Quest Journals
Journal of Education, Arts, Law and Multidisplinary
Volume 16 ~ Issue 4 (Jul. – Aug. 2026) pp: 01-14
ISSN(Online): 2347-2895
www.questjournals.org

Research Paper

Managing the ecological crisis: green capitalism, governmentality, and the displacement of environmental harm

Amit Mishra[1] Himanshu Kumar Pandey[2] Shailendra Kumar[3] Sanjay Sonkear[4]

Abstract
Contemporary sustainability strategies — net-zero accounting, green industrial policy, electric mobility, and renewable energy expansion — are routinely framed as resolutions to the ecological crisis, underwriting the claim that decarbonisation can be achieved without structural transformation. Existing critical scholarship has examined sustainability as governance, as a regime of accumulation, and as a redistribution of risk, but pairwise integrations of these registers leave a gap: no tri-axial analytic treats Foucauldian governmentality, Marxian metabolic-rift analysis, and Beckian risk society as jointly productive of a single decomposable phenomenon. This paper develops displacement of harm as that synthesising analytic, supported by critical-conceptual discourse analysis and a focused case study of electric vehicles and their extractive supply chains. Drawing on Bieker's lifecycle assessment, the case shows that battery electric vehicles deliver approximately 63 per cent lower lifetime greenhouse-gas emissions in Europe while concentrating manufacturing-stage costs in lithium, cobalt, and nickel territories whose burdens fall outside conventional accounting. The principal contribution is triple coincidence: the three axes covary because they are jointly produced by a single institutional architecture, with the consequence that strategies performing best on conventional metrics are those displacing cost most extensively along unmeasured axes. The framework offers an evaluative analytic for just-transition policy.

Keywords: *ecological crisis; green capitalism; environmental governance; governmentality; metabolic rift; risk redistribution; displacement of harm; electric vehicle supply chains*

*Received 06 July., 2026; **R**evised 15 July, 2026; **A**ccepted 17 July, 2026 © The author(s) 2026.*
P**ublished with open access at **www.questjournals.org

I. Introduction

The defining political claim of contemporary environmental governance is that the ecological crisis can be resolved without rupture: through technological substitution, market design, and reformed regulation operating within the existing global economic order. From the Paris Agreement architecture to corporate net-zero pledges, from the European Green Deal to subsidies for electric mobility, sustainability is offered as a managerial competence rather than a problem of structural transformation. This consensus has produced demonstrable material achievements. Renewable electricity capacity has expanded faster than most analysts forecast a decade ago (IEA, 2024); the carbon intensity of major economies is in long-run decline (IPCC, 2022); and the per-

[1] Research Scholar, Faculty of Education, Banaras Hindu University, Varanasi, India.

[2] Research Scholar, Faculty of Education, Banaras Hindu University, Varanasi, India.

[3] Research Scholar, Faculty of Education, Banaras Hindu University, Varanasi, India.

[4] Professor, Faculty of Education, Banaras Hindu University, Varanasi, India.

Corresponding Author – Himanshu Pandey (email-himanshu141995@bhu.ac.in)

kilometre lifecycle emissions of electric vehicles, even on partly fossil grids, are substantially below those of comparable internal combustion vehicles. These gains are not incidental.

What this paper contests is a different claim: that aggregate environmental gains amount to the *resolution* of harm. That inference treats environmental harm as an additive quantity that can be reduced to a single number — a tonne of CO_2-equivalent, a percentage of decoupling, a Sustainable Development Goal indicator — and read off the resulting balance. The empirical record suggests otherwise. Demand for "transition metals" has, in less than a decade, restructured the political ecologies of the Lithium Triangle (Bustos-Gallardo et al., 2021), the Congolese Copperbelt (Sovacool, 2019), and Indonesian nickel territories (Lèbre et al., 2020). Carbon offset markets have been shown to systematically overstate sequestration (Lohmann, 2009), while REDD+ forest-carbon programmes and the broader "green grabbing" of land for conservation and sequestration concentrate dispossession in pastoral, forest, and customary-tenure communities (Beymer-Farris & Bassett, 2012; Fairhead, Leach & Scoones, 2012). The electrification of personal mobility relocates pollution from urban tailpipes to extractive geographies, refining hubs, and waste streams whose operational tempo is decoupled from the moment of consumer benefit. None of this contradicts the desirability of decarbonisation; it does undermine the claim that current strategies *eliminate* harm rather than *reorganising* it.

The thesis of this paper is that contemporary sustainability strategies within global capitalism do not resolve the ecological crisis but reorganise environmental harm through governance mechanisms, market structures, and technological systems. Three theoretical resources illuminate this reorganisation. Foucault's work on governmentality and biopolitics clarifies how sustainability operates as a productive form of power that constitutes objects of governance and shapes conduct through indicators, audit, and target-setting. Marx's analysis of capital accumulation and the metabolic rift (Foster, 1999; Foster, Clark & York, 2010) clarifies how the apparent dematerialisation of advanced economies depends upon the materialisation of low-carbon supply chains in extractive peripheries. Beck's account of the risk society (Beck, 1992, 2009) clarifies how late-modern environmental risks are systematically redistributed across geography, time, and social class.

The paper's original contribution is an integrated framework — *the displacement of harm* — that synthesises these three lines into a single analytic decomposing reorganisation along three axes: spatial, temporal, and social. Pairwise integrations of these registers exist; what the tri-axial integration uniquely enables is the identification of *covariance* between the three axes, named here *triple coincidence*. The framework is operationalised through a case study of electric vehicles and their extractive supply chains, with a second illustrative application to voluntary carbon offset markets in Section 10.3. The remainder of the paper is organised as follows. Section 2 reviews the relevant literatures and specifies the gap, including the framework's specific point of departure from Brand and Wissen's (2021) imperial mode of living. Section 3 develops the integrated theoretical framework. Section 4 sets out methodology. Sections 5 to 7 analyse, respectively, sustainability as governmentality, the political economy of green capitalism, and the limits of technological substitution. Section 8 presents the EV case study. Section 9 articulates the displacement-of-harm framework, including its decolonial and indigenous correctives. Section 10 concludes with implications for theory and policy.

II. Literature review

The contemporary literature on sustainability and capitalism is organised around four principal positions, supplemented by parallel literatures on environmental governance and risk redistribution. The Brundtland formulation — development meeting present needs without compromising future generations — provided the lingua franca through which environmental concern was reconciled with growth (WCED, 1987), and its diffusion through the Rio process and the Sustainable Development Goals institutionalised a framework in which environment, economy, and equity are treated as co-equal pillars to be balanced through technical adjustment (Sachs, 2015). The framework has succeeded in mainstreaming environmental considerations across multilateral and national policymaking; its analytical limitation is that constitutive trade-offs are managed rather than confronted (Banerjee, 2003), with the development pillar treated as a necessary condition rather than as an object of inquiry. Ecological modernization theory (Mol, 2001; Mol & Spaargaren, 2000) emerged as a sociology of how advanced industrial societies might restructure production through innovation, regulation, and reflexive governance, illuminating the policy mixes that produced declines in air pollutants, ozone-depleting substances, and the carbon intensity of GDP across OECD economies. Its limitation is methodological: it tends to study the territories in which modernization succeeds and to bracket the ecological costs of those territories' supply chains, with the result that the imported metabolic flows of advanced economies are systematically under-represented (Wiedmann et al., 2015).

