



**ecomotive**  
solutions

IL TUO PARTNER NELLA TRANSIZIONE ENERGETICA

# HOLDIM group

La nostra missione al Gruppo Holdim è guidare l'innovazione e l'eccellenza in ogni settore in cui operiamo. Ci impegniamo a creare valore sostenibile attraverso soluzioni innovative, sviluppando partnership a lungo termine e contribuendo attivamente alla crescita delle comunità in cui siamo presenti. Con una leadership responsabile e una mentalità orientata al futuro, puntiamo a superare le aspettative dei nostri stakeholder, costruendo fiducia, creando opportunità e promuovendo un impatto positivo sulla società e sull'ambiente. Sosteniamo il "Made in Italy," rappresentando l'eccellenza e la qualità italiane. Operando con una prospettiva internazionale, colleghiamo il nostro impegno locale a una visione globale, promuovendo una crescita economica armoniosa attraverso tecnologie che riducono l'impatto umano sull'ecosistema.

**Numeri di HOLDIM → Fatturato: 57M€ - Dipendenti: 215 - Filiali: 6 - Presenza Paesi: 120**

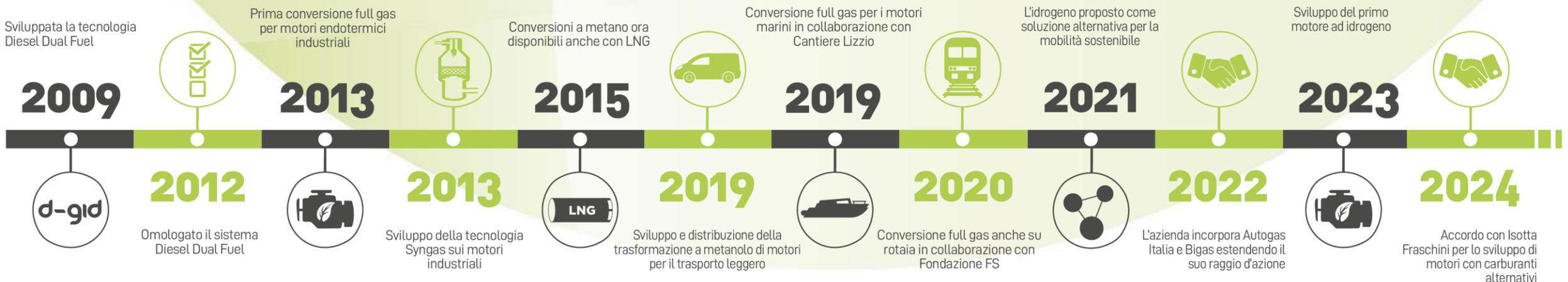


# SOTTO LE ALI DI **HOLDIM** group



Fondata nel 2009 nel gruppo Holdim Spa, il cui core business, dal 1991, è legato allo sviluppo di soluzioni per la gestione elettronica del motore. Ecomotive Solutions opera nel settore dei sistemi di controllo elettronico per motori a combustibili alternativi ed energie rinnovabili. Dalla piattaforma elettronica Diesel Dual Fuel ai motori a biometano e idrogeno con accensione comandata, offre tecnologie e prodotti Made in Italy, nonché formazione certificata e assistenza in tutto il mondo. Affrontando le sfide del futuro e in linea con le strategie del Gruppo Holdim, Ecomotive Solutions si è espansa all'inizio del 2022 incorporando Autogas Italia e Bigas, aziende storiche nel settore dei sistemi di conversione per veicoli bi-fuel (gas naturale e GPL).

Brands di Ecomotive: **AUTOGAS Italia** **bigas**



# PRODOTTI E SERVIZI

## PRODOTTI E SISTEMI COMMERCIALI



Progettazione, produzione e commercializzazione di prodotti per l'impiego di combustibili alternativi, sistemi Dual Fuel, Bi-Fuel e 100% Dedicati

## PROTOTIPI & MICRO-SERIE



Sviluppo e prototipazione di motori e sistemi personalizzati per una vasta gamma di clienti (OEM, industriali, ecc.)

## INTEGRAZIONE DI SISTEMA



Know-how e tecnologie a supporto dei clienti che richiedono la nostra competenza per progetti speciali.

## TESTING



Test emissioni completi a 360° per veicoli e motori. Progettazione e produzione banchi prova potenza e simulatori stradali

# PIATTAFORME ELETTRONICHE

## DIESEL DUAL FUEL



Implementa motori diesel con tecnologie avanzate per utilizzare carburanti alternativi, riducendo le emissioni di CO2 ed i costi, definendo un nuovo standard globale per la mobilità sostenibile ed i motori industriali.

## BENZINA BI-FUEL



Sistemi bi-fuel per veicoli a benzina, riducono emissioni e costi operativi. Aggiorniamo la tradizione di un settore che ci vede tra i leader emergenti.

## BENZINA BI-FUEL (DI)



Sistemi bi-fuel di ultima generazione per motori a iniezione diretta, adattati alle esigenze dei nuovi propulsori e della mobilità moderna. Tutta la nostra esperienza su motori ad iniezione diretta, diventa un prodotto destinato a rivoluzionare il mercato.

