Business Life

ENVIRONMENTAL TECHNOLOGY

The green way to keep on trucking

Transport companies are using route-planning software to reduce emissions and internet matching systems to fill empty vehicles, writes **Sarah Murray**

A family in Oregon recently embarked on an unusual experiment. Using the package-flow technology developed by UPS, the global transportation company, the family saved $3.69 a day on fuel – almost $1,000 over the course of the year.

When such savings are translated to UPS's fleet of almost 92,000 cars, vans, tractors and motorcycles, the results satisfy not only finance executives but also those trying to cut the company's carbon footprint.

While e-commerce is a fact of life, goods bought in the virtual world still have to be moved around using old-world, physical transportation systems. And, with rising oil prices and growing fears over climate change, transport – once considered a necessary evil by retailers and shippers – is now the focus of attention.

Many look to alternative fuels and hybrid-electric vehicles. But information technology has an important role to play in making existing vehicles more efficient, particularly when it comes to aggregating small gains across large fleets.

Take something as simple as reducing left-hand turns. For US drivers, this means less time idling in the middle of the road waiting for oncoming traffic to pass. "Left-hand turns – that's a huge issue," says Cyndi Brandt, product manager for the Roadnet transportation suite.

A division of UPS, Roadnet sells software that logistics managers at companies such as Pepsi and Anheuser-Busch use to re-engineer their fleet routing.

Roadnet uses an underlying map database that can penalise or disable left-hand turns in the route planning process. The system is well suited to the delivery business because drivers can run circular routes, ending up where they started.

Using this technique, Roadnet customers generate surprising savings on fuel and emissions. Collectively, Roadnet clients save an estimated 54.4m gallons of fuel a year and can cut about 85,000 trucks and cars out of their logistics systems.

"One customer in Florida parked two of its trucks, and then grew by 20 per cent but didn't put those trucks back on the road until year four," Ms Brandt says.

When it comes to transport emissions, the spotlight is now on aviation. Again, technology provides part of the answer. Because aircraft are at their most fuel-efficient at cruise altitude, reducing the time spent circling at lower levels substantially cuts emissions.

Automatic dependent surveillance-broadcast technology (developed by UPS Aviation Technologies, now part of Garmin International) uses GPS to determine a plane's position and lets pilots space out their aircraft more efficiently during landing.

Aircraft can use a continuous descent approach while flying in idle mode, cutting emissions by 3 per cent between cruise altitude and runway, and by 34 per cent below 3,000 feet.

"You imagine a three-degree slope from 35,000 feet down to a sea level airport, and you don't use any power on the aeroplane till you get 10 miles from the runway," says Karen Lee, a senior 747 captain at UPS. "The savings on fuel, noise and emissions are pretty incredible."

Technology is also helping retailers and logistics providers cut back on wasted "backhaul", when vehicles, having delivered goods, return to base with no cargo.

In Europe, one in three vehicles runs empty, according to some estimates.

Online freight brokerages can link companies that have backhaul space with shippers that need their goods transported. "Fleet owners are looking to fill some of their backhauls so they publish their capacity, availability and timing," says Greg Aimi, director of supply chain research at AMR Research.

"So the network has visibility to the carriers hauling freight today that will free up tomorrow afternoon."

Some believe that the real potential, when it comes to cutting the freight industry's carbon emissions, lies in determining whether shippers should be using trucks at all, if other modes of transport, such as rail, are available. In emissions terms, water and rail transport are the most efficient, while trucks and planes are the heaviest polluters.

Ironically, deploying different modes of transport was what Malcom Mclean, the "father of containerisation", had in mind when he came up with a uniform steel box that could be transferred seamlessly between ships, truck and trains.

But since then global businesses have embraced just-in-time delivery – which some say works against fuel efficiency and carbon emissions reduction.

Because speed and low inventories are what count in just-in-time delivery, manufacturers ship goods only when retailers need them – often in small, daily shipments. This requires extensive fleets of partially full vans, rather than a smaller number of fully loaded, larger trucks running weekly.

"What they're trading off is inventory versus oil," says Larry Lapide, head of research at MIT's centre for transportation and logistics. "Just-in-time is one of those concepts that makes sense while oil is cheap, but it doesn't make sense when oil is expensive."

Demand for timely manufacturing has also limited the amount of freight transport travelling "intermodally", using several modes of transport. Retailers like the speed and flexibility of trucks using direct routes to the shop or distribution centre, rather than the complex business of connecting their shipments with more carbon-efficient trains or ships.

Getting cargo back on to these different modes of transport is the idea behind research being conducted by academics at the Rochester Institute of Technology and the University of Delaware. "We're interested in the energy and environmental impacts of freight transport as a whole," says RIT's James Winebrake.

Prof Winebrake and his team are developing a computer model that would create commercial freight routes in the way that MapQuest or Google Maps make maps for motorists.

"But we're saying: 'I want to go from point A to point B in the least carbon-heavy fashion, or emitting the least particulate matter,'" Prof Winebrake says. "We also evaluate the least cost and least time of delivery routes and make those trade-offs – because it's all about trade-offs."

Researchers working on Gift – the geographic intermodal freight transport model – have laboriously input detailed data about roads, railways, waterways, ports and rail connections. So far the project has mapped out most of the US's eastern seaboard.

With time and resources, Prof Winebrake says, Gift could be applied on a global basis. "So if you want to move sneakers from Hong Kong to New York City you could see the least carbon-intensive way of doing that – our long-term goal is to have that in place."

Sarah Murray is the author of "Moveable Feasts: The Incredible Journeys of the Things We Eat", Aurum Press, May

> By penalising left-hand turns in route planning, the software generates surprising savings on fuel and emissions

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HIGH-TECH LOGISTICS REVEALS TRUE PATH

■ **Route and load optimisation software.** Transport management systems have long been used to increase the efficiency of retailers' and carriers' supply chains. However, companies now realise these systems can also cut fuel costs and carbon emissions.

■ **Aviation navigation technology.** Automatic dependent surveillance broadcast technology helps pilots form a continuous descent profile in which they are flying in idle mode, thereby cutting carbon emissions.

■ **Freight matching on the internet.** Like online dating, web technology matches freight forwarders with empty trucks to shippers looking for a cargo space, dramatically reducing the number of wasted return or "backhaul" journeys.

■ **Intermodal route optimisation.** Since some modes of transport are more environmentally friendly than others, researchers are developing a system to allow shippers to use a variety of modes of transport, to choose routes not only in terms of speed and expenditure but also in terms of lower cost to the environment.