SAFE, EFFICIENT
VEHICLE SOLUTIONS

No vehicle is an island, complete in itself

The purpose of SEVS is to explore how safe, efficient and affordable future vehicles should be designed and ascertain what research needs to be performed, with special focus on safety and energy consumption.

The project team consisted of members with different areas of expertise in order to explore important synergy effects and possible conflicts between new technologies.

A NEW APPROACH TO AUTOMOTIVE RESEARCH

Research in the automotive industry is generally conducted with the vehicle as the highest level of research. We, however, adopted a more holistic approach in which the vehicle is regarded as a component in a traffic system. While technological uncertainties make it impossible to determine today what will be the right automotive engineering solution in 2030, uncertain social factors play an even bigger part.

For this reason we set out to define four possible scenarios for the future, based on trends and tendencies we see in the world of today. Four future scenarios were created to address uncertainties and create a solid research strategy. We analysed the driving forces behind development in order to determine the feasibility of different types of vehicles.

FOUR FUTURE SCENARIOS, SEVEN VEHICLES

SEVS produced seven different vehicle concepts that are linked to these four scenarios. Together they illustrate several ways of achieving the goals and how factors in society influence which solution will or will not be used. For example:

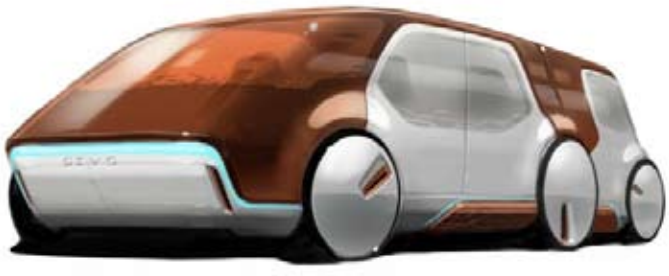
The city bus concept shows how public transportation can be significantly more energy efficient and how it is made more attractive and safer through a combination of vehicle and infrastructure solutions. Lightweight design is a key element in reducing energy consumption, which is especially true for the city bus.

The hydrogen plug-in hybrid (with similar functionality as today's passenger cars) offers a 50% reduction in energy consumption with no toxic emissions at all. This demonstrates how far technological advances can take vehicles with only minor compromises in functionality.

Radically different vehicles offer even further potential for reduced energy consumption, like 0.26 kWh/10 km as demonstrated by the city mover concept LeanE. However, this step requires that the customers change their requirements and how they use the vehicle.

Small vehicles can be designed with effective crash structures. Nonetheless, it will be vital to avoid collisions between lightweight and heavyweight vehicles. Both traffic separation and active vehicle control offers important solutions to this problem.

CITY BUS



HYDROGEN PLUG-IN HYBRID

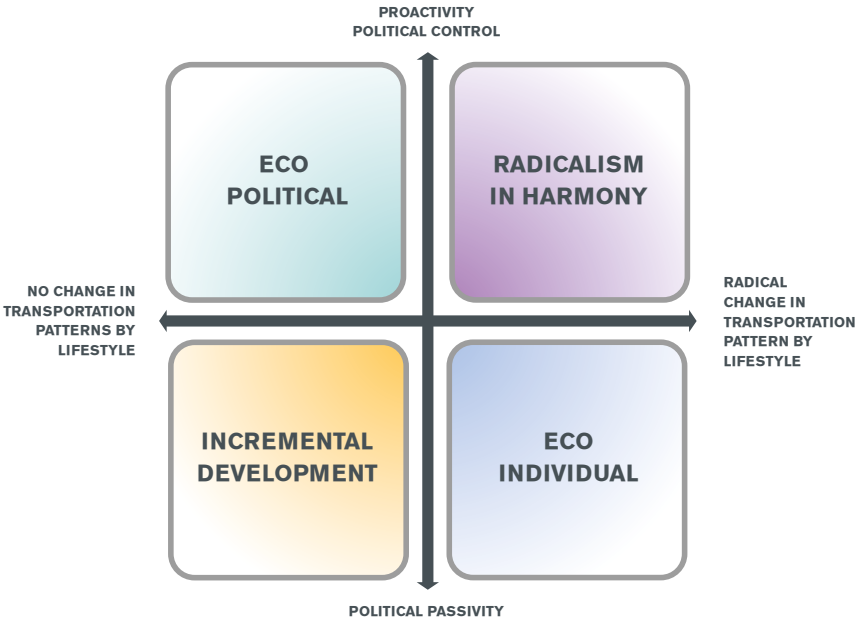
SEVS
Procedures and methods

Four possible futures – year 2030+

The overall mission of the project is to explore the needs for transporting people and/or goods and the new technologies that must be developed to facilitate future sustainable road transportation solutions.

The SEVS project's principal model, or methodology, adopts a holistic approach, taking into consideration both a societal perspective and a technological perspective. The work is carried out with a systematic and traceable method.

The project weighed in external changes that might, over time, profoundly affect the future of road transportation solutions.

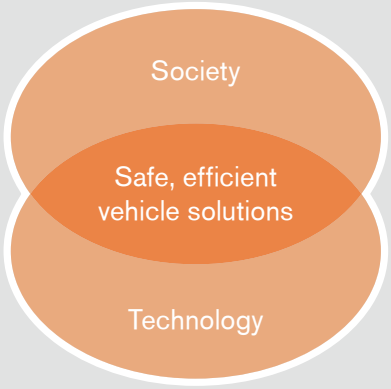


SCENARIO METHODOLOGY

The project's focus was not to predict the future, but rather to identify and learn about what drives change. The two types of driving forces that have been identified when creating the scenarios are:

Predetermined elements – forces that are highly likely to evolve in a direction that is predictable and unchangable.

Uncertainties – forces that are important, but unpredictable in terms of how they develop.



A SUCCESSFUL TEAM AND METHODOLOGY

Main steps:

- Identify future stakeholders (individuals, organizations, business, etc.)
- Identify requirements and expectations concerning how future transportation solutions meet the different categories of stakeholders' mobility needs.
- Identify future mobility needs for transporting goods as well as people.
- Societal perspective: Requirements and expectations concerning the construction/development of future sustainable road transportation solutions.
- Engineering perspective: Requirements and possibilities concerning the construction/development of future sustainable road transportation solutions.
- Transportation solutions were described in terms of products (e.g. vehicle concepts) and services (pro-active safety, third-party ticketing etc).
- Identify products & services.
- Identify critical research questions that need answers.
- Identify potential strategic partnerships.

INCREMENTAL DEVELOPMENT

An ordinary day in the imminent future

Tuesday, 14 May 2030. At first Jenny thought that she had overslept. Then it hit her. Today was the day of the presentation. Her boss was going to pick her up, and she had company-sponsored access to the high-speed roads. Not having to spend three hours twice daily in the free roads chaos was one of the perks of belonging to the upper echelons of the business community.

She looked at the hologram of her grandfather. In his youth, back in the 1970s, he had been one of the pioneers of the green movement. She wondered how he would have reacted to Greenpeace filing for bankruptcy last year. Or to her project presentation; the new Scandinavian office for China CoalFuel Inc.

BACKGROUND
HOW DID WE GET HERE?

Southern Europe's low economic credibility instigated a free fall on the financial markets. EU financial officers tried to regain the markets' confidence, but to no avail.