## SPARK IGNITED DEDICATE



Sistemi avanzati per lo sviluppo e la gestione di motori ad accensione comandata. La piattaforma più flessibile del mercato per lo sviluppo di applicazioni OEM ed il retrofit di motori e veicoli già in operazione.

# FUEL SYSTEM COMPONENTS

## REGOLARE



Un'ampia gamma di regolatori di pressione per Idrogeno, CNG, LNG e GPL, per condizionare la pressione e la temperatura del gas per una perfetta compatibilità con la combustione nei motori.

## INJECTING



I nostri iniettori, progettati per l'uso di combustibili gassosi e liquidi, garantiscono dosaggio preciso, alta durata e tempi di risposta rapidi. Questo è reso possibile grazie a RAIL, la nostra azienda partner all'interno del Gruppo Holdim, che sviluppa tecnologie di iniezione affidabili che da anni, equipaggiando migliaia di veicoli in tutto il mondo.

## FILTERING



Filtrare correttamente da qualsiasi contaminazione i combustibili gassosi, è essenziale per garantire la lunga durata dei componenti del sistema applicato a motori alimentati a gas.

## CONTROLLING



Un controllo rapido e affidabile del flusso di gas è essenziale per la sicurezza del veicolo, soprattutto con l'espansione delle applicazioni di carburanti alternativi. Con le nostre valvole, è possibile utilizzare in sicurezza idrogeno, gas naturale, nonché GNL o GPL.

# **METANO PER AUTO**

*Un Paziente da Salvare*

# METANO PER AUTO

## *Un Paziente da Salvare*

Il mercato delle immatricolazioni di veicoli a metano in Italia ha subito significative riduzioni negli ultimi dieci anni, riflettendo variazioni nelle politiche ambientali a livello europeo, nell'interesse dei consumatori e nelle opzioni tecnologiche disponibili.

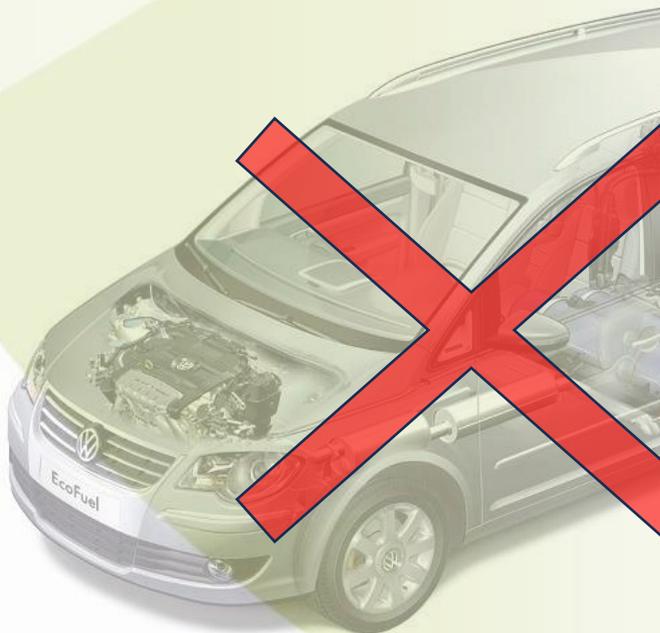


Dati raccolti da associazioni come Federmetano e ANFIA evidenziano che, dopo un picco del prezzo del metano intono al 2022, il già povero mercato dei veicoli leggeri a gas natale, si è completamente arrestato, e quello dei mezzi industriali si è notevolmente ridotto.

# METANO PER AUTO

*Un Paziente da Salvare*

**AUTO METANO  
OEM 2024**



**DISTRIBUTORI DI  
METANO 2024**



# METANO PER AUTO

*Un Paziente da Salvare*



OMOLOGAZIONI Km0

+

OMOLOGAZIONI  
FASE 2



# RETROFIT BIOMETANO

## LA TRANSIZIONE IBRIDA

**FEDERMETANO**

# PAMDA BIO HYBRID

*Ora Si Può*

 **ecomotive**  
solutions





La FIAT PANDA HYBRID oggi è anche a BIOMETANO!! La vettura più venduta in Italia unisce la sua natura Ibrida all'alimentazione a biometano, creando un mix ambientale eccellente, dove di fatto tutte le emissioni classiche dei motori a benzina, anche di ultima generazione, come benzene, CO<sub>2</sub>, CO e polveri, calano drasticamente. Grazie all'alimentazione a biometano questo tipo di veicolo con motore 999 cc tre cilindri aspirato, unito al recupero energetico elettrico, abbatte i consumi in modo determinante, superando nei percorsi misti i 33 km con un kg di metano.







## FIAT PANDA HYBRID CITY CROSS

FROM MILD HYBRID TO HYBRID + METHANE

### ENGINE COMPARTMENT

In the engine compartment are placed a double-stage pressure reducer, an ECU for the control and management of the methane system, one rail four methane injectors.

### TANKS POSITIONING

Positioning of 2 tanks of 24+24 litres that allow a variable range of 300-350 km according to the distances and to the conditions of use of the vehicle

### FUEL CHARGER

The fuel charger for refuelling the tanks can be positioned laterally, inside the fuel tank filler.

### SYSTEM ACTIVATION

In the passenger compartment there is a switch that allows you to select the type of fuel, verify the methane level available inside the tanks and receive information about any anomalies.

