

# **POLICY HIGHLIGHTS**

## **OECD Mining Regions and Cities**

**Towards a regional mining strategy  
in the region of Antofagasta, Chile**





## About the OECD

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## About OECD Mining Regions and Cities initiative

The OECD Mining Regions and Cities initiative was created in 2018 to develop recommendations to help improve regional development outcomes for regions and cities specialised in mining. The project is framed around three core components that deliver on that objective: 1) Analysis and evidence on well-being in mining regions, including a data and a policy toolbox; 2) Case studies to identify place-based recommendations for specific mining regions; 3) Dissemination of best practices through seminars and events to promote knowledge-sharing and dialogue between public/private sectors and local communities.

## About the Centre for Entrepreneurship, SMEs, Regions, and Cities

This initiative is co-ordinated within the OECD Centre for Entrepreneurship, SMEs, Regions and Cities. The Centre helps local, regional, and national governments unleash the potential of entrepreneurs and small and medium-sized enterprises, promote inclusive and sustainable regions and cities, boost local job creation, and implement sound tourism policies.

### About these policy highlights

These highlights provide a summary of the OECD Mining Regions and Cities, Antofagasta, Chile that provides the building blocks for a new mining strategy in the region of Antofagasta, by prioritising well-being standards and opportunities for local communities. This medium and long-term strategy aims to create a new pact amongst different stakeholders to build trust and unite efforts for more inclusive and sustainable growth in the region.

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## Introduction

Located in north Chile, Antofagasta, a region with a rich presence of mining resources and home to several Indigenous communities, has the fourth lowest population density among the 16 Chilean regions and ranks amongst the 25% least densely populated of the OECD's 50 mining regions.

Antofagasta is the world's leading copper and second largest lithium-producing region, with strategic importance for the global energy transition and Chile's economic development. Antofagasta's export-oriented mining sector has propelled economic growth in the region and the country, contributing to 72% of the region's GDP and to 39.4% of Chile's total exports (March 2023). The region's GDP per capita is the highest in the country and is almost twice as high as the average of 50 OECD mining regions. Beyond mining, Antofagasta benefits from a growing astronomy and tourism sector.

Antofagasta's mining industry is entering a new phase of development, driven by the expected surge in global demand for its minerals and the imperative to adapt to the green and digital transitions. As of January 2023, Antofagasta has the second highest total expected investment for the next five years in Chile, mainly driven by the mining and energy sector (Oficina de Grandes Proyectos, 2023).

Despite the wealth brought by mining, communities in Antofagasta lag on a number of well-being dimension. Antofagasta's income inequality (Gini coefficient of 0.51 in 2019) is above the national average (0.46). The region also records the lowest life expectancy and the fifth lowest life satisfaction index amongst Chile's 16 regions, and it emits 38% more greenhouse gas emissions per unit of electricity generated, than the average of 50 OECD mining regions. This challenges not only affect community well-being, but also the social licence to operate of the future projects in the region.

Against this backdrop, a new vision with a long-term strategy will leverage mining benefits to improve well-being standards and take advantage of the opportunities brought by the digital and green transition. The *Mining Strategy of Well-being for the region of Antofagasta 2023-2050* is this coherent long-term plan. Its elaboration requires the involvement of a variety of societal stakeholders in agreeing on common objectives and strategic projects focused on improving wellbeing standards. A multi-stakeholder governance mechanism is needed to help monitor the implementation of this strategy and ensure its continuity beyond political cycles. Likewise, the national government needs to support the regional institutional capacity to implement this strategy, and, in turn, advance Chile's mining strategy.

To this end, this OECD report presents the diagnosis, rationale and building blocks for the *Mining Strategy of Well-being for the region of Antofagasta 2023-2050* and identifies 5 pillars to support this long-term mining strategy:

- ✚ **Formalise the Mining Strategy** with concrete objectives and a timeframe of strategic projects based on local priorities.
- ✚ **Establish a governance mechanism to monitor progress and ensure sustainability of the Mining Strategy** over the long run and beyond government cycles.
- ✚ **Define a monitoring and evaluation framework** with different levels of indicators.
- ✚ **Ensure a formal channel of communication and involvement of regional stakeholders** on the mining strategy.
- ✚ **With the National Government, support the institutional modernisation and capacity of the national agencies operating at the regional level.**

## Antofagasta's mining industry is of strategic importance for the global energy transition and regional and national development

Antofagasta's export-oriented mining sector has propelled economic development in the country and the region. In 2023, the sector contributes 72% of the regional GDP in 2023 and 18.4% of the total jobs in the region. Antofagasta's GDP per capita is the highest in the country and almost twice as high as the average of 50 OECD mining regions<sup>1</sup>. The region's contribution to the national GDP is 12.8%, over five times its population share of 2.2%. It accounts for 39.4% of Chile's total exports, of which approximately 95% were mining-related products.

Home to an abundant reserve of minerals that are vital for a low-carbon future, including copper and lithium, the Antofagasta region is in a unique position to become a global leader in responsibly sourced minerals (ITA, 2022<sup>[7]</sup>). Antofagasta has world-class geological resources and large global mining companies, including some of the world's major copper mines, top lithium reserves and important production of molybdenum and boron (Box 1). The diverse set of assets that nurture Antofagasta's mining sector potential include:

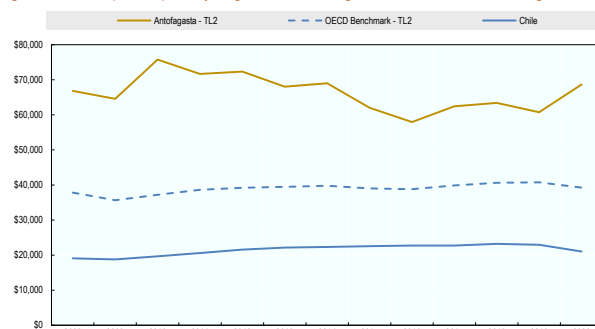
✚ **Geological attractiveness and global mining companies:** Antofagasta's copper and lithium deposits have attracted some of the world's largest mining companies. This includes 4 out of the top 5 mining companies globally, and 7 out of the top 10 copper producers worldwide, among which is the state-owned Codelco, the world's largest copper producer (Mining, 2022<sup>[8]</sup>).

