

CLIMATE

Strategic Significance

Orocobre’s products, operations and communities are directly impacted by the physical and transitional risks and opportunities presented by a changing climate.

Orocobre’s lithium production process utilises natural solar energy to evaporate brine extracted from the salar and concentrate the lithium content before it enters the processing plant. Because natural evaporation forms a critical part of this process, the Company’s productivity is naturally dependent on climatic variables.

Climate change could impact the Company’s operations in the future through changes in annual evaporation, temperature, rainfall, solar intensity or humidity that would impact on the evaporation process. Additional impacts could occur through changes to the frequency of extreme weather events.

The lithium Orocobre produces is used in electric vehicles and renewable energy storage systems, both of which are fundamental for the global transition to a low-carbon economy. The Company both supports and benefits from policies and regulations that promote carbon reduction and limit further contributions to climate change.

Given Orocobre’s strategic commitment to communities in the region, the resilience of local communities to changing climatic conditions is also a core focus for the Company, as is understanding broader potential impacts of climate change on the region’s natural resources.

Impact Boundary

This management approach disclosure refers exclusively to Sales de Jujuy S.A. and its activities.

Orocobre considers physical and transition risks and opportunities associated with climate change from two fundamental angles: 1) the impact of climate on Orocobre’s operations and 2) the impact of Orocobre’s operations on the environment.

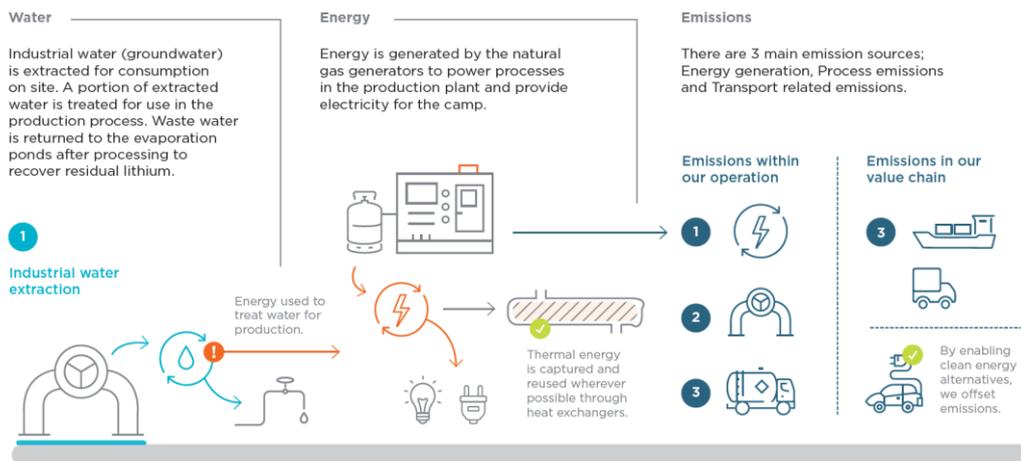
The Company considers impacts of extreme weather events across every aspect of its value chain, including operational sites and transport routes for both inbound supply of raw materials and outbound distribution of final product. It also considers push and pull factors for its product-to-market based on emissions-related regulatory changes and corporate procurement policies. The Company also considers climate impacts on its local stakeholders, assessing how it can build greater resilience in the communities around its operating area.

Impact of Environment on our Operations



Given the commercial and operational imperative to enhance the natural resource productivity of its operations, Orocobre is constantly exploring ways to reduce energy and water consumption, and thus reduce emissions and impact on climate. Some examples of the Company's actions to minimize environmental impact include heat and CO2 recovery; innovative energy supply contracts that enable thermal energy capture for process heat; water-reduction initiatives to enhance recovery rates; and optimized workforce rosters and streamlined logistics to reduce transport emissions.

Impact of Operations on the Environment



Management Approach

Commitment

Policies that demonstrate the Company's commitment to understanding the risks and opportunities associated with a changing climate include:

- [Environmental Policy](#)
- [Sustainable Development Policy](#)

In accordance with Orocobre's commitment to the UN Sustainable Development Goals, and in line with [Goal 13: Climate Action](#), the Company is working to enhance its awareness and institutional capacity on climate change mitigation, adaptation, and impact reduction. It is also working to strengthen the resilience and adaptive capacity of its operations and local communities to climate related hazards and natural disasters.

Management Systems

In order to establish solid management systems for climate impact in each area of the business, a comprehensive due diligence process is required.

Given the nature of Orocobre's business, the management of climate-related risks and opportunities has been an inherent part of the Company's strategy and operational approach since early feasibility.

The major climate-related issues that have been central to the Company's approach are:

- Physical impacts of climate on production, monitored and evaluated regularly as part of its operational risk, quality management and continuous improvement processes.