The downturn reduced the rate of climate change. Combined with the psychological effect of a depression looming on the horizon, the political right and left parties focused on economic growth and welfare. The greens were marginalized.

When the economy recovered, higher oil price stimulated electric and alternative fuel vehicle sales, but the underlying motivation was strictly economical. High fuel and battery prices increased demand for public transportation, but not enough for a revolutionary change.

Traffic fatalities rose in the early 2010s and failed to decline over the years, largely due to increasing traffic. Low average speed rates are the sole contributor to keeping casualty figures down.

KEY ISSUES

Politics: Focus is on economic growth, jobs and general welfare. Competitiveness of the Western world is commonly discussed, global warming is not.

Economics: Severe fluctuations in the price of oil due to upswings or downturns in the economy. These variations make the economy more volatile.

Public transportation: Investments made in an effort to cope with increasing traffic congestion.

Infrastructure: New roads are built all the time, but they look like the roads of today. Private roads for those who can afford them.

Safety: Is taken for granted, but not a priority. Most traffic injuries are caused by frustrated drivers hurting each other, more or less deliberately (road rage).

Engineering: Alternative fuels and electric vehicles are developed from a cost-efficiency perspective only.

Products and services: Smart logistics systems for private and commercial customers.

Vehicles: Heterogeneous mix; old and new, small and large, and many different fuel alternatives.

Products and services: Transform time spent in queues into work or playtime.

Simple fuel consumption reducers are used. Advanced security systems protect against road rage. Fully automated queue-assisted driving.

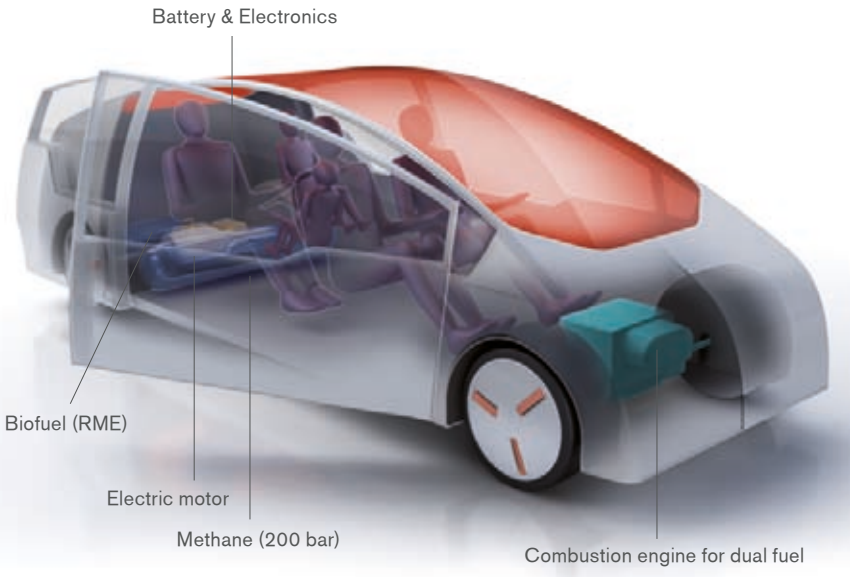
Energy supply: Mainly oil-based. Many alternatives (natural gas, bio fuel etc) are available but they are used only when they are cheaper than oil-based fuel.

Communication: Vehicle-to-vehicle and vehicle-to-infrastructure. Well developed but focuses on reducing congestion only.

Partnerships: Luxury cars sold with private efficient road subscriptions and/or fuel subscriptions to ensure availability also in times of shortage.

Long distance vehicle

Top-of-the-line of future long distance vehicles



SAFETY

DRIVER IN FOCUS

- Increased visibility – narrow A-pillars
- Personalised displays
- Voice control and dialogue systems
- Driver control systems

DRIVER SUPPORT

- Top of the line V2V and V2I communication
- Next generation information systems based on radars, cameras and sensors
- Next generation of night vision

COLLISION AVOIDANCE

- Next generation autonomous braking, steering and acceleration – to help avoid or mitigate severe crashes

PROTECTIVE SAFETY FOR ALL AGES AND SIZES

- Pre-crash sensing to trigger all kinds of protective systems
- Impact compatibility between all road users
- Next generation of belts & seats
- Integrated rear-facing child seat and two-stage booster cushions
- Safety solutions for vulnerable road users

CARING FOR THE ENVIRONMENT

DRIVELINE

- Parallel hybrid: combustion engine (DICI built for dual fuel) and electric engine (rear wheels)
- Fuel: methane (200 bar) and RME (non fossil)

ENERGY EFFICIENCY

- Optimised driveline for high efficiency
- Electric drive in low speed and brake regeneration
- 20% weight reduction
- Energy-effective styling and reduced rolling resistance

ECO POLITICAL

An eco political election day

Sunday, 15 September 2030. Johnny is at his local pub, having his usual organic beer. Since today is election day, two of his friends are discussing the results. After listening to them deliberate back and forth for a while, Johnny gets bored:

"So what? You can have green conservatism, green socialism, green liberalism, or green greenism. Who cares? Fuel prices will go up and tax money will be used to feed fat, green capitalists or equally fat, green bureaucrats. Let's watch the game instead."

BACKGROUND
THE ROAD TO THE ECO POLITICAL SCENARIO

In the early 2010s, a succession of severe rains and scorching summers nearly created an ecological disaster. Politicians with a green agenda swept into power. However, conclusive evidence that the drastic climate changes were caused by sunspots compelled people to forget their brush with disaster. The general public largely disregards the steady, less dramatic increase in global temperatures.

Despite public opinion, European politicians introduce an ambitious programme aimed at a better environment. The programme is funded by high taxes on fossil fuels, resulting in protests and demonstrations. Governments financially support upstarts offering promising new green technology. In 2022, the maximum speed limit is lowered to 70 km/h to decrease carbon dioxide emissions and save lives in traffic.

KEY ISSUES

Politics: The goal is a cleaner, greener society. Taxation, standardization and legislation are used to realise this goal, regardless of whether the general public wants it.

Public transportation: Drastic expansion of the public transportation system, which is subsidized to gain acceptance among the general public. Focus is on convenience and comfort.

Infrastructure: The drastic expansion of the public transportation system will have a big influence on the city center infrastructure in terms of road and energy distribution.

Safety: Car traffic restricted to driving slowly. Downtown areas are safe for walking, bicycling and driving small electric vehicles without extensive collision zones.

Technology: Apart from the vehicle itself, new innovative IT solutions are advocated, making mass transportation solutions more convenient.

Products and services: Focus on co-modality opens up for new IT solutions and business models like smooth ticket services, provided by a third party.

Vehicles: Alternative fuels and electricity are heavily subsidized (directly or indirectly), while fossil fuel is as heavily taxed. Large spectrum of different types of vehicles.

Partnerships: Energy companies and transportation providers. Insurance companies and IT providers; information opens up for lower insurance costs for those who drive carefully.

Economy: Standardization will favour traditional vehicle companies since they have influence over those who set standards.

Roads: More plants and trees. Grid networks will be developed to supply vehicles with energy. Clear separation between pedestrians and different types of vehicles.

