Trapeze™
Here for the journey

Rail Driving Advice System

Trapeze TTG Energymiser® Solution Brochure

Trapeze TTG Energymiser®
Rail Driving Advice System

Precise train driving advice, when it matters most. Improve on-time performance, reduce energy costs, while minimising driver anxiety and your environmental footprint.

RAIL INDUSTRY CHALLENGES

Rail operators face many challenges to keep trains moving – such as meeting passenger and regulatory punctuality requirements while increasing network capacity. There is pressure to operate sustainably and increase energy efficiency to meet stringent and time-critical environmental targets.

The rail industry is moving towards digitalisation and automation - connecting trains, tracks, and systems. Signals are moving from trackside infrastructure into the train cabs themselves.

Autonomous trains are becoming popular, potentially altering asset wear and tear while increasing energy consumption.

Finally, it is paramount that train services operate safely – minimising incidents and the frequency of signals passed at danger (SPAD) to reduce driver and operator anxiety levels.

INTRODUCING TRAPEZE'S TTG ENERGYMISER®

Our TTG Energymiser® Driving Advice System (DAS) technology provides optimal driving advice to ensure train operators meet schedules, reduce energy costs (fuel, battery, hydrogen), and decrease carbon emissions.

DAS helps drivers operate all trains on the network with the precision and efficiency expected of a modern rail system - while reducing or eliminating SPAD.

Imagine synchronised trains all driven in the most energy-efficient way, with real-time updates provided to dynamic scheduling systems – with such advice ensuring services arrive within seconds of schedule.

Operators and authorities now have time to fine-tune capacity and increase performance across the network. When schedules change on the day, driver anxiety is reduced as they are advised how to operate trains to new timetables optimally.

Our DAS solution is a globally proven, award-winning system that optimises performance for any train, anywhere, any time.

As of 2021, TTG Energymiser® has been installed on over 16,000 train and driver applications across 80,000 kilometres of track in ten countries and four continents.

TTG ENERGYMISER® BENEFITS FOR YOUR RAIL OPERATIONS

How a train is operated greatly affects energy usage, with several factors heavily influencing driver performance – efficiency levels can vary by 50% between the highest and lowest-performing drivers.
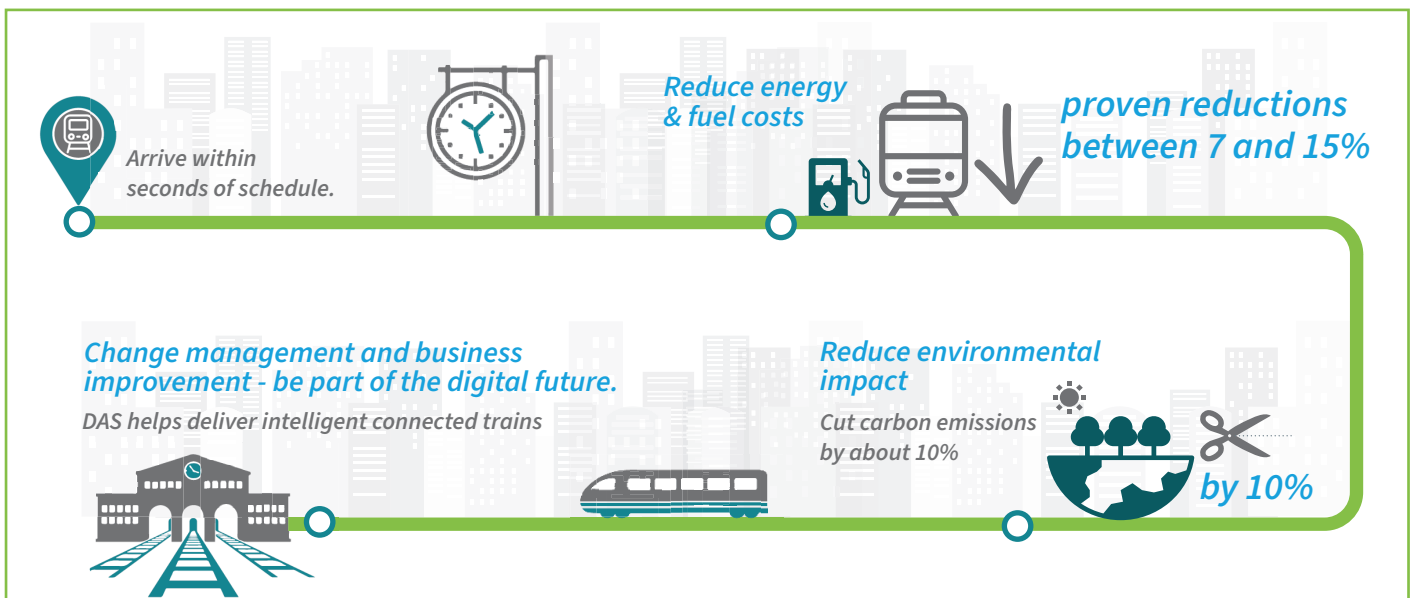

Arrive within seconds of schedule.

