Gioacchino Orsenigo*

THE SOCIOTECHNICAL IMAGINARY OF THE IMPERIAL MODE OF LIVING AND ITS *MINER(E)AL*: THE DARK SUBCONSCIOUS OF GREEN TRANSITION

Abstract
This article critically investigates the specific sociotechnical imaginaries of the imperial mode of living in its relation to the so-called ecological and digital transition. The term sociotechnical imaginary refers to the role of science and technology in producing visions of the common good, social relations, and the future. Here, however, the concept is reinterpreted through an Althusserian-Lacanian lens as a space of subject identification. The imaginary of the imperial mode of living is shaped by techno-determinist, utopian, and techno-liberal ideologies that depict technological development as both independent from social and ecological relations and, at the same time, as the sole engine of their transformation. Technologies appear as black boxes, concealing the socio-ecological processes, material extraction, and racialized labor exploitation that make them possible. The subject hailed by this imaginary is oriented toward the future through technology as the only drive of progress. Drawing on Lacan's notion of the *real*, the article identifies the mineral – as both a material and symbolic component of technologies – as the unthought unconscious of these imaginaries: a condenser of racial, colonial, and ecocidal dynamics, but also a prism through which to deconstruct the hegemonic imaginary of transition by exposing its inconsistency.

Keywords: Black Box, Ecological Transition, Imperial Mode of Living, Sociotechnical Imaginary, Technological Determinism

1. *Introduction*

In 2019, the European Commission presented its plan to achieve climate neutrality, the so-called European Green Deal. The main goal of the plan, according to the Commission, is to reduce greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels and to achieve climate neutrality by 2050[1]. Also, the plan is described as «Europe's structural response and new growth strategy that sets out ambitions to transform the EU into a modern, resource-efficient, and competitive economy»[2]. One of the key pillars of the European Green Deal is the joint implementation of ecological and digital transitions, referred to as the «twin transitions». According to a report by the

* Università degli Studi di Napoli L'Orientale – g.orsenigo@unior.it

1 European Commission, *Communication from the commission to the European Parliament, the European Council, The Council, The European Economic and Social Committee and The Committee of the Regions The European Green Deal*, 2019. Url: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1576150542719&uri=COM%3A2019% 3A640%3AFIN.

2 European Commission, *European green deal. Brussels: European Commission,* 2019, URL: https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf

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Joint Research Centre – the European Commission's science service[3] – the ecological transition entails a shift from a fossil-fuel-based economy to one based on renewable energies, with the aim of achieving climate neutrality across production, logistics, and consumption systems.

The European ecological transition thus involves the deployment of technologies that would enable this shift: wind turbines, solar panels, electric cars and bicycles, and technologies aimed at improving and maximizing energy storage and efficiency, thereby reducing the energy demand of the production sector[4]. The digital transition, on the other hand, refers to the increasing integration of digital, information, and communication technologies into both material and immaterial infrastructures, state and non-state institutions, and across productive, logistical, and consumption sectors. This integration leads to a structural transformation of these same sectors toward dematerialization and automation. The joint implementation of the two transitions is presented as a means for projecting Europe toward an ecological, equitable, and technologically advanced future[5].

Despite being presented as key solutions to the ecological crisis, these transitions rest upon a massive increase in the extraction of minerals and resource-processing activities with extremely high ecological and social impacts. For instance, the lithium-ion battery – central to the transition – also requires manganese, cobalt, nickel, rare earth elements, graphite, and aluminum, each tied to extractive supply chains with substantial consequences[6]. The so-called lithium triangle – Argentina, Bolivia, Chile – constitutes the largest global deposit. However, extraction demands enormous quantities of water in arid regions such as the Atacama Desert, where mining operations already consumed 65% of local water resources, with severe consequences for ecosystems and Indigenous communities[7]. Cobalt is sourced primarily – about 70% – from the Democratic Republic of Congo, where approximately 30% is extracted through artisanal mining. Working conditions are extremely hazardous, and pollution from heavy metals has devastating effects on human health, including respiratory diseases, congenital defects, and genetic damage[8]. Child labor is widespread, with an estimat-

3 S. Muench, E. Stoermer, K. Jensen, et al., *Towards a green and digital future*, in «Publications Office of the European Union», Luxembourg 2022.

4 *Ibidem*.

5 *Ibidem*.

6 Cfr. G. Bridge, E. Faigen, *Towards the lithium-ion battery production network: Thinking beyond mineral supply chains*, in «Energy Research & Social Science», 89, 2022.

7 Cfr. *Litio en Sudamérica: geopolítica, energía y territorios*, Editorial El Colectivo, Buenos Aires, 2019; War on Want, *A Material Transition,* 2021. URL: https://waronwant.org/resources/a-material-transition; C. Bonelli and C. Dorador, *Endangered Salares: micro-disasters in Northern Chile*, in «Tapuya: Latin American Science, Technology and Society», 4, n. 1, 2021, https://doi.org/10.1080/25729861.2021.1968634.

8 Cfr. T. Kayembe-Kitenge, I. Kabange Umba, P. Musa Obadia, et al., *Respiratory Health and Urinary Trace Metals among Artisanal Stone-Crushers: A Cross-Sectional Study in Lubumbashi, DR Congo*, in «International Journal of Environmental Research and Public Health», 17, n. 24, 2020, https://doi.org/10.3390/ijerph17249384; T. Kayembe-Kitenge, V. Manyong'a Kadiamba, C. de Luca, *et al., Agnathia otocephaly: A case from the Katanga Copperbelt*, in «Birth Defects Research», 112, n. 16,

ed 40,000 children involved[9]. Nickel, predominantly extracted in Indonesia and the Philippines, is among the top three minerals in terms of CO_2 emissions[10]. Extraction processes generate toxic waste that contaminates soils and aquifers, and sea dumping is also in constant growing[11]. Furthermore, the melting of nickel from sulfides releases sulfur dioxide, a major contributor to acid rain[12]. At least 40% of the world's reserves are located in areas of high biodiversity[13], often sites of human rights violations and land dispossession[14].

In general, these transitions are made possible only through an increase in extractive activities in already precarious regions of the planet, a dynamic that has been defined as extractivism: «activities that remove large volumes of unprocessed natural resources (or that are in a limited way), especially for export, according to the demand of the central countries»[15].

As numerous scholars have shown, extractivism entails, on the one hand, economic dependency, deterioration of social conditions, unequal distribution of benefits, the coercive displacement of populations, and low-cost labor[16]. On the other hand, it involves environmental degradation, water contamination, soil depletion, deforestation, and a

2020, pp. 1287-1291; C.L.N. Banza, T.S. Nawrot, V. Haufroid, et al., *High human exposure to cobalt and other metals in Katanga, a mining area of the Democratic Republic of Congo*, in «Environmental Research», 109, n. 6, 2009, pp. 745-752; C. Banza Lubaba Nkulu, L. Casas, V. Haufroid, *et al.*, *Sustainability of artisanal mining of cobalt in DR Congo*, in «Nature sustainability», 1, n. 9, 2018, pp. 495-504; R. Narendrula, K. K. Nkongolo, P. Beckett, *Comparative soil metal analyses in Sudbury (Ontario, Canada) and Lubumbashi (Katanga, DR-Congo)*, in «Bulletin of Environmental Contamination and Toxicology», 88, n. 2, 2012, pp. 187-192.

