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State of Missouri

WATER & LIGHT

AMERESCO

Jefferson City Landfill Gas Utilization Project

Partnership Generates Renewable Energy and Economic Benefits

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Introduction

- Introduction
- Request for renewable energy
- The renewable energy source
- Delivering the power
- Innovation: using the waste product

- Savings for the State of Missouri
- Project timeline and benefits
- Additional environmental initiatives in Missouri
- Project Case Study: BMW of North America
- Summary of project

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The Partnership, The Beginning

- In November 2004, voters in Columbia, Missouri, approved a local renewable portfolio standard (RPS)
- RPS requires the city's municipal utility, Columbia Water & Light (CW&L), to generate or purchase renewable-energy
- To meet their needs, CW&L solicited proposals from renewable energy project developers
- CW&L selected Ameresco’ s proposal to build a 3.2 megawatt (MW) landfill gas electricity generation facility
- CW&L pays a fixed cost for green power for 20 years
- This project will make up 2 percent of CW&L’s energy portfolio and help them comply with the RPS

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Original Project Proposal

- **Ameresco received permission from Allied Waste to use their landfill Ameresco's proposal to CW&L**
- **Ameresco proposed to develop, own, and operate the multi-million dollar landfill gas-to-energy power plant using LFG from the Jefferson City Landfill**
  - Develop 3.14 MWs of power that will be wheeled into the grid and purchase by CW&L
- **Ameresco will negotiate a Gas Service Agreement with Allied**
- **Ameresco will negotiate a Power Purchas Agreement with CW&L**
- **Ameresco will cover costs related to project development**
  - Construct and own the gas delivery system/power plant
  - Permitting
  - Interconnection
  - Operate and maintain the project

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Jefferson City Landfill

- **Owned/operated by Allied Waste**
- **Allied was a willing partner in finding a beneficial use for the LFG**
- **Opened in 1979**
- **Scheduled to close in 2014**
- **Site accepts approximately 175,000 tons of waste per year**
- **Contains 3.8 million tons of waste**
- **LFG collection system installed**
- **Currently flaring 1200 CFM**
- **Between 3.1-3.4 MWs will be generated from the landfill gas**

What Is Landfill Gas?

Most of the waste we generate ends up in landfills, where it decomposes and produces landfill gas. Landfill gas, if uncontrolled, can contribute to local smog and present health and safety hazards. Additionally, landfill gas is approximately 50 percent methane, a potent greenhouse gas that contributes to global climate change. Methane, however, is also a reliable and renewable fuel source that can be collected an used in a variety of applications.

Ameresco LFG Experts examine existing equipment at the Jefferson City Landfill

The Project Gets More Innovative

- Ameresco had just started the development process when the State of Missouri suggested that they be involved in the project
- Realized that there is a synergy between their nearby Correctional Facility and the waste heat coming from the engine
- Devised an innovative concept to locate the electricity generation facility at the Department of Corrections
- Pipe the LFG over three miles to Ameresco's 3.2 MW Generation plant

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Department of Corrections
Jefferson City Landfill
1
2
3
Pipeline Route
Algoa Farms
Osage City
63
50
Schubert
J

Waste Heat Recovery

- The electricity from the engines will be wheeled into the grid and sold to Columbia Water and Light
- The waste heat will be supplied to two State prisons, Algoa and JCCC, for thermal comfort
  - Handle heating and domestic hot water loads for both prisons
- Ameresco has executed 20-year contracts with Columbia Water and Light, the State of Missouri, and Allied Waste to support this project

