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### Climate change, fossil fuels, and the energy transition in the Global South

*Governance pathways to leave fossil fuels underground*

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## **8 Conclusion: policy pathways to LFFU**



*“Hegemony is like a pillow: it absorbs blows and sooner or later the would-be assailant will find it comfortable to rest upon.”*  
Robert W. Cox (1983, p. 173)

## 8.1 Introduction: North-South and LFFU

In this thesis the history of climate governance across North-South has been defined as a history of cumulative injustices (Gupta, Chen, McDonnell, et al., 2025), among which the ones related to defining and sharing the carbon budget, accounting for stranded resources and assets, and mitigation approaches and their link to fossil fuel distribution are the most vivid (see Chapter 3). The most vulnerable, poor, and marginalised in the Global South and the South within the North, those least responsible and least able to cope, are already experiencing the impacts of fossil-fuelled climate change: risks to food security (i.e., agricultural production could decrease between 2%-4% in 2030 and 2050 respectively, with almost 600 million people at risk of hunger in 2030), health (e.g., the climate-related damage could exceed USD 2 billion by 2030), and water resources (e.g., in Africa more than 50 million may face water stress) and increases in extreme rainfalls and heatwaves (Adom, 2024; J. Arrighi et al., 2025; IPCC, 2018; Narayan & Kuhl, 2025; Otto et al., 2024).

Fossil fuels are the cornerstone of Global North’s hegemony: in a manifestation of historical and ongoing global power asymmetries, the Global North bears the primary responsibility for cumulative emissions and the shaping of the world economy based on fossil capital (Malm, 2016a, 2016b): the Global North accounts for 92% of excess of CO<sub>2</sub> emissions (1850-2015) and 74% of excess material use (1970-2017)<sup>120</sup> relative to its fair share (Hickel, 2020; Hickel, O’Neill, et al., 2022). Fossil capital, however, does not accumulate in a vacuum: Global North-driven imperialism, (neo)colonialism, and extractivism condition how the Global South can navigate an energy transition and climate change (Carbon Brief, 2023; Hickel, Dorninger, et al., 2022; Rammelt & Ylla-Catala, 2025). The concentration of wealth (76% of it owned by the richest 10%) continue to structure North-South relations and fuel emissions (the richest 10% contributes to 50% of global annual emissions) (Chancel et al., 2022; Özekin, 2024). This concentration of wealth and power is both the cause and the outcome of capitalist market logics embedded in the colonial appropriation that made it possible in the first place (Bhambra & Newell, 2023). Hegemony is then enacted by the fossil fuel historical bloc not only materially and coercively – through asymmetries in capital, finance, technology and infrastructure – but also ideationally and consensually, in defining the dominant narratives of the transition, through developmental idealism (Falzon, 2023; Thornton et al., 2015), and accommodating Global South’s aspirations, as long as they do not threaten capital accumulation. By deflecting costs and responsibilities over the South, Global North’s hegemony continues to shape the ‘rules of engagement’ in climate governance.

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<sup>120</sup> Extraction, production, consumption and waste.

While the South faces impacts and loss and damage, the fossil fuel historical bloc, represented by the “Norths” in both Global North and Global South, is collectively planning even more fossil production, exceeding 1.5°-consistent levels by more than 120% (SEI et al., 2025). It is therefore worth reiterating that to stabilise the Earth System the vast majority of fossil fuels must be left underground (Trout et al., 2022; Welsby et al., 2021). Global North governments’ persistent failure to meet pledges and halt, let alone reduce, fossil fuel production implies steeper future declines to compensate and comply with the Paris Agreement (Gupta, Chen, McDonnell, et al., 2025; SEI et al., 2025): between 2015 and 2024, Global North countries contributed only USD 280 billion in grant-equivalent climate finance, allowing fossil companies to make over USD 1.3 trillion in profits (the same amount of the new collective quantified goal on climate finance to achieve annually by 2035; UNFCCC, 2025b), while without US, Canada, Australia, and Norway, which increased hydrocarbon production by 40% since 2015, global production *fell* (Oil Change International, 2025). Current events reinforce this responsibility avoidance. By end-October 2025, only 67 countries have submitted their NDC 3.0 (Climate Action Tracker, 2025; UNFCCC, 2025a). The US is on the brink of a second withdrawal from the Paris Agreement, while the European Union, divided on its collective climate goal, has yet to submit its NDC one month before COP30 (Weise & Guillot, 2025).

A critical account of climate politics and governance must therefore shift focus from the Global North’s leadership claims, and re-centre the Global South’s agency, as a space of greatest vulnerability, but decisive for global decarbonisation and fossil fuel supply’s fate, and a site of contestation, resistances, and alternative imaginaries for a just transformation. Recalling Cox’s words at the beginning of this chapter, hegemony is like a pillow. The Global South is at a crossroads: comfortably rest upon it or challenge its cushions to reshape its own trajectory.

For these reasons, this thesis set out to understand the role of LMICs in the energy transition, focusing on phasing out fossil fuels in just and equitable ways (see 2.4). Throughout the chapters, this study addressed the three main knowledge gaps (1.2.2): the energy transition and stranded assets in LMICs (KG1), the power dynamics and potential agents of change embedded in the energy transition, discussing the constraints posed by North-South power dynamics and fossil fuel incumbents (KG2), and the (technical, economic and political) feasibility and necessity of leapfrogging and energy transformation (KG3).

This concluding chapter addresses the overarching question and related sub-questions:

***What dilemmas do low- and middle-income countries (LMICs) face in LFFU and promoting renewable energies, how have these dilemmas evolved over time, and how can alternative narratives and agents of change be mobilised to promote inclusive development agendas?***

- a. *Which types of institutional settings, relationships, incentives, and narratives shape LMICs governments' responses to the dilemmas in the energy transition? How have these changed over time?*
- b. *How have LMIC governments' policies addressed the energy transition's dilemmas over time, and which actions have been successful, and which have not? Why?*
- c. *Which actors, powers, and narratives can be mobilised to redesign the policies and incentives to LFFU, address the dilemmas, and promote inclusive development?*

I first synthesise the findings of the research to populate the conceptual scheme outlined in 2.5 and answer the sub-questions (8.2); I then answer the overarching question (8.3), develop four speculative scenarios (8.4) and consequently identify a set of conditions for LFFU in LMICs (8.5), followed by personal reflections as epilogue (8.6).

