

CARBON CAPTURE AND STORAGE PHILIPPINE REPORT

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OUTLINE

- ▶ **STATUS OF CCS**
- ▶ **POTENTIAL GEOLOGICAL STORAGE**
- ▶ **FUTURE PLANS**



STATUS: Strategy for a Low Carbon Future.

- BioFuels Act for use of alternative fuels
- Use of CNG and LPG for sustainable transport
- Natural Gas Infrastructure Development Program
- Use of green fuels in the National Renewable Energy Program
- The Philippine Energy Efficiency Project
- **Intended Nationally Determined Contributions (INDC) to the UN Framework Convention on Climate Change (UNFCCC) for COP21: Paris Climate Conference**



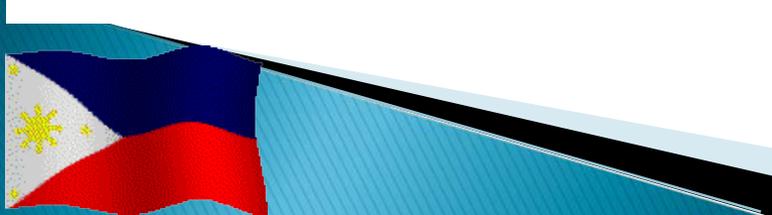
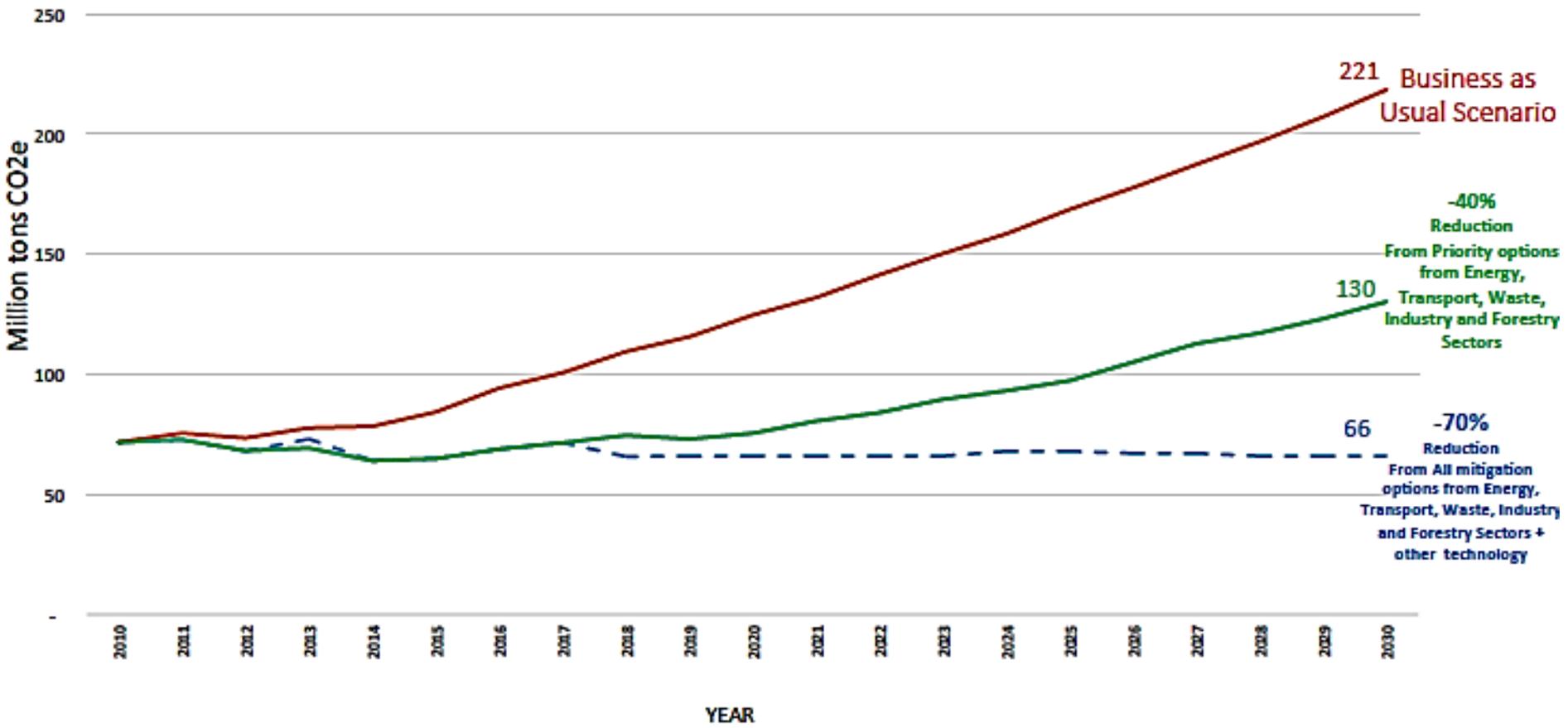
Intended Nationally Determined Contributions (INDC)

