# Methane Extraction on Lake Kivu: Green Extractive Humanitarianism

Kristin Doughty, Dieudonné Uwizeye, Elyseé Uwimana

**Abstract**: In 2016, Rwanda began extracting methane gas from Lake Kivu, an innovative project designed to reduce the risk of a deadly spontaneous gas release while providing clean and renewable power to an energy-strapped region. Based on qualitative research in Rwanda from 2016 to 2019, Doughty, Uwizeye, and Uwimana use the Kivu methane extraction project to ask, How do we balance urgent electrification needs with responsible energy policies that respond to environmental risks, particularly in post-conflict contexts? Analyzing the Kivu methane projects as "green extractive humanitarianism" provides cautions within the promises of sustainability and "green capitalism."

**Résumé**: En 2016, le Rwanda a commencé à extraire le méthane du lac Kivu, un projet novateur conçu pour réduire le risque de libération spontanée mortelle de gaz tout en fournissant une énergie propre et renouvelable à une région à court d'énergie. Doughty, Uwizeye, et Uwimana ont mené des recherches qualitatives au Rwanda de 2016 à 2019, en utilisant le projet d'extraction de méthane du Kivu pour poser une

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question de recherche: Comment équilibrer les besoins urgents en électricité avec des politiques sur l'énergie responsables qui répondent aux risques environnementaux, en particulier dans les situations d'après conflit? Analyser les projets de méthane au Kivu en tant qu' «humanitaire extractive vert» fournit des mises en garde dans le cadre des promesses de durabilité et de "capitalisme vert".

**Resumo**: Em 2016, o Ruanda começou a extrair gás metano do Lago Kivu, num projeto inovador concebido para diminuir os riscos de fuga espontânea de gás mortífero e simultaneamente proporcionar energia limpa e renovável a uma região com fortes constrangimentos energéticos. Com base numa investigação qualitativa realizada no Ruanda entre 2016 e 2019, Doughty, Uwizeye e Uwimana partem do projeto de extração de gás metano no Lago Kivu para levantar a seguinte grande questão: de que modo poderemos alcançar um equilíbrio entre as necessidades prementes de eletrificação e as políticas de energia responsáveis que respondam aos riscos ambientais, nomeadamente em contextos de pós-conflito militar? A análise do projeto Kivu chama atenção para algumas das cautelas que é preciso manter em relação às promessas de sustentabilidade e de "capitalismo verde".

**Keywords:** energy; post-conflict; resource extraction; development; Rwanda; sustainability; climate change

**Mots clés:** energie; post-conflit; extraction de ressources; développement; Rwanda; durabilité; changement climatique

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## Introduction

> The challenge before us all is daunting, and we have to be bold and practical. Old technologies brought us climate change, but new innovations are what will mitigate it, and in time, even reverse the damage. Ideas that sound like scientific fiction today may actually be more feasible and affordable than we realize…. We have delayed to take action with the necessary urgency and scale, but we still have the time and ability to mitigate the damage and stop the worst scenarios.[1]

In these comments before the G7 Summit Outreach Session in Canada in June of 2018, Rwanda's President Paul Kagame, Chairperson of the African Union at the time, emphasized what is now a commonly voiced concern in political discourse, journalism, academic conferences, and everyday discussions across the continent. Climate events are an increasingly urgent threat in Africa, contributing to drought, unpredictable storms, and rising sea levels, which cause food insecurity, public health crises, political instability, and violence. This growing threat of suffering is even more troubling given that carbon emissions on the continent are relatively low, due to inconsistent electrification.

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Even more specifically, Kagame's comments emphasize how, across the continent today, political and business leaders alike are looking to scientific innovation as the solution to the continent's urgent challenge of increasing electrification (access, quantity, and stability) without increasing vulnerability to climate change. Scientific and technical innovation are seen as solutions to unpredictable environmental conditions and threats, as well as to electrification and the access to participation in the modern world that ostensibly comes with power.

Lake Kivu, a 2,370 square kilometer lake that straddles the border of Rwanda and the Democratic Republic of Congo (DRC), provides a rich example of these dynamics. Lake Kivu is not yet exhibiting the impacts of climate change that are confronting many of the continent's waterways, which face increasingly unpredictable water levels or declining fishing stocks. Yet, according to government officials and international scientists, Lake Kivu holds another hidden danger: dissolved methane in its deepest layers that, if disturbed, could explode and devastate the two million people living in the lake's basin, including the towns of Goma and Bukavu in DRC and Rubavu, Karongi, and Rusizi in Rwanda. Public-private partnerships to extract methane from Lake Kivu, launched over the past decade, are framed as reducing the risk of a natural disaster and providing clean, renewable energy to spur development and alleviate poverty. Methane extraction from Kivu has been central to electrification goals. The Rwandan government set a goal in 2012 that "by 2020, at least 75% of the population will be connected to electricity (up from 2% in 2000 and 11% in 2010)" (Rwanda Vision 2020 2012:14). In 2018, the government announced the objective of achieving universal access to electricity by 2024, through a combination of grid and off-grid solutions, to increase the national grid capacity to 556 MW by 2024.

In this article, we use Lake Kivu as a launching point to ask broader questions about the relationship between on the one hand, international scientific, governmental, and corporate efforts to mitigate risks of natural disasters (both exploding lakes and climate change), and, on the other hand, efforts by these same actors to increase sustainable energy production, electrification, and development. Based on qualitative research in Rwanda from 2016 to 2019, we describe the Kivu methane extraction project here to ask: What might it take for innovative renewable energy projects to actually address climate change and its impacts on people in Africa? Are these projects promoting new ways of imagining access to resources, or reproducing existing logics of exclusion and vulnerability?

