

# COAL MINE METHANE AND ITS STRATEGIC ROLE IN CLIMATE CHANGE MITIGATION – CMM POLICIES IN COLOMBIA

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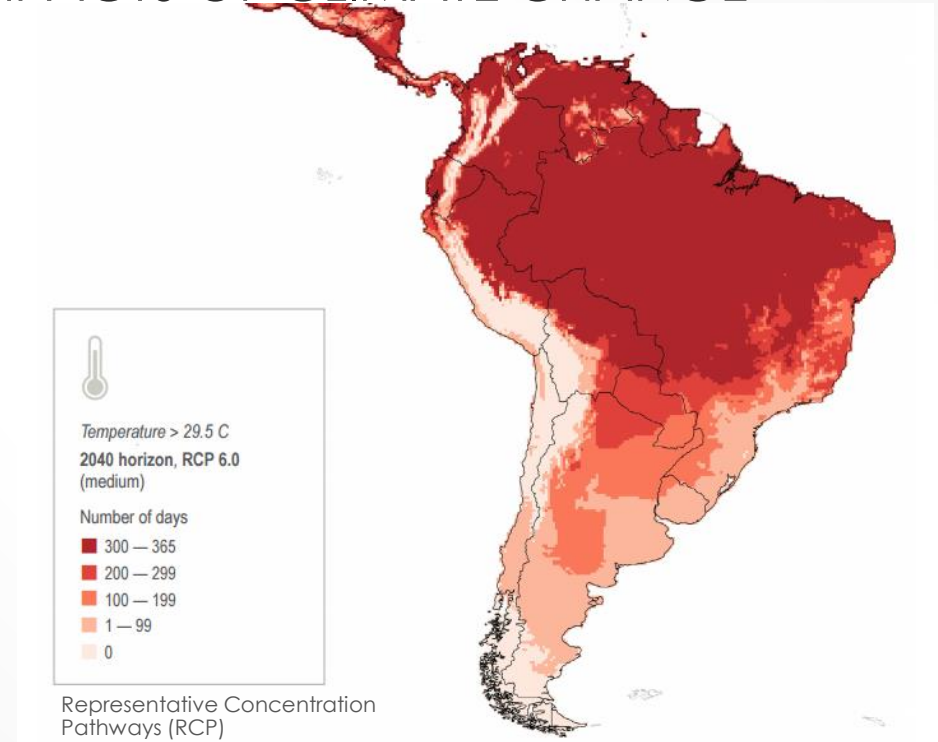
# BACKGROUND

CHARACTERIZED BY GREAT DIVERSITY OF ECOSYSTEMS



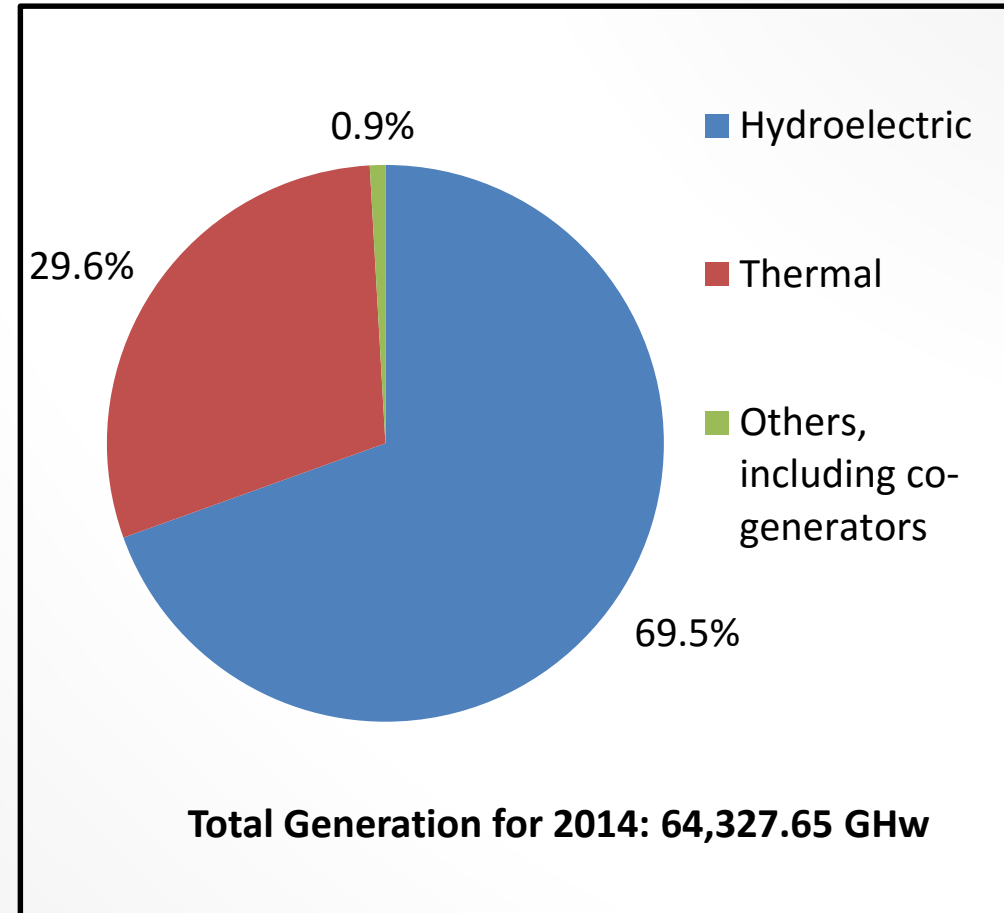
- 3 mountain ranges
- 6 geographic regions
- Large cultural diversity

