

Countum Group

**MECI**

Metering Solutions

## MECI Products and Company Overview



MECI is specialized in custody transfer solutions  
for oil and gas

- Since 1922 for instrumentation
- Since 1970 for metering solutions



Our customers:

National and international oil and gas companies  
EPC companies  
Equipment integrators

In April 2009: MECI joined the **COUNTUM** group

- French investment funds
- **SATAM**, sister company



**MECI : « up-stream » market, including refineries**

Oil and gas metering and proving systems for Refineries, Pipeline, Offshore platforms, Storage

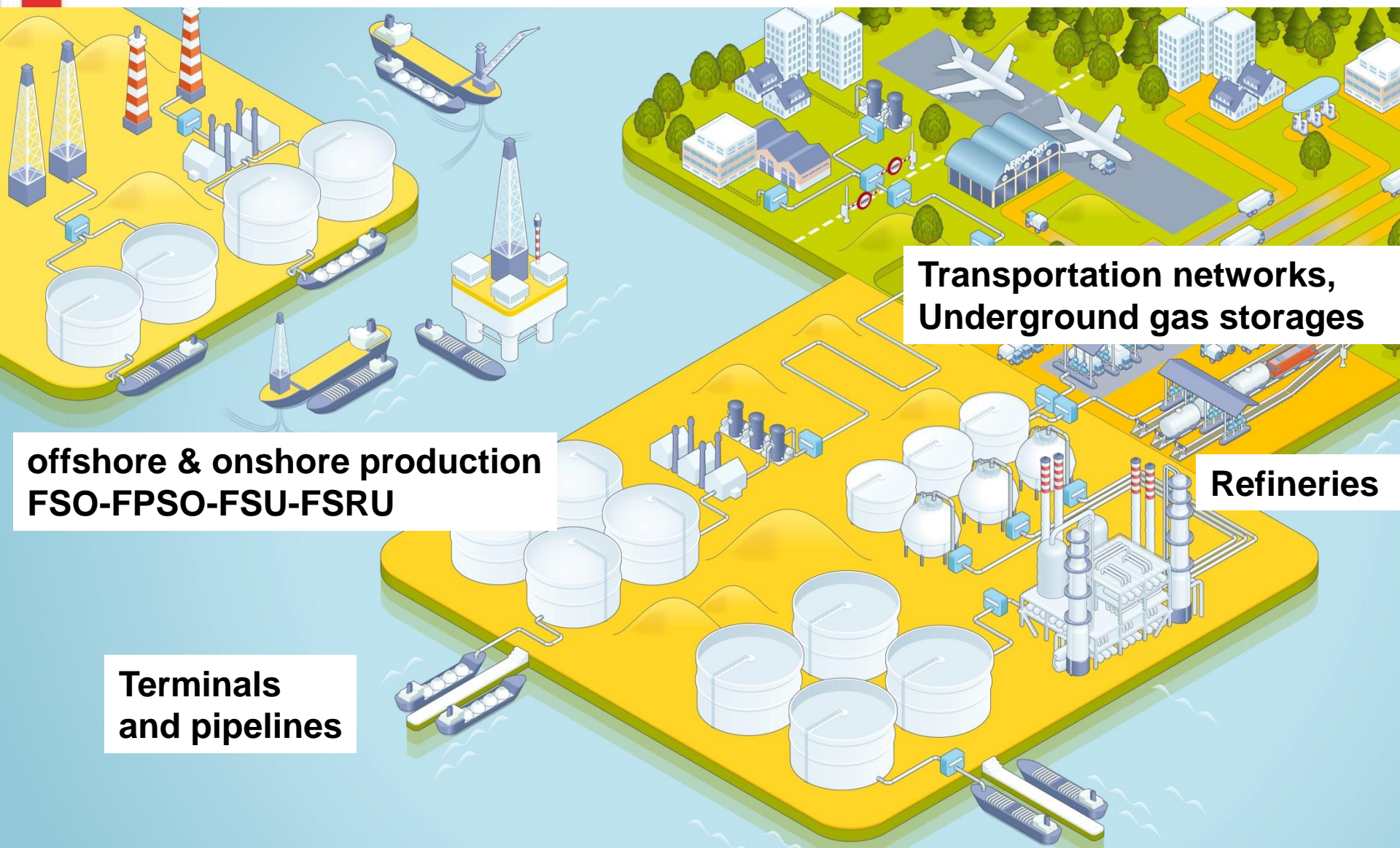
**SATAM : « down-stream » market**

Liquid hydrocarbons depots, Ship, Truck and Wagon loading and offloading

**COUNTUM addresses the oil and gas metering market from the production up to the distribution**

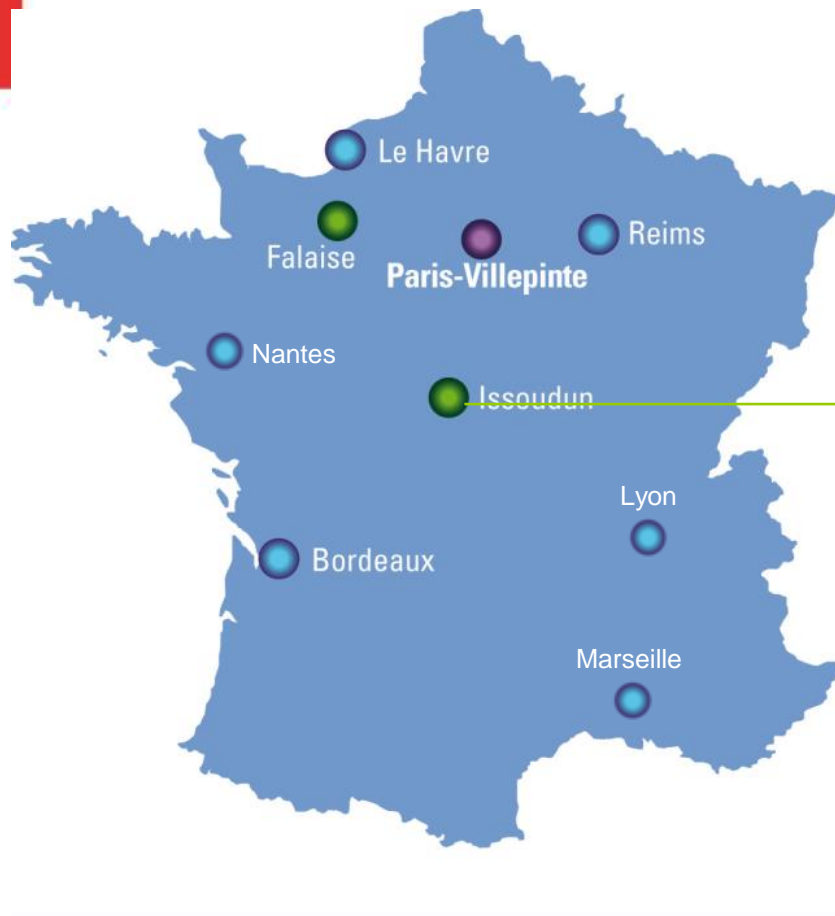


# COUNTUM : The Metering from Production to Distribution

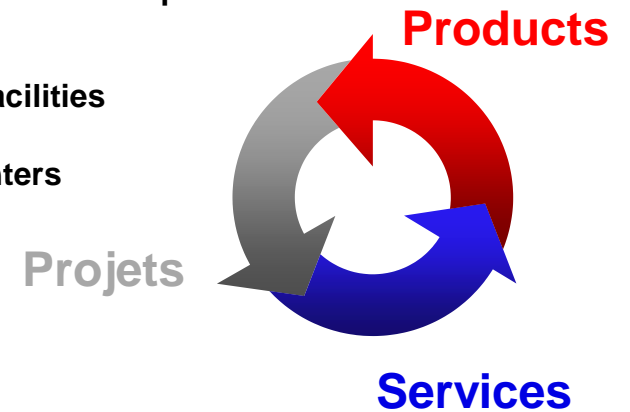


- Some functions have merged between MECI and SATAM
  - Top management, Human Resources, Financial, Sales and Marketing departments
- For other functions, responsibilities are split and they share the same tools
  - Quality, Research, Customer Services departments
- International sales are based on a mutual worldwide sales representative network

## Geographical locations : the service proximity



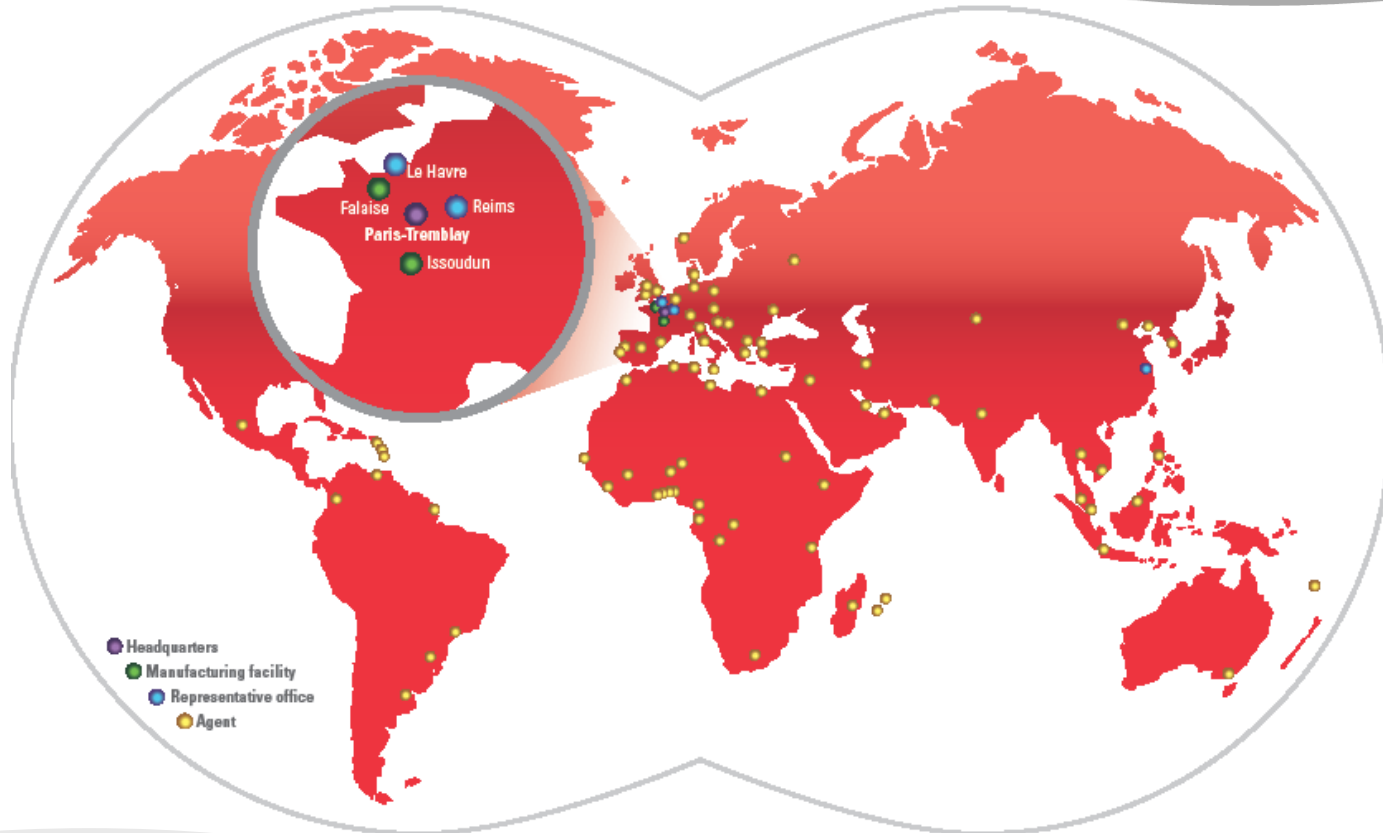
- Countum & Satam headquarter
- Production facilities
- Technical centers



