



## **Input to the COP30 Presidency Roadmap for Transitioning Away from Fossil Fuels**

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**Environmental Defense Fund (EDF)** welcomes the opportunity to contribute to the COP30 Presidency Roadmap for transitioning away from fossil fuels in energy systems in a just, orderly, and equitable manner, as called for in the COP28 Global Stocktake outcome (paragraph 28.d).

EDF commends the historic consensus reached at COP28 to transition away from fossil fuels in energy systems and recognizes the leadership of COP28 President Dr. Sultan Al Jaber in brokering an outcome that balanced climate ambition with economic circumstances. This consensus sends a clear signal that while pathways differ, the global community is aligned on direction. Similarly, EDF welcomes the COP30 Presidency's emphasis on implementation, and its focus on translating the Global Stocktake outcome into practical, near-term action.

This submission focuses on practical barriers, enabling levers, and implementation insights drawn from EDF's work across major fossil-fuel producers and importer regions. It emphasizes how near-term emissions reductions, particularly methane mitigation, can support an orderly transition - when implemented with appropriate governance, equity safeguards, and community engagement - while countries pursue longer-term structural transformation consistent with the Paris Agreement and national circumstances. EDF has structured its input according to the questions provided in the call for submissions.

### **(a) Critical Barriers to Transitioning Away from Fossil Fuels**

#### *1. Economic and Developmental Constraints in Fossil-Dependent Systems*

Many countries and subnational regions remain fiscally and economically dependent on fossil fuel production, exports, or consumption. Public revenues, employment, energy affordability, and balance-of-payments considerations are often tightly linked to hydrocarbons, particularly in resource-dependent economies. Transition pathways perceived as threatening near-term stability, whether through revenue loss, employment impacts, or higher energy costs, can face significant political and institutional resistance.

These constraints are compounded in lower-income and rapidly developing economies, where fossil fuels continue to play a major role in expanding energy access and supporting economic growth. Transition strategies that do not adequately address energy security, affordability, and access risk exacerbating inequality, undermining development objectives, and eroding public support. As a result, many governments face a dual challenge: reducing fossil fuel dependence while maintaining reliable, affordable energy systems and fiscal stability during the transition period.

## *2. Infrastructure Lock-In and Institutional Capacity Limitations*

Long-lived fossil fuel infrastructure, including production facilities, LNG terminals, power generation assets, and associated transport and export systems, creates structural lock-in through sunk capital, long-term contracts, and institutional commitments. These factors can delay phase-down decisions, increase stranded-asset risk, and limit policy flexibility, especially where public finances or state-owned enterprises are closely tied to fossil assets.

Institutional capacity constraints further compound these challenges. Inaccurate or incomplete emissions data, weak monitoring, measurement, reporting and verification (MMRV) and enforcement frameworks, fragmented governance across agencies, and limited access to finance can undermine effective implementation of transition policies. These barriers are not primarily technological, but institutional, and they slow the deployment of available, cost-effective mitigation and transition measures.

## *3. Social, Environmental, and Political Economy Barriers*

Social and environmental inequities present both ethical imperatives and practical barriers to transition. Frontline and low-income communities disproportionately experience the health, environmental, and climate impacts of fossil fuel systems, yet often lack meaningful participation in decision-making or access to the economic benefits of transition efforts. At the same time, historical patterns of extractive development have created distrust in many fossil-dependent regions, particularly where communities have experienced economic volatility, environmental harm, or unfulfilled promises of diversification. Overcoming these political economy barriers requires transition approaches that are not only technically viable, but socially legitimate, grounded in transparency, community engagement, and tangible improvements in livelihoods and well-being.

A just and orderly transition away from fossil fuels must explicitly recognize the workers and communities whose livelihoods are tied to legacy energy and industrial systems. Many of the skills embodied in fossil fuel and heavy industry workforces, such as engineering, operations, project management, safety, and maintenance, are directly transferable to clean energy, electrification, infrastructure modernization, methane mitigation, and industrial decarbonization efforts. Transition strategies that pair emissions reduction with workforce planning, retraining, and redeployment can reduce social disruption, preserve local economic value, and accelerate implementation by building on existing human capital rather than discarding it. Ignoring these workforce dimensions risks slowing political acceptance, deepening regional inequities, and undermining the durability of transition policies.

## **(b) Key Levers to Accelerate Implementation**

Across all mitigation and transition pathways, EDF's experience underscores common implementation requirements: coordinated governance across ministries and levels of government to develop and implement policies and regulations; transparent measurement, reporting, and verification; alignment of finance, regulation, and market incentives (e.g., leveraging buyers' purchasing power to incentivize supply chain methane mitigation); and prioritization of low-cost, high-impact actions identified through economic analysis, including marginal abatement cost curve (MACC) assessments. Where these enabling conditions are absent, well-intentioned initiatives, whether focused on methane, electrification, or alternative fuels, risk leading to fragmentation, duplication, and under-delivery. EDF's implementation experience also includes sustained engagement with national oil companies, sovereigns, and energy sector investors, working to align capital allocation, operational practices, and performance standards with transition objectives, including methane mitigation, reporting, and absolute emissions decline across existing assets.