A third literature, broadly critical-political-economic, examines green capitalism as a regime of accumulation organised through the climate-policy infrastructure itself. Bumpus and Liverman (2008) characterised carbon markets as accumulation by decarbonization; Lohmann (2009) showed how carbon accounting transforms incommensurable practices into tradable units; Newell and Paterson (2010) traced the construction of climate capitalism as a coherent political project; Böhm, Misoczky and Moog (2012) argued that

the greening of capitalism reproduces, rather than supersedes, the contradictions Marx identified between the rhythms of accumulation and the rhythms of nature. This work draws on metabolic-rift analysis recovered by Foster (1999) and developed by Foster, Clark and York (2010) and Moore (2015). The degrowth literature (Kallis et al., 2018; Hickel, 2020; Hickel & Kallis, 2020; Parrique et al., 2019) makes the strongest claim: that absolute decoupling of GDP from material throughput at the rate required for safe-climate compliance is empirically unprecedented and theoretically implausible. Its strength is the insistence that the question of aggregate scale not be displaced by efficiency arguments; its limitation, for present purposes, is that the disaggregated analytic of *how* harm is reorganised within green growth remains under-developed.

A parallel governmentality literature — Hajer (1995), Castree (2008), Bakker (2010), and the broader corpus on neoliberal environments (Heynen et al., 2007) — has analysed sustainability as governance, treating its discourse as a productive technology that constitutes problems and authorises solutions, with indicators, audits, and certification regimes operating as technologies of conduct (Rose, 1999). Its strength is conceptual precision about how governance works; its limitation is its development in relative isolation from the political-economic literature on green capitalism. Beck's risk-society thesis (Beck, 1992, 2009) emphasises that the production of wealth in late modernity is systematically accompanied by the production of risk, and that environmental risks tend to migrate downward and outward — toward poorer populations, later generations, and less politically organised geographies. The insight is foundational, but the framework was developed before the consolidation of climate governance as an industry; its application to specific contemporary policy instruments requires updating.

2.1 The gap addressed by this paper

Across these literatures a recurring pattern is visible. Each frames a partial account: governmentality describes how sustainability operates as governance but not how it relates to accumulation; political-economy critiques describe accumulation but not the granular distribution of harms; risk-society analysis describes redistribution but predates the current sustainability infrastructure; degrowth specifies the macro problem but not the meso operation. *Pairwise* integrations exist and are well-developed: governmentality has been read together with political-economic critique in the neoliberal-natures literature (Castree, 2008; Heynen et al., 2007); metabolic-rift analysis has been extended to extractive geographies in world-ecology and political-ecology scholarship (Moore, 2015; Dunlap & Jakobsen, 2020); Beck's risk-society thesis has been linked to climate governance (Beck, 2009). The gap addressed here is therefore not the absence of integration in general, but the absence of a tri-axial synthesis that treats governance, accumulation, and risk as jointly productive of a single, decomposable phenomenon: the displacement of harm along spatial, temporal, and social axes.

What the tri-axial integration enables analytically — and what each pairwise treatment does not — is the identification of *covariance* between the three axes of displacement. A governmentality reading of carbon accounting will identify how lifecycle boundaries make manufacturing-stage emissions less visible than use-phase emissions; this is a finding about the form of governance, not about who bears what cost. A metabolic-rift reading of EV supply chains will identify the spatial concentration of extraction in lithium and cobalt territories; this is a finding about the structural driver, not about its temporal or social profile. A risk-society reading will identify class-stratified vulnerability; this is a finding about the resulting distribution, not about its institutional production. The integrated framework allows the further observation that these findings are not independent. The same accounting boundary that makes manufacturing-stage emissions weakly visible at the level of indicator simultaneously makes the geography of those emissions weakly visible, *and* makes the social distribution of their costs weakly visible. The three displacements are produced by a single institutional architecture and are therefore systematically correlated: the strategies performing best on use-phase metrics tend to be precisely those that displace cost most extensively on the spatial and social axes. This covariance — what Section 9.4 names *triple coincidence* — is invisible to each register taken separately, and it is the framework's principal analytical contribution. It justifies treating displacement as a unified phenomenon rather than as three loosely related side-effects.

The closest precedent for the integrated diagnosis advanced here is Brand and Wissen's (2021) account of the imperial mode of living, which traces how the social and ecological costs of consumer lifestyles in the global North are systematically externalised across class, geography, and time. The framework presented here departs from theirs in one specific respect: where Brand and Wissen locate the integration at the level of consumption norms and the political compromises that stabilise them, the displacement-of-harm framework locates it at the level of the institutional architecture of sustainability accounting — the lifecycle boundaries, jurisdictional inventories, valuation conventions, and audit categories through which decarbonisation is rendered legible to policy. The covariance claim of triple coincidence is correspondingly more specific than that of the imperial mode of living: the three displacements are not merely co-occurring features of an externalising lifestyle but are jointly *produced* by a single accounting apparatus, with the analytical implication that they are jointly modifiable through changes to that apparatus. This shift from a sociology of consumption to an institutionalism

of accounting distinguishes the present synthesis from prior integrative diagnoses, and it specifies a tractable target for evaluative critique that Brand and Wissen's more societal-systemic framing leaves indeterminate.

This gap is not merely scholastic. Operationally, sustainability policy is evaluated against indicators that are themselves the product of governance choices: lifecycle boundaries, accounting conventions, time horizons, jurisdictional scope. A framework that names what those choices systematically obscure — and the systematic *correlation* between what they obscure on the spatial, temporal, and social axes — is a precondition for more honest policy evaluation.

III. Theoretical framework

3.1 Foucault: governmentality and the conduct of conduct

The most useful Foucauldian resource is the lectures on governmentality (Foucault, 2007, 2008), in which power is reconceived as a productive force that operates through the shaping of conduct rather than primarily through prohibition. Governmentality designates the rationalities and techniques by which populations are made governable: the construction of fields of intervention, the indicators that render those fields visible, and the technologies — audit, certification, target-setting — through which conduct is calibrated. Biopolitics, on this account, is the regime that takes life itself as its object. Sustainability discourse fits this register with unusual precision. It does not primarily prohibit; it produces. It produces objects (carbon budgets, ecosystem services, transition pathways), subjects (the responsible consumer, the green firm, the climate-vulnerable migrant), and procedures (lifecycle assessment, ESG disclosure, just-transition consultation), establishing a continuous gradient of evaluation along which conduct is adjusted. Governmentality is not a synonym for repression: a great deal of substantive environmental work is done within its frame. The question is what it forecloses, and how.

3.2 Marx: accumulation and the metabolic rift

The Marxian register supplies the structural analysis of why displacement is durable rather than incidental. Capital, for Marx (1976, 1981), is value in motion: a process whose continuation depends on the appropriation of socio-ecological inputs and the disposal of socio-ecological wastes. Foster (1999) recovered Marx's concept of the metabolic rift to designate the systemic disjuncture between the rhythms of capitalist production and the rhythms of ecological reproduction. Foster, Clark and York (2010) extended this into a systematic account of how the rift is reproduced and shifted across geographies. Moore (2015) reframed the question as one of cheap nature — the appropriation of unpaid socio-ecological work[5] — and Malm (2016) demonstrated, historically, that the choice of fossil fuels was the product of class struggle over the temporality and geography of production. The convergent claim is structural: capital cannot internalise its full ecological cost while remaining capital. Sustainability strategies operating within accumulation accordingly relocate, rather than eliminate, the externalities they target. The metabolic rift is not closed by green capitalism; it is geographically redistributed.