CLIMATE DEPENDENT ECONOMY; HIGHLY VULNERABLE AND SENSITIVE TO ADVERSE IMPACTS OF CLIMATE CHANGE



# CLIMATE DEPENDENT ECONOMY

- Electricity generating capacity is dominated by hydropower
- Due to the effects of El Niño, hydropower is operating at 60% of capacity
- Between 1998 – 2012, 90% of disasters were related to hydro-climatological phenomenon
- Droughts impact agriculture and livestock production



# CLIMATE DEPENDENT ECONOMY

- First South American country to release New Climate Plan ahead of Paris COP 21
- Current and future impacts of climate change on Colombia:
  - Economy – agricultural, livestock, the need to import energy
  - Energy security – energy independence
  - National security – peace building among Colombians i.e., increases the separation of social classes
  - Poverty –
    - 22% of the population: multidimensional poverty i.e., poverty beyond income-based factors to include education, health and living standards
    - 29% of the population: monetary poverty

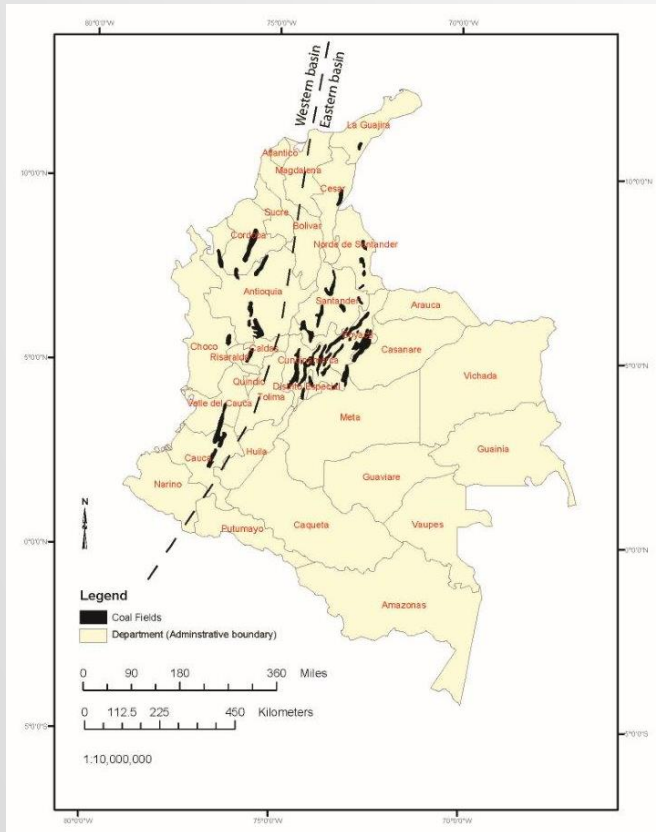
# THE ENERGY SECTOR CHALLENGES

Diversity in the energy mix is necessary, but there are challenges to diversification

