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Green economic planning as 'directed entanglement'

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Abstract:

Sustainability transformations depend on ambitious state action. We propose green economic planning as a framework for states to set ambitious climate plans and ensure policy coherence across three dimensions: inputs (sources of information, planning directors, and political regimes), processes (technical expertise and political negotiation), and outputs (monetary-financial, fiscal, and state ownership strategies). To capture how green economic planning works across democratic and authoritarian institutions, we conducted a comparative case study of three countries. France's intersectoral non-green and Denmark's sectoral green planning covers democratic institutions, while China's intersectoral green planning covers authoritarian institutions. Through these cases, we show that 1) green economic planning is both feasible and adaptable across diverse political economies, 2) effective planning requires balancing decentralized information flow with strong central coordination, 3) successful planning depends on managing tensions between autonomous planning agencies, market discipline, and long-term political legitimacy. We term this 'directed entanglement,' positioning it as a cornerstone for the emerging research agenda on green economic planning—a blueprint for navigating the use of the state to steer a green transition under capitalism.

Key words: Green state; economic planning; directed entanglement; China; France; Denmark

Introduction

A consensus is growing that an active state is needed to carry out a systemic green transition (Ban & Hasselbalch, 2025; Gabor & Braun, 2025; Green, 2023). The literature on the 'green state' emphasizes the critical role of state capacity, highlighting institutional strength (Kedward & Ryan-Collins, 2022), financial power (Stiglitz, 2020), private-sector collaboration (Mazzucato, 2021), and adequate designs for industrial policy (Aiginger & Rodrik, 2020, pp. 189–190). Add to this mixture resurgent nationalism and heightened geoeconomic tensions, and the centrality of the state is impossible to ignore (Cha, 2023; Meckling, 2025; Weiss & Thurbon, 2021).

Although policy priorities seem to be shifting away from the climate emergency, the implacable physics of climate reminds us that we are still on a tight schedule for rapid and dramatic emissions reductions (IPCC, 2023). In this regard, scholarship is converging on three major theoretical lenses on state-led green transitions under capitalism: Neo-Schumpeterian disruption (Thurbon et al., 2023), critical macro-finance (Gabor & Braun, 2025), and green industrial policy (Allan et al., 2021). Although these three options support viable reforms within capitalism, they lack the necessary coordination and communication amongst each other to deliver the required scale of emissions reduction and green investments (Brand et al., 2025). One approach to achieving such integration is green planning—a field predominantly influenced by degrowth perspectives—which advocates for the global democratization of political institutions and productive forces as part of a broad ecosocialist project (Durand et al., 2024), a highly improbable political future stretching far ahead of the timeframes that climate science stipulates for staying below catastrophic thresholds.

Green state action under capitalism often relies on liberal assumptions that planning means abandoning capitalism. Most current economic planning research presupposes post-capitalist conditions, reinforcing this bias. Yet, as Monnet (2018) shows, post-WWII French planning was a process designed to align state, private, and labor union expectations—shaping markets rather than replacing them—and served as a pragmatic tool to ease crises and drive reconstruction through demand management, industrial policy, and credit control. This largely forgotten tradition of muscularly indicative planning is now re-emerging as a model for state-led rapid decarbonization (Ban & Hasselbalch, 2025).

Here, we provide an analytical framework for political economists to design enabling structures that underpin the most ambitious, highly integrated sustainability transformations achievable under capitalism. Building on historical insights drawn from research on indicative planning, our starting point is inherently

political: if the literature on critical macrofinance and industrial policy is correct, then the buffering effects of capital on state-led decarbonization efforts are neither predetermined nor immutable. In other words, transforming this relationship lies within the realm of political agency (Braun, 2020; Gabor & Braun, 2025). We therefore contend that creating an analytical framework for green economic planning today requires a deeper understanding of how political agency has historically shifted the balance of power in favor of the state throughout the decades of postwar capitalism and beyond (Monnet, 2024a). In essence, our analysis reveals that the widely accepted logic—wherein the state's role is seen as merely derisking private sector-led decarbonization—is taken for granted largely because the narrow scope of state intervention itself is assumed.

Our framework for green economic planning comprises three elements: "Inputs," which include the political regime, planning directors, and information-sourcing mechanisms; "Processes," referring to the technical and political coordination in designing and implementing plans; and "Outputs," covering monetary-financial policies, fiscal policies, and state ownership strategies. We support our approach with three empirical case studies that offer actionable blueprints for a green transition strategy. To provide an analysis of how green economic planning works across democratic and authoritarian institutions, our research design is based on a comparative case study of three countries. France's intersectoral non-green and Denmark's sectoral green planning are chosen to account for democratic institutions. This is important because the standard objection to planning is that it questions democracy and replaces it with technocracy and even authoritarianism. We then look at China's as such a case of authoritarian planning but value it not for its regime type but for the only case of intersectionality in green planning today. These studies draw on secondary literature and primary documents. The discussion section uses the evidence thus evaluated to engage in normative scholarship that lays out templates for green indicative planning for scaling up the green economy and scaling down the carbon economy in various contemporary contexts and conjunctures.

Our argument is threefold. First, green economic planning is not only feasible but also versatile enough to adapt to various political economies and regime types, underscoring its potential as a foundation for the green transition. Second, effective planning requires a balance between decentralization and robust central coordination—a dynamic that keeps plans agile while aligning with broader goals. Third, it is crucial to sustain a productive tension among the planning agency's autonomy, the market's disciplining forces, and the political imperatives that legitimize its actions. We call this delicate balance "directed entanglement," which captures the state's ability to orchestrate investment, discipline capital, and collaborate with market actors without succumbing to state capture. This approach marks a decisive shift from the traditional framework of "embedded autonomy" (Evans, 1995) and "governed interdependence" (Weiss, 1995), which

characterized East Asian developmental states. Unlike models that seek equilibrium between state and capital, green economic planning demands a state-dominated approach—a command center capable of guiding and coordinating future expectations of policy stakeholders enrolled in the decarbonization effort.

At first glance, it might seem counterintuitive to call for the return of indicative planning in a time when the U.S. is hostile to state intervention and in Europe, security is prioritized over decarbonization. However, we argue that these very conditions make green economic planning even more urgent. Without a robust planning framework for mitigation, adaptation, or disaster response, societies risk either floundering or falling prey to securitized answers to the consequences of climate degradation. Critics may dismiss our approach as a nostalgic return to the era of "les trente glorieuses"—a period supposedly lost to globalized, financialized capitalism. However, planning ended not because it did not "work" but because elites chose to terminate it during the neoliberal era, transferring the state's infrastructural power to financial capital (Schmidt, 1996). In retrospect, this power shift was neither inevitable nor natural, and it can be reversed.

State of the art

A consensus on strong state action in the green transition is emerging as a response to the failure of current market-led approaches. For example, Green (2023) shows that the combination of the 'the urgency, scale, and complexity of activity … requires the authority and coordinating capacity of states', Mazzucato (2022) demonstrates that the state is required for the provision of finance, coordination between actors, and for ensuring that a transition takes into account social injustice, and Johnstone & Newell (2018) argue that the green transition needs the political power, coordinative capacity, and infrastructural reach of states. A cross-topical and cross-disciplinary research agenda has therefore emerged on the green state with a normative strand (Christoff, 2005; Dryzek et al., 2003; Eckersley, 2004), historically growing alongside an empirical one (Duit et al., 2016; Hausknost & Hammond, 2020; Paterson, 2016). This distinction has blurred recently, with scholars using "green state" and "environmental state" interchangeably to merge formerly separate approaches and examine empirical evidence on the dynamics of realizing the normative green state. Similar terms include "developmental environmentalism" (Thurbon et al., 2023) and the "green developmental state" (Gabor, 2021), both referring to global South efforts to integrate green objectives into developmentalist approaches (Larsen & Jackson (2025)) for an extensive overview and comparison of terms similar to the "green state").

