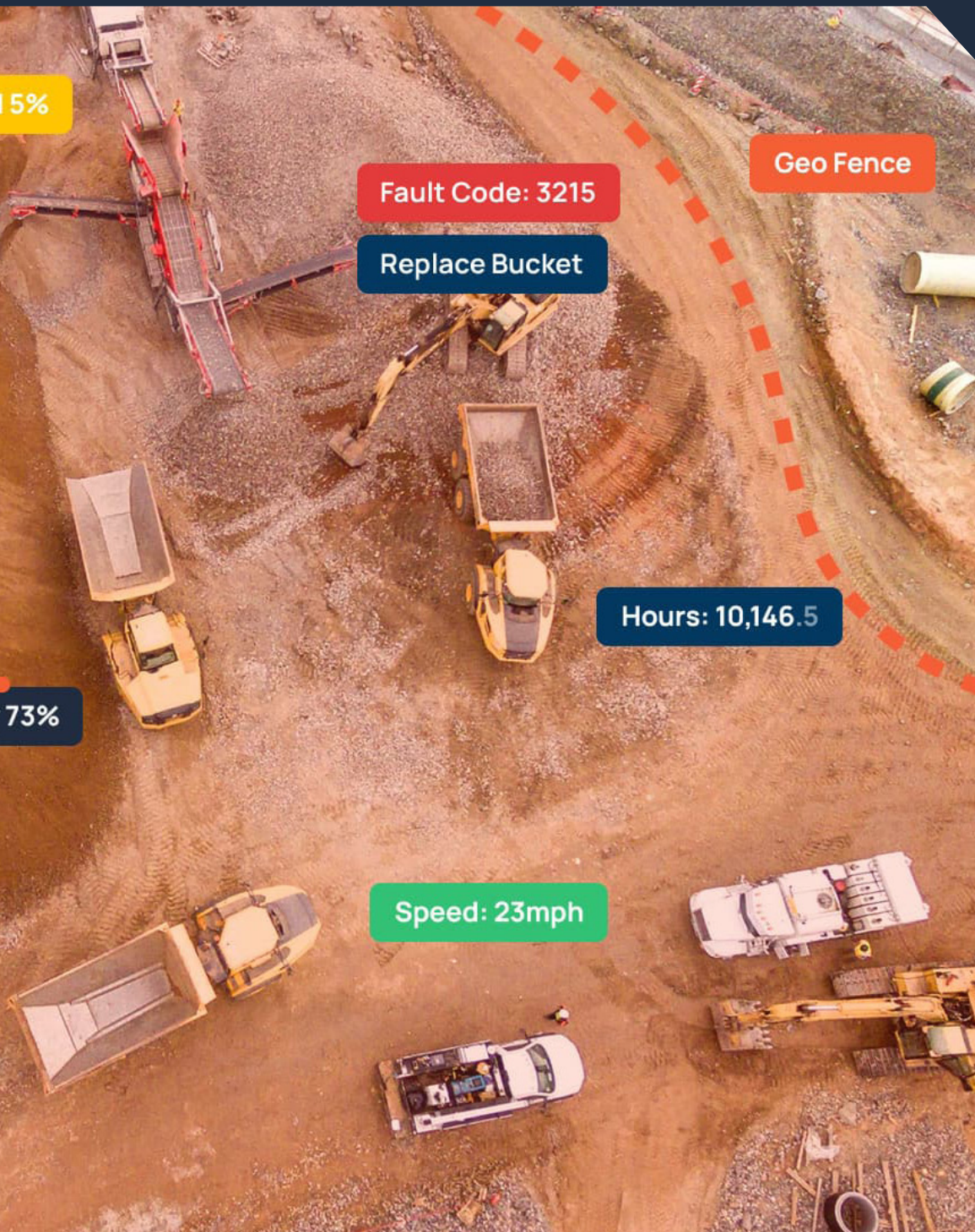
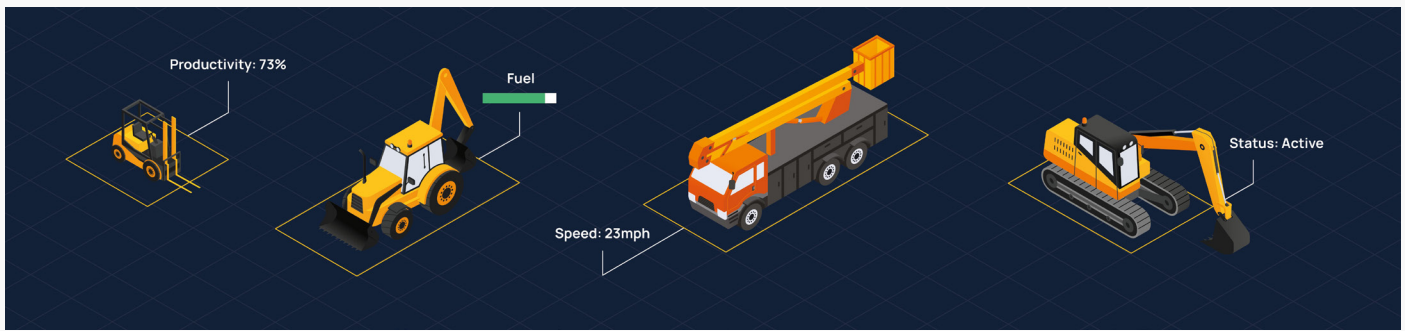


