



Electric-vehicles-as-a-service

A viable fleet transition model
in South Africa

Glossary

AC	Alternating Current
DC	Direct Current
ESG	Environmental, social and governance
EV	Electric Vehicle
EVaaS	Electric vehicle as a service
ICE	Internal Combustion Engine
LDV	Light delivery vehicle
SAIC	Shanghai Automotive Industry Corporation
VW	Volkswagen
PV	Photovoltaic





Key Insights

- There are 2 670 338 light delivery vehicles (LDVs) in South Africa. This is the second largest vehicle market for electrification, after private passenger vehicles.
- There is a global and local demand to transition these fleets to electric vehicles (EVs) to save costs, improve efficiencies and reduce carbon emissions.
- In the transition from internal combustion engine (ICE) vehicles to EVs, fleet managers face three main barriers:
 1. The high upfront capital cost of EVs.
 2. The upfront capital cost of the required charging infrastructure.
 3. The lack of services and support for EVs in South Africa. Electric-vehicles-as-a-service (EVaaS) models improve the business case for fleet electrification by addressing the high initial purchase price of EVs.
- EVaaS models provide an economical and low-risk approach to EV charging, which improves the operational feasibility of an EV fleet.
- EVaaS leasing models show a reduced business risk through dedicated technical and servicing support.



This industry brief is written for:

1. Investors in the EV industry who are looking to implement EVaaS business models in South Africa.
2. Fleet managers exploring EVs as an option.



Context

The South African EV market remains nascent with overall low penetration levels. The main barriers limiting market growth remain the high upfront capital cost of EVs, limited public charging infrastructure and, more recently, grid instability (due to loadshedding).

Within this nascent market, the electrification of centrally managed fleets presents a unique market opportunity in the EV transition. The electrification of LDVs represents the second largest market opportunity in South Africa after the private passenger vehicle market.

The market shift towards commercial fleet electrification is driven by different factors ranging from rising fuel costs to a greater focus on corporate environment, social and governance (ESG) aspects of business. In the transition from ICE vehicles to EVs, fleet managers face three main barriers: the upfront capital cost of electric vehicles, the upfront capital cost of the required charging infrastructure and the lack of services and support for electric vehicles in South Africa. In an attempt to address these barriers and spur the growth of the EV market in South Africa, an EVaaS ecosystem is starting to develop. Within the ecosystem, the common objective is the delivery of a seamless electric mobility experience for commercial fleet managers who are looking to transition their fleet to electric vehicles.



What is EVaaS?

EVaaS is an innovative commercial model that combines different services under a single contract. Vehicles are leased through a single, bundled monthly subscription. This subscription includes the cost of the vehicle, the installation of charging infrastructure, vehicle telematics, fleet management, servicing and maintenance. The concept offers fleet managers the possibility of an on-demand, personalised and seamless transition to EVs.



Operational cost benefit analysis

Globally, one subset of this fleet transition has been the move to transition from ICE panel vans to electric alternatives. This can be seen globally and locally. Globally, with Rivian supplying 3 000 vehicles to Amazon in the US market in 2022¹. Locally, Everelectric has supplied 41 electric SAIC panel vans to Woolworths in 2023, for their online grocery delivery service².

As an illustrative example the cost benefit analysis of a transition of a fleet of 50 panel vans from ICE vehicles to EVs under the EVaaS model is explored below. Interviews with commercial and municipal fleet managers suggest that vehicles are currently replaced every five to seven years. Therefore, for comparison purposes between a leasing and outright purchase models, a lifespan of seven years has been assumed.

Using the traditional outright purchase model as seen in **Figure 1** that is favoured by fleet managers and municipalities, the combined purchase price and operating cost over seven years of an electric SAIC panel van (R980 320) is lower than that

of an ICE VW Caddy panel van (R1 394 885). At a fleet size of 50 vehicles, this would amount to R49 016 000 for an electric fleet, compared to R69 744 250 for an ICE fleet.

