

Seeing Lithium Extraction

Countering the Myth of 'Green' Transition through
Contemporary Art

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Abstract

This thesis examines the intersection between lithium extraction and contemporary art through a visual semiotic analysis of three contemporary artworks: Unknown Fields' *We Power Our Future With the Breast Milk of Volcanoes*, Marcela Magno's *Land [2] Litio*, and Julian Charrière's *Future Fossil Spaces*. It explores how lithium extraction is visualised in the selected artworks, what connotations can be extracted from them, the geopolitical dimension expressed in them, and how they relate to the myth of 'green' transition. This text takes a starting point in the notion of critical visualisations of extractivism in contemporary art as an urgent political, artistic, and ecological issue. Extractivism is a crucial concept in this thesis, and it is further explored through the intersection of art and extractivism in dialogue with previous research by, for example, Eray Çaylı, Macarena Gómez-Barris, and T.J. Demos. The artworld's interest in lithium has grown in the last years, with cultural projects and exhibitions on lithium taking place in Sweden and the Netherlands, yet there are no academic texts that explore the intersection of lithium extraction and contemporary art. The aim of this thesis is to thoroughly examine this intersection through three contemporary artworks, to expand academic literature regarding this topic, but also to make the results available to curators, cultural workers, and artists who are currently developing cultural projects around lithium and its extraction. The results of the visual semiotic analysis demonstrated that all three of the artworks critically engaged with lithium extraction by visibilising either present or future green sacrifice zones. They all countered the myth of 'green' transition with different strategies: by showing the two-furthestmost-apart links in the lithium supply chain, by recuperating Indigenous creation myths of the extracted landscapes, and by exploring the supposed intangibility of our ever-expanding digital world.

Keywords

Lithium extraction, contemporary art, extractivism, 'green' transition, myth, green sacrifice zones, visibility, countervisuality, Unknown Fields, Marcela Magno, Julian Charrière.

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Introduction

The first time I saw a Tesla electric car in real life was when I moved to a student accommodation in Danderyd, in the northern part of Stockholm, a year and four months ago. I walked uphill to the Mörby Centrum subway station every day and spotted all the Teslas parked outside the villas' garages in the affluent neighbourhood. These electric cars run on lithium batteries, which have been hailed as a key to the 'green' transition that would turn the current environmentally unsustainable global situation and secure global wellbeing.¹

I come from Argentina, a country where lithium is a mineral that most people have a basic knowledge of, as it holds 22.4% of the world's reserves, which lay in salt flats located in North-western parts of Argentina.² The potential of lithium extraction for Argentina's economic growth in a scenario of 'green' transition is a topic much discussed in the national press and the government is pressured to take advantage of the country's position as a main provider of the metal. However, it was only in Sweden that I started to explore the intersections this extraction could have with contemporary art. On a fieldtrip in May 2022 organised by Belgian/Australian artist Alexis Destoop and the International Artist Studio Programme in Sweden, IASPIS, where at the time I was doing an internship, this interest took a different turn.³ Destoop's artistic practice is marked by the junction of contemporary art and extractivism, and in his residency at IASPIS he highlighted that lithium was first identified by Brazilian mineralist and poet José Bonifácio de Andrada e Silva in the early 1800s on Utö, a small Swedish island located east of the Stockholm Archipelago. Swedish artists David Larsson and Hanna Ljungh, who joined the fieldtrip, further

¹ The category of 'green' in relation to energies and technologies will be used between single quotation marks to underline the contestation of it throughout this thesis.

² The 2021 estimated amounts of lithium per country were reported in: *Lithium. Mineral Commodity Summaries*, National Minerals Information Center (2021), 2, <https://pubs.usgs.gov/periodicals/mcs2021/mcs2021-lithium.pdf>.

³ IASPIS is the International Artist Studio Programme in Sweden, a state-funded international residency programme that is part of Konstnärsnämnden, the Swedish Arts Grants Committee.

elaborated this theme (alongside Gideonsson/Londré) in the exhibition *Lithium Time* which they developed at Haninge Konsthall in 2022.⁴

The collaborative artistic research between these artists had as a first chapter *Lithium Time*, where they explored lithium's effect on the body—its use as treatment for psychiatric disorders and its ability to change the circadian rhythm of bodies and nonhuman species—, and lithium's relevance in a world headed into a 'green' energetic transition, since lithium is a key ingredient of lithium-ion batteries, currently the best solution for storing renewable energies, such as solar or wind energies. As a second chapter of the project, David Larsson, Hanna Ljungh, and Gideonsson/Londré developed the *Litiumfestivalen* on Utö during the summer of 2022. With performances, discussions, lithium-powered screenings and workshops, the festival expanded the ideas developed in the first chapter, and incorporated a variety of narratives into the lithium discussion. This included a conversion of time into the 28-hour lithium day by Gideonsson/Londré, a hike on the island with geologist Erik Jonsson, as well as a screening of Jan Lindqvist's 1970 film *Bolivia efter Che* which explores the relationship between Bolivia's military coup, the death of Che Guevara and the country's tin extraction.⁵

The May fieldtrip to Utö, alongside the accounts of these experiences, were my first approaches to the intersection of contemporary art and lithium. Even though there were multiple perspectives present in the projects, a dimension that was not particularly highlighted was lithium's extraction. This encouraged me to further explore contemporary artworks—outside the Swedish scene—that critically engaged with the extraction issue from different points of view, which is also the topic of this thesis.

This thesis takes as a starting point critical visualisations of extractivism in contemporary art as very urgent political, artistic, and ecological issues. Extractivism is understood in this thesis as the “forced removal of raw materials and life forms from the Earth's surface, depths, and biosphere”.⁶

⁴ We were also accompanied in the fieldtrip by Sarah Guarino Werner, curator of Haninge Konsthall, other members of the Konsthall staff, IASPIS artists-in-residence Weronika Bela and Ivar Hagren, and IASPIS 2022 guest curator Valerio Del Baglivo.

⁵ David Larsson, Hanna Ljungh, and Gideonsson/Londré, *Litiumfestivalen*, (Utö: 2022).

⁶ Sandro Mezzadra and Brett Neilson, "On the multiple frontiers of extraction: excavating contemporary capitalism," *Cultural Studies* 31, no. 2-3 (2017): 188.

It is a crucial topic in today's world, since it is often considered to be "at the heart of contemporary global world capitalism".⁷ The exploitation of natural resources in the service of transnational companies creates a ripple effect that expands towards negative impacts on the environment and the communities of extraction zones where the materials are sourced from, geopolitical conflicts, and uneven power relations between countries in the Global North and Global South.

Lithium, 'white gold', 'petroleum of the 21st century' are some of the names used to designate the soft, silvery-white metal at the heart of the future 'green' energetic transition. To understand more about what a 'green' transition entails, there is a need to briefly examine the 2015 Paris Agreement, in which 195 countries signed a commitment that ratified and established new measures for the reduction of greenhouse gas emissions, intending to limit global warming to under 2°C in relation to preindustrial levels.⁸ With this agreement and other pledges in place, most countries from the Global North have formalised their goals through Green New Deals, in which they aspire and encourage a 'green' transition, from fossil fuels to renewable energies. Lithium's growing relevance as a key ingredient of lithium-ion batteries—and the batteries as a real possibility for renewable energy storage—cannot be traced back more than twenty years. Throughout this research process, there has been an attempt to find artists and artworks that explored lithium and its extraction. Only nineteen artworks were found worldwide, and none of them is dated before 2012. There is a high possibility that there are more artworks that were not found while researching for this thesis. Yet the low number of works that were indeed found speaks to a topic that has not been explored much.

Numerous scholars in the cultural field have investigated the relationship between extractivism and contemporary art and explored the boundaries, possibilities and effects of this intersection. With a focus on extractive zones, cumulative violence, production systems, cartographic power, among others, cultural theorists examine the potential of contemporary art to provide resistance and facilitate insight into the geopolitics of ecology. These critical perspectives inform this thesis

⁷ Jingzhong Ye et al., "The incursions of extractivism: moving from dispersed places to global capitalism," *The Journal of Peasant Studies* 47, no. 1 (2020): 171.

⁸ Melisa Argento et al., *Litio en Sudamérica. Geopolítica, energía y territorios*, ed. Bruno Fornillo (CLACSO, 2019), 27. All the texts cited in this thesis that are originally in Spanish are my own translation.

by engaging in, and defining key categories used to interpret the relationship between contemporary art and extractive practices.

The scholarship that delves into this intersection is taken further in this thesis and narrowed toward lithium extraction, since it is a field that has yet to be academically explored. There are a few contemporary exhibitions and non-academic collections of essays that examined this particular intersection, which helped inform this thesis. It is inaccurate to say that this research process explores uncharted territory, since the scholarship of contemporary art and extractivism provides a stable base from which to proceed to a more specific analysis. The scientific novelty here consists of exploring a contemporary issue that is starting to become present in the Swedish art scene. There is a clear interest in examining the potentials, consequences, and effects that lithium has on the global market and our own bodies, an interest with a physical and conceptual manifestation in the collaborative project developed by David Larsson, Hanna Ljungh, and Gideonsson/Londré. Aside from the two aforementioned chapters (exhibition and festival), the artists are currently designing a proposal for a permanent lithium monument to be constructed and installed on Utö. In a context where lithium is gaining relevance in the Swedish art scene, this thesis serves the purpose of investigating the extractive dimension of lithium in contemporary art, a topic that has not been explored academically. It can be thought from and through critical visualities, with the possibility to explore the geopolitical aspects of contemporary art, and delve into the potential of art as a counter-myth.

Aim and research questions

The research aim is to analyse how three contemporary artworks critically engage with lithium extraction and its consequences, often considered a necessary process for worldwide energetic transition, yet the source of many problems in extractive zones. The main focus is on the way these artworks visibilise and engender a semiotic process that provides critical perspectives on lithium extraction and its relation to local environments, digital realities, and Indigenous cosmologies in Latin America. This thesis also intends to reflect on the geopolitical dimension of these artworks, and their approach to the myth of ‘green’ transition, which is analysed as a narrative that

invisibilises the costs of appropriation and extraction which countries in the Global South have to pay to enable countries in the Global North to change their energetic matrix.⁹

To achieve the research aim, the following questions are asked:

- How is lithium extraction visualised in the selected contemporary artworks?
- What primary connotations can be extracted from this empirical material?
- What is the geopolitical dimension of the artworks?
- In what ways do they relate to the myth of ‘green’ transition?

The first research question focuses on the visual aspects of the selected artworks. This is studied using a visual semiotic method, particularly through the denotative messages of the artworks. It highlights how the basic components of the works such as images and sound, materials, perspectives, spatial notions, and techniques are used to depict different aspects of lithium extraction.

The second research question explores what connotative meanings can be extracted from the artworks, and reflects on how these connotations contest, visibilise, explore, or reimagine lithium extraction and its relation to local environments, digital realities, and Indigenous mythologies.

The third research question analyses if the extracted denotations and connotations could be said to provide a geopolitical dimension or perspective on extractive practices and discuss how the works position themselves in relation to this world-wide conflict.

The fourth research question reflects on the relation between the works and the myth of ‘green’ transition, departing from philosopher Roland Barthes’ semiotic understanding of myths.

Material and delimitations

This thesis examines three contemporary artworks and projects that deal with lithium and its extraction: *We Power Our Future with the Breast Milk of Volcanoes* (2016) by Unknown Fields,

⁹ Maristella Svampa, "Dilemas de la transición ecosocial desde América Latina," *Documento de Trabajo Especial OXFAM INTERMÓN 2* (2022).

Land [2] Litio (2022) by Marcela Magno, and *Future Fossil Spaces* (2014-2017) by Julian Charrière. All of the contemporary pieces that are explored in this thesis were accessed virtually, through the artists' websites or video channels.

We Power Our Future with the Breast Milk of Volcanoes (2016) by nomadic art- and design studio Unknown Fields is a video work that juxtaposes drone images of the endless technicolour lithium evaporation pools in the Salar de Uyuni in Bolivia and the Atacama Desert in Chile, with a presentation speech given by Elon Musk in 2015 in which he emphasises how little space is needed and how easy it is to generate and store renewable energies. The designers showcase the explanation of one of the world's richest men on how little changes the United States will have to go through to transition to 'clean' energies, in opposition to the images of endless spaces and resources used in the Global South to extract the mineral that supports Tesla's production system.

Land [2] Litio (2022) by Argentinian artist Marcela Magno is a series of assembled maps constructed with images from Google Earth that represent the most important salt flats which constitute the Lithium Triangle: Atacama in Chile, Uyuni in Bolivia, and Salinas Grandes, Olaroz-Cauchari, and Hombre Muerto in Argentina.¹⁰ Magno explores the geographical images of these extractive zones, in an area in South America where approximately 58% of all worldwide lithium reserves exist.¹¹ For this thesis, two works of the series *Land [2] Litio* were individually analysed: *Bolivia, Salar de Uyuni, 20°32'54.95"S 67°22'36.33"O, 30 Abr 2019. 2021*, and *Argentina, Salar del Hombre Muerto, 25°28'15.80"S 67° 5'9.92"O, 16 Oct 2020. 2021*. All the works in the studied series are part of the overarching project *Land* (2012-ongoing)

Future Fossil Spaces (2014-2017) by French-Swiss artist Julian Charrière is an installation of towering salt-brick columns and lithium brine, using materials from the Salar de Uyuni, the largest salt flat in Bolivia that remains to this day largely unexploited. Charrière reflects on the future negative spaces that are and will be carved on the Earth by the mining operations that seek to

¹⁰ "2022. Land [2] Litio," 2022, accessed November 20, 2022, <https://marcelamagno.com/project/2022-land-2-litio/>.

¹¹ *Lithium. Mineral Commodity Summaries*, 2.

extract lithium to fuel ‘green’ technology, “traces of how the virtual world requires a hollowing-out of the world of natural resources”.¹²

The materials analysed in this thesis are the aforementioned contemporary artworks that explore discourses around lithium and its extraction through different formats, media, and from different geographical perspectives. The materials are the artworks themselves, as well as contextual information where they have been exhibited. Due to the scope of this thesis, the feedback of the artworks and exhibitions made by critics in the press are not considered.

Delimitations

The selection of the three artworks studied in this thesis was made through an online search for artists that have shown an explicit research interest in lithium extraction. This preliminary mapping of the empirical field was done by scanning cultural institutions and artists’ websites, press articles and reviews, books and academic texts about contemporary art and extractivism, and through informal conversations with curators and cultural practitioners. A total of nineteen artworks and series of artworks were found during this preliminary research that explore lithium. The artists of these works are: Unknown Fields, Marcela Magno, Julian Charrière, Jean Katambayi Mukendi (in collaboration with Sammy Baloji and Daddy Tshikaya), David Larsson, Hanna Ljungh, Gideonsson/Londré, Maarten Vanden Eynde & Musasa, Alejandra Prieto, Tomás Saraceno, Edward Burtynsky, Marjolijn Dijkman, David Habets, Cameron Hu and Stefan Schäfer, Maarten Meij, Cédric Gerbehaye, Godofredo Enes Pereira and Lithium Triangle Studio (Mingxin Li, Antonio Del Giudici, Yvette Waweru, Melis Goksan), Alice Wong, and Juan Arturo García. There are likely more contemporary artworks that deal with lithium, but they were not found in the limited timeframe for this research.

The final selection of three works was not simple, but due to the scope and research aim of this thesis I decided that it would not have been viable to analyse all the works that were found. This relates to the qualitative research focus that is used as a method. Performing an extensive semiotic analysis of three artworks provides complex information that superficial analyses of nineteen

¹² "Future Fossil Spaces," 2014, accessed October 20, 2022, <http://julian-charriere.net/projects/future-fossil-spaces>.

artworks would not. The criteria used for the final selection was to choose artists from the Global North and the Global South, both male and female; as well as artworks that complemented each other in terms of the themes that appeared in them, and that provided different insights that would enable a nuanced and differentiated discussion.

Method

Visual semiotics is the primary research method used in the analysis of the selected artworks. “Semiotics is concerned with how meaning is made and the various ways in which language, here broadly intended, can be used to represent reality and therefore also to tell stories”.¹³ In general terms, semiotics is a method designed to produce knowledge on how language can mediate and engender processes of meaning-making. Thus, in this thesis, the visual and textual language analysed in the selected material is understood as knowledge-making.

Some of the main concepts within semiotics that are used in this thesis are sign, index, relay and anchor. Broadly speaking, in semiotics a sign is understood as something that represents something else.¹⁴ The two theorists considered to be the ‘fathers’ of semiotics are Charles Sanders Peirce and Ferdinand de Saussure. For Peirce, signs were composed of three parts: the representamen—the form the sign takes—, the interpretant—the sense made of the sign—, and the object—the thing to which the sign refers.¹⁵ For Saussure on the other hand, signs were composed of two parts: the signifier—the form that the sign takes—, and the signified—the concept that it represents.¹⁶ Peirce’s focus laid on the relationship between the sign and the referent (its object), while Saussure stated that a set of norms always fixed signs and defined them as part of a system of other signs.

For this thesis, the most relevant type of sign identified in the elaborate taxonomy of signs developed by Peirce is the index. This is defined as “a sign that has a direct relationship to its object, in terms of physical or causal contiguity”.¹⁷ In an index, the signifier is not arbitrary but directly

¹³ Giorgia Aiello, "Visual Semiotics: Key Concepts and New Directions," in *The SAGE Handbook of Visual Research Methods*, ed. Luc Pauwels and Dawn Mannay (London: SAGE Publications, Inc., 2020), 2.

¹⁴ Anne D'Alleva, *Methods & Theories of Art History* (London: Laurence King Publishing, 2005), 28.

¹⁵ D'Alleva, *Methods & Theories of Art History*, 30.

¹⁶ D'Alleva, *Methods & Theories of Art History*, 30.

¹⁷ Aiello, "Visual Semiotics: Key Concepts and New Directions," 4.

connected to the signified. Examples of indexes can be footprints—physical trace of feet on a surface—or photographs—imprint of light on a sensitised surface. The notion of the index is important for this thesis because it provides a key notion when analysing *Land [2] Litio*. It is used to identify the representations of geographical features in the landscape, but also to contest the conception of satellite images as indexical representations.

Philosopher Roland Barthes focused on visual semiotics and looked at signs and signification as dynamic elements of a social and cultural fabric.¹⁸ He understood the denotative message—literal meaning of an image—in visual semiotics as a necessary support for the connotative message—ideological or symbolic meaning of an image.¹⁹ When studying the complementary relationship between language and images, Barthes focuses on two main concepts: anchorage and relay. Barthes understands relay as “the meanings that are not to be found in the image itself”.²⁰ Relay can be presented in different ways, for example in cinematic dialogues, where image and text/spoken word create a more complete picture, allowing for more ambiguous interpretations of the materials. Whereas anchorage is explained as the text used to anchor or fix the meaning in an image, for example in advertising and news media. These notions are used as tool to identify the relationship between the titles of the artworks and their visual components, as well as the effects generated by the sound component of the video *We Power Our Future With the Breast Milk of Volcanoes*.

The semiotic analysis is used in this thesis to structure the presentation of the artworks. In each chapter, I start with a denotative analysis of the materials, through a meticulous description of their visual, sound, and textual elements. This is followed by a connotative analysis, attempting to interpret the signification of the identified denotative signs. In this methodological step, I also consider the information available about each piece, such as titles, artistic statements and accounts found in previous research. While the notion of extraction is used as an operative methodological tool, and lithium as a lens for analysis that binds the analytical examples together, the specificity of each of the artworks is explored through semiotic analysis, and further interpreted using theoretical notions discussed in the following sections.

¹⁸ Aiello, "Visual Semiotics: Key Concepts and New Directions," 5.

¹⁹ Aiello, "Visual Semiotics: Key Concepts and New Directions," 5.

²⁰ Roland Barthes, *Image, music, text*, ed. Stephen Heath (New York: Hill and Wang, 1977), as cited in Aiello, "Visual Semiotics: Key Concepts and New Directions," 7.

In *Mythologies*, Roland Barthes introduced ‘myths’ as additional layers of signification. According to Barthes, myths “relate to ideological concepts that are ‘evoked’ by a certain sign”, rather than the connotation, where “the ideological meaning is ‘attached’ to a specific sign”.²¹ With a task to give historical intentions a natural justification, and making contingency appear eternal, myths do not disappear information, they distort it.²² In Barthes’ visual semiotics, myths are systems of communication that naturalise concepts through second-order semiological systems.²³ They operate in accordance with certain dominant streams of thought, only naturalising certain narratives but not others.

Considering Barthes’ definition of myth, this thesis focuses primarily on ‘green’ transition as a myth—understood as a system of communication that naturalises concepts in accordance with dominant narratives—, and on how the analysed artworks can contest, relate, or respond to it. There is also a secondary focus on other types of myths that are connoted in the selected artworks, such as the myth of modern progress, or even Indigenous myths of creation. In this semiotic analysis, I am interested in exploring what I understand as counter-myths, stories and signs that contest dominant narratives and propose other alternatives for meaning-making. In some cases, the artworks themselves can act as counter-myths, but in other cases myths can operate as such.

Theory

In this section there will be an exploration of different theoretical concepts that have accompanied this research, establishing frameworks to examine the mentioned materials.

