

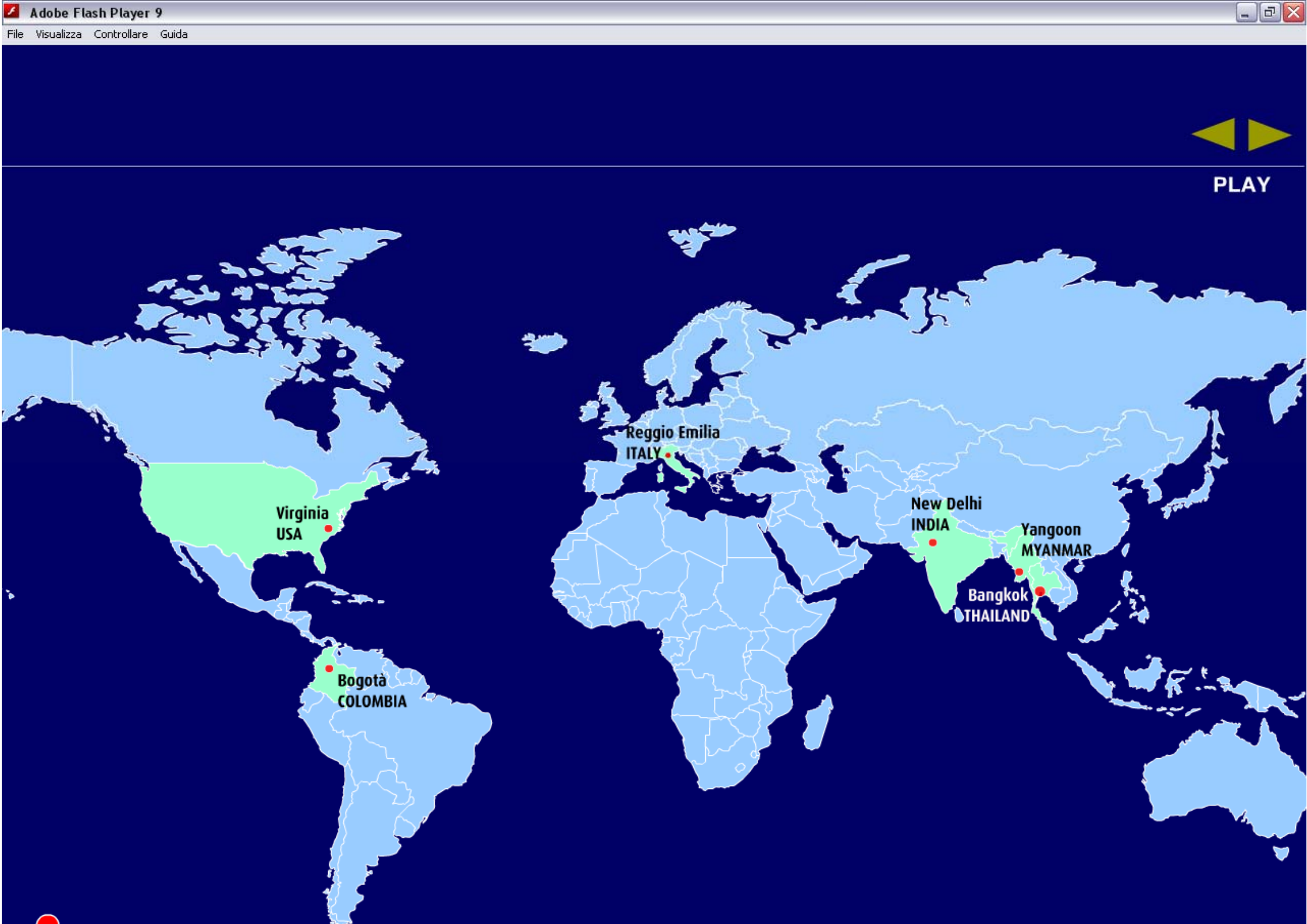
# DIESEL CONVERSION TO NATURAL GAS

Speaker:

IORI LUCA

(Chairman of NGV GAS – Italy)





NGV Motori Srl is located in Reggio E. - ITALY - Emilia district



# Certificates

-NGV Motori Srl is in possession of the certificates of conformity  
CISQ/IMQ/CSQ – ISO 9001-2000 and is authorized to the production  
of internal combustion engines from the Italian Transportation and Navigation Ministry.



