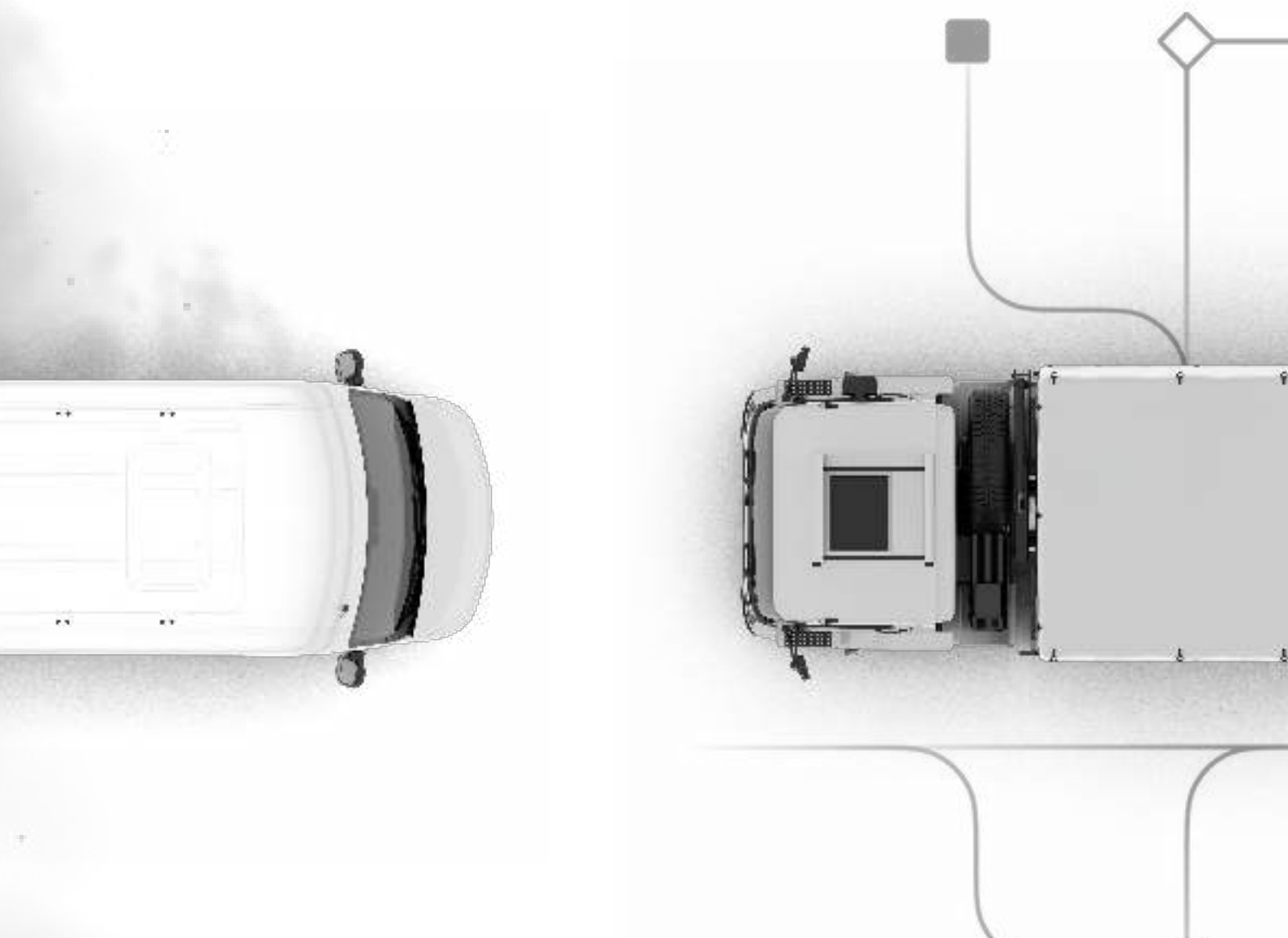
Optimize TMS & Ride-Hailing Platforms with Emission Capabilities



Executive summary

Emission management is no longer just a regulatory requirement; it is a strategic imperative that drives operational efficiency and market differentiation. As the global march towards carbon neutrality accelerates, businesses are increasingly pressed to adopt sustainable practices.

This whitepaper delves into the growing importance of integrating emission capabilities within Transport Management Systems (TMS) and ride-hailing platforms, particularly as regulatory frameworks tighten across key markets. The paper analyzes how these capabilities can transform logistics and transportation operations, ensuring compliance, enhancing customer satisfaction, and securing a competitive edge.

