

SNIS Final report - January 31, 2024
'Green Dealings' - Report 1 - Abstract and Executive Summary

Abstract (of the Executive Summary)

The climate crisis lends weight to the political imperative for an energy transition in Europe. Meanwhile, the production of lithium-ion batteries, primarily for electromobility, has increased demand for minerals like lithium, found in high concentration in the South American salt flats. The project examined the governance schemes under negotiation within and between Europe and South America relevant to the lithium-ion battery value chain. Engaging diverse stakeholders in qualitative and quantitative social science methods, we identified points of consensus and divergence on the significant social justice and sustainability challenges faced. While the 'chain' is a simple metaphor for connecting political economic relations across places, 'governing the chain' uniquely from the position of Europe is potentially insufficient to ensure sustainability, justice, and secure critical mineral supply.

Executive summary

In light of the climate crisis, there is a broad consensus regarding the imperative of an energy transition to reduce greenhouse gas emissions. The development of high density batteries based on lithium is seen as pivotal in driving progress along this trajectory, in particular when transport is concerned. Yet, the rapid expansion of electromobility in recent years has significantly increased the demand for certain minerals. In particular, according to estimations from the International Energy Agency, lithium is forecast to experience rapid growth in demand. Therefore, the 'governance' of lithium has gained importance in public debate and captured the attention of many sectors, including governments, companies, communities, non-governmental organizations, and academics. The European Union in the context of its 'Green Deal' has launched an ambitious industrial policy centered around lithium batteries. On the other end of the supply chain, the region of Argentina, Bolivia, and Chile concentrates around 55% of the world's lithium resources and 80% of those in salt flat brines. The growing demand for lithium has created new economic opportunities for these countries while also entailing risks. The extraction of lithium has environmental impacts and it affects the people living where it occurs.

In this context, the 'Green Dealings project' examined the governance schemes currently under negotiation and formation within and between Europe and South America relevant to the lithium-ion battery value chain. We placed the question of justice at the center of the project to address the broader analytical question of how natural resources, extracted in some places, produce and reproduce global inequalities, by serving as raw materials for industries in other places.

Our interdisciplinary and international team combined different approaches to the governance of raw materials, from political ecology and economic geography, to conceptually and methodologically grasp negotiation processes at different scales. In this perspective, we understood 'governance' to describe the formal and informal ways in which decisions are made regarding issues of collective interest, such as natural resources, as well as how these decisions are accepted, accommodated or contested by relevant stakeholders at different scales. Therefore, we understood lithium resource governance as permeated by competing visions, conflicts and power struggles between different actors along the entire value chain.

Accordingly, we sought to analyze the relations between these actors, and the broader structures congealing as a consequence of these relations, as the outcome of dynamic negotiation processes across distant places. In particular, we sought to understand and contrast different actors' perspectives on moving towards a more 'sustainable' and 'just' lithium battery value chain.

The project employed a mix of qualitative and quantitative social science research methods. On the qualitative side, several fieldwork missions were conducted in Argentina, Bolivia, Chile, Belgium, Germany and France. These methods sought to include a broad range of perspectives from diverse social actors, including from policy-makers, business, academia, civil society, indigenous communities, and political activists. On the quantitative side, two rounds of a Delphi survey were conducted with a similar set of stakeholder groups, providing broader scope. The primary aim of the survey was to gather insights from an expert panel regarding the key challenges confronting the sustainability of lithium mining in salt flats. In addition, the study inquired about participants' opinions on initiatives and public policies to address the identified sustainability and justice concerns. In a highly dynamic regional context, where each lithium-rich country has approached sustainability challenges from distinct perspectives and with diverse tools, the survey offered valuable insights into the priorities identified by the expert panel and the potential avenues to address them.

One of the key milestones of the research was to clarify to what extent negotiation processes have arrived at any points of consensus on key issues such as the environmental sustainability and social justice implications of the lithium battery chain. Lithium-ion battery production traverses diverse scales, perspectives, and interests. Our results highlight that points of both consensus and divergence permeate ongoing negotiation processes at different levels, and between very diverse stakeholder groups along the lithium battery chain. Social and environmental justice concerns have been raised around lithium extraction, including concerns over lack of community consultation, indigenous rights, the distribution of extraction's costs and benefits, and the impacts on water resources. While these may seem like merely 'local' concerns, they have important implications for the lithium-ion battery industry, and for EU-Latin America relations. Meanwhile, policy-makers and corporate actors have placed their confidence in diverse sets of standards, while questions regarding how such standards can be applied, by whom, and whether this will be effective in ensuring sustainability and social justice goals, remain the subject of debate.

In fact, a unique and clear picture of what a 'just' lithium battery chain would look like does not emerge. However, what seems clear is that cooperative relations between EU and Latin America on lithium extraction, or put more crudely, Europe's ability to supply itself with lithium and lithium-based batteries and components to attain the ambitious goals it has set in terms of electromobility and industrial independence, will likely depend on the degree to which stakeholders manage to build not only effective policies and standards, but inclusive and legitimate negotiation mechanisms to define these in the first place.

On a broader conceptual level, we have found that questions of scale, and relations across scales, are key to understanding and addressing issues of governance along the lithium battery chain, and likely value chains more generally. Drawing on reflections from interviews and focus groups in several countries, the qualitative research in particular allowed us to reflexively interrogate some of the scales that stakeholders commonly employ to communicate and to understand the world, and which we were employing as categories in our own research. For example, one such interrogation was to examine implicit and explicit

invocations of 'global' and 'local' scales and how they shape our assumptions about what kind of perspectives, concerns, and knowledges different stakeholders could possibly hold.