Critical views on the Anthropocene

²¹ John Fiske, *Introduction to communication studies* (London ; New York: Methuen, 1982)., as cited in Aiello, "Visual Semiotics: Key Concepts and New Directions," 7.

²² Roland Barthes, *Mythologies*, trans. Annette Lavers (London: J. Cape, 1972), 120.

²³ This is based on Saussure’s understanding of semiotics. The first-order semiological system consists of the relationship between the signifier and the signified that conform a sign. This first sign constitutes the signifier, that in relation to a second signified, creates a new sign: the myth.

The first theoretical assumption guiding my thesis is the critical questioning of the concept Anthropocene. It is defined as a geological epoch characterised by the influence of human activities on the global environment. Geographers Simon L. Lewis and Mark A. Maslin argue that the scale, duration and impact of human-induced changes in the natural landscape has caused such deep changes in the land surface and the atmosphere, that the current epoch should not be named Holocene, as it is formally referred to, but instead as the Anthropocene Epoch.²⁴ While there is a large scientific consensus on the geological impact of the human species, there is also an extensive critique of the notion of the Anthropocene in the fields of Marxist cultural studies, art history, critical race study and decolonial studies.

There are two important critical remarks that guide this thesis. Firstly, the idea that the current notion of the Anthropocene tends to understand all humanity as equally responsible for the changes inflicted on the planet, not considering the predominant role played by countries of the Global North. For art historian and cultural critic T.J. Demos, the rhetoric behind the Anthropocene acts as a universalising mechanism “which enables the military-state-corporate apparatus to disavow responsibility for the differentiated impacts of climate change”, obscuring the accountability behind eco-catastrophes.²⁵ In line with Demos, cultural theorist Macarena Gómez-Barris indicates that the concept Anthropocene delimits “the temporalities and spatial catastrophe of the planetary through a universalizing idiom and viewpoint that hides the political geographies embedded within the conversion of complex life”.²⁶ She thus criticises the universality of ‘human’-induced changes, where the Anthropocene works as an invisibilising agent, treating all humanity as equally responsible for Earthly damages. Furthermore, Gómez-Barris emphasizes the un-universality of the Anthropocene by investigating forms of resistance to capitalism and colonialism through ‘submerged perspectives’. This critical perspective is further elaborated in my thesis through a consideration of the unequal relations between countries in the Global North and the Global South in a context of lithium extraction, as connoted through the selected materials.

²⁴ Simon L. Lewis and Mark A. Maslin, "Defining the Anthropocene," *Nature* 519, no. 7542 (2015): 171.

²⁵ T. J. Demos, *Against the anthropocene : visual culture and environment today* (Berlin: Sternberg Press, 2017), 17.

²⁶ Macarena Gómez-Barris, *The Extractive Zone: Social Ecologies and Decolonial Perspectives*, Dissident Acts, (Durham and London: Duke University Press, 2017), 4.

The second argument for opposing the Anthropocene which has guided this thesis, is that this concept serves as a geological justification for the perpetuation of colonial patterns and modes of production in the creation of a more sustainable future, since the Anthropocene appears as a point of no return. As Environmental Studies researcher Bruce Erickson writes, “the Anthropocene functions as a geophysical justification of structures of colonialism in the services of a greener future.”²⁷ He establishes that “in its attempt to place environmental collapse and change as the defining problem of all of humanity in the future to come, the Anthropocene discourse legitimizes the continual colonial assertions of jurisdiction through conservation”.²⁸ This perspective provides the basis for the way this thesis approaches ‘green’ transition as a myth, presented as the only solution for battling climate breakdown, legitimising the neo-colonial extractive endeavours on territories of the Global South.

Extractivism: accumulation by dispossession

The concept extractivism derived from the Latin American term *extractivismo*, coined in the 1970s and promoted originally by large transnational companies, banks and governments, yet also adopted by members of civil society who opposed it.²⁹ The term was used as a description of mining and oil developments for export.³⁰

In his text “Blackout. The Necropolitics of Extraction”, Demos addresses the visual culture and the aesthetics of resistance towards contemporary extractions.³¹ He understands extractivism as accumulation by dispossession, and argues that it is currently “the dominant paradigm of advanced capitalism”.³² Moreover, he explains extractivism as

²⁷ Bruce Erickson, “Anthropocene futures: Linking colonialism and environmentalism in an age of crisis,” *Environment and Planning D: Society and Space* 38, no. 1 (2020): 111.

²⁸ Erickson, “Anthropocene futures: Linking colonialism and environmentalism in an age of crisis,” 112.

²⁹ *Reframing Latin American Development*, ed. Ronaldo Munck and Raúl Delgado Wise, Routledge Critical Development Studies, (London: Routledge, 2018), 61.

³⁰ Francesco Durante, Markus Kröger, and William LaFleur, “Extraction and Extractivisms: Definitions and Concepts,” in *Our Extractive Age: Expressions of Violence and Resistance*, ed. Judith Shapiro and John Andrew McNeish (London: Taylor & Francis, 2021), 21.

³¹ T. J. Demos, “Blackout. The Necropolitics of Extraction,” in *Art and Activism in the Age of Systemic Crisis: Aesthetic Resilience*, ed. E. Steinbock, Ieven, B., & de Valck, M. (New York: Routledge, 2020).

³² Demos, “Blackout. The Necropolitics of Extraction,” 50.

an accumulation without corresponding deposit (except in the form of waste, disease, and death), which transforms whatever it touches—be that mines, forests, rivers, oceans, or human and nonhuman life—into economic value, employing whatever means at its disposal, including machinery, architecture, labour, finance, logistics, and media.³³

Demos analyses artworks that visualise extractivism, but also highlights the importance of international solidarities, in which artists from the debtor and creditor countries become aware of their shared interests and act with radical defiance towards the impositions of global finance.³⁴

In a similar vein, political theorist Sandro Mezzadra and cultural theorist Brett Neilson define extraction as the “forced removal of raw materials and life forms from the Earth’s surface, depths, and biosphere”.³⁵ They also move towards an expanded concept extractivism, that not only includes the appropriation and expropriation of natural resources, but also of infrastructures, spaces, values, and forms of life subject to capitalist valorisation.

The thesis departs from this argument to theorise the geopolitical dimension of the artworks, with an understanding of ‘geopolitics’ and ‘geopolitical’ as “the study of the international scene from a spatial or geocentric viewpoint”, having as an essential part “the examination of the components, but this is basically undertaken for the purpose of reaching a clearer understanding of the whole”.³⁶ There are many spatial and political components to extractivism, some of them are investigated in the three selected artworks. This thesis will attempt to unveil the geopolitical dimensions that the artworks are inscribed in.

Cumulative violence: racialised, extractable, and disposable bodies

In his article “Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil”, researcher in Portuguese and Spanish Ricardo Duarte Filho explores cumulative violence as a new perspective on extractivism, related to the construction of racialised, extractable and

³³ Demos, "Blackout. The Necropolitics of Extraction," 50.

³⁴ Demos, "Blackout. The Necropolitics of Extraction," 58.

³⁵ Mezzadra and Neilson, "On the multiple frontiers of extraction: excavating contemporary capitalism," 188.

³⁶ Parker Geoffrey, *Western Geopolitical Thought in the Twentieth Century*, Routledge Library Editions: Political Geography, (London: Routledge, 2015), 2.

disposable bodies.³⁷ For Duarte Filho, the mainstream construction of climate breakdown is the image of the catastrophe. The representations of environmental crises focus on the idea of apocalypse which, according to Duarte Filho, constitute “a privileged locus for artistic and mediatic responses to ecological crimes”.³⁸ These images of the doom obscure the smaller-scale and enduring consequences of extractive activities, as well as its larger temporal frame.

In opposition to these catastrophic representations, Duarte Filho analyses artworks in different media presenting quasi-events, or what he also speaks about as the moments before a collapse. By focusing not on the doom, but on the impending doom, these artworks can explore the persistent and slow violence that extractive practices apply over racialised bodies and nonhuman extracted agents.³⁹ This counter-response to the frenzy over catastrophic narratives allows me in this thesis to shift perspectives and understand extractivism as linked “to the larger project of the construction of racialised, extractable, and disposable bodies and existents”.⁴⁰

Aside from the catastrophic representations of climate breakdown, Duarte Filho explores the different visualisations present in extractivist capitalism, stemming directly from its conception:

extractivist capitalism was constructed upon an all-seeing myth, beginning with cartographical production putting on display the colonies’ resources, to the centrality assumed by visual control in the plantation system, to the contemporary usage of satellite and drone pictures to enhance neo-colonial practices.⁴¹

Duarte Filho’s understanding of the origin of extractivist capitalism as the construction of an all-seeing myth directly relates to Barthes’ definition of myth as a system that operates in accordance with hegemonic streams of thought, naturalising certain narratives but not others.

Both Duarte Filho’s concept of cumulative violence and the construction of extractivist capitalism as a myth are relevant for this thesis, since they act as tools to analyse the selected materials, to

³⁷ Ricardo Duarte Filho, “Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil,” *Journal of Latin American Cultural Studies* 30, no. 3 (2021): 417.

³⁸ Duarte Filho, “Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil,” 425.

³⁹ Duarte Filho, “Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil,” 418.

⁴⁰ Duarte Filho, “Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil,” 419.

⁴¹ Duarte Filho, “Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil,” 426.

delve deeper into what they connote, regarding the sometimes-unseen effects of extractive practices and their historical structures.

Green colonialism, energetic transition, and eco-social transition

Green colonialism is a recent theoretical concept grounded in the current period of energetic transition. In a situation of climate breakdown, energetic—or ‘green’—transition seems like the only possible solution for all the consequences of the exploitation of natural resources perpetrated by industries and countries. According to political theorist Christos Zografos, “[l]arge-scale solutions to the climate crisis drawn up in the global North too often remain embedded in colonial relations of injustice”.⁴² For sociologist, activist, and writer Maristella Svampa, lithium extraction “exacerbates the agenda of green capitalism, hand in hand with a new energetic colonialism”;⁴³ it constitutes a “false solution”.⁴⁴

One of the Global North’s major large-scale solutions or goals drawn by central countries to mitigate the effects of climate breakdown that Zografos investigates, is the Green New Deals (GND). GNDs are comprehensive policy plans that address the social, economic and legal concerns of energetic transition. They comprise “targeted state investment in activities which produce goods and services to measure, prevent, limit, minimise or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco-systems”.⁴⁵ GNDs also include the necessary innovations in products, services and infrastructure for a transition to ‘cleaner’ energies. The most significant criticism Zografos makes of the dominant GND narratives, is that they do not consider the deeply negative effects of the achievement of a transition in the Global South: “[t]hose impacts are perhaps most prominent in the sourcing of materials: green solutions for the North are often based on mining unprecedented quantities of minerals from Global South localities”.⁴⁶

⁴² Christos Zografos, "The contradictions of Green New Deals: green sacrifice and colonialism," *Soundings* 80 (2022): 37.

⁴³ Svampa, "Dilemas de la transición ecosocial desde América Latina," 15.

⁴⁴ Svampa, "Dilemas de la transición ecosocial desde América Latina," 14.

⁴⁵ Philipp Schepelmann et al., "A green new deal for Europe," *Wuppertal Institute for Climate, Environment and Energy* (2009): 13.

⁴⁶ Zografos, "The contradictions of Green New Deals: green sacrifice and colonialism," 41.

Svampa focuses on the different responsibilities of countries in the Global North and in the Global South. She stresses that central industrialised countries keep on being importers of nature, generating emissions not only within their borders, but also outside their territorial limits, since they import commodities. “The countries from the Global South suffer the costs of appropriation and extraction of these commodities, changing their territories into sacrifice zones.”⁴⁷ The novelty that Svampa highlights, is that “to the already existing extractivism, a green extractivism is added, in the service of a corporative and transnational transition, that benefits central countries”, increasing the gap between poor and rich countries, and increasing the ecological debt.⁴⁸ Svampa understands the eco-social energetic transition as “the passage from one energetic conception of energy, with a concentrated character, to another that conceives it in terms of common good, renewable and sustainable in a full meaning, common and decentralised.”⁴⁹ This definition is not only about a transition to a decarbonised society, but also a change in productive models and our relationship with nature. An eco-social transition approaches questions about the type of society we want to live in, a more democratic and egalitarian productive system that takes into consideration the historically uneven extractive relations between the Global North and the Global South.

The concepts of green colonialism, energetic transition, and eco-social transition are extremely valuable to analyse the connotations extracted in the three contemporary artworks, especially for answering the last two research questions proposed in this thesis. These notions become resources to understand the geopolitical dimension of the artworks, and to interpret how these works are related to the myth of ‘green’ energetic transition. Svampa’s and Zografos’ theories are invaluable to define this thesis’ comprehension of ‘green’ transition.

Visibility and countervisuality

In his book *The Right to Look: A Counterhistory of Visuality*, visual culture theorist Nicholas Mirzoeff explores the theory behind visuality, stating that “[a]s a discursive organisation of history, visuality was never able to achieve its goal of representing totality, because ‘history’ itself as a

⁴⁷ Svampa, "Dilemas de la transición ecosocial desde América Latina," 5.

⁴⁸ Svampa, "Dilemas de la transición ecosocial desde América Latina," 26.

⁴⁹ Svampa, "Dilemas de la transición ecosocial desde América Latina," 7.

form of the historicopolitical was not monolithic, but structured as conflict.”⁵⁰ For Mirzoeff, visibility has played a central role in the legitimisation of Western hegemony, it “is always-already a tool for hegemonic and imperial power, is the self-entitled right to look that refuses the right to be looked back at”.⁵¹ Mirzoeff coins the term ‘countervisuality’ as an essential tool to dismantle this imperial visibility, as a “crucial decolonial strategy for it does not seek a different way to look at images, but it is an ‘attempt to reconfigure visibility as a whole.’”⁵²

In *Visual Occupations: Violence and Visibility in a Conflict Zone*, Comparative Literature and Gender studies researcher Gil Z. Hochberg focuses on “the relationship between visibility, power, domination, and control, paying attention to the conditions of visibility as created under particular moments or phases of the conflict,”⁵³ especially analysing this relationship in the context of the Israeli Occupation of Palestine. This book is relevant to the current thesis, since it researches the political construction of visibility and denaturalisation of vision. According to Hochberg,

[h]ow much one can see, what one can see, and in what way one can see or be seen are all outcomes of specific visual arrangements that are created and sustained through particular configurations of space and various processes of differentiations along national, ethnic, racial, religious, gender, and sexual lines.⁵⁴

What is remarkable of Hochberg’s text, is that she engages with a large range of works (literature, photography, video, film) that contest that construction of visibility and create new ways of seeing, involving “the manipulation of visual positions, new settings for spectatorship, new modes of appearance, and at times new modes of disappearance, concealment, or refusal to appear. It also involves the ability to see one’s own blindness and render visible one’s failure to see.”⁵⁵ For Hochberg, the precondition to overcome oppressive geo-sociopolitical orders, is in fact generating

⁵⁰ Nicholas Mirzoeff, *The right to look: a counterhistory of visibility* (Durham, NC: Duke University Press, 2011), 22.

⁵¹ Duarte Filho, "Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil," 433.

⁵² Duarte Filho, "Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil," 433.

⁵³ Gil Z. Hochberg, *Visual Occupations: Violence and Visibility in a Conflict Zone*, ed. Jack and Lowe Halberstam, Lisa, *Perverse Modernities*, (Durham and London: Duke University Press, 2015), 4.

⁵⁴ Hochberg, *Visual Occupations: Violence and Visibility in a Conflict Zone*, 5.

⁵⁵ Hochberg, *Visual Occupations: Violence and Visibility in a Conflict Zone*, 3.

these new ways of seeing. This can be directly paralleled to the call for visibility of submerged perspectives that Gómez-Barris proposes.⁵⁶

The notions of visuality in Mirzoeff, and in Hochberg—here especially approached in a context of conflict zones—are crucial to understand what a neo-colonial visuality might entail in contemporary times, and how the selected artworks could be defined as counter-visualities in Mirzoeff's terms, countering the visualisations of extractive sites as tools for hegemonic and imperial powers.

On a general level, visualisation can be defined as “the act or process of interpreting in visual terms or of putting into visible form”.⁵⁷ Visibilisation on the other hand, is not present in dictionaries I searched, even though it is frequently used in academic texts.⁵⁸ The closest dictionary definition of the noun *visibilisation*, is the verb *visibilise*: “to make visible something that was previously intangible or invisible to the naked eye”.⁵⁹ Thus, *visibilisation* is understood in this thesis as the act of rendering the invisible visible; of shedding light or highlighting that which is hidden or unseen.

Throughout this thesis, more theoretical concepts will appear, but they are not explained in this section since they only apply to one of the artworks studied in this research.

Previous research

This thesis has been informed, in different ways, by several research fields, such as curating art, art theory, sociology, political theory, environmental sciences, and geology. There are many texts in these fields that discuss the specificity of the lithium extraction context: its consequences, geopolitical contexts, opportunities, power structures, and the gathering of technical information. These materials will not be discussed in this section, but mentioned throughout the chapters

⁵⁶ Gómez-Barris, *The Extractive Zone: Social Ecologies and Decolonial Perspectives*.

⁵⁷ "Visualization," 2022, accessed January 3, 2022, <https://www.merriam-webster.com/dictionary/visualization>.

⁵⁸ As seen in Lisa Y.M. Leung, "'No South Asian Riders, Please': The Politics of Visibilisation in Platformed Food Delivery Work during the COVID-19 Pandemic in Hong Kong," *Critical Sociology* 48, no. 7-8 (2022), or Sebastiano Citroni and Mattias Karrholm, "Neighbourhood events and the visibilisation of everyday life: The cases of Turro (Milan) and Norra Fäladen (Lund)," *European Urban and Regional Studies* 26, no. 1 (2019).

⁵⁹ "Visibilize," 2022, accessed December 30, 2022, <https://www.macmillandictionary.com/dictionary/british/visibilize>.

whenever relevant for further explanation of connotations identified in the semiotic analysis of the artworks.

For the scope of this section, there will be a focus on books, academic articles, and other resources that explore: the boundaries, possibilities and effects of the relationship between art and extractivism; the construction of images and cartography as instrumental tools for the imperial gaze; and possible encounters between lithium extraction and the cultural field.

Artistic practice and extractivism

Political and cultural theorist Eray Çaylı focuses on the spacial and visual politics of violence. In his article “Contemporary art and the geopolitics of extractivism in Turkey's Kurdistan” he studies artworks produced in sites of extraction, particularly by artist Cengiz Tekin, resident of Amed, a city in northern Kurdistan, or, officially, Diyarbakır in Türkiye. Çaylı discusses Tekin’s works while exploring the larger question of “contemporary art’s potential to facilitate critical insight into the (geo)politics of ecology today”.⁶⁰ In his discussion of art’s potentials regarding extractive practices, Çaylı problematises Eurocentric aesthetics and its links with colonialism and racialised humanism. He focuses on the Anthropocene as a phenomenon that is not anthropically homogeneous in its causes and effects, and reflects on racial capitalism as the chief progenitor of the heterogeneity that characterises this concept. In studying art that addresses extractive practices from within extractive zones, Çaylı explores how art can help locate the Anthropocene in “both the history of racial capitalism and its current neoliberal iteration”.⁶¹

In her article “Visual dialogues about neoextractivism”, researcher of the Research Centre for Art and Patrimony (CONICET, Buenos Aires) Cecilia Casablanca reviews a selection of contemporary artistic productions by three Argentinian artists: Marcela Magno, Diana Doweck, and Dana Prieto.⁶² Casablanca opposes the global narratives of climate change and the overarching concept of

⁶⁰ Eray Çaylı, "Contemporary art and the geopolitics of extractivism in Turkey's Kurdistan," *Transactions of the Institute of British Geographers* 46, no. 4 (2021): 929.

⁶¹ Çaylı, "Contemporary art and the geopolitics of extractivism in Turkey's Kurdistan," 933.

⁶² Cecilia Casablanca, "Diálogos visuales sobre el neoextractivismo: Obras situadas y conflictos ambientales en tres artistas mujeres contemporáneas," *Heterotopías* 5, no. 9 (2022).

Anthropocene with critical Latin American narratives. These narratives establish that environmental conflicts have an origin in colonisation and neo-colonisation processes, and that they require a critical review of current accumulation models and unequal social structures.⁶³ It is within this context that Casablanca approaches the works of the three contemporary artists, which in her view implement diverse strategies of sensibilisation, production, and visibilisation. The two aspects that Casablanca highlights in her conclusions, are, firstly, the temporal aspect present in the artworks, revealing the consequences of predatory actions against territories. Secondly, she argues that these works show a common interest in the landscape, through which they insert themselves in the dispute for the visible: to register and show that which is hidden or far away.⁶⁴

Cultural studies theorist Macarena Gómez-Barris explores the relationship between contemporary practices and extractivism in her book *The Extractive Zone: Social Ecologies and Decolonial Perspectives*, through an analysis of artistic practices that she considers as submerged and emergent perspectives which challenge obliteration.⁶⁵ In her book, Gómez-Barris not only focuses on the devastation, destruction, and violence caused by colonialism and neo-colonialism, but also explores heterogeneous experiences that create alternative forms of living within extraction zones. In an attempt to decolonise the Anthropocene by exploring these perspectives, she uses a decolonial and queer episteme and methodology. Gómez-Barris turns to Latin American conflicts within extractive zones, analysing in her different chapters phenomena such as spiritual tourism, Yasuní alternative anticapitalist economies, dispossession of Mapuche territory, commodification of water, and Indigenous feminist anarchist critiques. With an aim to challenge extractive capitalism through analysing these submerged perspectives, Gómez-Barris concludes that we need to fight the apocalyptic view of the already-depleted no future, and look to the decolonial potential of these alternatives ways of life to stop the continuous re-making of the colonial state.