**MECI : 80 people**

## COUNTUM Group Worldwide coverage

70 countries



agents - distributors

## MECI activities: Products, Projects and Services

### ➔ Products

#### Mastering the conception and manufacturing

- Control room and site flow computers
- Prover controller computer
- Data logger
- Remote Terminal Unit
- Energy metering package

### ➔ Projects

#### Engineering and operation system

- Complete metering system with associated control panels
- Analysis package for product quality control
- Automated truck loading application
- Calibration via prover or master meter
- Automation and supervisory system

### ➔ Services

- Commissioning, start-up and upgrade
- Factory repairs
- Initial control verification
- Training for customer
- Technical assistance
- Repairs on site or in Meci facilities
- Proving & recalibration
- Preventive maintenance

### ➔ Periodical control verification

- Gas volume converter
- Chromatographs
- Measuring systems for liquids other than water



## MECI products range

METERING



DATA LOGGERS



REMOTE  
MONITORING



ANALYSIS



# MECI Product Range

## CDN16 Flow Computer



## DES16 Densitometer



*transducer*



## CDV15 on site gas flow computer



CDV15-3 P, PT, PTZ



CDV15-4  
DEPRIMOGENE

## PES15 Chromatographe and Calorimeter



*Natural Gas analyzer*



*Calorimeter*



## LOG15 Data Logger

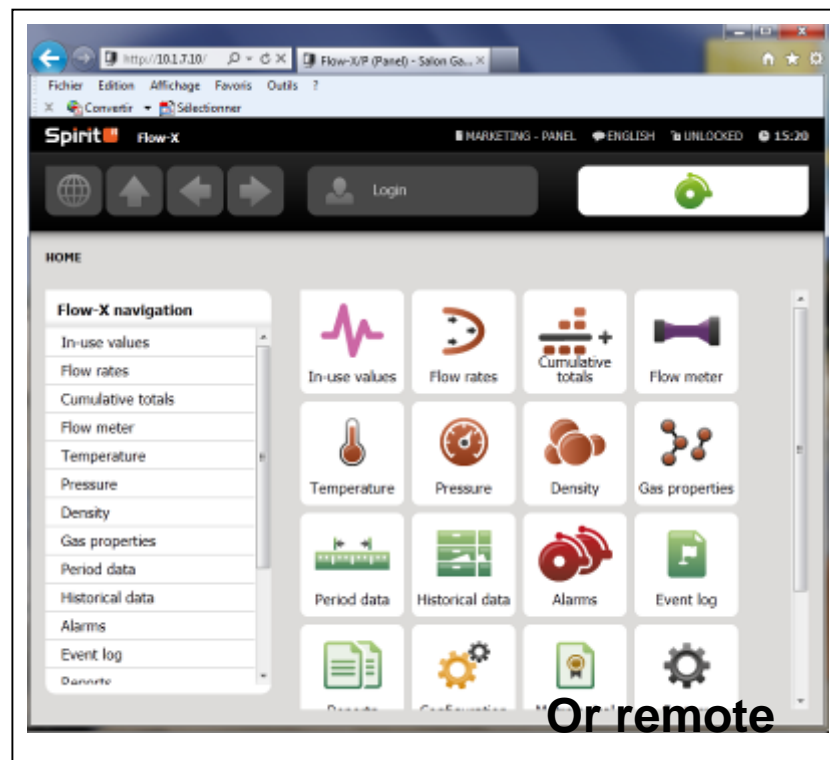


## SM@RT U Remote management



GPRS/3G

# The CDN16 the improved and optimized version by MECI of the Flow-X



## MECI CDN16 Flow Computer



CDN16/M



CDN16/S



CDN16/P



CDN16/T



CDN16/R



## MECI CDV15 field gas Flow Computer

**CDV 15-3:** gas volume corrector for turbine and ultrasonic flow meters

**CDV 15-4:** gas flow computer for differential pressure system ( $\Delta P$ )

### Innovative concept:

### On-site maintenance with no impact on accuracy and certification:

- ✓ Change of pressure captor
- ✓ Change of temperature probe
- ✓ Change of electronic box

### High level functionalities:

- ✓ Chromatograph management for energy measurement
- ✓ High accuracy
- ✓ No impact of temperature variations
- ✓ Compatible with supervisory

### MECI CDV15



CDV15-3 P, PT, PTZ

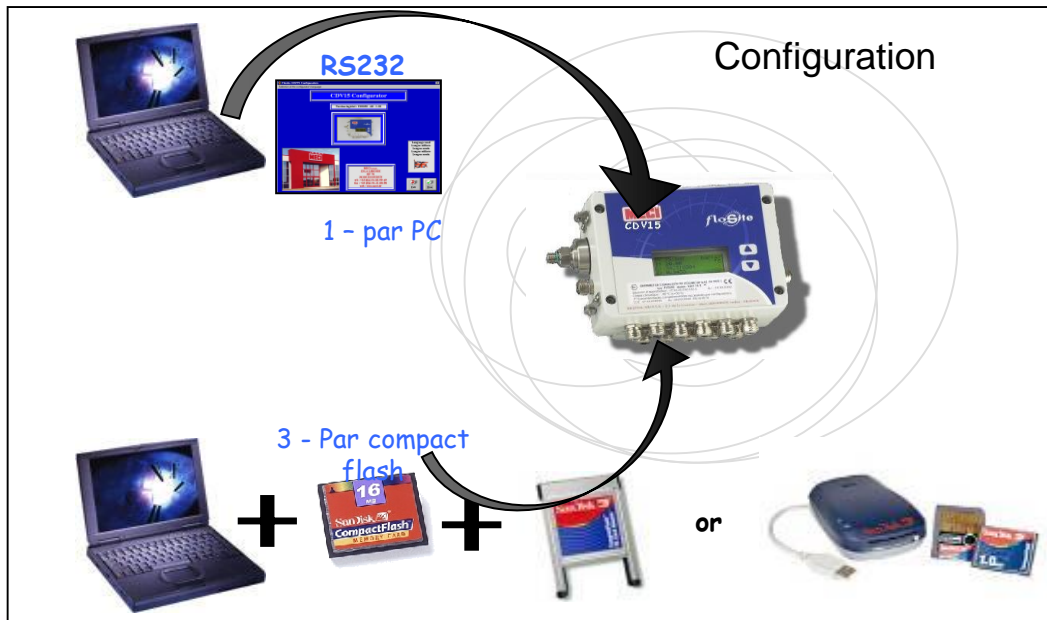


CDV15-4



## MECI LOG15: Data logger

- Functions
  - Data acquisition
  - Alarm watch
  - Recording
- ATEX low consumption concept
- Large storage capacities
- Ability to manage data stored on an external flash card



## MECI DES16 densitometer

- Dedicated to custody transfer measurement system for liquids
- Compatible with most of existing field and panel flow computers
- Compact design
- A ready-to-use solution

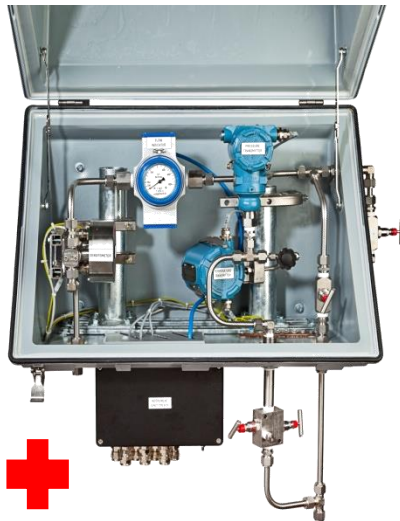


## MECI DES16: general configuration



**DTV-16:** volumetric mass captor

- Gross volumetric mass
- Associated temperature



**DES16:** instrumented densitometer loop

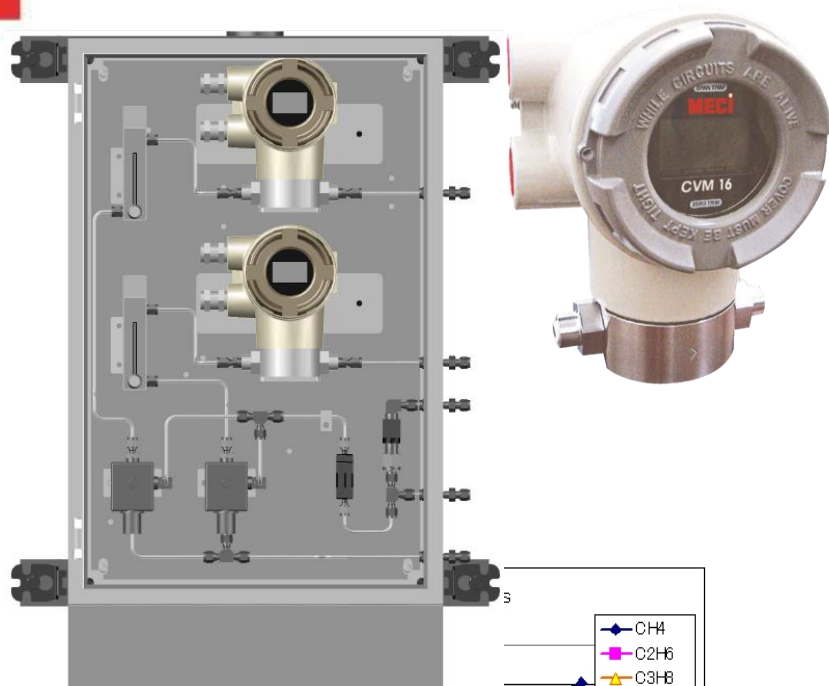
- Liquid volumetric mass
- Associated temperature
- Associated pressure



**CDN16:** Flow computer

- Basic volumetric mass
- Converted volume
- Mass

## CVM16 natural gas calorimeter



- GasCVD is a natural gas calorimeter that measures the calorific value, wobble indice of natural gas.

