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The Jadar lithium mining project in Serbia: imperatives mean complex decision-making

Abstract

This article examines the decision by the Serbian government to approve the highly controversial Jadar project to mine lithium at a site in the western part of Serbia. Lithium is a critical raw material with a variety of applications including, most strategically, in terms of its role in the batteries that power electric mobility. While it is not particularly rare, known global reserves of this critical raw material are heavily concentrated in a small number of places very few of which are in Europe. Consequently, there is sizable political pressure to develop an industry, where reserves can be found, within Europe. The authors – editors of the SEER Journal – consider why Europe needs to develop a lithium industry as well as some of the environmental considerations surrounding lithium mining, these being sizable enough for protesters to have played a significant role in halting the Jadar project in 2022. They conclude by locating the decision to reopen the project in the context of Serbia's European integration and point to some of the implications for Serbia's relations both with the EU and with its neighbours.

Keywords*: lithium mining, green transition, net zero future, electric vehicles, environmentalism, Serbia, European integration, geopolitics*

Introduction

In September 2023, the Serbian daily *Danas* (Today), formed in June 1997 by a group of former *Borba* and *Naša Borba* journalists and now operating within the United Media group, reported that President Aleksandar Vučić had signed a Letter of Intent with Maroš Šefčovič, European Commission Vice-President in charge of the green agenda.[1] *Danas*'s story came rather simply from an item that Vučić had himself posted on his Instagram that the Letter of Intent concerned:

> … the accelerated accession of Serbia to the EU in the field of raw materials management, energy, mining, as well as the development of new technologies necessary for further sustainable economic growth and environmental protection.

Danas journalists and environmental activists from Ekološki ustanak (Environmental Uprising), amongst others, were quick to realise that this was a partially

1 'Vučić sa potpredsednikom EK, potpisano Pismo o namerama ('Vučić signs Letter of Intent with the Vice President of the EC') *Danas* 22 September 2023, accessed 24 June 2024 at: https://www.danas.rs/vesti/politika/vucic-sa-potpredsednikom-ek-potpisano-pismo-o-namerama/.

coded reference to the Jadar project, for which a Spatial Plan approved by a government Regulation in 2020 allowed Rio Sava Explorations, a subsidiary of Rio Tinto, to go ahead with the mining of lithium at the site. This Regulation had been revoked in 2022 following sizable environmental protests,[2] and activists forecast that this was therefore now likely to be reactivated.[3] The revocation of the Regulation was itself a controversial move, not least since it had led to a series of legal cases filed by Rio Tinto against the Serbian government and various of its ministries. Furthermore, the revocation was declared unconstitutional by the Constitutional Court of Serbia, although the Court was careful to state that its decision did not by itself revive the original 2020 Regulation.[4]

Subsequently, the story was confirmed, not least by the Economist Intelligence Unit (EIU 2023) and most recently by the *Financial Times*.[5] The Serbian government initially trod very carefully in response to the revelations, not least with its electoral timetable in mind – a snap general election was called for December 2023 and repeated in Belgrade, following widespread allegations of electoral fraud, six months later. However, the Constitutional Court decision, followed within days by the government announcement that the project would be allowed to go ahead, accompanied by another MoU signed with the EU at a critical raw materials summit held in Belgrade, has allowed it come out swinging, with Ana Brnabić, president of the Serbian Assembly and former prime minister, taking to social media to defend the project stoutly. Interestingly, she raised the possibility of Serbia being able to use the lithium deposit to develop its own 'Norwegian miracle' following the discovery of oil there:

2 'Serbian anti-mining activists block bridges, roads' *Al Jazeera* 27 November 2021, accessed 24 June 2024 at: https://www.aljazeera.com/news/2021/11/27/serbia-anti-mining-activists-block-bridges-roads.

3 'Ekološki ustanak: Sporazum sa EK potvrđuje da se od projekta Jadar nije odustalo' ('Environmental uprising: agreement with the EC confirms that the Jadar project has not been abandoned') *Danas* 26 October 2023, accessed 24 June 2024 at: https://www.danas.rs/vesti/drustvo/ekoloski-ustanak-sporazum-sa-ek-potvrdjuje-da-se-od-projekta-jadar-nije-odustalo/.

4 'Serbian court ruling on scrapped lithium mine dismays environmentalists' *Balkan Insight* 11 July 2024, accessed 13 July 2024 at: https://balkaninsight.com/2024/07/11/serbian-court-ruling-on-scrapped-lithium-mine-dismays-environmentalists/.

5 'Serbia set to give green light to Rio Tinto lithium mine' *Financial Times* 16 June 2024, accessed 24 June 2024 at: https://www.ft.com/content/2bd0d74e-ff22-442e-8be1-1250fe4bf826.

> In other words, in our development in the next 10 years, we could repeat the 'Norwegian miracle' after the Norwegians discovered their oil sources and create something even more valuable for all our citizens and generations yet to come[6]

– the latter part of which which may be a reference to the Norwegian government decision to establish an oil fund in 1990, now worth more than 1.6 trillion dollars. The Jadar project is not quite on that scale, but the opportunity to do something similar would, nevertheless, be an interesting, and an attractive, one.

This article uses desk-based research to examine the importance of the project, both to Serbia and to the EU, the environmental aspects of lithium mining and what it means for the countries of the western Balkans, in terms both of relations with the EU and with each other.[7] The authors – both editors of the *SEER Journal* – have a background in research and teaching both in the region and in the green transition not least as it relates to the switch to the production of electric vehicles (Galgóczi 2020, 2023). The core approach of the article is, therefore, largely one of political science; and it seeks to respond to the question as to in whose interests developing the Jadar project lies.

Lithium and its role

Lithium is a soft, silver-white alkali metal, capable of being cut by a knife. The origins of its name – in the Ancient Greek for 'stone' – convey its discovery in the late eighteenth/early nineteenth century in rock rather than in the plant material where the rest of the family of alkali metals were discovered. It does not occur naturally as a metal but is found in various forms of igneous rock, including granite, and, given its high solubility, in mineral springs and in seawater. It has the lowest density of all metals (it can float on water and on the lightest hydrocarbon oils) and is both highly reactive – the reason why it does not occur naturally – and highly conductive of heat and electricity, although also extremely flammable.