Let us consider the three main interpretations of how to achieve this green state. First, Neo-Schumpeterians speak for a *green entrepreneurial state* (Mazzucato, 2015) and place their hopes in the creative destruction

of “missions” (Kattel et al., 2022) as a defining feature of capitalist development and readjustment in the face of climate change (Thurbon et al., 2023). The entrepreneurial state approach falls short because even the boldest forms of innovation have not replaced fossil-based energy with green energy at scale—it has merely expanded the range of energy sources (Smil, 2010). It is unrealistic, in other words, to expect innovation missions to provide sufficiently deep and transformative change by themselves as innovation may fail to scale. The second major alternative is critical macrofinance and the *big green state* (Gabor & Braun, 2025). This appears incomplete because it focuses exclusively on the institutional arrangements among central banks, treasuries, fiscal and quasi-agencies that form the macrofinancial regimes governing credit allocation to green investments (Guter-Sandu et al., 2024; Sharma & Babic, 2025). Problematically, it leaves unaddressed the fact that much of the structural transformation of economies never comes through financial channels alone. The final major alternative, green industrial policy, shifts attention away from finance and towards manufacturing as well as the coalitions between industrialists and political elites that facilitate the transformations (Allan et al., 2021; Chomsky & Pollin, 2020; Nahm, 2021; Rodrik, 2014). The challenge is to build industrial coalitions and “green new deals” that align interests for robust decarbonization with strong government support. However, recent U.S. experiences during Trump's second term revealed that carbon coalitions are more resilient than expected, casting doubt on whether green industrial policy can overcome entrenched brown coalitions, especially so long as states prove unwilling to discipline “carbon capital”.

All three major strategies for strong green state action confront the same fundamental challenge: how to equip the state not only to rapidly build out green infrastructure, but also to dismantle and replace existing fossil fuel systems. While each approach concentrates primarily on the first task, they devote too little attention to the second. Addressing this neglected side of the equation would require articulating a middle path—one that navigates between liberal, capitalist models focused on de-risking private-sector-led decarbonization and radical, democratic ecosocialist visions that call for unrealistic, short-term transformations.

How should we conceptualize the possibility space for this middle ground—a more interventionist state within a rebalanced mixed economy? At first glance, it may not seem like an especially promising platform for launching ambitious green transitions. Two major obstacles stand out. First, since the post–World War II era, financial capitalism has not only liberalized and globalized but has also grown in scale, complexity, and influence to an almost unrecognizable degree. In this new terrain, the infrastructural power of the financial sector—its embeddedness in everything from corporate governance to state debt management—acts as a major constraint on the state’s capacity to reassert directional control over investment and resource

allocation (Braun, 2022; Gabor, 2021). Second, expanding state ownership runs counter to the dominant liberal orthodoxy that has fueled decades of privatization and the shrinking of the public sector. Within this ideological framework, proposals for nationalization are often dismissed as politically toxic or economically outdated, rendering them nearly untenable in both policy circles and public discourse. Yet, on closer inspection, neither of these obstacles is insurmountable. If anything, the scale and urgency of the green transition may begin to shift the boundaries of what is politically imaginable and economically necessary.

There has been some debate around whether or not green states themselves are compatible with capitalist economic structures (Babić et al., 2025; Brand et al., 2025; Collington, 2026; Hausknost, 2020). Here, we follow Eckersley (Eckersley, 2020) in not dismissing capitalist green states out of hand, but focusing on the potential for their emergence within capitalism through reconfiguring the relations between social forces inside and outside state structures. Critical political economy has long portrayed the state as a contested social field rather than a unified actor (Babic & Sharma, 2023, pp. 765–767). As relations inside this social field are altered, novel forms of state agency and possibility can emerge. This has implications for the question of state ownership in a mixed economy: even though the state continues to play a strong role in fossil-fuelled accumulation strategies, state ownership of carbon assets can also be a lever for decarbonization (Alami et al., 2022; Babić & Dixon, 2023). Regardless of liberal orthodoxy, state ownership remains a defining—if often under-acknowledged—feature of contemporary capitalism. This reality can be interpreted in two opposing ways: either as a latent opportunity for more ambitious and strategic state agency or as a bureaucratic entrenchment that limits transformative action. Extending this logic to the financial sector, public ownership of financial institutions reduces reliance on private finance and, in doing so, potentially diminishes the infrastructural power that the private sector wields over investment flows, credit allocation, and the broader tempo of economic change (Gabor & Braun, 2025).

To build on the latent potential of strong green states within mixed economies, we ask a crucial question: what happens if green states begin to plan? The green state literature, shaped by a rejection of liberal capitalist planning, has largely focused on building state capabilities—often in siloed sectors like finance or energy. Yet this approach tends to overlook the state's capacity to coordinate policy across fiscal, monetary, and industrial domains. Green economic planning reimagines the middle ground not as a compromise, but as a site of transformation—recovering the legacy of postwar indicative planning to inform a new kind of strategic coordination. Realizing this vision requires a more expansive understanding of capitalist diversity, where indicative planning emerges as one historically grounded and institutionally feasible path toward the construction of greener states (Ban & Hasselbalch, 2025). The literature on

indicative planning (Estrin & Holmes, 1990; Monnet, 2018; Wood, 2000), on the other hand, has not dealt systematically with decarbonization, and it is not comparative, two gaps we aim to fill in the next section.

Indicative planning in capitalist economies differs from central planning in command economies, as it seeks to guide markets rather than replace them. It targets informational market failures (Estrin & Holmes, 1990, p. 532) while directing credit and mobilizing state-owned assets to benefit desired sectors (Monnet, 2018). It has been effectively implemented in post-war France, Japan, and the Netherlands (Ban & Hasselbalch, 2025). Unlike war economy planning, which developed extensive state planning capacities under military rule (Koistinen, 2004), indicative planning in peacetime democracies shaped Keynesian policies that drove post-war growth until the stagflation crisis (Jones, 1972). In the context of the green transition, weak forms of indicative planning rely on information-sharing, goal-setting, and coordination, often reinforcing neoliberal governance (Evrard, 2025). In contrast, strong indicative planning reshapes economic expectations using tools like state credit, monetary policy, subsidies, procurement, and regulation (Estrin & Holmes, 1990; Monnet, 2018, pp. 216–270). It actively manages supply and demand in key sectors, making it a viable strategy for climate action. This approach differs from ecosocialist planning, which envisions a post-capitalist transformation (Adler, 2019; Foster, 2023), and from degrowth planning, which seeks decentralized economic downscaling (Durand et al., 2024; Sorg & Groos, 2025). Instead, our position argues for pragmatic, mixed-economy planning within existing parliamentary systems to drive green transition policies.

Analytical framework: Planning inputs, processes, and outputs

In this section, we advance the state of the art by proposing an analytical framework generated through the engagement with the literature on planning in democratic and non-democratic contexts. This comparative approach resulted in an analytical posture that implies the deployment of a conceptual trinity for translating generic planning lessons to be used for green planning: input, process, and output. Inputs to green economic planning are filtered through different *political regime types*, gathered by *planning directors*, who organize the process of *sourcing information*. There are both *technocratic* and *political* processes to the formation and deliberation of plans. And the outputs from green economic planning redefine *monetary-financial policies*, *fiscal policies*, and the degree and distribution of *state ownership* in the economy.

Starting with planning inputs, the most immediate distinction is the *political regime* in which planning occurs. Given the history of indicative planning, it is essential to differentiate between democratic and

authoritarian regimes. In democratic settings, elected officials and societal stakeholders typically contribute to setting goals and directions, while in authoritarian contexts, these roles are reserved for political and bureaucratic elites. Moreover, further distinctions among various types of democratic and authoritarian regimes influence the goals, inputs, and processes of planning, as our case studies will show. We define *planning directors* as the organizational bodies most directly involved in formulating the plan—typically ministries, agencies, or discrete planning authorities. Considering both regime types and planning directors at the input stage provides crucial context for the initial phases of a plan, including goal formulation and decisions on information sourcing. We also differentiate among bottom-up, mixed, and top-down patterns of *sourcing information*. Bottom-up approaches emphasize pluralistic inputs from the local level—such as municipalities, local government agencies, social movements, or direct citizen engagement—as exemplified by the design of post-growth planning (Adler, 2019; Durand et al., 2024, pp. 5–6). Top-down patterns emphasize more centralized and elite sources such as industry associations, state-level agencies and ministries, and governmental executive bodies, as exemplified by information pooling in the French tradition of indicative planning (Estrin & Holmes, 1990, pp. 533–535; Monnet, 2018). We can also identify a mixed pattern of gathering information emphasizing coordination between technocratic, industrial, and parliamentary elites, as seen in Danish energy planning (Krog & Sperling, 2019).

