Abstract

Renewable energy is a buzzword that has been thrown around a lot over the past decade. We hear about it in spaces ranging widely from the sciences to the humanities, from the geothermal plan executed on Mount Holyoke's campus to the European Union's 2030 Agenda for Sustainable Development. Across the world, groups ranging from individuals to international organizations are pushing for a transition away from fossil fuels and towards sources ranging from solar to the relatively new technology known as green hydrogen.

My research focuses on how this transition from fossil fuels to renewables is playing out in a small country located in Southern Africa. It covers over a century of political and economic development between Germany and Namibia, seeking a deeper understanding of how Global North and Global South countries are interacting throughout the renewable energy transition.

Green hydrogen itself is hydrogen gas that has been made by splitting water into oxygen and hydrogen gases using electricity sourced from renewable energy sources such as wind and solar. It creates an environmental impact issue as it requires a large quantity of water, which is difficult to source in an arid country such as Namibia.

It focuses on a piece of land that is 22,000 km² along the coast of Namibia, a national park called "Sperrgebiet" or "No Man's Land" located in the oldest desert on earth. The park, renamed to the Indigenous name of Tsau||Khaeb National Park in 2012, is one of the world's 34 most biodiverse regions. It is the only arid biodiversity hotspot on the planet.

This thesis will offer a brief history of the region, detailing the first genocide of the 20th century, the diamond rush and then green hydrogen development. It also offers a history of how science earned a reputation as apolitical and the feminist arguments that have pushed for an understanding of science as activism, wherein scientists and community leaders work collaboratively in advocating for climate justice. Understanding this issue requires an interdisciplinary perspective, one that is increasingly essential in this age of green revolution. In attempts to create a better future, we must understand the history we are building upon, or we risk recreating the injustices of the past in a greener, more sustainable way.

The Green Energy Revolution:

An Interdisciplinary Analysis of Green Hydrogen in Namibia

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A thesis submitted to the Chemistry Department of Mount Holyoke College in partial fulfillment of the degree of Bachelor of Arts with Honors

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Mount Holyoke College

South Hadley, Massachusetts

April 27, 2026

This thesis was prepared under the directions of Dr. Donald Cotter, for

8 credits of independent study

ACKNOWLEDGEMENTS

I owe so much to those who have come before me, creating a scientific community that is more welcoming and supportive. The greatest contributor to my own ability to navigate this process has been my advisor, Dr. Donald Cotter. Thank you for being brave enough to be yourself, Donnie, and for making room for future chemists to experience their full humanity as well. I am so grateful for your light.

And to my other thesis committee members, Dr. Darren Hamilton, for your empathy when I was struggling through Organic Chemistry all the way to my present work. To Dr. Dinko Hanaan Dinko, for your encouragement and belief in me when I was really working through the ethics of this work. I am very grateful for your support through this project.

To the Namibian leadership team that runs the study abroad program that I participated in during Spring 2025, *Decolonizing the Mind: Racial and Environmental Thought,* thank you for all that you have done in teaching your students about green hydrogen and decolonial thought. In particular, thank you to Albertina (Tina) Shifotoka and to Pinias Kashedi for guiding me through this project during its inception. Your program is truly life changing and has redirected me on my path through the sciences and I will always remember, "Nothing about us, without us."

Thank you to Andreas Elombo for your encouragement when I first began exploring this project. I remember how you said that students deserve the utmost support and encouragement on their journeys, and I really felt that from you and your team.

I am so honored and grateful to have received funding from the *Susan B. and Peter R. Betzer '65 Endowed Fellowship Fund* to attend the conference where I conducted the interviews. I could not have written this thesis without your generous financial support. Obtaining that funding has made me braver in pursuing future opportunities that I previously would not have considered.

This thank you section is extensive as it involves such a large number of people. The friends who I have made here at Mount Holyoke and beyond have forever changed my life. To Baxter, who has heard me stress about this thesis from the beginning, thank you for being my friend. I really could not have done it without you. To Daniel, for being a constant source of light and encouragement and for telling me that "it will feel so good to be done." To Allyson and Maya, for being with me every step of the way through college. To my old roommate, Claribel, for being here throughout the past few years and now together again finishing our theses, writing at the World's Longest Table

To Lauren, for telling me "you've got this" and for having written a thesis and gone out into the world and bought me brunch. To Davida, for offering a walk and respite if it ever gets too hard and scary. For always being so generous with your light. To Kaylee, for always hyping me up, and to Sabina for telling me to "stop playing solitaire and work on your thesis." And to the countless others who have listened to me talk about it and offered words of encouragement, I am forever grateful.

And finally, to my family, for always encouraging me to think outside the box and to create something beautiful. I would not be the person I am today without you. From my grandmother, Tasia Young, who was the Director of the New Mexico Commission on the Status of Women to my father, who wrote his Master in Library Science thesis on the conflict in Palestine, I come from an extraordinary family. And to my mother, for showing me how to build a wonderful community and connect the dots. You are incredible.

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1. INTRODUCTION

1.1. Technoutopianism

Matthews[1] states “What an extraordinary development that we as a civilization should have powered our way to wealth through the discovery of fossil fuels, and then have reached our present state of wealth but coming up against the impasse of global warming, that we should find a benign alternative that can act as successor to the fossil fuels economy. No one could have predicted this astonishing sequence of developments in advance of their recent appearance. To a time-traveling observer from the eighteenth century, it would be quite incredible. Yet it falls to us in the twenty-first century to bring this sequence to fruition.”

Within my lifetime, I have witnessed a remarkable increase in technology. It is relentless - from CDs to Blackberries, the first iPod and then iPhone. Laptops becoming smaller and more efficient, social media taking shape; great swaths of technology that connect the world. There is a soft hum of progress in the rooms where scientists work, a gentle kind of surety that the work we are doing is worthwhile. That it contributes to this general concept of “good.” That we only need to create more technology to solve the problems generated by its existence in the first place.

The quote that opens this chapter comes from a slim book called *A Solar-Hydrogen Economy: Driving the Green Hydrogen Revolution.* It has an almost evangelical quality to it, one that I have witnessed throughout the sciences. There is an almost religious value to the faith that we place in the scientific method to transcend the fickle quality of human nature. Mathews echoes a sentiment that is widely accepted in the scientific community, one that came to be in the late 19th to early 20th century - one of technological utopianism. This belief system claims that the advancement of technology will solve all societal problems, from the environmental to the psychological.[2] In this

utopian world, distance would be eliminated through the introduction of technology that can bridge vast gaps, people would no longer go hungry and everything would improve. It espouses this belief that progress is inevitable, that with this development comes an increase in the quality of life for humankind.

Writing from the perspective of the early 21st century, Mathews joins a long line of people who have brought this voracious belief in the positive effects of technology through the industrial revolution all the way into the age of the anthropocene. Today, living at a time when climate anxiety is rampant, we must create solutions to the problems that we are facing. However, I contend with the idea that these strategies should be a direct extension of the continuous development of new technologies, without consideration of their social and economic consequences.

The green energy transition is one that is not free from the realities of the world we live in. Like all things, from peanut butter sandwiches to the Bohr model of an atom, it does not lie in a vacuum and therefore must follow the laws that we are commonly familiar with. The traces of colonialism bleed into imbalances in power dynamics as the Global North sets her sights on "barren land" in the Global South, continuing a deep and problematic history of *terra nullius*. Global North nations include the United States, Canada, Europe, Japan, South Korea, Taiwan, Australia, New Zealand and Israel. Global South countries include South and Central America, Africa, the Middle East, excluding Israel, Asia and Oceania, excluding the aforementioned nations. This classification system is meant to distinguish countries based on their level of development, with Global North nations being more developed and Global South nations less developed.[3] This political designation is important in understanding the power dynamics that are

happening today as sustainability is a key development goal, one that is seen in the ever-developing story of Germany and Namibia, one that we will reach in later chapters.

A key operating principle dictated the colonial-era international expansion. Under the Doctrine of Discovery, lands that were unoccupied by Christians were deemed completely available for settlement by Europeans from the 1400s on.[4] According to the Doctrine of Discovery, although Indigenous Peoples occupied the land, they did not own it by European standards and were therefore unable to lay claims to it. By a systematic process, this idea of *terra nullius* (vacant land) guided the seizure of land for whatever purpose the colonizers saw fit, without concern for existing human or natural life aside from what was economically valuable. If a person could be used to power the empire, then their life was necessary to preserve, and if it conflicted with development, it was deemed unworthy. The eerie truth is that this sentiment still persists into the 21st century, into the economic and political models that allow for Global North powers to construct technology designed to solve their own environmental crisis in distant nations. Plants, minerals and people are all fuel for the relentless pursuit of progress. How much must we lose before we consider that time has not led to the development of a just society, one that considers every voice and not just the ones that speak in the language of wealth?

The Decarbonisation Consensus is a term that was defined by Breno Bringel and Maristella Svampa, referring to this concept, popular among wealthy nations, that economic growth is central to the organization of both economies and societies and that simply swapping renewables for nefarious fossil fuels will solve the environmental crisis.[5] This idea extends the market well beyond its original reach, encompassing carbon trading deals being constructed between hemispheres. CO_2 molecules become

representative of the entire climate crisis, symbolic of positive environmental changes. Along with the aesthetically pleasing marketing plan comes a dark underbelly - this Decarbonisation Consensus is a form of Green Colonialism. It operates by utilizing neocolonial ecological practices to cast the Global South as a blank canvas, ideal for sustainable development that will directly benefit Global North nations. Green Colonialism refers to the idea that the green transition of society is a legitimate reason for developed states, corporations and international bodies to enforce environmental policies or resource projects on developing countries.[6] It is a natural extension of imperial rule, reimagined with shiny bows and tinsel and all the prettiest things. A wolf in sheep's clothing, a Trojan horse if you will.

In this case, the wolf would be the vampiric desire to control, take and devour the abundance of natural resources and the sheep would be the beatific language surrounding these projects: "green, sustainable, environmentally friendly." These words allow for projects to get in through the castle wall and lay siege to the land. There is certainly heart in this quest for the survival of our species. We are united like never before by a shared desire to continue living on this blue and green planet, however, these goals are not met by a population on a level playing field. We are coming of age in a world that has seen centuries of extractivism, of land grabs, of war and bloodshed. How naive are we to fall for the latest in a long line of effective marketing strategies? How human, and how predictable.