3.3 Beck: risk and the redistribution of harm

Beck's *Risk Society* (1992) supplies the third register. Beck argued that, beyond a certain stage of industrial development, the production of wealth is systematically shadowed by the production of risk, and that the distribution of risk operates by a logic distinct from the distribution of wealth. Risks of late modernity — radiation, persistent organic pollutants, cumulative climate change — are characterised by long latency, delocalisation, and invisibility to ordinary perception. Beck's later work (2009) extended the analysis to a global scale, arguing that climate risk renders methodological nationalism untenable as a basis for political theory. The risk-society framework illuminates a feature of displacement that the Foucauldian and Marxian registers, taken alone, do not foreground: the *temporal* and *cognitive* properties of the harms involved. Many of the costs displaced by green capitalism are diffuse, slow, and difficult to attribute. They migrate not only between places and between social classes but between calendrical horizons; they exceed the time of policy cycles and the time of corporate accounting.

3.4 Integration: three registers, one analytic

The three registers are sometimes presented as competitors. They are better treated as complementary lenses on a single phenomenon. Governmentality clarifies the *mode* of operation: how sustainability constitutes its objects and shapes conduct. Marxian analysis clarifies the *driver*: why, given accumulation, displacement is the path of least resistance. Risk-society analysis clarifies the *form* of the resulting distribution: where harms migrate and why they are difficult to perceive. Read together, these registers ground the displacement-of-harm framework. Governance produces the categories that make displacement unproblematic at the level of indicator

[5]Moore's (2015) cheap-nature formulation is contested in some readings; for an alternative emphasising the socio-natural specificity of energy regimes rather than a generalised cheapness, see Malm (2016).

(Foucault); accumulation imperatives produce the pressure ensuring displacement is the dominant strategy (Marx); risk dynamics determine the geography and temporality of the resulting reorganisation (Beck). Each axis of displacement to be analysed below — spatial, temporal, social — receives illumination from each of the three registers, but no single register would suffice on its own. The integration is the analytical contribution.

The integration also has methodological consequences. Each register supplies its own preferred mode of evidence: governmentality is best evidenced through discourse analysis of policy texts and accounting conventions; metabolic-rift analysis through the political economy of supply chains and material-flow data; risk-society analysis through epidemiology, climate science, and geographies of vulnerability. The framework adopted below treats these forms of evidence as complementary, with the displacement analytic functioning as a translation device between them. A policy intervention can be examined as text (what does it constitute?), as flow (what does it materially require?), and as distribution (whose vulnerabilities does it heighten or redistribute?). A finding that holds across all three registers is correspondingly more robust.

A potential objection should be acknowledged. The three theorists sit in different — at moments incompatible — philosophical positions. The framework here does not require their reconciliation at that level. It uses each register *operationally*: governmentality as a method for analysing how sustainability constitutes its objects, the rift concept as a structural account of why displacement is durable, and risk redistribution as a description of the resulting pattern. The three registers are integrated at the level of the explanandum, not at the level of philosophical foundation.

IV. Methodology

The paper is a critical-conceptual study supplemented by a focused case study. This combination is appropriate for two reasons. First, the principal contribution is theoretical: the development and operationalisation of the displacement-of-harm framework. Concept development requires sustained engagement with the existing theoretical literature, careful specification of analytical categories, and demonstration of how those categories generate purchase on empirical material. Second, the framework is intended to be empirically usable. A case study, even a focused one, provides a discipline of concreteness that prevents conceptual drift. The critical-conceptual approach is well-established for theory-building work in environmental humanities and political ecology, exemplified by Hajer's (1995) discourse-analytic study of ecological modernization and Castree's (2008) conceptual reconstruction of neoliberal natures.

The methodological approach has three components. The first is *discourse analysis*: a critical reading of sustainability discourse including IPCC and IEA reports, EU and national green-policy documents, corporate sustainability disclosures, and the secondary scholarly literature interpreting them. The focus is on how problems are framed, which categories are made central, which boundaries are drawn around the unit of analysis, and which costs are systematically located outside the frame. The second is *secondary empirical analysis*: a synthesis of secondary empirical material on the political ecology of green technology supply chains, including lifecycle assessments and case-study research from political ecology and extractive-industries scholarship (Lèbre et al., 2020; Sovacool, 2019; Dunlap, 2018). The third is *theoretical synthesis*: integration of governmentality, metabolic rift, and risk society into the displacement framework described in Section 3. No primary data was collected and no ethical approval was required.

A reflexivity note is in order. The framework's principal theoretical inheritance is European critical theory: Foucault, Marx, Beck, and the Anglophone scholarship developed in dialogue with them. This inheritance equips the framework to analyse the institutional architectures of sustainability accounting and the structural drivers of accumulation, but it has corresponding limitations. It tends to treat displacement as a feature of an abstracted capitalist modernity rather than as a continuation of historically specific colonial and racialised geographies of extraction; it underweights the place-based ecological knowledge held by communities at the supply-chain peripheries; and its categorical apparatus — core, periphery, externality, frontier — is itself a product of the colonial epistemic order it is deployed to critique. Section 9 addresses these limitations not by appending an indigenous-and-decolonial corrective but by threading their corrections into the axis definitions themselves: Section 9.2 reframes the temporal axis as bidirectional in light of Whyte's (2020) account of cumulative colonial environmental change, and Section 9.5 consolidates and extends the corrective work that the axis definitions have already begun.

Three further limitations are noted. The absence of original primary fieldwork limits the granularity of empirical claims; readers requiring strong attribution of specific harms to specific localities should consult the cited primary literature. The focus on a single principal case (EVs), supplemented by a briefer second illustration (voluntary offsets in §10.3), does not establish that the framework generalises across all green-capitalism instruments. The paper is written in a critical register and aims to produce conceptual clarity rather than detailed policy evaluation; it identifies where harms are concentrated but does not, in itself, propose detailed remedial instruments.

V. Sustainability as governmentality

5.1 The constitution of measurable objects and subjects

Climate governance is mediated by an apparatus of measurement: greenhouse-gas inventories, carbon footprints, temperature targets, biodiversity indices, ecosystem-service valuations. Each of these is a productive technology in the Foucauldian sense: it does not record an antecedent reality but renders an aspect of socio-ecological process governable by giving it a form that policy can address. The choice of metric is consequential. Tonnes of CO_2-equivalent privilege gases over land use; territorial accounting privileges production over consumption; lifecycle assessment is bounded by methodological choices about scope, allocation, and time horizon. None of these choices is neutral; each constitutes the field of governance differently.[6] A worked example: consumption-based carbon accounting (Wiedmann et al., 2015) consistently revealed that wealthy importing economies were responsible for a substantially higher share of global emissions than territorial inventories suggested. The finding was technically robust and politically marginal; it did not displace territorial accounting from international policy. The reason is not that consumption-based accounting is wrong but that it implies a different distribution of responsibility, and the existing apparatus was constituted around the territorial frame.

Sustainability discourse simultaneously produces a recognisable typology of subjects: the responsible consumer who manages their footprint, the green firm that discloses its emissions, the vulnerable population that receives adaptation finance. Each subject position carries a corresponding repertoire of conduct, technologically mediated by the apparatus of measurement and disclosure that allows the subject to recognise themselves as such (Rose, 1999). The political consequence is asymmetric. Subject positions in Global North consumer economies are constituted around choice, optimisation, and disclosure; those in Global South extractive economies are constituted around vulnerability, eligibility, and adaptation. The repertoires of agency available to each are different in kind, not merely in degree — an asymmetry reproduced in international fora not because participants act in bad faith but because the categories themselves are organised around it.

