



# Clean Cities Transportation Workshop for Almaty

Refueling Technologies, Strategies, and Basic Economics  
Fundamentals and Options for Fuelling NGVs

Almaty, Kazakhstan  
March 30 – 31, 2011  
Intercontinental Hotel

## Speakers:

Paolo Petracchi	VP CNG Dresser Wayne
Domenico Sicilia	BD CNG Dresser Wayne



# About Us



# A Leader Across the Energy Value Chain

Dresser manufactures and markets highly-engineered products and related services for mission-critical applications throughout the global energy value chain.



# Unparalleled Breadth of Product and Service Offerings

**Dresser Inc. provides equipment solutions to a number of applications for the energy industry**

## Flow Technologies



Control Valves & Actuators  
Safety & Safety Relief Valves  
Instrumentation & Positioners  
Aftermarket Services

**DRESSER Consolidated**  
**DRESSER Masoneilan**



## Measurement & Distribution



Fuel Dispensers  
Retail Site Management Systems

**CNG Solutions**  
Aftermarket Services

**DRESSER Wayne**



## Infrastructure Solutions



Control Valves & Actuators  
Meters & Regulators  
Centrifugal and Rotary Blowers  
Air Movement Packages

**DRESSER Roots**



## Power & Compression



Gas Compression Engines  
Power Generation Engines  
Aftermarket Parts

**DRESSER Waukesha**



# 2011...GE acquired DRESSER Inc



Since February 2011, a part of:



**GE Energy**

# Top Global Market Position – Measurement & Distribution



## Profile

- A global leader in the design, manufacture, and servicing of integrated fueling forecourt solutions where reliability and uptime are critical
- **Dispensers, secure payment platforms, control systems, and technology** from Dresser Wayne play an essential role in traditional and alternative fueling sites around the world
- Primary Markets: Retail petroleum service stations, high-volume retailers, commercial fleet fueling, **compressed natural gas, CNG and renewable fuels**

## Customers



# CNG UNPARALLELED EXPERIENCE

*When choosing a CNG system, experience matters. After all, you need proven technology and reliable performance: that's something that can't be developed overnight.*

*...first installation for CNG purpose in 1929....  
...250 bar discharge pressure reached in 1939...  
...more than 2000 CNG stations sold worldwide....*

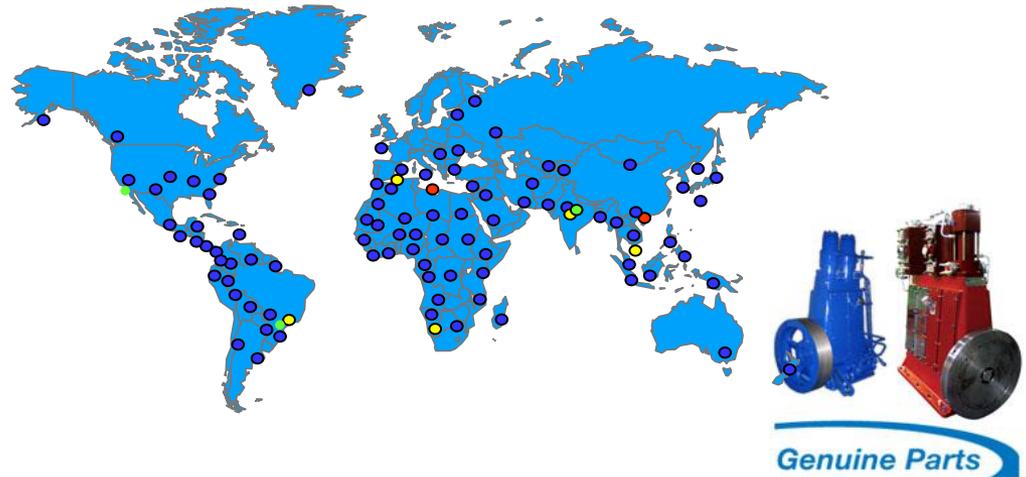


**UNIQUE KNOWLEDGE & EXPERTISE**

# OWNERSHIP & WORLDWIDE PRESENCE

*We've been building CNG compressors for over 75 years...  
so you won't find anyone with more experience in the field.*

- Complete turn-key solutions: engineering, manufacturing, commissioning & start-up
- Single point responsibility for assembly, packaging and full load testing
- Shop & on-the-job Training
- Great after sales Service, thanks to strong global presence and network



**ONE BRAND TO FIT ANY CUSTOMER NEEDS**

# SAFETY, STANDARDS & CERTIFICATIONS

*Because safety is key, all our units fulfill the most stringent international safety standards and each unit is 100% load tested before delivery*

**COMPLIANCE WITH THE MOST STRINGENT INTERNATIONAL REGULATIONS**

**ISO, ATEX, IEC, PED, ANSI, API, RUSSIAN STANDARDS**

**FULL SPEED & FULL LOAD PERFORMANCE TEST IN OUR OWN TEST BED**



**SAFETY, PERFORMANCE, ACCURACY**

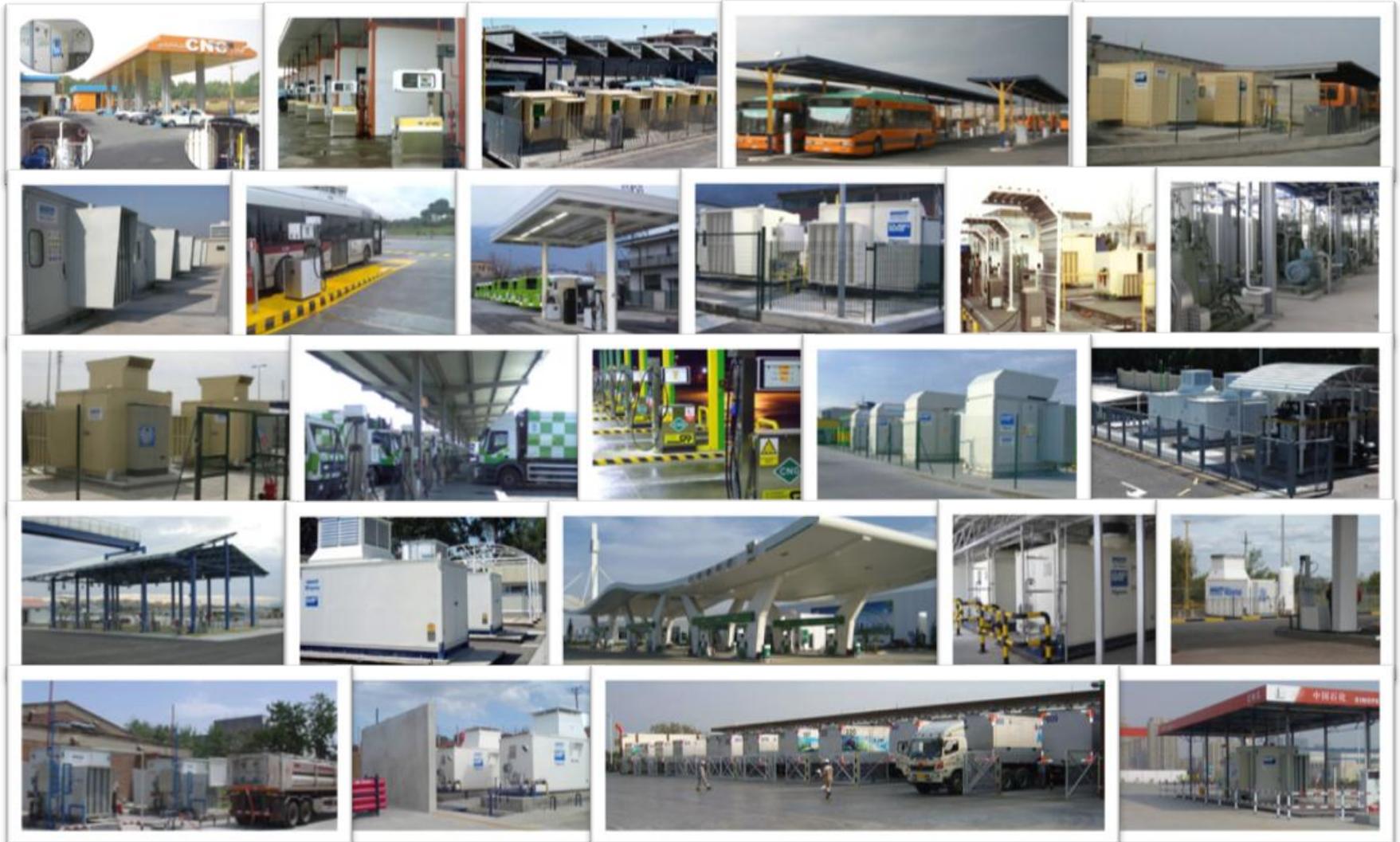


# A Worldwide Success

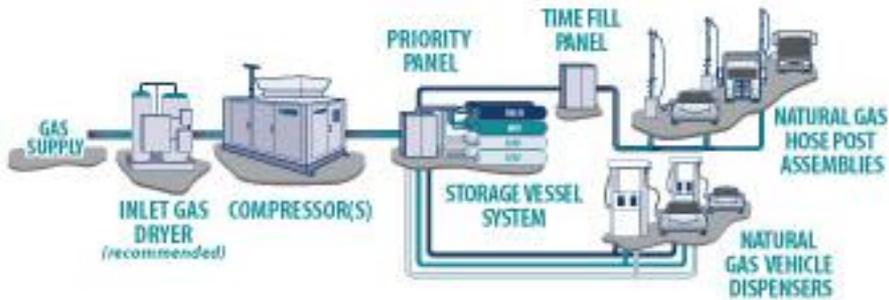


**Wayne**

# OUR CNG STATIONS: A WORLDWIDE SUCCESS



# OUR CNG STATIONS: A WORLDWIDE SUCCESS



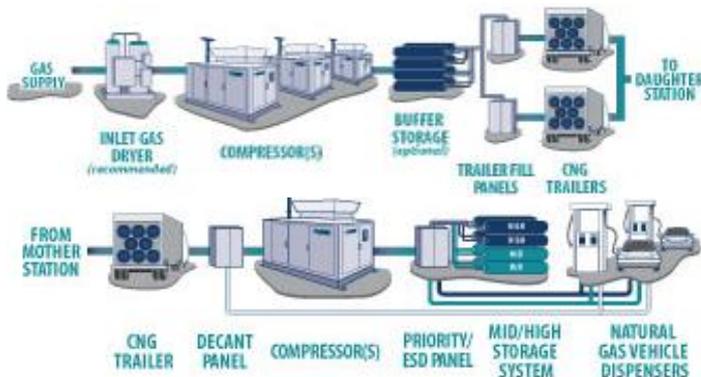
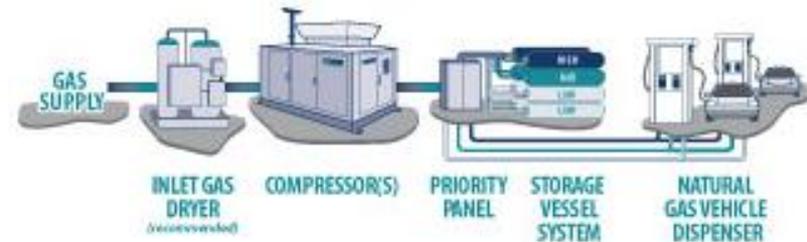
## FLEET STATIONS

Dresser Wayne is leader in the design, production and service of fleets solutions both for busses and trucks. Our equipment and solutions are the ideal choice for any filling configurations:

- FAST FILLING STATIONS
- SEQUENTIAL FILLING STATIONS
- SLOW FILLING STATIONS

## PUBLIC RETAIL STATIONS

The reliable and advanced technology of Dresser Wayne CUBOGAS™, together with their wide operating capability, makes them suitable to serve any kind of CNG station (from 10 cars/hour up to 300 cars /hour) at any latitude and in all ambient conditions (from the hottest to the coldest).