Social scientists Gabriela Merlinsky and Paula Serafini explore artistic expressions of resistance towards the commodification of nature and the expropriation of territories in their article “Art and

⁶³ Casablanca, "Diálogos visuales sobre el neoextractivismo: Obras situadas y conflictos ambientales en tres artistas mujeres contemporáneas."

⁶⁴ Casablanca, "Diálogos visuales sobre el neoextractivismo: Obras situadas y conflictos ambientales en tres artistas mujeres contemporáneas."

⁶⁵ Gómez-Barris, *The Extractive Zone: Social Ecologies and Decolonial Perspectives*, 12.

Resistances to Extractivism in Argentina. Languages to Defend and Reinvent the Common”.⁶⁶ As Gómez-Barris, they analyse artistic practices that wish to construct alternative political spaces. The practices they explore in their article examine ways of resistance through attempts to destabilise processes of enclosure, commodification, and privatisation of public natural spaces, unveiling unequal power structures. Merlinsky and Serafini conclude that these practices of political alternatives generate new spaces of representation and cocreation by using documentary filmmaking, visual and performative arts to visibilise environmental conflicts and decolonise common spaces.

Demos examines the possibilities with which cultural practitioners can contest the financialisation of nature by neoliberal globalisation in his article “Contemporary Art and the Politics of Ecology”.⁶⁷ While exploring definitions of political ecology through theorists Félix Guattari, Bruno Latour, and Neil Smith, Demos analyses the intertwining between the realm of political ecology and the artworld. One example he mentions of the growing interest in political ecology from the art sector, is the commissioning of the text “The Corporate Control of Life” by Indian scientist and environmental campaigner Vandana Shiva by the curatorial team at Documenta 13 in 2011. In his article, Demos examines how the contemporary aesthetics of political ecology blur “the divisions between activist visual culture, artistic forms and the appearance of nonhuman agents of environmental change”.⁶⁸

The imperial gaze

Art historian Marta Penhos analyses colonial representations of Latin America through maps, texts and images of European scientists and artists in her book *See, Know, Dominate. Images of South America in the End of the 18th Century*.⁶⁹ According to Penhos, the European expeditions to Latin America in the 18th century were motivated by the need to gather materials and images for a data collection that would optimise the colonisers’ political dominion. Through an analysis of written and iconological representations in these maps, texts and images, she dismantles the processes

⁶⁶ Gabriela Merlinsky and Paula Serafini, “Arte y resistencias al extractivismo en Argentina. Lenguajes para defender y reinventar lo común,” *Ecología Política*, no. 57 (2019).

⁶⁷ T. J. Demos, “Contemporary Art and the Politics of Ecology,” *Third Text* 27, no. 1 (2013).

⁶⁸ Demos, “Contemporary Art and the Politics of Ecology,” 7.

⁶⁹ Marta Penhos, *Ver, Conocer, Dominar. Imágenes De Sudamérica a Fines Del Siglo XVIII*, Arte y pensamiento, (Buenos Aires: Siglo Veintiuno Editores, 2005).

through which these representations were considered testimonies and social documents, relating the cultural and historical elements that intervene in the—necessarily trimmed and subjective—act of seeing with the collecting of knowledge of the South American territories, and “the symbolic and material mechanisms of its dominion”.⁷⁰

Art and film critic Graciela Speranza reflects on the uses of maps and cartographies in the context of imperial visuality in her book *Portable Atlas of Latin America. Wandering Art and Fictions*.⁷¹ For Speranza, “the map is loaded with all the information and knowledge of the world, and it has been, since the beginnings of cartography, an instrument of power and domination”.⁷² She establishes that even if maps provide accurate representations of the world, they are also the most abstract ones. In her analysis of the 2010 exhibition *Atlas. How to Carry the World on One’s Back?* curated by Georges Didi-Huberman at the Museo Nacional Centro de Arte Reina Sofía in Madrid, Speranza examines how artists appropriate maps to denaturalise the imperial gaze and instituted orders, “to interrogate territorial identities, to extend passages in impassable frontiers, to surmise other possible worlds, and to trace imaginary paths”.⁷³

Lithium extraction in the cultural field

It is essential to mention that during the period of research for previous literature, there were no findings of academic texts that directly discuss contemporary art and lithium. This could be due to the relative novelty of this topic, as lithium has only gained relevance for its everyday technological implications in the last fifteen years, and all the artworks found in this research that discuss this topic do not date back before 2012.

The only academic text found during these months of research that delves into lithium extraction outside the fields of sociology, politics, environmental sciences, and geology, is Derek Rayle’s 2018 thesis for the completion of the degree Master in Landscape Architecture, from the University

⁷⁰ Penhos, *Ver, Conocer, Dominar. Imágenes De Sudamérica a Fines Del Siglo XVIII*, 16.

⁷¹ Graciela Speranza, *Atlas portátil de América Latina. Arte y ficciones errantes*, Colección Argumentos, (Buenos Aires: Anagrama, 2012).

⁷² Speranza, *Atlas portátil de América Latina. Arte y ficciones errantes*, 23.

⁷³ Speranza, *Atlas portátil de América Latina. Arte y ficciones errantes*, 23.

of Oregon.⁷⁴ Titled “After Lithium. Reclamation Strategies for Salar de Uyuni, Bolivia”, he analyses the spatial parameters of lithium extraction in the Uyuni salt plane in Bolivia, the world’s biggest lithium reserve. Rayle speculates about the future of this territory after projected decades of extractive practices and imagines a possible reclamation programme in a post-extractive era. Rayle’s work is relevant as an example of how lithium extraction can be navigated in a discipline that is not its privileged scenario for communication. In the case of Rayle’s work, he intersects the situation of lithium extraction in Bolivia with landscape architecture. Since the research aim of the present thesis is to find new ways to navigate an intersection between lithium extraction and curating contemporary art, Rayle’s thesis is relevant to understand the possibilities of such intersection.

As mentioned before, there were no findings of academic texts that delve into the intersection of lithium and contemporary art. However, there are some examples of interdisciplinary projects in the recent years that explore this intersection. The 2021 book *Lithium. States of Exhaustion*, edited by Francisco Díaz, Anastasia Kubrak and Marina Otero Verzier, was developed alongside an exhibition programme from Het Nieuwe Instituut in Rotterdam, and compiles contributions from architects, academics, lawyers, astronomers, biologists, philosophers, journalists and activists on lithium extraction, pharmacology and mental health.⁷⁵ The website *On Trade Off* also has a collection of projects and essays from artists in different latitudes.⁷⁶ They use lithium as a starting point, through which they explore a wide range of questions, from the history of electricity, technological industries, raw materials, to financial speculation.

Other art experiences that deal with lithium worth mentioning are the exhibition *Lithium Time*, showed at Haninge Konsthall, Sweden, between April and May 2022, and the *Litiumfestivalen* on Utö, Sweden in August 2022, which both included a collaboration between artists David Larsson, Hanna Ljungh and Gideonsson/Londré. And exhibition *Lithium*, showcased at Het Nieuwe Instituut, Netherlands, between September 2020 and August 2021, with contributions from David Habets, Cameron Hu, Stefan Schäfer, Cédric Gerbehaye, Juan Arturo García, Nicolás Jaar,

⁷⁴ Derek Rayle, "After Lithium. Reclamation Strategies for Salar de Uyuni, Bolivia" (Master in Landscape Architecture University of Oregon, 2018).

⁷⁵ Francisco Díaz, Anastasia Kubrak, and Marina Otero Verzier, *Lithium. States of Exhaustion* (Het Nieuwe Instituut and Ediciones ARQ, 2021).

⁷⁶ "On Trade Off," 2022, accessed 28 December, 2022, <https://www.on-trade-off.net/en-us/>.

Maarten Meij, Godofredo Enes Pereira, Lithium Triangle Studio (Mingxin Li, Antonio Del Giudici, Yvette Waweru, Melis Goksan), Anabel Garcia-Kurland, and Alice Wong.

List of definitions

Climate breakdown

With essentially the same meaning as climate change, climate breakdown is a phrase that expresses scientific precision yet communicates a real state of urgency. This phrase is used to replace climate change, because this traditional concept “sounds rather passive and gentle when what scientists are talking about is a catastrophe for humanity”.⁷⁷ Marking a clear difference with the more conventional phrase climate change, climate breakdown is a more substantial term that wishes to convey the gravity of our present situation.⁷⁸

Energetic transition

In the late 1970s the term *energiewende* was coined in Germany in a context of protests against nuclear energy, and it translates in English as energetic transition.⁷⁹ A definition used by countries in the Global North and global governing bodies is that energetic transition assumes a modification of the energetic matrix—mainly based on fossil fuels—by integrating more renewable and sustainable energy sources, and increasing the levels of savings and efficiency in order to fight the negative consequences of global climate breakdown.⁸⁰

Eco-social transition

⁷⁷ Damian Carrington, "Why the Guardian is Changing the Language It Uses about the Environment," *The Guardian* (London), May 17 2019, <https://www.theguardian.com/environment/2019/may/17/why-the-guardian-is-changing-the-language-it-uses-about-the-environment>., as cited in *The Routledge Companion to Contemporary Art, Visual Culture, and Climate Change*, ed. T.J. Demos, Emily Eliza Scott, and Subhankar Banerjee (London: Routledge, 2021), 3.

⁷⁸ *The Routledge Companion to Contemporary Art, Visual Culture, and Climate Change*, 3.

⁷⁹ Argento et al., *Litio en Sudamérica. Geopolítica, energía y territorios*, 25.

⁸⁰ Argento et al., *Litio en Sudamérica. Geopolítica, energía y territorios*, 44.

Eco-social transition or just transition is an understanding of energetic transition from a holistic perspective, which “aims towards an integral change of the socioecological regime, on energetic, productive, and urban levels”.⁸¹ Eco-social transition articulates social justice within a framework of environmental issues. It is understood to shift towards economic and productive practices based on reciprocity, care and complementarity, and work towards a new pact with nature that guarantees the sustainability of a worthy life.⁸² This integral understanding of energetic transition implies a modification in dominant capitalism’s ideas of consumption, everyday experience and culture concerns, tied to a notion of infinite energy.⁸³ Eco-social transition stresses the necessity of a decentralised model that understands energy as a common good and a strategic resource.

Extractive zone

Macarena Gómez-Barris defines the extractive zones as spaces which “refer to the colonial paradigm, worldview, and technologies that mark out regions of ‘high biodiversity’ in order to reduce life to capitalist resource conversion”.⁸⁴ Extractive zones name “the violence that capitalism does to reduce, constrain, and convert life into commodities”, reducing its heterogeneity.⁸⁵

Green sacrifice zones

As explained by Christos Zografos, green sacrifice zones are invisibilised territories in the Global South that emerge and multiply with Global North policies for energetic transition. As the Global North seeks to transition to a low-carbon society, there is an expansion of extractive zones “necessary for the sourcing, transportation, installation, operation and waste clear-up that goes along with the creation of the infrastructure” for an energetic transition.⁸⁶

Lithium-ion batteries

⁸¹ Svampa, "Dilemas de la transición ecosocial desde América Latina," 3.

⁸² Svampa, "Dilemas de la transición ecosocial desde América Latina," 4.

⁸³ Argento et al., *Litio en Sudamérica. Geopolítica, energía y territorios*, 44.

⁸⁴ Gómez-Barris, *The Extractive Zone: Social Ecologies and Decolonial Perspectives*, xvi.

⁸⁵ Gómez-Barris, *The Extractive Zone: Social Ecologies and Decolonial Perspectives*, xix.

⁸⁶ Zografos, "The contradictions of Green New Deals: green sacrifice and colonialism," 38.

Since their initial development in the 1970s, lithium-ion batteries—or Li-ion batteries—have become the main renewable energy storage solution. They are widely used as a power source in portable electronics, electric vehicles, and grid storage, due to their high energy density, high power density and long-life cycle.⁸⁷ The current technology in Li-ion batteries is based on insertion-reaction cathodes and anodes.⁸⁸

Thesis disposition

This thesis is divided into three analytical chapters. The first chapter focuses on the video work *We Power Our Future with the Breast Milk of Volcanoes* (2016) by Unknown Fields, a film in which the nomadic art- and design duo shows aerial images of lithium extraction pools, juxtaposed with a speech regarding batteries used to store solar and wind energy. Following a visual and auditive semiotic analysis of the work, there is an examination on how it represents the overlap of two links within the lithium supply chain, that arguably connotes, not a catastrophic moment, but a quasi-event and a halt in time. The artwork's title anchors an Indigenous myth of creation of the Bolivian salt flat, which bears the possibility of it acting as a counter-myth to the myth of 'green' transition.

In the second chapter of this thesis, there is an exploration of how contemporary artists appropriate cartographic images in various forms to visibilise, contest, explore, and create territories, pinpointed to the specific case of *Land [2] Litio* (2022) by Marcela Magno. The artist uses and modifies Google Earth satellite images of Andean salt flats in Bolivia, Chile, and Argentina, with the intention of visibilising extraction zones. Treated as cartographies of depredation, Magno's work opens up several discussions regarding imperial visibility and invisibility of green sacrifice zones.

For the final analysis chapter of this thesis, there is an examination of Julian Charrière's large-scale installation *Future Fossil Spaces* (2014-2017). With a visual denotative analysis followed by an extraction of the possible connotations that the artwork provides, this chapter presents the

⁸⁷ Yangtao Liu et al., "Current and future lithium-ion battery manufacturing," *iScience* 24, no. 4 (2021).

⁸⁸ Arumugam Manthiram, "An Outlook on Lithium Ion Battery Technology," *ACS Central Science* 3, no. 10 (2017): 1064.

installation as a geological excavation of the future, and as an access point to the issue of apparent dematerialisation of the virtual world's infrastructure and the idea of unlimited growth.

I: *We Power Our Future with the Breast Milk of Volcanoes* – Unknown Fields

Unknown Fields' *We Power Our Future with the Breast Milk of Volcanoes* (2016) is a colour video with sound with a duration of 7 minutes and 15 seconds. A 2017 edition of this video work was exhibited in the show *Eco-Visionaries. Confronting a planet in a state of emergency*, curated by Gonzalo Herrero Delicado, Mariana Pestana, Pedro Gadanho and assisted by Rose Thompson, at the Gabrielle Jungels-Winkler Galleries in the Royal Art Academy in London, England, between November 2019 and February 2020 (Image 1). The video was accompanied by a lithium, aluminium and graphite glass battery developed by Unknown Fields, and exhibited in Gallery 1 alongside works by HeHe, Ana Vaz, and Tristan Bera, Tue Greenfort, Carolina Caycedo, Nerea Calvillo / In the Air, Olafur Eliasson, and Virgil Abloh. *Eco-Visionaries* presented very different works by artists, architects, and designers that delved into the current ecological transformations of the climate breakdown, "producing a critique of their causes, raising awareness of their less visible aspects and anticipating alternative visions of how to respond and adapt to their consequences".⁸⁹ The video work is also available online through Unknown Fields' website and their Vimeo channel.⁹⁰

The video shows drone footage of arid landscapes with white and grey surfaces, and pools filled with technicolour liquids, each in a different shade: azure, turquoise, cyan blue, neon green, viridian, khaki green, muddy yellow. At the beginning of the film, the scale of the pools is not apparent, but when a truck ride is seen on a road that limits one of the pools, it is possible to understand the massive size that each of these perfectly delimited and artificial bodies of water have. The short description of the work that the artists supply reveals that the vast landscape shown in the film denotes the Uyuni salt flat in Bolivia, and the Atacama salt flat in Chile. The artificial water bodies in the video are evaporation pools used to extract lithium from the Andean territories.

⁸⁹ "Eco-Visionaries. Confronting a planet in a state of emergency," 2019, accessed November 3, 2022, <https://royal-academy-production-asset.s3.amazonaws.com/uploads/caad3b0c-f1fc-402c-a204-ba09fab458df/EcoVisionariesLargPrintLOW.pdf>.

⁹⁰ "We Power our Future with the Breast Milk of Volcanoes," Unknown Fields, 2016, accessed November 3, 2022, <http://www.unknownfieldsdivision.com/summer2015bolivia+atacama-lithiumdreams.html>.

While observing these drone images of a landscape, the viewer hears the sound of a man giving a speech (or different parts of one) and also listens to his audience's reactions of approval, with applause, laughter, and cheers. The speech begins with a welcome address in English stating that this is the announcement of Tesla Energy. It starts with a short comment on the situation of fossil fuels in today's world, the effect greenhouse gasses have in our atmosphere, and the projected outcomes of the continued use of fossil fuels to power our world. This introduction leads to a "two-part solution" presented by the speaker, in which solar energy is the first part, and battery systems are the second. The speaker emphasises the very little space and land needed for the United States to transition from fossil fuels to renewable energies.



Image 1: Gallery view of Eco-Visionaries at the Royal Academy of Arts, London, 2020, showing The Breast Milk of the Volcano, by Unknown Fields. Photo: © Royal Academy of Arts, London; photographer: Marcus J Leith

It is safe to say that most viewers can recognise the speaker's voice almost immediately as belonging to Elon Musk, a business magnate, investor, and currently the second richest person in the

world.⁹¹ The mention of Tesla in the sixth second of the video serves as a further anchor that the speech is given by Musk, as CEO and product architect of the American car and energy company Tesla Inc. Indeed, Unknown Fields use the audio of parts of a famous speech given by Musk in 2015 in which he presents Tesla Energy and the small “sculpture-like” battery system Tesla designed for homes and industries, the Tesla Powerwall.⁹²



Image 2: Image still from the video work We Power Our Future with the Breast Milk of Volcanoes, by Unknown Fields, 2016 (Still made from the film, publicly posted on Vimeo platform by the artists).

At first, the purpose behind the juxtaposition of the visual images and the seemingly unrelated sound is hard to decipher. As described in the Method section of this thesis, Barthes used the term relay in visual semiotics to designate “the meanings that are not to be found in the image itself”.⁹³ In this semiotic analysis of the film *We Power Our Future with the Breast Milk of Volcanoes*, the recorded speech given by Elon Musk is comprehended as a relay. Upon seeing the unfathomable

⁹¹ According to "The World's Real-Time Billionaires," Forbes, 2022, accessed January 3, 2023, <https://www.forbes.com/real-time-billionaires/#55767a963d78>.

⁹² "Tesla introduces Tesla Energy," 2015, accessed November 25, 2022, https://www.youtube.com/watch?v=NvCIhn7_FXI. The full transcription of the edited speech used by Unknown Fields is available in the Appendix 2 section of this thesis.

⁹³ Barthes, *Image, music, text.*, as cited in Aiello, "Visual Semiotics: Key Concepts and New Directions," 7.

planes of Bolivian and Chilean salt flats, there might not be an immediate association with the production of lithium-ion batteries. The shape and format of lithium evaporation pools require a specific knowledge, and many of the viewers might not recognise them at first sight. Yet if they do, there is still a possibility that they do not know the full extent of the lithium supply chain. This makes me suggest that the function of the relay between sound and moving images in the artwork is to connect the lithium evaporation pools to the presentation of a final product, the Tesla Powerwall.

When paying attention to Musk's speech, it is relevant to mention that the word lithium is not mentioned at all. He focuses on new battery technology, but circumvents the specifics of the technology and composition of this new product. Instead, he concentrates on emphasising the minor changes needed to make an energetic transition happen in the United States:

[...] a lot of people aren't clear on how much surface area is needed to generate enough power to completely get the United States off of fossil fuels. Most people have no idea. They think it must be a so huge amount of area [...] actually very little land is needed to get rid of all fossil fuel electricity generation in the United States [...] It's really not much.⁹⁴

The juxtaposition in the film *We Power Our Future with the Breast Milk of Volcanoes* allows for a critical reflection. While the visual component of Musk's speech is not present, his little space and land discourse is opposed to the thousands of square kilometres used to extract the key raw material from which Tesla Powerwall is made. From the point of view of this analysis, the film visibilises the lithium extractive zone that is made invisible in Musk's speech.

