



# Transforming Together Clydach Nickel Refinery's Community Report, 2021-22





## A message from Alfredo Santana

Vale's North Atlantic Operations are in the midst of an exciting Transformation journey, and as we gain momentum, one thing that will not change is our obsession with safety. We continually introduce new safety initiatives to mitigate risk and ensure we live up to our core value: **Life Matters Most**.

Our Transformation journey includes revitalising our Canadian and UK operations' asset portfolio. In Newfoundland and Labrador, we are extending mine life to at least 2035. In Manitoba, we are investing \$150 million Cdn to extend our mining activities by 10 years. In Ontario, we have invested approximately \$950 million Cdn in a mine project. And at our Clydach Nickel Refinery in Wales, we have been investing £10 million per annum in capital investments over the years to keep our facilities in top-notch condition, and this year, we spent around £4m in hazardous identification and risk analysis towards our company-wide pledge to continuously improve safety, everywhere.

Globally, adoption of electric vehicles (EVs) and renewable energy is rising, while demand for our critical metals — nickel, copper, and cobalt — is rising in tandem. As we proceed, we must meet our emission targets, and help our customers meet theirs. Thus, we are transitioning to low-carbon alternatives to power our operations wherever possible.

Building a diverse, inclusive and respectful workforce is also part of our Transformation. Over the past year, we have advanced workstreams focused on diverse language, built inclusive facilities, and we are actively recruiting, training and educating with an eye to diversity and inclusion.

While we are making significant progress, there is still much to do. It will require constant diligence, continuous learning, regular communication, and leadership by example.

Vale has long been underpinned by outstanding assets, people, and community relationships, and we have been recognised for our safety performance, operational excellence and leadership in sustainable mining.

While our Transformation journey is just beginning, we will stay the course as we continually improve and achieve our purpose to **Improve Life and Transform the Future. Together**.

### Alfredo Santana

Chief Operating Officer, Vale's North Atlantic Operations & Asian Refineries

## Did you know?

With operations in approximately 30 countries, Vale is one of the largest mining companies in the world and is the number one producer of iron ore, pellets and nickel. In addition to mining, we work with logistics — railways, ports, terminals and state-of-the-art infrastructure — energy, and steel making.

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**Purpose:** To improve life and transform the future. Together.

**Vision:** To be the Number One global natural resources company in creating long-term value, through excellence and passion for people and the planet.

**Values:** Act with Integrity. Value the People who Build our Company. Respect our Planet and Communities. Making it Happen

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**Company levers:** Safety. People. Innovation. Vale Production System (VPS). Environmental Social Governance (ESG)

On the cover: Vale's Clydach Nickel Refinery surrounded by the beautiful village of Clydach, River Tawe and Swansea Canal.



**We are ISO certified  
in Quality, Safety  
and Environmental  
Management.**



## A message from Darren Poland

Welcome to our 2021–2022 annual Community Report! It's been a wonderful and historic 120th Anniversary Year for us here at Vale's Clydach Nickel Refinery, with an equally exciting journey ahead.

As we reflect on more than a century of rich history producing some of the world's purest nickel products, we pause to appreciate the workforce who came before us, as well as our longstanding partnerships with the village of Clydach and surrounding communities. After all, what truly makes us special is the people.

Looking around today, I see our nearly 200-strong workforce, the beating heart that pumps life into our operation, every single day. This year, I am particularly proud that we achieved our best environmental performance — ever, and we continued to perform strongly in safety and production. We also hosted an Open Day in September that drew 575 community partners, friends and family members (See images of the day on the back cover). Combined, it truly has been a special year.

And scanning the horizon, I can tell you that our Refinery and Vale, our global parent company and the largest nickel producer in the world, have embarked on an unprecedented transformation.

In the battle against climate change, our Class 1 (>99.9% pure nickel) pellets and

powders will play a critical role in the markets that support the production of batteries for electric vehicles (EVs). Case in point: This November, our operations in Canada and General Motors Co. signed a long-term nickel supply agreement for battery grade nickel sulfate. The EV battery market is currently valued at approximately USD \$21.9 billion with projections around USD \$155 billion by 2028.\*

Our drive for sustainability is also inward focussed. The completion of our multi-year, multi-phased closed-loop cooling system means that 100% of the water used for our processes is wastewater from our Effluent Plant. Read more about this massive accomplishment, as well as our onsite Algae Farm partnership with Swansea University on page 3.

Since our inception, Vale's Clydach Nickel Refinery has been known as a people-first organisation. Last year, we were recognised with the Silver Standard from Investors in People (IIP), a global organisation for people management. The Silver Standard is proof that our people feel empowered, and our work culture is positive and supportive.

While I am proud of this accomplishment, we can do more. To be a more diverse and inclusive workplace, we have launched a recruitment campaign to attract all genders, all members of the LGBTQIA+ community, all ethno-racial backgrounds, all people with disabilities — everyone.

If, as the saying goes, "History is Rooted in the Future," the prospect for Clydach Nickel Refinery's next 120 years will be exciting indeed. Stay tuned!