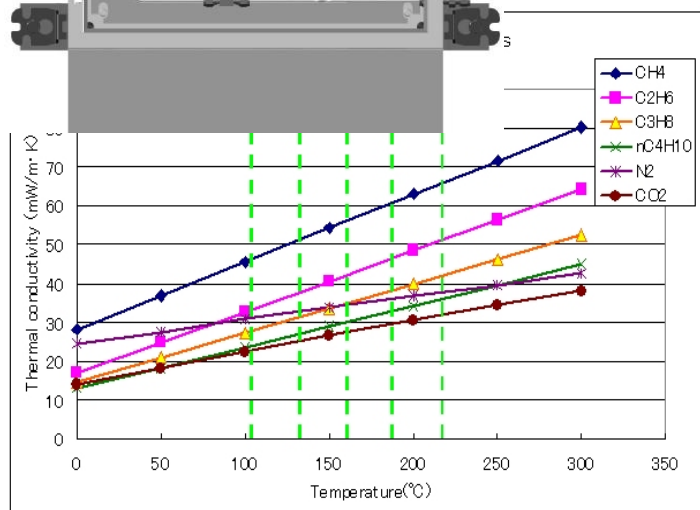
- Compact design with lower price
- Stable measurement
- High reliability and accuracy
- High speed response

GDF SUEZ laboratory compliant

ATEX compliant

NMI compliant

LNE compliant



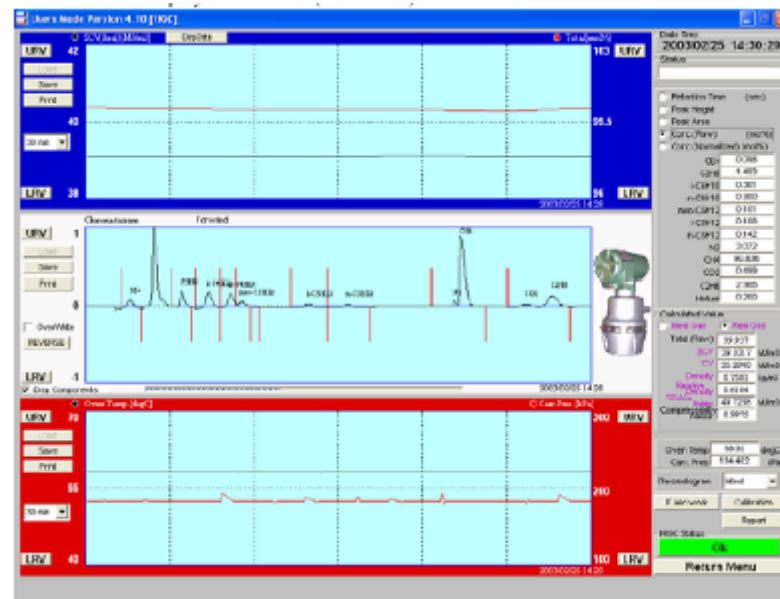
# MECI PES15: Energy metering package



- Energy system measurement for natural gas and biogas applications
- Measurement of the 11 main components of the gas
- ISO 6976 standard
- AGA 8 standard

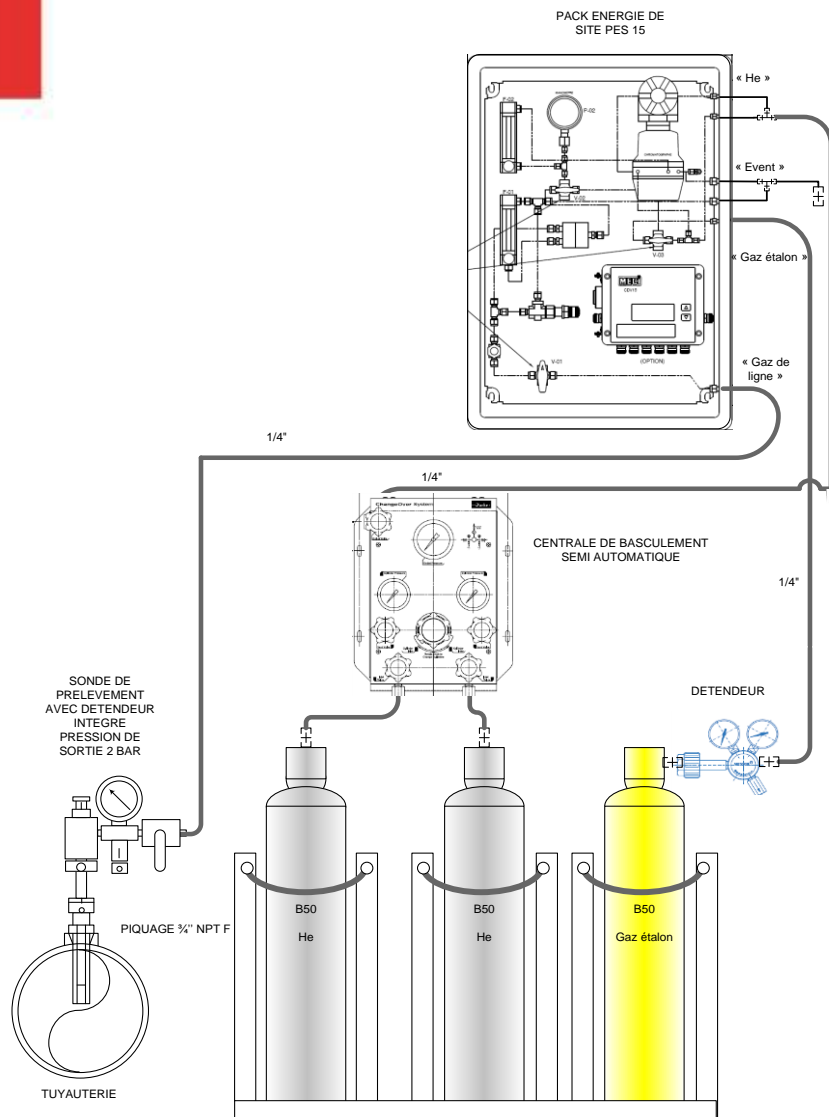
## OUTPUT DATA

PV1	Sum of C <sub>6</sub> +
PV2	C <sub>3</sub> H <sub>8</sub>
PV3	i-C <sub>4</sub> H <sub>10</sub>
PV4	n-C <sub>4</sub> H <sub>10</sub>
PV5	neo-C <sub>5</sub> H <sub>12</sub>
PV6	i-C <sub>5</sub> H <sub>12</sub>
PV7	n-C <sub>5</sub> H <sub>12</sub>
PV8	N <sub>2</sub>
PV9	CH <sub>4</sub>
PV10	CO <sub>2</sub>
PV11	C <sub>2</sub> H <sub>6</sub>
PV12	Real Gross Heat Value
PV13	Gas Density
PV14	Wobbe Index
PV15	Compressibility Factor
PV16	Total of Raw Concentration
PV17	Oven Temperature
PV18	Carrier Gas Temperature
PV19	Lower Heat Value
PV20	Relative Density





## MECI PES15: a compact solution



■ A standard compact solution for analysis and measurement:

- Optimization of installation costs
- Competitive price
- Fast analysis cycle
- Easy configuration and start
- Maintenance (plug & play)
- Modbus communication



