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GOLDEN GATE

RED HYDROGEN ALERT

Where confusion abounds
BETWEEN TREES

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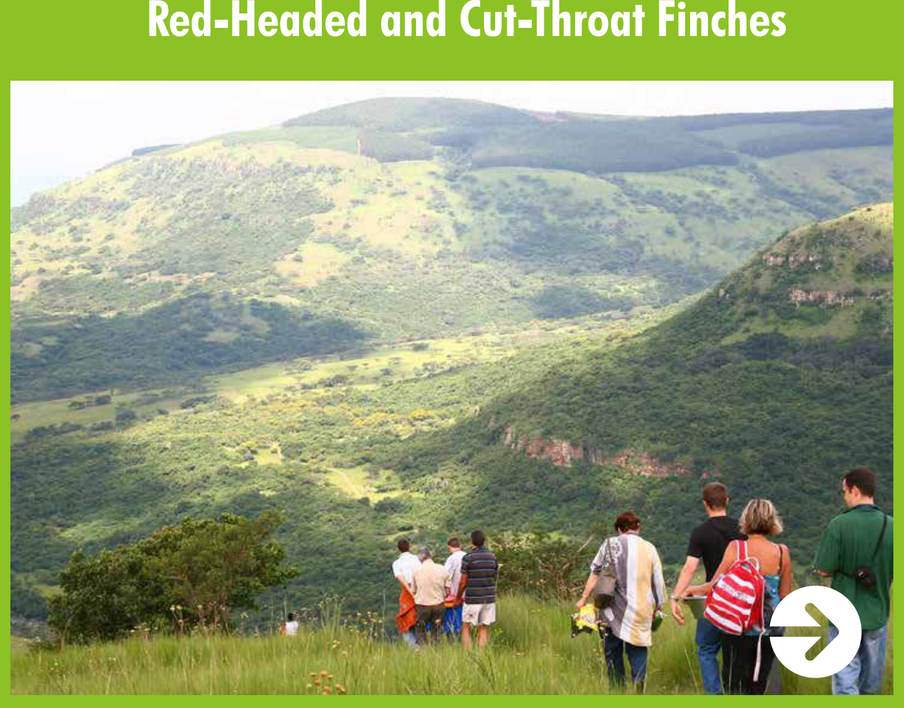

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RED HYDROGEN ALERT

RENEWABLE ENERGY PRODUCTION THAT HARMS THE ENVIRONMENT IS NOT GREEN

The most biodiverse national park in Namibia could be turned into an industrial zone in the name of producing 'green' hydrogen and ammonia destined for Germany. The Namibian Chamber of Environment (NCE) produced a detailed position paper to detail the risks of this project to the environment and Namibia's sustainable development aspirations.

Namibian Chamber of Environment

Flowering landscape, Sperrgebiet (Photograph: NCE)

The NCE Position Paper (see https://n-c-e.org/resource/green-hydrogen-and-tsau-khaeb-sperrgebiet-national-park) described how hundreds of wind turbines and solar panels, with associated roads, powerlines, pipelines, substations and production plants are planned for a 4,000 km² area in the Tsau //Khaeb (Sperrgebiet) National Park. This is only the beginning, however, as this project is designed to make similar developments that would ultimately cover the entire park, including 21,800 km² of near pristine wilderness (download the PDF here). It also involves the construction of industrial production plants in Important Plant and Bird Areas that attract many tourists to Lüderitz in southern Namibia.

Green hydrogen production challenges

This part of Namibia is also known for its extremely windy conditions, which is why Lüderitz hosts a global wind-surfing competition (https://luderitz-speed.com/) each year that regularly breaks world speed records in this sport. A little further inland beyond the sea fog that characterises the Namibian coast, the desert landscape enjoys more days of sunshine than most other parts of the planet.

The windy and sunny conditions, along with access to the ocean as a water supply and Lüderitz harbour for imports and exports, makes this area particularly attractive for producing 'green' hydrogen. Producing hydrogen and its derivatives – ammonia, kerosene and methanol – requires water and large

amounts of energy. Seawater is desalinated and then split into hydrogen and oxygen using a process called electrolysis.

Currently, over 90% of the world's hydrogen is produced using fossil fuels, which limits the emission cuts that can be gained by switching from petrol and diesel power to hydrogen. Using renewable energy sources to produce hydrogen and its derivatives has therefore been branded as 'green'.

