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Does renewable energy affect violent conflict? Exploring social opposition and injustice in the struggle over the Lake Turkana Wind Farm, Kenya

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ABSTRACT

Renewable energy projects offer prospects for sustainable development and meeting climate goals. However, new renewable energy projects, often driven by donor aid and foreign direct investment, have triggered several challenges, notably those related to conflicts. Struggles over renewable energy projects demonstrate a range of social opposition and injustice that needs to be better understood. This study applies a conflict sensitivity framework to examine how changes in energy systems alter conflict. Using the case study of the Lake Turkana Wind Farm (LTWF) and secondary sources, the study analyses the range of conflict mechanisms identified by project implementers, as well as independent analysts. Conflict mechanisms reveal how energy system changes may affect violence in the project area, as well as the kinds of socio-economic consequences of conflict generated by LTWF. The paper critically examines the discrepancies between the project developer, Lake Turkana Wind Power, and analysts of independent studies in how conflict mechanisms are attributed to pathways of increasing or reducing conflict. The paper finds that the project developer evaluates its impact on conflict in a minimal way, making conflict sensitivity limited. The paper extends examination beyond inequalities in project outcomes and indicates a way to understand conflict sensitivity throughout the energy system.

1. Introduction

Energy policy increasingly attempts to address multiple aims of energy security, climate change and poverty [1]. While such policy offers prospects for sustainable development and meeting climate goals, there are challenges such as land conflict and corruption [2]. In places like Sub-Saharan Africa, renewable energy projects are increasingly taken up in policy, thanks to Independent Power Producers (IPPs) and donors who provide aid for energy projects [3,4]. There is growing pressure for both development projects and foreign direct investments to be conflict sensitive [5–7]. However, implementation of conflict sensitivity is lagging, in part due to the complexity of potential interactions between project impacts and conflict [8–11].

The objective of this paper is to determine ways to better understand how and when conflict manifests as energy systems around renewable energy projects change. Further, it attempts to show the relevance of conflict sensitivity for IPPs, donors and project implementers that actively take part in shaping energy systems. This study applies a conflict sensitivity framework to renewable energy contexts to examine how energy system changes alter conflict. The significance of this framework is that it extends the scope of current scholarship to systematically examine diverse pathways in which project impacts have a bearing not only on inequality arising from the production of renewable energy but also on the socio-cultural fabric of communities and existent conflict. The study uses a case study of the impacts of the Lake Turkana Wind Farm (LTWF) in Kenya. LTWF is one of the largest private investments in the country and the largest wind farm on the African continent [12]. It operates in a region that is widely recognised as experiencing violence and conflict between communities. Furthermore, the project has been the site of social opposition and injustice over benefits and access to resources. The project is the recipient of significant equity and debt finance from the investment funds of development aid actors [13,14]. As such, considerable research effort has been expended in understanding its impact both by the consortium operating the wind farm, Lake Turkana Wind Power (LTWP), and its aid donors, as well as by independent researchers [15]. These secondary sources provide prime ground to identify and categorise project impacts on conflict as reported by project implementers as well as independent analysts to assess conflict sensitivity. The aim is to identify project dimensions which project developers consider as interacting with conflict, rather than whether

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conflict occurred or not.

The study advances understanding of conflict that arises from renewable energy projects at multiple points in energy system changes. It argues that conflict mechanisms demonstrate how and when energy system changes are considered relevant to conflict actions by project developers. Consequently, conflict is not regarded merely as an outcome but as interacting with energy systems—i.e. actions around renewable energy projects can not only exacerbate but also reduce conflict. The study aims to contribute to the theory underpinning conflict sensitive approaches and the causes of violent conflict more generally in contexts of energy development.

Following a review of relevant literature, the framework of conflict sensitivity is addressed with a systems mapping approach suited for energy systems. Subsequently, a description of methods and data used are detailed, along with limitations of the study. The results are set out in three sections. First, a systems map of conflict manifestations captures available evidence of violence and other conflict actions. Second, the study shows the range of conflict mechanisms reported by project developers as well as in independent studies. These conflict mechanisms are grouped into different pathways of conflict. Third, the paper examines discrepancies between the project developer and analysts of independent studies in identification of conflict mechanisms. These results inform a discussion of implications to conflict sensitivity, critiquing the limitations of LTWP. The final section concludes with insights on enhancements of conflict sensitivity in renewable energy projects.

2. Relationship between energy systems and conflict

2.1. Conflict escalation

While existence of causal links from energy systems to violent conflict is well established, there is less clarity on the exact nature of these causal links. There are studies that explore these links for fossil fuels [16–18] but analysis for renewable energy is still nascent [19]. On one hand, it has been argued that energy systems can catalyse violent conflict, notably through their role in the "resource curse" (ibid). The theory articulates how a country's endowment in energy resources can spark violence as it facilitates the maintenance of poor governance structures [20,21]. On the other hand, while securing access to renewable energy resources may not be regarded as contentious compared to other scarce resources [22,23], it can nevertheless be a trigger of interstate violence [24,25] and throw up security concerns [26]. Furthermore, violent conflict can be experienced when energy systems exacerbate competition for land (e.g. [27]), hold potential to induce environmental degradation and affect local communities and livelihoods (e.g. [28]). In cases of wind energy, it has been argued that there can be both "manifested and hidden reasons for opposition" to projects, making causes of conflict hard to discern. Further, conflict can emerge, even after a project decision has been taken [29].

One of the reasons for this fragmented scholarship can be attributed to the vague understanding of conflict. The terms 'violent conflict', 'armed conflict', and 'conflict' are often used interchangeably [30]. There is no agreed-upon operational definition in research on violent conflict [31–34]. For the purpose of this paper, we draw on studies on micro-level conflict, which argue that "[i]n its most simple understanding 'conflict' can be defined as a fundamental disagreement between at least two actors on some issue of common concern… while one can define 'violence' simply as use of force." ([35]: 14–15). Here, violence is an action, through which something is being done. In contrast, conflict is related to beliefs, perceptions and interests, and so is a state of being rather than a specific action. Thus conflict is one of several possible motivations for violence.[1] Importantly, conflict may also be manifest in actions other than violence.

