



RioTinto

Environmental Sustainability

Our approach in developing the Jadar Project



pioneering
progress

Our business

For 146 years, Rio Tinto has been pioneering the production of materials essential to human progress. The minerals and metals we produce play a vital role in meeting consumer needs and in building a low-carbon environment we all strive for. They're used in a diverse range of everyday items and innovative technologies that help make modern life work.

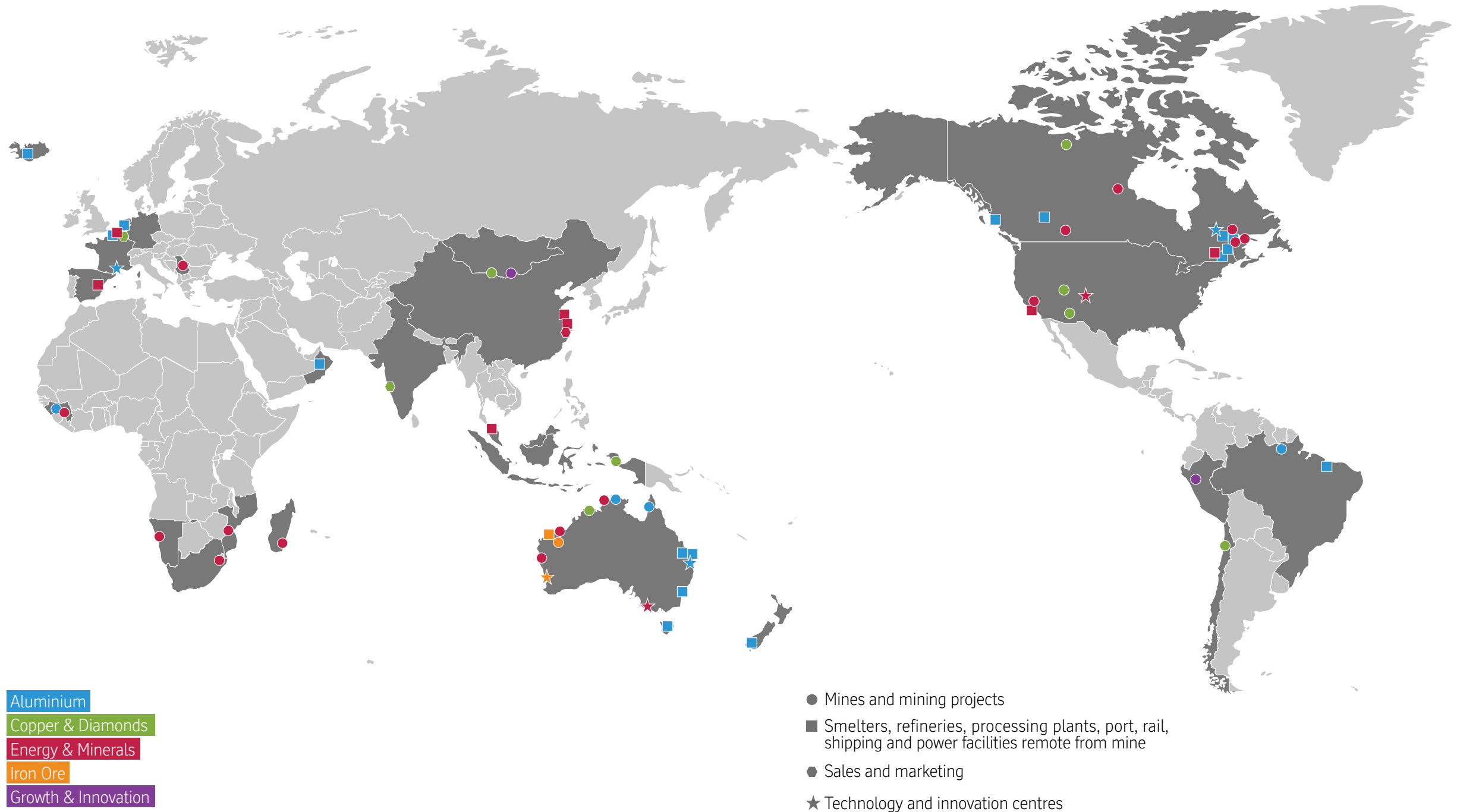
As a leading international mining and metals group, we have an important role to play in helping create positive impacts for the benefit of many – for our people, the communities and governments we work with, our shareholders, partners, customers and suppliers, and wider society.