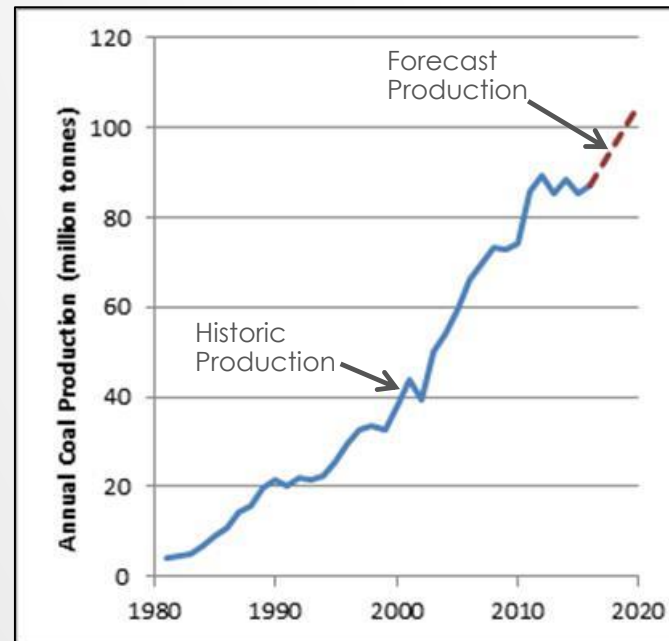
- The Economist Intelligence Unit projects fossil fuels will continue to play a large role in Colombia's energy mix for the coming decades
  - New coal and natural gas-fired power plants are planned
- Additional large hydro-plants will be brought online in the next couple of years, but will still be adversely impacted by climate change (drought)
- Renewable sources will need to comprise a larger percentage of the energy mix
  - Several of the large population centers are located in mountainous terrain, where solar and wind power generation systems are impractical

# COAL IN COLOMBIA

## COAL FIELDS



## COAL PRODUCTION



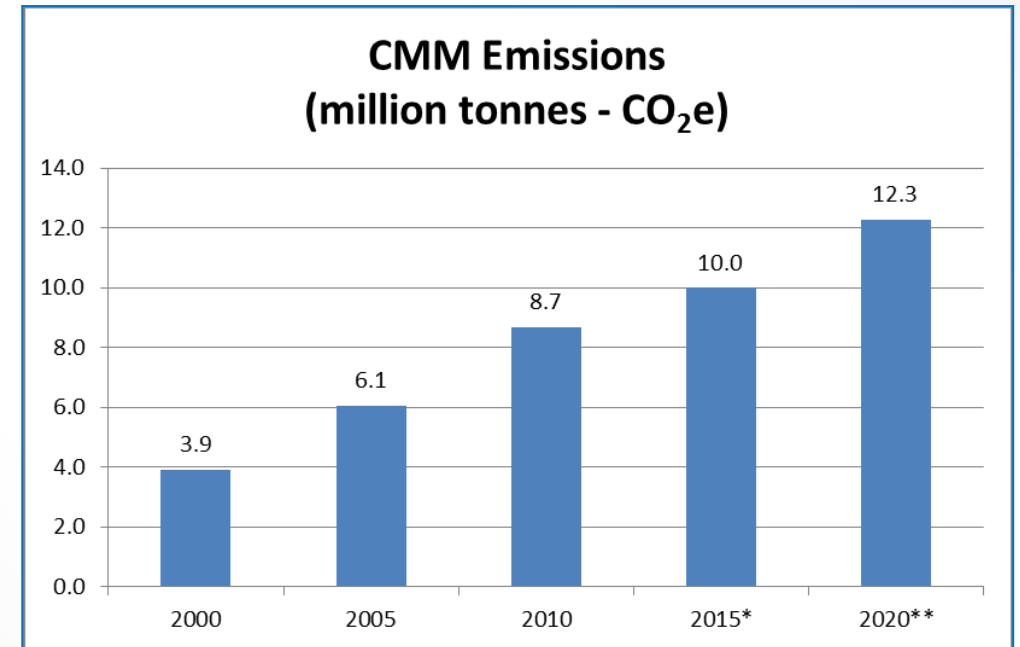
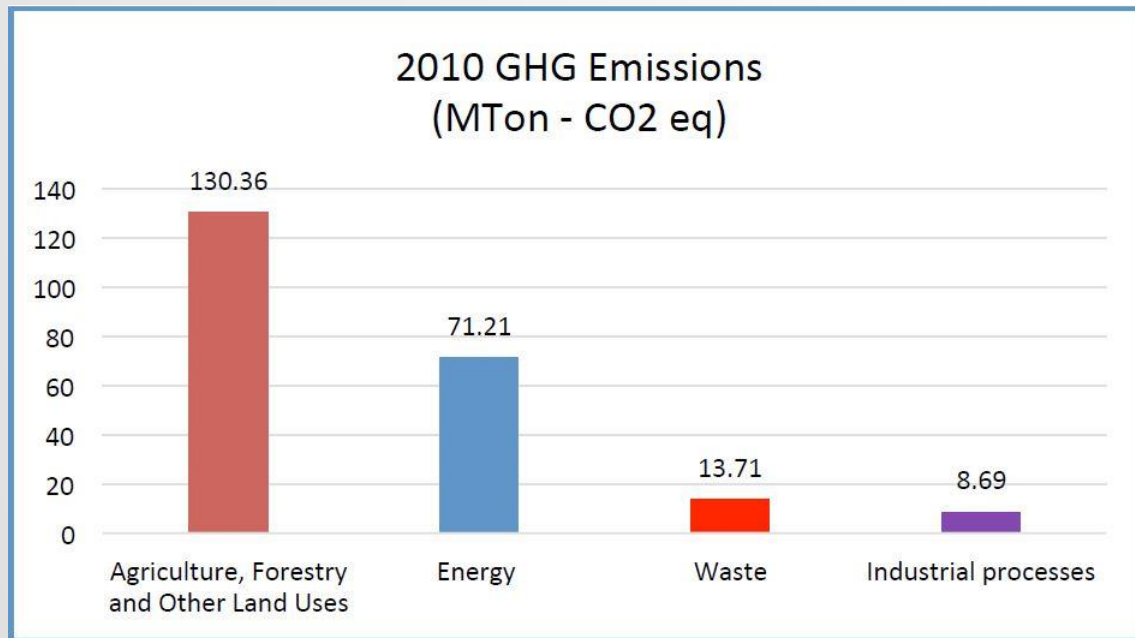
- Colombia's estimated proved reserves are 6,746 million tonnes (2015) - anthracite and bituminous
- Produced 87.2 million tonnes (2016)
- 92% of production is from three companies (2016)
  - Cerrejón
  - Drummond
  - Prodeco
- Production continues to rise because of hydropower's fluctuating performance and new coal-fired power plants coming online with plans for more
- Majority of coal produced from surface mines, but mining will move underground