There are diverse ways in which conflict can manifest, identified in studies on models of conflict escalation [36–38]. Here, we use a condensed and adapted form of the conflict escalation model by Yasmi et al. [38] to frame analysis of conflict manifestations: i) *Conflict communication* incorporates all of Yasmi et al.'s [38] actions involving exchange of information: 'debate and critique', 'lobby and persuasion', and 'protest and campaigning'; ii) *Use of justice services* incorporates court action but also other third party involvement in justice and restitution, such as in traditional conflict resolution mechanisms [39]; iii) *Restriction of access* includes actions that impose costs on others but fall short of causing direct physical harm. This includes roadblocks or other such restrictions of freedom of movement; iv) *Violent actions* include actions taken that either cause physical damage to, or else appropriate, people or property. This includes killing or injuring, sexual violence, arson, theft of property, and so on. The violent actions of interest are those that are group-based and motivated by conflict, rather than criminal violence.

2.2. Conflict sensitivity

Being attentive to such conflict and its escalation is pertinent to renewable energy projects because they highlight the implications of foreign direct investment and the role of the private sector [6,7], amidst efforts towards addressing climate change. It is important to private sector investors because of both reputational and operational risks [40]. Where energy projects are donor-funded to support development, conflict sensitivity is additionally important. Scholarship on conflict sensitivity regards conflict as "the result of a disagreement between actors on the basis of perceived incompatible goals" [41], adapting [42]. Where the goal is development, impacts on existing conflicts as well as creation of new conflicts are serious mitigating factors. For accountability as well as for improving practice, it is important for donors and implementers using those donor funds to transparently analyse and communicate their impact on conflict.

Contrary to current scholarship that focuses on existing conflict, by employing a conflict sensitivity lens, it is possible to understand the potential of projects to *generate* new conflict as well as to interact with *existing* conflict. This approach advances existing studies that analyse how energy projects result in conflictive outcomes [43,44] and further makes it possible to consider how energy projects may be the cause of reduction in conflict. Conflict sensitivity encompasses a range of approaches to reduce manifestations of conflict. Seminal work on conflict sensitivity focuses on the principle of 'do no harm' and emphasises the importance of enhancing local capacity to deal with conflict [45]. This requires a deep understanding of the local context, across a range of aspects including systems and institutions, shared values, attitudes, experiences and culturally understood symbols relating to peace and conflict. The study on conflict sensitivity also suggests that there are patterns of aid and development initiatives interacting with conflict which need to be understood and anticipated. Analysis of the intervention itself provides clarity on ways to reduce negative impacts to conflict whilst enhancing impacts that go towards abating conflict. Studies also indicate that hypotheses of causal links between development intervention and conflict (and reduction of conflict) need to be examined. In other words, considering "possible negative and positive effects" in a participatory manner with the community in which the development intervention is to occur is valuable to provide joint decision and ownership of actions ([46]: 76). Studies by donors and development agencies in which conflict sensitivity frameworks have been applied to the Turkana region examine the multiple ways aid may impact conflict by utilising baseline survey, stakeholder mapping, resource-use mapping, conflict mapping and heavy use of participatory approaches [47].

[1] In this paper, we exclude individualised criminal violence, petty theft and so on and consider that conflict may exist independently of such violence.

2.3. System mapping and conflict

Applying the conflict sensitivity framework to renewable energy contexts requires an analysis of how implementers identify conflict; assess their business operations interacting with conflict; and consider avoiding negative and maximising positive impacts on conflict, including avoiding generating new conflicts [6]. To better operationalise this framework for energy systems, this paper follows the 'Actions & Actors' approach to system mapping [44,48], which focuses on the structural interconnections within an energy system that demonstrates a range of causal pathways through which change happens. The system is mapped around one or more 'core' actions and associated resources.[2] In mapping the systems associated with energy projects, these core actions could include the production, distribution, sale, and use of electricity. Prior and subsequent to these actions, there are land acquisition, construction of electricity generation facilities, use of electricity, and consequential environmental damage from using electricity etc. These are added to the system as additional actions in the stylised sequence. Note that this system mapping comprises a stylised sequence of actions of a system, and the sets of actors that perform these actions. This approach is rooted in the practitioner-oriented Mechanisms of Social Change language for analysing systems, which comprises a novel typology of action that permits consistent analysis of actions with both positive and negative outcomes. This is particularly appropriate for application to contexts of conflict, both in increasing or reducing intensities of conflict [49].

This system mapping has been previously applied to a case study of mini-grids in Kenya, which examined conflict by analysing the causal relationships between various impacts of mini-grids on local communities in Turkana County [44]. The analysis of conflict impact used Sovacool et al.'s [43] concept of entrenchment, which focuses on inequality between groups. In this paper, we apply the system mapping to large-scale projects and examine how *reported* conflict by project implementers relate to energy system changes. The mapping enables systematic categorisation of positive and negative impacts on conflict, as reported by the scholarship on the LTWF. The purpose of the mapping is to better show the project dimensions which implementers consider as interacting with conflict and thus clarify their understanding of conflict mechanisms. Consequently, the system mapping is not a diagnosis of conflict trends or grounded empirical analysis of conflict causes, which would have required extensive field data collection beyond the secondary literature used in our study, as exemplified further below. The benefit of the system mapping is to highlight potential blind spots in conflict sensitivity by implementers.

