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"Made for corruption?" Private sector actors, renewable energy, and corruption risks for wind power in Mexico and solar electricity in Kenya

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ABSTRACT

A future decarbonized global energy sector could require up to $110 trillion in new investment. With so much funding at stake, it is likely that low-carbon energy systems will attract and perpetuate corruption. This paper aims at providing an overview of private-sector stakeholders in the renewable-energy realm and examines possibilities and instances of corruption at the interface between private climate interventions and international development. In this paper, corruption risks and instances facing wind energy (including a mix of offshore and onshore designs) and solar photovoltaic panels (in off-grid configurations) are investigated. Based on original expert interviews and document analysis, we explore corruption risks in two national contexts (Mexico and Kenya) before offering a suite of recommendations and solutions to address corruption, and a conclusion with suggestions for future research.

1. Introduction

A future decarbonized global energy sector will not only better protect the global climate; it will need large amounts of money to become a reality. For example, the International Renewable Energy Agency anticipates that cumulative investments of at least $110 trillion between now and 2050 will be needed for a low-carbon energy system (International Renewable Energy Agency, 2018). With so much funding at stake, it is likely that low-carbon energy systems will become a potential magnet for corruption.

This paper aims to provide an overview of private-sector stakeholders in the renewable-energy realm and examines possibilities for corruption at the interface between private climate interventions and international development in Mexico and Kenya. We ask: Who are the new private actors in selected renewable electricity markets in each of these countries? To what degree do such actors face corruption risks? What efforts can be considered to help reduce corruption?

To operationalize these questions, the paper focuses on two sectors as empirical case studies: commercial wind energy (including a mix of offshore and onshore designs) in Mexico and off-grid solar photovoltaic panels in Kenya. Based on original expert interviews, we then explore corruption risks before offering a suite of recommendations and solutions to address corruption and a conclusion.

2. Background and literature review

Evans offers a definition of corruption as "the act by which 'insiders' profit at the expense of 'outsiders'", a revealing classification because it indicates that corruption can involve the abuse of one's position, offending relationships, and underhandedness (Bryan, 2010). When a public official undertakes an act of corruption, it is termed "public corruption," whereas when a manger or member of a business organization commits corruption, it is termed "private corruption." (United Nations Environment Program, 2009; Cuervo-Cazurra, 2016)

According to USAID the energy sector in general is a prime target for, and source of, corruption, in part because of the time-sensitive nature of energy resources and the key role that energy plays in society and economy. As they noted:

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The main areas of corruption in the distribution of energy – and electricity in particular – include, among others, non-technical system loss (e.g. falsified meter readings, altered invoices and illegal purchases); interference in the flow of funds/barter/offsets within the system and to fuel suppliers; manipulation of the flows of electricity to favored customers; and opaque uneconomic import arrangements (USAID Corruption, 2002).

Other studies have explored how corruption generates policy uncertainty when it comes to permitting manufacturing facilities in China, (Zhang et al., 2014) or can be subject to flawed tendering processes (Dirk Kayser, 2016). One study in Italy traced connections between organized crime and renewable energy investments (Gennaioli and Tavoni, 2016). Another study found high rates of cronyism in the Bangladeshi energy industry (Kotikalapudi, 2016). Other work has explored corruption risks in renewable energy auctions in Brazil (Armijo and Rhodes, 2017).

Within the existing literature, however, we discern some weaknesses. First, while there is a preponderance of quantitative data on corruption effects or risks, (Amoah et al., 2022a; Rahman and Alam, 2022a; Ren et al., 2021a) often from panel or survey data, fewer studies utilize qualitative approaches grounded in original empirical data. This helps justify our qualitative research design explained in Section 3. Second, much of the existing evidence base looks at "renewable energy" at a high level, as a single category or sector, rather than distinct reference classes such as wind power or solar energy, which have very different technological characteristics and innovation dynamics (Binz et al., 2017; Quitzow, 2015; Strauch, 2020; Geels and Ayoub, 2023; Yang et al., 2020). We address this head on by looking at wind and solar energy as distinct subsectors of renewable energy (Amoah et al., 2022b; Rahman and Alam, 2022b; Ren et al., 2021b). This contrasts with our focus which is how corruption can be embedded in renewable energy planning, deployment, and the misallocation of costs and benefits.

3. Country selection, research design and limitations

As mentioned, the paper relies on a qualitative research design common in the social sciences. It uses document analysis, comparative case analysis, and original interviews to examine corruption risks in two different types of renewable energy technologies in two distinct countries: commercial wind farms in the North American country of Mexico, and small-scale and off-grid solar power in the African country of Kenya. For each country, we look at only a single sector or type of renewable energy, which ties into our case study selection. We selected Mexico because it is a leader in wind energy (but not solar energy), and Kenya a leader in solar energy (but not wind energy), which is why we only look at one technology or sector per country.

Mexico represents a potent site for prospective and even aggravated corruption given several intersecting factors. The first is extreme poverty, as in Mexico 70 percent of Indigenous peoples are poor and 40 percent of Indigenous language speakers live in extreme poverty (Sovacool et al., 2019). One consequence of this poverty is that energy companies operate with high levels of risk and debt, with documented predatory practices among state electricity firms which erode the rights of consumers (Cervantes and Reilly Solís, 2024). The second is political control and centralization, with domestic renewable energy policies in Mexico often determined and coordinated by the federal government in a top-down fashion steered by, and benefitting, technical and financial elites (Pischke et al., 2019; Rennkamp et al., 2017). Both trends—poverty and debt, and centralized control—have only been worsened by the Covid-19 pandemic, which further benefitted private actors in the renewable energy sector (González-López, 2022) and resulted in a further commitment to energy corporatism through long-term clean energy auctions and licenses for private firms (Torres, 2023). A third is the active dispossession of rural and Indigenous groups, which have suffered significant negative impacts including conflicts over land tenure and corruption, barbaric fighting, and social division (Dunlap, 2018; Martinez, 2020; Zárate-Toledo et al., 2019). These three factors could be why Nsude et al (Nsude, 2024). reviewed almost 40 cases of opposition and injustice to renewable energy globally and found that Mexico reported the greatest number of reported conflicts.

Kenya is equally intriguing, and valid, as a case study. Waswa et al (Waswa et al., 2024). critique it for "misguided public policy and power procurement processes that are poorly matched to the needs of evolving power systems," which may be explained, in part, by corruption. Malala and Adachi (Malala and Adachi, 2020) note that, like Mexico, Kenya has a power surplus but the percentage of population that has access to electricity is low, making it also prone to high rates of poverty and energy inequality. Gregory and Sovacool (Gregory and Sovacool, 2019) add that in Kenya, electricity transmission infrastructure is continually vandalized, particularly by aggrieved stakeholders, or has electricity stolen from it; key personnel are subject to kidnapping; and it takes very long to complete renewable energy projects there, given that they suffer from multitude of construction and financing risks. Boulle (Boulle, 2019) suggests that Kenya is an interesting case of an energy regime committed to the interests of big business and regulatory elites—aspects that we believe justify a focus on the topic of corruption.

The paper utilizes semi-structured research interviews along with document analysis. We interviewed specialists who had expertise in tackling corruption as well as knowledge about our two case study countries of Kenya and Mexico. Our sampling for participants was centered on three types of experts or actors:

- Those working for private renewable-energy companies (e.g., designers, manufacturers, service providers, operators, retailers or marketers);
- Those involved in academic research on corruption or conducting research on behalf of civil society groups (e.g., university professors and experts, anti-corruption experts, and governance experts);
- Those working in finance and offering loans or financial services to renewable energy providers (e.g., those at commercial banks, local banks, multilateral and development banks, or development donors).