# GREENHOUSE GAS EMISSIONS

## NDC BASELINE COUNTRYWIDE EMISSIONS

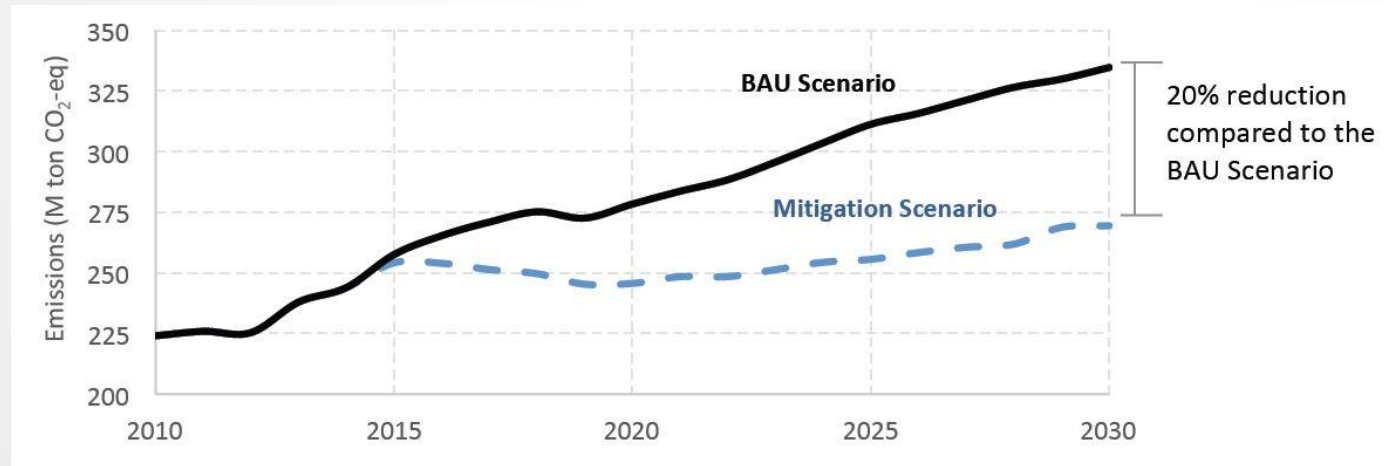
## COAL MINE METHANE EMISSIONS



NOTE: \*estimated, \*\*forecasted

- CMM emissions are 12.2 percent of total energy GHG emissions in 2010

# COLOMBIA'S COMMITMENT TO REDUCING GHG EMISSIONS



- NDC Commitment: reduce emissions by 2030 through mitigation and adaptation actions by increasing resilience (reducing poverty) and reducing the carbon intensity in the economy
  - 20% reduction compared to business as usual (BAU)
  - 30% reduction with international support
- Estimated per capita emission in 2030
  - BAU: 5.8 TCO<sub>2</sub>e
  - Compliance with NDC (20% reduction): 4.6 TCO<sub>2</sub>e