In order to understand green colonialism further, let's dig into its rich nuances. What exactly is classified under the term "green?" It involves two dimensions - both environmentalism, largely in the form of conservation efforts, and a relatively new

environmental industry. This industry involves renewable energy and critical minerals production and climate change mitigation technology. The colonialism dimension of this equation involves both exploitative activities and territorial expansion wherein a ruling population makes decisions for an "alien" society. This naturally leads to the creation of a dependent relationship between colonizer and colonized. The colonial relationship relies upon the maintenance of uneven development within a global capitalist society. In a truly liberated society, one where colonial dynamics did not exist, the development of green energy solutions would look very different. It is difficult to even imagine this reality, as it is so distant from our own, but by understanding the history, we are better equipped to recognize when colonialism produces uneven power dynamics in the world of green transition.

Scientists have a moral obligation to fight for the good of humanity and take a moral stance in the face of climate change and socioeconomic inequality.[7] It has a rich history within the scientific field, from Darwin's debates with religious authorities to Rachel Carson's *Silent Spring.* Entire fields have sprung up within science dedicated to the betterment of society - from medicine to climate science to conservation work. As we, young scientists who are just beginning our careers, look towards the future, it is important that we remember that questioning the status quo and working to shift paradigms is not a new endeavor but rather one that researchers throughout time have tended to. It is important that scientists work in tandem with social advocacy groups. Our interests are highly compatible and supportive of one another.

From the eye-catching title *Beyond Beyond Analysts of Doom* comes a history of the Scientific Rebellion, an international organization that was founded in 2020.[8] They

are organizing civil disobedience rebellions that bring scientists together from a broad range of backgrounds and locations. The organization is horizontally organized so no singular person is in charge based on a perceived hierarchy. Rather, it involves scientists whose titles range from undergraduate to full professor. The discipline of membership varies greatly, bringing together people with diverse research interests. This is foreign in the highly specialized world of science, where people are typically filtered into niche sectors that keep them separate from not only society at large but also each other. Scientific Rebellion offers an opportunity for folks to come together with a shared mission: to go beyond simply announcing doom to enacting change on a personal, institutional and system level. This work is vital as the walls that separate us only serve to prevent us from working towards a collective humanitarian effort. Activist groups are necessary as they break down the rules of what it means to be a proper scientist. Going further than simply publishing a paper in a closed academic journal, one can create things that fall into many other categories and reach the public with a loud and direct voice.

Knowing that this organization exists is comforting to my soul. It is an answer to a question that arose within me as I became steeped in the world of science - where does my conscience go? Where does my ability to care about people go when I am shut into a laboratory, creating something that few will benefit from. I don't want to serve the oligarchy, pseudo-monarchy or president. I want to refrain from producing minerals in a more climate-friendly way that will be used to manufacture bombs. When I decided to become a scientist, I did so with the intention of bettering humanity, not recreating the very systems that I am vehemently opposed to. And I am not alone. In laboratories across the globe, in papers published in journals that range from open access to exclusive,

people are producing work that fights for human and environmental rights, that resurrects the history of science from its origin and sifts through the web to create something more ethical, more just and more adaptive to shifting environmental and political factors. We are united in working towards a just transition. This means that we not only shift the means of production away from fossil fuels and towards clean energy alternatives but that we go a step further and ensure that we avoid transferring the costs of transition to workers and their communities that are already at the "frontline" of climate change impacts[9]. It is unacceptable to simply transfer these 'zones of sacrifice' to a location that is out of sight and, therefore, out of mind. From the perspective of one of the wealthiest nations in the world, it is an option presented - place your clean energy developments in a country that is far away from your clean and bright borders. This sanitized vision of the green energy transition can appear just to the untrained Western eye, which makes it imperative that we scientists ensure that our activism extends to the public. It is a privilege to be trained so thoroughly in this field and to see the hypocritical realities from the inside. One must remain ever vigilant and continue to become educated in social issues for fear of doing the blind bidding of people in power.

The ambitious plans presented by powerful nations (the US, Australia, UK, South Korea and Europe) over the past five years offer a potential for the creation of Green Sacrifice Zones. These would occur in geographic regions where the resources necessary for this transition would come from; consider lithium and cobalt, both essential components used in electric vehicles. Nearly 50% of cobalt reserves are located in the Democratic Republic of Congo (DRC), which has led to extremely dangerous working conditions for miners and the extensive use of child labor. It has also been linked to the

DRC civil war. Meanwhile, the majority of lithium reserves are located in the Lithium Triangle, spread throughout Argentina, Bolivia and Chile, and their extraction places undue stress on already limited water resources. The justification of this action often includes an argument that critical minerals are absolutely necessary for transition to a low-carbon economy. This argument shuts down many necessary conversations that critique the ties between this green energy transition and colonial era extractive relationships between outsider and native inhabitants.

The idea of coloniality and its interactions with this movement of green capital must be understood. The colonial order privileges the material and cultural needs of whiteness above all else and constructs a religious fervor around the concept of salvation. Under this belief system, it is necessary to go into developing nations and "save them" from the environmental atrocities of the past. There must be room in this transition for consideration of the strengths and solutions that Indigenous communities throughout the globe have constructed. Rather than coming in as the benevolent outsider and offering a new order, developing reciprocal relationships that value the contributions of those living in these front-line communities is imperative in not replicating the history of colonial violence.

Although there is more social capital associated with science than art, for example, we function much in the same way as artists during the medieval period - creating beautiful paintings for wealthy clients in exchange for money. Many of us are patrons of institutions, governments and large corporations, our minds rented out to create a profitable product. We are at the mercy of capitalism, played into ornate patterns by its haunting refrain. Joining together with like-minded individuals who question the

cruelty inherent to much of this system is not simply an option - it is a necessity. It allows us to continue on, bringing our vitality, perspective and experience into science. Divorcing ourselves from our larger political beliefs and identity in pursuit of publishing relentlessly is effectively a separation from our own humanity. We are not puppets, we are living, breathing people, bringing with us a myriad of experiences that shape the questions we ask, the fields we feel welcome in and our ability to advance in prestige. Breaking this system down and creating a more egalitarian model that engages thinkers from all different points in the scientific community and beyond is excellent.

1.2 Blood Diamonds

"By 1908, the United States accounted for 75 percent of world diamond demand, followed distantly by Britain, Germany, and France. Although rich and middle-class citizens buying a ring in New York City or Chicago did not imagine themselves fueling a colonial engine in Africa, their purchases subsidized European violence in militarized zones extending from the deep mining pipes of Kimberley to the harsh Namib. To this extent, American materialism enabled European empire in Africa, with the beautiful luxuries adorning American fingers metaphorically tarnishing their owners with the stain of overseas exploitation and war. Americans became consumers of "blood" or "conflict" diamonds, well before such concepts existed." - Page 7 of Steven Press' *Blood and Diamonds*[10]

Although we consider ourselves far removed from the colonial regimes of the turn of the 20th century, the reality is that the path of distant consumerism links us to our extractive roots. Modern Americans, typing text messages on phones that use critical minerals mined primarily in China. The mining sites where Rare Earth Elements (REEs) are mined have caused environmental and health destruction across China.[11] Exposure to these minerals can cause any number of diseases including cancer, neurodevelopmental, neurodegenerative and diseases of the endocrine and immune systems to name a few.

There is a complex system of actors that conspire across the planet to first purify these minerals from their raw form and then to manufacture devices that are sold at premium to the wealthy and powerful. When I was in South Africa and Namibia, I became more aware of the power of the brand. A teenager I spoke to had her heart absolutely set on buying an iPhone and she asked me about all the specifications of mine. Prior to this conversation, I was not entirely aware of the impact of the brand name.

The middle men in this supply chain are made invisible. We do not see the people who are working in mines overseas, exposed to pollutants daily. We do not grieve the losses that they experience in the process of creating the devices we tap away at, creating research articles destined to hide behind a paywall or TikTok videos to entertain ourselves. There is something very meta about the whole experience. A power in purchasing something that is so far removed from the blood, sweat and tears that go into its creation. Growing up in a digital age, it seems impossible not to buy into this world of technology that weaves us together in webs that cross oceans and time zones. Lines that connect us, physical manifestations of the globalized world we now live in. What creates the perceived value of our products? The scarcity mindset, the vision of success. The text chains that go green when someone with an android joins.

With this modern model put into consideration, let us jump back to a little over a century ago, to the “discovery” of diamonds in the Namib desert. It is worth noting that, prior to colonization, raw diamonds lay in the sand, untouched. It was only with the creation of a complex economic system that they became worth a higher price tag. Thousands of dollars to buy romance and commitment. Happily ever after: with a price tag. Diamonds were first mined by those indigenous to the region: in the Namib desert,

this meant the San or Nama people. White collar bankers increased the value of stocks, Midwest salespeople claimed scarcity of product to signal higher value and wealthy society people flashed their jewelry in dark ballrooms. Were the socialites, the newly wealthy and those with old money, considering where the product they were purchasing originated? No. They were proud of the status symbol it offered - a signal that screamed power and success.

In Namibia, the creation of a mining empire began immediately following a brutal genocide. During this time, Germans placed the Nama and Herero in concentration camps, enacted extermination orders and mass starvation. It was not until the 1960s that this became known as an atrocity worthy of note in the eyes of world history. It is still contested today whether or not this event is considered a genocide. It was not until after World War II ended that the United Nations outlawed genocide in an instrument known as the *Convention on the Prevention and Punishment of the Crime of Genocide*.[12] This was enforced beginning in 1951. This means that all of the genocides that happened before this date did not happen, legally speaking.

1.3 Blood Hydrogen

"RWE legitimizes the original illegal transfer of ancestral Nama territories, permanently erasing the prospect of addressing the generational injustice perpetuated on the Nama people. It continues a legacy of extraction that has systematically excluded and impoverished our communities: first through blood diamonds and now through blood hydrogen."