Within this sample, we approached 30 people as prospective respondents, and completed 12 interviews over the course of August and September 2022. Interviews lasted between 25 and 90 minutes, and each interviewee was given a respondent number (see Tables 2 and 3 in Annex II). All interviews were conducted in English. Our specific list of interview questions (which differed slightly based on the type of stakeholder) is presented in Annex I, and our sampling strategy and list of respondents is shown in Annex II. Informed consent was obtained for experimentation with human subjects, and the privacy rights of human subjects have been observed.

We supplemented our interview protocol with two types of document analysis. We first searched for grey literature, especially relevant reports and government publications, published in English from 2015 to 2024 from intergovernmental entities such as the World Bank, International Energy Agency, and International Renewable Energy Agency as well as from national government departs and lastly civil society groups. We also searched the peer-reviewed, academic literature on Scopus published from 2015 to 2024 searching for the terms "corruption", "fraud," and "misconduct" in the titles, abstracts, and keywords of studies along with "Kenya," "Mexico," "renewable energy," "renewable electricity," and "renewable power" along with "wind turbine," "wind power" and "wind energy" (for Mexico only) and "solar power," "solar energy," and "solar photovoltaics" (for Kenya only).

To be clear, our sample of experts is small, and can be said to be illustrative rather than fully representative. But this still has value, given that expert interview exercises need not be representative, but purposive. In our case, the topic is so specific to country and topical expertise in corruption that not many experts existed. Interestingly, although the number of respondents may be considered low by some, the actual data

itself is rich. In short: the quality of the interviews was clearly high, even if the quantity of respondents was low.

Also, given our expert interviews are qualitative and prone to potential selection, interviewer, question order, and interpretation bias, (Sovacool et al., 2024) we designed our study so that selection bias was minimized by inviting a broad spectrum of respondents representing different stakeholders; interviewer bias minimized by having multiple team members conduct interviews; question order bias minimized by randomly ordering some of the core questions during the interviews (other than introductory and closing questions, we randomly ordered the questions about corruption drivers, risks, and recommendations); and interpretation bias minimized by triangulating our interview data with document analysis.

4. A theoretical framework for renewable energy and corruption

Much of the extant literature on energy and corruption focuses on fossil fuels, given their current embeddedness in the global energy system but also the fact that historically most energy services have been delivered by oil, coal, and natural gas (Williams, 2022). However, evidence is emerging that corruption risks also feature in renewable energy markets. As one report cautioned, "the potential for corruption and rent-seeking applies to renewable energy projects as much as it does to the extractives sector." (Mete, 2018) Another study notes that "Corruption risks can also differ by the specific type of renewable energy technology being planned for, built, or operated," with specific risks involving hydroelectricity, wind power, solar power, and land use for biofuels (Sovacool, 2021).

There are some important factors that make the renewable energy sector uniquely suited to acts of corruption (Rimšaitė, 2019a). First, renewable energy is a capital-intensive sector prone to consolidated control among a small number of actors, especially regulators, making it prone to higher levels of regulatory capture or the corruption of regulatory actors. Indeed, almost all renewable energy sources are far more capital intensive than their fossil-fueled counterparts, they are less operations or fuel intensive. Fig. 1 shows that compared to fossil fuels, renewable energy sources need far greater amounts of finance. Second, renewable energy is a sector that sees a high amount of coordination between public and private actors, giving rise to possible corruption across both the supply side and demand side and a "dual nature" of corruption. Third, renewable energy is a sector featuring large amounts of public procurement, which can become prone to bid rigging, price fixing, artificial partitioning of markets, or exchanging sensitive information (Rimšaitė, 2019b).

The U4 Anti-Corruption Resource Centre argues that corruption for renewable energy can indeed take several forms: (Rahman, 2020)

- Diverting public spending intended for renewable energy projects or poverty reduction schemes;
- Artificially inflating the cost of developing infrastructure;
- Inefficiently allocating public contracts based on nepotism or patrimonialism rather than performance;
- Tender rigging via collusion, market sharing, and anti-competitive behavior, especially during auction schemes;
- Allowing bribery, mismanagement and inefficiency to gain access to energy investments or to fail to set proper standards or tariffs that prevent or minimize bribery;
- Encouraging or failing to prevent the theft of energy equipment or energy services (including non-technical losses in electricity supply, transmission or distribution);
- The use of unlawful tactics such as torture or violence or unfair land grabbing or procurement processes;
- Tax evasion.

Given all the financing and resources at play, corruption can affect multiple parts of the renewable energy supply chain. Table 1 offers a summary illustrating how corruption can result in not only higher prices or less affordable services for consumers, but greater negative impacts on local communities, lower efficiency of companies, higher budgetary costs for government, and the distortion of markets.

In the next two sections, we operationalize this framework. Sections 4 and 5 explore the emergence of these risks specifically related to Mexican commercial wind power and Kenyan off-grid solar energy, using a narrative case study approach common in the social sciences.

5. "New energy with old politics": Mexico and wind power corruption

This section presents our evidence concerning corruption risks in the first case study of wind energy in Mexico. In doing so, it draws upon both the second, specific literature review looking at wind energy and the original expert interviews. The section is structured according to four parts: providing some context to the sector; identifying key actors and their motivations; assessing corruptions drivers, risks, and awareness; and offering suggestions to address corruption in the sector.

5.1. Background and context

Gusty winds, low operational costs, and a focus on auctions have rendered Mexico Latin America's leader in wind energy. The Isthmus of

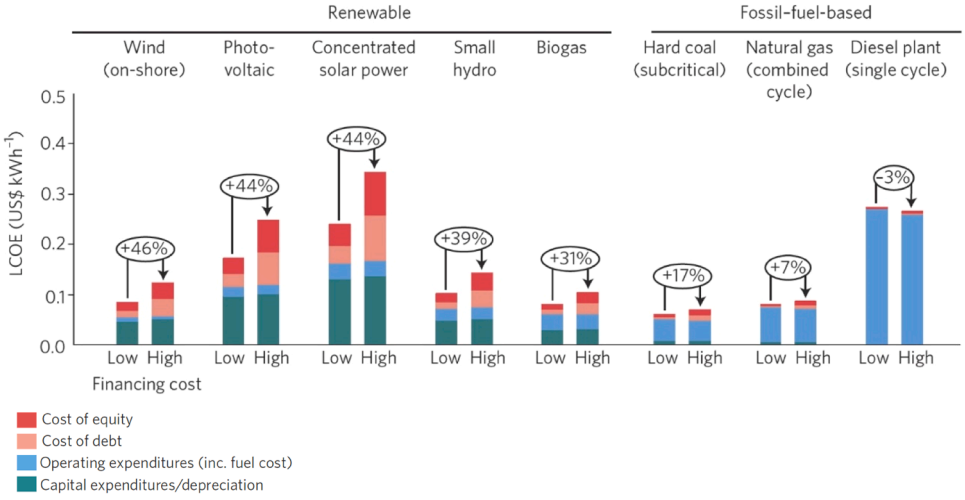

Fig. 1. Financing expenditures, equity, and debt ratios for various energy systems, Source: (Schmidt, 2014).

Table 1
The impact of corruption on the renewable energy supply chain.