Key Insights

Global Regulatory Overview

Emission regulations, like the EU's ETS and the US EPA mandates, are pushing businesses to adopt emission tracking and reporting tools.

Read it on **page 02**

Impact on Sectors

A major emitter, the transportation sector is under scrutiny. Logistics, shipping, and ride-hailing companies need advanced emission tracking tools for real-time data, compliance, and insights.

Read it on **page 08**

Strategic Growth

The Ansoff Matrix shows how emission capabilities support market growth and diversification, especially in regions with new or stricter regulations.

Read it on **page 11**

Operational Gains

Emission data helps businesses optimize routes, cut fuel costs, and automate compliance, reducing admin work.

Read it on **page 14**

In-House Development Challenges

Building emission tracking systems in-house is costly and complex. Partnering with climate-tech experts offers a smarter choice.

Read it on **page 17**

Market Advantage

Emission tracking platforms can boost market positioning, meet sustainability demands, and avoid compliance risks.

Read it on **page 20**

This whitepaper is an essential resource for executives in the transportation and ride-hailing sectors, offering valuable insights into emissions reporting and compliance strategies.

Table of Contents

The growing importance of emission capabilities

The global shift towards carbon neutrality is compelling businesses to embrace sustainability by choice or necessity. As carbon neutrality becomes a global priority, companies face new challenges in meeting regulatory and customer demands. Sustainability in 2024 and beyond isn't just about the actions you take; it's about the broader impact those actions have and how successful they are in generating positive reactions.

A key aspect of achieving carbon neutrality is managing emissions, which is becoming increasingly important in today's landscape. Look at Fig. 1, which shows global greenhouse gas emissions by sector. It highlights that the energy sector is the largest contributor, making up 73.2% of global emissions. Of this, energy use in industry contributes 24.2%, transportation 16.2%, and energy use in buildings 17.5%.

Global greenhouse gas emissions by sector

This is shown for the year 2016 - global greenhouse gas emissions were 49.4 billion tonnes CO_2eq.