The technicolour evaporation pools captured by Unknown Fields in the salt flats of Chile and Bolivia constitute the behind-the-scenes that host one of the world's most precious materials. Key to batteries that store renewable energies, lithium is a mineral that rests in mobile phones, electric cars, and in the Tesla Powerwall. Yet if this material is somewhat visible in what is understood now as every-day objects, the landscapes where it comes from are hidden from gaze: "You cannot

⁹⁴ Transcribed from the video work by Unknown Fields: "We Power our Future with the Breast Milk of Volcanoes." Full transcription available in the Appendix 2 of this thesis.

see it on the desperately flat horizon, or access it by any public road. Its mystery is protected by its isolation".⁹⁵ Due to the inaccessibility of these vast extraction sites, Unknown Fields seek to render it visible from the air: "what was once the crystal white expanse of the Salar de Uyuni has now been flooded with a surreal tinted sea".⁹⁶

In my view, *We Power Our Future with the Breast Milk of Volcanoes* is conceived as a visualisation of the landscapes that are placed out of view. There is a great effort to ignore that technologies are forged from the Earth's raw materials, as Musk's speech also connotes, since technologies are represented in continuous dematerialisation. While the techno-discourse invisibilises the raw materials that are taken from the Earth to sustain the 'immateriality' of the digital, Unknown Fields' film counters the invisibilisation of this contemporary extractivism. They visit the invisible and forgotten sites of production to trace the shadows cast by emerging 'green' technologies.⁹⁷

The links within the chain

We Power Our Future with the Breast Milk of Volcanoes focuses on lithium extraction from a very particular point of view: by visibilising—through the relay between the moving images and sound—links of its supply chain.⁹⁸ The work highlights these two moments within the lithium supply chain. On the one hand, and through the moving images, the intricate extraction of the raw material. On the other, and through the sound in the video, the commercialisation of lithium-ion batteries as a finished product available for consumers.

In the face of an-already-occurring climate breakdown, many countries in the world are seeking to leave behind fossil energy due to the impact the emissions of greenhouse gasses have on the atmosphere and, in consequence, on the Earth's ecosystems.⁹⁹ The way in which these countries are

⁹⁵ "We Power our Future with the Breast Milk of Volcanoes."

⁹⁶ "We Power our Future with the Breast Milk of Volcanoes."

⁹⁷ *The Breast Milk of the Volcano*, ed. Unknown Fields, Tales from the Dark Side of the City, (London: AA Publications, 2016).

⁹⁸ Understood as the process and network of people, companies, resources and technology involved from the extraction of raw materials, their transformation into intermediate goods, to the creation of products sold to customers.

⁹⁹ In this thesis I will not delve deeper into the impact that fossil fuels have on the environment, but it is important to mention it since it is the primary motivation for a 'green' energetic transition.

formalising their intentions of an energetic transition is through Green New Deals (GND). The energetic transition proposed by most GNDs focuses on replacing the fossil fuelled economic structure with renewable energies, making it possible through investments by the private and public sectors.

Zografos analyses how the GND discourse may invisibilise the actual consequences of what low-carbon transition plans inflict in the communities and ecosystems of the sites that are expected to “provide the infrastructure for such salvation”.¹⁰⁰ For Zografos, the large-scale solutions (such as GNDs) that wish to resolve the current triple crisis we live in are written and planned in the Global North, and are usually “embedded in colonial relations of injustice”.¹⁰¹ While analysing the GNDs made by the European Union and South Korea, he criticises how these countries are writing about transition, understanding it as care and support for the people within their borders, without acknowledging the situation for the people and land in the extraction zones that, as *We Power Our Future with the Breast Milk of Volcanoes* makes visible, will be deeply affected by the depletion of natural resources needed for the transition in the North to occur. This hints at the geopolitical dimension of the film: the extracted connotations that are explored in this section, point towards how the work positions itself in relation to extractive practices as a world-wide conflict.

While fossil energies do not need to be stored, it is not the same for renewable energies. The problem with solar and wind energies, is that they cannot be ‘combusted’ in the same way as fossil energies but need to be generated and stored for their use. Since the 20th century there have been several attempts to solve the dilemma of how to store renewable energies in batteries that are strong enough yet small enough to function in autonomous devices such as cars, trains, etc. (often referred to as the ‘holy grail’ of renewable energies). It was in the 1970s when Japanese companies started developing lithium-ion batteries; today, they are the most efficient and the cheapest solution to store renewable energies.¹⁰²

¹⁰⁰ Zografos, "The contradictions of Green New Deals: green sacrifice and colonialism," 38.

¹⁰¹ Zografos, "The contradictions of Green New Deals: green sacrifice and colonialism," 37.

¹⁰² Argento et al., *Litio en Sudamérica. Geopolítica, energía y territorios*, 36.

Even though renewable energies are obtained from virtually inexhaustible natural sources, the materials needed to assemble lithium-ion batteries are not. Lithium, graphite, cobalt, and manganese are some of the materials needed to produce these batteries, and they are limited raw materials that need to be extracted. According to a 2021 report from the United States Geological Survey, there is an estimate of 86 million tons of lithium around the world.¹⁰³ This natural resource can be extracted from brine—drilling and pumping liquids from underground salt flats and into evaporation pools, which is the form denoted in *We Power Our Future With the Breast Milk of Volcanoes*—or hard rock (spodumene)—extracting it directly from the ore.

While lithium is neither a scarce mineral, nor distributed unequally across the planet, the most profitable exploitation of this mineral is in salt flats. Out of the 86 million tons of known lithium reserves, 58% of it is located in salt flats in Bolivia (Uyuni), Argentina (Salinas Grandes, Olaroz-Cauchari, and Hombre Muerto), and Chile (Atacama), popularly referred to as the ‘Lithium Triangle’.¹⁰⁴ Lithium mining in salt flats is different from conventional metallic mining as it is no longer necessary to remove tons of soil or dynamite mountains.¹⁰⁵ The main problem is water mining: for every extracted ton of lithium, two million litres of fresh water are used.¹⁰⁶ The extraction of lithium in Andean salt flats is mainly controlled by five companies: Albemarle (United States), SQM (Chile), Livent Corp. (United States), Orocobre (Australia), and Ganfeng (China).¹⁰⁷

In *We Power Our Future with the Breast Milk of Volcanoes*, Unknown Fields specifically focus on the extraction part of the lithium supply chain. The aerial views of numerous evaporation pools that are shown in the film denote, in my reading, the system used to extract lithium brine from salt flats. Indeed, the array of colours in the pools is a visual representation of how the extraction through evaporation works. In the text that accompanies their video work, the artists write: “[a] tessellated ocean of evaporation ponds where each shift in hue signals a rising concentration of lithium salts [...] Each month the ponds are drained and transferred to the next in line, and each

¹⁰³ *Lithium. Mineral Commodity Summaries*, 2.

¹⁰⁴ Svampa, "Dilemas de la transición ecosocial desde América Latina," 8.

¹⁰⁵ Maristella Svampa and Enrique Viale, *El colapso ecológico ya llegó. Una brújula para salir del (mal)desarrollo* (Ciudad Autónoma de Buenos Aires: Siglo XXI Editores Argentina, 2020), 159.

¹⁰⁶ Svampa, "Dilemas de la transición ecosocial desde América Latina," 9.

¹⁰⁷ Svampa, "Dilemas de la transición ecosocial desde América Latina," 8.

month the colour changes and the Lithium gets richer”.¹⁰⁸ When the lithium is concentrated to its ideal percentage, it is taken to refineries, where it is transformed into lithium carbonate and sold. In 2017, 39% of commercialised lithium was destined to lithium-ion battery production, but it is projected that by 2026 that number will increase up to 70%.¹⁰⁹ China, South Korea, and Japan explain two thirds of the market’s demand for lithium; European countries import around 10%, and the United States 6%.¹¹⁰ This shows that both Global North and Global South countries are responsible for lithium exportation while its importation is unidirectional, as there are no peripheral countries requiring large-scale lithium quantities.

This stresses the significance of the sound component in Unknown Fields’s *We Power Our Future with the Breast Milk of Volcanoes*, and its relevance to understand the latter links in the supply chain. In Musk’s speech presenting Tesla Energy (a line of products designed to power homes with sustainable energy), he addresses the consequences of fossil fuel energies, and speaks about what he understands as the solution, namely renewable energies. The only obstacle he describes, is that existing batteries to store solar energies are “expensive, they’re unreliable, they’re sort of stinky, ugly, bad in every way”.¹¹¹ He presents Tesla Powerwall, a battery which stores the necessary energy to power a household in a grid system, that “looks like a beautiful sculpture on the wall”.¹¹² What Musk emphasises in his speech, is the small amount of surface area needed, on the one hand, for all the solar panels needed for energy supply in the United States, and on the other, for the batteries to store all the energy that the panels would provide.

The batteries produced by Tesla are lithium-ion batteries, the technology for privileged electrical accumulation in the world market. It is true that with current developments, the batteries do not occupy much space. But the critical geopolitical gesture of *We Power Our Future with the Breast Milk of Volcanoes* consists in juxtaposing Musk’s argument about the small space needed to get to

¹⁰⁸ “We Power our Future with the Breast Milk of Volcanoes.”

¹⁰⁹ Numbers and projections taken from a 2017 report made by the Argentinian Ministry for Energy and Mining, as cited in Argento et al., *Litio en Sudamérica. Geopolítica, energía y territorios*, 62.

¹¹⁰ Argento et al., *Litio en Sudamérica. Geopolítica, energía y territorios*, 60.

¹¹¹ Transcribed from the video work by Unknown Fields: “We Power our Future with the Breast Milk of Volcanoes.” Full transcription available in the Appendix 2 of this thesis.

¹¹² Transcribed from the video work by Unknown Fields: “We Power our Future with the Breast Milk of Volcanoes.” Full transcription available in the Appendix 2 of this thesis.

a point of energetic transition in the United States, with the vast extractive zones in Andean salt flats from which the main component of lithium-ion batteries is extracted. The different conceptions of space in both components of *We Power Our Future with the Breast Milk of Volcanoes* illustrate the mainly invisible conflict in different links of the lithium supply chain. By choosing to show the two-furthestmost-apart links of this chain—lithium extraction as a raw material, and presentation of the finished battery product for a United States audience of investors and members of the press—the film visibilises these conflictual concepts of space and sacrifice. The connoted abuse of the Earth's territories shown in the film is opposed to the idea of economic space proposed by Tesla Inc.'s CEO, and reinforces the idea of the salt flats as green sacrifice zones.

While the audience that can be heard in Musk's presentation speech is cheering and applauding, hearing the perfect solution to climate breakdown with no setbacks presented, the audience of *We Power Our Future with the Breast Milk of Volcanoes* is introduced to something different. Even if the same speech is heard, the juxtaposed images that oppose it might not expect a reaction of applause. The Musk speech that introduces a solution to our energy crisis, hides in it the myth of 'green' transition. The small changes that will be made to transition into renewable energy sources and Tesla batteries to store them, are small changes for the Global North. In opposition, the changes that will be inflicted in territories of the Global South, especially green sacrifice zones, are insurmountable. The hollowing-out of natural resources in extractive zones that keep multiplying will render possible Musk's 'perfect solution' to climate breakdown and the energy crisis.

The tears and breast milk of a grieving volcano

The title of the film *We Power Our Future with the Breast Milk of Volcanoes* is understood in this semiotic analysis as an anchor to the artwork, defined by Barthes as text used to fix the meaning of an image.¹¹³ This anchor can provide a connotation of the myth of creation of the Uyuni salt flat in Bolivia, referring to Indigenous narratives which describe "this shimmering white expanse being created from the mixing of the tears and breast milk of a weeping mother volcano who has just lost her lover".¹¹⁴

¹¹³ Aiello, "Visual Semiotics: Key Concepts and New Directions," 7.

¹¹⁴ "We Power our Future with the Breast Milk of Volcanoes."

There are as many versions of this myth of creation as there are Indigenous communities close to the salt plane.¹¹⁵ These communities include atacameños, quechuas, aymaras, and kollas.¹¹⁶ Since the stories stem from oral tradition, they differ according to which source is followed, yet there are not many accounts available in academic texts.¹¹⁷ According to the legend, Tunupa was a beautiful woman who was “caught up in fraught relations with the masculine sacred forces of the surrounding volcanoes”.¹¹⁸ Several suitors contested her love, but in the end she married Cuzco. Her husband had numerous indiscreet affairs, and during a fight, Cuzco stole their newly born child from Tunupa. Overpowered by grief, Tunupa transformed into a volcano, and unable to move and search for her child, she started weeping. While her tears filled the inside of the vast land around her, the breast milk that was meant for her child escaped her breasts and created the salted layer that covers the surface of Uyuni. It is said that she rests on the edge of the salt flat as a volcano, but every year her tears bring with them the annual floods that renew Uyuni.¹¹⁹

Using a reference to this creation myth of the Uyuni salt plane as an anchor to the film *We Power Our Future with the Breast Milk of Volcanoes* marks a clear connotation that the video offers. The myth of ‘green’ transition present in the use of Musk’s speech as a relay to the moving images, is counterposed to the Indigenous creation myth that is anchored through the title. In this perspective, the legends of Tunupa are conceived as an explanation for the creation of the Uyuni salt flat, yet her tears and breast milk are also associated as the fuel that powers our contemporary technoscientific world and serves as a sort of creation myth for our electric age, resulting in the future of late capitalism.

¹¹⁵ Rebecca Hollender and Jim Shultz, *Bolivia y su litio ¿Puede el “oro del siglo XXI” ayudar a una nación a salir de la pobreza?* (Cochabamba: Centro para la Democracia, 2010), 23.

¹¹⁶ Argento et al., *Litio en Sudamérica. Geopolítica, energía y territorios*, 175.

¹¹⁷ The Tunupa myth compilations that were used in this section are: Hollender and Shultz, *Bolivia y su litio ¿Puede el “oro del siglo XXI” ayudar a una nación a salir de la pobreza?*; Jean Friedman-Rudovsky, "The Myth of Tunupa," in *The Bolivia Reader: History, Culture, Politics*, ed. Sinclair Thomson et al. (Duke University Press, 2018). and Teresa Gisbert, "El Cerro de Potosí y el Dios Pachacámac," *Chungará (Arica)* 42 (2010).

¹¹⁸ Friedman-Rudovsky, "The Myth of Tunupa," 20.

¹¹⁹ Hollender and Shultz, *Bolivia y su litio ¿Puede el “oro del siglo XXI” ayudar a una nación a salir de la pobreza?*, 23.

While thinking about this gendered character of the landscape that in some way gave birth to the world's biggest lithium reserve, there is a possibility to imagine an alternative contemporary history of the extracted landscape. This makes me suggest that what is commonly conceived as a myth—of creation—in Barthes' definition, is now acting as a counter-myth, or as a substitution for the technoscientific myth that threatens to rule these territories. This Indigenous gendered figure deconstructs the very naturalised myth of 'green' transition, but also provides a new mythological understanding of (this) nature.

A halt in time

Duarte Filho analyses the interminable portrayals and discourses of apocalyptic ends in contemporary media culture.¹²⁰ In everything from blockbuster movies to doomsday cults and artworks, it is common to see images of giant waves engulfing continents, invasions, plagues, glaciers melting, etc., pushing a discourse of proximity to the end. For Duarte Filho, there are echoes of this obsession with apocalyptic ends in the discussion of the Anthropocene, drawing a parallel with the catastrophic consequences of human intervention of the territory. The problem with such catastrophic narratives, he argues, is that they "obscure the larger temporal frame in which extractive relations – both to nature and to racialised bodies – are established".¹²¹

This catastrophic discourse based on disruptive disasters is a privileged position for mediatic and artistic responses to climate breakdown. Still, it conceals the works that bear a larger temporal frame and consequently a different geopolitical agenda. These works evoke stillness while being aware of the impending doom, showing what Duarte Filho calls, "an ambiguous halt in time".¹²² In my view, *We Power Our Future with the Breast Milk of Volcanoes* provides an alternative to the mainstream position of representing climate breakdown by images of disruptive disasters and apocalyptic symbolism. The aerial footage of lithium extraction sites in Latin America, along with Elon Musk's presentation speech of the Tesla Powerwall, are neither catastrophes nor their aftermath. They are rather seen as visualisations that connote the moment before; what is happening

¹²⁰ Duarte Filho, "Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil."

¹²¹ Duarte Filho, "Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil," 425.

¹²² Duarte Filho, "Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil," 426.

now, quasi-events, that will—eventually—lead to disasters. The argument explained by Duarte Filho is inspired by the conceptualisation of quasi-events made by Elizabeth Povinelli, where she understands them as “a form of occurring that never punctures the horizon of the here and now and there and then [...] It is only ever here-ish and now-ish and this asks us to focus our attention on forces of condensation, manifestation, and endurance”.¹²³ *We Power Our Future with the Breast Milk of Volcanoes* can arguably be framed within Duarte Filho’s main argument, understanding “extractivist practices not through an apocalyptic sense of drastic ruptures, but rather through a perspective of cumulative violence.”¹²⁴ The extractivist endeavours not only implement mechanisms of slow and cumulative violence towards the extracted nonhuman agents, but also towards racialised bodies, where nature—or Pachamama—can also be understood as an extracted racialised body.

In their exploration of Amerindian perspectives, philosopher Déborah Danowski and ethnologist Eduardo Viveiros de Castro describe the understanding of the natural world for Amazonian peoples as a “multiplicity of intricately connected multiplicities”.¹²⁵ Animals and other spirits are conceived as political entities with a subjective dimension embedded in a collective political alterity. According to Danowski and Viveiros de Castro, in Amerindian cosmologies, nonhuman agents are endowed with anthropomorphic characteristics. In an Amerindian perspective, the environment is conceived as “a society of societies [...] There is, therefore, no absolute difference in status between society and environment”.¹²⁶ In this sense, the Amerindian perception of animals and other species with a subjective dimension, and the myths of creation that associate nonhuman agents with an anthropomorphic origin is here used as a backdrop for reinterpreting Duarte Filho’s conceptualisation of cumulative violence.

What *We Power Our Future with the Breast Milk of Volcanoes* denotes is footage of lithium extraction sites. Still, it is worth mentioning that the consequences of these activities cannot be fully

¹²³ Elizabeth Povinelli, *Geontologies: A Requiem to Late Liberalism* (Durham, NC: Duke University Press, 2016)., as cited in Duarte Filho, "Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil," 418.

¹²⁴ Duarte Filho, "Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil," 418.

¹²⁵ Déborah Danowski and Eduardo Viveiros de Castro, *Há mundo por vir? Ensaio sobre os medos e os fins*, trans. Rodrigo Nunes for e-flux (Cultura e Barbárie, 2014).

¹²⁶ Danowski and Viveiros de Castro, *Há mundo por vir? Ensaio sobre os medos e os fins*.

portrayed, since they overgrow and spill out beyond the frames. Unlike in images of catastrophes, *We Power Our Future with the Breast Milk of Volcanoes* does not focus on the aftermath of a disaster, but concentrates on how the effects that extractive practices have expand beyond what they can—and choose—to show. In my view, the video work is immersed in a spiral-like temporality, “in which catastrophe has both already happened and is still happening”.¹²⁷ This has consequences for the meaning of the film’s geopolitical potential as it connotes a stillness before the impending doom, which however is re-signified as the result of cumulative slow violence against nature as a gendered nonhuman actor. Ultimately, the film portrays what is presently happening to the landscapes in Latin America that are used to support the Global North’s future ‘green’ transition, and shows how this process is connected to a counter-myth of the same landscape as the materialisation of a volcano-mother that mourns.

¹²⁷ Duarte Filho, "Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil," 429.

II: *Land [2] Litio* – Marcela Magno

Land [2] Litio (2022) by Marcela Magno was exhibited in the 14th edition of the La Habana Biennale in the first half of 2022. The title of the biennale was *Future and Contemporaneity*, and it gathered artistic projects that established reflexion platforms on civilization's development, from the perspective of artistic territories understood as plural and decentralised spaces.¹²⁸ Magno participated in the exhibition *Unstable Horizons* curated by Margarita Sánchez Prieto in the Fototeca de Cuba, alongside Belén Rodríguez, Bernhard Lang, Cecilia Barreto, Colectivo FIBRA, Gabriele Rothemann, Paz Encina, Renata Roman, and Sebastián Vereá.¹²⁹

Not being present for the Biennale herself, Magno sent a 'cartographic box' containing three printed images of 150 x 220 cm, three books composed of several printed sheets, and an installation system for the oversized prints to be hung slightly separated from the wall. The 'black box' she sent to Cuba was made in a fine black fabric, and Biennale curators had full liberty on how to show the works contained in the box. The curatorial team decided to exhibit the box's contents as intended originally, using the installation system devised by Magno to hang the three large-scale prints on the walls, and leave the prints of the three books accessible for visitors to touch and take.

Marcela Magno's *Land [2] Litio* is a series of black and white images, showing diversely shaped flat rectangles with different shades of grey. The backgrounds where these rectangles are placed differ between the images, each with varying textures in black, white and grey. This series shows traces of reliefs and planes across the works. The common thread in the images is, on the one hand, the indexical representations of geographical features as seen from above, and on the other hand, the flat rectangles in shades of grey that reappear in different shapes, sizes, and placements.

Currently there are ten different works made by Magno as part of the series *Land [2] Litio*, but as she continues this series, she also creates more and more works. Although the meticulous working

¹²⁸ "Bienal de la Habana," 2021, accessed October 2, 2022, <http://www.wlam.cult.cu/14bienaldelahabana.html>.

