



No. 4 / 2018

SABOA BUS

VEHICLE OF COMMUNICATION OF THE SOUTHERN AFRICAN BUS OPERATORS ASSOCIATION

Steering and Suspension
Components



Transmission



ZF Ecofluid

ZF EcoLife

Telematics Unit



Rear Axle



Brake
Components



Brake Pads

Brake Discs

Front Axle



Shock Absorbers



AFTERMARKET

LEMFÖRDER



SACHS

TRW



AFRIWAY



AFRIWAY is the all-inclusive solution from a single source

The IVECO bus chassis is assembled from imported CKD kits and the Bus body is manufactured at a single facility based in Rosslyn, Pretoria - Iveco South Africa Works (Pty) Ltd. The benefit is that any technical issue relating to the total bus product is referred to a single source for analysis and rectification therefore increasing up-time.

The complete bus is engineered by Iveco and as such there is a "matched" interface between body and chassis resulting in European engineering and quality standards adapted for Southern African conditions and the lowest cost of ownership.

AFRIWAY is Top of the Class

The AFRIWAY'S interior noise levels are the lowest in its class. In addition, the flat floor saloon area and interior floor to roof heights are the best in the entire commuter bus class. The superior legal carrying capacity of the AFRIWAY bus, together with the best fuel consumption, enables Iveco to offer the lowest capital cost per revenue paying passenger. With the engine positioned in the chassis, major damage to expensive driveline components in the event of a front end accident is prevented. This position relative to the body under floor height results in superior engine cooling.

The AFRIWAY bus is available in both 4x2 and 6x2 variants, fitted with either manual or automatic transmissions.

The core values of Iveco Bus are: • Efficiency • Reliability • Safety • Total Cost of Ownership



IVECO BUS

IVECO SOUTH AFRICA WORKS (PTY) LTD

72 Kitshoff Street, Akasia, Rosslyn, Pretoria | T: +27 12 941 8300 or +27 12 941 8275
E: bus-sales@cnhind.com

Becoming

MICHELLE Obama prefaces her autobiography, *Becoming*, with the assertion that the question so often posed to children – ‘What do you want to be when you grow up?’ – is a useless enquiry: “As if growing up is finite. As it at some point you become something and that’s the end.”

The bus industry is certainly in the process of ‘becoming’. Beset by perennial challenges – running the gamut from subsidies to contracts, funding, taxi intimidation and fuel price hikes – there are also opportunities. On the technology front, for instance, Vix Technology business development director Michael Hart says, “The pace of change is awesome. We’re on the precipice of the 4th Industrial Revolution – and it’s exciting.” What South Africa needs to do though “is avoid buying a Betamax when we’re on that precipice” – leapfrogging old technology for solutions that are innovative, cost effective, appropriate and efficient.

The newest participant in the bus industry’s process of ‘becoming’ is Real African Works, which launched recently as South Africa’s first 100% black owned OEM in the automotive industry. Headed by Vuyelwa Toni Penxa, RAW is contracted to deliver 135 Gautrain buses as well as 35 units to Polokwane. Making its debut with Euro V diesel buses, RAW intends to swiftly progress to electric and hydrogen fuel cell offerings. Its goal is to sell zero emission drivetrains

through the localisation of technology and manufacturing.

- Compilation of the programme for the 2019 SABOA Conference and Exhibition – taking place at the CSIR International Convention Centre on 31 July and 1 August – is under way. Suggestions are welcome: if you’d like to raise a topic for consideration, e-mail saboa@saboa.co.za.

Cindy Haler, Editor



SABOA BUS

VEHICLE OF COMMUNICATION OF THE SOUTHERN AFRICAN BUS OPERATORS ASSOCIATION

SABOA Bus magazine is published on behalf of SABOA by Titan Publications (Pty) Ltd,
PO Box 1491, Pinetown 2123. Telephone: (011) 789-3730/1/2 or Fax to E-mail: 086 635 9834;
E-mail: truckbus@mweb.co.za

Editor: Cindy Haler

SABOA, Postnet Suite 393, Private Bag X033, Rivonia, 2128. Telephone: (011) 511 7641 or Fax: 011 511 1769 E-mail: saboa@saboa.co.za Website: www.saboa.co.za

SUPPLIERS

The prototype bus is equipped with two AVE 130 electric portal axes for a powerful drive



ZF electric drive solutions simplify move to e-mobility

TO MAKE the transition to local zero-emission city buses and low-emission logistics transport trucks as easy and flexible as possible, ZF is providing commercial vehicle manufacturers with technology and systems expertise.