**Darren Poland**  
Operations Manager, Vale's U.K.  
& Asian Refineries

\*Stats: GlobeNewswire/Fortune Business Insights



From left: Steve Barfoot, Rhiannon Davies, Rhiannon Laker Davies, Lee Wellington

## We live and work in the community

One of our key behaviours at Vale is to **Actively Listen and Engage with Society**, which our company and teams proudly action in the workplace and in our surrounding communities.

### Diversity & Inclusion aren't just buzz words

Diversity & Inclusion is a company-wide goal at Vale. In 2022, our HR team at our Clydach Nickel Refinery actively engaged with colleges and universities to show that we offer stable, well-paying and fulfilling careers — to everyone. An employee-run Diversity & Inclusion Committee was also launched this year to raise awareness around Black History Month, Pride Month, International Women's Day and the White Ribbon Campaign, with more to come 2023.

**Steve Barfoot**, Senior Kiln Plant Technician, celebrated 45 years with our company in 2022, becoming the longest-running Vale employee in the U.K.! Thank you for your valued service, Steve!

When **Rhiannon Davies** joined us this year as a Process Operator, she shattered a 120-year-old glass ceiling as the first

woman to hold this position at our Refinery. Rhiannon, we are proud of you for paving the way!

From 2002 to 2003, **Rhiannon Laker Davies** worked as a student placement, the following year she was hired as a Technologist and in 2020 she was promoted to Business Support Superintendent in Operations. Rhiannon holds an undergraduate degree in chemistry (Swansea University) and a Master's in molecular modelling (Cardiff University).

**Lee Wellington** joined Vale in 2005 on a four-year Mechanical Maintenance Technician apprenticeship paid by our company. In 2013, Lee was seconded to Systems Engineer, and in 2020 he earned a bachelor's degree in Mechanical Engineering, again funded by Vale. This year, he was promoted to his current role: Mechanical Project Engineer.



**Men's Shed Clydach** is located directly opposite Vale's Clydach Refinery (that's our Admin Building in the background!). Men's Shed is a safe space for all community members to come together to work on projects and share skills. Our company's most recent donation of £5,624 was used to purchase a secondary storage unit to safely hold tools and equipment.

Photo courtesy Men's Shed Clydach.



### Caring for our community

Vale's Clydach Refinery has an employee-run Community Donations Committee that identifies local charities in need of financial support including, most recently:

**£26,000**

Ty Croeso-Swansea Food Bank

**£15,000**

The Swansea Canal Society

**£5,624**

Men's Shed Clydach

**£2,440**

The Leon Heart Fund

**£1,000**

Clydach Army Cadets

**£530**

Swansea Environmental Forum

**£500**

Clydach Heritage Society

**And more!**

# We are innovating for the future

Innovation — the implementation of creative ideas to realise sustainability, efficiencies, decreased costs and increased revenues — is a company-wide lever that our Clydach Nickel Refinery is proud to have achieved great success in over the last couple of years.

## Here's what cool looks like

As one of the world's most precious resources, water must be respected and protected at all costs. This is why we invested £4 million in 2022, and another £1 million slated for 2023 to build a Closed-loop Cooling Water System on site. The system recirculates treated wastewater from our Effluent Plant to all other areas of the Refinery, thus completely eliminating the need to extract water from Swansea Canal and River Tawe. This, in turn, reduces consumption of more than 4 billion litres of water/year and generally reduces water discharge by up to 80% — and during dry spells it's 100%!

## Blowing out electricity consumption and costs

In 2022, one of our Kiln Plant lines began running with variable speed drive (VSD) motors on the blowers, allowing our Operators to change speeds with just a click of the mouse. Prior to installing the VSDs, the entire system had to be shut down for upwards of five hours to switch out the pulleys used to change the speed. Not only are the VSDs a massive time saver,

they are reducing our electrical usage by around 60% and our electrical costs by approximately £700/day. The success of the VSD project has warranted replicating it on the other Kiln line.

## Algae has us seeing green

You probably wouldn't expect to see an algae greenhouse at a nickel refinery — but that's exactly what we have here thanks to our partnership with Swansea University's Reduction in Industrial Carbon Emissions (RICE) group. Inside the 30-metre-long greenhouse, different types of algae are being fed CO<sub>2</sub> from our nickel refining process. After a few weeks, the algae are harvested, dried and processed into high-value protein for animal feed and nutritional supplements, as well as pigment products. It's a winning combination all around: decreasing greenhouse gas (GHG) emissions, whilst increasing the potential for renewable sources of food and energy. The success of this Vale-Swansea Uni collaboration has spurred a scale-up demonstration that will see more than 100 tonnes of carbon dioxide per day — our current emission rate — captured and used to produce a soy protein replacement.



Vale employee Kieran Charles working in the Kiln Plant with a VSD motor in the foreground.



Algae being grown in our onsite greenhouse  
Photo courtesy Eira Rowe, Swansea University

From left: Vale employees Dave Whitmore, Bob Fussell and Liz John discuss the Closed-loop Cooling Water System.