- Antofagasta is the third most prospective region within Chile for the development of non-copper related projects, with a total of 48 potential targets for silver (26 projects), molybdenum (8), zinc (6), iron ore (5) and lead (3) (Muñoz López, Matamala Escobar and Olivares Quintanilla, 2021).

✚ **Mid-size mining companies:** there are a few mid-size operations in the region (Mantos Blancos, Taltal, Mantos de la Luna, Michilla and Franke) that account for a small fraction of total copper production and produce some other minerals in larger proportions, most notably gold and silver.

✚ **Export-oriented infrastructure.** Antofagasta's infrastructure has been tailored to support its heavyweight mining industry, including ports and trains. The region also benefits from the highest broadband access in the country (84.3% of households vs 72.5% national average), which can facilitate economic transformation and diversification efforts (OECD, 2023<sup>[9]</sup>).

Figure 1. GDP per capita by region in Chile against the national average, 2021



Note: GDP per capita (USD ppp base year 2015)

Source: Regional Statistics. Database for Regional Economic indicators (OECD, 2023)

### Box 1. Antofagasta's global mining relevance:

- **Copper:** about 53% of Chile's production, it is the largest single producing region in the world (approx. 3 Million tones in 2021), hosting the world's largest copper mine (Escondida).
- **Lithium:** Antofagasta produces all of Chile's lithium, placing the country as the second largest lithium producer in the world. The region hosts one of the largest lithium mines in the world (Salar del Carmen).
- **Molybdenum:** top producing region, making Chile the second largest producer in the world.

<sup>1</sup> The OECD's *Toolkit to Measure Well-Being in Mining Regions* (OECD, 2023<sup>[20]</sup>) identifies 50 OECD mining regions with a high specialisation in mining activity relative to their respective countries to better benchmark well-being trends relative to other OECD regions and identify challenges and strengths

Several prestigious national universities such as the Antofagasta University (UANTOF) and the Catholic University of the North (UCN) together with research and development centres such as the Scientific and Technological Research Centre of the Antofagasta Region (CICITEM) and the forthcoming Lithium Institute offer highly qualified training and research. These institutions can contribute to the region's technological advancements, environmental sustainability, and the cultivation of a skilled workforce.



*The region is poised to lead the global green transition with a more sustainable mining and energy sector.*

To meet the net-zero emissions scenario, the global demand for Antofagasta's main minerals, copper and lithium, is projected to almost double and increase tenfold, respectively, by 2040 (Box 2).

The increasing global demand for minerals and the green and digital transition in mining can represent greater inflow of investments for Antofagasta in the coming years. In fact, as of January 2023, Antofagasta has the second highest total expected investments for the next five years in Chile (24% of total investment of Chilean projects). Moreover, the mining sector, responsible for 51% of the total expected investment, aims at modernising and expanding existing mining operations, primarily in copper mines, or enhancing exploration of non-traditional minerals such as lithium.

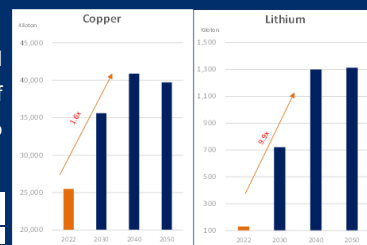
Most of these mining projects aim to improve environmental sustainability and productivity, using renewable energy sources and desalinated or reused water in mining operation together with greater

#### Box 2. Expected demand for copper and Lithium by 2040:

In a scenario that sets the pathway for the global energy sector to achieve net zero CO2 emissions by 2050 (NZE), the demand for copper and lithium will keep increasing (Figure 2). Even in a baseline scenario, the demand for lithium will grow four-fold.

Clean-technologies would account for about half of copper demand and up to 90% of lithium demand.

Figure 2. Expected Global demand in the Net Zero Emissions by 2050 scenario.  
Source (EIA, 2023)



process automation. The energy sector accounts for 44% of total expected investments in the region, mainly greenfield projects of solar and wind energy production and transmission projects. Due to its favorable geographic location and export infrastructure, the region can become a logistic gateway for mining ventures in neighboring countries, such as Argentina and Bolivia which are attracting investments mainly for lithium production but lack the necessary transport infrastructure.

Beyond mining, Antofagasta has additional assets to support a diversified economic development. Its tourism sector benefits from the Atacama Desert, known for its breathtaking natural landscapes, preserved ecosystems, and unique biodiversity. The region is also home to several natural preservation areas, offering opportunities for ecotourism, adventure tourism, and wildlife observation. Additionally, Antofagasta boasts a rich cultural heritage, including significant archaeological sites and Indigenous communities that uphold their traditions and customs. This cultural wealth presents opportunities for cultural tourism, promoting cultural exchanges, and fostering understanding and appreciation of the region's indigenous heritage. Another noteworthy asset is the exceptional astronomical conditions in the region, which have attracted scientists, observatories and research centers that nurture a growing regional astronomy sector.

**Table 1. Main assets of Antofagasta**

Assets	Description
<b>Economic</b>	
Strong mining sector	Antofagasta's mining sector provides the largest mineral production and exports in the country, with a pool of multinational companies and a network of globally competitive mining service companies. Geological potential with essential minerals for the global green transition such as copper and Lithium.
Export oriented infrastructure and high broadband connectivity	Antofagasta's export-oriented infrastructure facilitates the transportation of mining products to global markets, driving economic growth and international trade. Additionally, the region's robust broadband connectivity, with over 83.4% of households having internet access, supports various digital activities, including business operations, remote work, and online education.
<b>Social</b>	
Young and growing population	The region has a population growth rate of 2.5%, above the national average (1.53%). The population is young, with 25-44 age range representing 53.2% of the total population, provides a vibrant workforce.
Institutions of education and research	The region has several higher education and research institutions, including the University of Antofagasta, the Catholic University of the North and the Lithium Research Centre. These institutions support the local economy and workforce development by providing training and conducting research in relevant fields.
<b>Environmental</b>	
Renewable energy potential	In addition to its vast mineral reserves, Antofagasta is rich in solar energy potential due to its high level of sunshine hours, offering opportunities for renewable energy development.
Eco-tourism	Antofagasta's diverse assets, including its vibrant tourism sector in the Atacama Desert and rich cultural heritage with significant archaeological sites and indigenous traditions, provide a robust foundation for economic and social development, emphasizing ecotourism, adventure, wildlife observation, and cultural tourism

Without a proactive strategy, the region may miss out on opportunities to benefit from digital and green projects in mining and, instead, increase exposure of the regional workforce and companies to adverse environmental and social risks. For instance, automation in mining operations will require a new set of skills and type of inputs that are adapted to the new technologies. Similarly, new mining and energy investments and the opportunity to become a strategic player in mining in Latin-America, require an agile regulatory and permitting process, clear communication on the potential of mining for local development and standard benefit-sharing agreements to improve impacts on communities and secure the social license to operate for new developments.