The Kivu methane project can be understood as an example of "green extractive humanitarianism," in which the government and corporate partners frame the project both as a form of social welfare and as a renewable energy solution that could help combat climate change. We show the discursive work that green extractive humanitarianism did to justify the methane project and insulate it from criticism, and the particular role of scientific research to this frame. While the methane project indeed benefited Rwandans (and also the international companies and investors), it did so unevenly,

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**Map 1. Map of Great Lakes Region, Google Maps.**


producing an "Us versus Them" dichotomy that runs at cross-currents to national unity and reconciliation programming while also constructing inequalities. Methane extraction is controlled by the same neoliberal capitalist logics that fuel rising inequality both within Rwanda and worldwide, logics of consumption, mobility, and profit that are also driving climate change. We thus point to the ways green extractive humanitarianism fails to deliver the kinds of radical transformation that, arguably, are needed to protect the most vulnerable people from the dual threats of economic and political marginalization and environmental risk.

## Research Methods

This article draws on data produced as part of a larger project conducted from September 2016 through October 2019, during a total of ten months of fieldwork in Rwanda using qualitative methods including participant observation, interviews, and document analysis.[2] The research was conducted by three people from within and outside Rwanda with expertise in Anthropology and Development Studies and training in qualitative methods. Our varied disciplinary traditions, along with a combination of insider and outsider perspectives, generated complementary expertise and perspectives that enriched our data gathering and analysis.

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Our research design gathered information from people across diverse levels of society who are involved in and impacted by the methane extraction project to create a three-dimensional perspective on extraction. We focused on Rubavu and Karongi, lakeside towns where extraction operations are centered, conducting semi-structured and informal interviews and focus groups with over 450 individuals in four key groups: 1) Rwandans whose lives are closely linked with the lake, including fishermen, fish sellers, boat operators, school teachers, community health workers, local mediators, women's council members, hotel workers, and market women, 2) American and Rwandan methane extractors and engineers and their European funders, including visits to corporate offices, the barges, and power plants, 3) Rwandan scientists involved in monitoring the lake through the Lake Kivu Monitoring Program, and their international collaborators from Europe and the U.S., including participation in international scientific conferences about the lake, student trainings on the lake, and work in the lakeside laboratories, and 4) Rwandan government officials, including in the Rwandan Energy Group and National Center for Electricity Control, and visits to hydropower plants, peat plants, and solar plants around the country.

Our research design presupposed that methane extraction in Lake Kivu is not an isolated project, but rather is experienced by local people as part of a broader constellation of development projects. Through interviews and participant observation, we asked holistic questions to understand how methane extraction fits into the broader concerns of people living and working in Western Rwanda. Our study was longitudinal, gathering data across a four-year period in order to trace the emerging development of the project and to track changes over time.

As this was a qualitative ethnographic project, we analyzed the data inductively, using content and discourse analysis of interviews and fieldnotes through a grounded-theory approach. We transcribed interviews conducted in Kinyarwanda, French, and/or English, coded with NVivo along themes that drove the initial project as well as themes that emerged unexpectedly. We aggregated broad perspectives across interviews, using representative quotes that stand in for broader trends, and cross-checked our findings through feedback sessions with people we had interviewed. In addition, for a portion of the work considered here, one of us analyzed migration data from the National Institute for Statistics. Together, our methods allowed us to provide a poly-vocal approach that presents the methane extraction project from the perspectives of corporate offices, contractors, Rwandan government officials, and people living in the shadow of the project.

## Extractive Humanitarianism and Green Capitalism

Scholars have long attended to the critical role of resource extraction in shaping political, social, and economic life across Africa, and the longstanding role of African resources in fueling global capitalist expansion. A generation ago, scholars used the Copper Belt mines in Southern Africa as central

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for examining the impact of colonization and modernity in Africa through urbanization, labor migration, and shifting patterns of kinship and ethnicity (Ferguson 1999; Miner 1967; Moore 1994; Powdermaker 1962). Much of this work now focuses on oil. In addition to longstanding oil industries in the Gulf of Guinea, North Africa, and Angola, reserves have recently been found in Mozambique, Senegal, and South Africa that have excited the oil and gas industry, in addition to smaller but promising reserves found in Uganda, Kenya, Somalia, and Tanzania. While many African Studies scholars initially focused on the resource curse, in which the existence of natural resources seems to correlate with stunted economic growth, recent work seeks to understand the complex ways in which natural resources and political and economic development are intertwined in people's lives (Watts 2004). Current work emphasizes how resources such as diamonds and oil can fuel conflict between governments and opposition groups (Adunbi 2015; Ferguson 2006; Schritt 2019), spotlights the environmental damage that often ensues (Reed 2009; Weszkalnys 2014), and also shows the political economic and lifeworld transformations these projects bring (Appel 2019; Appel et al. 2015; Chalfin 2015; Leonard 2016). Across these projects, past and present, a mix of cutting-edge technologies and conventional methods is mobilized to tame nature and exploit resources in the service of modernization and economic development.

These oil projects are part of a broader recent trend of massive development projects across Africa which focus on roads and railway stations as well as power generation and port development. These projects are funded through a partnership of global companies, governments, and international monetary institutions including the World Bank, the International Monetary Fund, and African Development Bank (Kimenyi & Lewis 2016). The discovery of oil and gas reserves in some African countries raised, at first, much optimism among the population expecting development gains, such as in Mtwara and Lindi in Tanzania, where natural gas reserves have recently been discovered. However, the promises of local development that came with the projects have remained mostly confined to the political rhetoric (Conceicao et al. 2011), as the crude product was piped to refineries far from the places where it was discovered (for example, the natural gas in Tanzania), or the people complained about unsatisfactory land compensation, such as in Uganda's Albertine Graben region, where oil has been discovered (Kimenyi & Lewis 2016), or the exploitation of the resources came with much environmental degradation generally observed on different sites on the continent (Wasonga et al. 2011).