3. Research design

In analysing causal connections from energy projects to violent conflict this paper follows a case study approach, which is suited to analysing complex causal links or pathways [50,51]. Within case study research, system mapping is one of a range of related methods for analysing causal relationships within complex systems, including energy systems [52].

3.1. Case of Lake Turkana Wind Farm

LTWF is a 310 MW wind energy project of 365 turbines in Marsabit County, close to the south-eastern shore of Lake Turkana built between 2014 and 2016. It was financed through debt, equity, and preference shares with investors and involved a number of financiers including the European Investment Bank, the African Development Bank, the Netherlands Development Finance Company and others [15]. Its blended finance model is representative of official development assistance in renewable energy [53]. Nevertheless, the project is considered as an example that demonstrates high planning risk to electricity financing in places like eastern Africa, with significant delays in achieving financial closure [54]. It is operated by LTWP, which represents a consortium of operators including Vestas, Siemens, SECO and Civicon. There are four main project components, namely the wind farm itself, the access road from Laisamis, the power line, and the 'Winds of Change' corporate social responsibility foundation. We focus on three of these, excluding the power line which is owned and operated by Ketraco rather than LTWP.

Existing scholarship has looked to this case as an example of renewable electrification through the interaction of local capacity and foreign investors and companies [55]. The project also exemplifies the role of international IPPs who actively play a part in energy production in Kenya—and more widely in the African continent [13]. Yet the project is located in a region that has experienced violent conflict and insecurity [56]. Livelihoods in the region have involved pastoralism and the area around the wind farm has a long history of violence, especially based on cattle rustling and associated killing and injury, as well as violence used to exert control over water and other scarce resources [57]. While there are many ethnic groups, these instances are exemplified in the prominent violent conflict particularly between the Turkana and the Samburu, relying on pastoralism. The fraught social fabric of the communities is against a backdrop of marginalisation and underdevelopment in the region, which makes opportunities for employment and poverty-alleviation significant. As such any impacts of the project on violent conflict are important to understand and have been the subject of numerous research efforts, as well as critique by international civil society groups, such as Danwatch on business ethics [58]; and by Friends of Lake Turkana, a community association, on social and environmental injustices particularly to indigenous communities [59]. Some studies indicate significant reductions in perceived levels of violence since the project [57]; others analyse new instances of inter-ethnic group violence and thus increase of violence [60]. Clearly, various aspects of the project have faced social opposition and are the source of contention and claims of injustice. This case provides a substantial amount of secondary data, collected over a number of years using various methods. Data collection and conflict analysis were undertaken by LTWP and related actors, as well as by independent researchers. Research on conflict and in areas affected by conflict is widely recognised as challenging [61,62], and so the availability of existing data is valuable. For the approach used here, such data makes LTWP a useful case for analysis. The data collection efforts allows us to examine these studies' approaches to understanding conflict impacts.

3.2. Data and limitations

To find studies on the conflict impacts of the LTWF, a combination of database searches, website searches, and snowball literature searches was undertaken. Web of Science and Google Scholar, as well as Google were used to search for academic and grey literature that reported findings on the project impacts and conflict of the LTWF. Websites of the organisations involved in funding and implementing the project were used to identify publicly available information on impacts. In addition, reference lists of identified studies were checked to locate additional reports. Throughout this process, the intention was to identify research that reported results of original empirical work on the ground, in the area around the wind farm.

This yielded the identification of nine main empirical studies, the findings of which form the basis for the analysis presented in this paper. The first is the Environmental and Social Impact Assessment (ESIA) commissioned by LTWP as part of its procedural requirements for project development, making information available to the wider public [63,64]. Two more documents commissioned by LTWP funders to assess various stages of the project are included: the first, an evaluation

[2] This is in line with the 'market systems' approach theorised by Springfield Centre [78]

feasibility assessment undertaken by QBIS Consulting [65], a Danish consulting company, at the request of Vestas, IFU, Finnish Fund for Industrial Cooperation Limited (Finnfund), and Norfund; and the second, an post-hoc impact evaluation undertaken by NIRAS Africa Limited [57], contracted by Finnfund. These two reports provide insight to project operators' decisions and actions and have an important function in disclosing information particularly to funders for their accountability and transparency. Further independent studies provide detail on how project implementers considered conflict sensitivity through their own critical analysis of the wind farm project. A PhD study by Kazimierczuk [15] was funded by the Dutch Ministry of Foreign Affairs as part of a wider research agenda, which is also a donor to the project, but due to the academic objectives it appears largely independent. Academic studies by Schilling et al. [66], Cormack and Kurewa [60], Drew [67], and Achiba [68] include substantive fieldwork and analysis of conflict impacts with a primary aim to contribute to independent scholarly knowledge, which includes assessing actions and decisions of project implementers. Further substantive field-based data that highlights the role of project implementers is included in an independent study comprised of two reports by a non-governmental organisation, IWGIA [69,70], which campaigns for the rights of indigenous people and to raise public awareness.

We conducted detailed content analysis of nine studies. Through initial keyword searches, each of the studies were examined to identify actions that had potential implications for local community interests. Further, the text of the nine studies were qualitatively coded to identify different impacts from the project, which were cross-referenced with wider literature. We mapped out the energy system to first include the full range of actions and then further filtered actions, which were reported by the nine studies as linked to conflict and violence (see Appendix 1). This served as a foundation to examine available evidence on the identification of causal mechanisms in the nine studies and evidence of changes made by LTWP to influence or address them to be conflict sensitive. Specifically, three studies by the LTWP were analysed in order to understand the levels and features of conflict sensitivity. A further six independent studies were analysed to understand wider awareness of causal mechanisms and to triangulate LTWP studies' reporting.

