

Low Cost, Low Carbon... What ?

- Most of the very low cost ideas to reduce CO₂ have already been realised...
- The next wave of technologies will bring about a greater CO₂ saving, but these will come at a higher cost
- Electrification of the drive train is a widely debated topic but one which is unlikely to be really “low cost”
- Will there be high volume manufacture of micro, mild and full hybrids ? 12V, 24V → 400V ?
- Engine downsizing can be enabled by technologies such as CPT’s VTES (Variable Torque Enhancement System) 12-90V
- Stop-Start performance can be very refined and comfortable when using CPT’s SpeedStart® 12V **Belt Integrated Starter Generator**



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Stop-Start... Acceptable ?

- Are the 1 million consumers happy with their new stop-start vehicles that have already been sold ?
- Are the 5-8% fuel savings being realised in real world driving ?
- Are the stop-start market leaders changing their strategy ?

Consumer Confidence

- Starter motor based systems have some weaknesses
 - Noisy, durability and specifically “Change of Mind” hesitation (or worse)
- Many consumers of starter motor based systems are switching off their stop-start systems in frustration
- The vehicle will not shut-down in gear, why not ?
- Belt driven integrated starter generators (B-ISG) will soon dominate the market share of stop-start, because the consumer will demand it and the OEM’s reputation will need it

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Stop-Start Powertrain

- The desire for more electrical power in our vehicles >150A
- AGM Batteries → Ultra-Caps → Cost, Package, Temperature?
- 12V or 24V or ... 388V → Higher ?
- Recuperation (free energy) ? Turbo-generator Integrated Gas Energy Recovery ?
- Belt Life & Losses ?
- Variable Torque Enhancement System – No problem
- 2.0L 14L 3.0L 16 Diesels – No problem
- In-Rush current control – voltage drop ?



Delivering CO₂ Reduction Technologies

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