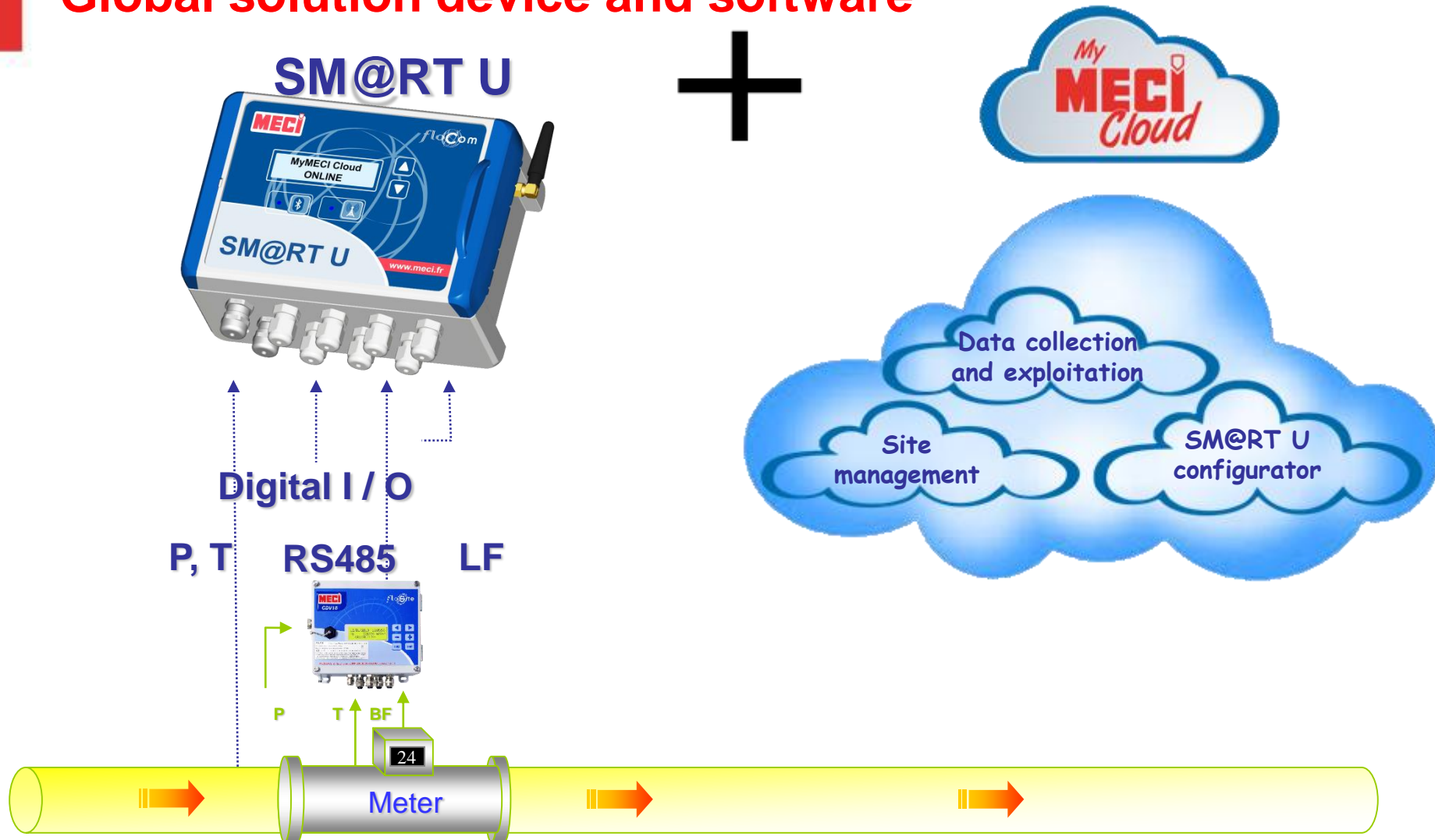
+



=

Energy  
measurement

## Global solution device and software



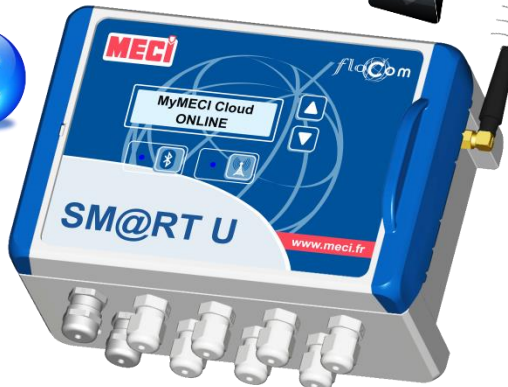
## Stand alone and wireless solution



### SM@RT U



On site access  
Bluetooth 4.0 LE



Remote access  
GPRS / 3G / ...



More than 10 years



Authorized in  
Atex area

Digital I / O

Temperature

Pressure

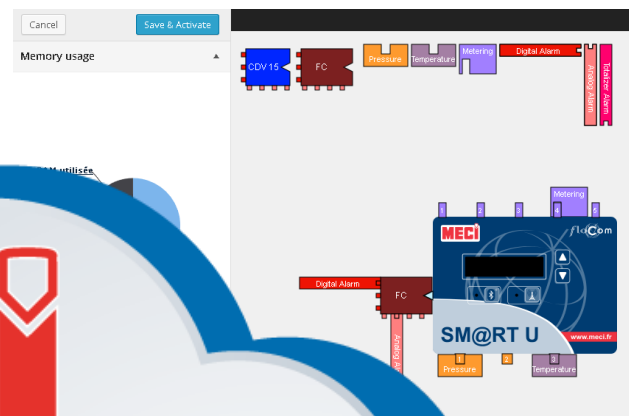
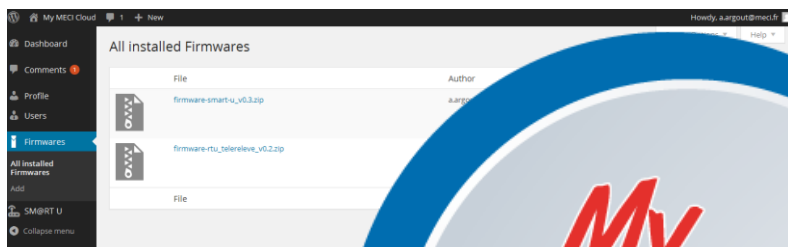
RS485



# MyMeci Cloud

Remote maintenance

SM@RT U configurator



## Journal d'événements

15/04/2016 14:30: Anomaly (integrated city)  
15/04/2016 15:30: Anomaly (integrated city)  
15/04/2016 15:30: Bordeaux (Télérévisé EC)  
15/04/2016 15:30: Dax (Télérévisé EC)

La "Pression" moyenne de la journée est de : 15,967 bar  
o Maximale de la journée : 15,998 bar à 11 h 32 min  
o Minimale de la journée : 16,041 bar à 1 h 03 min



## Système

Latest installed version:  
firmware-smart-u\_v0.3

## Journal d'événements

15/04/2016 15:30: Anomaly (integrated city)

Overall view of your sites

Friendly data exploitation



## Turn key Projects





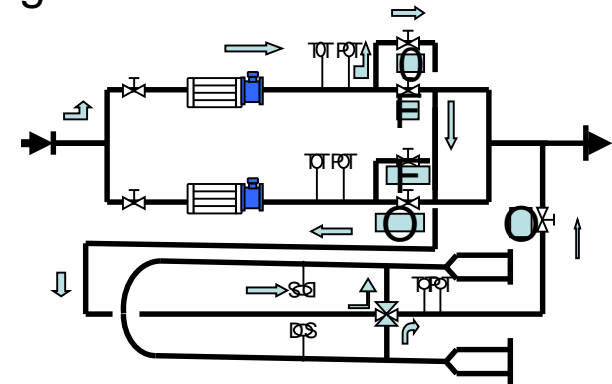
### ■ Ready-to-use solutions

- ❑ Surrounded products with application software and supervisory system

### ■ Turnkey metering systems for liquids and gases

- ❑ Feasibility, design, conception and manufacturing
- ❑ Gas analyzing systems
- ❑ Prover or master meter calibration systems
- ❑ Automation and supervisory systems
- ❑ Remote control solutions

### ■ Up-grading & revamping of existing metering installations



## **Extends the life of existing installations**

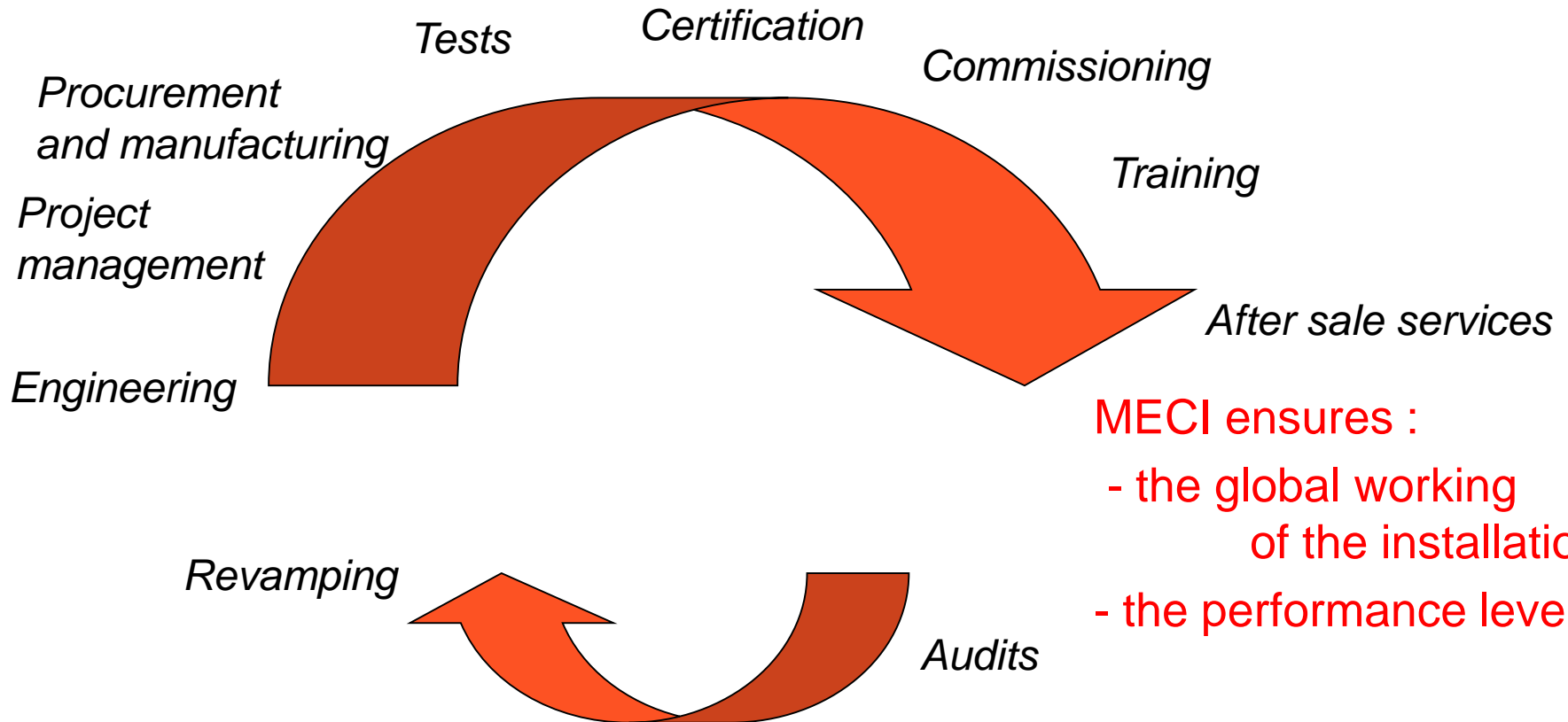
- Improving performance levels
- Bringing installations in line with new regulations requirements  
(ie MID in Europe)

