Net Zero and Regressive Execution

When Good Intentions Ignore Capacity, Constraints, and Economic Feedback Loops

This paper does not argue against decarbonisation, but for transitions that can be absorbed without creating regressive outcomes.

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Disclaimer

This paper presents an analytical framework for discussion. It does not constitute investment, legal, military, or policy advice, nor does it advocate specific actions. The views expressed are personal and intended to provoke informed debate.

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Executive Summary

The objective of reducing carbon emissions is widely accepted. The central challenge is no longer *whether* to decarbonise, but *how* and *at what pace*.

This paper argues that while net zero targets may be directionally correct, their execution often underestimates a critical constraint: **energy is a non-discretionary input** across households, industry, and employment. When transition costs rise faster than technology, infrastructure, and substitution options can absorb them, the result is not merely higher prices — it is a **regressive redistribution of burden**, with second-order effects on competitiveness and jobs.

The risk is not climate ambition itself, but confusing intent with feasibility, and long-term goals with short-term capacity.

Scope and Intent

This paper does not attempt to quantify aggregate GDP impacts, sector-specific output paths, or long-run welfare effects of decarbonisation. Those questions are actively studied elsewhere and show heterogeneous outcomes depending on policy design, timing, and national context.

The focus here is narrower: to examine how execution that outpaces technical and social absorption can introduce regressive pressures and destabilising feedback loops, even when long-term objectives are widely supported.

Energy Is Not Optional

Energy differs from many other policy domains in one fundamental way: people and firms cannot opt out.

Households may reduce consumption at the margin, but heating, lighting, transport, and basic mobility are not discretionary. For industry, energy is a core input into production, logistics, and services.

As a result, energy demand is **inelastic over meaningful time horizons**.

This makes energy price shocks uniquely potent:

- They affect households and firms simultaneously
- They propagate quickly through the economy
- They leave limited room for behavioural adjustment

Policies that raise energy costs therefore do not merely shift incentives — they **reallocate constraint**.

Cost Pass-Through and Regressivity

Higher energy costs do not remain confined to utility bills.

They:

- Raise household expenditure directly
- Increase transport and food costs
- Flow into rents, goods, and services

For higher-income households, these increases are often manageable. Energy represents a smaller share of total expenditure, and capital is available to adapt — through insulation, electric vehicles, or alternative heating.

For lower-income households, energy consumes a far larger share of income. The same price increase therefore imposes a much heavier burden.

This asymmetry makes poorly sequenced energy transitions **regressive by construction**, regardless of intent.

Capital Substitution vs Behavioural Constraint

One of the least discussed aspects of the energy transition is **who is able to adapt**.

Wealthier households respond to higher energy costs with capital:

- New vehicles
- New heating systems
- Better insulation
- Access to private charging or storage

Lower-income households respond with constraint:

- Reduced mobility
- Colder homes
- Fewer employment options
- Higher financial stress

The transition therefore divides society not into those who care and those who don't, but into those who can **substitute** and those who must **endure**.

Technology Maturity and Timing Risk

Many decarbonisation pathways implicitly assume that higher prices or penalties — such as emissions taxes or restrictions on high-emission assets — will naturally drive adoption, innovation, and substitution.

In practice, this assumption only holds when viable alternatives already exist or are close to maturity. In many cases, continued emissions reflect **technical and infrastructural constraints rather than discretionary choice**. Where substitutes are unavailable, immature, or prohibitively expensive, penalisation does not accelerate transition — it simply raises costs.

This distinction matters. Incentives are effective when they lower the cost of adoption or accelerate deployment of feasible alternatives. Penalties are effective when behaviour is elastic. When behaviour is constrained by technology, penalty-based approaches function less as signals and more as transfers, redistributing burden without changing outcomes.

Pushing price signals ahead of capability creates a timing mismatch:

- Costs rise immediately
- Adaptation lags
- Innovation responds slowly

This gap is where public support erodes. People and firms do not resist climate goals because they deny risk; they resist policies that **treat technical limits as choices**.

Mandates vs System-Level Incentives

Many transition policies focus on **end-state mandates** — for example, defining a future year after which only electric vehicles may be sold. While directionally clear, such mandates often compress a wide range of technical and practical constraints into a single rule.