9 Cfr. C. Kamemba, G. Bokondu, *Overexploitation and Ingjustice against Artisanal Miners in the Congolese Cobalt*, in «SARW Southern Africa Resource Watch», 18, 2020; E. Nkumba-Umpula, A. Buxton, B. Schwartz, *Islands of responsibility? Corporate sourcing of artisanal cobalt in the Democratic Republic of Congo*, IIED, London 2021.

10 Cfr. M.J. Eckelman, *Facility-level energy and greenhouse gas life-cycle assessment of the global nickel industry,* in «Resources, Conservation and Recycling», 54, n. 4, 2010, pp. 256-266; D. Andreucci, G. García López, I. M. Radhuber, et al., *The coloniality of green extractivism: Unearthing decarbonisation by dispossession through the case of nickel*, in «Political Geography», 107, 2023, https://doi.org/10.1016/j.polgeo.2023.102997.

11 Cfr. War on Want, *A material transition,* cit.

12 M. Azevedo, N. Goffaux, K. Hoffman, *How clean can the nickel industry become*?, in «McKinsey & Company», 2020.

13 N. Smith, *Nickel: A green energy necessity with environmental risks*, in «Verisk Maplecroft», 29, 2018.

14 Cfr. D. Andreucci, G. García López, I. M. Radhuber, et al., *The coloniality of green extractivism: Unearthing decarbonisation by dispossession through the case of nickel,* cit.; A.J. Idrovo, *Cerro Matoso mine, chemical mixtures, and environmental justice in Colombia*, in «The Lancet», 391, n. 10137, 2018, https://doi.org/10.1016/S0140-6736(18)30855-9.

15 A. Acosta, *Post-Extractivism: From Discourse to Practice – Reflections for Action,* in «International Development Policy | Revue internationale de politique de développement», 9, 2017, pp. 77-101, p. 81.

16 Cfr. N. Bruna, *A climate-smart world and the rise of Green Extractivism*, in «The Journal of Peasant Studies», 49, n. 4, 2022, pp. 839-864; A. Acosta, *Extractivism and Neoextractivism: Two sides of the same curse,* in M. Lang, D. Mokrani (eds.), *Beyond Development: Alternative Visions from Latin America*, Imre Szűcs, Amsterdam 2013, pp. 61-86; E. Gudynas, *The new extractivism of the 21st century: Ten urgent theses about extractivism in relation to current South American progressivism*, in «Americas Program Report», 21, 2010, pp. 1-14.

decline in biodiversity[17]. The concept of 'green extractivism' is often used to describe forms of extraction implemented under the premises of the green transition and carbon footprint reduction[18]. Similarly, the term 'renewable extractivism'[19] refers to extraction linked to the expansion of renewable energy infrastructures. Finally, 'eco-extractivism' can be understood as «the accumulation of land justified in terms of environmental protection or environmentally friendly projects […] undertaken by large investors whose other investments are in extractive industries»[20].

The defining feature of this form of extractivism lies precisely in the rhetoric through which resource exploitation is legitimized as a crucial action in the fight against climate change. Its justification rests on the assumption that technological solutions are the key to resolving the crisis – through technological modernization of both production and consumption[21]. As Archer and Calvão write, «a 'renewable energy' transition that relies on a significant expansion of mineral and metal extraction provides a convenient stage on which mining companies are able to cast themselves as a necessary partner in achieving global sustainability, […] justifying endless extraction as a condition for solving climate change»[22].

The green rhetoric reproduces and intensifies the creation and proliferation of sacrifice zones – areas where extractive environmental devastation is concentrated, far from Western, especially urban, contexts where the promises of technologies and of the transition are enjoyed[23]. With Macarena Gómez-Barris, we might also speak of 'extractive zones': spaces of extreme and continuous extractivism, organized through

17 A. Dunlap, A. Brock, *When the Wolf Guards the Sheep: The Industrial Machine through Green Extractivism in Germany and Mexico*, in J. Mateer, S. Springer, M. Locret-Collet, M. Acker (eds.) *Energies Beyond the State: Anarchist Political Ecology and the Liberation of Nature*, Rowman & Littlefield, Lanham 2021, pp. 91-123.

18 A. Dunlap, J. Jakobsen, *The Violent Technologies of Extraction: Political ecology, critical agrarian studies and the capitalist worldeater*, Springer International Publishing, Cham 2020; J. Verweijen, A. Dunlap, *The evolving techniques of the social engineering of extraction: Introducing political (re) actions 'from above' in large-scale mining and energy projects*, in «Political Geography», 88, 2021, https://doi.org/10.1016/j.polgeo.2021.102342; D.V. Kingsbury, *'Green' Extractivism and the Limits of Energy Transitions: Lithium, Sacrifice, and Maldevelopment in the Americas*, in «Georgetown Journal of International Affairs», 2021.

19 D. Del Bene, *More dams, more violence? A global analysis on resistances and repression around conflictive dams through co-produced knowledge*, in «Sustainability Science», 2018.

20 A. Núñez, M. Benwell, E. Aliste Almuna, *Interrogating green discourses in Patagonia Aysén (Chile): green grabbing and eco-extractivism as a new strategy of capitalism?*, in «Geographical Review», 2020, p. 3.

21 M. Arias-Loyola, F. Vergara-Perucich, F. Encinas, *Green (ing) extractivisms: Chile's mining evolution and adaptation to the global energy transition,* in «The Extractive Industries and Society», 22, 2025, https://doi.org/10.1016/j.exis.2025.101618; D. Voskoboynik, D. Andreucci, *Greening extractivism: Environmental discourses and resource governance in the 'Lithium Triangle',* in «Environment and Planning E: Nature and Space», 5, n. 2, 2021, pp. 787-809.

22 M. Archer, F. Calvão, *Sustaining Decarbonisation: EnergyStorage, Green Extractivism, and the Future of Mining*, in «Antipode», 57, n. 4, 2025, pp. 1259-1279, p. 1266.

23 Cfr. Archer, F. Calvão, *Sustaining Decarbonisation: EnergyStorage, Green Extractivism, and the Future of Mining,* cit; A. Brock, B. K. Sovacool, A Hook, *Volatile photovoltaics: Green industrialization, sacrifice zones, and the political ecology of solar energy in Germany,* in «Annals of the American Association of Geographers», 111, n. 6, 2021, pp. 1756-1778.

a colonial gaze that «facilitates the reorganization of territories, populations, and plant and animal life into extractible data and natural resources for material and immaterial accumulation»[24].

These are invisible extractive spaces, kept hidden in order to ensure the reproduction of what Brand and Wissen have termed the «imperial mode of living»[25]. As the authors argue, everyday life in capitalist centers is made possible only through the power to give specific form to social relations and nature–society relations elsewhere «by means of (in principle) unlimited access to labor power, natural resources and sinks»[26]. The imperial mode of living is exclusive and sustainable only through the construction of an outside that allows those who have access to it to take for granted the costs of social reproduction and to experience a general sense of security even in times of crisis. The everyday lived practices of the imperial mode of living produce subjects who internalize its norms and, above all, develop a psycho-emotional attachment to their condition of privilege that they are unwilling to relinquish. It is a way of life that generates hegemony in the Gramscian sense and an alluring, reassuring imaginary for those who partake in it[27].

Despite its growing ubiquity, this extractive reality remains largely rendered invisible within public discourses and narratives surrounding the transition. Why, however – despite the increasing evidence that the transition constitutes a viable solution only for a narrow portion of the world – does this solutionist rhetoric remain so widespread and readily accepted? As Brand and Wissen argue, the reason lies in the fact that attachment to imperial Western privilege produces a form of hegemony that exerts a psycho-emotional hold on those who benefit from it.