**IO Net**  
THE INTERNATIONAL CERTIFICATION NETWORK

**CERTIFICATE**

IO Net and its partner  
CISQ/IMQ-CSQ  
hereby certify that the organization

**NGV MOTORI SRL**  
VIA BACONE 13/4 - 42029 MASONE (RE) Italy  
for the following field of activities  
Assembling and installation of bus mechanical parts, engine conversion from diesel  
to CNG, heavy duty vehicle maintenance, cogeneration plant assembling  
Refer to quality manual for details of applications to ISO 9001:2000 requirements  
has implemented and maintains a  
Quality Management System  
which fulfills the requirements of the following standard  
**ISO 9001:2000**  
Issued on: 2003 - 12 - 15

Registration Number: **IT - 17889**

**IO Net** **Fabio Rovera**  
President of IO Net

**CISQ** **Giancarlo Prati**  
President of CISQ

IO Net partners:  
AENOR Spain AJAQ France AIB-Vinçotte International Belgium ANCE Mexico APCTE Portugal CISO Italy CDC China  
COM China COS Czech Republic DQS Germany DS Denmark ELIOT Greece FCAV Brazil FONDORIMA Switzerland  
HKQAA Hong Kong ISONTEC Colombia IFS Mexico IRAM Argentina JQA Japan KEMA Netherlands KPO Korea MSZT  
Hungary Nemko Certification Norway NSAI Ireland OQS Austria PCB Certification Singapore QMI Canada RRI Russia  
SAI Global Australia SGS Finland SII Israel SIQ Slovenia SQS Switzerland SRAC Romania TISI Sri Lanka TUV  
TUV is represented in the USA by the following partners: AFM, AIB-Vinçotte International, CBQ, DQS, KEMA, NSAI, QMI and SAI Global  
with the following signatures in order to the name of issue of this certificate. Detailed information is available under www.io-net-certification.com

**BUREAU VERITAS**  
Certification

**CERTIFICATE OF CONFORMITY**  
CERTIFICADO DE CONFORMIDAD

N° BV01/GAS/CP/1274 - 2008

This certifies to:  
Se certifica a

**DISTOVOTA LTDA. - NGV MOTORI S.r.l.**

Product:  
Producto

*Test de Aceleración del Kit de Conversión de Inyección Secuencial Gaseosa.*  
GNCV vs GASOLINA en un vehículo marca TOYOTA HILUX  
de Placas CBS-730, BZQ-156 - MOTOR F 2TR-FE 2.7 Ls MPL

Complies with the requirements of Standard  
Cumple con los requerimientos de las normas

**SAE J1491**

Los procedimientos aplicados fueron únicamente los correspondientes a la preparación  
y descripción del test de aceleración establecido en la norma mencionada

*Nota: El presente certificado hace referencia a la verificación documental suministrada por el cliente, el  
resultado NO hace parte del certificado*

At / on  
Emitido en

**Bogotá, D.C., 18 de Septiembre de 2008**

**ALEXANDER SERRANO C.**  
Certificación Producto  
BVQI Colombia Ltda.

Valido de Acuerdo a las Condiciones Comerciales  
To Check its validity phone 57-1-3129191  
Para verificar su validez, llame al Tel. 57-1-3129191.  
e-mail: info@bvqi.com.co  
N° BV01/GAS/CP/1274-2008, Página No. 1 de 1

*Ministero delle Infrastrutture e dei Trasporti*  
RAMO TRASPORTI (D.P.R. 8.12.2007 n. 271)  
DIREZIONE GENERALE TERRITORIALE DEL NORD-EST  
CENTRO PROVA AUTOVEICOLI DI BOLOGNA  
Commissione del Controllo di Conformità

