



Sustainability of hydrogen economy raw material chains

CASE: Human rights issues in South
Africa's platinum production



**With support from
Finland's development
cooperation**

The project received financial support from Finland's development cooperation funds.

Finnwatch is a non-profit organisation that studies the global impacts of Finnish business. Eleven development, environment and consumer organizations and trade unions support Finnwatch's work: The International Solidarity Foundation (ISF), Pro Ethical Trade Finland, Trade Union Solidarity Centre of Finland SASK, Attac, Finn Church Aid, Finnish Development NGOs Fingo, the Dalit Solidarity Network in Finland, Friends of the Earth Finland, the Consumers' Union of Finland, KIOS Foundation, and the Finnish Evangelical Lutheran Mission.

Publication date: The original Finnish version of the report has been published on January 2024. Unofficial English translation has been published on November 2024.

Cover image: International Labour Research and Information Group (ILRIG)

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1. Introduction

Countries taking part in the UN Climate Change Conference in Dubai in December 2023, agreed that countries should be encouraged to transition away from fossil fuels.¹ Changing the global energy system as required by the climate crisis is in many ways a difficult task, as there is very little time to reverse its course. Emissions caused by fossil fuels are still growing², even though the requirements of staying within the one-and-a-half-degree goal will require a 43 percent reduction in emissions already before the end of this decade³.

A significant additional challenge to the problem is that it is as of yet not possible to electrify all processes that are based on fossil fuels (at least in an economically viable way) by utilizing electricity produced entirely with renewable energy. Among other things, challenges remain in steel production, many processes in the chemical industry, shipping and air traffic. Challenges are also caused by the fluctuating production of renewable energy such as wind and solar power, which increases the need for flexible demand and energy storage.

The hydrogen economy has been seen as a central tool for resolving the challenges related to giving up fossil fuels. Emission-free hydrogen can be used to replace fossil fuels in industrial processes, and hydrogen also acts as an intermediate storage form for renewable energy. Various hydrogen projects have been launched quickly, and e.g. Finland has set a political goal to be a "key player"⁴ in the hydrogen industry.

Like the green transition in general, the hydrogen economy will also change the demand for different minerals. One of the key minerals in the hydrogen economy is platinum used in so-called PEM electrolyzers. The European Commission has defined platinum as a critical raw material. In addition to the growing hydrogen economy, platinum is widely used in the automotive and chemical industries, as well as in jewelry.

1 Finnish government. (13 Dec 2023). Dubai Climate Conference reaches agreement on phasing out fossil fuels. Press release. Retrieved on 10 Jan 2024 from <https://valtioneuvosto.fi/-/1410903/dubain-ilmastokokouksessa-sopu-fossiilista-polttoaineista-irtaantumisesta>

2 Global Carbon Budget. (4 Dec 2023). Fossil CO2 emissions at record high in 2023. Press release. Retrieved on 8 Jan 2024 from: <https://globalcarbonbudget.org/fossil-co2-emissions-at-record-high-in-2023/>

3 IPCC. (2023). Climate Change 2023: Synthesis Report, Summary for Policymakers. p. 21. <https://www.ipcc.ch/report/sixth-assessment-report-cycle/>

4 Valtioneuvosto. (2023). A strong and committed Finland : Programme of Prime Minister Petteri Orpo's Government 20 June 2023 <http://urn.fi/URN:ISBN:978-952-383-763-8>

Platinum production is highly concentrated, and South Africa supplies more than 70 per cent of the platinum needed by the EU.⁵ There are significant environmental and human rights risks in production in South Africa, the management of which requires due diligence on the part of buyer companies.

In this report, we look into the challenges of platinum production by examining the operations of Sibanye-Stillwater, one of the world's largest platinum producers, in the Marikana mining area in the North West Province of South Africa (Chapter 3). Sibanye-Stillwater also has a connection to Finland, as the company is planning a lithium mining operation, a concentrator and a refinery in Central Ostrobothnia.

This report also provides background on the connection between platinum and the hydrogen economy (chapter 2) and maps the sustainability practices of companies that have launched various hydrogen projects in Finland, focusing especially on the sustainability of minerals (chapter 4). At the end of the report (chapter 6), recommendations are presented for companies, decision-makers and citizens to ensure the sustainability of the minerals used in the hydrogen economy and, more extensively, the extractives required by the green transition.

2. Platinum a critical mineral needed in the green transition

Platinum is one of the so-called platinum group metals. Other metals belonging to the group are ruthenium, rhodium, palladium, osmium and iridium⁶. Of these, platinum and palladium in particular are of commercial mining interest, the other four platinum group metals are recovered as by-products of platinum and palladium production⁷. Palladium and platinum are very valuable raw materials, the price per kilo of both was around 30,000 euros at the time of writing this report⁸.

5 European commission (2020). Communication from the Commission to the European parliament, the Council, the European economic and social committee and the Committee of the regions. <https://eur-lex.europa.eu/legal-content/FI/TXT/PDF/?uri=CELEX:52020DC0474>

6 U.S. Geological Survey. (2023). Mineral Commodity Summaries 2023, p. 134. <https://pubs.usgs.gov/periodicals/mcs2023/mcs2023.pdf>

7 International Platinum Group Metals Association. (n.d.). The Primary Production of Platinum Group Metals (PGMs), p. 3. https://ipa-news.com/assets/sustainability/Primary%20Production%20Fact%20Sheet_LR.pdf

8 Rasmussen. (n.d.). Jalometallit, Pörssinoteeraukset ja hintahistoria. Retrieved on 3 Nov 2023 from: <https://www.rasmus-sen.fi/jalometallit/hintahistoria/>

Platinum is one of the critical minerals needed in the green transition⁹. As a concept, a critical mineral means that it is considered an essential raw material for the economy and has a high supply risk¹⁰. In the case of platinum, the risks of availability are related, e.g., to it being a rare raw material whose significant reserves are concentrated in only a few countries. With platinum, the risks are not only limited to the uncertainty of availability, but the risks associated with platinum production for people and the environment are estimated to be greater than with any other transition metal¹¹. Platinum production is discussed in more detail in subsection 2.1.

Platinum, palladium and rhodium have traditionally been used, for example, in the catalytic converters of cars. The automotive industry is the most significant user of platinum group metals. Other important uses include the jewelry industry (platinum), the chemical industry (platinum, palladium and ruthenium), the glass industry (platinum) and the electronics industry (iridium, palladium and ruthenium). Palladium is also used in dental implants.¹²

With regard to the green transition, platinum is needed in particular in hydrogen technology¹³, but it is also used, e.g., in the production of glass fiber used in wind turbines¹⁴. In the hydrogen economy, platinum is used especially in PEM electrolyzers, which produce hydrogen from electricity and water, and in fuel cells, which can produce electricity from hydrogen. Although the demand for platinum for hydrogen economy equipment is still small compared to traditional applications, it is expected to grow steadfastly. In 2040, the hydrogen economy may account for up to 35 percent of all annual platinum use¹⁵, which

9 Platinum or platinum group metals have been defined as a critical mineral in the EU and the USA, among others. The international energy organization IEA also considers platinum group metals as critical minerals. Sources: Grohol, M., Veeh, C. (2023). Study on the critical raw materials for the EU 2023. European Commission report, p. 17–18. <https://data.europa.eu/doi/10.2873/725585>; IEA. (2023). Critical Minerals Market Review. <https://www.iea.org/reports/critical-minerals-market-review-2023>; USGS. (22.2.2022). The U.S. Geological Survey Releases 2022 List of Critical Minerals. Release. Retrieved on 7 Sept 2023 from: <https://www.usgs.gov/news/national-news-release/us-geological-survey-releases-2022-list-critical-minerals>

10 European Commission. (2020). Critical Raw Materials Resilience: Charting a Path towards greater Security and Sustainability. <https://ec.europa.eu/docsroom/documents/42849>

11 Lèbre, É., Stringer, M., Svobodova, K. et al. (2020). The social and environmental complexities of extracting energy transition metals. Nature Communication 11:4823. <https://doi.org/10.1038/s41467-020-18661-9>

12 Cowley, A. (2023). PGM Market Report. Johnson Matthey - company's market report, p. 10–13 and 38–50. <https://matthey.com/documents/161599/404086/PGM+Market+Report+May23.pdf/2f048a72-74a8-8b23-f18e-c875000ed-76b?t=1684144507321>

13 Other metals of the platinum group are also needed for various purposes in the hydrogen economy. See e.g. Hydrogen Europe, IPA, Eurometaux et al. (2023). Platinum Group Metals (PGMs) – essential critical raw minerals for the hydrogen economy. Report. https://ipa-news.de/assets/news-debates/Final_IEA%20ministerial%20note%20PGMs%2026%20Sept%202023.pdf

14 Creamer, M. (21.11.2023). Industrial demand for platinum rises to record high. Mining Weekly website news. Retrieved on 22 Jan 2024 from: <https://www.miningweekly.com/article/industrial-demand-for-platinum-soars-to-all-time-high-2023-11-20>

15 World Platinum Investment Council. (2022). Platinum - the critical mineral for energy transition and energy independence – Executive summary. <https://www.cmegroup.com/articles/2022/platinum-the-critical-mineral-for-energy.html>

will cause challenges in ensuring mineral sufficiency¹⁶. The hydrogen economy is discussed in more detail in subsection 2.2.

Table 1: Estimated platinum supply in 2023 (tons)¹⁷

Mines total	180,6
South Africa	129,2
Russia	19,6
Other countries in total	31,8
Total recycling	47,2
From the automotive industry	37,3
From the jewelry industry	8,2
From the electronics industry	1,7
Total supply	227,8

Table 2: Estimation of platinum demand in 2023 (tons)¹⁸

Demand by industry	
Automotive industry, e.g. catalysts	95,3
Jewelry industry	42,0
Chemical industry	21,6
Glass industry	17,6
Electronics industry	8,3
Other pollution control excluding automotive catalytic converters (incl. other means of transport and industry)	8,1
Pharmaceutical industry	7,9
Oil industry	6,6
Other demand	24,5
Total demand	231,9

16 International Energy Forum. 4 Sept 2023. Energy transition to trigger huge growth in platinum for hydrogen. <https://www.ief.org/news/energy-transition-to-trigger-huge-growth-in-platinum-for-hydrogen>

17 Cowley, A. (2023). PGM Market Report. Johnson Matthey - company's market report, p. 38. <https://matthey.com/documents/161599/404086/PGM+Market+Report+May23.pdf/2f048a72-74a8-8b23-f18e-c875000ed76b?t=1684144507321>

18 Cowley, A. (2023). PGM Market Report. Johnson Matthey - company's market report, p. 38. <https://matthey.com/documents/161599/404086/PGM+Market+Report+May23.pdf/2f048a72-74a8-8b23-f18e-c875000ed76b?t=1684144507321>

2.1 Where and how is platinum produced?

South Africa is by far the most important area for the production of platinum group metals. In 2017–2021, substantially more than half of platinum came from South African mines, after which the next most important source of platinum has been recycling. In the case of rhodium, South Africa's share is the same as in platinum, while more than 90 percent of the supply of iridium and ruthenium comes from South African mines. When it comes to palladium, Russia's production levels are also high, in addition to which, palladium is also abundantly obtained from recycling sources. However, the export of platinum metals from Russia is estimated to have decreased due to the war in Ukraine. This has concerned, in particular, palladium, whose Russian exports have decreased by about a third.¹⁹

Table 3: Estimate of demand, production, and use of platinum group metals 2022–2023²⁰

	Demand	Main sources	Main applications
iridium	7 tons	South Africa (91 %), Zimbabwe (6 %), Russia (3 %)	electrochemical industry (45%), electronics industry (16%)
palladium	306 tons	recycling (33 %), Russia (27 %), South-Africa(25 %)	automotive industry (84%), electronics industry (6%), chemical industry (5%)
platina	232 tons	South Africa (57 %), recycling (21 %), Russia (9 %)	automotive industry (41%), jewelry industry (18%), chemical industry (9%)
rodium	33 tons	South Africa (56%), recycling (32%), Russia (5%)	automotive industry (90%), chemical industry (8%)
rutenium	34 tons	South Africa (93%), Zimbabwe (5%), Russia (2%)	chemical industry (40%), electronics industry (35%)

Among the platinum group metals, osmium has not been included in the table because its production and use are very minor and comprehensive statistics²¹ are not available.

19 Cowley, A. (2023). PGM Market Report. Johnson Matthey - company's market report p. 8–9. <https://matthey.com/documents/161599/404086/PGM+Market+Report+May23.pdf/2f048a72-74a8-8b23-f18e-c875000ed76b?t=1684144507321>

20 The main source of data in the table for the estimates for 2023 is Cowley, A. (2023). PGM Market Report. Johnson Matthey - company's market report, p. 38–50. <https://matthey.com/documents/161599/404086/PGM+Market+Report+May23.pdf/2f048a72-74a8-8b23-f18e-c875000ed76b?t=1684144507321>; Iridium and ruthenium production data are from 2022 and do not include recycled sources. USGS. (2023). Minerals yearbook, Platinum-Group Metals, 2022 tables-only release. Excel-file. <https://www.usgs.gov/centers/national-minerals-information-center/platinum-group-metals-statistics-and-information/>;

21 Technology Metals Market. (n.d.). Osmium. Website. Retrieved on 13 Dec 2023 from: <https://tm2.com/tm2-network/technology-metals-pipeline/osmium/>

Platinum and other metals of the platinum group are often produced in deposits, from which copper, nickel and cobalt are also obtained, sometimes also gold. The refining process of platinum group metals takes a great deal of energy and can take months. Various methods are used during the refining phase, such as dissolving, distilling and smelting to separate nickel and copper, etc. At best, only a few grams of refined platinum can be obtained from one ton of ore, which is why the disadvantages and risks associated with production are significantly greater than the production quantities alone suggest.²²

The Bushveld complex in South Africa, north of Johannesburg, is the world's most significant areas for platinum group metal ores. South Africa is estimated to have up to 90 per cent of the global known reserves of platinum group metals.²³ Production In South Africa takes place at a depth of 0.5–2.0 kilometers by drilling and blasting. Mining is labor and energy intensive. Energy is used for transporting the ore, for running tools, and for cooling, which is necessary due to the depth of the mines.²⁴ Power shortages²⁵ and smelter maintenance has caused production interruptions in recent years²⁶.

Because platinum is very expensive compared to many other metals, and it is very reusable²⁷, its recycling is quite advanced. About a fifth of the platinum and about a third of the palladium needed in various applications can be recycled from previous use, especially from the catalytic converters of cars. Since most of the platinum that can be recycled comes from combustion engine cars that are being scrapped, the possibilities for quickly increasing recycling are quite limited, as it would require a faster renewal²⁸ of the car fleet. On the other hand, the need for platinum in the automotive industry will decrease with electrification, as fewer catalytic converters that clean exhaust gasses will be needed.

22 International Platinum Group Metals Association. (n.d.). The Primary Production of Platinum Group Metals (PGMs), p. 3. https://ipa-news.com/assets/sustainability/Primary%20Production%20Fact%20Sheet_LR.pdf; Lèbre, É., Stringer, M., Svobodova, K. et al. (2020). The social and environmental complexities of extracting energy transition metals. *Nature Communication* 11:4823. <https://doi.org/10.1038/s41467-020-18661-9>

23 U.S. Geological Survey. (2023). Mineral Commodity Summaries 2023, p. 135. <https://pubs.usgs.gov/periodicals/mcs2023/mcs2023.pdf>

24 International Platinum Group Metals Association. (n.d.). The Primary Production of Platinum Group Metals (PGMs), p. 3. https://ipa-news.com/assets/sustainability/Primary%20Production%20Fact%20Sheet_LR.pdf

25 The reason for the electricity shortage is especially the maintenance debt of the production plants, which is based on, among other things, corruption. See e.g. Harding, A. (24.5.2023). South Africa load-shedding: The roots of Eskom's power problem. BBC online news. Retrieved on 2 Dec 2023 from: <https://www.bbc.com/news/world-africa-65671718>; Imray, G. (5.4.2023). South Africa ends 'state of disaster' over electricity. AP online news. Retrieved on 21 Dec 2023 from: <https://apnews.com/article/south-africa-electricity-crisis-16e5b4d50978e364766f90da9aa47529>

26 U.S. Geological Survey. (2023). Mineral Commodity Summaries 2023, p. 135. <https://pubs.usgs.gov/periodicals/mcs2023/mcs2023.pdf>; Cowley, A. (2023). PGM Market Report. Johnson Matthey company's Market Report, p. 6–7. <https://matthey.com/documents/161599/404086/PGM+Market+Report+May23.pdf/2f048a72-74a8-8b23-f18e-c875000ed-76b?t=1684144507321>

27 International Platinum Group Metals Association. (n.d.). The Primary Production of Platinum Group Metals (PGMs), p. 3. https://ipa-news.com/assets/sustainability/Primary%20Production%20Fact%20Sheet_LR.pdf

28 World Platinum Investment Council. (2023). Platinum Quarterly Q3/2023. Market overview. https://platinuminvestment.com/files/849223/WPIC_Platinum_Quarterly_Q3_2023.pdf

2.2 Future of the hydrogen economy globally and in Finland

Hydrogen is generally seen as one important tool in a climate-resilient energy system. The mitigation of climate change will require the quick phasing out of fossil energy use. The role of hydrogen is especially important in applications where the replacement of fossil fuels by direct electrification is not possible for one reason or another. Such applications include, such things as the production of methanol and steel, as well as sea and air traffic. In addition, hydrogen produced with electricity can be used for energy storage in situations where electricity production exceeds demand, and correspondingly for electricity production when demand exceeds supply. In this way, hydrogen-based solutions can support increasing the role of fluctuating renewable electricity production such as wind power.