- Submitted to the UN Framework Convention on Climate Change (UNFCCC) last October 2015
- Aims to reduce carbon emissions of the country by 70% by 2030
- CO2 Emission Reduction will come from the following:
 - Energy
 - Transport
 - Waste
 - Forestry
 - Industry



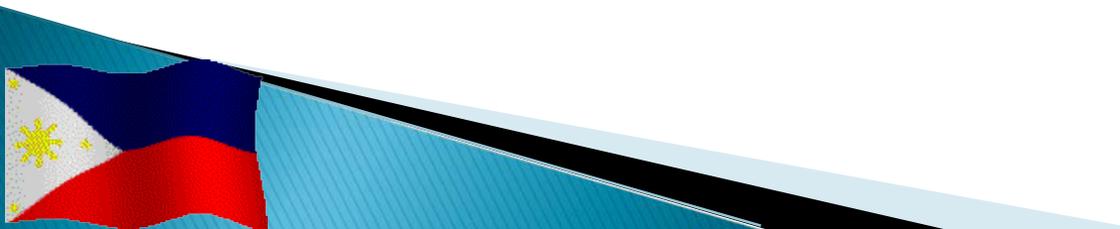
GHG Reduction

Absolute GHG Reduction (Conditional)
In MtCO₂e



CO₂ EMISSION

Electricity Generation	39.9%
Transport	35.6%
Industry	17.0%
Commercial, Agricultural and Residential	7.5%

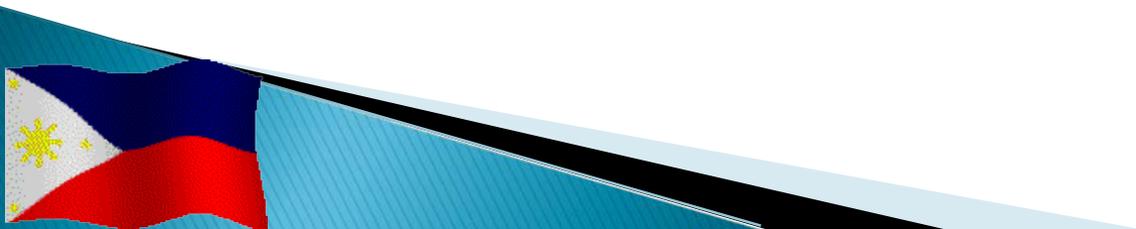


CARBON CAPTURE

Why no carbon capture projects in industrial processes or in operating power generation facilities in the Philippines?

Due to the many challenges such as:

- Technical
- Cost-competitiveness
- Environmental and public health risks
- Absence of policies mandating reductions in carbon emissions or specific laws for the purpose.



CARBON EMISSION SOURCES

CALABARZON (Cavite, Laguna, Batangas, Rizal, Quezon)

- comprises a disproportionately large share of the total energy-based GHG emissions of the country

Other sources:

- Industrial zones
- Coal-fired power plants
- Gas-fired power plant
- Cement plants
- Oil refinery



CARBON STORAGE

Identified potential CO₂ storage facilities:

- Sedimentary basins (conventional storage) – oil and gas fields
 - Effective capacity of the country: 0.3 Gt *
- Saline aquifers
 - Theoretical capacity of the country: 22.7 Gt *
- Unconventional storage sites such as geothermal field, ophiolites, coal beds and shales. *

**Asian Development Bank (2013). CO₂ Storage Estimate. Prospects for Carbon Capture and Storage in Southeast Asia, p. 26, 39-40. Mandaluyong City, Philippines.*



Geothermal Fields

Geothermal fields and prospects would need further study or pilot testing for CCS especially in areas that are within reasonable distance of identified CO₂ sources.