## Despite the wealth and opportunities from mining, the region faces well-being gaps

*Mining wealth has led to rapid population growth relative to both the national average and comparable OECD mining regions, adding pressure on the local labour market.*

Over the past decade, Antofagasta's population has grown at an annual average rate of 2.5%, outpacing both the national average (1.53%) and the average of the 50 OECD mining regions (0.8%).

The population density of Antofagasta is 5.7 individuals per square kilometre, almost four times lower than the average in Chile (24.06). This makes it the fourth least densely populated region in the country and among the 25% of OECD mining regions with the lowest density.

This steady increase in Antofagasta's population is largely driven by international migration. As of December 2021, the region hosted 106,000 foreign residents, comprising about one-seventh of the total population. About half of the foreign residents in the region are in the city of Antofagasta (15% of the city's population), and one-fifth are in Calama (16% of the municipal population). The region is attractive to a working-age population, with 53.2% of all foreign residents being between the ages of 25 and 44 (CASEN, 2017<sup>[10]</sup>). This has contributed to the demographic shift and rapid growth in the region.

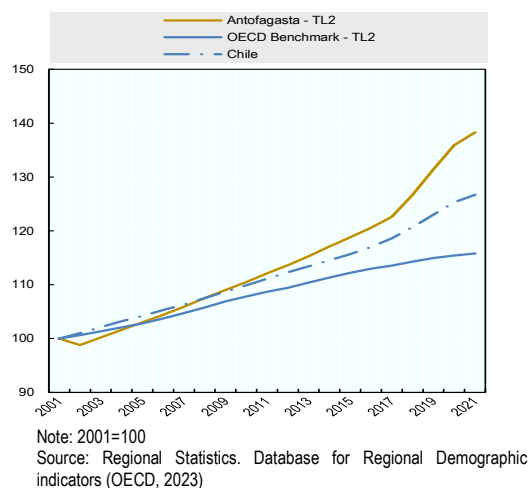
While population increase holds potential for Antofagasta's development, it presents specific challenges, including the integration of the migrant population, the efficient provision of services to all residents, and land-use planning. For instance, the rapid growth of the migrant population has put additional pressure on the local labour market and community infrastructure. Despite this growing population, the region exhibits a strong sense of community, with a perceived social support network of 92.0%, ranked second in Chile and in the top 36% across all OECD regions (OECD, 2023<sup>[9]</sup>).

*Despite the vast amount of wealth brought by mining, many communities, especially Indigenous peoples, have been left behind across a wide range of well-being indicators.*

Mining wealth has been unevenly distributed, leaving behind some communities in Antofagasta across economic, social, and environmental dimensions of well-being such as a lack of access to quality public services (childcare, secondary health etc) and to parks and green areas for recreation and leisure activities.

**Economically**, Antofagasta's income inequality (Gini coefficient of 0.51 in 2019) remains above the national average (0.46), as well as its unemployment rate (9.6% in 2021) that surpasses the average in Chile (9.1%) and the average rate of 50 OECD mining regions (7%) (OECD, 2023<sup>[11]</sup>). Despite the prominence of the mining industry in Antofagasta's economy, local companies have a relatively low participation in the mining value chain. Only 15% of the companies in the region are part of the "World Class Suppliers Mining Cluster" program, illustrating a limited integration of local businesses within the larger mining eco-system. This lack of forward linkages in the mining process is further illustrated by the fact that most of the copper extracted in the region is


Figure 2. Population growth Antofagasta region, OECD Mining regions benchmark and Chile 2001-21






exported without undergoing a refining process, representing a missed opportunity for locally added value.

The region has a high dependency on copper resulting in increased volatility in regional economic growth. The fluctuations in copper prices can deter entrepreneurship and discourage investment in other sectors. To create a more balanced and resilient regional economy, it is vital to foster an economic environment that encourages diversification, enhances local participation in value chains, and stimulates stable job creation in other activities.

 **Socially**, the region records the lowest life expectancy (79.2 years) amongst Chile's 16 regions and the fifth lowest life satisfaction index in the country. Low levels of life satisfaction in the region reflects community concerns about the scarcity of parks and green areas for recreation and leisure activities.

Moreover, **Indigenous communities** face acute challenges across several areas. These communities in 2017 represent 9.5% (18.5% of the rural population and 8.2% of the urban) of the regional population and record higher income poverty rate (14.5%) than non-Indigenous communities (8%), yet between 2011 and 2017, the extreme income poverty rate decreased in over 10 p.p. (14.5% to 4%). Indigenous people also report greater difficulties in accessing quality health, with malnutrition affecting Indigenous children aged 0 to 6 years. For instance, the percentage of children aged 0-6 years who accessed free food at the clinic or hospital in the last 3 months was 10.4 percentage points higher for indigenous peoples (63.9% compared to 53.5%). Furthermore, indigenous individuals face challenges in education, with 45% of indigenous individuals aged 19 and above not completing secondary education (compared to 36.6% for non-indigenous individuals) (CASEN, 2017<sup>[10]</sup>).

This calls for more inclusive and equitable benefit-sharing arrangements between Indigenous peoples with mining companies that can deliver poverty reduction, improve access to public services, meaningful participation in decision making and better tracking their progress. To address these issues, other mining regions such as Ontario or Northwestern Territories in Canada have improved institutional and financial conditions for Indigenous communities to participate in decision-making, share the benefits of mining, and partake in mine ownership opportunities.