The company is offering its proven AVE 130 electric portal axle and the new CeTrax electric central drive for city buses, acting as a one-stop shop for all the components required. This means manufacturers can choose conventional low-floor and high-floor platforms as well as low-entry buses for electrically powered models, which makes the electrification of vehicle fleets more economical and convenient.

In long haul transport logistics, electric drives are no longer just an idea: the hybrid version of the ZF TraXon commercial vehicle transmission exhausts previously unused power savings potential at maximum output.

Stricter emissions limits and the public debate on fine dust pollution are putting pressure not just on the passenger car manufacturers, but also on public transport operators, which are obligated to reduce emissions. This means bus manufacturers are investing resources on system integration and even more on development.

ZF provides OEMs with expertise during this transition and its new prototype bus impressively demonstrates what the company can offer. The 18-metre articulated bus is equipped with two of the proven AVE 130 electric portal axles, with a total of four motors providing powerful thrust. ZF offers this axle in a more complete package, which includes advanced inverters, drive control and full power electronics all fully integrated. The company thus guarantees optimal energy efficiency – and a larger range. For sufficient power, a standard articulated bus only needs one driven AVE 130 electric portal axle.

In principle, the installation space required for the AVE 130 is about the same as that of a conventional portal axle. For manufacturers, this means major cost savings because they do not

have to develop their own chassis platforms for electric mobility solutions. The AVE 130 can be combined with most conventional power sources, including batteries, supercaps, fuel cells or even overhead lines. It is also suitable for serial hybrid and plug-in versions. This gives OEMs and public transport operators flexibility when selecting the power supply. Thanks to standardised high-volume components, it is also maintenance-friendly.

'Plug and drive' with CeTrax

In addition to the AVE130, ZF offers the new electric CeTrax central drive as a system solution for low-floor and high-floor buses. CeTrax is built on a plug-and-drive approach, so it can be integrated into existing vehicle platforms without having to make major changes to the chassis, axles, statics or differential.

ZF is therefore turning to manufacturers that plan to switch from existing conventional models to electrically powered models as part of their platform strategy. CeTrax is configured with a maximum output of up to 300 kW and maximum torque of 4 400 Nm. It is intended for challenging bus applications and offers considerable weight advantages as well as outstanding efficiency.

Delivery scope of the system package also covers drive control and inverters, so manufacturers get a fine-tuned total solution when it comes to performance, efficiency and service life. OEMs can also save time and money because ZF handles the homologation and testing of the drive system.

TraXon Hybrid for long haul

The TraXon Hybrid, equipped with an electric motor positioned between the combustion engine and transmission, allows hybrid functions in heavy commercial vehicles. In generator mode, the hybrid module can also supply power to other units (for refrigerated transport, for instance). TraXon Hybrid is also ideal for coaches, where the hybrid drive can offer the same advantages. ■

Driver safety awareness training

Driver safety awareness training is on offer in terms of a memorandum of understanding between the Road Traffic Management Corporation and SABOA

MORE than 45 people per day lose their lives due to road traffic accidents, according to a study conducted by the Road Traffic Management Corporation (RTMC). It is estimated that these road traffic accidents cost the country approximately R142,9 billion per annum.

SABOA fully supports the objectives of government to reduce the number of fatal crashes on our roads by 50% by the year 2030. To this end, the National Council of SABOA resolved to adopt the Road Transport Management System (RTMS) and is currently busy with the establishment of a Driver Training Academy for the bus and coach industry.

