

# Final Consolidated Barriers and Solutions for Sustainable Biofuels in Land Transport

This matrix consolidates the recurring barriers and proposed solutions identified through Task 39, IAC and guest experts online and in-person international consultation conducted in 2026.

| No. | Strategic area                                     | Consolidated barriers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Priority solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | <b>Policy certainty and market creation</b>        | <ul style="list-style-type: none"> <li>• Electoral cycles and changing government priorities undermine continuity.</li> <li>• Technology-specific policies, fragmented regulation and the absence of long-term targets create uncertainty for investment and market development.</li> <li>• Energy-security objectives are not consistently integrated into transport and fuel policy.</li> </ul>                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• Establish stable, predictable and technology-open long-term policy frameworks.</li> <li>• Combine blending mandates and carbon-intensity standards with predictable targets and stable tax and pricing regimes.</li> <li>• Use environmentally responsible market and financial incentives to create durable demand.</li> <li>• Make energy security an explicit policy objective alongside emissions reduction and secure long-term government commitments.</li> </ul>                                                  |
| 2   | <b>Credible lifecycle and emissions accounting</b> | <ul style="list-style-type: none"> <li>• WTW and LCA methodologies, definitions, system boundaries and land-use models remain inconsistent across jurisdictions.</li> <li>• Data are insufficient or not publicly accessible, traceability gaps persist, and some attributional approaches cannot be independently verified.</li> <li>• Inconsistent treatment of upstream emissions, electricity sources and tailpipe emissions can distort comparisons among fuels and powertrains.</li> <li>• Global stakeholders are not adequately represented in forums that develop accounting frameworks, increasing complexity for policymakers and OEMs.</li> </ul> | <ul style="list-style-type: none"> <li>• Develop transparent and harmonized methodologies, definitions and system boundaries, using prospective LCA where appropriate.</li> <li>• Create shared, public and independently verifiable databases, carbon-intensity registries and traceability systems.</li> <li>• Promote mutual recognition of credible accounting systems and build technical capacity across countries.</li> <li>• Ensure inclusive participation by stakeholders from all regions in the development of lifecycle accounting rules.</li> </ul> |

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|-----|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3   | <b>Economics finance and bankability</b>                                 | <ul style="list-style-type: none"> <li>• Fossil fuels retain price advantages and continue to benefit from subsidies.</li> <li>• Biofuel projects require substantial capital, while investor momentum remains weak and business cases are often uncertain.</li> <li>• Capital costs and financing constraints are especially severe in emerging economies.</li> <li>• Lack of price competitiveness limits consumer uptake even when biofuels offer significant societal and environmental benefits.</li> </ul> | <ul style="list-style-type: none"> <li>• Use green premiums, concessional finance, carbon credits and credible minimum carbon prices to improve project economics.</li> <li>• Provide targeted public support and other market incentives where required to make sustainable biofuels competitive for consumers.</li> <li>• Reduce costs through productivity gains and learning-by-doing across expanding value chains.</li> <li>• Create stable demand through durable policy signals, procurement and long-term government commitments.</li> </ul>                                                                                                                                                                                                                  |
| 4   | <b>Fleet and infrastructure compatibility</b>                            | <ul style="list-style-type: none"> <li>• Some vehicles cannot use higher blends, and concerns persist about engine damage, performance and warranty coverage.</li> <li>• Storage, blending, distribution and refuelling infrastructure is insufficient in many markets.</li> <li>• Fuel availability and quality can vary locally and seasonally.</li> <li>• Deployment depends heavily on OEM decisions and cooperation across the fuel-vehicle system.</li> </ul>                                              | <ul style="list-style-type: none"> <li>• Expand flex-fuel and hybrid-flex vehicles and implement targeted upgrades for priority fleet segments.</li> <li>• Use demonstrations, government procurement and strategically selected fleet applications to prove technical performance and create demand.</li> <li>• Support infrastructure expansion, including distributed and small-scale biomethane projects, through appropriate investment and tax incentives.</li> <li>• Strengthen local and seasonal fuel-quality control, OEM cooperation and communication campaigns on compatibility, safety and performance.</li> </ul>                                                                                                                                       |
| 5   | <b>Political narrative social legitimacy and environmental integrity</b> | <ul style="list-style-type: none"> <li>• Electrification is often presented as the preferred or only sustainable pathway for land transport.</li> <li>• Food-versus-fuel claims, forest concerns, feedstock discrimination and misinformation weaken public and political support.</li> <li>• The complexity of a portfolio approach is difficult to communicate, and concerns about environmental and social performance can erode confidence.</li> </ul>                                                       | <ul style="list-style-type: none"> <li>• Use real-world case studies, practical demonstrations and clear evidence of lifecycle emissions reductions to communicate the role of sustainable biofuels.</li> <li>• Communicate policy decisions transparently and sufficiently in advance so producers, OEMs, infrastructure providers and consumers can prepare and adapt.</li> <li>• Strengthen cooperation with vehicle manufacturers and other trusted messengers.</li> <li>• Apply robust sustainability safeguards: zero deforestation and ecosystem protection; lifecycle GHG accounting supported by a public carbon-intensity registry; best management practices for water, soil and nutrients; and protection of Indigenous rights and land tenure.</li> </ul> |

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|-----|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6   | <b>International coordination with regional differentiation</b> | <ul style="list-style-type: none"> <li>• Road transport lacks a global coordinating institution equivalent to those serving international aviation and maritime transport.</li> <li>• Standards and regulatory approaches are incompatible, national circumstances differ, and no common implementation vision has emerged.</li> <li>• Fragmentation constrains trade, investment, technology transfer and the use of fuels across markets and transport modes.</li> </ul>                                                          | <ul style="list-style-type: none"> <li>• Develop global and cross-sector baseline standards or meta-standards while preserving flexibility for different national and regional circumstances.</li> <li>• Advance mutual recognition and interoperability across road, aviation and maritime transport.</li> <li>• Use international forums and working groups to align approaches, recognize regional roadmaps and build a shared implementation vision.</li> <li>• Expand knowledge exchange and capacity building so all regions can participate effectively.</li> </ul> |
| 7   | <b>Scalable inclusive and affordable certification</b>          | <ul style="list-style-type: none"> <li>• Certification costs are high, auditor capacity is limited, and requirements are duplicated across schemes.</li> <li>• Prescriptive requirements are not always adapted to national circumstances or proportionate to actual sustainability risks.</li> <li>• Complex systems are difficult to scale and can exclude small producers and emerging economies.</li> <li>• Compliance already verified by credible national systems is not consistently recognized internationally.</li> </ul> | <ul style="list-style-type: none"> <li>• Establish an intergovernmental baseline sustainability framework with clear minimum safeguards.</li> <li>• Recognize government-verified compliance for requirements already covered by credible national systems.</li> <li>• Use risk-based third-party auditing, mutual recognition and verified public databases to reduce duplication while preserving integrity.</li> <li>• Design certification schemes that are scalable, applicable and affordable for small producers and emerging economies.</li> </ul>                 |