¹²⁹ "'Horizontes inestables" en la XIV Bienal de La Habana," Ministerio de Cultura, República de Cuba, 2022, accessed December 27, 2022, <https://ministeriodecultura.gob.cu/es/actualidad/noticias/horizontes-inestables-en-la-xiv-bienal-de-la-habana>.

process of collage is not always clearly visible in the images, Magno composes each work through an intricate selection of the best satellite images available for each pixel, and spends hours conflating these segments into the exhibited collages. The result of this assembly is the—sometimes—imperceptible use of satellite images of various years and qualities. Her conflation of images into a new one, constructs, following contemporary definitions of collages, a new way of seeing something that, in a sense, was already visible; taking something out of its context and giving it a new one.¹³⁰ Writer Brandon Taylor investigates collage in the 20th century in his book *Collage: The making of modern art*, where he explores collages as part of the abyss between the modern optimism of the official world and the material residue that derives from it.¹³¹ Even though the differences between the collages of the last century and the present are immense due to technological resources and choices, Taylor's notion of collage resonates with the composite imagery of *Land [2] Litio*.

There are many works in the studied series, but the visualisation and analysis of two will particularly help with the study of *Land [2] Litio*. The works *Argentina, Salar del Hombre Muerto, 25°28'15.80" S 67°5'9.92" O, 16 Oct 2020* (Image 3), and *Bolivia, Salar de Uyuni, 20°32'54.95" S 67°22'36.33" O, 30 Abr 2019* (Image 4) are exemplary to explore the visuality of the series, and to understand the collage process the artist applies to each work.

In the first work, there is a vertical landscape with several shades of grey colliding and combining to form organic shapes, and leaving traces behind. Like a watercolour stain, the dark figure in the centre of the image expands towards the light grey and white adjacent spaces. Different geographic features appear, such as hills, mountains, and water bodies, some more detectable than others. The monochromatic translation of the satellite images confuses the viewer, but the cartographic representations of elevated planes and salt concentrations are still visible. My eyes are repeatedly drawn to the massive black organic figure that covers a large portion of the image, appearing to be a black body of water but which could also be seen as an oil spill or a watery paint stain. Human-made roads divide and intersect the represented territory, delimiting the natural landscape. Where the roads

¹³⁰ Claudia Prieto Guerrero, "Fragmentos de una realidad : El collage" (Bellas Artes Universidad de Sevilla, 2020), 23.

¹³¹ Brandon Taylor, *Collage: The making of modern art* (London: Thames & Hudson, 2004).

intersect in the end of a 'V' shape (left lower quadrant of the image) small rectangles and parallelograms are also visible. Each of these varying between light and medium greys. In this context it is not easy to understand the size of the four-sided geometric shapes. They appear to be quite small, although there is no comprehensible scale to compare them with.



Image 3: Argentina, Salar del Hombre Muerto, 25°28'15.80" S 67° 5'9.92" O, 16 Oct 2020, by Marcela Magno, 2022. Courtesy of the artist.

The second work, *Bolivia, Salar de Uyuni...*, follows the same construction process as the one discussed above, yet there are some visible differences. Geographical features are present, especially the reliefs surrounding the big white shape in the middle of the image. In these reliefs, the

textures generated by a zenith viewpoint indicate elevations and depressions in the landscape. The central white shape is constructed by visibly different segments, in each the off-white tone being slightly altered. Portrayed even smaller than in the work discussed above, are highly-defined rectangles and groups of rectangles in the mid-lower section of the image. Roads that delimit the landscape are not as visible as in the last work. But what is denoted in this case, is the use of fragments that compose the digital collage made by Magno. Even if some of her works in the series seem like black and white screenshots of satellite images, in this ‘broken’ image where all fragments are visibly appearing, the selection and choices behind each piece become visible and makes it clear that the work is presented as a collage.



Image 4: Bolivia, Salar de Uyuni, 20°32'54.95" S 67°22'36.33" O, 30 Abr 2019, by Marcela Magno, 2022. Courtesy of the artist.

The titles accompanying all the works in *Land [2] Litio* are chosen to anchor the original technical tools—satellite imagery—used in each of them. They are all composed of the country’s name, the salt flat’s name, the exact geographic coordinates (with degrees, minutes and seconds), and the month and year of when the screenshots were made by the artist—prior to the conflation of fragments. When looking into the names of these particular works, one that stands out is the one of the

first works analysed in this section: Salar del Hombre Muerto. The direct translation of this is: Dead Man's Salt Flat, which is the name that this salt flat carries, located in the Catamarca province in the North west of Argentina. The origin of this name is uncertain, yet it is believed that Argentinian geologist Luciano Catalano coined it in the 1920s during expeditions he made to the Puna region as National Deputy Secretary of Mining. It is believed that Catalano named this particular geographic area due to a tomb that was on the edge of the salt flat.¹³² Although the origin of the name is not entirely certain, in this analysis, Salar del Hombre Muerto can be comprehended as a connotation that concerns the symbolic and historic meaning of death, anchoring these possible conceptions to the particular salt flat. The black organic figure that covers the central part of the work can connote death, as mentioned above, by reminding the viewer of an oil spill, or perhaps a dead body of water.

The exercise of anchoring the works with titles composed of technical data of the explored sites is also present in the overarching project *Land* (2012-ongoing), where *Land [2] Litio* is a recent chapter of. Magno explores through satellite images from Google Earth the topographies of different extractive zones. She categorised the maps according to the material extracted: petroleum, gold, soy, copper, silver, and lithium. The artist explains that this project aims to make visible the cartographies of extraction sites of natural resources and their waste, showcasing the political construction, geopolitical identity, and historical evolution of the territory.¹³³ Working with cartographical images of extractive zones, Magno's images visibilise the capitalist transformation of landscapes that are conceived to produce "environmental disaster, equivocal territorial definitions and the uncertain future of our planet".¹³⁴ While expanding her artistic research into extractive zones, in *Land [2] Litio* Magno has centred her focus towards lithium extractivism, exploring cartographic representations of salt flats in Bolivia, Chile, and Argentina.

Magno's *Land [2] Litio* highlights the cumulative effect of extractive capitalism through a conception of a different relationship with nonhuman agents, where lithium—a nonhuman agent—is the main character of the works. The series of printed black and white maps constructed with

¹³² "Salar del Hombre Muerto," EOL Energía Online, accessed 9 December, 2022, <https://www.energiaonline.com.ar/salar-del-hombre-muerto/>.

¹³³ "2012 / in progress. LAND 1," 2012, accessed October 3, 2022, <https://marcelamagno.com/project/land/>.

¹³⁴ "2012 / in progress. LAND 1."

selected and cropped images of lithium extraction zones, focuses particularly on the salt flats in Atacama (Chile), Uyuni (Bolivia), and Hombre Muerto, Olaroz, and De los Pastos Grandes (Argentina). These high-definition assembled satellite images confront viewers with the image of how lithium mining in Latin America transforms the landscape into green sacrifice zones.

Cartographies of depredation: the visibilisation of inaccessible territories

Contemporary artists appropriate cartographic images in various forms to visibilise, contest, explore, and create territories.¹³⁵ In *Land [2] Litio*, Magno examines the political constructions of lithium extraction zones, while tracing the visible changes these territories go through and the geopolitical identities associated with them.

The use of thousands of satellite image fragments of different months and years connote the historical evolution of landscapes, emphasizing the territorial and economic transformations they go through. By making high-resolution and large-scale prints of intervened satellite images, her works visibilise—through a zenith viewpoint that is deconstructed and reconstructed into a collage—the pressing situation of extractive zones in Latin America to which the public is not allowed access. Whether the exploitation and extraction of lithium in salt flats are being managed by private or state-owned companies, extractive zones are regularly not open for visits. They are industrial gated complexes that do not allow visibility. However, *Land [2] Litio* visibilises these contested territories by spending hours conflating the thousands of satellite images into digital collages and giving them a circulation in a different field. These images are normally present on the search engine Google Earth, and even though it is an open access site, there is no particular reason for users to search these exact geographic coordinates. What Magno creates is a new spectatorship, by showcasing these images for audiences that experience artistic exhibitions.

Casablanca uses the term ‘cartographies of depredation’ in her analysis of the overarching series *Land* to explain the visibilisation of extractive activities in Magno’s work, especially to analyse

¹³⁵ Speranza, *Atlas portátil de América Latina. Arte y ficciones errantes*, 23.

her work on oil extractive zones.¹³⁶ In this analysis, *Land [2] Litio* can also be interpreted as the representation of cartographies of depredation, as it connotes a visibilisation of the physical changes in the landscape where lithium is extracted from. In my view, *Land [2] Litio* constructs a sort of geopolitical map that gives an account of Latin American landscapes, marked by the depredation of transnational companies.¹³⁷ The images present in *Land [2] Litio* thus result in a visualisation of the capitalist food chain, where the proliferation of capitalistic endeavours has as a premise the creation of green sacrifice zones and the death of primeval landscapes. Ultimately, Magno's images described above connote the dystopian result of modern utopias, summarised today in the bearings of climate breakdown. The myth of modern progress and the myth of 'green' transition appear, from the perspective of Latin American landscapes, as two sides of the same—colonial—coin. The unlimited economic growth that characterised modernity is rebirthed in the contemporary process of energetic transition. The consequences of the Global North's industrial expansion in the search for key materials that sustain 'green' production systems are expressed in the creation and expansion of green sacrifice zones in the Global South.

Through a process of resignification of cartographic images, *Land [2] Litio* serves the spectator with the 'right to look' through a countervisuality, understood by Mirzoeff as an essential tool to dismantle imperial visibility, as a "crucial decolonial strategy for it does not seek a different way to look at images, but it is an 'attempt to reconfigure visibility as a whole'".¹³⁸ In his 2011 book *The Right to Look. A Counterhistory of Visibility*, Mirzoeff analyses hegemonic complexes of visibility related to modernity's dominant narrative of progress: the plantation complex, the imperial complex, and the military-industrial complex.¹³⁹ For Mirzoeff, all visibility was and is imperial visibility.¹⁴⁰ The imperial complex reframes the racial hierarchies from the plantation complex, and structured the world according to historically oppressive binaries, ordering spaces between

¹³⁶ Casablanca, "Diálogos visuales sobre el neoextractivismo: Obras situadas y conflictos ambientales en tres artistas mujeres contemporáneas."

¹³⁷ Casablanca, "Diálogos visuales sobre el neoextractivismo: Obras situadas y conflictos ambientales en tres artistas mujeres contemporáneas."

¹³⁸ Duarte Filho, "Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil," 433.

¹³⁹ Sara Blaylock, "Review: The Right to Look," *InVisible Culture*, no. 17 (2012).

¹⁴⁰ Mirzoeff, *The right to look: a counterhistory of visibility*, 196.

colonies and metropolises, and setting boundaries to the limits of the possible, determined by the authority of the civilised over the incommensurably primitive.¹⁴¹

By critically engaging traditional imperial tools of visualisation such as the map, *Land [2] Litio* can be understood under Mirzoeff's category of countervisuality. In a manipulation and decontextualisation of the imperial visuality that the satellite images of the transnational corporation Google Earth connote, *Land [2] Litio* resignifies images which are used to study, understand, and dominate a natural landscape to highlight the geographical and environmental result of modernity's utopias. The narrative of unlimited growth made possible by renewable energies that predominates today's energetic transition discourses, has a direct impact on the territories from where the raw materials that sustain these infrastructures (lithium, in this case) are extracted from.

In her book *Visual Occupations: Violence and Visibility in a Conflict Zone*, Hochberg focuses on the geopolitical construction of visibility, the denaturalisation of vision, and the recognition of our own blindness. For Hochberg, to overcome oppressive geo-sociopolitical orders, it is necessary to recognise our own failure to see, and to generate new ways of seeing. In this chapter, I come to argue that Magno is creating a new way of seeing the territory through her collages that can be understood with Hochberg as a process that involves tactical and physical interventions in the landscape, but also a conscious manipulation of visual positions, new modes of appearance/disappearance, and creating new settings for spectatorship.¹⁴² More concretely, Magno's work visualises, through her conflated cartographic images, the historical—yet contemporary—identity of Latin America as a reservoir of natural resources for the Western world to exploit. By manipulating the imperial visuality that the satellite images are understood to connote, *Land [2] Litio* confronts viewers with an indexical view of the tangible consequences of extractive endeavours in Latin American landscapes. The indexical sign is used in this context to explore how the images of *Land [2] Litio* are signifiers of, not only geographic features, but also the effects of lithium extraction in the chosen territories.

¹⁴¹ Mirzoeff, *The right to look: a counterhistory of visuality*, 14.

¹⁴² Hochberg, *Visual Occupations: Violence and Visibility in a Conflict Zone*, 3.

As Graciela Speranza states in her book *Portable Atlas of Latin America. Wandering Art and Fictions*, maps are an instrument for power and domination.¹⁴³ The identity that has crossed the history of Latin America after its colonisation is explored by Penhos in her famous book *See, Know, Dominate. Images of South America at the End of the 18th Century*.¹⁴⁴ Penhos analyses colonial representations of Latin America through maps, images, and texts of European expeditions to the current Argentinian territory in the 18th century. Penhos dismantles the processes through which these representations were considered testimonies and social documents, relating the cultural and historical elements that intervene in the—necessarily trimmed and subjective—act of seeing with the collection of knowledge of the South American territories, and the symbolic and material mechanisms of dominion. Motivated by the need to gather materials and images, the participants of these expeditions would collect iconographic and written data that, once analysed, would optimise the colonisers' political dominion.

Taking these definitions of maps and their colonial usages into account—which shaped an imperialistic view of Latin America as the reservoir of natural resources up for grabs—*Land [2] Litio* creates a new way of seeing cartography. This results from a critical appropriation of a contemporary mapping technique, transforming it into a tool for visualising and visibilising exploitative endeavours in green sacrifice zones. According to the artist herself, the overarching series *Land* “is a work of geopolitics, about how natural resources are negotiated and distributed, about what is the true strategic relevance of each of these zones on Earth”.¹⁴⁵ The fragments of extractive infrastructure, from evaporation pools to roads for trucks to take out raw materials, are visualised in *Land [2] Litio*, indicating the strategic relevance of these territories for a ‘green’ energetic transition. Extractivism is visualised here as “an unstoppable activity, in constant expansion, since the technological development—hand in hand with population growth—forces an incessant increase in its demand”.¹⁴⁶

¹⁴³ Speranza, *Atlas portátil de América Latina. Arte y ficciones errantes*, 23.

¹⁴⁴ Penhos, *Ver, Conocer, Dominar. Imágenes De Sudamérica a Fines Del Siglo XVIII*.

¹⁴⁵ "Marcela Magno, cartográfica," 2019, accessed 2 November, 2022, <https://www.diariocronica.com.ar/noticias/2019/09/09/22874-marcela-magno-cartografica>.

¹⁴⁶ Margarita Sánchez Prieto, Paisaje en datos: las cartografías satelitales de Marcela Magno, October 2022, Unpublished manuscript.

Google Earth and the artistic use of digital images

As discussed in the previous sections of this chapter, for her work *Land [2] Litio*, Marcela Magno spends hours conflating thousands of satellite images taken from Google Earth, carefully choosing fragments of each and optimising them, resulting in the images seen in the series. They denote a different view of the lithium landscapes to the ones accessible through Google Earth, since the artist identifies and delimits the zone to be mapped and seeks the best pixels in every stretch of each screenshot, “to later ensemble them so that the area that they occupy is appreciated”.¹⁴⁷ Her act of making a collage with these fragments changes the original visualisation present in Google Earth. In this sense, Magno uses an existing resource produced by an open access system of geographic information from a transnational company to highlight the marks of green colonialism through digital manipulation—threading the fragments together in Photoshop—, and giving an alternative circulation of these images within the global artworld.¹⁴⁸

According to curator and art critic Ticio Escobar, techno-digital images—such as satellite images from Google Earth—have not been conceived for any expressive or aesthetic usage, since they come from a very different environment than the artistic one, namely, from the techno productive and scientific fields.¹⁴⁹ Escobar discusses how, in many cases, the aesthetic component of images created with numeric technology is neglected, most probably because of its direct engagement with the market’s logics. The images in that context are conceived in a spectacular and corporative key, and generate a system that moves away from the individual profile of the ‘inventor-creator’, towards a technician employed by mega corporations, or as Escobar defines them, “productive innovators”.¹⁵⁰

Land [2] Litio, with a gesture to show the manipulation and transformation of the context of techno-productive images available on Google Earth, depicts a translation of the thousands of chosen fragments into monochrome. Black, grey, and white serve to flatten the surfaces, that combined

¹⁴⁷ Sánchez Prieto, *Paisaje en datos: las cartografías satelitales de Marcela Magno*, 2.

¹⁴⁸ Casablanca, “Diálogos visuales sobre el neoextractivismo: Obras situadas y conflictos ambientales en tres artistas mujeres contemporáneas.”

¹⁴⁹ Ticio Escobar, *Aura latente: estética - ética - política - técnica* (Asunción: Centro de Artes Visuales, Museo del Barro, 2020), 158.

¹⁵⁰ Escobar, *Aura latente: estética - ética - política - técnica*, 145.

with the zenith viewpoint of satellite images, profoundly transform the visible representation of the landscape, where depressions and elevations are barely identifiable, without depth nor horizon.¹⁵¹ This also changes the traditional connotation of satellite images as indexical representations of territories, since this transformation highlights the construction process behind each pixel in the resulting works.

Taking the same works from the series *Land [2] Litio* used for analysis in the previous sections as reference, one can search what Google Earth shows in these locations. In the case of the first analysed work, *Argentina, Salar del Hombre Muerto...*, when looking at this salt flat on the open access tool in November 2022, the passings of time are seen, such as the reduction of the water body, or the darkening of the geometric shapes in the lower part of the image. But aside from these traces that show the changes that the territory suffered, it is clear that the monochrome transformation Magno applies to her works alter how the overall landscape is perceived. The geographic features are partially obscured; the very clear zenith view of the aforementioned water body in the satellite image becomes a much more unspecified black stain in the landscape. This mode of diminishing the indexical status of the satellite images has consequences for the semiotic reading of the images as they appear to open a different set of meanings. The artistic technique applied in *Land [2] Litio* enables a more associative reading, where the blackness of this central body can connote meanings that the Google Earth satellite image of the same landscape could not. *Land [2] Litio* could then be said to re-signify the indexical sign as such, where in this context it becomes a trace for extractive capitalism's violence over green sacrifice zones.

When searching on Google Earth for the Uyuni salt flat in Bolivia, the landscape explored in the second work analysed in this chapter—*Bolivia, Salar de Uyuni...*—, the image result in the search engine has very little in common with the image presented in Magno's work. However, it is possible to spot a seemingly similar image in Google Earth, the result of what appears to be only one satellite image. But when dissecting closely into the same territory, the different layers of satellite images are exposed and it became clear to me how the search engine composes its representations through an overlapping of numerous satellite images, with diverse resolutions, colour schemes,

¹⁵¹ Casablanca, "Diálogos visuales sobre el neoextractivismo: Obras situadas y conflictos ambientales en tres artistas mujeres contemporáneas."

and from different moments in time. The point is to highlight how Magno in her work process uses different images that fit best in her composition and threads them together to create her final collage. This conscious selection humanises the—otherwise—artificially composed topographies. In his book *Against the Anthropocene*, T.J. Demos analyses satellite images as tools for visualisation used in the name of the Anthropocene, and states: “Seemingly existing as self-evident pictures, satnav imagery resembles and is often taken for photography, but actually comprises a composite set of digitized files, the result of processed quantities of data collected by satellite-based sensors, much of it invisible to human perception”.¹⁵² In contrast, the intervened images present in *Land [2] Litio* connote a human eye and a critical gaze towards the original—and often semiotically opaque—satellite images taken and assembled by machines and algorithms, that are reused as tools for enhancing human perception.

Through a conscious and critical—therefore, human—selection, manipulation and re-contextualisation of satellite images, the semiotic notion of index can be applied not only to the indexical view of a physical location in *Land [2] Litio*, but also, and in my point of view more significantly, as an index of the human hand and critical intervention of the artist. In that sense, she uses a tool that was conceived in and for the technoproductive machinery—in the case of extractive capitalism, to survey and control—and re-signifies it into an artistic production. Through the selection of pixels for her collages, she visibilises the invisibilised data processing performed by websites such as Google Earth in its attempt to generate an ‘objective’ representation of territorial realities. *Land [2] Litio* counters the myth of transhumanism in an attempt to explore, in Ticio Escobar’s words, “the rebellious possibilities of art in the times of total market”.¹⁵³

¹⁵² Demos, *Against the anthropocene : visual culture and environment today*, 14.

¹⁵³ Escobar, *Aura latente: estética - ética - política - técnica*, 136.

III: *Future Fossil Spaces* – Julian Charrière

Julian Charrière's *Future Fossil Spaces* (2014-2017) is a large-scale installation composed by two main elements: off-white and brownish bricks in different shapes, and bricks in spaces that connote small pools of water. In the installation, Charrière stacks the rough textured bricks into towers that vary in height and volume, and around or inside of them he includes these pool-like containers. The large-scale installation leaves corridors in between these stacks and pools where visitors can go through to examine the piece from different angles.

The exact size, brick and pool shapes, and overall configuration of the space varies directly depending where the installation was placed. The first edition of the piece was created for (Off)icielle in Paris, France (2014), but there were also different editions for Kunsthalle zu Kiel in Kiel, Germany (2015); for the Biennale di Venezia, in Venice, Italy (2017); for Art Basel in Miami, United States (2017), among others. For this analysis, there will be a focus on two particular editions: the one created for (Off)icielle in Paris (Images 5 and 7), and the one from the Biennale di Venezia (Image 6). Although the details and the configuration of the installation changed from edition to edition, there are several elements that are constant.

