Around the world, the movement of people and goods is reliant on ground transportation; cars, trucks, lorries and buses move millions of people along with food and products. With the population growth of the last 50 years, this sector has experienced enormous expansion — for both passengers and freight.

The consumption of energy to supply this sector is currently around 50 million barrels of fuel — including gasoline and diesel — per day. This level of energy consumption contributes to a significant environmental footprint which is responsible for at least 75% of CO₂ emissions in the transport sector, as well as 15% of total global CO₂ emissions.

**Global CO₂ emissions from transport**

Based on global transport emissions in 2018, which totalled 8 billion metric tons CO₂.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Emissions as % of Total CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road (Passenger)</td>
<td>45.1%</td>
</tr>
<tr>
<td>Road (Freight)</td>
<td>29.4%</td>
</tr>
<tr>
<td>Aviation</td>
<td>11.6%</td>
</tr>
<tr>
<td>Shipping</td>
<td>10.6%</td>
</tr>
<tr>
<td>Rail</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>2.2%</td>
</tr>
</tbody>
</table>

**Source:** OurWorldinData.org

**Key Terms**

- **Biomass:** Any source of renewable organic feedstock, such as specially grown energy crops, agricultural or municipal waste, agricultural or forest residues, and wood chips.

- **Transport Biofuel:** Liquid or gaseous fuel produced from biomass.

- **Advanced Fuels:** Advanced fuels are fuels produced from either biogenic end-of-life products and production residues, recycled carbon fuels from non-biogenic end-of-life products and production residues, or renewable liquid and gaseous fuels of non-biological origin.

- **E-Fuels (Electrofuels):** E-fuels are advanced synthetic, drop-in fuels — produced using hydrogen, renewable electricity, and carbon monoxide obtained from biogenic or non-biogenic CO₂.
GROUND TRANSPORTATION: FAST FACTS

- Ground transport accounts for more than 70% of global transport-related CO2 emissions, representing more than 5 billion tonnes of CO2eq per year.¹
- Brazil and the United States are the world’s largest producers of bio-based and advanced fuels for ground transport.²
- Global ethanol production is expected to expand from 113 billion litres in 2015 to 128.4 billion litres by 2025.³
- Global biodiesel production is expected to increase from 31 billion litres in 2015 to 41.4 billion litres by 2025.⁴
- India, China, and the Association of Southeast Asian Nations (ASEAN) are expanding the production capacity of biofuels — mainly ethanol — to meet SDS by 2030.⁵
- Supportive policies are mandatory to reduce the costs of advanced fuels and stimulate countries to go beyond blending mandates.⁶
- The potential greenhouse gas mitigation effect of using recycled carbon is substantial. More than 35% of transport fuel could be produced using carbon recycled through gas fermentation.⁷
- It is estimated that 2 million people were employed in the biofuels sector at the end of 2018, with Brazil accounting for the largest workforce in the sector.⁸

Building strong connections with farmers and supporting them to implement sustainable agricultural techniques and follow a path of continuous improvement is a key strategy for SAIPOL to ensure that we have access to the very best and most sustainable feedstocks. Working with a trusted and reliable sustainability standard like RSB will enable us to support sustainability across our entire supply chain.

Romain Lebas, Head of Sustainable development, SAIPOL

The Betting on Best Quality report finds that RSB “covers more sustainability criteria, with greater detail, and with more breadth in terms of level of assurance” than any of the other voluntary sustainability schemes. - IUCN

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2 https://www.iea.org/reports/tracking-transport-2019/transport-biofuels
5 https://www.iea.org/reports/tracking-transport-2019/transport-biofuels#abstract
6 https://www.iea.org/reports/tracking-transport-2019/transport-biofuels#abstract
Transforming an Industry

SUSTAINABILITY IN THE GROUND TRANSPORT INDUSTRY

Sustainable transformation of the ground transport sector must be driven by the implementation of low-carbon technologies, improved energy efficiency, and the use of supply chain certification schemes to verify real impacts on global CO2 emissions.

BIO-BASED AND ADVANCED FUELS

Both the reduction of vehicle CO2 emissions from fuel usage and increased energy efficiency are key strategies for decarbonising this sector.

Bio-based and advanced fuels with proven supply chain sustainability are commercially viable options for the decarbonisation of the ground transport sector, with large quantities of ethanol and biodiesel already being produced and consumed in many countries — either through direct use or through blending mandates.