Reduce energy & fuel costs

proven reductions between 7 and 15%

Change management and business improvement - be part of the digital future.
DAS helps deliver intelligent connected trains

Reduce environmental impact
Cut carbon emissions by about 10%

by 10%

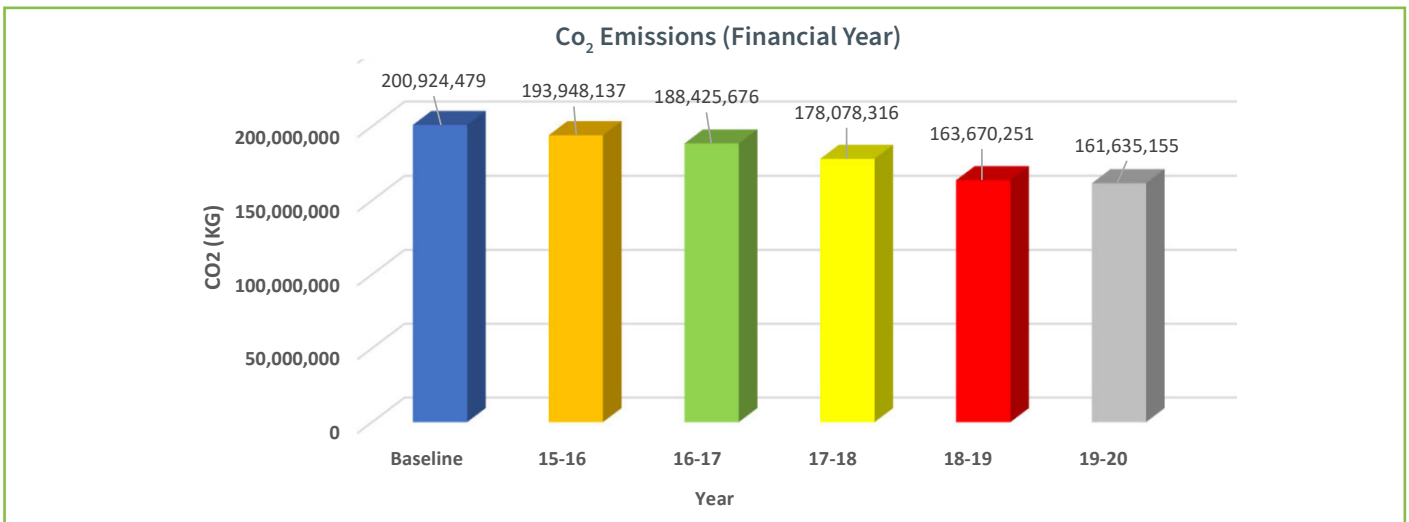*Figure 1: Benefits for Your Rail Operations*

Figure 2: Annual Co2 reduction by Scotrail

Rail operators can significantly raise driving standards and median performance levels by training drivers how to drive efficiently, especially when accurate on-train advice is provided in real time.

The TTG Energymiser® algorithms have been developed over 25 years using patented mathematics, leading to energy and fuel savings of between 5 to 15% - saving operators millions of dollars every year.

Additionally, a significant contributor to a rail operator's carbon footprint occurs from wear on various track components or within the rolling stock asset itself.

Using driving advice to reduce component wear on brakes and bogies allows operators to keep trains in service longer, reducing maintenance and component replacement frequency.

Trapeze's DAS solution considers all schedule aspects, including temporary speed restrictions, and advises drivers when to make up time when an incident causes delays.