The considerable fuel cost savings from switching from ICE to EV is the driving factor of the business case for commercial fleet electrification. This comparison however, does not include the cost of purchasing and installing charging hardware which costs around R22 000 exl. VAT for an AC charger and between R175 000 to R800 000 for DC charging hardware. Therefore, a theoretical EVaaS subscription model has been developed that would remove the upfront cost of an electric panel van, as well as the upfront cost of the charging hardware that would be required.

Figure 2, shows that if the EVaaS subscription is priced that a maximum of R16 000 per vehicle per month, there will be a business case for electric panel vans compared to the ICE equivalent.

¹ Source: <https://www.aboutamazon.com/news/transportation/everything-you-need-to-know-about-amazons-electric-delivery-vans-from-rivian>

² Source: <https://cleantechnica.com/2023/05/12/south-african-retailer-woolworths-new-fleet-of-41-electric-delivery-vehicles-are-now-on-the-road/>

Assumptions underlying the theoretical business case for EVaaS

Table 1: ICE Panel Van Assumptions

Vehicle cost	R509 000
Energy consumption	0.11 litres per km
Range	600 to 800 km
Average annual mileage assumption	50 000 km
Petrol cost assumption	R23.00 ³
Operational Cost per km	R2.53

Table 2: Electric Panel Van Assumptions

Vehicle cost	R800 000
Energy consumption	0.224 kWh per km
Range	250 to 280 km
Average annual mileage assumption	50 000 km
Electricity cost assumption	R2.30 kWh
Operational Cost per km	R0.52

Model 1: Outright purchase EV vs. ICE panel van business case

Figure 1 shows that there is a business case for commercial fleet managers to procure electric panel vans instead of ICE panel vans using the outright purchase model. However, the cost of charging hardware will reduce the overall business case depending on how many AC or DC chargers are required for the fleet operation.

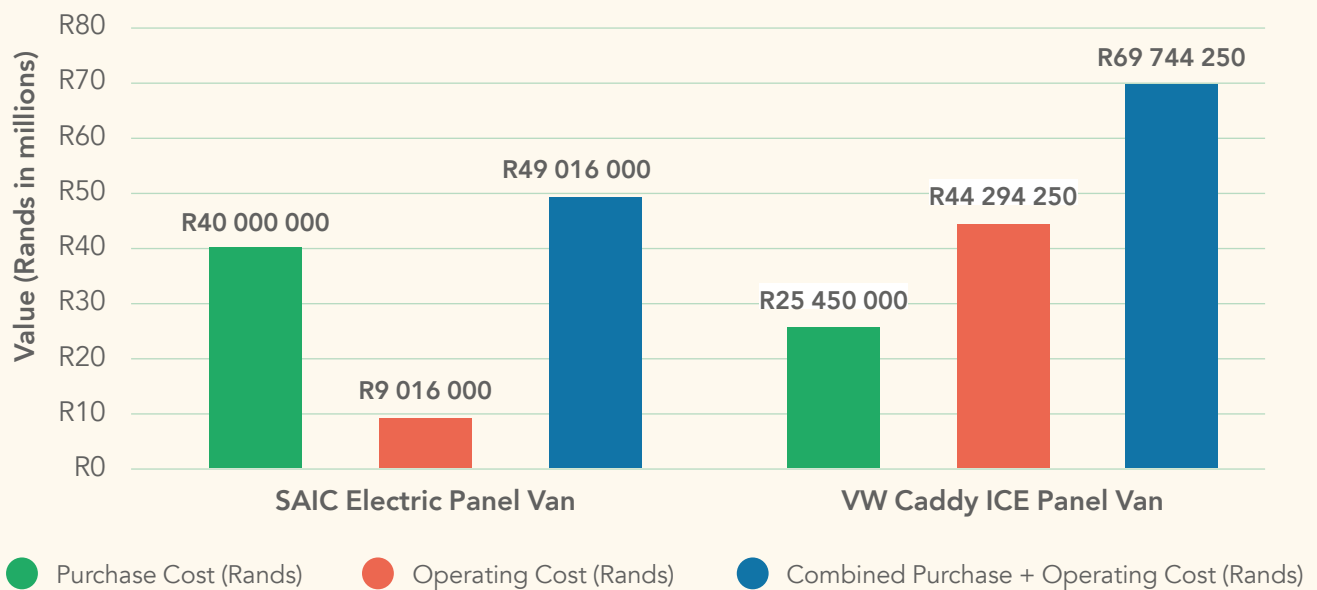


Figure 1: Outright purchase electric vs. ICE panel van business case for 50 vehicles