## **8.2 Synthesis: the political economy of energy transitions in the Global South**

This thesis examined how the global political economy of climate change, energy governance, and development strategies intersect in shaping fossil fuel trajectories in the Global South. Climate change politics remain structured by enduring North-South asymmetries, increasingly fragmented by Global South's internal heterogeneity and by the agency of Global South States, coalitions, and movements. The conceptual scheme developed in Section 2.5 helps trace the dynamics analysed throughout the Chapters and reveals how global asymmetries, active and proactive actors, and competing narratives combine to produce hegemonic policy redesign that preserves fossil fuels, or counter-hegemonic reconfigurations towards a just transformation for LFFU.

### ***LMICs***

Global South countries were identified as geographic-geoeconomic South, historically marginalised and subordinated countries (Chapter 3), and operationalised as being LMICs and non-Annex I (Chapter 5 and 6), to shed light on the dilemmas they face between climate change and fossil fuel-based development (see 8.3). The thesis identified passive and proactive actors within this group, either governments, NOCs, or malleable energy coalitions (Chapters 5, 6 and 7). Among the mostly passive actors are major producers such as OPEC countries (e.g., Algeria, Iran, Iraq) or non-OPEC established and prospective producer countries (e.g., Argentina, China, India, Indonesia, Mozambique, Uganda), which are heavily involved in current or future fossil development (Chapters 5 and 6). NOCs, pillar of fiscal budgets, national identities, formal employment, and often the biggest company in these countries, follow profit-seeking mandates that increase asset stranding exposure (see below) and as such, represent the organic tie between States and fossil capital: despite their claims (Chapters 5, 7, and below), the largest 250 oil and gas companies (including NOCs like Petrobras, Ecopetrol, YPF, Pertamina, Sonatrach) own about 1.42% of global operational RES capacity, representing 0.13% of their total primary energy extraction (Llaverro-Pasquina

& Bontempi, 2025). Conversely, some countries show a more proactive stance (e.g., China, Brazil, Colombia, and some LDCs, see Chapters 5 and 6). While common challenges are present (see drivers below), the analysis of fossil reserves, production and infrastructure (Chapter 6) uncovers that fossil fuel involvement in LMICs is deeply heterogeneous, shaped by distinct political-economy conditions.

### ***Drivers***

Through Chapter 3-7, different drivers act on LMICs in a fragmented global energy transition. As international and indirect drivers, a GDP-growth consensus/obsession develops within neoliberal capitalist structures, influenced by colonial legacies and developmental idealism (see 3.2.5; Falzon, 2023), and affects national and direct drivers that push for fossil expansion and extractivism. Indeed, financial constraints dictated by a historically subordinated position in the global financial architecture materialise in higher cost of capital and indebtedness (see 4.4.1) that, (a) limit RES deployment in the Global South; and (b) paired with higher profitability of FF (fossil capital accumulated a record-high profit of USD 916 billion in 2022; Semieniuk et al., 2025), exacerbate a vicious cycle of fossil expansion and increased indebtedness (sovereign and FF-related): fossil fuels provide greater capacity to borrow and revenues from exports, nurturing increased reliance on those revenues for debt servicing (Steadman et al., 2023). Directly and nationally, dependency on imported fuels, competitiveness in global markets, rising energy demand, hydrocarbon projects ownership structures and FF-for-debt build an underestimated stranding risk in terms of labour, assets (with related debt) and potential revenue shortfall of USD 9 trillion (-60% of expected revenues across Asia, Africa and Latin America; Chapters 4, 7; Coffin et al., 2021).

### ***Policy context***

These drivers shape the policy context of climate and energy governance, which still embodies a quintessential North-South problem. Northern actors (governments, corporations, international institutions, and the elites in the geographic South) set the terms of discussion, and their historical overuse of the carbon budget and reluctance to operationalise the CBDRRC principle have shaped an international climate policy context marked by (i) lower-than-expected climate finance (e.g., the USD 100 billion per year by 2020 materialised only in 2022; Chapter 3); (ii) increasing carbon inequality (e.g., LDCs reserves amount to only 5.79% of the global richest 1%'s cumulative emissions over 1990-2019; Chancel et al., 2023); and (iii) a liberalised and privatised energy transition with unjust outcomes in the South (e.g., in Mozambique, Madagascar and Philippines; Chapter 4). At the country level, the context is characterised by governance gaps (e.g., institutional capacity, limited data collection and systematisation, weak participation of stakeholders, policy and regulatory coordination, centralisation versus decentralisation) and an accelerated but concentrated RES deployment (Chapter 4), in which market-driven promotion policies support its additive feature and exacerbate extractivism (Chapters 5 and 7). In parallel, fragmented and opaque hydrocarbon

governance frameworks (i.e., types of contracts, EIAs, licenses, and revenue management, Chapter 7) shape ownership structures of extraction assets (Chapter 5) and facilitate FF promotion schemes (e.g., subsidies 5-13 times higher than those for RES in Brazil and Argentina, tax breaks) that lower break-even prices for expensive unconventional production (i.e., fracking in Argentina, deep-water extraction in Brazil; Chapter 7). The resulting overall policy context is then an energy system in which fossil and renewable systems coexist, deepening carbon lock-in, but in which some instruments (e.g., EIAs, NDCs, no-exploration pledges) are object of contested redesign (i.e., politically disputed reforms of instruments).

### ***Fossil narratives and hegemonic redesign***

The fossil fuel historical bloc mobilises resources to justify fossil expansion, resisting (i.e., coercion) and accommodating (i.e., consent) challenges to its hegemony. Southern States and Northern actors, given the drivers and policy context, harness the RtD as an instrument of *passive revolution* (Chapters 4, 5, and 6), accommodating legitimate demands for development while preserving fossil fuels as the engine of capital accumulation. Another tactic is depicting gas as a transition fuel (Chapters 4, 5 and 7), which underpins *trasformismo* in a tripartite fashion (i.e., gas for substituting more pollutant fuels; gas as the ideal partner for RES in power generation; and, in the form of LNG, as the ideal commodity to get revenues for development and the transition), co-opting RES and defusing their counter-hegemonic potential. LMICs' diverse political-economic realities underpin qualitatively distinct fossil-based RtD rationales (Chapter 6), related to different options for FF use – full, fair, developmental, or rational use. While the full use option relates to the *geopolitical right*, the *long-run right* is situated between the full use and the fair use. The *pure right*, involving LDCs, is about the developmental use, while a rational use option may underpin the *short-run right*. These are differently articulated depending on domestic political factors, and support FF-narratives that legitimise continued extraction. Chapter 7 showed some of these articulations: a *short-run right* and full FF use in Argentina to get foreign exchange, investments, and revenues for debt servicing; a *geopolitical right* and fair-share use in Brazil, mobilised through technological neutrality and “sweet oil” to get revenues for development, or a *short-run right* and rational use in Colombia, justified through energy security concerns, employment, and fiscal and macroeconomic stability. Developmentalist arguments (revenues for structural change, or industrialisation) rest on flawed claims about revenues for the transition or “development”, reinforcing the extractive imperative and denialist discourses (e.g., Brazil, Argentina). These claims are flawed since revenues are highly concentrated, lack transparent management, and are rarely reinvested in productive sectors, often being diverted to debt repayment. As a result, the bloc enacts an *hegemonic redesign*: the mobilisation of discursive and material/institutional resources (i.e., lobbying, obstructionism to loosen regulatory frameworks and climate governance; Chapter 7) allows tactical readjustments that feed back into a policy context even more

favourable to fossil fuels, with outcomes such as energy addition, diversified lock-ins (Chapter 5), hedging strategies (DeBoom, 2025), and divide-and-conquer tactics in climate governance that reduces pressure to Northern actors to take the lead (Chapter 3).