It has been hoped that hydrogen will provide a solution for reducing greenhouse gas emissions in many different sectors. Due to other technological alternatives, costs and the limited availability of hydrogen, hydrogen has been seen as particularly necessary where there are the fewest alternatives for it, i.e. to replace fossil fuels in the production such things as steel and methanol.²⁹

Increasing the use of hydrogen as part of emission reductions in the energy system is not an unambiguously problem-free solution. First, the production of clean hydrogen requires a large amount of electricity in a situation where the need for clean electricity is growing anyway. Promoting the hydrogen economy therefore requires investing in the sufficiency of clean electricity. If the availability of energy is not ensured, this can prolong the use of fossil fuels. In addition, both hydrogen production and the necessary electricity production increase the use of land, water and various raw materials, which requires consideration of ecological and social sustainability. Land use and the primary production of minerals are associated with human rights risks, especially in countries located in the global south.³⁰

This report covers the raw material risks of the hydrogen economy and how to prepare for them, focusing on platinum production (see chapter 3). Platinum group metals are

29 One way to visualize the applications of pure hydrogen is the seven-step ladder drawn up by analyst Michael Liebreich. At the highest levels where the use of hydrogen is most justified are, for example, the production of fertilizers, methanol and steel, as well as ships and off-road vehicles. On the lowest rungs, where electricity from the grid or batteries should be used instead of hydrogen, for example, are passenger cars, commuter trains and home heating. Liebreich, M. (15.8.2021). The Clean Hydrogen Ladder [Now updated to V4.1]. LinkedIn-post. Retrieved on 29 Sept 2023 from: <https://www.linkedin.com/pulse/clean-hydrogen-ladder-v40-michael-liebreich/>

30 Heinemann, C., Mendelevitch, R. (2021). Sustainability dimensions of imported hydrogen. Working paper of the Oeko Institute 8/2021, p. 4-5. <https://www.oeko.de/en/publications/sustainability-dimensions-of-imported-hydrogen>; Villagrasa, D. (2022). Green hydrogen: Key success criteria for sustainable trade & production. Joint report of Brot für die Welt in ja Heinrich Böll Stiftung, p. 20. <https://www.brot-fuer-die-welt.de/fileadmin/mediapool/downloads/fachpublikationen/sonstige/green-hydrogen-key-success-criteria.pdf>

needed in some of the many alternative technologies³¹ used to produce hydrogen. The most typical method that requires platinum for the production of hydrogen is electrolysis with so-called PEM (proton exchange membrane) technology, where platinum is used as a catalyst to enhance the chemical reaction. In addition to platinum, PEM electrolysis requires iridium from the platinum group metals. PEM technology can also be used in fuel cells, which in turn produce electricity from hydrogen. Although there are also alternative technologies for both fuel cells³² and electrolyzers³³, PEM technology is considered a viable option for both purposes. Platinum has been identified as one of the critical minerals for hydrogen production³⁴. Although the quantities of platinum needed in fuel cells and electrolyzers are small, the concentration of its raw material production in a country with significant environmental and human rights risks and its high price make platinum a critical raw material. There has been concern about the sufficiency of both platinum³⁵ and iridium³⁶ to meet the needs of the green transition and especially the hydrogen economy. It has been deemed necessary to ensure as comprehensive recycling as possible of both after use. In the case of iridium, the need can also be reduced by the development of PEM technology³⁷.

Along with PEM electrolysis, other significant methods for producing hydrogen from water with electricity include alkali electrolysis and solid oxide electrolysis³⁸. They do not necessarily use platinum group metals at all, but in electrolyzers used for steam electrolysis, metals such as cobalt, lanthanum, manganese, nickel, strontium, yttrium and

31 Fossil-derived hydrogen based on the recovery of greenhouse gases is often called "blue" to distinguish it from "green", which is produced by electrolysis using renewable energy. On the other hand, if emission-free nuclear power is used in electrolysis, the resulting hydrogen is said to be "pink". On the other hand, fossil hydrogen produced without recovery is called gray (natural gas), brown (lignite) or black (hard coal), depending on the fuel used. National Grid. (n.d.). The hydrogen colour spectrum. Article on the website of the British grid company. Retrieved on 3 Nov 2023 from: <https://www.national-grid.com/stories/energy-explained/hydrogen-colour-spectrum>

32 U.S. Department of Energy. (n.d.). Comparison of Fuel Cell Technologies. US Energy Agency website. Retrieved on 3 Nov 2023 from: <https://www.energy.gov/eere/fuelcells/comparison-fuel-cell-technologies>

33 U.S. Department of Energy. (n.d.). Hydrogen Production: Electrolysis. US Energy Agency website. Retrieved on 3 Nov 2023 from: <https://www.energy.gov/eere/fuelcells/hydrogen-production-electrolysis>

34 Christensen, A.B. (19.4.2023). The material risk of green hydrogen. On the website of the Ramboll company. Retrieved on 3 Nov 2023 from: <https://www.ramboll.com/insights/decarbonise-for-net-zero/the-material-risk-of-green-hydrogen>

35 Rasmussen K.D., Wenzel, H., Bangs, C. et al. (2019). Platinum Demand and Potential Bottlenecks in the Global Green Transition: A Dynamic Material Flow Analysis. *Environmental Science & Technology* 53:19, 11541-11551. <https://doi.org/10.1021/acs.est.9b01912>

36 Minke, C., Suermann, M., Bensmann, B., et al. (2021). Is iridium demand a potential bottleneck in the realization of large-scale PEM water electrolysis?. *International Journal of Hydrogen Energy* 46:46. <https://doi.org/10.1016/j.ijhydene.2021.04.174>

37 Minke, C., Suermann, M., Bensmann, B., et al. (2021). Is iridium demand a potential bottleneck in the realization of large-scale PEM water electrolysis?. *International Journal of Hydrogen Energy* 46:46. <https://doi.org/10.1016/j.ijhydene.2021.04.174>

38 Department of Energy. (n.d.). Hydrogen Production: Electrolysis. Website. Retrieved on 4 Dec 2023 from: <https://www.energy.gov/eere/fuelcells/hydrogen-production-electrolysis>

zirconium can be used³⁹. Of these, cobalt, nickel and strontium are critical raw materials according to the European Commission's definition⁴⁰. Alkali electrolysis typically requires at least nickel⁴¹.

Traditionally, fossil fuels and so-called steam reforming have been used in the production of hydrogen. Even with this method, low-emission hydrogen can be produced if the released carbon dioxide can be recovered with CCS technology (carbon capture and storage). However, such recovery methods are still quite undeveloped and their climate impact is subject to uncertainties⁴². Traditional steam reforming can also produce hydrogen from renewable raw materials when biogas is used instead of natural gas⁴³.

Although there is a lot of talk about hydrogen as a solution for the green transition, for the time being, hydrogen production in the hydrogen economy is still based on fossil energy, and its demand is mostly in traditional applications and not in new solutions promoting the green transition. In a market review published in September 2023, the International Energy Agency (IEA) estimated that low-emission or zero-emission hydrogen currently covers only 0.7 percent of hydrogen demand, and that new applications related to energy production or transportation account for only 0.1 percent⁴⁴ of the total hydrogen demand.

The IEA estimates that the production of low-emission hydrogen could reach a level of 38 million tons by 2030 (in 2022, hydrogen production totaled 95 million tons). About

39 Wikipedia. (n.d.). Solid oxide electrolyzer cell. Retrieved on 3 Nov 2023 from: https://en.wikipedia.org/wiki/Solid_oxide_electrolyzer_cell; <https://www.ramboll.com/insights/decarbonise-for-net-zero/the-material-risk-of-green-hydrogen>

40 Grohol, M., Veeh, C. (2023). Study on the critical raw materials for the EU 2023. European Commission report p. 4 ja p. 16. <https://data.europa.eu/doi/10.2873/725585>

41 Kumar, S.S., Lim, H. (2022). An overview of water electrolysis technologies for green hydrogen production. Energy Reports 8: 13793–13813. <https://doi.org/10.1016/j.egy.2022.10.127>

42 In terms of climate impact, it is essential how much of the emissions can be recovered in the process itself and how much greenhouse gas leaks into the atmosphere occur in other stages of production. Recovery also requires energy, which should be clean in order to minimize the harmful climate impact. In the worst case, only about half of the emissions can be recovered in the recovery alone, in which case the so-called blue hydrogen would not be nearly emission-free. Without technological development, it is therefore not clear to what extent blue hydrogen can be part of a completely emission-free or very low-emission energy system. In a bit the same way as there are many competing uses for hydrogen, also in the case of carbon dioxide recovery technology, efforts have been made to make a classification based on where the use of recovery is most profitable. In Bellona's and E3G's adaptation of Liebreich's hydrogen ladder (see footnote 29), blue hydrogen production is placed in the middle stages of the scale. Ks. Bellona & E3G. (2023). Carbon Capture and Storage Ladder. <https://www.e3g.org/publications/carbon-capture-and-storage-ladder/>; Faithfull, E. (12.7.2022). Horses for Courses: H2 in a Net Zero Economy. Article on the website of the ISS company. Retrieved on 3.11.2023 from: <https://insights.issgovernance.com/posts/horses-for-courses-h2-in-a-net-zero-economy/>; Howarth, R.W., Jacobson, M.Z. (2021). How green is blue hydrogen?. Energy Science & Engineering 9:10. <https://doi.org/10.1002/ese3.956>; Schlissel, D., Wamsted, D., Mattei, S. et al. (2022). Reality Check on CO2 Emissions Capture at Hydrogen-From-Gas Plants. IEEFA report. https://ieefa.org/wp-content/uploads/2022/02/Reality-Check-on-CO2-Emissions-Capture-at-Hydrogen-From-Gas-Plants_February-2022.pdf

43 Zhao, X., Joseph, B., Kuhn, J., et al. (2020). Biogas Reforming to Syngas: A Review. iScience 23:5. <https://doi.org/10.1016/j.isci.2020.101082>

44 IEA. (2023). Global Hydrogen Review 2023. Report, p. 13. <https://iea.blob.core.windows.net/assets/cb9d5903-0df2-4c6c-afa1-4012f9ed45d2/GlobalHydrogenReview2023.pdf>

ten million tons of this is estimated to come from fossil sources using emission recovery technology. The production of electrolyzers used in electricity-based hydrogen production is expected to increase approximately one hundredfold from 2022 to 2030. The IEA is more concerned about demand than production, because according to the agency, the targets of companies to increase hydrogen use in operations that reduce fossil emissions only amount to around 14 million tons. This is only one fifth of what is needed for 2030 according to the agency's net zero by 2050 scenario.⁴⁵

Increasing the use of green hydrogen in the planned manner will require an increase in electrolyzer capacity. Capacity refers to the efficiency with which it is possible to produce hydrogen. In addition to capacity, the amount of hydrogen produced will depend on the utilization rate of electrolyzers. At the end of 2022, the combined capacity of the electrolyzers was about 700 megawatts⁴⁶ and was projected to roughly triple to just over two gigawatts during 2023. Despite the rapid growth, there is still a long way to go to the level indicated in the IEA's net zero scenario, because according to the scenario, the electrolyzer capacity should be around 600 gigawatts in 2030. According to the IEA's estimate, the published plans range from 175 to 420 gigawatts, depending on whether or not projects in the very early planning stages are included in the calculations.⁴⁷ In addition to electrolyzer capacity, the sufficiency of the clean electricity needed for their use is also crucial. In an IEA report published in January 2024, it was estimated that the renewable energy projects that produce the electricity needed to produce hydrogen will not progress at the same pace as the actual electrolysis projects⁴⁸.

It is expected that the Nordic countries have the potential to produce so much renewable energy that with their transition to the hydrogen economy, they will have the opportunity to become an important part of the EU's energy and industrial cluster, which has previously been centered in Central Europe. The production of green methanol by combining green hydrogen produced with renewable electricity and bio-based carbon dioxide produced in the forest industry is seen as one of Finland's special strengths.⁴⁹ In addition, it has also been suggested that a hydrogen pipeline network could be built between Finland

45 IEA. (2023). Global Hydrogen Review 2023. Report, p. 11–13 ja 20. <https://iea.blob.core.windows.net/assets/cb9d5903-0df2-4c6c-afa1-4012f9ed45d2/GlobalHydrogenReview2023.pdf>

46 Of the electrolysis batches introduced by the end of 2022, approximately 60 percent were based on alkali technology, 30 percent on PEM technology and less than one percent on solid oxide technology. As for the rest, the technology was not known to the IEA. Most of the electrolyzers were in use either in Europe or China, both accounted for about a third of the global capacity. IEA. (2023). Global Hydrogen Review 2023. Report, p. 69–70. <https://iea.blob.core.windows.net/assets/cb9d5903-0df2-4c6c-afa1-4012f9ed45d2/GlobalHydrogenReview2023.pdf>

47 IEA. (2023). Global Hydrogen Review 2023. Report, p. 68–73. <https://iea.blob.core.windows.net/assets/cb9d5903-0df2-4c6c-afa1-4012f9ed45d2/GlobalHydrogenReview2023.pdf>

48 IEA. (2024). Renewables 2024, Analysis and forecast to 2028. Report, p. 88–93. <https://www.iea.org/reports/renewables-2023>

49 Laaksonen, P., Pyrhönen, O. & Vakkilainen, E. (7.9.2023). Vetytalous käynnistää Euroopan suuren teollisen murroksen. Opinion piece in Helsingin Sanomat. Retrieved on 8.9. from: <https://www.hs.fi/mielipide/art-2000009818120.html>

and Germany through which hydrogen produced in Finland could be transported to Germany for use and refining by German industry⁵⁰.

In March 2023, Prime Minister Sanna Marin's Government approved a policy goal in Finland, according to which Finland will aim to be a "European leader in the hydrogen economy throughout the entire value chain". In the policy goal, it is estimated that "should economic conditions develop favorably, Finland will have the ability to produce at least ten percent of the EU's emission-free hydrogen in 2030"⁵¹. On the other hand, it is mentioned in Prime Minister Petteri Orpo's Government Programme that "Finland will become a key player in the hydrogen economy, and is an attractive location for projects that further refine hydrogen"⁵².

The hype is not only in the politicians' visions. In recent years, many types of cooperation around the hydrogen economy have been developed in Finland, also by companies and municipalities. For example, hydrogen clusters have been outlined in at least three different areas: the so-called "Silicon Valley of the hydrogen economy" would be located on the axis Kokkola-Raahe-Oulu-Kemi-Tornio⁵³ while the "Hydrogen Valley" would be in Southeast Finland⁵⁴ as well as in Uusimaa⁵⁵. On the other hand, the hydrogen projects of many companies have also encountered delays due to uncertainties related to land use politics or the market⁵⁶.

For this report, Finnwatch surveyed companies that have or have planned business related to the production of clean hydrogen in Finland. The sustainability practices of these companies are examined in chapter 4, focusing especially on how the companies are ensuring the responsibility of the minerals used in hydrogen production.

50 Parviala, A. (9.12.2023). Saksa haluaa ostaa rajattomasti vetyä Suomesta – ministeriö ja valtionyhtiö täysin eri linjoilla viennin järjestyksestä. Yle's online news. Retrieved on 21.12.2023 from: <https://yle.fi/a/74-20063157>; Power, A. (5.1.2024). A pre-feasibility study for Nordic-Baltic hydrogen pipeline has been launched by six gas transition operators. Online news on Hydrogen Technology Expo -webpage. Retrieved on 9 Jan 2024 from: https://www.hydrogen-worldexpo.com/industry_news/a-pre-feasibility-study-for-nordic-baltic-hydrogen-pipeline-has-been-launched-by-six-gas-transition-operators/

51 Valtioneuvosto. (2023). Valtioneuvoston periaatepäätös vedystä. Valtioneuvoston julkaisuja 2023:17, p. 11. https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/164743/VN_2023_17.pdf?sequence=4&isAllowed=y

52 Valtioneuvosto. (2023). A strong and committed Finland : Programme of Prime Minister Petteri Orpo's Government 20 June 2023 <http://urn.fi/URN:ISBN:978-952-383-763-8>

53 Sallinen, P. (10.12.2021). Valmiiksi vetyä varten. Article from Energiauutiset website. Retrieved on 3.11.2023 from: <https://www.energiauutiset.fi/kategoriat/markkinat/valmiiksi-vetya-varten.html>

54 City of Lappeenranta. (2 Feb 2023). Suomen Vetylaakso ry perustettu edistämään itäisen Suomen elinvoimaa ja teollisia investointeja. Release. Retrieved on 3.11.2023 from: <https://lappeenranta.fi/fi/ajankohtaista/suomen-vetylaakso-ry-perustettu-edistamaan-itaisen-suomen-elinvoimaa-ja-teollisia-investointeja>

55 Uusimaa. (20 June 2023). Neste ja energiayhtiöt yhdistävät voimansa teollisen vetylaakson kehittämiseksi Uudellemaalle. Uusimaa newspaper's online news. Retrieved on 3.11.2023 from: <https://www.uusimaa.fi/paikalliset/6016358>

56 Mäntylä, J.-M., Hukkanen, V. (20 Dec 2023). Yle selvitti: Vetyhankkeiden piti tuoda Suomeen paljon töitä ja rahaa, mutta nyt moni projekti yhtäkkiä sakkaa. Yle's online news. Retrieved on 21.12.2023 from: <https://yle.fi/a/74-20065871>

3. CASE: Human rights impacts of Sibanye-Stillwater Marikana platinum mine in South Africa

Sibanye-Stillwater is a South African mining and metal refining group that operates on five different continents. The company is one of the world's largest producers of platinum, palladium and rhodium. In addition, it produces significant amounts of gold. Sibanye-Stillwater's portfolio also includes the production and processing of iridium and ruthenium as well as nickel, chromium, copper and cobalt.