When a revised on the day schedule is provided, advice on all trains is updated to ensure drivers are performing to the new schedule.
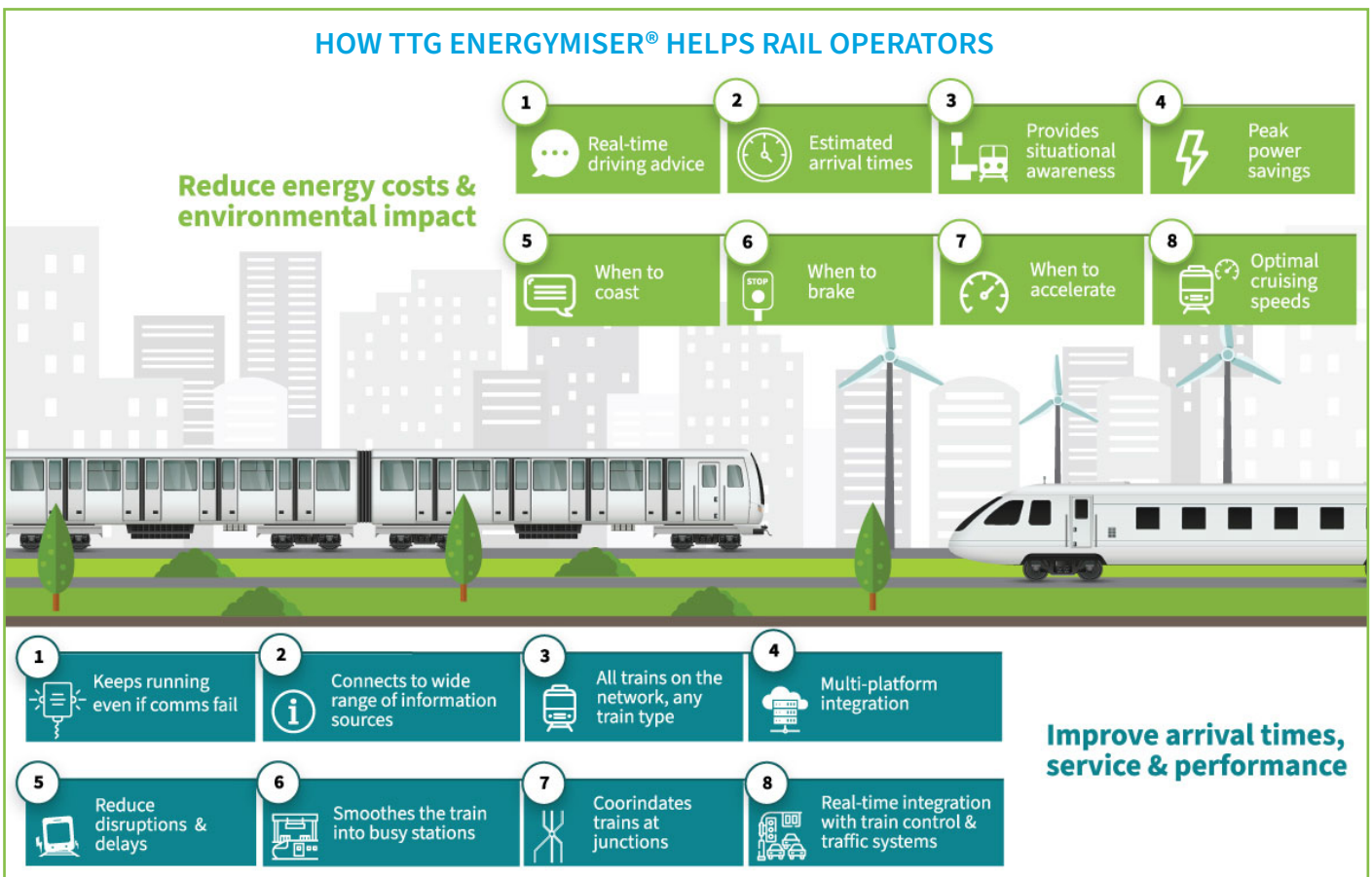

Figure 3: TTG Energymiser® - Key Features

On the day revisions can be provided to update schedules dynamically and recalculate advice, keeping trains running to the new schedule, reducing delays and disruptions while increasing capacity.

The efficiencies TTG Energymiser® delivers provide numerous benefits. **The payback period for the solution is as little as one to three years**, a very fast return on investment.

DAS capabilities are further enhanced by connections with dynamic scheduling systems or traffic management systems.

REDUCE ENERGY COSTS AND ENVIRONMENTAL IMPACT

Easy to follow real-time advice: TTG Energymiser® provides driving advice to manage trains efficiently and keep them on time – adapting to changing conditions on the day. It uses advanced, precise algorithms to determine the most efficient way to drive, guiding drivers with small changes that significantly impact energy use and carbon emissions.

Figure 5: The display shows when the driver needs to accelerate, hold, coast and brake.

REDUCE ANXIETY BY ADVISING DRIVERS WHEN TO:

Accelerate	Applying power at the right time reduces overall energy requirements, e.g., when climbing hills.
Hold	TTG Energymiser® calculates cruising speeds that keep trains on time and advises drivers when to maintain their speed.
Coast	Used at the correct time, coasting saves energy and reduces braking on declines.
Brake	Efficient braking advice reduces train and track wear - optimising energy use, improving rail asset longevity and reducing maintenance costs.