**CERTIFICATO N. 054/08/BO**  
**CERTIFICATE N.**

Il costruttore  
the manufacturer

**NGV MOTORI S.r.l.**

per l'impianto di produzione sito in  
for the manufacturing plant located in

**Via Amundsen, 1  
fraz. Gavassa 42100 Reggio Emilia - ITALY**

e per il prodotto  
and for the product

**Motori - entità tecniche per motori**

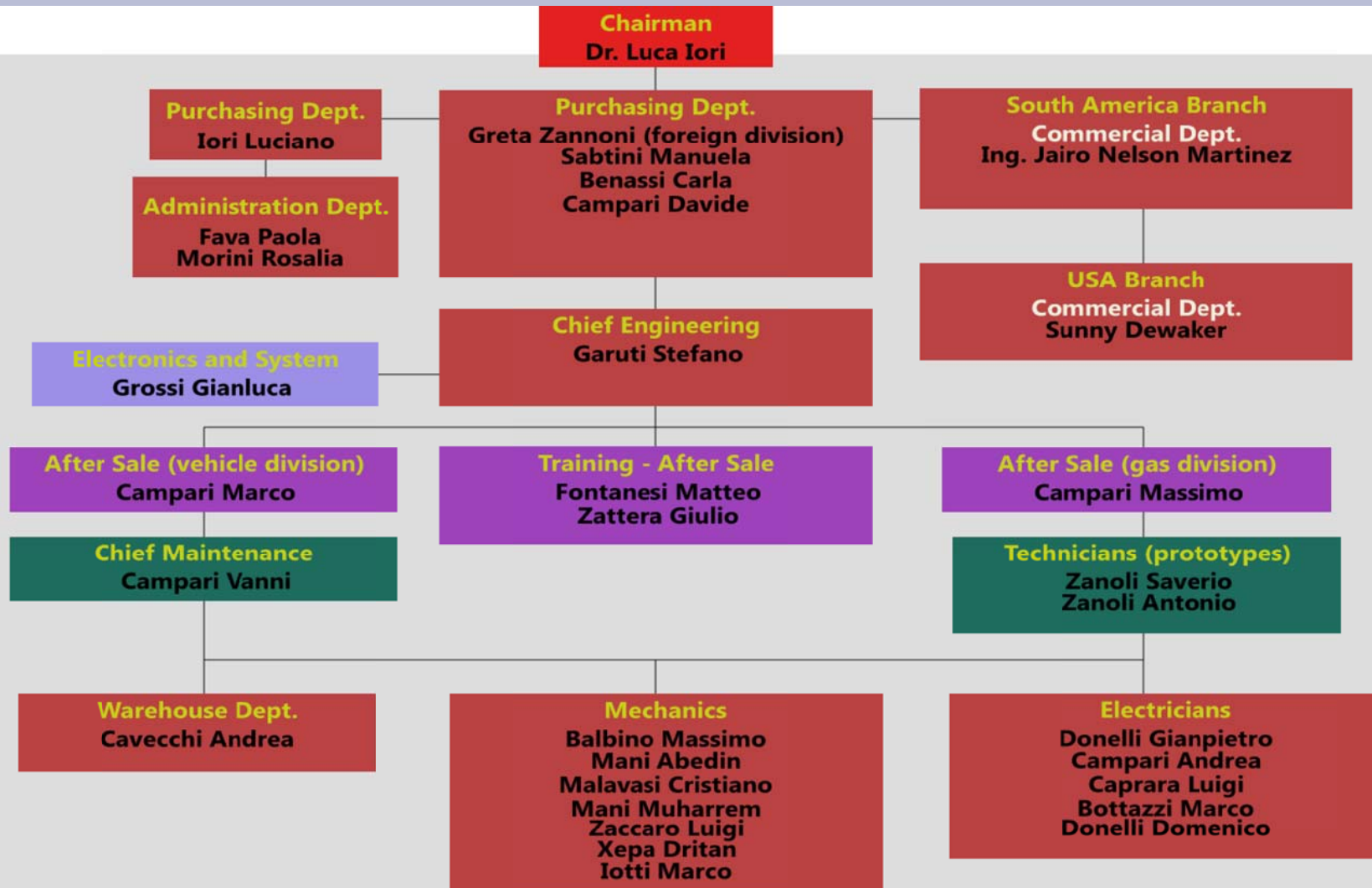
**E' RITENUTO IDONEO ALLA PRODUZIONE IN SERIE**  
**IS QUALIFIED FOR THE PRODUCTION IN SERIES**

Bologna, **11 dicembre 2008**

Il presente certificato è valido due anni  
This certificate is valid two years

**IL DIRETTORE / THE DIRECTOR**  
(Dott. Ing. Edoardo DONZELLI)

# Staff





# Plants



# Plants



GAS division  
( foreign market )



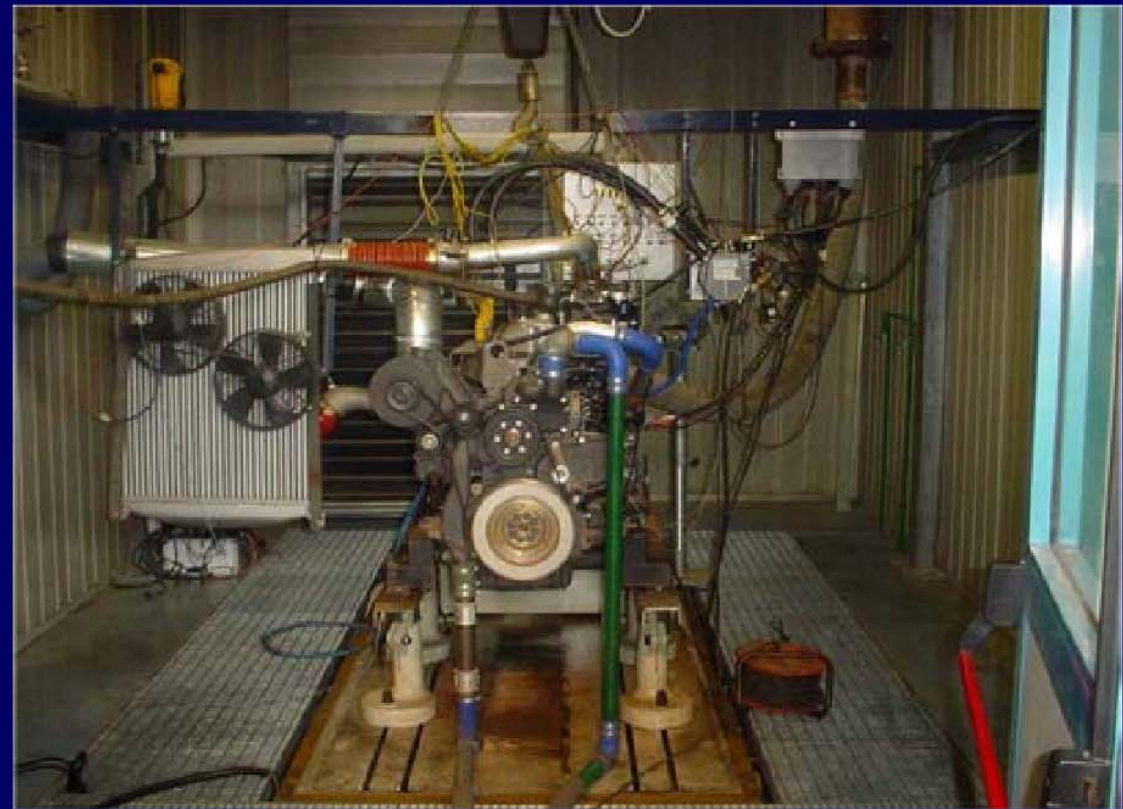
GAS division  
( national market )