Ammonia is used for fertiliser production and as a replacement for coal in steel production, while kerosene is a key ingredient in aviation fuel and methanol can be used to power ships. While hydrogen itself is used to power vehicles, it is a difficult and expensive substance to transport, as it is prone to leakage, highly flammable and explosive.

Hydrogen's derivatives are easier and cheaper to ship, which is why projects like the one planned for Namibia are producing ammonia rather than pure hydrogen. A recent report from the European Union's Joint Research Centre found that producing and shipping 'green' ammonia and methanol (e.g. from Namibia to Germany) had higher overall environmental impacts than producing pure hydrogen closer to where it is used (e.g. from sources in Germany) See https://www.hydrogeninsight.com/policy/green-hydrogen-imports-to-europe-might-cut-carbon-emissions-but-would-be-worse-for-environment-than-domestic-production-eu-report/2-1-1649078

While producing green hydrogen and its derivatives rather than 'dirty' or 'grey' hydrogen (produced from fossil fuels and gas, respectively) may limit greenhouse gas emissions, it costs anywhere between 2.5 to 6 times the price. Green hydrogen can also be produced relatively cheaply using nuclear power, which is a much cleaner source of energy than fossil fuels.

The price of green hydrogen production can be reduced in places with the high levels of wind and sunshine that are characteristic of Tsau //Khaeb National Park, but it will still be considerably more expensive to produce than other forms of hydrogen. The cost will undoubtedly increase further if the commercial developer, Hyphen Hydrogen Energy, adheres to the environmental management plan designed to avoid and reduce their impact on the unique species and ecosystems in this environment.

The environmental and economic costs of 'green' hydrogen and its derivatives raises serious questions about whether this source of energy will

The history and importance of Tsau // Khaeb (Sperrgebiet) National Park

The Sperrgebiet ('forbidden zone') was initially established as a security zone for the diamond mines in southern Namibia. Besides the coastal mining sites, most of the area was left untouched by humans for over 100 years. As the mining activities started to move offshore, the Sperrgebiet was proclaimed as a national park in 2008, although it has remained off-limits to the public since then.

The Ministry of Environment, Forestry and Tourism produced a detailed management plan for the park in 2020 with funding from the German development bank, KfW. This plan recognised the extreme ecological sensitivity of this area and suggested that tourism development be highly controlled and carefully planned to minimise its impact.

The reason for this cautionary approach is the immense biodiversity value of this protected area. Covering only 3% of Namibia's land surface, the Tsau //Khaeb hosts 25% of the country's plant species, 31 of which are endemic (occurring nowhere else on earth). Some of these endemic species occur only on specific mountains in the park. If one were to build *anything on these mountains it could result in the extinction of several species at once.*

This park covers 90% of Namibia's portion of the Succulent Karoo Biome – a global biodiversity hotspot that is shared with South Africa. While most well-known for its plant diversity, the park also hosts at least 100 reptile, 16 amphibian and an unknown number of invertebrate species. The area is severely understudied, which means that there are many more species waiting to be discovered – if they aren't killed before then.

One of the key areas for conservation in the park is a peninsula not far from Lüderitz town, which Birdlife International has designated as an Important Bird Area. Several endangered and critically endangered seabirds (notably, the African Penguin, Cape Gannet, Cape and Bank cormorants) use the peninsular and nearby islands for breeding and roosting. In recognition of its importance for marine conservation, this area is part of the Namibian Islands Marine Protected Area (NIMPA), the only MPA in the country.