 **Environmentally**, the region emits, on average, 38% more greenhouse gas emissions (GHG) per unit of electricity generated compared to 50 OECD mining regions. There is a need for sustainable practices and the introduction of energy-efficient technologies within the region's key industries. Amongst Antofagasta's subregions, Tocopilla exhibits the highest per capita emissions, placing it amongst the top emitters across OECD mining regions. Furthermore, water resource management, especially considering the arid nature of Antofagasta, emerges as a crucial environmental challenge. This was highlighted between 2018 and 2019 when the region's subregions experienced drier conditions when compared to other OECD mining regions. El Loa faces significant impact, with a ranking among the top in OECD mining regions for soil water content anomalies.

Mining activities in the region have also been associated with higher levels of PM 2.5 particles in the air. This poses potential health risks for residents, with a possibility of increased incidences of respiratory and cardiovascular diseases. The transformation of the region's natural landscape due to these activities has implications for residents' quality of life and future tourism prospects. Addressing these concerns calls for a more comprehensive and up-to-date environmental data collection and monitoring system. These enhancements will allow for more accurate



assessments of the environmental impact of mining and enable the development of more effective responses.

**Table. 1. Main challenges of Antofagasta**

Challenge	Description
<b>Economic</b>	
Low diversification levels.	Antofagasta's economy is heavily reliant on mining, which makes it vulnerable to fluctuations in global commodity prices and demand for minerals. Economic downturns in the mining sector can lead to job losses, reduced investment, and a decline in overall economic activity in Antofagasta. Therefore, diversifying the economy and reducing the reliance on mining is crucial to enhance the region's economic resilience and stability.
High unemployment and income inequality	Despite its economic prosperity, Antofagasta has a higher unemployment rate (9.6% as of 2021) than the national average. Furthermore, the region's income inequality, as represented by a Gini coefficient of 0.51, is also higher than the national average. Addressing this disparity and creating more job opportunities across various sectors is a major economic challenge for the region.
<b>Social</b>	
Limited access to quality services	While Antofagasta leads Chile in broadband access, it may face challenges in other areas of service provision due to its low population density and remote location. There might be issues in the quality and access to education, healthcare, and other important services, especially for the more isolated and vulnerable populations (e.g., Indigenous peoples).
Low perception of quality of life	Despite the region's high GDP per capita, life satisfaction is relatively low. This could reflect a variety of issues, including dissatisfaction with public services (e.g., health, education, etc.), security levels recreational and cultural infrastructure, as well as environmental concerns.
<b>Environmental</b>	
Risks of lack of water resources	Antofagasta is one of the driest regions in the world, with nearly all its freshwater coming from outside sources. This presents significant challenges in terms of securing sustainable and affordable water supplies for both residents and industries.
Green House Gas Emissions and lack of environmental information	The region's reliance on mining contributes to high GHG emissions and potential water contamination, posing a threat to the local environment and people's health. Improvement of environmental information systems is critical to monitor biodiversity, freshwater quantity and quality together with air pollution levels.

## At the same time, the mining sector is facing increasing challenges to remain competitive

The mining sector is also undergoing transformations:

- 🌐 The mining industry is under increasing pressure to reduce their impact on the environment and the Green House Gas emissions to meet global climate agreements.
- 🌐 Mining companies also face a context of increasing competition with decreasing qualities of ore that are more difficult to access.

The challenges affecting the future competitiveness of the Chilean mining sector include:

- 🌐 **Productivity and diminishing ore grades:** Productivity of mining in Chile and in Antofagasta has been in decline, becoming a drag on national productivity for the past 20 years (De la Huerta, 2018<sup>[1]</sup>; OECD, 2022<sup>[2]</sup>). This decline can be attributed to a decoupling of mining production and inputs (e.g. energy requirements), deteriorating ore grades, and longer processing and internal transportation times from extraction at greater depths.
- 🌐 **Availability of skills:** there is a significant deficit in employees and competencies needed in mining-specific skills. For the period 2021-2030, a 25 000-employee gap is foreseen due to the compounding effects of the retirement of current workers and the expected creation of new jobs

resulting from the sophistication of mining operations and the green energy transition (CCM and Programa Eleva, 2021<sup>[11]</sup>).

- 🌐 **Complex and centralised Land management system:** an overly centralised public land administration and management system coupled with a high proportion of lands owned by the state or mining companies in Antofagasta has resulted in land scarcity and a costly, bureaucratic process for obtaining public lands for productive purposes, such as downstream activities in mining processes (Martorell Awad, 2020<sup>[12]</sup>).
- 🌐 **The imperative to swiftly align with evolving environmental requirements:** There is an absence of coherent strategies to address the persistent concerns about the long-term environmental effects of mining. These issues concern the long-term impact of marine water capture and desalination, as well as the region's substantial carbon footprint, resulting from the intensive use of energy and reliance on fossil fuels for energy generation, among others. Furthermore, policies aimed at reducing the use of continental water have excessively encouraged the use of desalinated water, providing fewer incentives for other alternatives, like water reuse. This disproportionately affects medium-sized mines that lack the capacity to invest in desalination infrastructure.
- 🌐 **Social concerns:** The equitable allocation of benefits from the industry, both at the regional and local community levels, may become challenging due to the changes in procurement and labour demand brought by digitalisation in mining.



**A long-term strategy is warranted to leverage mining benefits to reduce well-being gaps and take advantage of the green and digital transition in mining**

Both the well-being and the private sector challenges in the region are multidimensional and will not be solved with short-term strategies or by the regional government alone. Governance approaches so far have left many communities and citizens behind, despite the wealth generated through mining activities.

**Therefore, a new social pact is needed to ensure an equitable distribution of wealth across the region and the development of a competitive mining sector with more environmentally sustainable practices.** This new pact must be built with communities and private sector **and ensure its sustainability in the medium to long-term through coordinated** efforts by various societal stakeholders to align efforts towards delivering higher well-being standards.