## MOTHER & DAUGHTER STATIONS

Typically a Mother Station is equipped with one or more high capacity compressors according to the gas volume to be supplied and to the required maximum filling time. In the daughter station gas is delivered to vehicles by means of a compressor connected directly to the trailer or to a local storage. Dresser Wayne has the only real energy saving solution in the market providing the highest capacity performances.



# Why Dresser Wayne CNG Solutions...



**Wayne**

# Why Choose Dresser Wayne CNG Solutions?

## *... 7 very good reasons:*

1. 0,1-200 bar Suction Pressure and up to 18,000 Sm<sup>3</sup>/h capacity Product Range
2. Heavy Duty, Dry lubricated, proprietary 1-6 cylinder compressor ...8600 hours/year continuous operation and no Oil in your customer's NGV storage
3. Fast filling Dispensers driven by mass-controlled, temperature-corrected algorithm to grant up to 13% higher refilled gas in the shortest time
4. Unique Source for all station equipment ... One-Stop-Shop for Dispensers, Gas Dryer, Storage, Compressor package, Gas engine, and Control System
5. Modular Technology, Top equipment quality, RM&D system to grant you 99% station Uptime and 98.3% Reliability
6. 48 hour parts availability
7. More than 70 years experience in solving the CNG industry's toughest problems at your disposal anytime, anywhere you want it

**Engineered to provide the lowest cost of ownership  
and highest quality station availability**



# Filling Stations Types

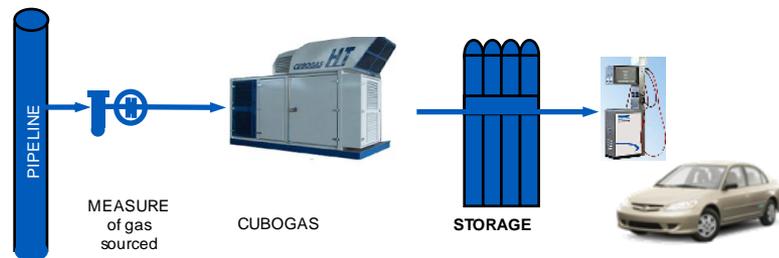


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# What is a CNG station?

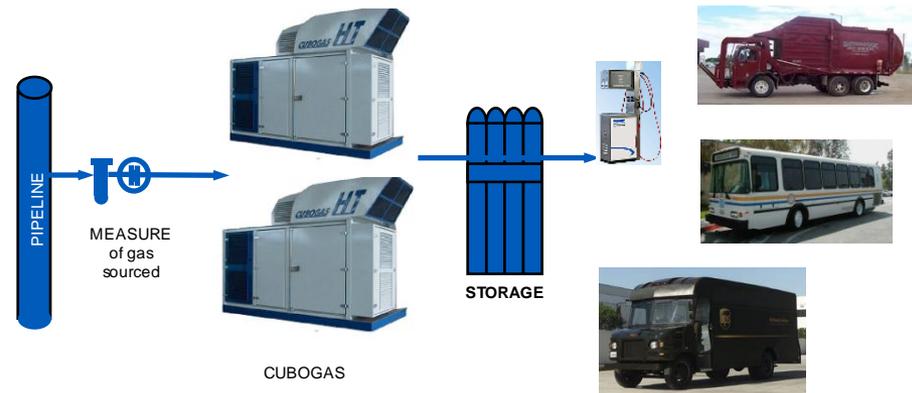
## ***PUBLIC***

- ❑ Vehicles arrive random and complete filling in 3-5 minutes
- ❑ Vehicles are normally car or minivans
- ❑ CNG is sold in €/kg or €/Sm<sup>3</sup>
- ❑ Drivers pay cash or credit cards
- ❑ Can be CNG only or multifuel



## ***FLEET***

- ❑ Vehicles arrive according to a specific schedule
- ❑ Filling can last for 3-7 minutes or for some hours (slow filling)
- ❑ Vehicles are normally busses, trucks or company cars
- ❑ CNG is dispensed for free
- ❑ Drivers use company cards to record vehicle data and filling details



# Why a CNG station is different from a Fuel Retail Station?

- ❑ CNG is dispensed as gas at high pressure (200-250 bar(g))
- ❑ Natural Gas is available from pipelines at pressures different from one site to another
- ❑ Natural Gas is “transformed” into CNG by a compressor which increases pressure up to 250-300 bar(g) and makes it available for storage and dispensing units
- ❑ Natural Gas can be supplied via Pipeline, re-gasified LNG, Wellhead or Biogas
- ❑ Natural Gas can be dirty, aggressive and wet
- ❑ Electric power “demand” is 5 to 6 times that of fuel retail stations
- ❑ Private CNG Station has normally one compressor package
- ❑ Public Fleet CNG Station has at least a back up compressor package.

What if something fails and compressor is down for one week (7 working days) in a “small” station having two double dispensers?

-CNG sales will be 0 for 7 days

What is the Customer loss?

-Assuming a sales price of 0,9 Euro/kg

-Assuming 100 vehicles refilled every day

-Total loss will be  $0,9 \times 15 \times 100 \times 7 = 9.450$  Euro !!!!!

**Station Availability  
and Service Support  
is the KEY!**



# Who are the Final Customers?

## ***PUBLIC***

- Major/Regional Oil Companies
- Major Gas Companies
- Independent Private Companies
- Private Customers
- Engineering Procurement Contractors (EPC)

## ***FLEET***

- Municipalities
- Bus fleet companies
- Major Gas Companies
- City cleansing Companies
- Service Gas Companies
- EPCs



# Final Customer Expectations

## ***PUBLIC***

- An NGV driver has few stations to rely on to refill his car
- The number of kilometres he can drive with a “full tank” of CNG is much less than a traditional fuel car



- NGV driver will not accept more than 3-5 minutes to complete refilling
- Drivers expect full-tank filling at the maximum pressure
- Drivers prefer stations where they can get more kilograms of CNG

## ***FLEET***

- Vehicles are CNG only and **MUST** be refilled every day
- Most of the time a public service is involved (transportation, garbage collection....) and there are strong penalties for the owners

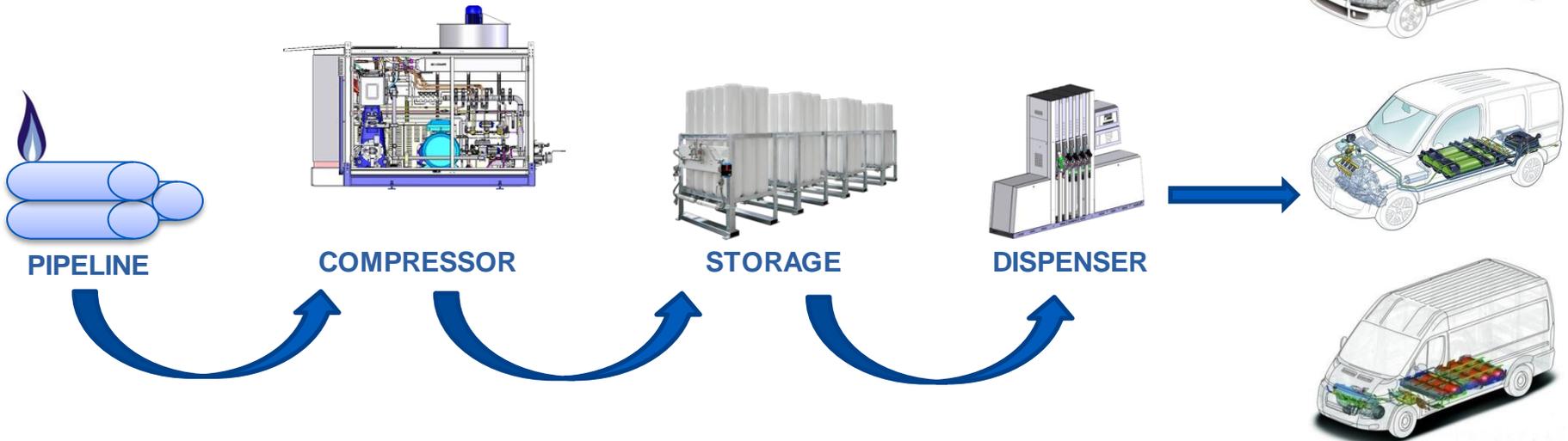


- A spare Compression Package is required (or recommended)
- High quality and high reliability equipment is required
- Redundant equipment (stand by compression unit)
- Long Term Service Agreement preferred
- Full tank at maximum pressure is required