Its first applications were in engineering lubricants, largely in World War Two aircraft, when the US was the largest producer worldwide, as well as in rocket fuel as a result of its light weight and its low melting point but very high boiling point. Production increased dramatically during the Cold War, when it was used in the

6 'Brnabić o projektu „Jadar": Da li ćemo uvoziti baterije koje će pokretati apsolutno sve u narednih 100 godina ili ćemo te baterije izvoziti u celu Evropu?' ('Brnabić on the "Jadar" project: Are we going to import batteries that will power absolutely everything in the next 100 years, or are we going to export those batteries to the whole of Europe?') *Danas* 19 June 2024, accessed 24 June 2024 at: https://www.danas.rs/vesti/ekonomija/brnabic-o-projektu-jadar-da-li-cemo-uvoziti-baterije-koje-ce-pokretati-apsolutno-sve-u-narednih-100-godina-ili-cemo-te-baterije-izvoziti-u-celu-evropu/. Brnabić's original quote runs thus: 'Drugim rečima, u svom razvoju u narednih 10 godina mogli bi da ponovimo „norveško čudo" nakon što su Norvežani otkrili svoja izvorišta nafte i napravimo nešto još vrednije za sve naše građane i generacije koje tek dolaze' (the English translation is the authors' own).

7 Given the contemporary nature of the topic and the likelihood that events surrounding it are likely to be fast-moving, readers should note that the date of the final revision of the article is 15 August 2024.

production of nuclear fusion weapons, before its conductivity led to further applications in high-quality, heat-resistant, glass and ceramics. However, most interest in its applications today come from its suitability for use in rechargeable lithium-ion (Li-ion) batteries, deployed in a wide variety of applications from smartphones to laptop computers and power tools, e-bikes to electric vehicles, and in energy grid storage applications where it has a key role in the storage of wind and wave power. In such batteries, lithium ions held in an electrolyte solution move from the negative electrode (the anode) to the positive electrode (the cathode) during discharge, and back again when being charged, in either case such movement forming an electric current.

Lithium is a suitable material for battery power purposes on the grounds of its weight and its high reactivity, which makes Li-ion batteries capable of storing more energy, and generating more power, for their mass than other types of battery. In addition, they lack a 'memory effect', which means they do not need to be fully discharged before being recharged; have a low run-down rate, since they do not lose charge as quickly when not in use; and they can be recharged, implying less physical waste than other battery types.

They are, however, hard to recycle, owing to the range of parts involved and, even when safely broken apart, the components are not easy to reuse.[8] The EU battery regulation (adopted in June 2023) sets a target for lithium recovery from waste batteries of 50% by the end of 2027 and 80% by the end of 2031 (European Union 2023), but this is expected to contribute no more than six per cent of 2030 demand (Azevedo et al. 2022). Recycling technology is lagging behind in most areas other than China, where the gap between demand and supply is particularly acute and which controls the overwhelming majority of lithium processing. Nevertheless, that expertise is beginning to build: there are fifty companies in Europe who are recycling lithium batteries, or planning to do so, and a further 40 in North America (US Geological Survey n.d.), heavily based around the automobile industry. It is also worth making the point that relatively few Li-ion batteries have yet reached an end-of-life state, so there is not so much raw material to recycle, hence the lack of an industry at this point. Indeed, this may not be the case until 2035 or 2040.[9] In spite of the higher recycling rates expected in the future, demand for lithium will significantly exceed supply (ECA 2023: 33); therefore, raw material extraction will continue to play an important role.

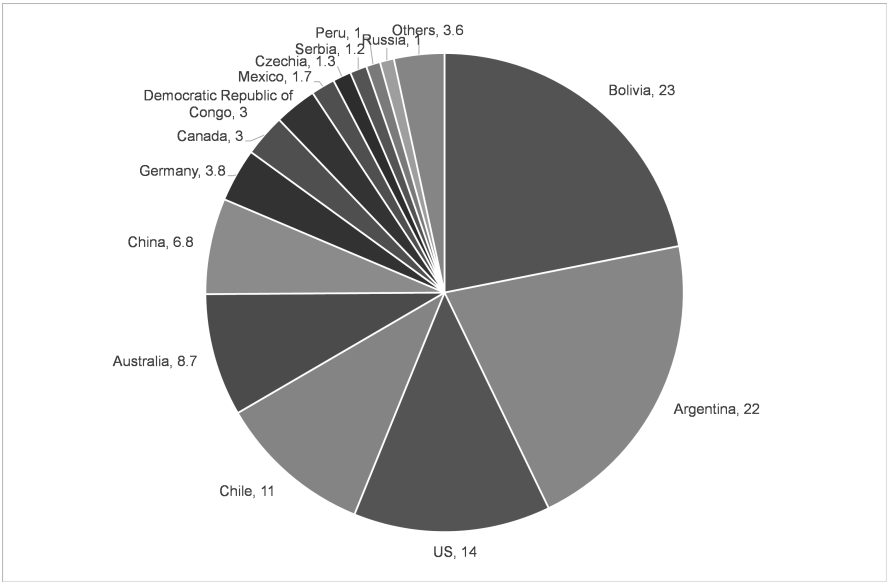
Lithium is quite widely distributed on earth but usually in low concentrations, implying that most deposits are of low commercial value. Bolivia has the biggest known reserves, with Argentina and Chile – together making up the 'lithium triangle' – also having sizable deposits although neither of the first two yet contribute significantly to global production. Global reserves total about 105 million tons cur-

8 'Lithium batteries' big unanswered question' BBC Future, 6 January 2022, accessed 25 June 2024 at: https://www.bbc.com/future/article/20220105-lithium-batteries-big-unanswered-question.

9 'Postoji li održivo rudarstvo i da li je moguće u Srbiji?' ('Does sustainable mining exist and is it possible in Serbia?') *Demostat* 26 October 2023, accessed 26 June 2024 at: https://demostat.rs/sr/vesti/ekskluziva/postoji-li-odrzivo-rudarstvo-i-da-li-je-moguce-u-srbiji/1887.

rently, according to the latest estimates – an increase of some seven per cent on the 98 million tons reported in 2023 and of 18 per cent on the 2021 figures; Figure 1 documents the current reported distribution.

Figure 1 – Measured and indicated lithium resources (million tons)



Source: US Geological Survey (n.d.)

Note: Chart shows all individual countries where the reserves are 1 million tonnes or more; there are ten more collected in 'others'.