### ***Agents of change***

However, hegemony is not monolithic nor contested, and the State represents simultaneously an agent for fossil expansion and a potential lever for transformation (Chapter 5 and 7). At the international level, historically marginalised countries (AOSIS members,<sup>121</sup> LDCs and notably Colombia) are socialising anti-fossil fuel norms (e.g., the FF non-proliferation treaty; FF NPT, 2025a; van Asselt & Green, 2023). The three cases analysed in Chapter 7 identified a series of agents of change: multi-scalar meta-coalitions (Salmi et al., 2024) of civil society organisations, social movements, think tanks, leaders, policy entrepreneurs within the State and actors in labour movements, that mobilise (limited) material resources across scales to contend certain instruments (e.g., EIAs and NDCs) and expose the historical bloc's flawed arguments, in a process of counter-hegemony building. Through litigation, advocacy and direct engagement with institutions (e.g., legislative monitoring), some coalitions press governments to operationalise just transitions and phase-out (e.g., Brazil), others use evidence-based advocacy, research and litigation in subnational areas most affected by climate change impacts and fracking (Argentina) or are currently inside the State apparatus mobilising new narratives (Colombia).

### ***New narratives and counter-hegemonic redesign***

New narratives are mobilised to redefine the terms of the energy transitions, in what can be defined as *counter-hegemonic redesign*, that bolsters decolonising approaches, justice considerations, and inclusive development (Chapter 3). On a systemic level, (i) North-South as a flexible and relational dichotomy depicts a geographical-geo-economic South, a South within the North, and a South within the South, whose alliance across scales could represent a new narrative for infusing decolonising approaches into ESG (Chapter 3); (ii) alternative RtD rationales (the *phase-out right* and the *RtSD*, Chapter 6) are a counter-hegemonic reinterpretation that reframes the RtD to address political economy drivers fuelling fossil expansion; and (iii) a revitalised leapfrogging narrative (WMO et al., 1990) and the costs of action lower than the costs of inaction could enhance instrumental redesign towards LFFU. In the different contexts analysed, agents of change mobilise overarching and comprehensive visions for ecological, social, and economic transformation beyond just replacing energy sources, advancing comprehensive understandings of just energy transitions across governance levels, including workers, affected communities, autonomy, human rights and energy democracy, to address extractivism, colonial legacies, inequality, and climate vulnerability (see 7.5). These

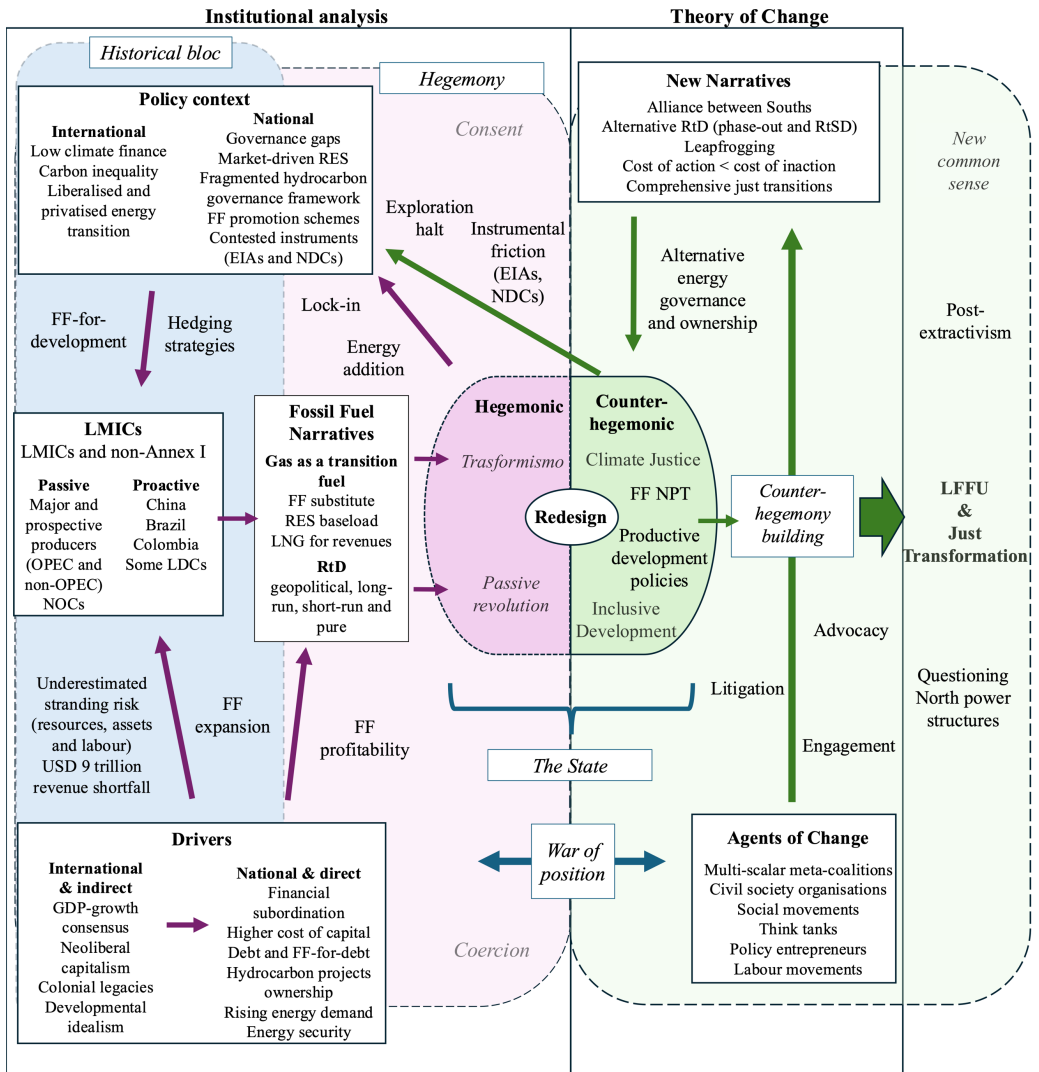
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<sup>121</sup> Few AOSIS members produce fossil fuels, e.g., Trinidad and Tobago, Guyana, and Timor Leste. The latter endorsed the Fossil Fuel Non-Proliferation Treaty (FF NPT, 2025a).