- *Nama Traditional Leaders Association*[13]

From the European Center for Constitutional and Human Rights comes a 2025 case, advocating for the removal of German energy giant RWE from a Memorandum of

Understanding that it would purchase hydrogen for export to Europe. This is a direct example of the heinous disregard for Indigenous rights during this period of decarbonization. The EU plans on importing 50% of its green hydrogen supply, primarily from regions in the Global South. According to the United Nations[14] 2007 *Declaration on the Rights of Indigenous People* Article 10, Indigenous peoples may not be relocated from their land without free, prior and informed consent and with the option of return. Hyphen Ltd. has plans to construct infrastructure on Sperrgebiet, also known as Tsau //Khaeb National Park. The park, occupying 22,000 km², has the highest diversity of succulent flora globally.[15] The land has been closed to the public since 1908, following the discovery of diamonds. The park safeguards the Succulent Karoo ecosystem[16], classified as one of the world's top 34 biodiversity hotspots.[17]

On a purely ecological level, preserving this land is critical. Biodiversity hotspots are identified as containing at least 1500 species of vascular plants found nowhere else on earth and having lost 70 percent of their primary native vegetation. Some of these hotspots include the Caribbean Islands, Madagascar, the North American Coastal Plain and the Mountains of Southwest China. Some species in the Succulent Karoo region have an extremely limited range (less than 50 km^2)[5] according to a contribution from UNESCO World Heritage Convention. The region extends from the south-west through the north-western areas of South Africa and into southern Namibia. It is home to 6,356 plant species, 40% of which are endemic. It also has a rich variety of amphibian, reptile, mammalian and bird species, many of which are also endemic.

The plans made by Hyphen Ltd. to develop Tsau //Khaeb National Park endanger these internationally protected species. Given the endemic nature of many of these

organisms, some to extremely small areas, the environmental destruction that will accompany this development is sure to cause the extinction of some of these critical species that are native only to a very small geographic region. The Succulent Karoo biome is the world's only arid hotspot. From a conservation perspective it should be protected from development at all costs. Meanwhile, Hyphen Ltd. is planning to develop their project on ~4000km^2 of concessioned land located within the national park.[18] The plan, according to their website, is to scale up production in the Southern Corridor Development Initiative (SCDI).[19]

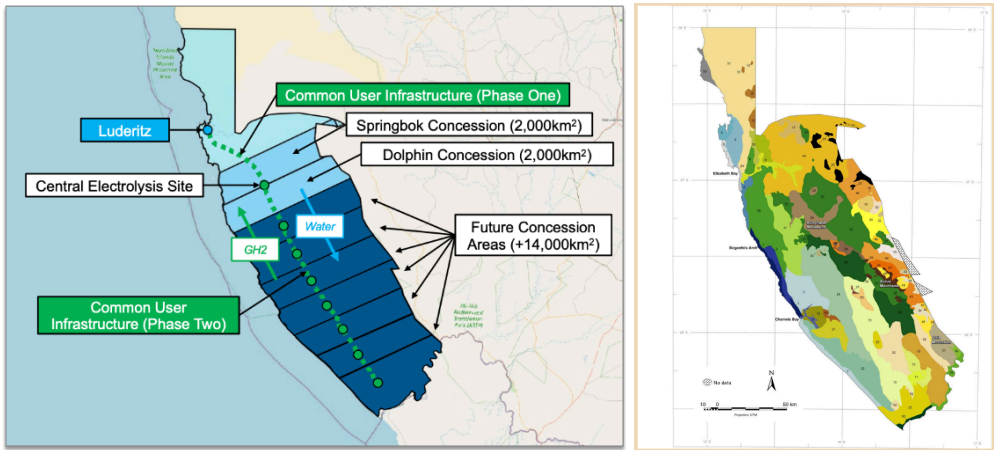

Figure 1. Image of the planned Southern Corridor Development Initiative on the left and image of the various vegetation types found in Tsau||Khaeb National Park on the right[20]

As you can see in Fig. 1, the intended SDCI covers the entirety of Tsau //Khaeb National Park and its wide variety of microclimates in turn. Hyphen is developing the infrastructure found in Common User Infrastructure (Phase One), which will be followed by the further introduction of additional electrolyzers, solar, wind and desalination plants. If the SDCI is successful, 22,000 km² of the total 116 000 km² will be disturbed.

According to a 9th-12th grade educational activity from National Geographic, conservation is necessary due to the historic exploitation of earth's resources.[21] It states

that, prior to the colonial-era, Indigenous peoples lived off the land sustainably, without degrading it. The National Park movement in the United States advocated for preservation of land without the interaction of people. Leaving land “pristine and untouched.” In Namibia, this led to the natural extension of Sperrgebiet, or the “Forbidden Zone” into an untouched National Park in 2004.

Effectively, the land has been inaccessible to Indigenous people since the introduction of a colonial presence during the turn of the 20th century. Since 2004, the land has been under preservation law. Prior to that, there was an Indigenous presence on the land that supported the flourishing of biodiversity. This separation of people and land is artificial and unethical. The reality of the UN’s rights for Indigenous peoples being instituted decades after the colonization and forced relocation of ethnic groups from the Southern regions of Namibia is that this right was already infringed against. The legacy of colonialism is felt today in the way that land is still inaccessible.

METHODOLOGY

2.1 Literature Review

A literature review was conducted to understand the case of green hydrogen in Namibia and the ways in which it fits into the global green energy movement. Sources were selected mainly using Mount Holyoke College Library and Information Technology's search engine "LITS" as well as Google searches. This search covered the ideas of technology, morality of scientific research as well as colonialism and the history of Namibia and Germany. A wide range of texts were analyzed and used to generate interview questions and further analysis of the information originating from the contents of the interviews.

2.2 Semi-structured Interview Planning

Semi-structured interviews were selected so as to focus on specific topics, with flexibility for the conversation to be more detailed in certain areas depending on the interviewee.[21] Generally speaking, these interviews are meant to be between 30 minutes and 1 hour, with a set of guiding questions to maintain a concise line of questioning. The interviews were recorded with audio to make it easier for the interviewer to remain focused on asking clarifying questions rather than note-taking. The interviews were performed with either individuals or small groups at the Global African Hydrogen Summit 2025. Interviewees were selected at random on the day of from the conference floor. The interviewees were informed on the risks of the study prior to consenting. A verbatim transcript was generated later using Kaltura, a technology that is supplied by Mount Holyoke College.

Interview Questions

1. When and how did you first learn about green hydrogen?
2. How will the people of Namibia benefit from the green hydrogen project?
3. What do you think about the social impact of this project in the Global South vs the Global North?
4. What, if anything, is the role of ethics, politics and culture in the development of the green hydrogen project?
5. Does the green hydrogen project disrupt historic legacies of colonialism or reconstruct them?
6. Do you believe that science is inherently good or bad?

The interview questions were selected with the goal of having a greater understanding of the general knowledge that conference attendees have of green hydrogen as well as the conversation on colonialism that has been circulating recently throughout academic papers and public news sources alike. They were intended to open up a larger conversation on the dynamic between Global South and Global North as well as the ethics of scientific research. They began with a focus on green hydrogen and gradually extended to consider the picture of science at large.

2.3 Interview Synthesis

The transcripts were generated using software called Kaltura. Larger themes were identified and connected to existing texts. The information was contextualized and some loose

ends that were presented by certain interviewees were followed for further analysis. A narrative structure was constructed from the various ideas touched on to make sense of the overarching story and add to the body of information already available.

RESULTS

3.1 When & How Did You First Learn About Green Hydrogen?

The interviewees[22] mainly learned about the topic of green hydrogen from the Namibian government's various representatives who have been spearheading the initiative from 2021 onwards. This is in agreement with search terms for green hydrogen beginning to increase worldwide[23] in 2020 and within Namibia[24] in July, 2021. Various political figureheads have voiced their support for the project, including former president Hage Geingob (2015-2024), James Mnyupe, who was the Green Hydrogen Commissioner from 2021-2025, who accepted a senior position[25] in the company thyssenkrupp Uhde, which manufactures chemical plants globally. He plans to bring this infrastructure to Namibia to advance the industry in concrete ways.

3.2 How Will the People of Namibia Benefit from the Green Hydrogen Project?

Overall, people mainly mentioned job creation, skill development, infrastructure development and economic development for the country. There was also an interesting perspective from Darius Green Hydrogen Village, located in the Erongo region in central Namibia, which is an example of a local project that is designed to give back to the community. The traditional authority where the Village is located has a 10% share in the pilot project. There

was a clause during the construction portion of the project that required 30% of subcontractors and material to be sourced from the local community. The buildings are made of red bricks with earth from the local area. The Green Hydrogen Village is designed to produce ammonium sulfate fertilizer. At this time, Namibia imports all inorganic fertilizers, mainly from South Africa and Japan. This makes the country reliant on other nations for agricultural production. The Village has a greenhouse where the fertilizer will be tested and it is all designed to be sustainable.

3.3 What do you think about the social impact of this project in the Global South vs the Global North?

It was mentioned in multiple interviews that this may be a form of neocolonialism, largely due to the fact that the energy produced will all be exported to Europe and that the burden placed on Namibia is substantially larger than what Germany is experiencing. A specific example of this is the pressure placed on the town of Luderitz, Namibia and the surrounding area. With an influx of people seeking employment, there will be a need for more infrastructure and likely an increase in crime. As interviewee #2 stated in reference to the plan for Hyphen to develop Sperrgebiet National Park, it would be unheard of in Germany for a National Park to be developed. As a result of this industrialization, the ecosystem is now in danger and the fishing sector is at risk. Additionally, the resource pressure that will be placed on Namibia to produce water and energy to fuel this new industry is substantial in a country where water is already a scarce resource, particularly the need for desalination facilities.

There were concerns expressed about the lack of adequate education offered to local communities in a language that they understand and using terminology that is accessible. This means that many citizens who live on or near development projects lack the ability to offer

informed consent. As a result, there is rampant misinformation that must be cleared up. Finally, the financial construction of the green hydrogen development project is questionable as a large portion of the money is borrowed from Europe. Although the current administration may be benefitting from the influx of cash, the youth will feel the lasting effects of this investment decades from now. In large part this project is designed to help decarbonize Europe, which is the largest emitter of pollutants, so it will be beneficial to them.

3.4 What, if anything, is the role of ethics, politics and culture in the development of the green hydrogen project?

As described by interviewees, the push towards green hydrogen has been mainly political, with the infrastructure and economic development necessary to sustain the plans functioning as a secondary priority. Formal documents that describe the plan are being created at the same rate as the desalination plants, solar panels and electrolysis buildings. The ships and pipelines necessary to ship resources up the Atlantic coast of Africa are not in place. In Europe, the hydrogen infrastructure is still under development. The public perception of the project is that it is haphazard, with the policies developing after the projects are already begun. The green hydrogen project creates an undue burden for the town of Lüderitz, forcing it to increase literacy rates as well as the land area of the town. It will also need to enhance the town's infrastructure, including roads, pipelines and energy transportation capacity, as well as plan new townships and a new port to sustain the added burden of people and energy. The town is centering the people throughout this development, speaking to a strong local leadership, but on a local planning and environmental level it will be absorbing the challenging shifts.