Most biofuel mandates are based on blending levels that are not higher than 10% — although policies in Brazil, Indonesia, and Thailand offer exceptions. Some countries, such as Brazil, also have flex-fuel automotive technology, allowing vehicles to be filled with petroleum-derived gasoline and/or ethanol biofuel blended to any ratio.

### Table 1: Bio-based and advanced fuel production worldwide

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Current (Average 2015–2018)</th>
<th>2029/2030</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ETHANOL</strong></td>
<td>22387.2 PJ</td>
<td>2978 PJ</td>
</tr>
<tr>
<td><strong>Biodiesel</strong></td>
<td>1323.4 PJ</td>
<td>1525 PJ</td>
</tr>
<tr>
<td><strong>Biogas</strong></td>
<td>1424.6 PJ</td>
<td>4022 PJ</td>
</tr>
<tr>
<td><strong>Biomethane</strong></td>
<td>125.7 PJ</td>
<td>1886 PJ</td>
</tr>
<tr>
<td><strong>Hydrogen</strong></td>
<td>240 PJ</td>
<td>2350 PJ</td>
</tr>
</tbody>
</table>

10 https://www.oecd-ilibrary.org/sites/3aeb7be3-en/index.html?itemId=/content/component/3aeb7be3-en#:~:text=Global%20ethanol%20production%20projected%20from%20country%20to%20country.

The new RSB Standard on Advanced Fuels will be instrumental in supporting the development of waste-to-fuels projects. Having clear guidance regarding this certification process gives consumers, producers, investors, and all other stakeholders confidence in the sustainability of these fuels.

Bruno Miller, Managing Director Fulcrum Bioenergy

"
Fuel producers and the automotive industry are now working on processes and technologies that can accommodate local and regional demands — considering factors such as the availability of feedstock, the available infrastructure, and the energy matrix.

**CURRENT INDUSTRY TRENDS**

In general, the main trends and innovations for low-carbon intensity fuel production and powertrain systems are:

- Increased use of wastes and residues, such as used cooking oil (UCO), agricultural and forest residues, waste gases, and even end-of-life plastics.
- Increased use of green diesel and biomethane for heavy-duty vehicles.
- Use of hydrogen as a fuel obtained from water electrolysis or fuel reforming.
- Uptake of e-fuels produced using water, hydrogen, CO, CO2, and electricity.
- Increased acceptance of hybrid electric, battery electric, and fuel cell vehicles.

**INDUSTRY TRANSFORMATION: ENSURING SUSTAINABILITY**

1. Increase the use of sustainably certified bio-based and advanced fuels.
2. Maximise circularity, through increasing the use of wastes and residues as feedstock.
3. Ensure GHG emissions are accurately measured and reduced along the real supply chain to deliver real decarbonisation.
4. Increase the yield and productivity of biomass and fuels from bio-based and advanced feedstocks.
5. Reduce deforestation and land use change through the use of waste & residues, degradable lands for cultivation and high productivities.

**CHALLENGES TO SUSTAINABLE TRANSFORMATION**

1. Scaling up of sustainable crop-based feedstock production without impacting negatively on food security, ecosystems, and others.
2. Difficulty in finding sustainability guidelines and certification solutions for handling complex supply chains and feedstock combinations.
3. Low consumer awareness and market demand for certified products.
4. Poor feedstock and product traceability, which makes it difficult to identify the exact production impacts — particularly for waste and residue materials.
5. Organisational and management challenges for smallholder certification, as well as reduced incentives for sustainable small scale production.
By offering a powerful framework within which such feedstocks can be utilised — while achieving and demonstrating genuine sustainability — RSB’s uniquely credible and robust standard bolsters trust and awareness with consumers and end users.

The RSB Standard can help guide transformation in the ground transport sector by promoting good management practices and the use of waste and residues, as well as encouraging innovation in new and novel feedstock development while supporting sustainability in existing products.

RSB enables the certification of sustainable supply chains for bio-based and advanced fuels — from the production of raw materials to the end product — with sustainability requirements mandatory for biomass production and for industrial processing, including traders.

This approach is for feedstock producers, fuel producers, traders, processors, and transporters in any region of the world — excluding those who wish to trade in the EU-regulated market.