We recognise that our work has the potential to affect people, communities and the environment. We work with those affected to minimise our impacts and to share the value that our business creates. We produce materials responsibly – developing, operating and closing operations safely and with care.



Employees at Grande-Baie aluminium smelter, Saguenay, Quebec, Canada

Operations map



Shared value

Our approach is long-term. We develop tier one orebodies into large, long-life and efficient operations, and apply technology at our mines, plants and in our infrastructure to make work safer and more efficient, and to reduce our environmental footprint. As a result, our operations are capable of sustaining competitive advantage through volatile business cycles.

We pursue opportunities for productivity improvements, cost reductions and prudent growth. By making these enhancements, we aim to stay ahead of market changes, securing our future so that we can deliver long-term shared value for our stakeholders.

The strength of our partnerships – with our people, the communities we work with, the countries where we operate, our customers and suppliers – help make human progress possible. We always look to improve and enhance our partnerships and find smarter ways of operating.

Our contribution

At Rio Tinto our business strategy is delivering superior value for our shareholders through the business life cycle, and our strategic focus on portfolio, performance, people and partners.

Our contribution is governed by our “partner-to-operate” approach. This guides us in balancing and bringing together the internal priorities that will set us up for success with the priorities of our broad network of stakeholders, and the changing external environment in which we operate.

At all times, we are guided by our values of safety, teamwork, respect, integrity and excellence. These are set out in our global code of business conduct, [The way we work](#), and expressed through our business principles, policies and standards. Our values underpin the way we manage the social, environmental and economic effects of our operations, and how we govern our business.

The Jadar Project

The Jadar Project, near the City of Loznica in western Serbia, is a world-class lithium-borate deposit. The project is 100 percent owned by Rio Tinto. The project is managed locally by *Rio Sava Exploration d.o.o.*, a Serbian subsidiary of Rio Tinto. The Project is currently in the study phase, which is to be followed by a construction phase and then by operations, depending on the progress of the studies.

Once developed, Jadar could supply a significant proportion of global demand for lithium and borates. Lithium and borates are essential building blocks for modern life and critical for human progress. They are used to produce vital products such as batteries for electrical vehicles, glass and ceramics, and fertilisers. Lithium also has an important role in the development of the post-fossil fuel economy. Through its application in efficient battery storage, lithium is vital to the development of renewable energy sources and electric vehicles. When the Jadar Project moves into operations, the City of Loznica and Serbia as a whole are expected to benefit from a number of long-term benefits as a result of this investment.



Employees at Jadar Project, Loznica, Serbia

Our approach to developing Jadar

In planning and operating our assets, we seek to avoid, prevent, mitigate and remediate the potential environmental impacts of our activities. We work with our host communities and regulators to manage and monitor such impacts and ensure that we comply with relevant regulations and international standards. We believe we can make the most difference by “thinking globally and acting locally”. We look at each of our sites and set targets that reflect our overall objectives while taking into account the particular circumstances of each location. This includes managing risks and impacts related to emissions and non-mineral waste.

Our operating principle is to protect human health and the environment* and we work with neighbouring communities to understand any potential impacts. We work in accordance with the Rio Tinto management system standard as well as Groupwide and business-specific environmental standards and processes. We participate in industry reviews covering topics such as tailings (waste) management and water stewardship to share knowledge, learn from others and improve our management approach. We seek to avoid and minimise biodiversity loss and land disturbance, while continuously improving our biodiversity management practices. Our approach is consistent with the mitigation hierarchy of avoidance, minimisation, restoration, and offsets where appropriate.

The local community and its residents are essential to the successful development of the Jadar Project. We want to continue actively engaging the community about the future of the project.

We meet regularly with the community to ensure a constant flow of information and feedback. This has helped us improve our planning in numerous ways.

Despite the expected positive outcomes from the project, the legacy of previous industrial activities and their effects on the environment and communities in Serbia understandably concern some community members. Our team will continue consulting with community members while completing all necessary studies as we plan the pathway to progress the project to next phase, and then to construction and operations. The Jadar Project team will always be committed to earning trust and support from the community.

* Environment refers to the surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation.