The height fluctuation of the brick stacks is present in all the editions; stacks that are just one brick high, stacks that are taller than human bodies, stacks that exist somewhere in between. These different heights invite the visitor to inspect each stack as an individual phenomenon, getting close to the floor to see the details in the lower stacks, but also trying to appreciate the details in the higher stacks from a vantage point that will never see their beginning—or end. The difference in scale of each stack also affects how visitors perceive themselves in relation to the space, and to what lays in front of them.

Another material quality of the installation that reoccurs in every edition of *Future Fossil Spaces* is the visual textures present in the sides of the bricks. Visible as brown horizontal lines over the off-white brick surfaces, they flow in the space connected with one another (Image 7). For each edition, the bricks have a certain size, and that is maintained. The lines that envelop each unit are placed at the same height within them, so that when towers of bricks are laid immediately next to

each other, their horizontal lines will show continuity, generating this visual texture as more bricks are combined, stacked, and organised in the exhibition space.

Either as prisms or triangular prisms, the three-dimensional bricks presented in the stacks have no sharp edges. In the case of the installation for (Off)icielle, the prisms form almost linear structures, placed perpendicularly from each other, and leaving ample spaces for visitors to go through (Image 5). It is different in the case of the Biennale di Venezia, where the stacks are made out of triangular prisms that, combined, form hexagonal prisms. They are placed closer to each other, in what appears to be an irregular manner, making it harder for visitors to walk freely through the narrow corridors they generate (Image 6).



Image 5: Future Fossil Spaces, by Julian Charrière, 2014-2017, salt-bricks from Salar de Uyuni, acrylic containers filled with lithium brine. Installation view, (Off)icielle, Paris, France, 2014. Copyright of the artist; VG Bild-Kunst, Bonn, Germany. Photo by Studio Julian Charrière.

Following the shape of its corresponding bricks, the pools that appear in the installation differ in shape depending on the brick configuration. Where bricks are prisms, the contained bodies of

water are rectangles laying on the floor next to the towers (Image 7). But where the bricks are triangular prisms that form hexagonal towers, the pools appear quite differently: they are no longer placed on the floor, but within the towers (Image 6). Here they are embedded in them, taking the place of several bricks. Another variation between the representation of pools in the different editions of *Future Fossil Spaces* is the colours they have and the materials with which they are constructed. The rectangular floor-placed pools are constructed with materials that are not transparent, and their colours go from light blue to light greens, without significant contrasts between the shades portrayed. The pools embedded into the hexagonal brick towers, on the other hand, are made out of a translucent material (could be glass or acrylic) and their colours range from bright green, turquoise, azure, light blue, and muddy green.



Image 6: Future Fossil Spaces, by Julian Charrière, 2014-2017, salt-bricks from Salar de Uyuni, acrylic containers filled with lithium brine. Installation view, La Biennale di Venezia, Arsenale, 57th International Art Exhibition, Viva Arte Viva, 2017. Copyright of the artist; VG Bild-Kunst, Bonn, Germany. Photo by Jens Ziehe.

For the construction of *Future Fossil Spaces*, Charrière uses salt and its resulting lithium brine extracted from a trip he made to the Uyuni salt flat in Bolivia. The installation, which oscillates between denoting a topography and a physical landscape, connotes the future negative spaces that will be carved in the Earth by the mining operations that seek to extract lithium, showing “traces of how the digital era will mar the physical which sustains it, effectively demonstrating how the enlargement of the virtual world requires a hollowing-out of the world of natural resources”.¹⁵⁴

In his work, Charrière used the salt lumps that he gathered in a fieldtrip to Uyuni to construct a negative space of the mined salt that leaves a new cavity in Bolivia.¹⁵⁵ As mentioned in the previous chapters, the Uyuni salt flat, as part of the Lithium Triangle, holds the biggest known lithium reserve in the world. However, due to negotiations over the terms of its extraction and posterior development into batteries, most of the lithium in Uyuni remains largely unexploited.¹⁵⁶ *Future Fossil Spaces* visualises the changes that this vast landscape is destined to suffer in the upcoming decades. Due to the increased value that lithium has and most probably will continue to have, this seemingly infinite environment will be hollowed-out. While our dependence on lithium batteries continues to grow exponentially, more and more of these salt flats will be exploited and modified.

The hexagonal prism brick towers in the 2017 edition shown at the 57th Biennale di Venezia resemble the white polygonal salt scabs present in the surfaces of actual salt flats. The brown lines that envelop each brick, stacked on top of each other in the installation's towers can then denote the age lines of strata, understood as traces of the lengthy geological processes that the planet has gone through to generate mineral concentrations. However, the age lines of strata in Charrière's *Future Fossil Spaces* are seen to connote how the rapid expansion of the digital world and the technologies needed for a 'green' transition comes hand in hand with the continuous extraction of raw materials generated by the Earth during tens of thousands of years. It is the extraction of these natural resources that allow a future embedded in the myth of the 'green' transition, presented as an ever-increasing dematerialisation, and the consolidation of a brave 'green' world.¹⁵⁷ In contrast, *Future Fossil Spaces* visualises the traces that this new world will come to generate in primeval

¹⁵⁴ Charrière, "Future Fossil Spaces."

¹⁵⁵ Charrière, "Future Fossil Spaces."

¹⁵⁶ Argento et al., *Litio en Sudamérica. Geopolítica, energía y territorios*, 225.

¹⁵⁷ Aldous Huxley, *Brave New World*, 11th ed. (London: Vintage, 2010, 1932).

landscapes, bringing them back in to the present by “displaying the raw material of the digital as an artifact from the past”.¹⁵⁸ In this sense, the work is read as a the sacrificed spaces for a tactile experience of the age of the digital, which arguably is inseparable from the proliferation of ‘green’ capitalism.



Image 7: Future Fossil Spaces, by Julian Charrière, 2014-2017, salt-bricks from Salar de Uyuni, acrylic containers filled with lithium brine. Installation view, (Off)icielle, Paris, France, 2014. Copyright of the artist; VG Bild-Kunst, Bonn, Germany. Photo by Studio Julian Charrière.

A geological excavation of the future

Charrière’s artworks can be described as speculative palaeontology, since he departs from “an archaeological frame to question the increasing relevance of both non-living forms, and non-human time-scales, to the field of contemporary art”.¹⁵⁹ This suggests that *Future Fossil Spaces*

¹⁵⁸ Charrière, "Future Fossil Spaces."

¹⁵⁹ Amelia Barikin, "Arche-Fossils and Future Fossils: The Speculative Palaeontology of Julian Charrière," in *Julian Charrière. Future Fossil Spaces. Musée cantonal des Beux-Arts de Lausanne*, ed. Nicole Schweizer (Milan: Mousse Publishing, 2014), 19.

connotes the negative spaces left in the landscape through a juxtaposition of times. Still, temporality is denoted in this work as a physical manifestation in the space. This sort of experimentation with non-linear modes of temporality allows Charrière to cross the boundaries between past, present, and future. It also provides an elastic or spiral conception of time that was elaborated in the first chapter, where the past is continuously affecting the present, but also in the sense that the future is continuously affecting the past. This non-linear understanding of time connoted in *Future Fossil Spaces* can be analysed as countering the modern myth of progress, which is often symbolised as the arrow flowing forward through space. The modern vision consolidated a dualist paradigm, placing humanity in the centre, separated from nature.¹⁶⁰ This modern vision of temporality is denoted in *Future Fossil Spaces* as a negative space generated by the myth of unlimited growth and consumption.

In the catalogue for the exhibition in the Musée Cantonal des Beaux-Arts in Lausanne, art historian Amelia Barikin analyses the works of Charrière presented in that 2014 exhibition—among many others, *Future Fossil Spaces*—under the ambiguous concept of ‘future archaeology’. Its ambiguity resides from its two possible definitions, understood as “an as-yet undiscovered method for interpreting the material residue of the past”, and also as “a literal geological excavation of the future”.¹⁶¹ For this analysis, the concept of future archaeology presented by Barikin is relevant to examine *Future Fossil Spaces* as a geological excavation of the future, which in a similar way visualises the traces that the exploitative extraction of raw resources will inevitably leave behind in ancestral landscapes. Created by geological processes over tens of thousands of years, or by the breastmilk and tears of a grieving mother-volcano, as the work of Unknown Fields suggests, these primeval landscapes will be hollowed-out by the future lithium-dependent society that, as this thesis argues, is sustained by the myth of ‘green’ transition.

The understanding of fossils as relics of history is displaced in Charrière’s work which instead, following Barikin, connotes a temporal fusion: “the key to the present lies in the dust of the future”.¹⁶² These future fossils, she writes, “seek to re-activate the presence of the past in the present

¹⁶⁰ Svampa and Viale, *El colapso ecológico ya llegó. Una brújula para salir del (mal)desarrollo*, 197.

¹⁶¹ Barikin, "Arche-Fossils and Future Fossils: The Speculative Palaeontology of Julian Charrière," 19.

¹⁶² Barikin, "Arche-Fossils and Future Fossils: The Speculative Palaeontology of Julian Charrière," 29.

for the purposes of mining the future”.¹⁶³ In this thesis, Charrière’s interest in the geological formations of the past is understood to be embedded in a relationship with contemporary civilization and its extractive endeavours. *Future Fossil Spaces* thus explores the potential juxtaposition of times that result from this intersection.

The elasticity of time presented in *Future Fossil Spaces* can also be defined as a presentation of expanded timescapes, a concept used to analytically understand the complexity of past, present and future, introduced by Barbara Adam in 1998.¹⁶⁴ Timescape emerges as an alternative to anthropocentric notions of time informed by Newtonian physics, expressed in the chronological time of traditional calendars and clocks.¹⁶⁵ The expanded timescapes present in Charrière’s installation allow an interpretation of time in a different manner, juxtaposed ideas of past, present, and future that are shown in the exercise of future palaeontology.

Visualising the cloud

As mentioned in the previous sections, Charrière’s *Future Fossil Spaces* explores the effects of the expansion of the digital world into the physical world that sustains it. In another words, the work connotes a spatiotemporal process in which the exponential growth of the virtual world causes the depletion of natural resources and hollowed-out landscapes in green sacrifice zones.

This expansion of the virtual realm can appear to be intangible—more so with terms and metaphors such as ‘the cloud’—or defined as ethereal, obliterating the digital realm’s physical structure. The pervasive vision of the Internet as a ‘green’ space, located nowhere in particular yet everywhere at once, is sustained through different channels, some of them being advertisements for transnational corporations such as Microsoft or Google.¹⁶⁶

¹⁶³ Barikin, "Arche-Fossils and Future Fossils: The Speculative Palaeontology of Julian Charrière," 28.

¹⁶⁴ Anna-Maria Hällgren, "(Un)steady as a Rock: Believing, in Times of Make-believe," *Konsthistorisk tidskrift/Journal of Art History* 88, no. 1 (2019): 36.

¹⁶⁵ Hällgren, "(Un)steady as a Rock: Believing, in Times of Make-believe," 36.

¹⁶⁶ Allison Carruth, "The Digital Cloud and the Micropolitics of Energy," *Public Culture* 26, no. 2 (73) (2014): 342.

Among the heavy usage of terms drawn from ecological metaphors, for environmental scholar Allison Carruth the most ubiquitous of all is ‘the cloud’. The technical definition of cloud that Carruth uses in her research is picked up from the Oxford English Dictionary, “[as] a network operated by a telecommunications service provider, used in routing data”.¹⁶⁷ The cloud can also be understood as an enabler of “on-demand access to a shared pool of computing resources”.¹⁶⁸ The prevalence of nomenclatures that stem from ecological metaphors when speaking about technology and the digital realm mask, “wilfully in some cases, what is an energy-intensive and massively industrial infrastructure”.¹⁶⁹ Because of this concealment of the digital infrastructure and its energy use, in many cases the public is not aware of the wires, towers, undersea cables, servers, data centres, nor the enormous quantities of water and energy needed to power them and in turn, to cool them down.

In some communication technologies, the infrastructure and waste generated by the industry that produces it is visible. The act of connecting a device to an electrical supply, the accumulation of e-waste generated by phones, computers, and tablets, are some instances where the consumptions and left-overs are visible and gain public attention. However, when it comes to the cloud, it is highly invisible, it remains in the shadows.¹⁷⁰ The celebrated virtuality of the cloud is problematised by its voracious demand of energy and its industrialised structure. The cloud is closer to heavy industries—such as the automotive industry—and further away from the ethereal, ‘green’, and intangible picture painted by technology companies.¹⁷¹

The information stored in ‘the cloud’ is stored in third-party servers, not on the file owner’s computer. This emulated intangibility poses the question of who actually owns the stored information: instead of users choosing which data to share or not to share, “the cloud represents a model in which data is stored in ‘banks’ that are owned by private corporations”.¹⁷² Today, the maintenance

¹⁶⁷ Carruth, "The Digital Cloud and the Micropolitics of Energy," 342.

¹⁶⁸ Nick Couldry and Ulises Mejias, *The Costs of Connection: How Data Is Colonizing Human Life and Appropriating It for Capitalism* (Stanford: Stanford University Press, 2019), 42.

¹⁶⁹ Carruth, "The Digital Cloud and the Micropolitics of Energy," 342.

¹⁷⁰ Carruth, "The Digital Cloud and the Micropolitics of Energy," 346.

¹⁷¹ Carruth, "The Digital Cloud and the Micropolitics of Energy," 350.

¹⁷² Couldry and Mejias, *The Costs of Connection: How Data Is Colonizing Human Life and Appropriating It for Capitalism*, 46.

and ownership of storage clouds is the largest-growing IT sector.¹⁷³ It is not only through the raw materials that are hollowed-out of the physical world to support our virtual world, as pointed out in *Future Fossil Spaces*, what makes ‘the cloud’ an extractivist endeavour. By virtually owning millions of people’s data and in many cases selling this information, the infrastructure and companies that are involved in the cloud empire enforce a certain violence of dispossession.¹⁷⁴

There is a rising trend of data storage companies transitioning towards renewable energies, using a dominant rhetoric of the ‘green cloud’, even though most of them still have the higher proportion of their consumption in fossil fuels.¹⁷⁵ However, as seen in the previous chapters, the lithium-ion battery system that currently sustains most of the storage of renewable energies is very problematic.

In some ways, resisting these dominant narratives can be translated into making this ephemerally-perceived industry visible. With *Future Fossil Spaces*, Charrière visibilises the carved-out reality that will be a direct consequence of the exponential expansion of the virtual world, its infrastructure, energy requirements, and the implications of what a ‘green’ transition will look like in the cloud empire.

In the digital realm there are several modes of violence that unfold, such as the aforementioned violence committed against the landscape in Latin America, where raw resources such as lithium are extracted. But the extractivist logic of the digital world is not limited to the physical extraction of natural resources. It expands on social levels, such as the “potential violence that could be perpetrated against individuals when their personal data is accumulated in mass and deployed against them or monetized”.¹⁷⁶

¹⁷³ Couldry and Mejias, *The Costs of Connection: How Data Is Colonizing Human Life and Appropriating It for Capitalism*, 46.

¹⁷⁴ Couldry and Mejias, *The Costs of Connection: How Data Is Colonizing Human Life and Appropriating It for Capitalism*, 47.

¹⁷⁵ Gary Cook, *Clicking Clean: Who Is Winning the Race to Build a Green Internet?*, Greenpeace Inc. (Washington D.C.: Greenpeace Inc., 2017), <http://www.clickclean.org/international/en/>.

¹⁷⁶ Judith Shapiro and John Andrew McNeish, *Our Extractive Age: Expressions of Violence and Resistance*, Routledge Studies of the Extractive Industries, (London: Routledge, 2021), 176.

For media, communications and social theory scholar Nick Couldry and critical internet studies researcher Ulises Ali Mejias, the technological advances often portrayed as progress, such as the cloud empire, “have a lot in common with the economic logic of historical colonialism”.¹⁷⁷ Through an ongoing appropriation of social life via data, and with a capitalist system that seeks to commodify everything, “human life *as organized through data relations* becomes the direct input of capitalism”.¹⁷⁸ In other words, the social quantification sector, including private and public actors with financial objectives, uses data colonialism as an extractive process through which all life is appropriated by capitalism in the shape of the cloud empire.¹⁷⁹ This system is understood by Couldry and Mejias as capitalism’s new horizon for appropriation.

In *Future Fossil Spaces*, a dire picture of what our physical landscapes might—and most probably will—look like in the near future is connoted, after what appears to be an endless expansion of the digital world, using intangible narratives to hide its impact on the real world. This impact is made tangible in Charrière’s installation: the myth of the immaterial cloud and virtual realm is countered by the physical remains of the extractive activities in green sacrifice zones that allow the digital world to be possible and prosper. This leads me to suggest that the geopolitical dimension of the work consists in visibilising the tangible effects of the digital and ‘green’ future in the Global South, in opposition to the intangible narratives posed by countries and companies of this technocratic sector in the Global North.

Degrowth of unlimited and expansive economies

Another connotation that can be extracted from *Future Fossil Spaces* is how the expansion of the virtual world appears to be unlimited. With towering stacks of bricks that embody the Andean salt flats, the installation shows how primeval landscapes formed over the course of thousands of years keep being exploited and hollowed-out. This work thus counters the idea of the ‘green’ transition

¹⁷⁷ Couldry and Mejias, *The Costs of Connection: How Data Is Colonizing Human Life and Appropriating It for Capitalism*, 38.

¹⁷⁸ Couldry and Mejias, *The Costs of Connection: How Data Is Colonizing Human Life and Appropriating It for Capitalism*, 38.

¹⁷⁹ Couldry and Mejias, *The Costs of Connection: How Data Is Colonizing Human Life and Appropriating It for Capitalism*, 39.

from fossil fuels to renewable energies (and the storage abilities of lithium-ion batteries) as the solution to all of our climate breakdown problems.

It is by countering the myth of ‘green’ transition as a perfect solution, and as a path that has many invisible yet negative consequences in green sacrifice zones, that *Future Fossil Spaces* can be understood as hinting a deconstruction of extractive capitalism. Perhaps it is by connoting the many damages that this transition has on peripheral countries that the installation poses a model of degrowth.

Environmental sociologist and economist Enrique Leff is a key theorist to understand degrowth from a Latin American perspective. According to Leff, the 1960s population boom sounded an ecological alarm: the principle of progress driven by science and technology, and the myth of unlimited economic growth were fractured.¹⁸⁰ The modern idea of human superiority over all other nonhuman agents, tied to the right to dominate and exploit nature in benefit of humans, was suddenly questioned by climate breakdown. The modern conception of rational progress was not guided by the coevolution of cultures in their environments, but by unlimited economic development. With the economic system denying the underlying problem, “the geopolitics of ‘sustainable development’ generated a process of commodification of nature, and an over-economisation of the world”.¹⁸¹ The privatisation of nature and common goods, the pricing of natural resources, and the generation of markets for transaction of rights to contaminate and the trading of carbon credits are many of the phenomena that characterise this supposed ‘sustainable development’. Upon the failure of global and national policies for ecological reform of the economy, there is a realisation that the globalised economic process is unsustainable, and claims for limited growth and degrowth appear.

In relation to unsustainable economic growth—explored in *Future Fossil Spaces*—, Maristella Svampa writes, “transition cannot be reduced only to a change of the energetic matrix, guaranteeing the continuity of an unsustainable model of consumption”.¹⁸² For Svampa, there is no planet

¹⁸⁰ Enrique Leff, *Discursos sustentables* (México D.F.: Siglo XXI editores, 2008), 65.

¹⁸¹ Leff, *Discursos sustentables*, 67.

¹⁸² Svampa, "Dilemas de la transición ecosocial desde América Latina," 15.

that can endure, nor enough lithium and critical minerals, if we do not change our consumer patterns.¹⁸³ A new model of economy and consumption that Leff and Svampa mention can be thought in the key of degrowth. The problem here lies in the question of how to deactivate the development of a process that has in its genetic code a motor that impulses it to grow or die. How is it possible to achieve such purpose without generating as a consequence an economic recession with socio-environmental impacts of a planetary level?¹⁸⁴ A dramatic halt in growth would only lead to an economic crisis of unsurmountable effects. Because of this, a new model needs to be thought not only in terms of a degrowth, but also in terms of a transition towards a sustainable economy: a deconstruction of economy.¹⁸⁵

The height fluctuation in the brick stacks presented in Charrière's installation invites the visitor to look closely at each of them. The different scales affect how they perceive themselves in relation to space, in relation to the negative spaces that are presented in front of them. The immersion of the viewer in this bodily way could be understood as inducing a self-reflection of the hollowed-out raw materials that make our contemporary habits possible. It is perhaps this self-reflection that invites visitors to think on what is happening in green sacrifice zones, and how the ongoing and unsustainable energetic transition might not be 'green' enough when looking at it through a planetary lens. The audience's embodiment of the negative spaces carved out in extractive zones connotes, in this analysis, the consequences of what the idea of unlimited growth is doing to primeval landscapes for the sake of a 'green' transition.

¹⁸³ Svampa, "Dilemas de la transición ecosocial desde América Latina," 15.

¹⁸⁴ Leff, *Discursos sustentables*, 70.

¹⁸⁵ Leff, *Discursos sustentables*, 70.

