

Working Paper

Global Green Road Corridors: Enabling Factors for Successful Launch, Development, and Scale

By Adrian Serna Tamez, Drive to Zero, and Bill Van Amburg
September 2024

WHY GREEN ROAD CORRIDORS?

All sectors of the world economy are starting to flatten or reduce their carbon emissions—[except transportation](#). Within this sector, the fastest growth in emissions [comes from medium- and heavy-duty commercial vehicles](#) (MHDVs). A rapid transition to zero-emission (ZE) MHDVs is crucial to reverse this trend and improve air quality in communities heavily burdened by diesel pollution.

While the first big growth of ZE-MHDVs is taking place in return-to-base applications (such as urban transit and local goods movement), the greatest climate and health impacts come from regional and long-haul segments, which utilize the largest trucks driving longer distances between major depots, hubs, cities, and ports, and along key transportation routes. For example, these segments make up less than 15% of the U.S. fleet but are responsible for [approximately 60%](#) of greenhouse gas (GHG) emissions, urban nitrogen oxides, and particulate matter due to their higher mileage and more intensive use. As the demand for freight transport continues to grow globally, these numbers are expected to increase.

Road corridors provide the connections that make the transport system work. ZE-MHDV technology is now able to serve these highest impact segments and turn the world's corridors green.

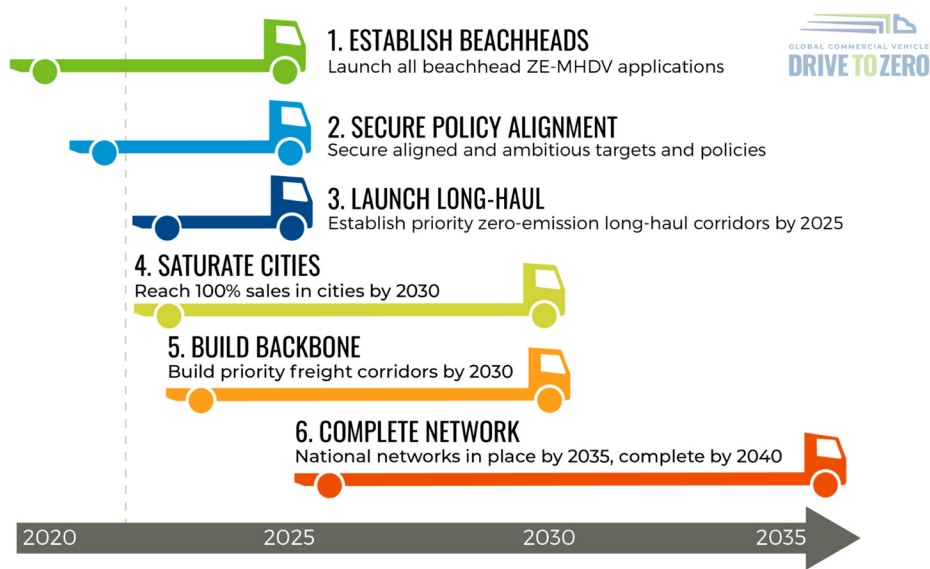
WHY ACT NOW?

To avoid the worst impacts of climate change, the world must achieve a net-zero economy by 2050. For trucks and buses, this means 30% of new sales must be ZE by 2030 and 100% by 2040, as is being carried forward by 38 nations through the [Global Memorandum of Understanding \(Global MOU\) on ZE-MHDVs](#). To achieve these targets, efforts to organize and develop green road corridors must advance.

As shown in the [Global Roadmap for Reaching 100% ZE-MHDVs by 2040](#), it is imperative to begin the buildout of these first corridors by 2025 to stay on track to 2040 outcomes (Figure 1). Acting now provides valuable lead time to address the unique requirements of ZE regional and long-haul vehicles, including capital costs, operational demands on longer routes, and high-power infrastructure. Building the first key corridors proactively positions the world to stay on pace to reach climate neutrality and sends a powerful message of certainty to the entire market.