There are limitations to this study pertaining to data comprehensiveness. It appears that three further studies exist, which may contain relevant findings. However, we could not obtain them in the public domain. In 2017, an internal report was commissioned by Vestas entitled "Measuring Vestas' Social License to Operate on the Lake Turkana Wind Power (LTWP) Project, Kenya" carried out by ERM.[3] A mid-term review of LTWP was undertaken by Triple R Alliance, [4] and in 2017 the Netherlands Development Finance Company (FMO) commissioned an assessment on the evaluability of LTWP. A further limitation is that no new field-based data was collected as part of our study to augment the level of data availability for analysis; the study utilises only secondary sources. Consequently, data from communities is restricted to what has been reported largely in independent studies. While such primary data would have gone towards verifying community narratives of LTWF, the study makes use of secondary sources to demonstrate the variation in perspectives of the different analysts that inform conflict sensitivity.

[3] The ERM study is referenced in QBIS [65], but an online search provided no results. Some findings of ERM are discussed in QBIS report.

[4] QBIS [65] refers to a mid-term review of the LTWP project by Triple R Alliance: "at the time of writing this report, a forthcoming mid-term review of the LTWP project based on input from more than 200 local stakeholders is awaiting publication" (p 9) which "includes several observations with potential implications for governance and community cohesion, including changes to stakeholder perceptions on the general security situation in the area and changes related to the resettlement of Sarima village." (p 78)

4. Intensity of conflicts in LTWF

To examine how project implementers identify conflict, the selected nine studies provide reporting on a range of examples relating to existing conflicts in the area of the project as well as consequences of conflict generated by LTWF. The reported manifestations of conflict map onto the four stages of conflict escalation referred above in the literature review. The four conflict actions help clarify who contested what kind of energy system actions (Fig. 1) from available reported data. It was found that different local community groups, electricity producer and authorities are regarded as agents of conflict at various points of LTWF project stages. The following paragraphs provide further detail on the reported examples of conflict. Overall, it is clear that renewable energy projects involve high stakes for different communities.

Conflict Action A: Local community and electricity producers communicate about conflicts. Conflict was communicated through the use of community forums and letterboxes in the local community to collect grievances. Additionally, Community Liaison Officers (CLO) passed on their understanding of conflict to the LTWP [57]. Social opposition is expressed through the use of rallies to communicate concerns of land lease acquired through illegal means or to refute such accusations; to identify how politicians and wind power brokers were applying pressure or using bribes to ensure support for the project ([67]:190).

Conflict Action B: Local community uses formal or informal justice services to resolve conflicts. This conflict manifestation is the result of changes in system action that impacted land and permission acquisition. A primary example is, in 2014, a landmark case of illegal land acquisition for the project site was filed at Environment and Land Court in Kenya, implicating local and national authorities, but also against the company [15,68,71]. The petitioners representing Laisamis Constituency and Karare Ward Residents contested the project with regards to indigenous rights, agrarian and environmental justice [72]. In particular, they highlighted the absence of Free, Prior and Informed Consent (FPIC) [60] and requested the allocation of fair compensation and the development of revenue-sharing agreements [72]. LTWP also appears to be referring conflicts to mediation-based justice provision with community elders to manage conflicts in the community [57].

Conflict Action C: Local community obstruct roads and restrict access to project site. Roadblocks seem to be a method used where other forms of conflict communication have failed. Cormack and Kurewa [60] describe how roadblocks were used due to a lack of other options to communicate their desires. There has been widespread use of roadblocks in an attempt to gain leverage in accessing LTWP

	DESCRIPTION OF ENERGY SYSTEM ACTIONS
8	LTWF and local authorities invest in and supply the local community with the following services: water, security, education, health.
7	Electricity producers generate electricity. Electricity produced by LTWF is sold to the wider Kenyan population and distributed through the national grid. Some smaller producers generate electricity for supply to the local community.
6	LTWF builds and maintains wind farm and rehabilitates and maintains roads. LTWF uses roads for construction, maintenance and operations.
5	LTWF recruits workers from local community and the wider Kenyan population. Electricity producers buy physical inputs needed for construction, operation and maintenance from the local community.
4	Exchanges between the local community and in-migrants and other workers directly or indirectly employed in LTWF.
3	Local community and wider Kenyan population move into or away from the area of LTWF.
2	LTWF actors buy or lease land and acquire license to operate.
1	LTWF actors consult with local community and with local and national authorities, about the proposed project.

Fig. 1. Eight energy system actions impacting conflict manifestation
Source: authors' own.

benefits. Drew [67] describes how one group of Samburu youth learned the method from other Samburu and Rendile, who in turn were inspired by the use of roadblocks against oil companies in Turkana county. This Samburu youth group was using roadblocks to communicate their conflict not with LTWP itself, but with a Samburu broker who controlled access to LTWP benefits. This conflict escalation stage resulted in the construction of a borehole by LTWP, employment of people of the project and cases where jobs were selectively allocated to protest leaders to quell the protest [66,67].

Conflict Action D: Local community enacts violence against other members of the local community, or against electricity producer assets. Benefits from LTWP has been contested in ethnically oriented and divisive political campaigns (see, for instance, [68]). Independent studies argue that territorial violence may have been important in a particular incident in Sarima village in 2015 that is the most noteworthy violent incident in relation to the wind farm. It is said that over 100 Samburu men attacked Sarima village, killing and injuring many Turkana residents [67]. It is reported that tension between communities resulted in Sarima allegations of displacement by Samburu to have a greater claim to the project and its benefits [60] and in other various other counter-allegations, generally in accordance with ethnic allegiance, but all pointed to conflict over LTWP benefits [67]. This violence is against a backdrop where there are reports of politicians inciting violence to directly influence election outcomes [67] and violence between ethnic groups becoming particularly territorialised and politicised since the devolution of governance to counties [68].