³ Source: Automobile Association of South Africa (May, 2023)

Model 2: EVaaS vs. ICE panel van business case

Figure 2 shows that if a leasing model is priced at a maximum of R16 000 per vehicle per month, the overall business case is stronger for an electric panel van leasing model, including the charging hardware required for a fleet of 50 vehicles. This has been compared to the outright purchase of 50 ICE panel vans plus operating costs over seven years. If a EVaaS subscription is priced at below R12 000 per vehicle per month, this would be more affordable over seven years than the outright purchase plus operating costs of 50 electric panel vans.

Given these calculations, the market needs to now determine if it is possible to price EVaaS at this theoretical viable business case amount, and what the barriers are that might prevent this competitive price point.

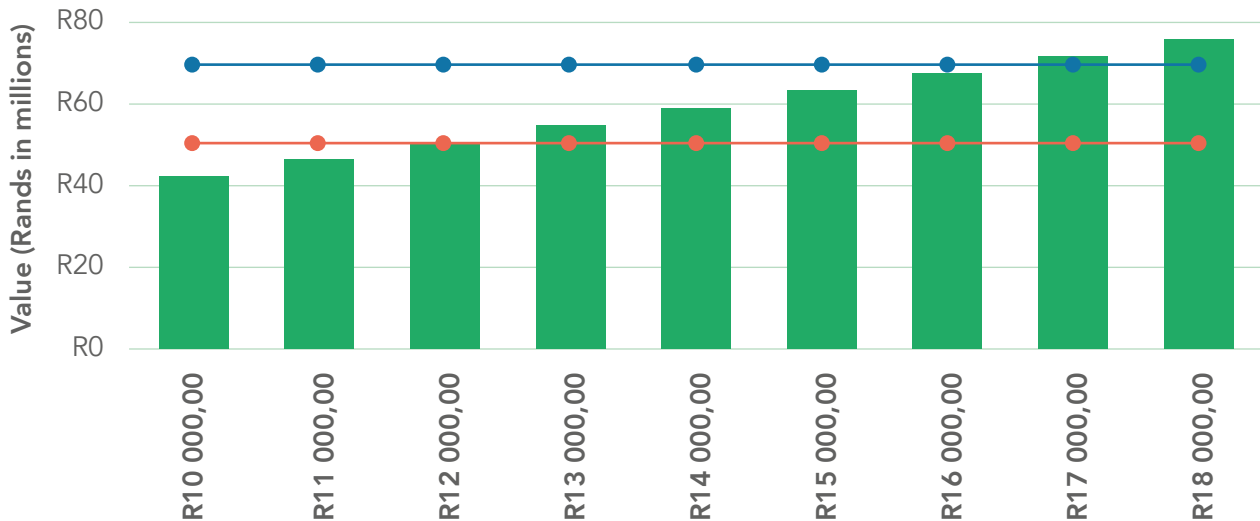


Figure 2: Modelling EVaaS business case over seven years for 50 vehicles

EVaaS Subscription per vehicle per month (Rands)

- EVaaS Total Opex Cost over 7 Years
- Electric Outright Purchase + Operating Cost over 7 Years
- ICE Outright Purchase + Operating Cost over 7 Years

