The Landfill Project Reporting Protocol

CCAR Workshop: Registering Voluntary Reduction Projects

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Overview

- Project accounting frameworks
- Landfill protocol development process
- Introduction to Landfill Protocol

Project Accounting Frameworks

- Bottom-up (project-specific) approach
  - Developed on case-by-case basis by project developer
  - Represent conditions for a single project
- Top-down (standardized) approach
  - Criteria developed by GHG program
  - Applicable to multiple projects within sector

The Performance Standard

- There are several benefits to a top-down approach
  - Low up-front costs to project developers
  - Efficient review and approval of projects
  - Transparency and consistency
  - Same approach applies across projects
  - Prescriptive guidance to eliminate judgment calls
  - But... high initial resource investment to program

Landfill Protocol Development Process

- Literature review and draft protocol
  - Consistent with RGGI, US EPA, CDM and other offset protocol approaches
  - July - September 2007
- Convene multi-stakeholder workgroup and receive workgroup feedback
  - September - October 2007
- Public & workgroup review period
  - October - November 2007
- Present to CCAR Board for adoption
  - November 29, 2007

Workgroup Participant Affiliations

- CARB
- CIWMB
- Bay Area AQMD
- Californians Against Waste
- Covanta Energy
- CRRC
- EcoSecurities
- Environmental Defense
- ERM
- LACSD
- NSWMA
- NorCal Waste
- Rural Counties – ESJPA
- Sacramento County
- SCS Engineers
- SWANA
- US EPA
- Veolia
- Waste Connections
- Waste Management

Project Protocol Components

- Define the GHG reduction project
- Determine eligibility (e.g., "additionality")
- Establish the accounting boundary
- Calculate GHG reductions
  - Baseline emissions
  - Project emissions
- Verify project performance
- Register GHG reductions

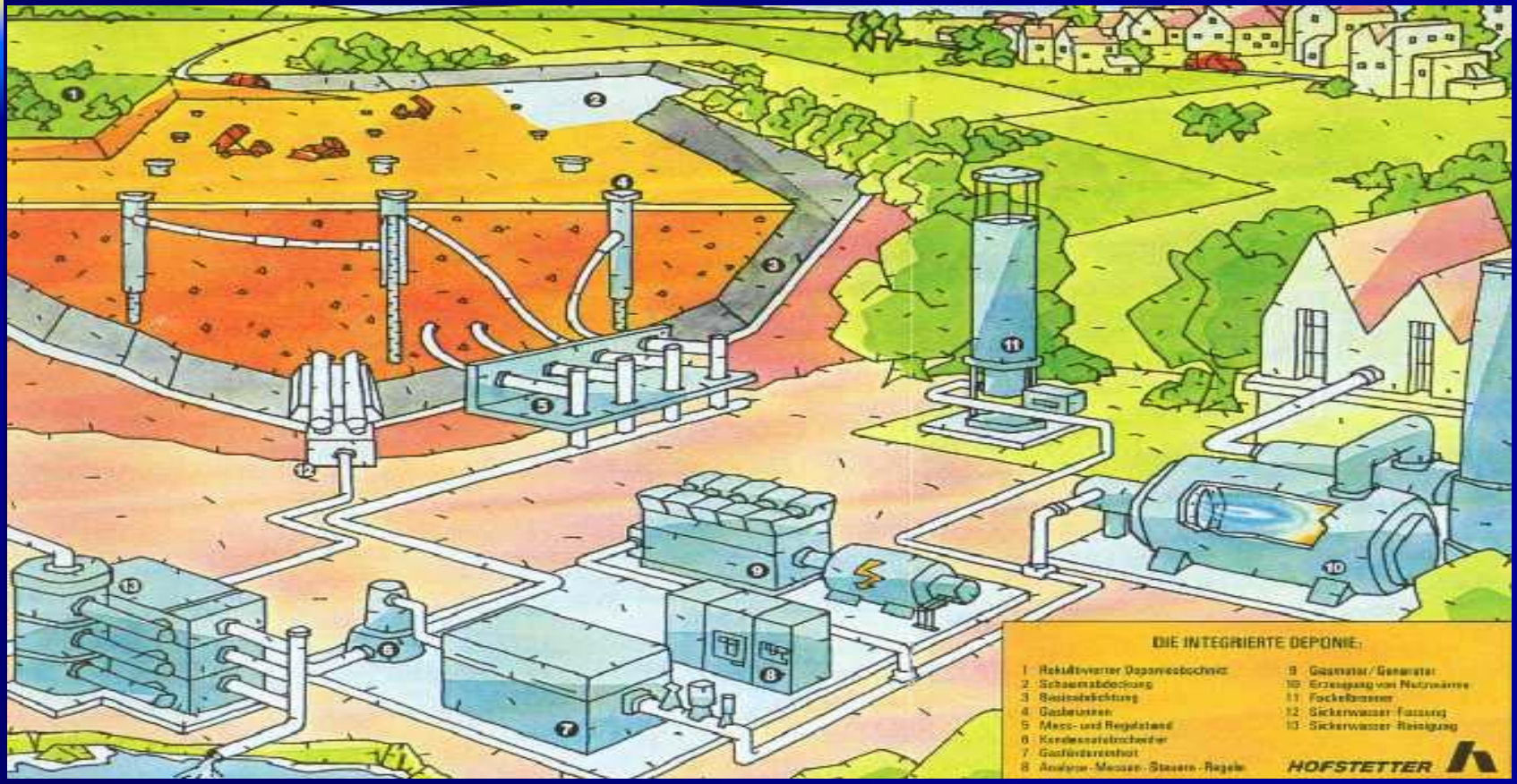
The Landfill GHG Reduction Project Defined