The company has stated that its strategy is to increase the mining and processing of battery metals, such as lithium and nickel, and it has also invested in recycling and enrichment waste reprocessing operations. In Finland, Sibanye-Stillwater is currently constructing the Keliber lithium mine and refinery operations in the Kokkola area. The company emphasizes that the PGMs it produces are also important minerals for the green transition needed in the production of green hydrogen.⁵⁷

Sibanye-Stillwater does not disclose the names of its clients to the public. However, the company disclosed that , the automotive industry is its most important client group for platinum group metals⁵⁸. In Sibanye-Stillwater's annual report, significant clients are referred to with letter combinations A, B and C⁵⁹. The company says that its platinum group metals market is divided geographically into the United States (47 percent), Great Britain (22 percent), South Africa (12 percent) and other markets (19 percent). The company's battery minerals are mainly bought in Switzerland (63 percent), followed by Belgium and the Netherlands, which account for 8 percent of purchases respectively. The German chemical company BASF, which also supplies raw materials to the automotive industry, has stated that Sibanye-Stillwater is its supplier⁶⁰.

Sibanye-Stillwater's PGM mines are located in South Africa and the United States. The company also has a 50% JV shareholding in a PGM mine in Zimbabwe.⁶¹ The com-

57 Sibanye-Stillwater. Annual report 2022, p. 13–17. <https://reports.sibanyestillwater.com/2022/download/ssw-IR22.pdf>

58 Sibanye-Stillwater. Annual report 2022, p. 101. <https://reports.sibanyestillwater.com/2022/download/ssw-20F22.pdf>

59 Sibanye-Stillwater. Annual report 2022, p. 375. <https://reports.sibanyestillwater.com/2022/download/ssw-20F22.pdf>

60 BASF. (2022). Supplier management. Retrieved on 11 Dec 2023 from <https://report.basf.com/2022/en/managements-report/sustainability-along-the-value-chain/responsible-procurement/supplier-management.html>

61 Sibanye-Stillwater. Annual report 2022, p. 5. <https://reports.sibanyestillwater.com/2022/download/ssw-IR22.pdf>

pany produces more than 30,000 kilograms of platinum annually (34,984 kilograms in 2022⁶²), which is about one-fifth of total global platinum production⁶³.

In South Africa, Sibanye-Stillwater's PGM mines are located in the North West and Limpopo provinces, and they are part of the world's most significant deposit of platinum group metals, the Bushveld Igneous Complex. In addition, the company is progressing with the construction of the K4 shaft at Marikana. This report focuses in particular on the company's already operating PGM mines in South Africa's North West province in the Madibeng area where its Marikana operations are situated. South Africa is a country where business operations are subject to high human rights and environmental risks.

3.1 Marikana mining complex

Sibanye-Stillwater's Marikana is a large mining complex built for the extraction and processing of platinum group minerals. It is located 40 kilometers from the town of Rustenburg in South Africa's North West province. The mining complex covers a total area of more than 26,000 hectares⁶⁴. Sibanye-Stillwater gained ownership of the mining complex through a corporate acquisition: Sibanye-Stillwater purchased the Marikana operations and other assets when from the previous owner, Lonmin Plc, in 2019⁶⁵. Marikana is part of a larger series of Sibanye-Stillwater's contiguous mines and mining operations spanning 60 kilometers, which includes the Rustenburg, Kroondal and Platinum Mile mining complexes and other mining operations.

The Marikana mine complex includes five vertical mine shafts, four of which were in use at the time of drafting this report, and five inclined mine shafts, two of which are currently in use. Shafts that are not used are under renovation and maintenance. Vertical mine shafts extend to a depth of 900–1,130 meters underground. The depth of the inclined shafts reach a depth of about 400 meters.

The mining complex also includes eight concentrator plants. Four of these are used for ore processing. Of the remaining four concentrators, two are under care and maintenance, and two process the mine's tailings. The current operational capacity of the concentrators is 1.16 million tons per month⁶⁶. From the concentrators, the concentrate is

62 Sibanye-Stillwater. Annual report 2022, p. 85. <https://reports.sibanyestillwater.com/2022/download/ssw-IR22.pdf>. The company's platinum production in 2022 was 1,124,891 Troy ounces.

63 NS Energy. (26 Oct 2020). Profiling the world's top five platinum-mining companies. Retrieved on 5 June 2023 from <https://www.nsenerybusiness.com/features/top-five-platinum-mining-companies/>

64 Sibanye-Stillwater. Annual report 2022, p. 7. <https://reports.sibanyestillwater.com/2022/download/ssw-RR22.pdf>

65 Sibanye-Stillwater. (7.6.2019). Sibanye-Stillwater's acquisition of Lonmin – Scheme becomes Effective. Press release. https://thevault.exchange/?get_group_doc=245/1559925962-WithLogoSibanye-StillwateracquisitionofLonminbecomeseffective7June2019.pdf

66 Sibanye-Stillwater. Email message to Finnwatch on 18 Jan 2024

directed to a smelter located near the mining area, and from there to a base metals refinery (where copper and nickel are extracted). The resulting PGM-rich product is refined at a precious metals refinery, which is situated in Brakpan, east of Johannesburg.⁶⁷ Chrome is also produced at four chrome concentrators with a current operational capacity of 777,000 tons per month⁶⁸. The process produces chromium(III) oxide (Cr₂O₃).⁶⁹

The smelter is located in the Wonderkop area of Marikana near the informal settlement of Nkaneng, where some of the company's employees live. In addition to the production-related structures, the Marikana mining complex also includes a water treatment plant, tailings depositions, an official residential area for employees and three hospitals/health centers⁷⁰. In 2022, 22,660 people were employed at Sibanye-Stillwater's Marikana, which included 18,800 employees and 3,860 contractors.



Photo: HotIn, CC BY-SA 3.0 DEED. Marikana location added to the picture.

The Marikana mining complex is located in the North West province of South Africa.

67 Sibanye-Stillwater. PGM Operations, Marikana. Retrieved on 5 June 2023 from <https://www.sibanyestillwater.com/business/southern-africa/pgm-operations/marikana/>

68 Sibanye-Stillwater. Email message to Finnwatch on 18 Jan 2024

69 Sibanye-Stillwater. Annual report 2022, p. 46. <https://reports.sibanyestillwater.com/2022/download/ssw-RR22.pdf>

70 Sibanye-Stillwater. PGM Operations, Marikana. Retrieved on 5 June 2023 from <https://www.sibanyestillwater.com/business/southern-africa/pgm-operations/marikana/>

3.2 How the research was done

The study of the Sibanye-Stillwater Marikana mining complex's human rights impacts began in the summer of 2023 by conducting a preliminary investigation in the area. During that time, Finnwatch's South African partner, non-governmental organization ILRIG visited residential areas close to the mining complex and interviewed local organizations and researchers who had previously investigated Sibanye-Stillwater's mines. With the help of the preliminary study, Finnwatch and ILRIG mapped the main human rights impacts of the Marikana mining complex and drew up a more detailed research plan based on this.

The actual research was carried out in October 2023. During this research, a total of 15 employees working in the Sibanye-Stillwater Marikana complex and 13 other people living in the area were interviewed. In addition, two experts from South Africa's Benchmark Foundation who had previously investigated Sibanye-Stillwater's operations in Marikana were interviewed and the employees' residential areas were visited.

The employee interviews focused on how workers' rights are realized in Sibanye-Stillwater's operations. The questions focused on such things as salary and working hours, occupational health and safety, and freedom of association. Interviews with members from the surrounding community centered on questions that would help form a picture of how the nearby mine affects their lives. The questions for community members covered themes such as living conditions and infrastructure, environmental impacts, and the implementation of social and labor plans (SLP) legally required for mines in South Africa. All the interviewees were also free to bring up the themes they felt were important to the discussion.

Due to the violent conflict in the area in 2012 ("Marikana massacre") and the violence that has continued since then, there is an atmosphere of fear in the area and people are generally not willing to share their views with outsiders. The Marikana massacre took place in August 2012 when police opened fire on striking miners, killing 34 and injuring 78.⁷¹ The massacre had been preceded by violence against the Marikana mine's security guards and the internal violence in NUM, the trade union that originally represented the striking workers.

Since the 2012 massacre, at least 22 local activists or trade union representatives have been killed or murdered in the region, without the perpetrators being caught or the exact motives of the violence being revealed⁷². For this reason, interviews with employees and the local community were carried out in a safe and private place as 1-on-1 interviews.

71 TimesLive. 19 Aug 2012. Miners vow to continue strike despite Lonmin ultimatum. <https://www.timeslive.co.za/news/south-africa/2012-08-19-miners-vow-to-continue-strike-despite-lonmin-ultimatum/>

72 Sinwell, L., Smith, N. (2022) Killing the collective. <https://africasacountry.com/2022/07/killing-the-collective>

This was done to ensure that the identity of the interviewees would not be revealed to outsiders, to avoid retaliation. The names of interviewees or their photos will not be published in this report.

Out of the 28 people in total who were interviewed, 11 were women. However, there were significantly fewer women than men among the interviewed employees. The exact number of interviewed female employees is known to Finnwatch, but it is not made public to protect the persons in question. The overwhelming majority of the workers at the Sibanye-Stillwater Marikana mine are men⁷³.

The interviewed employees work in the mine in various positions including miners, lifting equipment operators, rock drillers, drivers and guards. Almost all the interviewees live in the Nkaneng informal settlement near the mine in Wonderkop, near the Sibanye-Stillwater smelter.

Sibanye-Stillwater was offered the opportunity to comment on the findings before publication of this report. The report was sent to the company on 14 December 2023 and the company was given time until 11 January 2024 to respond. On 15 January, Finnwatch and Sibanye-Stillwater representatives met in an online meeting to discuss the main findings of the report. After that the company was given the opportunity to check the amendments made to the final report.

Sibanye-Stillwater's view is that the methodology and approach of the Finnwatch study "does not meet the criteria for a balanced and fair analysis". Sibanye-Stillwater criticizes the sample size and the fact that part of the research has focused on the informal settlement (Nkaneng) next to the company's operations. According to the company, this results in what it believes to be "unverified and biased outcomes". Sibanye-Stillwater also believes that it was not given enough time to comment on the findings of the report as December is holiday season in South Africa.

Finnwatch would like to stress that its research is not quantitative research, but qualitative research providing deeper insights into problems experienced by workers and communities in the area. Qualitative research is a common approach when looking into human rights issues. Housing conditions in Nkaneng are a well-known human rights issue and therefore a natural area of focus for the research. Finnwatch follows its ethical guidelines in its work⁷⁴. Finnwatch is also of the opinion that a response time of nearly one month is enough for a large, listed company operating globally.

73 In its response to Finnwatch, Sibanye-Stillwater said that it has established policies and procedures to increase female representation across all levels of the organisation. At the SA PGM operations, the percentage of women has increased from 12.5% in 2020 to 13.5% in 2021 and 15.6% in 2022. At Marikana the percentage of women employed has increased from 9.6% in 2019 to 15% currently.

74 Finnwatch. Ethical instructions. Retrieved on 20.1.2024 <https://finnwatch.org/fi/keitae-olemme/eettiset-ohjeemme>

3.3 Wages and working hours

According to Sibanye-Stillwater, it pays employees competitive wages. According to the company's website, its average starting salary in South Africa is 22,806 South African Rand (1,102 euros⁷⁵) per month.⁷⁶

Most of the employees interviewed for this report were the company's own permanent employees who receive a monthly salary. The majority of employees work a six-day 45-hour work week, but there are variations in the working week (38–45 hours) and some work in shifts of four days work and two days off. Among the interviewed permanent employees on the company's payroll, the lowest gross monthly salary before deductions was reportedly 17,500 rand (846 euros). The highest gross monthly salary reported was almost 44,000 rand (2,127 euros). Most workers said they earn between 20,300 and 22,000 rand (981–1,063 euros) a month before deductions.

The wages reported by the employees included a housing allowance (2,400 rand, 116 euros), an allowance for healthcare and a pension fund payment. After deductions including taxes and unemployment insurance, the highest net salary reported by an interviewed worker was 28,000 rand, and the lowest between 12,000 and 13,000 rand (580–628 euros). Most of the company's own permanent employees interviewed said their net salary was between 15,000 and 16,800 rand (725–812 euros).

Among the interviewed employees were also trainees (so-called cadets), whom Sibanye-Stillwater uses extensively in its workforce, according to the interviewees. The monthly gross wages of the trainees, between 4,500 and 7,000 rand for a 38-hour work week, were significantly lower, although according to the workers interviewed, they do much the same work as other workers. Trainees are also not paid salary supplements such as a housing allowance, an allowance for healthcare or a pension fund payment.

In its response to Finnwatch, Sibanye-Stillwater denied the interviewed workers' view that cadets were used extensively. According to the company there were only 355 cadets in the Marikana complex in 2022 (Marikana employed a total of 22,660 people in 2022) of whom 265 have been permanently employed. Sibanye-Stillwater sees the cadet program as a major opportunity for the community – in a country with such high unemployment, this provides a possible bridge especially for young people to transition from unemployment to developing their skills for future employment. According to Sibanye-Stillwater the cadet scheme is another way of offering younger local people employment opportunities, where they join the cadet program so that they can be trained. This allows them to obtain experience which may enable permanent employment.

⁷⁵ All currency conversions in the report use the South African rand rate of 20.6892 on Jan 19, 2024. Source. Bank of Finland. Exchange rates. <https://www.suomenpankki.fi/fi/Tilastot/valuuttakurssit/>

⁷⁶ Sibanye-Stillwater. People. Retrieved on 7 Nov 2023 from <https://www.sibanyestillwater.com/sustainability/people/>

The company also hires contract workers via outsourced operators, whose wages are lower than those of permanent workers. In interviews, the contract worker's gross salary was said to be 12,000 rand (580 euros) per month. After deductions, they are left with around 10,000 rand (483 euros). Contract workers are not offered a health care allowance and therefore they cannot use the health services provided by the company. In its response to Finnwatch, Sibanye-Stillwater stated that its view is that contracting companies are responsible for negotiating pay, health and other benefits with their own employees (i.e. contract workers working in the Marikana complex).

The salaries of cadets, contract workers and the company's own permanent employees exceed the statutory South African minimum wage of 4,182 rand (202 euros) per month for a 38-hour work week and 4,957 rand for 45-hour work week⁷⁷. However, according to some of the employees, the company does not pay overtime pay, even though there is a lot of overtime work. According to South African legislation, an employer must pay an employee at least one and one-half times the employee's wage for overtime worked. In addition to this, an employer may not require or permit an employee to work more than three hours of overtime a day or ten hours of overtime a week.⁷⁸

"My working hours should be eight hours a day. However, I often go to work at five in the morning and finish at six at night. I don't get paid for overtime."

"Lonmin [the mine's previous owner that was acquired by Sibanye-Stillwater] paid for overtime, Sibanye doesn't."

In its response to Finnwatch, Sibanye-Stillwater denied workers' claims. According to the company, there have been no grievances or action on record relating to employee refusing and or failing to work overtime and or complaining he/she is forced to work overtime or not being paid for working overtime. According to the company, its overtime policy and procedure are very clear on when overtime is allowed and the need to get overtime approved prior to it commencing. If a person decides to stay underground and continue with work outside normal hours without obtaining authorization for such overtime work this overtime is deemed unscheduled and unauthorized, and the person does not have permission to continue with the work outside normal hours. Only in case of an emergency will payment be approved for such unscheduled overtime.

77 Republic of South Africa. National Minimum Wage – Wage increase 2023 flyer. <https://www.labour.gov.za/Document-Center/Publications/Basic%20Conditions%20of%20Employment/National%20Minimum%20Wage%20-%20Wage%20increase%202023%20flyer.pdf>. Minimipalkkaan ei lasketa mukaan erilaisia lisiä.

78 Republic of South Africa. Basic Conditions of Employment Act [No. 75 of 1997]. https://www.gov.za/sites/default/files/gcis_document/201409/a75-97.pdf

What is a living wage in Marikana?