In Rwanda, a landlocked country without the mineral or petroleum wealth of some of its neighbors, methane has engendered similar promises. In the first social science analysis of the early attempts to extract methane on Lake Kivu in 2007, Martin Doevenspeck argued that methane could be critical to providing the affordable energy necessary for the Rwandan leadership to "legitimate itself as a guarantor of progress and economic growth" (Doevenspeck 2007:98). He emphasized the importance of interregional development and cooperation with the Democratic Republic of Congo, given

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the shared nature of the methane in the border lake, even as he questioned the mobilization of "disaster discourse" around the project, and noted that depending on risks of its implementation or how carbon dioxide outputs would be degassed, it may or may not actually be "green" as an alternative to diesel or charcoal (Doevenspeck 2007:106–7).

Rwanda's methane extraction is occurring in the context of a highly centralized state described as developmental patrimonialism (Kelsall 2013)—characterized by a strong leader, a single party system, top-down patron-client networks, and the maintenance of economic technocracy—and where policies ostensibly designed to benefit the rural poor have often been criticized as being at "the expense of the large mass of small scale peasants" (Ansoms 2008:1, 2011). In developmental patrimonialism, a "regime retains a neo-patrimonial character, with a more or less systemic blurring of the boundaries between public resources and the private property of the ruler(s)" (Kelsall 2013:25), and in the case of Rwanda, it involves "the heavy involvement in business of the ruling party itself" (Kelsall 2013:120). Notably, holding companies directly tied to the ruling Rwandan Patriotic Front are directly invested in methane extraction as well as peat (Booth & Golooba-Mutebi 2012). This economic context of centralized power and a gap between urban elites and rural poor as well as the need for "a different sort of caution relat[ing] to the human rights record of developmental patrimonial states" (Kelsall 2013:47), suggest a need to rigorously deconstruct the "disaster discourse" (Doevenspeck 2007) and how it mobilizes a variety of actors, and to analyze the quotidian impacts of methane extraction's implementation.

In what follows, we propose that extractive humanitarianism and sustainability as frames for methane extraction do discursive and ideological work that buttresses developmental patrimonialism, enabling it to be naturalized and accepted at multiple levels of scale, from rural residents to global financiers. We suggest that the Kivu methane extraction projects are best understood as an example of what Lori Leonard and Siba Grovogui (2017) have called "extractive humanitarianism": especially in the global south, with the fall of communism and the retreat of the developmentalist state, corporate efforts to extract natural resources have come to be framed in relation to noble intentions to reduce poverty and promote general welfare. They explain, "Poverty reduction and humanitarianism have become key tropes in the operation of the extractive sector—a sector that earlier eschewed the notion that its operations were in any way entangled with the fates of local communities and that organized its operations in ways that highlighted this separation and detachment" (Leonard & Grovogui 2017:3). As a recent example in Mozambique, where ExxonMobil, Anadarko, and Baker Hughes G&E, all involved in developing giant gas deposits found offshore in recent years, donated more than USD500,000 to the Red Cross in the wake of cyclone Idai in March 2019. That is, the oil industry swept in to provide relief to people suffering from a cyclone that has been seen as a direct example of the rising risks in Southern Africa of storms that are both unpredictable and unusually large, and also in a context that underscores the ways industry

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developments, including deforestation, increase the negative impacts on those most vulnerable.

Yet, extractive humanitarianism can be understood as even more than just this type of philanthropic capitalism. Instead, in the case of the Kivu methane project, extractive humanitarianism at its root conceptualizes its entire profit-making enterprise, specifically a material practice of extracting resources from the earth, as itself a form of social welfare. Companies and the Rwandan government frame methane extraction specifically as averting a natural disaster and thus promoting human welfare in the region.

Further, we suggest here that methane projects as extractive humanitarianism gain further ideological force through being framed as "sustainable energy" projects, part of green capitalism or eco-capitalism, an approach that argues that market levers can resolve environmental problems, including climate change (Holleman 2018). Officials at Contour Global and Shema Power, alongside Rwandan government authorities from local to national, frame methane extraction as not only a clean, renewable form of energy, in contrast to diesel, coal, or even peat, but also one that actively improves the health of the environment by rendering the lake more stable. Sustainable or green capitalism projects are thus purportedly beneficial, not merely environmentally neutral, through avoiding the toxic impacts of other extractive projects that have historically plagued the continent, such as oil spills or uranium contamination. This "greenwashing" frame serves to situate these projects within the environmentalist frame that the Rwandan government has adopted and provides moral authority for the extraction operators and its backers. The sustainability gloss can insulate the projects from critique.

But "green" can equal "thorny and mean," as Peter Little (2019) has shown in Kenya, where technical interventions aimed at greening the environment instead produced violence and impoverishment. An emerging body of ethnographic work on sustainable energy projects in Africa and elsewhere has shown that despite the promises of green capitalism, such projects typically replicate domains of state violence, reproduce relations of domination, and fail to bring tangible benefits for marginalized and vulnerable populations (Boyer 2019; Cross 2013; Folch 2019).

Here we use the case study of methane extraction on Lake Kivu to provide empirical detail regarding how the frames of extractive humanitarianism and sustainability are mobilized in what we are calling "green extractive humanitarianism," and to what effect, specifically in a post-genocide context. Leonard and Grovogui point to two specific consequences of extractive humanitarianism: it pits the needs of the poor against the needs of mitigating climate change, and it shifts the focus away from the role of the state, to include global forms of governance, global ethics regimes, and transnational actors. We propose that the Rwanda methane extraction example sheds light on how corporate and government partners in projects such as methane extraction center the role of scientists and their expertise to render the project inevitable as green extractive humanitarianism, and purport to

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address rather than overlook climate change. The green extractive humanitarianism frame works to naturalize and buttress particular economic projects and associated political configurations, while reinforcing divides between elites and rural residents.