5. Mechanisms of conflict in LTWF

The review of conflict actions can be further analysed to show the nine studies' interpretation of causal links between project impacts on the energy system and conflict. We found that there were 16 conflict mechanisms (CM) identified by the studies. These conflict mechanisms give an insight into how business operations are considered to be interacting with increasing as well as reducing conflict. The reports show there were five mechanisms that have a potential 'positive' outcome in terms of conflict manifestation, while 11 are 'negative'. Fig. 2 below presents a tick symbol for studies that implied or directly reported evidence of each mechanism. Where the study explicitly stated that they were hypothesising about the potential existence of mechanisms rather than reporting evidence these are marked with a P.[5] There is a clear trend of positive outcomes being reported in LTWP research, and negative outcomes being reported in independent research. There were 38 reports of negative mechanisms, of which LTWP study reports three negative mechanisms, excluding discussion of potential impact. Four of the positive mechanisms were reported only in LTWP research, while one – CM15 – was reported in both independent and LTWP research.

In general, LTWP studies are seeking to analyse a wide spectrum of wind farm impact (on health, incomes, food security, assets etc.). Impact on conflict, framed as 'security' or 'community cohesion', is thus just one small part of the overall analysis. The studies are not explicit in the exact nature of their research design for gathering data on conflict mechanisms, which makes it difficult to understand the strength of evidence. The LTWP research draws only on secondary reports to identify negative mechanisms. Furthermore, they do not take into consideration fully existing studies reporting conflict impacts. The NIRAS study [57] makes use of only two of the six independent studies included in this analysis (ie. [60,69,70]). This point is pertinent as it has been argued that conflict sensitivity analysis needs to draw on existing research in order to be effective [73].

There are several stark discrepancies in the reporting of conflict mechanisms. First, the land lease agreement (CM8) is a mechanism that was reported by all six independent studies. Yet there were no reports of this key conflict mechanism in the three LTWP studies. The NIRAS study [57] outlines some basic facts around the land issue and court case before stating "we did not explore the matter during the study" with no further explanation. Second, conflict mechanisms CM2 and CM3, which related to perceived inequity in allocation of jobs and opportunities, were widely reported in independent studies. Kazimierczuk ([15]:205) finds that this conflict was known about and tolerated by LTWP. It is argued that it sought to establish informal license to operate and allowed local brokers to pass out LTWP-derived favours to their constituents, resulting in disproportionate benefits to Samburu communities during the construction phase—a period when most jobs and supply opportunities are available. Once LTWP had attained this informal license to operate, procedures were put in place to ensure equitable allocation of jobs to Turkana and Samburu. In contrast, the impact assessment by NIRAS states, without detailed supporting evidence, that jobs and opportunities were allocated equally amongst ethnic groups, and even contributed to reduced conflict between groups.[6] Third, increased land competition and subsequent conflict (CM7) is referred in the reporting of an attack by Samburu on a Sarima village in 2015, during which it is suggested that many Turkana were injured and killed. Multiple, complex allegations on both sides point to attempts to claim wind power benefits: "People often accused other cohorts and their inciting patrons of using violence to try to chase others away from the area so they can benefit exclusively from the wind farm development." ([67]: 204). In contrast, a LTWP study claimed that sources and levels of community conflict are unaffected by the wind farm. This is based on global conflict dataset based on media reports, which does not include incidence of the attack [65]. Overall the NIRAS study [57] – despite seeking to draw conclusions regarding conflict impact – did not appear to produce evidence for or against any of the 11 negative conflict mechanisms identified in the wider literature but did produce evidence in support of all five positive mechanisms.

While most studies explicitly refer to conflict impacts of a given mechanism, some studies (for example Drew) went so far as to describe the conflict manifestation resulting from a given mechanism. Others (notably Kazimierczuk) would describe evidence for certain mechanisms, such as increased competition for resources, but not refer to its potential to increase conflict manifestation. In analysing the studies we also looked for – and failed to find – reports of evidence that a given mechanism was present but did not have any impact on conflict or manifestations.

A key finding is how the nine studies attribute various changes in the energy system to different conflict mechanisms. This reveals how those executing the research in the nine studies understand the pathways or linkages between the project and conflict outcomes, which are further exemplified below. In particular, there are differences between LTWP studies and independent studies in how they consider various conflict mechanisms as increasing or reducing conflict.

[5] The clearest example is the ESIA by LTWP [63,64] which is an ex-ante impact assessment that serves to identify potential outcomes. The QBIS study [65] reported results of another study that was otherwise unavailable – these findings are marked with an asterisk. Where a mechanism was mentioned based only on secondary literature this was not included. For instance QBIS [65: 83] cites ERM as finding some suggestion that increased "economic activity" following construction of the wind farm may have improved security through reducing "idle time for criminal activity". As no evidence was presented in the QBIS study itself, and no available study on conflict impacts identified this mechanism, it is not included here.

[6] Note this apparent claim in the NIRAS study of a positive impact on existing intercommunity conflict through equitable allocation of jobs was rather brief and ambiguous, and without supporting evidence, so was not classified as a positive conflict mechanism.