### *1. Rapid Methane Mitigation as a Source of Near-Term Wins*

Rapid methane mitigation in existing oil and gas systems offers a uniquely scalable opportunity to deliver immediate climate benefits while reducing waste, improving air quality and public health, and managing fiscal exposure in fossil-dependent economies. The International Energy Agency's (IEA) MACC assessments of the oil and gas sector indicate that a substantial share of methane emissions can be reduced using commercially available technologies at low or even negative net cost, with captured gas offsetting mitigation expenses.

In practice, barriers such as lack of adoption of methane's global warming potential on a 20-year timeframe, gaps between company policy and operational practices, limited access to capital, inaccurate and incomplete emissions data, lack of regulatory oversight and weak or inconsistent enforcement have prevented these cost-effective reductions from being realized at scale. Addressing these barriers through robust and transparent empirical data, clear performance standards, strong regulatory frameworks, and aligned market incentives conditioned on methane performance can unlock rapid emissions reductions while governments pursue longer-term structural transformation of energy systems. Moreover, engagement with national oil companies, who often control the majority of upstream emissions, can reduce split incentives and accelerate adoption of cost-effective mitigation when paired with strong regulatory and financial signals.

### *2. Structural Transformation of Energy Demand and Supply*

Achieving a durable transition away from fossil fuels requires structural change in how energy is produced and consumed, with clean-powered electrification and energy efficiency as central

pillars of that strategy rather than parallel agendas. Accelerating clean-powered electrification across buildings, transport, and industry can significantly reduce long-term fossil fuel reliance while lowering consumer costs, improving air quality, and strengthening system resilience. Explicitly embedding electrification into fossil fuel transition roadmaps and national planning helps align near-term emission reductions with durable structural change, reduces dependence on transitional technologies over time, and avoids new infrastructure lock-in that could undermine long-term decarbonization objectives.

At the same time, alternative fuels, including sustainable biofuels, hydrogen, and e-fuels, may play limited and clearly defined roles in a small number of hard-to-electrify sectors, such as aviation, maritime shipping, and select industrial processes. [These offer economic development and energy security advantages to countries who can harness abundant local resources and participate in new markets.](#) However, these pathways must be explicitly bounded and governed to ensure they support, rather than undermine, the transition away from fossil fuels, especially considering fossil-based fuels dominate the current alternative fuel supply.

[Without strong policy guardrails,](#) alternative fuel deployment risks reinforcing fossil fuel dependence, increasing upstream methane and/or lifecycle emissions, driving deforestation, or creating capital-intensive infrastructure that locks in new forms of extractive dependence. These risks are particularly acute for crop-based biofuels where sustainability standards and lifecycle accounting are often weak or inconsistently applied.

To contribute credibly to a just, orderly, and equitable transition, alternative fuels must meet four core conditions:

- Full lifecycle emissions accounting, including upstream methane emissions, unintended releases of hydrogen and ammonia, and GHG emissions associated with indirect land-use change;
- An evaluation of the alternatives and opportunity costs to ensure alternative fuels supplement, rather than displace, investments in electrification and efficiency;
- Explicit alignment with absolute fossil fuel decline, with deployment explicitly linked to phase-down strategies rather than fossil fuel expansion; and
- Strong social and environmental safeguards, particularly for land, water, ecosystems, and affected communities.

### *3. Carbon Capture, Utilization, and Storage (CCUS) as a Bounded Transition Tool*

[CCUS can play a limited but important role](#) in enabling a just and orderly transition away from fossil fuels, particularly in sectors and assets where near-term emissions elimination is not technically or economically feasible. EDF's work underscores that CCUS is not a substitute for

the phase-down of fossil fuels, nor a justification for new fossil fuel expansion. Rather, its use is best deployed in addressing residual emissions from existing infrastructure, reducing industrial process emissions in hard-to-abate sectors, and supporting the early retirement or repurposing of high-emitting assets when paired with clear phase-down strategies. CCUS may also play a transitional role in the production of lower carbon alternative fuels such as [hydrogen](#) or ammonia.