RTMS is an industry-led, government supported, voluntary, self-regulation system that encourages

road transport operators to implement a management system (SANS 10399:2012) with outcomes that improve road safety.

To further enhance road safety in the bus industry, the RTMC and SABOA concluded a Memorandum of Understanding (MoU) in terms of which the RTMC will conduct Driver Safety Awareness Training programmes among SABOA members. The Driver Safety Awareness Training will focus on, inter alia, the following:

- Road safety education, including impaired driving, distracted driving and overloading;
- Reconstruction of accidents, including possible causes and preventative measures;
- Pre-trip inspections;
- Roadworthiness.

For operators who have venue facilities, the training will be conducted on their premises. These operators who are interested in the Driver Safety Awareness Training should contact SABOA so that the necessary arrangements can be made with the RTMC.

For operators who don't have the required facilities (for example, SMMEs), the training can be offered to groups of not more than 30 drivers per session at a venue which will be identified by the RTMC. SABOA branches will play a leading role to identify and co-ordinate these groups for training.

There is no cost for the training.

Members who require the training should contact SABOA on saboa@saboa.co.za or on telephone (011) 511 7641 or, alternatively, contact their respective Provincial Executive Committees. ■



Only Authorized Supplier of
WAYFARER
in South Africa



WAYFARER6

Tel: 011 476 5400 - Fax: 086 554 2482 - Email: info@ebussupplies.co.za - www.ebussupplies.co.za
33 Judges Avenue, Randburg, Johannesburg

No respite forthcoming on finance front

Although the Economic Regulation of Transport Bill is wending its way towards imposition, Gauteng MEC for roads and transport Ismail Vadi says there are fundamental questions to be confronted before getting to the issue of proper financial management

THERE appears little prospect of respite for hard-pressed bus operators seeking some relief on the financial front, with numerous pressing questions to be addressed in a bid to achieve progress.

Gauteng MEC for roads and transport Ismail Vadi, addressing a recent Transport Forum gathering focusing on financial management and transport, says it's impossible to understand financial management without understanding the funding and financing of public transport – and transport – infrastructure.

“These three things – funding, financing and financial management – go hand-in-hand. We, as a country, have not solved the first two issues, yet we're looking at financial management and regulation of finances through the new bill.

“We have to make more realistic assessments of where we are and what we're doing,” says Vadi, “and within that context we can talk about proper financial management of the transport system. We need a transport authority. We've experimented with a voluntary transport commission for two or three years and there have been some good successes, but it's clear that we need a legally established juristic authority that can plan and coordinate.

“It's important to start pulling things together, setting the standards and asserting some institutional authority between the provincial government and the municipal authorities in our province so that we can make better use of our limited resources. In public transport we have no choice: we have to pull things together to integrate the system more effectively for better coordination and better use of the limited financial resources that we have at our disposal. Within that, then can start talking about financial management.”

An understanding of the policies that underpin funding and financial

mechanisms is crucial. There is a policy underling measures such as etolls, for instance, says Vadi. “When people are unhappy with the policy, the instrument becomes blunted – so some people pay tolls, others don't pay until perhaps they're dragged to court, and others don't pay on principle.”

Resolution of policy questions is essential for effective financial management.

Even with policies and sound financial management in place, Vadi questioned whether adequate and effective oversight mechanisms are in place throughout the political system – a question that's clearly answered by conclusive



Gauteng MEC for roads and transport Ismail Vadi

evidence in a number of SOEs in the transport sector in which very serious breakdowns have occurred. “There has been phenomenal failure by the oversight bodies. It took civil society and the media to raise the red flag – and to push the flag in the face of politicians.

“These things are interrelated. Funding, financing, financial management, oversight and accountability. If any one fails, you’ll see the system starts wobbling and unfortunately we’ve seen significant failures in recent years.

“There are huge losses to the fiscus which will take us a long time to overcome, because the economy is down, revenue is down. It is much more difficult now to find money for transport, whether for infrastructure or public transport operations. So we all lose – not just in the present, because things have gone wrong, but over the next five, 10 years. We are in a very difficult phase. One has to recognise what went wrong and identify what we will do about fixing the things that went wrong before we can even talk about the regulatory entity.”