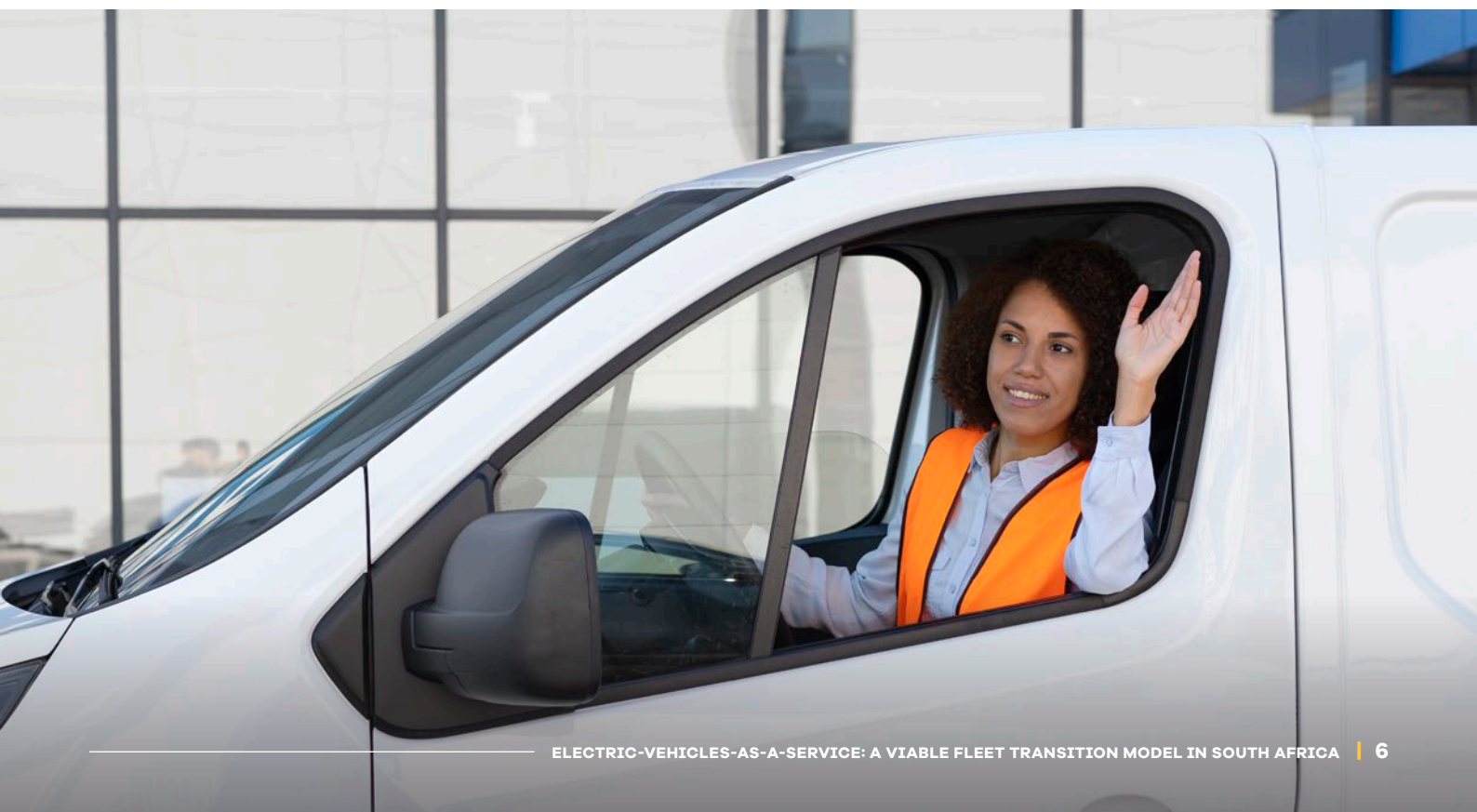


Figure 3 shows how the total outright purchase plus operating cost of an EV and ICE panel van respectively would vary based on fluctuations in the electricity and petrol price. The outright purchase plus operating cost of the ICE panel van would still be higher than the EVaaS model, over seven years, despite an up to 25% fluctuation in petrol and electricity price above and below the baseline.

The cost of electricity for EV charging is still quite low compared to petrol price fluctuations, even considering an up to 25% fluctuation in electricity prices above and below the baseline. The EVaaS model would have a lower overall cost than the outright purchase plus operating cost of the electric panel van over seven years if priced at a monthly subscription of R11 000 and below.