Living wage means a salary that enables an employee to obtain a basic, but locally acceptable, standard of life for themselves and their family. Such a salary is sufficient to satisfy the basic needs of family members (for example, adequate food, housing, health care, clothing, movement and children's education) and enables small-scale savings and participation in social and cultural life. A living wage is the lowest acceptable wage level that meets human rights requirements. Living wage refers to the wage paid for normal working hours, i.e. it does not take such things as compensation paid for overtime or performance-based compensation into account.⁷⁹

The most internationally known initiative for calculating living wages is the Global Living Wage Coalition (GLWC). Its work is based on the Anker methodology, and it has several certification systems for members. However, GLWC has not produced a living wage calculation for South Africa's North West Province, where the Marikana mine is located. The system's only South African calculation has been compiled for the Western Cape province, where the living wage estimate for November 2023 was 5,354 rand (259 euros). The calculation assumes that there are 4.5 people in the family and that there are 1.64 employed people in the family.⁸⁰ Many civil society representatives and researchers in South Africa consider the GLWC's estimate of a living wage to be completely inadequate⁸¹.

According to the interviewed Sibanye-Stillwater employees, it is difficult for them to get by on their salary. This is mainly due to unemployment being very high in the region, and the employees have to support many people with their wages. The interviewed employees said that in addition to their nuclear family, there are also other relatives to support, such as their parents and siblings and their siblings' children. On average, the interviewed employees had more than seven people to support. Two interviewees said that there were up to 12 people dependent on their salary.

The unemployment rate in South Africa as a whole is 32.9 percent and in the North West province it is 38.0 percent⁸². In the Marikana region, the situation is even more difficult,

79 More information about a living wage as a human rights issue: Finnwatch. (2015). Elämiseen riittävä palkka ihmisoikeutena. <https://finnwatch.org/images/pdf/RaporttiERP.pdf>

80 Global Living Wage Coalition. (2023). Living Wage for Western Cape Province, South Africa – Rural South Africa. <https://www.globallivingwage.org/living-wage-benchmarks/rural-south-africa/>. The details behind the calculation in question and the shortcomings of the calculation update process are discussed in more detail in Finnwatch's report on South African wine production "Ihmisoikeudet Etelä-Afrikan viinitiloilla" (2022). The report is available at <https://finnwatch.org/fi/julkaisut/ihmisoikeudet-etelae-afrikan-viinitiloilla>

81 BusinessTech. (22.11.2023). Calls to pay workers a 'living wage' of R12,000 a month in South Africa. <https://business-tech.co.za/news/business-opinion/732765/calls-to-pay-workers-a-living-wage-of-r12000-a-month-in-south-africa/>

82 Statistics South-Africa. [Beyond unemployment – Time-Related Underemployment in the SA labour market](https://www.statssa.gov.za/?p=16312). Retrieved on 30.11.2023. <https://www.statssa.gov.za/?p=16312>; Statistics South-Africa. (2023). Quarterly Labour Force Survey Quarter 1: 2023, s. 8. <https://www.statssa.gov.za/publications/P0211/P02111stQuarter2023.pdf>

and for example, unemployment of women in the region has been reported to be over 70 percent⁸³. Interviewees accused Sibanye-Stillwater of creating far too few direct and indirect jobs. Dissatisfaction with the number of indirect jobs brought by the mine is also mentioned in Sibanye-Stillwater's own annual report. The unemployment situation is complicated by the fact that social services provided by the state and other state provided safety nets in the region are of poor quality. According to Sibanye-Stillwater, the mine is one of the largest employers in the North West Province and supports many indirect jobs.

"My salary is not at all at a sufficient level to get by. I have to take care of the school fees of four children. My money is not enough to buy food for the whole family."

Poverty caused by high unemployment even causes malnutrition in the region⁸⁴. Interviewed workers and other community members said that they often have to resort to debt from loan sharks in order to buy food. The loan sharks may require them to hand over their personal papers as collateral for the repayment of the loan. According to the interviewees, loan sharks often have connections with criminal networks operating in the area, which use confiscated identity papers for various frauds.

In its response to Finnwatch, the company underlines that the mining industry is highly unionized and wages are negotiated regularly with the unions representing employees. "As such the wages are the outcome of negotiated agreements, so they cannot be considered "unfair"", the company stated. Referring to workers resorting to loan sharks, the company said that it cannot influence how individuals manage their finances and spend their income. However, the company has started a program⁸⁵, in which it educates employees to make better financial decisions and reduce their indebtedness. Sibanye-Stillwater admits that "fair wages" are a difficult societal issue in South Africa. Sibanye-Stillwater has not assessed what a human rights-based living wage would be in Marikana.

Poverty also fuels other crime in the area, and a large part of the interviewees were very concerned about this. Two of the interviewed employees had themselves been the victims of a robbery.

"The shacks [in which we live] are not safe. There are a lot of criminals in the area who get into loot by cutting open the sheets covering the walls of the shacks. Walls don't stop criminals; they can also shoot through them."

83 Mail & Guardian. (16.8.2021). Time in Marikana has stood still. <https://www.mg.co.za/news/2021-08-16-time-in-marikana-has-stood-still/>

84 Mail & Guardian. (16.8.2021). Time in Marikana has stood still. <https://mg.co.za/news/2021-08-16-time-in-marikana-has-stood-still/>

85 Sibanye-Stillwater. Care for iMali – Taking care of personal finance. <https://reports.sibanyestillwater.com/2022/download/ssw-FS22-care-imali.pdf>

One interviewee also talked about thefts in the mining area. In 2022, an outsider (*zama zama*⁸⁶), who had tried to steal cables had been shot dead by guards in the mining area. Cable thefts are also mentioned in Sibanye-Stillwater's annual report. In 2022, cable thefts had become so common that they even caused production interruptions.⁸⁷

3.4 Collective punishments undermine the occupational safety culture

Many of the interviewed employees work in jobs with an increased risk of accidents and occupational health hazards. The employees interviewed operate vehicles and winches, which are used to move and lift rock out of the mine or set explosives to remove rock.

Mine safety is regulated in South Africa by the Mine and Health Safety Act (1996). The Act requires mining companies to ensure that working conditions are safe and healthy, workers are provided with protective equipment, and that occupational safety and health risks are assessed and addressed. The law also gives workers the option to refuse work or leave the mining area if the conditions are unsafe.⁸⁸

Sibanye-Stillwater says that it is committed to safe working conditions and constantly improves safety through risk assessments. The company's goal is to eliminate all fatal accidents. The employees interviewed for this report said that they had received safety training and some also said that they participate in daily safety reviews. In general, many of the interviewees estimate that the company takes occupational safety seriously.

However, interviews revealed that there were also problems in the company's safety practices, which seem to be at least partly due to the conflicting goals set for supervisors. Some of the interviewed employees said that employees' concerns about safety are not always taken seriously, and those who refuse dangerous work may be punished. One case from 2022 came up in the interviews, in which workers who refused to work in a mine shaft they perceived as dangerous had been punished. According to the interviewees, this was due to the supervisors' own production goals being jeopardized if work was interrupted, and therefore they have an incentive to pressure employees into dangerous jobs as well.

Some of the workers also complained about the lack of protective equipment, the lack of toilets, and the fact that the cages used to lower workers into the mine shafts were often too full of people.

86 Zama zama means a person doing informal small-scale mining, who uses, for example, closed mine shafts without permission. For example, Makhetha E. (2023). 'Zama Zama' and leftovers: The recycling of ore in abandoned gold mines in South Africa. <https://www.sciencedirect.com/science/article/abs/pii/S2214790X2300062X>

87 Sibanye-Stillwater. Annual report 2022, p. 18. <https://reports.sibanyestillwater.com/2022/download/ssw-IR22.pdf>

88 Department of Mineral Resources. (1996). Mine Health and Safety Act 29. https://www.dmr.gov.za/Portals/0/mhs_act_29_of_19960_1.pdf

More than half of the interviewed employees knew of accidents that had happened in the mine or had been involved in them themselves. For example, the employees reported on an accident that happened in 2022, where the water mixed into stone cargo weighing tens of tons had leaked and flowed out uncontrollably, causing the death of one person. Other recent accidents reported included a fatal accident related to the careless use of a winch, an accident resulting in hospitalization due to broken pipes, and a finger badly injured in a grinder. Sibanye-Stillwater's own annual report states that in 2022 there were 4.90 accidents per million working hours in the company's platinum operations in South Africa. A total of 472 accidents occurred in the company's platinum operations in South Africa in 2022.⁸⁹

However, the most significant problems in the mine's occupational safety culture are linked to collective punishments, which were mentioned by almost every employee interviewed for this report. Workers work in teams in mine shafts, and if someone in the team makes a mistake and causes an accident, the entire team is punished or even fired. Several interviewees said that team members are punished for accidents even when they were away from work during the accident.

"Collective punishments are common and they apply even to those team members who are not at work at the time of the accident. According to the company, being on vacation doesn't matter, because the accident would have happened anyway."

Due to the heavy penalties following accidents, accidents are hidden, and injuries are not reported. This leads to management not always being aware of occupational safety risks. Injured employees who are forced to continue working and thus have a reduced ability to work can also cause occupational safety risks. Hiding accidents has also led to fights between employees.

"Employees work under pressure and the threat of dismissal. To avoid being fired, the rest of the team pressures employees not to report problems because they fear this will lead to the whole team being fired."

"In spring 2024, one miner beat up another injured worker to keep him quiet and not report his injury. It is common for injuries to go unreported because team members are afraid of being fired."

The employees' stories are confirmed by Sibanye-Stillwater's annual report. In 2022, the company says it fired a 216 employees in South Africa due to violations of safety instructions. "Although it is always unpleasant to fire employees, we are forced to draw a strict line for unsafe behavior," the company states in its report. According to the company, its accident prevention strategy is based on understanding people's behavior patterns and "fair and just" consequences for behavioral violations.⁹⁰

89 Sibanye-Stillwater. Annual report 2022, p. 134. <https://reports.sibanyestillwater.com/2022/download/ssw-IR22.pdf>

90 Sibanye-Stillwater. Annual report 2022, p. 129. <https://reports.sibanyestillwater.com/2022/download/ssw-IR22.pdf>

In its response to Finnwatch, Sibanye-Stillwater said that safety is its number one priority. The company also confirmed that “teams are units and have to take joint responsibility”. However, according to the company collective punishment is not a “general practice”. Regarding a case of a worker dismissed when on leave the company recollected that there had been a case where a full crew was suspended and dismissed due to poor and substandard work and at the time of the suspension one worker left for leave. However, details of the case were not clear. According to the company it would not “take action as a result of an incident that occurred during a person’s absence”. According to Sibanye-Stillwater, firing 216 workers in one year (2022) in South Africa for safety violations is not much as it represents only 0,3% of the company’s workforce in the country⁹¹. According to the company, safety violations where negligence is proven had to be dealt with.

Finnwatch agrees with the company that deficiencies in occupational safety must be addressed. However, whether collective punishments and the suspension of entire teams are the best way to do so is debatable.

A large number of workers also reported health problems caused by mining, such as respiratory problems and asthma caused by rock dust. Tuberculosis was also said to be a problem, as it spreads easily in the cramped spaces of mine shafts. According to the World Health Organization, crowded and poorly ventilated living and working environments often associated with poverty constitute direct risk factors for tuberculosis transmission⁹². The problems related to tuberculosis have also been highlighted in Sibanye-Stillwater’s annual report, according to which 4.37 cases of tuberculosis had been observed per 1,000 employees in the company’s South African PGM operations in 2022⁹³. The tuberculosis incidence rate in South Africa is 4.68 (estimates range from 3.04–6.65)⁹⁴. For reference, the prevalence of tuberculosis in Finland is 0.034⁹⁵.

Health concerns also extend to the workers’ homes, as the mine also produces air pollution outdoors. These effects have been discussed in more detail in chapter 3.9.

Half of the interviewed employees also highlighted problems related to sick leave. According to the employees, the company does not accept sick leave certificates signed by anyone other than the company’s own doctors and the company claims other sick leave certificates are fake. If the employee’s sick leave certificate is not accepted, they must go to work or register as absent without pay. Some of the employees report that they worked while sick.

91 However, the layoffs apply in practice only to the company’s miners, not to all employees employed by the company.

92 WHO, <https://www.who.int/teams/global-tuberculosis-programme/populations-comorbidities/social-determinants>

93 Sibanye-Stillwater. Annual report 2022, p. 141. <https://reports.sibanyestillwater.com/2022/download/ssw-20F22.pdf>

94 WHO, https://worldhealthorg.shinyapps.io/tb_profiles/?_inputs_&entity_type=%22country%22&iso2=%22ZA%22&lan=%22EN%22

95 Finnish Institute for Health and Welfare. Prevalence of tuberculosis in Finland. Retrieved on 30 Nov 2023 from <https://thl.fi/fi/web/infektioaudit-ja-rokotukset/taudit-ja-torjunta/taudit-ja-taudinaiheuttajat-a-o/tuberkuloosi/tuberkuloosin-esiintyvyyssuomessa>



The tin shacks are cold in the winter and suffocatingly hot in the summer. The roofs are fixed with stone blocks, which are used to try to prevent the sheet metal from flying away with the wind.

"The company is very strict. If you feel bad and you get a sick leave certificate from a doctor, they question it. They always say that the certificate is fake, no matter how sick you are."

"When sick people come to work in the mine shaft, they infect the whole team."

In its response to Finnwatch, Sibanye-Stillwater said that sick leave certificates are refused only if they are suspected of being fraudulent. Employees are free to visit any accredited doctor.

3.5 Poor living conditions

Most of the interviewed workers live in an informal shanty town called Nkaneng, located next to the Sibanye-Stillwater smelter. Nkaneng is a word in the local Tswana language meaning "difficult place". More than half of the interviewed workers live in shacks made of sheet metal. Some have managed to rent a room in a private house, which they share with other people. Four of the interviewed employees live in flats or houses provided and maintained by Sibanye-Stillwater or in subsidized housing provided by the government.⁹⁶ Almost all the local community members interviewed for this report lived in shacks.

⁹⁶ The South African government runs a subsidized housing program called Reconstruction and Development (RDP)

Most of the shacks are not owned by the interviewees. They must pay rent for these, which totals around 350–700 rand per month. The number of rooms in the huts varies from one to three. The shacks do not have indoor toilets. Instead, residents either use toilets dug in the ground or go in the bushes. There is also no running water in the shacks. Residents fetch water from water points provided by Sibanye-Stillwater. In winter, the shacks are cold and in summer they are scorching hot. The roofs of the shacks are fixed in place with stone blocks, which are used to try to prevent the sheet metal from flying away with the wind.

"My shack has two rooms and six people live in them: me, my sister and four children. There are ten other shacks in the same area. With the residents of those shacks we share a toilet dug in a hole in the ground and one water point."

"I have rented a separate room in the yard of a house. There are five of us in the same room. A total of 26 people live in the same yard. We share one toilet dug in a hole in the ground and one water point."

The availability of water in the area is uncertain. Several interviewees said that the water supply is often cut off without prior warning. Most often, water outages last a few hours, but some of the interviewees reported water outages lasting up to two days. The local Benchmark Foundation also reported on the phenomenon in 2022. At that time, it was suspected that Sibanye-Stillwater limited the availability of water when its own processes required a lot of water.⁹⁷

"The availability of water is causing us problems... Sibanye can turn off the water supply if they want. They turn off the faucets and don't tell the community."

In its response to Finnwatch, Sibanye-Stillwater disagreed with these claims and said that the mine does not just cut off water supply without warning: employees and local communities are warned in advance. The company also stressed that it is not responsible for providing water and other services to people/communities off its property. The Government has that responsibility and controls national utilities like water and electricity.

Some of the interviewees also said that the water supply was also sometimes cut off because of disintegrating water pipes. Water is led to the water points through pipes close to the surface of the earth, and according to the interviewees, they can break when cars drive over them.

The availability of electricity also caused problems for some of the interviewees. Residents of the Nkaneng area pay for electricity through a prepaid subscription, which makes electricity expensive. Some of the shacks were also connected to the electricity grid independently (and illegally), which leads to dangerous situations. One interviewee

⁹⁷ Bench Marks Foundation. 30 Aug 2022. Nothing has changed for the better things are worse. <https://www.benchmarks.org.za/nothing-has-changed-for-the-better-things-are-worse/>

said that an accident that led to the death of a child had happened in the community: a child playing near the shack had accidentally touched the electrical wires and gotten a fatal electric shock. The interviewees blamed the lack of official electricity connections primarily on state-owned electricity company Eskom, which does not always respond to requests to connect homes to the electricity grid.



The mine workers live in shacks made of sheet metal. There is no proper sanitation. Shared toilets are built on top of a pit in the ground (pictured in the middle).

There are no sewers in Nkaneng and the roads leading there are not paved. When it rains, the area becomes muddy and difficult to traverse. This means cars or minibuses do not run, and children cannot go to school.

There are not enough affordable apartments in the area. According to Sibanye-Stillwater, it offers more than 8,100 employees studio apartments and more than 10,000 family apartments throughout South Africa. The company says that employees who choose to live in other than the offered apartments are paid a housing allowance as part of their salary.⁹⁸ In light of the figures, it is clear that the apartments offered by the company do not meet the needs of the employees and living in a shack is not merely a “choice” made by workers. The Marikana mine complex alone employs more than 20,000 people, and the neighboring mines in the Sibanye-Stillwater area (Marikana, Rustenburg and Krondal) together employ more than 46,000 people. The interviewed employees confirmed that not all applicants get apartments. According to the employees, the queues for the apartments are long and not everyone can afford to pay the requested rent.