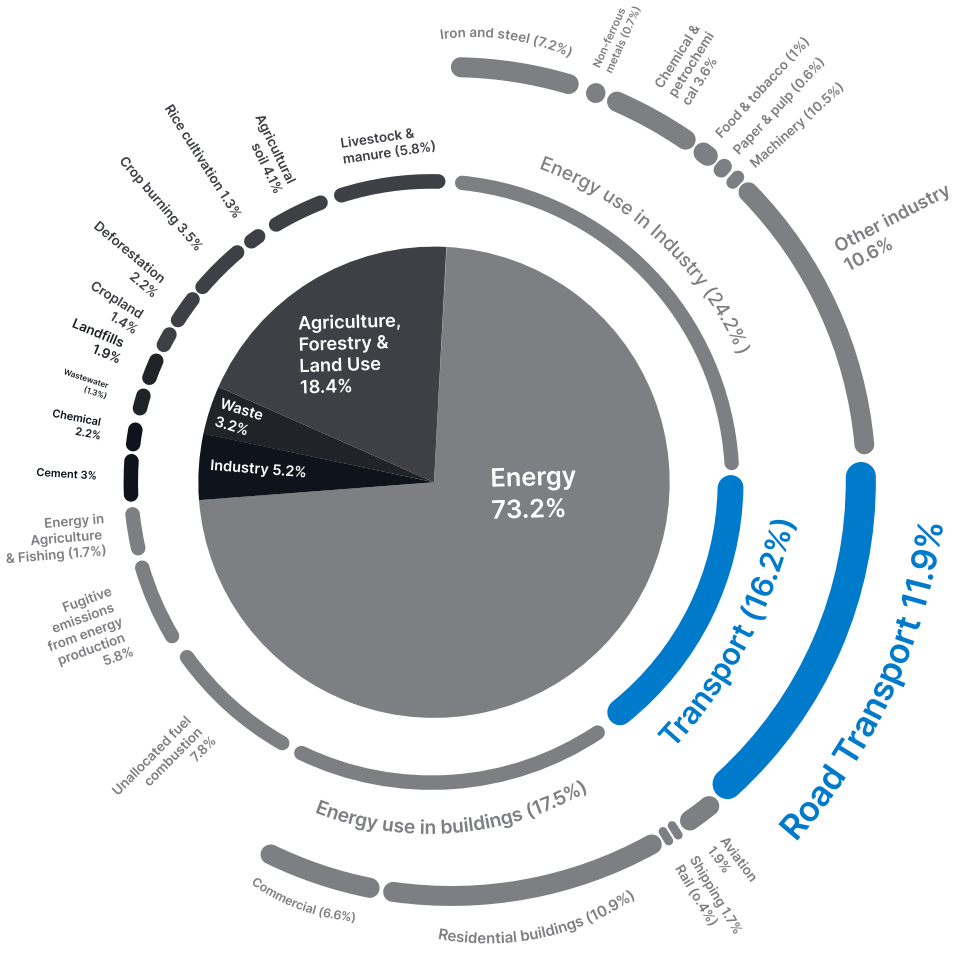
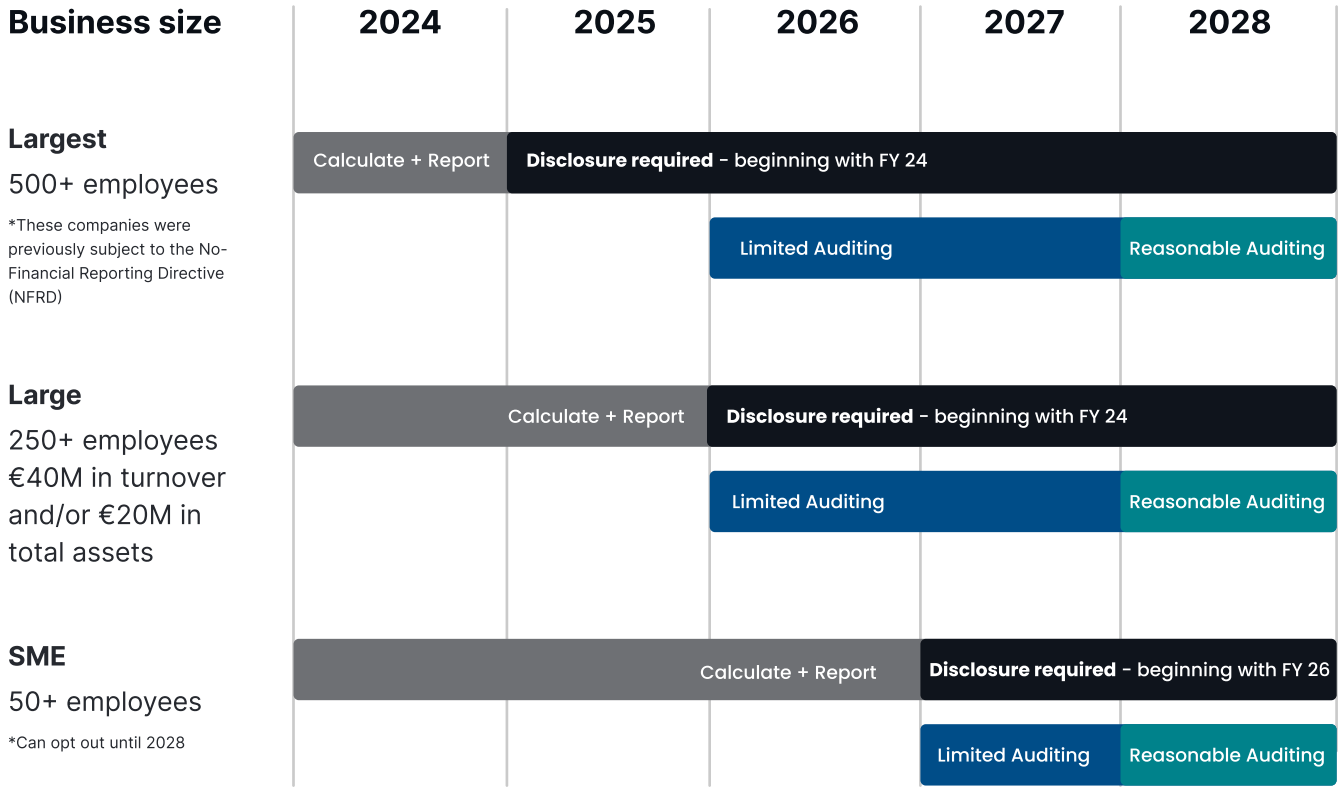


Fig. 1: GHG emissions by sector (OurWorldInData.org, licensed under CC-BY by author Hannah Ritchie)

As regulatory frameworks tighten and consumer expectations evolve, businesses in these sectors must prepare for the inevitable changes. For example, in the United Kingdom, companies having more than £36 million annual turnover, a balance sheet total of £18 million or more, or greater than or equal to 250 employees have to report their greenhouse gas emissions, energy consumption, and energy efficiency measures in their annual reports as a mandate to **SECR reporting**.