# EXISTING CLIMATE CHANGE POLICIES AND REGULATIONS

- Since 2010 development of the following climate policies:
  - Policy Document CONPES 3700
  - Colombian Low Carbon Development Strategy (CLDS)
  - National Strategy for Reducing Emissions from Deforestation and Forest Degradation (ENREDD + Strategy)
  - National Adaptation Plan for Climate Change
- Since 2013 working on developing a system for monitoring, reporting and verifying of GHG emissions reductions and climate financing
- In 2014 formulated its National Climate Change Policy - developing mitigation and adaptation actions
  - Develop its National Development Plan (NDP) 2014 – 2018 which includes a **Green Growth Strategy**: will submit under the global agreement being negotiated under the UNFCCC
- Eight Sectoral Mitigation Action Plans (SMAPs) aimed to maximize the carbon-efficiency of economic activities at the national and sectoral levels which contribute to social and economic development

# NDC IMPLEMENTATION APPROACH

- Create a network between universities and research groups to strategize on issues to achieve proposed mitigation and adaptation goals
- Promote private investment, private-public partnerships and seek foreign investment with an emphasis on scientific research and technology transfer
- Develop an agenda that would promote research, innovation and technological development on climate change topics
- Integrate national institutes and other entities with relevant UNFCCC mechanisms for technology transfer
- Create network between other Latin American countries to share knowledge regarding adaptation and mitigation to climate change
- Integrate the National Government with regional governments to formulate and implement comprehensive climate change plans that foster competitive and sustainable cities
- Work with the financial sector to develop solutions to the country's environment and social challenges; identify financing sources and define a climate-finance strategy

# CBM/CMM IN COLOMBIA

- Drummond is producing methane from coals located within their coal license as well as Cerrejón's coal license
- Gecelca drilled test borehole in Córdoba Department to characterize coal measures for potential CBM/CMM development
- Water monitoring wells located within coal leases in Córdoba Department displayed evidence of gas bubbling to the surface
- Methane explosions at underground mines
  - 2010 methane explosion at the San Fernando mine in Boyacá Department, killing 73 miners.
  - In 2011 methane explosion at the La Preciosa Mine in Norte de Santander Department, killing 20 miners. In 2007, at the same mine 31 miners were killed due to methane explosion.
  - In 2015, four miners were killed in a methane explosion at the San Patricio Mine in Boyacá.
  - The biggest loss of life in a mining accident in modern Colombia occurred in 1977 when 85 people died in another mine in Boyacá.

# INCLUDING CMM IN ENVIRONMENTAL STRATEGIES

- Government of Colombia offers incentives for unconventional gas development (Law 756 of 2002)
- Assembled a working group to investigate and address underground CMM emissions – MME, ANH, ANM and UPME
- Energy Mining Planning Unit (UPME), attached to the Ministry of Mines and Energy– currently investigating technologies that are applicable to VAM
- Colombia Geological Survey hosting a series of seminars on CBM and CMM

# GMI'S ROLE IN SUPPORTING CMM MITIGATION STRATEGIES IN COLOMBIA

- Colombia is a member of GMI
- Currently developing a countrywide energy market report
- Host workshops in-country promoting CMM development through dissemination of information about existing projects and technologies
- Assistance with development of proposed legislation/regulation - Resolution 90325 of 2014

# BENEFITS OF CMM PROJECTS

- More sustainable development of natural resources
- Tangible and intangible effects measured on both regional and countrywide scale
  - Provides access to and creates a market from additional sources of affordable and clean energy
  - Employment and educational opportunities improve, thereby reducing inequalities between rural and urban populations, alleviating poverty/increasing resilience
  - Benefits from new industry and infrastructure established
  - Reduction of GHG emissions that are the result of capturing methane that would otherwise escape to the atmosphere during coal mining – surface & underground mining
  - Support the United Nation's Sustainable Development goals, which Colombia has adopted



# NEXT STEPS?

- Begin to focus on emission reductions from surface mines – the majority of coal production comes from surface mines
- Continue education, dissemination information about technology and policies in place that encourage development of CMM resources
- Promote the development of the co-located coalbed methane and natural gas with the coal resources in active and future coal licenses

## Test Borehole in Córdoba



# ACKNOWLEDGEMENTS

Global Methane Initiative

Ms. Felicia Ruiz, USEPA

James S Marshall, Vice President, Raven Ridge Resources

Candice Long, Staff Geoscientist, Raven Ridge Resources

## Reference:

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<https://publications.iadb.org/handle/11319/7746#sthash.VwxSjwg1.dpuf>

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