# Plants



Arrow keys for back and forth



Test bench equipments



# Diesel vehicle conversions are rising exponentially all over the world

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## The main reasons are:

- Price of diesel fuel is growing
- Environmental aspects
- International pressures (Kyoto protocol – WTO pressures)
- Diesel is subsidized by Government

There are two solutions for these  
type of vehicles  
(either new or used ones):

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- Dual fuel system
- Dedicated system



The Natural Gas market of diesel vehicle converted to Natural Gas is today shared in the followings way:

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Vehicle:

- 95% Bus
- 5% Trucks

System:

- 97% Dedicated
- 3% Dual Fuel





# DEDICATED SYSTEM

## Diesel cycle > Otto cycle (100% Natural Gas)

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### Aspects to be considered:

- Range: max 300 Km
- Filling stations must be easily reachable
- Maintenance infrastructures with high standard level

Due to these aspects, the ideal field of applications is: CITY BUSES

### This, in addition to other very important factors:

- In downtown city the pollution is more concentrated
- Bus fleets are often Governmental properties, so very sensible to the cost savings
- There is a political return of image



# DUAL FUEL SYSTEM

## Diesel cycle

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- Natural Gas for feeding
- Diesel for ignition

### Aspects to be considered:

- Long range
- System reversible

Due to these aspects, the ideal field of application is: TRUCKS



# Comparison between Dedicated System and Dual Fuel system:

	DEDICATED	DUAL FUEL
■ Fuel savings	☆☆☆☆	☆☆
■ Pollution decrease	☆☆☆☆	☆☆
■ Range	☆☆	☆☆☆☆
■ Kit installation costs	☆☆	☆☆☆☆
■ Conversion costs	☆☆	☆☆☆☆
■ Kit cost	☆☆☆	☆☆☆☆
■ Payback	☆☆☆☆	☆☆
■ Power	☆☆☆☆	☆☆☆☆