### SPARE WHEEL CONNECTION

The spare wheel can be repositioned under the body of the car through a special fixing system.

## TECHNICAL DATA

ENGINE	999cc 51KW/69HP
NUMBER OF TANKS	2 (24+24 litres)
METHANE QUANTITY	7,5 kg
RANGE	260-300 km
MAINTENANCE / SERVICE	required about every 30.000 Km



## TOYOTA C-HR 1.8 HYBRID

FROM HYBRID TO HYBRID + METHANE

### ENGINE COMPARTMENT

In the engine compartment are placed a double-stage pressure reducer, an ECU for the control and management of the methane system, one rail four methane injectors.

### TANKS POSITIONING

3 tanks capacity 24+24+22 litres that allow a variable range of 300-350 km according to the distances and to the conditions of use of the vehicle

### FUEL CHARGER

The fuel charger for refuelling the tanks can be positioned laterally, at the rear of the vehicle, outside the bodywork or in the engine compartment.

### SYSTEM ACTIVATION

In the passenger compartment there is a switch that allows you to select the type of fuel, verify the methane level available inside the tanks and receive information about any anomalies

## TECHNICAL DATA

ENGINE	1.8 HYBRID 89KW/122CV
NUMBER OF TANKS	3 (22+24+24 litres)
METHANE QUANTITY	11 kg
RANGE	300-350 km
MAINTENANCE / SERVICE	required about every 30.000 Km



**NON SOLO HYBRID**



## ALFA ROMEO STELVIO TI Q4

FROM PETROL TO PETROL+ CNG (BI-FUEL)

### ENGINE COMPARTMENT

In the engine compartment are placed a double-stage pressure reducer, an ECU for the control and management of the methane system, one rail eight methane injectors designed for high performance.

### TANKS POSITIONING

3 tanks capacity 30+30+30 litres that allow a variable range of 280 km according to the distances and to the conditions of use of the vehicle

### FUEL CHARGER

The fuel charger for refuelling the tanks can be positioned laterally, inside the fuelling tank or in the engine compartment.

### SYSTEM ACTIVATION

In the passenger compartment there is a switch that allows you to select the type of fuel, verify the methane level available inside the tanks and receive information about any anomalies

### TECHNICAL DATA

ENGINE	2.0 PETROL ENGINE 205 kW 280 HP
NUMBER OF TANKS	3 (30+30+30 litres)
METHANE QUANTITY	15,5 kg
RANGE	280 Km
MAINTENANCE / SERVICE	required about every 30.000 Km



## JEEP GRAND CHEROKEE 3.0

FROM DIESEL TO DIESEL+CNG (DUAL FUEL)

### ENGINE COMPARTMENT

In the engine compartment are placed a double-stage pressure reducer, an ECU for the control and management of the methane system and the methane injectors.

### TANKS POSITIONING

3 tanks capacity 24+30+30 litres that allow a variable range of around 350-400 km according to the distances and to the conditions of use of the vehicle.

### FUEL CHARGER

The fuel charger for refuelling the tanks can be positioned laterally, at the rear of the vehicle outside the bodywork, or inside the engine compartment.

### SYSTEM ACTIVATION

In the passenger compartment there is a switch that allows you to select the type of fuel, verify the methane level available inside the tanks and receive information about any anomalies.

### TECHNICAL DATA

ENGINE	3.0L V6 CRD 184kW/247HP EDC17C79
NUMBER OF TANKS	3 (24+24+30 litres)
METHANE QUANTITY	15 KG
RANGE	350-400 KM
MAINTENANCE / SERVICE	required about every 30.000 Km



## FIAT 500 X 1.6 E-TORQ

FROM PETROL TO PETROL+ CNG (BI-FUEL)

### ENGINE COMPARTMENT

In the engine compartment are placed a double-stage pressure reducer, an ECU for the control and management of the methane system, one rail four methane injectors designed for high performance.

### TANKS POSITIONING

3 tanks capacity 30+30+30 litres that allow a variable range of around 350 km according to the distances and to the conditions of use of the vehicle

### FUEL CHARGER

The fuel charger for refuelling the tanks can be positioned laterally, inside the fuelling tank or in the engine compartment.

### SYSTEM ACTIVATION

In the passenger compartment there is a switch that allows you to select the type of fuel, verify the methane level available inside the tanks and receive information about any anomalies

### TECHNICAL DATA

ENGINE	1,6 PETROL ENGINE, 81 kW 110 HP
NUMBER OF TANKS	3 (30+30+30 litres)
METHANE QUANTITY	15,5 kg
RANGE	350 Km
MAINTENANCE / SERVICE	required about every 30.000 Km



## JEEP RENEGADE 2.0 MULTIJET

FROM DIESEL TO DIESEL+ CNG (DUAL FUEL)

### ENGINE COMPARTMENT

In the engine compartment are placed a double-stage pressure reducer, an ECU for the control and management of the methane system, one rail methane injectors.

### TANKS POSITIONING

3 tanks capacity 24+24+24 litres that allow a variable range of 400 km according to the distances and to the conditions of use of the vehicle

### FUEL CHARGER

The fuel charger for refuelling the tanks can be positioned laterally, at the rear of the vehicle, outside the bodywork.