5.2 Audit and the technologies of conduct

The proliferation of audit and disclosure regimes — ESG ratings, sustainability reporting frameworks, certification schemes for sustainable palm oil, green sovereign bonds — operates as a technology of conduct: behaviour is shaped by the production of comparable, monitorable performance scores. These instruments have substantive effects, sometimes desirable. They also exhibit a characteristic governmentality property: they make some forms of harm legible and others systematically illegible. What governance can see depends on what it has chosen to measure. When audit captures Scope 1 and 2 emissions but treats Scope 3 as voluntary, large categories of harm fall outside the score. When biodiversity offsetting valorises restoration in one place against destruction in another, the units of comparison are constituted by the methodology rather than discovered by it. The governmentality reading is not that sustainability indicators are arbitrary; they reflect, often well, important aspects of socio-ecological process. The claim is that they reflect those aspects through choices that have political content, and that the same apparatus producing substantive outcomes — air-quality regulation, ozone protection, emission-intensity targets — also produces, through its categorisations, the conditions under which displacement registers as success. The Foucauldian register thus identifies *how* displacement becomes invisible at the level of governance: through the constitution of categories that bound the field of view. The political-economic register identifies *why* the categories are bounded that way.

VI. The political economy of green capitalism

6.1 Accumulation, the rift, and uneven geographic development

The displacement of environmental harm is not the product of poor measurement. It is the path of least resistance for a mode of production whose reproduction depends on the appropriation of socio-ecological inputs and the disposal of socio-ecological wastes. Capital, Marx (1976, 1981) argued, treats the conditions of its own reproduction as exogenous; the cost of restoring those conditions is socialised, displaced in time, or deferred altogether. Foster's (1999) recovery of the metabolic rift demonstrated that this dynamic was Marx's diagnosis of nineteenth-century soil exhaustion: nutrients extracted from the countryside accumulated as urban waste rather than returning to the land. What changes across capitalist eras is not whether socio-ecological reproduction is displaced but where it is displaced *to*. In the present conjuncture, the rift is reproduced in a new geographic register: decarbonisation in advanced economies depends on supply chains that materialise extraction, refining, manufacturing, and waste in other geographies. Capitalist accumulation has long been organised through uneven geographic development — cores and peripheries produced together by the dynamics of capital flow, labour markets, and state formation (Smith, 1984; Harvey, 2003). The IEA's analysis of critical-minerals supply (IEA,

[6]The territorial / consumption-based accounting distinction is a methodological choice, not a controversy at the level of physical accounting. See Wiedmann et al. (2015) for the production-trade-consumption decomposition.

2021, Executive Summary; Chapter 1) draws an explicit comparison between the present concentration of refined production for several transition minerals — notably cobalt, lithium, and rare earths, where top-three producer shares of refined output range between approximately 75 and 90 per cent — and the concentration of petroleum supply during the height of OPEC's market leverage in the 1970s. The comparison is offered analogically rather than as a strict quantitative equivalence; the underlying point — that the supply geography of the transition is markedly more concentrated than that of fossil energy in the late twentieth century — is robust across mineral categories. Green industrial policy in core economies is, structurally, a demand-side intervention into a global resource map whose supply geography is concentrated, contested, and historically organised by extractive capital.

6.2 Unpaid socio-ecological work and the financialisation of the transition

Moore's (2015) reformulation of metabolic-rift analysis foregrounds the role of unpaid work — both the unpaid reproductive work performed by humans and the unpaid work performed by ecosystems. Capitalism, on this account, depends on the appropriation of cheap nature: cheap food, cheap energy, cheap labour, cheap raw materials. Each historical frontier of cheap nature is exhausted in turn, requiring the opening of new frontiers. The transition-metals frontier — lithium brines under the Atacama, cobalt in the Congolese Copperbelt, nickel in Indonesian laterites — is the most recent. Empirical work on these frontiers consistently identifies a triad of socio-ecological costs: heavy water demands in arid territories (Bustos-Gallardo et al., 2021); occupational hazard and child labour in artisanal mining sectors (Sovacool, 2019, 2021); and forest loss and tailings management challenges in tropical laterite operations (Lèbre et al., 2020). These are not aberrations; they are the predictable signature of accelerated demand intersecting with weak regulatory capacity and historically organised extractive territories. A further mechanism specific to the contemporary moment is the financialisation of climate policy. Green bonds, sustainability-linked loans, and the ESG asset universe channel capital toward sustainable projects, but the evaluation criteria tend to be those that financial markets can monitor: disclosed emissions, certifications, ratings (Christophers, 2022). Material flows escaping these categories are correspondingly under-valued in financial decision-making. Bumpus and Liverman's (2008) accumulation by decarbonization describes the resulting dynamic: climate-policy infrastructure becomes a site for the construction of new asset classes, with the trajectory of the transition shaped by the requirements of financial valuation rather than by the requirements of ecological reproduction. The political-economic register thus identifies the structural reason that governance categories tend to bound the field of view in ways that make displacement invisible: the institutional architectures within which policy operates are organised around forms of legibility that systematically exclude unmeasured costs.

VII. Technological substitution and its limits

7.1 Substitution as displacement

A common rejoinder is that critical analysis understates the rate of technological progress: solar PV has fallen in cost by an order of magnitude in two decades; battery costs have fallen comparably; grid management has been reorganised to absorb variable renewables. Why should we not expect technological substitution to drive throughput, and therefore harm, downward over time? Empirical studies of the relationship between alternative-energy expansion and fossil-fuel consumption have repeatedly found that the former does not, on average, displace the latter at scale. York (2012) demonstrated, across countries, that increases in non-fossil electricity production were associated with comparatively small reductions in fossil consumption. York and Bell (2019) generalised the argument: historical energy transitions have, in aggregate, more often added than substituted. Smil (2017) makes the same point on longer historical scales. The mechanism is partly the Jevons paradox: efficiency gains lower the unit cost of energy services and tend to expand the scale of those services. Net harm reduction from technological substitution is therefore conditional on demand-side dynamics that the technology itself does not determine. Adjacent technologies illustrate the same dynamic. Carbon dioxide removal is treated, in many integrated assessment models, as an effectively unconstrained future flow that brings 1.5°C pathways into reach (IPCC, 2022, Chapter 4); the treatment is technically defensible but politically consequential, permitting present emissions on the assumption of future removal and thereby displacing harm temporally.

7.2 Boundary effects and conditions for benign substitution

A second limit is methodological. Lifecycle assessments typically draw their boundaries around the use phase of a product. Improvements in the use phase — for instance, the elimination of tailpipe emissions — register strongly while the displacement of emissions to the manufacturing phase registers weakly, particularly when manufacturing emissions are concentrated in jurisdictions with carbon-intensive grids. The numerical result is a real net improvement, but a smaller one than headline comparisons suggest, and one whose distribution is geographically and socially specific. Figure 2 below illustrates this for the EV/ICE comparison. A more careful framework would specify the conditions under which substitution reduces harm rather than relocating it. These include integration of consumption-based accounting with production-based accounting; convergence of supply-

chain and use-phase regulation; demand-management instruments alongside supply-side substitution; and explicit attention to the geographic and social distribution of manufacturing-stage costs. None of these are technically inaccessible. Their absence is a political-economy fact, not a technical one. The substitution debate is thus not a debate between optimists and pessimists about technology. It is a debate about the conditions under which technological gains are translated into harm reduction, and the institutional mechanisms that determine those conditions.

VIII. Case study: electric vehicles and extractive supply chains

Electric vehicles function as a paradigmatic case for the displacement framework because they exhibit, simultaneously and clearly, all three displacement axes — spatial, temporal, social — while also delivering genuine aggregate climate benefits. The case demonstrates the framework's analytical purchase: an honest evaluation must hold the gain and the displacements in the same field of view.

