

Iron-ore mining- an economic success or an environmental disaster?

By Lilly Brincker

Western Australia's iron-ore mining accounted for more than seven-hundred and ninety-four million tonnes in sales between 2018-2019. Providing over Western Australia over fifty-thousand jobs, it was and continues to be a major driving force in Australia's economy. In my community town of Derby, many family members and friends have close ties with iron-ore mining and the iron-ore mines off the coast of Derby bring in revenue to the town. Even so, iron-ore can have devastating impacts on the local and worldwide environment and questions about its sustainability often come into play. Many people often have to decide if the economic or environmental aspect of mining iron-ore is more important and political discussions often describe the problem of iron-ore mining as choosing one or the other. But is it possible to find a balance? Or will we eventually have to choose one in the future? While iron-ore is a huge part of our economy in Western Australia and responsible for many positive influences, it is difficult to ignore the negative impacts of iron-ore through its extraction, transportation, and manufacturing processes and it can be argued that even though it is a beneficial resource it is an unsustainable fossil fuel and steps must be taken to ensure its use becomes sustainable and environmentally friendly. The ongoing iron-ore mining, despite the economic value and possible job opportunities, results in many detrimental impacts on the environment, climate, and to future generations to come.

Iron-ore mining is a beneficial and important aspect of WA's economy and provides many jobs to people. Mining in Australia is one of the largest financial contributors to the economy, through export income and employment. Having a strong mining industry in WA results in a large number of jobs, with over one-hundred thousand people being employed by various mining industries. These opportunities provide people of all ages to receive a high-paying income and directly stimulate growth in WA's economy. Currently, iron-ore is Australia's largest source of export revenue and accumulates around sixty-three billion dollars each year. This iron-ore is exported each year to Australia's trade partners including China, Japan, and Taiwan, which is then used for the manufacturing of goods and services. These exports offer Australia a wider range of markets and give us the ability to connect to many more countries, creating an ever-expanding market of iron-ore.

Koolan Island, located off the Kimberley Coast of Western Australia, was once a major iron-ore mine and accumulated over seventy million tonnes of high-grade iron-ore to be sold across the market throughout the years. In the 1960s BHP commences the opening of an open pit mine on Koolan. At the peak of its business, Koolan Island has a small population of almost one-thousand and had several buildings including a school, police stations, and multiple shops. It was a thriving mine and BHP continued to extract iron-ore from the island until it shut in the 90s. This mine had many positive effects on its communities and the economy. It employed a large number of workers and gained millions of dollars in profits and exports. Once mines are closed, many steps are taken to rehabilitate the native area around it. On Koolan Island, most of the buildings were taken down and several exotic flora species were removed. This enables us to minimize the damage caused to the natural landscape as a result of modern-day mining practices and allows the environment around the mine to slowly revert to its natural state as much as possible. Although many steps are taken to ensure the safety and stability of the environment around the mine, more must be taken to ensure we can

continue to mine iron-ore in Australia's future. Mines such as Koolan Island were and still are a major contribution to the Australian economy and the future of job opportunities.

Iron-ore mining is an unsustainable practice and results in environmental damage through processes extraction, transport, and manufacturing. In China alone, the demand for iron-ore in 2013 grew to 1.1 billion tonnes as a result of urbanisation and the mass amounts of development of infrastructure. This then leads to a large number of emissions of greenhouse gas as steel and iron-ore are one of the leading causes in carbon dioxide emissions in the atmosphere a major contributor to climate change. Iron-ore is used to make steel; and around 1.4 tonnes of iron ore is used to produce around one tonne of steel, which in turn produces about two tonnes of greenhouse gas emissions. This is due mostly because of the smelting and processing part but also partly due to transportation and the extraction.

Mining has both a global impact and a local impact. The mining method most commonly used to extract iron ore is called open-cast mining which is also known as open-pit mining too. The method involves removing very large amounts of waste rock to access the minerals within it. This both impacts the land around the mine but also creates issues in waste removal. Once an area has been mined and is no longer useful, the process of rehabilitation is costly and takes time, which may disrupt the native flora and fauna. This stage portrays the problem of sustainability and if the process of extraction will be able to continue in the future. Many argue that the large amounts of waste rock and the smaller amounts of iron-ore that is extracted cannot continue due to the large environmental impacts it has on the surrounding areas. Water usage is also a major growing problem in iron-ore mining- this may be due to the increasing size and depth of mines which requires more water in turn. Without further changes to the practice of iron-ore mining and the processes that follow, new environmental consequences will emerge.

Processing of iron ore involves changing it into various forms of iron through different processes and many of them have negative effects on the environment. One of which involves placing the ore, coking coal into a blast furnace at very high temperatures, melting the ore, and removing the impurities and rock formations to the pure iron. This method releases large amounts of carbon dioxide and small carbon monoxide into the atmosphere, both in turn contribute to the green-house effect. Steel production also involves the use of iron ore and, during melting, releases many chemicals and there are also high amounts of carbon dioxide released as well. Other than gas and water usage, waste removal of waste from iron-ore also poses a major environmental problem. The 'slag' produced when the ore is in the blast furnace contains many harmful chemicals that are dangerous to the surrounding environment. Cleaning up landfills that contain dumped slag is also extremely costly due to the huge environmental threat the slag creates when left untreated. The processing of iron-ore mining releases harmful greenhouse gases into the air and the waste produced are major causes in the environmental damage caused by iron-ore mining. These gases including carbon monoxide, carbon dioxide, and sulfur all contribute to climate change.