Questioning whether we have appropriate, responsive, adequate and accepted policy for the

funding of public transport and transport infrastructure, Vadi noted that the subsidisation of buses is an outdated policy that has been run for the past 25 years. The policy is inefficient and no longer sustainable.

The PWV 15 east-west highway (the first new Gauteng highway to be built since the 1970s and crucial for the province’s freeway network) will cost roughly R7 billion: “Where are we going to get that?” Despite major pressure, government’s expenditure ceiling remains intact – there will be no new funding and no increases for government departments for the next three years – and Vadi baulked at committing to a loan for which five governments would be liable for the next 25 years. “There are no easy answers anymore.”

In addition, the taxi industry was pressing for inclusion in the subsidy framework.

“The point is that at the moment we don’t have a clear, well-defined policy position on the funding and financing of transport operations and transport infrastructure.”

Another question Vadi raised was whether existing financial resources are being used

prudently and effectively. In addition to areas of duplication – Putco buses running alongside BRT vehicles, for instance – huge settlements have taken root over the past 25 years, requiring services including transport.

An additional issue is the deep-seated corruption and state capture in which the transport sector has been affected by looting running into billions of rands (in which the private sector is complicit along with government).

Other points to consider included whether there has been effective coordination between national, provincial and local government when it comes to financial management issues to attain coherence, and whether transport functions are suitably allocated to the various spheres of government. Rather than blind adherence to what has been done in the past, big and bold moves should be contemplated to inject greater efficiency into the system. Similarly, tough decisions on SOEs and outsourcing to the private sector are required.

The bottom line? There are many pieces to be slotted into place in the transport puzzle for a clear picture to emerge. ■

•PERFORMANCE •RELIABILITY •EXPERIENCE •FUTURE

ISRI **ISRINGHAUSEN**

Isringhausen of South Africa
 Gauteng, Jet Park - Sales: + 27 11 397 8731
 East London - Factory: + 27 43 736 3545
 Email: info@isri.co.za
 Website: www.isri.co.za

Africa to reap benefit of AFC groundwork

By Cindy Haler

Ticketing, in the past, was just that: ticketing. A ticket machine, cash and a slip was about the extent of it. Now, advances in the fare collection arena have seen ticketing and automated fare collection mechanisms take a central stage position as the source of a wealth of data on transporters' customers for analysis and planning

THERE are large parts of Africa where automatic fare collection systems and cash alternatives are not deployed and the continent has traditionally been viewed as a market for old technology – the technology that is no longer wanted or required in other parts of the world.

“For too long, transporters have been happy to buy this old technology – but now they’re beginning to understand that they don’t need to adopt old technology as a first step along the road to getting to where they want to be,” says Michael Hart, Vix Technology business development director. “They can leapfrog, learn from the mistakes others have made, learn from the investments others have made and deliver something that’s innovative, cost effective, appropriate and that works.”

Vix Technology is the architect of sweeping transit projects – from Beijing’s smart card-based Automated Clearing Centre which processes more than seven million transactions daily, to Seattle’s contactless ORCA card used by more than 70% of passengers in a system which processes more than 210 million rides a year.

Locally the company’s projects include Tshwane’s A Re Yeng BRT system (low-value payment debit cards for convenience for passengers and lower costs for the operator), Cape Town’s MyCiTi operation (contactless debits

cards to replace paper-based ticketing), eThekweni’s Go!Durban (automated fare collection), Interstate Bus Lines (ticketing and fare collection) as well as a subsidy monitoring system in Limpopo encompassing 18 regional operators.

Although there are some twists in terms of distance, terrain and environment, Hart notes that South Africa’s transit requirements are very much in line with those of other countries. “The challenges of population growth and density, congestion, trying to support GDP growth and improving access to education, employment and health care are so similar to those challenges in other parts of the world. They’re common everywhere. The issues facing transit in Africa and South Africa are very common at the core.”

Despite the fact that a combination of factors continues to stunt growth in the public transport arena in South Africa,

public transport is a vital cog in driving economic growth.