How telematics can improve equipment efficiency



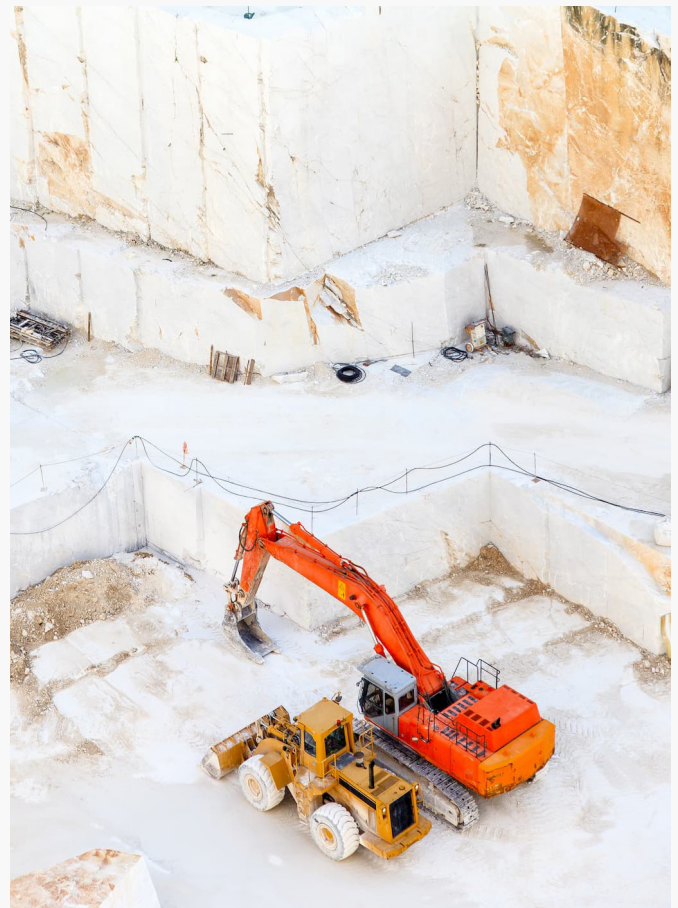


It is easy to see why managing mixed fleets can become complex and result in inefficiencies: the fleet is often spread across several operations, sourced from different plant hire companies, tends to be a mix of different manufactures, ages, models, and could have third parties involved in maintaining and operating the machines. Due to the vast number of stakeholders, inequality of data and lack of granularity, it is no surprise that there is limited visibility of what individual equipment are doing at any given time, resulting in a fragmented view of the fleet and its respective operations.