Other than in South America, significant land reserves are found in China, Central and North America and sub-Saharan Africa (principally in the Democratic Republic of Congo although also elsewhere in southern and western Africa). However, the biggest reserve is seawater, thought to contain some 180 billion tonnes (although in extremely dilute form, with the highest concentrations being found near hydrothermal vents).

As far as Europe is concerned, there are reserves of varying sizes in Germany, Austria, Spain, Portugal, Czechia, Serbia, Finland, Ukraine and the UK,[10] although

10 From a UK perspective, this is in the far south-west of the country in the county of Cornwall, where the deposits are sufficient to generate 20,000 tonnes of lithium carbonate per year, roughly two-thirds of likely demand by 2030, and with sufficient reserves to last thirty years ('UK lithium mining announced in Cornwall' *BBC News* 29 June 2023, accessed 26 June 2024 at: https://www.bbc.co.uk/news/uk-england-cornwall-66051126). From a broader perspective, Cornwall is a county historically associated with tin mining, tin being a common feature also at the Greenbushes lithium mine in Australia and indeed elsewhere.

production across the continent is likely to reach no more than five per cent of global demand by 2030, while the identified reserves stand at less than seven per cent of the global total. Researchers from the French Geological Survey have identified 27 hard rock lithium deposits in Europe, although no deposit has yet been turned into an active mine.[11] Over half of the known European reserve lies in Germany, based largely around the Upper Rhine Valley and which is brine-based, while Serbia accounts for a further 17 per cent and where the deposits are found in ore, or hard rock form,. Neither, however, appear to contribute much by way of current production.

The field of lithium mining is new, it having been given little attention prior to the 2000s,[12] so it is possible that exploration will reveal many other areas, both in Europe and beyond, and that prospecting for 'white gold' may well thus become an established feature of the landscape in the next few years. It is this factor which is behind the considerable increases in worldwide reserves reported in 2024; and the 2025 figures may well represent another sizable revision. Right now, however, it does give those countries with reserves to exploit, and the multinationals with the capability and expertise to do the exploiting, with some key advantages – as well, in the case of governments, with some domestic pressures of their own from campaigners and environmental activists.

Production

While there have been markets for lithium for some time, it is its application in Li-ion batteries which is driving current demand for it against the background of the need to achieve the climate goals of the Paris Agreement and the European Commission's plan in response to have a net zero economy by 2050, with major implications for the automobile industry. An article for McKinsey predicts that demand for Li-ion batteries, largely driven by car manufacturing, will increase at a compound annual growth rate of 30 per cent per year to 4,000 gigawatt-hours (GWh) under a base scenario, or to 4,500 GWh in an accelerated one, from a figure of around 250 GWh in 2020. This implies that demand for lithium will rise commensurately, from approximately 500,000 tonnes of lithium carbonate equivalent (LCE) in 2021 to some 3-4 million tonnes by 2030, and then further as the 2030s progress. This will require not only an increase in supply from existing sources, given that lead times imply a production of no more than 2.7 million tonnes by 2030, but the application of new production technologies to reduce the environmental, social and governance footprint (Azevedo et al. 2022).

The US Geological Survey (n.d.) reports that worldwide production increased in 2023 to 180,000 tons, matching demand. However, the price of lithium carbonate, which had skyrocketed at the beginning of March 2022 to 75,000 dollars/tonne, while lithium hydroxide prices had exceeded 65,000 dollars/tonne (compared with a five-year average of around 14,500 dollars/tonne) (Azevedo et al. 2022), fell back sharply to an annual average price in the US of 46,000 dollars/tonne in 2023, a

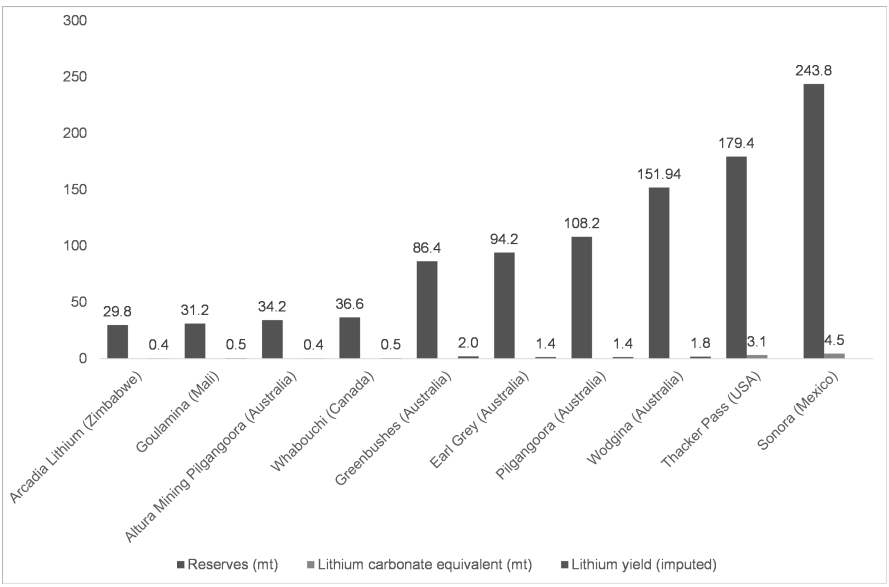
11 'Postoji li održivo rudarstvo i da li je moguće u Srbiji?' *Demostat* 26 October 2023.
12 Li-ion batteries became the dominant use for lithium as recently as 2007.

decrease of 32 per cent on 2022. Factors in the fall include the ending of electric car subsidies in China and weaker than anticipated global sales of electric vehicles.

Concerns about 'over-supply' are also a factor in the fall of lithium prices from 2022 levels, but this is likely to be a short-term view applicable to the world market, not least in view of the imperative resulting from the shift to electric vehicles in Europe from the European Commission's net zero targets. Furthermore, the dimensions of the confirmed reserves reported in Figure 1 increases the pressure to exploit those reserves that have already been identified; and will, at the same time, raise the price of that supply.

The globally biggest producer, with five of the ten biggest mines (see Figure 2 below) and around half of the world's total production, is Western Australia although there is a mine also in Australia's Northern Territory which began operation in October 2022. Australia, Latin America and China accounted for 98 per cent of production between them in 2020, and this figure remains at over 90 per cent. Australia, US and China each have three of the top 15 lithium mining companies, while China has two of the three largest. Within Europe, the largest mine is in the Guarda region of Portugal, operated by Grupo Moto, Femica, the leading producer in Europe. However, Portugal is small in comparison with the largest producers worldwide.