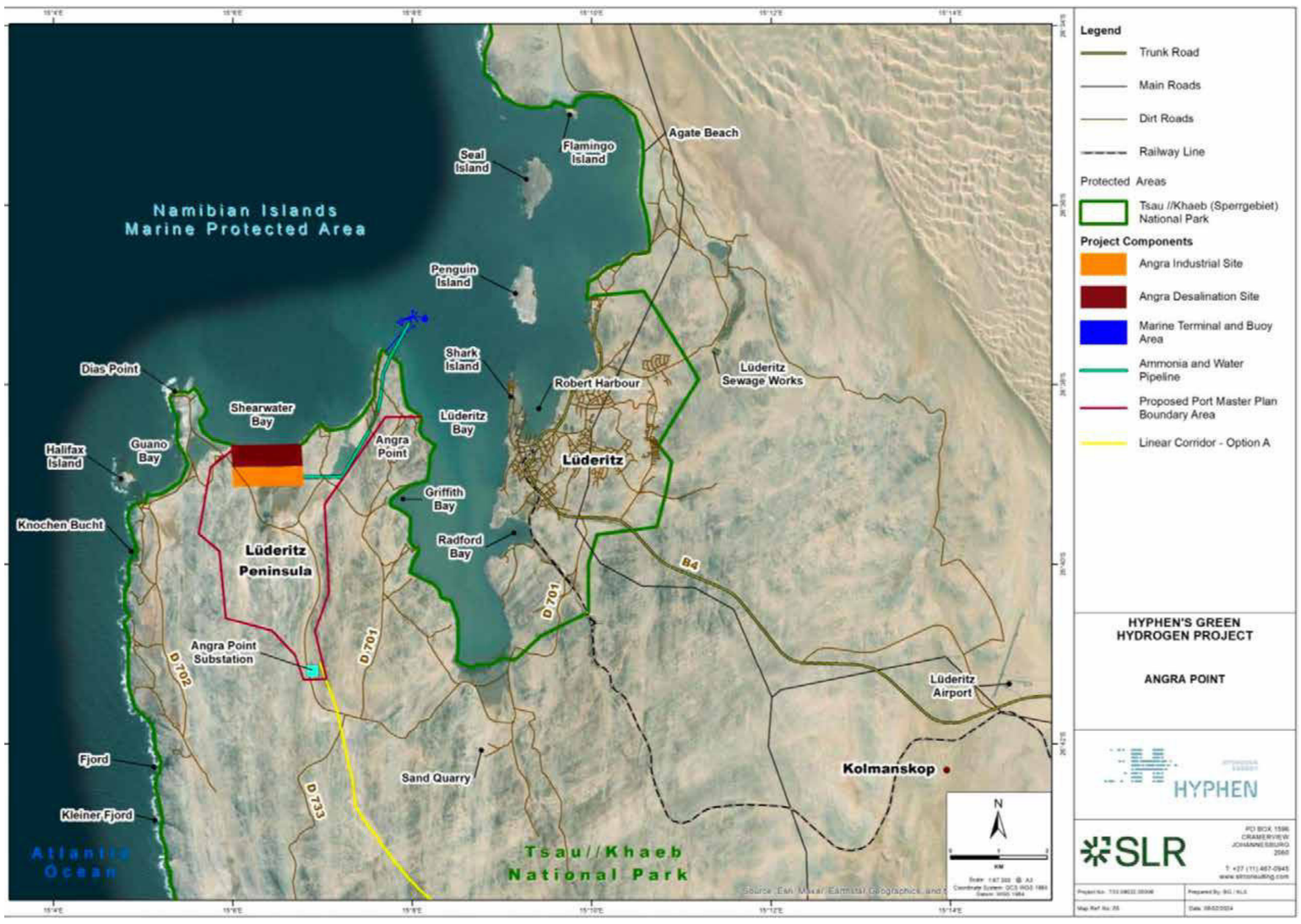


Figure 1. Proposed industrial development for the Hyphen project on Angra Point. These areas will be used for desalination and ammonia production plants, a power substation and other infrastructure. Note desalination plant location on Shearwater Bay. Source: TKNP Management Plan.

be widely adopted and used in future. Hydrogen producers will find themselves fighting market forces and the growing political commitment to reducing environmental harm – a fight that they are likely to lose.

Throwing biodiversity under the climate change bus

Paying a premium for energy only makes sense if that energy is truly green – in that it reduces greenhouse gas emissions and has a minimal impact on the environment. Development projects around the world that focuses on reducing greenhouse gas emissions should not worsen the biodiversity crisis, which is just as urgent and disastrous for our planet.