Responsibility beyond processing and mining operations

Balancing economic growth and environmentally sustainable development is one of the world’s key challenges. Our ability to operate rightly depends upon the quality of our environmental stewardship. We respect the value of natural resources in the countries we operate in. We consider the environmental impact of all our activities, and we deploy innovative solutions to reduce energy use and carbon emissions, manage our use of water responsibly, and reduce waste.

The study phase of the project requires completing technical, environmental and socio-economic studies. During the ongoing study phase, the project has mobilised Serbian and international experts in different disciplines, including underground mining, mineral processing, engineering, and community relations. These experts continue to assess the technical and economic viability of the project. The work includes completing orebody knowledge studies, testing new processing methods, conducting mining trade-off studies, and collaborating with Serbian experts to conduct extensive environmental and socio-economic analyses to lay the groundwork for efficient and responsible development.

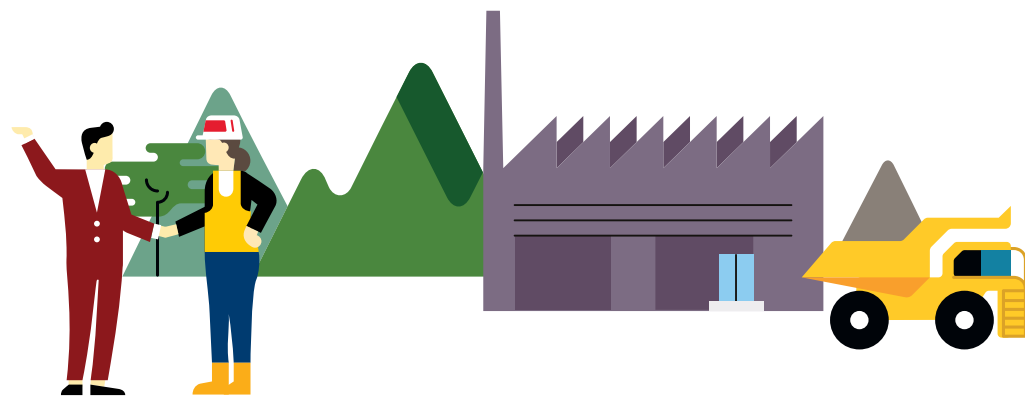


Ensuring compliance

Detailed planning goes into balancing the environmental, social and economic outcomes of the project. The work of studying, predicting, and mitigating the potential environmental impacts will take place in the framework of strategic planning documents to be developed by both the Serbian Government and Rio Tinto.

At the Jadar Project, we are fully committed to complying with all relevant laws and Serbian regulations. In addition to the legal framework, we are conducting an Environmental and Social Impact Assessment to international standards. As part of Rio Tinto, our Serbian company will follow the same key standards used at our projects and mining operations around the world, with a particular focus on EU standards.

We are committed to building an operation that makes a meaningful contribution to livelihoods in our host communities. Therefore, joint partnerships with the government are a critical part of our business.



Continuous improvement

The Rio Tinto management system is based on the Plan-Do-Check-Review model. In the heart of this model lies our continuous effort to establish, develop, implement, operate and monitor the environment in which we operate. Over the years we've learned from our successes and our mistakes. We continue to develop our approach, refine the methods and tools we use, and learn from our experiences.

The monitoring programmes that we will put in place will determine whether the mitigation measures that have been implemented are producing the desired outcomes in reducing environmental impacts. Mitigation will be assessed and modified if required, based on monitoring results. Government inspections will be carried out at our operations as per the law to review compliance with Serbian regulations.

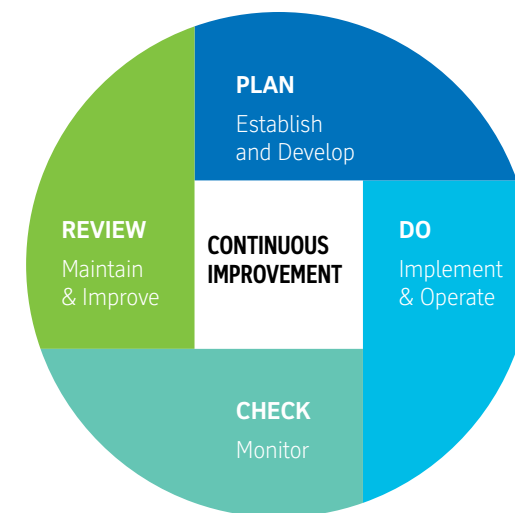


Chart: Rio Tinto Plan-Do-Check-Review model

Rio Tinto will conduct conformance audits and reviews against our environmental standards. We will work on developing our management plans for both construction and operations phases, which will include approved mitigation measures.