### SYSTEM ACTIVATION

In the passenger compartment there is a switch that allows you to select the type of fuel, verify the methane level available inside the tanks and receive information about any anomalies

### TECHNICAL DATA

ENGINE	2,0 DIESEL, 103 kW 140 HP
NUMBER OF TANKS	3 (24+24+24 litres)
METHANE QUANTITY	12 kg
RANGE	400 Km
MAINTENANCE / SERVICE	required about every 20.000 Km



## IVECO DAILY 3.0

### ENGINE COMPARTMENT

In the engine compartment are placed a double-stage pressure reducer, one rail two methane injectors and an ECU for the control and management of the methane system.

### TANKS POSITIONING

In the cargo compartment of the van or under the frame are placed the CNG tanks which, depending on the location chosen by the customer, allow a variable range of 300 to 800 km according to the distances and to the conditions of use of the vehicle.

### FUEL CHARGER

The fuel charger for refuelling the tanks is positioned laterally, at the rear of the vehicle, outside the bodyworks or inside the engine compartment.

### SYSTEM ACTIVATION

In the passenger compartment there is a switch that allows you to select the type of fuel, verify the methane level available inside the tanks and receive information about any anomalies.

### FROM DIESEL TO DIESEL+CNG (DUAL FUEL)

### TECHNICAL DATA

ENGINE	3.0i 110kW/147Hp EDC17C49
NUMBER OF TANKS	3 (30+30+30 litres) or 2 (115+115 litres)
METHANE QUANTITY	16 kg or 40 kg
RANGE	300-800 Km
MAINTENANCE / SERVICE	required about every 30.000 Km



## FIAT DUCATO

### ENGINE COMPARTMENT

In the engine compartment are placed a double-stage pressure reducer, one rail two methane injectors and an ECU for the control and management of the methane system.

### TANKS POSITIONING

In the cargo compartment of the van or under the frame are placed the CNG tanks which, depending on the location chosen by the customer, allow a variable range of 300 to 800 km according to the distances and to the conditions of use of the vehicle.

### FUEL CHARGER

The fuel charger for refuelling the tanks is positioned laterally, at the rear of the vehicle, outside the bodyworks or inside the engine compartment.

### SYSTEM ACTIVATION

In the passenger compartment there is a switch that allows you to select the type of fuel, verify the methane level available inside the tanks and receive information about any anomalies.

### FROM DIESEL TO DIESEL+CNG (DUAL FUEL)

### TECHNICAL DATA

ENGINE	2.0i 16V Mjet 85kW/114Hp EDC17C69
NUMBER OF TANKS	3 (30+30+30 litres) or 2 (115+115 litres)
METHANE QUANTITY	16 kg or 40 kg
RANGE	300-800 Km
MAINTENANCE / SERVICE	required about every 30.000 Km



## MERCEDES SPRINTER 519

### ENGINE COMPARTMENT

In the engine compartment are placed a double-stage pressure reducer, one rail two methane injectors and an ECU for the control and management of the methane system.

### TANKS POSITIONING

In the cargo compartment of the van or under the frame are placed the CNG tanks which, depending on the location chosen by the customer, allow a variable range of 300 to 800 km according to the distances and to the conditions of use of the vehicle.

### FUEL CHARGER

The fuel charger for refuelling the tanks is positioned laterally, at the rear of the vehicle, outside the bodyworks or inside the engine compartment.

### SYSTEM ACTIVATION

In the passenger compartment there is a switch that allows you to select the type of fuel, verify the methane level available inside the tanks and receive information about any anomalies.

### FROM DIESEL TO DIESEL+CNG (DUAL FUEL)

### TECHNICAL DATA

ENGINE	3.0l 16V CDI 140kW/188Hp EDC17CP10
NUMBER OF TANKS	3 (30+30+30 litres) or 2 (115+115 litres)
METHANE QUANTITY	16 kg or 40 kg
RANGE	300-800 Km
MAINTENANCE / SERVICE	required about every 30.000 Km



## VOLKSWAGEN CRAFTER

### ENGINE COMPARTMENT

In the engine compartment are placed a double-stage pressure reducer, one rail two methane injectors and an ECU for the control and management of the methane system.

### TANKS POSITIONING

In the cargo compartment of the van or under the frame are placed the CNG tanks which, depending on the location chosen by the customer, allow a variable range of 300 to 800 km according to the distances and to the conditions of use of the vehicle.

### FUEL CHARGER

The fuel charger for refuelling the tanks is positioned laterally, at the rear of the vehicle, outside the bodyworks or inside the engine compartment.

### SYSTEM ACTIVATION

In the passenger compartment there is a switch that allows you to select the type of fuel, verify the methane level available inside the tanks and receive information about any anomalies.

### FROM DIESEL TO DIESEL+CNG (DUAL FUEL)

### TECHNICAL DATA

ENGINE	2.0l 16V TDI 103kW/138Hp DCM6.2
NUMBER OF TANKS	3 (30+30+30 litres) or 2 (115+115 litres)
METHANE QUANTITY	16 kg or 40 kg
RANGE	300-800 Km
MAINTENANCE / SERVICE	required about every 30.000 Km



## CITROËN JUMPER

### ENGINE COMPARTMENT

In the engine compartment are placed a double-stage pressure reducer, one rail two methane injectors and an ECU for the control and management of the methane system.