In the EU, the **ETS** limits total greenhouse gas emissions, requiring companies emitting over 25,000 tonnes of CO2 annually to buy carbon credits. In the US, facilities emitting over 25,000 metric tons of CO2 must report to the **EPA**, with states like California setting stricter thresholds.

Adopted by the European Commission in November 2022, the **CSRD updates** and expands the Non-Financial Reporting Directive (NFRD), introducing more detailed reporting requirements and broadening the scope of companies required to comply.



*The EU will determine reasonable audit requirements by October 2028

Fig. 2: Timeline for CSRD compliance: preparation, disclosure, and audit deadlines.

Australian companies have to report according to **NGER requirements**, which determine obligations under the NGER Act based on facility thresholds and corporate group thresholds. Fig. 3 talks about global climate targets and regulatory trends.

Country	Target	Regulations
United States	Net-zero emissions by 2050	EPA to reinstate and strengthen methane emissions regulations from oil and gas operations. DOE to implement new energy efficiency standards for buildings and appliances.
India	Reduce GHG emission intensity by 45% by 2030 compared to 2005 levels Achieve net-zero emissions by 2070	Framework for cleaner energy transition (2021-2030). Increase green jobs and boost low-emissions product manufacturing. Promote green hydrogen. Green hydrogen target of 5 million tonnes/year by 2030. Carbon sink of 2.5 to 3 GtCO2e by 2030. Energy consumption standards for ships and vehicles. Non-fossil energy requirements for some consumers.
Europe	Reduce GHG emissions by at least 55% by 2030 compared to 1990 levels	EU ETS covers around 45% of GHG emissions, revised to align with the 2030 target. Carbon Border Adjustment Mechanism (CBAM) to be introduced from 2023.
China	Peak carbon emissions by 2030 Achieve carbon neutrality by 2060	National ETS was implemented in 2021, initially covering the power sector and large industrial emitters. Plans to expand to other sectors.
United Kingdom	Net-zero emissions by 2050	Domestic ETS introduced in 2021 covering power, industry, and aviation. Carbon pricing to increase from £18 per tonne in 2021 to £70 per tonne by 2030.

Fig. 3: Regional climate targets and associated regulatory actions.

McKinsey & Company found that, in a pathway to 50% logistics emissions reduction by 2030, **dynamic route optimization is the 2nd largest lever for supply chain efficiency**, which is dealt with by Transport Management System – TMS software.

Pathway to 50% logistics emissions reduction by 2030

Supply chain efficiency levers
Supplier/technology levers
Transport
Warehousing

Levers	Emissions reduction%	Impact Source	Description
Logistics emissions	100		
Network redesign	7-9		Optimized network to reduce distance traveled and optimize assets/footprint.
Routing optimization	5-7		Reduced distance traveled and empty backhauls with dynamic route optimization.
Load optimizaation	4-5		Improved utilization with load optimization and planning.
Mode mix	4-6		Utilizing higher-efficiency modes such as shipping and rail.
Vehicle efficiency	5-6		Efficient vehicle design, tire technology, and operations.
Electrification	10-12		Electrification of fleets to ensure zero tailpipe emissions.
Advanced fuels	2		Switching to advanced fuels and fuels from waste that reduce overall GHG emissions.
Energy efficiency	2		Purchasing renewable energy, using solar panels, switching to electric material-handling equipment.
Building efficiency	1		Effiecient building materials, lighting, and insulation to reduce energy usage.
Future emissions	50-60		

Fig. 4: Pathway to 50% logistics emission reduction – McKinsey & Company.

Similarly, according to the Transport Environment Organization— advocates of clean transport and energy in Europe, cited a U.S. study indicating that **ride-hailing trips now contribute approximately 69% more climate pollution**.

Given this heightened focus on awareness, reporting, and compliance, emission capabilities are becoming a crucial component for SaaS solutions in logistics, transportation, and ride-hailing. These platforms must enhance their features to include robust emission tracking and reporting tools, which are essential for addressing environmental impacts and meeting regulatory standards.

Soon, companies involved in transportation and logistics will be required to analyze CO_2 emissions mandatorily. To facilitate this, companies will increasingly rely on vendors, such as those providing Transport Management Systems (TMS), for comprehensive emission analysis and reporting capabilities. This reliance may leave them with less time for scenario analysis and meeting requirements, potentially resulting in inaccurate reporting or oversight due to limited resources and insufficient insights provided in a short timeframe.