Part of renewable energy supply chain	Impact of corruption
Energy consumers, households, or users	Higher energy prices; less affordable and reliable energy supply; negative environmental, health, and safety impacts.
Local inhabitants and communities	More negative environmental and social impact projects; fewer social or external benefits; higher impoverishment risks; fewer funds for local communities for compensation of damage, mitigation of negative impacts and benefit-sharing; fewer climate change mitigation commitments and a higher vulnerability to climate change.
Energy suppliers	Lower efficiency in operation; higher negative environmental impacts and environmental taxes; higher costs of energy supply; higher interests and borrowing costs, including higher equity costs; fewer financial resources for service expansion and quality improvement; delayed and overpriced infrastructure projects; higher debts, losses, and risk of bankruptcy.
Governmental institutions and bodies	Higher energy sector costs; higher budget spending for repayments of loans or loans guarantees and support for vulnerable population; negative impact on social and environmental policies implementation; negative environmental impacts and related health impacts requiring more mitigation actions; slower economic growth and job creation; increase in energy, poverty and vulnerability of population; increase in social tensions, political instability risks.
Independent Power Producers, private business developers in the energy sector	Distortion of competition; unfair competition and efficiency losses; wasted tender payments and other additional expenses and losses; rescinded approvals, terminating the projects.
Financing institutions	Higher risks and dangers of reputation; higher demand for borrowing; additional costs and fraudulent claims; adverse selection and moral hazard problems; risk of bankruptcy and financial crisis.

Source: modified from (Lu et al., 2019)

Tehuantepec, in the southern state of Oaxaca, a narrow corridor between the Pacific Ocean and the Gulf of Mexico, attracts developers to set up shop as winds can reach 200 km/h for half a year. In the first half of 2021, Mexico ranked as having the fifth-cheapest costs for onshore wind producers of 27 countries reviewed by Bloomberg-NEF (Blomberg, 2021). Most wind farms have been erected in the municipality of La Ventosa, home to various Indigenous groups. Yet, wind energy projects have expanded to the country's north. By the time of writing, Mexico relied on wind energy to generate 21 terawatts of electricity per year, or enough to power 14 million households, and it was seventh in the world in total wind energy production (Mexico Business News, 2022a). More specifically, the Mexican wind energy sector featured more than 3100 turbines across almost 70 wind farms spread across 15 states, contributing to about 9 % of national electricity supply (Mexico Business News, 2022b).

Mexico has a diversified portfolio of wind projects located across many provinces and states. It has seen a boom in wind energy installations over the past decade, driven by strong policy incentives set by the government as well as ambitious targets by developers. From 2019 to 2020 alone, the Mexican wind market grew by 25 % and it is expected to grow further from 13 GW of installed capacity in 2020–50 GW by 2030. Such growth in wind energy has also accompanied changes in the Mexican electricity sector, including evolving policy incentives, regulations, investment patterns, and transmission and distribution grid investments.

Although these numbers seem impressive, the growth of the wind sector is recent. Fig. 2 shows wind power still occupies a meagre percentage (about 10–12 %) of all low-carbon electricity generated throughout the country. Moreover, experts consulted for this study concluded that room for renewable energy growth has narrowed due to the incumbent government's energy policy agenda. Not only has it prioritized fossil fuels, such as oil and coal, over renewable energies, but also it has restricted firms from bidding for electricity tenders. In addition, recent reforms to the whole electricity provision system have placed the state provider, *Comisión Federal de Electricidad* (CFE for its Spanish acronym), in a privileged market position vis-á-vis private-sector competitors. These factors might explain why investments in wind power dropped by more than 60 % between 2020 and 2021, as one interviewee claimed.

Thus, the future speed and scope of wind investments in Mexico are difficult to predict, entering a period of great uncertainty.

5.2. Actors, stakeholders, and motivations

Observers affirm that Mexico's wind energy sector can be characterized as strongly competitive. It is shaped by a wide spectrum of private sector actors, ranging from technology developers to marketing firms, where an important share of Mexican firms focusses business on. Following a 2013 energy market reform, rules governing the participation of private companies in public tenders suffered substantial changes. The reform spurred private actors to enter the energy sector and centered the award of public tenders around long-term auctions, including in renewable energy. The new approach was accompanied by standard transparency measures such as proactive information disclosure on targeted websites. The reform also paved the way for various multinational actors to join the market, known for bringing to the table high-capacity factors and relevant know-how from overseas projects. Yet, unlike other countries that are more diversified, the Mexican wind sector sees consolidation with three wind companies—Gamesa, Acciona, and Vestas—dominating with 90 % of the market.

Different actor types are involved in the wind energy sector in various ways. R11 spoke about three different clusters of important actors that sell electricity (group 1, e.g. RWE), sell technology (group 2, e.g. Siemens) or distribute and market energy services (group 3, e.g. Mexican sales and marketing partners). Other actors in the sector include CENACE, a decentralized public body whose purpose is to govern the national electricity system, including the wholesale, transmission, and distribution network. Local distribution is undertaken by firms such as Fuerza Eólica or Grupo Bimbo.

Debt providers and banks play an active role in lobbying on behalf of their interests to capture more revenue from loans and interest rates—they have even been known to pressure the government on how it sets tariffs. Supply and technology resourcing companies as well as manufacturing firms want expedited and quick approval for their projects, and they may pay bribes to do so. As R09 mentioned, large multinational technology firms see Mexico as an important "hub" for distribution to the entire Latin American market:

> *The strategy [for overseas technology firms] is on the regionalization of wind energy, a hub for North America, Central America, and South America. If you want the lead in the Latin American market, you need a hub, and we have three in Mexico: north, Mexico City, and south. In a way you can see it as a domination strategy, we grow there, a footprint strategy.*

Our expert respondents identified various motivations for involvement in the sector, although financial and economic ones were at the top of the list. R02 stated that "*profit maximization*" is the dominant logic driving the sector, with firms seeking to return "*the most revenue out of their investments in wind.*"

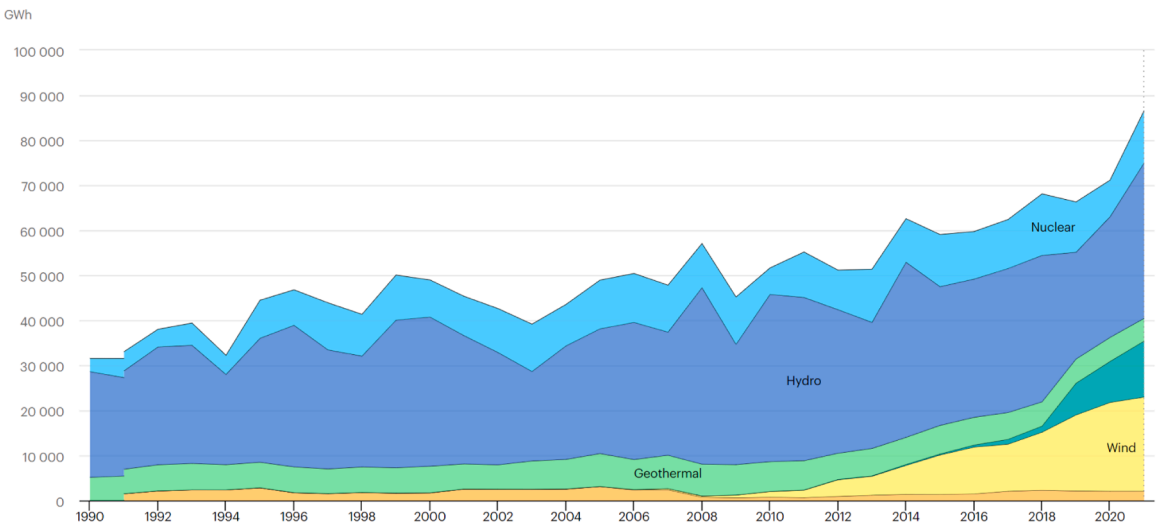

Fig. 2. Low-carbon electricity generation by source, Mexico 1990–2021, Source: International Energy Agency 2023.