narratives are then embedded in *counter-hegemonic redesign* to address exclusion and political-economic constraints: (i) alternative models of energy governance and ownership (i.e., energy communities in Colombia) enhances ecological, relational and social inclusiveness; (ii) within the State, not awarding licenses can divide the fossil bloc and reduce asset-stranding exposure, strengthening the ecological and relational components and bolstering alternative coalitions; (iii) instrumental friction fostered by actors within the State includes climate criteria into environmental governance (i.e., EIAs) and promotes, in economic planning, revenue diversification and productive development in fossil-dependent regions (e.g., the Just Energy Transition Roadmap in Colombia or the Ecological Transformation Plan in Brazil); and (iv) in international climate governance, agents of change leverage institutional entry points (e.g., courts, State agencies and ministries) to influence the NDCs in implementing COPs decisions (relational and ecological inclusiveness), while some governments openly support a FF NPT (i.e., Colombia). Through a war of position for counter-hegemonic redesign, the identified agents of change are involved in realising the justice and decolonising agenda outlined in Chapter 3: questioning Northern power structures, embedding justice, democracy and inclusiveness at different governance levels, and promoting a sharing narrative within safe and just Earth System boundaries.

Figure 26 repopulates the conceptual scheme (2.5) through the findings discussed throughout the thesis (see the respective Notes on publication).

Figure 26 – Repopulated conceptual scheme



Source: Author.

### 8.3 Overarching conclusions: policy pathways to LFFU in the Global South

The synthesis in 8.2 leads to three conclusions of this thesis, answering the overarching question (8.1). Each of these addresses a different component of the overarching question: dilemmas, their evolution, and the alternatives.

#### Overarching conclusion 1: Dilemmas

**In the Global South, LFFU and RES promotion represent more than a single energy transition.** Considering Global South's heterogeneity, the global (i.e., North-driven) energy transition, when situated in LMICs' contexts, needs to be reframed as *plural energy transitions*, which can be conceptualised as **three interrelated processes** (Foster et al., 2024): an *energy transition*, a *productive transition*, and a *comprehensive just transition*. Indeed, the global energy transition, structured around emissions, decarbonisation and electrification (Chapter 1), and entrusted to private capital, imposes an enormous additional challenge on LMICs: they must decarbonise their energy systems while simultaneously dismantling the resource-based development paths underpinning their economic structures and social imaginaries of development (Alarcón, 2024; Pellegrini, 2018). From this framing, **two sets of dilemmas emerge: the cost of action versus the cost of inaction and the feasibility and risks of leapfrogging.**

Climate change is already causing losses of USD 143 billion per year (Newman & Noy, 2023). When the cost of inaction is interpreted narrowly as stranded-asset exposure and related fiscal, employment and debt risks (see 1.3.2.3), it reveals how asymmetrical temporal and distributional burdens between North and South make the dilemma an intrinsically political-economy problem, driven by fiscal constraints and profitability of fossil extraction relative to alternatives. Indeed, LMICs' interests and exposure to fossil fuel supply vary according to the geographical concentration of reserves, governance capacities, and political economy factors (Chapters 4 and 6). In this context, the classic energy trilemma (i.e., security, affordability, and sustainability) requires adding a fourth dimension (i.e., LMIC-specific socioeconomic and governance constraints), thus becoming a quadrilemma (Lazaro & Soares, 2024). Depending on whether a country is an established or prospective producer, the dilemma manifests differently: decommissioning and diversification for the former and avoiding carbon lock-in for the latter.

These dilemmas are intensified by extractivism, dependence on fossil fuel revenues, balance-of-payments pressures, and subordinated positions in global value chains and financial hierarchies (Ameli et al., 2021). These factors shape LMICs' specialisation in commodities or low-added value goods, with well-known outcomes such as enclave economies, deindustrialisation, the Dutch disease, and debt. Over half of LMICs dedicate on average 15% of government revenue to external debt service, facing adverse refinancing conditions that constrain fiscal space for public or climate policies (Rehbein

et al., 2025; Steadman et al., 2023). Debt distress and high capital costs of capital generate a vicious cycle (climate investment trap; Ameli et al., 2021), leaving little room for manoeuvre in the broader context of financial subordination (Larsen, 2025). Given these adverse circumstances, the dilemma is structurally skewed toward inaction, which in practice manifests as continued or expanding fossil fuel production (Chapter 6). However, for FF-exporting countries structurally dependent on hydrocarbon rents for employment and welfare systems (Chapter 7), continued extraction further increases fiscal vulnerability (Steadman et al., 2023), and asset stranding is a macroeconomic and social risk (Hoffart & Holz, 2024).

The second set of dilemmas surrounds the idea of leapfrogging, which is strictly understood as a techno-economic shift to RES-based systems. This entails seizing opportunities for building a green economy in the Global South and transformative upgrades to productive structures and value chains that have not been previously accomplished (Hochstetler, 2025). In addition, the Weighted Average Cost of Capital in many LMICs (Africa, Latin America, and the Middle East) is higher than in the Global North (Calcaterra et al., 2024), and when comparing it across low- and high-carbon technologies, the cost of capital for the former is higher in the Global South (Ameli et al., 2021). Because RES investments require higher upfront capital costs than fossil fuels, a high cost of capital disproportionately hinders RES rollout in the Global South. Even though RES are economically cost-competitive (Chapter 4), these structural constraints make leapfrogging extremely challenging.

**Policy implication:** the first step to reduce asset stranding exposure is to close the extractive frontier. **LMICs should socialise a “no new fossil” norm** (Green et al., 2024), **operationalised by not awarding exploration licenses.**

Investing in FF today is a future cost of inaction, because emissions are cumulative: delaying mitigation transfers the burden to the future, making action more expensive tomorrow than it is today (Chapter 1). Intuitively, closing the extractive frontier today means foregoing the *potential* market value of fossil fuels, while avoiding higher future costs – economic (emission mitigation), ecological (e.g., biodiversity loss, climate impacts), and social (impacts on society at large) – which, if fully accounted for in the first place, would transform the resource from an asset into a liability. Given the complexity of fully measuring costs and benefits across geographies, timeframes, generations, and historical responsibilities, a justice-based, normative approach focuses instead on the *political* case for a no new fossil norm, mobilising narratives that frame unextracted fossil fuels as climate hazards safely stored (Green et al., 2024; Murphy, 2021b, 2021a). Compared to decommissioning infrastructure, avoiding new extraction is generally more feasible economically, politically, and legally (Green et al., 2024). Strategically, halting exploration can divide incumbents, creating opportunities to gain

allies and alter investment strategies across incumbents, new entrants, sub-industries, and different types of extraction (Chapter 7).