8.1 The aggregate case for EVs

Lifecycle assessments converge on a substantial net benefit for battery electric vehicles relative to comparable internal combustion engine vehicles, with the magnitude of the benefit depending on grid mix, battery chemistry, and assumed lifetime mileage. Bieker (2021), in a comparative LCA covering medium-segment 2021 passenger cars in Europe, reports lifecycle emissions of approximately 251 gCO_2e/km for a gasoline ICE and approximately 91 gCO_2e/km for the comparable BEV running on the projected average European grid over the vehicle lifetime — a reduction of approximately 63 per cent (Bieker, 2021, Figure 6). The IEA (2024, Chapter 4) reports a globally averaged figure closer to 50 per cent lower lifecycle emissions for BEVs relative to comparable ICE vehicles, with regional variation depending principally on grid carbon intensity. Figure 2 below adopts the Bieker (2021) European medium-segment values to illustrate the stage-by-stage decomposition.[7] Air-quality co-benefits in urban environments are additional and substantial.

[FIGURE 2 INSERT HERE]

Figure 2. Lifecycle greenhouse-gas emissions of medium-segment European passenger cars (2021 registration), gasoline ICE vs battery electric vehicle, decomposed by stage (vehicle manufacturing, battery manufacturing, fuel or electricity production, tailpipe combustion, end-of-life). Values: ICE ≈ 251 gCO_2e/km; BEV ≈ 91 gCO_2e/km on the projected average European grid mix over a 240,000 km lifetime — a reduction of approximately 63 per cent. Source: Bieker (2021), ICCT White Paper, Figure 6.

8.2 The supply chain and its concentration

The supply chain that delivers this benefit is concentrated. Lithium production is dominated by Australia (mineral concentrate), Chile and Argentina (brine), and increasingly China; refining is concentrated in China. Cobalt production is dominated by the Democratic Republic of the Congo, with significant artisanal mining contributions (Sovacool, 2019). Nickel for battery applications has expanded rapidly in Indonesia and the Philippines via laterite operations (Lèbre et al., 2020). Battery cell manufacturing is concentrated in China, Korea, and Japan, with Europe and North America building capacity. The IEA (2021) Critical Minerals analysis documents top-three producer shares for refined cobalt, lithium, and rare-earth output in the range of approximately 75 to 90 per cent — a level of concentration the IEA itself compares analogically with petroleum supply during the period of OPEC's market leverage.

8.3 Spatial, temporal, and social displacement

The spatial axis is exhibited directly. Use-phase emissions are reduced in the consuming geography (typically OECD cities) while manufacturing-stage emissions and non-GHG environmental costs are concentrated in extractive and processing geographies. Lithium brine extraction in the Atacama region intersects with severe water scarcity and indigenous land claims; the operations have been documented to depress aquifer levels in already arid territories (Bustos-Gallardo et al., 2021). Cobalt extraction in the DRC is associated with documented occupational hazards, child labour in informal sectors, and limited revenue capture by host populations (Sovacool, 2019, 2021). Nickel laterite operations in Indonesia have been associated with deforestation, marine sedimentation, and air-quality impacts from coal-fired processing (Lèbre et al., 2020). None of these costs is

[7]Bieker (2021, Figure 6) reports a lifecycle GHG of approximately 251 gCO_2e/km for medium-segment 2021 European gasoline ICE passenger cars, and approximately 91 gCO_2e/km for the comparable BEV running on the projected average European grid over a 240,000 km lifetime — a reduction of approximately 63 per cent. The IEA (2024, Chapter 4) reports a globally averaged reduction closer to 50 per cent, varying primarily with grid carbon intensity.

captured by use-phase metrics; non-GHG costs (water, biodiversity, labour) are systematically under-represented in standardised LCAs.

The temporal axis is exhibited in the disjuncture between the moment of climate benefit and the moment of certain costs. Battery-manufacturing emissions are produced in advance of vehicle use and offset depends on cumulative mileage achieved over the vehicle's life. Mine tailings and waste streams from extraction operations have governance and remediation horizons measured in decades; battery end-of-life infrastructure is, as of the mid-2020s, only partially operational at the scale required (IEA, 2024, Chapter 4). The temporal asymmetry is structural: the consumer benefit is immediate; significant cost components are deferred or distributed across decades. The social axis is exhibited in the distribution of beneficiaries and bearers. Beneficiaries of cleaner urban air, reduced fuel costs, and access to government EV subsidies are disproportionately middle- and upper-income households in OECD jurisdictions. Bearers of supply-chain costs are disproportionately mining-region populations, informal workers, and indigenous communities in resource-rich territories whose participation in the design of the transition is structurally limited (Bridge, 2009; Dunlap & Jakobsen, 2020).

8.4 What honest evaluation looks like

Read against the displacement framework, the EV case yields three observations. First, the aggregate climate benefit is genuine and should not be denied. Second, that benefit coexists with a structural reorganisation of costs across all three displacement axes. Third, conventional sustainability accounting is configured to make the gain visible while making important components of the displacement invisible. The framework suggests several adjustments to honest evaluation. Lifecycle assessment should be supplemented by extended environmental and social-impact assessment that includes water, biodiversity, and labour metrics in extraction territories as comparable terms in the evaluation rather than as appendices. Attribution should distinguish between gross emissions reductions and net displacement; transparency about the geography of the latter is a precondition for democratic deliberation about transition design. Distributional analysis — who benefits, who bears, on what timeline — should be a routine component of green-policy evaluation rather than a specialist concern.

IX. The displacement of harm: a framework

This section consolidates the framework. Displacement of harm names a specific operation: the reorganisation, rather than elimination, of the ecological and social costs of capitalist production through governance, market, and technological mechanisms. The operation is decomposed along three axes — spatial, temporal, social — each with characteristic mechanisms, indicators, and analytical questions.

[FIGURE 1 INSERT HERE]

Figure 1. The displacement of harm: three axes of analytical decomposition. The framework integrates Foucauldian governmentality (mode of operation), Marxian metabolic-rift analysis (structural driver), and Beckian risk redistribution (form of distribution) along spatial, temporal, and social axes. Triple coincidence — the systematic covariance of displacement across all three axes — is produced by a single institutional architecture of sustainability accounting.

9.1 The spatial axis

The spatial axis describes the displacement of harm between geographies. Its principal mechanisms include supply-chain restructuring, in which the manufacturing and extraction stages of green goods are concentrated in jurisdictions whose regulatory and political-ecological conditions diverge from those of the consuming jurisdiction; carbon-accounting boundaries, where territorial inventories under-record the ecological footprints of import-dependent economies (Wiedmann et al., 2015); and offset trading, in which mitigation in one geography is debited against emissions in another (Lohmann, 2009; Bumpus & Liverman, 2008). The analytical question is straightforward: where, geographically, does the harm associated with this strategy occur, and how does that geography compare with the geography of benefit?