Hence, the emphasis on profit maximization might partly explain why it sparks corruption. And yet, graft is perceived to be a significant challenge to profit-making, allegedly being responsible for a three-quarter reduction in profit, wasted mainly in the form of kickbacks and bribes. despite claims that corruption payments are considered to reduce profits, the continued expansion of Mexican wind power suggests that the profit-to-corruption ration is still highly favorable to private sector investments in Mexican wind. Given that the logics of private sector engagement in wind are determined by profit maximization, corruption may actually give a competitive edge to businesses that engage in it. R03 affirmed this point, noting that for many companies "*being corrupt*" is simply a part of "*doing business*" in the Mexican renewable energy sector. The next section will delve into specific corrupt acts and risks in wind energy due to the diversity of private sector actors and institutions presented in this section.

5.3. Corruption drivers and risks

Our expert interlocutors commented that the centralization of electricity tariff setting and policymaking, coupled with the monopoly status of CFE, create "*higher risks of corruption for renewables compared to fossil fuels*." R09 even went so far as to claim that the CFE was for all intents and purposes "made for corruption," noting that the government involvement makes institutions "ripe for corruption". The focus on an all-encompassing outfit such as CFE, responsible for buying renewable energy from all developers, raises concerns over power concentration. Moreover, since contracts are bilateral, opaque, and negotiations are conducted exclusively with CFE, the setup is believed as "made for corruption" as investors must deal with a range of authorities on behalf of CFE.

Wind energy's value chain is complex and its deployment in Mexico is often implemented in a top-down fashion, yet with higher involvement of certain stakeholders especially at early stages. That is the case Indigenous peoples and communities. The interface between communities and developers in areas such as land affairs (acquisition, property, and registers) has escalated violence and political upheaval, despite developers are known to keep involvement at small-scale. R12 expressed:

> *They are reproducing some of the old imperial political economy challenges associated with operating in territories (…) They are not really different from fossil fuels, they have a different product, but their operation has been very much traditional. They didn't have an alternative governance strategy. They are old dogs, jumping through the same tactics as the other energy sector. It's old politics with new energy. An institutional and cognitive dependence path.*

The actions of green energy operators reproduce colonial methods of resource extraction prevalent in Mexico's past and in contemporary times by fossil fuel companies. Conflicts emerge between energy operators and developers and local communities and Indigenous Peoples over access to, possession and use of land. This has given rise to major reports of unlawful grabbing, violence, human rights abuses, and crime in areas of high interest. This section moves on to take stock of a number of instances of corruption in land affairs involving local communities and developers.

The *Zapoteca* Indigenous group of the Mexican Isthmus of Tehuantepec is known to be particularly attached to its land. As a result, deploying wind-energy infrastructure in this land has proven problematic. Administrative procedures such as filing for approval to build infrastructure have been met with resistance by landowners and, in some cases, led to the displacement of families and individuals to bigger urban centers. Interviews and reports accessed highlight the extent of corruption in which developers and authorities have colluded to facilitate the dispossession and displacement of Indigenous groups. The repertoire of practices includes intimating, threatening, disappearing, or murdering Indigenous leaders and outspoken voices opposing the projects, oftentimes at the hands of sub-contracted illegal actors. Similarly, brokers have been hired to push communities through dealings with operators, quashing local organization and autonomy, as R02 noted.

Qualitative reports also indicate that companies have been found to engage with local elites, politicians, and bureaucrats to maintain "political stability." This in effect translates into the suppression of community concerns by the manipulation of laws governing land registry and land permits. In one such case, the judiciary has ruled in favor of Indigenous communities. The recent ruling argued that the government overlooked its obligation to adequately consult *Juchitán's* Indigenous people about La Ventosa wind project, mandated by the 2014 hydrocarbons law. The government approved permits to Eólica del Sur during the consultation, breaking the mentioned rule (New York Times, 2016).

Companies are said to advance vested interests by illegally financing the political campaigns of local authorities in exchange for decisions that favorably affect ongoing or scheduled projects. This corruption, often comes at high costs to local communities and ecosystems, as it can result in the forgery of land deeds and contracts in order to claim legal rights over land held by local communities. Private sector developers might also represent a challenge to local governance given the convergence with local elites through corrupt practices to further projects' deployment. When asked about factors that enable corruption in the

sector, an interviewee who knows the state's provider from the inside brought up flawed social impact assessments:

> *My impression is that Social Impact Assessments in Mexico were not always transparent. As a former worker of CFE, we did not have a group of experts conducting social impacts assessments, but only a handful of anthropologists that, although raised serious concerns about how local communities will be affected by a certain project, their opinions were rarely taken into consideration.*

Given that respondents identified similarities in the practices of renewable energy actors and fossil fuel actors, there was widespread concern around a lack of transparency in the Mexican wind-power sector. Respondents agreed that instances of business opacity in fossil fuels will be reproduced in renewable energy, including a lack of transparency in state auctions. For instance, under a state-led campaign for "energy independence," the Mexican government recently acquired full control of a Houston-area refinery (USA) for US$ 596 million and plans on investing around US$ 8 billion in the "Dos Bocas" oil refinery project. The government's handling of both projects, in particular spending, has raised concerns over transparency, affecting the private sector's confidence to engage in wind energy.

Tender rigging is another concern. R05 said that they believed:

> *Corruption risks are now greater. 70 % of Mexican government or infrastructure projects that were granted by this administration were direct contracts, no auctions, no transparency, highly prone to corruption and poor accountability.*

Another respondent went as far as to lay out a typology of corruption risks in wind energy, suggesting that the lack of transparency originates from limited market competition. The resulting corruption feeds into a cycle of political corruption and clientelism:

> *There is a whole set (of risks) associated with the administrative process: permits, concessions, buying the land, and there is another set of risks because it's not an open market, not inviting all actors to bid or auction on a power purchase agreement, it's a niche market not really open to competition. Then post the project starting, there is political corruption, people ask for funding or donations for their political campaigns, and issues over employment or jobs or environmental performance, this image of clean energy but it still has externalities.*

Other respondents advised that regulatory agencies are likely to fail checking permits and oversee due diligence procedures. This entails a higher risk of corruption as the government directly controls regulatory agencies. And corruption risks have materialized in bribes to get contracts involving CFE over turbines involving vast sums. "*Millions of dollars were claimed to have been spent on bribery, and even someone, director of operations of CFE, went to jail!*" admitted an expert.

5.4. Recommendations for anti-corruption

Both the literature and our interview respondents identified numerous recommendations for mitigating corruption risks and practices (see Fig. 3).

Better corruption mapping and tracking was one recommendation. R10 framed this as a cornerstone of anti-corruption activities, "*requiring companies to write down and map their corruption risks, as well as how they plan to address it, so it is all on the record.*"

A second was better information systems and disclosure in the sector. R12 noted both limited action on this aspect so far, but also the promising potential that it could have:

> *There are civil society groups concerned with transparency initiatives, information systems, disclosing information, maybe crisis management teams, things like that, but nothing really dealing with corruption. Anti-corruption is not the same as proactive transparency, you can be very open, but also very cynical. What has been done in the energy sector has been very limited so far. I don't see any sort of coherent approach from civil society into the sector, other than some patches. Let's do a new website for the company, things like that. Nothing that fundamentally changes company policies or corruption practices.*

R02 also affirmed this idea, stating that "*better transparency and questioning the modelling, data and data collection procedures*" are needed. R04 said that "*the problem is we don't have adequate tracking and monitoring.*" R05 stated that "*better information and data about costs, permitting times, and other financial data is critical. Making that transparent could really help, and show the benefits of renewables. Making sure no one can play with the numbers.*" R10 supported this idea and suggested that all documentation for renewable energy projects ought to be public, not private, as "*opening up the process of procurement online, making it all open, opening up all the documents, publishing everything openly in a register*"

Fig. 3. Summary of recommendations for anti-corruption efforts. Source: Authors.

would significantly deter corruption.

