete with electrolysis in terms of greenhouse gas (GHG) emissions reductions. Notwithstanding, the UK government has backed CCUS as part of its strategic plan for achieving 'net zero', which may hinge on the techno-economic feasibility and social acceptability of converting part of the housing stock to 'hydrogen homes'. Critically, the domestic hydrogen transition is set to unfold across parts of the country characterised by disparate economic and social geographies where questions of energy justice are at stake; especially during the switchover period when vulnerable households will be temporarily disconnected from the gas grid. In view of these challenges, this paper examines the socio-technical barriers of the domestic hydrogen transition, accounting for challenges and conflicts inherent in the deployment and use of hydrogen homes.

Sustainable Energy for All? Assessing the potential of green hydrogen development for energy transitions in the Global South

Author: Robert Lindner (Platform of Inter-/Transdisciplinary Energy Research, Kyushu University)

Fuel cells and other hydrogen-based technologies have gained considerable support in industry and politics in recent years. Several countries, such as Japan or Germany, have recently formulated ambitious national hydrogen strategies, which rely considerably on the import of low-carbon hydrogen from countries in the Global South. However, although there is currently a strong political momentum behind hydrogen development, the success of those strategies is far from certain and many questions remain about their technological, economic and political feasibility. The presentation is based on an extensive review of policy documents and academic literature. It uses the lens of sustainable energy transition theory to explore the potential opportunities and shortcomings of the green hydrogen strategies of importing and exporting countries. The analysis identifies opportunities for collaboration, as well as potential implementation barriers and areas of conflict. The presentation concludes by suggesting avenues of further social scientific research about the feasibility of international green hydrogen trade networks.