# CNG STATIONS – ON-LINE STATIONS

## ON-LINE STATIONS

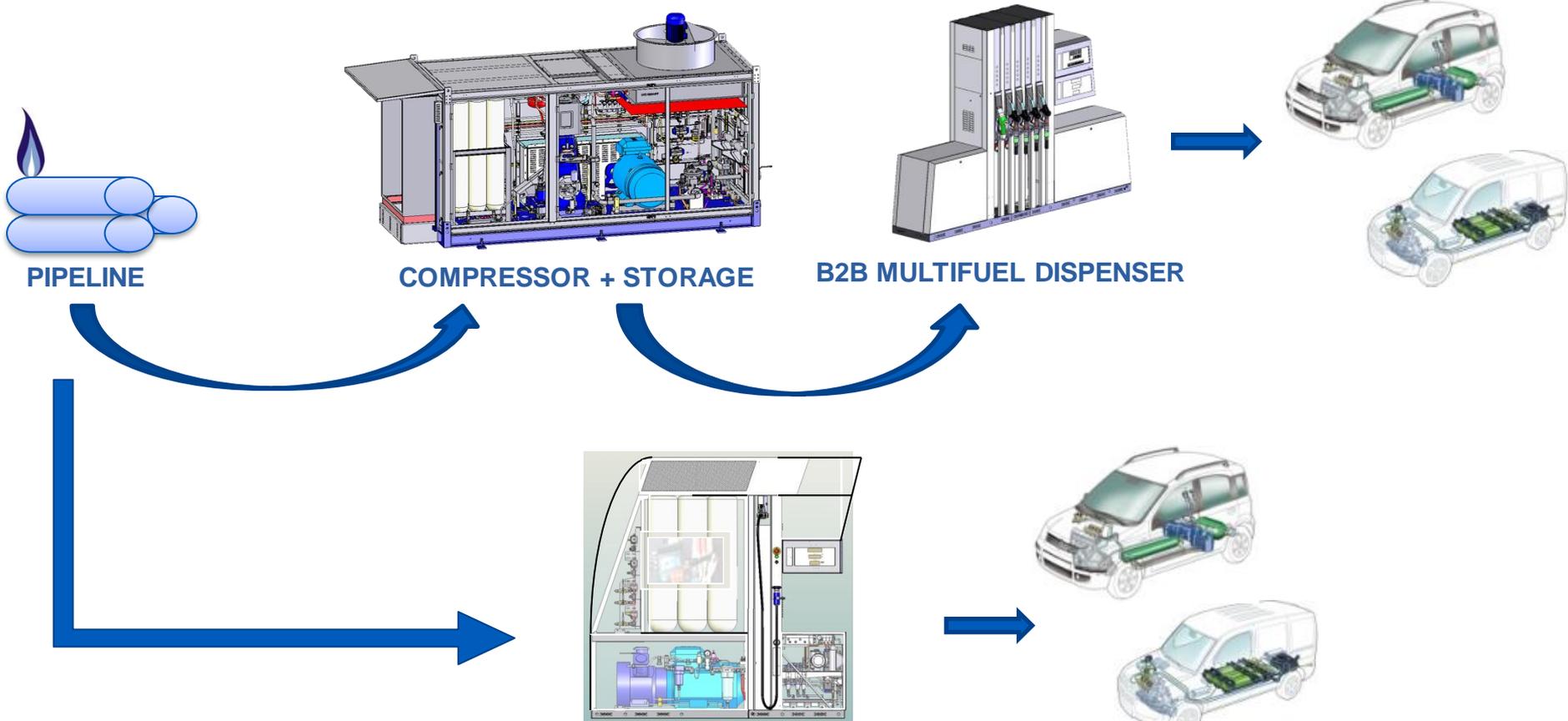
- Receive gas directly from pipeline
- Compress gas in storage
- Dispense compressed gas to vehicles



# CNG STATIONS – MULTI-FUEL STATIONS

## MULTI-FUEL STATIONS

- Gasoline & CNG combined in the same station
- Generally smaller storage and lower compressor performance requirements



# CNG STATIONS – FAST FILL

## FAST FILL

- Vehicles come & go similar to gasoline stations
- Suitable for refueling cars, vans & light trucks, buses
- Public & fleet operations
- Average refueling time: 3-5 minutes
- Benefit: fast refueling
- Key Factor: must be designed with peak usage in mind



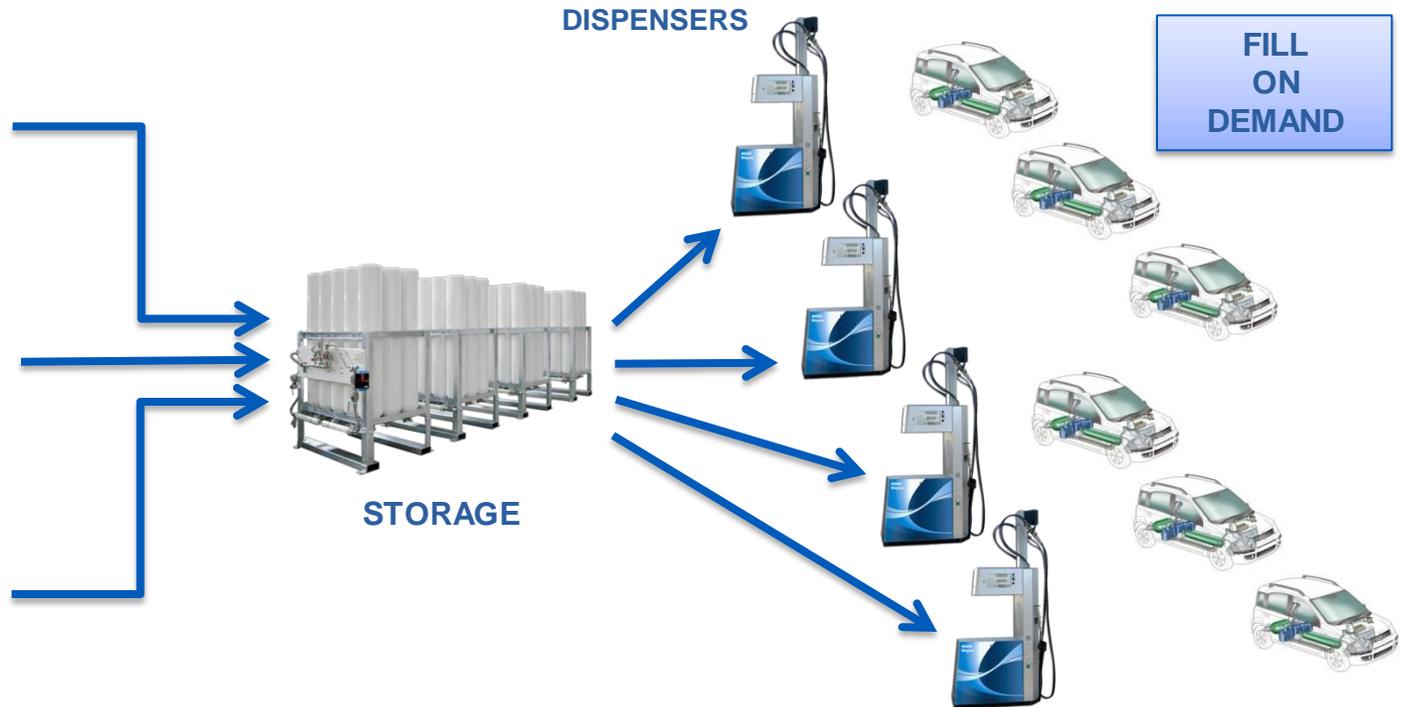
COMPRESSOR 1



COMPRESSOR 2



COMPRESSOR 3



# CNG STATIONS – SLOW FILL

## SLOW FILL

- Automatic control of final filling pressure
- All filling points refilled simultaneously
- No measurement of gas filled for each bus

### COMPRESSORS



SATELLITE DISPENSER



SATELLITE DISPENSER



SATELLITE DISPENSER



SATELLITE DISPENSER



SATELLITE DISPENSER



SATELLITE DISPENSER

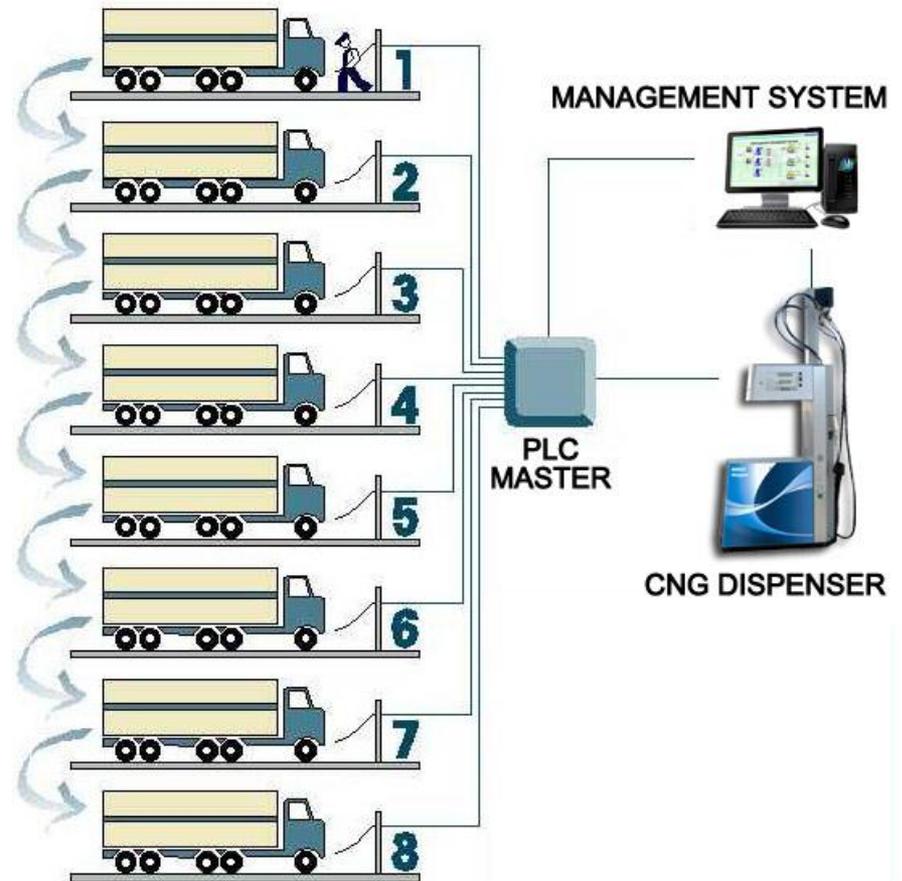


FILL  
OVER  
TIME

# FILLING MANAGEMENT SYSTEM FOR FLEET VEHICLES

## ASSOCIATED BENEFITS

- Safety
- Reports available in 24 hours
- Total control of the station, fleet and staff
- Total integration with liquid fuel stations
- Lowest energy consumption
- **Sequential optimized refilling**
- Absence of downtime