Planning for the long-term

Environmental stewardship is essential to our relationships with host communities, regulators and others. We recognise that our environmental performance is important to our host communities and that we are responsible for mapping, planning and managing potential impacts associated with our future operations in a responsible way.

Where our impacts add to those from other mining operations or development, we seek to work with them to understand and manage cumulative impacts in a region.

Rio Tinto's business life cycle extends through the exploration, development, operation and closure of our assets, how we market minerals and metals products, and the legacy we leave at the end of an asset's economic life. Coupled with our framework for managing risk, sustainable development considerations form part of every phase.



While our operations often last for many decades, we plan the closure of our mines many years ahead and often as part of the development process. As with construction and operations, we work with local communities during this planning as the eventual closure of our operations can have a significant impact on the surrounding local community. We work with stakeholders to understand the community's priorities, set closure objectives, manage risks and identify sustainable, beneficial future land uses.

Our objectives include:

Reduce our environmental footprint

Comply with all local regulations, Group-wide and business-specific environmental standards

Implement the best available economically achievable environmental controls and mitigations



Partner with communities and external stakeholders to achieve and implement further environmental footprint reduction in the future

Leading through innovation by using the development and application of new technologies to meet our objectives



Jadarite, Loznica, Serbia

Nurturing good community relationships

We undertake social and economic impact assessments to understand the implications of our activities and reduce any negative impacts throughout the life cycle of our operations. We collaborate with local communities to develop the clear and transparent agreements essential to providing access to land and for ensuring those affected by our activities benefit from them too.

The Jadar Project's early and regular engagement with communities is helping us understand community priorities and concerns. This engagement helping our environmental experts identify community expectations, and consider necessary improvements and adjustments in planing of the future mine and processing plant. Jadar's experts continue to engage with the community regularly about all aspects of potential project development.

Developing strong, trusting and lasting relationships with our host communities and recognising and respecting people's diverse cultures, lifestyles, heritage, preferences and concerns are principles embedded in our business values, policies and standards. We aim to be a good neighbor across all our operations and build relationships that allow us to share benefits and secure community support for our work.

Engaging local communities early, and on regular basis, the Jadar team will be able to continuously review and improve our current project plans. This will help us to reduce our environmental footprint, and at the same time continue to understand the priorities of the local communities while helping them better understand the project and its potential impacts.



Preparing for the future

Rio Tinto sees the potential for a broader suite of metals to play an increasingly important role as new and disruptive technologies change the way we live. Among those, it is the potential for electric vehicles and new power storage solutions that may bring significant change to our lives in the near future and consequently to the mining industry. We are already well placed to benefit from this growth with our copper and aluminium portfolio and we are evaluating what other metals and minerals may also be impacted positively.

The Jadar deposit contains jadarite and other borate minerals. It lies in three zones – the upper, middle and lower zones - each with a thickness of between 4m to 50m at depths from 100m to 700m below ground. Jadar is a world-class deposit in both commodities, containing Li and B at grades similar to those found in traditional borates and lithium rich minerals. The indicated and inferred resource at the Jadar deposit amounts to some 136 million tonnes, containing 2.5 million tonnes of Li_2O and 21 million tonnes of B_2O_3 , giving the potential for a multi decade mine life.* Taking into account the scale of the orebody and favourable location, our planning will seek to ensure the mine has future opportunities for expansion.

When developed, Jadar will be an underground mine with shaft access and mined using methods suitable for this type of orebody. An onsite processing plant will produce battery grade lithium carbonate and boric acid.