3.5 Does the green hydrogen project disrupt historic legacies of colonialism or reconstruct them?

There were a range of responses to this question. Interviewee #1 had a more nuanced perspective, calling attention to ongoing negotiations for reparations between Germany and Namibia. According to this interviewee, it is not as simple as a reconstruction of colonialism given the range of countries besides Germany that have invested in the industry, and their respective interests. This person also brought up the industrialization plan that Namibia is following with an investment in both fossil fuels and renewables. They spoke to an unfairness regarding the current energy landscape where industrialized countries that developed with the help of fossil fuels are now dictating that everyone switch to renewable energy, which can be unreliable for those low-income countries that are seeking development.

One of the interviewees mentioned that the green hydrogen project is vehemently opposed by the Traditional Authorities in the Kharas region as they do not want the land where their ancestors lost their lives to be developed. This respondent explained that in African culture it is very important that descendents be able to visit the grave site. People are very angry because of this. Meanwhile, the other respondents were cautiously optimistic, referring to job creation as well as the potential for green hydrogen to offer Africans the ability to have a sustainable energy source and to be less import dependent. As stated by Interviewee #4, it could be a game changer for the chronic and multidimensional poverty that Namibia deals with, offering an opportunity to expose young Namibians to a sector they would not otherwise encounter.

3.6 Do you believe that science is inherently good or bad?

All of the respondents were optimistic about the potential that science has to do good. Respondents #1 and #4 in particular dug deeper, explaining that it is less about the nature of science than of people. It depends on who the scientists are and who commissioned them. People attach their personal interests to the process of science and it becomes increasingly subjective. To some extent it is beyond the power of scientists, even, as larger forces that move the money determine the questions asked, supported and funded.

DISCUSSION

4.1 The Creator of the Project Determines the Fate

Prior to conducting interviews, the only green hydrogen projects that came up in the literature review were designed by outsiders, such as Hyphen Ltd. The papers seemed to tell a story that the project is very clearly a colonial invention and did not reflect the diversity of thought and intention found within individual projects. From the interviews it became clear that there are a wider range of projects that have different objectives in mind. For example, the Daures Green Hydrogen Village offered an example of how green hydrogen technology can be implemented to center the needs of locals. The project was designed by Namibians, for Namibians, and you can feel that in the thoughtful details that benefit local communities, as opposed to some other projects that are clearly designed by foreigners with their benefit as the main priority. Daures sources materials locally, has allocated a portion of the profits to the

traditional authority of the local community and is producing fertilizer that is meant for use within the country. Comparatively, projects like Hyphen produce a product that is 100% intended for export. Hydrogen will leave the country and even the geographic region of Southern Africa, bound for Europe. The economic construction of Hyphen bleeds into the historic relationship between North and South and resource extraction without reciprocity. This conversation brought to light the fact that there is nuance within the various projects. They are not a monolith, and must be considered in their specific detail. It is not that green hydrogen is inherently bad, but rather that the goals of the designers of the project dictate the way that it will be constructed and who will benefit.

4.2 The Evolution of Science

> It depends who the scientists are. It depends who commissioned the scientists. If you look at the Albert Einsteins of this world, not only was he a pioneer in good science; he was also used for bad science. But at the end of it all, it is the funders. The scientists are not billionaires. They are people with knowledge and it is ultimately the funders that decide whether such science is good (Anonymous informant #4, 2025).

Under this model, scientists are not dissimilar to any other contract worker, at the mercy of their benefactor. Throughout this conversation, I thought of the book *Hitler's Scientists: Science, War, and the Devil's Pact*, published in 2004.[26] It details the ways in which German scientists in the early 20th century contributed to the Nazi regime. The book reminds us of the argument that basic scientific research is apolitical, uttered by scientists worldwide. The origin of the argument that science is objective comes from feminist scientific theory. This field evolved in the 1980s and 1990s, a natural extension of feminist theory, cultural studies and technological studies. According to Janet A. Kourany in her 2010 publication *Philosophy of Science after Feminism,* value-free science is as old as modern science itself.[27] Throughout the centuries, "Value-free science stood the test of time and in its long and distinguished career it garnered

support from such varied sources as the seventeenth-century idea that nature is merely matter in motion, devoid of qualities such as good and evil; the eighteenth-century idea that science deals with facts and that facts are distinct from values; the nineteenth-century idea that the sciences should be impartial resources for the solution of social problems; and the twentieth-century idea that the establishment of scientific truths is a purely epistemic affair." According to this argument, there is no difference between green hydrogen technology used to generate financial gains for Germany and a similar technology implemented with the goal of generating resources that support local populations.

Kourney continues to explain how the idea of value-free science transformed into the concept of socially responsible science, where scientific success can be measured in terms of social success in addition to empirical advances in scientific knowledge. This idea is the consequence of those with subaltern positionality contributing to the field of science. Dominant identities and their associated belief systems generated a stark reality that was monolithic, and then the subsequent diversification has generated a more complex and nuanced understanding of science. The identities of the researchers and entrepreneurs directly contributed to the construction of the project and the lens through which it was formulated.

The discipline of Black Feminist Thought can offer further understanding of how identity informs the construction of a nuanced political perspective. As defined by Patricia Hill Collins in her seminal work[28] on intersectionality defines critical praxis as the ways in which people use intersectional frameworks in their daily lives, whether that be in an academic setting or otherwise, to find solutions to social problems that come with complex intersecting identities. One does not have to have academic training and pedigree to produce political work. Lived experience is enough to inform theory production, as Barbara Christian[29] wrote in her 1988

article, *The Race for Theory,* "For people of color have always theorized – but in forms quite different from the Western form of abstract logic." Christian speaks about how the feminist revolution of the 1970s spilled into academic spaces in the 1980s and 1990s, prioritizing and upholding ideas crafted in language that could fit into an academic journal, on a dusty office shelf or in the minds of those who built the ivory tower. In considering interviews from people directly experiencing this issue of environmental justice, their words and ideas are just as worthy of consideration as those found behind a paywall, written by someone who is an "expert" in a topic that is someone else's everyday lived experience. The identities of the scientists who are constructing the solutions is central to the construction of solutions.

4.3 National Security

Part of the motivation for Europe to turn towards renewable energy sources over the past few years has to do with issues of national security. According to anonymous informant #2, a European, a big motivating factor for Germany to invest outside of the European Union was the 2022 move away from Russian energy. Further literature search identified the validity of this argument. Russia's invasion of Ukraine in 2022 caused a global increase in natural gas prices, one of the largest shifts in the global market since World War Two.[30] Since then, Russian imports of natural gas to Europe have reduced by 80% as pipelines through Ukraine have been disrupted. This forced the EU to look for energy sources abroad, and corroborated the initiative begun in 2010, known as Project 2030, that demanded a transition towards renewable energy and away from fossil fuels.[31]

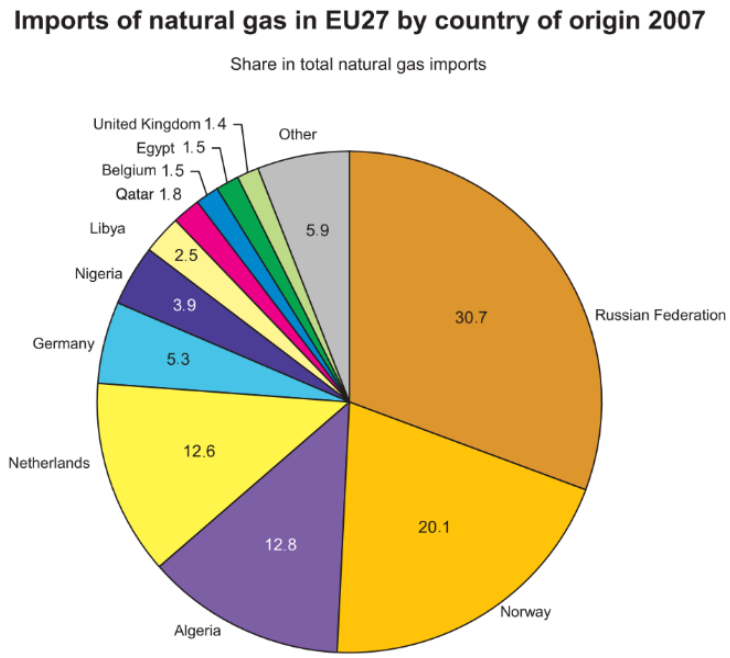

Figure 2: Imports of natural gas by country of origin in 2007

This places the transition to sustainable energy within the landscape of national security issues. Germany's move to source green hydrogen in Namibia can be traced, at least partially, to the war in Ukraine, some 8001 kilometers away as the crow flies.[32] Given this information, the move towards green hydrogen in Europe is a political issue, one that is woven into the complex intercontinental geopolitical landscape and global gas and oil prices. Namibia is consistently ranked in the top 3-5 most peaceful countries in Africa, so conflict is unlikely to cut off energy resources.[33]

4.4 Dual Investment Strategy

National security for Namibia is also important, as the country is currently largely import dependent. Because of this, they have decided to invest in multiple energy sources to have a

diverse portfolio that can weather shifts in the economy. In the two years following the 2021 commitment to the green hydrogen project, there were five major oil discoveries.[3][4]

Figure 3: A post on twitter from former president Dr. Hage Geingob

At the December 2023 UN Framework Convention on Climate Change Conference, or COP28, president Hage Geingob asked the public a hypothetical question, one that was all too real for Namibia (Figure 3) To have a major discovery in fossil fuel resources immediately following a substantial investment in sustainable energy (80 percent of Namibia's annual GDP during 2021) creates a conflict of interest for the country. After a brief period of deliberation, the country decided that it is a strength rather than a point of contention. Namibia has decided to pursue a "dual" strategy, wherein the country invests in both oil and green hydrogen. This decision is wise given Namibia's designation as a low-income nation. There are multiple needs

here, to both create a climate-resilient country while also pursuing industrialization and the resulting economic development. The decision to invest in fossil fuels may be controversial from the perspective of an industrialized nation such as Germany that grew during the early 20th century and is now focused on investment in low-carbon industries, but the reality is that the solution here must address multiple interests, and therefore be equally nuanced.