⁹⁸ Sibanye-Stillwater. People. Wages and benefits. Retrieved on 14 Dec 2023 from: <https://www.sibanyestillwater.com/sustainability/people/>

"I am not satisfied with the living conditions. Sibanye-Stillwater has a waiting list for family apartments, and I have been waiting for an apartment for years. The company does not offer enough apartments. There are many shacks in Marikana, many Sibanye employees live in them."

The poor living conditions in the Nkaneng residential area were also highlighted in the Farlam Commission's final report. The Commission was appointed by President Jacob Zuma and investigated the 2012 Marikana massacre. The Commission found that Lonmin (the former owner of the mine prior to Sibanye-Stillwater, which was acquired by Sibanye-Stillwater in 2019) had created an environment conducive to the creation of tension and labor unrest⁹⁹ by not addressing the housing situation at Marikana, including failing to comply with the obligations set out in its SLP plans. At that time, the director of Lonmin admitted in his statement to the Farlam Commission that the living conditions in the informal settlements were "truly appalling".⁹⁹ In 2016, human rights organization Amnesty International published a report in which it had analyzed the measures taken by Lonmin to improve living conditions. The organization found that the shortcomings of the residential areas were unchanged and stated that the company had neglected its obligations set by law and international corporate sustainability standards to improve living conditions.¹⁰⁰

Interviews and visits to the residential area for this report show that sufficient measures have still not been taken to improve the living conditions. Like Lonmin, the mine's previous owner, Sibanye-Stillwater is also aware of the problem and the risks it poses. In its annual report to the US Securities and Exchange Commission, Sibanye-Stillwater admits that there are many informal residential areas in South Africa near its operations where the company's employees live. In 2022, about 58 percent of the company's employees received a housing allowance paid in connection with their salary, and the company estimates that many of these employees live in informal settlements, which have grown in recent years. The company says that the living conditions are poor and considers it possible that diseases are spreading in these residential areas. The company considers it a financial risk that communities living in informal settlements protest, demand jobs from the company and better services and infrastructure, or that these demands lead to increased regulation.¹⁰¹

In its response to Finnwatch, Sibanye-Stillwater acknowledged that there is not enough decent housing in the area and that the company cannot provide housing to all of its wor-

99 Marikana commission of inquiry. (31.3.2015). Report on matters of public, national and international concern arising out of the tragic incidents at the Lonmin mine in Marikana, in the North West Province, p. 527. <https://www.sahrc.org.za/home/21/files/marikana-report-1.pdf>

100 Amnesty International. (2016). Smoke and mirrors – Lonmin's failure to address housing conditions at Marikana. https://www.es.amnesty.org/fileadmin/noticias/Sudafrica_-_Lonmin_Smoke_and_Mirrors_01.pdf

101 Sibanye-Stillwater. SEC, Form-20, p. 577. <https://reports.sibanyestillwater.com/2022/download/ssw-20F22.pdf>

kers. At the same time, the company stressed that the situation in the Marikana region is no different from the overall situation in South Africa and that the responsibility for community housing lies with the state (Government). Sibanye-Stillwater provides accommodation options to employees in company owned properties as well as the option of an employee benefit in the form of a housing allowance mandated by the South African law.

After Sibanye-Stillwater acquired Lonmin it has not built new housing in the area. According to the company, it has however, embarked in a process together with the government to formalize and upgrade Nkaneng. It is also in talks with the government on different partnership agreements related to housing linked to its PGM operations in the area. It has offered to donate land area totaling 253ha on which the government could build 6,500 housing units.

Sibanye-Stillwater also stressed that some (migrant) workers prefer to live in modest accommodation and invest in their properties at their places of origin. According to Sibanye-Stillwater it is also noteworthy to mention that most of the structures erected in Nkaneng provide rental income to those staying in formal conditions and have thus become a sub-economy and source of income.

3.6 The mine does not benefit the community, there is a corrupt competition for jobs

Mining companies In South Africa have a statutory obligation to draw up and finance a social plan (Social and Labor Plan, SLP) for the mining area. The purpose of the plans is to support socio-economic empowerment and change in mining areas. Each plan spans a five year period and their implementation is a condition for the mining permit. The elements of the SLP plans include the development of human resources, the promotion of equality in employment, the development of procurement and subcontractors, and financial investments in the implementation of the plans.

Sibanye-Stillwater has a total of 15 SLP plans in force in South Africa, which are at various stages of the plans' five-year term. The plans include various projects. The company has planned a total of 94 different projects for platinum mining in South Africa, of which 71 have been completed, 20 are underway and three have yet to start.

There are three SLP plans in the Marikana area, and the projects covered by these are mainly related to agriculture. These include projects related to animal breeding, small-scale farming, development of sheep shelters and beekeeping. In addition, there are projects with the aim of building and renovating schools and health clinics.¹⁰²

¹⁰² Sibanye-Stillwater, <https://reports.sibanyestillwater.com/2022/download/ssw-FS22-slp-projects.pdf>, p. 8–9

Interviews conducted for this report revealed dissatisfaction with community consultation regarding the implementation of SLP plans. The participation of the communities was not considered genuine, and it was mentioned that the company announced the SLP meetings too late. The interviewees also pointed out that, despite the plans, the communities in the mining area remain in poverty.

"Sibanye has not built apartments, the roads are in bad condition. They take but don't give back. There are constant protests here because people are unhappy with the lack of development. There will be no benefits for the community even though they promise them in the SLP plans. I am not satisfied with the company's operations."

"There is no development here. The company does not repair the roads, and its SLP plan does not lead to improvements. The state only trusts the company and does not monitor whether it does what it promises. The company offers few jobs, but the problems are big. Our living conditions are not in order. We live and will live in poverty."

In its response to Finnwatch, Sibanye-Stillwater stressed that the SLP's currently being implemented were designed by Lonmin and South Africa's competition authority requires that they be implemented as they are. The legislation in place at the time they were drawn up required no direct community engagement. Sibanye-Stillwater only started consultations in 2023 for the compiling of Generation 4 SLP's. According to Sibanye-Stillwater, broad-based consultations have taken place which makes it the first official consultation process in line with the new regulations.

Many interviewed employees and community members had a negative attitude towards Sibanye-Stillwater and felt that the mine did not bring enough benefits to the area: the community living around the mine lives in primitive conditions and there are few jobs available. The stakeholder section of Sibanye-Stillwater's own annual report reinforces critical views on jobs. According to the company, the concerns raised by its stakeholders are primarily related to employment and the experience that the company does not offer enough business opportunities for local subcontractors.¹⁰³

South Africa is the most unequal country in the world, with enormous income disparities¹⁰⁴. The salaries of the CEO of Sibanye-Stillwater, which came up in several conversations, caused particular bitterness in the interviewees. Many interviewees mentioned that Sibanye-Stillwater CEO Neal Froneman Earns 300 million rand (14.5 million euros) a year (this was actually his salary in 2021; in 2022 his total remuneration dropped to 198 million rand, 9.6 million euros, after decline in world commodity prices and the share

103 Sibanye-Stillwater. Annual report 2022, p. 75. <https://reports.sibanyestillwater.com/2022/download/ssw-IR22.pdf>

104 The World Bank. (2022). Inequality in Southern Africa, p. 1. <https://documents1.worldbank.org/curated/en/099125303072236903/pdf/P1649270c02a1f06b0a3ae02e57eadd7a82.pdf>

price of the company¹⁰⁵). The salary paid to one manager in 2021 as cited by the workers is large when compared to the money spent by Sibanye-Stillwater on implementing the statutory SLP in the Marikana area and on CSR projects, which was together just over 470 million rand (22.7 million euros) in 2022¹⁰⁶. The aforementioned sum has been used on measures such as training interns working in the company. The interviewed employees did not see the trainee program as a social project, but as a way for the company to reduce labor costs (see chapter 3.3).

After becoming the owner of the Marikana mine, Sibanye-Stillwater has implemented major reforms that have reduced jobs. When it bought the mine from Lonmin in 2019, it restructured the operation of the Marikana mine with the intention of cutting 5,000 jobs¹⁰⁷. At the time of writing this report in October 2023, Sibanye-Stillwater announced a proposed restructuring and shaft closures at its SA PGM operations which could potentially affect 4,095 employees and contractors, including some at Marikana.¹⁰⁸

There is fierce competition in the community for the remaining jobs. Both interviewed employees and community members said that bribes are charged for jobs and promotions. The size of the payments depends on the nationality of the employee. Fees are collected by local politicians affiliated with the company, employees of the company's own personnel department, and representatives of the community recruitment centers (Community Unemployment Forums). In particular, problems related to recruitment centers, corruption and nepotism came up in the interviews, and some of the interviewees expressed their opinion that the company should abandon recruitment through these centers.

"Jobs are paid for. You may have to pay the local decision-maker 10,000 rand if you are South African or 15,000 rand if you come from somewhere else. If the applicant fails the health check, they can purchase a health certificate for 2,000-3,000 rand. Corruption fees also help speed up the processing of job applications and promotions."

"The HR department sells promotions for money. If you want a promotion, it costs 5,000 rand. For example, if you want to get a supervisor position among the miners, you have to pay 10,000 rand."

"Some of the managers working in the company do not have the skills required for the job, because they have reached their position with the help of corruption."

105 South African Labour News. (25.4.2023) Sibanye-Stillwater CEO's pay cut R111m to R189m in 2022 financial year. <https://www.salabournews.co.za/60148-sibanye-stillwater-ceo-s-pay-cut-r111m-to-r189m-in-2022-financial-year>

106 Sibanye-Stillwater. Group Impact report 2022, p. 54. <https://reports.sibanyestillwater.com/2022/download/SSW-IM-PACT22.pdf>

107 Reuters. (25.8.2019). Sibanye plans to cut over 5,000 jobs in Marikana restructuring. <https://www.reuters.com/article/us-sibanyestillwater-layoffs-idUSKBN1WA10D/>

108 Mining Technology. (26.10.2023). More than 4,000 jobs at risk due to Sibanye South Africa operations revamp. <https://www.mining-technology.com/news/4000-jobs-sibanye-sa-revamp/?cf-view>

However, two interviewees said that the company had taken some measures to tackle corruption. In 2022, according to the interviewees, the company fired employees from the HR department who were suspected of being involved in corruption related to the provision of jobs.

In its response to Finnwatch, Sibanye-Stillwater disagreed with these claims. It acknowledges that there is indeed fierce competition for jobs, but the company upholds the strongest standards for employment. According to Sibanye-Stillwater, local politicians are not affiliated with the company and do not make decisions on employment. The allegations made on bribes, HR pay-offs for promotions and promotions based on corrupt practices are serious, but the company has no current evidence to support these claims. According to Sibanye-Stillwater, it has zero tolerance for fraud, theft and unethical behavior.

3.7 Workers not satisfied with how they are treated in the mine

Almost all interviewed employees were dissatisfied with the treatment of employees at Sibanye-Stillwater. Due to continuous dismissals, there is an atmosphere of fear at the workplace, which is combined with strict performance targets regarding the quantities of rock to be excavated and transported out of the mine. Employees are also pressured to achieve performance targets by inappropriate means. Employees have been threatened with dismissal if they do not agree to stay overtime, or if they have refused dangerous work (see also chapter 3.4). Employees are under pressure to reach the target even when some people from the team are sick or absent for some other reason.

"Threatening to be fired is our bread and butter. Our bosses threaten us every single day."

The interviewed employees were predominantly black, and they had not experienced direct racism in the workplace. However, structural racism was reported by three interviewed persons. According to them, white workers get regular employment faster and, unlike black workers, they also advance to management positions. Most of the workers at the mining level are black and the management representatives are white. This is typical in South Africa.

All employees interviewed were familiar with Sibanye-Stillwater's grievance procedures. However, some said that the handling of complaints varied from supervisor to supervisor and that complaints rarely led to genuine improvements.

"Sometimes we complain. They accept our complaint, but we hear nothing about its handling. The progress of complaints depends on the supervisor. Some lose the entire appeal or say it will be moved forward. Sometimes a meeting is organized about it, but in the end nothing changes."

"We are not treated well. Sibanye has only brought us grief."

"Working is nice, but we have a constant fear of layoffs. If goals are not achieved, they complain. If you exceed the targets, they start to investigate how it was done. Sibanye is never satisfied. During Sibanye's time, nothing has changed for the better, only the pain and suffering brought by collective punishments. All the good things here have been done under Lonmin [the mine's previous owner]."

3.8 Mining industry unions engaged in a violent struggle for power

Four different unions operate in the Sibanye-Stillwater mining complex, of which AMCU has the largest number of members. More than 70 percent of the mine's employees are members of AMCU. Its rival, the second largest union in the region, is NUM. The union UASA has started to organize contract workers working in the area. The fourth union organizing workers in the same mine is Solidarity. In addition to these four unions, a trade union called NUMSA organizes some of the workers working in the mine through contractors.

The degree of organized labor in the mine is high, estimated at almost 90 percent. Most of the interviewed employees confirmed that they can join the union of their choice and that Sibanye-Stillwater does not restrict organizing. However, a few employees said that the employer prefers the NUM trade union. According to Sibanye-Stillwater, this is not true, and the company does not have any preference for a particular trade union. However, the company stated that AMCU has been the most militant union recently, and its national leadership have specific agendas which they have been promoting, resulting in more visible disputes between AMCU and the company.

The interviews also brought to light problems in the trade unions' own activities. The operation and negotiation culture in South African labor market organizations is in many respects undeveloped, and unions do not always cooperate to achieve their negotiation goals¹⁰⁹. Instead of cooperation aimed at improving working conditions and terms of employment, they may focus on competing with one another for members. In the Marikana area, the fights between trade unions have even led to violence¹¹⁰. In 2016, six representatives of the AMCU trade union were murdered. AMCU blamed the killings on rival union NUM, which had lost members to AMCU. There has also been public speculation

109 The subject is covered, among other things, in Finnwatch's "Human rights in South African wineries" report 2023. The report is available at <https://finnwatch.org/fi/julkaisut/ihmisoikeudet-etelae-afrikan-viinitiloilla>

110 New Frame. (3.9.2021). Political assassinations must be stopped. Available web archive at the Wayback Machine from <https://web.archive.org/web/20230609183732/https://www.newframe.com/political-assassinations-must-be-stopped/>

that the murders are related to AMCU's own internal power struggles.¹¹¹ Other cases of violence that remain unresolved have also been directed at trade union representatives. For example, a representative of NUMSA, the union that organizes some of the workers employed by labor contracting companies used by Sibanye-Stillwater, was shot and killed in 2021¹¹², and the perpetrators have not been caught. Also in 2022, a person, who represented the NUMSA trade union, was shot and killed. In this case too, the motive and perpetrator of the violence remained unclear. However, the shooting coincided with a strike started by contract workers at another platinum mine operating in the area, Impala Platinum.¹¹³

The researchers interviewed for this report expressed their view that one of the causes of intra- and inter-union struggles is the benefits received by shop stewards and other official union representatives. Stewards work for the union, but the company pays them a salary for their work. The work is light and the benefits are good, so people fight hard to get and keep the position. Trade union officials also sometimes exercise significant power when participating in decision-making, in issues such as the use of healthcare allowances and pension funds. There have been suspicions of corruption in these financially significant decisions.

"It is problematic that NUM and AMCU are fighting with each other. It leads to disunity and violence between unions. In 2019, a man was shot in front of my church. He was on his way home from work. He was shot because he was a member of the NUM."

Despite these problems, the unions have succeeded in negotiating wages. In March 2022, NUM and AMCU were on strike at Sibanye-Stillwater's gold operations for three months after rejecting the employer's proposal on wages. In October 2022, the trade unions NUM, AMCU and UASA, which are active at the Rustenburg and Marikana mines, signed a five-year wage agreement with Sibanye-Stillwater¹¹⁴ According to the interviewed employees, the negotiations resulted in a six percent annual wage increases in the first three years of the contract and fixed wage increases in the following years.

However, the agreements on wages or on other working conditions concluded by the trade unions with the company do not apply to the trainees. The company decides on their salary alone without negotiations.

111 Ibid.

112 Times Live. (26.6.2022). Numsa shop steward gunned down in Rustenburg. <https://www.timeslive.co.za/news/south-africa/2022-06-26-numsa-shop-steward-gunned-down-in-rustenburg/>

113 Sinwell, L., Smith, N. (2022) Killing the collective. <https://africasacountry.com/2022/07/killing-the-collective>

114 Sibanye-Stillwater. Annual report 2022, p. 90. <https://reports.sibanyestillwater.com/2022/download/ssw-IR22.pdf>. This was followed by the Kroondal operations in November 2023 where Sibanye-Stillwater also concluded a five-year wage agreement.

Efforts were made to get interviews with AMCU representatives for this report from, as it is the largest union at Sibanye-Stillwater's Marika mining complex, as well as with NUMSA representatives, as the union has been the target of recent violence. However, despite repeated attempts, no interviews were agreed on.

3.9 Dust and other air pollution from the mine cause health problems

As mentioned earlier, the Sibanye-Stillwater smelter is located next to the Nkaneng informal settlement. The smelter has been reported to emit various air pollutants such as sulfur dioxide.

The workers and community residents interviewed for this report said they suffered from ailments such as rashes and asthma-like symptoms. According to the interviewees, the air quality is particularly bad when gas flaring takes place at the plant. The dust produced by the mine's waste basins was also mentioned as a problem.

