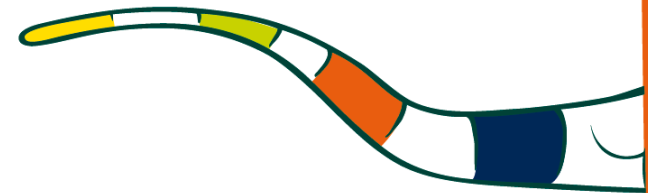




Global Methane Initiative (GMI) Oil & Gas Subcommittee meeting

2016 Ecopetrol progress to reduce methane emissions



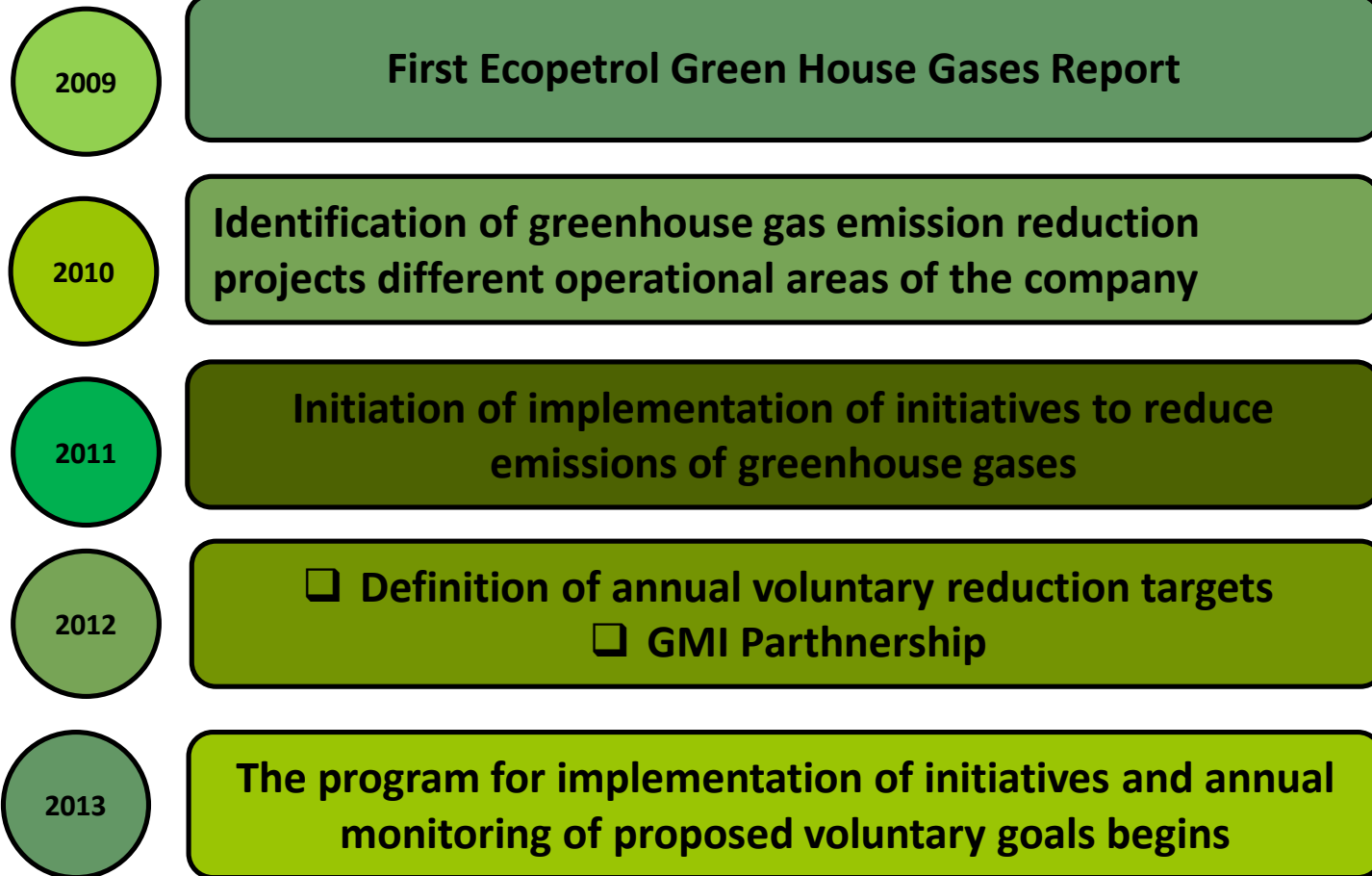
Ecopetrol efforts to reduce Methane emissions