This approach is for fuel producers, traders, processors, and transporters working within the European Union or trading with it. It is recognised by the European Commission for proving compliance with the requirements of the EU Renewable Energy Directive (RED), as well as with the RSB’s stringent sustainability principles.

RSB-certified fuels produced in 2019 contributed to an emissions saving of 582,202.86 metric tons of CO₂eq.
RSB’s Pioneering Approach

RSB’S CERTIFICATION SOLUTIONS FOR THE GROUND TRANSPORT SECTOR

ADVANCED FUELS:
The RSB Standard for Advanced Fuels defines a credible approach for using waste and residual material for fuel production by providing guidance and requirements for defining residues and wastes, ensuring sustainability, and assessing specific risks in the use of waste and residue materials from bio-based and recycled carbon sources.

MULTI-FEEDSTOCK:
RSB’s certification is suitable for any feedstock, including biomass or any bio-based carbons and fossil-based wastes and residues, as well as co-processing of biogenic sources and fossil fuels.

RISK-BASED:
RSB’s risk-based approach to certification enables operators to focus only on the sustainability risks that are relevant to their operation, context, and geographical location. In so doing, the burden on low-risk operators is reduced, while ensuring that high-risk operators comply with all relevant requirements.

SUSTAINABILITY ACROSS THE ENTIRE SUPPLY CHAIN:
RSB’s environmental and social sustainability requirements apply to industrial operators as well as feedstock producers, ensuring high levels of confidence in the social and environmental claims along the entire supply chain.

MULTIPLE SITES UNDER ONE CERTIFICATION SCOPE:
RSB’s certification allows supply chain actors to group into one certification scope, allowing for greater control and lower certification costs.

ZERO DEFORESTATION:
RSB’s Principles & Criteria on Conservation ensures non-conversion of new areas and has an explicit list of no-go areas.

LOW ILUC RISK:
RSB’s low ILUC risk module enables fuel producers to demonstrate their fuel production has a low impact on land use change, due to the development of high-productivity processes and production, as well as the use of wastes/residues and/or biomass cultivation on degradable lands.

FOOD SECURITY:
According to the RSB Principles & Criteria, operations must ensure adequate food provision and improve food security in food-insecure regions.

TRACEABILITY
RSB’s certification gives four different options for traceability, depending on the material, market, and manufacturing process.

RSB can certify supply chains and products using the following traceability options:

IDENTITY PRESERVED
The RSB-certified product delivered is uniquely identifiable and can be directly related back to the identity of the producer and resource base.

PRODUCT SEGREGATED
From the production of raw materials to the final products for consumption, the information on the sustainability of the physical product remains traceable.

MASS BALANCE
From the production of raw materials to the final products for consumption, information on sustainability can be traced to a specific production quantity.

The system allows for the physical mixing of certified and non-certified products along the supply chain. Separate records of the quantities of certified and uncertified materials are required. At each stage between, the quantity of certified material used as input and the quantity of certified material sold (output) is matched and recorded.
RSB’s Pioneering Approach

INNOVATION

RSB actively works with innovators and leaders to find solutions to key challenges facing the industry — such as by working with Bioledger (an RSB member) to develop a prototype blockchain database for UCO-based biodiesel. This blockchain prototype was recommended by industry stakeholders as one of the most comprehensive, credible, and robust biofuel databases available to the European Commission, which is looking to develop a Union Database as part of EU RED II implementation.

By participating in cutting-edge projects, RSB continues to be at the forefront of innovation to ensure that its approach to traceability and sustainability certification is able to solve the most important challenges faced by the sector. In supporting the biofuel sector in the EU and beyond to have confidence in the provenance of the fuels they use — by demonstrating that they are truly sustainable, that the supply chains are transparent, and that they have a real, positive impact on the climate crisis — RSB is a key partner for industry leaders around the world.

THE RSB STANDARD

The RSB Standard is the strongest and most trusted of its kind, recognised as such by leading global NGOs, including the World Wildlife Foundation (WWF), Blue Angel and the Natural Resources Defense Council (NRDC).
Certification of bio-based and advanced fuels to RSB’s uniquely robust and credible Standard enables operators to make powerful claims based on the real impacts of the fuel they produce or use.

1. SUSTAINABLE PRODUCTION

The RSB’s 12 Principles & Criteria are used to evaluate production sustainability for certification along the entire supply chain.