Energy supply: Ground and air-located energy distribution systems for public transportation vehicles. Personal electric vehicles can be charged at strategic locations.

Communication: Vehicle-to-vehicle and vehicle-to-infrastructure systems. Traffic guidance systems and route planning tools for proper energy management.


TO PUBLIC TRANSPORT
COMMUTER PARKING
CITY MOVERS
RULES & REGULATIONS:
CHARGING POLE
TO PUBLIC TRANSPORT

Distribution vehicle

CITY BUS

The super flexible and efficient public transportation of tomorrow! Modular, emission free and quiet.

ARCHITECTURE

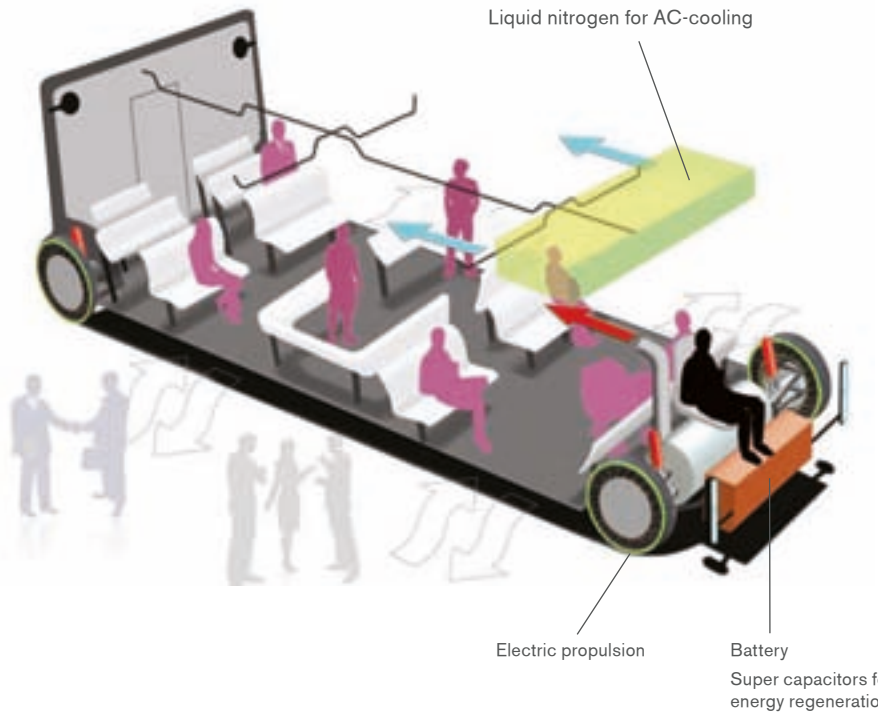
- Modular system to optimize bus for a specific route
- 20–50 passengers, (different modules, standing room is prioritized)
- Boarding & departure from both sides to increase passenger flow
- 300 km range (360 kg battery + super capacitors)
- Speed: Max 70 km/h, design 35 km/h
- Total weight: 10 tonnes, kerb weight 5–6 tonnes, cargo 4 tonnes
- Front wheel drive (enables low floor, modular concept & flexible size)
- Emission and noise-free operation

EFFICIENCY

- 50% kerb weight reduction (FRP and monocoque body/chassis)
- Electric motor – efficiency ~90% (combustion engine efficiency ~40%)
- Power-efficient automatic start & stop
- Liquid nitrogen (cooling) and dissipated energy (heating) leads to AC power reduction
- Solar cells and LED lights (interior & exterior)

MODULAR SYSTEM

- To customize for local needs (length, interior, etc.)
- To connect two or more modules when needed



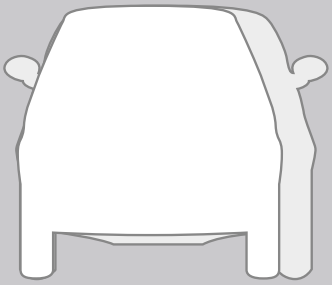
SAFETY

- Limited speed 50 km/h
- Separate lanes for buses (and cargo) transport
- Highly developed centralized safety infrastructure (V2X)
- Premium own active safety to enable driverless management
- Custom-made bus stops with safety doors
- Active front under run protection system
- Impact friendly interior and exterior

City mover

GTE

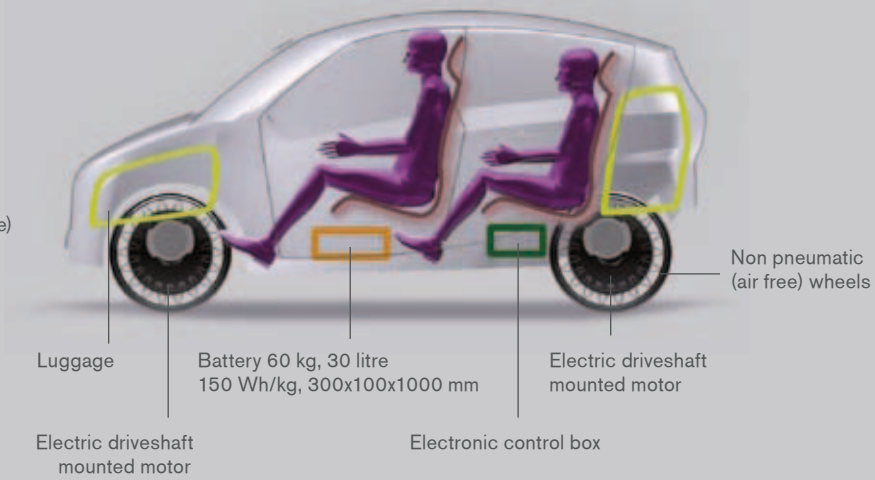
Quiet, clean and zero emission



GTE vs Peugot 107

ARCHITECTURE

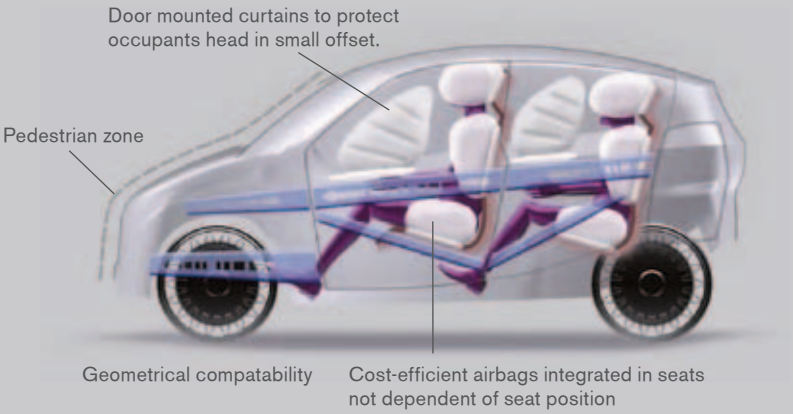
- Range: 60 km (80 km MVEG–95 drive cycle)
- Total weight: 890 kg (incl 2 adults, 2 children and luggage)
- Price: 0.5 blue-collar wage
- Top speed: 90 km/h



PASSIVE SAFETY

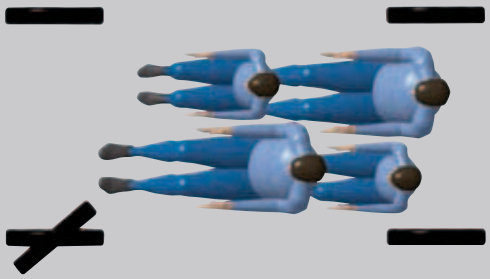
Ultra-light steel auto-body:

- Hydroformed parts and sandwich elements



EFFICIENCY

- Estimated yearly consumption: 2,500 SEK (15,000 km)
- Aerodynamic drag coefficient: 0.27
- Low energy consumption based on: narrow track (1250 mm) due to diagonal seating and small and full-size occupants



ECO INDIVIDUAL

The echo of a sales pitch

Jessica was watching her favourite show on MassTube. As usual, at the most dramatic moment, a commercial came on. And there was no way to avoid this – commercial time was pre-set in her free computer. The voiceover droned:

"Discover the new 2030 Euro-Cruiser Long Distance Vehicle. Equipped with all the software you'll ever need. Batteries you can rely on, mile after mile. Guaranteed to keep you rolling. Best of all – top speed is a mere 80 km/h. Just to be on the safe side."