## **A comprehensive offer**

- Global audit and solution design
- Incorporating the modification: metering system acceptance tests, metrology folders, automation and supervisory system
- Commissioning and training of local operating team
- Maintaining the installation

## MECI projects solutions

MECI takes in charge the project from the design of the solution



And manages its evolutions

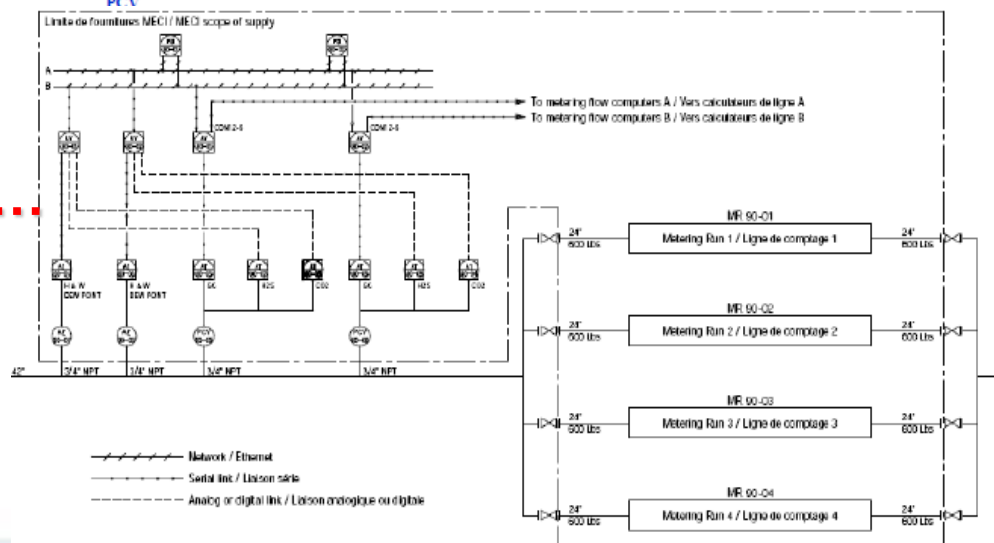
**A comprehensive offer for a ready-to-use installation**