Respondents also argued in favor of better systems of inclusion and local involvement of community actors. Especially pertaining to land acquisition or permitting. R02 noted that *"wind energy policy in Mexico should not exclude people, especially Indigenous nations*" and also that "*FPIC procedures should not be limited to marginalized identities, but everyone in an area effected by a megaproject.*" R04 also spoke on this issue, stating that "*better consultation with communities is a must, that would help improve accountability as well*."

Improved social or environmental impact assessments would minimize social harm. R02 said that "*more detailed and participatory Environmental Impact Assessment could be undertaken, rooted in medial pluralism.*" R03 expanded on this theme, arguing that:

> *Social and environmental impact assessments conducted transparently are necessary for a project to succeed. Also, government and private firms must evaluate and take on board recommendations from academics, NGOs and think tanks. It seems that although these groups are consulted, their opinions remain irrelevant for decision-makers, and the project will continue regardless of the negative effects this may cause.*

In addition, better tendering processes would ensure better financial governance. R03 said that:

> *Transparency in tenders is a must. There is this common knowledge in Mexico that most tenders are fixed before they even begin. Remediating this issue will bring great benefits and increase market participation.*

R09 also mentioned the critical importance of better transparency in auctions:

> *We are being more stringent in our requirements to developers, like Vattenfal or Orsted, to give us a proper roadmap that shows how energy will be distributed and priced. So transparency in contracts and pricing is key to giving clean and non-corrupt energy.*

An independent body to monitor corruption and/or to embed independent monitors into procurement processes was also recommended. Part of this recommendation centered on a wariness of going through the courts or channels within government. R04 explained that:

> *We have to think about how Mexico views itself, it was a country where the judiciary system was not made to solve problems, or help people, it was instead a system of political control … Although Mexico has a lot of good initiatives, the problem is that those initiatives are usually lacking resources, power, or action. Most are lacking people, time, or resources. Or they are not fully enforced.*

R05 even criticized the current Mexican government as having "*first world corruption regulations*" but "*fourth world enforcement.*" The solution to this is, in the words of R05:

> *Giving power back to the energy regulators, and independent entities, is one of the main things that needs to happen to stop corruption. Mexico needs to have an independent, separate entity from the government.*

R10 spoke about the promise of "*embedding Transparency International in our procurement process*" and how "*independent monitoring by a third body, a watchdog, changes the behavior of those who are getting involved.*" Such a pathway towards transparency would likely face resistance, or what R10 termed "*a long and winding road, a difficult process*," but in the end it would "*close the gap*" and "*build capacity to stop corruption.*"

6. "Everyone is aware of it": Kenya and solar energy corruption

This section presents our evidence concerning corruption and the second case study of solar power in Kenya. In doing so, it also draws from the specific literature review looking at Kenya as well as the original expert interviews. The section is similarly structured according to four parts: providing some context to the sector; identifying key actors and their motivations; assessing corruptions drivers, awareness, and risks; and offering suggestions for anti-corruption.

6.1. Background and context

Kenya offers a compelling case study for renewable energy and corruption because it is a world leader in the use of off-grid solar energy (including its use in micro-grids and mini-grids) and subject to exponentially rising volumes of investment and financing. R01 commented that in Kenya:

> *The opportunities for renewable energy are quite massive … There is a lot of donor money, and the World Bank for example is focusing on Northern Kenya, they already have a $2 billion budget, of which the Kenya Off-Grid Solar Access Project (KOSAP) is just one of many projects. And it's not just the World Bank, I know of every major European country with a donor agency working on aspects of these areas, related to climate change or renewable energy or both. Major donor money is being funneled into this … Kenya is an energy insufficient country, most of its energy comes from diesel generated power or hydropower, and the rivers are drying up, people are looking for alternatives. Kenya is rich in solar resources, with arid temperatures greater than 30 degrees. Potential for solar is huge, and unexploited. Investment is booming into solar.*

R07 concurred when they noted that:

> *Kenya records an impressive power generation mix with approximately 74 % of its total installed generation coming from renewable energy sources … The government therefore created … investments and self-organized renewable energy electrification initiatives in off-grid locations, not least in the 14 underserved countries (e.g. West Pokot, Turkana, Isiolo, Samburu, Marsabit, and Mandera). Common renewable energy technologies in the neglected geographies include plug-and-play systems, rooftop solar PV systems and solar-powered mini-grid electrification systems.*

Despite these impressive numbers, the off-grid solar market still plays a marginal role in the Kenyan energy system, as Fig. 4 indicates.

6.2. Actors, stakeholders and motivations

The Kenyan off-grid solar market differs from the Mexican case given the presence of global donors and development banks, as well as new entrant firms specializing in innovative business models for solar such as "pay as you go" or "bundled services." In 2022, these included M-Kopa, Orb Energy, One Degree Solar, Dlight, and Mobisol. The World Bank and African Development Bank, along with bilateral agencies such as USAID or DFID (now FCDO), also finance solar projects. Kenya sees an energy market with strong involvement of national government actors. Policymaking and standard setting are for example dominated by two bodies, the Ministry of Energy and Petroleum, and the newly created Energy and Petroleum Regulatory Association (EPRA) (Wakao and Ngumo, 2021). The Ministry is tasked with developing, publishing, and reviewing renewable energy plans, and delivering renewable energy services at a minimum cost. The EPRA is responsible for regulating the generation, conversion, distribution, and supply of renewable energy, as well as marketing and data related to renewable energy. Supply and technology resourcing companies are dominated by smaller and medium size players that often use "pay as you go" business models (Rolffs et al., 2015). Local manufacturing is more limited than our other cases, with only Solinc making domestic solar panels (with capacities ranging from 20 to 300 Watts-peak) along with LED lights. The Rural Electrification and Renewable Energy Corporation is responsible for national distribution of rural electricity, and the Kenya Electricity Generating Company governs most renewable energy supply.

The motivations behind solar investment are complex, but centered on a mix of donor-driven projects (meeting the aims and objectives of those funding organizations) but also generating revenue for companies

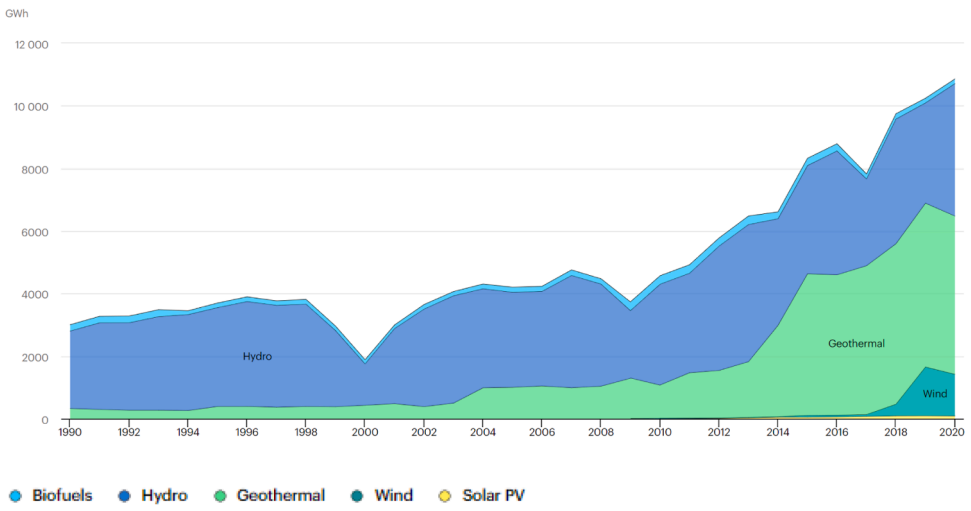

Fig. 4. Low-carbon electricity generation by source, Kenya 1990–2021, Source: International Energy Agency 2023.