Moving to the planning process, it is useful to distinguish between its *technocratic* and *political* components—even though in practice they are always intertwined (Estrin & Holmes, 1990, pp. 536–538; Monnet, 2018). Considering these processes requires attention to both the institutional structure and the political substance of planning. The way plans are defined, implemented, and legitimized within their political context significantly affects their outcomes. If the technical side of planning is too detached from political priorities and mandates, it risks failing to address critical societal challenges. Conversely, if the political process lacks grounding in expert insights, it may lose its credibility. When analyzing the technocratic process, we focus on how plans achieve credibility—particularly in the eyes of market actors. This means examining the connections between planning inputs and the capacities, as well as the institutional embeddedness, of the expert bodies involved. In contrast, our analysis of the political process centers on how plans gain legitimacy. This involves studying the political bodies and procedures that bridge the technical process with outcomes that carry political clout.

Finally, planning outputs coordinate policies and interventions across three discrete areas: *monetary-financial policy* (which we treat as combined), *fiscal policy*, and the degree and distribution of *state ownership*. Monetary policy is generally concerned with central banks and the targeted manipulation of credit to different kinds of economic activity while ensuring the refinancing of the state in non-inflationary

ways (Monnet, 2018), and financial policy involves regulating the private financial sector to induce green investment and dissuade brown investment (Guter-Sandu et al., 2024). These two are often inseparable in theory and in practice, which is why we consider them together. Fiscal policy looks at ways to tax and spend in support of green economic plans (Darvas & Wolff, 2023). And the question of state ownership is a crucial one for studies in indicative planning, where contrasting opinions can be found. For instance, Monnet (2018) found that state ownership of financial institutions and enterprises in France was crucial for effectively allocating credit in line with industrial plans. In contrast, Estrin & Holmes (1990) point to Japan and Sweden as examples of more flexible and market-oriented planning with lower levels of state ownership, but where governments still succeed in guiding financial flows and industrial decisions. Our analysis must also be sensitive to such differences in levels of state ownership in economic and financial sectors. Plans function when all three dimensions of planning outputs are aligned, but states may have different ways of achieving this and different settings within these dimensions.

Our framework also integrates key insights from the three theoretical lenses on the green state reviewed in the prior section—including Neo-Schumpeterian disruption, critical macrofinance, and green industrial policy—to break down silos between these debates. For example, neo-Shumpeterian principles inform the planning directors' ability to coordinate a 'mission' approach, critical macrofinance highlights the centrality of monetary and fiscal relations, and green industrial policy is often pursued through specific combinations of all three of the planning outputs (and more). Thereby, green economic planning unites these paradigms into a coherent program that places the state at the helm of the green transition by building necessary capacities, setting targets and policies, and ensuring a supportive financial environment. Table 1 summarizes this framework.

Table 1. *Analytical framework for green economic planning.*

Planning dimension	**Sub-dimension**	**Examples (not exhaustive)**
Planning inputs	Political regime type	Democratic (consultation, involvement) Authoritarian (political decree)
	Planning directors	Agencies, ministries, executive committees, etc.
	Sources of information	Top-down (centralized) Middle-out Bottom-up (decentralized)
Planning processes	Political process	Political bodies ensure legitimacy
	Technical process	Expert bodies ensure credibility
Planning outputs	Monetary-financial	Non-inflationary green credit
	Fiscal	Green taxing and spending
	State ownership	Ownership over finance and strategic industries

Our research design is a comparative case study of three countries. To capture how green economic planning works across democratic and authoritarian institutions, a two-country case study would be possible if a democratic country conducted intersectoral green planning. As that is not the case, we cover democratic institutions by covering France's (1945-1980) intersectoral non-green and Denmark's (1980 onwards) sectoral green planning. China's (1980 onwards) intersectoral green planning then covers authoritarian institutions. This comparative research design combines *maximum variation* and *paradigmatic* case selection (Flyvbjerg, 2006). Regarding the first, we intend to cover both democratic and authoritarian political institutions to explore how green economic planning might work across the differing political context present across the world. Regarding the second, we intend to cover countries that have been particularly successful at green economic planning. From that, the three countries cover both the variation on political institutions and are all paradigmatic cases of their practices.

Our strategy is threefold. First, we draw lessons from France's historical intersectoral planning under democratic institutions and the looser constraints of post-war capitalism. Next, we compare these insights to Denmark's democratic, but single-sector decarbonization planning—a contemporary analogue to post-

war France. Finally, we examine China, which supplements Denmark's lack of intersectoral coordination and reflects a very different political context. While no single case fully captures green economic planning, together they reveal its potential and challenges across diverse conditions. Each case, a partial success with distinct organizational setups and politico-economic environments, helps us identify the necessary ingredients for effective green economic planning. Cumulatively, the three cases allow us to approach intersectoral green planning across political regime types.

France: Post-war democratic, indicative, and intersectoral planning

French planning originated in a midcentury landscape of disillusionment and opportunity. The disillusionment with economic liberalism went back to the aftermath of the Great Depression when the French left had broached the first contours of planning under a democratic system with a market economy. Planning ideas were further developed by the right during the occupation of France. In 1945, with France devastated by war yet in a global context in which postliberal economic policy became the norm, France was ripe for a left-right compromise on planning (Monnet, 2018).

The result was a robustly directive inter-sectoral indicative planning system, and France showed that it was possible under conditions of mixed economy capitalism, trade openness, parliamentary democracy, and labor inclusion. Its enabling factor was *dirigisme*, an economic policy approach combining extensive state ownership in both industry and finance, state debt definancialization and an allocative credit regime based around state-led investment credit (Nord, 2012). Thanks to this planning system, France coupled forecasting and institutional coordination via a central planning bureau with state ownership in banking, energy, and heavy industry to successfully alter the structure of the French economy. Indicative planning, then, was not just about institutions but about their anchor in material structures. The results were spectacular, with the country going from obsolete industry, low productivity farming, and artisanal production to one of the world's most advanced industrial economies, with technological breakthroughs deployed at scale in nuclear power, advanced manufacturing, and agriculture.

Input: mobilising a centralised state

Postwar France was a democratic regime type with extremely high levels of political competition, where the Communist Party's role loomed large in politics. As such, it is a most valuable case for warding off the objection that planning is most likely in either authoritarian systems or highly consensual democracies. But France also had a meritocratic and centralized civil service that was ideally suited to execute ambitious

policies devised in Paris. Unsurprisingly, then, the input stage of the plan entailed highly centralized planning directors and top-down collection of information from a broad array of stakeholders.

Thus, the chief planning director was the autonomous Planning Commissariate (Commissariat Général du Plan or CGP), which shared its collected information with firms and issued guidelines and targets on issues as diverse as growth and sectoral development (Kindleberger, 1967). The CGP would do this alone or jointly with other agencies such as the Credit Council (a state body directing banks to prioritize lending toward sectors deemed strategic and setting credit ceilings to co-manage inflation with the central bank) or the Banque de France (the central bank of France), depending on the issue area. For example, local branches of the Banque de France collected information on local industrial potential to issue guidelines on rediscounting terms in the plan (Monnet, 2018).