## Methane Extraction's "Double Benefit": Reducing Risk and Providing Power

While scientific knowledge has long been involved in helping locate natural resources and in supporting the technical interventions needed to harness them, here scientific knowledge has created the political and economic conditions for extraction to occur. Interest in Lake Kivu's natural gasses is longstanding, both as a potential power source and for its risk of unpredictable eruption. Lake Kivu contains an estimated 60 billion cubic meters of dissolved methane gas, and an estimated 300 billion cubic meters of dissolved carbon dioxide. In the early 1960s, small-scale methane extraction was used to power boilers for fermentation at a Belgian-built brewery on the eastern shore of Lake Kivu. The extraction of methane from Lake Kivu was halted by the 1994 genocide against the Tutsi and the efforts to rebuild the nation. By 2000, the Rwandan government had identified the resource potential of Kivu's methane, noting in its Rwanda Vision 2020 development plan that the country had "large deposits of renewable methane gas in Lake Kivu" (Rwanda Vision 2020:19) that would be central to supporting "a clear Rwandan identity, whilst showing ambition and imagination in overcoming poverty and division" (Rwanda Vision 2020:2).

But it was not until scientific understandings of risk were tethered to the resource deposits that extraction became thinkable. Rwandans living along the lake have long identified the methane as risky and dangerous: local histories reveal stories of how methane pulls swimmers down, causes their fish nets to sink, or traps fish deep in the lake so they cannot be caught. Outsiders' perceptions of Lake Kivu's lethal risk rose after a 1986 deadly eruption in Cameroon's Lake Nyos asphyxiated approximately 1,700 people. Lake Kivu, by contrast, has a thousand times more dissolved gas, and more than two million people live in the basin (Doevenspeck 2007). In 2002, the eruption of the Nyiragongo volcano on the lake shore triggered new questions and concerns about the risk of the lake's possible unpredictable "devastating degassing" (Schmid et al. 2002) on surrounding populations and launched a wave of new studies. These studies ultimately found that a "gas outburst in Lake Kivu is not to be expected from future eruptions" (Lorke et al. 2004), even as they suggested volcanic activity could contribute to rising methane levels in the lake.

Scientific interest in Kivu was reanimated in 2005 with the publication of a paper by a team of European scientists which showed that "methane production within the sediment has recently increased, leading to a gas accumulation in the deep waters and consequently decreasing the heat input needed to trigger a devastating gas release. With the estimated current

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[methane] production, the gas concentrations could approach saturation within this century" (Schmid et al. 2005:1). That is, the authors argued that methane levels had increased dramatically between 1974 and 2004, and if they were to continue increasing at that rate, they would reach unsustainable levels by 2104 (Schmid et al. 2005). Oversaturation would decrease the lake's stability and increase the risk of spontaneous gas release—not only the methane but even more worrisome, the 300 billion cubic meters of dissolved carbon dioxide—particularly worrisome given the lake's location in the Albertine rift, with frequent volcanic eruptions, earthquakes, and landslides that could serve as triggering events.

Thus, government interest in generating power came together with scientific justification for pursuing extraction. At approximately the same time, the Rwandan government developed a Memorandum of Understanding with the DRC, outlining the terms of shared ownership of the methane resource in the lake which, estimates suggested, could generate as much as 500 to 800 megawatts during 40 years (LKMP 2011). The Rwandan government partnered with a foreign firm to build a small prototype barge and plant, KP1, which began operating intermittently in 2008, providing 3.5 megawatts of power. It was intended to serve as a prototype to show that extraction could be successful, and it worked. Two U.S. companies—Contour Global and Symbion Power LLC, later Shema Power Lake Kivu Limited—were granted concessions with the Rwandan government to build industrial-scale gas-fueled power projects, which are proceeding with national oversight as well as technical support and monitoring from several international academic institutions. A third concession, with Gasmeth Energy, was announced in early 2019, for a gas extraction plant, processing, and compression for heating appliances, cooking equipment, and vehicles. A fourth and final concession remains unclaimed.

The Lake Kivu Monitoring Program (LKMP), an agency within the Rwandan government established in 2006, was created with international financial and personnel support to monitor the extraction process and the stability of the lake. LKMP initially was under the Ministry of Infrastructure beginning in 2008; it then moved to the Energy and Water Sanitation Authority in 2012, then in 2014 moved to being overseen by the Rwanda Energy Group (REG)/Energy Development Corporation Limited (EDCL). LKMP was directed by a Rwandan and staffed by several Rwandan scientists, with two full-time international consultants (a biologist and an engineer), funded primarily by the Dutch government. Several scientists, both Rwandan and European, expressed frustration in repeated interviews across four years that LKMP was not sufficiently independent—there were failed discussions to move it to the Ministry of Environment—and that it did not have sufficient funding to provide force to its monitoring and evaluation. Some staff speculated that LKMP was merely cosmetic, used as a showpiece but unable to interrupt extractive logics, particularly given its position within the EDCL. Some of the Rwandan scientists who early on worked for LKMP later worked for Kivu Watt and Shema Power, and some of the international scientists who

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consulted for Kivu Watt trained in the same labs as scientists consulting for LKMP, raising questions about the use to which the ostensibly objective scientific expertise and evidence was being put.

Both Contour Global and Symbion (later Shema Power Lake Kivu Ltd), while focused on extraction, had explicit mandates to improve social welfare in the countries where they operated. Contour Global, founded in 2005 in New York, framed their investment in Rwanda, implemented through a local subsidiary KivuWatt Ltd, as part of a wider African regional strategy where they "believe in the power of energy to drive development, increasing stability for citizens and businesses."[3] Their approach, as their promotional materials explain, emphasizes "developing custom solutions from local resources. Project KivuWatt is a prime example of this innovative thinking in action."[4] They emphasize the humanitarian lens: "Our mission is to improve lives by offering reliable and accessible electricity, to promote economic growth and social well-being through the elimination of poverty, and to make the places where we work better because we are there."[5]

Symbion Power, which initially held the second concession, described itself as having "a deep commitment to empowering local communities, we bring together the knowledge and operational know-how to succeed in the world's most challenging construction environments."[6] Symbion failed to raise investments to support the project, and sold it in late 2019 to the new owner investor Irvine Laidlaw, under the new name Shema Power Lake Kivu Limited, for project Kivu56 (56 megawatts) and KP1 (50 megawatts). Laidlaw, ranked 105th among the top wealthiest people in the United Kingdom, is described as a businessman and philanthropist, illustrating the tight links between philanthropic capitalism and extractive humanitarianism.