In what follows, I aim to show how this hegemony – which enables the systematic overlooking of the consequences of green extraction – functions precisely because it rests upon a specific, typically Western, conception of technology: more precisely, a utopic and determinist sociotechnical imaginary, in which technological development is portrayed as independent of social and ecological relations and, at the same time, as the only force capable of transforming them[28].

I will first provide a definition of what is meant by technological determinism and sociotechnical imaginary, drawing on a twofold theoretical tradition: on the one hand, the psychoanalytic and post-structuralist reflection on the imaginary as a space of subject

24 M. Gómez-Barris, *The extractive zone: social ecologies and decolonial perspectives*, Duke University Press, Durham 2017, p. 5.

25 U. Brand, M. Wissen, *The Imperial Mode of Living. Everyday Life and the Ecological Crisis of Capitalism*, Verso, London & New York 2021.

26 Ivi, p. 40.

27 Cfr. U. Brand, M. Wissen, *The Imperial Mode of Living. Everyday Life and the Ecological Crisis of Capitalism*, cit.

28 Cfr. R. Williams, *Communication Technologies and Social Institutions*, in R. Williams (ed.), *Contact: Human Communication and its History*, Thames & Hudson, London 1981; R. Tutton, *Sociotechnical Imaginaries and Techno-Optimism: Examining Outer Space Utopias of Silicon Valley,* in «Science as Culture», 30, n. 3, 2020, pp. 416-439; N. Atanasoski, K. Vora, *Surrogate humanity: race, robots, and the politics of technological futures*, Duke University Press, Durham 2019.

identification[29]; on the other, Science and Technology Studies (STS), which examine how visions of the future take material form in technologies and the discourses that surround them[30]. Subsequently, I will show through a series of examples how this imaginary is reproduced and operates within the discourses and narratives surrounding transition technologies. Technologies emerge as 'black boxes'[31]: opaque objects that obscure the labor, extraction, and geographies of sacrifice that make them possible. It is this process of erasure that sustains the hegemony of the imperial mode of living, even within the context of the ecological crisis. At the heart of this imaginary, I propose situating the mineral as a figure of the Lacanian 'real': the necessary repressed that allows the imaginary to function, a condenser of racial, colonial, and ecocidal dynamics, but also a prism through which the hegemonic imaginary of the transition can be deconstructed, exposing its inconsistencies.

2. *The concept of 'Imaginary' and 'Technological Determinism'*

The concept of 'imaginary' originates primarily within the Lacanian psychoanalytic framework. In Lacan's early writings, it refers to the space in which the human subject first enters into a relationship with their reality, during the so-called 'mirror stage'[32]. Later, the term is integrated into the triadic conceptual structure comprising the imaginary, the symbolic, and the real. In this scheme, the imaginary is always oriented by the symbolic – the chains of signification constitutive of social space – while the real emerges as an impossible dimension that escapes both the symbolic and the imaginary, an inaccessible remainder[33].

The term also became crucial in Louis Althusser's reformulation of the theory of ideology. At its core is the ideological process through which an individual is constituted as a subject, with the primary function of ideology being the reproduction of the relations of production, and hence of the social structure, to which the subject must ideologically subjugated. Ideology, Althusser argues, «represents the imaginary relationship of individuals to their real conditions of existence»[34]. It produces the subject's sense of identification – the Lacanian imaginary – through the process of interpellation, whereby the

29 J. Lacan, *Scritti*, Einaudi, Torino 2002; L. Althusser, *On Ideology*, Verso Books, New York 2020; S. Hall, *Il rospo nel giardino: l'irruzione del Tatcherismo nella teoria*, in Id., *Il soggetto e la differenza. Per un'archeologia degli studi culturali e postcoloniali*, Meltemi, Sesto San Giovanni 2006.

30 S. Jasanoff, *Future Imperfect: Science, Technology, and the Imaginations of Modernity,* in S. Jasanoff, S.H. Kim (eds.), *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power,* University of Chicago Press, Chicago 2015.

31 B. Latour, *Pandora's hope: essays on the reality of science studies*, Harvard University Press, Cambridge 1999; J. Parikka, *A geology of media*, University of Minnesota Press, Minneapolis-London 2015.

32 Cfr. J. Lacan, *Scritti*, cit.; P. James, *The Social Imaginary in Theory and Practice*, in C. Hudson, E.K. Wilson, (eds,), *Revisiting the Global Imaginary: Theories, Ideologies, Subjectivities: Essays in Honor of Manfred Steger*, Springer International Publishing, Cham 2019, pp. 33-47.

33 *Ibidem.*

34 L. Althusser, *On Ideology,* cit.

individual is hailed by ideology and, through this act, recognizes themselves as a subject of that very ideology and, in doing so, also recognizes the authority and identity of the Subject that hails them – namely, power itself[35].

Some authors, such as Raymond Williams, contend that Althusser risks reducing the subject to a mere function of ideological apparatuses – the institutions that materially produce ideology – and in doing so, absolutizes the process of subjectivation without accounting for the processual nature of interpellation; that is, the subject must be continually re-interpellated in order to remain a subject[36]. According to Stuart Hall, Althusser's theory also seems to presuppose a complete identity between the dominant class and ideology – as if the dominant class had a singular and already given ideology – thus failing to account for the coexistence of multiple ideological formations within a single social formation[37].

Drawing on Gramsci, Hall focuses on the struggles over the necessary space for constructing ideological hegemony, emphasizing how such hegemony rests upon a shifting balance of social forces and must therefore be continually renewed[38]. There are multiple processes of interpellation: while some are newly formed, others are already present and are restructured by emerging ideological formations. The imaginary is thus composed of a chain of interconnected interpellations, which can be reconfigured and transformed: the subject's identity and their alignment with ideological formations are not static, but rather the outcome of ongoing processes of reorganization and negotiation.

The concept of 'sociotechnical imaginary', introduced by Sheila Jasanoff and Sang-Hyun Kim and further developed by Jasanoff, emerges from a different tradition, one more aligned with the interpretations of Cornelius Castoriadis and Charles Taylor. These authors characterize the social imaginary in contrast to, or at least as a critique of, ideology theory, and with less emphasis on psychoanalysis. Charles Taylor and Manfred Steger define the imaginary as «the ways we are able to think or imagine the whole of society»[39] and as a lived, generalized sensibility shared by the majority. In this sense, it is the way in which people imagine their social existence, their being and acting together with others, and the expectations related to that existence.

Initially introduced within the field of Science and Technology Studies (STS), the concept of sociotechnical imaginaries was used to analyze the relationship between na-

35 As Morfino notes, this is the articulation between the imaginary and the symbolic: the symbolic produces the discourse, the interpellation that operates on the level of the imaginary unconscious, as the moment in which the individual recognizes themselves as a subject. Cfr. V. Morfino, *L'articolazione dell'ideologico e dell'inconscio in Althusser*, in «Quaderni materialisti», 10, 2011, pp. 31-43.

36 R. Williams, *Communication Technologies and Social Institutions,* cit.

37 This is crucial to consider here, given that the ruling classes are not unified in articulating an ideology of ecological transition but, as is well known, there are also strong denialist tensions. Cfr. S. Hall, *L'importanza di Gramsci per lo studio della razza e dell'etnicità*, in Id., *Il soggetto e la differenza. Per un'archeologia degli studi culturali e postcoloniali*, cit.