DeBoom makes the argument in her 2025 article on the dual investment in green hydrogen and oil in Namibia that, for low-income, high resource countries in the Global South such as Namibia to invest in both is not counterproductive. Rather, investment in a fossil fuel that is currently relied upon internationally offers financial stability if the global economy shifts its focus away from a commitment to green energy alternatives. Although it is currently true that the market is prioritizing renewables, that could shift with changes in priorities. Green hydrogen specifically is a risky investment given the lack of existing infrastructure and the need to ship it a long distance from Namibia to Europe. Although it may be successful, ensuring that the country has economic viability in the meantime is imperative. Investment in oil also offers the ability to have a larger financial stake in future sustainable projects. Currently, the country has to cater to the needs dictated by more powerful nations that have more wealth and therefore more political power. Money speaks, and having the ability to communicate in the same language offers a more level playing field as the country transitions to sustainable resources.

Placing pressure on Global South nations to be the picture of morality is unfair as they have undergone various horrific events that have prevented them from growing at the same rate as the colonizing nations. If green hydrogen were to go completely bust, it would leave Namibians floundering without adequate financial resources, placing the youth in a precarious position. Diversifying the portfolio of investments offers greater security. As the global energy

landscape shifts away from high-carbon and towards low-carbon investments, having a stake in both allows for a smooth transition and greater resilience in the face of shifts in the market. Crude oil prices have increased substantially in the wake of the invasion of Ukraine, creating a market that is more willing to pay a premium for the resource. The ripple effect creates opportunities for low-income, resource-rich countries to benefit from geopolitical crises.

4.5 Reparations

One of the interviewees mentioned the potential conflict of interest between the work currently being done between Germany and Namibia to give reparations to descendents of the Nama and Herero genocide of the early 20th century and the majority stake that Germany currently has in the green hydrogen projects. This pursuit of reparations will have play a substantial part in determining how green hydrogen develops in the future. The German-Namibia reparations case is the first of its kind.[35] It began in 2015, when Germany acknowledged that the Empire had committed genocide on its colony, known as South West Africa prior to independence. Germany has made reparations for the victims of the Holocaust, but victims of other forms of extermination with the intent to destroy also seek recognition, commemoration and compensation in the form of reparations.

However, there are limitations to the pursuit of reparations as the uneven power dynamic between Germany and Namibia still exists today. When I was in Namibia during the first few months of 2025, a representative from the Ovaherero Genocide Foundation came and spoke with the American college students who were a part of my study abroad program. She explained that the negotiation period was ongoing as the first wave of discussions had happened in a closed room with only government officials from both countries present. Because the government of Namibia is mainly run by the Ovambo ethnic group, Nama and Herero representatives were not

present for negotiations. The government agreed to a number that was insultingly low, and was rejected, with an agreement to go back to the drawing board and renegotiate.

The Herero and Nama seeking reparations is a landmark case, and is thought to be one of many as various African countries seek reparations from their former colonizers. The African Union[36] (AU)'s theme of the year for 2025 was "Justice for Africans and People of African Descent Through Reparations." The AU has been working towards reparations and justice since 1963. The organization argues that the scope of the conversation extends beyond historic injustices and into the current fabric of societies around the world. The amount of lives and wealth lost at the hands of the Germans has created the lasting socioeconomic imbalance that causes the current green hydrogen initiative to center European needs.

Thorsten Hutter, Germany's ambassador to Namibia since mid-2023, says that the two countries are linked by a long and sometimes painful history, but that today, relations are diverse and future-oriented. This optimistic and callous perspective may prove destructive to Germany's ability to win deals for green hydrogen development projects over other European countries which do not share such a violent and extractive relationship with Namibia. True justice in the form of financial reparations being taken seriously is essential beyond the band-aid of apology and acknowledgement, and the Indigenous groups who were most affected by the violent colonial crimes must receive compensation. Even a large sum of money cannot bring back the lives that were lost, the homes and livelihoods and culture that was exterminated in the name of building an empire, but true action is imperative if Germany seeks to continue having an influential role in the green hydrogen project.

CONCLUSION & FUTURE DIRECTIONS

The issue of green hydrogen in Namibia is deceptively simple from the perspective of academic papers constructed with a specific line of reasoning in mind. In reality, there is far more nuance. For a high-resource, low-income country such as Namibia, investing in green hydrogen offers the opportunity to industrialize. In a country that has largely been left out of the global economy, the potential for this to increase the options available to residents is real and inspiring of hope. It is worth noting that those present at the conference have a greater knowledge and incentive to speak positively about green hydrogen than someone picked at complete random. Further study that involves a wider population would be helpful to understand this developing story.

More research into alternate projects that center the needs of Namibians should be conducted. A deeper understanding of why people are in support of this project is necessary, and more research that comes from Namibian and other Global South researchers. This work was done largely solo, partially because I am a Global North researcher and partially because I am a college student with limited experience. The experience of self-examination of my own perspective conducted throughout was powerful in shaping my own future directions. There is a profound irony in discovering that you are following the very dynamic you seek to reveal. Being a privileged academic from the United States, accessing funding and support of this project was relatively easy. The breadth of academic papers that already exist on the topic of the green hydrogen transition in Namibia comes mainly from American and German researchers in the social sciences. The systemic imbalances that generate the power dynamic found within the green hydrogen development project are also found within science, with certain people being

given far more support than others. From the work of Black Feminist Thought comes the idea of critical praxis as a lens to perform research. Having more Namibian voices uplifted in this conversation is imperative, or else the narratives of those outside of the context shape the line of inquiry.

As a group of Global South[38] researchers state, although Diversity, Equity and Inclusion (DEI) work has increased over the past few years within the scientific community, "little has been done to overcome the scientific labor division in academic research that promotes neocolonial practices and jeopardizes equity." The group advocates for three strategies to promote justice and equity within science. Firstly, diversity in scientific groups, such as journals, boarding members and scientific meetings and groups, should be increased. This is because the decisions made by leadership are informed by their personal experiences and background, and therefore having more diverse perspectives present will enrich the access and reach. An example that the group highlighted was that of non-native English speakers facing barriers to publishing. Considering the language barrier issue that Namibia is facing with green hydrogen development, having more people in scientific leadership positions who speak local languages would allow for greater dissemination of knowledge and informed consent.

Another action advocated for by the group is the potential for citation bias and the need to cite Global South researchers during the research process. During this research process, I found that most of the academic articles published on the subject were coming out of the Global North. Future work would further highlight the work of those coming from the Global South, as this was not a concept that I was focused on.

Further work should be performed on applications of chemistry in the green energy revolution to understand the ethics of the project. Although it does not necessarily need to be a

published article, conversations on the sociopolitical context of scientific technology should be explored more in scientific spaces. Citation bias should be discussed when chemists are performing research. Activism and science are compatible fields, but they require intentionality in their synthesis. Consider the identity and positionality of the scientists who are creating the work that is being widely referenced and consumed. Push back against the argument that science is value-free and apolitical. In reality, it exists in a world that is complicated by historic inequality and requires interdisciplinary analysis to truly understand.

In the case of green hydrogen in Namibia, it will be interesting to witness the next few years as so much has developed in the short time since the 2021 green hydrogen project took hold. We are living in a time of rapid decarbonization, which is exciting to witness. However, in using our scientific backgrounds in working towards environmental justice, let us consider the intersectional identities informing this green industrialization and dig deeper. Our commitment to social justice should follow us into the laboratory, the research publication, the board position, particularly for those of us who come from the Global North and have intersecting identities that offer us privileges that extend into science.

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APPENDIX

Interview transcripts[1]

Question #1: When and how did you learn about green hydrogen?

Answer #1:

I learned about it when it started booming with Green Hydrogen. Green Hydrogen started to pay attention from the global or international companies and how they were seeing the potential and how our previous president, Dr. Hage Geinko, he had this ambition of green hydrogen and green industrialization, but this was an ambition for me many, many years ago, but it only started being realized around 2021. That's when there was actually a call out from the German government for pilot projects, and that's where this company, Darius Green Hydrogen Village, actually applied for that call, and that's how we received our initial funding to actually develop this project. So I learned about it around that time, and that's also the time that I started doing my masters in renewable energy so a lecturer of mine actually spoke to us about the industry and he's the one who actually brought our attention to everything and then at some point I did get an internship here at this company.

Answer #2 & #3:

My case was in 2015, in Victoria at CSIR, and then I was invited to a study tour in 2016 in Germany, and we visited some places around the hydrogen region. Do you have more information or outside? However much you would like to visit. I think it was a five-day trip and we visited different companies. We went to a company, UNIQA, it's an affiliate company, We had done a pilot project with the United. Then we went to Dresden, to Sunshire. We built the first decks for an electrolyzer. And yeah, that was the first one. In 2019, I guess, in detail, because we modeled power systems in Germany and Europe and had different scenarios. One scenario we introduced was for hydrogen. So what happens if there is an uptake of hydrogen, especially green hydrogen, and how it would influence prices in European power markets. And, yeah,

[1] The transcript was created using Kaltura software. The author did some editing for accuracy, but there may be some errors given the lack of precision in the software. Also please note that the interview with subjects 2 and 3 was conducted together.

obviously, it's seamless energy, and, yeah, you know, basically, so, yeah. But mostly power, not hydrogen. It's, yeah, no electric, not hydrogen. Okay.

Answer # 4:

Well, I work for the Lüderitz Town Council, and the government of the Republic of Namibia introduced the concept of green hydrogen to Lüderitz. and they then identified Lüderitz as one of the towns where the industrial scale plant would be located and this this is how I found out about green hydrogen. Okay.

Answer #5:

I think it started in 2020. It started somewhere, 2020, 2022, when I attended the same, it was almost the same conference, so let me say the same summit specifically talking about green hydrogen. If I look at it green hydrogen came together with the oil and gas that was the time when we recognized that these two sectors are coming up in Namibia and have potential.

Answer #6:
It was 2022 when our delegate, can I mention the name? When James Mnuype introduced green hydrogen to the Namibian sector, whereby he was talking about the future plan for this whole green hydrogen, how we are going to decarbonize our carbon emission in Namibia. Yeah, it's the first time I heard about it, of course. Okay.

Question # 2: How will the people of Namibia benefit from the Green Hydrogen project?