2. CLIMATE CHANGE MITIGATION

Certified fuels demonstrate at least 50% lower lifecycle GHG emissions – calculated on a cradle-to-grave basis relative to the lifecycle GHG emissions of a comparable fossil product — whenever they are intended to replace fossil-derived fuels.

3. VIRGIN FOSSIL RESOURCE DEPLETION REDUCTION

Using wastes and residues for fuel production reduces pressure on fossil resources. Additionally, giving a second life to waste feedstocks that would instead end up in landfills, incinerators, and other end-of-life scenarios is a way for fuel to contribute to the circular economy.

EXAMPLES OF CLAIMS

RSB Compliant Biofuel: Delivering socially and environmentally ethical feedstocks/fuels certified by the RSB.

RSB EU RED Compliant Biofuels: Over its production lifecycle, this biofuel provides 60% greenhouse gas savings compared to a fossil fuel equivalent.
We are delighted to welcome RSB as a partner of Business for Nature. Its multi-stakeholder approach to the development of an advanced bioeconomy through practical and credible tools is a valuable addition to our coalition.

Businesses need clear and practical solutions to protecting and restoring nature throughout their value chains.

Eva Zabey, Executive Director
Business for Nature

**Why Work with RSB?**

With credible solutions, global expertise, partners across the spectrum from government to industry and NGOs, and an extremely robust approach to sustainability, RSB is the partner of choice for fuel producers as it seeks to fulﬁl its global commitments to greenhouse gas (GHG) reduction while also ensuring social development and environmental protection.

Germany’s oldest eco label, **Blauer Engel (Blue Angel)**, found that RSB is the only certification system for biomass that fulﬁls their own rigorous requirements.

RSB is a member-led organisation which represents a worldwide movement of businesses, NGOs, academics, as well as government and UN organisations that have demonstrated their commitment to the development of the sustainable bioeconomy by working together to create our Standard.

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Eva Zabey, Executive Director
Business for Nature
RSB offers trusted, credible tools and solutions for sustainability and biomaterials certification that mitigate business risk, fuel the bioeconomy, and contribute to the UN Sustainable Development Goals — in order to enable the protection of ecosystems and the promotion of food security.

Through its most-trusted sustainability Standard, RSB enables companies across the bio-based, advanced fuels, and circular economy to demonstrate real and credible sustainability.

RSB provides expert consultancy through its advisory services, which are grounded in the highest levels of social and environmental sustainability and are designed to support our clients’ most crucial needs throughout their supply chains — as they seek to transition to a positive impact and circular economy. We bring the expertise to unlock opportunity and overcome the challenges of transforming a business for operation and growth within our planetary boundaries.

By building partnerships across sectors, RSB is using the power of its sustainability standard to drive collective action in addressing the systems changes required to enable people and the planet to thrive. In bringing together business, civil society, and government in regional and global coalitions, RSB maximises the impact of its network.

RSB engages in targeted advocacy to support policy makers around the world in embedding meaningful and trusted sustainability — as outlined in the RSB Standard — into legislation, policy, and regulations. By providing expertise and guidance at the national and global levels as well as for specific sectors, RSB uses its resources to support awareness, knowledge sharing, and action with multiple stakeholders.

RSB is leveraging its community, resources, and best-in-class sustainability standard as part of a global movement to create a world of positive impacts and a thriving planet with:

- **Maximum Circularity**
- **Assured Global Nutrition and Water Access**
- **Fossil Fuels Left in the Ground**
- **1.5°C Warning Cap Achieved**
- **Guaranteed Human and Labour Rights**
- **Productive and Healthy Ecosystems**

This transition to a new, climate resilient society is done with the voices of all people — particularly the marginalised and workers in affected industries — at its core.
GranBio had a very positive experience with the RSB certification of its Cellulosic Ethanol production. During the process, it was clear that the methodologies used by RSB were very rigorous to certify the product’s sustainability and confirm all its traceability. We felt confident that the entire process met the highest European quality standards and that the RSB certification guarantees the necessary competitiveness to accelerate the decarbonisation plans of global industry.

Julio Cezar Araujo do Espirito Santo,
Industrial Biotechnology Manager, GranBio

We need alternative fuel produced using the right localised feedstock based on RSB Principles.

Jennifer Holmgren, CEO Lanzatech

ARE YOU READY TO TRANSFORM THE GROUND TRANSPORT INDUSTRY?

CONTACT US TODAY