THREE TYPES OF ACTIONS:

- PROCESS OPTIMIZATION
- GAS UTILIZATION FOR ELECTRICITY GENERATION
- SALE AND ENERGY EFFICIENCY

TIMELINE OF THE METHANE EMISSION REDUCTION PROGRAM AT ECOPETROL





Core methane emission source categories

- Natural gas driven pneumatic controls and pumps;
- Fugitive equipment and process leaks;
- Centrifugal compressors with “wet” (oil) seals;
- Reciprocating compressors rod seal/packing vents;
- Glycol dehydrators;
- Hydrocarbon liquid storage tanks;
- Well venting for liquids unloading;
- Well venting/flaring during well completion for hydraulically fractured wells;
- Casinghead gas venting



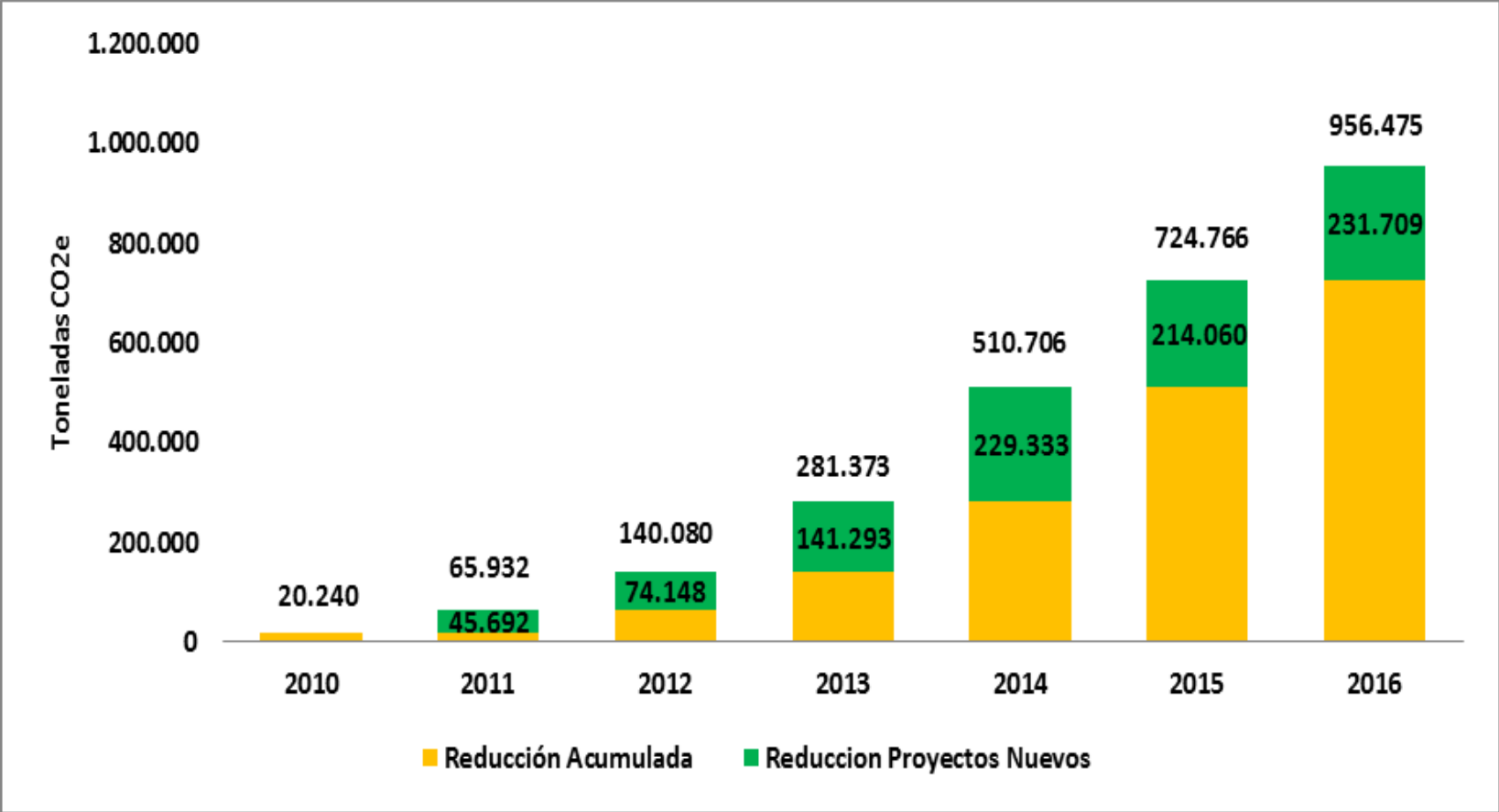
2016 Focussed

Casinghead gas venting





GHG EMISSION REDUCTIONS (TCO2EQ). 2010-2016 PERIOD



The projects implemented in 2016 achieved a GHG reduction of 231,709 tCO2e / year, exceeding by 39% the established target of 166,131 tCO2e / year. In addition to reducing the environmental impact of operations.