The *Mining Strategy of Well-being for the Region of Antofagasta 2023-2050* is that new social pact that sets a roadmap to strengthen Antofagasta's mining sector and ensure that mining wealth provides a long-lasting increase in well-being standards for its citizens. It can also unify different visions within the region, and improve coordination with Chile's mining national strategy and with other regional development policies.

### *Why a Mining strategy of well-being for the region of Antofagasta?*

The region of Antofagasta is currently undergoing a number of transitions that can be leverage to improve the effect of the mining in the regional development. Firstly, the region is attracting significant investment to modernise and expand existing mining operations, mainly copper, and to increase exploration and production of non-traditional minerals, such as lithium. Secondly, mining companies are increasingly adapting to the green and digital transitions, with projects to increase the use of renewable energy sources (solar and wind), desalinated water, and automation for mining operations. Finally, the ongoing decentralisation process in Chile has allowed for the first time in history, the democratic election of a regional governor with new administrative and strategic capabilities.

These transitions can bring new opportunities for local business and workers to participate and benefit from a more sustainable value chain. However, without proactive planning, new developments and green mining initiatives may lead to little benefits locally and instead creating additional challenges for example in the aggregated effect of uncoordinated water desalination plants or land requirements for solar and wind energy projects.

The mining strategy of wellbeing for the region of Antofagasta can be the roadmap to mobilise the regional assets and improve the competitiveness of the mining sector to make the most of the digital and green transition with the aim to deliver greater well-being standards to its inhabitants.

Against this backdrop, the following are the main rationales for a mining strategy for the region of Antofagasta:

- **To ensure a sustained improvement of people's well-being:** As mentioned previously, while mining wealth has fuelled Antofagasta's and Chile's development, it has not fully translated into greater well-being for Antofagasta relative to other regions in the country, with many challenges unsolved and uncertain development opportunities for local communities.
- **To make the most of global megatrends and transformations affecting the mining sector:** The regional mining sector is facing both the twin green-digital transition and decreasing qualities of ore, driving companies to invest in new technologies and processes and collaborate with governments to agree on environmental plans. In fact, automation is already advancing significantly in the region (e.g. autonomous trucks and drilling rigs in the Antofagasta Mienrals' Centinela mine or BHP's Escondida).
- **To materialise previous and current initiatives that aimed to translate mining wealth into greater well-being.** At the national level mainly the Minister of Mines and the Production Development Corporation (CORFO) have promoted policies and strategies to promote development in Antofagasta. At the regional level, private companies and Codelco, the public



company, together with local governments have undertaken initiatives to improve the impact of mining in local communities (e.g. the Mining Cluster of Antofagasta, Calama Plus).

**However**, these different initiatives have lacked long-term planning to support diversified economic activities and coordination between local and national government to prioritise relevant projects. They have also prioritised economic outcomes, overlooking social and environmental aspects. This new mining strategy for the region of Antofagasta builds on previous efforts and provides a subnational lens to the National Mining Policy 2050.

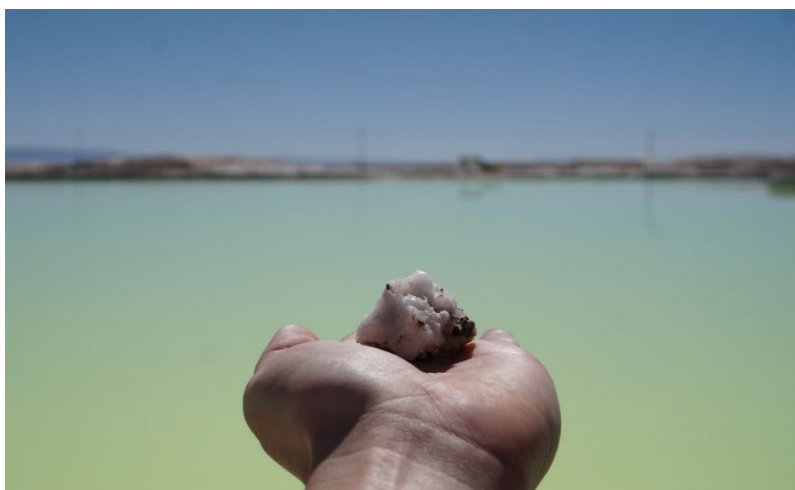
- **To materialise upcoming investments of the mining and energy sector with a community focus and create synergies with ESG strategies of private companies.** Antofagasta is on the verge of an expected inflow of investments for brownfield and greenfield projects in mining and energy. In parallel, private companies in the region have invested in Corporate Social Responsibility projects in local communities. Data collected by the regional government and the UCN identifies at least 89 private companies' initiatives to improve well-being in communities. Projects include drinking water and sewerage infrastructure (Codelco and Antofagasta Minerals), improving urban and recreational infrastructure (Codelco, BHP and Antofagasta Minerals), promoting digital skills of students and the work force and providing tertiary education opportunities (Antofagasta Minerals, BHP, Codelco, Glencore Sierra Gorda), or supporting local economic diversification (Albemarle and SQM).
- **To capitalise on the ongoing decentralisation process in Chile.** The strategy can be benefit from the figure a regional government that is democratically elected with greater tools to implement strategies. This change provides scope for improved adaptations of regional and national policies to better meet local needs, opportunities, and challenges, to enhance accountability and help facilitate institutional channels for communities to participate in decision-making.



Note: A dialogue session with the 'Pueblos Atacameños' community members during the second on-site mission of the OECD in the Atacama region, as part of the stakeholder consultation process for the regional development strategy (April 2023).

Thus, to assist the region in mobilising Antofagasta's assets and addressing its challenges, this document identifies five priority pillars for an effective and sustainable **Mining Strategy of Well-being for the region of Antofagasta**.

- **Formalise and implement the Mining Strategy of Well-being for the region of Antofagasta 2023-2050** with concrete objectives and a timeframe of strategic projects based on the priorities of the different regional stakeholders.
- **Establish a governance mechanism to monitor progress and ensure sustainability of the Strategy** over the long run and beyond government cycles.
- **Define a monitoring and evaluation framework** with different levels of indicators.
- **Ensure a formal channel of communication and involvement of regional stakeholders** on the construction, progress, and changes of the Strategy.
- **Support the institutional modernisation and capacity of the national agencies** operating at the regional level. The national government is crucial for the success of the regional mining strategy and ensure a more sustainable mining sector in Chile.