Furthermore, input work leading to drafting the plan also carried out market simulation and forecasting around key growth indicators that firms could access at any time (Lovering, 2024). This comprehensive data exercise went beyond traditional statistics to include regional and sectoral surveys, as well as joint reports produced by experts from academia, industry, and government. Capitalists had a clear incentive to participate since they gained access to extensive macro-data, ranging from the commune level to the national level. This expensive, granular data—superior to basic price signals—was highly valued because poor information typically led private firms to underinvest, which in turn generated unemployment and waste (Monnet, 2018).

In this stage of the plan, two technocratic bodies, the CGP and the Treasury, agreed on the GDP growth rate. To smooth the process, the two institutions shared some of the staff. Most of the work was done by approximately 140 highly-trained staff in CGP's three horizontal commissions (Economy, Finance, Regional) and ten vertical sections for each horizontal commission (Energy, Transport, Industry, etc). Horizontal commissions maintained coherence across intersectoral targets, and their meritocratic selection and technical expertise enhanced the process's credibility. Growth targets, set by the CGP in collaboration with other state institutions, were assigned to 22 annual issue-area commissions. Each issue area was further divided into specific policy problems, with each problem managed by its own working party—varying in number each year according to emerging economic and social issues (for example, the fourth plan engaged around 3,000 participants). The process culminated in calibrated sectoral and intersectoral targets rather than firm-level directives.

Process: entangling technocracy and democracy

Unlike the technical phase of data collection, the second phase focused on converting targets into concrete strategies by layering democratic elements onto technocratic ones. Working parties now included civil servants, sectoral experts, business representatives from both state-owned and private firms, as well as leaders from militant trade unions and academia. Contributions from engineers, local government officials, and advocacy groups ensured a broad, adaptive consultative process. At this stage, the central bank and treasury secured state targets with sufficient directed credit and spending capabilities through macro-financial policy.

The CGP consolidated the amply debated commissions' findings into a coherent multi-year plan, setting indicative targets for growth, investment, and production in key sectors. This plan was then submitted to another democratic process: the broader societal consultations through the Economic and Social Council—a corporatist body with around 200 representatives from labor, capital, professionals, and intellectuals—and the High Planning Council, which comprised about 60 individuals from ministries, chambers of commerce, employer organizations, and trade unions. These consultations were crucial for securing democratic legitimacy in general and investor and labor union support in particular, so the CGP had to take their recommendations seriously. Ultimately, the plan achieved standard democratic legitimacy through ratification by Parliament, marking a transition from a technocratic-democratic hybrid to a fully parliamentary process that became increasingly democratic over time (Kindleberger, 1967, p. 238).

"Apart from the First and Third plans, which were adopted by administrative order, the plan is submitted to Parliament for ratification. In the Fourth Plan, the debate was a heated one and resulted both in some modification in favor of regional projects and agricultural interests and a change in the order of events. Submission to the National Assembly formally took place at the last stage: the Fifth Plan, however, was submitted before it had been finally determined, to permit greater democratization in the planning process".

The democratization of French indicative planning faced challenges, particularly by the late 1960s. During the Sixth Plan (1968–1973), planners sought to enhance intersectoral coordination by adopting a single econometric model, which reinforced the technocratic core of planning while weakening its democratic dimension. This shift limited union influence, as some of their previous strategies were no longer viable under the new approach. Moreover, it gradually socialized all participants into a macroeconomic modeling framework, just as its underlying assumptions were becoming less aligned with state interventionist policies. Ironically, despite this technocratic turn, the Sixth Plan was the most socially progressive, reflecting the influence of the May 1968 student and worker unrest.

Output: state ownership and dirigiste macro-finance

In the implementation phase, the planning process mobilized a complex set of state capabilities to tilt the incentives of French capital to get it to invest in the sectors prioritized by the plan (Estrin & Holmes, 1990). Thus, France's fiscal and monetary policy was particularly enabling for plan implementation. Monetary policy gave planning a further boost. The CGP-central bank coordination (through the latter's supervisory body Conseil National du Crédit (CNC, National Credit Council) was of essence for giving indicative planning a strong macrofinancial footing. In fiscal policy terms, indicative planning used ministry funds to drive structural transformation without being constrained by sovereign debt market disciplines. Budget-financed procurement for new technologies was a critical inter-plan mainstay of the French system, financed in a bespoke way. Unlike today's market-based approach, the French state refinanced itself through administratively set sovereign bond interest rates (Lemoine & Orléan, 2016). The system persisted until the late 1970s and would require drastic changes in central banking and state management today.

As the shareholder of a large part of the financial system, the French state effectively provided investors committed to plan targets with credit on preferential terms, credit insurance, export credit, and loans advanced for raw materials and technology so as to increase targeted investment. Of essence here was the nationalization of credit combined with robust state ownership in the French financial sector. This effected structural changes in the economy without turning the French state into a central planner as such (Monnet, 2018). Direct credit in the context of indicative planning processes enabled France to achieve rapid industrial development and industrialization in the 1950s and 1960s. No other industrialized economy apart from current China benefited from this financial landscape, the result of the particular political context of the early postwar period. Even at their peak in the late 1950s, direct loans to French industry from the government budget remained limited compared to the total amount of medium and long-term credit in the economy, as demonstrated by Monnet (Monnet, 2018).

Planning would have been merely forecasting if not for the state's control over most investment credit. At the top of this system, the central bank rediscounted loans from state financial institutions to plan-targeted sectors at lower interest rates and applied bank-specific credit ceilings to curb debt-driven inflation (Monnet, 2018). The Credit Council then coordinated with the central bank to propose exemptions from these ceilings for targeted loans. Additionally, the Credit Council and CGP worked together to establish credit flow terms from specialized promotional banks to plan-targeted sectors, a process that by the late 1960s resulted in 50 percent of French loans being issued below market rates. The state also leveraged its ownership of four of the five largest commercial banks, along with sectoral promotional banks and major insurance companies, to incentivize capitalist investment in plan-targeted sectors. Without these institutions

focusing on medium and long-term credit, French capitalists would have relied almost entirely on the short-term borrowing favored by private banks. This developmental state financial system supported between 10 and 60 percent of gross sectoral investment during "Les Trente Glorieuses" (1945-1975) and provided about 45 percent of French loans at preferential rates in the 1960s (Monnet, 2018). The system was underpinned by financial repression measures, including interest rate caps, mandatory government securities holdings, capital controls (Loriaux, 1997), and non-market state debt financing coordinated by the central bank and the Treasury (Lemoine & Orléan, 2016).

Like the current Chinese state, as well as in the case of Danish energy planning, the postwar French state had another advantage: it could ask industrial SOEs to help fulfill planned objectives (Massé, 1991). Since these firms that had been nationalized in the aftermath of the war accounted for 11 percent of GDP and 35 percent of gross investment during the 1950s and 1960s, the state could use its shareholder rights to push the management to support the plan targets (Monnet, 2018). In the context of the green transition, this would entail state ownership in critical green infrastructures and emerging green technology sectors.

In the same vein, the state had much to offer the private sector in exchange for its enrollment in implementing the plan. Thanks to the plan, the private sector would get price control concessions, commercial diplomacy in exports markets, assistance for the conversion of activities from low to high productivity, preferential treatment in government procurement, massive investments in public research and development programs for frontier sectors (nuclear energy, electronics, aeronautics) and legacy sectors alike (Bess, 2003). Large capitalists benefited the most, as the planners were of the Schumpeterian view specific to many developmental states that high efficiency, resilience, and innovation-based growth were best achieved in economies of scale pursued via mergers, which thus received favorable regulatory and fiscal treatment (Estrin & Holmes, 1990). In exchange for state commitment to ensure the Keynesian demand management conditions for full employment, labor unions' support for planned sectoral targets also got significant increases (especially during the late 1960s) in state-provided housing, education, and health. Given France's traditionally contentious industrial relations, wage moderation would have been much harder to attain.

As the next section shows, even as indicative planning withered out during the 1980s in France, it was precisely from this point onwards, at the apex of neoliberalism, that it consolidated at the sectoral level in another vibrant democracy up North: Denmark.