		LTWP STUDIES			INDEPENDENT STUDIES						
Author/Name	Imp.	LTWP	QBIS	NIRAS	Kaz.	Sch.	C&K	Drew	IWGIA	Ach.	
Year		2009/11	2018	2020	2020	2018	2018	2017	2015/19	2019	
Conflict mechanism											
1. *Increased conflict between local community & LTWP – lack of local electricity provision*	⇧					✓					1
2. *Increased conflict between local community & LTWP – perceived injustice in allocation of benefits*	⇧		*		✓	✓	✓	✓			5
3. *Increased conflict between ethnic groups, and between lineage groups – perceived injustice in allocation of benefits*	⇧	P		P	✓	✓	✓	✓			6
4. *Increased conflict between local community & LTWP – perceived injustice related to road traffic accidents*	⇧	P	*								2
5. *Increased conflict between local community & in-migrants increased population, increased resource competition*	⇧	P			✓		✓				3
6. *Decreased conflict within local community – increased public services, decreased resource competition*	⇩			✓							1
7. *Increased conflict within local community – increased value of land, increased land competition*	⇧	P	P			✓	✓	✓			5
8. *Increased conflict between local community & LTWP – perceived injustice in land purchase*	⇧				✓	✓	✓	✓	✓	✓	6
9. *Increased conflict between local community & in-migrants – perceived wrongdoing in consumption choices and health impacts*	⇧	P	*		✓	P	✓				5
10. *Strengthening of identity grouping based on lineage*	⇧						✓	✓			2
11. *Strengthening of identity grouping based on geography*	⇧							✓			1
12. *Emergence of interest grouping based on opposition to or support for LTWP*	⇧							✓		✓	2
13. *Emergence of interpersonal grouping based on employment by LTWP*	⇩		*	✓							2
14. *Improved use of mediation, facilitated by CLOs*	⇩			✓							1
15. *Improved security provision by police and LTWP security*	⇩		✓	✓	✓	✓					4
16. *Improved conflict communication service provision by LTWP and CLOs*	⇩			✓							1
TOTAL POSITIVE	⇩	0	2	5	1	1	0	0	0	0	9
TOTAL NEGATIVE	⇧	5	4	1	5	6	7	7	1	2	38

✓ denotes evidence of conflict manifestation
P denotes identification of potential impact on conflict or conflict-manifestations but with no evidence
* denotes claim based on other studies [applicable to QBIS only]

Fig. 2. Identification of conflict mechanisms
Source: authors' own
✓ denotes evidence of conflict manifestation
P denotes identification of potential impact on conflict or conflict manifestations but with no evidence
* denotes claim based on other studies [applicable to QBIS only].

5.1. Pathway of change in levels of conflict between groups

Over half of the conflict mechanisms can be grouped into those that attribute dynamics of conflict between groups (Table 1). All the independent studies identify this type of conflict mechanisms, pointing to the significance of *underlying conflict* between groups. It can be argued that this significance sheds light on communities perceiving the project as creating greater inter-group inequality, or the change is seen as an injustice or being inequitable. For example, 'tit for tat' conflict, where conflict is rooted in revenge motivation for past violence. Independent studies highlighted conflict mechanisms that reveal incentives that affect competition for scarce resources–such as water, which has been historically contested between communities. Furthermore, as best represented in conflicts over land, these independent studies reported how conflict mechanisms reflect perceptions of social norms being breached, prevailing ideology being countered or adherence to formal laws failing, resulting in illegality. As Fig. 2 showed, LTWP studies identified potential impact on conflict or conflict manifestations but with no evidence, except in one instance. These three types of conflict suggest that independent studies examined in detail the complex relationships between groups. It is found that the energy project is couched in the wider development process that brings about trade-offs around employment, natural resources access and other livelihood options.

5.2. Pathway of changes in social groups

Four conflict mechanisms identified the impact of changes in social groups (Table 2). These may be groupings of households or individuals in the community, or groups of individuals that are acting as part of companies. The independent studies highlighted the importance of identity groupings based on ethnic group or communities, namely Samburu, Turkana, and Rendille. In addition, it was reported that interest groups matter, in their goals to achieve LTWF or to demonstrate social opposition. These studies showed that access to LTWP resources, additional (non-energy) services provided by LTWP have the effect to delineate social groups more clearly, indicating how conflict sensitivity around perceived benefits and losses from the energy project are highly important. Only one study by LTWP highlights personal relationships amongst LTWP employees and consider this conflict mechanism as having positive impacts.

5.3. Pathway of direct impacts on conflict manifestations

Both LTWP and independent studies indicate how stages of conflict escalation have the scope to address conflict and violence in positive ways. For instance, investment in policing may directly suppress violence without reducing conflict. Investment in inter-group communication platforms may improve conflict communication without affecting the level of conflict. Consequently, impacts of system changes directly affect conflict manifestations (Table 3).

Table 1
Change in levels of conflict between groups and conflict manifestations.

Inequity & inequality	
Conflict follows from actions that create or increase inequalities between groups, or are seen as being unjust.	
CHANGE IN ACTION 7: Generate & sell electricity.	
1	*Increased conflict between local community & LTWP related to perceived injustice of land historically belonging to the local community being used to generate electricity that is provided to the wider Kenyan population but not to the local community* [66].
CHANGE IN ACTION 5: Access labour & inputs & ACTION 8: Invest in and supply local community services.	
2	*Increased conflict between local community & LTWP based on perceived injustice in allocation of jobs, investments and opportunities within the local community, which may seem to suit interests of LTWP or CLOs* [15]. *This also includes conflict due to loss of employment* [65,66], *overdependency and expectation of ongoing service and employment provision* [57,60], *and perceived failure to consult* [67].
3	*Increased conflict between ethnic groups, and between lineage groups within communities based on perceived injustice in allocation of jobs, investments, and opportunities within the local community, particularly related to role of the CLOs* [60,67], *including favouritism by CLO brokers and chiefs that allegedly favoured their own area, clan, lineage, or those who access jobs through bribes* [67], *and failure to consult [*ibid*].*
CHANGE IN ACTION 6: Construct & maintain facility (including road use)	
4	*Increased conflict between local community & LTWP based on perceived injustice related to road traffic accidents. This includes not only local community resentment towards LTWP due to livestock deaths, but LTWP resentment towards the local community due to perceived extortion through staged accidents to receive compensation* [65].
Incentive & Insufficiency	
Actions affect levels of competition for scarce resources.	
CHANGE IN ACTION 4: Access goods, services, rent housing etc.	
5	*Increased conflict between local community & in-migrants due to increased demand for charcoal, water, building materials, sanitation services, and other local goods creates over-exploitation of natural resources and subsequent shortages* [60], *as well as increased waste pollution* [63].
CHANGE IN ACTION 8: Invest in and supply local community services.	
6	*Decreased conflict within local community due to increased supply of water and associated water access management systems reduces conflict related to competition for water* [57].
7	*Increased conflict within local community due to increased land value and competition for benefits accruing to owners or occupiers of the land, including hardening of ethnic group and lineage-based claims to land* [60,66,67].
Ideology & Illegality	
Actions are done in a way that is seen as being immoral, illegal, or otherwise contrary to behavioural norms.	
CHANGE IN ACTION 2: Acquire land.	
8	*Increased conflict between local community & LTWP due to perception that the land lease was secured illegally and with inadequate consultation* [15,60,66,69], *including the failure to classify local communities as indigenous, and hence avoid FPIC* [60,69]. *This includes resentment towards those representing the community as brokers in agreeing the lease* [67] *and towards those supporting LTWP due to perception they benefit from LTWP* [68]. *Perhaps underpinning this conflict is the perception of unequal benefits accrued from the sale of electricity generated on the land, and other opportunistic actions including perceived political gain for taking opposition to LTWP* [15]. *Also related here is the involuntary relocation of Sarima village* [60,65,66], *and land leases provided to LTWP employees* [67].
CHANGE IN ACTION 4: Access goods, services, rent housing etc.	
9	*Increased conflict between local community & in-migrants due to perceived wrongdoing as demographic change leads to increased consumption of alcohol, increased prostitution, and sexually-transmitted disease,* etc. [60,65].