With no consolidated view of the fleet, it is often the case that equipment operates sub-optimally, resulting in unnecessary costs, project delays, and a detrimental impact on the environment. An obvious solution is to use live machine data to highlight inefficiencies and underperformance - after all you cannot manage what you cannot measure.

Historically, accessing live data across the whole fleet was expensive and onerous. However with the proliferation of IoT, telematics and standardisation of APIs, this is rapidly becoming easier. A scaled approach avoids overwhelming volumes of data and enables a clear focus on areas of opportunity and our experience shows the biggest initial impact can be made by focusing on a handful of the most important machine metrics. Once these opportunities have been exploited the metrics can be expanded and new opportunities identified.

The metrics providing the biggest initial impact include: utilisation, idling time, fuel consumption, location, and operating hours. Our customers, across all industries, have used these metrics to identify patterns in operational inefficiencies including: too many equipment onsite resulting in under-utilisation, incorrect equipment used for the job resulting in lower productivity, ineffective site layout resulting in idling and excessive travelling, suboptimal operator behaviour resulting in dangerous, and inefficient utilisation.



Insights and actions by tracking machine utilisation

Across our customer base, the average utilisation is around 4.5 hours per day. When considering the major investment involved in owning and operating heavy equipment, these numbers are astonishingly poor. Focusing on increasing the utilisation, means doing more with fewer equipment. The results? Decreased plant hire costs, freeing up the balance sheet by improving capital discipline, and reducing the number of resources required to manage the complexities of a larger fleet.

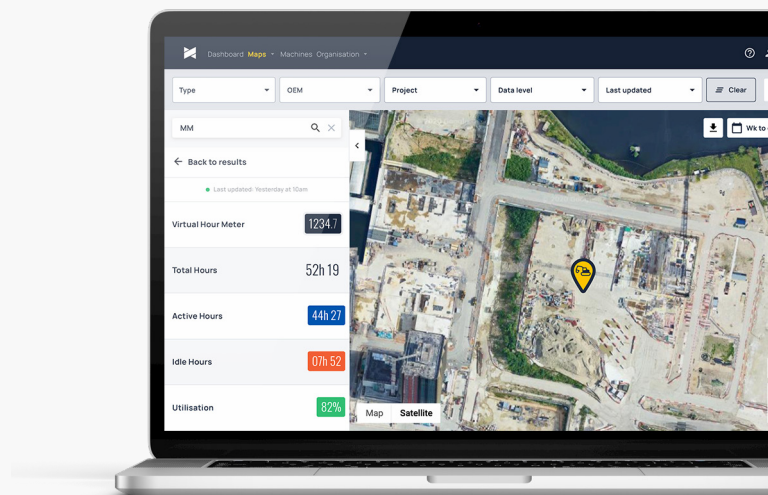
With live utilisation data, it's easy to identify underutilised equipment, creating the opportunity to reallocate and sell or off-hire some assets. Some of our customers have significantly reduced their plant hire expenses by up to 10%, saving them millions on an annual basis. Other customers have managed to sell assets that were being underutilised - one of our customers decreased their loading fleet by 50%, freeing up capital and decreasing expenses related to maintaining & operating those equipment.