Throughout, the Rwandan government and private companies involved in trying to harness the methane framed the projects as securing the population's welfare through averting a natural disaster (gas explosion) and stabilizing the lake as the foremost priority, and alongside it, providing electrification. The threat of methane offered by the government and the companies was widely narrated in the international media, calling it a "freshwater time bomb" (Rochester Institute of Technology 2009). The journal *Nature* called Kivu "dangerous" (*The World* 2012), the *Economist* (2016) described it as a "hidden menace," and *Time* magazine called it a "toxic menace" (Baker 2016). These articles not only secured the notion of the lake's danger in popular consciousness, but also emphasized the humanitarian, even "noble" (Baker 2016) role of both the companies and the government involved in extraction. Methane plants were designed, these articles exclaimed, to "mitigate the dangers" (*Economist* 2016), "lessen the natural threat of an explosion" (MENA Report 2014), where "failure to do so may result in yet another tragedy" (Sharife 2009:61). Articles emphasized the technical prowess of these companies, and the risks (both physical and financial) they were willing to undergo.

The Rwandan English-language newspaper *The New Times*, describing the May 2016 official inauguration of the Kivu Watt extraction, presided over by

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President Kagame, explained, "Extraction of methane gas from Lake Kivu has a double benefit: reducing the risk of possible catastrophic outburst of the gas and solving the issue of energy shortages in Rwanda" (Kwibuka 2016). That same framing is manifest in the national Museum of the Environment, which was being developed alongside the methane operations. It narrates: "In Rwanda, the exploitation of methane gas reduces the gas concentration of methane and carbon dioxide in the lake, turning it much safer." A sign proclaiming "Lake Kivu is Exceptional," posted along the shoreline of Lake Kivu by Contour Global and the Lake Kivu Monitoring Program as the facility was being built narrated the same story, as "[Methane's] extraction will reduce the gas pressure in the lake" while professing the lake's safety for tourism.

In January 2016, after five years of securing capital, infrastructure development, and trial and error, to much global attention, Kivu Watt began methane extraction operations as the first industrial-scale gas-fueled power project in Rwanda and in the world. Within months of Kivu Watt's launching, the country director of Symbion (now Shema Power) narrated to me parallel justification logic, explaining, "If nothing is done, with time, the gas will come up. We are in the process of getting the lake to saturation. As this occurs, the amount of water on top will not be enough to keep the gasses down, it will allow for an explosion, an outburst, a release. You have seen the way the place is populated there!"[7] By early October of 2019, when the groundbreaking occurred for Shema Power's new power plant, the Rwandan press remobilized the risk-reduction narrative, suggesting that "With methane concentrations rising, scientists warn that Kivu will eventually experience a deadly phenomenon known as an overturn" (Bizimungu 2019).

In addition to this critical risk reduction that is central to why we see this project as extractive humanitarianism, the government and both companies framed themselves as green, clean, and renewable. Rwanda Vision 2020 identified "protection of environment and sustainable natural resource management" as one of three cross-cutting priorities in each of the six pillars of national development. Contour Global touted their Kivu Watt project as clean and green in their publicity materials. The country director stated, "In the heart of Africa, nature offers us a sustainable and renewable energy source. We offer the opportunity to use it for present and future generations."[8] The Contour Global website continues, "Since 2016, KivuWatt extracts this energy source in an environmentally friendly manner and generates 26 MW of electricity for local populations. The high efficiency of the process and the renewable character of the energy source make this project an example of the sustainable exploitation of an energy source helping the development of present and future generations for Rwanda and the neighboring countries."

In a visit to the extraction barge in October 2016, the Kivu Watt director was asked if the extraction is a completely clean and renewable process. He responded, "Le procèssus est totalement propre. La technologie est totalement propre. C'est totalement naturelle. Pas besoins de réaction chimique,

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ni de réaction mécanique. Aucun produit chimique, aucune réaction chimique." (The process is totally clean. The technology is totally clean. It's totally natural. No need for chemical reactions, nor mechanical reactions. No chemical products, no chemical reactions.)

The frame of clean power and renewability is also present for Shema Power Lake Kivu Limited. The Ministry of Infrastructure suggested in a press release the project would "preserve the environment and the wellbeing of the population adjacent to the site and beyond, by reducing emissions and ensuring proper operating procedures."[9] In a visit to their offices and construction site in October 2019, Shema Power staff emphasized their small environmental footprint and extensive precautions to avoid destabilizing the lake, contaminating the air, or polluting the water.

Methane extraction is part of Rwanda's wider move to "go green," including policies such as banning plastic bags and trash burning, and supporting investment in innovative alternative energy projects including biofuel, geothermal, and solar energy—projects that earned President Kagame the UN "Champions of the Earth" award in 2016, its highest environmental accolade. Meanwhile, despite the emphasis on green capitalism here, the government is contracting scientists and industry leaders to prospect for petroleum under Lake Kivu, after failed efforts to promote geothermal energy in the Volcanoes region. Two new peat plants have recently been built, much to the dismay of many Rwandan and international conservation scientists involved in the vibrant environmental conservation community in Rwanda. Further, when visiting the first such peat plant in October 2018, we were told that, when peat runs out, the plants can be retrofitted to burn coal—suggesting that the pursuit of sustainable energy is not the only story in Rwanda.