## **Pillar I - Formalise and implement the Mining Strategy with concrete objectives and a timeframe of strategic projects based on local priorities**

### *Setting a clear and long-term vision that unifies the regional stakeholders*

Setting a clear and ambitious goal in the strategy is useful to align efforts across different levels of government and other regional stakeholders to meet common goals, attract skilled workers and new investors, and create partnerships with international actors that support the long-term plan of the region.

To build trust across different parts of society, improve policy certainty, and move towards a common regional goal, this strategy would benefit from recognising the priorities raised by different societal stakeholders.:

- 🌐 **Recognising that some communities have been left behind in several well-being dimensions and more needs to be done to deliver development opportunities locally.** This involves prioritising a range of issues from access to quality public services such as childcare and secondary health, to the availability of parks and green spaces for recreation and leisure activities, with the active involvement of the community.

- 🌐 **Recognising the strategic role of the mining sector in the future development of Antofagasta**, which involves improving efficiency in government processes to facilitate the expected investments and ensure certainty in their implementation.

The regional government has already anchored the process of elaborating the strategy in the construction of a new regional pact. The former recognition, demanded from both the private sector and the communities, will facilitate discussions about a shared future for the region. This transition involves shifting from a focus on past challenges towards a narrative centred on collaboratively constructing a better future.

Departing from this recognition, the long-term vision of the strategy should be one that sets the future aspirational goal for the region. A well-managed vision, becomes a slogan that helps various actors to work on the same end goals. As a marketing slogan, the vision needs to be widely shared. This vision could translate as follows:

***A greater well-being in Antofagasta built on a competitive and environmentally responsible mining sector***

This vision could also help build common agreements with regional stakeholders to reach shared development targets. The Governor of Antofagasta has recently outlined a number of common goals to include all stakeholders as part of the strategy vision:

***Concrete objectives to address Antofagasta's development priorities and materialise the vision.***

The objectives of the mining strategy need to address the main regional priorities that help ensure greater quality of life with a more environmentally sustainable and competitive mining sector.

According to discussions with various regional actors throughout engagement activities and the priorities identified, the regional government should include at least five comprehensive, challenging, and measurable objectives in its 2023-2050 strategy (Table 1).

Attaining the objectives require specific actions that build trust on the strategy in the short-term and ensure a long-term continuous implementation. To this end, a timeframe of strategic projects should be put in place, by indicating the projects that are a priority to implement in the short-term (e.g. 2023-30) and those others that are inscribed in the medium and longer timeline (2030-2050) (Table 1).

Selected projects are set to meet the most pressing priorities in the region. These projects have been identified from three type of sources: i) meetings with regional stakeholders for the preparation of this strategy-including more than 40 meetings conducted by the Regional government with OECD, ii) direct information provided to the regional government since October 2022 in bilateral meetings with key stakeholders, iii) assessment conducted by this OECD study and the regional priorities already identified by two flagship regional strategies: the regional development plan and the innovation strategy.

**Table.1. Suggested objectives and timeframe of strategic project for the mining strategy for the well-being of Antofagasta 2023-2050**

Timeframe	Improve the quality of life of local communities	Increase the participation of regional business	Strengthen skills and the knowledge ecosystem in the region	Improve governance for a more productive or	Rehabilitate and preserve the Environment



	and indigenous peoples	in the mining value chain		sustainable mining sector	
Short-term (2023-30)	Improve Drinking Water and Sewerage systems in mining communities	Measure the participation of regional companies in the mining value chain and establish roadmap of opportunities	Support the Lithium Institute to set a roadmap of innovative projects in lithium (e.g., water management)	Improve the capacity of environmental institutions in the region (e.g., Supervisor of environment)	Support civic environmental monitoring
	Facilitate the upgrade or installation of quality health centers	Expand the participation of local business in mining companies' programs to upscale providers (the world-class supplier)	Promote apprenticeships in mining across regional schools	Facilitate approval of industrial land (in collaboration with SEREMI of Public goods)	Reduce air pollution from mining operations
	Expand the number of recreational and green infrastructure and the public lighting	Promote synergies among mining companies' programmes on local procurement	Complementing workforce training programs of mining companies to make the most of the automation of operations.	Improve collaboration between large and medium/small mining	Reduce mining waste generation and facilitate its valorisation.
Medium and Long-term (2030-2050)	Fund/structure to support the creation of indigenous businesses	Support technology transfer to regional companies	Adapt basic education to prepare students for the mining automation process	Enhance capacity of local governments to structure, submit and approve projects.	Reduce to a minimum the use of inland water for mining activities
	Fund/structure to promote economic diversification (e.g., agriculture in the dessert, artisanal fishing)	Internationalise the regional mining providers	Support a network of research centers for the mining of the future	Ensure that processes for metal recovery or extraction (e.g., oxide leaching) are achieved on time and with high environmental standards.	Evaluate the mechanisms to return water rights to the communities
	Improve tertiary roads and broadband infrastructure	Support local entrepreneurs /SMEs to boost circular economy activities in mining (recycling o Lithium)	Improve quality of education with a focus to reduce inequalities across the region	Promote greater use of renewable energies in mining operations (e.g., speeding up permits for interconnection and generation)	Produce an environmental diagnosis of region

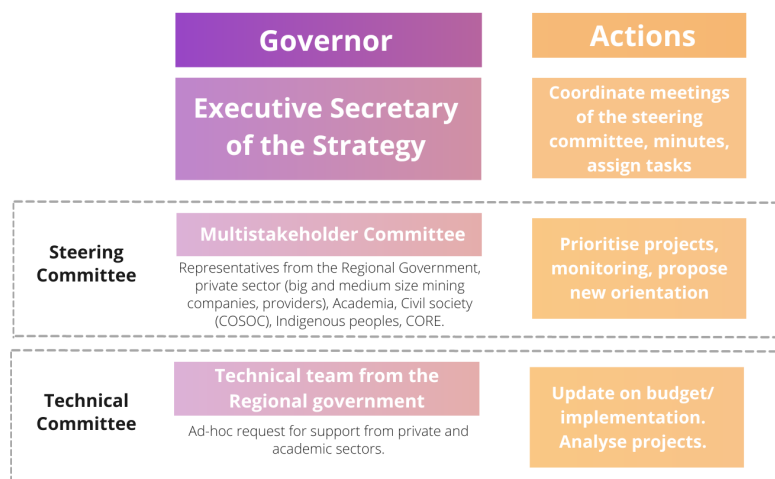
## **Pillar II – Establish a governance mechanism to monitor progress and ensure sustainability of the Strategy over the long run and beyond government cycles**