and even providing jobs. R01 characterized it this way:

> *Renewable energy projects are generally driven by donors. Many projects are either funded by donors, or supported one way or another by donor agencies, in Nairobi or abroad. What normally happens is donors insist upon public private partnerships at the local level or the national level. So that is the main identifiable actor in terms of moving the money into renewables. Of course, there are many energy companies with financial motivations, Nairobi is an East African hub for private sector companies, cooperating in different sectors, that is why private sector representation becomes a key issue. Energy companies, entrepreneurs, investors, and people wanting to invest in renewable energy are all represented here. Local private sector companies operate independently, or in some partnership with major private sector companies nationally, regionally, or internationally, and offer jobs and amenities to local communities.*

R07 clarified that in Kenya, there is a focus on entrepreneurism and innovation as well, often driven from the bottom up, but also (perhaps oddly) that expansion of the solar market still underserves the poor, given its focus on financial viability:

> *Solar energy companies and actors proudly label themselves as 'social entrepreneurs', 'green energy enthusiasts', 'pro-poor' institutes and yet opportunistically charge desperate rural customers exorbitant rates through instalment or so-called 'flexible financing mechanisms'. M-KOPA, for example, has gained a strong foothold in locations where KPLC electrical grids are either unavailable or unreliable. Plug-and-play systems are easy to operate, and the energy services are suited to the needs of poor households needing energy for basic lighting, powering radio sets, and small television sets. Customers who default instalment payments are disconnected by a virtual means before confiscation of the facility. MKOPA requires its customers to make initial deposits of at least 15 % of the total costs of their facilities, and per their own financial permutations even unbridled payments in default does not affect profit-making margins in a significant way. Also, proposed monthly tariffs by private mini-grid operators are approved by the regulatory agency (EPRA) per detailed assessment of sunk and operational costs, technology used, and location of the facility. Currently, there are 19 private mini-grid operators and some charge as high as 5 times the kWh cost of energy charged by KPLC, and yet EPRA has no alternative to approving energy billing applications. The customer base of private mini-grid operators in off-grid locations keeps expanding, which is an indication that these investments are worthwhile.*

As we will see in Section 5.3, This uneven access or inequality in the diffusion of solar energy leads to pressure to keep costs low, but it can also lead to resentment and forces driving corruption, at least in terms of theft.

6.3. Corruption drivers and risks

As in Mexico, the drivers behind corruption in Kenya are variegated. At the top of the list however are claims that the political system in Kenya is highly prone to corruption, and that this can spillover into private sector corruption. R01 framed this as "reverse corruption" as it is the state corrupting private actors, rather than the other way around:

> *What is interesting about Kenya is it reverses the usual relationship about corruption. Here [in Kenya], corruption is highly influenced by politicians. Normally, the narrative is the private sector corrupts public officials. In Kenya, public officials control the private sector, and then corrupt the private sector.*

R06 picked up on this theme as well, commenting that in Kenya:

> *Corruption starts from the top, it's not something starting at the bottom. Unfortunately, many of the practices are more systemic and engrained in trading patterns, politics and business.*

This creates a blurred line between public and private actors, further driving corruption.

A third driver is, similar to Mexico, monopoly like entities that control many aspects of solar energy financing or policy. R01 explained that some entities such as the KPLC are practically "*made for corruption*":

> *One of the structural drivers is the fact that you can only sell your power, whether you generate it from solar or wind, to one company, Kenya Power and Light Company (KPLC). It is a monopoly, a publicly owned company. It is made for corruption. This is one of the main drivers. KPLC are the people who buy the energy and distribute it nationally. It has smaller parastate companies, regulation etc., but if a private sector company wants to bribe its way up, it is very easy… It can become a one-stop-shop for corruption. We have laws regulating interaction between KPLC and people, but these laws are not implemented, KPLC can do what they want to do, and get away with it. Everyone is in the pockets of KPLC.*

A fourth driver relates to the sheer volumes of investment in energy access pouring into Kenya, but also unevenness in terms of who can access modern energy services, leading some providers to act "*corruptly*" with the intent of expanding access to the poor. R07 noted that:

> *Profit-oriented private investors have taken advantage of the electrification regime to provide electricity to households in the Kenyan periphery and have thus reduced spatial disparities in energy access. That said, these created new geographies of electricity sector corruption, uneven electricity*

tariffs (or energy expenditure) and sometimes sub-standard energy services.

However, R07 went on to explain how this can itself lead to corruption in the name of poverty reduction:

State neglect of territorially remote areas in electricity provision, and/or bureaucratic bottlenecks in grid connection applications and institutionalized corruption in centralized grid connections have created desperation on the part of rural residents and the emergence of opportunistic private investors in the provision of off-grid electrification alternatives. In fact, electricity customers in underprivileged locations in Kenya consider corruption as the norm and the most promising avenue to gaining expeditious energy access.

Small scale providers could be the "*worst performers*" in this regard, as they may flout (intentionally or unintentionally) existing solar energy regulations. As R07 explained:

Small-scale solar PV providers and solar energy technicians operating in rural areas have the penchant for flouting Solar Photovoltaic Systems Regulations 2012. They are almost everywhere in rural areas and their services are badly needed by the desperate rural folks. It is difficult subjecting these small-scale operators or their unscrupulous deals to state control.

A fifth driver is a norm against speaking out about corruption. R06 commented on how it would not be in their business interest (as a private sector solar company) to speak out against corruption, as this could hurt their market share relative to other competitors:

We're not actively lobbying against corruption, that sort of speaking out wouldn't get us anywhere.

R08 agreed, and admitted that in Kenya:

There is a culture of agreeing with your boss, doing what they said, not shaking the boat, not speaking out. We have a whistleblower site, where people can speak up, and nobody uses it! Can be corruption, or sexual harassment, or even bullying, but even then it's not used.

A sixth and final driver could be confusion over or a lack of knowledge of the regulatory framework governing a highly technical sector. R06 suggested that at least some actors were prone to "*accidental corruption*," noting that "*people fall prey to misunderstanding the law and what actually needs to be done. It is the fear of the unknown that may drive companies to accidentally be corrupt.*"

Overall, the Kenyan environment has "corruption everywhere," driven by a suite of conditions that feature prominently in the solar energy market through an overreliance on the public sector's role. R08 argued that "*Africa is a bribe heavy environment, people tried to bribe us all the time, initially, when our business was starting.*" R01 added that:

Corruption related to solar energy especially can happen at the national level, multinationals and big energy companies influence policy at the highest level. When we mentioned legislation, one of the committees in Parliament had a strange interaction with private sector players, with some sort of sponsorship to go to very high-end hotels to do their meetings. The first draft that came out said that for renewable energy, the companies can do CSR, no revenue sharing. The interaction is both ways. Private sector players dig deep into their pockets and really influence some of the things happen there.

The removal of profit sharing from the draft legislation is incredibly problematic given that a high profile and ongoing legal case in the wind sector focuses on how CSR has been used to "greenwash" corruption in land registry and depriving local communities of access to their land (Achiba, 2019). Furthermore, nepotism within Kenya could be "*widespread*," with R06 noting that:

One Kenyan version of corruption in the solar sector is keeping people on staff who don't actually have a job. Some important politician's nephew or, son, or brother-in-law. Or people pass around large brown envelopes stuffed with cash. We know many of our peer companies that do this, but not us.