BACKGROUND
THE ROAD TO THE ECO INDIVIDUALISTIC SOCIETY

In the early 2010s elections, most politicians in Europe focused primarily on jobs. Consequently, all green and safe incentives were discarded. Public disappointment in traditional party policies leads to the formation of a strong, green subculture. This new green wave lobbied quite hard. Not to the politicians, but to consumer organizations and media.

An energy crisis in 2024 sparked a trade war between China and the USA. The UN does everything to stop this from evolving into something bigger by moving the next global climate summit to Beijing. The meeting fails since world leaders, afraid of not getting re-elected or overthrown, cannot agree to take the drastic measures needed.

Instead, people make their own solutions. The former subculture is no longer a subculture but mainstream. People care and show it by modifying their consumption patterns, both in terms of goods and transportation.

KEY ISSUES

Society: Green and safe has a very high status. There is a willingness to spend more on green and safe transportation, even without incentives or regulation. Exit the "0-to-100 generation".

Technology: Green and safe due to consumer requirements. New battery technology and business models support new energy sources and diversified transportation alternatives.

Sustainable transportation: Extreme diversification, unique solutions for different purposes. Small-scale, flexible solutions such as carpooling with friends and neighbours.

Business: Large, established companies suffer due to inertia. Local initiatives have a safe and green mindset. Private imports, from nanotechnology to vehicles.

Safety: Caring is a key word, including caring for the environment as well as caring for the safety of all.

Products and services: Carpool service including cars, logistics systems, service and maintenance, etc. The car industry sells not only products, but transportation solutions.

Infrastructure: Slow change driven by consumer demands, not incentives or regulations. Parking lots are located outside cities and combined with public transportation.

Roads: Maintained, but not improved with governmental funding.

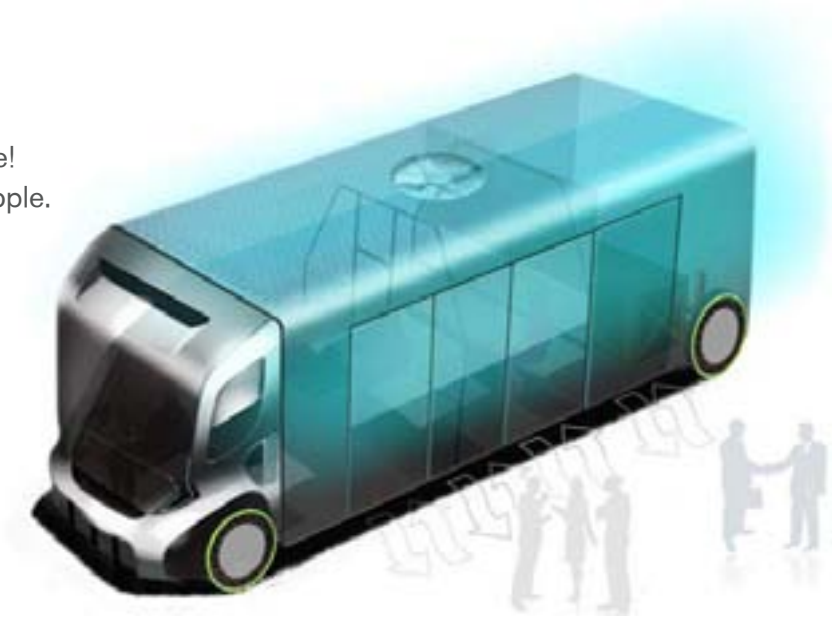
Energy supply: Local, small entrepreneurs dominate. Green and safe solutions attract venture capital. New battery technology supplies small-scale wind power to the grid.

Communication: Need for faster, more precise navigation with an option for the greenest route as standard. Solutions to avoid congestion, pollution and booking electric vehicle recharging.


MORE PEOPLE WORKING FROM HOME
CARPOOL PARKING
ROOF GARDENS AND TERRACES
SOLAR PANELS
CARPOOLING
DISTRIBUTION VEHICLE & POOL BUS
CHARGING POLE
ELECTRIC MOPED

Distribution vehicle

The multipurpose heavy vehicle of the future!
Efficient transportation of goods and/or people.



ARCHITECTURE

- Combined vehicle for passengers and/or cargo transportation (~20 passengers and/or max 10 tonnes cargo)
- Large doors on both sides to increase accessibility
- DME combustion engine + battery
- Range: DME–200 km, battery–100 km (165 kg)
- Speed: Max 90 km/h, design 70 km/h "Green and safe driving"
- Total weight: 12–15 tonnes, kerb weight 4–5 tonnes, cargo max 10 tonnes

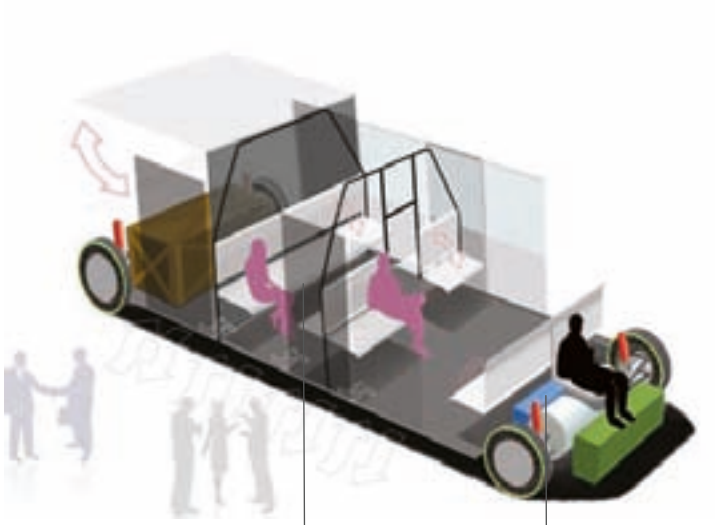
EFFICIENCY

- Kerb weight reduction (FRP and monocoque body/chassis structure)
- Super capacitors for brake energy regeneration
- Solar cells and LED lights (interior and exterior)
- Improved aerodynamics
- Logistics system favoring green and safe transportation, enables the vehicle to run fully loaded the complete route
- Loading and unloading of goods from both sides to optimize the route
- Possible to transport passengers and goods at the same time