"When the smelter is flaring and the wind blows into our residential area, we get air pollution."

"Many people have lung problems, especially children. The smelter causes problems. Dust from the mine causes problems. Trees have also been cut down in the area and that makes the situation worse."

Interviewed employees and community members also brought up poor living conditions in connection with pollution. Pollutants move from the air into the workers' residences, because the shacks where most people live are not airtight and the air entering them is not filtered. Residents thus have no way to protect themselves from pollution. Interviewees were especially worried about the pollution's effects on children.

"The dust rising from the mine waste basin also causes problems. We have lung problems and breathing problems. I live in a shack and it's not tight. When the dust produced by the mine settles here, it is everywhere. There are chemicals in the dust and it causes rashes."

"My seven-year-old child has chest pains."

In its response to Finnwatch, Sibanye-Stillwater stated that South Africa has national legislation on environmental protection which the company is required to comply with. The company stresses that communities are able to use established grievance procedures to raise any issues or request a response. The company's annual report states that there have been both environmental issue and health and wellness-related grievances¹¹⁵.

115 Sibanye-Stillwater. Annual report 2022, p. 82. <https://reports.sibanyestillwater.com/2022/download/ssw-IR22.pdf>

According to the company, annual external audits monitor its compliance with the requirements of its Atmospheric Emission Licence (AEL). For 2022, the company achieved 100% AEL compliance at its SA PGM operations. During 2022, the company's dust fallout levels were maintained at a compliance level of 96% for its SA PGM operations. Any excesses are investigated and reported to authorities. The company will aim to improve SO₂ capturing and cleaning efficiency in its smelter operations in Marikana from 80% to 90% by 2027 and to 99% by 2030. According to the company's annual report, its platinum group metals operations in South Africa produced 2,576 tons of sulfur dioxide emissions in 2022¹¹⁶.



Sibanye-Stillwater smelter

3.10 Human rights and sustainability processes in Sibanye Stillwater

In Finland, Sibanye-Stillwater has said that corporate responsibility is currently at the center of all the company's operations¹¹⁷. In its response to Finnwatch, Sibanye-Stillwater also stated that it is no longer sufficient for a modern mining company to just optimally extract resources. According to Sibanye-Stillwater: "As miners, we have to go much further in making the world a better place through our activities. To secure recognition as a Force for Good, we aim to go well beyond being a responsible operator that conducts its busi-

¹¹⁶ Sibanye-Stillwater. Annual report 2022, p. 194. <https://reports.sibanyestillwater.com/2022/download/ssw-IR22.pdf>

¹¹⁷ Helsingin Sanomat. (11 May 2023). Eteläafrikkalaisella kaivosyhtiöllä on suuret suunnitelmat Suomessa. <https://www.hs.fi/talous/art-2000009565534.html>

ness in a way that causes no harm to actually adding value and contributing positively to society.”

The company's human rights policy outlines that it is committed to the UN's Guiding Principles on Business and Human Rights and has promised to follow the due diligence process that is part of these principles.¹¹⁸

However, it appears from the company's annual report that its human rights due diligence process is only in its infancy. Regarding 2022, the company states that "The human rights due diligence was not completed" during the operating year. However, the due diligence process should be a continuous activity in which the company identifies its human rights risks and impacts, prepares plans and takes measures to eliminate and reduce these risks and to correct the harmful human rights impacts that have already occurred. The due diligence process includes continuous monitoring and public reporting on the measures taken.

Sibanye-Stillwater says very little about the content and outcomes of its human rights due diligence process. According to the company, its due diligence process has identified two "concerns" regarding the consultation of vulnerable groups and the engagement of communities regarding emergency planning but does not specify the process by which the concerns were identified and selected. The company also does not say what it considers to be salient human rights issues in terms of its operations or what kind of human rights risks or impacts it has identified in its value chains.

Stakeholder consultation is a key part of human rights due diligence. In its annual report, Sibanye-Stillwater explains about the dialogue it has with its local stakeholders in South Africa.¹¹⁹ The company cites the following as the main concerns raised by stakeholders: possibilities of local suppliers to offer products and services, as well as demands for employment. However, it is not clear from the company's reporting whether the issues raised by stakeholders have been taken into consideration in the company's human rights risk assessment process and whether measures have been taken based on them.

Some of the stakeholder concerns mentioned in the company's report echo the views of employees and community members interviewed for this report. According to Sibanye-Stillwater, the main concerns of the communities are the experience that the mine does not offer business opportunities for local suppliers and there is a demand for jobs. The company also highlights the community's "misaligned expectations"¹²⁰ in the section dealing with risks concerning its entire business operations in South Africa.

118 Sibanye-Stillwater. (2021). Human Rights Policy. https://thevault.exchange/?get_group_doc=245/1623770079-ssw-human-rights-policy-june-2021.pdf

119 Sibanye-Stillwater. Annual report 2022, p. 75. <https://reports.sibanyestillwater.com/2022/download/ssw-IR22.pdf>

120 Sibanye-Stillwater. Annual report 2022, p. 55. <https://reports.sibanyestillwater.com/2022/download/ssw-IR22.pdf>

However, Sibanye-Stillwater has not identified some of the problems that came up quite often in the interviews for this report, or for some reason does not mention them in its report. These include problems related to infrastructure, housing and dwellings, difficulties in making ends meet, constant fear of layoffs, and health problems caused by the mine. However, they are reflected in the complaints submitted to the company's public complaint mechanism. In 2022, issues related to community development (46%), issues related to job opportunities (37%) and environmental problems (10%) have been the biggest complaints concerning the company's South African operations.

According to the company, companies in South Africa often face pressure to provide "socio-economic opportunities" to communities. According to Sibanye-Stillwater, this is due to the country's history of inequality, poor basic services and unemployment.

The company also says that it often encounters demonstrations that disrupt the company's operations.¹²¹

The company's reporting does not show the extent to which it has recognized its own human rights responsibilities for the harmful human rights impacts occurring in the vicinity of the Marikana mine and linked to its operations, and the steps it has taken to address these. Based on the research by Finnwatch, it would seem that such human rights issues and impacts that are salient to the company include the right to housing, the right to clean water and the right to a decent livelihood.

In its answers to Finnwatch's questions about these human rights issues, the company repeatedly invoked the human rights obligations of the South African state. It seemed that the company did not feel that it was responsible for such things as the poor living conditions of its employees, the lack of sanitation, electricity or clean water. Of course, the company is absolutely correct that the South African state has its own human rights obligations based on human rights treaties. What the company does not seem to realize, however, is that the company has an independent responsibility to respect human rights in its own value chain, independent of the state's obligations. The company has this obligation also when the state neglects its own obligations.

Corporate responsibility to respect human rights has been adopted in the guiding principles concerning business and human rights approved by the UN as early as 2011, on which all key human rights standards concerning business are based. Although Sibanye-Stillwater says it is committed to the UN principles, it did not seem to give value to the UN principles, be familiar with them or the OECD guidelines that specify them. In its comments to Finnwatch, Sibanye-Stillwater's representative stated, e.g., that "certain conditions in South Africa are much more complicated than what may have been anticipated in the UN's very high-level statement".

121 Sibanye-Stillwater. Annual report 2022, p. 75. <https://reports.sibanyestillwater.com/2022/download/ssw-IR22.pdf>

Sibanye-Stillwater's lack of human rights expertise was also reflected in that it did not seem to know key human rights concepts such as a living wage. Finnwatch highlighted the employees' views that their salary is not enough to cover living expenses because there are so many people to support in the area. In response to the criticism, the company asked Finnwatch whether the company is responsible for the number of dependents of its employees. The company is not responsible for the number of dependents, but it is responsible for ensuring that the wages it pays enable a sufficient livelihood. When determining this human rights-based minimum living wage, the number of dependents is important, and therefore the number of dependents is one of the factors taken into account in the widely used Anker methodology developed for determining a living wage.

The company asked that Finnwatch highlight that it implements many kinds of charity projects in its area in this report. The company sent links to YouTube videos¹²² that tell about its various projects related to such things as food security, promoting micro-entrepreneurship and combating gender-based violence. More of the company's projects are presented in its Impact report concerning social impacts (which has also been referred to in relevant parts in earlier chapters)¹²³. Finnwatch considers the projects beneficial, but they do not compensate for shortcomings in the company's human rights due diligence process.

4. Sustainability of Finnish hydrogen projects and the need for platinum

Companies that have business related to the production of green hydrogen in Finland, at least at the planning stage, were surveyed for this report. Many hydrogen projects planned in Finland are joint projects between several different companies. The mapping focused on those companies that are primarily responsible for the production of hydrogen or for planning its production. Thus, the mapping does not include those companies whose role in the project is to produce renewable electricity for hydrogen production.

122 Videos presenting various projects sent by the company can be found at <https://youtu.be/TdNzl4pyRhY>; <https://youtu.be/x6jH-ntOLts>; <https://youtu.be/neytkQ7BC-Y>; <https://youtu.be/XCBCTF7T4-A>; <https://youtu.be/nqkuOPR2cAM>. The company's entire YouTube channel is at <https://www.youtube.com/channel/UCl9UZT87nncSvSvj8i7az8Q>.

123 Sibanye-Stillwater. Group Impact Report 2022. <https://reports.sibanyestillwater.com/2022/download/SSW-IMPACT22.pdf>

A questionnaire was sent to the companies, with the aim of obtaining information on their human rights due diligence processes. As described in the previous chapter, human rights due diligence is the most important corporate sustainability tool, defined in the UN Guiding Principles on Business and Human Rights. In the human rights and environmental due diligence (HREDD) process, the company maps its value chain, identifies human rights and environmental risks and its involvement in these, and takes measures to reduce and eliminate the risks. In addition to the due diligence process, the survey investigated whether companies use or intend to use platinum or other platinum group metals in the production of green hydrogen.

Some of the projects originally included in the survey have been left out of this report, as some of the companies said that the hydrogen projects, they originally planned, are no longer relevant. Some examples of these include Fortum's plan to produce hydrogen for SSAB's steel plant in Raahe¹²⁴, Vantaa Energia's plan to produce hydrogen and further methane from it in connection with the Vantaa waste power plant and Westenergy's plan to produce hydrogen and further methane from it in at the Vaasa waste power plant¹²⁵.

Out of the final 23 companies, 21 responded to Finnwatch in some manner. Some of the companies answered the survey comprehensively, some in a very limited manner, citing reasons such as, the early stage of the plans. A few operators only commented on the information regarding the company's project compiled by Finnwatch from public sources. Plug Power and Vanadis Fuels did not respond to Finnwatch at all. The information presented in this study concerning them is based on public sources only. The answers of other companies have also been supplemented, as necessary, with information available from public sources.

Table 4 presents the current situation of the projects of all 23 companies at the end of 2023. The table also includes the size category of the related hydrogen production based on the power of the electrolyzer used¹²⁶. In addition, the table states whether the company has a human rights and environmental due diligence process (HREDD), what actions or plans the company has in place for monitoring the responsibility of the minerals needed in the hydrogen production process, and whether platinum group metals are used in the equipment needed for the production of hydrogen.

124 Fortum. (2 Nov 2023). Fortum and SSAB have concluded a joint study on fossil-free hydrogen production in Raahe, Finland. Press release. Retrieved on 5 Jan. 2023 from: <https://www.fortum.com/media/2023/11/fortum-and-ssab-have-concluded-joint-study-fossil-free-hydrogen-production-raahe-finland>

125 Westenergy. (1 Dec 2023). E-mail.

126 The actual amount of hydrogen produced depends not only on the power of the electrolyzer, but also on its utilization rate.

Table 4: Hydrogen projects in Finland and their responsibility practices

Company	Project (situation in November 2023)	Does the company have a human rights and the environment due diligence process in place?	How is the sustainability of minerals needed for the hydrogen production monitored?	Are platinum group metals used in the equipment that is being used for hydrogen production? If so, what is the required amount and origin of the said metals?
Blastr Green Steel ¹²⁷	Plans a factory in Inkoo to produce green hydrogen and use it in steel production. Phase: Project planning (the goal is to be in full production by the end of the decade) Scale of green hydrogen production: 600 megawatts.	Not yet. Organization and practices related to, among other things, human rights are built alongside planning and licensing.	Intends to use contracts with raw material suppliers to require regular auditing and monitoring of the activities. All suppliers must comply with international guidance, EU directives and human rights legislation.	No exact information. Alkaline-water technology has been chosen for the electrolyzer, which requires less platinum group metals as catalysts than, for example, in PEM electrolyzers.
Convion ¹²⁸	"Manufactures products based on solid oxide fuel cells in Finland, which can also be used to produce hydrogen. Phase: In operation Scale of green hydrogen production: Does not produce hydrogen itself, but the output of the electrolyzers produced is 250 kilowatts."	Not yet, but says that it is committed to environmentally sustainable activities according to the EU taxonomy, where such a process is required.	No own actions extending to the mine level, but sustainability is one criteria in the selection of suppliers.	No.
EPV ¹²⁹	An electricity storage and production facility based on green hydrogen planned in Vaasa together with Vaasan Sähkö and Wärtsilä. Phase: Project planning (operations could start Q3/2025) Scale of green hydrogen production: 6-7 megawatts.	No.	No own actions extending to the mine level, but the ethical guidelines for suppliers require compliance with the rules defined therein, supervision and reporting of violations.	A PEM electrolyzer has been tentatively planned, and it is estimated that three kilograms of platinum would be needed. The origin is not yet known.
ETFuels ¹³⁰	Plans green hydrogen and methanol production in Ranua with Neova Phase: Project planning (operations could start in 2028) Scale of green hydrogen production: 220 megawatts.	Not yet, but there is plan for one as the project progresses.	Policies are selected when the suppliers have been selected and the related risks identified.	Not yet known.

127 Blastr Greem Steel. 2023. Ympäristövaikutusten arviointiohjelma. https://www.ymparisto.fi/sites/default/files/documents/Blastr%20Green%20Steel%20Oy_Vihre%C3%A4%20ter%C3%A4stehdas%20Inkoo_Ymp%C3%A4rist%C3%B6vaikutusten%20arviointiohjelma_14082023.pdf; Laatikainen, T. (14.3.2023). Inkooseen rakennetaan maailman suurin 600 MW:n vetylaitos – Blastrin terästehtaasta riittäisi 300 MW kaukolämpöä Helsinkiin. Tekniikka & Talous -lehden online news. Retrieved on 18 Dec 2023 from: <https://www.tekniikkatalous.fi/uutiset/inkooseen-rakennetaan-maailman-suurin-600-mwn-vetylaitos-blastrin-terastehtaasta-riittaisi-300-mw-kaukolampoa-helsinkiin/b935c26a-7575-4edf-973d-e49472245b9d>

128 Convion. (n.d.). Company. Company website. Retrieved on 18 Dec 2023 from: <https://convion.fi/company/>

129 EPV. (15.1.2021). Vaasalaistoimijat aikovat tuottaa tuulesta vetyä ja vedystä sähköä. Company announcement. Retrieved on 18 Dec 2023 from: <https://www.epv.fi/2021/01/15/vaasalaistoimijat-aikovat-tuottaa-tuulesta-vetya-ja-vedysta-sahkoa/>

130 Business Ranua. (8.2.2023). ETFuels ja Neova: Ranuan vihreän metanolin tehdas tavoitteena saada käyntiin vuonna 2028. News on the Business Ranua website. Retrieved on 18 Dec 2023 from: <https://businessranua.fi/uutiset/etfuels-ja-neova-ranuan-vihrean-metanolin-tehdas-tavoitteena-saada-kayntiin-vuonna-2028>

Company	Project (situation in November 2023)	Does the company have a human rights and the environment due diligence process in place?	How is the sustainability of minerals needed for the hydrogen production monitored?	Are platinum group metals used in the equipment that is being used for hydrogen production? If so, what is the required amount and origin of the said metals?
Flexens ¹³¹	Plans green hydrogen production in Kokkola and Lempäälä. Also participates in a green hydrogen project in Åland. Phase: Project planning (production could start in Kokkola in 2027, Lempäälä not yet known) Scale of green hydrogen production: 2.5 megawatts in Lempäälä and Kokkola about 300 megawatts.	Not yet, but French partner Lhyfe, which will operate the hydrogen production, plans to develop its human rights management in 2024.	So far unclear, but the aim is to take into account the sustainability of the production plant in design and technology procurement. Suppliers are also to be required to take some kind of sustainability measures. The aim is to find out the environmental effects for the whole life cycle.	Depends on the selection of the electrolysis technology, which Lhyfe will do later.
Fortum ¹³²	"Plans a pilot project for hydrogen production near the Loviisa nuclear power plant. Phase: Project planning Scale of green hydrogen production: in Loviisa 1–2 megawatts."	Yes.	"Fortum does not produce green hydrogen at the moment. If they go into production, suppliers are required to commit to the code of conduct) and compliance is monitored among other things with audits."	Not yet known. If platinum group metals are needed, their origin will be taken into account in the tender.
Green North Energy ¹³³	"Plans green hydrogen and ammonia production in Naantali. Phase: Project planning (commercial activity begins 2027) Scale of green hydrogen productions: 280 megawatts."	Under development.	Selection of partners and their commitment to code of conduct, risk identification, regular audits and traceability down to the mine level.	The need will depend on the final decisions in the planning. The risks associated with the platinum group metals are one factor in technology comparison. In addition, the risks are taken into account in negotiations with and selection of the suppliers.
Helen ¹³⁴	"Plans green hydrogen production in Vuosaari, Helsinki with Gasgrid, Neste and Vantaan Energia. Phase: Project planning (operations could start in the pilot plant in 2025 and more widely in 2028) Scale of green hydrogen production: 5 megawatts (pilot plant)."	Under development.	Selection of suppliers and their commitment to code of conduct. In addition, the purpose is to use certifications up to the mine level, if such traceability is possible.	The use is likely. There is no choice on the technology has been done, so required amount of raw materials or their origin is not yet known. Getting the exact information from the equipment suppliers is estimated to be challenging.