Overall, the scientific "fact" of Kivu's risk came to do significant political and economic work in mobilizing these assemblages of economic capital, engineering technology, and political agendas. As KivuWatt's Economic and Social Impact Assessment in 2009 indicated: "[T]he project represents a major positive benefit through the reduction of the risk associated with the catastrophic event and *the 'do nothing' scenario is not an option*" (emphasis authors) (Sinclair Knight Merz 2009). This same language was written into Symbion's Economic and Social Impact Assessment submitted in 2017 (later inherited by Shema Power), which emphasized that "If nothing is done to counteract the accumulation of the gas with extraction, the likelihood of a catastrophic eruption occurring within the next 100-200 years will continue to grow" (Eco Design and Protection Ltd 2017:19). It continued even more forcefully than Kivu Watt's statement: "The *no project* scenario is not an option in this case due to the need to reduce gas levels in the lake in order to avoid the hazardous consequences of a spontaneous future gas eruption with the possibility of a large number of fatalities" (Eco Design and Protection Ltd 2017:155, emphasis in original). That is, the science suggested that not doing extraction was not even an option—and this established a baseline for a cost-benefit analysis where the threat-reduction value of the project was

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unassailable, so the costs to be borne were presumed to be necessary, perhaps especially those disproportionately felt by local inhabitants.

And yet, even as the narrative of the benefit of converting threats to power became more entrenched, the science that motivated it came into question. In May 2017, at a workshop convened by the Lake Kivu Monitoring Program (LKMP), international scientists discussed the latest research on Lake Kivu. A Belgian hydrologist who worked as a consultant for KivuWatt presented research based on measurements of gas in the lake over the previous years, arguing that there is "no evidence for any increase of CH4 in deep water in recent years," and "no strong evidence for any increase of CO2 in deep waters from 1970s. We are very close to a steady state. The production of methane is close to fully compensated by the disappearance rates. We don't know the total amount of gas we can exploit for staying at steady state" (LKMP workshop, May 2017). Later in the same meeting, at which all other sessions were open to all participating scientists and presenter, government officials, gas scientists, and methane operators met in a confidential session that excluded other participants. The Rwandan government commissioned another study of the gas composition in the lake by multi-national teams of scientists, but by mid-2020, the results remained buried on a government website. There, these experts concluded, "The 2018 measurements *do not confirm* the previous hypothesis that the CH4 concentrations were increasing during the last decades in Lake Kivu. They rather indicate approximately constant concentrations since the first observations in the 1950's within the uncertainty range of the present and previous measurements" (Schmid et al. 2019:1, emphasis ours). Yet this did little to dislodge the risk reduction frame that was so central to framing the project as green extractive humanitarianism, and surely did not undo or even slow massive investments of capital, land expropriations, and extractive operations that had been mobilized.

## "But for Us, There is Nothing": Unequal Benefits in the Context of National Unity

The methane extraction companies and Rwandan government officials, with help from the press, narrate the project seamlessly as intrinsically about promoting social welfare, through averting natural disaster, providing electrification, and doing so in a way that is good for the environment. Extraction is thus consistent with a long line of modernization projects using technoscientific approaches to harness nature and secure social advancement and development. Specifically, in the context of Rwanda, the project was designed to help support post-genocide recovery, benefiting all Rwandans through the expansion of the electricity grid to every household. It is part of the emphasis on energy in the Rwanda Vision 2020 development plan, which named the "high cost of electricity and low level of energy production" as key challenges (Rwanda Vision 2020 2012:5) to creating a "united, democratic, and inclusive Rwandan identity" (i). Importantly, this energy project occurred in Rwanda

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in a context of post-genocide unity programming and the nation reconstruction efforts which some European and American scholars have argued is authoritarian and often preoccupied with coercive unity and development of the few (Ansoms 2013; Burnet 2012; Chakravarty 2016; Ingelaere 2016; Straus & Waldorf 2011; Thomson 2013).

We suggest that the humanitarian risk reduction and sustainability frames amplify the assumption that generalized and unquantifiable benefits of increased security are sufficient, resulting in a silencing of any legitimate critique of the project or its implementation. The green extractive humanitarianism frame creates a resignation to any negative impacts and obscures attention to profit motives, even as the project creates an us/them divide. Rwandans are not equally positioned in relation to the costs, benefits, and risks (whether financial, environmental, or social) of the project. Benefits are unequally distributed, concentrated either with the increasing stability of the power grid in urban areas or localized community engagement projects in the local communities.

Methane extraction does indeed provide benefits. Unlike oil in the Niger Delta, for example, or coltan and other precious metals in the DRC, methane stays in Rwanda rather than being transmitted outside as a raw material. Methane extracted from Lake Kivu is converted directly into electricity at shoreside power plants and put directly onto the national grid. Kivu Watt's launch in 2016 added 26MW added to the national grid, increasing overall capacity at the time by 25 percent. People in Kigali and other urban centers reported that power quickly became more stable at that point, with fewer spontaneous cuts. Kivu Watt is poised to add another 74 megawatts, if government approves the subsequent stages of construction, while Shema Power (formerly Symbion) has contracted another 106 megawatts. In multiple regions across Rwanda, people report electricity has become more stable, with fewer outages, which are shorter when they occur (hours rather than days). Further, people report that electricity access is increasing to areas previously off the grid.

In addition to increased electrification, there have been improved roads and increased water in some areas, and some people described a temporary rise in business during the period of construction of particular plants. Yet, like elsewhere in Africa, these electrification benefits are uneven (Aidoo & Briggs 2019; Winther 2008). Many people living alongside the lake report their economic prospects have not changed through meaningful employment, and they do not access the methane yet—either they do not yet have a connection to the national grid, or they have connection but electricity remains too expensive. As one fisherman described in a widely-repeated sentiment, "There is almost no change apart from that they come to extract it in the area we work in and do not give us jobs. That is the problem."[10] Many lakeside residents report that the methane is bypassing them, literally passing in wires over their heads, and going to support either Kigali directly, or to other countries.