Source: authors' own.

Table 2
Changes in social groups and conflict manifestations.

Identity	
CHANGE IN ACTION 5: Access labour & inputs & ACTION 8: Invest in and supply local community services.	
10	*Strengthening of identity grouping based on lineage within ethnic groups: Allocation of LTWP resources and opportunities through CLOs results in realignment of ethnic group relationships by lineage* [67]. *This includes Rendille and Samburu claims to Sarima based on the Ongeli ancestry story* [60].
11	*Strengthening of identity grouping based on geography: Allocation of LTWP resources and opportunities in a geographically defined area results in reforming identities based on geography – specifically whether people are located in Marsabit County or Laisamis Constituency, or are over the border in Samburu County* [67].
Interest	
CHANGE IN ACTION 2: Acquire land.	
12	*Emergence of interest grouping based on opposition to or support for LTWP: Process of acquiring land promoted the formation of groups with shared interest in seeking overturning of perceived illegal transaction* [70]. *While public meetings aimed to consolidate opposition to LTWP across ethnic groups* [67], *these interests remain along primarily ethnic lines, with Rendille and Samburu predominant amongst court case petitioners* [68]. *Interest groups in favour of LTWP also formed, including due to patronage payments by those involved with LTWP* [67].
Interpersonal	
CHANGE IN ACTION 5: Access labour & inputs.	
13	*Emergence of interpersonal grouping based on employment by LTWP: Allocation of jobs created a group within the local community who interacts regularly across ethnic group boundaries, leading to the emergence of more, stronger personal relationships across ethnic groups* [57].

Source: authors' own.

6. Challenges of conflict sensitivity

There are major implications of the above pathways on conflict sensitivity. The range of conflict mechanisms demonstrates the scope and extent of conflict sensitivity—i.e. what is considered as important or relevant by those conducting the studies to avoid negative impacts and to maximise positive impacts. As clarified earlier, this study does not assess the accuracy of conflict evidence or evaluate the actual causal implications on conflict outcomes. Rather, by categorising the pathways, this study exposes the limited understanding of conflict

Table 3
Direct impacts on conflict manifestations.

CHANGE IN ACTION B: Use justice services.	
14	*Improved use of mediation, facilitated by CLOs: LTWP facilitates 'peace meetings/ initiatives'* [57], *resulting in increased use of mediation as opposed to violence to resolve conflict.*
CHANGE IN ACTION 8: Invest in and supply local community services / ACTION D: Violence.	
15	*Improved security provision by police and LTWP security: Employment of 400 security guards and assignment of 20 armed county police officers to the company* [57]. *Their presence inhibited cattle rustling and other forms of violence and in general, changes the payoffs to violence; road improves security service response times and access* [65]. *LTWP sponsored boreholes also feature a management system that pays for two security guards per borehole.*
CHANGE IN ACTION A: Conflict communication.	
16	*Improved conflict communication service provision by LTWP and CLOs: Through (1) complaints boxes and official grievance reporting mechanisms, and (2) CLOs employed by LTWP to identify conflict issues in the community, and bring these to the attention of community leaders or authorities* [57].

Source: authors' own.

sensitivity, particularly by LTWP research. The LTWP research only identified *potential* impact on conflict from mechanisms that relate to the dynamics of conflict between groups. As Table 1 showed, it identified increased conflict between the local community and LTWP/in-migrants in the early process of developing the project. However, there is little reporting throughout the process of energy system change. Further compounding this problem is that LTWP research by QBIS states that other studies have reported the existence of CM8 (and CM9), before stating that their own data suggests a 'more nuanced picture' and describing positive impacts on economy and conflict [65: 82]. However, this does not explain whether their own data provides evidence of either the existence of, or the absence of, CM8 and CM9. This reflects findings in wider literature that show project proponents tend to under-report project impacts, demonstrating their power dynamics particularly vis-à-vis indigenous communities and biases of decision-making [74,75]. The implication being that the role of energy project in conflicts are not well investigated or understood. The conflict mechanisms that underscore the challenges around resource competition indicate that renewable energy projects have a major bearing on the environment. Conflict mechanisms identified in independent studies confirm that stakeholders who may have the most to lose from project development rely on the environment as a foundation for community livelihoods and people's access to resources needs to be better considered throughout energy system changes.