## Manufacturing – Integration : some examples





**From Pre-design to P&ID...**

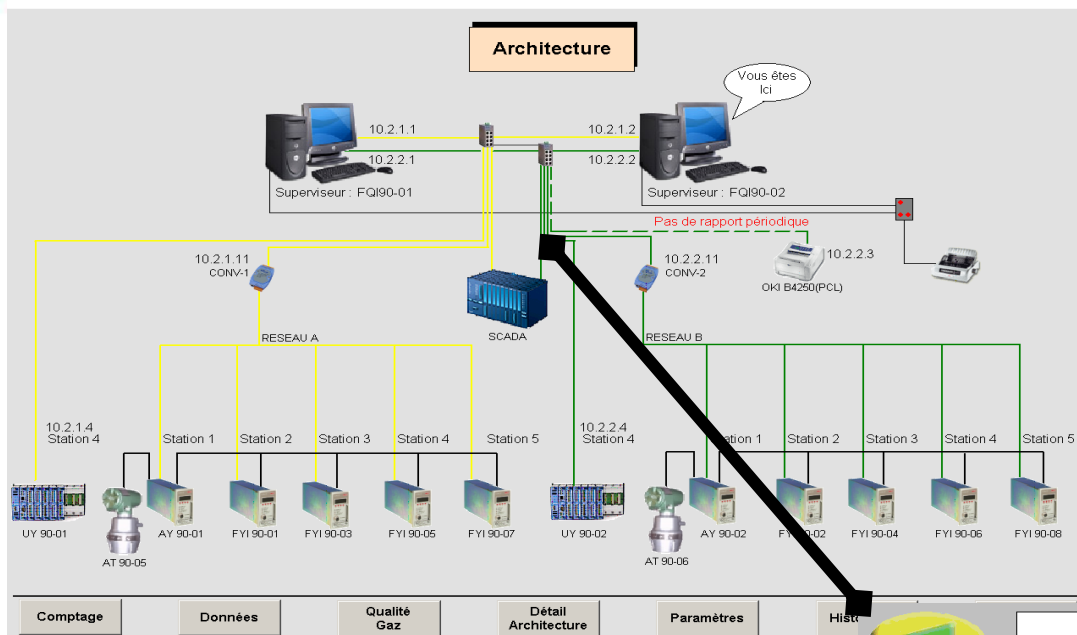




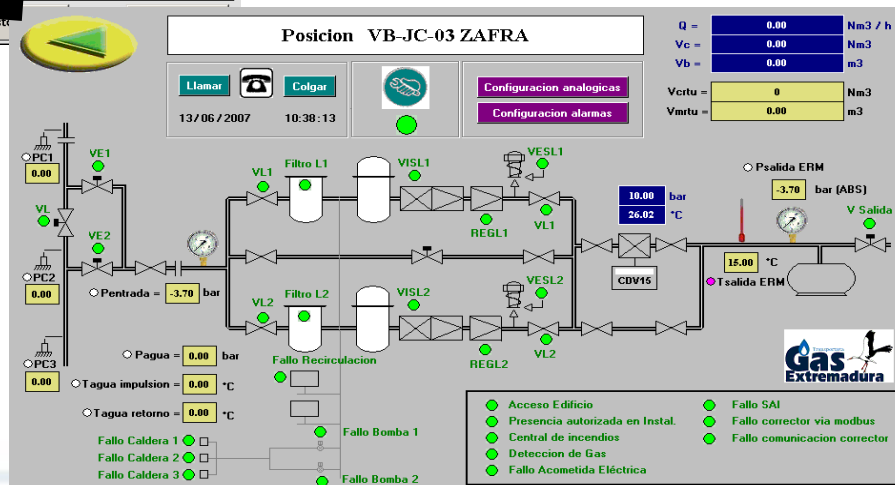
Superviseur : FQI90-02

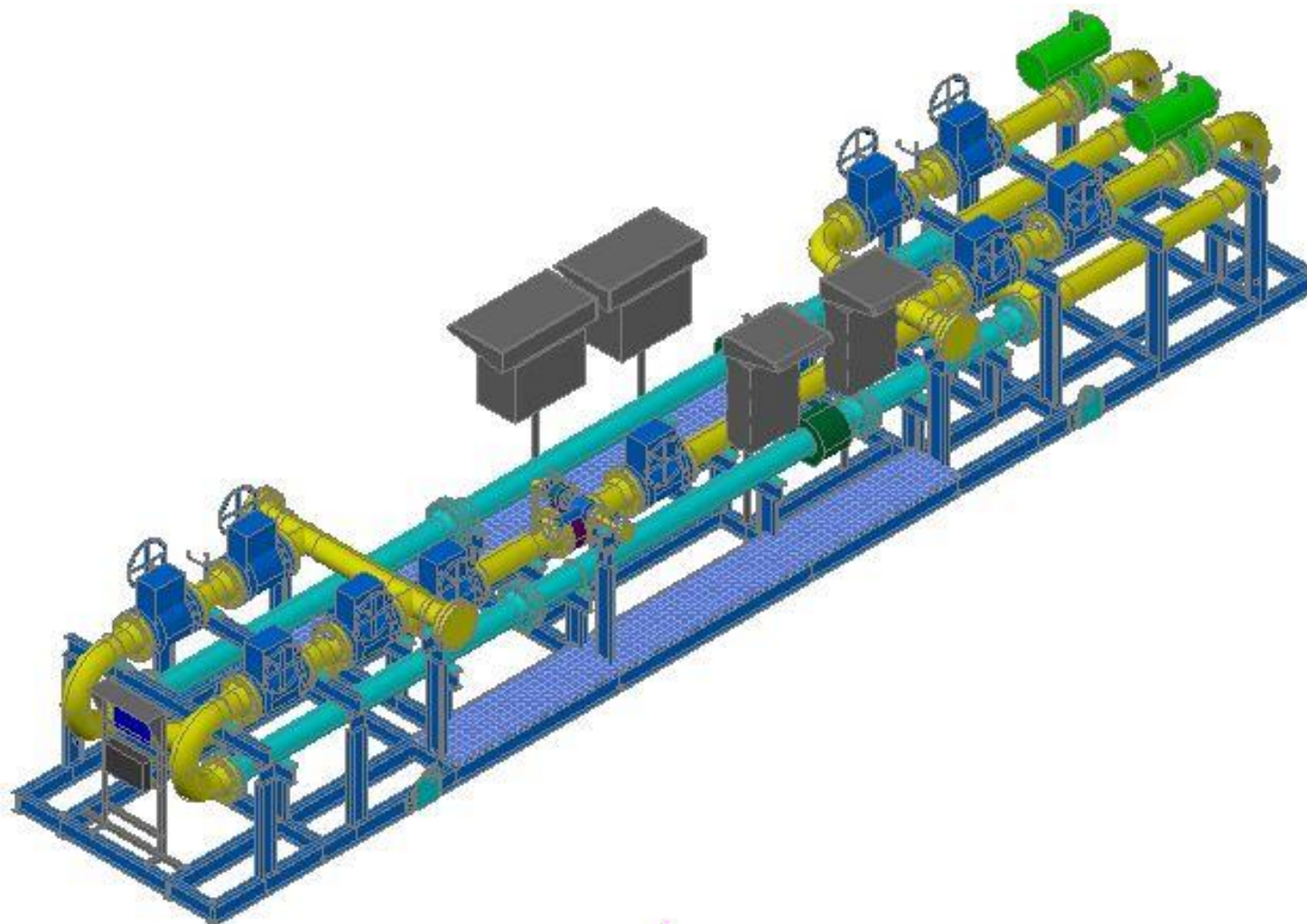
GAZODUC GZ4: MEDGAZ PHASE III

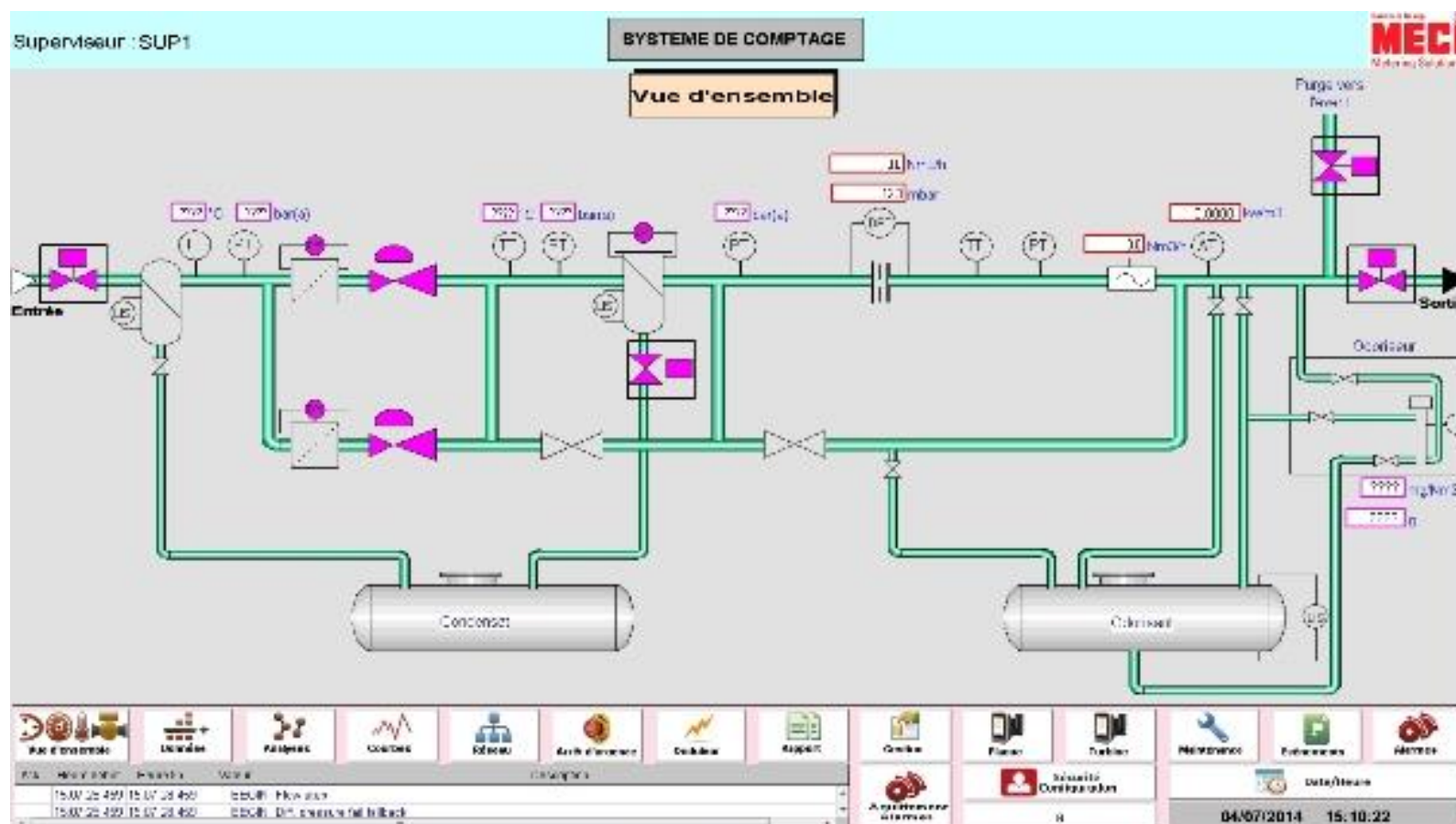
MECI



... To system's architecture and customized Scada views







## Some projects

### ■ Natural gas storage



### ■ Gas Terminal - Fos Cavaou



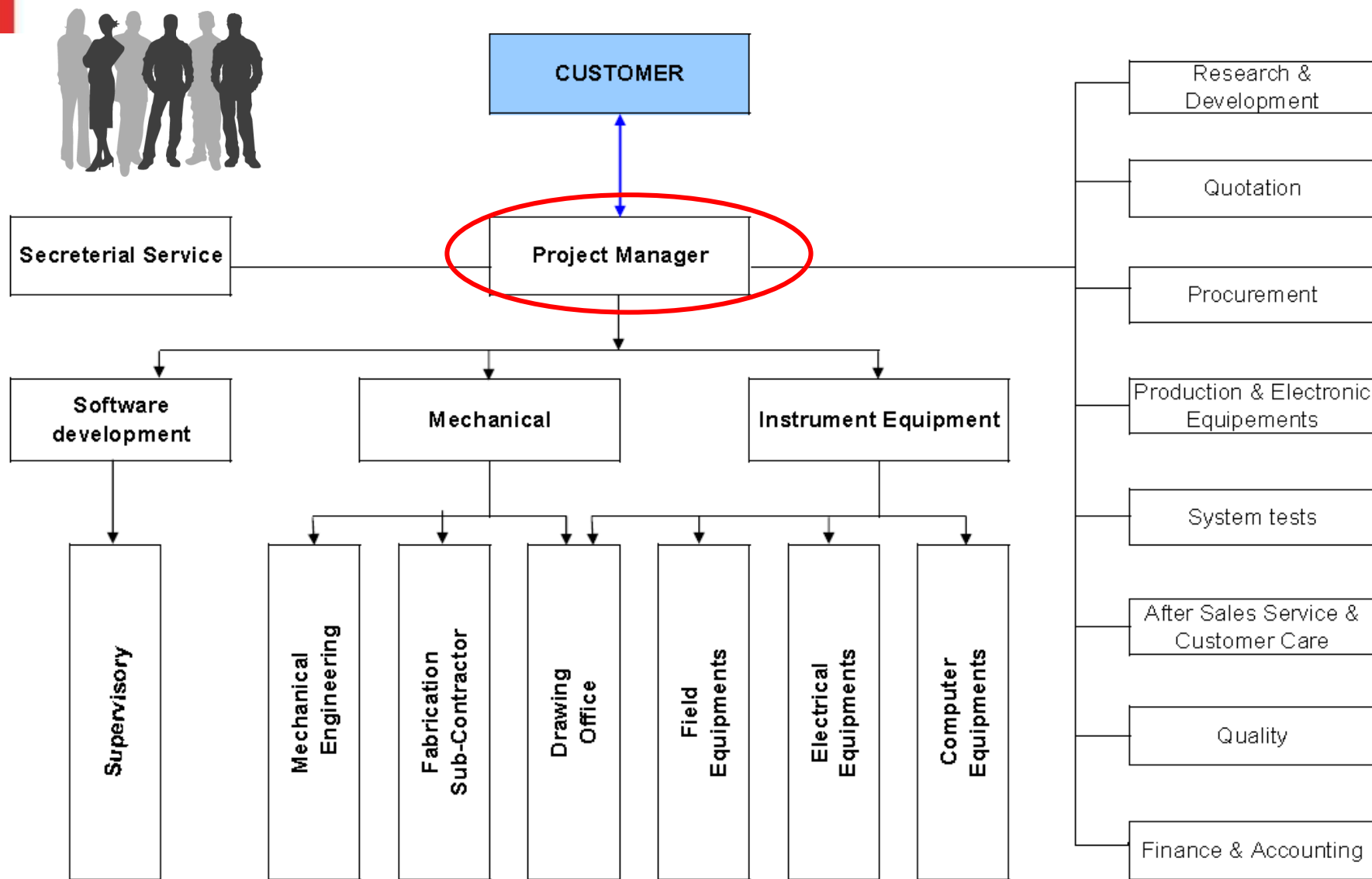
### ■ LPG metering skid - Algeria



### ■ LPG un-loading / off-loading for trucks and wagons



## Organization for the projects





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**Services & after sales team**



## Services

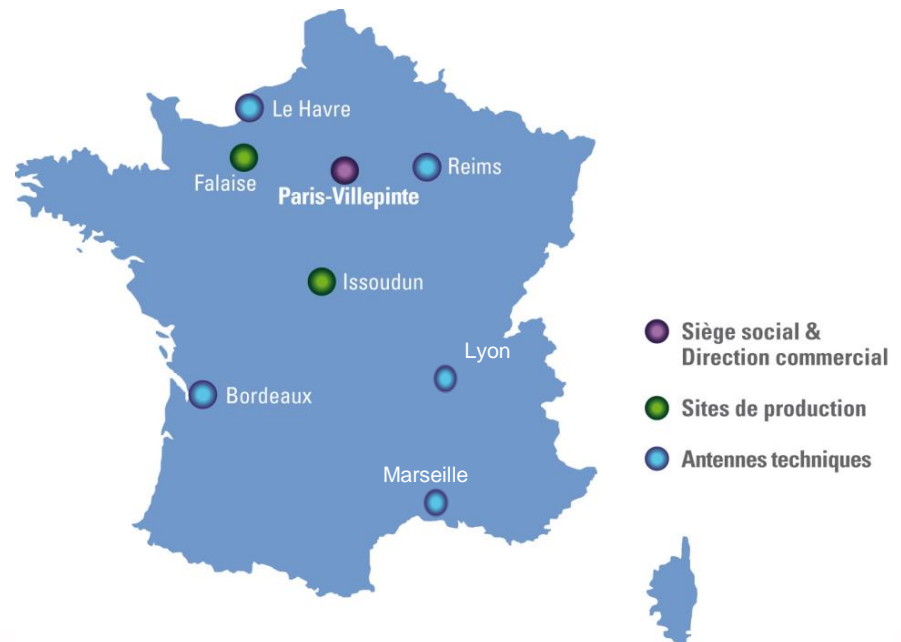
- Start-up, commissioning
- Initial calibration
- Customer training
- Technical support
- On site or factory repair
- Proving & recalibration
- Preventive Maintenance



The service team: 25 people  
spreaded all over the country and  
abroad

## Periodic verification

- Volume gas flow converter
- Chromatograph
- Measuring systems for liquids other than water