Figure 1. Global Roadmap for Reaching 100% ZE-MHDVs by 2040

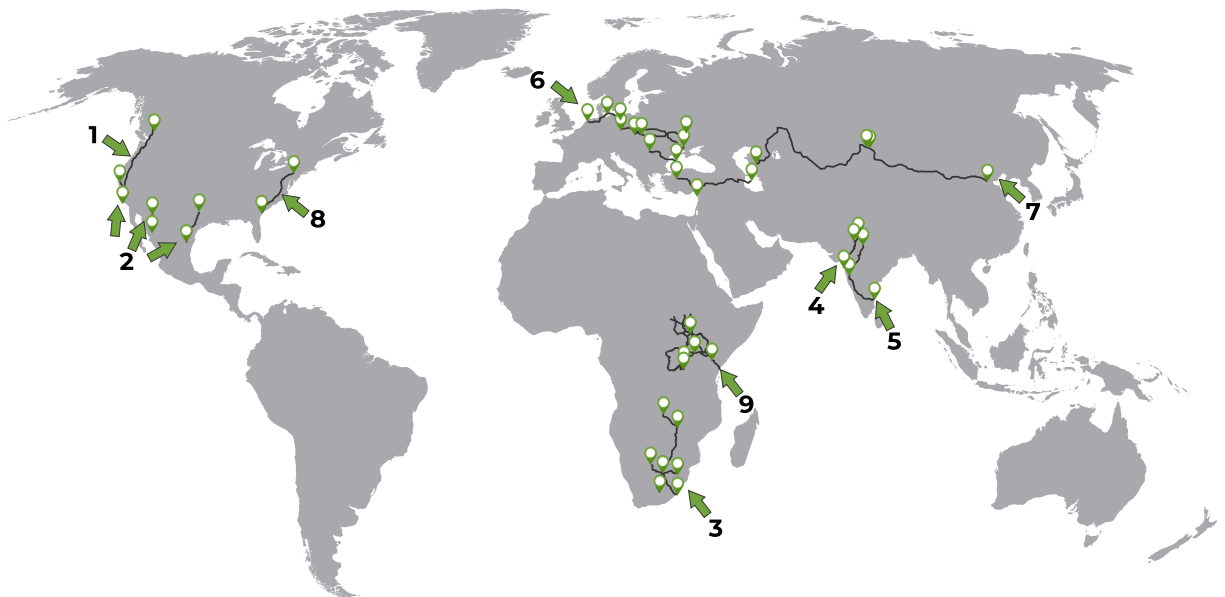
6-STAGE STRATEGY TO ENABLE 100% ZE-MHDVS BY 2040 (AND 30% BY 2030)



GLOBAL GREEN ROAD CORRIDORS INITIATIVE

CALSTART's global Drive to Zero program, alongside our partners and allies in the [ZEVWISE](#) coalition, have launched an ambitious effort to advance a diverse set of the world's road corridors (Figure 2) to transition to a ZE-MHDV ecosystem. These Global Green Road Corridors, each led by an array of partners worldwide, will establish the basis for a replicable, adaptable model that can accelerate global ZE-MHDV deployment. This model will serve as a real-time resource and framework for growth and success. Beyond the scope of the initiative, Drive to Zero has identified nearly 30 green road corridors in development worldwide, showing the momentum, scale, and benefit of this effort.

Figure 2. Initial Set of Corridors Supported by Global Green Road Corridors Initiative