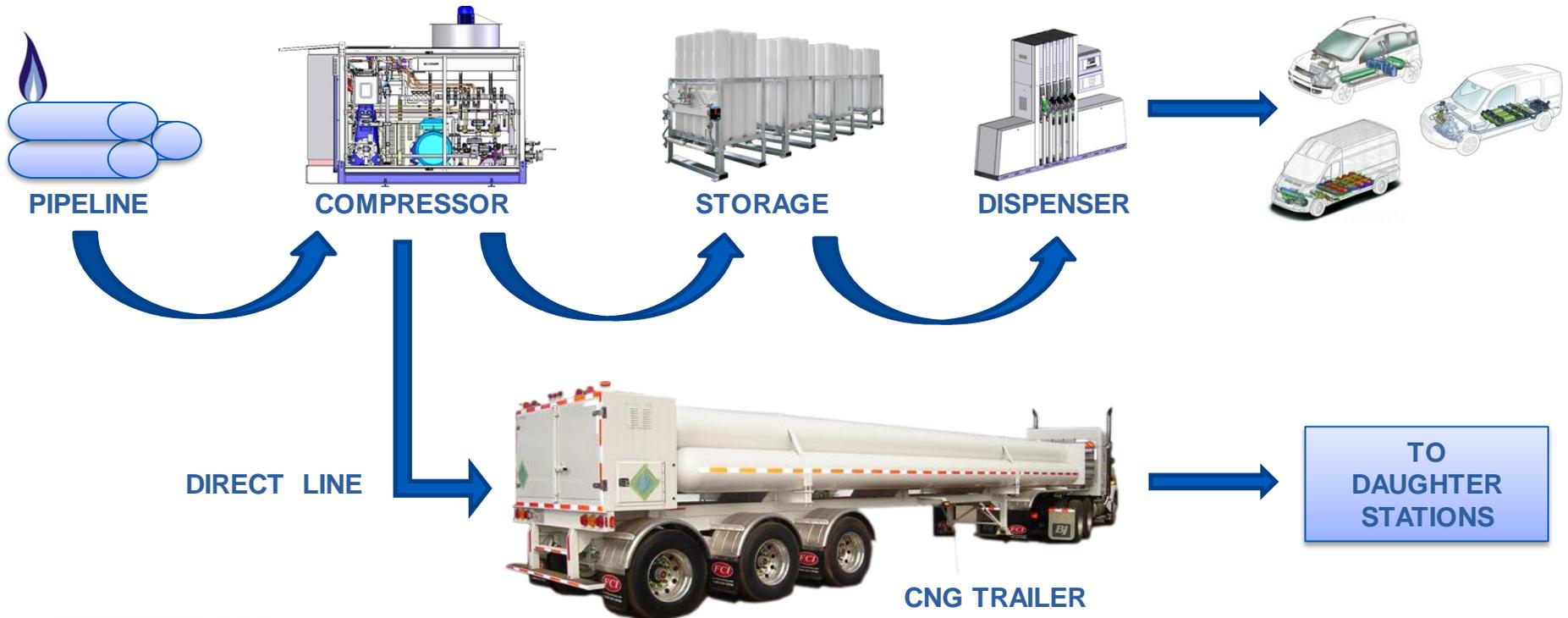


**Most Effective, Efficient Fleet Filling Solution**

# CNG STATIONS – MOTHER STATIONS

## MOTHER STATIONS

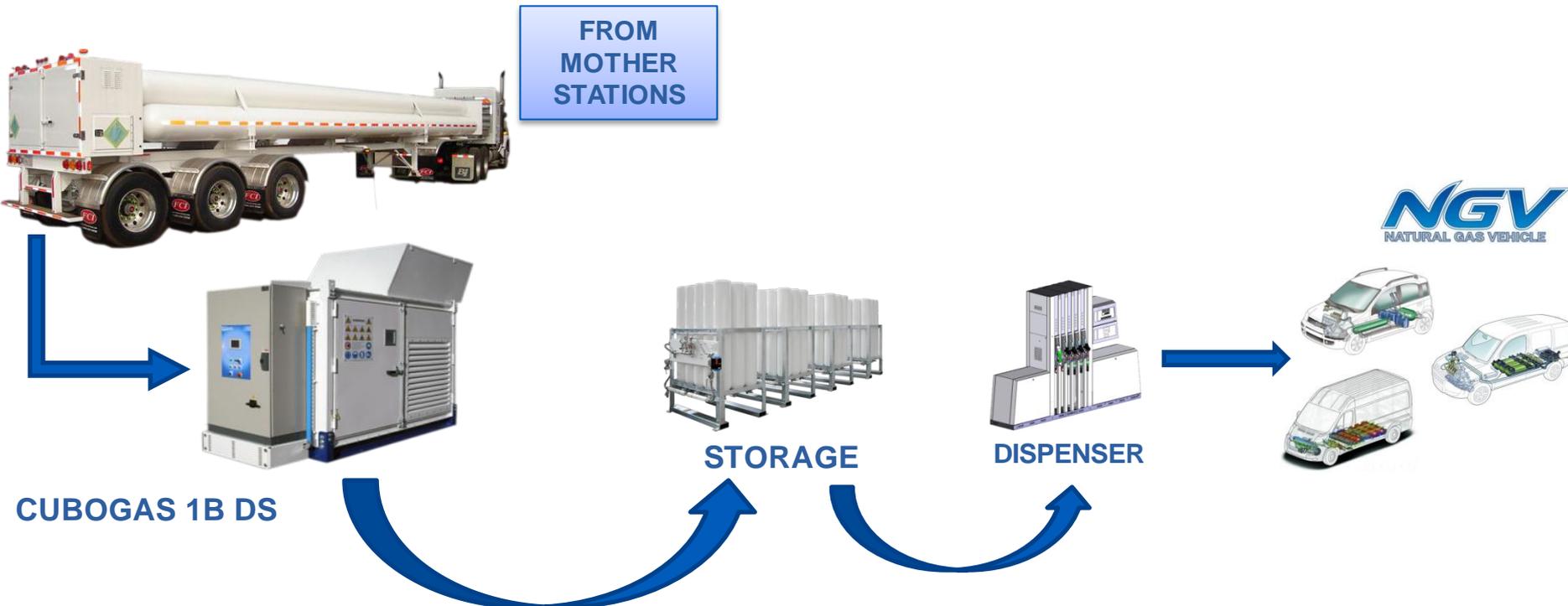
- Receive gas directly from pipeline
- Compress gas to:
  - ✓ gas trailers for daughter stations
  - ✓ on-site storage



# CNG STATIONS – DAUGHTER STATIONS

## DAUGHTER STATIONS

- Located far from gas pipeline infrastructure
- Gas delivered by gas trailers
- Gas recompressed with specialized compressors without gas inlet pressure reduction to save energy



# CNG station design criteria: Critical External Parameters

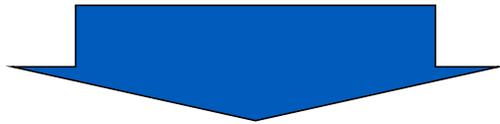
- **Gas Availability**
- **Gas Quality:**
  - **Chemical Composition**
  - **Dew Point**
  - **Temperature**
  - **Pressure**
- **Ambient Temperature**
- **Inlet Gas Temperature variation during the Year**
- **NGVs type, volume and phasing**
- **Electric Grid availability & stability**
- **W&M regulation**
- **Local Environmental protection requirements**
- **Safety Clearance and Area Classification**
- **Geologic and Geothermal Site Characteristics**
- **Data/Tel Line availability**

- **Station Type: Conventional VS Mother Daughter system**
- **Compressor Material and Dryer presence and its selection**
- **Driver and Compressor / Cooler selection**
- **Star-Triangle, Soft Start, Inverter (Variable Flow)**
- **Station Lay-Out (logistic NGV routing)**
- **Dispenser Selection**

- **Station and Equipment Design (Noise, Gas, Oil or other abatement)**
- **Station Lay-Out**
- **RM&D data output**

# CNG station design criteria: CAR parameters

- One standard CNG car is equipped with a 80 or 100 liter-tank, as a minimum
- The equivalent CNG content is 16-20 Sm<sup>3</sup> (11-15 kg)
- The diameter of internal car circuit limits the refilling speed of the dispenser hydraulics



- To complete a refilling in the maximum acceptable time of 3-5 minutes, the needed capacity is 200-250 Sm<sup>3</sup>/h for each nozzle
- The number of filling hoses should be proportioned to the available capacity in order to avoid long wait times for customers

# CNG station design criteria: BUS parameters

- One standard CNG bus is equipped with a 880 up to 1440 liter tank.
- The equivalent CNG content is 160-280 Sm<sup>3</sup> (100-190 kg)
- Bus never reaches the station empty (20%-30% residual is normal)
- The diameter of internal bus circuit limits the refilling speed of the dispenser hydraulics
- Bus dimensions and logistic a routing



- To complete a refilling in the maximum acceptable time of 5-7 minutes, the needed capacity is 800-1500 Sm<sup>3</sup>/h for each nozzle
- The number of filling hoses should be proportioned to the available capacity in order to avoid long wait times for customers
- Refilling points and NGV routing lay out

# CNG station design criteria: Mother-Daughter System

- **Gas Quality:**
  - Chemical Composition
  - Dew Point
  - Temperature
  - Pressure
- Ambient Temperature
- Inlet Gas Temperature variation during the Year
- NGVs type, volume and phasing
- Electric Grid availability & stability
- W&M regulation
- Local Environmental protection requirements
- Safety Clearance and Area Classification
- Geologic and Geothermal Site Characteristics
- Data/Tel Line availability