38 S. Hall, *Il Rospo nel Giardino: l'Irruzione del Tatcherismo nella Teoria*, cit.

39 P. James, *The Social Imaginary in Theory and Practice*, cit.

tional identity and state-led technoscientific projects[40]. Later, the scope of the term was expanded to include corporations, social movements, and scientific communities as sites in which these imaginaries are articulated and enacted. Jasanoff describes sociotechnical imaginaries as:

> [...] collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology. This definition privileges the word 'desirable' because efforts to build new sociotechnical futures are typically grounded in positive visions of social progress.[41]

By adopting the term 'sociotechnical', Jasanoff highlights the role of science and technology in performing and producing different visions of the common good, of social relations, and of future expectations. Technologies materialize «the invisible components of social imaginaries»[42]. In Jasanoff's view, these imaginaries occupy the space between collectively held imaginaries as classically understood, but which she considers lacking in materiality, and the networks and material assemblages mapped by STS, which, she argues, risk remaining politically neutral. Sociotechnical imaginaries thus offer, on the one hand, idealized visions of what kind of society technological development may bring about and, on the other, visions of what kind of society is required for innovation to flourish[43]. They mobilize collective social aspirations and project the future as the temporal space where those aspirations might be realized.

Although Jasanoff and Kim adopted the term in contrast to concepts such as 'ideology' and 'interest' – which, in their view, fail to capture the normative and affective dimensions of science because they operate on a primarily cognitive level[44] – this article adopts a reading more aligned with that of Althusser and Hall. I employ the concept of the sociotechnical imaginary as defined by Jasanoff, while emphasizing how individuals are interpellated and subjectivated through such imaginaries, and how the mobilization of the imaginary represents a constant and contested terrain in the production of hegemony. As Jasanoff herself notes, many different actors can generate imaginaries, and multiple, even conflicting, imaginaries can coexist within the same social space. For this reason, it is crucial to recognize the sociotechnical imaginary as one of the principal battlegrounds for cultural contestation and hegemonic struggle, precisely because these imaginaries mobilize a libidinal and affective dimension of desire and expectation – one that is particularly powerful given the material and social nature of technologies.

40 S. Jasanoff, S.H. Kim, *Containing the Atom: Sociotechnical Imaginaries and Nuclear Power in the United States and South Korea*, in «Minerva», 47, n. 2, 2009, pp. 119-146.
41 S. Jasanoff, *Future Imperfect: Science, Technology, and the Imaginations of Modernity*, cit.
42 Ivi, p. 12.
43 R. Tutton, *Sociotechnical Imaginaries and Techno-Optimism: Examining Outer Space Utopias of Silicon Valley*, cit.
44 M. McNeil, M. Arribas-Ayllon, J. Haran, et al. (eds.), *Conceptualizing Imaginaries of Science, Technology, and Society*, *The handbook of science and technology studies*, The MIT Press, Cambridge 2016.

One of the traits by which the typically Western technological imaginary has been characterized since the 1980s is a radical trust in the capacity of 'technology' to solve the problems of a given historical conjuncture and to revolutionize society and culture. This faith is embodied in the notion of 'techno-utopianism', defined as «the belief in technology […] as the means of achieving a 'perfect' society in the near future»[45].

This techno-utopianism relies on a reductionist and deterministic conception of technology – on the claim that technology drives social transformation while remaining detached from the social relations and contexts within which it emerges and operates, «as if the design of tools and machines […] were not in constant interplay with the social arrangements that inspire and sustain their production»[46].

Technological determinism is the belief that technological development follows an internal, inevitable logic, unaffected by social, political, economic, and cultural dynamics. Yet, precisely because of this autonomous logic, it is also presumed to be capable of determining the transformation of those very contexts[47], functioning as a kind of *deus ex machina*.[48] As I will show in the following paragraph, this determinism – typical of the Western sociotechnical imaginary – also informs the discourses and narratives surrounding the transition.

3. *Technological determinism and ecological transition*

In this section, I will analyze two examples – European policy documents and a speech by Elon Musk – that I consider particularly paradigmatic to explicate how rhetorics and narratives of transition lie upon a deterministic sociotechnical imaginary. It is clear that these are very different actors – an intergovernmental political and economic institution on the one hand, and the world's wealthiest tech entrepreneur on the other – with equally distinct and often conflicting objectives. However, I deliberately juxtapose them precisely in their difference, in order to show how they nonetheless share the same implicit conception of technology: the same technological determinism that informs their representations of social progress.

3.1 *The European Green Deal*

The European Green Deal and the twin transitions are presented as a harmonious and universalist project, aimed at simultaneously addressing the climate crisis, social inequality,

45 H. Segal, *The Technological Utopians*, in J. Corn (ed.), *Imagining Tomorrow: History, Technology and the American Future*, The MIT Press, Cambridge 1986, p. 149.

46 S. Jasanoff, *Future Imperfect: Science, Technology, and the Imaginations of Modernity*, cit., p. 2.

47 Cfr. R. Williams, *Communication Technologies and Social Institutions*, cit.; D. Freedman, A *'Technological Idiot'? Raymond Williams and Communications Technology*, in «Information, Communication & Society», 5, n. 3, 2002, pp. 425-442; S. Wyatt, T*echnological Determinism is Dead; Long Live Technological Determinism*, in E.J. Hackett, O. Amsterdamska, M.E. Lynch, J. Wajcman (Eds.), *The Handbook of Science and Technology Studies*, The MIT Press, Cambridge 2008.

48 M.R. Smith, L. Marx, *Does Technology Drive History?: The Dilemma of Technological Determinism*, MIT Press, Cambridge 1994.

and economic stagnation. However, behind this narrative lies a determinist and techno-liberal ideological framework[49], in which technology is not only conceived as a solution but as an autonomous, inevitable, and morally justified force. As Aleksandra Čavoški explains, although the European Green Deal is presented as an ecological plan, it is primarily an economic and technological development strategy, in which ecological goals are subordinated to those of economic growth and technological advancement: «While the stated primary aim is to address climate and other environmental objectives, at times these appear secondary to economic objectives and the pursuit of economic growth in the EU. Technology is regarded as a key enabler for change, predominantly change that will lead to economic development. […] technology is considered the prime driver of change»[50]. According to Čavoški, the European plan is thus characterized by a strong technological determinism that posits technological development as the engine of economic, social, and, in this case, ecological progress.

Two excerpts – respectively from the 2019 European Commission report on the Green Deal and the 2022 Joint Research Centre report on the twin transitions – illustrate the centrality of technology within this framework:

> Europe's new growth strategy, which will transform the Union into a modern, resource-efficient and competitive economy. The European Green Deal aims to make Europe climate neutral by 2050, boost the economy through green technology, create sustainable industry and transport, and cut pollution. Turning climate and environmental challenges into opportunities will make the transition just and inclusive for all.[51]

The green transition is an opportunity to unlock economic and societal benefits. Green technologies can provide economic and environmental win-win situations for both societies and economies. The green transition is an opportunity to transform today's unsustainable activities towards a just future. One that overcomes societal challenges such as growing disparities, and opens up avenues for competitive advantages of economic activities that provide solutions without exceeding the planetary boundaries[52].