9.2 The temporal axis

The temporal axis describes displacement between calendrical horizons. Its mechanisms operate in two directions, forward and backward. Looking forward, displacement migrates toward later horizons through carbon dioxide removal assumptions in integrated-assessment modelling that permit present emissions against assumed future removals (IPCC, 2022, Chapter 4); the long latency of cumulative warming, in which present emissions produce warming on horizons that exceed the timeframes of mitigation policy; durable waste streams whose remediation horizons exceed the lifetimes of the institutions authorising their production; and infrastructural lock-in, where decisions about transport, urban form, and energy systems made in the present constitute the demand profile of subsequent decades. Looking backward, the temporal axis is reframed by Whyte's (2020) account of indigenous climate justice, which characterises climate change as the continuation rather than the initiation of a cumulative colonial environmental transformation: for many indigenous and customarily land-tenured

communities, climate vulnerability is not a future risk against which present strategies are weighed but the latest sediment in a layered history of colonial environmental change, in which an ecological transformation as profound as anything the climate-vulnerability literature anticipates has already been effected by prior cycles of dispossession. On this reading, what the framework tends to register as deferred future burden is, for some constituencies, sedimented past loss, and the temporal asymmetry of displacement runs not only between present consumer benefit and later cost but between the periodisation of policy and the periodisation of those whose dispossession provided the conditions under which the policy operates. The analytical question is correspondingly bidirectional: when, in time, is the harm associated with this strategy incurred — including in time already elapsed — and how does that timing compare with the timing of benefit?

9.3 The social axis

The social axis describes displacement between social groups. Its mechanisms include class-stratified consumption of green-premium goods, where access to lower-emission consumption is mediated by income; the geographic-class compounding of this stratification with the spatial axis; intra-jurisdictional displacement, in which the costs of green infrastructure fall disproportionately on already marginalised communities (Brand & Wissen, 2021); and intergenerational redistribution, in which the costs of long-latency harms are borne by populations that did not authorise their production. The analytical question is who benefits, who bears, and how the social distribution of benefit and cost relates to the existing distribution of socio-economic and political power.

9.4 Triple coincidence: the covariance argument

The three axes are analytically distinct but empirically entangled. A characteristic pattern observable in the EV case — and in many adjacent cases — is what may be called *triple coincidence*: a strategy benefits a present, geographically core, socio-economically advantaged constituency while displacing harms onto temporally distant, geographically peripheral, socio-economically disadvantaged constituencies. The triple coincidence is not coincidental. It reflects the political-economic dynamics analysed in Section 6: actors with greater political weight have greater capacity to shape the boundary conditions of the evaluation, with the result that *winning* strategies are systematically those whose costs fall outside the field of view of the winning constituencies. The analytical force of the framework lies precisely in this covariance claim. Each register taken alone identifies one direction in which harm migrates; only the integrated tri-axial framework reveals that the three migrations are not independent but jointly produced by a single institutional architecture of accounting boundaries, valuation regimes, and jurisdictional frames. This is what justifies treating displacement as a unified phenomenon rather than as three loosely related side-effects, and what distinguishes the contribution from prior pairwise integrations.

9.5 Decolonial and indigenous correctives

The framework's principal theoretical inheritance is European critical theory, and the temporal-axis discussion in Section 9.2 has already begun to absorb the corrections that indigenous and decolonial scholarship require. This section consolidates and extends those corrections, treating them as constitutive of the framework rather than supplementary to it.

The first such corrective comes from indigenous environmental scholarship, exemplified by Coulthard's (2014) account of grounded normativity. On Coulthard's reading, what European theory describes as a structural displacement of harm is, on indigenous land, frequently the continuation of a settler-colonial dispossession that long predates the climate-policy infrastructure and whose logic is not adequately captured by the metabolic-rift or risk-society vocabularies. Grounded normativity — the system of obligations and reciprocal relations between people and place that constitutes indigenous political life — is precisely what the spatial axis of displacement, as deployed in conventional analysis, fails to register. The lithium brines of the Atacama and the cobalt territories of the southern DRC are not, on a Coulthardian reading, neutral *zones of extraction* into which transition demand is projected; they are inhabited landscapes whose human and non-human relations are constitutive of indigenous and customary political orders, and the disruption of those relations is a category of harm that GHG and water-stress metrics cannot represent.

The second is decolonial scholarship, exemplified by Grosfoguel's (2011) analysis of the coloniality of power and its ecological dimensions. Grosfoguel situates the spatial axis within a longer history in which the constitution of *the South* as a zone of ecological appropriation predates and conditions the supply-chain politics of the present transition. The categories through which European critical theory analyses the global economy — core, periphery, externality, frontier — are themselves products of the colonial epistemic order they are deployed to critique. These literatures sharpen the displacement framework in three ways: they give historical depth to the spatial axis, which the rift concept tends to flatten into a generic structural feature of capital; they specify that the social axis is not merely class-stratified but racialised, with bearer constituencies disproportionately drawn from populations whose territories bore the costs of earlier extractive regimes; and they raise a question that European

critical theory raises less directly — whether the bearer constituencies are also, or primarily, the constituencies whose place-based ecological knowledge could inform alternatives to displacement-based transition pathways. These literatures are not optional supplements to the framework presented here but necessary complements to it; the displacement-of-harm analytic is incomplete without them.

9.6 What the framework is not

The framework is not anti-technology: it does not claim that low-carbon technologies are net negative, nor that they should be opposed in principle. It claims that their evaluation should be honest about the structure of their costs. It is not a denial of progress: the history of environmental governance includes substantive achievements — the Montreal Protocol, lead phase-down, the long-run decarbonisation of European electricity systems — that cannot be reduced to displacement. The framework is intended to identify which strategies are robustly net-positive across all three axes and which are net-positive only on one axis at the expense of others. And it is not deterministic: the fact that displacement is the path of least resistance under existing institutional conditions does not entail that it is inevitable. Different boundary conventions, valuation regimes, and participatory designs would produce different distributions. The framework is a diagnostic, not a fatalism.

9.7 Operationalisation

The framework is operationalisable through a checklist that can be applied to any sustainability strategy. For a given intervention: first, what is the evidence of net aggregate benefit, and what is the analytical boundary within which that benefit is calculated? Second, across each of the three displacement axes, where does the strategy reorganise harm? Third, what is the relation between the geography, timing, and social location of benefit and the geography, timing, and social location of cost? Fourth, are the answers to these questions reflected in the formal evaluation criteria of the strategy, or do they appear only in critical literature? The checklist does not, in itself, decide whether a strategy is desirable; it produces the information against which that decision should be made.

X. Conclusion: implications for theory and policy

This paper has argued that contemporary sustainability strategies, considered as a class, do not eliminate the ecological crisis but reorganise the harms associated with it. The reorganisation is decomposable along three axes — spatial, temporal, social — illuminated by the integration of three theoretical registers: governmentality, metabolic-rift analysis, and risk-society analysis. The case study of electric vehicles and their extractive supply chains demonstrates the framework in operation. The principal theoretical contribution is the identification of *triple coincidence*: the systematic covariance of displacement across the three axes, jointly produced by a single institutional architecture of sustainability accounting. The framework's connection to risk-society analysis is direct: each axis instantiates a Beckian mechanism — risks migrate toward less politically organised geographies (spatial), operate over horizons that exceed the time of politics (temporal), and are class-stratified independently of the distribution of wealth (social). What the framework adds to Beck is the specification of mechanism: harm migration is not a metaphysical property of late-modern technology but a tractable consequence of governance categories, accumulation imperatives, and supply-chain configuration, each of which is in principle modifiable.

10.1 Theoretical contributions

The principal theoretical contribution is the integrated framework itself. The three registers are typically deployed in isolation; their integration through the displacement-of-harm analytic provides a synthesising vocabulary that connects governance, accumulation, and risk; an operationalisable decomposition into three specific axes; and a checklist applicable to specific instruments. The framework is intended to be portable beyond the EV case to other green-capitalism instruments — hydrogen pathways, carbon dioxide removal, biofuels, agricultural offsetting — each of which exhibits displacement dynamics the framework can systematise. Section 10.3 below briefly demonstrates the framework's application to a second case, voluntary carbon offset markets, before turning to the limitations of the analysis.

