



# Methane to Markets

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## *Partnership in Action*

### U.S. and Ecuador Landfill Biogas Project and Oil & Gas Systems Support

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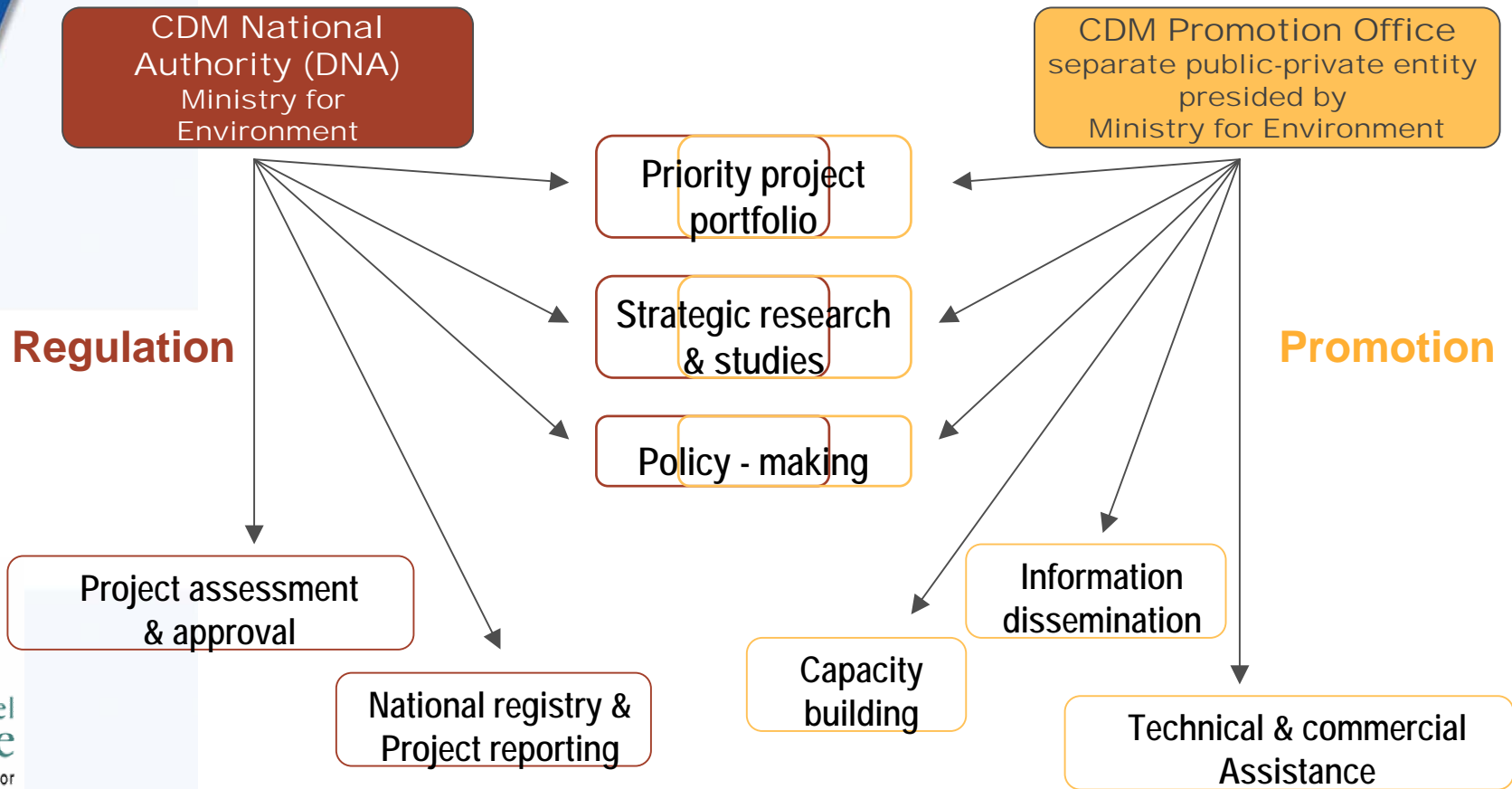
# *Milestones related to the CDM*