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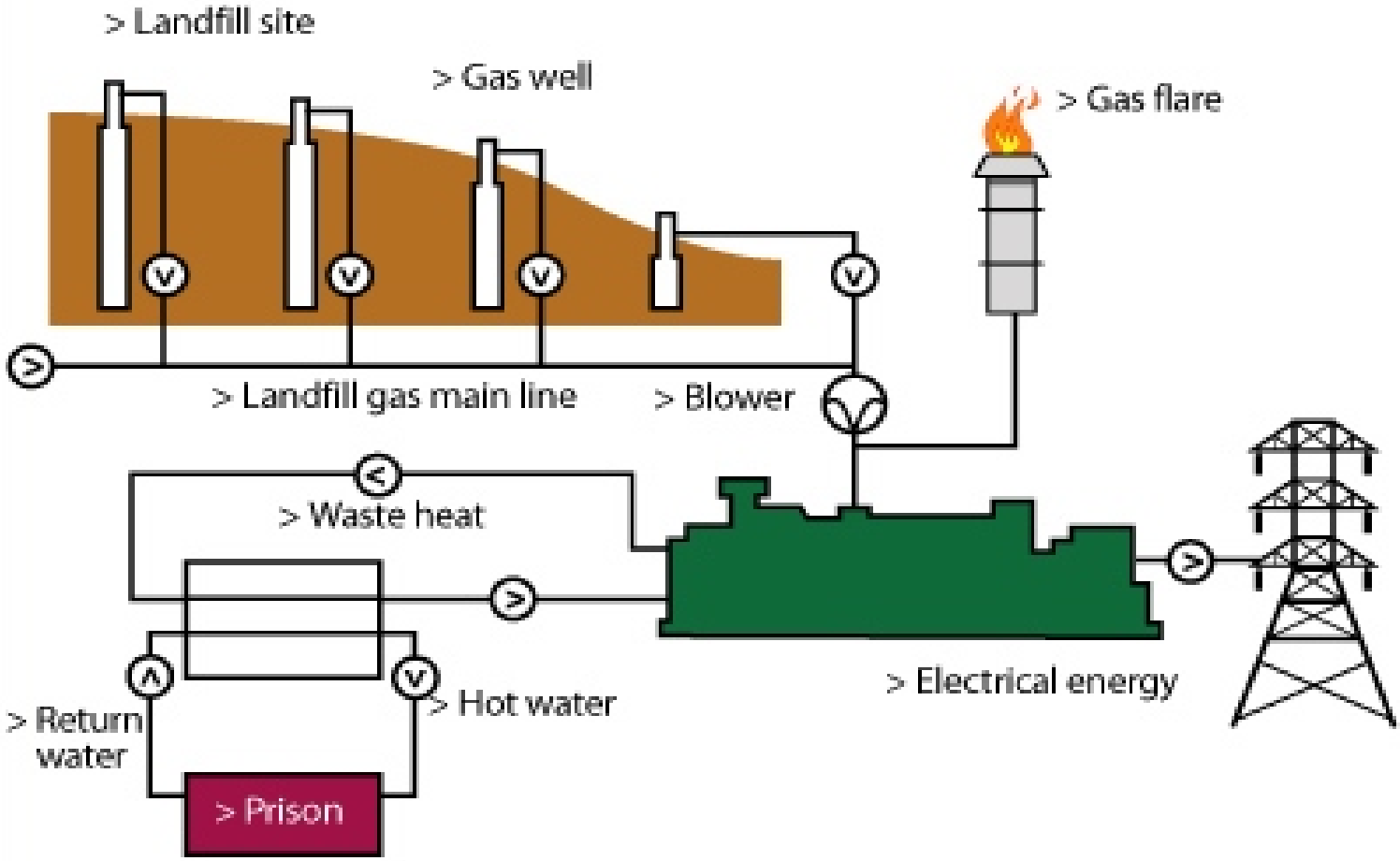
Anatomy of the Jefferson City Landfill Gas Utilization Project



Landfill Gas will be collected and piped to an engine where it is converted to electricity. The waste heat from the engine will be used to heat water for the prison.