For the strategy to be successful and lasting, a governance mechanism must be implemented capable of making the strategy last beyond political cycles, which allows prioritising projects and deciding the best way to implement them, as well as monitoring their results until 2050. This governance must be made up of various actors in the region, with a clear structure of participants, and an established decision-making capacity and frequency of meetings. Other OECD regions like Brainport in Netherlands or Morelos in Mexico have adopted multi-stakeholder governance models to oversee the design and implementation of key strategies for regional development.

Figure 4 describes the suggested governance scheme for Antofagasta, which has the following characteristic:

- 🌐 **A public official in the government coordinating the Strategy** and ensuring its implementation and continuity, with a defined budget and a team for operation and coordination.
- 🌐 **A steering committee in charge of prioritising projects, rendering accounts of monitoring, and proposing new orientations to the strategy.** It should be composed of representatives of relevant actors in the region (private and public sector, civil society, and Indigenous communities), with periodic rotation to expand possibilities of participation and representation (e.g., 2 years) and a consensus-based decision process.
- 🌐 **A technical committee in charge of overseeing the projects**, providing updates on the progress of the project and the budget and respond to other requests from the Steering Committee. This committee is made up of an executive secretary with a team of professionals in collaboration with personnel from the academy and private sector.
- 🌐 **Ensure that the Strategy upholds Indigenous peoples' rights** and promotes meaningful participation in the decision-making and free, prior and informed consent in the design and implementation of relevant strategic projects for these communities.

**Figure 4. Proposed governance mechanism for the Strategy**








### Pillar III – Define a monitoring and evaluation framework with different levels of indicators

Antofagasta's mining strategy needs to be accompanied by a monitoring framework with different indicators to ensure a sound implementation at the different stages of the strategy. This includes impact indicators to measure the long-term policy effect of achieving each of the strategic objectives, and outcome indicators to monitor the implementation of the strategic projects in each objective. In turn, a set of output indicators are needed to measure the implementation of the operative tasks in each strategic project. Two government actions are relevant for this:

1. **Set up an evaluation framework** that can recurrently measure the outputs and outcomes of the various strategic projects to attain each of the objectives of the Strategy.
2. **Monitor progress of the overall Strategy** in improving well-being standards in the region through specific impact indicators that are horizontal to the strategic projects in each objective.

Table 2 provides an example of monitoring indicators for the strategy and the short term strategic projects.

**Table 2. Examples of monitoring indicators for the Mining strategy for the well-being of Antofagasta 2023-2050**

Objective of the Strategy	Strategy Project	Output indicator (example)	Outcome indicator (example)	Impact indicator (example)
Improve the well-being of local communities and indigenous peoples 	Facilitate the upgrade or installation of quality health centers	Number of health centers built or upgraded	Change in waiting times to access a specialists or an healthcare intervention Share of communities covered by secondary health	Increased life expectancy in the region
Increase the participation of regional business in the mining value chain 	Expand the participation of local business in mining companies' programs to upscale providers (the world-class supplier)	Number of local business and SMEs from new towns in Antofagasta that are part of the world-class supplier	Change in the capacity of local business to provide services to mining activities.	Increased participation of local business in the mining value chain
Strengthen skills and the regional knowledge ecosystem 	Promote apprenticeships in mining across regional schools	Number of secondary students in apprenticeships inside mining companies	Share of young population with training or education in mining activities	Greater share of local workforce in high-value added positions in mining companies.
Improve governance for a more productive mining sector 	Improve the capacity of environmental institutions in the region (e.g. SEREMI, Supervisor of environment)	Number of new staff in the SEREMI of environment and Supervisor of environment Number of process that re done digitally	Number of permits processed per year Number of decision appealed that are finalised	Reduce time to process and issue decisions of environmental permits and monitoring
Rehabilitate the environment 	Support civic environmental monitoring	Number of environmental monitoring stations managed by civil organisations	Increased data on air pollution in different areas of the region	More specific measures to mitigate the impact of mining on the environment

## Pillar IV – Ensure a formal channel of communication and involvement of regional stakeholders on the construction, progress, and changes of the Strategy

The strategy also needs openness and inclusion, which represent two pillars to deliver better policy outcomes not only for, but with, citizens. Local communities not only have better knowledge of local conditions but also the capacity to adapt policies to the context. Antofagasta can leverage existing participatory community structures like The Civil Society Council (COSOC) and the *Neighbors councils* (“Juntas de vecinos” in Spanish) to inform and monitor the strategy.

This strategy needs to support a meaningful involvement of Indigenous communities. It starts by acknowledging Indigenous Land rights and involving communities in mapping and standardising benefit sharing agreements to providing clarity to the mechanisms and measures available for local benefit-sharing. A clear framework on benefit-sharing agreements can help the region understand how private companies relate with Indigenous communities.

The private sector is also fundamental in this strategy. The mining companies in the region have been one of the main promoters of diverse initiatives to improve local well-being. While often company driven and dispersed, they have created links with local needs and helped companies establish relationships with the communities.

Companies can help the implementation of the strategy in various ways:

- Information sharing with the government about projects, agreements with communities, environmental information and labour force.



- Support the implementation of strategic projects either by sharing capacity to structure projects or facilitating expansion of their individual projects.
- Resources allocated to individual ESG or Corporate Social Responsibility projects can be allocated to strategic projects of this strategy.

The role of education institutions and universities is fundamental to support local skills and lead innovation to attain the strategic goals. The region benefits from an important presence of private and public universities and high education institutions. This network of institutions can be coordinated to improve capacities in the region, aligning the educational offer with the needs of the mining industry and diversification plans within the mining value chain. Tertiary and secondary education institutions are also needed to guide some strategic projects in education and innovation, as well as supporting the capacities of the regional government for planning and implementation when necessary.