GREENHOUSE GAS EMISSION REDUCTION PROJECTS 2016

Casabe-Peñas Blancas Self-generation Project

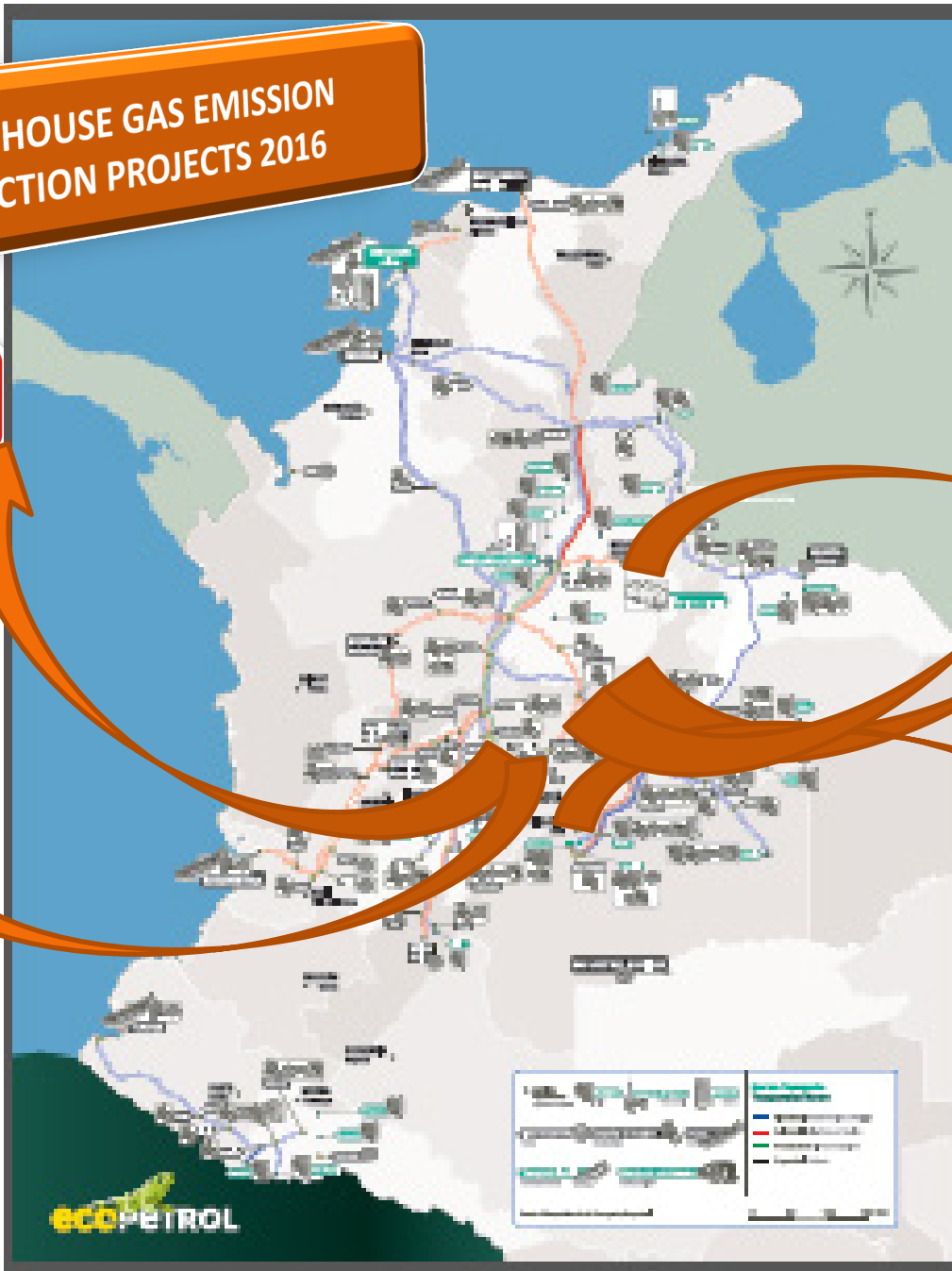
Cira-Infantas autogeneration project

Economic technical office electricity GRB

Gas interconnection, for sale Gas before venting

Tibu Casinghead connection project

Cira-Infantas Casinghead gas venting utilization



BUSINESS CASE- Autogeneracion from Gas Production



ENERGY EFFICIENCY

EFFICIENT USE OF PRODUCTION GAS MINIMIZE WASTE GAS IN FLARING AND VENTS

The energy supply model is made through a guaranteed energy availability contract where a third party is in charge of the design, supply, assembly, construction, testing, commissioning, operation and maintenance of the generation center, and Ecopetrol delivers the gas to Self-generation.

Economic benefit, with a lower cost tariff for the electric energy required in the operation and environmental benefits with the reduction of greenhouse gas emissions

AUTOGENERATION PROJECTS IN CIRA-TECA AND CASABE FIELD

ACHIEVE REDUCTIONS : 28.600 Ton CO2 eq./year. Economic Benefits: 3.4 MU\$D/year





LESSONS LEARNED GAS STAR PARTNERS VENTED GAS RECOVERY IN PRODUCTION FACILITIES AT THE OIL AND GAS SECTOR

EXECUTIVE SUMMARY

Natural gas is regularly lost when it is flared or released into the atmosphere during the oil and gas production process. Casinghead gas in extraction systems at production facilities has been identified as one of the main contributors of methane in the atmosphere, increasing the concentration of greenhouse gases causing global warming. It is a very common practice to lower well pressure to maintain and increase production. This vented gas is very valuable from the economic and energy point of view, so that its recovery is profitable for the companies. There are different practices at the operational level that allow the recovery and use of wellhead methane gas for use in power generation or for sale. This paper describes the best practices carried out in the Magdalena Medio field (Colombia) By Ecopetrol S.A, member of the Global Methane Initiative (GMI), Led by EPA (United States Environmental Protection Agency). The results of these better practices and have allowed advances in the company's voluntary effort to reduce its emissions Greenhouse gases, through the installation of beam gas compressors and the gas capture through Casing head gas from wells for use in gas plants and electric power generation.

THINGS COMMING



- To study methodologies for verification and Certification of the reduction achieved
- To Improve the mechanism to get the fugitive emissions to reduce the gap between the inventory and the reality
- To continue with the voluntary reduction program from facilities, and targests for each year.



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