### **Overarching conclusion 2: Dilemmas over time**

**Over time, these dilemmas faced by LMICs in balancing fossil fuels and RES have intensified**, due to escalating climate impacts, market uncertainties, geopolitical reconfigurations, and a global energy transition unfolding under financial subordination. **The result is an energy addition, rather than transition** (*a mid-transition*; Grubert & Hastings-Simon, 2022; York & Bell, 2019),<sup>122</sup> in which **pragmatic settlements alleviate immediate pressures but ultimately exacerbate exposure to asset stranding**.

Across this evolution, capital accumulation has continued to favour fossil fuels. Institutional, regulatory, and policy frameworks in climate and energy governance reward fossil fuel expansion while penalising not-market-driven RES deployment (Chapter 7). Although the vast renewable potential, the declining costs and the opening of electricity markets have indeed allowed RES growth (Chapter 1), incorporation has been partial and path-dependent, since the regulatory frameworks have been designed for fossil fuel-based generation (or baseload), and the disruptive acceleration in RES deployment has not led to an overhaul of electricity markets mechanisms (Chapter 7). Electricity-sector unbundling and liberalisation, inherited from the market reforms of the 1990s, have fragmented electricity governance by entrenching a profit-driven logic (e.g., in Argentina and Colombia) and locked-in thermal generation and associated infrastructure, increasing asset stranding exposure.

It is revealing that in relatively cleaner electricity systems (e.g., Colombia and Brazil), cleanliness derives not from unconventional RES (wind and solar), but from established conventional RES, such as hydropower, vulnerable to climate-related impacts on water and well-known for the socio-environmental injustices to communities (Kumar, 2023; Roquetti et al., 2024). As Christophers (2024) observes, declining RES costs is not the right lens through which to view decarbonisation and electrification, but rather profit. The RES business, compared to FF, is not very profitable, mainly due to electricity markets design, cost structure across time (very high upfront costs, uncertainty of revenues), and continued reliance on subsidies. Financial de-risking mechanisms, referred to as part of the Wall Street Consensus (Gabor, 2021), act as indirect subsidies to the financial sector by reducing investment risks, thereby making RES projects “bankable” (Christophers, 2024).

Furthermore, the RES business in LMICs has come to replicate the extractive and exclusionary patterns of fossil fuels, producing sacrifice zones, socio-environmental conflicts and unjust outcomes, with the paradoxical situation of communities not having

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<sup>122</sup> “[...] a medium-term future where the conventional, fossil-based energy system coexists with a new, zero-carbon energy system. Each imposes operational constraints on the other” (Grubert & Hastings-Simon, 2022, p. 1).

access to energy (Banks & Schwartz, 2023; Castán Broto et al., 2018; Cholibois, 2020; Levenda et al., 2021). The global green economy's demand for strategic minerals, largely driven by the Global North, exacerbates this degradation (Hochstetler, 2025; Riofrancos, 2025), enhancing a 'reloaded' extractivism, across both RES and FF sectors (Alarcón, 2024).

As a pragmatic response to these structural constraints, LMICs have adopted *hedging strategies* (DeBoom, 2025), leveraging fossil fuels to (arguably) finance low-carbon sectors and reposition themselves within a decarbonising world economy (Chapter 5 and 7). China epitomises this contradiction: the undisputed leader in RES (an "electrostate"; Kennedy, 2025), and simultaneously one of the largest fossil fuel producers (Chapter 6). By overlooking LMICs' structural challenges and understood as a mere substitution of energy sources, the mid-transition has not displaced fossil fuel from production and consumption, increasing asset stranding exposure without providing the means to address the implications.

**Policy implication:** the evolution of these dilemmas underscores the need for a second strategic step centred on **productive** (i.e., low-carbon and value-adding) **development and diversification** (i.e., broadening the revenue base beyond fossil fuels dependence). This involves adopting industrial policies that account for Global South's limited autonomy (Larsen, 2025) (i.e., constrained by financing obstacles, imported technologies, and market access) and target existing and prevalent sectors (Hochstetler, 2025), to substitute imports and shift revenue bases away from FF exports. Simultaneously, inclusive instruments (e.g., energy communities) should reframe energy as a common good and provide concrete, productive alternatives for extraction-dependent communities.

### **Overarching conclusion 3: The alternatives**

To mobilise alternative narratives and agents of change towards inclusive development agendas, it is *politically unfeasible to expect the Global South to LFFU without first addressing its structural dilemmas* (Hoffart & Holz, 2024). **Energy transitions that fail to confront historical inequalities, poverty, and vulnerability to climate impacts (conditions rooted in colonial legacies) risk becoming truncated transitions** (Fajnzylber, 1983). **Inclusive agendas must therefore foreground comprehensive just transitions** (see 7.5.2), shifting away from an extractivist paradigm and towards a post-fossil vision of autonomy and justice.

Reframing imaginaries requires political work that mobilises discursive and material resources to redesign instruments that tackle societal demands (see Chapter 7). The RtD, deployed to legitimise extraction, can instead become a vehicle for transformative claims (Chapter 6), if operationalised through instruments such as the EIAs (at the project level) and comprehensive just transitions policies that focus on economic and energy planning for productive development, aligning local demands with structural reforms in finance,

debt and technology. In this sense, LFFU becomes a means of reclaiming autonomy and agency in the global energy transition.

Alternative narratives, however, need to be sustained through multi-scalar meta-coalitions of agents of change (see 8.2). In contexts of political contestation and limited policy space, as the Colombian case shows, coalition-building without broad-based domestic legitimacy can trigger backlash to LFFU policies. Mobilising agents of change therefore requires building broader consensus within society, gaining allies across social groups, and defending spaces within State structures (7.5.2). In a Global South context, it entails also strategically prioritising policies to consolidate a supportive political base.