We think that such questionings are significant for issues of value chain governance. Indeed, they compel us to question the principal consensus that the Green Dealings project dealt with (and indeed was based on) namely that there is indeed a common object of concern, the lithium battery 'chain,' and that 'governing the chain' is a necessary and sufficient approach in search of more sustainable and just relations between and within world regions. As our research shows, when it comes to the practical question of 'how to govern the chain' consensus is much less clear, and participants struggle not only with diverse opinions but also with conceptual challenges. How precisely the chain metaphor can be used to capture (and eventually, address) actual sustainability and justice challenges of the global battery industry, and what alternative metaphors might be employed to provide complementary or contending perspectives, will be crucial questions for further research. It is clear from a political economy perspective, that the production of lithium-ion batteries connects real material concerns across distant places, and has implications for the distribution of costs and benefits of production across diverse social groups. However, the research suggests that more than a 'chain', and more than 'chain governance' is needed to render a full account of, and address, the sustainability and justice challenges that these political-economic relations imply.



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'Green Dealings' - Report 2 - Final scientific report

Problem statement

In light of the climate crisis, there is a broad consensus regarding the imperative to mitigate greenhouse gas (GHG) emissions. As global energy production emits $\frac{2}{3}$ of GHGs, an energy transition is unavoidable and, as transportation represents 35% of energy use and about a quarter of global carbon dioxide emissions, it is at the core of this energy transition. The shift to electric vehicles is at present the main alternative to combustion engines. Until recently the main limitation was that the energy density and practicality of fossil fuels was hard to compete with. The development of high density batteries based on lithium was pivotal in driving progress along this trajectory. The three major economic blocs now aim to strongly increase the proportion of zero emissions vehicles (electric and other technologies like hydrogen fuel cells) in the coming decades (all new cars and vans sold in the European Union by 2035,¹ 50% by 2030 in the USA,² 40% by 2030 in China according to national plans³).

Yet, the rapid expansion of electromobility in recent years has significantly increased the demand for certain minerals. In particular, according to estimations from the International Energy Agency, lithium is forecast to experience rapid growth in demand (an estimated 250'000 tons in 2030 over 130'000 t in 2022). Therefore, the “governance” of lithium has gained importance in public debate and captured the attention of many sectors, including governments, companies, communities, non-governmental organizations, and academics.

The European Union in the context of its “Green Deal” has launched an ambitious industrial policy centered around lithium batteries, creating the conditions for the EU to master the batteries supply chains, from the extraction of minerals to batteries recycling, especially in the context of its geopolitical dependence on China. What is more, the entire supply chain would work under “sustainable conditions”, a dimension seen as a moral imperative and a European comparative advantage. A crucial element of this strategy is to guarantee a steady and stable supply of lithium compounds.

On the other end of the supply chain, the region of Argentina, Bolivia, and Chile concentrates around 55% of the world’s lithium resources and 80% of those in salt flat brines. The growing demand for lithium has created new economic opportunities for these countries. However, it also entails risks. The extraction of lithium has environmental impacts and it affects the people living where lithium mining occurs. Lithium-rich countries are thus placed in a dilemma between the risk of missing a valuable opportunity to develop domestic mining activities and their social and environmental impacts.

In this context, the Green Dealings project examined the governance schemes currently under negotiation and formation within and between Europe and South America relevant to the lithium-ion battery value chain. While lithium-ion battery and electric vehicle supply chains are largely dominated by Asia, Europe is concerned about how its dependence on the supply of materials and components will affect its industries (Kalantzakos 2020). Meanwhile, in the South American countries the lithium boom has raised both hopes for economic development

¹ https://ec.europa.eu/commission/presscorner/detail/en/ip_22_6462

² <https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/05/fact-sheet-president-biden-announces-steps-to-drive-american-leadership-forward-on-clean-cars-and-trucks/>

³ <https://news.mit.edu/2021/chinas-transition-electric-vehicles-0429>

and fears of environmental and social costs (Fornillo 2019, Barandiarán 2019, Lunde Seefeldt 2020). At stake in the global dynamics revolving along the lithium battery chain is the inequitable division of labor between consumer and producer regions that characterizes raw material economies (Bunker and Ciccantell 2005, Frey et al. 2019) and competition between regions and nations for dominance over raw material supply and techno-industrial development.

The scholarly literature has grappled with different aspects of this problem, namely how natural resources, extracted in some places, produce and reproduce global inequalities, by serving as raw materials for industries in other places (Howe 1981). In particular, it has evidenced how power imbalances in the global political economy perpetuate the transfer of surplus value from raw materials producing places to industrialized centers (e.g. Wallerstein 1984, Cardoso and Faletto 1979, Arrighi 1994). Doing so it has also exposed complexities in the territories of extraction, showing how national and regional dependencies on resource extraction are in fact characterized by internal tensions and contradictions (e.g. Gudynas 2009, Brand et al. 2016, Burchardt and Dietz 2014, Veltmeyer and Petras 2014). Elucidating how places of raw material extraction are embedded into circuits of global industries (e.g. Barry 2013, Bridge 2008, Bair 2009), it has shown that raw material extraction is not merely an issue of political economy, but crucially also has ecological, epistemological and even ontological dimensions (e.g. Bebbington and Burry 2013, Odegaard and Rivera Andía 2019, de la Cadena 2015, Li 2015). Thereby, it has shown how the unequal distribution of value is a product of complex and multi-dimensional power relations that materialize in negotiations around contracts and projects across these circuits (see Coe and Yeung 2015, Yeung and Coe 2015).

In the context of lithium, social scientists have contributed to such debates, but have fallen short of convincingly addressing both global and local dimensions of the problem. In short, this research has failed to examine how the political economy of lithium is shifting with the new energy regime. And while scholars have highlighted the unequal nature of relations between raw material producers and consumers, they have not grappled with the potential of these global dynamics to variably alleviate, reproduce, or even exacerbate these inequalities through industrial policies and standards, such as Europe's hopes of producing the "greenest" batteries. To address this gap, we placed the question of justice at the center of the Green Dealings project, by focusing on how negotiations in the lithium battery chain shape the relations between South American lithium producers and the EU.