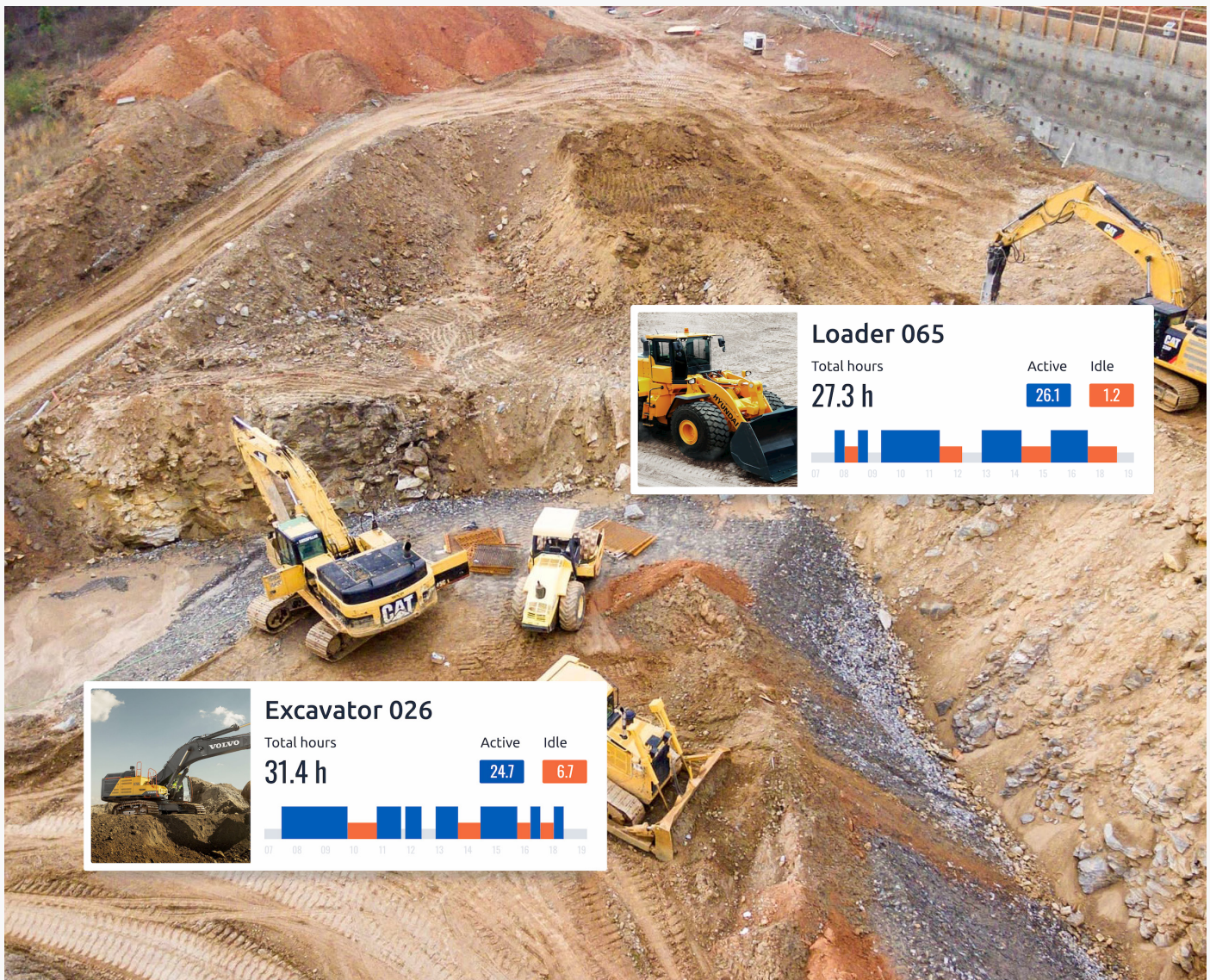
Insight and actions by tracking idling time

Industry benchmarks indicate that idling makes up around [40% of operating time](#), but the data across our customer base shows that it can be much higher. Idling is problematic because for every hour a machine idles, it wastes an hour of warranty, burns around [4 litres of fuel](#), moves closer to the next maintenance occurrence, decreases the life of the componentry, decreases operator efficiency and loses an hour of output. We [estimate](#) idling costs about \$50 per hour for a medium sized excavator, so reducing idling by just 1 hour a month can result in a return on your data investment.

Idling cannot be entirely eliminated but it can be significantly reduced. The use of live idling data enables one to see where and when it is occurring, immediately addressing the issue and moving towards a more proactive approach. Many of our

customers have managed to eliminate idling periods of more than 5 minutes by monitoring data and streamlining operations, resulting in decreased operating costs. Other customers have managed to decrease their average idling time by 10% and even changed the way in which they pay their contractors, by excluding all non-operational idling hours from the billing.