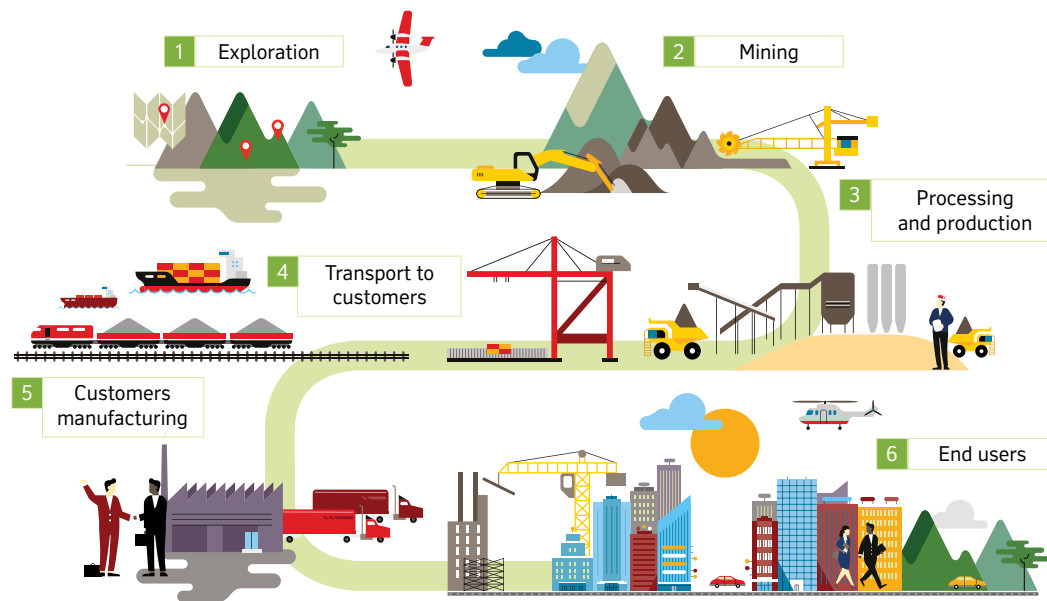
* Source: 2017 Rio Tinto Annual Report - riotinto.com/ar2017



Process and planning what matters

We look for new opportunities around the world to develop orebodies in both greenfield and brownfield settings. Our in-house exploration teams and partners are often the first contact with communities we may then work alongside for many years – we conduct exploration activities and engage with local communities respectfully.

Potential resources are evaluated to ensure the resource supports the Group's vision and investment decision-making, and the future product is positioned in the marketplace in ways that add value.



Rio Tinto Business life cycle

Our energy use

Rio Tinto's business is energy intensive and we release greenhouse gas (GHG) emissions through the energy used to power our operations and in the processes used to produce metals. We acknowledge the changing global climate and support the intent and aspirations of the Paris Agreement to limit global warming to less than 2°C above pre-industrial levels.

We are aiming for a substantial decarbonisation of our business by 2050 and are taking steps to manage risk, build resilience to climate change and develop our role in a low-carbon future. In 2015 we extended our GHG emissions intensity target to a 24 per cent reduction, from our 2008 baseline, by 2020. We report our progress to the Group's Executive Committee and Sustainability Committee throughout the year.



Diavik Diamond Mine, Canada

Preparing for a low-carbon future

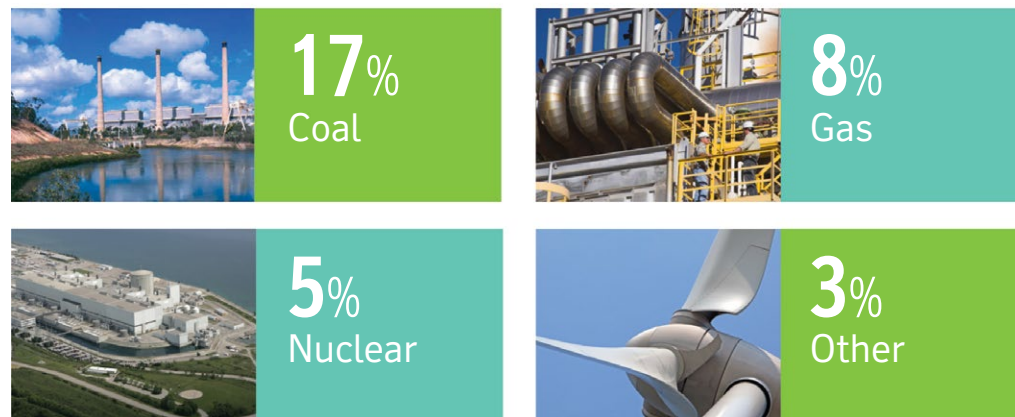
As a business we have a responsibility to our employees, investors, regulators and communities to ensure we are prepared for the challenges. Many of these challenges are complex and some are yet unknown, so it's important we are open and honest with our stakeholders about the challenges and the work we're doing to prepare.