It can be argued that project implementers did not emphasise the significance of underlying conflict between groups. In contrast, independent studies were relatively more cognisant of the existing circumstance of political strife and inter-group tensions. This is backed up by reporting of conflict mechanisms that involve actions affecting competition for scarce resources and tensions around land, which are both long-standing aspects of local disputes. Such reported conflict mechanisms were found to be related to all stages of the project, suggesting that conflict sensitivity cannot be limited to ex-ante considerations. It can be argued that project implementers could benefit from a more thorough understanding of existing power relationships, political economy structures and history of conflict that shapes the project process throughout.

Furthermore, the LTWP research provides a limited view of how pathway of changes in social groups have broader implications on other conflict mechanisms. While independent studies highlighted the complex nature of changes within social groups from the project and its impact to conflict within communities and against LTWP, LTWP studies only provide a snapshot. Specifically, the pathway of changes in social groups is limited to an understanding of access to employment and labour. The same action of accessing labour is also contested in the pathway of conflict between groups; no links between conflict mechanism in these two pathways are made in LTWP studies.

The direct pathway of addressing conflict shows that only LTWP studies report ways to resolve disputes designed and provided by the project implementers. This can be considered as efforts at maximising impacts from the project to address conflict by the project implementers. However, the positive impact cannot be triangulated with independent studies. CLOs are utilised by the project to facilitate dialogue but they are sources of contentions in 'negative' conflict mechanism in pathway of conflict between groups, as Table 1 shows. Insights from wider literature suggest that information dissemination, community engagement and consultation do not guarantee reducing inter-community conflict [76].

7. Discussion and conclusion

In examining the LTWF, the range of conflict mechanisms and the pathways through which they contribute to increasing or reducing conflict is variegated according to the nine studies. The aim of the analysis was not to question whether energy development is at all possible given the risks of conflict. Rather the analysis reveals there are often gaps, omissions and uncertainty about impacts to conflict, which call for more rigorous conflict sensitivity thinking. This study does not aim to derive actual causes of conflict, however there is a lack of clarity over the data seen in many of the studies. LTWP studies tended to portray limited conflict impacts; this is not to say that independent studies are sufficient. Many reports of mechanisms are not supported by an assessment of the underlying evidence and, importantly, we could find no rigorous attempts to falsify hypothesised mechanisms. In examining the case study, we looked for – and failed to find – reports of evidence that a given conflict mechanism was 1) not present or 2) present but did not have any impact on conflict or manifestations. The understanding of conflict mechanisms is compounded by sampling issues, particularly in sub-contracted studies by LTWP, which utilised evidence collected from current or former LTWP employees, community intermediaries, or corporate social responsibility programme beneficiaries. It was common for Sarima village to be avoided for security reasons. Even if researchers were able to interview respondents without a direct relationship to LTWP, then there were likely to be challenges in getting people to speak freely given the tense political situation surrounding the issue of the windfarm (see eg. ([67]:191). However, reviewing these nine studies provides a first step in understanding concerns related to conflict beyond issues of inequality, which is largely the focus of existing literature. Reviewing through the lens of conflict sensitivity shows how energy projects need to not only consider negative conflict impacts but also actively seek positive impacts on reducing conflict. By breaking down actions in the energy systems, it is possible to understand how and when impacts to conflict matter in more detail.

The study showed that impacts to conflict need to be considered even before the renewable energy project is completed. In fact, conflict sensitivity is already relevant in early stages of establishing the project such as consultation or acquisition of land. How conflict mechanisms are identified is largely dependent on existing knowledge about the local context, engagement with the local community and use of evidence. The study also showed that there is scope to consider the implications of conflict mechanisms on each other. Any change in *both* actions in the energy system (Actions 1–8 in Fig. 1) and conflict actions (A-D explained in Section 4) need to be examined to better grasp how conflict is affected. By considering conflict mechanisms as shaping pathways to increasing or decreasing conflict, it is possible to better account for the implications of energy system changes as having multiple effects on conflict.

Analysis of the reported conflict mechanisms showed limited conflict sensitivity awareness of LTWP implementers: their identification and scope of conflict mechanisms were crude at best. The implication is that

there may have been missed opportunities to address conflict. Struggles over the project reflect a complex socio-ecological context. While there were efforts to deal with security concerns and grievances, there was less understanding of how the socio-cultural fabric of communities is affected and the significance of changes to the environment.

It is clear from the case of the LTWP that reflexivity on project impacts throughout all phases is necessary to address the intersecting losses. This presents some lessons for donors, investors and implementers to mainstream conflict sensitivity beyond the scope of mere ex-ante impact assessment. Especially so when the take up of renewable energy is reinforced by donors further augmenting their aid based on renewable energy needs [77]. Renewable energy development with the supposed aim of solving climate change implications can create further problems of exacerbating existing conflict or inducing new ones at multiple points of energy system changes. Donor-led projects have also facilitated foreign direct investment, making the private sector an important actor for lesson learning in conflict management. As renewable energy development is influenced by the role of donors, there should be an expectation on their part to embed conflict analysis *throughout* impact assessments, rather than presented as one area of impact analysed distinct from others.

The study presented a conflict sensitivity framework adapted to energy systems to sharpen analysis of energy system changes and conflict mechanisms. A contribution of the study was to highlight the need to explore not only negative but also positive impacts on conflict for a comprehensive understanding of conflict sensitivity. While our study was limited to publicly available data on the LTWF, engaging donors, project developers and implementers and communities may further identify commonalities and discrepancies between conflict mechanisms. There is scope for future studies to enhance the framework, exploring further pathways in other empirical contexts.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Naho Mirumachi reports financial support was provided by Swedish Research Council Formas.

Data availability

We have used publicly available data, fully referenced in the paper

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.erss.2023.103089.

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