



**LOGISTICS OF FUELS &  
ENERGY MANAGEMENT**

**5 th CEN CENELEC ANNUAL MEETING  
Madrid, July 2009**



# PRIORITIES IN ENERGY MANAGEMENT

*GUARANTEE OF SUPPLY*

*DIVERSIFICATION*

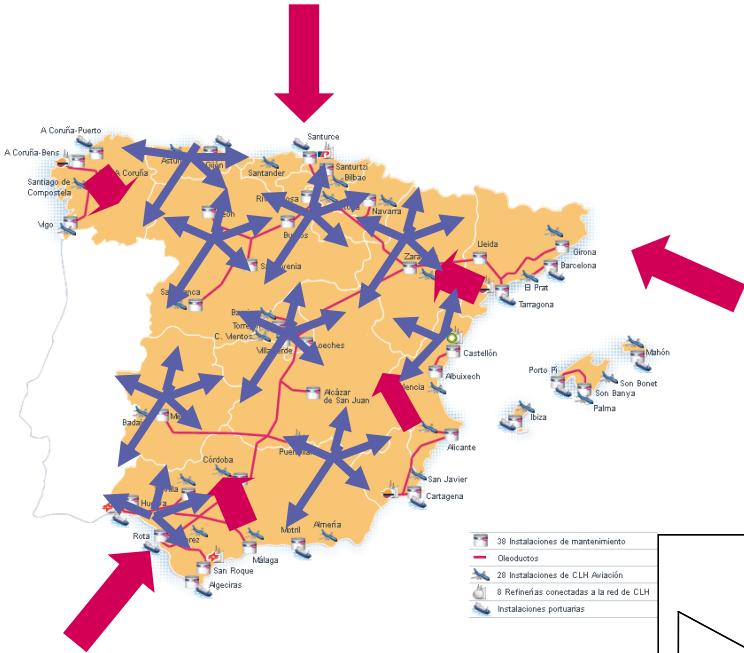
*ENVIRONMENTAL RESPECT*

*LOW CARBON*

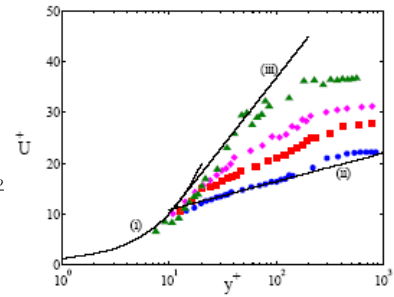
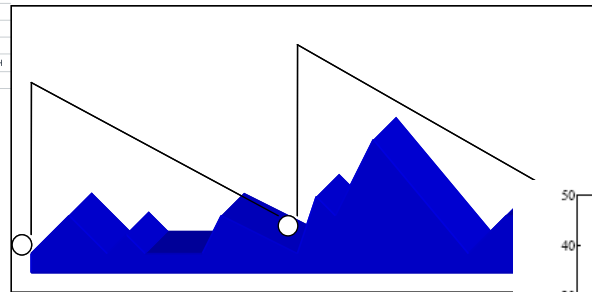
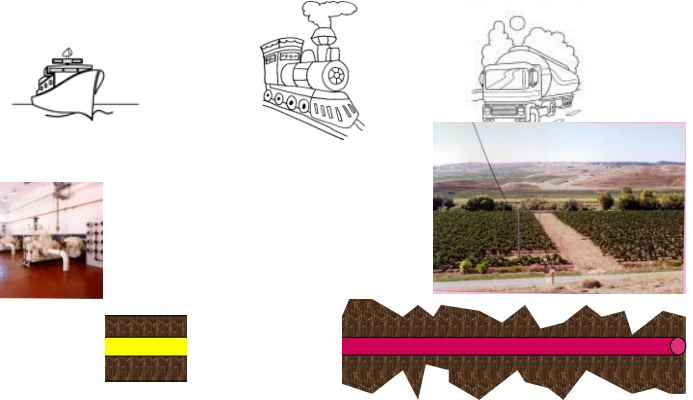
*EFICCIENCY  
IMPROVEMENT*