131 Flexens. (n.d.). Project Portfolio. Company website. Retrieved on 18 Dec 2023 from: <https://flexens.com/project-portfolio>

132 Fortum. (15.6.2023). Fortum suunnittelee vedyntuotannon pilotointia Loviisassa. Press release. Retrieved on 19 Dec 2023 from: <https://www.fortum.fi/media/2023/06/fortum-suunnittelee-vedyntuotannon-pilotointia-loviisassa> Fortum. (2023). Human rights due diligence at Fortum. <https://www.fortum.com/files/human-rights-due-diligence-fortum/download?attachment%3Fattachment>

133 Green North Energy. (n.d.). Project. Company website. Retrieved on 24 Jan 2024 from: <https://www.greennorth.energy/en/project/>

134 Helen. (30.11.2022). Sweco Helenin ensimmäisen vetylaitoksen suunnittelijaksi. News on the company's website. Retrieved on 19 Dec 2023 from: <https://www.helen.fi/uutiset/2022/sweco-helenin-ensimmaisen-vetylaitoksen-suunnittelijaksi>; Helen. (20.6.2023). Helen ja muut johtavat energiayhtiöt Suomessa yhdistävät voimansa teollisen vetylaakson kehittämiseksi. News on the company's website. Retrieved on 19 Dec 2023 from: <https://www.helen.fi/uutiset/2023/helen-ja-muut-johtavat-energiayhtiot-suomessa-yhdistavat-voimansa-teollisen-vetylaakson-kehittamiseksi> Helen. (2023). Sustainability report 2022. <https://www.helen.fi/tietoa-meista/vastuullisuus/vastuullisuus-helenissa/vastuullisuusraportti>

Company	Project (situation in November 2023)	Does the company have a human rights and the environment due diligence process in place?	How is the sustainability of minerals needed for the hydrogen production monitored?	Are platinum group metals used in the equipment that is being used for hydrogen production? If so, what is the required amount and origin of the said metals?
Hycamite TCD Technologies ¹³⁵	"Produces hydrogen from biogas in the Kokkola test facility using TCD technology. With the expansion to be completed in 2024, natural gas may also be partially used. Hydrogen production based on natural gas is also planned in North America. Phase: Production starts in 2024. Scale of clean hydrogen production: in the new facility the production is 2,000 tons of hydrogen, which corresponds to a production with 20 megawatt electrolyser, but some share may be produced from natural gas."	Not yet, but plans to have one during 2024.	So far unclear, but the aim is to take into account the sustainability of the production plant in design and technology procurement. Suppliers are also to be required to take some kind of sustainability measures. The aim is to find out the environmental effects for the whole life cycle.	Not used at all.
Koppö Energia ¹³⁶	"Plans green hydrogen and methane production in Kristiinankaupunki. Phase: Project planning (operations could start in 2026) Scale of green hydrogen production: 200 megawatts."	Not yet, but plans to establish a process in-line with processes and requirements of Koppö's co-venturer Prime Capital AG.	Own actions do not extend to the mine level, but suppliers are obliged to do monitoring according to the general ESG principles on the website of Prime Capital AG which is a co-venturer of the project.	No, because production uses alkaline electrolysis.
Linde Gas ¹³⁷	"Plans to convert Harjavalta hydrogen plant to produce and liquefy green hydrogen. Phase: Project planning Scale of green hydrogen production: Not known."	Yes.	Suppliers are required to commit to ethical guidelines. In addition, suppliers are audited as necessary.	Not known.

135 Hycamite. (n.d.). Hycamite Technology. Company website. Retrieved on 18 Dec 2023 from: <https://hycamite.com/technology>; Hycamite. (2.10.2023). Hycamite sopi maakaasun toimittamisesta Kokkolan tuotantolaitokselleen. News on the company's website. Retrieved on 19 Dec 2023 from: <https://hycamite.com/news/hycamite-sopi-maakaasun-toimittamisesta-kokkolan-tuotantolaitokselleen>

136 CPC Finland Oy. (25.7.2023). Koppö Energia Oy:n vihreän vedyn tuotantolaitos ja metanointiyksikkö etenee Kristiinankaupungissa. Press release. <https://www.epressi.com/tiedotteet/energia/koppo-energia-oy-n-vihrean-vedyn-tuotantolaitos-ja-metanointiyksikko-etenee-kristiinan-kaupungissa.html>; Korhonen, A. (18 Nov 2023). Vihreän vedyn yli 10 miljardin investoinnit etenevät – tänne laitokset tulevat. News from online news. Retrieved on 19 Dec 2023 from: <https://www.verkkouutiset.fi/a/vihrean-vedyn-yli-10-miljardin-investoinnit-etenevat-tanne-laitokset-tulevat/#86740cb7>; Prime Capital AG. (21.7.2021). Responsible Investment Policy. Company website. Retrieved on 19 Dec 2023 from: <https://www.primecapital-ag.com/responsible-investment-policy-2>; Dokso, A. (16.8.2023). ANDRITZ & Koppö Energia Forge Green Hydrogen Future in Finland. News from the Energy News site. Retrieved on 19 Dec 2023 from: <https://energynews.biz/andritz-koppo-energia-forge-green-hydrogen-future-in-finland/>

137 Ministry of Economic Affairs and Employment of Finland. (25 Sept 2023). Liite: Suuret uuden energiateknologian investointihankkeet 2023, hakemukset. Press release annex. <https://tem.fi/-/35-uutta-hakemusta-suurten-demonstraatiohankkeiden-investointitukihakuun> Linde. (2023). Sustainable Development Report 2022. <https://www.linde.com/-/media/linde/merger/documents/sustainable-development/2022-sustainable-development-report.pdf?la=en>

Company	Project (situation in November 2023)	Does the company have a human rights and the environment due diligence process in place?	How is the sustainability of minerals needed for the hydrogen production monitored?	Are platinum group metals used in the equipment that is being used for hydrogen production? If so, what is the required amount and origin of the said metals?
Neste ¹³⁸	Plans green hydrogen production planned in the Porvoo refinery. Participates also in the demonstration of hydrogen production in a cooperation project at the company's refinery in Rotterdam. Phase: Project planning in Porvoo (operations could start in 2026), Rotterdam project in commissioning phase. Scale of green hydrogen production: 120 megawatts in Porvoo and 2.6 megawatts in Rotterdam.	Yes.	No own actions extending to the mine level, but suppliers are expected to follow ethical rules, and a risk screening is performed for potential suppliers. Every investment decision includes assessment of criteria related to human rights.	"Not yet known. A solid oxide electrolyzer is used in Rotterdam, and that does not usually need platinum."
Nordic Ren-Gas ¹³⁹	Plans production of green hydrogen, methane and district heat in six locations. Phase: Project planning (operation could start 2026–2027) Scale of green hydrogen production: together all six projects account for more than 500 megawatts.	Not yet, but committed to comply with the EU taxonomy requirements, (including the so-called minimum safeguards), and accountability processes will be developed in accordance with the criteria of the EU taxonomy and the identified needs.	"No own actions extending to the mine level, but partners are required to commit to suppliers' ethical operating principles, and they are asked for information and results of audits. Further action may be required, if deficiencies are identified or if the supply chain extends to locations where environmental and social the risks are assumed to be high."	Not yet known as technology selection has not been made. According to a preliminary estimate the platinum need for PEM electrolyzers in all planned projects would be in total 50–200 kilograms. In addition, 200–1350 kilograms of iridium would be needed. The development of technology and recycling is hoped to reduce the need for virgin materials.
OX2 ¹⁴⁰	Plans green hydrogen production in Åland Phase: Project planning (operations could start in 2025) Scale of green hydrogen production: Not known.	Under development.	Not yet known.	Not yet known.

138 Neste. (3.5.2023). Nesteen uusiutuvan vedyn projekti Porvoossa etenee. Press release. Retrieved on 19 Dec 2023 from: <https://www.neste.fi/tiedotteet-ja- uutiset/vastuullisuus/nesteen-uusiutuvan-vedyn-projekti-porvoossa-etenee>; Neste. (23 Nov 2021). Neste proceeds into execution phase with partners in the MultiPLHY project, aiming to demonstrate production of green hydrogen at its Rotterdam refinery. Press release. Retrieved on 3 Jan 2024 from: <https://www.neste.com/releases-and-news/innovation/neste-proceeds-execution-phase-partners-multiplhy-project-aiming-demonstrate-production-green> Neste. (2022). Neste Human Rights Principle. https://www.neste.com/sites/neste.com/files/neste_human_rights_principle_0.pdf

139 Nordic Ren-Gas. (n.d.). Projektit. Company website. Retrieved on 19 Dec 2023 from: <https://ren-gas.com/projektit/>

140 OX2. (7.2.2023). OX2 Åland aloittaa vety-yhteistyön Orklan kanssa. Press release. Retrieved on 19 Dec 2023 from: <https://www.ox2.com/fi/suomi/ajankohtaista/tiedotteet-ja- uutiset/ox2-aland-aloittaa-vety-yhteistyon-orklan-kanssa/> OX2. (2023). Annual and sustainability report 2022. <https://www.ox2.com/files/mfn/72d797ae-6da2-4049-b630-9f403f228935/ox2-annual-and-sustainability-report-2022.pdf>

Company	Project (situation in November 2023)	Does the company have a human rights and the environment due diligence process in place?	How is the sustainability of minerals needed for the hydrogen production monitored?	Are platinum group metals used in the equipment that is being used for hydrogen production? If so, what is the required amount and origin of the said metals?
P2X Solutions ¹⁴¹	Green hydrogen production plant under construction in Harjavalta. The goal is to expand production. Phase: Under construction (production in Harjavalta scheduled to start in 2024). Scale of green hydrogen production: in Harjavalta 20 megawatts, but company has a goal of 1,000 megawatt generation capacity by 2031.	No.	No own actions extending to the mine level, but the company has a code of conduct and HSEQ requirements covering own operations as well as the ones of the suppliers. The sustainability of purchases will be monitored.	"For the production of hydrogen alkaline water electrolysis technology is used. According to the company's information, this technology does not use platinum group metals, but the entire value chain is not fully known."
Plug Power ¹⁴²	Plans green hydrogen production in Kokkola, Kristiinankaupunki and Porvoo. Phase: Project planning (production could start by the end of the decade) Scale of green hydrogen production: total of 2,200 megawatts.	Did not respond and comprehensive information about the HREDD process could not be found from public sources.	Not known.	Details are unknown, but based on the information that is publicly available plan is to use PEM electrolyzers, which usually require platinum group metals.
Raahen Monivoima ¹⁴³	The electricity storage and production plant based on green hydrogen planned in Raahen. Phase: Project planning (operations could start in 2024) Scale of green hydrogen production: 6 megawatts	Didn't answer the question and comprehensive information about the HREDD process could not be found from public sources.	No own actions extending to the mine level, but sustainability and reporting is required from technology suppliers and from other partners.	Not yet known.
Solar Foods ¹⁴⁴	Produces hydrogen and then protein from it in Vantaa. Phase: Production starts in 2024. Scale of green hydrogen production: about 1.5 megawatts.	No.	No own actions extending to the mine level, but after the introduction of ethical guidelines, the aim is to pay increasing attention to the supply chain.	No, because an alkaline electrolyzer is used.

141 P2X Solutions. (n.d.). Projects. Company website. Retrieved on 24 Jan 2024 from: <https://p2x.fi/en/project/>

142 Business Finland. (30.5.2023). Plug Power suunnittelee kumppaniensa kanssa kolmea vihreän vedyn tuotantolaitosta Kokkolaan, Porvooseen ja Kristiinankaupunkiin. Press release. Retrieved on 19 Dec 2023 from: <https://www.businessfinland.fi/ajankohtaista/uutiset/tiedotteet/2023/plug-power-suunnittelee-kumppaneidensa-kanssa-kolmea-vihrean-vedyn-tuotantolaitosta-kokkolaan-porvooseen-ja-kristiinankaupunkiin>

143 Puhuri Oy. (15.2.2023). Raahen Monivoiman uusien energiaratkaisujen pilottihanke etenee – TEM:ltä yli 5 M € tuki. Press release. Retrieved on 19 Dec 2023 from: <https://www.puhuri.fi/raahen-monivoiman-uusien-energiaratkaisujen-pilottihanke-etenee-temlta-hankkeelle-yli-5-miljoonan-euron-tuki/>

144 Solar Foods. (19 Oct 2023). Factory 01: Loading the food revolution — Almost complete. Company website. Retrieved on 19 Dec 2023 from: <https://solarfoods.com/factory-01-loading-the-food-revolution-almost-complete/>

Company	Project (situation in November 2023)	Does the company have a human rights and the environment due diligence process in place?	How is the sustainability of minerals needed for the hydrogen production monitored?	Are platinum group metals used in the equipment that is being used for hydrogen production? If so, what is the required amount and origin of the said metals?
Solvay Chemicals Finland ¹⁴⁵	Plans a electrolysis facility to produce green hydrogen for its hydrogen peroxide factory in Kouvola. Phase: Project planning (operations could start in 2028) Scale of green hydrogen production: unknown.	Didn't answer the question and comprehensive information about the HREDD process could not be found from public sources.	No own actions extending to the mine level, but the procurement must follow the parent company Solvay's responsibility principles.	Not yet known.
St1 ¹⁴⁶	Plans to produce green hydrogen and methanol in cooperation with Finnsement in Lappeenranta. Phase: Project planning Scale of green hydrogen production: unknown.	Yes.	No own actions extending to the mine level, but the partners are chosen inline with the company's due diligence process.	Not yet known.
Tecoil ¹⁴⁷	Produces green hydrogen in Hamina for use in waste oil processing and refining. Phase: In operation. Scale of green hydrogen production: 1 megawatt.	No.	The equipment was already acquired in 2009, and it is estimated to be in use for another 5–10 years. The practices related to any future acquisitions is not known at this stage.	No, uses an alkaline electrolyzer.
UPM ¹⁴⁸	Plans a biorefinery, where green hydrogen could be produced. Phase: Project planning Scale of green hydrogen production: unknown.	Yes.	If there are procurements related to hydrogen production, these will be made in accordance with responsible procurement processes. These include, as necessary, risk assessments covering the entire chain and audits. If high risks are identified, special care in procurements is taken in accordance with defined processes.	"Will not comment on details at this point."

145 Kouvola Innovation. (14 Sept 2022). Vihreä vety ja kiertotalouden maksimointi – Näin kouvolaalaiset yritykset taistelevat ilmastonmuutosta vastaan. An article on Kauppalehti's website. Retrieved on 19 Dec 2023 from: <https://www.kauppalehti.fi/kumppanisallot/kouvola-innovation/vihrea-vety-ja-kiertotalouden-maksimointi-nain-kouvolaalaiset-yritykset-taistelevat-ilmastonmuutosta-vastaan/> Solvay. (n.d.). Solvay Human Rights in Business Policy. <https://www.solvay.com/sites/g/files/srpend221/files/tridion/documents/20170529-Human-Rights-Policy-EN.pdf>

146 St1. (4 Oct 2022). St1 suunnittelee synteettisen metanolin pilottilaitosta Lappeenrantaan. Press release. Retrieved on 19 Dec 2023 from: <https://www.st1.fi/st1-suunnittelee-synteettisen-metanolin-pilottilaitosta-lappeenrantaan> St1. (2023). St1 Due Diligence Statement 2022. https://content.st1.fi/sites/default/files/2023-05/ST1%20DD2022_EN_FINAL_03052023_0.pdf; St1. (2023). Game Changer 2022. https://content.st1.fi/sites/default/files/2023-04/ST1_AR22_GC_final_0.pdf

147 Tecoil. (n.d.). Regenerointilaitoksemme toimii vihreällä vedyllä. Company website. Retrieved on 19 Dec 2023 from: <https://tecoil.fi/fi/#regenerointi>; Neovolt. (10.10.2023). Neovolt ja STR Tecoil yhdistävät voimansa vahvistaakseen suomalaisen vetyliiketoiminnan kilpailukykyä. Press release. Retrieved on 19 Dec 2023 from: <https://neovolt.fi/neovolt-ja-str-tecoil-yhdistavat-voimansa-vahvistaakseen-suomalaisen-vetyliiketoiminnan-kilpailukyky/>

148 UPM. (17.2.2021). UPM mukaan kestävä vetyä edistäviin koalitioihin EU:ssa ja Suomessa. Press release. Retrieved on 19 Dec 2023 from: <https://www.upm.com/fi/tietoa-meista/medialle/tiedotteet/2021/02/upm-mukaan-kestavaa-vetya-edistaviin-koalitioihin-eussa-ja-suomessa/> UPM. (2022). UPM & Human Rights Responsibility. <https://www.upm.com/siteassets/responsibility/documents/upm-human-rights-responsibility.pdf>

Company	Project (situation in November 2023)	Does the company have a human rights and the environment due diligence process in place?	How is the sustainability of minerals needed for the hydrogen production monitored?	Are platinum group metals used in the equipment that is being used for hydrogen production? If so, what is the required amount and origin of the said metals?
Vanadis Fuels ¹⁴⁹	Plans to produce green hydrogen and methane in Kokkola. Phase: Project planning (operations could start in 2029) Scale of green hydrogen production: Not known.	Did not respond and comprehensive information about the HREDD process could not be found from public sources.	Not known.	Not known.