This example of 'robbing Peter to pay Paul' has been highlighted as a cause for concern by the International Union for Conservation of Nature (IUCN) at the latest global climate change conference (CoP28). In an open letter addressed to signatories of the UN Framework Convention for Climate Change, they warned: "We cannot solve one problem by creating others. But careful siting of energy projects can greatly reduce the impact on biodiversity and still contribute to the green energy transition." (See https://www.iucn.org/crossroads-blog/202311/we-must-unite-our-efforts-fight-climate-change-and-biodiversity-loss)

The hydrogen developments planned for the Tsau //Khaeb National Park will certainly have major impacts on biodiversity. The 4,000 km^2 Hyphen project area is located in a sensitive part of the park, but that is not the full extent of the government's plans. Hyphen is meant to pave the way for the Southern Corridor Development Initiative (https://hyphenafrica.com/projects/), whereby projects of a similar size will be established throughout the park using the infrastructure that Hyphen builds. Ultimately, large parts of the park will be covered with roads, powerlines, wind turbines, solar panels and other infrastructure. Even with strong adherence to environmental management plans, endemic species will be threatened with extinction and sensitive ecosystems will be irretrievably damaged.

About the Namibian Chamber of Environment

The Namibian Chamber of Environment (NCE) is a membership-based and -driven umbrella organisation established as a voluntary association under Namibian Common Law to support and promote the interests of the environmental NGO sector and its work. The NCE currently has 65 Full Members – Namibian registered NGOs whose main business, or a significant portion of whose business, comprises involvement in and promotion of environmental matters in Namibia; and 12 Associate Members – individuals running environmental programmes and non-Namibian NGOs likewise involved in local to national environmental matters in Namibia.

This development will also put species at greater risk of poaching, which is already a concern for the rare succulent plants and unusual reptile species that occur in Namibia and South Africa. Contractors and staff working on the planned projects cannot be monitored 24/7 in such a vast area, providing ample opportunity for the illegal collection of these plants and animals.