- The voluntary installation of a landfill gas control system for capturing and combusting methane gas that would have otherwise been emitted to the atmosphere as fugitive emissions from the landfill surface

LFG Control System

- Wells, pipes, blowers, caps and other technologies that enable or enhance the collection of landfill gas and convey it to a combustion technology.
- Combustion of the LFG by:
  - burning/flaring it
  - combusting it in an engine or boiler to generate energy
  - or purify & injecting it into natural gas pipelines

LFG Control System



LFG Well Head

Determining Eligibility

(i.e. additionality)

- Eligibility in five steps:
  - Step 1: Performance threshold assessment
    - Assessment of the market penetration of technology to determine if BAU?
  - Step 2: Regulatory test
    - Is it required by law?
    - Narrows pool of eligible landfills to landfills of small – medium size

Eligibility Continued

- Step 3: Project Start Date
  - Projects starting operation after Jan 1, 2001
- Step 4: Project Location
  - Must be based in the United States
- Step 5: Regulatory Compliance
  - Project activity must comply with all air & water quality regulations

California Projects

- CARB & CIWMB developing control measure to require gas collection and control systems on landfills where not currently required.
- Regulatory adoption date = December 2008
- This limits applicability of protocol in CA
- 30 to 40 landfills in CA that could register reduction projects if LFG control system installed and operational by December 2008