To undertake this task, engagement with the State cannot be sidelined (see 7.5.1; Newell, 2025). Yet in the Global South, the State is both an arena of contestation and a bounded agent whose policy autonomy is constrained by global financial hierarchies and fossil capital (Babić & Dixon, 2023; Lange, 2015; Larsen, 2024; Newell & Carter, 2024). Despite these constraints, even bounded States can exhibit “green” characteristics by strategically designing, sequencing and adapting interacting policies to build societal support, maximising the limited room for manoeuvre available (Larsen, 2024; Pakizer et al., 2023; Sovacool et al., 2025). Normatively, this points to a **post-fossil transformative State**. Facing bounded autonomy and subordination, such a Gramscian integral State (7.2) is both critical and problem-solving (Eckersley, 2021), fostering new energy systems while phasing out fossil-based ones, and identifying the successive steps with the greatest transformative potential (Eckersley, 2021; Johnstone & Newell, 2018; Silvester & Fisker, 2023). Such a relatively sovereign State can only emerge through deep structural transformations in the world system, which bring significant implications (see 8.4 and 8.5).

Such mobilisation in the Global South inevitably implies gradualism (“building upon the built”) and dealing with contingency and reversibility (Patterson & Paterson, 2024). Broad-based policy frameworks (i.e., Just Energy Transition Roadmaps), long-term planning, and alternative energy governance models such as energy communities can gain legitimacy through experience sharing between countries, subnational governments and civil society at large (an alliance among Souths; 8.2) and the diffusion of equity-based anti-fossil fuel norms (Nazareth et al., 2024). By engaging with NOCs and reorienting their mandate towards public interest, while supporting horizontal instruments such as an FF NPT, transformative States can generate the necessary policy incentives and international support to create policy feedback loops that accelerate *qualitative* leapfrogging trajectories (Sovacool et al., 2025). Ultimately, the transformative potential of State ownership lies in turning the instruments of extractivism into tools for transformation (Ciplet, 2022).

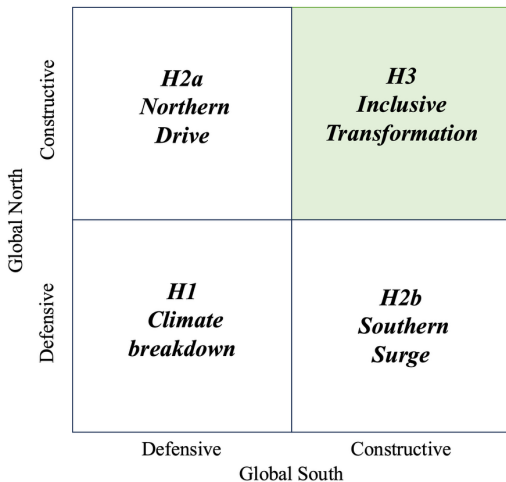
**Policy implication:** mobilising such transformation requires re-politicising energy governance, treating LFFU not only as a technical challenge but as a political project

within and beyond the State. By strategically aligning discursive, coalitional and institutional mobilisation, narratives and agents of change can redefine inclusive development imaginaries making a “realistic climate utopia” possible (Salmi et al., 2024).

### 8.4 What alternatives? Four scenarios laying ahead

Inspired by the Three-Horizon model applied to global environmental change and transformation (Sharpe et al., 2016), which describes H1 as business as usual, H2 as the “messy middle” and H3 as the optimal future, this section speculatively presents four scenarios in global climate and energy governance from 2025, across the tripartite North-South relation (Chapter 3) integrating the key findings and overarching conclusions of this research. Building on Figure 9, Figure 27 illustrates four scenarios based on the defensive or proactive stances of Global North and Global South in climate governance (Gupta, 2000). I further apply the concept of mid-transition (Grubert & Hastings-Simon, 2022) and of climate finance as an onion or an avocado (Cotugno, 2024a, 2024b).<sup>123</sup> Moreover, I reflect on each scenario’s implications in relation to inclusive development (see 2.4.1.4). Scenarios are unpacked as if they were mutually exclusive for concision and sake of the argument, but the dynamics described can overlap, vary in time, and manifest in different scenarios (Sharpe et al., 2016).

Figure 27 – The four scenarios



Source: Author.

#### 8.4.1 Climate breakdown

Both the Global North and South adopt defensive stances, prioritising short-term economic growth, maintaining fossil fuel centrality for capital accumulation (Chapter 5), and actively undermining climate governance. Rising far-right, reactionary, and denialist

<sup>123</sup> Climate finance can be likened to an onion, with a core of public finance, followed by layers of mobilised finance. This includes private finance backed by states or co-financed between states and private institutions, multilateral development bank funding, and mostly private finance. Conversely, an avocado has a hard core – the solid and irreplaceable public finance provided by the North – and a soft and flexible part of private finance.

governments (Chapter 7) deepen Northern disengagement, resulting in issue avoidance, symbolic decisions, and weak and fragmented climate policies (Chapter 3), and minimal RES investment fostering energy addition at best (8.2). Southern countries frame their RtD rationales as *short-run*, *geopolitical* and full-use to justify continued extraction for fiscal stability and debt servicing (Chapter 6). This embodies LMICs' dilemmas that skew incentives towards inaction and mounting stranded-asset exposure (Conclusion 1). The “South” in the North and the “North” in the South also take defensive stances, exacerbating social and political resistance to mitigation (Chapters 3 and 7). The mid-transition phase is mismanaged and tilted towards FF-based systems, with FF subsidies and lock-in, increasing asset stranding exposure. Limited climate finance, if available, targets adaptation under market logics, reflecting the North's historical failure to operationalise the CBDRRRC principle (Chapter 3; 8.1). The limited amount of finance will likely come following an emergency and exclusive agreement in an inter-governmental context, such as at the G20.

### ***Implications***

**Ecological inclusiveness:** Carbon bombs (Chapter 6) are likely to trigger increasing global emissions and more frequent and severe climate-related disasters (e.g., floods, droughts, wildfires, see 1.2), negatively impacting ecosystems and energy infrastructure through rising physical risks (i.e., water scarcity for hydropower and cooling systems for power plants and floods), affecting energy supply and prices.

**Social inclusiveness:** The “Souths” in the North and South suffer from increased multidimensional inequalities (i.e., income, vulnerability and exposure to harm; see 1.2) and limited access to climate finance. Progressive actors in the Global South struggle to drive change due to limited support from the North and domestic political backlash (Chapter 7).

**Relational inclusiveness:** The absence of effective climate finance mechanisms exacerbates exclusion of the Souths. Debt servicing accounts for growing proportions of revenues from exports, fuelling vicious cycles of FF-for-debt (Steadman et al., 2023). As climate change impacts worsen and resources become scarcer, social and geopolitical tensions rise, with economic instability due to fluctuating fossil fuel prices, revenues shortfall (Chapter 4) and environmental damage.