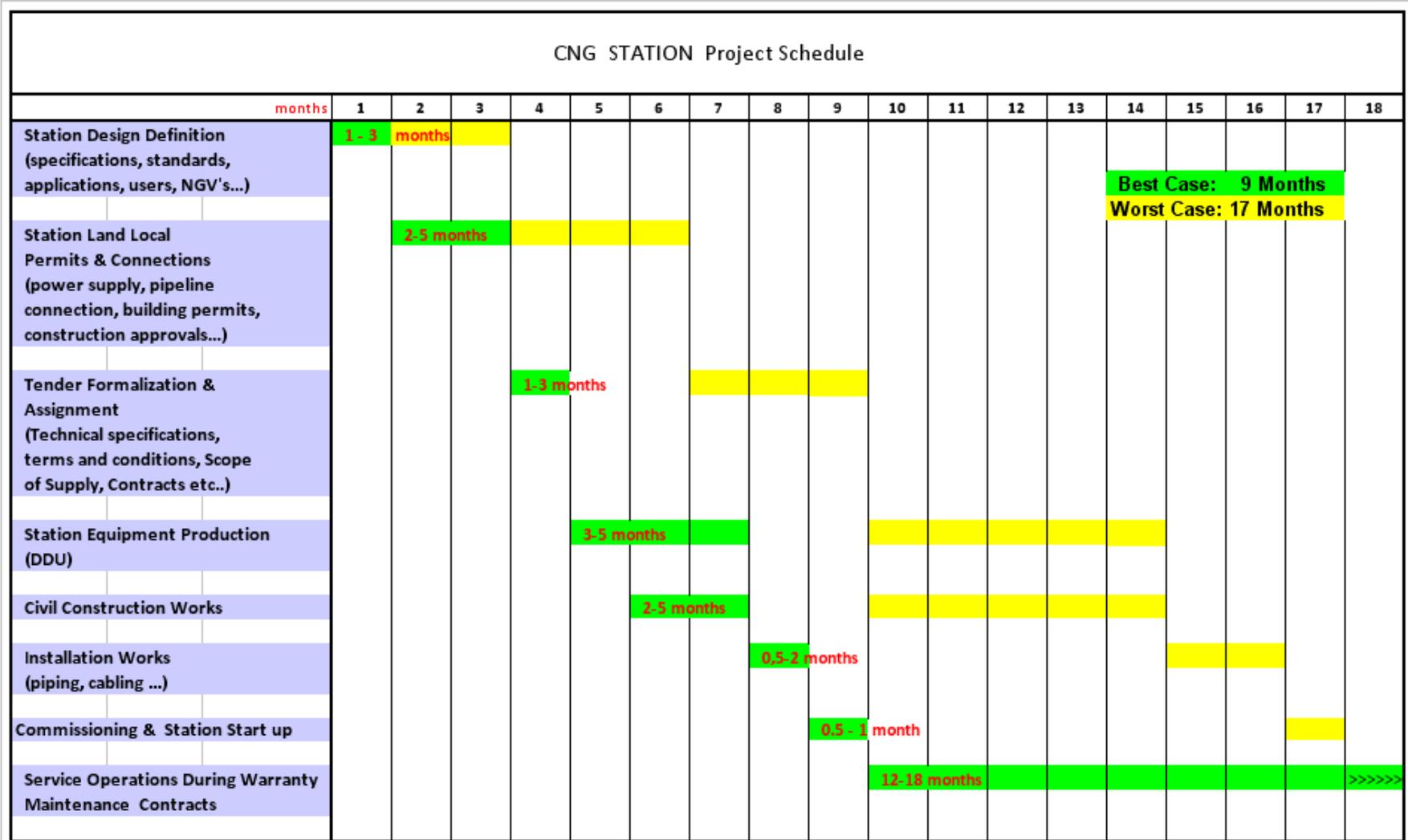


- Available Trailer Size
- Distance between Mother and Daughter Stations
- Daughter Stations Quantity
- Capacity/Load of each Daughter Stations: normally 200-300 Sm<sup>3</sup>/h per Nozzle
- Storage Design (Peak Shaving)
- Roads viability



- Mother Station Capacity need and Design
- Daughter Station Design
- Quantity and type of Trailers

# CNG Stations from preliminary design to start up





# CNG Station Sizing Philosophy



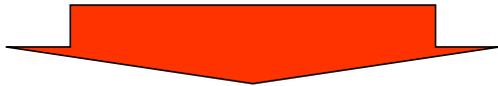
**Wayne**

# CNG station design criteria: Compressor and Storage

- Limited Available Electric Power
- No limitation of Space Availability
- Limited Compressor Capacity
- Well known station refilling load Schedule (hourly or daily)



**Small Compressor Capacity with High storage capacity**

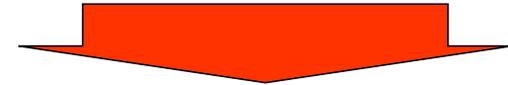


- Limited operative life of compressor,
- higher Consumables parts costs
- Long filling time for out of schedule NGV

- No limitation on Available Electric Power
- Limited Space Availability
- High Capacity Compressor
- Random station refilling load Schedule



**High Compressor Capacity with Adequate storage capacity**



- Bit Higher Installation Costs (Electric Transformer)
- Longer Equipment Operative Life
- Always ready with full Capacity
- Storage need to be designed to smooth Electric Motor Starts/Stops



# CNG Products

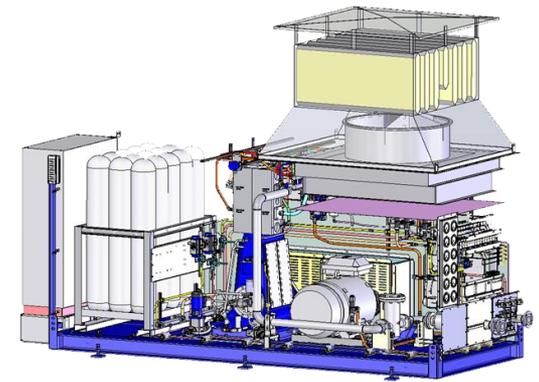
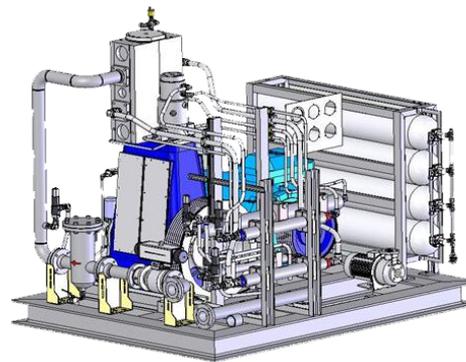
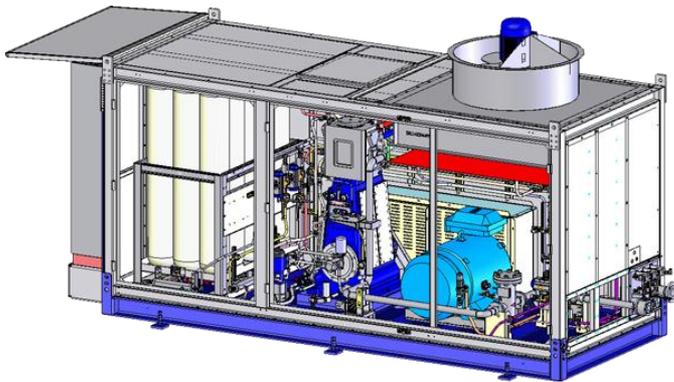


**Wayne**

# IT MUST BE PROVEN TECHNOLOGY

*Based on our experience, Compressor Package must be engineered to satisfy Reliability and Availability Customers' needs, whatever they might be*

- Innovative reciprocating compressor designed based on API 618 standards should be preferred
- Conservative rotational speed limits wear
- Engineered to function all day, every day: no matter the conditions
- Non-lubricated cylinders reduces costs and gas contamination risks



**Reliable & Flexible Equipment For Each Application**

# Compressor Package Driver Solutions

Depending on Electric Grid Availability and Reliability  
...Compressor can be Driven by an Electric Motor or a Gas Engine



ELECTRIC  
MOTOR  
DRIVEN



**CUBOGAS**  
*A green road to  
deliver natural power*

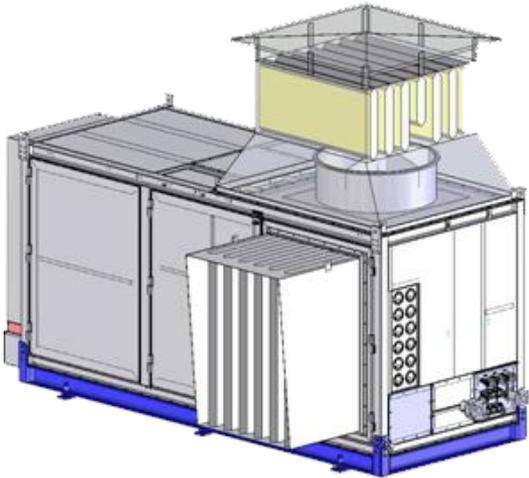


GAS ENGINE  
DRIVEN



Compact & efficient solution to deliver clean CNG to your station

# Compressor Package Features & Versions

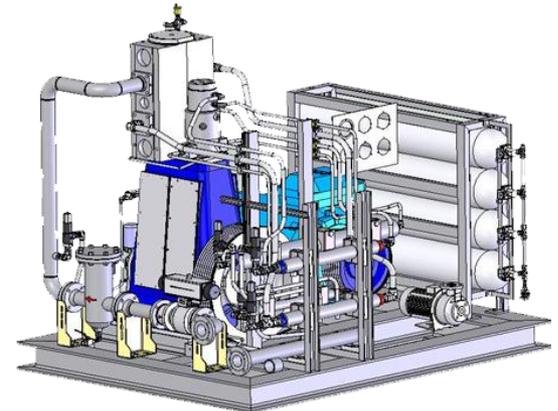


## Canopy Enclosure version

- Canopy for weatherproof and soundproof 75 dB(A)
- Gas sensor and doors micro switches
- Available with 1,2 or 3 pressure levels configuration
- On board power/control panel

## Skid version

- Suitable for installation in concrete building (supplied locally)
- Available with 1,2 or 3 pressure levels configuration



## Main Features

- Coupling: V belts, Direct Coupling, Gear reducer
- Air Cooler for cooling of compressed gas
- Control system: PLC based with touch screen and remote monitoring
- Storage module: cylinders for 250 barg, completely assembled in a rack on skid
- Soundproof/weatherproof enclosure