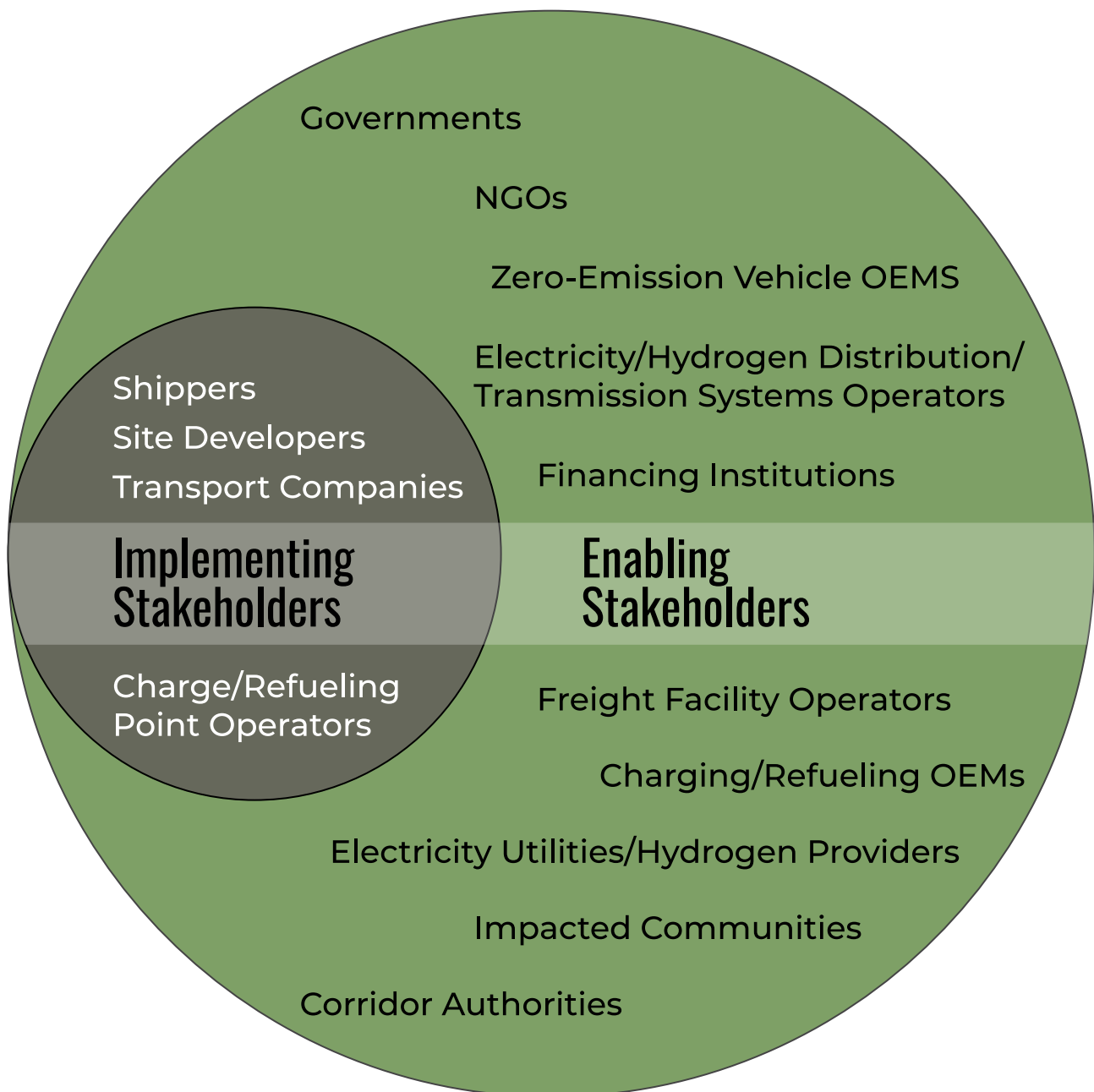


WHO NEEDS TO BE INVOLVED?

Corridors are complex, dynamic transportation systems that require involvement and coordination of multiple stakeholders to be successful, including government, authorities, industry, nonprofit organizations, and communities. Stakeholders involved in green road corridor development can be categorized into two primary groups (Figure 3):

- **Enabling stakeholders** focus on creating the conditions necessary for the successful development of corridors.
- **Implementing stakeholders** are directly engaged in the deployment, use, management, and maintenance of the corridor network and associated publicly available infrastructure.