## Key legend:

Fairly good ☆☆

Good ☆☆☆

Excellent ☆☆☆☆



# Who can finance?

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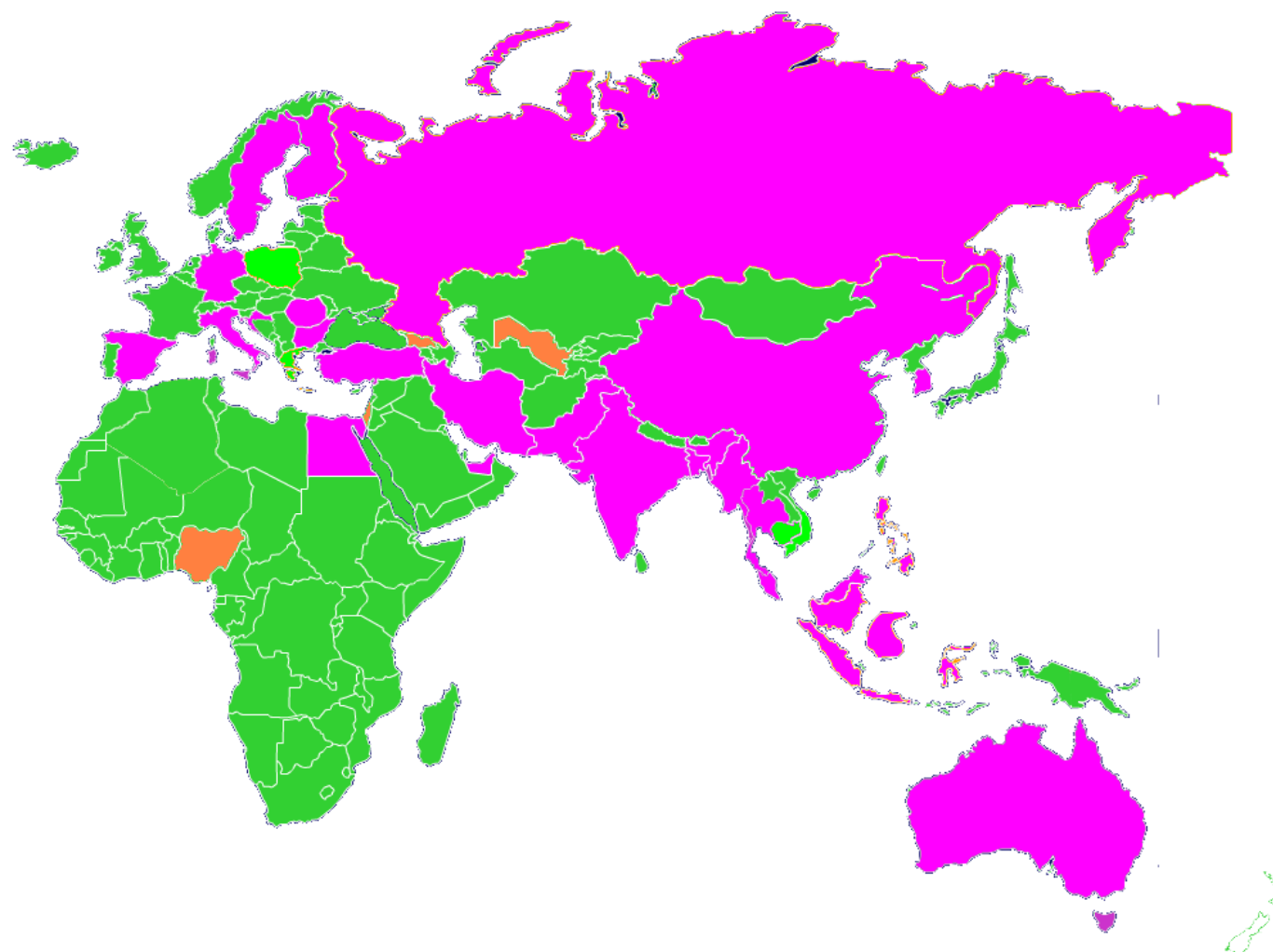
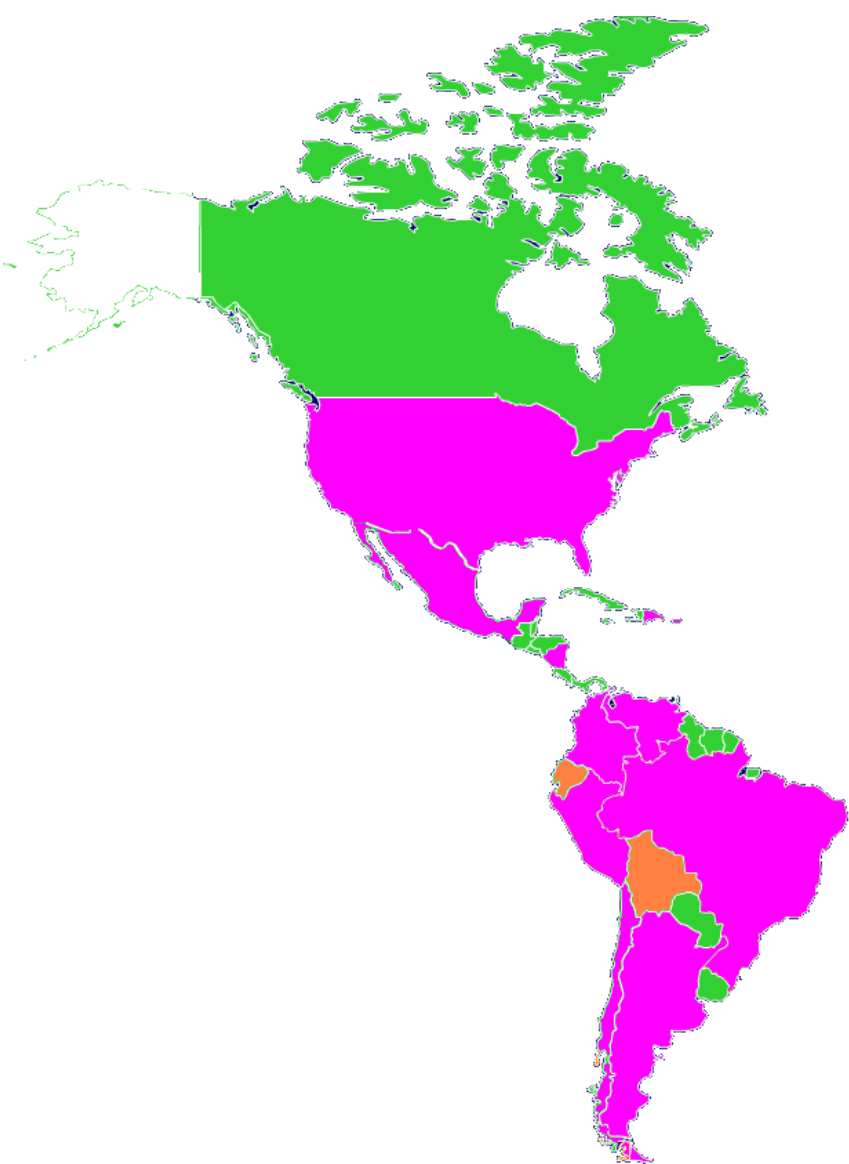
- Government (Subsides, tax exemption, incentives)
- Privates
- Gas distributors