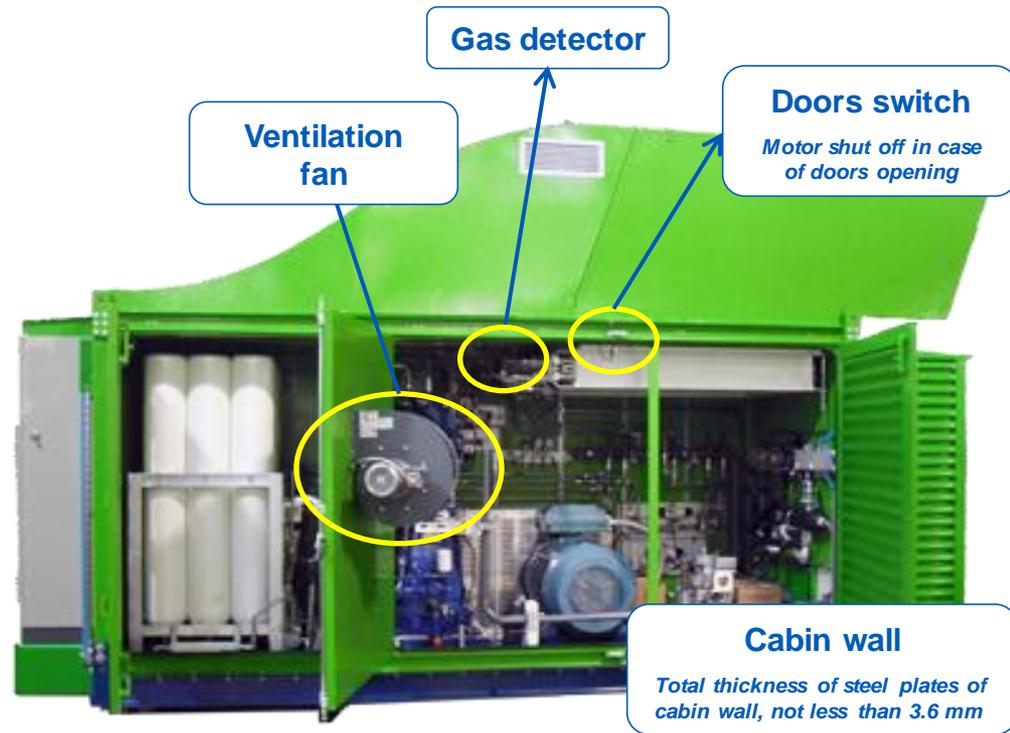
## Main optionals

- Low ambient temperatures kit (-40C)
- Three pressure levels
- Gas extra cooling (chiller system)
- Gas actuated valves
- Canopy for 65 dB(A) noise level
- Soft start
- SMS remote monitoring kit

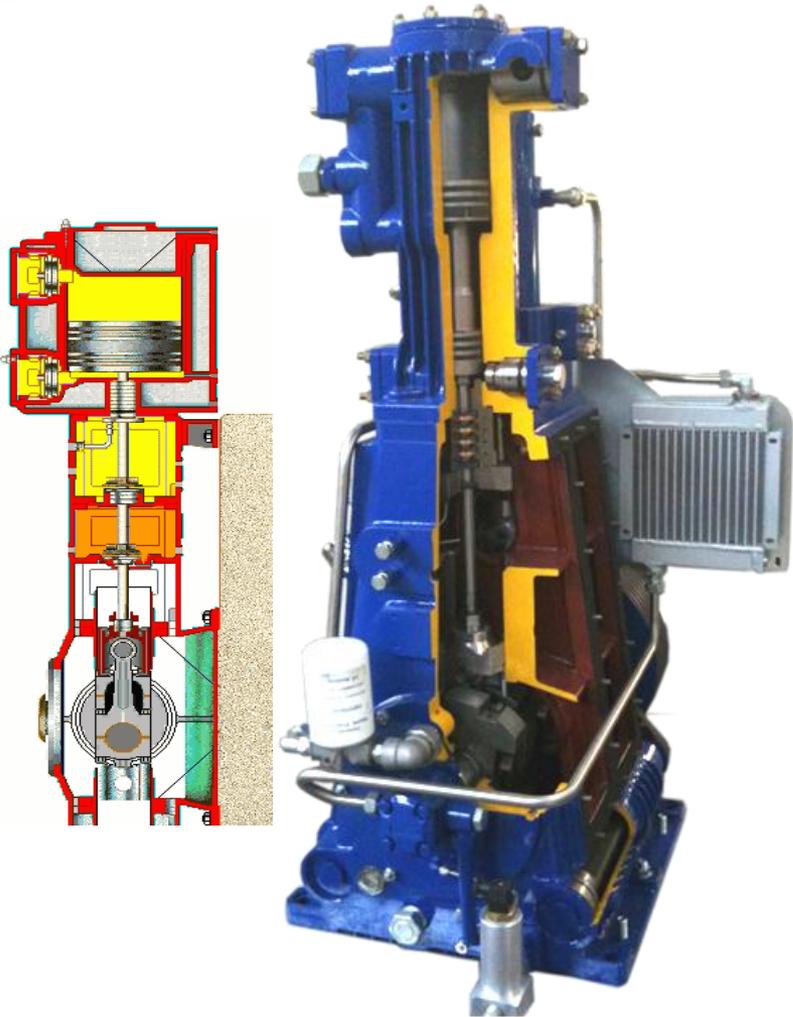
# Safety and Control Instrumentation

## Safety Devices in addition to the machine control system on the instrument panel

- **PRESSURE TRANSMITTER** on the suction line for shut-down under low/high compressor inlet pressure
- **PRESSURE TRANSMITTER** for unit start/stop under low/high pressure at compressor delivery
- **INTERSTAGE THERMOCOUPLES** for shut-down under high gas discharge temperature of each stage
- **THERMOCOUPLE** on the compressor discharge line for shut-down under high gas temperature at compressor delivery
- **SAFETY VALVE** at each stage delivery
- **SIGHT-GLASS** for oil level on compressor skid
- **PRESSURE TRANSMITTER** for low oil pressure
- **GAS DETECTOR**
- **FORCED RECIRCULATING AIR FAN**
- **THERMOCOUPLE** for shutdown under high cooling water temperature at cylinders' jacket exit
- **SOUND/WEATHER PROOF CANOPY** fire resistant up to 2 hours



# CNG Compressors Technology



- **API 618 COMPRESSOR**
- **NO PRESSURIZED CRANKCASE:** for safe operation
- **SMALL OVERALL SIZE:** smaller space for installation and easier maintenance, thanks to vertical design
- **DRY LUBRICATED CYLINDERS:** with negligible presence of oil on the gas outlet
- **CONSERVATIVE ROTATIONAL SPEED:** safer and smoother operations. Higher reliability of components whose life depends on cycles. Lower maintenance costs.
- **LONG PISTON STROKE & LIQUID COOLED CYLINDERS:** for long life of sealing elements
- **EQUIPPED WITH CROSSHEADS:** for higher reliability and less wear
- **FORCED LUBRICATION** and sleeve bearings of crankshaft & connecting rod
- **OPTIMUM BALANCE:** thanks to the counter balance shafts on the frame

**Our technology: highest reliability with lowest operating expenses**

# CNG Standard Dispensers

## Global Vista



## Global Star



## Satellite Slow Filling



**Innovative filling algorithm available for all versions**

# CNG DISPENSER features

## FEATURES

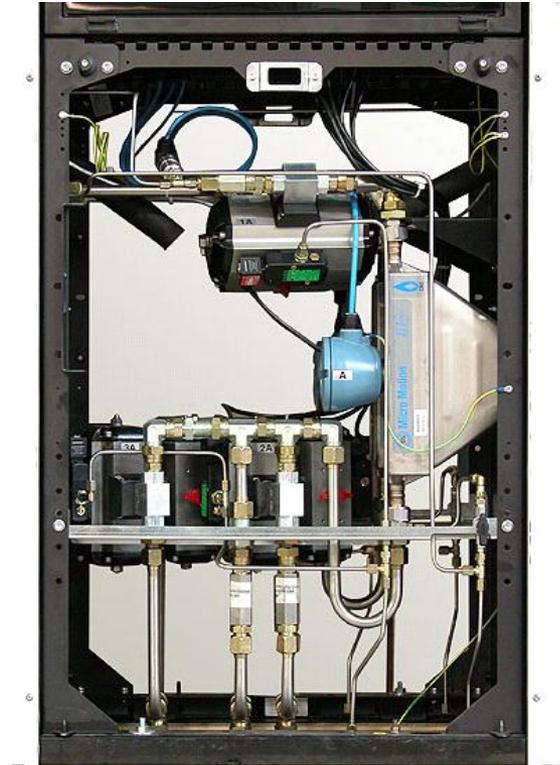
- ✓ Nozzles
- ✓ Pressure Banks  
low/mid/high pressure
- ✓ Max nominal flow rate
- ✓ Min nominal flow rate
- ✓ Accuracy
- ✓ Density
- ✓ Working temp
- ✓ Max working pressure
- ✓ Typical working pressure
- ✓ Routine test pressure

## CAR

1, 2, 2 alt.  
1 to 3  
**18 Kg/min**  
0.3 Kg/min  
+/- 1 %  
0.65 – 0.80 Kg/Sm<sup>3</sup>  
- 30°C ; + 55°C  
220 / 250 bar  
0 – 250 bar  
1,5 \* Pmax hydro  
(100% units)

## BUS

1, 2, 2 alt.  
1 to 3  
**77 Kg/min**  
7 Kg/min

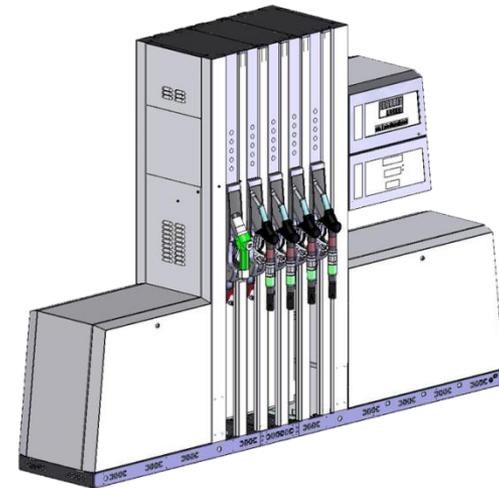


Same set of components.... but different size to satisfy demands of:

1. CAR
2. BUS / FLEET
3. 1 to 3 banks.....depending on installation
4. Mass Controlled / temperature compensated Algorithm