Figure 2 – The ten largest lithium mines in 2019: reserves and lithium yields



Source: Mining Technology, 30 August 2019 (https://www.mining-technology.com/features/top-ten-biggest-lithium-mines/).

Note: The MT article produces figures that are hard to compare quoting, in the two largest cases, figures for lithium carbonate equivalent (LCE) and, for the rest, a yield, expressed in percentage form,

of lithium oxide. For reasons of quick comparability for the purpose of the figure, we have imputed a lithium oxide yield in million tonnes based on applying this percentage to the reserve of each mine.

The extraction process and its environmental cost

Extracting lithium and processing it into a useable form can be done in one of two ways: in a fairly traditional mining context, via the crushing of rock taken out of the ground in opencast pits; and via its extraction from brine (or seawater) via the relatively simple, in theory, process of the evaporation of water. The Australian deposits are rock-based, as are those in Central and North America; those from the lithium triangle are brine-based, and more abundant than hard rock ones; while those from the US and China are a mixture of the two.

Both methods are, environmentally speaking, highly problematic: the use of opencast pits is well-known from the mining industry, leading not only to ugly scars on the landscape but huge disturbance in the form of the mining operations themselves as well as in the transport of rock, usually by road, away from the pit. Some 80 per cent of the rock mined in Western Australia for lithium is currently exported for processing to China.[13] Consequently, the extraction of lithium from rock ore involves a high carbon freight cost, although spodumene – one of the types of rock in which lithium is found in relatively high concentrations – accounts for 82 per cent of the short-term capacity increase in the early 2020s (Yao 2022). Processing spodumene for lithium requires significant amounts of energy, substantially based on the use of fossil fuels to roast the ore, as well as large quantities of sulphuric acid, after which the waste will have to be disposed of – a process that needs to be monitored if those responsible are to avoid polluting the disposal sites. Poisoning of the land and its impact on farming is one of the major aspects of environmentalists' protests about lithium mining in Serbia.

Rock mining is of course also hugely destructive: the rock reserves of the ten largest pits (in 2019) are depicted in Figure 2, set against their yield either in terms of lithium carbonate (the USA and Mexican pits – the two largest) or lithium oxide (the remaining eight). While the mined rock can also be processed to extract other minerals, and then used in various construction projects, it is clear that the lithium yield is a small fraction of the overall quantity of rock that has to be dug out of the ground to obtain the lithium.

Equally, brine mining, while using the sun's energy for evaporation purposes, requires the construction of vast pits, or ponds, into which brine can be pumped either from underground sources or from elsewhere on the Earth's surface, implying extensive amounts of land use while evaporation takes place. Research evidence also exists that, around Chile's Atacama Salt Flats, brine mining for lithium is linked to declining vegetation, hotter daytime temperatures and increasing drought conditions (Liu et al. 2019) in climates that are arid in the first place. Both rock mining and extraction from seawater also demand huge quantities of water, in the first place for cooling purposes and in the second for evaporation (it can take roughly 1.9m litres

13 'How is lithium mined?' Ask MIT Climate Portal, 12 February 2024, accessed 24 June 2024 at: https://climate.mit.edu/ask-mit/how-lithium-mined.

of water to produce one tonne of lithium,[14] although less thirsty operations put the figure at 500,000[15]); and water is, of course, also a scarce resource, particularly in some mining regions. Furthermore, it carries the risk of pipework leaks and spills, and thereby the possibility of contamination of the land and of water courses.

A 2021 paper reports that lithium concentration and production from brine can create about 11 tons of CO_2 per ton of lithium, while mining lithium from spodumene ore releases about 37 tons of CO_2 per ton of lithium produced (Kelly et al. 2021).

With its central importance to how we live our lives, lithium occupies a role akin to that of fossil fuels in the past, and so whether lithium can be sourced sustainably is thus a key question. The advantage is that the high environmental costs as regards lithium extraction are clear, whereas the long-term impact of burning fossil fuels was, back then, less well known. And, with knowledge does indeed come responsibility (Tedesco 2023). There are several alternatives to lithium within the 'clean energy' spectrum including, as regards primary battery material, calcium, magnesium, mercury and zinc. These alternatives have been extensively studied in a report by the Clean Energy Technology Observatory (CETO) drawn up to provide an evidence base on battery technology in support of the EU policymaking process around the Green Deal (Bielewski et al. 2023). In practice, however, these are either at a much lower level of development or where applications have limitations: Chinese researchers have, for instance, produced a calcium smartphone battery, although its charge/discharge cycles appear even in the lab to be limited to 700[16] – a problematic factor in view of the need, with the environment in mind, to encourage consumers to extend the life of their smartphones. Therefore, these potential alternatives are uncertain not least in view of high-performance applications such as e-mobility.

New methods of extraction are also being pioneered. These include direct lithium extraction (DLE), in which filters are used to separate lithium from brine, with a resultingly smaller footprint than traditional brine operations, and with the water recycled back into the ground in the process; and direct lithium to product (DLP) via a type of electrolysis of a polymer containing the lithium. DLE techniques are also much quicker than traditional evaporation ones, extracting lithium in hours compared to the up to eighteen months taken by traditional methods. Some of these methods are experimental, and others have yet to prove themselves at commercial scale despite the claims which point to extremely high success rates in terms of extraction rates amidst, simultaneously, counter claims that the technology is inefficient and

14 'How Australia became the world's greatest lithium supplier', *BBC Future* 11 November 2022, accessed 25 June 2024 at: https://www.bbc.com/future/article/20221110-how-australia-became-the-worlds-greatest-lithium-supplier.

15 'The spiralling environmental cost of our lithium battery addiction' *Wired* 5 August 2018, accessed 26 June 2024 at: https://www.wired.com/story/lithium-batteries-environment-impact/.

16 'First calcium battery that could provide more sustainable alternative to lithium' *Balkans Green Energy News* 14 February 2024, accessed 26 June 2024 at: https://balkangreenenergynews.com/first-calcium-battery-that-could-provide-more-sustainable-alternative-to-lithium/.

uneconomic.[17] Research from an environmental impact perspective (Vera et al. 2023) reports some advantages to DLE, but there are continuing worries over real-world testing, the adoption of a holistic lifecycle approach to production techniques and water consumption rates.