Vix Technology SA CEO Tjaart Kruger says that although the bus industry is under stress – given the economic environment and uncertainty on allocation of subsidies – transport is moving and changing quite rapidly.

“With innovation, there’s still business to be done,” says Kruger. “It’s no longer a case of simply supplying ticketing machines or fare collection systems. We’re finding different ways to achieve what clients need and are offering holistic solutions to clients’ requirements. During this impasse, it’s vital to drive profitability. In addition to access to Vix’s international expertise, we also have a local development centre.”

Vix’s fare evasion and monitoring solutions will play a role in ensuring that subsidies flowing down through regional transport authorities go towards



TECHNOLOGY

providing the transport services for which they are intended, avoiding payouts for journeys not provided or undertaken.

South Africa, in fact, is leading the world in some aspects of technology uptake, says Hart, citing the example of being able to open a bank account with your face. “That’s world leading technology. This is a great place to do business,” says Hart.

The pace at which technology is evolving is astounding. “It’s about productisation, a service expected as standard, cloud data security – those factors and industries are changing at a phenomenal rate. Five years ago, you would never have envisaged using your phone to pay for your groceries or your bus ticket. What’s going to happen in the next five years? The pace of change is awesome. We’re on the precipice of the 4th Industrial Revolution – and it’s exciting.

“What South Africa needs to do is avoid buying a Betamax when we’re on that precipice. You need to buy platforms that are open, that are device, token and payment source agnostic, that are easy to integrate with multiple partners and parties – because the days of one company being the right answer for all of your requirements are gone.

“No one company has a monopoly on good ideas, so why should we have a monopoly on a client’s transit solution? That’s how we’re going to cope with the challenges of the future: by working collaboratively and openly to achieve the true requirements of the travelling public, operators and agencies.”

Kruger concurs: “Adopting a single-minded approach to this, not enabling anyone to plug into your IP, is a death knell,” he says. “If you can’t make that shift, then you’re not going to be around to tell the story – technology is going to overtake you.”

While operators are well aware of the potential of technology solutions that seamlessly blend fare collection and monitoring (of fare collection and safety event) functionality, there is also a need to explore avenues to deal with the financial constraints that hamper uptake, continues Kruger. Leasing is one option



under consideration, while Hart favours a shared risk and shared reward approach.

The bottom line, though, is that innovation is on the cards – from funding to fare collection solutions. “The days of simply trying to sell some hardware to a bus operator are long gone,” says Kruger.

Although Vix technology touches the

lives of millions of commuters daily, Hart says that it’s not a brand that the majority of people will have heard of – nor should it be. “If our systems don’t work, people don’t get to work – or they have challenges and we ruin their day. We want to be part of that pleasurable customer journey, but an invisible enabler to make it happen.” ■



TECHNICAL COMMITTEE



Technical committee wraps up good year

Although resolution of issues facing the bus industry is never speedy, a reinvigorated Technical Committee appears to be making solid progress

THE year's final SABOA Technical Committee meeting was hosted by Voith Turbo at Emperor's, with a presentation by Voith on its electric drivetrain technology kicking off proceedings, followed by a Vix Technology overview of its fare evasion counter-measures.

Topics on the agenda included towing capacity

of buses (with delegates favouring increased law enforcement on non-compliant operators rather than the imposition of additional legislation), compulsory requirements on glass, sharing of NaTIS numbers and rollover protection.

The Committee will meet next year on 20 February, 22 May, 31 July, 19 September and 20 November. ■

Keeping cool

By Dai Davies, OBE

Radiator mounting on a bus is less straightforward than in the truck world, but warrants scrutiny because less-than-optimum design can give rise to numerous problems

WHEN you see a truck, you expect to see the radiator at the front – and that’s exactly where you will see it. The main reason for this is efficient engine cooling.

With a bus, the situation is somewhat different, depending on where the engine is situated. Virtually all front engine buses have the radiator mounted in the conventional position – at the front, like all trucks. This position offers maximum cooling efficiency as well as making it easy to carry out repairs and maintenance.