Answer #2:

Well, I can't speak about hydrogen as a whole, so I'll speak in the context of this project specifically. So this project's ambition is actually to produce ammonium sulfate fertiliser, which is ammonium-based fertilisers and one of the ways that Namibia can benefit from this is that we import all our inorganic fertilisers and because we import them the prices are not, a lot of Namibians, the average Namibian cannot afford fertiliser from the store so what they use is they use their organic fertiliser which does not have enough nutrient contents within it and You can't control the different nutrient contents in it for your specific plants to grow. So we do have a food security issue as well. And we do live in a semi-arid country. So fertilizer is a very important thing within the agricultural industry because our soil is not that suitable for crops. so because we import everything very dependent or reliant on all these other countries which is not the

safest thing to think - yeah a country should be self-reliant um from the top of my head i can name South Africa and Japan oh interesting yes yes those are some of the countries that we actually get our fertilizer from um so any fertilizer that you actually do buy from the stores it's not locally produced we don't have any manufacturers of fertilizer here so one of the the main goal that this project was looking at was how can Namibia benefit from the green hydrogen sector now as opposed to waiting for the industry to actually mature and for it to just grow because as we know the hydrogen industry is only abroad right now like the main yeah so a lot of these goals when they're at their industrial scale what they're looking to do is they're going to produce the hydrogen here. And then export it to Europe. Exactly. Yeah. Exactly. To help with the decarbonization agenda within the global goals. Right. So we were like, okay. How do we benefit? Yes. Actually, maybe it's now? Now. Yes. Yes. Yeah. So what we found was agriculture. Yeah. It's a very big sector within the country and it contributes to our GDP greatly. So that is something that we were looking at and we even do have the agricultural component to the project we have a smart greenhouse on site and it's one hectare big so it's very big and what we're trying to do is we're going to I know yeah so what we're trying to produce this fertilizer where we can also use it in our greenhouse and have an end-to-end solution where So we will be able to use some of that fertilizer that we produce on site in our own greenhouse and have carbon-free, it's a circular economy, exactly, very very cool, and then we'll also be able to provide Namibia with its own fertilizer, its very first carbon -free, I mean there's no carbon premium in Africa right now, the carbon premium you'd get in the European countries in the western countries but we have carbon free fertilizer that we can be producing and selling to Namibians where we won't have huge like prices or price deficits in terms of importing things because when you import things there are other costs that are involved because now you have to include your logistics costs and the taxes and whatnot and potentially while producing something locally you could also get a tax break from the government actually that's the government can actually support this specific project. So there's government funding you said? No, no, no. Initially, we got a grant from the German Federal Ministry of Research and Education. That grant allowed us to actually procure and develop this project until we could produce ammonia. And right now we are in the testing and commissioning phase of that ammonia plant. Okay. And then we managed to get an additional grant from the UN, so from UNIDO. And what that grant will allow us to do is it's enabled us to actually be able to unlock this ammonium sulfate plane. yeah yeah so that's where our funding has been coming from we are now busy with business casing and we're trying to raise additional financing so we can actually upscale all of this so it doesn't have to be on a pilot level anymore okay yeah that's okay it is very exact a very interesting project I love it so much but also another way that this project actually benefits the Namibian community is that we're developing this project in communal land So, it's not owned by the government, it's owned by the community. Where is it located? In the Darius constituency, so it's within the Erongo region. Like, yeah, central Namibia, but more to the coastal side. So, central, western Namibia. Yes, it's around there. So, what we decided to do is, we decided to give the local community ownership of this project. So they have 10% share of view within the pilot project, actually. So the traditional

authority and the conservancy, the system conservancy, they own 10% of the project, and there's a trust where those shares fall into. So that's how it benefits the local community, per se. And then we also did, during the construction of our pilot project, because we already finished the construction last year, we had a clause in one of our country for our main contractors stating that 30% of your subcontractors and your material should be taken from the community So that that did happen As you can see I don't know if you want to see our buildings but maybe in the videos You might be able to see them but all those buildings are built with red bricks Like every single building is just red bricks. They're not painted over and nothing because it looks very pretty Yeah but all those red bricks actually come from the area wow yeah so that's another way in which we actually supported the community through our contractors.

Answer #2 &3:

I think one point would be that additional jobs will be created locally. It will then provide jobs in construction and hopefully also permanent jobs in the long term. Then they expect that they can also somehow some benefit from the energy, which maybe will not be all utilized for Germany, but also the food population of Namibia can benefit because also the prices of these big gigawatt projects should be quite low compared to other projects. And I think that would be also a benefit. And the last one maybe also if they have a strong supply of this and maybe they can also add some other industry in the value chain, for example, green steel and so on, that can maybe also offer these services. Yeah, I mean, again, that's it. Economic benefits, shared infrastructure, let's see how it all works out. But I guess, yeah, could be some benefits, but it's very highly dependent on what is going on in Europe, who's the off-taker, and is there any off-taker? Right. So job creation, but the infrastructure here, like do you think that Namibians will... I mean, like Uber said, maybe some power of the, like this Hyphen project, for example, could be used for power uses for the Namibian households and industries, so like shared infrastructure, so this would be the benefit in this term, for example, and also like maybe not all the hydrogen should be shipped to Germany or Europe or I don't know to really explore new way of chains here like quick steel and so on and really this clean industrialization idea or strategy they developed could be benefit from the whole hydrogen hive of our hydrogen developments here.

Answer #4:

Employment, a different sector, economic sector that is currently not in the country. and I'm hoping that we also benefit from some of the power that will be generated. We are informed that all generated power will leave the country. Yeah, so I think employment and economic sector, and hopefully the country can generate some money and revenue through royalties, etc. But as of us benefiting from the power itself, that remains to be seen.

Answer #5:

Oh, the benefit is a little bit quite higher in terms of logistics since we have the, especially in Walvis, but we have the port company. We are the second, let me say the first hub in our, in Africa actually, with our airport. and the benefit when it's coming to the SME development, the benefit when it's coming to the, even the infrastructure itself, just to make sure that our roads, they are well taken off, the roads are okay. So even when it's coming to the skill development, the skill transfer, when it's coming to job creation, a lot of jobs will be created to the, from from this specific sector. It's quite a lot of benefits that a country at large will benefit from this sector of Green High Project. A lot, I'm so sure if you are reading media, a lot have been said. However, when it's coming to employment creation, when it's coming to community development, when it comes to skill transfer, when it comes to capacity building. When it comes to investors, you will of course have a lot of investors to do this specific sector. Of course a lot will happen and of course a lot will benefit the Namibia nation as a whole.

Answer #6:

Currently, they will be benefiting in different portions. At first, I would say into skill development or job creation to the youth in Namibia. So 70 percent of Namibians will be employed in this project 70 to 90 percent of Namibia basically they will be employed really yes so it's only 10 percent that they will include the extract outside Namibia yeah so that one is a huge benefit and also the end product which will also benefit Namibia in a such way that we use this hydrogen to create ammonia or to make ammonia which ammonia sulfate which is a fertilizer for crops and it will be used for irrigation purpose so the green scheme that we are running in Namibia.

Question #3:

What do you think about the social impact of the green hydrogen projects in the global north versus the global south?

Answer #1:

I mean, right now in terms of the social impacts, I think the one thing that the communities are actually just afraid of is them not benefiting from this industry, but that's also coming from the space of them not understanding the industry. There's a knowledge deficit, and one of those knowledge deficits actually comes from the fact that not everyone's preferred communication medium is English. so people need to learn how to actually simplify all these technical terms and all these projects and what not to a simpler version of English to even just the local languages so people actually understand what is happening in their country because at the end of the day, this is their country. They need to be made well aware of everything that's happening and right now there's a lot of miscommunication and misinformation or disinformation What do you think some of the common mis- or disinformation is? Well, I mean, there's just a notion that they think that

every single one hydrogen project means the entire country. So their crowds and their issues with specific projects are directed to anyone within the field, and they also don't understand what hydrogen is. There have been some instances where, for example, my mom told me that, no, she was at church, and the pastor said that no the hydrogen is the reason why we don't have rain in the community oh okay yeah yeah so there's just like a bunch of that because people aren't listening I mean even when you go out to the community because I also do need some community engagement sessions within the specific area where our project is located so I go around the community with our community liaison officer we teach them about the industry and he translates it for us we go around with a few translators with the main languages that they actually speak within the specific areas so they will translate that information for them so they actually understand what is going on because then they can actually make some informed decisions about these things in terms of even leadership for example like when we're voting for our different leaders and they're talking about specific issues and projects within the community now the community members actually understand what these projects are and they can now decide to either support them or not support them up to them but now it's actually coming from an informed space so that is that is one of the things because I do note that in the western countries people understand what the industry is I mean a lot of people are like is it not just like Another, like within Namibia, they're like, is it not just another form of, is it neo-colonialism? Yeah. Where all these countries... What are your thoughts on that? I'm not too sure. I'm very subtlete about it. Yeah. Right now, because my thing is all this funding that's coming in, they are, they're giving us all this funding. Yeah. But then the problem is, is that there's no such thing as free money. Yeah. in as much as yes some of the funding is broad funding there's no such thing there's usually always terms and conditions that are attached to this funding right and that's not something that us as Namibians as the average Namibian we're not going to be privy to these things like our our government right now they've taken up like in the national project which is the hyphen project they've taken I think it's 24% stake yeah that is a lot of money it is we do not have the cash before that so the government had to go borrow take a loan right yes exactly so borrowing that money also comes with its own conditions and the problem now is that these implications from these conditions they're not going to be felt by the current administration it's going to be felt by us the youth yeah and then we are if it's negative we are going to be the ones what thoughts of actually mitigating all these different issues that are going to arise from these specific conditions that I don't know of because I'm not a politician… I'm not part of the administration I'm in corporate man yeah I'm just here to do my job for sure so that's just one of many things I think it's um what do you call it I forgot the word it happens it happens yeah um I did remember a question I had earlier, how much fertilizer are you going to produce versus the Namibian demand? In its pilot phase, do I remember the figure? I'm trying to remember but it's not that much. I think we'd be able to produce, like for us we would just be taking 10% of what we're producing in the pilot phase and we'll use that on site. and then the remaining 90% would be off taken by the by Namibia so and this is just ammonium sulfate though yeah like we have to make that distinction okay when we say fertilizer people probably think oh it's just standard

fertilizer but they don't understand if there are different kinds of fertilizer that you use according to what your plants need yeah yeah so ammonium sulfate what it's the most ammonium sulfate yes it's just a fertilizer that's a mix between ammonia and sulfuric acid yeah those are the two main products they're the only product products that you actually use to make that specific fertilizer but it was also like economically feasible it was the most feasible fertilizer to use at the moment because if we were to make ammonium nitrate that would require additional steps more technology more money okay we didn't have yeah so as a stepping block it was ammonium sulfate first yeah and we're going to be producing that in a liquid form because in the granular form that's also more expensive okay you have to add a dryer yeah yeah it's more expensive right now it was budget cuts yeah but I'm not too sure I think maybe memory memory do you know how much fertilizer we're producing in the pilot phase in comparison to I will get back to you on that, you can actually just give me your email address or number, whichever one is most suitable and I can actually get the exact figures for you, yeah, I mean you have my email address, yes, that's true, I do, I do, yes, I do. Note it down okay um okay