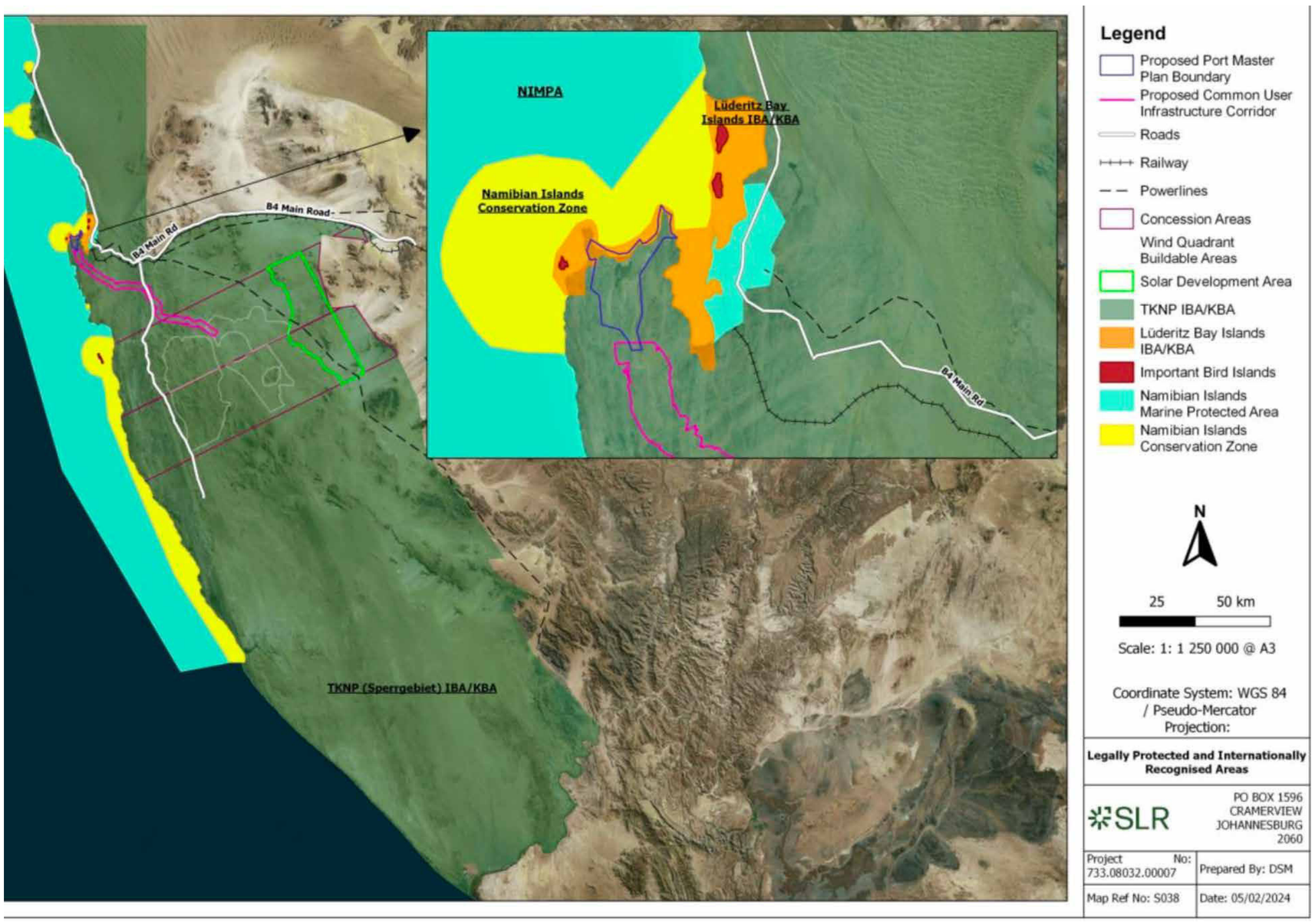


Figure 2. Angra Point (inset) is an Important Bird Area and Key Biodiversity Area, whereas Elizabeth Bay (south of the Namibian Islands Conservation Zone) has not been considered for port development even though it has lower biodiversity value. Source: Presentation by SLR Consulting of the Hyphen Environmental and Social Screening Study.1

The tourism potential for this reserve, as highlighted in the park management plan, will disappear entirely. The hydrogen and ammonia plants planned for the Lüderitz peninsula will greatly devalue the tourism experience that current visitors to the town experience, while the proposed carefully guided tours to discover one of the world's last wilderness areas will no longer be possible.

The long-term, near-certain damage to the park and its tourism potential must be considered alongside the uncertainty around green hydrogen as a source of energy explained in the previous section. It makes no sense to gamble the future of a global biodiversity hotspot

Seascape, Sperrgebiet (Photograph: NCE)