# Our projects in the world

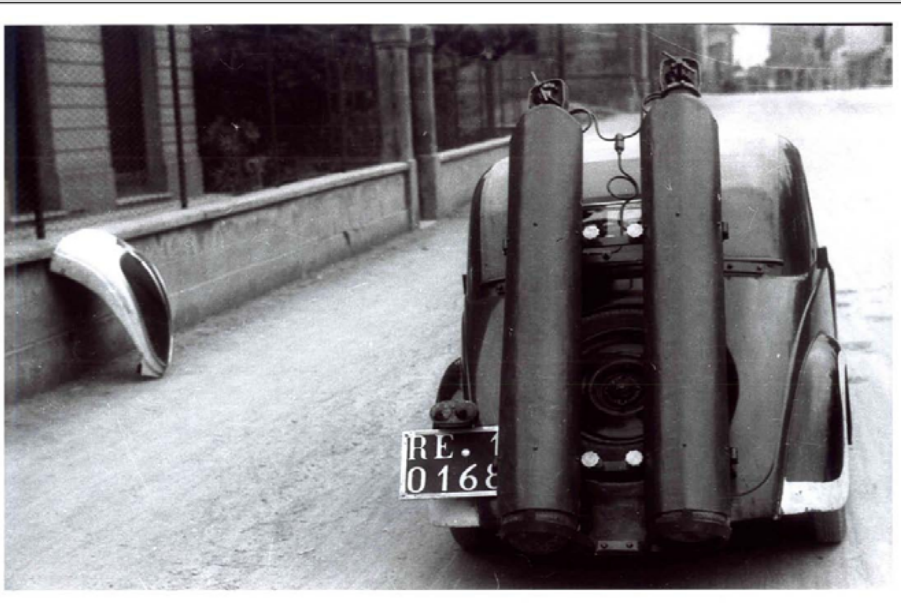
Working  
vehicles

Work in  
progress





# From the beginning to now



1947



2011



Turkey



Mexico

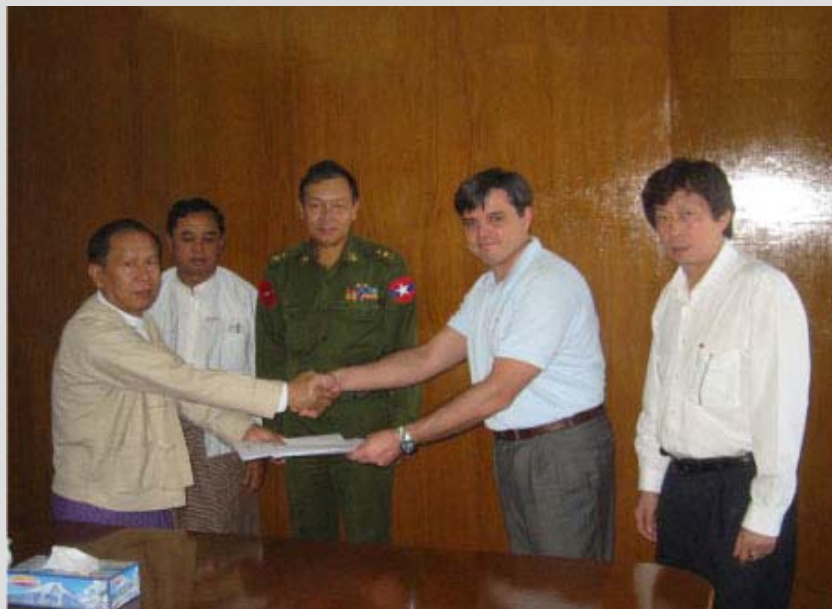


Brasil



USA





Myanmar



Myanmar





BANGLADESH



ROMANIA



Egypt



India





Pakistan



Colombia



Thailand



Thailand



Iran



Iran



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2010 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT OF 1990