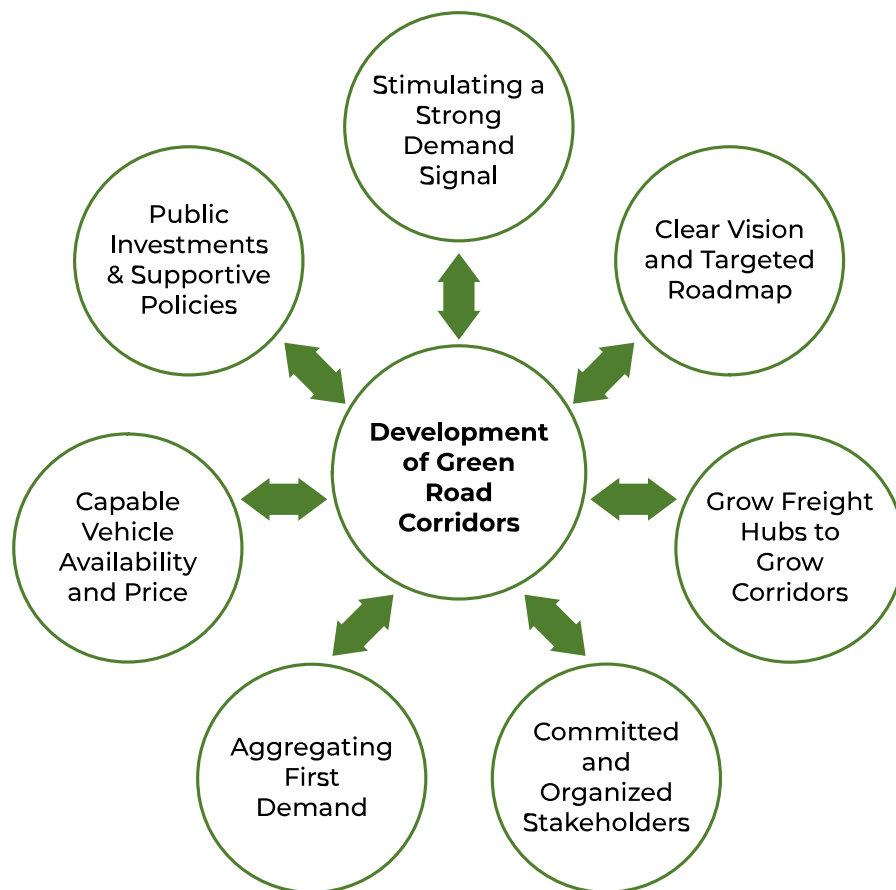
Figure 3. Stakeholders Involved in Road Corridors Development



WHAT ARE THE ENABLING SUCCESS FACTORS?

Developing green road corridors requires understanding key factors that drive their establishment and effectiveness (Figure 4). Governments and authorities have a significant role to play. By engaging and coordinating stakeholders on these factors early on, leaders can speed up action and increase the likelihood of success. These factors form an interconnected ecosystem of support, none of which are sufficient alone. The following preliminary factors distill the learnings from leading site developers, charge-point operators, shipper and transport companies, and governments interviewed by Drive to Zero, and will be further elaborated upon in a comprehensive report to be published at the end of this year.

Figure 4. Key Enabling Success Factors for Developing Green Road Corridors



Stimulating a Strong Demand Signal

Driving and supporting vehicle and infrastructure demand is the fundamental enabling success factor to establish green road corridors on the timeline needed. This demand can be driven by several elements, but based on stakeholder discussions, the strongest form comes from government regulations that require an increasing number of ZE-MHDVs to be bought and sold each year. Examples include supply-side regulations (SSR) such as [Advanced Clean Trucks \(ACT\)](#) in California and other U.S. states or the [heavy-duty CO2 emission standards](#) in Europe. Demand-side regulations, such as California's [Advanced Clean Fleets \(ACF\)](#), which requires fleet purchase of ZE-MHDVs, can complement SSR. These regulations establish a clear transition timeline, encourage production at scale and associated price reductions, and allow companies—and investors—to plan for the future.

Public Investments and Supportive Policy

Demand must also be backed by strong initial government funding and supportive policy. While private capital will provide the backbone for the long-term buildout of road corridor infrastructure, initial public co-funding of infrastructure deployments, for purchasing ZE-MHDVs and even underwriting the charging business case, is a critical enabling condition. This can take the form of grants, incentives, loan funding utilization guarantees, or other innovative financial mechanisms that reduce the risk of investing in and using ZE-MHDVs and infrastructure. The public has an immense stake in ensuring corridor success to reap the economic and health benefits.