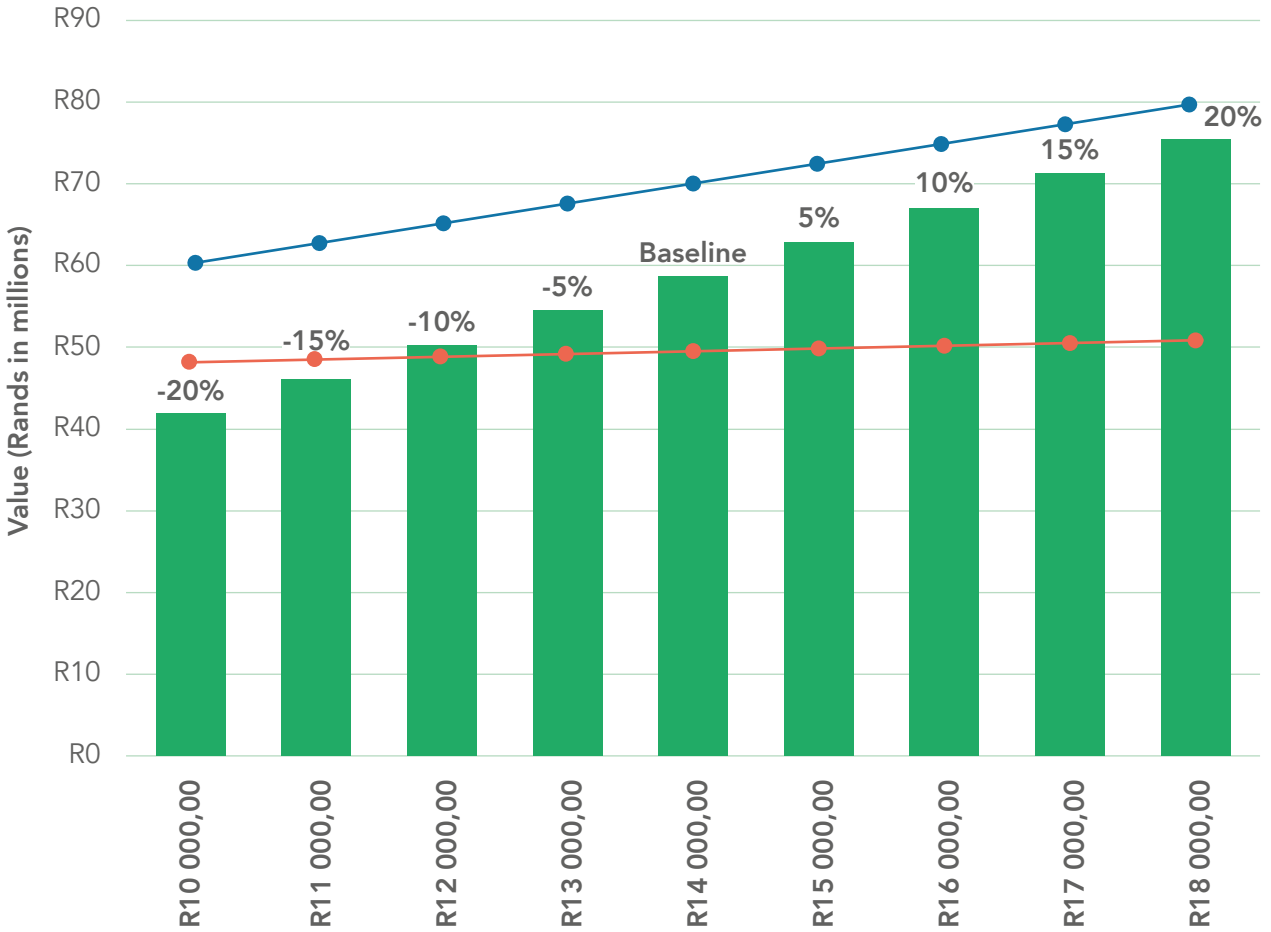


Figure 3: Purchase price plus operating cost sensitivity analysis

EVaaS Subscription per vehicle per month (Rands)

- EVaaS Total Opex Cost over 7 Years
- Electric Outright Purchase + Operating Cost over 7 Years
- ICE Outright Purchase + Operating Cost over 7 Years



Case Study: Everlectric

Everlectric is an innovative South African EVaaS start-up that is bundling commercial EVs, a network of charging infrastructure, sustainably sourced electricity and an enabling digital IoT platform that has been curated to unlock the EV transition of commercial fleets in South Africa. They have successfully rolled out 41 electric panel vans in partnership with Woolworths Dash and DSV (Woolworths Dash is an online grocery delivery service in South Africa).