As these quotes suggest, the crisis is framed as an opportunity – an opening toward a just and inclusive transition for all, a chance to stimulate economic growth by making the Union a competitive and efficient economy, with green technologies capable of delivering mutually beneficial outcomes – so-called 'win-win situations' – for both society and the economy. Europe states itself as the guardian of the entire planet, described as «polluted and destroyed»[53], through a plan for technological transition capable not only

49 N. Atanasoski, K. Vora, *Surrogate humanity: race, robots, and the politics of technological futures*, cit.
50 A. Čavoški, *The European Green Deal and technological determinism*, in «Environmental Law Review», 24, n. 3, 2022, pp. 201-213, p. 212.
51 European Commission, *Communication from the commission to the European Parliament, the European Council, The Council, The European Economic and Social Committee and The Committee of the Regions The European Green Deal*, cit.
52 S. Muench, E. Stoermer, K. Jensen, et al., *Towards a green and digital future*, cit.
53 European Commission, *Communication from the commission to the European Parliament, the European Council, The Council, The European Economic and Social Committee and The Committee of the Regions The European Green Deal*, cit., p. 2.

of addressing the ecological crisis but also of solving social issues – «a transition just and inclusive for all»[54] – and boosting the economy.

The very name 'Green Deal' evokes Roosevelt's New Deal, the economic and social recovery plan launched in the United States in the aftermath of the Great Depression of the 1930s. The invocation of a 'new deal' promotes the idea of a new course in European history, a renewed social contract with its citizens and a novel development model aimed at economic and social growth, though now framed within an ecological horizon. The reports emphasize a commitment to future generations to ensure a more just and ecological future[55].

As scholars have noted, green rhetoric serves as a means to stabilize the contradictions between extractive capitalism and environment, enabling the formation of a coalition of interests and opinions that either support or at least do not oppose extraction-based development[56]. Simmet further argues that mainstream Western ecological discourse imposes an abstract and generic vision of the future – one that is in fact its own – onto the rest of the world, representing this vision as a universal aspiration[57]. The imaginaries of ecological transition are based on technology as the sole index of development, sidelining societies and their specific needs, thereby displacing more nuanced understandings of what 'development' could mean. Moreover, they impose on non-Western imaginaries – Simmet refers specifically to the African context – the perception of being underdeveloped and backward[58].

The Green Deal thus reproduces European universalism and exceptionalism by establishing the rules of engagement in the fight against climate change and promoting the idea that the crisis affects everyone equally – the 'we are all in the same boat' logic – presenting itself as a benevolent guide and moral actor. While on the one hand the European Union seeks to position itself as a global leader on climate action, on the other it not only avoids confronting the imperial and colonial legacy that has shaped its relationship with the rest of the world, but in fact exploits these very conditions in the name of the transition: «the EU opts to maintain these uneven relations in service of greenwashed notions like decarbonization, dematerialization, and decoupling economic growth from socioecological impacts»[59].

54 *Ibidem*.

55 The commitment to future generations has, after all, been one of the cornerstones of so-called 'sustainable development' since the 1985 Brundtland Report by the World Commission on Environment and Development, which first introduced the term (UN – United Nations 1985).

56 G. Bridge, P. McManus, *Sticks and Stones: Environmental Narratives and Discursive Regulation in the Forestry and Mining Sectors*, in «Antipode», 32, n. 1, 2000, pp. 10-47.

57 H.R. Simmet, "*Lighting a dark continent": Imaginaries of energy transition in Senegal,* in «Energy Research & Social Science», 40, 2018, pp. 71-81.

58 *Ibidem.*

59 D. Vela Almeida, V. Kolinjivadi, T. Ferrando, et al., *The "Greening" of Empire: The European Green Deal as the EU first agenda*, in «Political Geography», 105, 2023, https://doi.org/10.1016/j.polgeo.2023.102925. In the current context of global geopolitical crisis and war – particularly the Russian-Ukrainian conflict – the discourse surrounding the transition, although partially weakened by this very context, is increasingly intertwining with military and security narratives. The supply of raw materials and energy is progressively being reframed as a strategic issue of geopolitical security – what

3.2 *Elon Musk presents Tesla Energy*

Technological determinism permeates not only governmental dispositions and public policy documents – such as the aforementioned EU reports – but also advertising and public discourse by entrepreneurs and politicians. As Gillian Rose has observed, advertisements are omnipresent and, for this very reason, serve as a quintessential vehicle of ideology[60]. Similarly, Stuart Hall emphasized that the media at large are the principal agents in providing the images and representations through which society interprets itself as a whole[61]. The media and representational power of Elon Musk – along with that of other major tech entrepreneurs and their corporations – plays a crucial role in shaping the collective sociotechnical imaginary[62].

A paradigmatic example is a widely cited 2015 speech by Elon Musk[63], in which he introduced Tesla Energy Operations Inc. – better known as Tesla Energy – the division of Tesla entirely devoted to 'green' technologies, specializing in solar energy generation systems and energy storage products. Although it might appear old – and despite Elon Musk's evident rhetorical shift toward increasingly neo-reactionary and conservative positions – it remains a perfect example of how technological determinism continues to inform the discourse of tech corporations today. In other words, it exemplifies how technology companies narrate and imagine social, and in this case also ecological, progress: as driven by technological development and placed in the hands of the corporations themselves.

In the video, Tesla's founder – at the time presented himself as guru and leader of mainstream environmentalism[64] – begins his speech by referring to the climate crisis and the issue of fossil fuels and their pollution. On the screen behind him appear images of industrial facilities emitting black smoke: «This is how it is today, it is pretty bad […] it sucks, exactly. I just want to be clear because sometimes people are confused about it: this is real». Musk proceeds to describe how fossil fuels have caused enormous damage, stressing the importance that «we, collectively, should do something about this». The ecological crisis is immediately framed as a general crisis, affecting everyone indiscriminately. The reference to fossil fuels identifies a clear and recognizable enemy – one that is, however, easy to overcome through technological development.

Musk repeats a gesture of abstraction which constructs the idea of a universal human totality, both responsible for and victim of the crisis, thereby erasing the responsibility

Riofrancos (2023) refers to as the *security–sustainability nexus*. Cfr. T. Riofrancos, T*he Security–Sustainability Nexus: Lithium Onshoring in the Global North*, in «Global Environmental Politics», 23, n. 1, 2023, pp. 20-41.

60 G. Rose, *Visual Methodologies. AN Introduction to the Interpretation of Visual Materials*, Sage Publications, London 2007.

61 S. Hall, *Culture, the Media and the «Ideological Effect»*, in J. Curran, M. Gurevitch, J. Wollacott (eds.), *Mass Communication and Society*, Edward Arnold, London 1977, pp. 315-48.

62 S. Jasanoff, *Future Imperfect: Science, Technology, and the Imaginations of Modernity, in Jasanoff,* cit.

63 https://www.youtube.com/watch?v=NvCIhn7_FXI&ab_channel=Tesla.

64 Musk's shift from being a guru of technoutopian progressivism and mainstream environmentalism to a leader of the neoconservative Right is currently one of the key areas of development in my research.

of a specific economic, political, and social system[65]. Musk reaffirms the Anthropocene as a «white public space»[66], one that obscures the causal relations underlying the current crisis and the differential ways in which it manifests and affects vulnerable subjects, concealing them behind a generic identification with 'humanity' – a humanity that is, however, white and Western. Moreover, the whiteness of the Anthropocene, with its presumed universality, determines the boundaries of what is sayable and unsayable, its epistemology, and consequently the possible responses to the crisis.

As the video continues, Musk presents a simple and effective solution: the sun, a free source of energy that «shows up every day and produces ridiculous amounts of power». According to Musk, the only problem lies in storing that energy – precisely where Tesla Energy intervenes, with its energy storage devices and electric batteries. He thus offers an apparently straightforward, fully technological solution to the crisis – one that is not in conflict with economic growth and development but aligned with it. The development of efficient electric batteries, along with solar panels and other technologies, is framed as already projecting us into a clean, fair, and green future. Technological and economic development are not only compatible with ecological challenges, they become their main drivers. These technologies are thus presented as mediators between nature and humanity, as instruments of reconciliation between the two poles of the Cartesian dualism.