Answer #2&#3:

Social impact? In Global North and Global South? I'm not an expert in this whole project development here, but I know that some projects are from some national parks. And this is kind of a huge problem, which never happened in norther Europe or like norther regions. And this is kind of an unbalanced problem. We can build things that we can convert in Germany, for example. We can build it here. And kind of like this, something just to the neo-colonial vibes that we are now always extracting new fuels and so on, to close off, because it's there, it's cheaper, and that's my perspective. I want to be anonymous here. Yes. Don't worry, anonymous. Yeah, no, from my side, I think what I can add is that yes, it's a big project, so are planned in the Sperrgebiet, it's a big national park, and there are also some other interests in this area, one is mining, mining is quite strong, second one is some concerns with this project around water supply, because they need quite a lot of water, and we know in Namibia it's quite a dry country, and they need also to make some plants accordingly, and what We can see already that some people are expecting already jobs in the near future. And now for example Lüderitz is a smaller town. Where now the people are already hitting you and it's now already overcrowded. And they have some challenges because the people are going to these towns like Swakopmund, Walvis Bay, Lüderitz. They are looking for jobs. But at this stage only two jobs are available in this area. But there's a water problem, don't they use seawater for this to de-mineralize it and then you have to use de-mineralize water for this? Yeah, but then on the other hand the people can't farm the agriculture or whatever and they're doing this only to produce electricity to shift to Europe. Although they should have a portion also for agriculture. Especially the fact that it's in Sperrgebiet, the national park, it's even more bitter taste because in the past, Germany called this thing Sperrgebiet because there was a huge diamond rush over there and nobody could find it. And now some companies with German chairs are coming back to Sperrgebiet and highlighting

the space again. And this is kind of a bitter taste, I would say. Yeah. But don't say this too high as the word we send you. But I just learned that hype is mostly all by some experts. And I try only a minority share. I just got told by a five type. Yes. No, you're all good. And it is confidential, they will not hear.

Answer #4:

Okay, so, of course, our picturesque natural landscape will be impacted. Yes. It's in the national park, right? Yeah, that'll be impacted. Your flora, fauna, wildlife, and then of course, with this type of development, I'm worried about crime; it will increase, because you will have more people. And I am also a little bit worried about our natural lay of land, as I may put it. It will not be the same. The birds will have to find a different sanctuary. Also, the fishing sector is at risk, so it needs to be managed quite prudently and then the other risk of importation of skills would it rather be wise for those in control and in power to rather upskill Namibians to the level of specialization instead of saying that the entry-level jobs are reserved for Namibians. That is not sufficient. So I see an imbalance socioeconomically, and unless there are deliberate attempts to include Namibians from your entry level to your specialized field, you might do an injustice to the locals. So I'm cautiously optimistic, and what worries me even more is that we don't have a legislative framework, we don't have policies, we don't have acts. There's nothing to guide us in terms of the rules of engagement when it comes to green hydrogen. The other risk factor is that now we have, for lack of a better description, foreign people that will assist us in writing the policies. And they will tailor it in such a way that it benefits them. Yeah. So, yes.

Interviewer:
Yeah, especially in the context of Luderitz, I've been learning about the history, the diamond mining, and then the Forbidden Zone, and then the National Park, and then the Green Hydrogen Project.

Interviewee #4:
Yes. Yeah. It is. One cannot but worry because there's such a vacuum and it's open for manipulation in the wrong hands. Yeah. I hope it goes to he right hands.

Answer #5:

When it's coming true? The social impact? The social impact with the green hydrogen in terms of environmental-wise, green hydrogen doesn't have much social impact comparing with the others in terms of that it doesn't pollute it does not cause any pollution or something however the social impact in terms of i can say in terms of environmental wise it's okay there's no nothing much Let's go there. Okay. Post. One second.

Answer #6:

Social impacts it's it's uh one of the conflict that is currently ongoing because they They have to attain the assessment on it, specifically Hyphen, they are into that, so they are carrying on, it's a lot of things whereby they are experiencing a lot of things. This agreement with the local people in Namibia, in certain areas, due to some issues. and but however Namibia is a vast land so there's a lot of open space that is not occupied by human beings or animals that are living there because mostly the project will be carried at the coastal area or in the Namib desert where you are inside and for the Global North for the Global Global North. Global North, like the Europeans? Yeah, how are they benefiting? Because Namibia, at the end product when we are going to produce this hydrogen, so the Global North or the Europeans are the main benefit or the main investor in this project because they are the ones that want to use this green hydrogen so that they can decarbonize. their factories or their, because I would say they are the most emitter of CO2 in the atmosphere, so Namibia to produce this green hydrogen, for them it's like a game changer in the market for them, so it will really benefit them.

Question #4:

What if anything is the role of ethics, politics and culture in the development of the green hydrogen project?

Answer #1:

I mean in terms of politics you need your administration to actually support the industry. If they're very indifferent about the industry there it reflects badly as a nation as well because you will not get um investors because investors are like oh but your administration doesn't even support your industry so what's the guarantee that that is the industry is actually going to take off it might be like if if your president supports you then that's a good sign that means that your nation believes in you they believe in that specific industry so there's that confidence that's built around that specific industry. But then we also started to look at policies and how even right now we don't have a set policy out yet. We're still busy developing it. But in terms of politics, if this is something that's a priority, then we're actually prioritizing these policies in place and these standards in place. Because right now the policies are developing at the same rate that the projects are developing, which doesn't make sense. The policies are supposed to really be in place. Because now what happens when your policy is different, what has been developed, which means these projects need to go change things too. And the policies also need to reflect like global policies. Yeah. So they can be in unison as well. So, yeah, there's that. I don't know. I can't think of anything more. Yeah. I know, I realize that.

Answer #2&#3:

It's a different world for me, like, to me it's all political, actually, that we announced a hydrogen strategy in Europe because everybody wants to get independent of Russian guests, especially. And now they're pushing it to the limit and seeking for places where we can produce our

hydrogen needs for Europe. or Asia, it would be like all the OECD industry partners, which are kind of getting, kind of, want to get away from the gas and the virus. For me, mostly for the video motivated. Interesting. I didn't know about the Russia... I mean, like, after the cut of Russian gas in 2022, we were seeking for new ways to feed our gas hunger, you're kind of addicted to pressure gas, and how could we substitute it? And also to decarbonize our industry. For me it's mostly political, because economically it doesn't make any sense. It's completely different. Yeah. Okay, from my side I can't really add so much, but I think in the last five or ten years, the hydrogen was mainly driven from the politics around what I already mentioned, and I think now they're moving a little bit more stronger on the financial aspects, and they realize that the hydrogen is coming at this additional cost, which they somehow need to cover. So, that is now really a big challenge to get an off-taker. We are building the next bubble here, actually. It feels like. We are building a huge infrastructure project, but the value chain has gaps, because there is no off-taker after now. And maybe even wrong assumptions on what kind of needs for a hydrogen we have. Because it should be mostly used for industry processes and not for producing power again. Gas turbine should not be used for H2 then. It's just too expensive. You can show champagne, it's the same. How do you actually convert all of that infrastructure? Yeah, and also, like, just a few, of course, because it's, yeah. Yeah. Okay. Um, this is my neocolonial question to what you were saying.

Answer #4:
I point you to our ethos and our values. Ethical and sustainable planning is a must with a focus on the social fabric of literacy. If we do not include key principles, even in just... I'll give you an example. So now we need to do so much more in literacy than anywhere else in the country we need to increase our town lands we need to enhance our town's infrastructure we need to plan for new townships we need to plan a new port together of of an import and if it is not people sent it but ethics as a corporate you will find that we will plan to benefit the capitalist system and ignore the men and women on the street. So our planning must have them as a center. When we plan on expanding our township, our townlands, we need to look at ease of transport, schools, social amenities, schools, the safety of our residents. So ethics plays a key role, and I think we can disagree on many things, but in terms of morals and ethics, we should speak the same language. Yeah. What about Shark Island and the green hydrogen plans? I've read a bit about that. What about it? Are they planning on using Shark Island? No. So, Lüderitz’s situation is very unique currently in the sense that not only are we the epicenter of green hydrogen production, green economy, as I call it, but we are also the epicenter of fossil fuel discovery. So now we need to find the balance between allowing these two industries to coexist. And in terms of Shark Island, from where I'm sitting, Shark Island or the port next to it will not accommodate green hydrogen nor will it accommodate oil and gas. We have identified Angra Point that is adjacent to Shark Island because there's nothing on it. We are able to put up infrastructure and whereas Shark Island and the port next to it is earmarked for expansion to cater for the construction and expansion of Angra Point because whatever we need to do mostly has to come by the sea and I think it is point of contact for logistic purposes and it is not it's too small for us to be able to erect

this infrastructure and want to put there and also from from a town planning perspective to use Shark Island as a port of choice for oil gas it just won't be feasible because you will congest the CBD and we do not have the capacity to accommodate large trucks of trucks as a town council we actually trying to move trucks outside of the CBD so that we have a dry port outside of town and the trucks necessarily won't be required to come into town and disrupt and disturb the infrastructure so no I don't think So Shark Island is pinpointed to say we are going to build a port for the ammonia uptake at Shark Island. No, no, I don't think. It's Angra Bay. Okay, thank you.