- Ratification y adoption of the UNFCCC (1994) and the Kyoto Protocol (1999)
- Establishment of the National Committee of the Climate (interinstitutional platform)
- Institutional setting for the CDM
- Up to date: 9 projects registered by the EB of the CDM (May 2007)



# National institutional arrangement for Carbon Markets, especially the CDM



# *A Partnership is Formed*

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- Ecuador joined Methane to Markets *November 2005*
- Ministerio de Ambiente, Ecuador (MAE) formed a partnership with U.S. EPA's Landfill Methane Outreach Program (LMOP) *June 2006*
- LMOP and MAE launched activities under the partnership *August 2006*



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# U.S. - Ecuador Partnership Objectives

- Opportunity
  - Technical assessments & pre-feasibility studies of selected disposal sites
  - Financial impacts and opportunities for landfill biogas projects
  - Disseminate understanding of the potential for landfill biogas projects
  - Local and practical training (capacity building)
- Tools and Resources
  - Development of an Ecuador specific Landfill Biogas Model
  - Development of landfill biogas assessment reports and pre-feasibility studies
- Benefits
  - Local and global environmental and economic benefits through development of a landfill biogas projects
  - Social through skills transfer



# Launching Activities

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- MAE conducted survey of Ecuador landfills using the Methane to Markets template for profiling landfills. *July 2006*
- MAE used the resulting data to identify 5 landfill candidates for evaluation. *August 2006*
- LMOP visited the sites to confirm profile data and gather additional data. *October 2006*
- Two landfills were selected as good candidates for further technical and economical evaluation, including physical field trials. *November 2006*



# Measuring methane concentrations at Loja LF, Loja. October 2006



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# Measuring methane concentrations and leachate levels at Pichacay LF, Cuenca. October 2006



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# Measuring methane concentrations at El Valle LF, Cuenca. October 2006



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# *Current Progress and Anticipated Outcomes*

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- Pumping trial completed in Cuenca
- Another trial currently underway in Guayaquil
- Site assessment reports are being prepared for other three sites
- The landfills may be featured at the Partnership Expo 2007
- Development of a minimum of two landfill biogas projects by 2008



# *Drilling gas wells for pump test at Pichacay LF, Cuenca. March 2007*



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# *Pipes connecting gas wells to flow measurement and flare station. Las Iguanas LF, Guayaquil. April 2007*



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# *Portable flow measurement and flare station. Pichacay LF, Cuenca. March 2007*



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# Flow metering and recording instruments on portable measurement and flare station. Las Iguanas LF, Guayaquil. April 2007



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# *Flaring landfill gas at the flow measurement and flare station. Las Iguanas LF, Guayaquil. April 2007*



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# *Preliminary Lessons Learned*

- Many Ecuador landfills contain significant leachate, requiring closer well spacing
- Both test sites had good gas flows and methane concentrations
- Local drilling companies have limited experience drilling in waste
  - Increases effort required to install a collection system
  - Suggests benefits for alternatives to conventional wells
- Chimney gas vents can be converted to productive gas wells using simple modifications





# Converting gas vent to gas collection well at Pichacay LF, Cuenca. March 2007



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# Converting gas vent to gas collection well at Pichacay LF, Cuenca. March 2007



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# Completed gas collection well from a converted gas vent. Pichacay LF, Cuenca. March 2007



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# Upcoming Landfill Activities

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- Development of Ecuador Landfill Biogas Model
  - Oriented to Ecuador municipal officials, landfill owners and other interested parties
  - Designed to accommodate aerobic conditions on poorly capped sites, and leachate saturated sites
- Workshop in Ecuador for training personnel (August/September 2007)
  - Landfill biogas basics and model tutorial
  - Oriented to Ecuador municipal officials and landfill owners and staff



# Launching Oil & Gas Activities

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- Held gas flaring and venting reduction conference with PetroEcuador. *January 2007*
- Presented Methane to Markets oil and gas opportunities to over ten public and private sector companies. *January 2007*
  - Included coordination with World Bank's Global Gas Flaring Reduction partnership to capture carbon market opportunities in projects.
- Actively seeking engagement with oil and gas companies to begin emission reduction opportunity assessment. *On-Going*



# Thank you for your time....

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