Denmark: Democratic, energy sector planning

What turned Denmark into the world's most spectacular case of energy decarbonisation during the 1990s and 2000s was an aggressive yet democratic form of planning for the energy sector that connected grid decarbonisation with green industrial policy targeted at the domestic clean tech firms. Amid the oil shocks of the 1970s, the Danish government launched its first energy plans aimed at scaling cooperatively-owned wind power and district heating, deliberately rejecting nuclear energy and Russian gas as part of a broader national energy security vision. As these decentralized systems grew, the government introduced the landmark Energy 2000 Action Plan in 1990—the world's first comprehensive low-carbon energy transition strategy—which prioritized the rapid integration of renewable energy resources and planned for a gradual phase-out of coal. Denmark's journey toward sustainable governance reached a decisive milestone in 2014 with the introduction of its inaugural Climate Act. Another significant shift occurred in 2020 when, following a broad national political consultation and an accord among eight of the country's ten parties after the 2019 general elections (Nash & and Steurer, 2022), the country adopted an amended Climate Act setting legally binding targets to reduce greenhouse gas emissions by 70% and chart a course toward net-zero by 2050. This law is the world's first to feature legally binding 2030 targets, a five-year ambition review, and an independent expert body to evaluate the annual climate plan.

This section is sectorally focused on energy because by the 1980s, the end of intersectoral planning in democratic systems left energy planning as one of the few relics of the old system. The survival owed to the centralized nature of energy systems (Prasad et al., 2014). Even as neoliberalism set in, diluting and even eliminating indicative planning institutions from Japan to France (Lewis, 2013), governments continued to craft long-term blueprints to secure energy supply, stimulate investment, and steer the transition from fossil fuels to renewables. Energy shocks and climate imperatives boosted these systems, with multiannual energy programmes designed to meet stringent decarbonisation targets and bolster energy security becoming common(Pastore et al., 2024) and, in the case of the EU, even mandated them. In some cases, entrepreneurial states used energy planning systems to also plan the reorganisation of the manufacturing sector specialized in the supply of clean technologies. Denmark, a former oil guzzler who turned into global green leader (Sovacool, 2013, pp. 28–30), is one of the clearest examples in this regard with 85 percent renewables in its electricity system, 55 percent renewables in the total energy system, no energy poverty to speak of (Dyrhauge, 2022, pp. 607–608) and most of the renewable energy technology manufactured by local equipment manufacturers.

Overall, the Danish story told in this section is one where energy plans are embedded in democratic and, decentralized processes that mobilized (much like postwar France) state ownership, quasi-state forms of finance and ambitious, albeit discreet, industrial policies to decarbonize the electricity supply while developing a globally competitive wind energy technology sector to achieve that objective. Democracy and decentralization under neoliberalism had costs, however, in the form of plans weakened by partisan turnover in the Parliament and grassroots resistance to more onshore wind power once cooperatives became less relevant to the energy transition in a broader European energy market.

Input: a municipalist-corporatist-cooperativist system

Unlike postwar France, Denmark is a more consensual and decentralized democracy with a strong municipalist tradition. In this institutional environment, the plan gets inputs through a combination of technical directors in the central government and democratic ones steeped in local and central-level politics, with a strong democratic corporatist flavor layered on top.

For decades, the Danish energy planning system obliges the Minister of Climate, Energy, and Utilities to review and update national energy decarbonisation targets every five years. As of 2020, the law requires the government to publish an annual climate action plan detailing specific measures and their implementation pathways (e.g., decrease in emissions by approximately 68% by 2030 compared to 1990 level), with clear delegation of monitoring to an independent technical agency that has since built a reputation for critical assessments. Key to this process are the two technical actors: the Ministry of Energy and Climate—responsible for political direction and management—and the Danish Energy Agency (DEA), established in 1976 and housed within the same ministry to develop long-term energy policies. Both entities provide input in a technologically neutral manner, allowing industry and universities to determine the most effective technologies. Moreover, since 1993, consolidating energy and climate within one ministry has ensured a linkage between state, market, and societal actors at the highest level of governance (Dyrhauge, 2022, pp. 603–605).

Since the 1980s, the DEA has led multi-year energy plans, while the Ministry of Energy and Climate finalizes the National Energy and Climate Plans after consulting with democratic, corporatist, grassroots, and technocratic stakeholders. The DEA then models these plans, develops scenarios, and holds hearings with municipalities, companies, and independent power producers. Meanwhile, the Danish Climate Council annually reviews the plans and offers recommendations to keep emission reductions on track (Klimarådet, 2025). The process is continuous, with DEA annual energy outlook reports updating and calibrating the planning process.

But unlike in France's centralized-technocratic input process, in Denmark, input has been deeply steeped in municipal democracy and local cooperatives from the 1970s onwards. More formalized and professionalized in the early 2010s (Folketinget, 2012), three main pillars structure the process: municipal task development, development of plans, and the whole energy chain approach to planning (Krog & Sperling, 2019). In this system, central agencies like the DEA issue draft guidelines, and municipalities that participate commit budget funds toward strategic energy targets. Municipal data and resource mapping are then integrated into the DEA's planning process. Denmark's democratic corporatist framework also plays a role, with unions and employer associations offering insights on clean tech investments, skill management, and wage levels to support domestic cleantech expansion (Johansen, 2021).

As early as the 1970s, energy cooperatives joined the process as well, with both wind and district heating systems being run as cooperatives, especially during the 80s and 90s (Kirch Kirkegaard et al., 2021). During the 2000s, despite a broad political consensus on decarbonization, partisan debates diluted support for wind energy in the 2000s and for greening transportation in the 2010s (Dyrhauge, 2022, pp. 611–612). More recently, partisanship ebbed, in part due to stronger support from both business and society. As of 2020, organised business joined "climate partnerships" with 14 sectors under the Green Business Forum, and in 2023, green tripartite negotiations were formed with agricultural organizations, the food industry, trade unions, and the Danish Nature Protection Society. As of 2020, a technical body (the Climate Council) was tasked to critically comment on the actual policy impact on climate targets, with their evaluations then imputed into the next plan (Dyrhauge, 2022, p. 604).

Process: The more centralized, the more democratic

The most important feature of Danish energy planning today is the democratic dynamics within energy ownership: despite the advances of corporate forms of ownership, electricity production is controlled by 25 cooperatives and consumer-owned companies that produce 70 percent of Danish electricity, while 10 municipal not-for-profit energy companies account for 25 percent of electricity production (Dyrhauge, 2022, p. 608), steeping in grassroots representation the microfoundations of planning itself.

Another important feature is monitoring energy planning. With the 2020 Climate Act, Denmark institutionalized Europe's most comprehensive public and stakeholder participation in five-year decarbonisation monitoring processes (Oberthür et al., 2025). Under the Act, the Danish Climate Council (DCC) acts as a plan watchdog conducting constant plan surveillance on technical grounds and appoints a

Climate Dialogue Forum for a three-year term. The DCC ensures the technical credibility of the process. It comprises 41 organizations drawn from business, civil society, NGOs, trade unions, and public agencies, providing the council with diverse input and perspectives. The Forum meets at least once annually before the submission of the DCC's report, and all its contributions—including written submissions—are published publicly to ensure transparency (Bäckstrand, 2025). Based on the ensuing reports, the DCC can press an "action trigger" in case of risk of deviation from the planned targets, thus forcing the government to propose new measures and the parliament to ensure accountability. In this way, the plan is monitored by some of the country's most credible technocrats as well as by a broadly democratic forum encompassing democratic corporatist actors as well as the broader civil society.