Even providers of emission capabilities in TMS may face challenges if their solutions are not designed with a strong understanding of climate principles and their impact on various scenarios. Without support from companies specializing in climate technology and data, these providers could encounter increased proprietary risks and limitations in their capabilities.

Scenario analysis: Emission capabilities in TMS & Ride-Hailing platforms

As sustainability demands and regulatory pressure grow, TMS & Ride-hailing platforms will feel the need to build emission capabilities. Figures 5 & 6 compare platforms with and without these features in both sectors.

Comparison of emission capabilities for TMS offering to logistics & shipping companies

Feature	Without Emission Capabilities	With Emission Capabilities
Key Features	Basic TMS functionalities, standard shipment tracking, and route planning.	Advanced emission tracking, CO2e calculation, and reporting tools.
Capabilities	Limited to standard logistics features without emission insights.	Real-time emissions data, route optimization, compliance reporting.
Market Differentiation	Limited differentiation, struggles in a sustainability-focused market.	Strong differentiation through comprehensive sustainability features.
Customer Demand	May fail to meet increasing expectations for eco-friendly solutions.	Meets growing demand for emissions transparency and sustainability.
Regulatory Compliance	Risk of falling behind on compliance with evolving regulations.	Helps clients comply with environmental regulations.
KPIs	Potential delays in market entry, lower customer satisfaction, missed growth opportunities.	Faster time to market, improved customer satisfaction, revenue growth.
Examples of Applications	Shippers (limited decision-making), Carriers (no emissions reports), 3PL Companies (difficult compliance).	Shippers (eco-friendly decisions), Carriers (detailed emissions reports), 3PL Companies (client emissions reporting).

Fig. 5: TMS Capabilities: with vs. without emission features.

TMS platforms without emission capabilities offer basic features like shipment tracking and route planning but fall short as emission regulations tighten. & demand increases. In contrast, platforms with advanced emission tools provide real-time CO_2e tracking, route optimization, and compliance reporting, enhancing market differentiation and meeting sustainability demands. These features help clients navigate regulations, attract sustainability-focused companies, and optimize supply chains more sustainably.

Comparison of emissions capabilities for ride-hailing platforms and solutions

Feature	Without Emission Capabilities	With Emission Capabilities
Key Features	Basic ride-hailing functionalities without emission tracking.	Emission tracking, support for various vehicle types, reporting tools.
Capabilities	Focused on ride matching, payment processing, and basic management.	Emission calculations for trips, route optimization, regulatory compliance.
Market Differentiation	Limited differentiation, struggles with sustainability features.	Differentiates with built-in emission tracking features.
Customer Demand	May not meet user expectations for eco-friendly travel.	Addresses demand for sustainable travel options.
Regulatory Compliance	Risk of non-compliance with regulations and voluntary norms.	Ensures adherence to environmental regulations and disclosures.
KPIs	Lower satisfaction, potential regulatory issues, reduced appeal.	Enhanced user satisfaction, improved compliance, increased appeal.
Examples of Applications	Riders (no emissions data), Drivers (no carbon offsetting), Fleet Operators (no optimization).	Riders (eco-friendly travel choices), Drivers (emissions insights), Fleet Operators (optimized routes).

Fig. 6: Ride Hailing: with vs. without emission features.

Ride-hailing companies lacking emission capabilities focus on core functions like ride matching and payment processing but may fall short as environmental priorities grow. Platforms with emission tracking, vehicle support, and detailed reporting can offer eco-friendly options, support carbon offsetting, and optimize routes. These features improve market appeal and ensure compliance with sustainability standards.

For both TMS and ride-hailing platforms, integrating emission capabilities isn't just about meeting regulations—it's a strategic move. Companies that adopt these capabilities will be better positioned to capture market opportunities, boost customer satisfaction, and drive revenue growth. Advanced emission tracking and reporting tools help manage regulatory risks and offer a competitive edge in a sustainability-driven market. As global focus on climate action sharpens, providing robust emission insights and supporting sustainability goals will become increasingly vital.

The strategic imperative of emission-focused operations

Adopting emission capabilities as a strategic imperative provides more than just compliance benefits—it significantly enhances operational efficiency. By integrating advanced emission tracking and reporting tools, companies gain a competitive edge through improved resource management and streamlined operations, as shown in Fig 7. These capabilities enable better route optimization, reduce resource wastage, and lower operational costs by providing actionable insights into emission patterns and operational inefficiencies.

Additionally, automating emission reporting processes mitigates compliance risks and reduces administrative overhead, allowing teams to focus on core business activities. This strategic focus meets regulatory requirements and aligns with customer preferences for sustainability, driving market differentiation and growth.