Figure 4: A touch screen in front of the driver provides real-time suggestions.

Provides situational awareness on time, location, what's ahead, where to stop: The algorithms provide advice that challenges driver experience and instincts. For example, to minimise acceleration and braking, it can tell a driver to turn off the power before reaching the top of a hill to avoid braking on the downhill descent. It also reminds drivers where and when to stop at specific stations and platforms.

Peak demand management: Electric railways can be a significant load on the grid, especially during peak times like extremely hot or cold weather.

TTG Energymiser® coordinates all trains on a network to reduce the peak power demand - significantly reducing electricity costs. During peak times, TTG Energymiser® temporarily slows some trains, with minimal disruption to the schedule.

IMPROVE ARRIVAL TIMES, SERVICE AND PERFORMANCE

All trains and platforms on the network: TTG Energymiser® works for any type of train across multiple platforms. Manage the entire network to make sure conditions, conflicts or adjustments on the day are applied to every train – making them work together in a synchronised and efficient way.

Arrival times and SPAD reductions: TTG Energymiser® takes into consideration schedules, temporary speed restrictions, and on the day changes to help provide advice on how to perform on schedule and avoid signals passed at danger, improving safety.

Keeping trains flowing smoothly through junctions: Keeping trains flowing smoothly throughout the day: When trains arrive early at a station, junction, or other timing points, they are often delayed by the signalling system. This can be due to the train running early, changes on the network or a variety of other variables. This requires trains to stop and start again, wasting time and energy. With TTG Energymiser ®, driving advice considers these on the day changes and advises drivers to operate the train so they arrive at timing points right on time, helping streamline network flow.

Rail Driving Advice System

Interfaces Traffic Management and Dynamic Scheduling: Provide accurate real-time data to train operations centres and allow instant train schedule updates to be sent directly to trains.

Interoperable with Autonomous Trains (ATO): The powerful TTG Energymiser® algorithms can be used to provide ATOs with energy-efficient profiles to be considered during train operations.

Connect to multiple external information sources: Connected Driving Advice Systems (C-DAS) provide real-time, secure integration with third-party systems, allowing for accurate on the day information to produce the most up to date train advice. Trapeze is deploying this interface to European Train Control Systems (ETCS), Traffic Management Systems (TMS), and in Train Control Monitoring Systems (TCMS).

If communications fail, TTG Energymiser® keeps running: If other systems stop, TTG Energymiser® provides an alternative view of how trains are performing to schedule, a history of what happened on the day, and train locations – including who is operating them.

Junction Scheduler: This add-on module proactively monitors trains approaching a junction and will update the advice if they are approaching the junction in a matter that will require them to stop. The system calculates each train's required acceleration/deceleration to avoid signalling system intervention. It sends revised arrival times to trains and issues driving advice so each locomotive has a clear run through the junction. It does this by resolving conflicts automatically in real time – critical for congested rail networks. Junction Scheduler also decreases energy use as train stoppages and start-ups are minimised. Asset wear and tear is also reduced due to decreased braking requirements.

MyDAS: Delivers individual driver and team performance statistics and reporting via a web application available on multiple platforms. It reinforces good driving behaviour by considering human factors, including what motivates driver improvements. MyDAS provides drivers with the intelligence required to make accurate and consistent driving decisions on future trips.

Infrastructure Menus: Rather than remembering infrastructure issues (e.g., track debris, future hazards) and reporting them at the end of service, DAS allows train drivers to select from a drop-down menu and log the issue in real time. The DAS unit automatically adds geo stamps to the log and provides the geolocation of infrastructure issues to maintenance crews to rectify the problem quickly.

Data and reporting: The system harnesses journey data and makes it available via powerful reports covering energy, performance, delays, etc. These inform effective decision making in the field and control centre, e.g., engineers can monitor existing problems and pre-empt issues.

INTEROPERABILITY AND COMPLIANCE WITH SAFETY SYSTEMS

ETCS Integration: TTG Energymiser® is interoperable with multiple safety systems, including the European Train Control System Levels 1 and 2. The solution does not interfere with them; it only provides advice on how to drive the train efficiently. The resulting speed profiles do not exceed what a driver would normally perform.