Output: creating synergies between state ownership and industrial policy

Denmark's five-year energy plans of the 70s and 80s backed strategic thinking with resources to integrate homegrown clean technology into the country's electricity and heat generation. Importantly, the Danish state did this without having the advantages of the French planning system: fiscal resources backed by the monetary policy interventions of the central bank, ample credit guidance institutions, and powerful central government capabilities in industrial policy. Yet the Danish state's armory in this struggle was similar to some of the key elements of the French case: state ownership serving as an enabling feature of aggressive plan execution and financial support for niche sectors leveraged by state and para-state finance. As the director of the process, the state effectively embedded energy sector actors, financial sector actors, and clean tech manufacturing actors into an entrained system that served Denmark well for many years. Indeed, the state threw in not just subsidies for wind and district heating, but also a quiet industrial policy linking universities, state-owned firms, and, during the 2000s, the country's ample pension funds to decarbonize energy while turning the country into a global leader in clean technology (Sovacool, 2013).

Starting in the late 1970s, the state leveraged top engineering universities as R&D hubs and test centers for wind turbine producers, while providing export financing and pioneering wind maps to boost sales and projects. In the 1990s and 2000s, state ownership of utilities decarbonized electricity using domestic manufacturers, and mobilizing pension funds to finance large-scale offshore wind farms propelled Denmark to the forefront of energy decarbonization (Dyrhauge, 2022). Indeed, if the essence of planning—as seen in France—is that the state actively directs industrial development to achieve specific economic and social goals through state control over economic assets, then Denmark's strong state footprint in energy exemplifies this approach. Thus, in 1989 the Danish state saved its key wind turbine producer (Vestas) from bankruptcy by using a state-owned company while using a state-owned export promotion fund to secure foreign orders in times of crisis. Ministerial funds and test centers based in public universities were used to

massively subsidize a rich technical innovation ecosystem based around several wind turbine value chains for whom the state guaranteed orders.

Originally established in the 1970s to secure national energy interests and hold first rights over Denmark's North Sea oil and gas, state-owned DONG was later mandated by state planners to pivot to onshore wind in the 1990s and to pioneer offshore wind energy. At a time when offshore wind was deemed risky, DONG placed an unprecedented order for 500 turbines—far exceeding the typical 50 per order. By fostering competition and innovation among turbine manufacturers, DONG's strategic investments helped drive technological advances in offshore wind, solidifying Denmark's leadership in the sector" (Voldsgaard & Rüdiger, 2022, p. 3633). Continued state-ownership in energy production remained a key instrument in meeting planned targets for scaling up clean energy and exporting Danish wind tech worldwide, turning Denmark into the undisputed global leader of this technology until Chinese producers began to dominate by 2023, under the impetus of China's centrally planned and mercantilist green energy transition.

However, as Danish energy planning became increasingly entangled with EU liberalization and financialization, the partial privatization of DONG and the de-risking logic of contracts for difference (Kedward et al., 2022) weakened the state's role. The overall result has been a plateauing of clean energy "missions" in Denmark, the rise of NIMBY obstructions for onshore wind (Borch et al., 2023) and a dependence in fickle private sector appetite for decarbonisation (Kirch Kirkegaard et al., 2021) in a country where the state does not have the powerful state-owned institutions of postwar French indicative planning. Such obstacles matter more as the 2020 Climate Law's objectives to advance on decarbonisation not just on energy but also on industry, transport, and agriculture seem hard to attain (Klimarådet, 2025), leading to reliance on niche technologies like carbon capture storage and challenging power-to-X to meet these goals, a looming failure that demands a transition from sectoral to intersectoral planning even in this best of cases for decarbonisation under capitalist democratic rule (Voldsgaard et al., 2022). As the next section shows, China's green economic planners have been facing few of these challenges.

China: Authoritarian and intersectoral green planning

In China, economic planning has evolved from rigid Soviet-style central planning to a more flexible model often described as *grand steerage* (Naughton, 2020), where the state guides the economy through strategic direction rather than direct control, in close coordination with a dynamic private sector. This model now underpins China's approach to green transition planning. Since the mid-2000s, the Chinese government has launched a series of strategic policy frameworks aimed at environmental sustainability—most notably the

concept of *ecological civilization*, which integrates ecological goals into long-term development planning and state-led investment priorities (see Larsen (2024) for an account of these concepts).

Since 2021, climate action has been formally tied to the Chinese government's overriding strategic objective of 'national rejuvenation,' elevating it from a sectoral concern to a pillar of the country's long-term political project (State Council, 2021). On climate issues, the most important long-term plan is the 'Dual Carbon Goal' of peaking emissions by 2030 and becoming carbon neutral by 2060. Beyond these policy areas, Green objectives are now embedded across the distinctive instruments of Chinese governance, from five-year planning cycles to the performance metrics used to evaluate local officials and the political education curriculum required of party members (Wu & Cao, 2021). 5-year plans are the concrete, tangible, near-term manifestation of longer-term strategic planning conducted either directly by the Chinese Communist Party (CCP) or through the state apparatus while guided by the CCP. Rather than production quotas that would trickle down to individual work units to meet, the new type of planning sets overarching targets by economic sectors to steer actors rather than directly control their production. This leaves a greater role for the private sector and competition between SOEs. The Chinese state plays a key role in not just developing the plan but also in implementing the plan through the state's governance tools alongside market intervention and participation. That China operates a fundamentally capitalist yet state-steered political economy (Chen-Florea & Larsen, 2025) is critical to our conceptual exploration of green economic planning under capitalism. It illustrates how strategic state intervention and long-term planning can coexist with market mechanisms, offering an alternative to both laissez-faire liberalism and centralized command economies in the pursuit of ecological goals.

China's ongoing green transition reflects the country's overarching approach to planning transformation. China's environment has historically been harmed by an emphasis on economic growth at all costs (Y. Huang, 2020), but in recent years, pure GDP growth has been deprioritized. Over the past decade, references to GDP growth in official strategy documents have steadily declined, creating political space for environmental and security objectives to rise in the hierarchy of state priorities (Wallace, 2022). Furthermore, China considered green transition and economic growth as directly mutually supporting, which makes it possible to prioritize both simultaneously (Wang, 2022). In a notable break with tradition, China's 2020 five-year plan omits GDP growth targets while mandating stricter environmental goals—such as energy intensity per GDP unit, non-fossil fuel share in total energy, and forest cover. In both rhetoric and practice, China now prioritizes the environment as equally important as growth (Shen & Jiang, 2021; Zhang, 2021).

Inputs: a ‘tightly scripted consultative process’

China's green economic planning inputs align with our framework. The central mechanism—a five-year plan—takes about three years to develop, coordinated by the ministry-level National Development and Reform Commission (NDRC) as the planning director. Subsequently, it is approved by the National People’s Congress. Initially, the State Council, NDRC, and the CCP Central Committee assess progress on the current plan and draft ideas for the next. The four steps of drafting the plans include preliminary research, formulation of basic principles, internal central government feedback, and the drafting of a plan. Through this three-year process, input is gathered from diverse stakeholders across all levels through a ‘tightly scripted consultative process’ (Naughton, 2005). This includes think tanks, industry associations, leading intellectuals, and government bodies. At the lower geographic levels, this includes similar stakeholders at the provincial, municipal, and township levels. For example, in 2020, citizens could submit their opinions and suggestions on a draft plan online, resulting in more than a million comments (Xinhua, 2021). As a state-controlled process, input is broadly collected, while there is no transparent mechanism for seeing how it is used.

China’s experience suggests that even under authoritarian institutions, the state can effectively gather useful informational inputs for green economic planning. While the Chinese party-state is not subject to direct accountability, transparency, separation of powers, and independent civil society (Heilmann, 2017)—environmental governance appears to be a partial exception, as the Chinese state creates institutional space for input from citizens, businesses, and civil society actors on environmental issues (C. Huang et al., 2022). For example, the number of environmental NGOs in China is increasing by the thousands, and they are allowed to reveal pollution problems and identify their causes (Aikawa, 2017). As an example of citizen input, the award-winning mobile application Blue Map allows users to report air, soil, and water damage on a platform for both the public and government to see (IPE, 2026). NGO and Blue Map data is used by banks to assess company creditworthiness, highlighting its recognized value by the state. However, data quality issues persist due to inaccuracies and deliberate manipulation—local governments, for instance, often alter air pollution or GDP figures to boost their performance (Silver et al., 2025). A similar phenomenon is called performative environmental governance, where local governments superficially appear to address environmental problems without addressing the core problem, such as by swimming in the one clean river that has been cleaned instead of cleaning all rivers (Ding, 2022). Despite the presence of input mechanisms, China’s green economic planning system remains constrained by structural features of authoritarian governance. The lack of transparency, control over the media, and absence of independent monitoring bodies limit the accountability of planners and weaken the institutionalization of bottom-up

feedback. As a result, while the system allows for the collection of input from citizens, firms, and civil society, it is ultimately up to state planners to determine how—if at all—such input is used.