*R&D  
+innovation*

# IDEA 1: LOGISTICS OF FUELS AND EFFICIENCY



- 38 Instalaciones de mantenimiento
- Oleoductos
- 28 Instalaciones de CLH Aviación
- 8 Refinerías conectadas a la red de CLH
- Instalaciones portuarias



$$f = \frac{64}{Re}$$

$$f = 0,3164 Re^{-0,25}$$

$$f = 1,02 + (\log_{10} Re)^{-2,45}$$

$$f = 0,0055 + 0,125 Re^{-0,32}$$

$$\frac{1}{\sqrt{f}} = 1,889 \log Re \sqrt{f} - 0,358$$

$$\frac{1}{\sqrt{f}} = -2 \log \frac{2,51}{Re \sqrt{f}}$$

$$\frac{1}{\sqrt{f}} = 4 \log Re \sqrt{f} - 0,4$$

$$\frac{1}{\sqrt{f}} = -2 \log \left[ \frac{\epsilon/D}{3,7} + \frac{2,51}{Re \sqrt{f}} \right]$$

$$f = \frac{0,25}{\left[ \log \left( \frac{\epsilon}{3,7D} + \frac{5,74}{Re \sqrt{f}} \right) \right]^2}$$

$$\frac{1}{\sqrt{f}} = \frac{1,8}{n} \log \left[ \left( \frac{6,9}{Re} \right)^{11/4} + \left( \frac{\epsilon/D}{3,75} \right)^{11/4} \right]$$

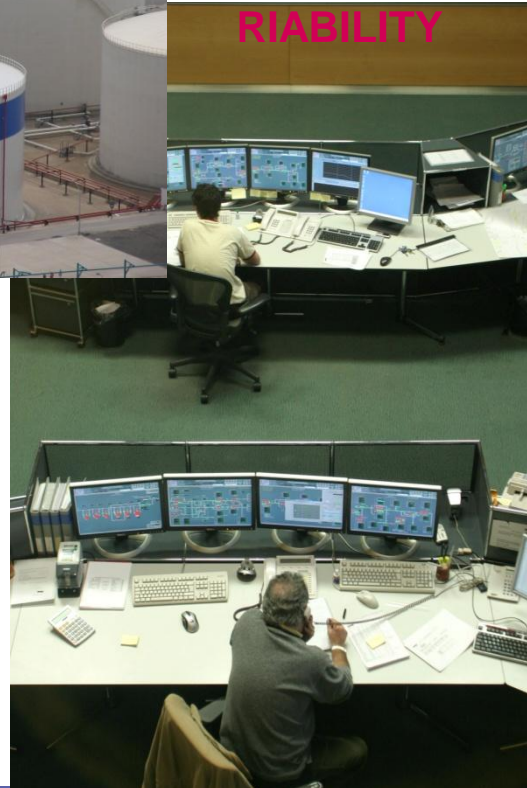
$$f = 1,325 \left[ -\log \left[ \frac{\epsilon}{3,7D} + \frac{1,963}{Re} \ln \left( \frac{\epsilon}{3,7D} \right)^{11/4} + \frac{6,0}{Re} \right] \right]^{-2}$$