For CCUS to contribute meaningfully to transition objectives, strong policy guardrails are essential. These include robust lifecycle emissions accounting and air quality monitoring; credible monitoring, reporting, and verification of captured and stored CO<sub>2</sub>; safely operated and responsibly sited CO<sub>2</sub> pipelines; rigorous technical requirements and oversight to ensure the [environmental integrity of geologic storage](#); community engagement; and alignment with economy wide decarbonization pathways consistent with the Paris Agreement. Without such safeguards, CCUS deployment risks delaying structural transition, entrenching incumbent interests, and misallocating scarce public and private capital. When appropriately bounded and governed, however, CCUS can reduce transitional emissions risks, protect workers and communities tied to existing industrial systems, and help manage economic disruption as energy systems [transform](#). The safe transportation and geologic sequestration of carbon will also be vital in supporting carbon removal technologies such as direct air capture, underscoring the added utility of developing rigorous oversight programs for future non-fossil purposes.

#### *4. Enabling Governance, Coordination, and Economic Alignment*

The constraint in delivering a transition away from fossil fuels at the pace and scale required is not the availability of solutions, but rather the governance systems that enable their deployment. Strong economic governance is essential to manage revenue volatility, reduce stranded-asset risk, and align near-term mitigation with long-term transition objectives.

Carbon pricing, whether implemented through emissions trading systems, carbon taxes, or crediting mechanisms, is among the most economically efficient instruments for driving the structural transformation required by the Global Stocktake commitment. By placing a price on emissions, these instruments create persistent incentives for technology deployment, fuel switching, and investment reallocation away from fossil fuels, while generating revenues that can support just transition programs, fiscal diversification, and social protection.

Sector-specific international mechanisms further demonstrate how carbon pricing and fuel standards can drive investment into low and zero carbon technologies at scale. In international aviation, the [Carbon Offsetting and Reduction Scheme](#) for International Aviation (CORSIA) embeds a carbon cost into sectoral growth while reinforcing demand for high integrity emissions reductions under robust accounting rules. In maritime shipping, the International

Maritime Organization’s (IMO) Net-Zero Framework (NZF), combining a global fuel standard with a pricing mechanism on greenhouse gas emissions, represents a near-term opportunity to unlock investment in cleaner fuels, efficiency improvements, and enabling infrastructure across a globally mobile sector. While the [fate of the specific measures](#) around the IMO NZF remain uncertain, these mechanisms illustrate how coordinated international policy can reduce fragmentation, create predictable investment signals, and accelerate innovation in hard-to-abate sectors.

Finally, EDF’s experience shows that fragmented financing, uncoordinated initiatives, and inconsistent regulatory signals often prevent countries and institutions from prioritizing the low-cost, high-impact abatement opportunities identified through economic analysis. Better alignment across public finance, regulation, and market incentives can significantly improve implementation outcomes and reduce the overall cost of transition. In this context, the reformed Action Agenda and its Pathways to Accelerate Solutions (PAS) provide a critical opportunity to translate Roadmap priorities into coordinated action across governments, financial institutions, industry, and civil society. Aligning Roadmap outcomes with relevant PAS, particularly those focused on energy, industry, and transport, can help address fragmentation, close financing and MRV gaps, and accelerate delivery of cost-effective solutions consistent with a just, orderly, and equitable transition.

### **(c) Roadmap Experiences, Best Practices, and Lessons Learned**

#### *1. Integrating Near-Term Emissions Reduction with Economic Resilience*

EDF’s work across major fossil fuel producers and importer regions demonstrates that successful transition strategies consistently pair near-term emissions reduction with measures that strengthen economic resilience. Rather than treating pollution reduction and economic diversification as sequential or competing objectives, effective roadmaps integrate these goals from the outset. This integration is particularly important in fossil-dependent economies, where early, cost-effective emissions reductions can reduce fiscal and political risk and create space for subsequent investments in clean energy deployment, workforce transition, and local economic diversification. These reductions can deliver additional co-benefits, such as waste reduction and health improvements from fossil fuel methane mitigation.

#### *2. Transparency, Accountability, and Coordination as Enablers of Scale*

A second consistent lesson from country, regional, and sectoral transition efforts is the central role of transparency and coordination in enabling scale. Public, independently verifiable emissions data improves confidence among governments, markets, and communities, supports enforcement, and allows for credible tracking of progress over time. Where transparency is weak, roadmaps often struggle to translate ambition into delivery.

EDF's experience further highlights that uncoordinated initiatives across funders, domestic government actors, industry, service providers, and cross-country supply chains can lead to duplication, gaps in coverage, and inefficient use of limited resources. National roadmaps that establish clear lines of responsibility, shared data systems, and mechanisms for coordination across actors are better positioned to prioritize high-impact actions, mobilize finance, and maintain momentum through implementation.

### *3. Avoid New Extractive Lock-Ins and Vulnerabilities*

Finally, experience shows that transition pathways must be designed to avoid creating new forms of economic and environmental lock-in. Strategies that replace fossil fuel dependence with poorly governed extraction-oriented alternatives, including inadequately regulated alternative fuel supply chains, risk reproducing the same vulnerabilities that transitions seek to resolve.