OFFICE OF TRANSPORTATION  
AND AIR QUALITY  
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: NGV Motors AGA NGV CONVERSION INC. (A) (Alternative Fuel Conversion)  
Certificate Number: ANGCT05.6822.001

Effective Date:  
12/31/2009

Expiration Date:  
12/31/2010

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2010 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT OF 1990

Certificate Issued To: NGV Conversion, Inc.  
(Alternative Fuel Conversion)  
Certificate Number: ANGCT05.6822.001

Effective Date:  
12/27/2009

Expiration Date:  
12/31/2010

Compliance and

Pursuant to section 204 of the Clean Air Act (42 U.S.C. 7525) and 40 CFR Parts 85, 86, and 88 as applicable, this certificate of conformity is issued to certify that the requirements of the regulations on Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines (40 CFR Parts 85, 86, and 88) have been demonstrated compliance with the applicable emission standards as more fully described in the manufacturer's application. This certificate is issued in accordance with the applicable standards specified in 40 CFR Parts 85, 86, and 88 as applicable at both high and low altitude as applicable.

**REDUCED FEE CERTIFICATE:** EPA is issuing this certificate under the reduced fee provisions of 40 CFR 85.2406 (part 85, Subpart 85.2406) and an additional fee payment is required if the number of vehicles covered by this certificate exceeds 25 vehicles.

This certificate covers only those new motor vehicles or vehicle engines which conform, in all material respects, to the design specifications and documentation required by 40 CFR Parts 85, 86, and 88 as applicable and which are produced during the 2010 model year production period prior to introducing any vehicle covered by this certificate into commerce 1) in the State of California, or 2) in a State that, under the authority of the California standards to which this test group has been certified.

Catalyst-equipped vehicles designed to be operated on gasoline or flexible fuel are equipped with an emission control device which the Administrator certifies, which are driven outside the United States, Canada, Mexico, Japan, Australia, Taiwan and the Bahamas Islands will be presented to the control program operated by manufacturer or a United States Government Agency and approved by the Administrator.

In the case of completely assembled vehicles, this certificate of conformity covers only vehicles which are completely manufactured prior to January 1, 2011. Normally completely assembled vehicles (such as cab chassis) may be completed after this date, provided that the basic manufacturing (including installation of the emission control system) was completed prior to January 1, 2011. This certificate does not cover vehicles sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.



GOVERNMENT OF INDIA  
MINISTRY OF DEFENCE

VEHICLES RESEARCH & DEVELOPMENT ESTT.  
MUMBAI - 400 004

Phone : 0221 - 548401 - 04 (4 Lines)  
Fax : 0221 - 548401

VEL-NCAT/TTG/CNG/NGAS  
Mrs. Nagesh Technologies India (P) Ltd  
A-27-27 G T Karnal Road Industrial Area  
Andheri  
Delhi - 110 033

SUB : EXTENSION OF CERTIFICATION

REF : Your letter No. NGT/VRD/01/02/15 dt. 30/01/2009

Kindly note that a certificate bearing No. TE/2001/184CMVR/26 dt. 9 Feb was issued by us regarding type approval of CNG for NGT/INDV of M/S NGV (MOT) Notification bearing USR No. RJ-1101/11-99-MVL dt. 01.02.2001. This certificate is valid for CNG conversion on any vehicle manufactured upto March 2006, with engine capacity from 1300 cc upto 5675 cc.

The above conversion is valid upto 08-07-2006 i.e. 5 years from the date of the above referred certificate or till the validity of the above referred notification thereon, whichever is earlier.

It may further be noted that the onus of verification of fitness / compliance w roadworthiness/safety requirements / proper functioning of the CNG conversion on each and every vehicle converted under the above certification lies with you.

Thanking you,

Yours faithfully,

Scientist 'E'  
(N KAREKPAIA)  
for DIRECTOR, V

Testing & Evaluation activities at NCAT : NADI Accredited



Ministero dei Trasporti  
e della Navigazione  
DIPARTIMENTO DEI TRASPORTI TERRESTRI  
Unità di Gestione della Motorizzazione e della Sicurezza del Trasporto Terrestre  
NOTA: I VEICOLI DI MARCA SUPERIORE A 15 TONNELLATE - RACCOMANDA MOTORE A.T.P.

COMUNICAZIONE



riguardante: RILASCIO DELL'OMOLOGAZIONE

di un tipo di motore a gas naturale (G.N.), quale entità tecnica indipendente per quanto riguarda le emissioni di gas inquinanti in conformità al Reg. n° 49.