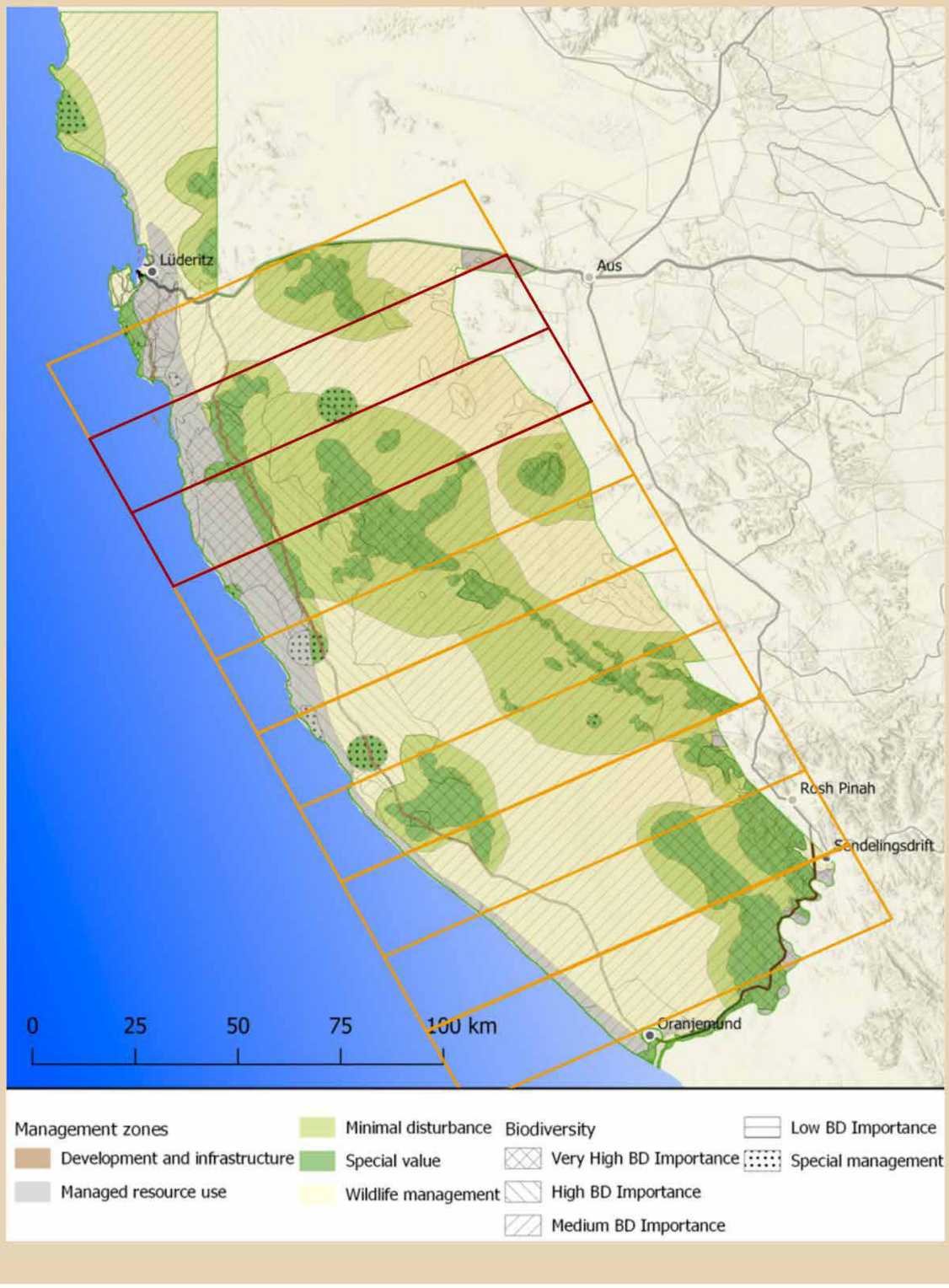


Figure 3: Current (red rectangles) and future (orange rectangles) hydrogen development projects. The future development areas will be facilitated by Hyphen's current infrastructure development plans. Source: Map recreated based on Hyphen presentation, https://hyphenafrica.com/projects.

for a source of energy that could become obsolete before it even starts to generate a profit.

With so many impacts that cannot be avoided or mitigated, this hydrogen project simply cannot claim to be 'green'. The NCE's position paper therefore coined a more suitable term for such projects: Red Hydrogen (or, more generally, Red Energy). This term is inspired by the IUCN Red List, which is a global record of the conservation status of plants and animals. Pushing species further towards extinction is known as driving them 'into the red', which is exactly what energy projects like this one will do.