# We are obsessed with safety

**Life Matters Most** is the most important company value at Vale. Here at our Clydach Nickel Refinery, we live this value by continually investing in safety improvements as technology matures and safety design evolves.

## Putting money where it matters

This past year, we invested £4 million to uncover every possible opportunity to improve safety. This included everything from adding more actuated valves to our safety shutdown system, to a new ammonia detection system, to additional monitors for CO<sub>2</sub> and other gases — plus more. And we won't stop there. In an ongoing system of checks and continual investment, every month we verify that all safety controls are working as expected, and then we conduct an annual review to determine that the overall risk profile is reduced or nullified.

## Another layer of protection

As most residents in the village of Clydach are aware, every three years we participate in a full-scale emergency plan with Swansea City Council, local ambulance, police and fire services, and every year we test our onsite and public warning

mechanisms. As another layer of protection, in 2021 we invested approximately £200,000 in 13 solar-powered G7 gas monitors (see photo below). Situated around our property perimeter, the G7s are connected to a cloud-based 4G network, which is monitored by our Safety personnel and include automatic updates and data collection.

## 5s sets the stage for safety

5s is a workplace organisation methodology used to identify suboptimal and potentially unsafe working conditions, and improve them. Originally developed in Japan, 5s involves five steps: Sort, Set in Order, Shine, Standardise, Sustain. Over the course of 2021, 46 areas around Vale's Clydach Nickel Refinery went through the 5s process including the Effluent Plant. The Effluent pumps, pictured at right, were painted standardised colours: green for motors, blue for pumps and red for guards. Broken cable trays (located in front of the pumps) were replaced, and wood and cardboard were removed to declutter. The 5s work was led and performed by the people who know the area best — our Effluent Plant Operators.

Before 5s



After 5s



Effluent pumps.

Photos by Vale employee Mark Fish

Vale employee Matthew Francis checks one of the 13 solar-powered G7 gas monitors positioned around our property.



Major Emergency Safety instructions can be accessed here: [www.valeclydach.com/about-vale/communities/our-health-safety/](http://www.valeclydach.com/about-vale/communities/our-health-safety/)



Litter pick volunteer and Vale employee Clare White.

## We are committed to sustainability

**Respect our Planet and Communities** is a Vale value that we practise every day, with everything we do.

### Powering towards electric and biofuel vehicles

Earlier this year, Vale's Clydach Nickel Refinery received our first delivery of feed material using a 100% electric truck — and as of publication, there have been three more. Driving the 148 km round-trip from Cardiff to Clydach while carrying 20-tonnes of material, the electric truck produces zero emissions. A comparable diesel-powered truck driving the same round-trip route will emit 108.88 kg of CO<sub>2</sub>. We have also received deliveries made by biofuel trucks. Biofuel, a clean-burning biodegradable fuel, is made from domestically sourced waste such as vegetable oils, restaurant grease and animal fats. The resulting fuels are less toxic than other diesel fuels.



From left: FSEW Electric truck driver and Vale's Darren Poland, Adrian Jones, Peter Martin and Fiona Sharp.



Bumble bee photo by Vale employee Fiona Sharp

### We bee friendly

New this year is our 350 sq. metre Pollinator Garden, planted by our employees using seed packets of Celtic wildflowers that our company supplied. Selected to maximise wildlife benefits for pollinators — bees, butterflies, birds, bats, moths and others — the 16 varieties of seeds included common birds foot trefoil, devils bit scabious and red bartsia. Employees were also given seed packets to spread at home.

### That's a load of rubbish!

One evening in the spring of 2021, during the pandemic, Vale employees gathered for a volunteer litter pick. Spearheaded by our employee-run Health & Wellbeing Committee, the event lasted around two hours and covered Tawe Canal, a nearby playground and the village of Clydach. By the end, each person had a bag full of plastic, broken glass, cigarette butts, lollipop sticks and other rubbish — plus fresh air, exercise, and much-needed camaraderie. More litter pick days are in the works.



## 2021 sustainability stats

### Recycled

**161.64**

tonnes of metal

**89.14**

tonnes of wood

**20.22**

tonnes of cardboard, card and paper

### Reused

**44.78**

tonnes of pallets

**6,545**

tonnes of cardboard

**0.664**

tonnes of wood shoring

### Reprocessed

**1.94**

tonnes of lagging

Open Day photos by Vale  
employee Mathew Francis



## Open Day

On September 24, 2022 Vale's Clydach Nickel Refinery hosted a spectacular Open Day welcoming 575 guests to join us in celebrating our 120th year of operation in the community. The many highlights included a one-hour bus tour of our site, an outdoor racetrack with a

remote-control forklift that scooped up wooden pallets, Fire Service personnel with a fire engine for kids to explore, an indoor historical area with black and white photos and other memorabilia, a face painter, balloon maker and of course food and drinks. We also invited 15 local

community partners to set up stalls: Ty Croeso-Swansea Food Bank, Swansea Deaf Centre and Swansea University which included a rideable, hydrogen-powered stationary bike — and more! It truly was a celebration befitting a 120-year birthday!



For more info, please visit: [vale.com/united-kingdom](https://vale.com/united-kingdom)