SAFETY

- Speed limit 70 km/h (customer driven)
- Highly developed on-board active & passive safety (customer driven)
- Collision mitigation by braking, automatic emergency braking, lane change/keeping support, driver alert system, blind spot information system and alco lock
- Active front and rear under run protection system
- Seat belts for driver and passengers + seat belt reminders
- Neoprene at head and shoulder level
- Loading/unloading from the side, not from the road side

COMBINED BUS/TRUCK CONFIGURATION



Very flexible interior to enable switching passenger/cargo during route

Combustion engine with DME fuel

TRUCK CONFIGURATION

Battery

Super capacitors for brake energy regeneration

Noise-free electric propulsion for city use

Easy loading/unloading – large sliding doors on both sides combined with low floor

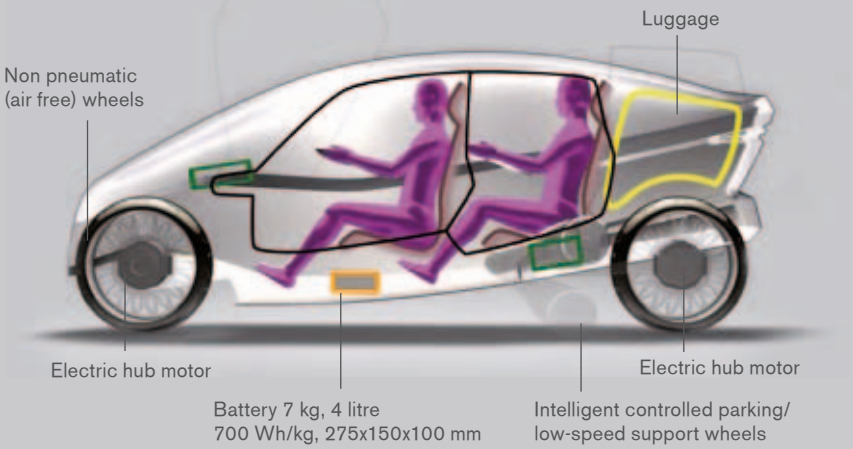
City mover

LEAN-E

Quiet, clean and zero emission

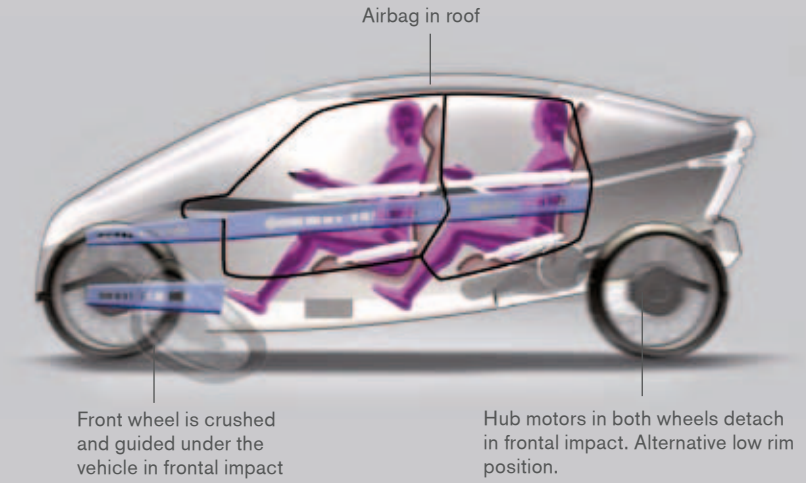
ARCHITECTURE

- Range: 60 km
  (120 km MVEG–95 drive cycle)
- Price: 1.5 blue-collar wage
- Total weight: 510 kg (incl 2 adults and luggage)
- Top speed: 110 km/h
- Acceleration: 0–100 km/h in 8 sec



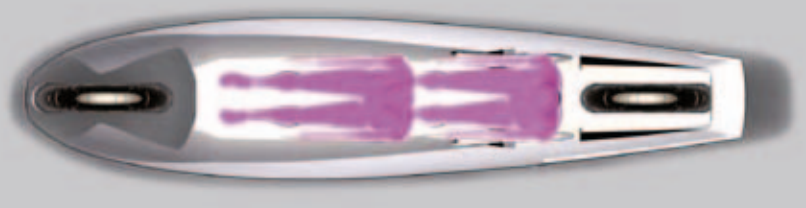
PASSIVE SAFETY

- CFRP monocoque safety cell
- Front designed to avoid direct hit in frontal crash
- Roof designed to withstand impact from another vehicle when lying down
- Load path at waist level with minimum gap and soft zones between doors and body
- Inflatable curtain inflates upwards from waistline
- Four-point, neck-supporting safety belt
- Gas-injected front-crash beams to increase strength in frontal impact



EFFICIENCY

- Estimated yearly consumption: 1,000 SEK
  (15,000 km)
- Aerodynamic drag coefficient: 0.19
- Extremely low energy consumption due to: weight reduction, optimized aerodynamic shape/frontal area and precharging of climate



RADICALISM IN HARMONY

A history lesson in the not so distant future.

"I would like to welcome you to this course in late 20th and early 21st Century history. First I want you to adopt a new perspective. You must realise that in those days, people actually accepted pollution and casualties in traffic. I know it sounds absurd, but it is easy to sit here in 2030 and stand in judgement over how people reasoned in the past.

"In the 20th century – as well as the early 21st century, for that matter – pollution was a fact of life, just like slavery was in ancient Rome or Greece. Of course, no one wanted to be a slave but the institution as such was never really questioned."

BACKGROUND
THE ROAD TO RADICALISM IN HARMONY

It all started when the European green parties decided on a common agenda. The strategy was to own "The Big Story". Just like the liberals owned the story of freedom and the left owned the story of justice, the greens would own the story of a clean, safe earth. The best PR and advertising consultants money can buy communicated the new strategy.

The Green Wave in Europe was an immediate success, making it clear that one could live a cool, green, efficient and affordable life using the latest technologies. Finally, voters and elected officials understood each other and tried to outdo each other in being, living, voting and governing green. Old, smoggy technologies were banned, and an upgrading programme was implemented in all sectors including vehicles, houses, roads, industry, energy production and agricultural production. The scales had shifted to green once and for all.

KEY ISSUES

Transportation market: Radical change to greener alternatives, offering more niche products. The green aspects determine transportation. Smart logistics solutions dominate.

Economy: Willingness to pay more for green, safe products. Strong legal and financial incentives and public opinion that demand faster modifications creates a positive spiral.

Technology: Quicker shift towards green and safe. Public opinion and government co-act for greener and safer engineering solutions for transportation.

Vehicles and infrastructure is a perfect match – development activities are coordinated. Hardware, software, and logistics solutions are matched.

Sustainable transportation: New drive-lines. Public transportation is dramatically enhanced, and as are goods and pas-senger freight solutions.

Safety: Low, adaptable speed limits. Separate lanes, and a willingness and acceptance for more expensive infrastructure in general geared toward the ultimate objective of being as green and safe as possible.

Products and services: Diversified products. Co-planning for goods and passenger transportation and services. Incentives for greener alternatives.

Infrastructure: Always building the safest infrastructure. More public trans-portation solutions. Adaptable speed limits (low). Separate lanes.