Consequently, in view of the time pressures and imperatives that now exist particularly in Europe towards the production of e-vehicles, which require batteries as a power source in place of the combustion engine, there is little realistic alternative to lithium, at least in the short-term. In the long-term, the plethora of research and development into different battery chemistries means that there may be some chance of replacing lithium: this is a dynamic process and its endpoint is completely uncertain. What is certain is that lithium will be needed for quite a while – demand will overshoot supply after 2030 (ECA 2023: 33, Figure 6) – and that the EU is heavily dependent on international markets to secure the required primary raw materials used in battery manufacture (ECA 2023: 30, Figure 4). While the need to develop the EU battery value chain has received attention in policymaking terms, including a proposal for a new regulation on batteries on 2020, there remain serious shortcomings not least in view of the capacity to gather up-to-date information and monitor the competitiveness of that value chain and identify both the risks and the balance between supply and demand (ECA 2023: 23).

Demand outstripping supply and a dependence on international markets point, in general, towards the importance of remediating and reducing the impact of extraction, rather than eliminating it altogether, via the proper environmental regulation of mining operations, taking a lifecycle approach to the measurement of environmental cost, investing in research and in the development of recycling facilities and operations, and supporting localised co-location of mining and processing facilities. While there are no guarantees, it is possible to encourage mining operations to take place in a socially responsible way as regards local communities, ecosystems and plant workers. This should be based on dialogue, involvement and social investment; and there is a valid argument that a western requirement for lithium should seek to fulfil that need by taking responsibility for developments within Europe rather than seeing them exported to parts of the world with, perhaps, a series of lesser standards in all of these areas.

We should, nevertheless, not forget that all methods of extraction, however well researched, costed and applied, consist of a process of exploitation of the earth. As Cayte Bosler puts it more directly: sustainable mining is an oxymoron – not least in that mining operations are responsible for no less than 80 per cent of species loss (Bosler 2021). We should also bear strongly in mind that lithium mining disproportionately affects low-income and marginalised communities and has also often had a deleterious impact on lands of cultural importance to Indigenous communities (Bosler 2021).

17 See e.g. ‘Lilac Solutions releases lithium extraction data amid rising competition’, Reuters, 25 June 2024, accessed 25 June 2024 at: https://www.reuters.com/technology/lilac-solutions-releases-lithium-extraction-data-amid-rising-competition-2024-06-25.

The ever-present role of geopolitics

China refines 60 per cent of the world's lithium and 80 per cent of its lithium hydroxide – the preferred material for battery manufacturers – although this may change as local facilities are built closer to extraction locations, as is now beginning to happen in Australia. Chinese companies also own many investments in lithium mine operations globally, including in the Greenbushes mine in Australia. Meanwhile, in 2022, the US Department of Energy selected 12 lithium-based projects for support in terms of new commercial-scale domestic facilities to extract and process lithium, manufacture battery components, recycle batteries and develop new technologies to increase US lithium reserves, funding these with 1.6 billion dollars under the Bipartisan Infrastructure Law. Moreover, the Inflation Reduction Act adds tax incentives to consolidate the sourcing of battery materials and manufacture of electric vehicles from among North American and US-partner countries. There is thus a danger that the EU could get squeezed, in a situation of international market shortages of lithium, between China and the US.

It is also true that the presence of lithium reserves in the Global South, particularly in Africa and Latin America, is concerning against the background of colonial exploitation, substantially by the European powers, as well as against current evidence that, in spite of their lithium deposits:

> … these countries do not yet have robust strategies for the critical minerals sector. Instead they are simply sucked into the global rush for these minerals. (Boafo et al. 2024)[18]

The deposits of lithium in Africa are not – as far as we yet know – particularly large, being less than five per cent of the global total and smaller than in Europe, even though the hard rock deposits in the Democratic Republic of Congo are thought to be the largest in the world. In the context of a relatively scarce and critical resource, all deposits matter; and the sensitivity around the history of multinational involvement both in Africa and in Latin America creates a need for a better, more careful and more socially attuned response.

Therefore, the security of a reliable, diversified supply of lithium is becoming a major concern and a top priority for governments, particularly in Europe, conscious of the dangers of being caught between US and China policy affecting the green transition (Galgóczi 2024); as well as of Europe's own past in colonial exploitation.

Lithium appears on the EU's fifth list of critical raw materials, which also lists it as strategic, these being those materials regarded as crucial to Europe's economy and where there is a high risk associated with their supply.[19] It also appears on similar lists maintained by Australia and the US.

18 'The world is rushing to Africa to mine critical minerals like lithium – how the continent should deal with the demand', *The Conversation* 22 May 2024, accessed 26 June 2024 at: https://theconversation.com/the-world-is-rushing-to-africa-to-mine-critical-minerals-like-lithium-how-the-continent-should-deal-with-the-demand-229831.

19 List available at: https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials_en.

The 2023 European Critical Raw Materials Act seeks to ensure that the EU can rely on strong, resilient and sustainable value chains for critical raw materials, with the express purpose of strengthening all stages of the European value chain; diversifying imports to reduce strategic dependencies; improving the capacity to monitor and mitigate risks of disruption in the supply of critical raw materials; and improving circularity and sustainability. It does so on the basis of setting a series of benchmarks along the value chain for critical raw materials and with regard to the diversification of supplies, with no more than 65 per cent of annual consumption coming from a single third country. To that might well be added the importance of ensuring that supplies are also diversified in terms of the extraction technology: a fair balance of deposits secured from brine mining as well as hard rock mining. Either way, freeing the EU from dependence specifically on China and on the US is a key driver not only currently but one which is likely to remain substantial in at least the medium-term. And, as has already been observed, there are shortcomings in the EU's information gathering capacity in these areas.

Implications for the western Balkans

This article has sought thus far to discuss the importance of lithium as a scare mineral resource, critical to the way we live our lives both today and in regard to our net zero future, and the power that this gives to the countries (and their governments) where reserves can be found. Those governments in European countries which have reserves, particularly when allied to an expertise in mining, therefore occupy a significant position in the development of critical raw materials industries within Europe. The government of Serbia, which fulfils both arguments having comparatively fairly sizable lithium reserves on top of a history in coal mining, is in exactly this position.