Households face very different realities. Access to off-street charging varies widely. Daily mobility needs differ. Grid capacity and local infrastructure are uneven. Treating adoption as a simple choice risks penalising those constrained by circumstance rather than preference.

An alternative policy lens focuses not on mandating outcomes, but on **designing systems that close the gap between ambition and feasibility**.

One example is the potential role of vehicle-to-grid (V2G) capability. Rather than viewing electric vehicles solely as consumers of energy, V2G treats them as distributed storage assets. Vehicles can be charged during periods of low demand or surplus generation, used for mobility during the day, and then provide residual energy back to the household or grid during peak periods before recharging during excess periods.

Such an approach:

- Expands effective energy storage without large central infrastructure
- Reduces peak demand stress on the grid
- Improves utilisation of intermittent generation
- Preserves choice while aligning incentives

The distinction is subtle but important: **mandates remove choice, while system-level incentives expand capability**.

Incentivising System Value, Not Just Adoption

Current electric vehicle subsidies largely reward ownership rather than **system contribution**. In practice, this treats all EVs as equivalent, despite their very different impacts on grid stability.

An alternative approach would align incentives with **system-level value**. Vehicles capable of vehicle-to-grid (V2G) participation — or similar bidirectional energy functionality — provide more than mobility. They function as distributed storage assets that can absorb surplus generation, smooth peak demand, and reduce reliance on centralised energy storage infrastructure.

Targeting subsidies toward EVs that offer this functionality would help close a critical gap in the transition. Rather than increasing demand on the grid, such vehicles actively support it.

Where deployed at sufficient scale, distributed vehicle-based storage can:

- Reduce peak load stress
- Improve utilisation of intermittent generation
- Lower the need for large, centralised storage facilities
- Localise energy balancing, reducing transmission strain

This approach does not remove choice. It preserves flexibility while rewarding designs that strengthen the system as a whole. The policy objective shifts from accelerating adoption at any cost to **accelerating adoption that reduces infrastructure pressure**.

In this sense, distributed storage embedded in everyday assets can provide resilience more efficiently than purely centralised solutions. Incentives that recognise this contribution help align private decisions with public system needs.

From Subsidy to Investment

When subsidies are granted simply for adoption, they function as a cost — accelerating uptake but leaving the underlying system no more resilient. When subsidies are tied to **measurable system contribution**, they become an investment.

Electric vehicles capable of providing vehicle-to-grid (V2G) functionality do not merely consume energy; they contribute to system stability by offering distributed storage and demand flexibility. Incentivising these capabilities allows public spending to build durable infrastructure embedded within privately owned assets.

At sufficient scale, such contributions reduce peak demand stress, improve utilisation of intermittent generation, and lower the need for large, centralised storage facilities. The benefit accrues not only to the vehicle owner, but to the wider energy system.

In this framing, targeted subsidies are no longer a transfer designed to encourage behaviour. They are a **capital investment in resilience**, deployed incrementally and locally rather than through monolithic infrastructure projects.

This distinction matters. Investments that reduce system stress compound over time, whereas subsidies that merely accelerate adoption must be repeated to sustain momentum.

From Early Adoption to Shared Benefit

Early subsidy regimes inevitably favoured those with the capital and circumstances to change first — households able to afford new vehicles, home charging, or property modifications. In practice, this meant public funds disproportionately benefited those already best positioned to adapt, while the broader system absorbed higher costs.

Linking subsidies to **system contribution** changes this dynamic. When incentives reward assets that stabilise the grid — by reducing peak demand, absorbing surplus generation, or providing localised storage — the benefit extends beyond the individual owner. Distributed contributors can support neighbours indirectly by easing infrastructure stress and lowering system-wide costs.

At sufficient scale, this turns private adoption into shared capacity. Peaks are smoothed, reliance on expensive central storage is reduced, and overall energy costs can fall. The subsidy no longer accelerates change for a subset of households; it finances resilience that benefits the entire network.

In this way, contribution-based incentives transform a regressive transfer into a **collective investment**, aligning private capability with public affordability.

Physical Constraints Cannot Be Wished Away

The purpose here is not to offer an engineering assessment, but to highlight the existence of physical and operational constraints that shape feasible timelines.

Energy systems require not just sufficient capacity, but stability. Baseline demand must be met continuously, supply must remain controllable, and system balance must remain within narrow tolerances.