Our interdisciplinary team combined different approaches to the governance of raw materials, from political ecology and economic geography, to conceptually and methodologically grasp negotiation processes at different scales (e.g. Obaya and Cespedes 2021, Hufty 2008, Dorn and Huber 2020). In this perspective, we understood 'governance' to describe the formal and informal ways in which decisions are made regarding issues of collective interest, such as natural resources, as well as how these decisions are accepted, accommodated or contested by relevant stakeholders at different scales (Hufty 2011a, Hufty 2011b). Therefore, we understood lithium resource governance as permeated by competing visions, conflicts and power struggles between different actors along the entire value chain. Accordingly, we sought to analyze the relations between these actors, and the broader structures congealing as a consequence of these relations, as the outcome of dynamic negotiation processes across distant places. In particular, we sought to understand and contrast different actors' perspectives on moving towards a more "sustainable" and "just" lithium battery value chain.

The project employed a mix of qualitative and quantitative social science research methods. On the qualitative side, several fieldwork missions were conducted in Argentina, Bolivia, Chile, Belgium, Germany and France. For this, we relied on our international team of participating researchers who in most cases conducted research in their own countries, while maintaining close collaboration on research questions and methods through frequent virtual meetings. The majority of the fieldwork was conducted in the lithium-producing countries (Argentina, Bolivia, Chile), while more focused interviews in Belgium (Brussels) and France (Paris) targeted key informants like industry experts and policy-makers. A final group fieldwork visit to disputed lithium mining sites along the Czech-Germany border and battery chain industrial sites in Germany in November 2023 served as a key point of reference to interrogate and consolidate research findings from the different country studies, and conduct further key informant interviews. We also employed participant observation and focus group workshops during a multi-stakeholder conference organized in the context of the project in Buenos Aires in October 2023. Together, these methods sought to include a broad range of perspectives from diverse social actors, including from policy-makers, business, academia, civil society, indigenous communities, and political activists.

On the quantitative side, two rounds of a Delphi survey were conducted with a similar set of stakeholder groups, providing less depth but broader scope. The primary aim of the survey was to gather insights from an expert panel regarding the key challenges confronting the sustainability of lithium mining in salt flats. In addition, the study inquired about participants' opinions on initiatives and public policies to address the identified sustainability and justice concerns. In a highly dynamic regional context, where each lithium-rich country has approached sustainability challenges from distinct perspectives and with diverse tools, the survey offered valuable insights into the priorities identified by the expert panel and the potential avenues to address them. To add depth to this approach, and using mixed quantitative and qualitative methods, the results of the Delphi survey were in turn used as a starting point for three online focus groups, where the results were discussed and nuanced with different stakeholder groups.

The findings from the quantitative and qualitative methods are complementary and are presented below in conversation. It should be taken into account that in-depth qualitative methods like fieldwork and focus groups require longer time frames for data collection and analysis than quantitative ones do. Analysis for some of the qualitative data is still ongoing.

Results

One of the key starting points was to clarify to what extent negotiation processes have arrived at any points of consensus on key issues such as the environmental sustainability and social justice implications of the lithium battery chain. The survey findings (Obaya et al. 2023 a,b,c; Obaya et al. 2024 a,b) indeed demonstrate a widespread consensus that there are substantial sustainability challenges associated with lithium mining in salt flats: according to the majority of the panel (67%), lithium mining in salt flats presents significant sustainability problems. However, the survey indicates significant differences between stakeholder groups (academia, government, industry, NGO) and study regions (EU and South America). Participants from lithium-demanding countries (EU) assigned a higher level of severity to these problems than participants from lithium-rich countries (South America). Respondents working for NGOs assigned the greatest severity to the sustainability problems (66% rated them as "very significant" problems), followed by respondents from academia and governments (respectively 37% and 31%). This position contrasts with the opinion of industry proponents:

only 13% indicated “very significant problems”, while 46% characterized these problems as “some specific problems”, rather than serious overall challenges. When asked about the most important sustainability issues, overall, the panel noted that the main challenges are environmental, followed by social, economic and finally institutional issues related to the governance of mining sustainability.

The second main point of consensus is the acknowledgement that lithium mining projects will not be able to continue to expand if sustainability issues remain unaddressed; the entire panel agreed on this point. Most of the respondents (77%) considered that measures should be taken even if they meant slowing down the pace of mining expansion (56.6%), while 20.5% of the respondents (in particular NGO and academia representatives) thought that sustainability had to be addressed even if it meant suspending mining activity.

The research also explored stakeholder perceptions on the public initiatives or policies that could effectively address the sustainability challenges, indicating key points around which present and future negotiations will revolve. Results from both the qualitative and quantitative methods indicate a consensus on the value of establishing participatory and multi-stakeholder consultation mechanisms involving the relevant groups in dialogue, problem-solving and planning. The importance of increasing state investment in capacity building in national and sub-national governments in monitoring, oversight, information production, and transparency was also stressed. Participants from government and academia prioritized the generation of, and access to, environmental information and, like industry, the improvement of extraction technologies. NGO participants, on the other hand, prioritized regulatory changes to establish more rigorous standards and monitoring and participatory mechanisms as an instrument to address the challenges to environmental sustainability.

Crucially, the research inquired about the issue of justice, which continues to be a key issue of debate. We asked about the conditions that should be promoted to guarantee that the lithium battery chain is just for countries developing lithium mining in salt flats. Survey findings reveal that for the panel as a whole, justice is especially linked to economic sustainability, before environmental and social sustainability. Accordingly, prioritizing economic benefit sharing with local communities was considered the primary option. Additionally, survey respondents stressed that lithium-demanding countries (EU) should promote adherence to social and environmental standards while facilitating knowledge and technology transfer to lithium-producing countries (South America). According to the overall survey panel, the main obstacles to a more just battery value chain are institutional weaknesses and limited state capacities within lithium-producing countries, before resource asymmetries between lithium demanding and producing countries.