According to Everlectric, the average ICE panel van costs around R2/km to operate. An equivalent electric panel van costs approximately 40c/km despite fluctuating electricity costs. This data is based on two years of operational tests conducted on South African roads. The electric panel vans used by Woolworths have an average daily mileage of between 150km to 220km per day which is suitable for the 300km battery range that is available on a full charge. DSV has rolled out rooftop solar PV at their logistics depots in order to produce renewable energy that could be used for onsite charging. Everlectric estimates that the 41 electric panel vans in operation with Woolworths and DSV will save approximately 400 tonnes of direct tailpipe CO₂ emissions annually.

Impact on vehicle procurement for commercial fleets

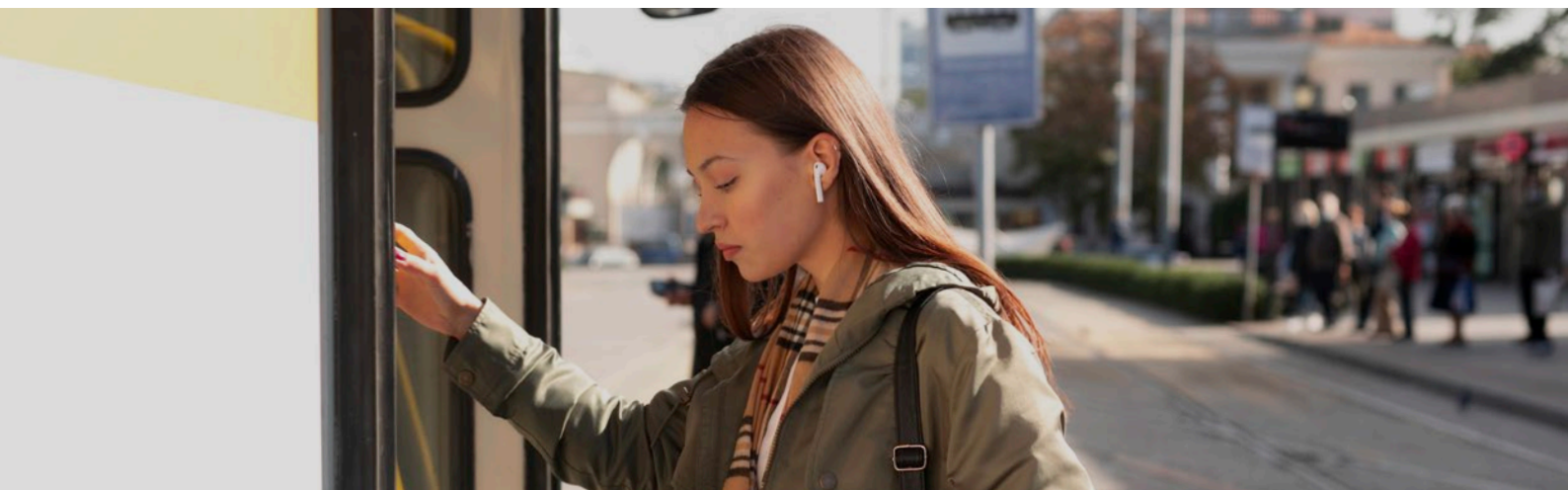
EVaaS is a promising business model, that if applied correctly, could accelerate the uptake of EVs in the South African market. EVaaS addresses market barriers such as the high capex cost of electric commercial vehicles and the charging hardware required for fleets with 50 electric vehicles and more. In addition, the provision of support services with regards to vehicle tracking, fleet management and maintenance reduces the overall risk involved with transitioning towards an electric vehicle fleet.



Next Steps

EV finance in South Africa remains a challenge, due to the lack of market data on the accurate residual value of EVs over the long term. Commercial banks are currently setting the residual value of leased electric commercial vehicles at 0% after five years. This results in higher interest rates on financing loans

which in turn leads to a higher total cost of ownership for EVaaS service providers. Commercial banks in South Africa should work closely with innovative EVaaS companies to collect real world data on EV fleets in South Africa which can be used to model more accurate residual values.



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