

# **BRAZIL - CCS TECHNOLOGIES AND PROJECTS FOR EMERGING ECONOMIES**

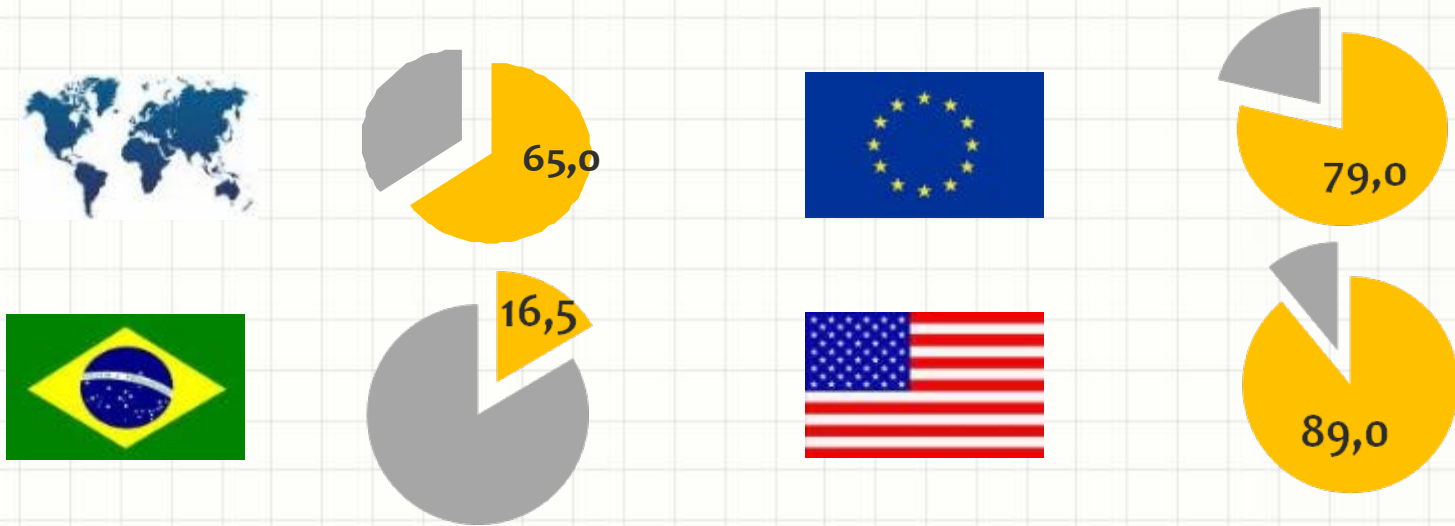
CSLF Technical Group Meeting  
Seoul, Korea  
March 25, 2014

# Agenda

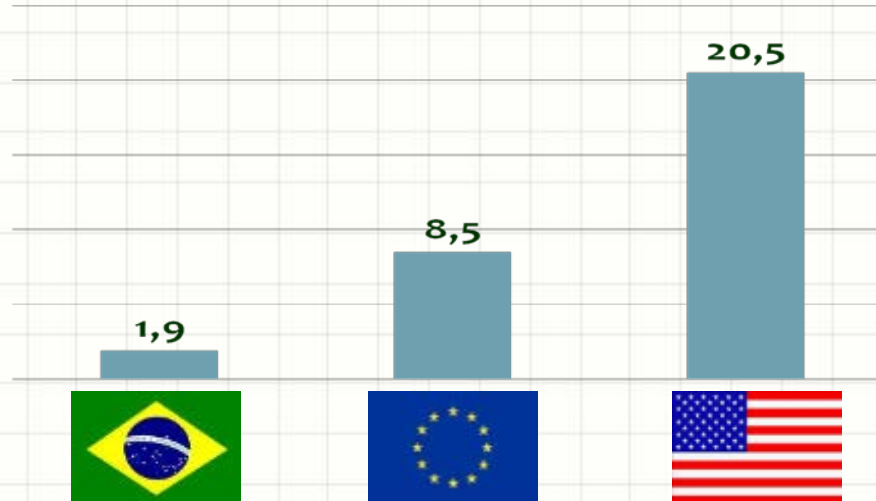
- **Brazilian GHG Emissions**
- **CSLF Capacity Building Program in Brazil**
- **Petrobras R&D Initiatives on CCS**
- **CO<sub>2</sub> Geological Storage in the Pre-salt**