We work with our supply chain partners on life cycle assessments of our products to reduce GHG emissions and improve processing efficiencies. We were the first company to introduce a low CO₂ aluminium brand, RenewAl™, to capitalise on growing demand for low impact, renewable aluminium.

More recently, we announced the formation of a new partnership with Apple™ and Alcoa™ to develop the technology required to create a carbon free aluminium smelting process. Our Iron Ore team is researching, with partners, the emissions intensity of steel - making use of different iron ore blends. The aim is to produce metallic iron with near net zero carbon emissions.

Sources of electricity used 222 petajoules

Source: Rio Tinto Climate change report 2017



Minimising our biodiversity impacts

It is not possible to extract the mineral resources essential to modern life without impacting the natural world. But by adjusting the way we develop, build, operate and close our mines, mining companies can make a large difference to the ultimate impact we have on ecosystems and biodiversity.

These four types of actions are integral to Rio Tinto's approach to biodiversity:

- **Avoidance.** This fundamental principle of the mitigation hierarchy involves changing or stopping a normal course of action in the interest of biodiversity. For example, we might divert a haulage road around an area of conservation significance.
- **Minimisation.** This is about reducing biodiversity impacts when they cannot be completely avoided. For example, vehicular speed limits on haulage roads, insulation of high voltage overhead infrastructure and exotic species introduction control measures.
- **Restoration.** In this process, disturbed land is stabilised and revegetated with the aim of establishing a specific habitat type. For example, we might restore forest habitat, or create a biologically diverse area where there may previously have been land of low conservation significance.
- **Offset.** Conservation actions designed and implemented to address residual impacts with the goal to achieve at least a no net loss or net gain for biodiversity compared to a reference scenario which would likely have occurred in the absence of the project and offset.



Sustainable development of the Jadar Project

Biodiversity

- The Jadar Project team will work to avoid and minimise biodiversity loss and land disturbance, while constantly strengthening our biodiversity management practices.
- Our approach, which has been well established over many years, is consistent with the Cross-sector Biodiversity Initiative's (CSBI) guide for implementing the mitigation hierarchy of avoidance, minimisation, restoration, and offsets where appropriate.
- We use the Integrated Biodiversity Assessment Tool before seeking tenure for exploration. The tool, accessed through the Proteus industry partnership, lists land that is protected or that has specific restrictions.
- In a project's development phase we avoid significant or lasting impacts by seeking sympathetic mine and infrastructure designs, such as rerouting infrastructure or applying exclusion zones around significant ecological communities.
- Detailed studies on Jadar have been completed to determine the types of flora and fauna that may be impacted by the project.
- Mitigations may include reducing the size of the mine footprint where possible, protecting animals by relocating them prior to construction, rehabilitating land progressively as soon as possible after disturbance, enhancing biodiversity where possible and exploring offsetting options.
- All further plans and development will be conducted in close consultation with relevant authorities and in accordance with all Serbian regulations.

Biodiversity and why it matters

Much more than just a description of the variety of life on Earth, biodiversity is a pivotal characteristic of the environment on which the human world depends. It plays a role in providing us with the fresh air, water and fertile soils we need. Each feature of biodiversity adds stability to the system and builds resilience.

Air

- The processing plant will be designed and equipped with the best economically available technology and air filtering systems. Air pollution ignores national borders, so it needs to be tackled through cooperation on local, regional, Serbian, European, international and global levels.
- State of the art controls will be in place to limit the amounts of dust generated at the site, these could include:
 - vegetating waste rock and landfill when possible
 - wetting/watering roadways
 - application of dust suppressants
 - hard surfaces (paving) of roadways
- Monitoring will be conducted by trained professionals to ensure compliance with Serbian regulations, and we will utilize automation technology to measure, monitor and control emissions.

Noise

- Detailed construction noise modelling will be developed during the Feasibility Study, when the construction methodology will be more defined. Noise modelling for future operation is being developed to influence the design layout of the future operation.
- Design of the processing plant includes engineering solutions to mitigate noise levels during operations.
- The project is evaluating a number of controls, both engineering and administrative, that are intended to minimise noise and the associated impacts.
- Noise monitoring will be conducted by trained professionals to ensure compliance with Serbian regulations. We will use automated systems and instrumentation that is designed to proactively monitor environmental impacts.