Bosnia and Herzegovina, a country also with long-established reserves of raw materials and a mining history, might also occupy a similar place. There are lithium reserves here too, with investors interested in further examination of sites at Ugljevik, Lopare and Zvornik, close to the border with Serbia. Given the proximity of the Jadar project to that border, formed by the River Drina into which the River Jadar flows, the presence of deposits here would not be a surprise. Furthermore, there are deposits in the District of Brčko, although the local administration is categorical that the exploration and exploitation of lithium and other minerals will not take place there on environmental and public health grounds.[20]

The availability of a critical raw material has frequently been a strong policy driver in international relations terms and the revitalisation of interest in acceding the countries of south-east Europe to the EU could perhaps be seen also in that light. It might be regarded as invidious were Serbia to accede to the EU ahead of the others in the region on the grounds of its capability to supply a critical raw material, regardless of whether viable deposits are also found elsewhere in the

20 'Red light for lithium in Brčko District of BiH – mayor' *Balkan Green Energy News* 2 February 2024, accessed 25 June 2024 at: https://balkangreenenergynews.com/red-light-for-lithium-in-brcko-district-of-bih-mayor/.

region. Alternatively, it may simply be that the EU wishes to gain some control over the project, not least by ensuring that the development proceeds in alignment with EU strategy and standards as regards environmental impact.

The Jadar project

This section turns to the key moments in the development of the Jadar project in Serbia, contextualising this with trends in European integration and in terms of Serbia's relationships with its neighbours in south-east Europe.

An investigative article on *Balkan Insight* provides a wealth of detail of the background to the project, commencing with a series of journal articles on borate and lithium deposits in Yugoslavia written in the 1990s by a team of researchers led by Professor Jelena Obradović of Belgrade's Faculty of Mining and Geology which came to the attention of Rio Tinto, the Anglo-Australian mining multinational.[21] In 2004, on the basis of an exploration permit covering just 60 acres, geologists had discovered 'jadarite', a material made up of borates and lithium, in the Jadar River basin.

By 2019, the company had bought up more than 40 acres of the 250 on which the site of its $2.4bn mine was to be located, with the local authorities in Loznica apparently doing what they could to be helpful. Growing public anger and a 38,000-strong petition, however, largely as a result of fears over the project's potential impact on the environment and on public health, led to the government cancelling its Regulation in January 2022, fearful of any knock-on effects on the popularity of the ruling Srpska napredna stranka (SNS; Serbian Progressive Party), ahead of an election that April. Protesters were also concerned about the adoption of laws on property expropriation and which would impose administrative fees on popular initiative referendums which they regarded as paving the way for foreign companies to circumvent popular discontent over projects like Jadar, against the backdrop of Serbia already having major problems in air and water pollution and poor waste management, among other substantial environmental issues, allied to deeply entrenched mistrust in state institutions.

Rio Tinto, however, had clearly not given up on the project, continuing to buy up plots of land in the Jadar basin, spending 1.2 million euros on such purchases between June 2022 and January 2023,[22] after its licences at Jadar were revoked, and announcing a programme of support for sustainable local development in Loznica via grants for local enterprises. Exploration licences have also been awarded to a series of lithium mining companies in central as well as in western Serbia, including to one in an area adjacent to the land owned by Rio Tinto for its Jadar project, many

21 '"It's [Not] Over": The Past, and Present, of Lithium Mining in Serbia' *Balkan Insight* 13 April 2022, accessed 24 June 2024 at: https://balkaninsight.com/2022/04/13/its-not-over-the-past-and-present-of-lithium-mining-in-serbia/.

22 'Rio Tinto Spends Million Euros on Serbian Land since Mine Cancellation' *Balkan Insight* 23 February 2023, accessed 24 June 2024 at: https://balkaninsight.com/2023/02/23/rio-tinto-spends-million-euros-on-serbian-land-since-mine-cancellation/.

of them run by former employees of Rio Tinto but only one of which is Serbian owned.

Much of the opposition to the Jadar project comes on environmental grounds. Some of these are explored above, but it is worth noting that the project here would be a world first in that it would be the first lithium mining operation to take place in a populated and fertile agricultural area with a potentially significant impact on groundwater reserves (Đorđević et al. 2024). Even the company's drilling operations, ahead of the actual operation of the mine, have caused environmental damage, with breaches of remediation limit values with consequences for both surface and underground waters (Đorđević et al. 2024).

The geopolitical context

As a candidate country for EU membership, along with its neighbours, Serbia is of course in the process of aligning its legislation and its entire economic approach with European standards. This means, firstly, its membership of the Energy Community for South East Europe (ECSEE), an international organisation consisting of the EU and candidate and accession countries to the south-east and east of the EU. ECSEE aims to extend the EU internal energy market to the wider region, and its members commit to implementing the *acquis* and to developing an adequate regulatory framework. As far as Serbia is concerned, this was reflected in its adoption in 2021 of a package of legislative measures on energy which commits Serbia to the five dimensions of the energy union and to draw up a national energy and climate plan (NECP), submitted in draft form in June 2023.[23] Most notably in this context, this encompasses decarbonisation and energy security, in the latter case regarding:

> … diversifying sources of energy and ensuring security of supply through solidarity and cooperation between EU and Energy Community countries. (NECP: 1)

Here, Serbia must define:

> … national targets related to increasing the diversification of energy sources and supply from third countries the purpose of which may be to reduce energy import dependency, increasing the flexibility of the national energy system and addressing constrained or interrupted supply of an energy source for the purpose of improving the resilience of regional and national energy systems. (NECP: 2)

These commitments have a broader remit and do not directly commit Serbia to mine lithium. However, when read in this context, the direction of their implications is clear. While trying to maintain a balanced international policy, the Serbian government recognises its European future, at least tacitly. It also needs actively to pursue influence to support its goals in terms of its relations with other countries in the region, most notably Kosovo via the Belgrade-Prishtina dialogue committing the

23 'Secretariat publishes its Recommendations on the draft National Energy and Climate Plan of the Republic of Serbia' 13 November 2023, accessed 14 July 2024 at: https://www.energy-community.org/news/Energy-Community-News/2023/11/13.html.

two governments to EU-mediated talks to normalise relations – a dialogue which appears, however, to be increasingly on life support. Furthermore, the Serbian government also needs access to financial streams, particularly in view of its Stand-by Arrangement with the International Monetary Fund. Consequently, it is no surprise, in the period immediately after the settlement of Serbia's electoral position for the next cycle, that the 2022 cancellation of the Jadar project has now been revoked.[24]