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The electricity being generated by methane, as well as other power projects throughout the country, is indeed also now being sold outside Rwanda to help stabilize the regional grid. The Energy Development Corporation Limited had already signed agreements, or was in discussions to do so, for power sharing with several countries (Uganda, Kenya, Burundi, Democratic Republic of Congo, and Ethiopia). Transmission lines to Uganda have been completed, and construction has begun on a line to Burundi. Citizens living alongside the lake indicate that they want to access the resource. As one described, "But for us, there is nothing. We did not get any benefit as we dwell here. Have we got that electricity? We do not have electricity!"[11]

Migration trend data seem to corroborate that even if the promises of extraction generated the anticipated benefits, they were not enough to cause local residents to stay in the region, and even more, they were causing outsiders to come in and displace local residents. On one hand, the data from the National Institute of Statistics of Rwanda showed a very high population change in the Rubavu sector, on the north shore of the lake, where migration toward the sector from other parts of the country has reached around 50 percent of its population between 2010 and 2015. Nowhere else in the country has the internal migration reached that rate, even within Kigali or toward Kigali. Yet the data also indicated that people were actually moving from West to East. The data by the National Institute of Statistics of Rwanda indicates that many people migrated from the Western Province to the East or the city of Kigali from 2010 and 2015, the period corresponding to the implementation of methane extraction from the Lake Kivu. The (internal) migrants are generally between 15 and 50 years old, with a peak in the 20 to 29 age group. The main reasons for migration, as the reports indicate, are that people are searching for employment and opportunities—suggesting extraction did not provide sufficient economic or other opportunities to stop the outward flow. The data suggest that the population in methane extraction sites are not seeing much benefit in staying, leaving the new settlers—many who seem to be from the capital—with all the benefits that the new developments offer.

Many people living along the lake repeatedly suggested that they felt they should receive benefits in the same ways that those who live near natural parks get particular benefits from those resources. They see the methane in Lake Kivu as a national resource in the same ways that the gorillas (Volcanos), chimpanzees (Nyungwe), or the "big five" (lion, leopard, black rhinoceros, elephant, and cape buffalo in Akagera) are in Rwanda's national parks. Those regions have revenue-sharing models in place, where a fixed percentage of the tourist fees are paid directly to the local authorities for reinvestment in projects decided upon by the community. Many lake dwellers wondered if there were a way that they could have similar forms of revenue-sharing that would promote sustainable ongoing local investment and employment opportunities, though there were no known governmental plans in place to create such policies.

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Even within the towns of Karongi and Rubavu, many felt that only those closest to Kivu Watt would benefit. During interviews just one hillside away from the lake, people said they have seen no change since the methane extraction began. Kivu Watt did support several local projects: water treatment at a refugee camp, two laptops, a cow, and a children's library for a local primary school whose gardening land was seized for the company's marine landing site. Up to six other local schools described receiving one-off support from Kivu Watt, including printers, desktop computers, books, and in one case, help to build a new kitchen and a playground. Some described individual employees as supporting specific students or families with direct school fees or health insurance. Yet, even at the schools Kivu Watt supports, people reported that the help is often one-off, rather than the result of an ongoing deep collaborative relationship. For example, several of the donated laptops no longer work, and teachers report that they have some difficulty finding funds now to pay the librarian or to pay ongoing support for the cows. Our visit to the school library created by Kivu Watt showed the books mostly unused.

Some residents also referred to a group of people closest to the project who received extra compensation. Kivu Watt worked with the 40 to 50 families who were displaced by the project in the early phases of construction in 2011. Through consultations, they tried to propose projects including a maize mill, scholarships, or cows, but the families kept asking for additional cash payments. Ultimately, they decided on cows, consistent with a Rwandan government policy to provide cows to rural families. The cows were only delivered in May 2017, though the country director of Kivu Watt spun it to the positive, indicating in May 2018 that those cows were beginning to have calves, which were being further distributed.

Kivu Watt employees went out of the way to proudly mention their community engagement projects, though without acknowledging these were at least in part mandated by their investors, because the payments provided to landowners for expropriation by the Rwandan government met domestic but not international standards. Kivu Watt's extraction was financed through loans from the African Development Bank, Emerging Africa Infrastructure Fund, Netherlands Development Finance Company, and the Belgian Investment Company for Developing Countries (Kimenyi 2016), and the launch of the first barge cost approximately USD142 million. While land expropriation was done by the government, the Economic and Social Impact Analysis indicated:

> The farmers have been compensated in accordance with Rwandan law but this is insufficient to meet the requirements of IFC and therefore of OPIC….. To comply with IFC requirements, ContourGlobal KivuWatt Ltd *will be expected to supplement governmental efforts* in order to bring the mitigation measures in line with the IFC standards (Performance Standard 5). (Sinclair Knight Mertz 2009:90–91, emphasis author's)

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One vice president of Sustainability at Contour Global described this to one of us in an interview in April 2016 as "a voluntary obligation" included in the company's concession to see how to help the affected people. She was the only company employee to acknowledge that this involvement was perhaps insufficient, expressing frustration at the delay, and saying, in comparison with other projects across Africa, "When I look at it from my office in New York, it's a failure on our part, that we haven't been able to execute that after five years."

Despite their repeated proclamations of the social good they were providing, Kivu Watt had limits. When they launched the first barge, they found it could generate 34 megawatts, and they thus proposed to build only three barges instead of four to complete the 100 megawatt concession. Government partners argued that the cost savings should be passed on to the purchasers through a price reduction, but Kivu Watt insisted on keeping the negotiated price the same, suggesting they should benefit from the increased efficiency. That is, capitalist logics that prioritize return on investment prevailed over the social welfare logics, when it came to practical implementation. And despite their interest in promoting the social good, they kept their operations fiercely confidential and the narrative highly controlled. They indicated researchers would need to sign a non-disclosure agreement to access documents, even public ones. LKMP officials repeatedly reported that Kivu Watt was not forthcoming in sharing results of their scientific monitoring unless it was explicitly mandated. At a 2017 international scientific conference Lake Kivu hosted by LKMP, Kivu Watt engineers presented second-hand the science about gas extraction, providing few details, and leading to a frustrated and disbelieving barrage of questions from expert scientists.