Insight and actions by tracking fuel consumption

Fuel is a significant line item on the P&L for any site, so by tracking and managing fuel, significant impact is made on the bottom line. Often the challenge is simply not knowing how much fuel is being used on a site but where and how it is being used.

Using fuel consumption data can highlight how fuel is being used and when it is being used unnecessarily. Tracking fuel consumption whilst idling can provide significant savings opportunities: for example, with 4.5 hours a day of utilisation and 40% of that being idling, across a fleet of 600

equipment, more than 100,000 litres of fuel would be unnecessarily consumed in a month. That's an annual cost of more than \$2 million.

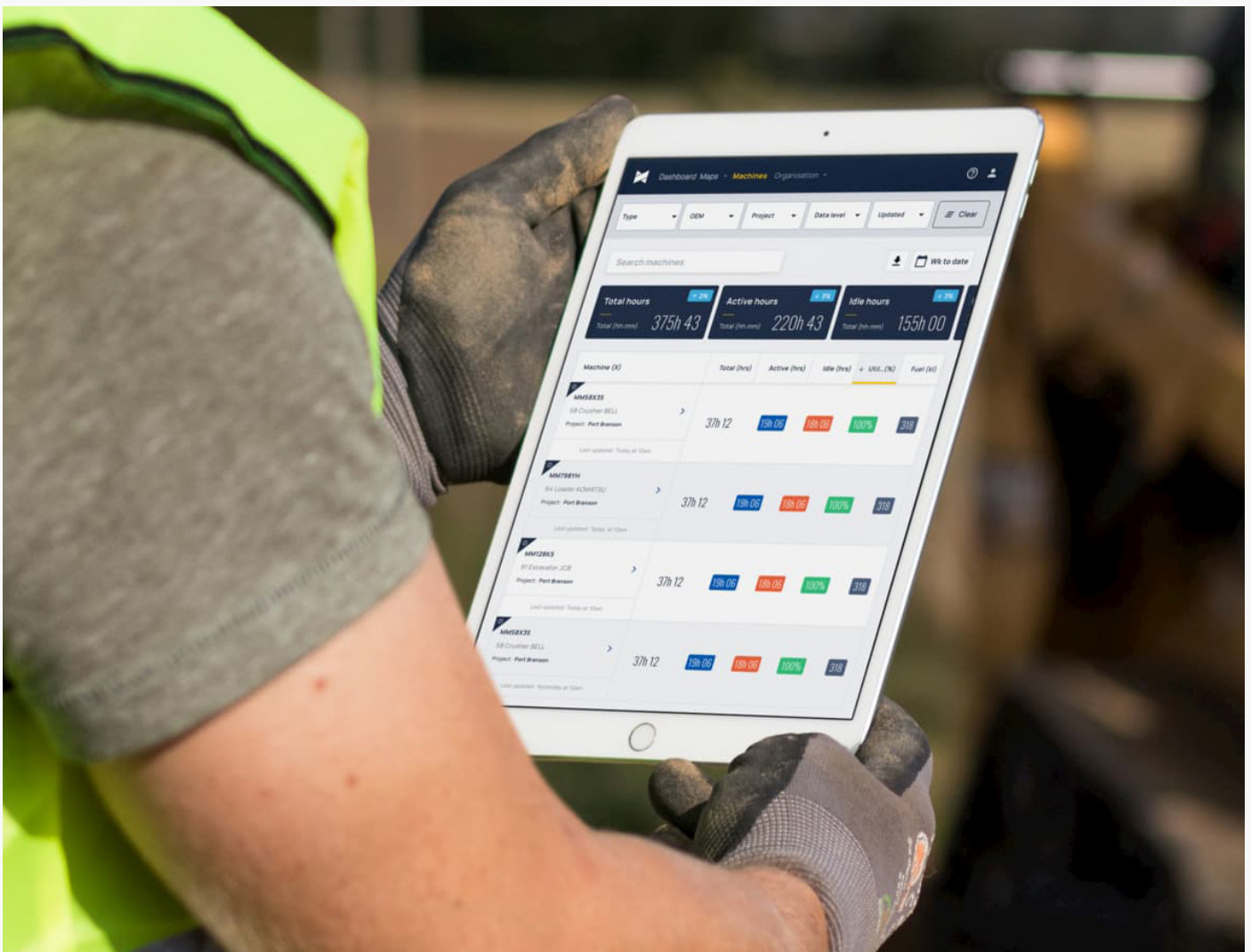
Many of our customers track fuel consumption to compare different OEM's performance, identify anomalies which may suggest imminent equipment failure, highlight potential fuel theft, and identify opportunities to improve and quantify operator performance.

