

European Association of Automotive Suppliers

- CLEPA is a strong promoter of "technology neutrality", to reduce CO₂ emissions.
- 48V is one of the many technologies available today, achieving the above target.
- This leaflet is one in a series of publications, describing the various solutions.

WHAT IS CLEPA?

CLEPA- the European Association of Automotive Suppliers -brings together over 120 global suppliers of car parts, systems and modules and more than 20 national trade associations and European sector associations.

WHAT DOES CLEPA DO?

CLEPA is the voice of the EU automotive supplier industry linking the sector to policymakers.



48 VOLT: A PROVEN TECHNOLOGY TO REDUCE CO₂ AND NOX EMISSIONS

WHAT IS IT ABOUT?

- Unlike a traditional 12V setup, a 48V system can cope with higher energy demand from the vehicle and equipment. 48 Volt electrical systems typically power stop-start motors, hybrid motors and turbochargers, allowing for smaller engines with better fuel economy and performance. 48 Volt systems handle hydraulic and mechanical accessories such as power steering, power brakes, water pump, radiator cooling and air conditioning.
- The system offers 4x the voltage and power at the same current compared to a conventional 12V architecture. It turns the vehicle, in combination with a **petrol** or diesel engine, into a "mild hybrid".
 For light urban vehicles, a 48V battery can also, function as one of the power units, propelling the vehicle and allowing emissionfree driving at short range.

FULL VERSUS MILD HYBRID VEHICLES

• A **full hybrid** is equipped with a strong electric motor alongside a petrol or diesel internal combustion engine, that delivers additional energy as needed.



 The petrol or diesel engine in a mild hybrid does most of the work and the electric motor is there to assist. Unlike a plug-in hybrid, a mild hybrid does not require a cable to be recharged, but uses regenerative braking while driving instead.



WHAT IS THE ISSUE?

- More and more systems are today being "electrified". Driver assist safety features such as adaptive cruise control, lane keep assist and head-up display, but also more comfort oriented features such as heated seats/steering wheel, are putting higher constraints on the traditional 12V battery.
- That leads to a higher fuel consumption and CO₂ output as a result while car manufacturers and suppliers want to achieve the opposite.

HOW DOES 48V MILD HYBRID WORK?

Automotive suppliers are today looking into several mild hybrid powertrain configurations using 48V. The chosen topology or location of the electric machine will decide on the levels of achieved benefits in terms of CO_2 reduction. The **Belt Starter Generator** is at this point the most widely spread as it combines a relatively **low integration cost** – and avoids on top additional expenses for electric shock protection - with the benefits of **CO**₂ **reduction** and **power boost**.

As seen on below graph, this system typically consists of:

- an electric machine (will also be put in different positions in the future)
- AC/DC
- DC/DC
- 48V Battery

By adding more electrical components to the 48V network, driveability and fuel efficiency can be further enhanced, e.g.:

- engine oil pump
- transmission oil pump
- A/C compressor
- power steering
- power brakes
- electrically heated catalyst



WHAT ARE THE ADVANTAGES?

The 48V technology is **helping car and vans meet CO₂ emissions regulations**, through a reduced fuel consumption of up to 10-15% and as a result a decrease in CO₂ output of **up to 15%**. 48V technology also provides **more power to the additional onboard features.**

And on top:

- it offers a more efficient level of energy recuperation, e.g. during braking.
- it can be integrated in the existing electrical **12V** system, car designs and internal combustion engine powertrains.
- It provides cleaner mobility in city traffic and in case of diesel engines, the 48V start/stop system can help reducing NOx (*) levels by around 10% during the acceleration phase.

(*) NOx= Nitron Oxide, gases generated when fuel is combusted.

- it has a compact design with little impact on rear storage and weight.
- it costs less than a 300-400V battery required for a full hybrid or electric vehicle:
 1/3 of the cost for 2/3 of the benefits.
- ➔ it offers an on-demand performance boost, due to the additional up to 20kWh from the 48V system.
- it can enhance ride and handling improvement via connected chassis systems.
- it provides faster and more silent engine start, disconnects the equipment from the revving engine and only uses requested output instead of engine speed.

RANGE OF 48V TECHNOLOGY COMPONENTS DEVELOPED BY CLEPA MEMBERS TODAY



THE FUTURE OF 48V TECHNOLOGY

Electrification is one of the **future solutions towards smarter and greener mobility**.

 48V technology has a definite place in the electrification process and will remain an important element in making the Internal Combustion Engine more efficient. Not only thanks to its potential to reduce consumption and CO₂ output but also due to its compact design, lower cost and compatibility with existing powertrains such as diesel or petrol.

- By 2025, 1 out of 10 newly sold cars are expected to be factory fitted with a 48V device, totalling 15 mn vehicles per year.
- By the same year, it is expected that **95%** of **mild hybrids** will incorporate 48V technology.



Note: all percentages reflect tailpipe reductions.

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