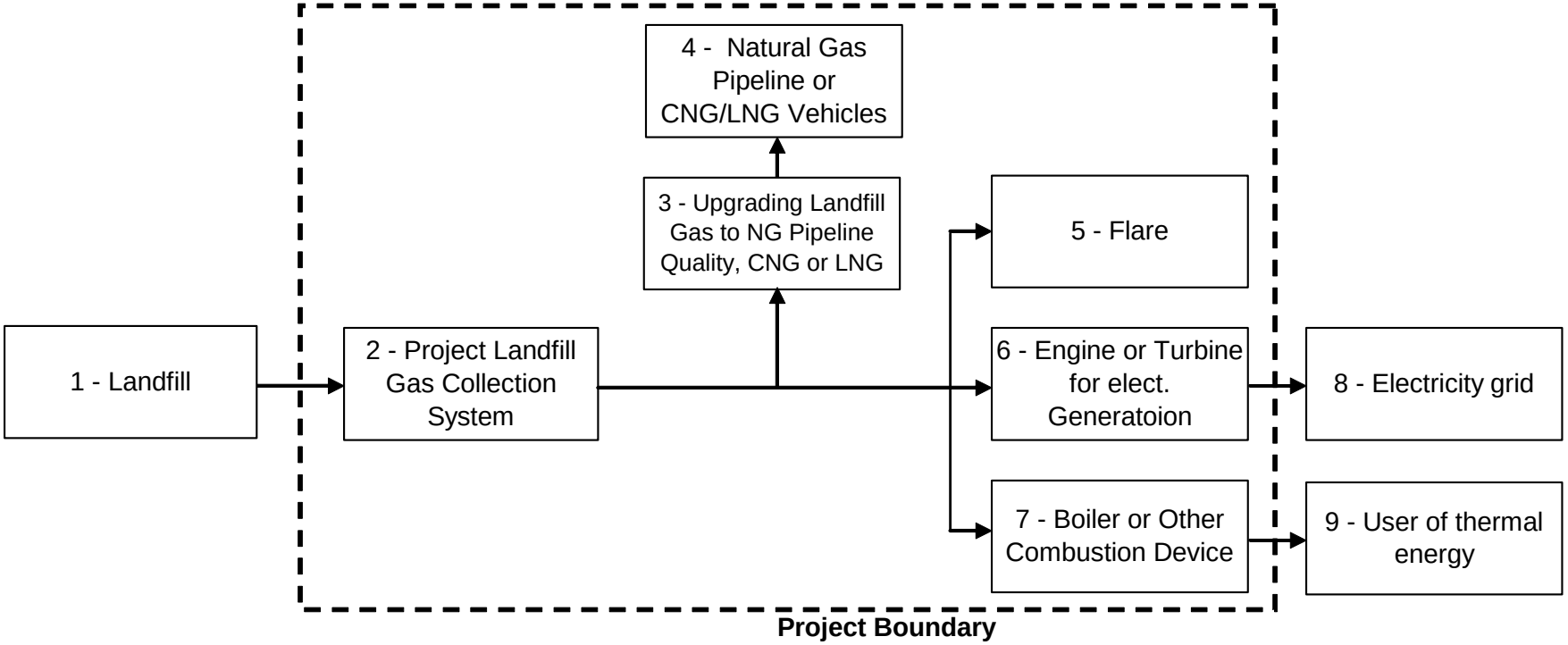
NMOC Threshold

- Landfill regulation often performance based
- For example, options for compliance with air regulations for NMOC
  - LFG combustion control technology (methane destroyed)
  - Carbon adsorption (methane released to atmosphere)
- Very few landfill use carbon adsorption
  - Approximately 4 in CA & 30-40 in U.S.
- If landfill chooses LFG combustion instead of carbon adsorption to control NMOC emissions – project could be considered additional
- Carbon adsorption operating costs increase as the NMOC emissions rate increases
  - Threshold where combustion technology is most practical approach
- Currently 600 pounds NMOC/month
- Under review and will likely be modified

Project Life

- 10 Year Project Life irrespective of changes in performance standard
  - If new regulations are enacted requiring a LFG control system at project location:
    - Emission reductions can be reported to the Registry up until the date that the landfill gas control system is required to be operational by regulation

Project Accounting Boundary



Calculating Emission Reductions

- Baseline scenario = all uncontrolled methane emissions are released to the atmosphere.
- No widely accepted method exists for determining the total amount of uncontrolled landfill gas emissions to the atmosphere from landfills.

Calculating Emission Reductions, cont.

- Project GHG emissions reductions equal:
  - Total amount of methane collected from the landfill, metered and combusted by the project landfill gas control system, minus
    - Methane oxidized by soil in baseline scenario
    - Effective radius of influence adjustment
      - Only for additional projects at facility where collection system already in place.
    - Discount factor for use of handheld CH4 analyzer
    - Carbon dioxide and methane from fossil fuel combustion
    - Indirect carbon dioxide from grid electricity use

Emissions Excluded from Protocol

- What emissions are excluded?
  - Biogenic carbon dioxide resulting from burning LFG
  - Indirect emissions benefits from displacing fossil fuel based grid electricity
  - N2O emissions (considered minimal)

Protocol Details

- Monitoring
  - Direct measurement
    - Continuous rate of LFG flow
    - Methane concentration of LFG sent to the combustion device
      - Continuous or hand-held measurement allowed
- No "de minimis" reporting provision
- Third Party Verification
  - Annual verification by a Registry approved entity

Protocol as Living Document

- Currently, bioreactor landfills are not allowed to register reductions using this protocol. May consider inclusion in future versions as information becomes available.
- NMOC threshold under review and will likely be updated in next version.
- Protocol currently does not allow for use of open flares. Next version will include default value for use of open flare.

Contact Information

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