Nevertheless, in relation to the question of justice, there were significant differences between stakeholder groups and across the two study regions, suggesting that the issue of justice is a key issue in the debate and ongoing negotiations. Participants working for NGOs and in academia thought of benefit sharing with local communities as a principal means to a more just value chain, while respondents from governments and industry favored developing productive and technological capacities. Those from lithium-demanding countries (EU) prioritized local community involvement and changes in consumption, production and mobility patterns (to reduce demand for raw materials in the first place). Meanwhile, participants from lithium-rich countries (South America) considered it more important to pursue value chain development and knowledge and technology transfer. Only industry participants thought that promoting compliance with social and environmental standards in

lithium-demanding countries (EU) was a principal means towards a more just lithium battery value chain. Significantly, this policy option, which has support from industry but not other stakeholders, most resembles the current path of EU policy making, with its focus on battery regulations and the ‘battery passport.’

Regionally, an overall trend is that while (environmental) sustainability concerns are driving the debate in the European context, the issue of justice is mainly formulated from a South American perspective. European actors seek to realize sustainability through ESG standards and norms, as exemplified in the new EU battery regulation, whereas in South America - where sustainability is also a key issue - many also wish to overcome the region’s historic role as raw materials provider and instead promote the development of a value production chain that is advantageous for the region. Local and indigenous communities living close to the salt flats voice concerns about the environmental and social impacts in their territories as well as their rights to participation, which they have started to articulate as issues of global environmental justice, in alliance with civil society actors (Díaz Paz et al. 2023; Díaz Paz et al. forthcoming; Escosteguy et al. 2022; Escosteguy et al. 2023). These specific results regarding local concerns confirm both our previous research (SNSF project LITHIUM, Grant 100017_172698) and the key underlying social justice issues motivating the current project.

In our different research activities and outputs – academic papers, blog posts, workshops, conferences, interviews, etc. – our interdisciplinary group focused on how selected actors and people positioned themselves within this particular landscape, while not losing sight of the overall power dynamics between unequal (macro) geographies. We organized our collective work along three distinct yet interrelated research lines: governance and standards, narratives, and supply chains. In each line we found both broad-based consensus and marked dissent between differently situated people. While the language we employed to frame our project (‘sustainability’, ‘justice’, etc.) worked to engage most of these people into conversations, the stakes that came to the fore during these conversations diverged significantly. It was insightful to experience how apparently common objects (lithium battery chain) and objectives (sustainability, justice) in fact differed, depending on who we were talking to and where. In the encounters we witnessed as part of our engaged research activities (in particular the Lithium Crossroads conference in Buenos Aires) we understood that such differences mostly pertained to the backstage while the public debate appeared to be characterized by broad consensus. For instance, in the panel discussions, company representatives defended the viewpoints and interests of their employers, while during the breaks they were more nuanced and shared their frustration with the polarization of the debate around lithium mining in South America.

We think that such differences and nuances are significant to better understand and address governance issues along the lithium battery chain, in particular when it comes to concerns that reach across distant scales in complex ways. For example, will ambitious ESG standards such as those defined by the new EU battery regulations satisfactorily address concerns of social justice as they are voiced by different stakeholders? These regulations mainly build on the concept of Due Diligence and thus adopt a risk management approach. This approach, however, is limited in addressing complex environmental issues where knowledge gaps persist and controversies and uncertainties remain, such as the impact of lithium mining on the water balance of salt flats (Díaz Paz et al. forthcoming). The same could be said for other environmental impacts, such as those on biodiversity, or social and economic impacts, such as ensuring adequate consultation with indigenous communities and improving the participation of local communities in the economic benefits of mining (Escosteguy et al. 2022). Moreover,

we have found that some stakeholders (mostly from EU) locate ‘social justice’ on the local level (e.g. community benefits and participation) while for others (mostly from South America) it pertains to the structural makeup of global economies (e.g. industrial upgrading or technology transfer). Whether standards will prove to be an appropriate governance tool to address justice issues will depend on whether such differences are written into their constitution and implementation. Accordingly, the risk management and certification approach should be complemented by a cooperative strategy for capacity building in lithium-rich countries. Yet the question remains whether lithium-producing countries (such as ABC) will actually seek to comply with EU standards in order to gain access to that market, or whether they will prefer to export to markets with less burdensome requirements and which promise resources such as technology transfer in exchange (e.g. China). That is, the different strategies and policies taken by the ABC countries which we have studied (e.g. Sanchez-Lopes 2023; Obaya 2022) are shaped by broader (global) political economic relations, shaping in turn the meaning and effectiveness of governance tools and mechanisms, such as standards, that are hoped to govern the battery value chain across different scales and places.

In our research we identified several areas of intervention that could foster a cooperative bi-regional (EU-Latin America) agenda (Obaya et al. 2024a,b). Most importantly, principles for the consultation and participation of indigenous peoples and communities need to be implemented. The voluntary implementation of rigorous responsible mining standards such as IRMA can have a positive impact. However, we came to understand that they are complementary to local institutions and cannot be considered a sufficient condition to certify that consultation has been carried out properly. We think it is necessary to strengthen an institutional system that assures to civil society that administrative procedures under state responsibility are modernized and align with the requirements of international best practices in consulting indigenous communities. Moreover, there is a need for a strategic and coordinated vision for sustainable extractive activities among countries that supply lithium. We have identified an important asymmetry in the bi-regional relationship in terms of the capacity to develop a strategic vision on a green and just transition and to design a policy agenda that underpins this process. This asymmetry represents a limitation when designing action plans for the strategic areas identified by both regions, as well as identifying projects that could be designated as “strategic” for both sides.