If we compare this discourse with a more contemporary example, we can observe the same mode of representing the ecological crisis in a commercial[67] by the Japanese company LG Energy Solution, the world's second-largest producer of electric batteries, controlling 14% of the global market. The video, titled *Introducing LG Energy Solution Global Newsroom*, was released on the company's YouTube channel on May 30, 2022. A female voice explains, in a tone meant to sound simple and direct but that comes across instead as rather flat and reductive, what climate change is:

> Have you ever been stuck at home because of a flood triggered by weeks of rains? Who would have thought of summer heat so severe that it would drive everyone to turn on their air conditioners and cause a massive power outage? Surprisingly this happens in many parts of the world. It's all because of climate change and carbon emission are a major contributor. Sadly, the climate crisis has now become part of our daily lives.

«Surprisingly», the video states, «this is happening all over the world», and «sadly», «climate change has now become part of our everyday life». Fortunately, it continues,

65 Cfr. J.W. Moore, *Capitalism in the Web of Life*, Verso, Londra/New York 2015; A. Malm, A. Hornborg, *The geology of mankind? A critique of the Anthropocene narrative*, in «The Anthropocene Review», 1, n. 1, 2015, pp. 62-69; L. Lewis, M.A. Maslin, *Defining the Anthropocene*, in «Nature», 519, n. 7542, 2015, pp. 171-180; D. Haraway, *Chthulucene. Sopravvivere su un pianeta infetto*, NERO, Roma 2019; Z. Todd, H. Davis, *On the Importance of a Date, or Decolonizing the Anthropocene*, in «An International Journal for Critical Geographies», 16, n. 4, 2017, pp. 761-780.

66 Z. Todd, *Indigenizing the Anthropocene*, in H. Davies, E. Turpin (eds.), *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments and Epistemologies*, Open Humanities Press, London 2015, pp. 241-254.

67 https://www.youtube.com/watch?v=Izr9HZVvjY0&ab_channel=LGEnergySolutionGlobal.

governments and corporations are working to solve the problem by promoting the use of electric vehicles and energy storage systems (ESS). LG, it explains, produces the electric batteries that will lead us toward a more sustainable world. The tone of the video is very relaxed – there is no trace of alarmism; the climate crisis is presented as a problem for which there exists a simple, straightforward solution.

Sabine LeBel has described the imaginary of renewed harmony between nature and technology, promoted by the tech companies of transition, through the concept of the technological sublime – borrowed from Perry Miller and Leo Marx, who first coined it. According to Miller and Marx, the technological sublime constitutes a contradictory impulse that fervently celebrates technology while simultaneously neglecting the consequences of industrialization and the infrastructures tied to new technologies[68]. It is the supposed novelty of such technologies that allows the sublime to emerge, in the continuous celebration of innovation that projects us into a radiant future and constructs green technologies as harbingers of both social and ecological harmony. The sublime is indeed tightly bound to the future and to the image of it produced through technology[69].

According to Devyn Remme, salvation imaginaries based on innovation serve to construct the notion of zero-emission electric vehicles: «This semiotic maneuver makes negative externalities disappear, ignoring environmental pollution and social displacement at remote sites of extraction and failing to account for the high carbon and water intensity present in the extraction, manufacture, and discard of Li-ion batteries»[70].

Electric batteries – and the green technologies associated with them – are presented as the core element for overcoming the crisis[71]. This is an example of 'technological fix'[72] or 'green fix'[73]. As Fox describes, so-called green capitalism is grounded in the idea that the 'free' market is the most effective means to lead the transformation of the economy

68 S. LeBel, *Wasting the Future: The Technological Sublime, Communications Technologies, and E-waste*, in «communication +1», 1, n. 1, 2012.

69 *Ibidem.*

70 D. Remme, S. Sareen, H. Haarstad, K. Rommetveit, *Electric Vehicle Paradise? Exploring the Value Chains of Green Extractivism*, in «International Development Policy | Revue internationale de politique de développement», n. 16, 2023, https://journals.openedition.org/poldev/5406.

71 As further evidence of the centrality of electric batteries among transition technologies, the three inventors who progressively developed and refined this technology – John Goodenough, Stanley Whittingham, and Akira Yoshino – were awarded the Nobel Prize in Chemistry in 2019, the very same year the Green New Deal was being promoted: «Through their work, John Goodenough, Stanley Whittingham and Akira Yoshino have created the right conditions for a wireless and fossil fuel-free society, and so brought the greatest benefit to humankind». Lithium batteries are here presented as a benefit for all humanity, and, once again, technological development is framed as the driving force behind collective social and ecological improvement. The emphasis on *humankind* further reveals a form of universalism that often characterizes Western discourses on both the ecological crisis – depicted as a problem affecting the planet uniformly – and its solutions – ecological transition as a one-size-fits-all remedy. Cfr. Nobel Prize 2019, p. 7, available at: https://www.nobelprize.org/prizes/chemistry/2019/popular-information/.

72 N.J. Fox, *Green capitalism, climate change and the technological fix: A more-than-human assessment,* in «The Sociological Review», 71, n. 5, 2023, pp. 1115-1134.

73 S. Holgersen, A. Malm, *"Green Fix" as Crisis Management. or, in Which World Is Malmö the World's Greenest City?*, in «Geografiska Annaler: Series B, Human Geography», 97, n. 4, 2015, pp. 275-290.

toward a sustainable future, aiming to replace 'natural capital' with «human ingenuity and technological development»[74]. It is the belief that the ecological crisis can be solved while continuing to produce value, in a 'business as usual' logic. More importantly, it is the belief that the crisis might even become an economic opportunity, making technological and economic development the engines of ecological transition, through «green spirals, in which new environmentally-friendly infrastructure and energy technologies create new markets, which in turn encourage further technological innovation»[75].

Furthermore, the notion that the answer to the crisis can be so simply advanced through technological progress implemented by capitalist companies serves to neutralize any critical questioning of the *status quo* and the unjust social structures at the root of the problem. It legitimates corporations as the sole agents not only of technological but also political and moral progress[76]. The ecological crisis is thus depoliticized, framed as a market opportunity and solvable through seamless technological change[77]. This narrative also constructs the idea that salvation lies in the use of transition technologies – framing the protagonist/hero of the crisis as a technological user who saves the world through the consumption of technological products themselves.

Elon Musk's explicit endorsement of Trump in the 2024 U.S.A. elections, and more broadly the shift of Silicon Valley toward neo-reactionary politics[78], then, fits seamlessly within this framework. On the one hand, there is the economic interest in deregulation and tax cuts championed by Trump; on the other, the anti-democratic belief that humanity's collective and social progress is determined by technology, and that tech corporations are the ultimate promoter of this process[79].

As has been widely analyzed, figures such as Elon Musk present themselves as heroic characters, capable of transcending all limits and carrying a messianic mission of epochal social transformation through their visionary creativity – the one that promises a new world and a new order, with the entrepreneur as its guide[80]. The 'fascistization' of technology companies, or even what some have called techno-feudalism, should therefore not be seen as a rupture or transformation, but rather as the natural expression of the ideology permeating the technological entrepreneurial milieu. The same messianic and anti-democratic conception of social progress that animates this ideology is precisely the one that, a decade ago, informed Elon Musk's discourses around the ecological crisis.