Process: Centrally planned, locally embedded

China's green economic planning is centrally coordinated and derives its technical credibility from expert bodies and its political legitimacy from the involvement of party-state organs. The NDRC is the central body coordinating the plans and embodies both technical credibility through its numerous technical bureaus housed in Beijing as well as political legitimacy from having a higher status than all other ministry-level bodies (Heilmann, 2017). The NDRC, renamed from the State Planning Commission in 2003, sits at the center, managing five-year, sectoral, and long-term plans. As an integral part of the party-state system, the NDRC works directly for both the CCP and the state council, making it subject to political pressures rather than being an independent expert body.

High-level inter-sectoral plans are initiated by the top governance echelons, with the NDRC coordinating their development and gathering input from a broad range of expert and societal stakeholders to ensure technical credibility and political legitimacy. The plans developed by the NDRC are subsequently turned into local and sectoral plans where government and quasi-government bodies are responsible for their on-the-ground implementation. In implementation, the NDRC relies on its local branches situated across the country to ensure similar credibility and legitimacy exist locally rather than just centrally. Adding to the societal acceptance of the plan is the fact that this is an institutionalized process conducted since 1953 and strictly implemented since.

Despite technical credibility and political legitimacy, green economic planning has encountered problems as planners have been too conservative. This stems from local government having considerable policy space to decide how to pursue targets in the plan. For both renewables and EVs this has led to fierce competition between companies situated in different localities in China. This center-local relation has been conceptualized as 'guided improvisation' (Ang, 2016). The outcome is reflected in China's climate performance. Based on China's climate ambitions, the country's Nationally Determined Contribution is 'highly insufficient' in its alignment with the Paris Agreement (Climate Action Tracker, 2025). However, actual climate performance has been stronger than ambitions, as carbon emissions may have peaked in 2024 already, despite China only targeting 2030 (Myllyvirta, 2024a). Most centrally, the NDRC appears to have underestimated the pace at which China could scale up green industries. While the National Energy Administration of the NDRC says China can (and should) install 100 GW of wind and solar combined, industry associations say the number is 200 GW for solar and 50 GW for wind (Myllyvirta, 2024b).

Similarly, China has already surpassed its 2030 goal of 40% electric vehicles in car sales and will likely reach 50% in 2025 (IEA, 2025). Still, it should be noted here that despite the performance and ambitions gap, even China's current performance is far inadequate to be aligned with the Paris Agreement, which would require not just peaking but a rapid, near-term emissions reduction.

Outputs: Extensive state control and ownership

China's green economic planning produces coordinated and mutually supportive outputs across monetary-financial, fiscal, and state ownership measures. Linking these policies together are the NDRC-led cross-cutting plans and two organs related to coordination at the level of implementation: The Central Financial Commission of the CCP coordinates all finance-related policies and activities, while the Green Finance Committee provides guidance for specific green sectors. Other scholars have highlighted the role of MIIT in sharing planning for advanced sectors, some of which are cleantech, with NDRC (Wang 2024). Monetary policies favor green industries by favoring green credit in a short-term standing lending facility, accepting lower-rated green bonds as collateral in medium-term lending, and offering lower interest rates for green relending (Larsen, 2024). Lending within the short-term facility has reached USD 75 billion by the end of 2023 (China Securities Journal, 2024) and total green credit reached over 4 trillion USD by 2025 (Ban 2026). In terms of financial outputs, the Chinese state's control over the financial system allows it to steer capital in a desired direction, resulting in a steady increase in green loans since 2010 in particular (Escalante et al., 2020). By the end of 2024, outstanding green loans reached USD 3.9 trillion, increasing from 6.7% to 13.9% of all loans (Yue & Nedopil, 2025).

Outputs within fiscal policy are facilitated by the Chinese state capturing a large share of GDP and directing it towards strategic industries, such as through state-capitalized guidance funds that take equity stakes in green assets. The scale of the green type of such funds surpasses USD 70 billion (Beck & Larsen, 2024). State-ownership outputs include public procurement and investment. For example, China uses SOEs to ensure a high and stable level of investments in renewables. In 2021, using its state-controlled fund that owns SOEs, the government mandated that these state-owned power generation companies achieve 50% renewables by 2025, irrespective of market conditions (SASAC, 2021). Thereby, the majority of China's renewable energy capacity is owned by state-owned energy companies..

China's green planning appears largely unimpeded by the governance fragmentation typical of its system (Brødsgaard, 2017), as plans originate from the State Council, with fragmentation occurring mainly at lower levels. While this can create overlaps, the effectiveness of green financing shows that such redundancy doesn't undermine overall progress. The credibility of Five-Year Plans and the 'Dual Carbon Goal' has

pushed firms to align with decarbonization. Coordinated monetary, fiscal, and SOE tools channel capital toward green sectors and help manage inflation through direct control of bank lending, as in postwar France. Cumulatively, these policies have played a central role in making China home to more than half of the world's electric vehicles and renewable energy capacity

China's green economic planning highlights that its successes stem more from strong central state intervention than from authoritarianism per se. Similar levels of intervention have appeared in democratic contexts, such as post-war France. Crucially, China shows that green planning is not confined to high-income Western states. Unlike past developmental models with more balanced state-capital relations, China represents a dirigiste, indicative planning approach marked by clear state dominance.

Discussion and theoretical contributions

Current literature on the green state falls short of explaining how to achieve the policy coherence needed for systematic climate action. While perspectives from Neo-Schumpeterianism, critical macro-finance, and green industrial policy each offer viable reforms within capitalism, they remain fragmented and lack integration. This disconnect limits their ability to inform coordinated climate policy. What is needed is a framework for understanding how green economic planning can be conducted under capitalism—a gap this paper seeks to address. While none of the three cases fully embody green economic planning, each reinforces its core components. Table 2, based on our analytical framework, highlights key similarities and differences across contexts—democratic and authoritarian, past and present, green and non-green, sectoral and economy-wide. Together, the cases demonstrate that: First, green economic planning is both feasible and adaptable across diverse political economies. Second, effective planning requires balancing decentralized information flow with strong central coordination. Third—and most critically—successful planning depends on managing the tension between the autonomy of planning agencies, market discipline, and the political legitimacy that sustains long-term direction.

We propose the term 'directed entanglement' to capture the green economic planning of a green state. In contrast to a market-led order, directed entanglement entails a state-market relationship whereby the state sets the direction for private capitalists and state-owned entities alike, ensuring that the business incentives of the private sector align with the opportunities and constraints set up by the planning system and backed by the state's own resources. The above empirics form the basis from which our definition of this term is inductively derived: Directed entanglement captures the capacity of the state to orchestrate investment, discipline capital, and coordinate closely with market actors while avoiding the gravitational pull of capture.

In terms of inputs, directed entanglement can function across regime types and sources of information, but requires a powerful state organization tasked with organizing green economic planning. Planning can function in both democratic and authoritarian systems, but it depends on formal, technocratic mechanisms to coordinate planners effectively. In terms of outputs, strong state steering across policy tools is essential, with state ownership—particularly in finance—emerging as a key feature. Despite their differences, the three cases each represent distinct types of directed entanglement regimes: a French dirigiste democratic model, a Danish liberal democratic model, and a Chinese dirigiste authoritarian model.