National roadmaps that emphasize locally rooted value creation, economic activities toward diversification beyond resource extraction, and strong social and environmental safeguards are more likely to deliver durable benefits. Conversely, approaches that privilege capital-intensive, export-oriented pathways without sufficient governance can constrain future policy space, deepen inequality, and undermine public support. Avoiding these outcomes requires deliberate attention to governance design, community participation, and long-term economic resilience.

#### **(d) Delivering a Just, Orderly, and Equitable Transition**

A credible global pathway must reflect diverse national starting points, levels of fossil dependence, and development priorities. The sequencing of transition actions matters as much as their direction: economies that rely on fossil fuel revenues for public services, employment, and energy access face a dual challenge, reducing emissions while sustaining the fiscal and economic stability that makes transition politically durable.

Economic research on labor market impacts of carbon and energy policies consistently shows that transition costs are concentrated, falling disproportionately on specific workers, communities, and regions, while benefits are diffuse. Managing this asymmetry requires deliberate policy design, not simply fuel substitution. Key principles include:

- Differentiated pathways that allow countries to sequence actions based on capacity, energy needs, and economic structure.
- Fiscal resilience and economic diversification, particularly in resource-dependent economies, where near-term emissions reductions, including methane mitigation, can reduce revenue volatility and create space for longer-term structural transformation without triggering fiscal crises.

- Protection of energy security, access, and affordability, particularly for vulnerable populations, recognizing that transition policies that raise energy costs without compensating measures risk exacerbating poverty and eroding public support.
- Deliberate attention to workers and communities, including social protection, redeployment, and participation in planning, with explicit attention to the geographic concentration of transition costs in fossil-fuel-dependent regions.
- Equitable distribution of benefits, ensuring frontline communities see tangible health, economic, and environmental gains.

An orderly transition is not defined by a single timeline or technology, but by governance choices that minimize disruption, reduce harm, and expand economic opportunity, particularly for those most exposed to transition risk.

### ***Key Messages for the COP30 Roadmap***

1. Rapid methane mitigation is a cornerstone of an orderly transition, delivering immediate climate and economic benefits while countries scale up clean energy.
2. Transition strategies must confront fossil dependence and energy poverty together, sequencing actions in ways that achieve energy access and affordability while enabling long-term structural change.
3. Just transitions require deliberate economic governance and local value creation, not simply fuel substitution, to avoid replicating extractive dependencies. Just transitions also require social legitimacy – transition strategies are more likely to succeed when built on transparency, community engagement, and visible improvements in local livelihoods.
4. Alternative fuels, including biofuels, must be explicitly bounded and governed – playing limited roles in hard-to-abate sectors, facilitating absolute fossil fuel decline, and following strong social and environmental safeguards including robust lifecycle accounting.
5. CCUS can support a just and orderly transition when appropriately targeted and strongly governed, but it is not a fig leaf for business as usual or a substitute for fossil fuel phase-down.
6. Transparency, accountability, and economic prioritization are essential to ensure emissions reductions are real, cost-effective, and durable.
7. Aligning Roadmap outcomes/priorities with the Action Agenda and its Pathways to Accelerate Solutions provides an opportunity to reduce fragmentation, improve coordination, and accelerate implementation at scale.



## Conclusion

There is no credible pathway to climate stability that does not involve a significant transition away from fossil fuels. At the same time, insisting on uniform or immediate outcomes risks undermining both equity and durable implementation. The COP30 Presidency Roadmap is well positioned to move the global conversation from aspiration to action by highlighting practical options, differentiated pathways, and proven levers that countries can adapt to their own circumstances. Together, near-term risk reduction, structural transformation of energy systems, and enabling governance and coordination form a coherent implementation framework for transitioning away from fossil fuels in ways that are just, orderly, and equitable.

To move decisively from strategy to implementation, the COP30 Presidency Roadmap should be closely aligned with the restructured Action Agenda and its many PAS. As indicated by the COP31 Presidency, immediate opportunities include prioritizing action in focus areas such as electrification and net zero industrial technologies like hydrogen and CCUS. These pathways provide an opportunity to operationalize Roadmap priorities by coordinating actors, finance, and technical capacity around proven solutions. EDF's experience indicates that without such alignment, methane mitigation and broader transition efforts can become fragmented, overlooking cost-effective abatement opportunities identified through economic analysis. Strong Roadmap and PAS linkages can help ensure that implementation efforts are coherent, economically efficient, and supportive of a just and orderly transition away from fossil fuels.

EDF stands ready to support the Presidency's efforts to translate the Global Stocktake commitment into durable, just, and actionable transition strategies.