# GHG Emissions

## Energy Sector emissions / Total Emissions



## Energy Sector Emissions / population (2005) - tCO<sub>2</sub>-eq/hab



# CSLF Capacity Building Program in Brazil

- **Petrobras** , Rio de Janeiro – CCS Course in 2 modules (2013)



- **CEPAC**, Porto Alegre – CCS Course in 3 modules (2012, 2013, 2014)
- **SATC** , Criciúma – CCS Course in 2 module (2012, 2013)

# Petrobras R&D on CO2

- **2 R&D Technological Programs :**
  - **EMISSÕES - Technological Program for Atmospheric Emission Reduction , comprehensive and long-term, including climate change impacts, vulnerabilities and adaptation;**
  - **PROCO2 - Technological Program on CO2 Management of Pre-salt, with a focus on the issues of CO2 in the development of Santos Basin Pre-salt cluster.**
- **Joint industrial projects : CO2 Capture Project (CCP)**
- **Participation in international institutions: International Petroleum Industry Environmental Conservation Association (IPIECA), IEAGHG, CCS - Society of Petroleum Engineers (SPE), Carbon Sequestration Leadership Forum (CSLF) e WBCSD (World Business Council for Sustainable Development).**
- **Investments of US\$ 150 million – 2010 to 2015**

# Carbon Sequestration and Climate Change Network

Establish and consolidate the technological and infra-structure base in Brazil to address Petrobras' challenges on CCS and climate change.

40 projects have been developed with 15 Brazilian universities and research centers. 17 million US dollars were invested in the period of 2006-13.