R08 agreed, and stated that "*some corruption practices are widespread, like nepotism, hiring those that are in your family; or giving gifts in exchange for preferential access.*"

Similar to Mexico, issues of land acquisition are prone to corruption. R01 commented that:

Bulldozing community interests over land acquisition and lack of free prior informed consent is another issue of corruption, see it with other renewable energy projects. People sign papers where they think were minutes of the meeting, but in fact papers about land acquisition, people transferring land away through false documents. People are not always literate so they cannot challenge the documents. They are not challenged as there is a big buy-in from the national level, only way to catch up with the rest of the company. Land transfer is an area rampant with corruption.

R06 expanded on this theme as well, commenting that:

Theft is an important corruption risk, we did a project with a specific county in Kenya, a few years ago, to install solar in schools, with a 3 year service contract. We have a local service order, but the county told us we need to pay them a surcharge for the inspections that they do. And then the equipment and panels go missing.

R06 added that the entire area of taxes, duties, and tariffs was prone to corruption, corruption which affects multiple parts of the solar supply chain. It can occur at the import process, at the port, when containers coming in have solar technology, and must clear customs, therefore generating unexpected "*non-tariff surcharges*" and "*hidden duties and surcharges.*" Then there are corruption issues with logistics, where shipments of solar technology can get "*stopped on the road for import documents*" or requests for "*vehicle inspections*" where you "*need money to grease the wheels, literally.*" R06 lastly spoke about corruption risks with revenue authorities, where city auditors or officials come into the solar energy shop and "*question our licenses and expect a payoff.*"

Nevertheless, it is important to put these corruption risks in perspective. R08 commented that "*Kenya is actually one of the best countries in terms of having the least amount of corruption in the region*" and that:

We find corruption much, much higher in other markets. It is very big in Mozambique, and we also had a major issue in Uganda, corruption so deep, the whole organization was rotten. We had to fire more than 80 % of our staff, everybody was involved in fraud, fake selling to fake customers, hacking the units, out of control corruption, videos online about it, very bad for us, and our sales, and our brand.

R07 suggested that participating in corrupt practices or playing the game would eventually be counterproductive, given both potential loss of customers and loss of donor funding:

Corruption seems self-defeating given the potential loss of customers to new service providers following stories of exploitation or cheating via installment payment systems … solar energy companies that depend on external funding expressed fears of possible funding cuts due to negative publicity on exploitation of customers.

It could be reasons such as these that see corruption within the sector decline over the coming years.

6.4. Recommendations for anti-corruption

Our evidence suggests that private sector and financial actors are widely aware about corruption. R01 affirmed this when they noted that:

Private sector actors are quite aware of corruption, it affects their business. Any report on energy is likely to mention corruption as the top

impediment to private sector engagement. There is awareness, but we have never heard of a private sector actor leaving because of it. What they do is work around it, pay people, or find an influential champion within the government for their projects. They work with corruption, rather than trying to avoid it or reform it. They acknowledge it's a reality that corruption exists in Kenya, it is very widespread, part of the Kenyan existence, from getting a passport or a license for an off-grid solar plant somewhere in Turkana.

R01 went on to explain that corruption can be so common and normalized, some institutions act corrupt overly, rather than covertly:

KPLC is not ashamed of corruption at all, it knows the Office of the President is probably leading on corruption. The very top of the Kenyan leadership is corrupt. Private sector actors who do their research know this, and know it's a principle agent issue. They are available, and can take bribes, and Kenya is known as a corrupt country.

R07 agreed and noted that its commonness also means (oddly) that little is usually done to address corruption:

All the private sector investors in the renewable energy are aware of corruption allegations against their operations but they react differently … Some providers care less about public complaints of exploitation because of high demand for their services in neglected geographies and/or instalment payment systems which are well suited to the financial conditions of the poor who cannot afford to pay usual high upfront costs … There have been so many allegations of corruption in the solar energy sector but nothing significant has been done beyond (social) media criticisms. Sometimes, evidence for prosecuting such cases is either non-existent or not convincing enough to initial any serious action.

Finally, R01 noted that corruption awareness is not the biggest problem, enforcement is. Even anti-corruption bodies have difficulty getting the Kenyan courts to pursue corruption investigations. As R01 stated:

There is valid criticism with Kenyan anti-corruption, these independent bodies were created for the less powerful, but the rich can hire the best lawyers and take them to court for the next five years, and are never indicted or charged … Even though the Kenyan judiciary has been transformed since 2010, it has a legacy of corruption, and corruption in the lower courts. People can't really fight the system … Civil society has been at the forefront of the corruption fight here in Kenya. Some of them have paid a very big price, especially local ones. In 2013 and 2017, civil society offered the information required to show the election was a fraud, they were targeted and had their licenses withdrawn.

Our data also suggests various policy recommendations and solutions. The first, similar to Mexico, is to move from mere situational analysis to more formalized corruption risk mapping, a theme picked up by R01 and R06. R06, an important private sector actor, confirmed this in part, noting that they did not assess corruption risks in the solar energy market nor were they familiar with such methods or approaches.

The second recommendation, also like Mexico, was for better information disclosure and monitoring. R06 noted that to stop such corruption, especially in rural areas, "*essentially you need better data and transparency and accountability*."

A third suggestion was better adherence to international regimes in place to try to mitigate corruption. R01 said that:

International conventions are important. Conventions for FPIC or anti-bribery are also strong in Kenya, same with demanding SIAs or EIAs, or compliance with other international statutes. The African Human Rights court is also strong here, a good precedent for giving people their land back, if it has been taken.

A fourth recommendation was for better community education, especially in rural areas. R01 explained this suggestion in the following way:

Community education is an important part of anti-corruption. If the communities are watching, and educated, this can help hedge politicians controlling the population, or capturing regulations. This can be a deterrence, and it has been for those companies prospecting for oil or looking at other natural resource extraction.

R01 agreed, and noted that:

Educating communities, knowing what is expected of them, resource extraction, and decision-making mechanisms at the local level, county governments, local legislatures, educating them so they know what to do, is an important solution. There needs to be training, strengthening their capacity to understand and know the right thing to do. Social accountability mechanisms, and strengthening capacity of civil society and legislatures.

A fifth and final suggestion was to choose good partners and achieve a particular economy of scale or volume of sales that makes your firm be too large to be taken down by corruption. R08 explained this suggestion as follows:

Choose strong, transparent, non-corrupt partners. Having certain services outsourced, like transport, working with a big company like G4S really helps, ensures not getting pulled over by the police. Also be large. Achieving a certain scale makes it more difficult to be corrupt. We are in a sense too big to fail. Build relationships with key people in government ministries and customs, having good relationships really helps, not asking for favors, but building a relationship with them based on honesty and transparency. Internally within a team, prevent corruption from running rampant within the team, it is important to have neutral third party people and place them into a department. Having turnover within supervising roles helps, too.

Their comment shows how a mix of internal and external factors can together mitigate and perhaps deter corruption in the solar energy sector.

7. Conclusion: towards future research gaps and needs

As our study has revealed, corruption is present in both the Mexican wind power market as well as Kenya solar energy diffusion. Corruption risks include inefficiently allocating public contracts based on nepotism or patrimonialism, as well as tender rigging via collusion, market sharing, and anti-competitive behavior, especially during auction schemes. Other forms of corruption involve allowing bribery, mismanagement and inefficiency to gain access to energy investments or to fail to set proper standards or tariffs that prevent or minimize bribery. Still other forms include the use of unlawful tactics such as human rights abuses, torture, threats, violence, and "disappearing people" for land grabbing. Other corruption risks relate to power concentration on a public entity and restrictions to market competition, lack of transparency in contract development, auctions, and policy direction, and illegally funding the political campaigns of local, provincial politicians as a *quid pro quo* for the benefit of project development. Corruption can also encompass ignoring and/or conducting flawed environmental and social impact assessments and due diligence processes, or overlooking performing *ex-ante* consultations with affected communities, such as Indigenous groups.