Roads: Safety first! Willingness to spend both more money and time in order to realise the Zero Vision Goal.

Energy supply: The safest source of energy is used. The safest batteries possible – rapid advances here! Green electricity. Solar power.

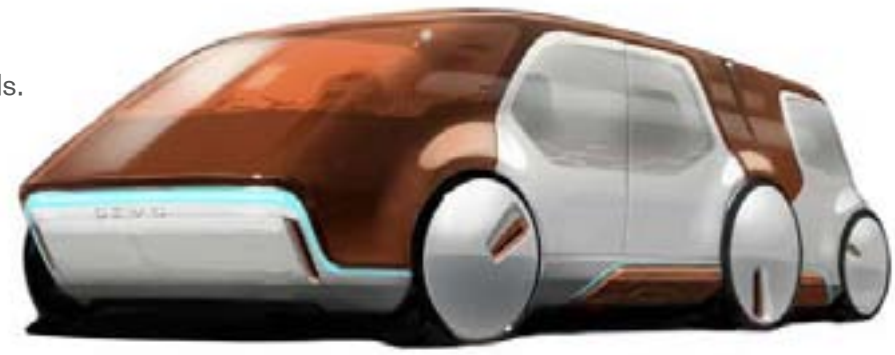
Communication: Adaptable road gui-dance for safe and smart transportation. Vehicle-to-vehicle and infrastructure-to-vehicle systems are implemented efficiently.

Partnerships: Bigger companies initiate partnerships with smaller companies with emerging technologies at a faster pace. This is driven by strict legislation.


PLATOONING
FUEL STATION -
HYDROGEN & MULTI-FUEL
NO NOISE
TO PUBLIC TRANSPORT
DEPOT FOR CITY MOVERS
& LONG DISTANCE VEHICLE EXTENDERS
DEPOT FOR TRADITIONAL VEHICLES
NO EMISSIONS
SPEED LIMIT
AUTO-DRIVE
INDUCTIVE CHARGING*

Long distance vehicle

Two vehicles in one!
For city traffic and – with the vehicle extender – to fulfil your long distance needs.



CARING FOR THE ENVIRONMENT

DRIVELINE
- Electric hub motors and fuel cell (PEMFC) as extender
- Fuel: hydrogen 700 bar

EMISSIONS
- Emission-free vehicle
- Hydrogen made with electrolysis minimizes emissions

ENERGY EFFICIENCY
- Electric engines and fuel cell
- 35% weight reduction
- Energy-effective styling

SAFETY

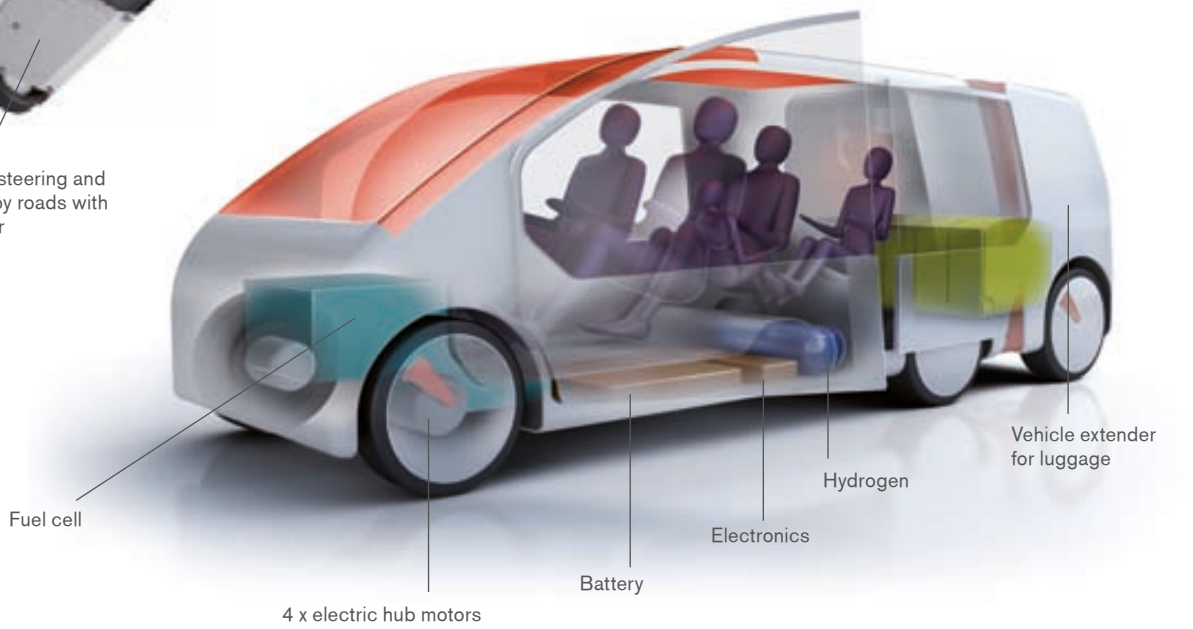
DRIVER IN FOCUS
- Fixed eye point and see-through A-pillars
- Personalised displays
- Voice control and dialogue systems
- “Platooning” on certain roads
- Driver control systems

DRIVER SUPPORT
- Top of the line V2V and V2I communication
- Next generation information systems based on radars, cameras and sensors
- Next generation night vision, including intelligent roads

COLLISION AVOIDANCE
- Next generation autonomous braking, steering and acceleration – to avoid or mitigate severe crashes

PROTECTIVE SAFETY FOR ALL AGES AND SIZES
- Pre-crash sensing to trigger all kinds of protective systems
- Impact compatibility between all road users
- Next generation belts and seats
- Optimizing safety structure with and without vehicle extender
- Integrated rear-facing child seat and two-stage booster cushions
- Safety solutions for vulnerable road users

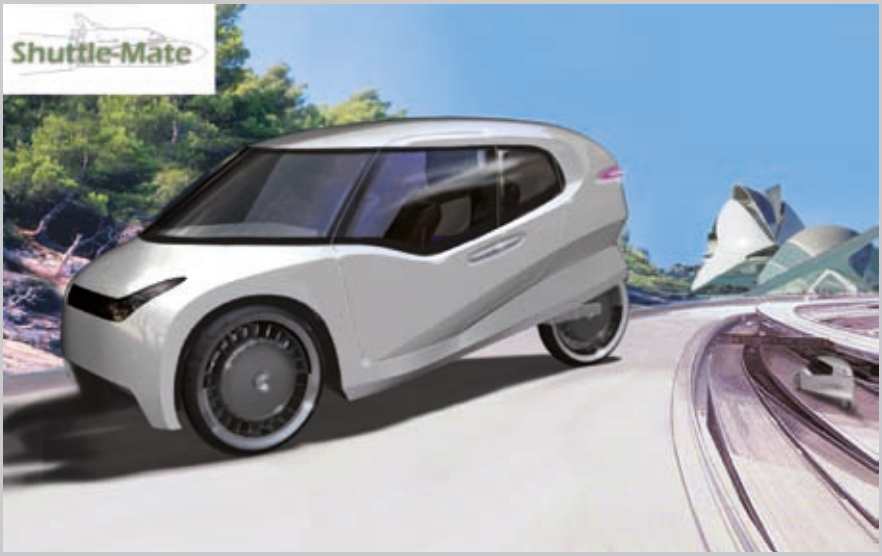
Technology for steering and driving on bumpy roads with vehicle extender