#### **Pillar IV – With the national government, support institutional modernisation and capacity of the national agencies operating at the regional level.**

Definition of responsibilities and financial autonomy for regions is still under discussion in Chile and discussions on a mechanism through which regions can ask for further competences and resources to be transferred to them are ongoing.

Therefore, the national government has a strategic role to ensure the success of the regional mining strategy and ensure a more sustainable mining sector in Chile. To this end, the national government needs to prioritise the institutional modernisation and capacity of the national agencies operating at the regional level. They include the Ministerial Regional Secretaries (SEREMIS)-deconcentrated entities representing each ministry at the regional level- the Superintendence of the Environment (SMA) or auditing bodies like the Controller of Environment. The Superintendence of the Environment has been identified by various regional stakeholders as one of the main bottlenecks to ensure an efficient environmental protection from mining and other activities in the region. For example, the SMA's staff is relatively low compared to the number of mining operations and companies to monitor.

Furthermore, there is an imperative to streamline the approval process for local public projects by the Ministerial Regional Secretaries (SEREMI) to expedite actions that address the needs of local communities. For instance, the execution of local projects related to community or economic infrastructure in mining municipalities of Antofagasta, such as expanding health centres or creating parks, green spaces, or industrial areas, need approval from the Ministerial Regional Secretary (SEREMI) of Public Goods to access public land. This process is often characterized by bureaucracy and lacks flexibility, further complicating matters for local governments with limited institutional capacity and constrained by the four-year political cycle.

## Recommendations: A framework for action for rural development in Antofagasta

This review identifies a framework for action providing 16 recommendations around five pillars to help Antofagasta take advantage of its mining strengths, while promoting inclusive and sustainable growth with better living conditions for its communities.

<b>I</b>	<b>Formalise and implement the Mining Strategy of Well-being for the region of Antofagasta 2023-2050 with concrete objectives and a timeframe of strategic projects based on the priorities of the different regional stakeholders.</b>
	<b>Recommendations</b>
1.	Formalise the Strategy with a dedicated budget line within the institutional and policy framework of the government of Antofagasta.
2.	Recognise in the Strategy the need of a new pact among communities and private sector in the region of Antofagasta to build trust across different actors and promote common agreements to improve the future development of the region and move forward the mining strategy.
3.	Ensure that the Strategy provides a medium and long-term vision that reflects the aspiration for the region to increase well-being standards in economic, social, and environmental dimensions, building on competitive and environmentally responsible mining sector
4.	<p>Setting objectives in the Strategy that address local priorities and are based on common agreements across the different actors of the region to attain the final vision of the strategy.</p> <ul style="list-style-type: none"> <li>▪ <b>Improve the quality of life of local communities and Indigenous peoples:</b> improve access to public services in mining communities, support projects to diversify the economy and ESG programmes of mining companies.</li> <li>▪ <b>Increase the participation of regional business in the mining value chain:</b> supporting suppliers and technologies that can address key mining priorities for the region (e.g., water and air pollution management), promoting local entrepreneurship in circular economy and sustainable practices in medium/small mining companies.</li> <li>▪ <b>Strengthen skills and the regional knowledge ecosystem, including:</b> supporting the Lithium Institute with a roadmap of innovative projects, promoting apprenticeships in mining, establishing formal spaces for exchange between businesses and academia, and improving quality of education from preschool across the region.</li> <li>▪ <b>Improve governance for a more productive and sustainable mining sector:</b> improving the capacity of environmental institutions in the region, promoting shared mining infrastructure (e.g. desalinated water facilities) and greater connections with renewable energy projects or ensuring a just transition in water management by mining companies.</li> <li>▪ <b>Rehabilitate and preserve the environment:</b> supporting civic environmental monitoring, improving information of the effects of mining on air or water pollution and incentivising a more efficient use of water (e.g., technologies for water reuse).</li> </ul>
5	Implement short and medium/long-term strategic projects to attain each of the objectives of the Strategy. Several strategic projects have been identified throughout different multi-stakeholder meetings in the region.
<b>II</b>	<b>Establish a governance mechanism to monitor progress and ensure sustainability of the Strategy over the long run and beyond government cycles.</b>
6.	Define a new role for a public official in the government, with responsibility for co-ordinating the Mining Strategy and ensuring its implementation and continuity, with a defined budget and a team for operation and co-ordination
7.	Establish a steering committee in charge of prioritising projects, monitoring and proposing new orientations to the strategy, composed of representatives of relevant actors in the region
8.	Establish a technical committee in charge of overseeing the projects, providing updates on the progress of projects and the budgets and responding to other requests from the steering committee
9.	Ensure that the strategy upholds Indigenous peoples' rights and promotes meaningful participation in the decision making and prior and informed consent in the design and implementation of relevant strategic projects for these communities
<b>III.</b>	<b>Define a monitoring and evaluation framework with different levels of indicators</b>
10.	Set up an evaluation framework that can recurrently measure the outputs and outcomes of the various strategic projects to attain each of the objectives of the Strategy.
11.	Monitor progress of the overall Strategy in improving well-being standards in the region through specific impact indicators that are horizontal to the strategic projects in each objective.
<b>IV</b>	<b>Ensure a formal channel of communication and involvement of regional stakeholders on the construction, progress, and changes of the Strategy.</b>
12.	Establish an appropriate communication strategy to disseminate the Strategy and its construction process with annual public reports on the progress of the strategy via media or public gatherings.
13.	Map and publicly report information on the ESG initiatives from the mining companies in the region.
<b>V</b>	<b>Support the institutional modernisation and capacity of the national agencies operating at the regional level. The national government is crucial for the success of the regional mining strategy and ensure a more sustainable mining sector in Chile.</b>

14.	Coordinate with the regional government of Antofagasta to identify institutional needs in the region and define methods to increase the capacity and upgrade the SEREMIs- specially the SEREMI of Environment and the SEREMI of National Goods - and the Superintendence of the Environment (SMA).
15.	Improve government coordination to better involve Indigenous communities in policy-making around mining and their territories.

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