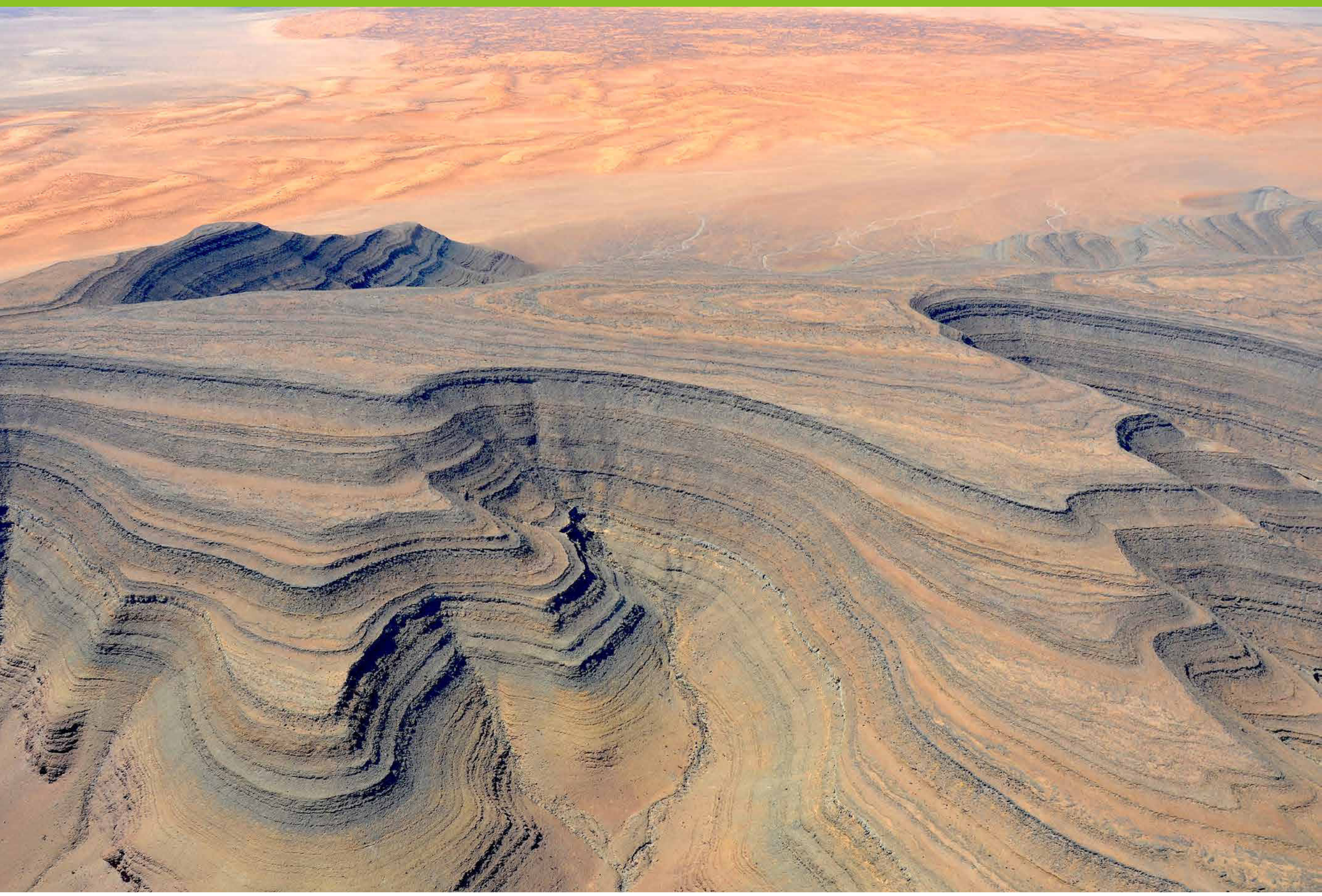
This term should be more widely adopted to expose projects such as this one that aim to address the climate crisis by exacerbating the biodiversity crisis. Responsible investors and consumers would then look to supporting *real* green energy production that has limited environmental impact.

Geopolitics and the future of green hydrogen

Germany and some other countries in the European Union (EU) are currently betting on green hydrogen as one way to solve their energy problems while still meeting climate change commitments. In the case of Germany, their energy problems are largely self-inflicted. After the tsunami that hit one of Japan's nuclear reactors in 2011, the German public and politicians finally decided to turn away from nuclear energy, even though Germany is not vulnerable to earthquakes or tsunamis. (See https://www.base.bund.de/EN/ns/nuclear-phase-out/nuclear-phase-out_node.html).

While nuclear energy comes with its own environmental challenges – namely, mining uranium and dealing with nuclear waste – it is a cleaner and more efficient form of energy than the other options available today. By shutting down its nuclear power stations, Germany forced itself to rely on imported energy in the form of gas and electricity produced from nuclear power stations in Russia. This strategy backfired with the Russia-Ukraine war, resulting in sanctions on Russian energy that created an energy crisis in Germany. (See https://www.theguardian.com/world/2024/mar/18/german-living-standards-plummeted-after-russia-invaded-ukraine-say-economists).

The hype around green hydrogen in Germany is partly related to this self-inflicted crisis. Unfortunately, German ambitions to reduce greenhouse gas emissions and alleviate their energy shortages may come at the cost of Namibia's biodiversity and national parks. Just as significant is the precedent that this will create, rendering the entire national park network at risk to future impulsive, poorly planned initiatives highly incentivised by industrialised countries under the guise of supporting development and job creation. The massive 4,000 km^2 Hyphen project in the Tsau //Khaeb will supply enough ammonia for only one German steel factory. Large tracts of biodiverse



Tsaus Mountains,Sperrgebied (Photograph: Olga Ernst & HP Baumeler)

Namibian land will thus be used to supply small amounts of German energy.

Despite the many issues with green hydrogen and derivatives highlighted above, Namibia has been persuaded that is an extremely lucrative market that will result in massive investments into the economy and thousands of jobs. Yet green hydrogen, ammonia, kerosene and methanol remain expensive, inefficient forms of energy.