### TANKS POSITIONING

In the cargo compartment of the van or under the frame are placed the CNG tanks which, depending on the location chosen by the customer, allow a variable range of 300 to 800 km according to the distances and to the conditions of use of the vehicle.

### FUEL CHARGER

The fuel charger for refuelling the tanks is positioned laterally, at the rear of the vehicle, outside the bodyworks or inside the engine compartment.

### SYSTEM ACTIVATION

In the passenger compartment there is a switch that allows you to select the type of fuel, verify the methane level available inside the tanks and receive information about any anomalies.

FROM DIESEL TO DIESEL+CNG (DUAL FUEL)

### TECHNICAL DATA

ENGINE	2.0l 16V BlueHDi 96kW/128Hp DCM6.2C
NUMBER OF TANKS	3 (30+30+30 litres) or 2 (115+115 litres)
METHANE QUANTITY	16 kg or 40 kg
RANGE	300-800 Km
MAINTENANCE / SERVICE	required about every 30.000 Km



## NISSAN NV400

### ENGINE COMPARTMENT

In the engine compartment are placed a double-stage pressure reducer, one rail two methane injectors and an ECU for the control and management of the methane system.

### TANKS POSITIONING

In the cargo compartment of the van or under the frame are placed the CNG tanks which, depending on the location chosen by the customer, allow a variable range of 300 to 800 km according to the distances and to the conditions of use of the vehicle.

### FUEL CHARGER

The fuel charger for refuelling the tanks is positioned laterally, at the rear of the vehicle, outside the bodyworks or inside the engine compartment.

### SYSTEM ACTIVATION

In the passenger compartment there is a switch that allows you to select the type of fuel, verify the methane level available inside the tanks and receive information about any anomalies.

FROM DIESEL TO DIESEL+CNG (DUAL FUEL)

### TECHNICAL DATA

ENGINE	2.3L 16V dCi 125kW/161HP SID310
NUMBER OF TANKS	3 (30+30+30 litres) or 2 (115+115 litres)
METHANE QUANTITY	16 kg or 40 kg
RANGE	300-800 Km
MAINTENANCE / SERVICE	required about every 30.000 Km



THE FIRST ITALIAN DUAL FUEL LNG BUS DELIVERED TO COTRAL



## IRISBUS SFR 160 CROSSWAY

**ENGINE COMPARTMENT**  
In the engine compartment are placed 2 double-stage pressure reducers, one rail 6 methane injectors for high performance and a Heavy-duty ECU for the control and management of the Dual Fuel system.

**TANKS POSITIONING**  
In the left-hand side luggage compartment of the bus has been installed the LNG tank that feeds the Dual Fuel system and provides a range of approximately 550/600 km, according to the distances and to the conditions of use of the vehicle.

**FUEL CHARGER**  
The fuel charger for refuelling the cryogenic tank is positioned directly on the LNG fuel tank. It ensures the supply in all charging stations as equipped with a universal connection.

**SYSTEM ACTIVATION**  
In the passenger compartment there is a switch that allows you to select the type of fuel, verify the LNG level available inside the tank and receive information about any anomalies.

FROM DIESEL TO DIESEL+LNG (DUAL FUEL)

### TECHNICAL DATA

ENGINE	7.8L 220kW/295HP EDC7UC31
NUMBER OF TANKS	1 LNG tank of 200 litres of which 175 Litres net.
METHANE QUANTITY	73 kg
RANGE	570 Km
MAINTENANCE / SERVICE	Required about every 30.000 km or 1400 hours



## MERCEDES ACTROS EURO 6

FROM DIESEL TO LNG (DUAL FUEL)

### TECHNICAL DATA

ENGINE	12.8L 350Kw/471HP OM471 LA 6B
NUMBER OF TANKS	1 of 450 LITRES
METHANE QUANTITY	160 KG
RANGE	1200-1400 KM
MAINTENANCE / SERVICE	required about every 60.000 Km

**ENGINE COMPARTMENT**  
In the engine compartment are placed 2 LNG pressure reducers, an ECU for the control and management of the liquid methane system, and all CAN-BUS network of the vehicle.

**FUEL**  
1 tank of the capacity of 450 litres that allow a variable range of 1200-1400 km according to the distances and to the conditions of use of the vehicle.

**REFUELLING**  
The fuel charger for refuelling the cryogenic tank is included with the LNG fuel tank.

**SYSTEM ACTIVATION**  
In the passenger compartment there is a switch that allows you to select the type of fuel, verify the LNG level available inside the tank and receive information about any anomalies.



**UNA SOLIDA ESPERIENZA**

# CASE HISTORY



AUTOMOTIVE

DUAL FUEL FOR PUBLIC AND PRIVATE TRANSPORT IN CHILE

# CASE HISTORY



DUAL FUEL FOR SUGAR CANE TRANSPORT AND INTERCITY BUSES IN BRASIL

# CASE HISTORY

## Johannesburg Converts 30 Buses to Natural Gas

September 4, 2015 | South Africa, Johannesburg and Italy, Serralunga di Crea



Italy's Ecomotive Solutions, a Holdim Group company and engine calibration specialist, has supported the conversion of 30 buses from the Johannesburg (South Africa) Metrobus fleet into Dual Fuel CNG (compressed natural gas) through its South African partner, Vehicle Gas Solutions. The recent conversion to natural gas is a part of a "Going Green" approach aimed at promoting and incentivizing the use of methane by the urban public transport system in Johannesburg.