- Emerging regulation and technology to support the transition to a low carbon future and the opportunities/risks this might present to the business, monitored and evaluated regularly as part of its ongoing commercial and market analysis.
- Mitigation of climate-related disruptions to inbound and outbound distribution channel, monitored and managed as part of the Company's supply chain management process.

Orocobre is now in the process of redefining its systems and processes to enable a more robust and quantitative approach to identifying, evaluating and managing climate-related risks, opportunities and performance across the business.

The Company is undertaking a formal Climate Risk Assessment, a foundational step for understanding and quantifying the impacts of changing climate on its business strategy and financial performance.

The Assessment is being conducted in 2 stages:

- **Stage 1** a top down climate vulnerability assessment across Orocobre's value chain to identify priority areas of climate-related risk and opportunity for further exploration during Stage 2.

The assessment will consider potential climate-related impacts on key business drivers including market demand and access to markets; physical assets; supply and distribution routes; access to competitive and reliable inputs; people and workplace; regulatory compliance, licence to operate and geopolitical stability; and access to capital and insurance.

Risks and opportunities will be evaluated across different time horizons based on two different climate scenarios: 1.5 °C above and 3.2°C above pre-industrial levels.

- **Stage 2** involves a more detailed review of the high priority risks and opportunities identified in Stage 1 along Orocobre's value chain. Those outputs will provide clear strategies and frameworks for control and optimization action over the coming years.

Monitoring and Reporting

Orocobre monitors and reports on climate-related indicators annually in its sustainability reporting (see [Energy and Emissions](#)) and in investor surveys such as the CDP Climate Survey. Once the Company's formal Climate Risk Assessment is completed and the risk register finalized, internal monitoring and reporting will commence against the risks identified using appropriate indicators, metrics and targets.

The Sustainability Committee will review climate-related risks half-yearly, associated strategy and budget considerations annually, and performance against goals and targets quarterly. Recommendations will be made to the Board regarding the adequacy of climate risk assessment processes and outcomes, and the integration of current and emerging climate risks into the enterprise risk management framework.

Responsibility

At group level, overall responsibility for climate risk and opportunity management sits with the Chief Sustainability Officer.

Responsibility for managing the climate-related risks and opportunities associated with specific business drivers resides with the executive responsible for the relevant business area.

Accountability

Once indicators and targets are defined and quantified, Orocobre will incorporate KPIs relating to climate-related risk and opportunity management into operational and executive performance reviews.

Board and Executive performance may equally be reviewed to incorporate climate-related metrics.

FY19 Update

At this stage, the Company has identified the following risks and opportunities through its operational and strategic risk processes.

RISKS

Type	Value Chain	Driver	Description
SHORT TERM			
Physical Risk	Operations	Changes in precipitation patterns and extreme variability in weather patterns	The production process draws on natural solar energy to evaporate brine extracted from the salar and to concentrate the lithium content before it enters the processing plant. Operational productivity is thus dependent on environmental and climatic variables. Climatic variables impact not only on the Company's productivity and operational efficiency, but also on its environmental performance. Lower evaporation rates place greater demands on the production process, requiring greater energy and material inputs to compensate for reduced concentration levels.
Management:	Explore ways to improve pond management and reduce production losses. Potential adoption and implementation of new technology to support/promote the evaporation process in periods of low solar radiation. Maintain higher pond inventory levels and increase overall pond evaporation area.		
Physical Risk	Supply Chain	Increased severity of extreme weather events such as cyclones and floods	The Company is dependent on the passage of input materials from Chile, and on the export of product to ports in Chile. Extreme weather conditions can impact the route across the border between Chile and Argentina - a critical transport route for the import of raw material and export of product.
Management:	Contingencies in place to ensure operational continuity during significant route closure periods, including alternate transport routes and local auxiliary sources for critical production materials. Increased hard stand storage for reagents to supplement the current warehouse capacity.		
Physical Risk	Operations	Increased severity of extreme weather events such as storms and floods	Flooding on site due to extreme weather (both rainfall and high winds which produce waves across the salar and evaporation ponds) can damage access roads, facilities and bore holes, delaying work and requiring capital for repairs and/or preventive adaptation measures.
Management:	Earthworks designed to create protective barriers to reduce the impact of severe flooding events. Other than further elevating bore holes and access roads following these events, there is little that can be done to manage or mitigate the flood risk itself.		
MEDIUM TERM			
Transition Risk	Operations	Policy and legal: Increased pricing of GHG emissions	Increased pricing of GHG emissions in the global market and potential impacts on operational costs. Orocobre's operations maintain a low emissions profile, but still account for approximately 39,500t of Direct Scope 1 emissions each year. If regulation was introduced requiring the Company to cover the cost of its direct emissions, Orocobre would

			have an additional operational expense of approximately \$1 million per year (based on carbon price of USD28).
Management: Monitor and measure emissions and emission reduction initiatives. Optimise the efficiency of operations to reduce exposure to carbon price risk.			