Renewable generation introduces constraints that are still being actively worked through. Output is weather-dependent and often highly correlated across regions, limiting the benefits of geographic diversification. Energy cannot be transmitted arbitrarily far without significant infrastructure investment, and large-scale storage remains expensive and limited in duration.

While integration across sources and regions improves resilience at the margin, it does not eliminate the need for dependable baseline supply or rapid controllability. When intermittent generation drops suddenly, recovery is neither instant nor frictionless. Systems designed for baseline provision often require careful sequencing, safety checks, and procedural restart, extending disruption beyond the initial shock.

These are not arguments against renewables. They are reminders that **physical systems impose constraints that policy timelines cannot ignore**.

Energy Costs and the Employment Feedback Loop

Energy policy does not stop at households. It feeds directly into the labour market.

A common response to rising transition costs is to argue that industry or higher earners should simply absorb them — through higher wages, subsidies, or taxation. In practice, these costs rarely remain isolated.

When energy input costs rise:

- Production becomes more expensive
- Margins compress or prices rise
- Products become less competitive domestically and internationally

Higher prices reduce demand. Lower demand reduces output. Reduced output reduces the need to hire — or forces firms to cut costs elsewhere.

In this way, energy costs loop back into the job market not through intent, but through arithmetic.

Competitiveness, Demand, and Labour

Firms cannot indefinitely absorb higher input costs without consequence.

If prices rise:

- Domestic consumers buy less
- Export competitiveness deteriorates
- Market share shifts to lower-cost producers

If firms attempt to maintain margins:

- Investment slows
- Hiring is deferred
- Automation accelerates
- Employment becomes more precarious

The burden ultimately falls on workers — particularly those with fewer skills, fewer alternatives, and less geographic mobility.

Energy policy therefore propagates through **prices, demand, competitiveness, and employment**, not just emissions accounting.

Mobility as a Second-Order Constraint

Energy and employment are tightly linked through mobility.

Rising transport and vehicle costs disproportionately affect those who must travel to work and cannot relocate easily. Mobility enables:

- Access to jobs
- Cheaper housing further from city centres
- Economic flexibility

Constraining mobility without viable alternatives compresses opportunity and weakens labour-market resilience.

Why This Risk Is Under-Priced Politically

The distributional and employment impacts of energy transitions are often weakly priced because:

- Benefits are long-term and global
- Costs are immediate and local
- Responsibility is diffuse
- Feedback is delayed

When disruption occurs, the burden spreads outward — to consumers, workers, and, in some cases, the public sector. Costs are not eliminated; they are **redistributed**, often to those least able to absorb them.

As with other systemic transitions, institutional adaptation lags policy ambition.

What a More Resilient Transition Would Imply

A resilient energy transition does not abandon ambition.
It recognises **sequencing, capacity, and absorption** as first-order constraints.

That implies:

- Aligning incentives with technological readiness
- Reducing adoption barriers rather than penalising constraint
- Buffering households and workers during transition phases
- Preserving competitiveness while alternatives mature
- Treating energy as economic infrastructure, not merely a pricing lever

Transitions fail not because goals are wrong, but because execution outruns feasibility.

Closing Thought

Environmental risk is real.
So are physical, economic, and social constraints.

When transitions are pushed faster than systems, firms, and households can adapt, the burden does not disappear — it concentrates. Policies intended to protect the future risk undermining the present if they ignore capacity, distribution, and feedback loops into employment.

Decarbonisation is not only an environmental challenge.
It is a **systems, execution, and labour-market challenge**.

A transition that cannot be absorbed will not endure.

The Risk of Delay

Poorly sequenced transitions are not the only source of regressive harm. Environmental degradation, extreme weather, and resource stress also impose disproportionate costs on vulnerable populations, often with limited capacity to adapt.

The argument here is not for delay, but for durability. Transitions that collapse under social or economic strain risk political reversal, undermining both near-term progress and long-term outcomes.

Well-engineered implementation reduces friction by aligning incentives, capacity, and timing. By contrast, transitions that rely primarily on forced compliance or compressed mandates often generate resistance, distributional stress, and institutional pushback. These dynamics can slow adoption, fragment public support, and ultimately delay the very outcomes they are intended to accelerate.

Execution that respects constraints is not slower by default; it is more likely to endure.