City mover

SHUTTLE-MATE

Quiet, clean and zero emission

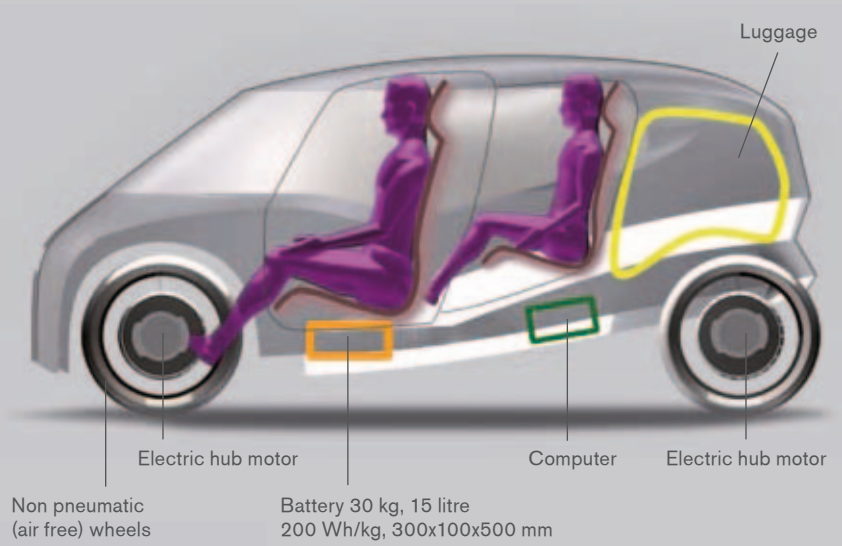


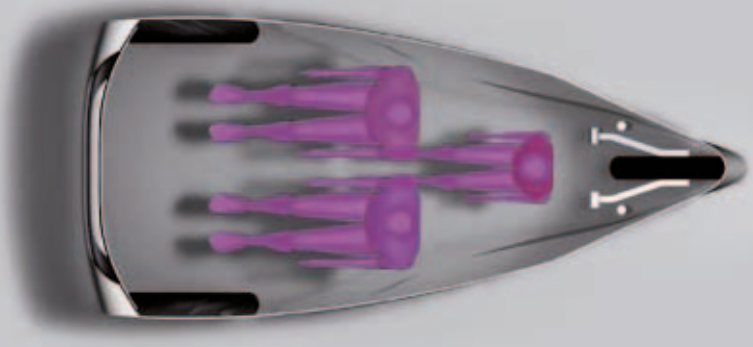
ARCHITECTURE

- Range: 60 km (90 km MVEG–95 drive cycle)
- Price: 1 blue-collar wage
- Total weight: 540 kg (incl 2 adults, 1 child and luggage)
- Top speed: 70 km/h

EFFICIENCY

- Estimated yearly consumption: 1,500 SEK (15,000 km)
- Aerodynamic drag coefficient: 0.26
- Low energy consumption based on weight reduction due to no need for passiv safety, and precharging of climate





	IDS	Active Safety	Passive Safety
GTE 	Medium	Premium	Medium
Lean- 	Basic	Premium	Premium
Shuttle-Mate 	Premium	Premium	Minimum

INTELLIGENT DRIVING SYSTEMS (IDS)

A virtually crash-free concept thanks to co-operative communication systems, advanced sensor-based active safety systems and the fact that the Shuttle Mate is driven within the intelligent traffic zone where only intelligent vehicles are allowed, an almost crash free concept is achieved.

ACTIVE SAFETY FUNCTIONALITY

- Vision enhancement – intelligent headlamp and fog/snow/rain vision
- Driving assist – adaptable cruise control, low friction detection system, lane following system, congestion traffic cruising system
- Dynamic control – electronic stability control, brake assist system, emergency brake system
- Collision avoidance – accident avoidance/ mitigate system by automatic maneuvering
- Impaired driving – driver assist system

Passive safety functionality
See different concepts

A selection of interesting conclusions

This is a summary of some important findings of the SEVS project. For easy reference, they have been divided into three categories, namely energy consumption, safety and the broader aspects of the different scenarios.

For more detailed information, please contact SEVS.

ENERGY CONSUMPTION – CAN BE CUT DRAMATICALLY

80% reduction in energy consumption is technically possible, if buyers and authorities choose to implement the solutions presented.

The single most effective step to reduce energy consumption is vehicle electrification.

One third of the energy in future efficient vehicles will be used by auxiliary loads and climate control.

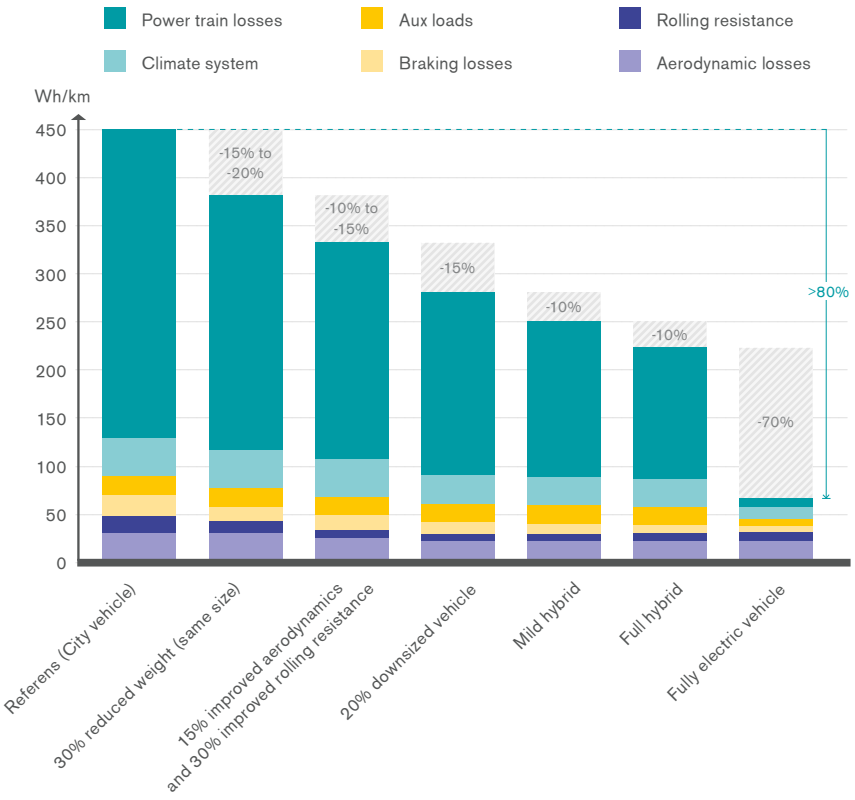
An important role in total energy reduction will be played by traffic management systems and modified travel patterns.