OPPORTUNITIES

Type	Value Chain	Driver	Description
SHORT TERM			
Products and services	Customer	Development and/or expansion of low emission goods and services	The growing shift from fossil fuels to renewable energy is driving greater demand for energy storage solutions and lithium-ion batteries specifically. This will continue to create strong demand for Orocobre's product for the foreseeable future as countries enforce shifts to low-carbon alternatives. As the world continues to move toward a low-carbon economy, the demand for Orocobre's product will continue to increase.
Management: Sustain core business and the production of critical input materials for batteries that support transition to low carbon future			
Resource Efficiency	Supply Chain	Reduced Scope 3 emissions through local sourcing / vertical integration	Given the remote location of Orocobre's operations, and the extensive distance between critical input suppliers, operations and end-users, the financial and environmental costs associated with transport and distribution of both raw materials and product to market are significant. The opportunity exists to minimise these costs through local supply contracts and through the co-location of core value-adding processes in the value chain.
Management: Orocobre is deploying a strategy of vertical integration to establish localised solutions for added value at both ends of the value chain. The construction of a lithium hydroxide plant in Japan (close to customers) will minimise the financial and environmental costs associated with product optimisation and distribution. A commitment to local supply is reinforced through the Company's shared value strategy which promotes local employment and local supplier development.			
MEDIUM TERM			
Resource efficiency	Operations	Use of more efficient production and distribution processes	Natural evaporation forms a critical part of Orocobre's production process, and operational productivity is dependent on environmental and climatic variables. It is possible that climate change in the region may lead to a greater proportion of dry years to wet years, which would result in higher evaporation rates and (in turn) higher productivity and increased revenues. The Company will be modelling the forecast changes to climate patterns as part of its upcoming climate risk assessment.
Management: Conduct climate risk assessment to evaluate the climatic changes one might expect in Orocobre's operating area and position the Company effectively to capitalise on opportunities for increased productivity as they arise. Actively testing selected emerging technologies to improve recovery and minimize water consumption			

Orocobre acknowledges that the global landscape is changing regularly, and that risks and opportunities are emerging across medium and long-term horizons that need to be identified and assessed in the short term to be effectively managed.

Greater clarity on these risks across the value chain and different time horizons will be provided on completion of a formal Climate Risk Assessment in FY20. Based on the outcomes and findings of that Assessment, the Company will provide more comprehensive and consistent climate-related disclosures from FY20 in accordance with Task Force on Climate-related Financial Disclosures (TCFD) recommendations.

IMPACTS

The Company acknowledges the following impacts of climate-related issues on the business and strategy:

Area	How Impacted
Products and services	<p>Negative: Orocobre’s production has been negatively impacted by extreme weather events in the past and production has been variable through the year. As a then new operator, with a non-standard production process, the Company was unable to effectively quantify the risks and production sensitivity. Orocobre has learnt from its experiences and is developing mitigation and adaptation measures to minimise these impacts on its operations in future.</p> <p>Positive: Direct customers and end-users are seeking providers with strong social and environmental credentials to ensure sustainability of their supply chain. Orocobre’s product is fuelling the transition to a low-carbon economy and the Company appreciates the importance of being a sustainable provider. Determined to ensure its operations reflect the Company’s commitment to a low-carbon future, Orocobre is enhancing resource efficiency in its operations and building resilience in its communities.</p>
Supply chain and/or value chain	<p>Negative: Orocobre’s supply chain has been physically impacted by severe weather conditions that have interrupted import and export of products, impeded service delivery and also increased health and safety risks for contractors. Flooding delayed exploratory drilling and transportation routes were impacted by weather-related events, impacting operational continuity. Extreme weather increased health and safety risks for suppliers on and off site.</p> <p>Despite these physical impacts, the commercial impacts have been limited. Orocobre maintains strong relationships with its suppliers, developing solutions to project delays and weather-related complications. The Company also works with suppliers to ensure that their vehicles and equipment are suitable to withstand and ensure safety of operators in harsh conditions.</p> <p>Positive: Orocobre works collaboratively with its suppliers to provide materials and support to its communities when they are severely impacted by extreme events. The Company also works with suppliers to co-design solutions that maximise resource efficiency - for example, incorporating thermal recovery technology into energy supply contract to transform excess heat from electricity generation into process heat for production. Orocobre is also capitalising on resource optimisation opportunities along the value chain through vertical integration and local supply solutions.</p>
Adaptation and mitigation activities	<p>Negative: Orocobre is in a constant process of adaptation and mitigation as the Company experiences the impacts of climate on its operations. Given the non-standard nature of the Company’s operations, Orocobre was not able to pre-empt the true nature of local climate impacts or prepare effective responses in advance. The Company has however been quantifying the impacts, evaluating contributing and causal factors, and developing appropriate mitigation and adaptation strategies to minimize impacts in future.</p> <p>Positive: Orocobre is constantly exploring more effective and efficient ways to operate and minimise its own impact, including heat and CO2 recovery in its production processes, innovative energy supply contracts, low-carbon waste disposal, and reduced transport emissions through consolidated transport options and optimised workforce rosters.</p>