AUTOMOTIVE

DUAL FUEL FOR PUBLIC TRANSPORT IN SOUTH AFRICA

# CASE HISTORY



DUAL FUEL FOR PUBLIC TRANSPORT IN ITALY

# CASE HISTORY



DUAL FUEL FOR HEAVY DUTY IN RUSSIA – KAMAZ (OEM)

# CASE HISTORY



AUTOMOTIVE

DUAL FUEL FOR HEAVY DUTY IN DOMINICAN REPUBLIC

ΤΕΧΝΟΛΟΓΙΑ DUAL FUEL: DIESEL + CNG

## ΜΕΤΑΤΡΟΠΗ ΤΡΑΚΤΟΡΑ ΣΕ ΟΧΗΜΑ ΔΙΠΛΟΥ ΚΑΥΣΙΜΟΥ ΠΕΤΡΕΛΑΙΟ & ΦΥΣΙΚΟ ΑΕΡΙΟ



Μετά την έκδοση της αναμενόμενης απόφασης με την οποία επιτρέπεται η χρήση πετρελαίου φυσικού αερίου (CNG – Compressed Natural Gas) και η μετατροπή των αυτοκινήτων σε οχήματα διπλού καυσίμου, το περιοδικό T&T σας παρουσιάζει τη μετατροπή βαρέως οχήματος – ενός τράκτορα DAF XF 105 460 – που γίνεται με πετρέλαιο και φυσικό αέριο.

Επιμόλυνση: Μανώλης Αγγελοστάσης

είχαν προηγηθεί επίτυχιες μετατροπές σε ένα Skoda Octavia TDI και σε ένα Fiat Ducato 2.3 Multijet 120.

Εμφάνιση με τα αποτελέσματα των μετρήσεων καταπόνησης που μας δίνει η εταιρεία, αυτά συγγίζονται το -24% και αφορούν σε ένα μικτό κύκλο διαδρομών με αναβάσεις σε μεταλλεία, στα δρόμα και σε κίνηση εντός του λιμανιού.

Το πιάς επιτυγχάνεται η παραπάνω οικονομία, αποτυπώνεται στον παρακάτω πίνακα, όπου λαμβάνεται ως δεδομένο σύγκρισης, ότι για έναν αντίστοιχο μικτό κύκλο διαδρομών, το συγκεκριμένο DAF θα είχε καταναλώσει σε πετρέλαιο 40 λίτρα για τα 100 κιλόμετρα.

DAF XF 105 460					
Euro 5, μόντ. 2012, 460 hp					
Diesel tank: 400lt (απορροφάει κ 2η δεξαμενή των 1200 lt.)					
CNG tank: 8x70lt (μέγιστη πλήρωση -70kg)					
Αυτονομία: [σε dual-fuel mode] -600km					
Πριν		Μετά			
	Diesel	Diesel	Diesel	CNG	
lt/100km	€/lt	lt/100km	€/lt	Kg/100km	€/kg
40	1,07	22	1,07	12	0,75
-	-	23,54 €	-	9 €	-
-	42,8 €	-	32,54 €	-	-
-23,97%					

Τημαντικό επίσης στοιχείο που πρέπει να προσέξετε στον παραπάνω πίνακα είναι η αλλαγή μέσης των δύο καυσίμων που είναι 30 προς 70 (πετρέλαιο προς φυσικό αέριο) και τα γεγονός ότι τα μεν πετρέλαιο πωλείται όπως γνωρίζουμε σε λίτρα, ενώ το φυσικό αέριο πωλείται σε κυβό.

Τη μετατροπή πραγματοποιήσε επιτυχώς η βιοτεχνολογική εταιρεία NGT – Natural Gas Technologies, την οποία γνωρίζουμε στην παλαιότερη έκθεση του T&T «Transport Show». Να υπενθυμίσουμε στους αναγνώστες μας ότι έχει ήδη επιτραπεί η μετατροπή οχημάτων σε διπλού καυσίμου βενζίνης – φυσικού αερίου. Λέγοντας διπλού καυσίμου σημαίνει ότι κινούνται ταυτόχρονα και με τα δύο καύσιμα σε συγκεκριμένη αναλογία τα καύσιμα ενώ είναι δυνατή και η κίνηση του οχήματος με το ένα μόνο καύσιμο. Ακόμη υπενθυμίζουμε ότι το CNG είναι ο υδρογονάνθρακας μεθάνιο και επειδή (τα μεθάνιο), δεν αποτελεί προϊόν βιολογίας, λέγεται φυσικό αέριο, όταν δε, αποθηκεύεται υπό πίεση παίρνει τη γνωστή σε μας ονομασία CNG.

### Κατανάλωση

Για το αποτέλεσμα στην κατανάλωση, το κόστος της μετατροπής και τα βασικά στοιχεία που πρέπει να γνωρίζει ο ενδιαφερόμενος, μιλάει στο T&T ο τεχνικός υπεύθυνος της NGT κ. Γεώργιος Αμπατζίδης και απαντά στις ερωτήσεις μας.