Discussion

Throughout this thesis there has been an analysis of the multiple dimensions present in three contemporary artworks: *We Power Our Future With The Breast Milk of Volcanoes* by Unknown Fields, *Land [2] Litio* by Marcela Magno, and *Future Fossil Spaces* by Julian Charrière. This analysis was done to explore how the three works critically engage with lithium extraction and its consequences, in relation to local environments, digital realities and Indigenous cosmologies in Latin America.

In each chapter, an artwork was studied using a visual semiotics method, starting with the artwork's denotations in the first level, conducive to an attempt to answer the first research question proposed in this thesis: How is lithium extraction visualised in the selected contemporary artworks? The analysis showed how the three selected artworks visualised lithium extraction through different media, techniques, colour schemes, evoked experiences, and viewpoints. It also found points of commonality which will be further discussed at this point.

In the case of the video *We Power Our Future With The Breast Milk of Volcanoes*, Unknown Fields resort to an audio-visual work with colour images and sound. The two apparently unrelated components are in dialogue with each other in what the analysis revealed as a relay. The drone footage of a vast landscape of grey and white surfaces is interrupted by large rectangular pools filled with technicolour liquids: cyan, azure, neon green, muddy yellows. As these territories are seen, an audio of Elon Musk's speech of the launch of Tesla Energy is heard. *We Power Our Future With The Breast Milk of Volcanoes* juxtaposes images of vast landscapes of lithium extraction sites in the salt planes of Uyuni in Bolivia and Atacama in Chile, with the business magnate's explanation of how little space and changes Tesla home batteries will need to achieve energetic transition in the United States.

Analysed in the second chapter, Marcela Magno's series *Land [2] Litio* explores lithium extraction sites by creating conflated works from satellite images taken from Google Earth. By selecting hundreds and thousands of fragments from different satellite images, and editing them in black, white, and shades of grey, *Land [2] Litio* explores the possibilities of visibilisation through a zenith

viewpoint. In Magno's edited satellite collages, the territories' geographical features are more diffuse. Water bodies that resemble oil or watercolour spills; roads that delimit the landscape seen as abstract lines. The textures created through this conflation and edition of many satellite images give the extractive zones new layers and reimagine their visual possibilities.

The third artwork studied in this thesis is Julian Charrière's *Future Fossil Spaces*. The large-scale installation is composed by off-white and brownish rough bricks of different shapes stacked together in towers of various heights, and small water bodies contained in pool-like elements. In some editions of the work, these pools are placed adjacent to the salt brick stacks, but in others, they appear within the towers as such. A visual pattern is generated through the piling of bricks, since they present brown horizontal lines on their sides that continue as they gather in the physical space of the exhibition room. The salt and resulting lithium brine used to construct this installation were extracted from the salt planes of Uyuni in Bolivia and Atacama in Chile.

Regardless of their chosen media, materials, colour schemes, and techniques, the three artworks selected for this thesis visualise lithium extraction. In the artworks by Unknown Fields and Marcela Magno, it is interesting to see how both works resort to aerial views of 'green' extractive zones: either through drone footage or through deconstructed and reconstructed satellite images. Different from these two cases is the third analysed work by Julian Charrière, in which the artist visibilises green sacrifice zones through what could potentially be left in those landscapes after decades of exploitation. *Future Fossil Spaces* thus creates negative spaces out of materials taken from conflictive extractive zones. Overall, the three artworks analysed in these chapters visualise lithium, its extraction, its consequences, and its impact in past, present, and future societies.

The second research question that guided this thesis regarded the primary connotations that can be extracted from the artworks. The denotations described previously show how they visualise lithium extraction; but to answer this second question, focus was placed on what possible meanings can be understood from the described denotations.

This analysis draws several connotations from Unknown Fields' *We Power Our Future With the Breast Milk of Volcanoes*. Firstly, just by looking at the play of juxtaposition present in the film,

there is a clear identification of the two furthest-apart links within the long supply chain that involves lithium. From its extraction on salt planes in the Lithium Triangle, to the presentation speech of a finished lithium-ion battery, ready to be installed in all homes across the United States to achieve energetic transition. The visualisation of the unfathomable salt planes in the Andean region overlapped with a speech in which Musk emphasises the little space required to actually make the transition happen—"just one red pixel"—, connote, in my reading, the concept of green sacrifice zones.¹⁸⁶ Behind the myth of the little space needed for home lithium-ion batteries around the United States, there are millions of square kilometres where materials are sourced, transported, and transformed. Another connotation in *We Power Our Future With The Breast Milk of Volcanoes* is the representation of a quasi-event instead of a catastrophe. There is a clear mainstream narrative used to visualise climate breakdown, which is the apocalyptic image: a huge oil spill in the middle of the ocean, a glacier melting, or an uncontrollable wildfire. What the film shows is, not the aftermath of a disaster, but the moments that risk leading up to the impending doom. A final connotation that can be drawn from the title of *We Power Our Future With The Breast Milk of Volcanoes* is the reference to Indigenous cosmology, specifically to the creation of the Uyuni salt plane from the tears and breast milk of the Tunupa volcano that in this creation myth is identified as a grieving mother. The gendered understanding of nonhuman agents in Andean cosmovision appears as a key anchor in the video's title. The consequences of lithium extraction through evaporation are read into the aerial images shown by Unknown Fields, where the tears and breast milk of volcanoes are understood to power our 'green' future.

As *We Power Our Future With The Breast Milk of Volcanoes* explores the possible visualisations of extraction sites, Marcela Magno's *Land [2] Litio* visualises, from a zenith viewpoint, the green sacrifice zones present in Bolivian, Chilean, and Argentinian salt planes. As a first connotation, the green sacrifice zones in *Land [2] Litio* reveal the geopolitical construction of the landscape, and the dystopian results of utopian modern ideas of progress. Another connotation present in *Land [2] Litio* is the understanding of Google Earth and satellite images as constructed realities, rather than indexical representations of the real territory. The images that stem from the techno productive and scientific fields are constructed by thousands of overlapped satellite images, and organised

¹⁸⁶ Transcribed from the video work by Unknown Fields: "We Power our Future with the Breast Milk of Volcanoes." Full transcription available in the Appendix 2 of this thesis.

in such a way that their computerised construction is not visible. In *Land [2] Litio* there is a connotation of the human eye, where the critical—therefore, human—selection and edition of the artist is emphasised. With the use of a cartographic gaze over extractive landscapes, *Land [2] Litio* connotes how maps are historically used as tools for imperial knowledge and domination. The imperial implications of cartography are translated into contemporary forms of representation such as satellite images, which, in extractive zones, are there to survey natural resources and control their exploitation. Through confronting viewers with an indexical view of the tangible consequences of extractive endeavours, *Land [2] Litio* connotes, in this analysis, a contestation of the indexical status of the satellite images. The artistic technique applied thus enables a re-signification of the indexical sign as such.

In the case of *Future Fossil Spaces* by Julian Charrière, instead of visibilising a present extraction zone, the installation concentrates on the future of green sacrifice zones: on the future negative spaces that will be hollowed-out in the physical landscape by the extraction of lithium in the Andean salt flats. The concept of future archaeology is a main connotation of Charrière's installation, understood in the framework of this thesis as a geological excavation of the future. *Future Fossil Spaces* presents the abstraction of a future landscape, depleted by continuous extraction, that will have sustained the expansion of the virtual world and the transition to a 'green' future. A consequence of these expansions that is already happening is the carving-out of the physical world of natural resources, taken from extraction sites in the Global South yet used for the 'green' and digital infrastructures of the Global North. The combination of past—connoted in the ancestral landscape—, present—in the current situation that is only expanding—, and future—in what will become of these territories—in the installation, speak to an elasticity of time or, in other words, a non-linear comprehension of temporality where these different dimensions of time coexist. The linear conception of time presented by modern utopias is thus challenged in *Future Fossil Spaces*. A final connotation described in the third chapter, is the continuous efforts by tech companies to portray themselves and their tools through ethereal terms such as 'the cloud'. This dematerialised conception arguably obliterates the digital world's physical structure and resources. The material infrastructure of the digital realm, which is connoted in the carved-out spaces that Charrière makes tangible in the installation, poses the question about the unsustainability of this unlimited expansion. By displaying the extractive zones' physical remains after the digital world has expanded and

the Global North has transitioned, *Future Fossil Spaces* makes this supposedly ephemeral world tangible for viewers who walk through the installation.

It is relevant to mention that all of the three analysed works have a common connotation: they visibilise green sacrifice zones. Whether they are in the present, recent past—in Unknown Fields' and Magno's works—or the future—in Charrière's work—the three artworks delve into the tangible consequences of lithium extraction and the 'green' transition in territories of the Global South. Having that as a common thread, they then diverge and concentrate on different aspects of lithium extraction, highlighting connotations such as the relevance of Indigenous cosmologies, or the visual presentation of seemingly intangible structures.

By extracting the connotations that are present in the three selected contemporary artworks, there is room for further reflection regarding the third research question that guides this thesis: what is the geopolitical dimension of the artworks? The interest to analyse the geopolitical dimension of the selected works stemmed from the article by Eray Çaylı referenced in the previous research section of this text. In his article, Çaylı departs from an analysis of contemporary pieces from extraction sites to discuss the larger question of "contemporary art's potential to facilitate critical insight into the (geo)politics of ecology today".¹⁸⁷ This exploration informed my thesis, and made the geopolitical analysis of the works possible. *We Power Our Future With The Breast Milk of Volcanoes*, *Land [2] Litio*, and *Future Fossil Spaces* show their geopolitical dimension—even if in different ways, and with various resources—through a visibilisation of the hidden, the unseen, and the unknown. By presenting that which is hidden, they create countervisualities and distance themselves from the imperial gaze by showing what is happening, using and reverting imperial tools, or excavating the future remains of our civilisation.

Through different denotations, the selected artworks visibilise inaccessible areas and, in doing so, highlight the consequences of a problem that is already here but is invisibilised. Hiding the problematic consequences of lithium extraction in green sacrifice zones serves the dominant narrative in which a 'green' energetic transition will solve our carbon-fuelled problems. In what ways do the selected contemporary artworks relate to the myth of 'green' transition?

¹⁸⁷ Çaylı, "Contemporary art and the geopolitics of extractivism in Turkey's Kurdistan," 929.

The answer to the fourth and final research question can be found throughout the chapters of this thesis, where the extraction of the possible connotations within the three selected artworks provides an understanding of how they approach the myth of ‘green’ transition.

We Power Our Future With The Breast Milk of Volcanoes directly questions the supposed sustainability of a transition to renewable energies, as seen in Elon Musk’s presentation of Tesla Energy, by visibilising the two-furthest-apart links within the lithium supply chain. Musk never mentions the world ‘lithium’ in his speech, but keeps stressing the small amount of land and space needed to make an energetic transition possible. What Unknown Fields’ film does, is oppose this discourse with what he is, in fact, not mentioning. By leaving behind the traditional catastrophic narratives of climate breakdown, *We Power Our Future With The Breast Milk of Volcanoes* challenges the ideal and change-free ‘green’ transition posed by the CEO of one of the leading electric car companies in the world. The video work can be examined as a counter-myth to the myth of ‘green’ transition, since it visibilises a behind-the-scenes of the ‘perfect’ solution to climate breakdown and ecological crisis we live in. Another significant aspect of the work, as mentioned before, is how it anchors the creation myth of the Uyuni salt flat in its title. This creation myth is presented as an alternative conception of nonhuman agents. Not only can the film itself be understood as a counter-myth to ‘green’ transition; but also, an Indigenous creation myth based on the image of a grieving Tunupa volcano provides a different narrative on the ecocide that is happening in extraction sites, hence countering the contemporary myth of ‘green’ transition.

As mentioned in this section, *Land [2] Litio* visibilises green sacrifice zones of the Andean region. By editing and engaging with satellite images that stem from the techno scientific field, the series delves into what is happening in these territories that remain out of sight. The lithium evaporation pools that appear in the different works that constitute *Land [2] Litio* show the dystopian results of modern utopias. In a world that, on some level, seeks to stop the catastrophic consequences of climate breakdown, ‘green’ transition is presented as the logical way forward. By showing the cartographies of depredation that make this transition possible, *Land [2] Litio* counters the myth of ‘green’ transition by making the unseen sacrifice zones in the Global South visible. Even though most greenhouse gas emissions were and are produced by industries from the Global North, it is

countries in the Global South that will keep exploiting nature in order to render the idea of a ‘green’ future possible for capitalist interest.

The last artwork analysed in this thesis, *Future Fossil Spaces*, focuses not on the present repercussions of lithium extraction, but on what the future aftermath of this exploitative activity will have on Andean landscapes if the ‘green’ energetic transition and expansion of the virtual realm continue to happen. The unsustainable extraction of raw materials that power the idea of a sustainable future is imagined in the work as the future depletion of primeval territories in Latin America. With a concrete materialisation of a seemingly ethereal virtual realm, *Future Fossil Spaces* grants tangibility to a problem that remains, in the collective unconscious, as immaterial and sustainable. The large-scale installation counters the myth of ‘green’ transition and immateriality of the digital by visibilising the hollowing-out of the natural world in favour of a seemingly ‘green’ future. The question of unlimited economic and productive expansion is opposed to the catastrophic results of what this eternal growth will generate in the landscapes that hold the key to our ‘green’ future. In this sense, *Future Fossil Spaces* can also be understood to deconstruct the myth of unlimited growth that remains as a dominant narrative in discourses around the ‘green’ transition.

To conclude this section, there is a possibility to explore the three analysed artworks, *We Power Our Future With The Breast Milk of Volcanoes*, *Land [2] Litio* and *Future Fossil Spaces* as pieces that visibilise an unseen problem. Lithium is part of our daily lives, since it powers many devices we use daily. Yet the extraction zones where it comes from, more specifically the green sacrifice zones that its exploitation leaves behind, are hidden from the ‘green’ transition discourse, as Elon Musk’s speech reveals. As Anna-Maria Hällgren points out, to grasp climate breakdown and the future it holds, “knowing might simply not be enough”.¹⁸⁸ The chosen artworks for this thesis have presented a critical view on a problem that will keep on growing. They visibilise information that is unavailable, but through their constructions and explorations of the topic, can also help us believe in times of make-believe.¹⁸⁹

¹⁸⁸ Hällgren, "(Un)steady as a Rock: Believing, in Times of Make-believe," 33.

¹⁸⁹ Hällgren, "(Un)steady as a Rock: Believing, in Times of Make-believe," 42.

Future considerations

Even though lithium-ion batteries were first developed in the 20th century, the relevance of lithium as a key raw material for the ‘green’ future to come started in the early 2000s. With no visible positive results stemming from international treaties and country pledges for a reduction of greenhouse gas emissions and mean world temperature, lithium-ion batteries appeared as the best solution to the holy grail of renewable energies: how to store them. Large-scale investments in lithium technology and extraction started not too long ago, when a clearer path to a ‘green’ transition was established.

The nineteen artworks mentioned in the delimitations section, including the three selected and analysed in this thesis, were created from 2012 onwards. This is not a coincidence: as lithium became one of the most valuable materials on Earth, contemporary artists started to investigate what its potentials, conflicts, visualities and myths might be. These artworks, including *We Power Our Future With The Breast Milk of Volcanoes*, *Land [2] Litio*, and *Future Fossil Spaces* are, to my understanding, pioneers in the intersection of lithium and contemporary art.

Much has been written about the intersection of contemporary art and extractivism, as mentioned in the Previous research section; yet there not a single academic article or book was found that delved into the specific junction of lithium and contemporary art. Perhaps this is because, as stated, it is a very new field. It is my understanding that since lithium extraction and relevance will grow in the upcoming years, artistic productions that explore this extraction in various manners will also increase. While very few non-academic texts that examine this intersection were found, no academic texts on this topic were encountered. This is why I decided to write about this intersection. I believe it will be a growing field, and there is a need to establish theoretical bases and frameworks from where to explore it.

It is fruitful, perhaps, to revisit some of the results discussed in this thesis, since these findings might be of help for future academic research, but also for future exhibitions or cultural projects that wish to develop the topic of lithium further. All of the analysed works critically engage with lithium extraction by visibilising either present or future green sacrifice zones, in some cases using

the resource of aerial views of these territories. According to the connotations provided by the analysis in this thesis, they all highlight the issues of extractivism in a context of ‘green’ transition, countering this myth by opposing the discourses that lie behind the idea of a ‘green’ and fossil-free future, or by recuperating Indigenous creation myths for these landscapes. They explore the supposed intangibility of our ever-expanding digital world, and they do so not by depicting a catastrophe, but rather by showing the quasi-events that are leading up to it, or the negative spaces that are left in its aftermath.

These results can be potentially helpful for cultural workers in Sweden and around the world that are considering to explore the intersection between contemporary art and lithium, mostly to provide an understanding of lithium extraction and its consequences, and how they can be analysed and portrayed through contemporary art practices. It is my belief that bearing in mind and highlighting the discussed problems behind lithium and its extraction is a necessary and ethical aspect for curating exhibitions about lithium and the ‘green’ transition. I sincerely hope that the research proposed in this thesis will assist future curators, artists, cultural workers and theorists that wish to examine the intersection further.

Summary

The aim of this thesis was to understand how a selection of contemporary artworks critically respond to lithium extraction and its consequences. The main focus was laid on demonstrating the geopolitical dimension of each of the works, and on understanding what they are able to show in relation to the myth of ‘green’ transition.

The thesis began with a presentation of the selected materials (the three contemporary artworks: *We Power the Future With the Breast Milk of Volcanoes*, *Land [2] Litio*, and *Future Fossil Spaces*), how they were accessed, and their delimitations, followed by an explanation of the methods used to approach these materials. Using visual semiotics, in particular denotative and connotative analysis, the materials were thoroughly examined. There was special attention to the semiotic concepts of relay, anchor and myth—as understood by Roland Barthes.

The theory section outlined critical narratives towards the concept of Anthropocene, followed by a comprehensive understanding of how extractivism is defined. This section also included an introduction to the framework of ‘green’ energetic transition and critical theories around it—such as green colonialism, and the recognition of what an eco-social transition might mean. Additionally, the potentialities of visibility and countervisuality constituted key terms to analyse the connotations and geopolitical dimension of the selected artworks.

The previous research section focused on writers and scholars that have delved into the intersection between contemporary art and extractivism, and that have researched cartography as tools for imperial and colonial power. There was also a revision of cultural projects and non-academic essays that explored the intersection of contemporary art and lithium.

The three selected artworks were analysed in individual chapters, using four research questions as guides. Each chapter delved into the denotations and connotations that could be extracted from an artwork, what its geopolitical dimension might be, and how it related to the myth of ‘green’ transition. In the discussion, a compendium of the answers to the research questions was provided, highlighting the commonalities and differences between the artworks, in search for concrete results

that stemmed from the analytical chapters of the thesis. The future considerations section links these results to their potential future implications for academic research, but also their importance in the development of cultural projects that delve into the relationship between contemporary art and lithium.

Bibliography

Books and articles

- Aiello, Giorgia. "Visual Semiotics: Key Concepts and New Directions." In *The Sage Handbook of Visual Research Methods*, edited by Luc Pauwels and Dawn Mannay, 1-17. London: SAGE Publications, Inc., 2020.
- Argento, Melisa, Martina Gamba, Martín Kazimierski, Florencia Puente, Gustavo Romeo, Elaine Santos, Ariel Slipak, Santiago Urrutia, and Julián Zicari. *Litio En Sudamérica. Geopolítica, Energía Y Territorios*. Edited by Bruno Fornillo. CLACSO, 2019.
- Barikin, Amelia. "Arche-Fossils and Future Fossils: The Speculative Palaeontology of Julian Charrière." In *Julian Charrière. Future Fossil Spaces. Musée Cantonal Des Beux-Arts De Lausanne*, edited by Nicole Schweizer, 18-27. Milan: Mousse Publishing, 2014.
- Barthes, Roland. *Image, Music, Text*. Edited by Stephen Heath. New York: Hill and Wang, 1977.
- . *Mythologies*. Translated by Annette Lavers. London: J. Cape, 1972.
- Blaylock, Sara. "Review: The Right to Look." *InVisible Culture*, no. 17 (2012).
- The Breast Milk of the Volcano*. Tales from the Dark Side of the City. Edited by Unknown Fields. London: AA Publications, 2016.
- Carruth, Allison. "The Digital Cloud and the Micropolitics of Energy." *Public Culture* 26, no. 2 (73) (2014): 339-64.
- Casablanca, Cecilia. "Diálogos Visuales Sobre El Neoextractivismo: Obras Situadas Y Conflictos Ambientales En Tres Artistas Mujeres Contemporáneas." *Heterotopías* 5, no. 9 (2022): 1-17.
- Çaylı, Eray. "Contemporary Art and the Geopolitics of Extractivism in Turkey's Kurdistan." *Transactions of the Institute of British Geographers* 46, no. 4 (2021): 929-43.
- Citroni, Sebastiano, and Mattias Karrholm. "Neighbourhood Events and the Visibilisation of Everyday Life: The Cases of Turro (Milan) and Norra Fäladen (Lund)." *European Urban and Regional Studies* 26, no. 1 (2019): 50-64.
- Couldry, Nick, and Ulises Mejias. *The Costs of Connection: How Data Is Colonizing Human Life and Appropriating It for Capitalism*. Stanford: Stanford University Press, 2019.