Consequently, corruption risks affect *communities* through unlawful tactics, violence, and torture along with flawed impact assessments (see Fig. 5). But they also impact *policymaking and regulation* through the concentration of power, bribery, and illegal funding campaigns for politicians. They shape *siting decisions* by overlooking particular issues in favor of elites, and they shape *planning* via pack of transparency, tender rigging, and collusion.

The literature on corruption sometimes differentiates corruption risks (environments or contexts where corruption could occur, e.g. unclear bidding processes or gaps and discrepancies in due diligence

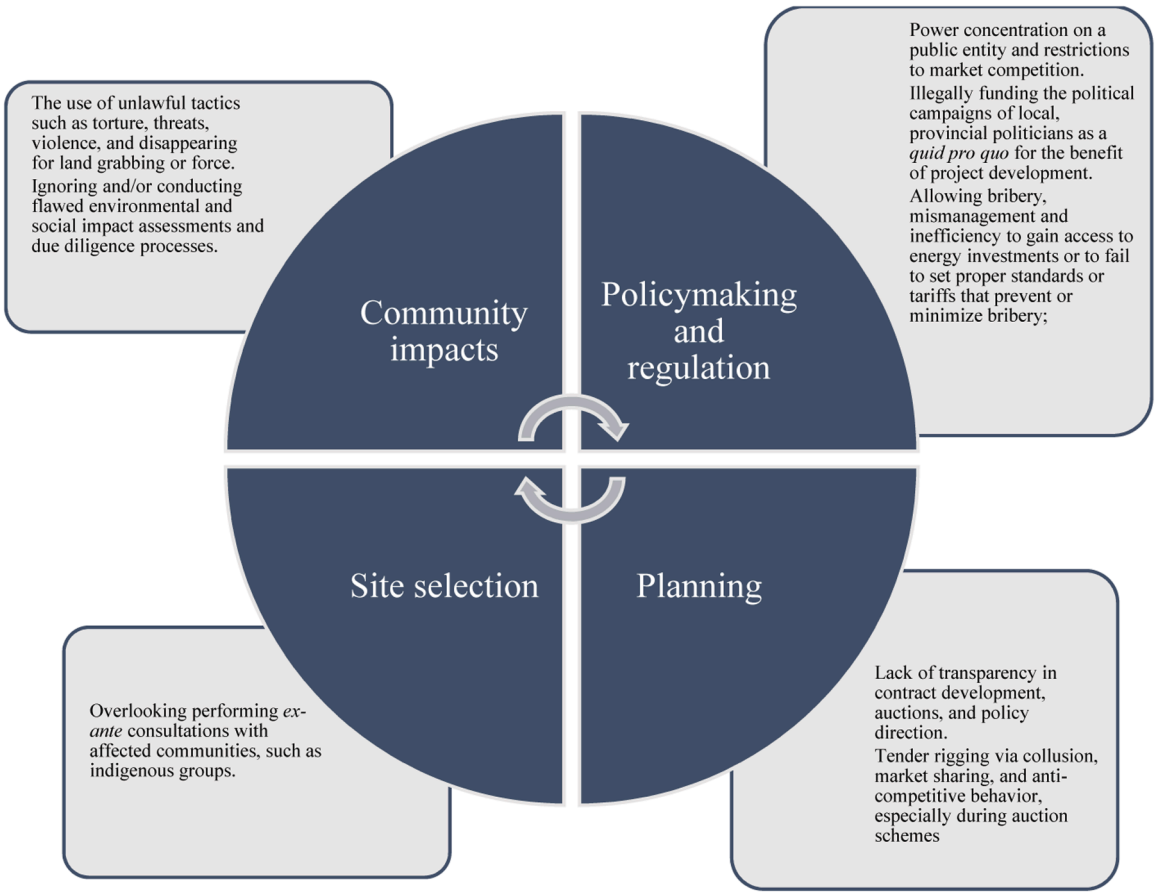

Fig. 5. A summary of corruption risks in renewable energy projects, Source: Authors.

procedures) (OECD, 2016); (Elizabeth Hart, 2016) from types or actual practices (e.g., bribery or abuse of power,). However, risks, types, and practices are frequently conflated in the energy studies and renewable energy policy literatures. Further work better demarcating corruption risks from practices would be fruitful, as would work better discussing the drivers from corruption (so-called antecedents or inputs) from the effects of corruption (so-called consequents or outputs) (Davis and Ruhe, 2003).; (Judge et al., 2011) Such research would allow for better capture of the causes of corruption, appreciate missing variables, and improve the analytical rigor of corruption and anti-corruption analysis.

Moreover, much of the extant literature on renewable energy and corruption is vague about connecting particular actors (especially private sector actor types) to particular types of corruption, perhaps intentionally so, due to fears about legal liability, possible reprisal, or restrictions on freedom of speech. The literature says little about what type of corrupt practices take place, how they are done, at which stage of the value chain, and what factors enable the corruption to happen and who is involved in the private sector. An entire research program could focus on these aspects, with an arsenal of tools available (including ethnographic work and field research, participant observation, focus groups, interviews, and deep case studies, to name a few) (Sovacool et al., 2018). These would enable researchers to better identify actors and the kinds of corruption risks the actors are exposed to or contribute to, and how these may vary across countries, cultures, or other contexts.

Furthermore, there is much to be learned from failure, and from earlier attempts at improving transparency and/or improving governance outcomes. For example, lessons from the EITI suggest that mandatory efforts at fighting corruption or reducing transparency may be more effective than voluntary ones; that comprehensive reforms are more efficacious than incremental ones; and that strong penalties need to exist for noncompliance, to avoid gaming (Sovacool et al., 2016).; (Sovacool, 2020)

An additional area of research could focus on new forms of corruption or systemic types of corruption, including state capture, which appears to take form in the Kenyan case. Besides, new types of corruption can be studied (and approaches to it). As R12 noted:

> *Corruption definitions are changing, new risks are going to be different than the past, new risks are being exposed in the daily press conference of the President, is more harmful than any sanction from a bank, if you are attacked by the President, and picked up by the Press. Moving away from legalist approaches of corruption to more sociological ones. nepotism, used to be a very hot commodity 20 years ago, simple to explain. Right now, we have already moved to more discussions about conflict of interest than nepotism, money laundering, tax evasion, and other issues.*

Exploring new types of corruption or using a lens to encompass a more high-level, systemic view as opposed to conventional bureaucratic corruption could also lead to new tools for open dialogue and improved governance. R12 expanded on this theme as well:

> *One hot topic that is very new are emerging free public open tools, and how to invest in these and use them. These types of conversations about risks, and how to address them, should be the type of open dialogue we have in the sector.*

Such research efforts—focusing on new analytical distinctions, new methods, learning from previous failures and outcomes, and new (or overlooked) types of corruption and anti-corruption approaches—would help ensure that rather than being marginalized and even perhaps stigmatized within the renewable energy community, corruption becomes a central feature of future research. Perhaps then funding and

community efforts could be further mobilized to better identify and document it, understand it, and thus minimize and prevent it.

Ethics statement

This study relies on original data gathered from human participants. All procedures were performed in compliance with relevant laws and institutional guidelines and have been approved by the Chr. Michelsen Institute (CMI) in December 2022 per Project Number 19066.

CRediT authorship contribution statement

Juan Camilo Ceballos: Writing – review & editing, Writing – original draft, Conceptualization. **Benjamin Sovacool:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization. **Saul Mullard:** Writing – review & editing, Writing – original draft, Project administration, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.tej.2024.107448.

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