The basis for such a decision lies specifically in the EU's desire for a strategic critical raw materials partnership with Serbia against the background of the Letter of Intent signed between Vučič and Šefčovič in September 2023. The EU has noted that the extraction of critical raw materials 'is based on a regulatory framework and practices aligned with EU environmental rule', not least as regards 'creating a sustainable and competitive e-mobility ecosystem'; Serbia, for its part, has been keen to stress that it has obtained 'new guarantees' from Rio Tinto as well as from the EU in relation to environmental standards at the site and, in addition, that related investments in the co-location of battery manufacturing and electric vehicle production would also be made in Serbia, meeting Vučić's demands over 'the whole value chain plus perfect environmental protections'.[25]

'Perfect' does need to be defined, however. Coincident with the *Financial Times* announcement, Rio Tinto published an environmental impact report that aimed to assuage concerns, promising a 'safe, reliable, and proven technology', while German Chancellor Olaf Scholz, in Serbia for the announcement of the MoU between the EU and Serbia, pledged that mining would be carried out 'in compliance with the highest standards of environmental protection', and that Germany would help in this.[26] These are sound, and necessary, promises – but Florian Bieber is right to point to the level of state capture in Serbia which renders such promises difficult to deliver meaningfully in practice and, therefore, hard to put credence in.[27] Furthermore, he is also correct in alluding to the EU's need for the mine making it rather less of an independent monitor of the standards that are in put in place there. On the other hand, Rio Tinto has agreed to the establishment of a permanent advisory body composed of civil society representatives, according to Franziska Brantner, State

24 A formal announcement is awaited at the time of writing but is likely to have been made by the time of publication, this being scheduled for July 2024.

25 All quotes in this paragraph taken from 'Lithium mining project returns to focus in Serbia, European Commission reiterates it wants a strategic partnership on raw materials' *European Western Balkans* 18 June 2024, accessed 24 June 2024 at: https://europeanwesternbalkans.com/2024/06/18/lithium-mining-project-returns-to-focus-in-serbia-european-commission-reiterates-it-wants-a-strategic-partnership-on-raw-materials/. The reference to the 'e-mobility ecosystem' are, in the context of the 'Jadar' project, particularly revealing.

26 'Protesters Opposed To Lithium Mining Hold Large Demonstration In Belgrade, Block Rail Traffic' *Radio Free Europe/Radio Liberty* 10 August 2024, accessed 12 August 2024 at: https://www.rferl.org/a/33073924.html.

27 'The lithium deal between Serbia and the EU: pulling a fast one' *BiEPAG blog*, 22 July 2024, accessed 12 August 2024 at: https://www.biepag.eu/blog/pulling-a-fast-one-the-lithium-deal-between-serbia-and-the-eu.

Secretary at the German Ministry of the Economy and a member of die Grüne (the Greens).[28]

Vučić, who in January on the sidelines of the World Economic Forum had already called for a public debate as to whether the project should be allowed to go ahead,[29] has also commented that the mine could be opened as early as 2028. Given the likely annual output of 58,000 tonnes of lithium, this would equate to the lithium demand of some 17 per cent of European electrical vehicle production, or 1.1 million cars, and, if the investments in localised manufacturing are actually met, this would indeed, in Vučić's own words, be a 'game-changer' for Serbia and for the whole region.[30] Serbia signed declarations of intent in November 2022 with the Slovak company InoBat, in which Rio Tinto is an investor, on the construction of a battery plant in Ćuprija, confirming this in September 2023 (EIU 2023). Ćuprija lies in central Serbia, some way from the Jadar basin, but it is close to Kragujevac, the site of substantial long-standing automobile manufacturing facilities in which Stellantis is now the ultimate majority owner. More broadly, lithium mining and processing could offer Serbia the prospect of linking to the existing EU automotive manufacturing cluster in Hungary, Slovakia and Czechia. Additionally, amongst other electric vehicle facilities, the first Chinese EV company is being set up (by BYD) in Szeged, just over the Hungarian-Serbian border, while there are four battery gigafactories in Hungary.

The quid pro quo nature of the arrangement thus seems clear. That such a move assists Serbia's European integration and a greater perspective in Brussels on its positions as regards relations in the wider region is evident; while it is also likely to be of importance to the EU that the mining multinational involved – while, like Serbia currently, representing third countries outside the EU – is not Chinese. For Serbia, which has attracted deep Chinese investments in recent years as part of the 'Belt and Road' Initiative, it would not in principle be a problem, otherwise, to grant exploration licences to the weighty Chinese mining multinationals engaged in lithium mining. With the value of the mine thought to be in the region of four billion euros over its lifetime, Serbia also secures a steady income stream which will assist it in balancing its books even if that sovereign fund hinted at by Ana Brnabić fails to materialise.

Furthermore, it would not be a surprise were Serbia to interpret its lithium resource, in the face of the EU need for lithium, as giving it a green light to continue

28 'Brantner: No "discount" for Serbia regarding the rule of law, Kosovo and BiH due to lithium' European Western Balkans 13 August 2024, accessed 14 August 2024 at: https://europeanwesternbalkans.com/2024/08/13/brantner-no-discount-for-serbia-regarding-the-rule-of-law-kosovo-and-bih-due-to-lithium/ and reporting an interview with the Berlin daily *TAZ*.

29 'Serbia wants talks with Rio Tinto over Jadar lithium project' *Reuters* 17 January 2024 accessed 24 June 2024 at: https://www.reuters.com/markets/commodities/serbia-wants-talks-with-rio-tinto-over-jadar-lithium-project-2024-01-17/.