As a rule only the largest companies which already had other business activities in place had an HREDD process. Some of the companies said that their HREDD process is currently being developed, while others said that the need for the process will only be assessed as the project progresses. Some only referred to the ethical guidelines for suppliers, which is not enough to replace the company's own HREDD process.

The ethical guidelines set by the companies concerning their suppliers often came up also in how the responsibility of the minerals needed in the hydrogen production process is to be monitored in practice. Some of the respondents also brought up the use of certificates or the conducting of audits. A few companies indicated that their aim is for their own operations to be compliant with the EU sustainable finance taxonomy. The taxonomy regulation related to the environmental impact of investments includes so-called minimum level protection measures¹⁵⁰, one of which mentions compliance with the UN Guiding Principles. It can be interpreted that this means the introduction of a human rights due diligence process in line with the UN Guiding Principles.¹⁵¹

Companies' responses regarding the use of platinum varied. Some of the companies already knew that a PEM electrolyzer, which typically uses platinum and iridium, was already in use or would be put into use. In some cases, the choice of technology focused on alkaline electrolyzers, where platinum group metals are not typically used. Many respondents did not yet know or were not ready to say which technology was being introduced. In terms of the technology used to produce hydrogen, Hycamite stood out from others. Hycamite produces hydrogen from biogas using TCD technology, in which case it is called clean and not green hydrogen. In addition to the operators related to hydrogen production, Convion was mentioned; the company does not produce hydrogen, but the electrolyzers used for its production.

149 Both2nia. (15 Aug 2023). Total Eren and Aliceco will develop one of the Europe's largest electrofuels facilities in Kokkola. Press release. Retrieved on 19 Dec 2023 from: <https://www.both2nia.com/en/news/total-eren-and-aliceco-will-develop-one-europes-largest-electrofuels-facilities-kokkola>

150 Regulation 2020/852 of the European Parliament and of the Council on a framework to facilitate sustainable investment and amending Regulation (EU) 2019/2088. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020R0852>

151 Platform on Sustainable Finance. (2022). Final Report on Minimum Safeguards. Report of the Sustainable Finance Forum, p. 34. https://finance.ec.europa.eu/system/files/2022-10/221011-sustainable-finance-platform-finance-report-minimum-safeguards_en.pdf

Of the operators who had already decided on a PEM electrolyzer that required platinum, some had already recognized that there were risks involved in the production of platinum. The companies did not say the exact quantities of platinum or iridium needed, but EPV and Nordic Ren-Gas referred to estimates in the literature about the size classes involved.

5. Summary

The hydrogen economy is expected to be a solution to the challenges of transitioning away from fossil fuels, especially where direct electrification is not profitable. Emission-free hydrogen can be used to replace fossil fuels in various industrial processes, and hydrogen also acts as an intermediate form of storage for renewable energy. Various hydrogen projects have been launched quickly, and in Finland a goal has been set to make Finland a pioneer in the hydrogen economy.

Just like the green transition in general, the hydrogen economy will also alter demand for different minerals. One of the key minerals in the hydrogen economy is platinum used in PEM electrolyzers. The demand for platinum is expected to increase rapidly. The strong concentration of platinum production has and will cause challenges: more than half of all platinum is produced in mines in South Africa, where human rights and environmental problems are common. The European Commission has defined platinum as a critical raw material.

South African company Sibanye-Stillwater, which also operates in Finland, is one of the world's largest platinum-producing mining companies. The company has stated that its strategy is to also increase the mining and processing of battery metals such as lithium and nickel.

This report examined Sibanye-Stillwater's Marikana platinum mining operations in South Africa's North West Province. Finnwatch's local partner interviewed 15 local employees of Sibanye-Stillwater and 13 people living near the mining complex. The goal was to determine the working conditions and terms of employment at the mine, the living conditions of the workers and the effects of the mine on the community.

The salaries of the interviewed employees exceed the statutory minimum wage, but it is difficult for them to make ends meet, especially on the lowest wages. Unemployment in the region is high, and social support systems are inadequate. The employees say that they must support an average of seven people with their salary, and often have to rely on e.g. loan sharks.

The Sibanye-Stillwater mining complex is surrounded by large informal shanty towns. The majority of the company's employees do not have access to decent housing. Thousands of the company's employees live in windowless shacks made of sheet metal. The shacks are cold in winter and scorching hot in summer. The dwellings lack sanitation and running water, and residents must use pits in the ground as toilets. Dust and other air pollution from the mine and its smelter penetrate the shacks, causing health problems.

Many of the interviewees were bitter towards the mining company, as they felt the company had not brought sufficient development to the area. Sibanye-Stillwater has not built new apartments in the area, the roads are in poor condition and the interviewees did not feel that they benefited from the statutory social programs implemented by the company.

In its dialogue with Finnwatch, the company shifted responsibility for the problems to the South African state and the employees themselves. According to the company, building apartments is not its responsibility, and it cannot be responsible for how the employees decide to spend their money. The company emphasizes that it offers a significant number of jobs in the region, that it pays competitive wages and that it participates in both statutory and voluntary projects for community development. Finnwatch points out that the right to housing and a decent livelihood are human rights, which the company has an obligation to respect in line with the UN Guiding Principles on Business and Human Rights, even when the state does not adequately fulfill its own human rights protection obligation. Finnwatch also states that in South Africa the responsibility for the social development of the mining community has been specifically transferred to the companies.

Finnwatch believes that Sibanye-Stillwater's corporate sustainability processes are undeveloped. The company says that it has started the preparation of the human rights due diligence process included in the UN Guiding Principles. However, it has not identified salient human rights issues related to its operations, did not explain its human rights risk assessment process or the results in detail, and did not say how it intended to address the risks or the negative human rights effects that have already occurred. The human rights due diligence process is currently being enacted as a legal obligation in the European Union (Corporate Sustainability Due Diligence Directive, CSDDD). Due diligence reporting is also required in the Corporate Sustainability Reporting Directive, which has already entered into force, and it is also part of the requirements related to the EU taxonomy.

Finnwatch also found deficiencies in the corporate responsibility processes of companies that had launched hydrogen projects in Finland. With regard to the raw material needs of the equipment used for hydrogen production and the risks associated with these, it is worrying that many Finnish hydrogen industry operators lack effective measures to ensure sustainability all the way to the mine level. Since the need for platinum is linked

to the purchase of the equipment needed for the production of hydrogen, the relevant sustainability processes should be in place already in the early stages of a project.

Only a few companies had a human rights and environmental due diligence process in place and they were those that have been engaged in some other business for a long time. On the other hand, companies established for new hydrogen projects had very varying practices in place for the consideration of procurement-related human rights and they mostly emphasized that direct suppliers were required to follow ethical guidelines.

Of the 23 examined companies working with hydrogen production or its planning in Finland, the majority said that the exact production method and thus the possible need for equipment using platinum was not yet known. Some of the companies had decided on a production method other than the PEM electrolyzer, and only a few were already aware of the use of the PEM electrolyzer. Few companies could give an estimate of the quantities of platinum that would be needed, if they chose a PEM electrolyzer that needs platinum. Although this report has focused specifically on platinum, it should be noted that other electrolysis technologies also require minerals, the production of which involves risks.

6. Recommendations

For Sibanye-Stillwater

- Sibanye-Stillwater must draw up a clear human rights commitment in line with the UN Guiding Principles on Business and Human Rights. With the help of the commitment, the company will communicate to its stakeholders that it understands its own obligations regarding human rights and set expectations for its employees and business partners regarding respect for human rights.
- The company should increase its organization's human rights expertise regarding key corporate sustainability standards. These include, in particular, the UN Guiding Principles on Business and Human Rights, and the OECD's guidelines, which put the aforementioned principles into practice, and most importantly the OECD Due Diligence Guidance for Responsible Business Conduct.
- Sibanye-Stillwater must ensure that the human rights due diligence process it has already initiated complies with the UN Guiding Principles. The company can use, e.g. the UN Guiding Principles Reporting Framework prepared by Shift, a center of exper-

tise focused on the UN Guiding Principles, as a practical aid for process planning and reporting.¹⁵²

- As part of its due diligence process, Sibanye-Stillwater must identify its salient human rights issues. It can approach these salient human rights issues, for example, by means of a geographical examination. It can be concluded on the basis of this Finnwatch report, that in South Africa, salient human rights issues in the company's operations include problems with occupational safety, the right to housing, the right to clean water and the right to a decent livelihood. The company must prepare operational policies regarding these salient human rights issues and report on their implementation. The company must also deepen its human rights expertise in the areas of its salient human rights issues.
- There is an insufficient number of decent apartments around the Marikana mining complex, as a result of which thousands of the company's employees live in inhuman conditions in shacks without adequate shelter and sanitation. The company must offer all its employees decent living conditions, for example by building more rental apartments in the area for their employees. The company must continue dialogue with the authorities and other government representatives to correct the shortcomings regarding housing and infrastructure. However, the state's negligence does not exempt the company of its own human rights responsibilities.
- The company must examine the appropriateness of the occupational safety processes it has implemented. Collective punishment for occupational safety violations is problematic for the rights of individual workers, as it causes disputes between teams working in mines and can even lead to situations where near misses or even accidents and injuries are not reported.

For companies operating in the hydrogen industry

- Companies must introduce a human rights and environmental due diligence process, in which companies map their value chains, identify the human rights risks in the chains and their involvement in these, and take measures to avoid and reduce risks. An essential part of due diligence is ensuring that potentially affected groups are meaningfully consulted. Companies can use e.g. the UN Guiding Principles Reporting Framework prepared by Shift, a center of excellence focused on the UN Guiding Principles as a practical aid for process planning and reporting, companies.¹⁵³

152 Shift. (2015). UN Guiding Principles Reporting Framework. <https://shiftproject.org/resource/un-guiding-principles-reporting-framework/>

153 Shift. (2015). UN Guiding Principles Reporting Framework. <https://shiftproject.org/resource/un-guiding-principles-reporting-framework/>

- International corporate sustainability standards also require that if harmful human rights impacts have occurred, they are corrected and/or compensated. Therefore, companies should also include corrective and compensatory measures in their due diligence process, i.e. so-called remedy processes.
- Several different hydrogen technologies require critical minerals, whose traceability is a significant challenge. Traceability of minerals to the mine level must be required from equipment suppliers, because without traceability the buyer cannot conduct their own human rights and environmental due diligence process.
- Information about the minerals used and their origin must be published. The transparency of information about value chains is a key tool that stakeholders can use to bring problems in value chains to the company's attention. Without open information about value chains, many harmful human rights and environmental impacts remain hidden, and the effectiveness of due diligence processes implemented by companies cannot be evaluated on a practical level.
- Companies should strive to promote a material-efficient circular economy in their purchases. This means making an effort to reduce the use of virgin raw materials and taking the end of the purchase life cycle, i.e. recyclability, into account as early as possible.

For political decision-makers in Finland

- Finland must support the political negotiation result achieved on the Corporate Sustainability Due Diligence Directive in the vote on the finalized directive in the council next spring. Once the directive has been approved, its national implementation should begin without delay.
- Companies should be supported in implementing human rights and environmental due diligence. Support measures offered to companies can include providing guidance and advice. Advisory services should be centered at e.g. the Ministry of Labor and Economy, which is responsible for the implementation of the OECD guidelines, by allocating sufficient resources to the ministry for this work.
- The recycling of platinum must be promoted, among other things, by ensuring the rapid electrification of the car fleet, which will free up platinum group metals from catalytic converters for other uses.
- An effort should be made to promote the transparency of critical minerals use of as part of the green transition. The EU is currently preparing the reform of the Union Customs Code. In connection with the reform, the public disclosure of customs information should be expanded to include information on operators importing products

into the Union and exporting products from the Union. In the negotiations, Finland must promote the transparency of customs information and thereby improve the status of victims who have been subjected to harmful human rights impacts and their possibilities for obtaining justice. Information on importers and exporters must be compiled and published in a database centrally by the new customs data center to be established in the EU.

- The implementation of the material reporting requirement (ESRS E5-4) required in the EU Sustainability Reporting Directive (CSRD) should be monitored and it must be ensured that the materiality requirement included in the reporting leads to the inclusion of information about critical minerals in the reporting. If necessary, it should be specified that the reporting must also cover critical raw materials used in equipment (such as platinum), even if their quantities are small.
- Decision-makers should monitor and support projects that aim to create technological solutions to improve the traceability of minerals. As an example, in Finland monitoring based on mineral isotopes has already been developed (see the BATTRACE project¹⁵⁴), and follow-up projects on the subject are underway at the EU level (e.g. the MADIT-RACE project¹⁵⁵). When there are technically viable means for monitoring minerals, their introduction should be promoted by regulatory measures. The product passports included in the EU battery regulation could include requirements on the traceability of minerals all the way to the mine from which they were extracted. Expanding the requirements for product passports should also be considered for other product groups that are central to the green transition.
- The realization of climate goals should not be tied to the implementation of uncertain hydrogen projects. Instead, emission cuts must be promoted with a comprehensive selection of measures in all industries. Industry-specific climate roadmaps must be updated regularly, and their compatibility must be evaluated from the point of view of such things as hydrogen and energy availability. This can be promoted by means such as setting up a planning unit for social change involving different administrative sectors, which broadly involves experts from the companies, administrations and organizations of different industries¹⁵⁶.
- For the emission-free energy production needed by the clean hydrogen economy to progress at a sufficient pace, the pricing related to the use of fossil fuels must be

154 GTK. BATTRACE – Sustainable Processing and Traceability of Battery Metals, Minerals and Materials. Retrieved on 23.1.2024 from: <https://www.gtk.fi/tutkimusprojekti/battrace-sustainable-processing-and-traceability-of-battery-metals-minerals-and-materials/>

155 More information about the project at <https://www.maditrace.eu/>

156 Finnwatch, SAK, Soste et al. (2023). Päätöksenteon rakenteet ja ilmastopolitiikan parantaminen. Oikeuden mukaisen ekologisen siirtymän toimenpideohjelma, p. 7–8. <https://finnwatch.org/images/Lausunnot/Rakenneohjelma.pdf>

tightened both nationally through fuel taxes and at the EU level through the emissions trading system. In addition, energy sufficiency must be supported by continuing measures to improve energy efficiency, e.g. in renovation construction, and by restoring subsidies for energy renovations¹⁵⁷.

- To speed up the clean energy system, Finland must promote the 90-95 percent emission reduction target at the Union level for 2040, in accordance with the proposal of the EU's climate panel. Nationally, it must be ensured that the carbon neutrality required by the Climate Act is achieved no later than 2035, after which carbon negativity will progress as quickly as possible.
- South Africa is Finland's most important trade partner in sub-Saharan Africa, and Finland has an embassy and Team Finland activities in South Africa. Finland must actively communicate to South African decision-makers and companies about the tightening of corporate responsibility voting in the European Union and the impact of human rights issues on the competitiveness of the country's companies. In discussions about the mining industry in South Africa efforts should be made among other things, to find out why the statutory SLP plans have not been successful enough to improve the living conditions in mining communities or why the standard regarding living and living conditions in the mining industry that entered into force in 2019¹⁵⁸ has not led to an improvement in living conditions.

For citizens

- The green transition is a necessary change. However, changing the energy system from the current fossil-based system to a system based on clean energy involves significant material challenges, especially in relation to minerals. These challenges can be managed by reducing unnecessary consumption:
 - by thinking before buying
 - by first looking for the necessary products on the secondhand market
 - by recycling and maintaining goods
- Citizens should ask companies for information on the origin and responsibility of the raw materials used in their products.
- The production of platinum requires enormous amounts of energy and the mining of large quantities of ore. At best, only a few grams of refined platinum can be obtained

157 Finnwatch, JHL, SAK et al. (2023). Energiaohjelma. Oikeudenmukaisen ekologisen siirtymän toimenpideohjelma. <https://finnwatch.org/images/Lausunnot/Energiatoimenpideohjelma.pdf>

158 South Africa. (2019). Government notices. Housing and living conditions standard for the minerals industry 2019. https://www.gov.za/sites/default/files/gcis_document/201912/42899rg11016gon1590.pdf

from one ton of ore. Citizens should avoid the unnecessary use of platinum, defined as a critical mineral in the green transition, and consumers should, e.g., choose other alternatives in jewelry.

- Citizens should see to the recycling of their old cars, so that the platinum in their catalytic converters and other minerals needed in the green transition are returned to use. When purchasing new cars, citizens should show a preference for electric cars.
- Citizens should demand ambitious corporate responsibility regulation from decision-makers.
- A just transition can also be promoted by supporting non-governmental organizations that work to support this.



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