Όπως αναφέρθηκε, η μετατροπή σε δίχημο διπλού καυσίμου (dual fuel) και πρώτα σε βαρύ όχημα, έγινε σε τράκτορα μάρκας DAF XF 105 460 ιδιοκτήτης του ομίλου FHL KIRIAKIDIS A.E. ενώ

60 T&T

### Τα τεχνικά στοιχεία της μετατροπής και το kit «d-gid»

Τα μηχανολογικά εξαρτήματα μιας μετατροπής πετρελαιοκίνητου σε dual-fuel, είναι κοινό με της bi-fuel (βενζίνη-CNG), δηλαδή φιάλη - αυτόματη βαλβίδα - αεόληνη σωλήνα υαλίνης είσοδο - πυρόμασνα - σωλήνα καυτήρας - μπεκ. Τα εξαρτήματα μετά τον πυρόμασνα δε, είναι κοινά και με τα γνήσια του LPG.

Αυτά που αλλάζει τελείως είναι τα ηλεκτρικά/ηλεκτρονικά μέρη. Ο εγκέφαλος (ECU) d-gid επικοινωνεί με το στενεομέτρο του πεντάλι του γκαζού αλλά και με την CAN BUS του οχήματος, ούτως ώστε να μπορεί να μετρήσει την έγχυση του πετρελαίου και να την ανακαταρτίσει στοιχειομετρικά με την αντίστοιχη ποσότητα αερίου, δυναμικά και μεταβαλλόμενο σε όλο το φάσμα των στροφών και του φορτίου. Η επικοινωνία με την CAN BUS επιτρέπει να γίνουν: όλες οι παραπάνω διαδικασίες αερίο και με κέρση αυτόματου κλιματίου ή cruise control.

«Αξίζει να σημειωθεί» μας αποκαλύπτει ο κ. Αμπατζίδης, «ότι αντίθετα με την συνηθιστή ήλιονότητα εγκάρδιων diesel dual fuel, που προέρχεται από την τεχνολογία του LPG, ο d-gid σταθερά στη μέγιστη μείωση της έγχυσης του πετρελαίου και όχι στην έμφυση εξοικονόμηση μέσω της υπερπροσόδου (εμπλουτισμός-oversfueling) με προσέλευση αερίου στο θάλαμο καύσης. Αυτή η διαφορά φιλοσοφίας βασίζεται στο γεγονός ότι τα επίθετα μέλη diesel & LPG χωρίς προσαρτήσεις μπορούν να φθάσουν στην καλύτερη περίπτωση σε επίθετα 70:30, ενώ αντίθετα στην περίπτωση diesel & CNG σε 30:70».

Εξίσου σημαντική, και απαραίτητη θα ήλεγχε, είναι η επισήμανση του κ. Αμπατζίδης ότι «το kit που υπόκειται σύστην τελικού συνθέσει δεν φέρουν συμμόρφωση με προς τα πρότυπα ρυθμίσεις».

Η εταιρεία N.G.T. από την πλευρά της έχει φρονήσει από τον περασμένο Αύγουστο και έχει καταχωρήσει στο μητρώο CNG του



ΥΜΕ όλα τα εξαρτήματα του kit d-gid, καθώς και τη συμμόρφωση μέχρι και για EURO 5, όπως αυτή εκδόθηκε βάσει αποτελεσμάτων δοκιμών από το ταβείο ΥΜΕ.

### Ασφάλεια-κόστος-φθορές

Για την ασφάλεια της εγκατάστασης, το κόστος και τυχόν φθορές, ο κ. Αμπατζίδης μας αναφέρει:

«Η ασφάλεια της εγκατάστασης είναι δεδομένη λόγω της απόλυτης συμμόρφωσης των εξαρτημάτων και των κανόνων της διασκευής βάσει του R110. Οι συγκεκριμένες εγκαταστάσεις μας δε, έχουν εκπαιδευθεί στην τακτική πάνω σε συγκεκριμένα αντικείμενα.

Το κόστος της εγκατάστασης σε ένα ελαφρύ επαγγελματικό όχημα κυμαίνεται από 3.000 έως 4.000 € + ΦΠΑ. Για ένα βαρύ όχημα από 10.000 έως 12.000. Σε κάθε περίπτωση η διακρίβωση οφείλεται στην επιλογή περισσότερων ή λιγότερων φιαλών



T&T 61



AUTOMOTIVE

# CASE HISTORY



HEAVY  
EQUIPMENT

DUAL FUEL FOR SPECIAL VEHICLES – BUCHER MUNICIPAL

# HEAVY EQUIPMENT & OFF-ROAD



# CASE HISTORY



HEAVY  
EQUIPMENT

DUAL FUEL FOR SPECIAL VEHICLES – GREEN CRANES PROJECT, LIVORNO (ITALY)