Table 2. *Summary of case studies across the three dimensions of directed entanglement.*

	France Whole economy 1945–1980	**Denmark** Green sectors 1980 onwards	**China** Proportionally greening whole economy 2000 onwards
Planning inputs			
Political regime type	Democratic	Democratic	Party-state authoritarian
Planning directors	Planning Commissariat, central bank, treasury, credit council	Danish Energy Agency, Ministry of Energy	National Development and Reform Commission (NDRC)
Sources of information	Top-down	Mixed	Bottom-up
Planning processes			
Political process (legitimacy)	Parliamentary	Parliamentary	Party-state coordination
Technocratic process (credibility)	Inter-sectoral coordination between planning directors	Sectoral coordination between planning directors	Inter-sectoral coordination between central and local planning directors
Planning outputs			
Monetary-financial policy	Credit allocative regime	Derisking regime	Credit allocative regime
Fiscal policy	Strategic and discretionary taxing and spending	Strategic and rules-based taxing and spending	Strategic and discretionary taxing and spending
State ownership	Partial state ownership (energy, finance, strategic sectors)	Limited state ownership (energy)	Majority state ownership (energy, finance, strategic sectors)
Directed entanglement regime	*Dirigiste democratic regime*	*Liberal democratic regime*	*Dirigiste authoritarian regime*

The emerging paradigm of the "big green state" represents a decisive shift in how governments approach the climate crisis—not as a market failure to be corrected but as a structural challenge requiring systemic economic transformation. At the heart of this shift lies the concept of directed entanglement, which provides a novel framework for understanding how states can strategically reorganize economic and institutional relationships more systematically to accelerate decarbonization. At its most basic form, directed entanglement reveals how state intervention, particularly through public ownership and planning, can reshape market dynamics to align with ecological imperatives. This perspective not only clarifies the limitations of current green capitalism models but also offers a roadmap for more effective state-led climate action that goes beyond the containerized analytical approaches political economists have offered to date.

Even if doubts persist about the state's fiscal capacity to directly finance decarbonization, alternative mechanisms exist for leveraging public resources and market incentives to steer capital toward ambitious climate goals. Activist green central banking, the de-financialization of state debt, and state ownership of promotional financial institutions can create a framework that can better align private capital's calculations with decarbonization objectives. This can be achieved through a mix of incentives and penalties. On the incentive side ("carrots"), tools include favorable credit conditions, involvement of state-owned financial institutions, subsidies, state equity stakes, and supportive regulatory frameworks (Kedward et al., 2024). On the penalty side ("sticks"), mechanisms range from financial disincentives for high-carbon credit and mandatory transition plans, to "brown haircuts" in central bank collateral frameworks, targeted bond purchases that devalue carbon-intensive assets, nuanced green taxonomies, and credit ceilings for polluting sectors (Gabor et al., 2019). Crucially, the state's fiscal position can be bolstered by an activist central bank prepared to back state debt, discipline markets, ensure compliance with decarbonization targets and manage inflation through credit controls rather than just the interest rates by working with a credit council (Lemoine & Orléan, 2016; Monnet, 2018). Furthermore, when public development banks (Mertens & Thiemann, 2019), off-balance-sheet fiscal agencies (Guter-Sandu & Murau, 2022) or state treasuries use financial markets as vehicles of state power, they bolster the state's directing function in these entanglements and may even override the price mechanism to fulfill state objectives. In this way, the state can 'entangle' capital in coordinated efforts to achieve ambitious decarbonization, even without relying solely on direct fiscal resources.

Three crucial insights follow from our conceptualization of directed entanglement. The first is its ability to illuminate the role of public ownership in decarbonization—a factor often marginalized in the literature.

For example, state-owned enterprises (SOEs) and public banks are not passive actors but active agents in structuring economic incentives. In contexts as different as France, Denmark, and China, state-controlled firms served as the backbone of coordinated planning actions spanning decades. Today, large swathes of state-owned energy, finance and mining assets can attract and discipline private sector participation in green planning, creating significant opportunity costs for private actors who resist transition pathways. In addition to state-owned financial institutions, SOEs in strategic industries are, in particular, important in supporting the demand side. In our cases, this is seen in nuclear in France, wind in Denmark, and renewables in China. Without such leverage, states lack the infrastructural power to enforce sectoral shifts, leaving decarbonization vulnerable to corporate capture and financialization.

A second critical insight from directed entanglement is its utility in counterfactual analysis, enabling comparisons between different state strategies for managing the green transition. Developmental environmentalism, for instance, relies on state-backed de-risking to mobilize private investment in renewables (Thurbon et al., 2023). However, as seen in Denmark's restructuring outfits energy system, even successful models often require reclaiming public control when market incentives falter. Directed entanglement thus exposes a key tension: while hybrid public-private models can accelerate initial transitions, long-term sustainability demands deeper state coordination, particularly in credit allocation (Kedward et al., 2024). Private financial institutions, driven by short-term returns, cannot autonomously redirect capital from high-carbon to low-carbon sectors at the necessary scale (Christophers, 2024). Only the state—through public banking, credit guidance, green monetary policy, not just regulatory compulsion—can enforce the sectoral reallocation of resources without triggering inflationary instability.

This leads to the third pillar of directed entanglement: the creation of new institutions—such as National Climate Councils (Buylova et al., 2024), Green Credit Councils (Monnet, 2024a; van 't Klooster, 2024), and Green Planning Bureaus—that centralize decision-making and enforce coherence across climate, fiscal, monetary, and industrial policies. These structures should be non-negotiable for overcoming the fragmentation of neoliberal governance. However, new institutions must be accompanied by adaptive governance mechanisms that allow for reflexive adjustments, as seen in China's reflexive bureaucracy, Australia's debates over lithium nationalization, or the EU's evolving carbon border policies. According to Monnet (2024b, p. 560), it is critical to embed new institutions in procedures of deliberation that produce 'a complex chain of inter-institutional dialogues and decisions', which should be directed through a green planning bureau. The challenge, however, is that many proposed hardware upgrades assume a degree of monetary sovereignty that open capital accounts often undermine. This raises unresolved questions about how to reconcile dirigiste green planning with financial globalization.

The concept of directed entanglement sits above the similar but different concepts within critical macrofinance and the developmental state literature. According to the former, in the current macrofinancial structure, direction is set not by the state but by private finance through what Benjamin Braun called "infrastructural entanglements": "When state actors transact in financial markets for governance purposes they create infrastructural entanglements, which constitute a distinct source of financial-sector power. In the case at hand, repo and securitization markets—the two main pillars of market-based banking—provide the infrastructure through which the European Central Bank (ECB) implements its monetary policy. This entanglement makes central bankers, who seek to maximize their economic steering capacity, dependent on bankers, giving the latter infrastructural power." (Braun, 2020, p. 396). Directed entanglement undermines this infrastructural power of the financial sector by controlling credit through state ownership, reversing the relationship of dependency. This relationship is manifest in the cases of France and China. In Denmark, the lack of state infrastructural power over finance was offset by state ownership in the energy sector and ample capital through the pension funds. Regarding the developmental state literature, directed entanglement marks a decisive departure from the frameworks of 'embedded autonomy' (Evans, 1995) and 'governed interdependence' (Weiss, 1995), which characterized East Asian developmental states. Unlike these paradigms, which aimed at equilibrium between state and capital for growth, green economic planning requires a state-dominated architecture—a command center capable of overriding market inertia to accelerate decarbonization. Only from that architecture is effective green economic planning possible.

Ultimately, directed entanglement forces a return to foundational questions about democracy and state power in the climate emergency. The cases examined suggest that half-measures—relying on carbon pricing, derisking, or voluntary corporate commitments—are insufficient. Instead, the big green state equipped with vast green planning infrastructures must actively reshape markets through public ownership, credit sovereignty, and institutional redesign in ways that build state-led rather than market-led infrastructural entanglements (Gabor & Braun, 2025). This is not just an economic imperative but a democratic one: without the state reclaiming infrastructural power from private finance, societies cannot ensure that decarbonization serves collective welfare rather than just private profit. The task ahead is not merely technical but deeply political—a reassertion of public authority over the economy in the name of long-term survival.

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