10.2 Policy implications

Several implications for policy follow. Each is analytically tractable but politically constrained, and each is at present only partially instantiated.

Evaluation criteria should be widened to include consumption-based accounting alongside territorial accounting; lifecycle assessment that integrates non-GHG metrics; and distributional analysis as a standard rather than specialist component. The principal obstacle is institutional: territorial accounting is the basis on which Nationally Determined Contributions are calibrated under the UNFCCC, and net-importing economies have a structural reason to resist a recalibration that would redistribute headline responsibility. Partial instantiation exists in the European Union's Corporate Sustainability Reporting Directive, which requires double-materiality and

value-chain disclosure, and in the EU Carbon Border Adjustment Mechanism, which introduces a partial consumption-side logic at the trade border for selected sectors.

The governance of green industrial policy should be linked to the governance of the supply chains it activates, with binding mechanisms for environmental and social-impact accountability in producing geographies — not as a bilateral aid programme but as a constitutive element of the transition framework. The principal obstacle is that domestic industrial policy is increasingly justified on competitiveness and economic-security grounds, which work against binding upstream accountability since the latter raises input costs and constrains strategic flexibility. Partial instantiation exists in the EU Battery Regulation (2023), which mandates due-diligence reporting for cobalt, lithium, nickel, and graphite supply chains; in the EU Corporate Sustainability Due Diligence Directive (2024); and at the soft-law level in the OECD Due Diligence Guidance for Responsible Mineral Supply Chains.

Demand-side interventions — urban form, mode shift, sufficiency policy — should be developed alongside supply-side substitution; the technological-substitution-only frame is one of the conditions under which displacement becomes invisible. The principal obstacle is electoral and discursive: sufficiency politics lacks an organised constituency in growth-committed democracies, and consumer-choice framings tend to position demand-side intervention as illegitimate paternalism. Partial instantiations are scattered, ranging from Japan's Top Runner efficiency programme to mode-shift targets embedded in EU member-state climate plans and contested mobility- and agriculture-restriction measures in the Netherlands and France, but no major jurisdiction yet treats sufficiency as a constitutive policy lever.

Just-transition programmes should be designed transnationally rather than purely nationally; the bearers of supply-chain costs are systematically located outside the jurisdictions that capture transition benefits. The principal obstacle is the methodological nationalism of climate finance and the asymmetric donor-recipient framing through which transnational climate transfers are organised, both of which make binding accountability across jurisdictions politically expensive for funders and politically suspect for recipients. Partial instantiation exists in the Just Energy Transition Partnerships negotiated with South Africa, Indonesia, Vietnam, and Senegal from 2021 onward, and in the operationalisation of the UNFCCC Loss and Damage Fund agreed at COP28; both remain modest in scale and contested in design, but they indicate that the direction is institutionally tractable rather than utopian.

10.3 A second illustration and the limits of single-case demonstration

The framework's portability beyond the EV case is suggested most clearly by voluntary carbon offset markets, which exhibit the same tri-axial signature in arguably starker form. Spatially, offset accounting permits emissions in consuming geographies — typically corporate purchasers in OECD jurisdictions — to be debited against sequestration claims in producing geographies, predominantly forest- and land-use projects in the global South (Bumpus & Liverman, 2008; Lohmann, 2009). Temporally, the present-tense permission to emit depends on sequestration over horizons of decades, against which permanence is contingent on project continuity, monitoring integrity, and the absence of fire or land-use reversal — a structural asymmetry between immediate benefit and contingent future cost reinforced by integrated-assessment models that treat large negative-emissions flows as effectively unconstrained (IPCC, 2022, Chapter 4). Socially, the implementation of REDD+ and adjacent land-based offsetting schemes has been documented to concentrate dispossession on pastoral, forest, and customary-tenure communities, whose tenure systems are imperfectly registered in the property frameworks against which offset projects are constituted (Beymer-Farris & Bassett, 2012; Fairhead, Leach & Scoones, 2012). Triple coincidence operates here through the offset architecture itself: additionality tests, baseline conventions, project boundaries, and permanence assumptions are jointly calibrated to render credits economically viable, with the consequence that tightening any one of them along the spatial, temporal, or social axis would erode the credit volumes the architecture is designed to produce. The displacements are not aberrations of the instrument but constitutive features of its accounting.

The argument has further limitations. It is conducted at the level of framework rather than detailed instrument design; the policy implications above are directions rather than blueprints. The two cases (EVs and voluntary offsets) demonstrate the framework's purchase across both a technological-substitution instrument and a market-mechanism instrument, but a fuller programme would test it across hydrogen pathways, engineered carbon dioxide removal, biofuels, and agricultural offsetting. The paper does not attempt to quantify cross-axis displacement; methodologies for such quantification are an open research programme. The engagement with indigenous and decolonial scholarship in Sections 9.2 and 9.5 is intended as a constitutive correction to the framework's primarily European theoretical inheritance, but it is a beginning rather than a substitute for fuller treatment; further work would draw more deeply on indigenous, decolonial, and Sinophone literatures on extraction, environment, and ecological knowledge whose contributions would substantially deepen the analysis offered here.

10.4 Closing

The ecological crisis is not, on the diagnosis offered here, a problem of insufficient technology or insufficient market design. Both are necessary conditions of any plausible response, and there is real progress on both fronts. The crisis is also, however, a problem of the categories through which environmental harm is rendered legible to political and economic decision-making. As long as those categories systematically obscure the displaced costs of the transition, the appearance of progress in core economies will continue to coexist with the intensification of harm at the supply-chain peripheries that those economies depend upon. The displacement-of-harm framework is offered as one contribution toward making those costs visible — and, on that basis, governable.