# CASE HISTORY



HEAVY  
EQUIPMENT

DUAL FUEL FOR SPECIAL VEHICLES – RTG CRANE, PORT OF MUMBAI

# CASE HISTORY



HEAVY  
EQUIPMENT

DUAL FUEL FOR SPECIAL VEHICLES – REACH STACKER, PORT OF DUISPORT

# CASE HISTORY



HEAVY  
EQUIPMENT

**100% BIOMETHANE CONVERSION FOR AGRICULTURAL MECHANIZATION**

# CASE HISTORY



HEAVY  
EQUIPMENT

100% BIOMETHANE CONVERSION FOR AGRICULTURAL MECHANIZATION

# CASE HISTORY



HEAVY  
EQUIPMENT

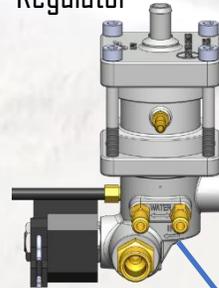
100% BIOMETHANE CONVERSION FOR AGRICULTURAL MECHANIZATION

# CASE HISTORY

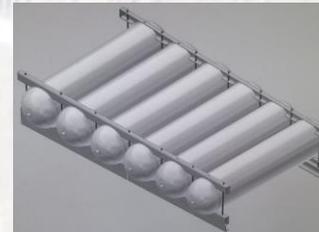
## CAT 777 Water Dumper C15 CNG



CNG HD Regulator



CNG pack onboard 6x150L



Exhaust T K Sensors



Air/Natural Gas Electronic Injection



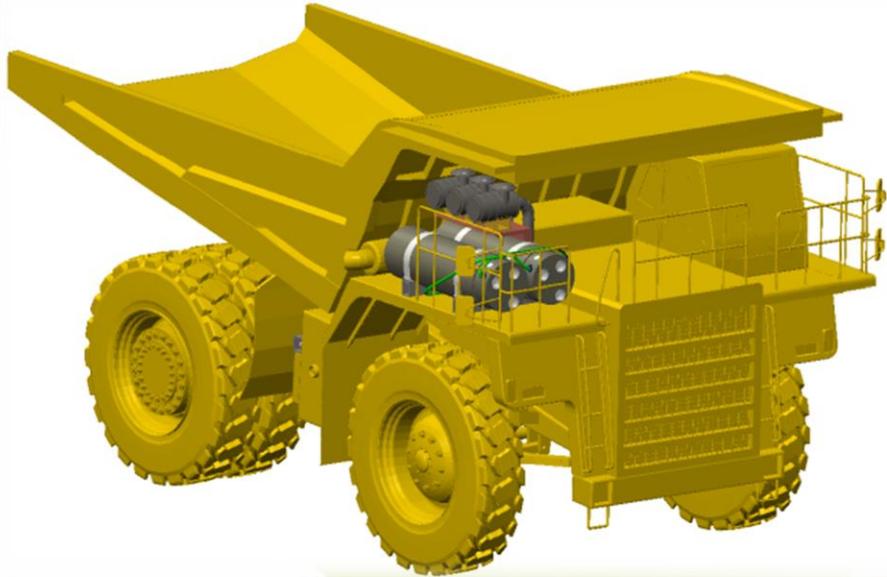
Dual Fuel Controller



HEAVY EQUIPMENT

DUAL FUEL CNG WATER DUMPER

# CASE HISTORY



HEAVY  
EQUIPMENT

DUAL FUEL LNG MINING DUMPER

# RAILWAY





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FOCUS ON / SUSTAINABILITY

## Train powered by LNG, here is the first authorization in Italy

### Fondazione FS Italiane experiments with the use of liquefied natural gas

May 17, 2023

100% LNG CONVERSION FOR RAILWAY: HITACHI RAIL /TRENITALIA



DIESEL TEST						
TEST	THC Total	NO Total	NO2 Total	NOx Total	CO2 Total	PM Total
[-]	[g]	[g]	[g]	[g]	[kg]	[g]
DIESEL_01	42,94	415,25	21,80	437,05	24,56	3,65
DIESEL_02	43,71	429,93	21,09	451,02	25,68	3,43
DIESEL_03	41,22	428,09	21,04	449,13	25,10	3,82
<b>MEDIA</b>	<b>42,62</b>	<b>424,42</b>	<b>21,31</b>	<b>445,73</b>	<b>25,11</b>	<b>3,63</b>

LNG TEST - BERSY CATALYST at 140 cm from the turbine								
TEST	THC Total	CH4	NMHC	NO Total	NO2 Total	NOx Total	CO2 Total	PM Total
[-]	[g]	[g]	[g]	[g]	[g]	[g]	[kg]	[g]
LNG_01	7,45	4,43	3,02	0,05	0,40	0,45	20,93	0,03
LNG_02	13,51	11,29	2,22	0,00	0,31	0,31	20,88	0,03
<b>MEDIA</b>	<b>10,48</b>	<b>7,86</b>	<b>2,62</b>	<b>0,03</b>	<b>0,36</b>	<b>0,38</b>	<b>20,91</b>	<b>0,03</b>

DELTA PERCENTAGE - LNG with CATALYST vs DIESEL					
THC	NO	NO2	NOx	CO2	PM
[%]	[%]	[%]	[%]	[%]	[%]
<b>-93,85</b>	<b>-99,99</b>	<b>-98,33</b>	<b>-99,91</b>	<b>-16,67</b>	<b>-99,17</b>

**100% LNG CONVERSION FOR RAILWAY: HITACHI RAIL /TRENITALIA**

# MARINE



# GREEN BOAT



## Venice



# Type 4 CNG Cylinders Layout



# CNG slow filling reuelling



# PARTNERSHIP



BM carrozzerie



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Business Development Manager