On a broader conceptual level, we have found that questions of scale, and relations across scales, are key to understanding and addressing issues of governance along the lithium battery chain, and likely value chains more generally. Drawing on reflections from interviews and focus groups in several countries, the qualitative research in particular allowed us to reflexively interrogate some of the scales that stakeholders kept referring to, and which we were employing as categories in our own research. One such interrogation was to examine implicit and explicit invocations of ‘global’ and ‘local’ scales and how they shape our assumptions about what kind of perspectives, concerns, and knowledges different stakeholders could possibly hold. It is often assumed, for example, that ‘local’ stakeholders (e.g. indigenous communities) have concerns that likewise pertain, and are thus limited, to the ‘local’ in range (e.g. ‘their’ salt flat). In contrast, in our work (e.g. Lorca et al. 2021; Köppel and Scoville-Simonds 2024) we showed that such portrayals do not correspond to how actually existing ‘local’ people understand and talk about lithium and battery related issues. Rather, scales like the ‘local’ (or the ‘global’ for that matter) are constructed as particular categories, or signifiers, among engaged communities who seek to solve governance challenges that are geographically dispersed and ontologically unstable.

We think that such questionings are significant for issues of value chain governance. Indeed, they compel us to question the principal consensus that the Green Dealings project dealt with (and indeed was based on) namely that there *is* indeed a common object of concern, like the lithium battery ‘chain,’ and that governing it is a desirable thing to *do* in search of more sustainable and just relations between world regions. As our research shows, when it comes to the practical question of ‘how to govern the chain’ consensus is much less clear, and participants struggle not only with diverse opinions but also with conceptual challenges. ‘How to govern the chain’, relates, in other terms, precisely to the diverse perspectives on the sustainability and justice issues discussed above, what the policy responses are seen as possible and desirable, and how these should be applied where and by whom. At its base, the category of the ‘chain’ offers a particular portrayal of how these different aspects hang together (or not) suggesting some ways in which they can (and should) be practically addressed while excluding others, whether as unmentioned possibilities or as explicit impossibilities. In short, the chain metaphor can allow researchers to highlight a set of relations through which different scales, peoples and places are connected, primarily in economic terms, at the risk of obscuring other actual or potential ways of thinking and relating. How precisely the chain metaphor can be used to capture (and eventually, address) actual sustainability and justice challenges of the global battery industry, and what alternative metaphors might be employed to provide complementary or contending perspectives, will be crucial questions for further research.

Conclusions

Green Dealings has highlighted that points of both consensus and divergence permeate ongoing negotiation processes at different levels, and between very diverse stakeholder groups along the lithium battery chain. Social and environmental justice concerns have been raised around lithium extraction, including concerns over lack of community consultation, indigenous rights, the distribution of extraction’s costs and benefits, and the impacts on water resources. While these may seem like merely ‘local’ concerns, they have important implications for the lithium-ion battery industry, and for EU-Latin America relations. Meanwhile, policy-makers and corporate actors have mainly preferred a risk management approach in line with the concept of Due Diligence, placing their confidence in diverse sets of standards. However, questions regarding how such standards can be applied, by whom, and whether this will be effective in ensuring sustainability and social justice goals, remain the subject of debate.

In fact, a unique and clear picture of what a ‘just’ lithium battery chain would look like does not emerge. However, what seems clear is that cooperative relations between EU and Latin America on lithium extraction, or put more crudely, Europe’s ability to supply itself with lithium and lithium-based batteries and components to attain the ambitious goals it has set in terms of electromobility and industrial independence, will likely depend on the degree to which stakeholders manage to build not only effective policies and standards, but inclusive and legitimate negotiation mechanisms to define these in the first place. Lithium-ion battery production traverses diverse scales, perspectives, and interests. Enhancing ESG standards and applying normative frameworks from the standpoint of Europe, as for example the new EU battery regulations do, is preferable to a world without standards. Yet, a more socially just and sustainable solution would require governance mechanisms that are formulated and regulated (i.e. governed) in a balanced way by different stakeholders, making room not only for the least common denominators (i.e. consensus) but also for the diversity and dissent articulated along the chain.

Our research suggests that to imagine, construct and sustain such governance mechanisms it is crucial to foster sensibilities for both how to build consensus and how to handle the (necessarily) remaining differences and disagreements. As we have shown, the governance of the lithium battery chain concerns how different stakeholders think about and relate to different scales, places, and peoples across the globe, and how they are related. This is where acknowledging both the advantages and limitations of the ‘chain’ concept is crucial, for analysts and practitioners alike. For instance, supporting bi-regional cooperation between producing and consuming regions shows promise for advancing towards more sustainable and just relations. Yet, framing certain regions as producing and others as consuming (i.e. as two ends of a chain) not only ignores the actual complexity of these relations but may repeat a logic of structural dependency. As our research has shown, stakeholders hold rather different views about how to address such issues. Indeed, during our research encounters it was often no longer clear where and at what scale the problems and their possible solutions were located, where they began and where they ended. How to imagine and develop governance tools, and the scales and relations they operate through, that take into account such complexity?

At the end of the Green Dealings project we can offer starting points to addressing this question, in particular by raising awareness about the possible implications and limitations of the ‘chain’ concept. More research is needed to gain a better understanding of these implications and to address questions of governance based on a sustainability and justice agenda. In fact, we suggest placing them at the center in future research by enquiring into how different stakeholders use concepts such as the ‘chain’ to comprehend the problems in front of them, and how a self-reflexive approach to such use can shape the way they imagine and enact possible solutions. It is clear from a political economy perspective, that the production of lithium-ion batteries connects real material concerns across distant places, and has implications for the distribution of costs and benefits of production across diverse social groups. However, the research suggests that more than a ‘chain’, and more than ‘chain governance’ is needed to render a full account of, and address, the sustainability and justice challenges that these political-economic relations imply.

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“Green Dealings” - Report 3 - Output and Impact report

Output statement

Specific outputs of the project are listed below under seven categories. Several more outputs are under preparation based on data gathered during the project, but only those published/completed or soon forthcoming are listed here. Given that the project had a strong focus on ‘engaged research’ and ‘knowledge circulation’, a good proportion of the outputs are public- and policy- oriented, or engaged diverse stakeholders, beyond traditional academic outputs. The project was directed at informing stakeholders in both Latin America and Europe. For this reason, different outputs targeting different stakeholder groups are in English, Spanish, or both.