References

[1]. Bakker, K. (2010). *Privatizing water: Governance failure and the world's urban water crisis*. Cornell University Press.
[2]. Banerjee, S. B. (2003). Who sustains whose development? Sustainable development and the reinvention of nature. *Organization Studies, 24*(1), 143–180.
[3]. Beck, U. (1992). *Risk society: Towards a new modernity*. Sage.
[4]. Beck, U. (2009). *World at risk*. Polity.
[5]. Beymer-Farris, B. A., & Bassett, T. J. (2012). The REDD menace: Resurgent protectionism in Tanzania's mangrove forests. *Global Environmental Change, 22*(2), 332–341. https://doi.org/10.1016/j.gloenvcha.2011.11.014
[6]. Bieker, G. (2021). *A global comparison of the life-cycle greenhouse gas emissions of combustion engine and electric passenger cars* (White Paper). International Council on Clean Transportation.
[7]. Böhm, S., Misoczky, M. C., & Moog, S. (2012). Greening capitalism? A Marxist critique of carbon markets. *Organization Studies, 33*(11), 1617–1638. https://doi.org/10.1177/0170840612463326
[8]. Brand, U., & Wissen, M. (2021). *The imperial mode of living: Everyday life and the ecological crisis of capitalism*. Verso.
[9]. Bridge, G. (2009). Material worlds: Natural resources, resource geography and the material economy. *Geography Compass, 3*(3), 1217–1244. https://doi.org/10.1111/j.1749-8198.2009.00233.x
[10]. Bumpus, A. G., & Liverman, D. M. (2008). Accumulation by decarbonization and the governance of carbon offsets. *Economic Geography, 84*(2), 127–155. https://doi.org/10.1111/j.1944-8287.2008.tb00401.x
[11]. Bustos-Gallardo, B., Bridge, G., & Prieto, M. (2021). Harvesting lithium: Water, brine and the industrial dynamics of production in the Salar de Atacama. *Geoforum, 119*, 177–189. https://doi.org/10.1016/j.geoforum.2021.01.001
[12]. Castree, N. (2008). Neoliberalising nature: The logics of deregulation and reregulation. *Environment and Planning A, 40*(1), 131–152. https://doi.org/10.1068/a3999
[13]. Christophers, B. (2022). Fossilised capital: Price and profit in the energy transition. *New Political Economy, 27*(1), 146–159. https://doi.org/10.1080/13563467.2021.1926957
[14]. Coulthard, G. S. (2014). *Red skin, white masks: Rejecting the colonial politics of recognition*. University of Minnesota Press.
[15]. Dunlap, A. (2018). 'A bureaucratic trap': Free, prior and informed consent (FPIC) and wind energy development in Juchitán, Mexico. *Capitalism Nature Socialism, 29*(4), 88–108. https://doi.org/10.1080/10455752.2017.1334219
[16]. Dunlap, A., & Jakobsen, J. (2020). *The violent technologies of extraction: Political ecology, critical agrarian studies and the capitalist worldeater*. Palgrave Macmillan.
[17]. Fairhead, J., Leach, M., & Scoones, I. (2012). Green grabbing: A new appropriation of nature? *Journal of Peasant Studies, 39*(2), 237–261. https://doi.org/10.1080/03066150.2012.671770
[18]. Foster, J. B. (1999). Marx's theory of metabolic rift: Classical foundations for environmental sociology. *American Journal of Sociology, 105*(2), 366–405. https://doi.org/10.1086/210315
[19]. Foster, J. B., Clark, B., & York, R. (2010). *The ecological rift: Capitalism's war on the earth*. Monthly Review Press.
[20]. Foucault, M. (2007). *Security, territory, population: Lectures at the Collège de France, 1977–1978* (G. Burchell, Trans.). Palgrave Macmillan.
[21]. Foucault, M. (2008). *The birth of biopolitics: Lectures at the Collège de France, 1978–1979* (G. Burchell, Trans.). Palgrave Macmillan.
[22]. Grosfoguel, R. (2011). Decolonizing post-colonial studies and paradigms of political-economy: Transmodernity, decolonial thinking, and global coloniality. *Transmodernity: Journal of Peripheral Cultural Production of the Luso-Hispanic World, 1*(1), 1–37.
[23]. Hajer, M. A. (1995). *The politics of environmental discourse: Ecological modernization and the policy process*. Oxford University Press.
[24]. Harvey, D. (2003). *The new imperialism*. Oxford University Press.
[25]. Heynen, N., McCarthy, J., Prudham, S., & Robbins, P. (Eds.). (2007). *Neoliberal environments: False promises and unnatural consequences*. Routledge.
[26]. Hickel, J. (2020). *Less is more: How degrowth will save the world*. William Heinemann.
[27]. Hickel, J., & Kallis, G. (2020). Is green growth possible? *New Political Economy, 25*(4), 469–486. https://doi.org/10.1080/13563467.2019.1598964
[28]. International Energy Agency. (2021). *The role of critical minerals in clean energy transitions* (Executive Summary; Chapter 1). IEA.
[29]. International Energy Agency. (2024). *Global EV outlook 2024* (Chapter 4). IEA.
[30]. Intergovernmental Panel on Climate Change. (2022). *Climate change 2022: Mitigation of climate change* (Working Group III contribution to AR6, Chapter 4). Cambridge University Press.
[31]. Kallis, G., Kostakis, V., Lange, S., Muraca, B., Paulson, S., & Schmelzer, M. (2018). Research on degrowth. *Annual Review of Environment and Resources, 43*, 291–316. https://doi.org/10.1146/annurev-environ-102017-025941
[32]. Lèbre, É., Stringer, M., Svobodova, K., Owen, J. R., Kemp, D., Côte, C., Arratia-Solar, A., & Valenta, R. K. (2020). The social and environmental complexities of extracting energy transition metals. *Nature Communications, 11*, 4823. https://doi.org/10.1038/s41467-020-18661-9
[33]. Lohmann, L. (2009). Toward a different debate in environmental accounting: The cases of carbon and cost-benefit. *Accounting, Organizations and Society, 34*(3–4), 499–534. https://doi.org/10.1016/j.aos.2008.03.002
[34]. Malm, A. (2016). *Fossil capital: The rise of steam power and the roots of global warming*. Verso.
[35]. Marx, K. (1976). *Capital: A critique of political economy, vol. 1* (B. Fowkes, Trans.). Penguin. (Original work published 1867)
[36]. Marx, K. (1981). *Capital: A critique of political economy, vol. 3* (D. Fernbach, Trans.). Penguin. (Original work published 1894)
[37]. Mol, A. P. J. (2001). *Globalization and environmental reform: The ecological modernization of the global economy*. MIT Press.

[38]. Mol, A. P. J., & Spaargaren, G. (2000). Ecological modernisation theory in debate: A review. *Environmental Politics, 9*(1), 17–49. https://doi.org/10.1080/09644010008414511
[39]. Moore, J. W. (2015). *Capitalism in the web of life: Ecology and the accumulation of capital*. Verso.
[40]. Newell, P., & Paterson, M. (2010). *Climate capitalism: Global warming and the transformation of the global economy*. Cambridge University Press.
[41]. Parrique, T., Barth, J., Briens, F., Kerschner, C., Kraus-Polk, A., Kuokkanen, A., & Spangenberg, J. H. (2019). *Decoupling debunked: Evidence and arguments against green growth as a sole strategy for sustainability*. European Environmental Bureau.
[42]. Rose, N. (1999). *Powers of freedom: Reframing political thought*. Cambridge University Press.
[43]. Sachs, W. (2015). *Planet dialectics: Explorations in environment and development* (2nd ed.). Zed Books.
[44]. Smil, V. (2017). *Energy and civilization: A history*. MIT Press.
[45]. Smith, N. (1984). *Uneven development: Nature, capital, and the production of space*. Blackwell.
[46]. Sovacool, B. K. (2019). The precarious political economy of cobalt: Balancing prosperity, poverty, and brutality in artisanal and industrial mining in the Democratic Republic of the Congo. *The Extractive Industries and Society, 6*(3), 915–939. https://doi.org/10.1016/j.exis.2019.05.018
[47]. Sovacool, B. K. (2021). When subterranean slavery supports sustainability transitions? Power, patriarchy, and child labor in artisanal Congolese cobalt mining. *The Extractive Industries and Society, 8*(1), 271–293. https://doi.org/10.1016/j.exis.2020.11.018
[48]. WCED [World Commission on Environment and Development]. (1987). *Our common future*. Oxford University Press.
[49]. Whyte, K. (2020). Too late for indigenous climate justice: Ecological and relational tipping points. *WIREs Climate Change, 11*(1), e603. https://doi.org/10.1002/wcc.603
[50]. Wiedmann, T. O., Schandl, H., Lenzen, M., Moran, D., Suh, S., West, J., & Kanemoto, K. (2015). The material footprint of nations. *Proceedings of the National Academy of Sciences, 112*(20), 6271–6276. https://doi.org/10.1073/pnas.1220362110
[51]. York, R. (2012). Do alternative energy sources displace fossil fuels? *Nature Climate Change, 2*, 441–443. https://doi.org/10.1038/nclimate1451
[52]. York, R., & Bell, S. E. (2019). Energy transitions or additions? Why a transition from fossil fuels requires more than the growth of renewable energy. *Energy Research & Social Science, 51*, 40–43. https://doi.org/10.1016/j.erss.2019.01.008