Clear Vision and Targeted Roadmap

Alongside regulatory certainty and financing, identifying and prioritizing the locations where corridors can succeed first is vital. Infrastructure site operators and fleets cannot afford to launch their efforts everywhere all at once. They require targeted locations chosen for success metrics, including high-volume freight traffic, supportive policy and financing mechanisms, available energy and conducive energy rates, proximity to high-volume freight hubs, and where emissions reduction of local and non-local air pollutants would produce the greatest benefits to air quality and GHG reduction.

Grow Freight Hubs to Grow Corridors

At their core, corridors are high-volume freight routes that connect important freight hubs, such as ports and major centers of distribution. Most stakeholders believe the first focus of any corridor must be to build out an effective regional charging capability at hubs and consequently grow the planned corridor from these success points. The first wave of market penetration for ZE-MHDVs will be in regional applications and expand as capabilities grow.

Capable Vehicle Availability and Price

While ZE-MHDVs are available in multiple models and applications from most of the world's major manufacturers, longer-distance, faster-charging vehicles need to enter the market at high production volumes sooner than currently planned. Their price must also be low enough to ensure affordability (especially for small and medium enterprises), support a viable life-cycle business case, and render investments in diesel vehicles impractical. In the near term, strong regulations combined with public incentives can help bridge the gap as vehicle volumes rise and supply chains grow. Manufacturers offering more competitive pricing to stimulate early market growth would provide significant support.

Aggregating First Demand

While regulations will provide broad demand certainty, aggregating initial specific demand from shippers and transport companies in targeted regions can help accelerate early corridor deployment, mitigate risks, reduce costs, and unlock finance. Fleets in the same location can coordinate timing on truck orders and infrastructure installation to promote asset sharing and help utilities coordinate. Realistically, most early users will not represent sufficient utilization of first sites on their own for third-party site developers to attract capital—unless the demand from additional users can be combined. Several NGOs are providing such valuable coordinative services to bring fleets and developers in business parks or hubs together, and more of this creative coordination around shared asset-use is needed.

Committed and Organized Stakeholders

Effective stakeholder coordination is essential for developing green road corridors, requiring early and ongoing collaboration. This is a role that trusted and well-capacitated governments, independent authorities, and NGOs can serve, providing a solid foundation. A balanced development approach that integrates both top-down and bottom-up strategies is ideal. Top-down engagement from central authorities, like national governments or corridor management bodies, provides policies, resources, and guidance. Bottom-up involvement from local governments, community groups, and other stakeholders ensures sensitivity to local contexts and support for development efforts.

Additional Enabling Factors

- Available and affordable energy
- Access to clean energy and steadily decarbonizing energy mix
- Streamlined permitting and grid connection times
- Interoperable and reliable charging/fueling systems
- Standardized and enforced emissions accounting frameworks, and fuel and air quality standards
- Megawatt Charging Systems (MCS) availability

WHAT CAN GOVERNMENTS DO?

Responsive governments play a critical role in the effective launch, development, and operation of green road corridors. Here is a preliminary list of recommendations:

- Establish clear goals, strong regulations, and supportive policies for ZE-MHDVs and their infrastructure.
- Develop a national/sub-national prioritized and phased ZE freight infrastructure plan to identify and target first hub and corridor locations.
- Provide government co-funding and incentives to launch hub and corridor infrastructure and reduce vehicle cost.
- Support innovative financial mechanisms that reduce the risk of investment and operation of ZE-MHDVs and infrastructure.
- Enable and require utilities and energy providers to accelerate and prioritize investments in and support for ZE-MHDV infrastructure interconnection and competitive rates.
- Engage with the ZEVWISE partners and allies in the Global Green Road Corridors initiative to advance ZE transportation together.

Drive to Zero would like to acknowledge several ZEVWISE partners for their input on this publication: WBCSD, UNEP, and The World Bank.