Anticipated Savings for the State of Missouri

Current Rates and Steam Use

	MCF Used	Mmbtu Used	Costs	$ MCF	$ mmbtu
JCCC	73,400	58,720	$ 723,724	$ 9.86	$ 12.32
Algoa	70,979	56,783	$ 699,853	$ 9.86	$ 12.32
Total	144,379	115,503	$1,423,579	$ 9.86	$ 12.32

- Natural Gas Costs drop from $ 9.86 MCF to $ 4.11 MCF
- MMbtu costs drop from $ 12.31 MMBtu to $ 5.21 MMBtu

Anticipated Savings for the State of Missouri

- **Savings can fund $ 7,700,000 performance contracting improvements, including:**
  - Combining Central Plants
  - Absorption Chillers
  - Summer peak load shaving
- **Breakdown of Saving:**
  - $410,000 thermal
  - $114,000 electrical
  - About $176,000 utility savings for the absorption chiller
  - TOTAL SAVINGS: $700,000 annually
- **The State will also benefit from significant operation savings from combining the two central plants at Algoa and JCCC.**

Timeline for Project Development

- **Permits:**
  - All permits finalized by September 2007, including: *pipeline, railroad crossing, interconnection and air permits*
- **Equipment**
  - All equipment will be delivered by November 2007, including: *engines, generators, electrical elements, control panels, gas conditioning skid, gas blowers, radiators, switchgear and interconnection transformers, building and pipeline materials*
- **Construction**
  - All construction work completed by April 2008, including: *earthwork, grading, utilities, engine building, pipeline installation, mechanical and electrical installation, interconnection*
- **Full operation: Summer 2008**

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Ground Breaking Ceremony

- **Create a high profile project worthy of acclaim and recognition**
- **Project partners hosted a ribbon cutting in April 2007 with Governor Matt Blunt (center)**

"The launch of this innovative project is a continuation of our commitment to renewable energy in Missouri," Governor Matt Blunt

State of Missouri Major Energy Initiatives

- Landfill Gas Plant
- Bio-Mass Co-generation Plant (s)
- Continuous Commissioning Program
- Utility Bill Pay Program
- Statewide Maintenance Program
- Ozone Laundry Program
- Steam Trap Program
- Statewide Performance Contract Program

Environmental Benefits

- **Developing new sources of renewable energy will lead to improved local and global air quality by offsetting the need to use other, more polluting fuels for energy.**
- **This project will reduce direct and indirect greenhouse gas emissions by approximately 23,288 tons of Carbon Dioxide (CO2) a year, a local environmental benefit equivalent to:**
  - Removing more than 30,000 cars from Missouri's roads
  - Planting nearly 40,000 trees annually
- **Enough energy to power 2000 homes**

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Proven Performance: Similar Project

Ameresco has a 20-year, multimillion-dollar contract with BMW to provide 25% of their electric and 100% of their thermal energy needs

- Ameresco designed and constructed a new landfill gas plant at the largest landfill in South Carolina
- The project is one of the largest of it's type in the US
- Project was completed in 8 months, and was operational by December 2002; ahead of schedule
- Ameresco owns and operates the plant -- compresses, dries, and delivers over 1 million MMbtu/yr of LFG to fuel 4 turbines at BMW (a 2.5 million square feet facility)
- Dual compressor stations at the landfill, BMW's facility, and the 10-mile pipeline are sized for expansion to 1.5 mil. MMbtu/yr
- Recently installed boiler/absorption cooling options
- Plant is operated by Ameresco operators hired locally
- LF system controlled by Allen Bradley 5/05 processors
  - Web site enables operators or BMW to view LFG system and BMW operations
  - System is tied into BMW internal system controls for monitoring and billing systems

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BMW Video

Promise

- Meet or exceed all of the development milestones as determined by the Partnership
- Develop/design a project that maximizes gas consumption
- Full compliance with all environmental regulations
- Innovative project that also uses the waste heat
- Be a beneficial, long-term partner
- Create the best value and best quality project

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