30 'Despite protests, Serbia readies to mine lithium as early as 2028' *Euractiv* 18 June 2024, accessed 24 June 2024 at: https://www.euractiv.com/section/enlargement/news/despite-protests-serbia-readies-to-mine-lithium-as-early-as-2028/.

to play hard ball in the EU-mandated process of dialogue with Kosovo. There are other issues at stake there too in terms of the reasons for the lack of progress, but it seems that this provides an additional reason why this is unlikely to change any time soon. There is also the issue of Republika Srpska, one of the two entities which, along with the District of Brčko, constitutes Bosnia and Herzegovina. The president of Republika Srpska, the sanctioned Milorad Dodik, makes no secret of his desire to secede from Bosnia and Herzegovina although a plan for the 'peaceful dissolution' of Bosnia and Herzegovina was recently withdrawn from the agenda of the National Assembly of the entity, the same day as it received a visit from Brnabić. Serbia, the recent host of the All-Serb Assembly which adopted a Declaration on the protection of national and political rights and the common future of the Serbian people, nevertheless respects the territorial integrity of Bosnia and Herzegovina and seeks to establish 'the best possible' relations with Sarajevo – a message that Brnabić took directly to the Republika Srpska National Assembly.[31] Secession is thus not official Republika Srpska policy. In the cases of both Kosovo and Bosnia and Herzegovina, the Jadar project does give Serbia a fairly powerful hand to play in its international relations and in policymaking terms, both as regards Brussels and accession to the European Union, and the terms on which it does so, as well as with regards to relations with its neighbours.

The proven reserves at the site – and Vučić's assertion that it could be producing by 2028 – also gives a key advantage to Serbia in view of the potential immediacy of production at Jadar, not least given the lead times elsewhere in terms of exploration and licensing, as well of course to Rio Tinto. Rising global demand, against a backdrop of restricted supplies and environmental controversy, provides it with certain advantages in terms of the current profitability of the mine – but this, at the same time, allows it to afford world-leading environmental standards both with regard to the time that the mine is operational and subsequently with restitution of the land.

The next steps are unclear at the time of writing, not least in that this is ahead of any formal announcement. However, campaign groups like Mars sa Drine (Get off the Drina), one of the environmental groups which has opposed the project throughout and which warned that the 2022 cancellation was 'a charade', have continued to reiterate that:

> Rio Tinto can stay on that land for 40 years, but there will be no mines.[32]

Conclusion

It is a little early for conclusions; we simply do not know what will happen next. In addition, despite the best journalistic endeavour, there are a number of

31 'Plan for the "peaceful dissolution of BiH" withdrawn from the agenda of the RS parliament' *European Western Balkans* 10 July 2024, accessed 14 July 2024 at: https://europeanwesternbalkans.com/2024/07/10/plan-for-the-peaceful-dissolution-of-bih-withdrawn-from-the-agenda-of-the-rs-parliament/.

32 'Rio Tinto Spends Million Euros on Serbian Land since Mine Cancellation' *Balkan Insight* 23 February 2023.

things that we do not know as fact. Protests have already recommenced, however, and thousands gathered in Loznica at the end of June 2024 to demand the government pass a law banning geological research and the mining of minerals used in Li-ion batteries within 40 days or face a blockade of the railways in Serbia.[33] This happened during the weekend of 10-11 August, once that time period had elapsed, with a large, well-attended demonstration organised in Belgrade by Ne damo Jadar (Don't give up on Jadar) and SEOS (Association of Environmental Organisations of Serbia). Some of this may reflect the existing dividing lines in Serbia's domestic politics, specifically within Belgrade. However, protesters are clearly gearing up for a lengthy, involved and committed battle, but the compulsion of circumstance – the need for lithium on the one side and its availability on the other, which gives Serbia a sizable amount of leverage – leads heavily towards an assumption that the mine will be built. Realpolitik is, it seems, likely to win out in the face of the real contradiction involved that, while this extraction project offers Serbia an economic development perspective, it does go against grassroots democracy, civil society engagement and social and democratic progress within the country.

The mine meets a proven need – the merits of possible alternatives to lithium notwithstanding – and a conjunction of circumstances that might, otherwise, be described as a fortunate one: Serbia needs influence in the EU, and an income stream; the EU needs to broaden and diversify its supply of critical raw materials and develop an industry within what might be conceived of as the European home even if Serbia is not within the EU – at least, not yet. Reducing reliance on China and the US is also an attractive outcome for the EU in terms of supply, regardless of the long-term impact of the building of industrial expertise, while the relative speed of access to Jadar's lithium is attractive to European producers at a time of rising global demand.

Environmental objections are a major sticking point, however. There are known issues around the extraction and processing of lithium, particularly around mining operations, and campaigners are able to raise entirely legitimate concerns of the long-term dangers that exist. Serbia's existing environmental record also leaves much to be desired; and this charge – how to enforce tough, EU-backed environmental standards (whatever campaigners may allege about their weaknesses) against a large multinational, in a country that has a poor record of enforcement of its own and which records a significant amount of state capture – is one that very clearly requires a response. The EU is sensitive to this: hence its reiteration that the site would be developed in line with EU environmental rules. These must be watertight but, even so, raw materials mining tends to take place in general rather more in the absence of environmental standards than in their enforcement, so precisely how much we do know about what standards work, exactly, is a moot point even before we get as far as trying to enforce them. Furthermore, evidence that even drilling operations at the

33 'Protesters in Serbia demand government pass law banning lithium mining' *Radio Free Europe/Radio Liberty* 28 June 2024, accessed 1 July 2024 at: https://www.rferl.org/a/33013672.html.

site have caused environmental damage is something that needs particular attention not least since such damage appears to detract from the 'perfect'.

As noted above, however, what is key is dialogue, both with the communities around the mine and more broadly, as well as with those likely to be working in it, both in the digging and the processing operations; and with those companies to which licences have been given. Proper dialogue can only take place in the context of openness and here the record is not strong, not least given the history of the development of the story so far. Ensuring that dialogue can flourish, and on the basis of objectivity and with a will to learn from, and apply, the best elsewhere is a key role for government institutions within Serbia and the EU; as well as with Rio Tinto itself whose early interests may well lie less in profit maximisation than in building scale and expertise within the global lithium industry (the mine will catapult it into the top ten lithium producers in the world).

If expediency insists that the mine will be built – as seems most likely given the strong interests of both the Serbian government and the European Union – then this gives worker organisations a large amount of leverage, too. If these are the realities, then workers' voices should be being raised loud and clear around the essential requirements of the highest health, safety and welfare standards, around building quality jobs for local communities and ensuring their future against the trend of rural and country-wide depopulation, and around not just promising but actually delivering strong, clear environmental safeguards. That the mine occupies such a key position in Serbia-EU relations not only gives worker organisations a strong hand to play, it also means that the door does not have to be broken down first before they can do so.

It is clear that a mine intended to provide a material which will help deliver a net zero economy for Europe must not only meet the best of modern environmental and welfare standards; it needs to set them for others for some time to come.

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