Insights and actions by tracking CO2 emissions

Heavy equipment are a significant contributor to greenhouse gas emissions. For example, a [report](#) produced in Norway suggests that transportation contributes towards 61% of total emissions and of that 30% comes from construction equipment. For every litre of fuel burnt it is estimated there is 2.6kg CO2 [emitted](#) - so managing fuel consumption will go a long way to reducing emissions.

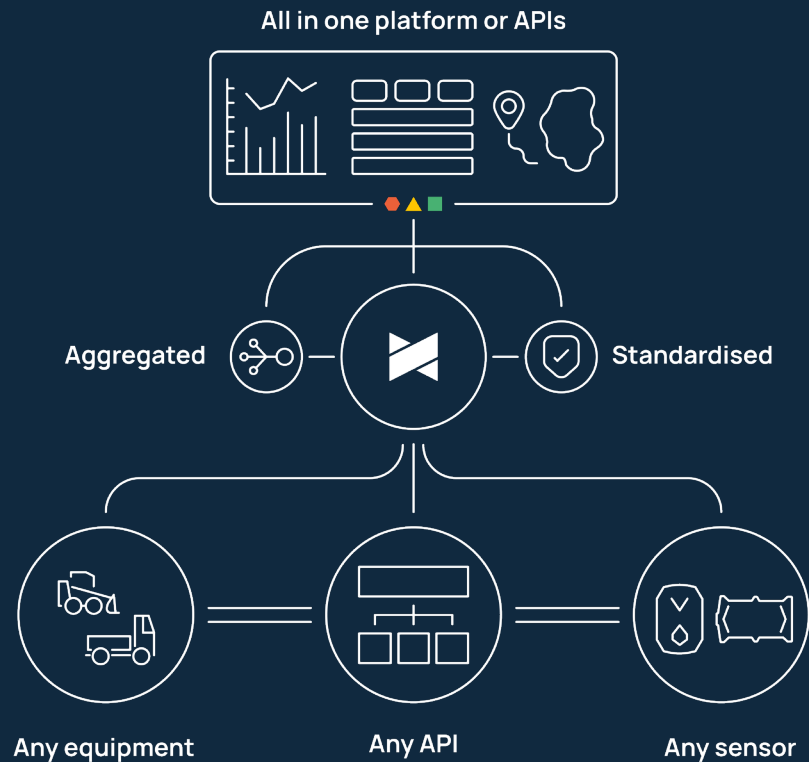
By tracking CO2 and fuel data, not only can you report on the emissions, you can improve them by monitoring idling periods, optimising driving routes, and improving operator behaviour.

Addressing operational inefficiencies using machine data can yield great benefits including: improved capital discipline by cutting down on the number of equipment, increased productivity by streamlining operations, decreased operating costs by cutting down on rental costs; decreased fuel consumption, maintenance costs, and CO2 emissions by using the machines more efficiently.



Connecting the fleet

The process of connecting the whole fleet follows three steps: hardware connectivity, data aggregation, and actionable insights.