Optimized Resource Allocation

Companies can identify inefficiencies in their logistics and transportation operations by analyzing emission data. This insight allows for better allocation of resources, such as optimizing fleet usage and reducing unnecessary trips, which can lead to cost savings.

Streamlined Reporting Processes

Automated emission tracking and reporting tools simplify the process of generating reports for regulatory compliance and internal audits. This efficiency reduces administrative overhead and frees up time for strategic activities.

Improved Operational Resilience

Advanced emission tracking tools offer early warnings about potential compliance issues or operational inefficiencies. This proactive approach enables companies to address problems before they escalate, enhancing overall operational resilience.

Enhanced Partner Relationships

By demonstrating a commitment to sustainability, companies can strengthen relationships with partners and suppliers who share similar values. This can lead to more favorable terms and collaborative opportunities.

Data-Driven Innovation

Emission data can uncover trends and patterns that drive innovation. For instance, companies might develop new features or services based on insights gained from emissions analysis, keeping them ahead of industry trends and customer needs.

Future-Proofing Operations

As regulations around emissions become stricter, having integrated emission capabilities ensures that companies are prepared for future compliance requirements. This forward-thinking approach can reduce the risk of making last-minute changes or facing operational disruptions.

Fig. 7: Emission insights enabling operational efficiency.

Operational efficiency driven by emission insights directly impacts the bottom line. The problem of accurately calculating emissions for logistics operations and for ride-hailing companies is significant and growing, which needs to be addressed for strategic growth.

Analyzing emission data helps companies spot inefficiencies in their operations, leading to better use of resources. For instance, optimizing fleet usage and cutting down on unnecessary trips can save significant costs.

Advanced emission tracking tools also alert companies to potential compliance issues or operational problems early on so they can address these issues before they become major concerns.

Given the complexity of these challenges, it becomes crucial to dive deeper into how refining operational processes can act as a catalyst for strategic growth. By tapping into the power of emission insights, companies can not only enhance efficiency but also uncover new growth opportunities, positioning themselves to thrive in an increasingly regulated and competitive market.

Streamlining operations with strategic growth leveraging emission insights

The problem of accurately calculating emissions for transportation and ride-hailing companies is significant and growing. The complexity of operations, with their numerous vehicles, varying routes, and diverse fuel types, makes precise emission calculations challenging. Ride-hailing companies, the sheer volume of trips, coupled with the need to account for factors like traffic congestion and vehicle type, adds to the difficulty. The scale of this problem is vast, as it directly impacts compliance, operational efficiency, and market reputation.

But is the problem big enough to solve now, considering demand & supply?

With governments enforcing stricter emissions regulations and customers increasingly favoring eco-friendly companies, the demand for accurate emission calculations is high. On the supply side, technological advancements in data analytics and machine learning have made it possible to develop solutions that can handle the complexity of emission calculations. Companies that address this problem now will not only ensure compliance but also gain a competitive edge by aligning with the global shift toward sustainability.

The convergence of demand for sustainability and the availability of advanced technological solutions makes solving this problem both timely and essential. Fig. 8 illustrates the strategic advantages of the Ansoff Matrix, highlighting how emission capabilities can drive growth for businesses targeting regions and sectors where emission regulations are either evolving or about to be implemented.

Markets	Products: Existing	Products: New
	Market Penetration	**Product Development**
Existing	**Focus**: Make the most of what you have. **Objective**: Strengthen your relationships with existing logistics and ride-hailing clients by integrating emission data into your current software. **Approach**: Show how emission insights can help clients optimize routes, cut down on fuel costs, and operate more efficiently. By offering these added benefits, your software becomes even more valuable, making it harder for clients to look elsewhere.	**Focus**: Stay Ahead with innovation or offerings. **Objective**: Add new features to your software that use emission data to offer predictive insights, real-time tracking, and automated compliance reporting. **Approach**: Develop tools that allow clients to monitor their carbon footprint in real time and make smarter decisions based on data. These features can set your software apart from competitors and offer clients new ways to improve their operations.
	Market Development	**Diversification**
New	**Focus**: Reaching a new audience. **Objective**: Attract new clients in areas where emission regulations are strict or where sustainability is a big focus. **Approach**: Position your software as a must-have for companies needing to comply with local and international emission standards. By offering a solution that helps them meet these requirements, you can tap into new markets and industries.	**Focus**: Exploring new revenue streams. **Objective**: Create new software modules for emerging sectors like electric vehicle fleet management or green logistics. **Approach**: Design solutions tailored to the needs of companies transitioning or adopting green logistics practices. By using emission data to provide insights into these changes, you help clients reduce costs and stay ahead of regulatory requirements.