Ophiolites

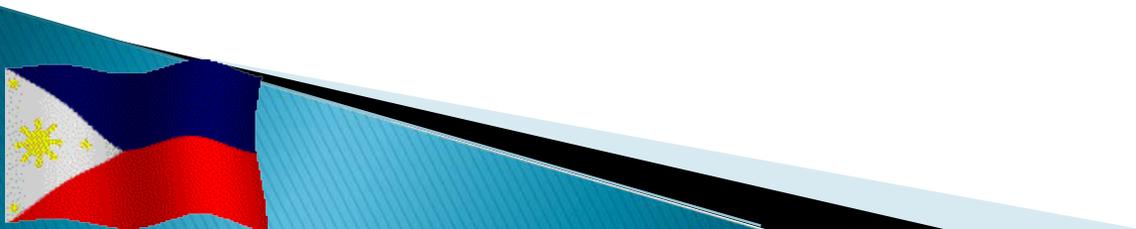
The Zambales Ophiolite, located west of the Central Luzon Basin, is the most promising among the ophiolite bodies for storage. However, substantial research on permeability and sealing is needed to assess their potential for carbon storage.



Coal Beds and Shales

Enhanced Coal-Bed Methane (ECBM) recovery in coal mines is being conducted by the government.

Coal mines, however, are located far from CO₂ emission sources.



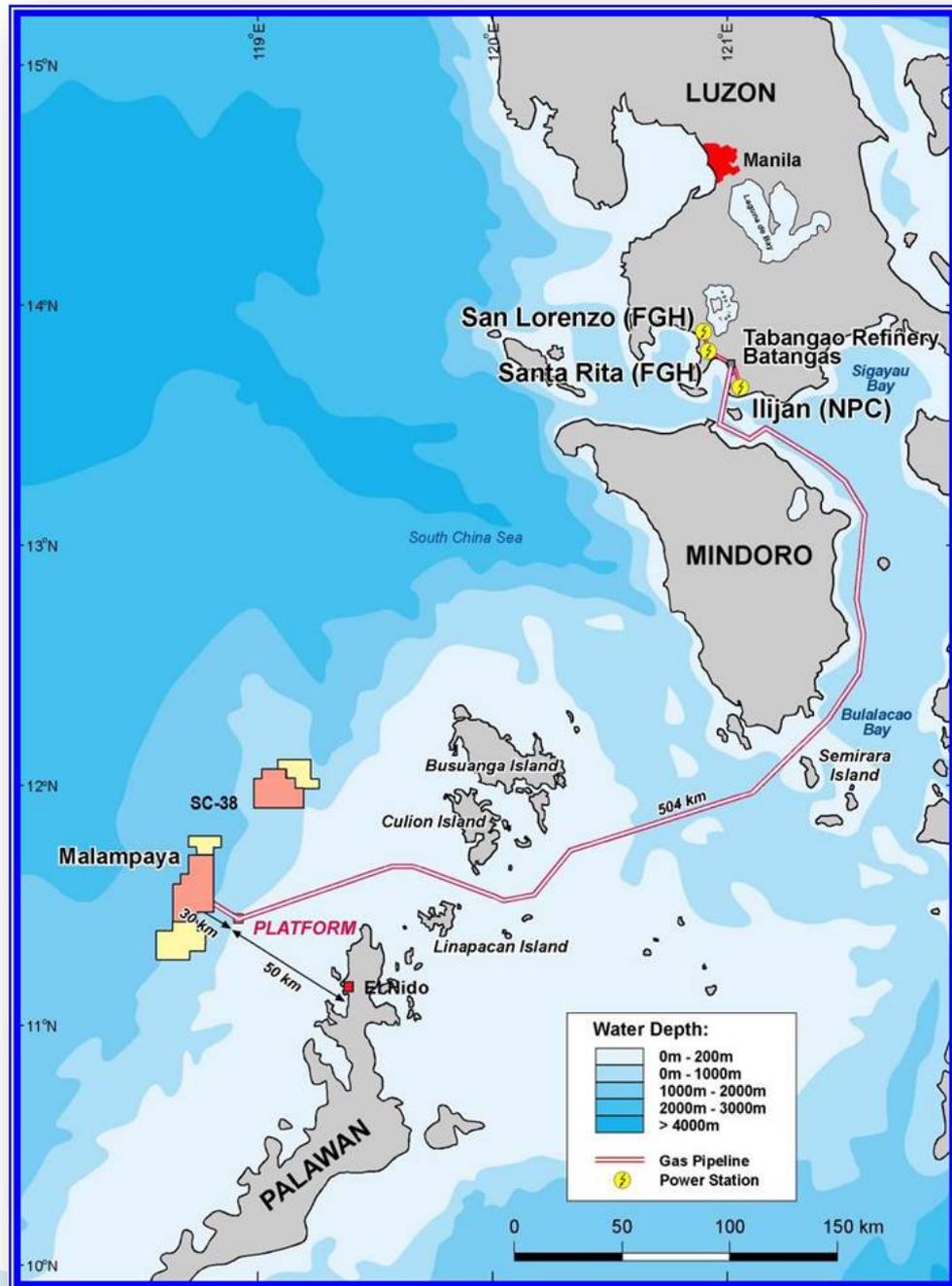
CARBON TRANSPORT

In the absence of other viable storage options in the near – and long – term, it is logical and practical to use the existing 504-km natural gas pipeline for transporting CO₂ from the CALABARZON Gas Fields to Malampaya