74 N.J. Fox, *Green capitalism, climate change and the technological fix: A more-than-human assessment,* cit., p. 263.
75 Ivi, p. 117.
76 C. Rhodes, *Woke Capitalism: How Corporate Morality is Sabotaging Democracy*, Bristol Universty Press, Bristol 2021.
77 E. Swyngedouw, *Whose environment?: the end of nature, climate change and the process of post-politicizatiom*, in «Ambiente & sociedade», 14, 2011, pp. 68-87.
78 H. Smith, R. Burrows, *Software*, *Sovereignty and the Post-Neoliberal Politics of Exit*, in «Theory, Culture & Society», 38, n. 6, 2021, pp. 143-166.
79 Cfr. J. Armistead, *The Silicon Ideology*, in «Archive.org», 18, 2016; H. Smith, R. Burrows, *Software*, *Sovereignty and the Post-Neoliberal Politics of Exit,* cit.
80 C. Ibled, *'Founder as Victim, Founder as God': Peter Thiel, Elon Musk and the two bodies of the entrepreneur*, in «Journal of Cultural Economy», 18, n. 5, 2025, pp. 629-649.

4. *Technologies as Black boxes*

As I showed, the twin transitions are presented not merely as transformations of economic and technological infrastructures, but more fundamentally as social and ecological transformations – supposedly oriented toward greater harmony with 'nature' and toward social equity. This idea is possible because it lies on a utopian/determinist sociotechnical imaginary that makes the technical device a neutral tool, external to both social and ecological relations – a 'black box'[81] that operates, seemingly, as if by magic[82]. A sociotechnical imaginary associated with the imperial mode of living, that could also be described as 'green-tech-determinism', emphasizing its ecological dimension: that is, the presumption that technologies are capable of transforming ecologies while remaining entirely disconnected from ecological relations.

This imaginary, in fact, works because it makes the technical device a simple object that, when given certain inputs, produce specific outputs. The very design of batteries – whether in computers, phones, or cars – is intended, as with most consumer technological devices, to obscure their internal functioning and make them difficult to access. As artist and theorist Samir Bhowmik writes, «the industry designs portables to discourage users to tinker and with the intention of discard after a few years. Not only batteries are glued within the body of the device, but merely to uncover them from within the bowels of the machine requires expertise and specialized tools»[83]. The materials and the complex mechanism that make up the battery are invisible and punctualized. Punctualization – a term of the Actor-Network Theory – describes, according to Jussi Parikka, the process through which various components are assembled into a single, complex system that can be used as a unified object[84].

The development of technological objects as black boxes – that is, as tools meant to be used without being understood – is one of the foundational characteristics of contemporary technological advancement[85]. More broadly, black-boxing involves the erasure of all the processes of labor and knowledge sedimentation, the social, economic, and political infrastructures, the materials, and the logistical systems that enable the actualization of the technical object. From an ecological point of view, black-boxing thus entails the erasure of the complex ecological web from which the device emerges. In a world where the primary mode through which technologies are presented is often that of commodities, it is crucial to note that, if – as Marx argued – the nature of the commodity is to conceal the 'social' relations that underpin it, it is also its nature to conceal the 'ecological' relations that make its existence possible. Sean Cubitt, drawing on Marx, refers to lithium batteries as 'social hieroglyphs': «an ostensibly innocent artifact in which is disguised a world of complex networks that, however, present themselves to humans in

81 Cfr. B. Latour, *Pandora's hope: essays on the reality of science studies*, cit.
82 Cfr. N. Atanasoski, K. Vora, *Surrogate humanity: race, robots, and the politics of technological futures*, cit.
83 S. Bhowmik, *The Battery is the Message: Media Archaeology as an Energy Art Practice*, in «communication +1», 7, n. 2, 2019, p. 5.
84 Cfr. J. Parikka, *A geology of media*, cit.
85 *Ibidem.*

'the form of a movement made by things, and these things, far from being under their control, in fact control them'»[86]. The process of black-boxing therefore results in the invisibilization of the extractive and productive networks – along with the material, ecological, and human exploitation – that sustain them. It enables the erasure of those forms of extractivism related to the ecological transition from the narrative – that we called green extractivism[87] or renewable extractivism[88].

The process of black-boxing thus sustains, in turn, the processes of exploitation of land and nature, which are conceived as property and as resource[89]. In line with ecofeminist critics[90], the earth and its elements are regarded merely as reserves of resources, whose extraction is not seen as problematic but rather embraced as a key element in resolving the ecological crisis itself[91]. It is precisely this process of 'erasure' – of extractive and exploitative processes – that enables, as previously discussed, the production of that 'outside'[92] which allows the costs of social and ecological reproduction underpinning the transition to be taken for granted – and thus to feel safe and absolved of responsibility – thereby ensuring the hegemony of the imperial mode of living.

5. *The 'Imperial' Subject and its 'Miner(e)al'*

To summarize the arguments outlined in the previous paragraphs, the sociotechnical imaginary, implicit in the imperial mode of living and that inform the discourses around transition, is a techno-utopian imaginary, one that promotes technology as the means to achieve a perfect, just, and ecological society in the future. Underpinning this vision is a deterministic conception of technology: technology is understood as having an internal logic of development, autonomous from social, economic, political, cultural, and – in this case – ecological dynamics. Yet, paradoxically, it is precisely by virtue of this internal logic that technology is also thought capable of driving those very dynamics, including social and ecological progress.

86 S. Cubitt, *Finite media: environmental implications of digital technologies*, Duke University Press, Durham-London 2017, p. 65.

87 Cfr. A. Dunlap, J. Jakobsen, *The Violent Technologies of Extraction: Political ecology, critical agrarian studies and the capitalist worldeater*, cit; J. Verweijen, A. Dunlap, *The evolving techniques of the social engineering of extraction: Introducing political (re)actions 'from above' in large-scale mining and energy projects*, cit.; D.V. Kingsbury, *'Green' Extractivism and the Limits of Energy Transitions: Lithium, Sacrifice, and Maldevelopment in the Americas*, cit.

88 Cfr. D. Del Bene, *More dams, more violence? A global analysis on resistances and repression around conflictive dams through co-produced knowledge*, cit.

89 Cfr. S. Cubitt, *Finite media: environmental implications of digital technologies*, cit.

90 C. Merchant, *The Death of Nature*, Harper & Row, New York 1980; V. Plumwood, *Feminism and the Mastery of Nature*, Routledge, London 1993; I. Stengers, *Thinking with Whitehead: A Free and Wild Creation of Concepts*, Harvard University Press, Cambridge 2011.

91 Cfr. M. Archer, F. Calvão, *Sustaining Decarbonisation: Energy Storage, Green Extractivism, and the Future of Mining,* cit.

92 Cfr. U. Brand, M. Wissen, *The Imperial Mode of Living. Everyday Life and the Ecological Crisis of Capitalism,* cit.

Within this framework, technology is celebrated with an almost religious fervor – an ecstatic and millenarian celebration, the technological sublime – that presents it as both a novelty and the bearer of futurity. In this imaginary, the ecological crisis is framed as an abstract and general condition, one that affects everyone equally, yet for which a reliable solution exists – namely, continued economic development and the technological innovations promoted by tech corporations. Just as the crisis is generic, so too is the Subject that the imaginary of the imperial mode of living seems to hail: a Subject presented as universal, capable of representing Humanity in its entirety.