#### **8.4.2 Northern drive**

Northern governments adopt proactive climate policies, investing in RES and financially supporting global initiatives (i.e., through revived EU's climate and transition ambitions, single US states taking the lead, and incremental changes; Gupta, 2000). Global South countries remain defensive, distrustful of Northern leadership (Chapter 3) and constrained by FF structural dependencies and limited institutional capacity (Chapter 4). Mobilising RtD rationales focused on the *short-run* and developmental use, they justify

overinvestment in FF to secure revenues and macroeconomic stability under bounded autonomy (Chapter 7). The mid-transition would likely protract, with uncoordinated decision-making (Grubert & Hastings-Simon, 2022) and major uncertainties related to fossil fuel prices and profitability (8.2). This prolongation reinforces energy addition and hedging strategies in the South (Conclusion 2). Climate finance is structured as an onion, mobilising private investment with public derisking (Gabor, 2021), but, as private-led, insufficient.

### ***Implications***

**Ecological inclusiveness:** Emission reduction is slow, with significant advancements in the Global North but limited improvement in the Global South. Hampered by the lack of action from the Global South, climate change will likely be mismanaged and aggravated (i.e., triggered carbon bombs in the 28 Global South countries identified; Table 12).

**Social inclusiveness:** The South in the Global North benefits from targeted climate finance and policies, supporting governments as inequalities decrease (Chapter 3). However, the South in the Global South faces limited access to resources, and increasing impacts and damage from climate change, exacerbating inequalities.

**Relational inclusiveness:** While the Global North provides financial and technological support, mistrust and defensive stances behind RtD rationales in the South hinder uptake (Chapters 5 and 6). This widens North-South inequalities, increasing risks of climate-induced migration and social unrest in the Global South (see 1.2). As the Norths bring about overshooting as main strategy (Carton & Malm, 2024), narratives around green capitalism, gradualism and energy addition would entail symbolic decisions and exclusion (see 3.4.3).

### **8.4.3 Southern surge**

The Global South adopts a constructive stance, expanding RES and advancing ambitious climate policies, mainly with China's support (i.e., China is projected to account for 60% of global RES capacity deployment in the period 2024-2030; IEA, 2024d), mobilising a leapfrogging narrative (see 5.4.2.5). Global South countries' RtD rationales focus on the potential *phase-out* right or fair-share use, allowing them to justify coordinated fossil reduction while addressing structural constraints (i.e., revenue substitution, debt servicing; Chapter 7). This scenario reflects the potential for counter-hegemonic building in the South and successful mobilisation of agents of change to redesign instruments (e.g., reducing FF subsidies, productive development policies, phase-out plans; Chapter 7). However, without sustained legitimacy, such mobilisation risks reversal and backlash (Conclusion 3). The Global North remains defensive, prioritising its own short-term interests and expanding fossil fuels (Chapter 3; 8.1). Given the North's disengagement, accommodation structures climate finance as a small onion, with multilayered public finance mobilising and derisking private investment.

### ***Implications***

**Ecological inclusiveness:** Emission reductions are significant in the Global South, but slower in the Global North. The mid-transition phase requires policy sequencing (Chapter 7 and 8.3) for adaptative management of coexistent fossil-RES energy systems, with reductions in fossil expansion in the South.

**Social inclusiveness:** The North in the Global South leads global climate initiatives and share successful models with other Southern countries, fostering regional cooperation in managing the socio-economic impacts of the mid-transition affecting the most vulnerable (i.e., productive development, labour reconversion; Chapter 7). Meanwhile, the South in the Global North faces increased multidimensional inequalities and limited access to climate finance.

**Relational inclusiveness:** Leadership shifts towards the Global South, with China playing a key role. Geopolitical tensions rise due to differing climate policies and priorities, with the Global South following a poly-alignment strategy (Alami, 2025). Achieving global climate goals is challenging due to Global North governments' disengagement. The Global South struggles to access to necessary financial and technological support from the Global North, relying on internal and regional climate finance initiatives (Chapter 3).

#### **8.4.4 Inclusive Transformation**

The fourth scenario is the only one that reflects inclusively LFFU. Both the Global North and Global South adopt constructive approaches to address climate change and phase-out, reaching consensus on which action should be undertaken, by whom, and who bears the associated costs, resulting not only in effective climate management but also in a fundamental transformation of the development paradigm (Rammelt & Gupta, 2021). The mid-transition phase is strategically managed through coordinated phase-out plans, with deadlines and provisions both for the Global North (which starts earlier) and South. Compensation mechanisms for Southern fossil-dependent countries and loss and damage are embedded in a revived UN system. The Paris Agreement is fully operationalised, with the Fossil Fuel Non-Proliferation Treaty and other supply-side mechanisms complementing it and easing the mid-transition phase (i.e., revenue substitution, debt-related provisions; 8.3). This configuration represents the mobilisation sequence (narratives-instruments, coalition-building, and institutional embedding through a transformative State) outlined in Conclusion 3. The Global South mobilises *phase-out* RtD rationales to reframe the RtD as a *RtSD* for LFFU (Chapter 6). Climate finance is structured as an avocado, with a core of public finance focused on grants over loans.

### ***Implications***

**Ecological inclusiveness:** Significant worldwide investment in RES infrastructure coupled with supply-side policies drive rapid emission reductions. Effective management

of the mid-transition phase, ensuring a smooth sunset of fossil-based energy systems, results in LFFU inclusively.

**Social inclusiveness:** Comprehensive just transition policies (Chapter 7) are successfully implemented, ensuring just outcomes for all communities (the “Souths” in both Global North and Global South) affected by the shift away from fossil fuels.

**Relational inclusiveness:** The Global North operationalises the CBDRRCC principle, and North-South relations are decolonised in favour of climate justice and sharing resources, within safe and just Earth System boundaries (Chapter 3).

Given the current conjuncture, the most likely scenario is the mid-transition, the messy middle (H2). With the caveats already stressed, in the short- to mid-term, the mid-transition may pivot to the *Southern surge* scenario (H2b), more due to geopolitical conditions and the Global North’s disengagement than clear and effective leadership from the South.