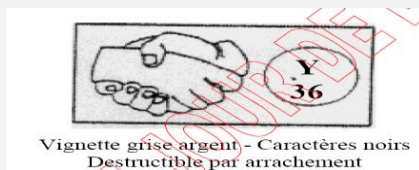
**ISO 9001 Quality insurance  
Manufacturing, Repair & Installation**



ACCREDITATION N°2-1878

**Periodical Verification  
COFRAC accredited body**

**Quality Insurance - Manufacturer  
ATEX certificates**



**Delegation of initial control verification  
since 2002**

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## MECI's References





## References





## *The Major Oil & Gas players have confidence in our know-how*

Area	References
<b>Gas metering systems</b>	AGIP, AIR LIQUIDE, ALZOFERT, BOTAS, D.T.P.G., EXXON, ELF, ENAGAS, GAZ DE FRANCE, GAZNAT, GRT GAZ, GEOSTOCK, GRD GAZ DE FRANCE, GAZ NATURAL, GVM, IGDAZ, IZMIT, KOREA GAS CORPORATION, LITORAL GAS, NAFTEC, NIGC, PORTGAS, QATAR LIQUEFIED GAS COMPANY, REPSOL, RAS LAFFAN OLEFIN COMPANY, SONELGAZ, SONATRACH, SOUTH GAS, STEG, SETGAS, SHELL, SIDER, TIGF, TOTALGAZ
<b>LPG</b>	ANTARGAZ, GTFT, STOGAZ, STIR, TOTALGAZ
<b>Crude oil and refined products applications</b>	AGIP, BANDAR ABBAS OIL REFINING CO, BOUYGUES OFFSHORE, B.P., CONPET, COMPAGNIE INDUSTRIELLE MARITIME, DORIS, DPO ORLEANS, ELF, EXXON, ENTREPOT PETROLIER DIJON, GROUPEMENT TFT, GEOGAZ LAVERA, GEOSOL MANOSQUE, GIE MAR PROFUNDO GIRASSOL, HAZIRA LNG, INDUSTRIE TECHNOFRIGO, KCC, KOTC, MOBIL, NAFTEC, NAFTAL, NIOC, NORGAL, PAM, PETROBRAS, PETROPERU, PETROFAC TUNISIA, RAS LAFFAN OLEFIN COMPANY, RAFFINERIE DU MIDI, REPSOL, SAKHTARE FARDA, SAMIR, SEJ, SES RUBIS STOCKAGE, SHELL, SOCIETE PETROLIERE DU BEC D'AMBES, STIR, SOFRESID, SRPP, SIGALNOR, SONATRACH, TOTAL, TOKHEIM SOFITAM APPLICATIONS
<b>Biocarburant</b>	TOTAL, DIESTER INDUSTRIE, INEOS MANUFACTURING, NORD ESTER, CENTRE OUEST CEREALES
<b>Refining &amp; chemical industry</b>	ARKEMA, ESSO RAFFINAGE, EXXONMOBIL CHEMICAL POLYMERES, NAPHTACHIMIE, TOTAL PETROCHEMICAL, RHODIA, SAMIR, SOLVAY, SHELL PETROCHIMIE MEDITERRANEE, TOTAL
<b>Engineering companies</b>	ABB-UTA, ABB GLOBAL ENGINEERING, AIR LIQUIDE INGENIERIE, AKER ENGINEERING AUXITEC, BOUYGUES OFFSHORE, CERTI SA, CEGELEC, DORIS ENGINEERING, ENTREPOSE CONTRACTING, ETPM, FOSTER WHEELER, KCC, LITWIN, MONDIAL CONTRACTOR, PRACSI ENGINEERING, SAIPEM, SNTC, SAIBOS AKOGEP, SOFREGAZ, SAKHTARE FARDA, S.A.E., SOFRESID, SIRAGA ENGINEERING, TECHNIP, TOYO ENGINEERING CORPORATION, TBS, INDUSTRIE TECHNOFRIGO, TECO TECHNO CONSULTING

Source : MecI

- **TOTAL**
  - 30% of the major metering systems (GRTGaz), 100% since 2012
  - 50% of the main storage sites (Storengy, Elengy)
  - 75% of the public and industrial delivery points (GRTGaz & GRDF)
  - 75% of GNL Terminals
- **TIGF**
  - 80% of the metering systems
  - 100% of the storage sites
- **AIR LIQUIDE**
  - 75% of the metering systems for air gases (N2, O2, H2, Ar,...)
- **Current major Projets 2013-2015 (see following map)**
  - Taisnières, Dunkerke, Manosque, Chere, Leuchey, Oltingue, Quevilly, Ourques

- Currently running:
  - >**100** Metering stations in Refineries (Total, Exxon, Lyondell, Sonatrach, Samir,..)
  - 500 metering systems in Oil Depots, (more than 10 000 meters for **SATAM**)
  - 100% of the Total LPG depots and tank farm in France
  - .....

- Currently running or running soon:
  - > 50 Major Metering stations in Raffineries, Oil platfroms, FPSOs, Pipe Lines, Oil or Gas Terminals, .... (Total, Exxon, Petroplus, Lyondell, Sonatrach, Samir, Sonangol...)
  - Africa: Algeria, Tunisia, Maroco, Lybia, Nigeria , Angola, Cameroun, Gabon, Congo, Ivory coast,...
  - Middle-East : Turkey, Qatar, Iran
  - Europe: Belgium, Spain, Italy, Switzerland, Poland,
  - Asia: Korea, China, Australia

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Metering Solutions

## Examples





## Some project examples

### ■ Analysis Shelter for Sonatrach in Algeria



**Girassol FPSO**



■ Liquid metering skid with Proover



■ Liquid metering skid for Doris



■ Multi-runs metering cabinet

## *GDF – France – Gas metering in Fos Cavaou LNG terminal*



**Production**

**Refinery**

**Transportation**

**Storage**

■ **Engineering**

Sofregaz

■ **Final user**

Gaz de France

■ **Location**

LNG terminal in Fos Cavaou (France)

Gas metering at the inlet of French gas network

■ **Application**

3 metering runs equipped with 20" ultrasonic flow meters & gas chromatograph

## *Total – Nigeria – Amenam Natural gas export terminal*



### Production

### Refinery

### Transportation

### Storage

- **Engineering** Technip
- **Final user** Total
- **Location** Natural gas metering in Amenam export terminal
- **Application** 3 metering runs with orifice plates  
chromatographs, densitometers, dew point analysers  
Cabinet with flow computers CDN12 and supervisory



## *Sonatrach – Total – Repsol – Algeria – Gas metering station*



Production

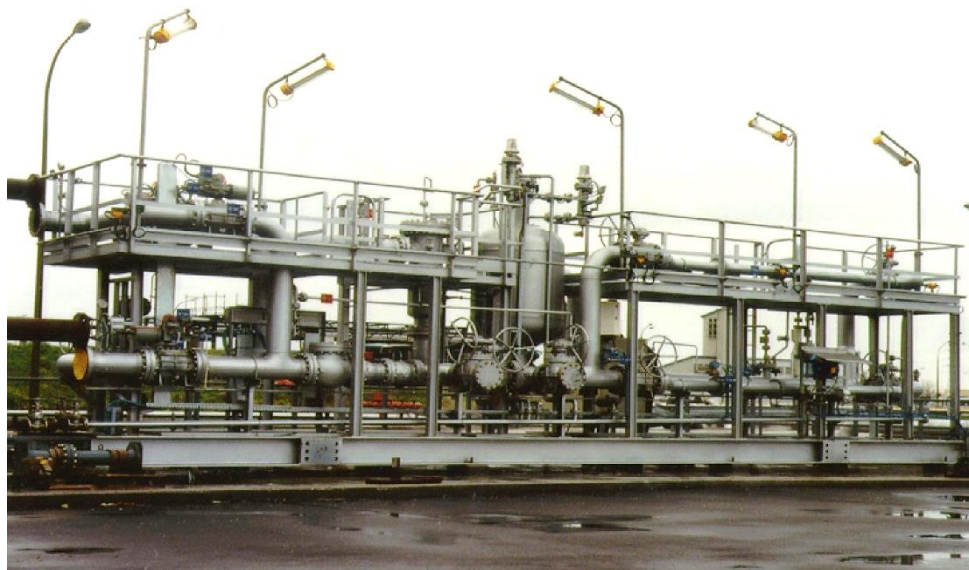
Gas treatment

Transportation

Storage

- **Customer** GTFT Natural Gas – Algeria
- **Final user** Sonatrach – Total – Repsol
- **Location** Natural gas treatment plant at Hassi Messaoud Algeria
- **Application**
  - 1 metering station for natural gas (2 x 30" runs)
  - 2 metering stations for LPG and condensate
  - 1 redundant supervisory system

## *Total – France – Multi-product metering station*



Production

Refinery

Transportation

Storage

- **Final user** Total France
- **Location** Metering of refined products at the exit of a Total refinery
- **Application** Multi-product bidirectional metering station  
2 runs with 6" turbine meters  
control cabinet



## *Sonatrach – Algeria – Natural gas metering station*



Production

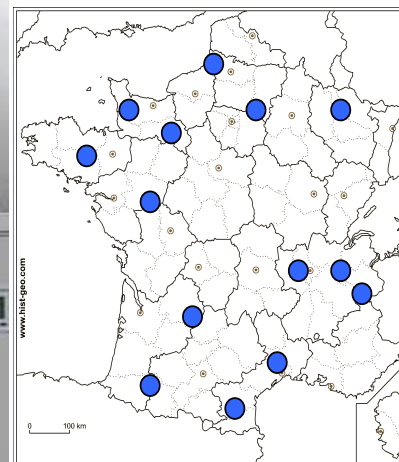
Refinery

Transportation

Storage

- **Engineering** TBS
- **Final user** Sonatrach Algeria
- **Location** Metering station on GZ4 (Algeria - Spain pipeline)
- **Application** 4 metering runs 24" with DP cells  
Complete gas analysis package installed in shelter

## Totalgaz – France – LPG trucks & rail loading/unloading



Production

Refinery

Transportation

Storage

- **Final user** Totalgaz – Atlas Project
- **Location** LPG tank farm in France
- **Application** Supervision and automation of 15 LPG tank farm including 7 unmanned tank farms (without any employee)  
Automation of loading & unloading of LPG, butane, propane  
Local and distant tank farm supervision, remote maintenance