Once the iron-ore has been processed and stockpiles are it produces, it is time to begin transport. Loads of newly converted pig iron are then loaded onto trains to be shipped elsewhere. The trains arrive at ports across Australia including Port Hedland, Dampier, and Cape Lambert to be sent to Australia's trade partners. Although transporting goods is needed

and is inevitable, transporting iron-ore still results in environmental impacts and is a contributor to climate change. Almost 50,000 ships carry iron-ore and other goods around the world, resulting in huge fuel usage (each ship uses up to 110 tonnes of fuel each day) and the release of harmful gases to the environment. These gases from the ships carrying iron-ore make up around three to four percent of the total man-made carbon emissions each year. Carbon dioxide is one of the major contributors to climate change as the gases in the atmosphere trap the heat from the sun, causing the Earth to gradually warm-up. Shipping and transportation on iron-ore is a major environmental factor, concerning the impact that greenhouse gases and fuel usage have on the climate and the future. The large-scale shipments of iron-ore across the world are a large part of the mining process and equally contribute to the environmental impacts.

For years, people have argued that there must be a way to find a balance between the negative and the positive impacts of iron-ore including its extraction, processing, and its transportation. Others say, that there is no solution to the problem. However, without changes to the way that iron-ore is produced, there will be consequences in the future. Many people are now researching and trying to find safe, achievable, and sustainable solutions to counter the impacts mining has on the environment.

The use of recycled steel (which is made up mostly of iron-ore) is a growing idea that has begun to take effect. To use recycled iron and steel greatly reduces the pollution that is creating in the refining process and saves more energy. The use of recycled or scrap steel can save up to seventy-four percent of the energy required to produce one tonne of brand-new steel- which saves around 1.5 tonnes of iron-ore and also saves coal. This is hugely important as the decrease in iron-ore used results in less damage to the environment as there will be fewer quarries and mines, less noise pollution from heavy machinery, and less traffic. Recycling of steel saves valuable, non-renewable resources such as iron-ore, meaning the deposits of iron-ore in Australia will last longer and lessens the demand for natural resources. This provides a more sustainable resource, as future generations will still have access to more iron-ore to use in infrastructure and to manufacture every-day utilities. To produce a tonne of steel, made from recycled steel, you reduce up to eighty-six percent of the gas emissions that are emitted using pure iron-ore. This means that if we were to reduce the amount of pure iron-ore being used and turn to recycled steel, over time we would reduce the amount of green-house gases; which in turn may slow the changes in climate that are affecting us right now.

Sustainable mines may soon become a new asset in Australian mining as there is little, we can do to reduce the overall impact that the extraction process causes to the environment. Sustainable mines can be defined as a mining development whose practices do not jeopardise the ability of future generations. This would include careful consideration of the environment surrounding the mine site, have strict rehabilitation rules to ensure the land is restored to its previous form, and have an overall understanding of its impact on the environment as a whole. There are few examples of sustainable mines, but some new developments in sustainable mining have emerged from Brazil and Papua New Guinea- these projects may compel other countries to advance further in developments like these. Sustainable mines are so important as will enable Australia to continue to support the economy and provide jobs

through mining, but also ensure that the land that it is mined on is protected and to further reduce the effects of harmful gases on the environment.

Mining is such a large part of Australian society; it is part of our economy, our jobs, and our way of life. In the years to come, new generations of young Australians will come forward and become part of the mining industry. But with its positive impacts come its negative ones too. Iron-ore and other mineral resources are becoming scarcer and less easy to find. By the rate of expansion and urbanisation, there will be much less iron-ore available and eventually, the reservoir in Australia will dry up. While there are many mining jobs on offers at the moment, as the deposits of iron ore becoming smaller and less plentiful, the jobs available with being less secure, and young people will find it to be harder to make it into the news industry. This may cause a shift in the way mining work, as the new generation may have a huge shift as it moves from traditional mining to a future of renewable and sustainable mining. To achieve this goal, changes and advancements will need to be made to ensure job stability, a sustainable future, and a healthier environment. Projects such as increasing the amount of recycled steel used to create pure steel to limit energy consumption and the release of greenhouse gases and the developments of sustainable mining to decrease the rate of iron-ore consumption. These changes over time will greatly improve the livelihoods of the future generation of Australians as they would now have a reassurance that they can grow up without worry or doubt about iron-ore or the impacts it currently has on the environment.

In conclusion, iron-ore mining is a profitable industry in the heart of Australian society; however, without changes and reform to the processes of extraction, processing, and transport, there will continue to be huge environmental impacts. Iron-ore mines in Australia such as Koolan Island that bring in huge profits and jobs to the Australian economy; but open-cut mining causes land disruption and impacts the surrounding flora and fauna with little rehabilitation. The resulting impacts of iron-ore are devastating on the environment and greatly contributes to the greenhouse gas effect and make up a large portion of carbon emissions in the world. The processing and transport of iron-ore also make up a large part of the total environmental damage it causes; as it is releasing toxic gases, waste and the transport ships amount to costly fuel usage. But, as the future of sustainability and climate change become a larger problem in Australian society, the question of whether the future of younger jobs or the environment is more important in the future. But through changes and new ideas such as recycled steel and sustainable mines, both ideas can become a reality. It will allow us to preserve the precious deposits of iron-ore and innovation will provide future generations with jobs and a secure future.