Answer #5:
What's the law of ethics? When it's coming to ethics, I think there are always standard procedures that need to be followed in anything perhaps where whoever is doing whatever. So standard, this is always a standard procedure that need to be followed by someone. So in the green hydrogen area or perhaps let me say sector as well we have standard we have Namibia standard institution who is actually leading that in our country so of course there is some sentence step standard that each or whoever sent in company who is involved in green hydrogen need to meet yeah for culture since it's a new for Namibian we are all in a learning process with the green hydrogen sector however I'm so sure that country who have already done or perhaps who have already implemented or who have gone through this process of green hydrogen can be able to testify that what type of a culture that is a sent in country or perhaps that is sent in a person need to follow when it's coming to green nitrogen because these people have a lot of expertise in it and these people have they are aware of what is what so that we can always the benchmark and we can always learn from them what is the role of ethics politics and culture and science at large you know that says

Answer #6:
The role of ethics okay so the thing is in Namibia green hydrogen is basically a new thing whereby like most of our leaders they are not really aware of what is happening most of them they I remember back in 2022 when the first thing came or the announcement came about a lot A lot of people were in disagreement with the whole project, they failed because it's just a chemical, they didn't know the main application of it. However, currently we have a program where we have to select each region, an ambassador, we train them. then this youth ambassador they go to local people and tell them what is green hydrogen how will it benefit hopefully this one will also benefit and it won't really create misunderstanding within our leaders or within our local region and what is the role of ethics politics and culture in science at large so politics basically are the decision makers so with them they are the one that brings investors into Namibia to invest in this project so without them nothing can really happen because basically if there's no politics or the rules or regulation about this sector, nothing can happen. So it's really impacting or it's really benefiting this project for them when they understand how Namibia, it will be rich in this project.

Question #5:

Does the Green Hydrogen Project disrupt historic legacies of colonialism or reconstruct them? Or is it more nuanced?

Answer #1:

I think it's a little more nuanced. Does it depend on the projects? Yeah, I think it's 100% more nuanced because in terms of, say, if we want to relate it to neo -colonialism, we would have to look at the relationship Namibia has with Germany. Right. Because that's the country that actually colonized us, but now that's also the country that's pouring in billions into the country. So we can help them with their decarbonization agenda. I think there is um… there have been talks about how this actually it might be like a conflict of interest does this mean that because right now Namibia and Germany are in talks for their reparations yeah um and Germany has already said that they will pay them. They have like a specific amount that they've agreed upon already and they've just said that they're not going to negotiate any further. They're not going to give no money and the current money that they're but I don't know. That's politics. I don't know what's happening there that side but I know that for a fact. So there have been some talks about how why are they so invested in why Namibia of all places knowing the history that our two countries have had right so but then that's what I'm saying it's a little more nuanced because Germany is not the only country that's investing in Namibia, there are a bunch of other countries that have decided to invest in this new sector so I mean we can still have the neo-colonialism argument but then now it's a little more nuanced because we're not just focusing on Germany so we're focusing on like what are the interests of all these other countries and yeah it's just a thing of like why can't especially how some of these countries want to control the way all these other countries are developing now because of the global emissions and climate change and everything because now they're saying hey you can't develop your country on fossil fuels anymore however you developed your country on fossil fuels yeah yeah so that's why some of the there's arguments here within the african continent where it's like we can do both at the same time we can invest in our oil and gas and then also invest in the renewable energy sector at the same time where right now I don't think we can develop the like we're looking at industrialization that's the goal right now we have the whole industrialization agenda um that's been written up it's like a full document by the Namibian government and also even by the Namibian green hydrogen program um so it's it's just the thing of like would we actually be able to industrialize on just renewable energy when renewable energy is very intermittent so I feel like without other countries having to be like hey if you continue investing in this we'll stop investing in you because then our country isn't actually making its own decisions right yeah so we have the financing yes yes yes and it's always about the money it is always about the money and maybe it doesn't have the biggest cash book so we do a lot of borrowing and even right now we've already delisted and now we're a lower income country when we used to be a middle income country and some

people are trying to push that as a good I think because now it unlocks more financing, but that's just a more nuanced view.

Answers #2&#3:

I mean, it's, sure, there are some imbalances, I'm sure, still, power-wise, but it's more on eye-level, it's getting more on eye-level now, because it should be a win-win for everybody, but sure, the ones with the body are still really, yeah, the ones with the power-wise, but I'm not sure, I'm not, uh, for me also not. I was saying what is at least good in the media that they are trying to get a fair share for the country and for the population. How it will play out is a different story, because there was in the past a lot of promises around jobs creation and so on. Let's see how it goes, because in general with this system up and running you don't need so many people. That's what you need to realize. You should avoid just extracting all the materials that are shipped into Europe. There should be, the way change should be also on the cloud. But like, because all materials go to Europe or America will be more compact. And here they left with, like, nothing. So there should be a more sustainable way to watch things, not just, like, if you can win and the rest is left behind. But yeah, at least there is some wins for all people in the front, but it's not like, I don't know, it's a very controversial question. How do you see things and not see things? Yeah, yeah. Okay, and my last question. That's good.

Answer #4:

From where I am sitting, we are such a global society that no man is an island and global trade has made it such that while your political pundits would say this is a reconstruction of colonial times where Europeans or the imperialists came colonized, took natural resources back to their territories and use it to build their society. But from my perspective, green hydrogen is an opportunity for us as Africans to leverage on technology and to even find sustainable alternatives to providing electricity and power to us. So it is a give-and-take, where due to our immense natural resources and vast land, virgin land, that even as a country, we are not on a sustainable trajectory in terms of development. We are heavily import-dependent, and what we import, we not only import what we eat, but we import technology, we import infrastructure. So this is an opportunity for Africa, and for us as Namibians, to change the narrative, introduce manufacturing plants or sectors, whereas if you look at the life span, projected life span, and of course some of us will not live that long. But this is an opportunity for us to stop being import dependent and use this as a chance to empower and expose youth and entrepreneurs to sectors that never would have come to if it had not been for hydrogen. So you will need the electrolyzers, you will need photovoltaic panels, the elements thereof. You will need the assembly, you will need the maintenance. This is an opportunity now for the government to say, of everything that you will import, reserve 30 to 40% of whatever you will bring in, for local

manufacturers only. This could reduce our chronic and multidimensional poverty. It could be a game-changer, depending on how we see it and manage it. Okay.

Answer #5:
Yes yes of course it does because you know especially in Namibia especially I heard from the southern part of the countries that side of Kharas yeah I heard that there are some local authorities that are complaining that when the land is given for green hydrogen project there are some people who are buried there historically people who are buried there and when these people are setting up their project they're setting a project on top of the people's graves and imagine now in our culture in African culture a grave is something that is more important that can be seen by your grandchildren even though you are not around for me of course I expect my kids kids to see where I'm lying on my see where I was buried so it is it is impacting and somehow somewhere I heard that the community is complaining they are not happy at all especially in the southern side of the country that no we are not contacted no community engagement that taking place for us to for us to know exactly where it's what maybe to inform the people that okay you come until here your project must start from here to where there's no such happening and people are very angry about that

Answer #6:

No, it does not, because the main, like I mentioned, 90% of Namibians will be benefiting for this in terms of employment sectors, and also Namibia itself, it will benefit by, whereby there's 50% on the production level, 50% whatever profit that they will make, 50% will come to the Namibian government. So there's nothing like colonizing. And the other 50% is the one that goes to the investors. So there's nothing like that. So it's fair.

Question #6:

Do you believe that science is inherently good or bad? Do you believe that science is inherently good or bad? Inherently good or bad? Yes. Science. Or is it like how you use it? In general, science.

Answer #1:

But yes, science. Science is inherently good. I think the issue is people and the different ambitions that people have. Because with science, science is supposed to be something that's objective, the same as research. Yeah. So it's supposed to be objective, not subjective. But now

what people do is they attach their personal interests to these things. I'm excited to make it fit. Okay. We're almost done. Yeah. We're almost done. We can continue. No, we're almost done. So what people do is they have a tendency of personalizing things. So all their goals and their ambitions and their greed, they start to attach to things that are not supposed to be attached to these specific things. So I do think science is inherently good. People I'm not too sure about. We ruin things. But science in general, because it's literally like the core of science is objectivity. You look at the facts and then you change whatever it is that needs to be. You look at your hypothesis, you get your conclusions. But we're not supposed to attach any other, the goodness, the badness, whatever. it's what you do with that specific science how you apply it that actually really matters.

Answer #2&#3:

Like science, yeah. Sorry, I call proper kind of fashion here. Why should be science bad? That's the question. Like do you think that it's inherently good or bad? Like in general science or like earth science or physics or... Science, technology, the development of scientific ideas like the green hydrogen ideas. But why should it be bad? I mean like it's always good to develop new things but there are maybe certain thresholds we pass in some parts of scientific research like some part of digitalization nowadays are kind of ridiculous why should I know what's going on all the time but in terms of energy production we are going in the right direction. I mean we are getting less dependent on positive views and so on but each This new scientific breakthrough has a new problem, like H2, we have now the water flow, we have the problem. So there is... Yeah, yeah, yeah. Oh, yeah. The things of Congo and... Yeah, yeah, yeah. We have... We have... That's my evidence-based science. Yeah, I hope so. Yeah. Okay. Thanks. What's the hard question? I don't know. I know. It's much broader than the other ones. Oh, yeah. Yeah. Yes. Do you have an answer to the science? No, to be honest, I have now some other troubles. Ah. This is I need to skip. Totally fine.

Answer #4:

It depends who the scientists are. It depends who commissioned the scientists. It could be that, I mean, if you look at the Albert Einstein's of this world, not only was he a pioneer in good science. But then they also used him for bad science. But at the end of it all, it is the funders. The scientists are not billionaires. They are people with knowledge and it is ultimately the funders that decide whether such science is good.

Answer #5:

There's nothing bad about science there's nothing bad about science I can say so it's only because now science it's something proven so of course it will not be so bad what is more important is just the understanding of the people you just need to inform people so that they can be able to understand the issue of science very well if they don't understand then they won't be able to say it's okay or not it's okay so what is more important is just understanding but there's nothing

wrong with science what is more important is just the understanding of science and the people in the south that you were talking about how would I get in contact with them yeah who's talking about it what's the conversation I actually learned it from the from the media even yesterday they since they don't have enough money to pay for them to attend the conference they were having their own area somewhere where they are and they are checking because if you allow them to come here and they will interrupt a lot of things they will start talking here and there so the summit won't go accordingly however they were somewhere in the center area there the way the place or media went so that they can be able to be interviewed however they understand and they see and they are following what is happening and what is going on uh maybe I can say that uh it's certain it's certain where at Kharas region there are a lot I think few green hydrogen projects that are taking place these are the company perhaps that you need to find out either with Hyphen or whoever then they can be able to give you their contact details and then yes you can be able to when you get their contact details and then yes you can contact you see some traditional authorities or traditional people who can be able to say yes this is how we feel about it okay

Answer #6:
Science is good because even me, I think science is my favorite thing that I like. So it's really good. And the technology behind the production of hydrogen is basically the whole science. Yes, I believe it's very beautiful. All right.