# B2B – Multiproduct Dispenser with CNG nozzle

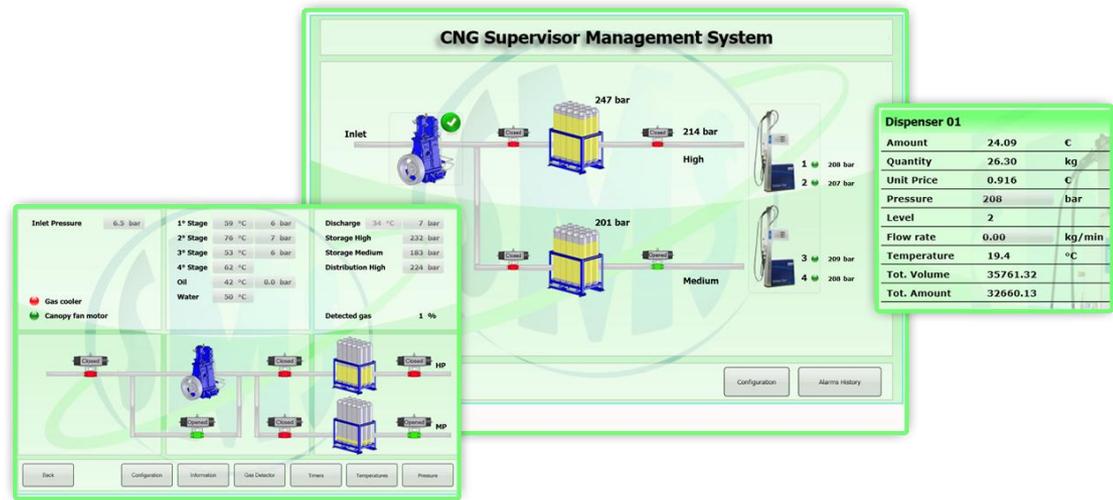
- Specially designed for multi-fuel station applications
- New ultra-compact layout for CNG hydraulics
- Two CNG nozzles + 8 liquid fuels nozzles
- Double computer head (IGEM+LT)
- External software management (SINP) for safety operation in accordance with Italian regulation
- First installation in Bolzano (Italy) in 2009



# PREDICTIVE MAINTENANCE

Predictive Maintenance gives us a way to operate on our compressors remotely: using our SMS-RM&D system, we're able to monitor the most important unit parameters, such as:

- Safety devices status
- Vibration analysis
- Station liquid levels
- All the Pressures
- All the Temperatures
- All the CUBOGAS™ Switches
- All the Dispenser Parameters



... by real time comparison with our Units Database, we can investigate if something doesn't match with normal thresholds. In case this happens the system launches a warning as an automatically generated e-mail or SMS enabling and Dresser Wayne CNG Service to know what is happening on the units, and to react to the plant before a shut down may occur.

**Predictive Maintenance to know what's happening and to react quickly**

# SUPERVISOR MANAGEMENT SYSTEM (SMS)

What you should look for when choosing a system to control, manage and supervise CNG filling stations.

The system can be connected with all devices in the CNG filling station to optimize their operation: it also visualizes and controls their functionality.

In addition, it allows us to operate on our units in a preventive mode, remotely reading any station parameters such as: devices status, liquids level, all pressures, all temperatures, and all Compressor Package switches.

## REMOTE MONITORING

- It is possible to connect to the system remotely using an Internet or LAN connection

## MAINTENANCE

- The system advises the user of service when it is necessary and whether to do ordinary or special maintenance of the device

## DATA STORAGE

- The system is able to store the logging data of all devices to permit future analysis

## FAILURE PREVENTION

- The system is able to analyze the data and signal maintenance requirements before a fault happens

## SAFETY ALARM SIGNALING

- When the system finds any safety or dangerous conditions it activates the alarm system

## ENERGY SAFE

- The system checks all apparatus and manages the start and stop sequence for each one in order to optimize energy

# SMS Snapshots

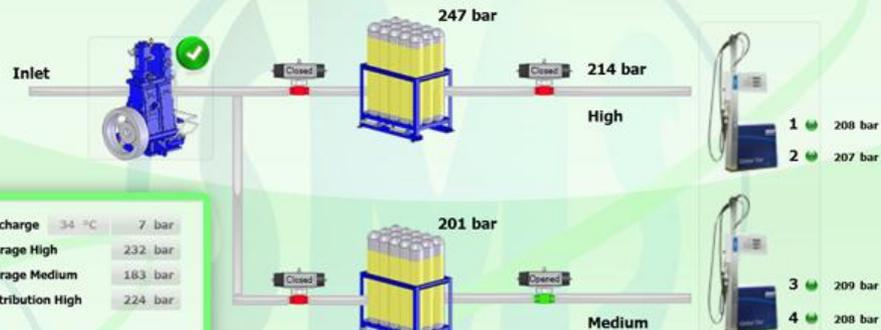
## CUBOGAS

- Status & Alarms
- Pressures & Temperatures
- Maintenance Data & Working hours

## DISPENSER

- All Parameters from Mass Meter
- All Refilling Data

### CNG Supervisor Management System



#### Dispenser 01

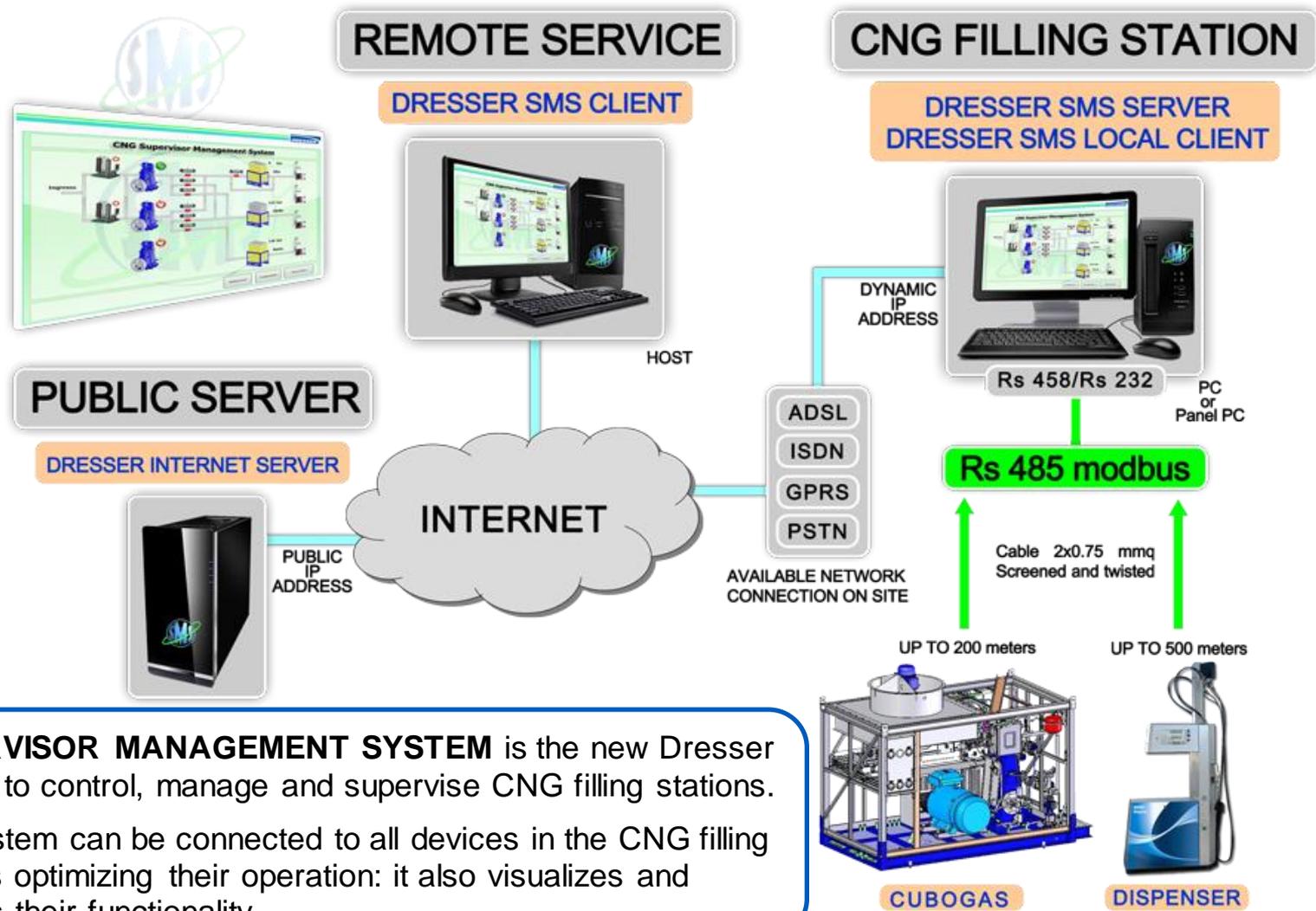
Amount	24.09	€
Quantity	26.30	kg
Unit Price	0.916	€
Pressure	208	bar
Level	2	
Flow rate	0.00	kg/min
Temperature	19.4	°C
Tot. Volume	35761.32	
Tot. Amount	32660.13	

The dashboard displays the following information:

- Inlet Pressure:** 6.5 bar
- 1° Stage:** 59 °C, 6 bar
- 2° Stage:** 76 °C, 7 bar
- 3° Stage:** 53 °C, 6 bar
- 4° Stage:** 62 °C, 0.0 bar
- Oil:** 42 °C
- Water:** 50 °C
- Discharge:** 34 °C, 7 bar
- Storage High:** 232 bar
- Storage Medium:** 183 bar
- Distribution High:** 224 bar
- Detected gas:** 1 %
- Gas cooler:** (Red indicator)
- Canopy fan motor:** (Green indicator)

Buttons at the bottom include: Back, Configuration, Information, Gas Detector, Timers, Temperatures, Pressure.