Fig. 8: Ansoff Matrix: Strategic growth opportunities with emission capabilities for vendors.

While the strategic imperative mentioned in Fig. 8 is for software services & products companies like TMS providers and ride-hailing companies, it's important to mention what their target customers and clients are going to achieve with emission capabilities; Fig. 9 of value chain analysis depicts the same.

Fig. 9: Porter's Value Chain Model: Value chain enhancement through emission capabilities for vendor's target audience.

For TMS and ride-hailing clients, subscribing to emission capabilities sharpens operational efficiency and opens the door to sustainability & compliance with regulations.

But having no prior experience or relying on poor emission data will help them deliver what regulations and reporting are looking is still a question mark. The question mark arrives here because of the expertise and learning curve that subject-matter expert companies have already developed.

Bottlenecks of in-house and unreliable emission data

Building a robust emission tracking system from the ground up is a complex and resource-intensive undertaking for transportation and logistics companies. It demands significant time, expertise, and financial investment.

To begin with, acquiring the specialized knowledge to accurately calculate emissions requires substantial effort. This involves hiring experts, training staff, and navigating a constantly evolving regulatory landscape. Moreover, developing a custom system demands extensive coding, testing, and integration, which can take months to complete. This process is prone to delays and unexpected challenges, diverting attention from core business operations.

Here is where two bottlenecks appear:

In-house development bottlenecks

Extended learning curve

Developing expertise in emission tracking and climate data requires significant time and effort, including hiring and training specialists.

High development costs

Building a custom emission system involves substantial expenses for development, testing, integration, and ongoing maintenance.

Complex compliance management

Continuously updating the system to meet evolving regulations adds complexity and increases the risk of non-compliance.

Operational disruptions

Diverting resources from core business functions to manage development projects can impact service delivery and efficiency.

Long implementation time

The lengthy process of developing, testing, and deploying a custom system can delay benefits and disrupt operations.

Unreliable emission data bottlenecks

Inaccurate reporting

Lead to incorrect emission calculations, resulting in misleading reports and potential compliance issues.

Poor decision-making

Hampers the ability to make informed decisions, affecting strategic planning and operational efficiency.

Regulatory risks

Increases the risk of non-compliance with environmental regulations, leading to potential fines and penalties.

Customer trust issues

Damage client trust and satisfaction, impacting relationships and market reputation.

Inefficiencies in operations

Disrupts efforts to optimize routes and manage resources effectively, leading to increased costs and reduced efficiency.

Fig. 10: Bottlenecks for developing emission modules for companies.

Addressing these bottlenecks with a reliable, pre-developed Emission API can streamline processes, ensure accurate data, and enhance overall operational efficiency.

Furthermore, maintaining compliance with environmental regulations is an ongoing challenge. Emission standards and methodologies are subject to change, necessitating frequent system updates. Non-compliance can result in hefty penalties and reputational damage.

In contrast, using a pre-developed **Emission API** provides a quick and efficient solution. These APIs are designed by experts who keep up with the latest emission calculation methods and regulations. Integrating an API into existing systems is much faster, so companies can start tracking emissions almost right away.

This approach saves both time and money while ensuring accurate data and regulatory compliance. By avoiding the need for in-house development and ongoing maintenance, businesses can focus on their core activities and improve customer experiences.

Overall, a pre-developed Emission API helps companies speed up their sustainability efforts, cut operational costs, and manage environmental risks more effectively, as mentioned in Fig 10.

Now, let's look at how pre-developed emission API can help form market differentiation.

Achieving market differentiation with pre-developed emission APIs

Pre-developed emission APIs offer a strategic opportunity for businesses to capitalize on this trend by integrating robust emission tracking and reduction capabilities. In order to thrive in a carbon-constrained future, the need is evolving. However, as the needs evolve, it is likely that there needs to be a differentiation. Fig. 11 focuses on some illustrative examples of features and benefits of using emission APIs.

Category	Features	Benefits
Emission Measurement & Analysis	Carbon footprint calculation	Quantify the environmental impact of shipments.
	Detailed emissions breakdown	Analyze emissions by mode of transport, distance, and weight.
	Real-time emissions monitoring	Track emissions in real-time for immediate insights.
Customer Value	Sustainability reporting	Provide customers with detailed emission reports.
	Carbon offset options	Offer carbon offsetting opportunities to neutralize emissions.
	Customized sustainability solutions	Tailor offerings to meet specific customer needs.
Compliance & Strategy	Regulatory compliance	Ensure adherence to environmental regulations and standards.

