FutureBridge

MOBILITY INDUSTRY INSIDER

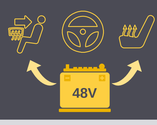
DIVE INTO THE REALM OF LOW-VOLTAGE ELECTRIFICATION

What is 48V?

48V mild hybridization of the engine involves 3 main aspects:

Capturing Energy and Re-usage

Decoupling Accessories



Boosting Engine Performance

Benefits of 48V

Improves fuel efficiency

48V mild hybrid vehicles can result in **25% fuel saving** based on the implementation strategy and driving cycle.

Easy integration

48V systems can be **integrated** into the **existing engine module** without design complexity.

Reduces CO_2 emission

The implementation of **48V can help OEMs** reach their **CO_2 target** with **low investment**.

Why 48V?

Limited cost and **simple integration** drive the implementation of 48V systems by automobile players, primarily those operating in **mass-volume segments**, where the **scale effect** is **high**.

Large-scale implementation of these systems can deliver **double-digit fuel savings**; benefits at global level might have favorable reception.

Expected CO_2 Limits (in g/km)

CHINA	2020	2025	EUROPE	2020	
	117g	105g		95g	
US	2025		JAPAN	2020	
	93g (Car only)			105g	

Adoption of 48V systems by OEMs

Leading automotive brands are implementing 48V systems...

Aston Martin	FCA	Kia	SAIC-GM
Audi	Ferrari	Mahindra & Mahindra	SsangYong
Bentley	Ford	Mazda	Skoda
BMW	Geely	Mercedes-Benz	Tata Motors
Buick	General Motors	Mitsubishi Motors	Volkswagen
Cadillac	Honda	Porsche	Volvo
Chang'an Motors	Hyundai	PSA	
FAW	Jaguar Land Rover	Renault	

...among them, FCA is planning to deploy 48V in various vehicle segments (small, compact, and large)

FCA FIAT CHRYSLER AUTOMOBILES

Mild hybrid 1st application plans in various brands of FCA with the type of method used

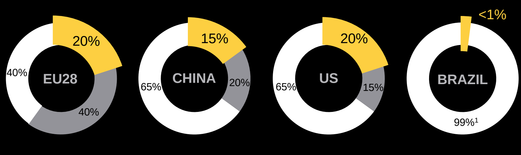
EV SYSTEMS	FIRST APPLICATION SHOWN					
48V	2017	2018	2019	2020	2021	2022
P1F 12V BSG FWD				FIAT 500		
P2 48V FWD/RWD					Jeep RENEGADE	
P0 48V BSG RWD/4WD					RAM 1500	

Target vehicle segments for 48V mild hybrid along with the type of method used

EV SYSTEMS	SMALL	COMPACT / MID	LARGE
48V (Two Type of Methods)	P2 48V FWD/RWD		
			P0 48V BSG RWD/4WD

Mild hybrid implementation rate in different geographies

FCA's 2022 projected adoption of different technologies by sales region



[1]99% (Brazil) – Non-electrified and ethanol-based

Key suppliers in the 48V market

Across the **48V building blocks**, key automotive suppliers like Continental, Valeo, and Bosch **dominate** the **supply chain.**

Key Suppliers

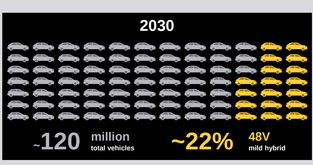
BorgWarner · SCHAEFFLER · MAHLE · MOBIS · MAGNA · DENSO · MITSUBISHI ELECTRIC · BOSCH · Continental · Valeo · Delphi Technologies

48V Building Blocks

- Software & Electronics
- Motor/ Generator
- Electrified Components
- Battery

Market growth

By **2030**, the **48V mild hybrid** share of the total vehicle market will **reach ~22%.**



What next?

Will the implementation of 48V systems lead to…

- **Replacement** of **12V lead acid** batteries?
- **Change** in **engine parameters** and requirement?
- **Competition** to other **HEV platforms**?
- **Integration** in **commercial vehicles**?

To uncover strategic opportunities triggered by 48V systems, subscribe to **Mobility Industry Insider**