Investment in R&D	<p>Negative: The primary focus of Orocobre’s R&D investment is on enhancing operational efficiency. Given the dependency of operational production on climatic variables and the uncertainty regarding future climate patterns in the region, R&D investment in technology to reduce the impact of climate on production might prove ineffective.</p> <p>Positive: New technologies to capture and re-use energy, CO2 and water in operational processes are constantly being evaluated to enhance productivity and reduce resource intensity of the Company’s operations. Orocobre seeks to reinforce and enhance the inherently closed-loop nature of its production process.</p>
Operations	<p>Negative: The impact of climate on Orocobre’s operations as well as the impact of Orocobre’s operations on the environment were clearly outlined in the 2018 Sustainability Report (pp 55-69). Given the harsh environment in which the Company operates, operational dependence on climatic variables, and the immediate climate impacts experienced since commencing commercial production in 2016, Orocobre is acutely aware of the nature and extent of its operations' exposure to physical climate risk.</p> <p>Positive: Incorporating the lessons learned in its first years of operations, the Company is currently working to improve its resilience to extreme-weather events and to reduce the impact of climatic variables on production.</p>

All information regarding Orocobre’s emissions and associated risks and opportunities can be found in the [Energy and Emissions Management Approach Disclosure](#).

Orocobre is working to align its climate-related disclosures to the recommendations set out by the Task Force for Climate-related Financial Disclosures (TCFD). The Company acknowledges that it will take time to achieve full alignment, but it will continue to monitor and review progress against the following TCFD Index over time.

Recommended Task Force Disclosures	Location of Disclosure	Alignment	Additional Comments
Governance			
a) Describe the board’s oversight of climate-related risks and opportunities	Governance MAD Climate MAD Sustainability Committee Charter	●	Sustainability Committee newly formed. Greater detail provided in FY20 on completion of Climate Risk Assessment.
b) Describe management’s role in assessing and managing climate-related risks and opportunities	Risk Management MAD Climate MAD	●	Executive Management actively engaged in Climate Risk Assessment. Greater detail provided on completion of Risk Assessment.
Management			
a) Describe the climate-related risks and opportunities the organization has identified over the short, medium and long term	Governance and Risk (Full Report) Climate MAD	●	Current risks disclosed in Governance and Risk Section of Full Report Additional risks and opportunities across different time horizons will be identified in formal Climate Risk Assessment and disclosed in FY20.
b) Describe the impact of climate-related risks and opportunities on the organisation’s businesses, strategy and financial planning	Strategy and Objectives (Full Report) Climate MAD	●	Improved disclosure on strategic, financial and operational impacts of climate-related risks and opportunities in FY20 report.
c) Describe the resilience of the organisation’s strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario	Strategy and Objectives (Full Report) Climate MAD	●	Strategy resilience evaluation based on different climate scenarios to be conducted in FY20 with results disclosed in FY20 report.
Risk Management			
a) Describe the organization’s processes for identifying and assessing climate-related risks	Risk Management MAD Climate MAD	●	First formal Climate Risk Assessment being conducted in FY20. More detailed disclosure in FY20 report.
b) Describe the organization’s processes for managing climate-related risks	Risk Management MAD Climate MAD	●	Management of climate-related risks to be disclosed in greater detail following evaluation of controls as part of the Climate Risk Assessment.
c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization’s overall risk management	Risk Management MAD Climate MAD	●	The Enterprise Risk Management framework and the Climate Risk Assessment process are newly established and complementary. Details on how the two are integrated will be disclosed in FY20.
Metrics and Targets			
a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process	Climate MAD Risk Management MAD	●	Metrics to assess climate-related risks and opportunities in line with strategy and risk management will be defined on completion of Climate Risk Assessment.
b) Disclose Scope 1, Scope 2 and, if appropriate, Scope 3 greenhouse gas (GHG) emissions and the related risks	Energy and Emissions MAD Data Pack (Environment)	●	Greenhouse Gas Emissions are measured and disclosed annually in accordance with the Greenhouse Gas Protocol.
c) Describe the targets used by the organisation to manage climate-related risks and opportunities and performance against targets.	Climate MAD Energy and Emissions MAD	●	Targets defined for emissions Additional targets to be determined based on findings of Climate Risk Assessment in FY20