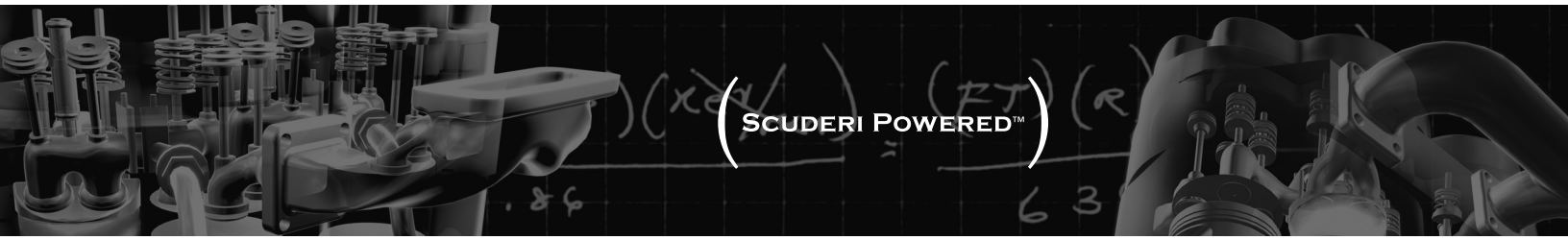
SCUDERI ENGINE

Revolutionary Technology
Evolutionary Design



Scuderi Air-Hybrid Engine

The First Hybrid System that Makes Sense

The Scuderi Air-Hybrid Engine is the first hybrid engine system that has the ability to capture and store energy, in the form of compressed air, which is normally lost during the operation of the vehicle. Computer simulation studies show that a vehicle equipped with a Scuderi Air-Hybrid Engine — based on the revolutionary Scuderi Cycle — could provide up to 50 percent greater fuel efficiency and reductions in harmful emissions by as much as 80 percent, when compared to any conventional engine on the road today. Further, the Scuderi Air-Hybrid Engine takes one-third the time to store energy than it does to use all of that energy, which could potentially make it the most efficient hybrid system to date and would be available for a fraction of the cost of an electric hybrid system.

How It Works:

A **Normal Operating Mode:** The air tank stores energy, in the form of compressed air, which is normally lost during the operation of the vehicle, and uses it for combustion.

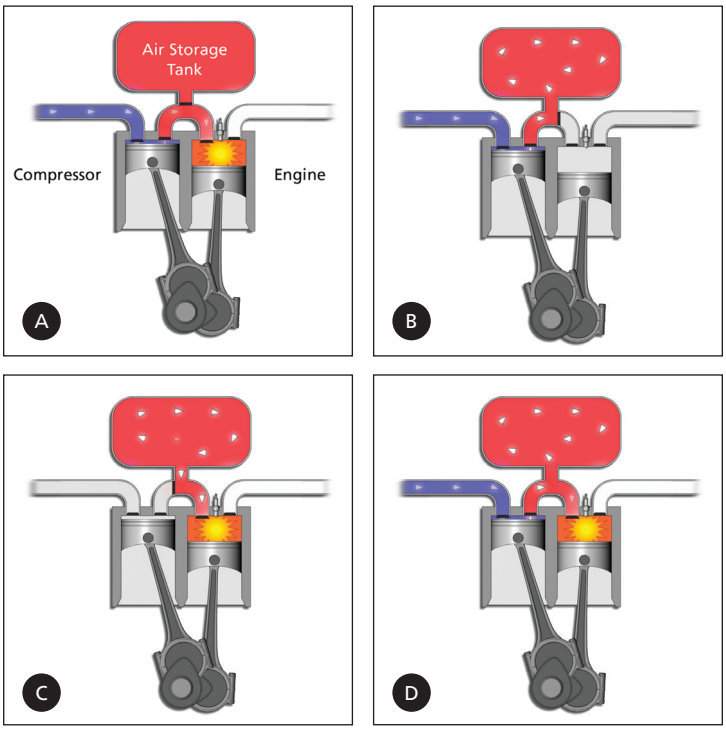
B **Regenerative Braking Mode:** By turning off the power cylinder and diverting the flow of compressed air to the storage tank, the momentum of the vehicle continues turning the engine, thereby compressing air and storing it in the tank for later use.

C **High-Efficiency Mode:** By turning off the compression cylinder and utilizing high-pressure air from the storage tank to supply the power cylinder, losses due to compression are reduced to nearly zero when operating in the high-efficiency mode.

D **Cruising Mode:** Only a portion of the compression cylinder's charge is sent to the power cylinder during cruising mode. The remainder of the charge is sent to the air storage tank for later use. Whenever the air tank is full, the compression cylinder shuts off, and the vehicle operates in high-efficiency mode.

Benefits:

- Reduces CO_2 Emissions by up to 50%
- Reduces NOx Emissions by up to 80%
- Increases Fuel Efficiency by up to 50%
- No High-Voltage System / Batteries
- Positive Recharge Time
- Minimal Retooling Costs



The Scuderi Air-Hybrid Engine, with its revolutionary Scuderi Cycle, provides a cost-effective hybrid solution that does not compromise performance and creates an unprecedented opportunity for engine manufacturers to take fuel efficiency to new levels and meet tomorrow's emission standards today.

Preliminary results from studying a turbo-charged, Scuderi Air-Hybrid Engine indicate:

SCUDERI ENGINE	SCUDERI AIR-HYBRID ENGINE
ENGINE SPEED	Up to 6,000 rpm
HORSEPOWER	Up to 135 hp per liter
EFFICIENCY (FULL LOAD)	5-10% higher than conventional engine
EFFICIENCY (PART LOAD)	25-50% higher than conventional engine
EMISSIONS — NOx	Up to 80% less than conventional engine
EMISSIONS — CO_2	Up to 50% reduction than conventional engine
AIR TANK CHARGE-TO-DISCHARGE RATIO	1:3
AIR TANK PRESSURE	Up to 200 bar
ENGINE OPERATING PRESSURE	110-130 bar
FUEL INJECTION PRESSURE	Up to 200 bar
BRAKE MEAN EFFECTIVE PRESSURE	Up to 22 bar
COMPRESSION RATIO	75:1 — Compression side 50:1 — Power side
DISPLACEMENT (APPROX. 1 LITER)	.48 — Compression side .52 — Power side