Shema Power, because it was privately financed, was not obligated to provide any additional remuneration to the families who were displaced through the government land expropriation process, though one employee reassured us that they intended to comply with the stricter international standards set by the IFC nonetheless. When we asked further about Shema Power's plans for community engagement projects, he told us:

> Normally, corporate social responsibility, they do that when the project has a huge footprint, or if there is damage to the community, or if there is a lot of contact with the community. But methane extraction is not like that. Up until now, we have not decided what to do, and we also do not know what the available budget will be. The most I can suggest is that if corporate social responsibility has to be implemented, aquaculture farming could be beneficial for some people, and vocational training program could be beneficial.[12]

Many residents where the Shema Power construction was taking place were concerned that the plant was to be situated on a flat area along the lakeshore that children had used to play soccer—a valuable local asset in a

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region of steep hillsides. Many local women we interviewed told us that Symbion had initially agreed to use their equipment to flatten a new area for the young people to play and asked us to advocate for this promise to be fulfilled. In October 2019, though, a Shema Power employee illustrated prevailing justifications that dismissed rural people's concerns and framed rural people as themselves the problem, explaining, "The football pitch was government land, within the 50 meter buffer zone along the lake. We cannot compensate something that was invaded. That flat area doesn't belong to those people, they were squatters."

While company employees at both Kivu Watt and Symbion/Shema were always quick to differentiate between themselves and the government, in general, Rwandan lakeside residents did not distinguish between the private interests of gas companies and the Rwandan government, in terms of who provided specific benefits. This is not surprising, since it is a public-private partnership, and community meetings are convened by a combination of local authorities, military security, and company representatives. Company property such as pipelines and barges are patrolled by national military security. Thus, these projects come to stand in for state governance more widely, in the experiences of the local people.

Overall, we suggest that the humanitarian and environmental frames contribute to naturalizing and justifying this dynamic of limited local benefit. The government and corporate partners use scientific justification to describe the methane project as at its root a form of social welfare to protect the population, with the use and profit of the resource secondary. The emphasis on threat reduction distracts from the role of economic profit, which people close to the project indicate will be substantial for both the ruling party and corporate partners, and suggests that the unquantifiable "protection" of the project is sufficient benefit to the local community, alongside trickle-down impacts of overall development investment, so that they should not ask for additional compensation.

Rural people living along the lake, many of them impoverished and with low political capital, bear the brunt of the negative impacts, with limited benefits. They describe the project as "we suffer, they benefit," where "they" refers to urban elites and foreigners (either those using hotels in the rising tourism industry or people in neighboring countries, to which the electricity is now exported along newly built high transmission power lines). This "us" versus "them" points to gaps in communication and runs counter to the government program of unity and reconciliation, which has as a goal that all Rwandans should see each other as unified. Although perhaps local people should speak out more about the need to share the benefits resulting from the methane extraction, we know that people living in poverty typically have difficulty claiming rights and utilizing available opportunities. Poverty goes beyond material deprivation to lack of power and voice to seize the opportunities and to articulate concerns, needs, and rights in an informed way (WorldBank 2005).Therefore, when the powerful players do not create a platform for the rural poor to take part in making decisions affecting these

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concerns, these residents may find it impossible to access the opportunities (Haughton & Khandker 2009; SIDA 2017).

Meanwhile, the projects continue to grow. Shema Power only just broke ground in October 2019, and plans to build up to four barges, twenty-two generators, and one power plant. Kivu Watt could build up to two more barges. Gasmeth has not yet started building. A final methane concession on the Rwandan side remains up for grabs, and another concession has just been sold on the Democratic Republic of Congo side. Transformations are coming quickly, with little evidence these dynamics are poised to change.

## Conclusion: The Limits of Green Extractive Humanitarianism to Address Climate Change

As voiced by President Kagame in the quote with which we began, methane extraction is an example of the "new innovations," formerly "scientific fiction" that is now affordable and feasible and could even help "stop the worst scenarios," whether climate change or an exploding lake. There are, of course, many benefits to this project, and surely there are worse examples all over the continent and world. This project uses a Rwandan resource to solve a Rwandan problem; it remains more locally rooted than other extractive projects where the resource is shipped worldwide rather than being used in-country; it has not yet had toxic environmental spills; and it has not yet generated violent conflict.

Yet, despite the glossy marketing of the companies and the Rwandan government, the Kivu methane extraction project remains locked between two intertwined logics: logics of governance in Rwanda that fuel unequal economic benefits from the methane between the urban and the rural, alongside neoliberal logics of extractive capitalism that have brought us warming climates. The frame of green extractive humanitarianism did ideological and discursive work to justify what is otherwise a standard neoliberal capitalist extractive project, and one that furthermore is being pursued in a "development patrimonialist" system, with a highly centralized government that emphasizes long-term rents, and that typically consolidates elite power while disenfranchising rural poor. While the project is justified as a means of reducing risk for the Kivu basin and providing electricity for national development, it both reflects and reproduces the status quo, in how rural people and places are secondary to electrification projects that are themselves fueling fuller incorporation of Rwandan elites into global domains of power. While this project was purportedly designed consistent with goals of national unity and development, it is in practice reifying the divide between rich and poor, urban and rural, us and them.

We recommend caution with this methane extraction project and others like it, and encourage the participating parties to imagine what actual sustainable and transformative energy projects would involve. Across the continent, new energy projects are emerging, many framed as sustainable or green, and many that can be seen as "extracting" a renewable resource,

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whether wind, solar, water, or biomass. Rather than uncritically supporting these projects, it behooves us to ask the same questions we bring to conventional energy and extractive projects about displacement from land, environmental toxicity, potential to increase violence, and differential impacts. How do we avoid allowing the solutions to risk—whether risk of unpredictable weather events due to climate change or risk of exploding lakes—to be hijacked to justify re-entrenching precisely the logics of vulnerability we seek to escape?

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