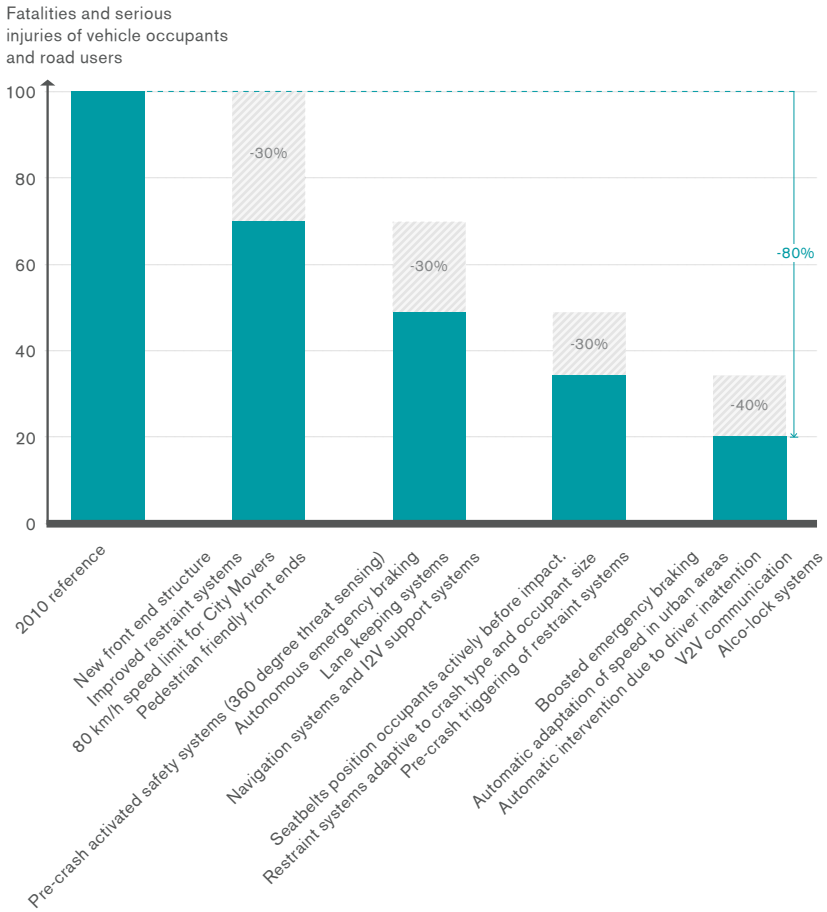
SAFETY – CAN BE IMPROVED DRAMATICALLY

80% reduction in fatalities and severe injuries is technically possible even with lighter vehicles. Sophisticated safety systems in vehicles and a well developed infrastructure make it possible.

Small vehicles are not a risk – the problem is mixing heavyweight and lightweight vehicles.

The only way to significantly reduce fatalities and injuries is by considering technology, human behaviour and infrastructure solutions. Active solutions like communication and control systems and passive solutions like traffic separation will play important roles.





SCENARIOS – A REALISTIC APPROACH TO THE FUTURE

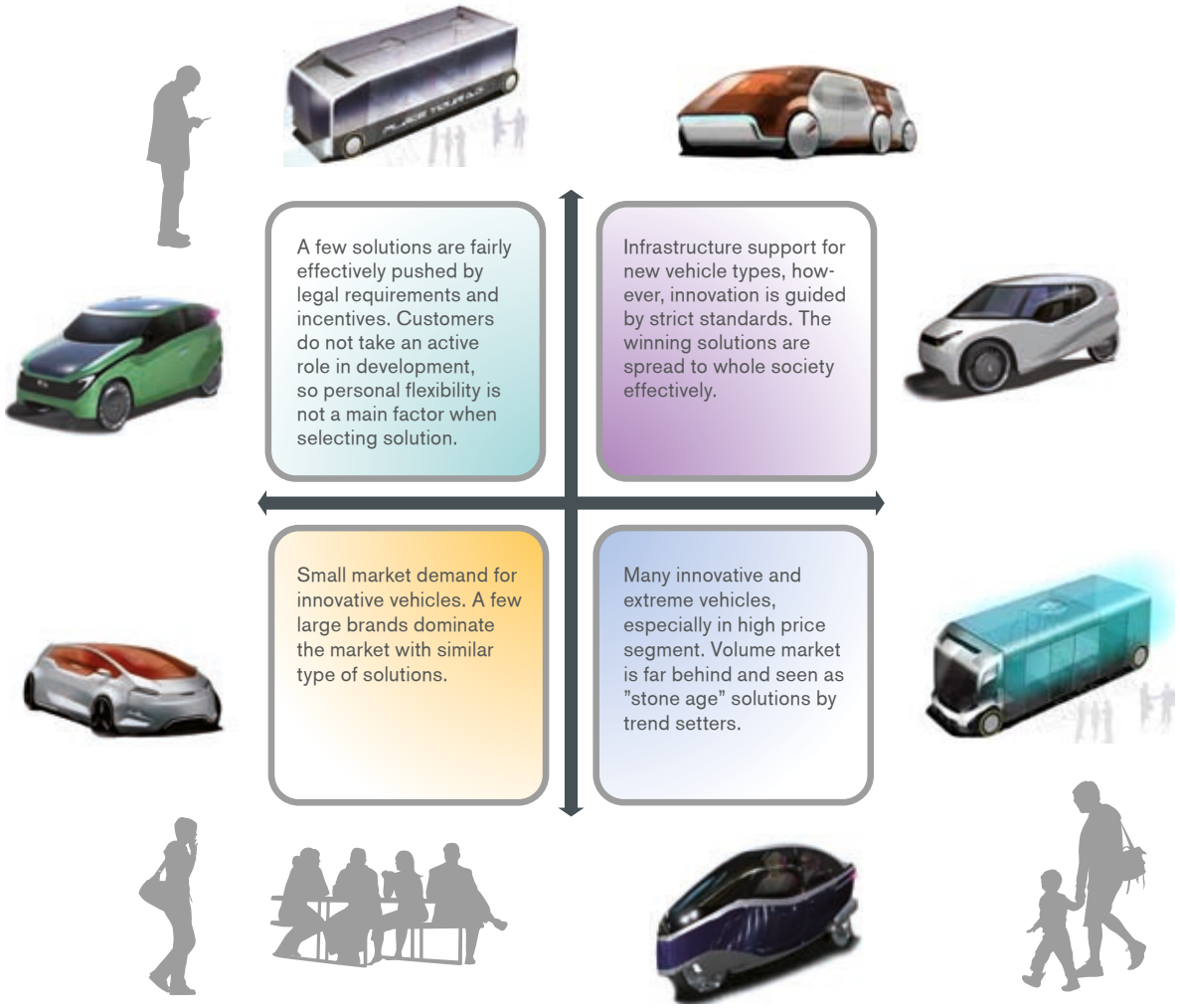
A description of society is necessary to determine the feasibility of a vehicle concept.

Any more significant changes in vehicle specifications, like smaller vehicles with limited range, necessitate that vehicle buyers modify their requirements and may require changes in how they use the vehicles.

Several scenarios must be examined in order to understand how a sustainable transportation system should be developed and implemented.

CO_2 – EXAMPLE GTE

Same vehicle – different results!



WE NEED TO KNOW MORE – SEVS PHASE 2

Using a holistic approach, the SEVS project phase 1 has shown that future vehicles and road transports can be both very safe and energy efficient.

To achieve these objectives, the SEVS project phase 2 will involve Swedish industry and academy, merging society and technology to create future sustainable road transport solutions.

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SHC Swedish Hybrid Vehicle Centre
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