Omologazione n° E3 49R 021338

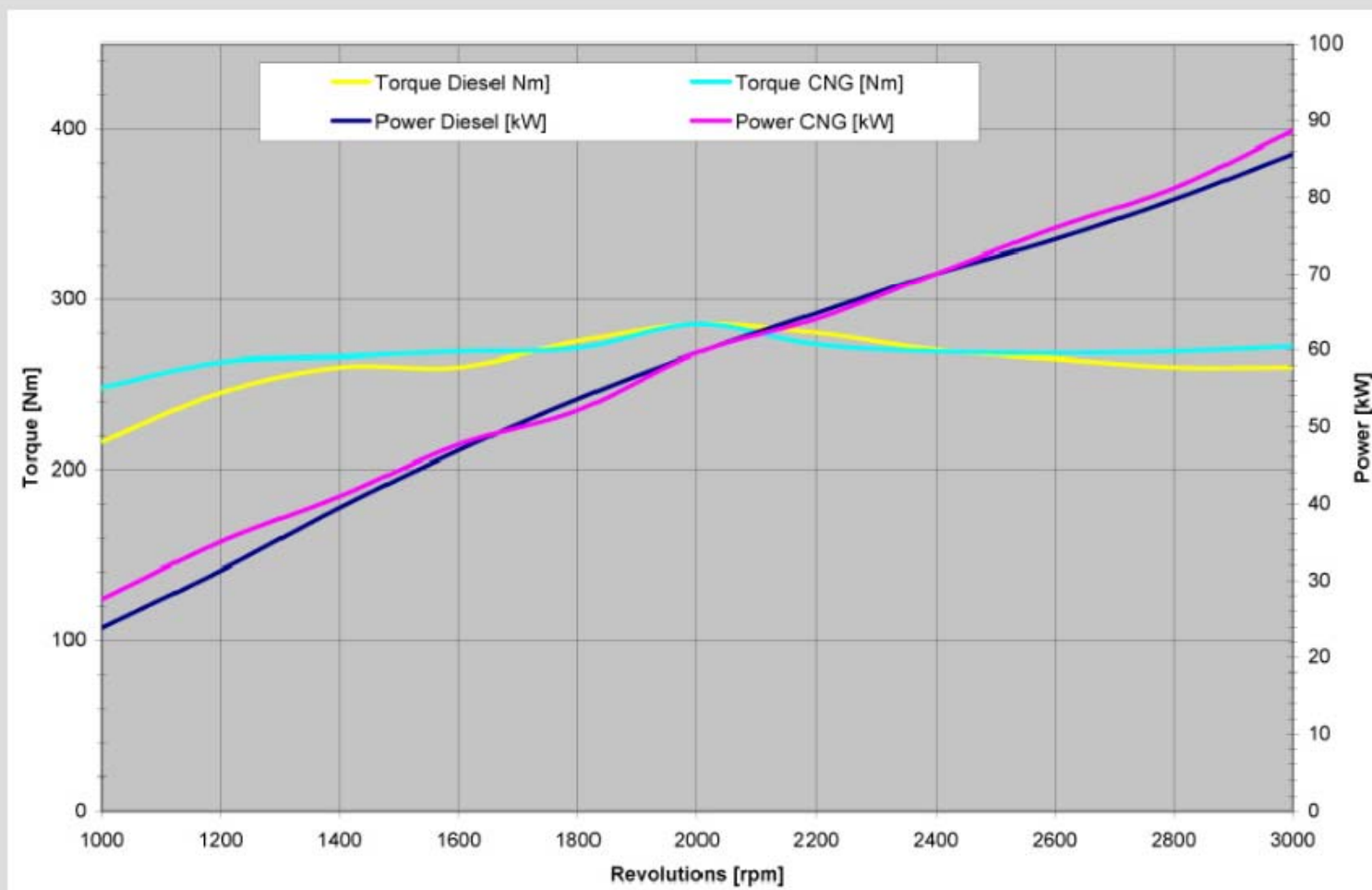
Estensione n° 3

1. Marchio di fabbrica o nome commerciale del motore
2. Tipo motore
3. Tipo di combustione
4. Tipo di carburante
5. Nome e indirizzo del costruttore
6. Depressione massima ammessa all'aspirazione
7. Contropressione massima ammessa
8. Potenza massima ammissibile e assorbita dai dispositivi azionati dal motore
9. Intervalli limitazioni di impiego
10. Livelli di emissione
11. Motore presentato per le prove di

NGV MOTORI  
5192.76.0 T.I.  
accensione comandata  
metano  
NGV Motori s.r.l.  
V. Emilia S. Stefano, 31  
Reggio Emilia (Italia)  
non riceve  
0.9 kPa  
35.5 kPa

Nominale 0 kW  
vedi appendice scheda informativa

# Performances



# Our CNG tank factory in Thailand

















ESC for exit  
ESC for exit