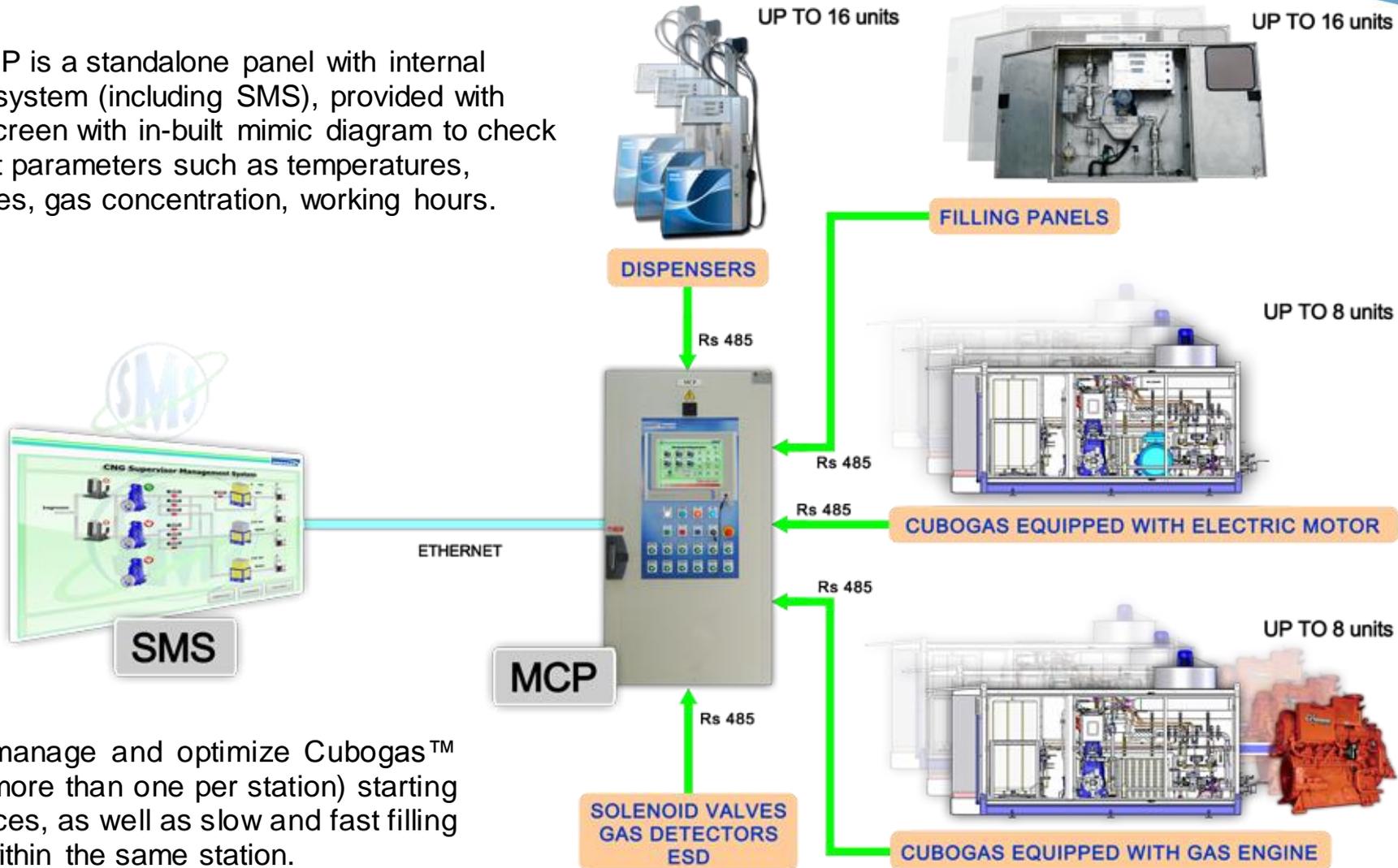
# SMS RM&D architecture overview



**SUPERVISOR MANAGEMENT SYSTEM** is the new Dresser system to control, manage and supervise CNG filling stations. The system can be connected to all devices in the CNG filling stations optimizing their operation: it also visualizes and controls their functionality.

# STATION "MASTER CONTROL PANEL"

The MCP is a standalone panel with internal control system (including SMS), provided with touch screen with in-built mimic diagram to check different parameters such as temperatures, pressures, gas concentration, working hours.



It can manage and optimize Cubogas™ (when more than one per station) starting sequences, as well as slow and fast filling areas within the same station.

# CNG Additional Station Equipment



## Gas Dryers

(Manual, Automatic, Single or double vessels....)

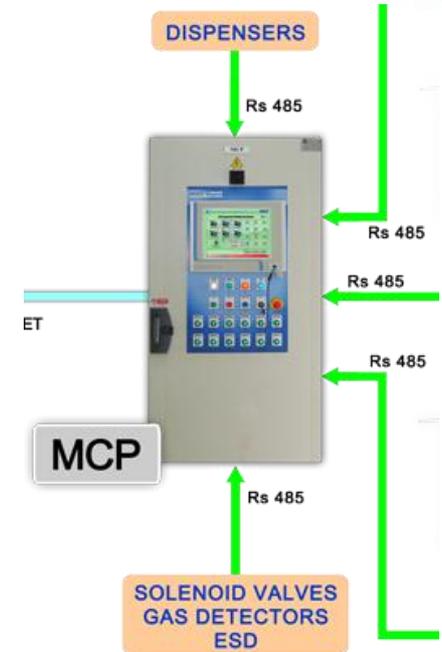


UP TO 16 units

## Filling Panels (for trailers)



## Additional Storages



## Master Control Panel



# Almaty's First CNG Bus Station by



Wayne

# Almaty CNG Station



- N. 2 Cubogas S240 at 1000 Sm<sup>3</sup>/h
- N.2 Fully Automatic Gas Dryers
- N. 1 Storage with 6.000 liters cylinders
- N. 4 Dispensers with 6 Bus nozzles & 2 for Cars
- N1. SMS Scada Monitoring System



# Almaty CNG Station



# Almaty CNG Station



# Almaty CNG Station





# Other Fleet Stations



**Wayne**

# Siberia (RUSSIA)



- N.15 Cubogas S15B (Siberia pipeline stations)
- N.18 compressors for big stations in Moscow

# Vilnius bus company – Lithuania - 2008



- N.3 Cubogas 2B without storage
- N.1 dryer
- N.2 fast filling positions
- N.100 slow filling positions



# SIENA (Italy) Bus Refilling Station with Photovoltaic PG



- N.2 Cubogas 1.300 Sm<sup>3</sup>/h
- Onboard storage 1.200 litres
- N.4 filling positions
- Up to 60 buses refilled in three hours

# FLORENCE (Italy): slow filling bus station



- N.4 Cubogas 500 Sm<sup>3</sup>/h,
- Onboard storage 800 liters
- N.8 filling positions fullgas type
- Up to 100 busses refilled every night



# NAPLES (Italy): bus slow filling station



- N.4 Cubogas 500 Sm<sup>3</sup>/h,
- Onboard storage 800 liters
- N.12 filling positions fullgas type
- N.1 quick filling point
- Up to 150 busses refilled every day



# NOVARA (Italy): bus quick filling station



- N.2 Cubogas 800 Sm<sup>3</sup>/h
- Onboard storage 800 litres
- N.4 filling positions
- Up to 50 busses refilled every day



# ROME (Italy): bus quick filling station



- N.5 Cubogas 1700 Sm<sup>3</sup>/h
- Onboard storage 800 liters
- N.6 filling positions
- Up to 200 busses refilled every night

# AOSTA (Italy): bus quick filling station



- N.2 Cubogas 800 Sm<sup>3</sup>/h
- Onboard storage 800 liters
- N.4 filling positions
- Up to 50 busses refilled every night



# LISBON (Portugal): bus quick filling station



- N.3 Cubogas 600 Sm<sup>3</sup>/h
- Onboard storage 800 liters
- N.3 filling positions
- Up to 200 busses refilled every day



# SPAIN: truck quick filling stations



- N.25 Cubogas in 20 stations
- External storage
- Up to 600 garbage trucks refilled every day

# FCC - Manoteras, Madrid - (Spain)



- Smaller Compressors and Big Storages
- Normally preferred when Electric Power is limited, there is lot of space available and a well identified demand in quantity and Schedule

# BRATISLAVA (Slovakia): bus quick filling station



- N.4 Cubogas 1000 Sm<sup>3</sup>/h
- Onboard storage 800 liters
- N.9 filling positions
- Up to 300 busses refilled every day



# UZBEKISTAN – Trucks quick filling station



- N.1 Cubogas S95B with storage
- N.3 DPGH/2
- Gas trailer refilling

# ATHENS (Greece): bus quick filling station



- N.4 Cubogas 1670 Sm<sup>3</sup>/h, 200 kW
- External storage 12000 litres
- N.5 filling positions
- Up to 200 busses refilled every night



# LISBON (Portugal): trucks quick filling station



- N.2 Cubogas 1400 Sm<sup>3</sup>/h
- Onboard storage 880 litres
- N.4 filling positions
- Up to 60 trucks refilled in three hours





# Public Retail Stations



**Wayne**

# Gas de Estado – Buenos Aires (Argentina)



- Over than 90 Cubogas shipped during the 80's

# GAZ de France – Toulouse (France)



- N.1 Cubogas 2B with on board storage 880 liters
- N.2 dispenser double hoses

# IFCO – (Iran)



- N.56 Cubogas 2B without storage
- N.1 set external storage 5.000 liters per each station
- N.224 dispensers double hoses

# Arezzo (Italy)



- N.1 Cubogas 2AHT with storage, super cooling and air compressor
- N.1 dispenser double hoses
- On board measuring station supplied

# AGIP Milano (Italy)



- N.1 Cubogas 2AHT with storage, super cooling and air compressor
- N.1 or N.2 dispensers GS double hoses
- On board measuring station supplied as an optional

# MANTOVA (Italy) - Multifuel Station with Photovoltaic PG



- N.1 Cubogas 2AHT with storage, super cooling and air compressor
- N.1 GS double hoses
- POS, Card Readers Fuel Dispenser, Solar Power Generation and Installation
- Total Turn Key Solution

# ASHGABAT (Turkmenistan)



- N.1 Cubogas 2B DB
- N.2 dispensers double hoses

# ROJANA (Thailand)



- N.61 Cubogas 2B without storage
- N.1 set external storage 10.000 liters per each station
- N.58 dispensers double hoses

# BOLZANO (Italy) – First Italian Multienergy Station



**MULTIENERGY Station represents a real step towards a new type of fuel distribution**

- First ENI Station with all Products (alternatives + traditionals)
- Strategic early adopter (flagship for ENI) for "green positioning"
- CNG + Petrol Global Star (new integrated - ahead of competition)

# Torre del Lago (Italy)



- N.1 Cubogas with “wave” silencer
- N.2 Global Star dispensers double hose

# ASHGABAT (Turkmenistan)



- N.1 Cubogas 2B DB
- N.2 dispensers double hoses

# Tula (Russia)



- N.1 Cubogas S131 B HT
- N.2 Global Star dispensers double hose



# Mother & Daughter Stations



**Wayne**

# BANDIRMA (Turkey) – MOTHER STATION



- N.2 Cubogas S30B without storage
- N.1 set external storage 1.200 liters
- Gas trailer refilling

# ZHENGZHOU (China) – DAUGHTER STATION



- N.30 Cubogas 1BDS in daughter stations, with inlet operating pressure from 200 down to 15 barg
- DW exclusive ENERGY saving system

# BANGKOK (Thailand) – MOTHER STATION



- N.5 CUBOGAS 4BDB without storage
- N.20 trailer refilling position
- It reaches the incredible flow rate of 19500 Sm<sup>3</sup>/h

# SHANGHAI (China) – DAUGHTER STATION



■ N.1 CUBOGAS 1BDS

■ N.4 Filling Points