## 8.5 What conditions? LFFU in the Global South

The Inclusive Transformation scenario represents the normative horizon, where LFFU becomes the governing orientation for energy transitions in the context of climate change. For the Global South, LFFU is the most effective strategy to mitigate climate and socio-economic risks while dismantling extractivism and fossil hegemony (8.3). By adopting a proactive stance (Gupta, 2000), Global South countries can show leadership, while demanding the North to assume its accrued Stranded Asset Debt (Rempel, 2023), given that fossil fuel expansion (i.e., stranded assets debt accrual) may constitute a wrongful act under international law (ICJ, 2025). Loosely applying a backcasting logics (Robinson, 1982), a set of interlinked conditions is identified across national (Global South) and international (North-South) levels to promote just and inclusive development trajectories and LFFU in the Global South. These conditions integrate the synthesis (8.2), the three overarching conclusions (8.3) and the scenarios (8.4). If the Global South is to LFFU, this implies that:

(a) At the national level (Global South)

1. Governments sequence domestic policies strategically to build legitimacy and momentum for LFFU (see 7.5.2): closing the extractive frontier (i.e., reducing asset stranding exposure), implementing RES and productive policies (i.e., diversification and labour reconversion, energy efficiency); adopting comprehensive just transition policies (i.e., addressing energy poverty and access, labour reconversion); and decommissioning assets with compensation mechanisms (designed in condition 2).
2. The extreme profitability of fossil fuels (in the trillions; Semieniuk et al., 2025) is progressively reduced through the removal of production subsidies (e.g., several times higher than those for RES) and incentives schemes that lower break-even

- prices for costly production (see Chapter 7), releasing funds for public policies, productive investments for diversification, and RES (linked to condition 6).
3. In the policy sequencing of condition 1, governments, as owners of fossil capital, engage their NOCs (see 7.5.2) to: (i) reorient mandates from profit-maximisation to public-interest considerations, to limit companies' devaluation risks in a decarbonising world and the resulting macroeconomic impacts to the country; and (ii) develop credible decarbonisation plans that demonstrate substantive contributions to global RES capacity (today is less than 2%; Llaverro-Pasquina & Bontempi, 2025).
  4. The profit-driven architecture of energy governance is reconsidered through a de-commodification and de-marketisation of electricity, and alternative models of energy governance and ownership (7.5).
- (b) At the international level (North South)
5. An international financial reform addresses debt and cost of capital through relief, restructuring, or swaps to: (i) ensure convergence of the cost of capital accelerate RES investment in the Global South (see 4.4.1; Ameli et al., 2021; Calcaterra et al., 2024); and (ii) redirect concessional and grant-based financial flows to RES- based energy systems and infrastructure; economic diversification; and just transition (see 7.5.2), rather than new debt accumulation in LMICs (Steadman et al., 2023).
  6. The Global North may have to fully operationalise the CBDRRC principle by (i) reducing fossil fuel production (see 8.1); (ii) scaling up grant-equivalent climate finance from USD 280 billion between 2015 and 2024 (Oil Change International, 2025) to *at least* USD 1.3 trillion per year; and (iii) establishing differentiated phase-out schedules across North-South and stranded assets and resources compensation schemes for Global South countries that face USD 9 trillion shortfall in FF revenues to 2040 (see 4.4.2.1). These resources would support RES investment, energy infrastructure, and comprehensive just transition policies (linked to condition 5).
  7. Climate governance may shift away from private finance logics toward redistributive mechanisms that tax the wealthiest and most responsible of the problem, in both North and South (see 3.4), mobilising the needed finance quantum under condition 6 (Chancel et al., 2025).
  8. Just Energy Transition Partnerships and country platforms (Hadley et al., 2022; Karg et al., 2025) would need to facilitate genuine technology transfer and appropriation in the Global South without adding to debt burdens (linked to condition 5).
  9. Supply-side coalitions and a Fossil Fuel Non-Proliferation Treaty would complement the Paris Agreement, operationalising COP28 decision to transition away from fossil fuels. Incentive mechanisms to couple phase-out with productive diversification may be introduced to include Global South producing countries in these coalitions (see 5.6).

Collectively, these conditions delineate the governance architecture for inclusively LFFU, combining immediate policy redesign with longer-term structural and paradigmatic change. Without such a justice-oriented strategy, the Global South risks remaining locked in extractivism, stranded-asset exposure, and injustice. Conversely, meeting these conditions in a sequenced fashion (as outlined in 8.3) would operationalise the Inclusive Transformation scenario (8.4.4), towards a just inclusive transformation grounded in sharing resources and responsibilities within safe and just Earth System boundaries. However, the evidence suggests that only some elements of these conditions are emerging (e.g., 1, 2, 4, and 9). If the Global North fails to fulfil its obligations, the Global South cannot rely on reciprocity but may enact policies consistent with the *Southern Surge* scenario: strengthening South-South cooperation, designing regional financing mechanisms, and pragmatically sequencing policies to reduce fossil dependence, address climate change impacts, and sustain political legitimacy in the transition.

## 8.6 Epilogue: personal reflections

*“Politics does not reflect majorities, it constructs them.”*  
Stuart Hall (1987)

This thesis aimed to contribute, both theoretically and empirically, to addressing one of the major existential threats of our time. I hope it provokes debate and reflection on recentring the agency of the historically marginalised, to build a more inclusive future across spaces and generations. Yet it would be naive to overlook the depth of unequal power relations involved, a central thread throughout this work. The political struggle ahead is enormous: a battle *against* time, *in* time, and *for* time.

Energy governance remains profoundly elite-centred, underscoring the political weight of elites’ perceptions (Hochstetler, 2020b), but also the instability of asymmetrical power relations (Sovacool & Brisbois, 2019): process tracing offers a means to uncover how such energy orders came into being, and how to transform them (Corral-Montoya et al., 2022; Cox, 1995). During fieldwork, the notion of ‘stranded assets’ was often dismissed as a Northern construct, detached from local realities. While analytically valuable, LFFU debates must be critically decolonised (van Vliet et al., 2025) by foregrounding Southern voices and experiences, to effectively tackle Global South’s concerns. Indeed, a just and inclusive transformation cannot be standardised, it must be grounded in the diverse and lived trajectories that shape the Global South (Foster et al., 2024; Newell, Shankland, et al., 2022). Though not generalisable in a quantitative sense, this research is analytically transferable to contexts characterised by fossil fuel dependency and financial subordination (Lund, 2014; van Vliet et al., 2025).

Energy transitions are then more than substituting energy sources imbued with technocratic ideologies. They are opportunities to redefine our civilisational paradigm

and our relationship with Nature. Transformation, in this sense, emerges *through* political conflict, not *despite* it (Patterson & Paterson, 2024): majorities for a new common sense are not simply ‘out there’, but are the outcome of politics, constructed through tireless political work, organisation and strategy. I hope to have offered at least a glimpse of potential fissures through which such construction could begin: towards the realisation of justice and emancipation, not by manufacturing new needs, but by materialising new freedoms.

As Antonio Gramsci, to whom I intellectually owe much, reminds us, “it is necessary to direct one's attention violently towards the present as it is, if one wishes to transform it. Pessimism of the intelligence, optimism of the will” (Gramsci, 1951, in Gramsci, 1971, p. 175). I hope this guiding principle resonates throughout my work.