Water

- The design of the infrastructure at the Jadar operations area will include water collection systems to ensure that runoff from rain and snow is collected and treated before being released to the environment.
- A wastewater treatment plant will be constructed at the site to treat water from the underground mine, processing plant, and surface runoff prior to being discharged into the environment.
- The wastewater treatment plant will be equipped with state of the art technology and operated by highly competent operators.
- Treated water will be monitored by online instrumentation, regularly sampled and analyzed to ensure it complies with discharge limits set under Serbian regulations.
- Water usage will be minimized by recycling/reusing mine water and processing water where possible.



Waste Management

- The mining of jadarite will create waste rock produced from the underground mine and waste from the processing plant.
- Waste generated by processing of the jadarite ore are proposed to be classified as Industrial Waste according to both Serbian and EU Regulations.
- We review and audit our operations to ensure that our practices comply with our management of waste and water storage facilities standards and are consistent with the principles in the International Council on Mining & Metals Tailings Governance Framework. Assurance over these storage facilities by internal and independent third-party reviews remains a focus.

Industrial Waste

- Rio Tinto strives to minimize waste generation. One opportunity being explored at Jadar will be the use of a proportion of waste as backfill in the underground mine.
- We have completed an extensive geological and hydrogeological survey of the proposed industrial waste landfill location. This has led to the development of a waste storage design that will be compliant with environmental regulatory requirements.

Waste Rock

- Waste rock at Jadar will be permanently stored in a waste rock pile which will be constructed to minimize the environmental footprint.

Closure concepts for both waste storage facilities will be developed and included in the Environmental Impact Assessment, to be reviewed and adopted by the Serbian Government.

What others think of us

ICMM

International Council
on Mining & Metals

A leading mining industry initiative

Message from Tom Butler, chief executive officer, International Council on Mining & Metals

“Rio Tinto is a founding member of the International Council on Mining & Metals (ICMM), which was set up 15 years ago to improve environmental and social performance in the mining industry, thereby helping preserve members’ social license to operate. In 2016, Rio Tinto continued to play a leading role through its participation in ICMM forums, sharing information to increase peer learning on priority issues such as safety and health, product stewardship and water management.

On safety, Rio Tinto has proactively engaged in the risk management working group providing and sharing safety data that enable ICMM to publicly present an aggregated view of member performance. Enhanced transparency on safety is an important differentiator for ICMM and its members. Similarly on health, Rio Tinto has provided expertise, contributed to peer learning and is driving the next phase of performance improvement on occupational health and safety.

Rio Tinto’s leadership of our chemicals management working group has raised standards for risk assessment and risk management of minerals and metals. A recent highlight was a partnership that resulted in official OECD guidance on how countries should develop their environmental risk assessment systems. The working group has also led our engagement with the International Maritime Organization around the issue of safe and environmentally sound transport of ores and concentrates.

The voluntary code for water management developed at Oyu Tolgoi in Mongolia is a third area where Rio Tinto has demonstrated a collaborative approach, showcasing its experience.”

Source: [Sustainable development report - riotinto.com/sd2016](https://www.riotinto.com/sd2016)

The way we work and operate

Our sites are recognised locally and globally for their efforts in managing biodiversity.

Our approach during the active mining phase includes rehabilitation and restoration and working with stakeholders to compensate for residual impacts through offsets.

- Our Richards Bay Minerals beach sands mine in South Africa conducts afforestation, agricultural projects and forest restoration on mined lands to balance the economic needs of host communities with the conservation of biologically diverse habitats.
- At the Oyu Tolgoi copper mine in Mongolia we’re collaborating with local herders and government on an anti-poaching programme.
- The Yandicoogina iron ore mine in Australia conducts wide-scale baiting programs on the Yarraloola land management area to reduce feral cat populations that threaten native fauna.



Measuring water quality, Argyle Diamond Mine, Western Australia

Our values at work

Our five values: safety, teamwork, respect, integrity and excellence define how we treat each other and how we work with our partners.



Employee, Jadar Project, Loznica, Serbia



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