Where rear engined buses are concerned, though, engine cooling is a little more complicated. Cooling is often less efficient, particularly on slow moving vehicles. That is why the ideal mounting position of the radiator is alongside the engine on the right hand (driver’s) side of the vehicle. Where vehicles are driven on the other side of the road and are left hand drive – most of Europe and some African countries such as Ghana and Nigeria, for instance – the radiator should be fitted on the left hand side of the vehicle.

One of the reasons for this is that if the radiator is mounted on the kerb side there is a greater tendency for the radiator fan to draw in more ‘rubbish’ from the kerb/hard shoulder through the radiator, thereby restricting air flow.

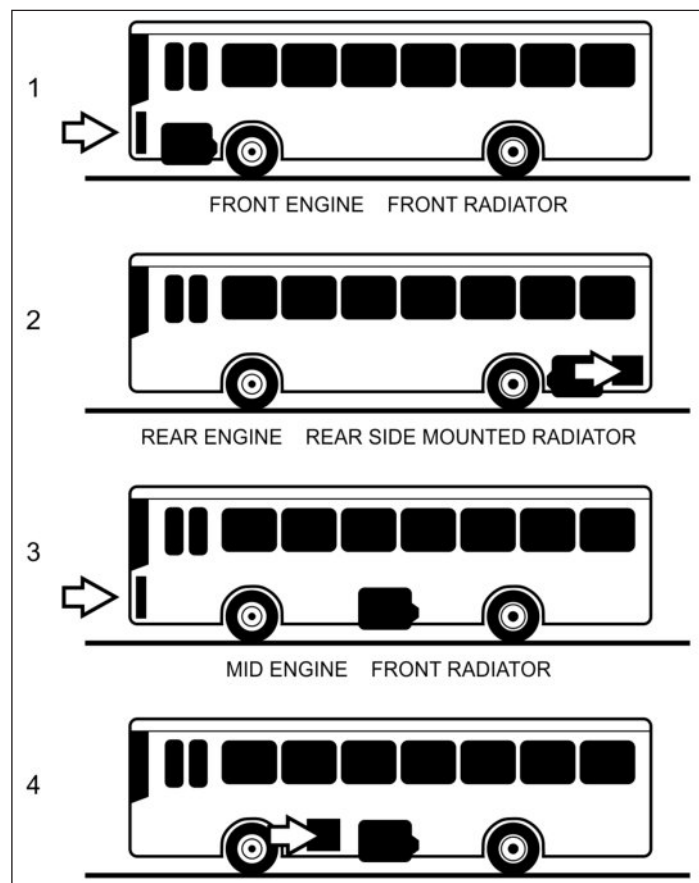
In the case of buses with a midship mounted engine – such as the ERF Super Trailblazer and Volvo B10M, or indeed older buses such as the Leyland Tiger, Olympic and Tiger Cub – some of these vehicles had the radiator mounted in the conventional position for maximum cooling efficiency with a hydraulic driven fan. This design was simple and efficient.

Some buses of yesteryear, and some today, have the radiator mounted mid-way in the chassis just in front of the engine (usually truck chassis converted to buses). Not only

is such a design inefficient from an installation point of view, but access for maintenance and repairs is difficult. In addition, the position of the radiator creates a vacuum cleaner effect: it tends to suck in all the dirt and grime from the surrounding area and the front wheels. The restricted height of the radiator also compromises engine cooling.

What is often acceptable for European operating conditions is not necessarily acceptable for African conditions. If you, as a would-be purchaser, are in any doubt, ask the sales person concerned to physically demonstrate to you the cooling features of the vehicle. If he is unable or unwilling to do this, you should kick him off the premises, as he is probably more familiar with the wine list than the list of the technical features of the vehicle.

There does not appear to be a mid-engine horizontal design now available in South Africa, with all the advantages the format offers of good weight distribution, easy passenger access, ease of maintenance and repairs, a shorter driveline with the elimination of midship bearing/s and – most important – improved driver and passenger comfort with reduced passenger area noise levels.