Hardware connectivity

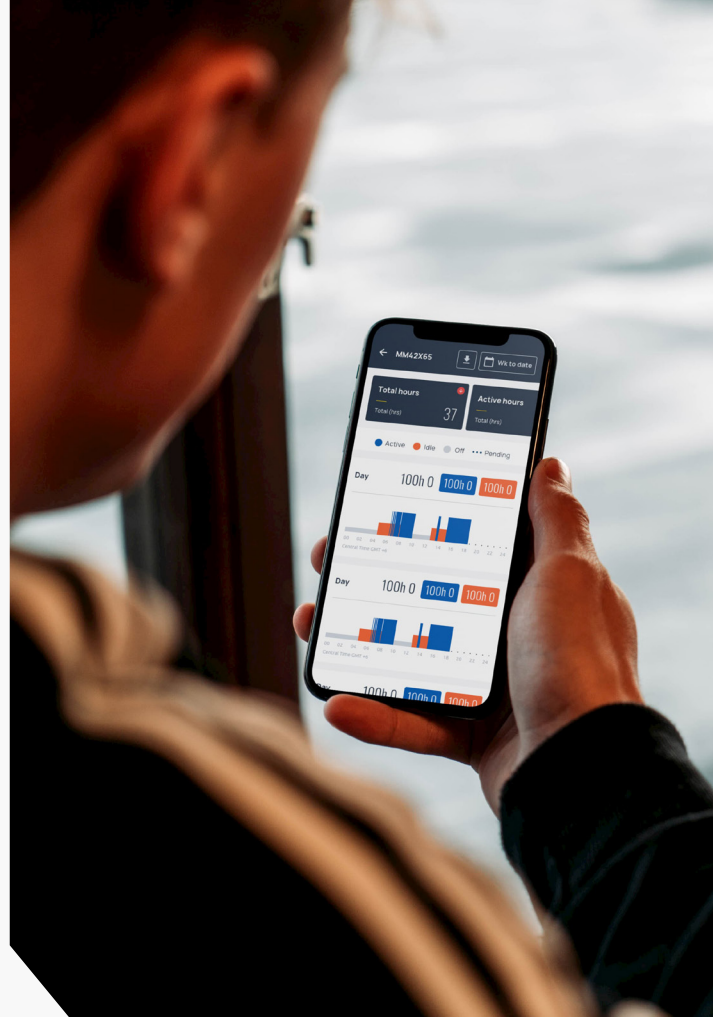
Most modern machines come with on-board telematics which provide basic metrics and relatively frequent updates. If the machine does not have a suitable solution, then there are many 3rd party providers available that can be retrospectively fitted to a machine. MachineMax can provide a revolutionary wireless sensor particularly useful for older or disconnected machines or rental equipment temporarily onsite.



Data aggregation

The telematic industry for heavy equipment has not historically focused on standardisation, resulting in the various hardware solutions using different data measurement points, unique definitions for metrics and various reporting intervals. Over the last few years, a standard has been introduced although data aggregation is still a fairly manual and complex task and if it isn't done, it's near impossible to compare data across a mixed fleet.

MachineMax however has enabled standard integration for most major OEM telematic and 3rd party data sources, with more in the pipeline. Once the data is ingested from the existing hardware, MachineMax will sanitise, aggregate, and normalise it, ensuring all data is comparable across the fleet.