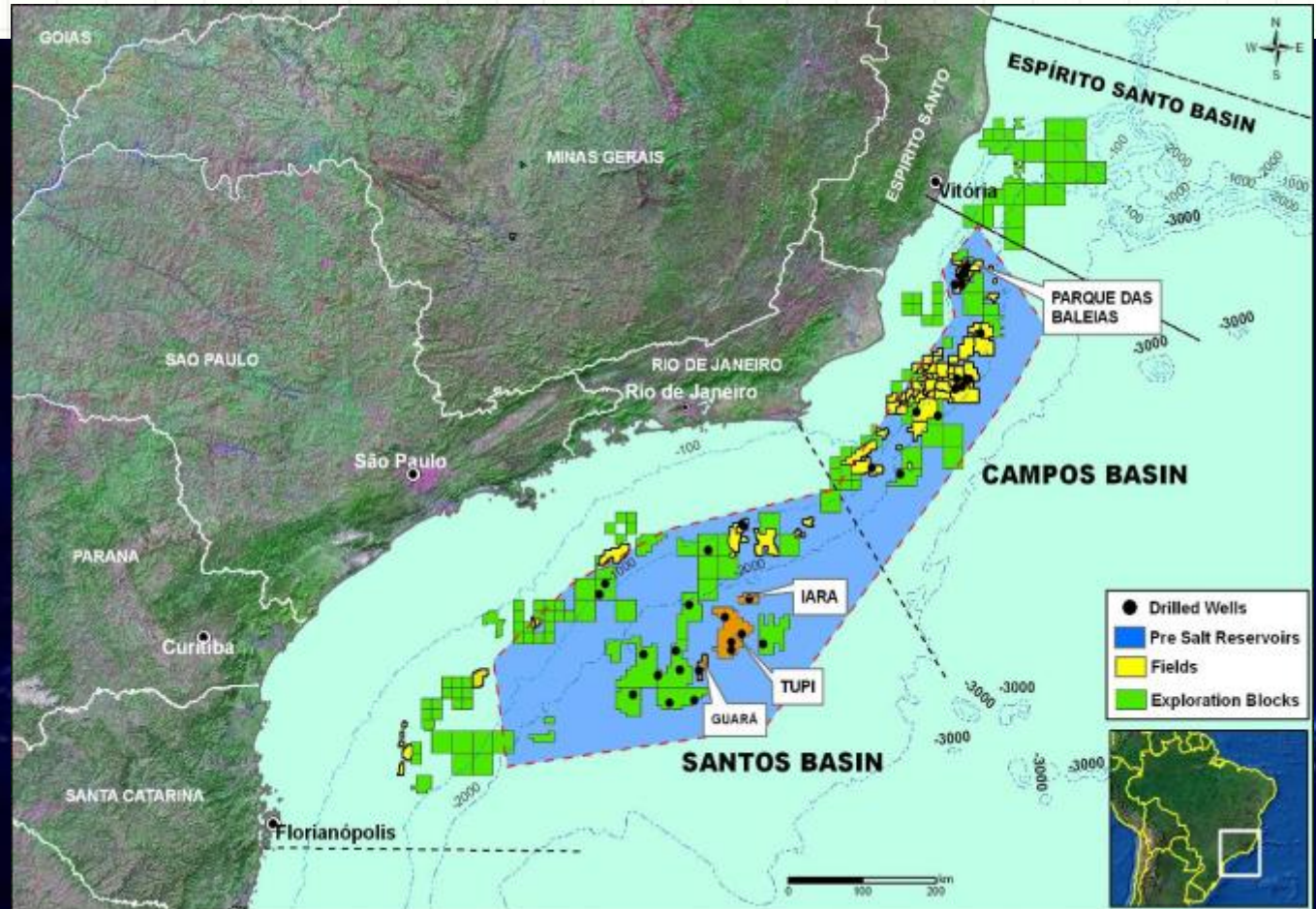


## Research Institutions that are part of the network:

UFRJ, PUC-RS, PUC-Rio, UFC, USP, UFMG, UFBA, INPE, UNICAMP, UFPR, UFRGS, FURG, IPEN, INT, UNESP

# Pre-Salt Province

The big blue area represents the expected Pre-salt location, with great potential for oil presence



# CO<sub>2</sub> Geological Storage in the Pre-salt

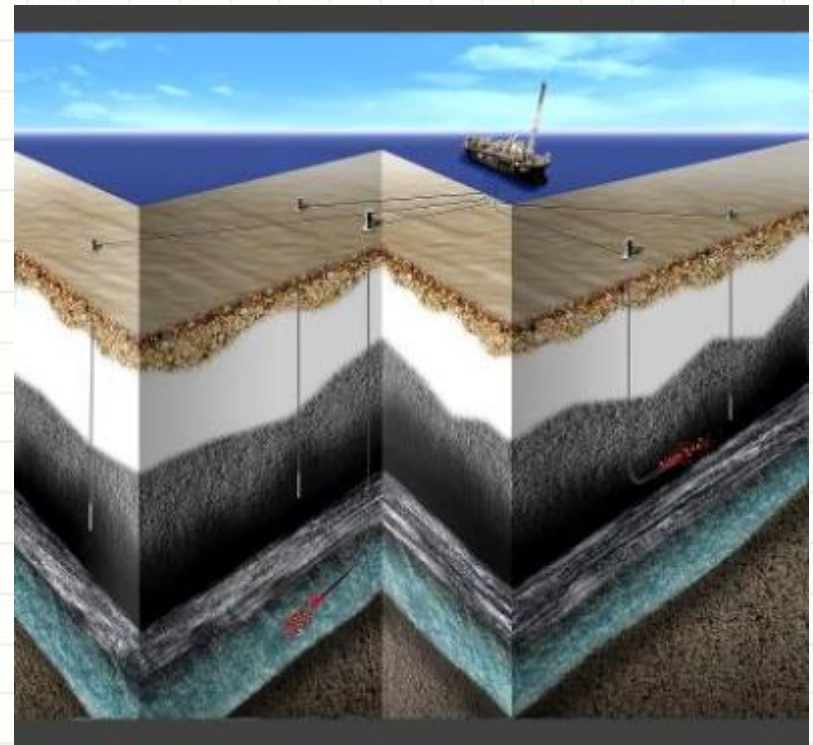
## Motivation:

High CO<sub>2</sub> content found in hydrocarbon in some wells

Petrobras and partners do not consider venting the CO<sub>2</sub> associated to the produced gas.

## Considered Alternatives:

- EOR in Pre-salt reservoirs
- Storage in Saline Aquifers





# CCS in the Pre-salt – Present Results

- CO<sub>2</sub> capture available technologies being used by major players: membranes and absorption (amines) - selection depends upon the CO<sub>2</sub> content;
- Development of new options more appropriated to the Pre-salt scenario together with providers and research institutions.



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