1. *Academic publications*

Díaz Paz, W.F., M. Escosteguy, L. Seghezso, M. Hufty, E. Kruse, M.A. Iribarnegaray. 2023. Lithium Mining, Water Resources, and Socio-Economic Issues in Northern Argentina: We Are Not All in the Same Boat. *Resources Policy* 81 (March): 103288. <https://doi.org/10.1016/j.resourpol.2022.103288>.

Díaz Paz, W.F., A.G. Salas Barboza, M. Escosteguy, P.V. Arias-Alvarado, E. Kruse, M. Hufty, L. Seghezso, M.A. Iribarnegaray (forthcoming) Water Footprint of lithium mining in Northern Argentina: A comparative study of conventional evaporative and DLE technology.

Escosteguy, M., A. Clavijo, W.F. Diaz Paz, M. Hufty, L. Seghezso. 2022. “We Are Not Allowed to Speak”: Some Thoughts about a Consultation Process around Lithium Mining in Northern Argentina.” *The Extractive Industries and Society* 11 (September): 101134. <https://doi.org/10.1016/j.exis.2022.101134>.

Escosteguy, M., W.F. Diaz Paz, M.A. Iribarnegaray, A. Clavijo, C.O. Insaurralde, H. Stern, C.D. Venencia, C. Brannstrom, M. Hufty, L. Seghezso. 2023. Will Electro-Mobility Encourage Injustices? The Case of Lithium Production in the Argentine Puna. In *Energy Democracies for Sustainable Futures*, edited by M. Nadesan, M.J. Pasqualetti, J. Keahey, 225–32. Academic Press. <https://doi.org/10.1016/B978-0-12-822796-1.00024-3>.

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Lorca, M., M. Olivera Andrade, I. Garcés. 2023. ‘Se Instaló El Diablo En El Salar’. Organizaciones Atacameñas, Agua y Minería Del Litio En El Salar de Atacama.” *Estudios Atacameños* 69. <http://dx.doi.org/10.22199/issn.0718-1043-2023-0004>.

Obaya, M. 2022. The scalene triangle. Lithium and productive development policies in Argentina, Bolivia, and Chile. *Cahiers des Amériques latines* 99 (December): 35–70. <https://doi.org/10.4000/cal.14501>.

Obaya, M., Kramarz T. Forthcoming. ‘This Time it Will Be Different’ - Derisking Development in the South American Lithium Triangle. *Review of International Political Economy*.

Sanchez-Lopez, M.. 2023. Geopolitics of the Li-Ion Battery Value Chain and the Lithium Triangle in South America. *Latin American Policy* 14 (1): 22–45. <https://doi.org/10.1111/lamp.12285>.

2. *Conference presentations, panels organized, and invited talks*

Barrera Vivero, A. and J. Köppel. (Panel leaders). 2022. A ‘Green Deal’ for who? The promises and pitfalls of sustainable EU-LAC commodity chains in the wake of global transformations, Congress of the Latin American Studies Association. Virtual. 5 May 2022.

Escosteguy, M. and W.F. Díaz Paz. 2023. Minería del litio en Argentina. Un análisis desde el enfoque de la ecología política, Webinar. Global Political Ecology of Lithium seminar series. University of Atacama, Chile. 28 July 2023.

Hufty, M. 2024. Lithium between supply chains and geopolitics, Seminar “Litio: Desafíos globales, problemáticas locales” organized by Mauricio Lorca. University of Atacama, 18 January 2024.

Lorca, M. 2024. (Panel leader). Pueblos indígenas: Territorio, información y participación, Seminar “Litio: Desafíos globales, problemáticas locales” organized by Mauricio Lorca. University of Atacama, 18 January 2024.

Murguía, D. y Obaya, M. 2022. Gobernanza para la sostenibilidad: reglas, estándares y proyectos en la minería de litio. Semana de la Investigación, el Desarrollo y la Innovación (7ma edición), Escuela de Economía y Negocios, Universidad Nacional de San Martín, San Martín, Argentina.

Obaya, M. and M. Hufty. 2022. The Power of the Norm. Can a new European Battery Directive lead to the virtuous governance of the lithium commodity chain?, Congress of the Latin American Studies Association. Virtual. 5 May 2022.

Obaya, M. 2023. The scalene triangle. Capability-development strategies in the lithium industry in South America, Society for the Advancement of Socio-Economics (SASE) Conference, Rio de Janeiro. 22 July 2023.

Obaya, M., Murguía, D., Freytes, C. and Allan, T. (2023). Encuesta Delphi: ‘Una cadena de valor de baterías de litio justa y sostenible’, presentation at the roundtable debate, "Sobre agua, baterías y comunidades: perspectivas para una minería de litio justa y sostenible en Argentina. Semana de la Investigación, el Desarrollo y la Innovación (8va edición), Escuela de Economía y Negocios, Universidad Nacional de San Martín, San Martín, Argentina.

Olivera Andrade, M. (Panel leader). 2024. Políticas tecnoproductivas comparadas entre ABC, la Unión Europea, Canadá y México, Seminar “Litio: Desafíos globales, problemáticas locales” organized by Mauricio Lorca. University of Atacama, 18 January 2024.

Olivera Andrade, M. and A. Clavijo. Impactos socioambientales de la extracción del litio y acceso a información ambiental en Argentina, Bolivia y Chile, Webinar. Global Political Ecology of Lithium seminar series. University of Atacama, Chile. 30 June 2023.

Sanchez-Lopez, D. 2023. Invited speaker for seminar “La Geopolítica del litio: La influencia de China y el impacto en el denominado Triángulo del Litio (Bolivia, Argentina y Chile)” organized by the Anglo-Bolivian Society. Online event.