## AUSTRALIA-KOREA-Total-Inpex - Metering of natural gas



### Production

### Refinery

### Transportation

### Storage

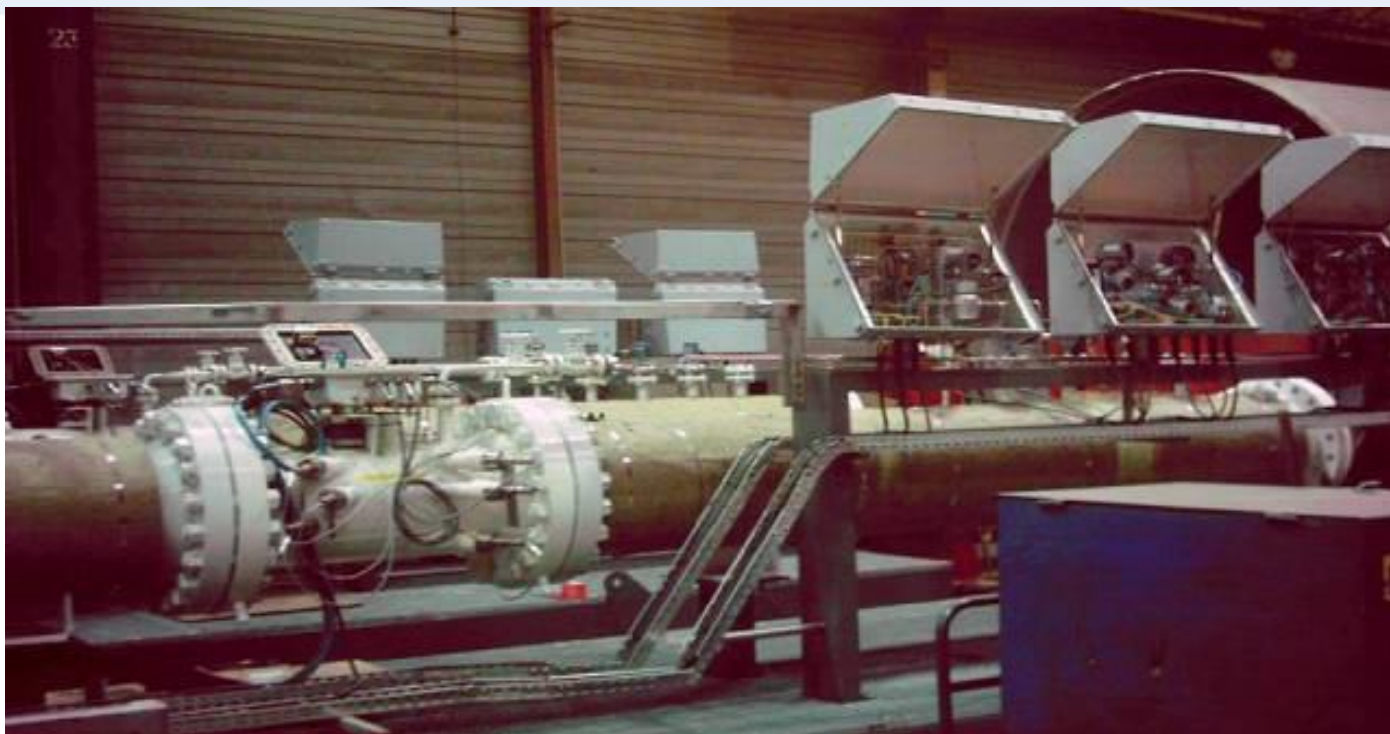
- **Customer** SAMSUNG HEAVY INDUSTRIES Korea
- **Location** Offshore western Australia
- **Application** Fiscal Export Gas Metering project for the ICHTHYS CPF

## AUSTRALIA-KOREA-Total-Inpex - Metering of natural gas

- **METERING DESIGN DATA**
- **Process Design Data**
- Product: Natural Gas
- Flow Rate: Min: 2 052 m<sup>3</sup>/h per stream Max: 4 330 m<sup>3</sup>/h per stream
- Design Pressure: 22.45 MPa(a)
- Design Temperature: -46°C / 80°C
- **Other Design Data:**
- Meter type Ultrasonic Flow Meters
- Metering configuration 4 x 50%
- **Design life of equipments 40 years**
- **Measurement Standard**
- AGA 9 ; AGA 8 ; ISO 6976 ; OIML R 137-1 ; OIML R 140 ; ISO 17089-1 2010
- **Overall system uncertainty:**
- The Fiscal Metering System will have an uncertainty limit on Standard Volume and Energy lower than **0.7%** of measured quantities.
- **Availability**
- The Fiscal Metering Unit will be designed to have an **availability of 98%**, in operation 24 hrs/24 and 365 days/year.



## SHELL – India – Natural gas metering in Hazira LNG terminal



Production

Refinery

Transportation

Storage

● **Engineering**

SAIPEM

● **Final user**

SHELL INTERNATIONAL – Hazira India

● **Location**

Measurement of natural gas at the outlet of LNG terminal

● **Application**

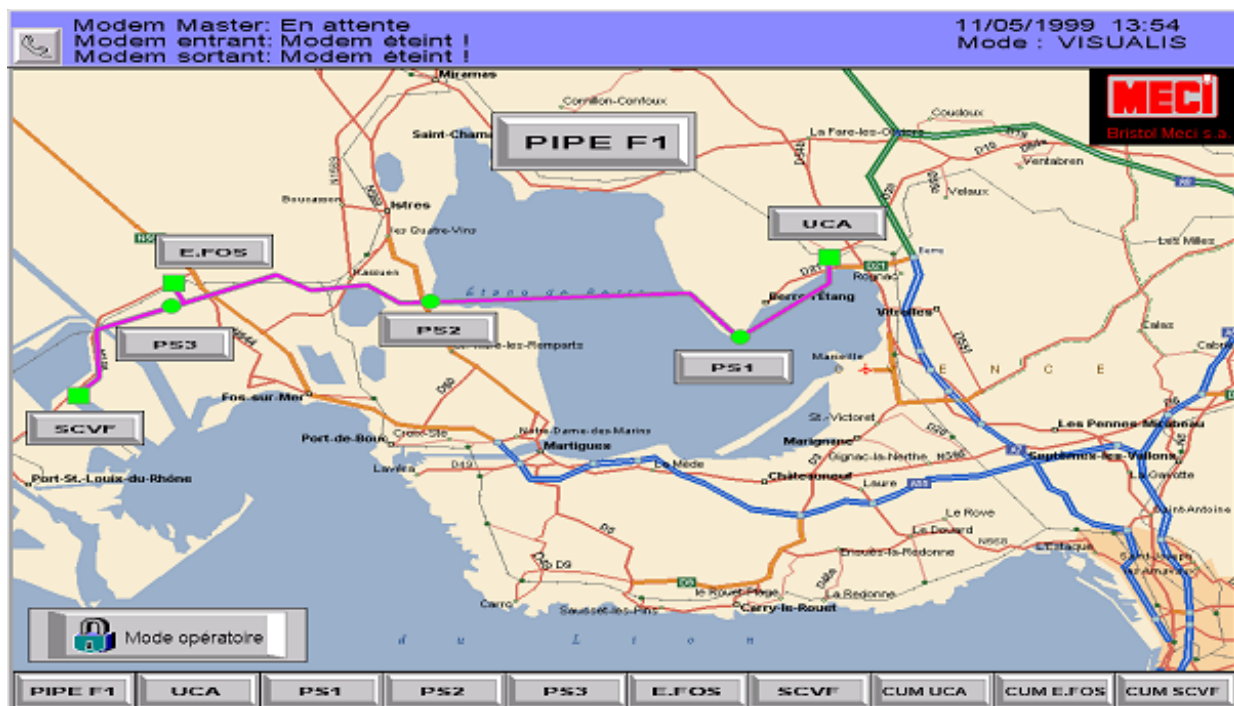
2 metering runs (700 T/h) including :

Ultrasonic flow meters

Chromatograph in metering cabinet



# Shell – France - Automation and Supervision



Production

Refinery

Distribution

Remote Mngt

- Final User : SHELL CHIMIE
- Location : Berre
- Application : Supervision and remote management by radio and telephone of the ethylene pipeline, Metering

## Gaz de France – France - Remote control solutions



**Production**

**Refinery**

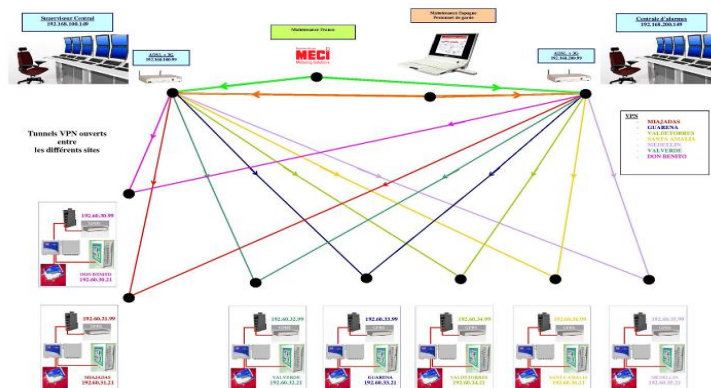
● **Final User** : Gaz de France Distribution

**Transportation**

● **Location** : all over France

**Ditribution**

● **Application** : Remote Management of gas station



## Distribution

- **Final User** : Gas Extremadura
- **Location** : Spain
- **Application** : Remote Management of gas station

# Totalgaz – supervision and automation loading/off loading



Production

Refinery

Transportation

Storage

- **Final user** Totalgaz
- **Location** France
- **Application** Loading/unloading of propane, butane or LPG according to the station configuration
-





**Production**

**Refinery**

**Transportation**

**Storage**

- **Engineering** Bouygues Offshore/ETPM (France)
- **Final user** Total - Exploration
- **Location** Girassol FPSO crude oil off loading to tanker (Guinea gulf)
- **Application** 3 metering runs 16"  
Ball prover 30" bi-directional  
Control panel