In relation to technologies, this universal and aspirational figure of the human takes the form of a technological 'user' who fulfills their humanity – as the rational, white subject of the imperial mode of living – and orients themselves toward the future through the very technological use. As Biscossi[93], drawing on Atanasoski and Vora, emphasizes, the technological user is the aspirational figure of the technological imaginary, embodying the ideal of self-determined autonomy characteristic of the modern liberal subject. This is the specific form assumed by the subject of the imperial mode of living in its relationship with technology. Black-boxing enables the framing of technologies as discrete, ready-to-use objects, concealing the infrastructures and forms of exploitation that make them possible. These objects are imagined as external to the user, fully under their control: «The desire for enchanted 'smart' technologies […] to perform the surrogate effect […] reaffirms post-Enlightenment conceptions of human autonomy, and therefore freedom, as separate from 'things' that are intended for pure use. It is in this mode that the enchanted object allows the liberal subject to feel human»[94].

The presumption of 'mastery' over technologies – as mere tools serving the human – produces the illusion of an active, autonomous subject. The technological tool thus appears as a discrete and accessible object, firmly within the grasp of the user who is presumed to command and control it entirely.

Deborah Atanasoski and Kalindi Vora have called this particular configuration of the human-machine relationship 'technoliberalism' – a political alibi through which technological development is framed as a promise of human emancipation, while in reality it obfuscates and reproduces racialized and differential conditions of exploitation[95]. We might further add: of ecological exploitation as well. Transition technologies are also framed within this logic, which codes them as tools in the hands of this hegemonic Subject, functioning 'magically' and in harmony with 'nature'. The technological user is thus affirmed as fully human within an ecological framework. The black-boxing that underpins this techno-deterministic logic encodes the idea of a user/subject who is presumed to have full control precisely because the infrastructural networks from which these technologies emerge – and which enable their functioning – have been erased. In the context of the transition, this subject is realized within a 'green' framework that

93 E. Biscossi, *The User and the Used: platoform mediation, labour and pragmatics in the gig economy,* Tesi di Dottorato Università L'Orientale, 2023.
94 N. Atanasoski, K. Vora, *Surrogate humanity: race, robots, and the politics of technological futures*, cit.
95 *Ibidem*.

posits them as the protagonist resolving the ecological crisis through the consumption of new technologies while preserving his attachment to imperial privilege intact.

The Subject I am positing here as the subject hailed within the sociotechnical imaginary of the imperial mode of living is, therefore, an autological subject – a subject of liberal law, capable of self-determination and oriented toward the future[96]. Their freedom is the freedom of the 'I', the subject who can enunciate themselves – even in the context of ecological crisis – claiming protagonism over both present and future. However, the hegemony of this subject depends on the erasure and invisibilization of the materiality of technology – both in terms of the raw materials from which it is made and the labor and exploitation of vulnerable and often racialized bodies involved in its production. The imperial mode of living, as mentioned, allows those who have access to it to take for granted – and to remain blind to – the costs of social reproduction. Again, this invisibilization is enabled by the production of a techno-utopian imaginary and the glorification of the technological sublime, which together produce the effect of technologies that function as if by magic, as black boxes severed from social and ecological relations.

The imperial mode of living produces specific subject, attached to their privilege. The hegemony it generates is bound to a determinist sociotechnical imaginary addressing technological subjects/users oriented toward the future. This hegemony is made possible precisely through the disavowal and invisibilization of the mineral, which thus becomes the repressed – the 'real'[97] – of the imaginary, its 'miner(e)al'. In Lacanian terms, the real is that which eludes – and must remain excluded from – both the imaginary and the symbolic. It must remain repressed because its surfacing would destabilize the symbolic order as well as the imaginary identity of the subject. The mineral thus emerges as the real of the imaginary underpinning ecological transition, its unsayable: it reveals that the identity of the subject/user cannot exist without the exploited labor of miners in Chile or Congo, without the suicides of Chinese factory workers[98], without the existence of electronic waste dumps[99]. Nor can it exist without the desertification and ecological devastation of mining regions, the prostitution and rape in mining towns like Antofagasta in Chile[100], the pollution of oceans by cargo ships, or the cancers and genetic malformations suffered by those living or working near dumpsites in Ghana, China, and Nigeria. It cannot exist, that is, without the complex web of relations that sustain the infrastructures of the transition.

The mineral, as the concrete materiality of transition technologies, condenses the racial and ecocidal violence upon which they are built. Once the black box is opened –

96 E.A. Povinelli, *Economies of the Abandonment. Toward a Theory of Intimacy, Genealogy, and Carnality*, Duke University Press, Durham-London 2006.

97 J. Lacan, *Scritti*, cit.

98 J. Chan, M. Selden, N. Pun, *Dying for an iPhone: Apple, Foxconn, and the Lives of China's Workers*, Chicago 2020.

99 S. Abalansa, B. El Mahrad, J. Icely, A. Newton, *Electronic Waste, an Environmental Problem Exported to Developing Countries: The GOOD, the BAD and the UGLY*, in «Sustainability», 13, n. 9, 2021, https://doi.org/10.3390/su13095302.

100 M. Arboleda, *Planetary Mine. Territories of Extraction under Late Capitalism*, Verso, London & New York 2020.

once the mineral makes its appearance – it emerges as trauma, as ghost, haunting the comfort of the Subject, dismantling their symbolic order and their imaginary identity. The mineral speaks on behalf of the chemical solvents and toxic residues used in refining, the particulates emitted by cargo ships, and the devastation wrought by e-waste. But it speaks even more forcefully on behalf of the exploited bodies of workers – from miners to e-waste-pickers, with their lungs full of heavy dust – of Indigenous communities dispossessed of their land and water, and of all the vulnerable subjectivities affected by these processes.

The mineral thus becomes the prism through which to deconstruct the hegemonic imaginary of the imperial mode of living, revealing its inconsistency – because once the technologies of the transition are viewed through, and from, the perspective of the mineral, they prove to be nothing more than a means of maintaining existing hierarchies of exclusion and the privileges of those who have access to the imperial mode of living, at the expense of the rest of the world. The ecological transition therefore appears as the very form through which the imperial mode of living ensures its own reproducibility within the context of the ecological crisis. This is a form of what the Critical Computation Bureau terms 'recursive colonialism': «we understand recursivity, […], to be about the self-regulation, self-adaption, and self-regeneration of systems – including the recursive regeneration of the colonial episteme, which we call 'recursive colonialisms'»[101]. To start from the mineral – not as a neutral component of technology, but as a destabilizing lens – allows us not only to enter the «extractive zone» and witness the reality of green extractivism, but also to start thinking technologies as part of social and ecological relations, bringing into (our) view «submerged perspectives […] anchored within social ecologies that reorganize and refute the monocultural imperative»[102], counter-imaginaries that resist the universalist and techno-determinist imaginary, and can propose, from the situated contexts of exploitation, alternative technological futures[103].

In other words, it destabilizes the sense of security of those who have access to the imperial mode of living, undermining their presumed identity, universality, and futurity. It exposes how these subjects are constituted only through the fragmentation and exploitation of a multiplicity of other subjectivities – those to whom such identity is denied, to whom access to the future is foreclosed, and who are confined within an extractive and colonial present. Phantom subjectivities that haunt the imperial Subject – rendered invisible, yet becoming visible when seen in the backlight of the sociotechnical imaginary of the imperial mode of living, through the deconstructive prism of the mineral.

101 Critical Computation Bureau, *Editorial – Dialogues on Recursive Colonialisms, Speculative Computation, and the Techno-social*, in «E-Flux», 123, n. 12, 2021, p. 1.
102 M. Gómez-Barris, *The extractive zone: social ecologies and decolonial perspectives*, cit.
103 I cannot elaborate further here due to space constraints; however, this will be the focus of an article I am currently developing.