Scoville-Simonds, M. (Panel leader). 2024. La cadena de producción del litio: Gobernanza transnacional y geopolítica, Seminar “Litio: Desafíos globales, problemáticas locales” organized by Mauricio Lorca. University of Atacama, 18 January 2024.

Scoville-Simonds, M. 2022. Knowledge (dis)connects in climate and energy narratives. Invited talk. University of Oslo. 20 June 2022.

Scoville-Simonds, M. and J. Köppel. 2022. Dreams, realities, or recurring nightmares? Comparing battery socio-technical imaginaries between Latin America and Europe. Congress of the Latin American Studies Association. Virtual. 5 May 2022.

Scoville-Simonds, M. V. Laterza, R. O’Born, S. Torjesen. 2023. De la extracción de litio a la producción de baterías: ¿Cómo estudiar la justicia y la sostenibilidad a través de lugares y escalas? Webinar. Global Political Ecology of Lithium seminar series. University of Atacama, Chile. 28 April 2023.

3. Organization of conferences, workshops, and seminars

Conference: “Lithium Crossroads (Las encrucijadas del litio)”, multi-stakeholder conference, University of San Martin, Buenos Aires, Argentina, 24-26 October, 2022. (ca. 150 participants).⁴

Workshop: “Lithium Crossroads: Social – science – policy laboratory”, workshop with diverse stakeholders, University of San Martin, Buenos Aires, Argentina. 25 October, 2022. (ca. 20 participants).¹

Final conference: “Governing Batteries? Articulating People and Places along Supply Chains”, Geneva Graduate Institute, 25-26 October 2023. The conference included a policy-

⁴ As explained in the intermediate report and follow-up communication, the event in Buenos Aires was funded using other sources but is included as a project output, as indicated in the approved SNIS research plan.

and public-oriented event titled “Sustainable supply chains for a ‘green transition’? Possibilities and limits of due diligence policies for lithium-ion batteries”, 26 October 2023.

4. *Policy-oriented reports and policy briefs*

Obaya, M.; Murguía, D.; Freytes, C. y Allan, T. (2023a). A just and sustainable lithium battery value chain. Delphi Survey – Executive Report, Green Dealings Project, Centre for International Studies, Geneva Graduate Institute (IHEID), Geneva. 44 pages. https://green-dealings.com/wp-content/uploads/2023/09/Resumen_GreenDealings_Ingles_CodBarras.pdf

Obaya, M.; Murguía, D.; Freytes, C. y Allan, T. (2023b). Una cadena de valor de baterías de litio justa y sostenible. Encuesta Delphi – Informe ejecutivo, Proyecto Green Dealings, Centre for International Studies, Geneva Graduate Institute (IHEID), Geneva. 43 pages. https://green-dealings.com/wp-content/uploads/2023/09/Resumen_GreenDealings_Espanol_CodBarras.pdf

Obaya, M.; Murguía, D.; Freytes, C. y Allan, T. (2023c). Una cadena de valor de baterías de litio justa y sostenible. Encuesta Delphi – Informe de resultados, Proyecto Green Dealings, Centre for International Studies, Geneva Graduate Institute (IHEID), Geneva. 165 pages. https://green-dealings.com/wp-content/uploads/2023/12/FU_DOC_GreenDealings_Litio_Final_Dic.pdf

Obaya, M.; Murguía, D.; Freytes, C. y Allan, T. (in press). A just and sustainable lithium battery value chain. Delphi Survey – Results report, Green Dealings Project, Centre for International Studies, Geneva Graduate Institute (IHEID), Geneva.

Obaya M, Murguía D and Sanchez-Lopez MD (2024a). El litio en la nueva agenda de la Unión Europea y América Latina y el Caribe: lineamientos de acción para una cadena birregional de baterías de litio justa y sostenible. EU-LAC Policy Brief 7. Hamburg: EU-LAC Foundation.

Obaya M, Murguía D and Sanchez-Lopez MD (2024b) Lithium in the new agenda of the European Union and Latin America and the Caribbean: action guidelines for a fair and sustainable bi-regional lithium battery chain. EU-LAC Policy Brief 7. Hamburg: EU-LAC Foundation.

5. *Public-oriented academic blog posts*

Köppel, J. 2022. Mining Indigenous Territories – Agree to disagree? *Lithium Worlds*. 8 February 2022. <https://lithiumworlds.com/mining-indigenous-territories/>

Köppel, J. 2023. Debate: Turning lithium into batteries and cars? *Lithium Worlds*. 18 September 2023. <https://lithiumworlds.com/turning-lithium-into-batteries-and-cars/>

Köppel, J. and M. Scoville-Simonds. 2022. Do we need lithium to save the planet? Dilemmas of mining and energy transition, *Lithium Worlds*. 8 December 2022. <https://lithiumworlds.com/dilemmas-of-mining-and-energy-transition/>

Murguía, D. 2023. Lithium governance in South America. Opportunities and concerns, *Lithium Worlds*. 10 July 2023. <https://lithiumworlds.com/lithium-governance-in-south-america/>

Obaya, M. 2023. How to build the lithium triangle? A cooperation proposal 9 August 2023. <https://lithiumworlds.com/how-to-build-the-lithium-triangle/>

6. *Other public- and policy-oriented dissemination*

Köppel, J. and M. Scoville-Simonds. 2023. Agree to disagree? On the social sustainability of lithium. Guest lecture, Environmental and Social Sustainability in Engineering (ESSE), Technische Universität Braunschweig, Germany. May 15, 2023.

Lorca, M. 2023. Impactos socio-ambientales de la minería del litio. Panelist, public debate and question-answer session. Universidad Mayor de San Andrés. La Paz. 31 August 2023.

Lorca, M. 2023. Minería del litio y comunidades atacameñas en el salar de Atacama, Chile. Consensos, disensos, y ambigüedades. Public seminar presentation. Universidad Mayor de San Andrés. La Paz. 31 August 2023.

Olivera Andrade, M. 2023. Desafíos de sustentabilidad de la industria del litio en Bolivia, Public seminar presentation. Universidad Mayor de San Andrés. La Paz. 31 August 2023.