Flexible hardware options: TTG Energymiser® can be deployed across different hardware types, including Trapeze-supplied devices, mobile tablets, and in-cabin screens or the TCMS.
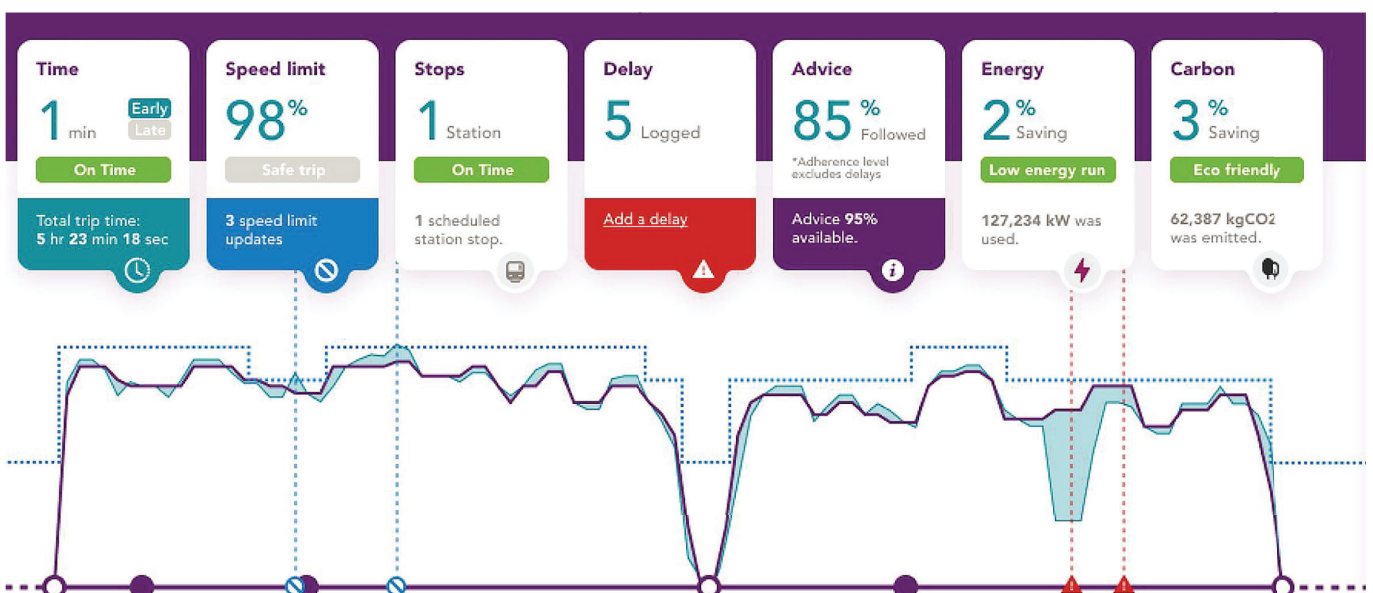

Figure 6: Reports help different parts of the business make important decisions

WHY TTG ENERGYMISER®?

TTG Energymiser® provides multiple benefits for rail operators across the entire organisation:

Commerical Teams

Minimise delays, so customers are more satisfied and you have fewer penalties.

Environmental & Sustainability Teams

Reduce energy usage and CO_2 emissions, helping meet targets.

Operations

Help you run trains on time, using minimal energy to deliver the services promised to customers. Improve overall performance and efficiency of your network.

Engineers and Technicians

Reduce wear and tear on trains, pre-empt issues from arising and manage energy usage.

Train Drivers

Drive under less stress by being advised on optimal speeds to arrive at stations on time, reduce signals passed at danger with less stopping. Also be provided with a digital coach to support improved performance.

Finance Departments

Keep on budget and reduce costs.

Figure 7: The benefits to different stakeholders in your business

TTG Energymiser® was developed with leading academics from the University of South Australia. The pedigree of expert mathematics and ongoing research behind the system is widely published and available for anyone to read.

It is the theory and the science of what we do and the precise advice behind when to change modes that differentiates our solution.

Our experienced team cntinues to roll out our DAS solution to rail operators around the world, with new functionality and long term benefits to all stakeholders.

The advice profiels provided by our solution is unmatched, providing for better performance, superior advice and a more positive impact to the environment. Read more here.

Trapeze™
Here for the journey

Be part of the digital rail future. Through automation and connected trains, you will drive performance, and reduce both energy usage and your environmental impact.

Contact us to find out more.
Tel: 1300 663 662 or email: info@trapezegroup.com.au

TRAPEZE GROUP APMEA HEAD OFFICE
Level 25, 288 Edward Street, Brisbane, QLD 4000 Australia
info@trapezegroup.com.au | 1300 663 662
trapezegroup.com.au