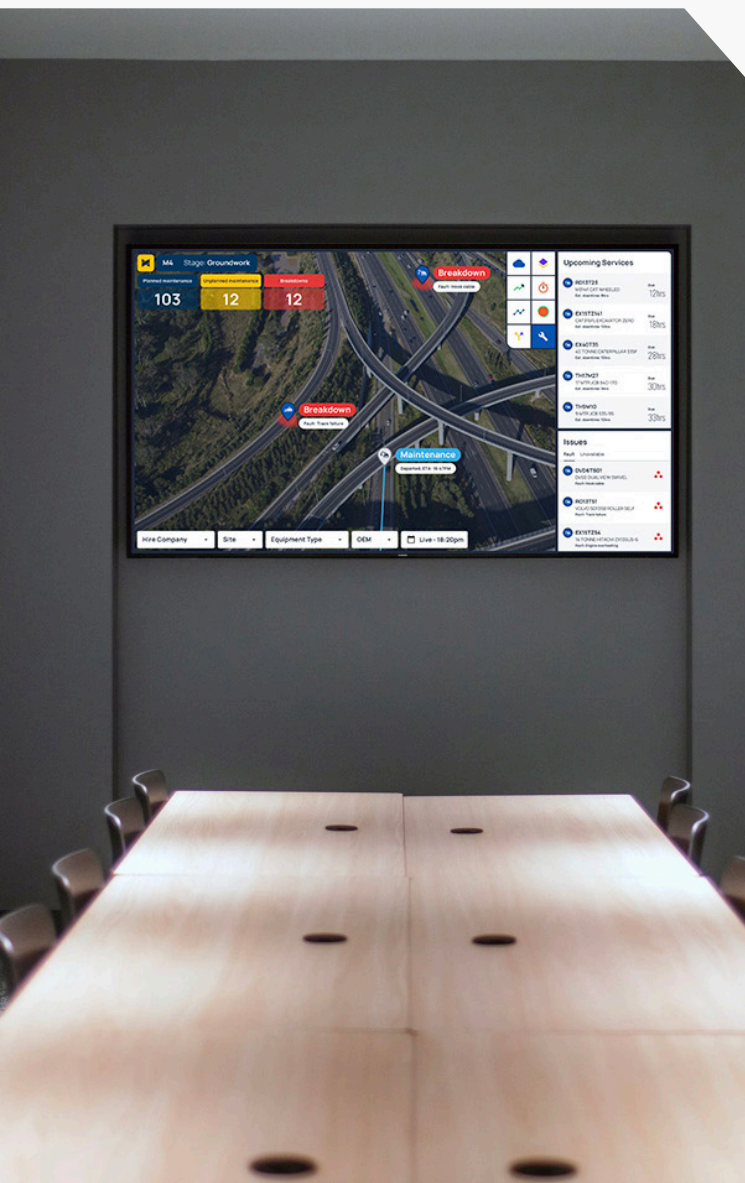


Actionable insights

Focusing on a few key metrics means the user will not be overwhelmed with data which in turn reduces the risk of decision paralysis. These metrics along with actionable insights should be shared regularly and in a timely manner to highlight to users areas that require attention, to improve equipment utilisation and reduce inefficiency.

Connecting all your heavy equipment doesn't need to be a big project, requiring massive overheads and considerable time. Start with the basics and quickly improve site efficiency, productivity, and sustainability.

MachineMax provides this data via an intuitive user interface as part of their equipment management platform solution.





About MachineMax

MachineMax provides an equipment management platform for heavy equipment users and owners to maximise the productivity and profitability of every machine in the greenest way possible... any make, any model, anywhere!

MachineMax came to life when Royal Dutch Shell & Boston Consulting Group's Digital Ventures joined forces to revolutionise the heavy equipment industry. After extensive research, the complexities of tracking mixed fleets, with varying levels of machine connectivity became apparent and so MachineMax developed a product which solves these challenges head on. That was the start of the journey and since then the solution has been deployed across the globe with exceptional results picking up several industry and technology accolades along the way.

The MachineMax full-stack offering includes a cloud-based aggregation layer which normalises and aggregates incoming equipment data, irrespective of the telematics provider. If an equipment is not connected, we can provide our revolutionary self-powered, wireless sensor. Cloud computing is then used to deliver real-time data and analysis, displayed in an intuitive platform which is accessible to all stakeholders, allowing users to optimise their fleet operations in real time.

Our mission is to track all equipment, allowing our customers to manage their entire fleet from one place, providing visibility and allowing them to make decisions which result in improved revenue and capital discipline, decreased operating costs and a better carbon footprint.