# IDEA 2: LOGISTICS OF FUELS AND GUARANTEE OF SUPPLY

## CAPACITY



## RELIABILITY



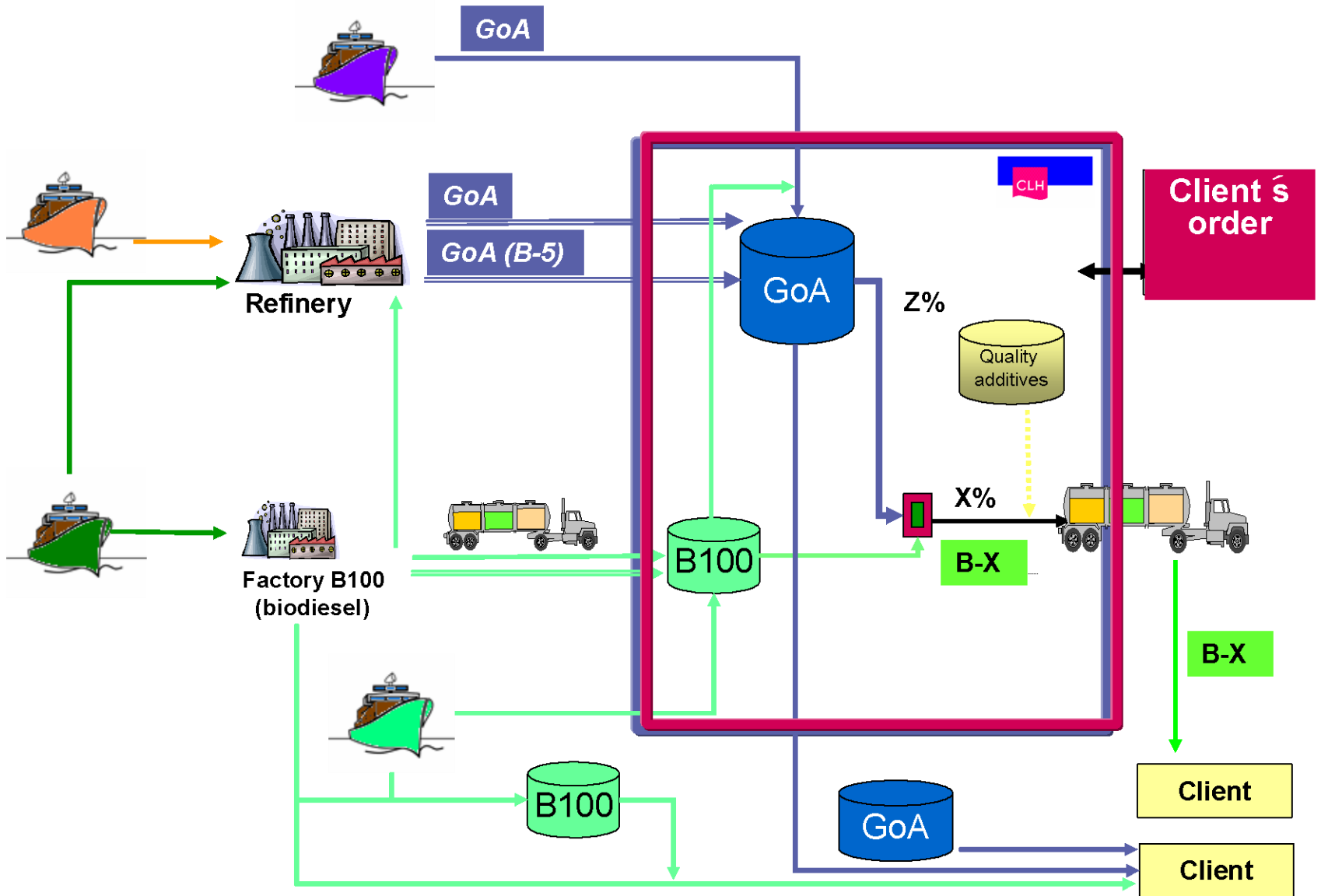
## PEOPLE CAPABILITIES



## FLEXIBILITY



# IDEA 3: LOGISTICS OF FUELS AND DIVERSIFICATION



## ***IDEA 4: LOGISTICS OF FUELS AND ENVIRONMENT***



# IDEA 5. STANDARDIZATION IN FUEL LOGISTICS

## PRODUCT QUALITY. STANDARDS HOMOGENEIZATION

*Main role of standardization organizations*

*Coordination/agreement between those organizations*

## HOUSEKEEPING STANDARDS & OPERATIONAL PROCEDURES

*JIG, STANAG, EN.....*

*ISO 9000...*

## QUALITY ASSURANCE

*To give confidence to clients and markets*

*To assure quality mainly when inspection 100% is impossible*

## PIPELINE TRANSPORT. CROSS CONTAMINATION

*New fuels; biofuels*

*New additives into them*

## ANALITICAL METHODS

*Laboratory*

*Fields methods for storage plants*

Thank you  
Muchas gracias

Compañía  
Logística de  
Hidrocarburos

CLH