- D'Alleva, Anne. *Methods & Theories of Art History*. London: Laurence King Publishing, 2005.
- Danowski, Déborah, and Eduardo Viveiros de Castro. *Há Mundo Por Vir? Ensaio Sobre Os Medos E Os Fins*. Translated by Rodrigo Nunes for e-flux. Cultura e Barbárie, 2014.
- Demos, T. J. *Against the Anthropocene : Visual Culture and Environment Today*. Berlin: Sternberg Press, 2017.
- . "Blackout. The Necropolitics of Extraction." In *Art and Activism in the Age of Systemic Crisis: Aesthetic Resilience*, edited by E. Steinbock, Ieven, B., & de Valck, M., 49-61. New York: Routledge, 2020.
- . "Contemporary Art and the Politics of Ecology." *Third Text* 27, no. 1 (2013): 1-9.
- Díaz, Francisco, Anastasia Kubrak, and Marina Otero Verzier. *Lithium. States of Exhaustion*. Het Nieuwe Instituut and Ediciones ARQ, 2021.
- Duarte Filho, Ricardo. "Drilled Mountains, Pulverised Bodies: Mining, Extractivism, and Racialisation in Brazil." *Journal of Latin American Cultural Studies* 30, no. 3 (2021): 417-36.
- Durante, Francesco, Markus Kröger, and William LaFleur. "Extraction and Extractivisms: Definitions and Concepts." In *Our Extractive Age: Expressions of Violence and Resistance*, edited by Judith Shapiro and John Andrew McNeish, 19-30. London: Taylor & Francis, 2021.
- Erickson, Bruce. "Anthropocene Futures: Linking Colonialism and Environmentalism in an Age of Crisis." *Environment and Planning D: Society and Space* 38, no. 1 (2020): 111-28.
- Escobar, Ticio. *Aura Latente: Estética - Ética - Política - Técnica*. Asunción: Centro de Artes Visuales, Museo del Barro, 2020.
- Fiske, John. *Introduction to Communication Studies*. London ; New York: Methuen, 1982.
- Friedman-Rudovsky, Jean. "The Myth of Tunupa." In *The Bolivia Reader: History, Culture, Politics*, edited by Sinclair Thomson, Rossana Barragán, Xavier Albó, Seemin Qayum and Mark Goodale: Duke University Press, 2018.
- Geoffrey, Parker. *Western Geopolitical Thought in the Twentieth Century*. Routledge Library Editions: Political Geography. London: Routledge, 2015.
- Gisbert, Teresa. "El Cerro De Potosí Y El Dios Pachacámac." *Chungará (Arica)* 42 (2010): 169-80.

- Gómez-Barris, Macarena. *The Extractive Zone: Social Ecologies and Decolonial Perspectives*. Dissident Acts. Durham and London: Duke University Press, 2017.
- Hällgren, Anna-Maria. "(Un)Steady as a Rock: Believing, in Times of Make-Believe." *Konsthistorisk tidskrift/Journal of Art History* 88, no. 1 (2019): 33-42.
- Hochberg, Gil Z. *Visual Occupations: Violence and Visibility in a Conflict Zone*. Perverse Modernities. Edited by Jack and Lowe Halberstam, Lisa. Durham and London: Duke University Press, 2015.
- Hollender, Rebecca, and Jim Shultz. *Bolivia Y Su Litio ¿Puede El "Oro Del Siglo Xxi" Ayudar a Una Nación a Salir De La Pobreza?* Cochabamba: Centro para la Democracia, 2010.
- Huxley, Aldous. *Brave New World*. 11th ed. London: Vintage, 2010, 1932.
- Larsson, David, Hanna Ljungh, and Gideonsson/Londré. *Litiumfestivalen*. Utö, 2022.
- Leff, Enrique. *Discursos Sustentables*. México D.F.: Siglo XXI editores, 2008.
- Leung, Lisa Y.M. "'No South Asian Riders, Please': The Politics of Visibilisation in Platformed Food Delivery Work During the Covid-19 Pandemic in Hong Kong." *Critical Sociology* 48, no. 7-8 (2022): 1189-203.
- Lewis, Simon L., and Mark A. Maslin. "Defining the Anthropocene." *Nature* 519, no. 7542 (2015): 171-80.
- Liu, Yangtao, Ruihan Zhang, Jun Wang, and Yan Wang. "Current and Future Lithium-Ion Battery Manufacturing." *iScience* 24, no. 4 (2021).
- Manthiram, Arumugam. "An Outlook on Lithium Ion Battery Technology." *ACS Central Science* 3, no. 10 (2017): 1063-69.
- Merlinsky, Gabriela, and Paula Serafini. "Arte Y Resistencias Al Extractivismo En Argentina. Lenguajes Para Defender Y Reinventar Lo Común." *Ecología Política*, no. 57 (2019): 81-85.
- Mezzadra, Sandro, and Brett Neilson. "On the Multiple Frontiers of Extraction: Excavating Contemporary Capitalism." *Cultural Studies* 31, no. 2-3 (2017): 185-204.
- Mirzoeff, Nicholas. *The Right to Look: A Counterhistory of Visuality*. Durham, NC: Duke University Press, 2011.
- Penhos, Marta. *Ver, Conocer, Dominar. Imágenes De Sudamérica a Fines Del Siglo Xviii*. Arte Y Pensamiento. Buenos Aires: Siglo Veintiuno Editores, 2005.

- Povinelli, Elizabeth. *Geontologies: A Requiem to Late Liberalism*. Durham, NC: Duke University Press, 2016.
- Prieto Guerrero, Claudia. "Fragmentos De Una Realidad : El Collage." Bellas Artes, Universidad de Sevilla, 2020.
- Rayle, Derek. "After Lithium. Reclamation Strategies for Salar De Uyuni, Bolivia." Master in Landscape Architecture, University of Oregon, 2018.
- Reframing Latin American Development*. Routledge Critical Development Studies. Edited by Ronaldo Munck and Raúl Delgado Wise. London: Routledge, 2018.
- The Routledge Companion to Contemporary Art, Visual Culture, and Climate Change*. Edited by T.J. Demos, Emily Eliza Scott and Subhankar Banerjee. London: Routledge, 2021.
- Schepelmann, Philipp, Marten Stock, Thorsten Koska, Ralf Schüle, and Oscar Reutter. "A Green New Deal for Europe." *Wuppertal Institute for Climate, Environment and Energy* (2009): 1-74.
- Shapiro, Judith, and John Andrew McNeish. *Our Extractive Age: Expressions of Violence and Resistance*. Routledge Studies of the Extractive Industries. London: Routledge, 2021.
- Speranza, Graciela. *Atlas Portátil De América Latina. Arte Y Ficciones Errantes*. Colección Argumentos. Buenos Aires: Anagrama, 2012.
- Svampa, Maristella. "Dilemas De La Transición Ecosocial Desde América Latina." *Documento de Trabajo Especial OXFAM INTERMÓN 2* (2022): 1-33.
- Svampa, Maristella, and Enrique Viale. *El Colapso Ecológico Ya Llegó. Una Brújula Para Salir Del (Mal)Desarrollo*. Ciudad Autónoma de Buenos Aires: Siglo XXI Editores Argentina, 2020.
- Taylor, Brandon. *Collage: The Making of Modern Art*. London: Thames & Hudson, 2004.
- Ye, Jingzhong, Jan Douwe van der Ploeg, Sergio Schneider, and Teodor Shanin. "The Incursions of Extractivism: Moving from Dispersed Places to Global Capitalism." *The Journal of Peasant Studies* 47, no. 1 (2020): 155-83.
- Zografos, Christos. "The Contradictions of Green New Deals: Green Sacrifice and Colonialism." *Soundings* 80 (2022): 37-50.

Electronic resources

"2012 / in Progress. Land 1." 2012, accessed October 3, 2022, <https://marcelamagno.com/project/land/>.

"Bienal De La Habana." 2021, accessed October 2, 2022, <http://www.wlam.cult.cu/14bienaldelahabana.html>.

Carrington, Damian. "Why the Guardian Is Changing the Language It Uses About the Environment." *The Guardian* (London), May 17 2019. <https://www.theguardian.com/environment/2019/may/17/why-the-guardian-is-changing-the-language-it-uses-about-the-environment>.

"Future Fossil Spaces." 2014, accessed October 20, 2022, <http://julian-charriere.net/projects/future-fossil-spaces>.

Cook, Gary. *Clicking Clean: Who Is Winning the Race to Build a Green Internet?* Greenpeace Inc. (Washington D.C.: Greenpeace Inc., 2017). <http://www.clickclean.org/international/en/>.

"Eco-Visionaries. Confronting a Planet in a State of Emergency." 2019, accessed November 3, 2022, <https://royal-academy-production-asset.s3.amazonaws.com/uploads/caad3b0c-f1fc-402c-a204-ba09fab458df/EcoVisionariesLargPrintLOW.pdf>.

"The World's Real-Time Billionaires." *Forbes*, 2022, accessed January 3, 2023, <https://www.forbes.com/real-time-billionaires/#55767a963d78>.

""Horizontes Inestables" En La Xiv Bienal De La Habana." Ministerio de Cultura, República de Cuba, 2022, accessed December 27, 2022, <https://ministeriodecultura.gob.cu/es/actualidad/noticias/horizontes-inestables-en-la-xiv-bienal-de-la-habana>.

"Julian Charriere. About ", 2022, accessed December 7, 2022, <http://julian-charriere.net/about>.

Lithium. Mineral Commodity Summaries. National Minerals Information Center (2021). <https://pubs.usgs.gov/periodicals/mcs2021/mcs2021-lithium.pdf>.

"2022. Land [2] Litio." 2022, accessed November 20, 2022, <https://marcelamagno.com/project/2022-land-2-litio/>.

"Marcela Magno, Cartográfica." 2019, accessed 2 November, 2022, <https://www.diariocronica.com.ar/noticias/2019/09/09/22874-marcela-magno-cartografica>.

"On Trade Off." 2022, accessed 28 December, 2022, <https://www.on-trade-off.net/en-us/>.

- "Salar Del Hombre Muerto." EOL Energía Online, accessed 9 December, 2022, <https://www.energiaonline.com.ar/salar-del-hombre-muerto/>.
- "Tesla Introduces Tesla Energy." 2015, accessed November 25, 2022, https://www.youtube.com/watch?v=NvCIhn7_FXI.
- "Unknown Fields. Mission." 2009, accessed December 7, 2022, <http://www.unknownfieldsdivision.com/mission.html>.
- "Visibilize." 2022, accessed December 30, 2022, <https://www.macmillandictionary.com/dictionary/british/visibilize>.
- "Visualization." 2022, accessed January 3, 2022, <https://www.merriam-webster.com/dictionary/visualization>.
- "We Power Our Future with the Breast Milk of Volcanoes." Unknown Fields, 2016, accessed November 3, 2022, <http://www.unknownfieldsdivision.com/summer2015bolivia+atacama-lithiumdreams.html>.

Unpublished sources

Sánchez Prieto, Margarita. Paisaje En Datos: Las Cartografías Satelitales De Marcela Magno. October 2022. Unpublished manuscript.

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Image 2: Image still from the video work *We Power Our Future with the Breast Milk of Volcanoes*, by Unknown Fields, 2016 (Still made from the film, publicly posted on Vimeo platform by the artists: <https://vimeo.com/165412717>).

Image 3: *Argentina, Salar del Hombre Muerto, 25°28'15.80" S 67° 5'9.92" O, 16 Oct 2020*, by Marcela Magno, 2022 (Courtesy of the artist).

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Image 5: *Future Fossil Spaces*, by Julian Charrière, 2014-2017, salt-bricks from Salar de Uyuni, acrylic containers filled with lithium brine. Installation view, (Off)icielle, Paris, France, 2014. Copyright of the artist; VG Bild-Kunst, Bonn, Germany. Photo by Studio Julian Charrière. (Courtesy of Patricia Bondesson Kavanagh, Studio Julian Charrière).

Image 68: *Future Fossil Spaces*, by Julian Charrière, 2014-2017, salt-bricks from Salar de Uyuni, acrylic containers filled with lithium brine. Installation view, La Biennale di Venezia, Arsenale, 57th International Art Exhibition, Viva Arte Viva, 2017. Copyright of the artist; VG Bild-Kunst, Bonn, Germany. Photo by Studio Jens Ziehe. (Courtesy of Patricia Bondesson Kavanagh, Studio Julian Charrière).

Image 7: *Future Fossil Spaces*, by Julian Charrière, 2014-2017, salt-bricks from Salar de Uyuni, acrylic containers filled with lithium brine. Installation view, (Off)icielle, Paris, France, 2014.

Copyright of the artist; VG Bild-Kunst, Bonn, Germany. Photo by Studio Julian Charrière. (Courtesy of Patricia Bondesson Kavanagh, Studio Julian Charrière).

Appendix

Appendix 1: Artists' biographies

Unknown Fields

Unknown Fields is a nomadic art- and design research studio founded in 2009 by Australian independent designer, architect and curator Liam Young, and British artist, architect and writer Katie Davies. Their practice seeks to show the shadows cast by contemporary cities, venturing into expeditions in remote sites of the world. The distant landscapes they encounter—forgotten, excavated, pristine, irradiated—are connected in complicated and unexpected ways to our everyday lives, embedded in global systems and supply chains. Unknown Fields use primarily film and animation to create chronicles of these interwoven narratives, shedding light on the consequences of emerging environmental and technological scenarios, exploring the dispersed narratives of contemporary cities, and reimagining the contradictory realities present at sites of future.¹⁹⁰ Their previous expeditions include sites such as Area 51 and other United States military outposts, the Texaco oil fields in the Ecuadorian Amazon, Madagascar sapphire pits, the Chernobyl Exclusion Zone, a container ship in the South China Sea, the gold fields in the Australia outback, and the Uyuni salt flat in Bolivia. They have exhibited their films, animations and objects in several international institutions, such as the Royal Academy of Arts and the Victoria and Albert Museum in London, England, the The ZKM | Center for Art and Media Karlsruhe, Germany, and the Centre de Cultura Contemporània de Barcelona, Spain.¹⁹¹

Marcela Magno

Marcela Magno is an Argentinian artist who explores conceptual approaches to the photographic medium. Her main interest lies in the power of the photographic image to produce and construct knowledge, and to structure individual and collective memory. In her practice, Magno investigates

¹⁹⁰ "Unknown Fields. Mission," 2009, accessed December 7, 2022, <http://www.unknownfieldsdivision.com/mission.html>.

¹⁹¹ For more information, visit the Unknown Fields official website: <http://www.unknownfieldsdivision.com/> or the book published by the artists: *The Breast Milk of the Volcano*.

and executes minimal gestures in images that circulate in specific fields of knowledge and re-signifies them by recontextualising them into new fields. With a background in pedagogy, she studied the MA in Contemporary Latin American Photography at the Centro de la Imagen in Lima, Peru. In 2017, she published the book *Land [1]*, with support from the Government of the City of Buenos Aires. She received the AAMEC Award for Contemporary Argentinian Photography (Argentina), the Carolina Hidalgo Vivar of Environment POY Latam Prize (Spain), and the second prize in the OFF European Photography Festival (Italy). Her works are part of the permanent collections of the Museum of Fine Arts, Houston, United States; the Museo Caraffa, Córdoba, Argentina; the Museo Minnicelli, Santa Cruz, Argentina, among others. She has exhibited her works in Argentina, Chile, Brazil, Italy, the United States, Peru, China, and Japan. She lives and works in Buenos Aires, Argentina.¹⁹²

Julian Charrière

Julian Charrière is a French-Swiss artist who explores ideas of nature and its transformation over deep geological as well as human historical time.¹⁹³ His practice addresses matters of ecological concern, derived from fieldwork in remote locations with particular geophysical identities, such as salt flats, radioactive sites, volcanoes, palm plantations, and icebergs. Through collaborations with practitioners outside the artistic field, Charrière's installations, performances, photographs and sculptures provoke and invite critical reflections on our encounters with the natural world. He was a former student of Olafur Eliasson, and participated in the Institut für Raumexperimente, an educational research project led by Eliasson in collaboration with the Berlin University of the Arts. He has had solo exhibitions in institutions such as the Dallas Museum of Art, United States; Musée des Beaux-Arts of Lausanne, Switzerland; Langen Foundation of Neuss, Germany, among others. He has exhibited his works in biennales such as the 17th Biennale Architettura di Venezia, Italy; the 1st Antarctic Biennale, Antarctica; the 12th Biennale de Lyon, France; and the 57th Biennale di Venezia, Italy. Charrière was one of the four nominees for the Prix Marcel Duchamp 2021. He lives and works in Berlin, Germany.¹⁹⁴

¹⁹² For more information, visit Marcela Magno's official website: <https://marcelamagno.com/>

¹⁹³ "Julian Charriere. About ", 2022, accessed December 7, 2022, <http://julian-charriere.net/about>.

¹⁹⁴ For more information, visit Julian Charrière's official website: <http://julian-charriere.net/>

Appendix 2: Full transcription of the edited speech given by Elon Musk in the presentation of Tesla Energy in 2015, as used in the video work *We Power Our Future with the Breast Milk of Volcanoes* (2016) by Unknown Fields.

“Alright, welcome everyone to, basically the announcement of Tesla Energy. So, what I’m gonna talk about tonight is about a fundamental transformation of how the world works. About how energy is livid across the Earth. This is how it is today, it’s pretty bad. Yeah, it sucks, exactly. I just wanna be clear cause sometimes for people like, confuse about this, this is real. Ok? This is actually how most power of the world is generated, with fossil fuels. If you look at the curve, that’s a famous curve, the Keeling curve, which shows the growth in CO₂ concentration in the atmosphere. And every year, it ratchets up. It gets higher and higher, and if we do nothing, that’s where it’s headed. To levels that we don’t even see in the fossil record. Well, I think we collectively should do something about this. And not try to win the Darwin award. For us and a lot of other creatures too. The way the grid works today is this, you got coal, you got natural gas, nuclear, hydro, and a little wind and solar, but not enough wind and solar, obviously. So, that’s sort of the grid typically, in most countries. And then you’ll notice something, which is that there’s quite a big difference between peak to trough usage. The peak usage is typically, at least twice the trough usage. So please, bear that in mind, I’ll reference that again later in the presentation. That’s an important point. So, what we are here to talk about is the solution. Actually, I think it’s a fairly obvious solution, but it’s something that we need to do. And the solution is in two parts. Part one: the Sun. We have this handy fusion reactor in the sky, called the Sun, ok? You don’t have to do anything, it just works. Shows up every day, and produces ridiculous amounts of power. Now, a lot of people aren’t clear on how much surface area is needed to generate enough power to completely get the United States off of fossil fuels. Most people have no idea. They think it must be a so huge amount of area, maybe you need these satellites in space, and maybe like space solar power, and if anybody should be in favour of space solar power, it should be me. But this is completely unnecessary. Because actually very little land is needed to get rid of all fossil fuel electricity generation in the United States. That blue square there, is the land area that’s needed to transition the United States to a zero carbon electricity situation. It’s really not much. And most of that area is gonna be in rooftops. So, you won’t need to disturb land, you won’t need to clear new

areas. It's mostly gonna be on existing, the roofs of existing homes and buildings. I really think that image is an important one to bear in mind when people are thinking about solar power. Like, how will it take? Is it gonna take some enormous amount? No, it's just that blue square. Blue square. Now, the obvious problem with solar power, is that the Sun does not shine at night. I think most people are aware of this. So, this problem needs to be solved. We need to store the energy that is generated during the day, so that you can use it at night. And also, even during the day, the energy generation varies, there's a lot more energy generated in the middle of the day than at dawn or dusk. So, it's very important to smooth out that energy generation and retain enough so that you can use it at night. Now, what you may not have noticed in that earlier slide where I showed the blue square, was that there was one red pixel. In the blue square there was a red pixel. That is the size of the batteries needed to transition all of the United States to being solar with batteries. Ok, it is a very tiny amount. One pixel. You should remember that. One pixel is the size of the batteries needed to, for the United States to have no fossil fuel generated electricity. This is no room at all. So, not a problem for solar or batteries. Now, the issue with existing batteries is that they suck. They are really horrible. They look like that. They're expensive, they're unreliable, they're sort of stinky, ugly, bad in every way; very expensive. You have to get, you need to combine multiple systems, there's not one integrated place you can go and buy a battery that just works. Which is what people really want to buy. So, we have to come up with the solution. That's the missing piece, that's the thing that's needed to have a proper transition to a sustainable energy world. So, the missing piece is what we're going to show you tonight. This is a product that we call the Tesla Powerwall. If you look back against that wall, you'll see a whole bunch of them in different colours. So, you can pick your favourite colour, and it looks like a beautiful sculpture on the wall. I want to point out a few things that are very important about this. The fact that it's wall mounted, is vital. Because it means you don't need to have a battery room. You don't have to have some room filled with nasty batteries. It means that a normal household can mount this on their garage or on the outside wall of their house, and it doesn't take up any room. It's flat against the wall, it has all the integrated safety systems, the thermal controls, the DC-to-DC converters. It's designed to work really well with solar systems, right out of the box, and it has, it addresses all the needs. If you're thinking about..."

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