Olivera Andrade, M. 2023. El litio como oportunidad para el desarrollo de Bolivia. Panelist, public debate and question-answer session. Universidad Mayor de San Andrés. La Paz. 31 August 2023.

Scoville-Simonds, M. 2022. Batteries as a Global Driver of Sustainable Change – For Better, or for Worse?, Panelist, public debate. Arendalsuka. Arendal, Norway. 16 August 2022.

7. *Related research funding proposals*

Several project researchers have led or contributed to the development of grant proposals to fund further research on related topics. Funding bodies and programmes include:

- Leading House for the Latin America Region (successful application in 2022)
- ANID, Chile - Concurso de Fomento a la Vinculación Internacional para Instituciones de Investigación (one unsuccessful and one successful application in 2022)
- ANID, Chile - Concurso regular de Fondecyt (successful application in 2024)
- Norwegian Research Council (unsuccessful application in 2022, reapplication in 2024 pending)
- Horizon Europe (one unsuccessful and one successful application in 2023)
- MSCA Doctoral Network (application in 2023 pending evaluation)

Impact statement

Our research has, or potentially has, impacts along three main impact pathways:

1. Stakeholder - including policy-maker - engagement

Green Dealings partnered with several key stakeholders throughout its work, and involved others in dialogue and knowledge production (data collection and validation). We have found that many actors, despite being important decision-makers in the value chain, lack knowledge about the different challenges along the value chain, and the diverging perspectives of other stakeholders. We therefore see engaging stakeholders in dialogue on the sustainability and justice challenges of the lithium-ion battery chain as a key pathway to policy impact.

As such, the Delphi methodology involved not only surveying various stakeholder groups, but also included follow-up focus group conversations with stakeholders to discuss and validate the results. The final results of the survey are published in full and executive summary versions, each in English and Spanish, to target different audiences. This work also resulted in several presentations for diverse audiences, and two policy briefs, produced in collaboration with the European Union, Latin American and Caribbean Foundation (EU-LAC), an important bi-regional strategic partnership fostering trans-atlantic cooperation by business, civil society, and governments.

The multi-stakeholder conference in Buenos Aires, October 2022 was an important milestone in the project. Although funded using co-financing (due to SNIS rules regarding funding only a final conference), several of our researchers used the opportunity to engage in dialogue, and conduct interviews, with stakeholders from the private sector, government, international organizations, and civil society. This allowed us to build trust with these key stakeholder groups. This supported not only data collection but also dissemination (the two activities being in dialogue). Similarly, the SNIS-funded final conference of the project, held in Geneva in October 2023, included a public-oriented presentation of the project results, but also invited a panel with stakeholders from UNCTAD, Inter-American Development Bank, and the NGO GermanWatch to respond and engage with the results and with a diverse public audience.

One concrete example of the potential outcomes of building this kind of dialogue is the cooperation agreement signed by the rectors of the Universidad Mayor de San Andrés, Universidad Técnica de Oruro and the Universidad Autónoma Tomás Frías in Bolivia, thanks to coordination by one of our researchers (Olivera Andrade). A 5-year agreement to collaborate on scientific research on lithium and the salt flat environments, it is unprecedented in the Bolivian context.

Our ability to engage diverse stakeholders in productive dialogue - representing sometimes opposing political perspectives on key issues - is improving, opening up broader avenues for social and policy impact. For example, the related follow-up research proposals (submitted to Horizon Europe, MSCA, and Norwegian Research Council, ANID) count key stakeholders as partners, including automobile, battery, technology, and mining companies; social-justice and sustainability oriented civil society organizations; and international organizations.

It is hoped that this work to identify clear points of consensus and future challenges will support enhanced collaborative - rather than competitive or conflictive - relations across the two regions, and across stakeholder groups with different political interests.

2. Bringing the social sciences into “technical” research

The themes of the project - energy transition, raw material extraction, environmental and social justice - are of key social, economic, and environmental importance over the coming decades. Yet the vital importance of the social sciences in this ‘technical’ field is not always widely recognized. The social sciences are increasingly carving out a niche for their important contributions, but this is a work in progress. There is a need for more interdisciplinary collaboration and conversation on these topics.

Demonstrating the relevance of the social sciences in this field is crucial to having scientific but also policy and social impact. For this reason, our academic outputs have primarily targeted interdisciplinary journals (e.g. *Extractive Industries and Society*). These interdisciplinary journals are read by technical specialists but also increasingly showcase the contributions of the social sciences.

A small yet concrete example of the impact this can have is the invitation we received to hold a guest lecture on social sustainability in a master’s course for engineering students at Technische Universität Braunschweig. Further, several of the research proposals (specifically, those for Horizon Europe and MSCA) have included interdisciplinary teams, including key roles for the social sciences, which build on these collaborations, and demonstrate that we are having an impact in this regard.

3. Stimulating early-career social science researchers to address this “technical” topic

Again, considering the perception of this field as ‘technical’, stimulating young researchers to pursue critical social science research in these topics is likewise a key impact pathway of the project, with academic, practical, and policy implications.

Specifically, of the three PhD students whose work (salary and/or fieldwork) was supported through the project, one (Köppel) has successfully completed his PhD and obtained a postdoc position in a related field. The other two (Escosteguy, Díaz Paz) are progressing well towards the end of their PhDs and have several successful peer-reviewed publications in this field. Another researcher supported by the project (Olivera Andrade) has begun a PhD thesis related to the project themes. The co-coordinator of the project (Scoville-Simonds), a postdoc, has been involved in several of the related research funding proposals listed above, which also aim to train the next generation of critical researchers in this field. Moreover, several Masters students successfully completed their studies with a dissertation project about lithium and batteries (Schmauser, Biondina, Niederberger, Øksnes Fjordbakk), engaging in active conversation with Green Dealings researchers and actively participating in project activities (conferences, joint fieldwork).