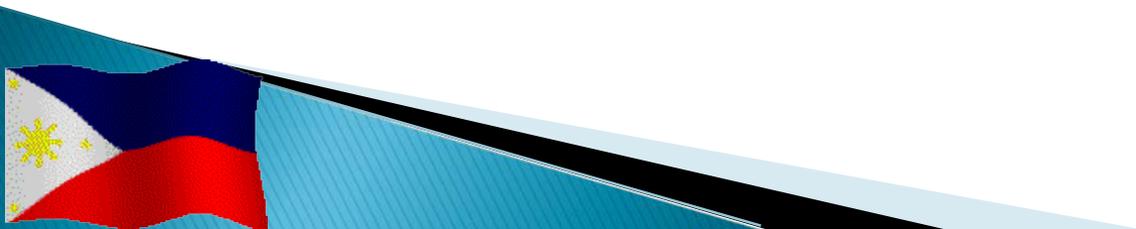
- Proposed gas fields will not be available for CO₂ storage before 2024
- Study on the compatibility of current pipeline for CO₂ transport?



**Malampaya
gas field can
accommodate
an annual
CO₂ emission
of 11 MT/year**

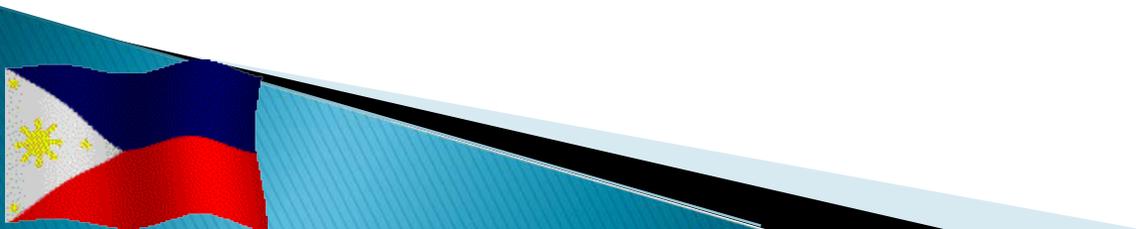


POLICY AND REGULATORY FRAMEWORK



POLICY

Specific provisions of law are needed to address, among others, ownership and long term steward of injected CO₂ on public land; containment structures, and monitoring, measurement and verification requirements.



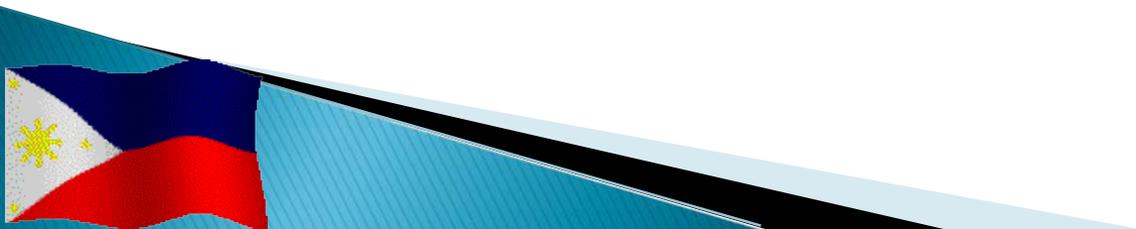
FUTURE PLANS

1. There are limited opportunities for large-scale deployment of CCS in the Philippines before 2024.
2. To focus the pilot on the technical details of reversing the circulation from the Malampaya OGP in Batangas to the Malampaya carbon storage site.
3. To undertake early work to pilot and test unconventional storage options (e.g. Geothermal Fields and ophiolites) for CO₂ generators that may not be able to easily access conventional CCS storage such as Malampaya.
4. Actively attend workshops related to CCS to be updated with the developments, technology transfer and future deployment of CCS in the country.



FUTURE PLANS

Government needs to demonstrate its commitment to pursuing CCS through public statements, funding of CCS activities at a low but effective level, institution of a basic “capture ready” policy and initiation of public engagement on CCS.



Thank You!