This situation incentivises research and development into other means of energy production, which could lead away from hydrogen and towards cheaper and more efficient forms of green energy. Even a change in German government policy that brings nuclear energy back to the table could leave Namibia stranded with a giant white elephant built at the expense of its most biodiverse national park.

None of these risks and costs have been adequately communicated to the Namibian or German public. Namibians have been sold the green hydrogen concept as a near-certain pathway to economic development and job creation, while Germans may think that buying expensive 'green' energy is the right thing to do. More transparent discussions around market uncertainty and environmental costs, starting with correctly branding the product as 'Red Hydrogen', would soon erode public support in both countries.

Certainly, environmentally-conscious people living in Germany would not support energy projects that degrade the national parks in their own country. Yet their national parks are relatively small and far from pristine when compared with the globally important Tsau //Khaeb National Park. By our calculations, the near pristine part of the Tsau //Khaeb is four times larger than the combined recognised wilderness areas in the whole European Union (https://european-wilderness.network/european-wilderness-network).

If the immense biodiversity costs of the Hyphen Project and those expected to follow it were fully communicated to the German public and politicians, we would expect widespread outcry against this project. Beyond Germany, global citizens should be concerned when governments plan to mitigate climate change at the expense of biodiversity.

Finding a way forward for climate, planet and people

Climate change and biodiversity loss are both global crises, while economic hardship is a daily reality for many Namibians. The NCE is dedicated to addressing all of these and fully supports sustainable development that addresses one or more of these challenges even if a reasonable level of compromise is required. Development projects with major socio-economic benefits can be accommodated provided that thorough environmental impact assessments are completed and subsequent management plans implemented.

Green hydrogen production near Walvis Bay is an example of such a project (https://www.namibian.com.na/namibia-sees-first-green-hydrogen-fuel-trucks/). The site chosen for this development is much less ecologically sensitive than the Tsau //Khaeb. Further, this project does not rely entirely on the export market, with a greater focus on developing local uses for hydrogen and its derivates alongside exports to the EU.

The NCE is acutely aware of the desperate need for economic development in Namibia, especially as droughts are expected in increasing frequency due to climate change. The //Karas Region of Namibia, which is where Lüderitz and the Tsau //Khaeb are located, is particularly impoverished.

Sheep farming is the dominant land use in the inland parts of //Karas, but this activity is becoming less and less viable with each major drought. Yet this area is an ideal location for producing solar power. A project that pays farmers to produce solar power for local use and to supply the national grid could lift many households out of poverty. Selecting land that is already degraded for these power plants would reduce the environmental impacts to negligible levels.

In response to NCE's position paper on red hydrogen, the Namibian green hydrogen commissioner, James Mnyupe, assured the public that Strategic Environmental and Social Assessment (SESA) was in the pipeline for hydrogen development in the Tsau //Khaeb. (See https://www.observer24.com.na/munyupe-belays-environmentalists-fear-of-green-hydrogen-project/).

A key problem with this promise is that the scope of the assessment already assumes that hydrogen must be developed in this hyper-diverse, sensitive ecosystem. The question answered by Mr Mnyupe's proposed SESA is: "Which part of the park will we sacrifice first?". Given that the Hyphen project is designed to allow others like it to develop nearby, establishing such a project anywhere in the park is effectively consigning the rest of it to development.

The NCE has therefore requested that the scope of the SESA be expanded to the national level. A pre-selected location annuls the whole principle of an SESA, rendering it fatally flawed. While the Tsau // Khaeb may be a convenient location for hydrogen production when viewed through a narrow prism of wind, solar radiation, water and harbour, it has not engaged with *inter alia* environmental considerations, supporting infrastructure needs and socio-economic optimisation. When environmental costs are factored in, this location becomes much less attractive. Further, projects located on land where people already live, like the sheep farms inland, will offer more broad-based socio-economic benefits than a project in a protected area that is currently uninhabited.

Finally, Namibia needs to take a more strategic and long-term approach to its energy sector to guide its decisions based on which projects are most likely to succeed and deliver on their promises. The government should commission a fully independent and up-to-date analysis of Namibia's renewable energy potential that takes stock of climate, biodiversity and socio-economic costs and benefits associated with the full gamut of potential energy development pathways.