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Practicalities of Implementing and Permitting a Landfill Methane Project

CCAR Climate Action Reserve
Workshop on California Landfill Methane Projects
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Design-Build vs. Construction Bid

- Traditional Construction Bid
  - Engineer creates detailed plans and specifications
  - Formal bids solicited and awarded to lowest bidder
  - Construction quality assurance (CQA) provided by engineer
  - Owner represented by engineer, who is independent of construction company
  - Formal process for change orders and final approval of construction

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Design-Build vs. Bid (cont.)

- Design-Build
  - Engineer creates preliminary design
  - Same company provides design and construction
  - Construction bid based on preliminary design
  - More changes in the field; field engineering
  - No formal CQA provided
  - More involvement from owner

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Design-Build vs. Bid (cont.)

- Hybrid Options
  - Competitive design-build with preliminary design or lowest unit pricing
  - Bid construction work to small group of pre-qualified construction firms
  - Use third-party firm for CQA or as owner's representative
  - Purchase major equipment separately; owner acts as general contractor
  - Use same firm that is providing O&M of existing GCCS to economize costs

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Design-Build vs. Bid (cont.)

- Design-build reduces time for entire process by 3 to 6 months; high end is for municipalities
- Design-build saves cost of fully detailed construction specifications and drawings
- Design-build provides single company responsible for entire project
- Construction bid has less change orders and changes in field

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Design-Build vs. Bid (cont.)

- Construction bid ensures lowest construction price
- Construction bid allows engineer to who designed GCCS to ensure it is installed properly
- Third-party engineer represents owner against contractor
- Hybrid options can be used to further optimize either approach

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Construction Timelines

- New GCCS with Flare: 6 to 12 months (flare longest lead time)
- Expanded GCCS: 2 to 6 months (no flare)
- LFG-to-Energy Plant: 16 to 24 months
- High end of range includes formal construction bid process

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Construction Timelines (cont.)

- Typical Obstacles
  - Air permitting; air district dependent
  - New electrical supply needed
  - Delays in major equipment delivery
  - Weather
  - Landfill operations
  - Electrical grid interconnect for LFG-to-energy projects

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CARB Landfill Rule Timelines

- Expected Effective Date: July 1, 2009
- GCCS Design Plan: July 1, 2010
- GCCS Installation: December 31, 2011 (30 months from effective date)
- GHG Reduction Credits: Credible through December 31, 2011
- All Areas of the Landfill Regulated: No Pre-NSPS GCCS (2/5-Year Rule)

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"Voluntary" Early Action Projects

- Reductions Prior to December 31, 2011
- New GCCS at non-NSPS and non-local air district sites
- Expansions to Existing Systems into non-NSPS Areas (Separate Systems)
- Continuation of Existing Voluntary Systems Installed After January 1, 2001
- GCCS Required by Regulation but Where Carbon is Shown as Cost Effective

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"Voluntary" Early Action Projects (cont.)

- New System: Maximum 3 Years of GHG Credits (2009-2011)
- Expansion: Maximum 3-1/2 Years of GHG Credits (July 2008- 2001)
- Existing System: Maximum 11 Years of GHG Credits (in operation after January 1, 2001)
- NMOC Criteria for Carbon Cost-Effectiveness: 600 lb/month ≈ 250 scfm @ 200 ppmv as hexane

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"Voluntary" Early Action Projects (cont.)

- Value of credits will not likely cover cost of GCCS for this window of time
- But if GCCS will be required anyway, then only need to offset operating cost and value of money for spending capital early
- After December 2011, very few landfill projects will be viable in California
- An increase in the NMOC threshold for carbon cost-effectiveness would open door to GCCS installed for non-air regulatory purposes.

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Typical GCCS Project Costs

- Vertical Extraction Wells: $8,000-$12,000/acre; $65-80/foot of drilling; $500-$600/wellhead
- Horizontal Collectors: $40-$60/foot; typical length = 200 to 300 feet
- Piping: $15,000-$25,000/acre; below grade more expensive than above grade by 30%-40%
- Blower/Flare Station: $250,000-$600,000 (size dependent)

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Typical GCCS Project Costs (cont.)

- Additional Flare: $150,000-$350,000
- Additional Blower: $25,000-$50,000
- Monitoring Equipment: $25,000-$50,000
- Engines: $1,110-$1,400/KW (installed)
  - 1.0 MW = 450 scfm of LFG
- Gas Turbines: $1,000-$1,200/KW (installed)

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Typical GCCS Project Costs (cont.)

- Microturbines: $3,000-$3,500/KW (installed)
- Engineering: $50,000-$75,000; much greater for energy plants
- Permitting: $20,000-$30,000; much greater for energy plants
- Evaluation of GHG Reduction Credits: $10,000-$20,000
- Verification Services: $5,000-$15,000

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Typical GCCS Project Costs (cont.)

- O&M Costs: $40,000-$75,000/year; much greater for energy plants
- Repairs and Upkeep: 7%-10% of capital costs
- Monitoring and Testing Costs: $20,000-$50,000; much greater for energy plants
- Life of Major Equipment: 15 to 20 years

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