Fig. 11: Examples of creating market differentiation feature using emission API.

While differentiation is crucial, reliability remains key for businesses seeking to maximize benefits. As highlighted earlier, this reliability is achieved through comprehensive solutions that meet all regulatory requirements. If your offering does not fully address emission capabilities and compliance needs, clients and customers may view it as incomplete and be reluctant to adopt it, especially with evolving regulations on the horizon.

Comprehensive end-to-end solution for operational flow

Transport Management Systems (TMS) and ride-hailing platforms can greatly benefit from integrating reliable, pre-built Emission APIs, making their solutions end-to-end and comprehensive. These APIs provide complete emission capabilities like tracking emissions across all aspects of logistics, shipments, and transportation. This means that every part of the process, from route planning to shipment tracking, is covered under one system, eliminating gaps in emissions reporting.

For TMS, this integration ensures that emissions data is seamlessly incorporated into every step of the logistics process, allowing for real-time monitoring and reporting. For ride-hailing platforms, it supports not only regulatory compliance but also meets customer demand for eco-friendly options by optimizing routes for lower emissions. By consolidating emissions capabilities into a single, integrated platform, businesses streamline their operations, reduce complexity, and improve efficiency. This comprehensive approach ensures that all aspects of emissions management are handled in one place, enhancing overall performance and delivering a stronger competitive edge.

End summary

As the push for carbon neutrality intensifies, Transport Management Systems (TMS) and ride-hailing companies are looking to address stringent emissions regulations and rising sustainability demands. Integrating emission capabilities into these platforms is not only necessary for compliance but also offers significant strategic advantages.

Regulatory Compliance

Navigating global regulations is essential to avoid penalties and stay competitive.

Operational Efficiency

Emission capabilities enhance resource allocation, route optimization, and reporting, aligning with sustainability goals.

Pre-Developed Emission APIs

These APIs provide a quick, cost-effective solution with features like real-time monitoring and compliance reporting.

Market Differentiation

Embracing emission capabilities differentiates platforms, meets customer demand, and opens new revenue opportunities.

While these were the key things mentioned in this whitepaper, you can contact us to understand how to integrate emission capabilities into your business and become compliant before your consumers, clients, or government bodies ask you to comply.

Write to us at
contactus@getambee.com

Seek expert guidance
https://www.getambee.com/contact

References

1. UNECE. (2023, June 21). UNECE adopts global regulation to measure tailpipe emissions in real driving conditions [Press release]. https://unece.org/environment/press/unece-adopts-global-regulation-measure-tailpipe-emissions-real-driving-conditions

2. Envizi, I. (2023, May 8). SECR reporting explained - IBM Blog. IBM Blog. https://www.ibm.com/blog/secr-reporting-explained/

3. EU Emissions Trading System (EU ETS). (n.d.). Climate Action. https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en

4. GHGRP and the U.S. inventory of greenhouse gas emissions and sinks | US EPA. (2024, May 15). US EPA. https://www.epa.gov/ghgreporting/ghgrp-and-us-inventory-greenhouse-gas-emissions-and-sinks#:~:text=In%20general%20only%20large%20suppliers,their%20annual%20greenhouse%20gas%20emissions

5. Corporate sustainability reporting. (n.d.). Finance. https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en

6. Corporate Sustainability Reporting Directive (CSRD), explained. (2024, September 3). Normative - Legislation. https://normative.io/insight/csrd-explained/#:~:text=The%20CSRD%20is%20finalized%20and,to%20disclose%20greenhouse%20gas%20emissions

7. Assess your obligations | Clean Energy Regulator. (n.d.). https://cer.gov.au/schemes/national-greenhouse-and-energy-reporting-scheme/assess-your-obligations

8. Tinnes, E., Perez, F., & Kandel, M. (2024, June 19). Decarbonizing logistics: Charting the path ahead. McKinsey & Company. https://www.mckinsey.com/capabilities/operations/our-insights/decarbonizing-logistics-charting-the-path-ahead

9. Uber pollutes more than the cars it replaces – US scientists. (2024, May 31). Transport & Environment. https://www.transportenvironment.org/articles/uber-pollutes-more-cars-it-replaces-us-scientists

10. Ritchie, H., & Roser, M. (2024, March 18). Sector by sector: where do global greenhouse gas emissions come from? Our World in Data. https://ourworldindata.org/ghg-emissions-by-sector