By Howard Mellet

The MaaS model gains traction in SA

Mobility as a Service – MaaS – separates the value of mobility from the ownership of the means of transport. What is the possibility of SA’s medium and heavy commercial sectors adopting MaaS on a broad scale?

GAUTENG MEC for Roads and Transport, Ismail Vadi, was absolutely correct when he said “transport is central to us as individuals and families because it is a factor that impacts on our decisions on how to make a life and how to make a living”.

Speaking at the launch of the 2018 Transport Month Campaign in Gauteng, he reportedly said that increasingly, transport professionals and practitioners globally talk about Mobility as a Service (MaaS), and it has become a central theme within the transport value chain. “The focus [within] MaaS is on the customer experience and satisfaction.”

Additionally, MaaS was presented as a viable solution for SA’s commercial transport sector at the i-Transport and UTAP (African Association of Public Transport) “Go-Green, Go-Smart” Conference earlier this year.

Key objectives of this event, hosted by the Intelligent Transport Society SA, were to keep delegates up to date with the technology revolution and promote the deployment of technologies aimed at making transport operations more efficient and ‘people friendly’.

There is little doubt that MaaS is a disruptive technology; witness the success of Uber and other on-line ride-hailing services that have secured positions in global markets while revolutionising the concept of public transport.

Technically speaking, MaaS separates the value of mobility from the ownership of the means of transport. It involves digital integration across transport infrastructures, giving customers access to mobility services.

What is the possibility of SA’s medium

and heavy commercial sectors adopting MaaS on a broad scale?

For an insight, we must look to China’s Truck Alliance Group which is developing MaaS technologies and business models to boost efficiencies in the long-haul sector in Asia. Here, according to Truck Alliance, heavy duty truck/trailer rigs often stand empty and unproductive for hours on end and could be put to better use.

Truck Alliance is definitely no light-weight. According to reports, as of August it boasted more than five million members in the form of owner-drivers and transport companies. They use Truck Alliance’s MaaS platform for free.

There are also 1,5 million customers on Truck Alliance’s books, ranging from factories and distribution houses to logistics specialists.

Truck Alliance generates revenue from fees paid by these companies when they need transportation services, either on a regular or once-off basis.

Truck Alliance also takes a percentage of the shipping fees and pockets profits when truckers use its online payments system to buy fuel or top-up ‘touch-and-go’ highway toll cards.

It’s an eminently successful business. The company processes the equivalent of R275 million rand in toll-card top-ups daily and, through its system, handles monthly fuel purchases worth more than R2,1 billion.

Truck Alliance also has a finance arm which assists owner-drivers and small operators to gain access to loans for new vehicle purchases.

Could such a system be replicated in SA? MEC Vadi seems to have confidence in such a concept’s merits, as does South African consulting firm RIIS, which, according to its promotional blurb, is

focused on “building networks and consortiums that solve intractable business and social problems”.

RIIS says it is currently working to understand the current MaaS environment in SA and suggest ways to transform existing transport systems into a MaaS ecosystem.

Is success just around the corner? As demonstrated by Truck Alliance and encouraged by MEC Vadi, MaaS has many immediate benefits for the industry.

MaaS advocates are encouraging manufacturers, distributors and other fleet owning organisations to gain a clear understanding of the total cost of truck ownership. They are urging company bosses to take regular rises in new vehicle purchase prices, the high cost of finance and insurance, inevitable depreciation, burgeoning running costs, growing labour issues and other operational expenses into account.

Accurate assessments and their projected long-term implications may well motivate support for the MaaS business model as a more cost-effective option in the foreseeable future.

Looking ahead, we already see emerging technologies able to complement MaaS in its most evolved form. For example, long-haul transportation, with its hours of cruising in relatively simple highway environments, presents an opportunity to deploy automated vehicles (driverless trucks) and platooning.

Innovation in this arena is being driven by visionaries from major manufacturers including Daimler AG, Tesla, Paccar, Volvo and others who stand ready to help us source, acquire, develop and commercialise knowledge for our ultimate benefit.