

# LANDFILL GAS TO ENERGY AT THE CITY OF GLENDALE

Keith A. Johnson, P.E.

# Project Time Line

- ◆ BAS obtains LFG rights to the City of Glendale Landfill

6/10/03 →

# Project Time Line

- ◆ United Metro Materials Asphalt Plant Project
  - ◆ Replace natural gas with landfill gas
  - ◆ Retrofit burners on asphalt plant
  - ◆ Less than one mile pipeline



# Project Time Line

- ◆ Pipeline to Luke Air Force Base / Exelon Services
  - ◆ Federal requirement for renewable energy - electricity
  - ◆ The project was not feasible due to high capital cost



6/10/03

2004 →

# Project Time Line

- ◆ Pipeline to Luke Air Force Base / Honeywell Building Solutions
  - ◆ Use LFG for cooling with direct-fired absorption chiller
  - ◆ The project was not feasible due to high capital cost

6/10/03

2005



# Project Time Line

- ◆ Landfill Gas used at the Fire Training Facility
  - ◆ LEA Architects initially very positive
  - ◆ Use LFG for fire training props
  - ◆ Use LFG for boiler – hot water for heating and cooling



6/10/03

Nov-Dec 05



# Project Time Line

- ◆ BAS teams with Sexton Energy to submit proposal to APS

6/10/03

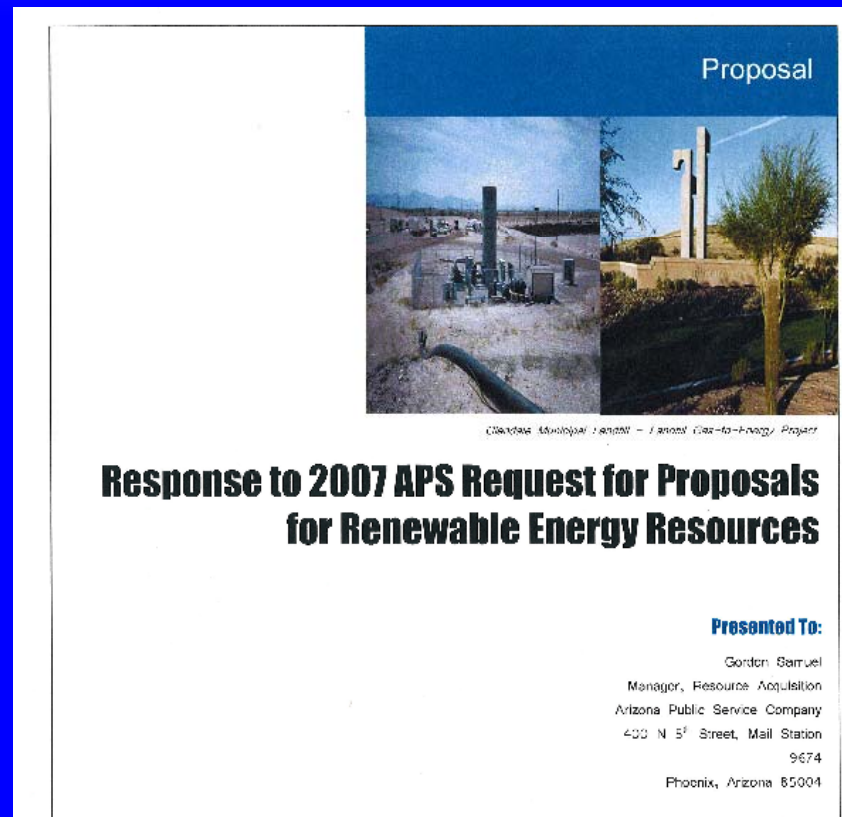
Apr 07

# Project Time Line

- ◆ Response to 2007 APS RFP for Renewable Energy

6/10/03

May 15, 07



# Project Time Line

- ◆ APS selection notification and initial meeting with APS Renewables Group

6/10/03

July 15, 07

# Project Time Line

- ◆ APS 6-Month Process to obtain PPA???
- ◆ Negotiate Term Sheet
- ◆ Negotiate PPA Contract
- ◆ APS Submits Contract Pre-Approval Request to Arizona Corporation Commission (ACC)
- ◆ ACC Review and Approval Process
- ◆ ACC Approval of APS's Filing
- ◆ Executed PPA

6/10/03

Jul 07 to  
Jul 08



# Project Time Line

- ◆ BAS submits Title V Permit Application for Landfill and Gas to Energy Plant
- ◆ Emissions for two 1.4 MW engines included

6/10/03

Oct 07

# Project Time Line

- ◆ APS completes Interconnection Feasibility Study
  - ◆ Requires connection at 69,000 volts NOT 12.5 kV feeder line

6/10/03

Nov 15, 07

# Project Time Line

- ◆ Extension of LFG rights agreement with the City of Glendale
  - ◆ Needed 20-year Term for financing to work
  - ◆ Required City Council Action

6/10/03

Dec 11, 07

# Project Time Line

- ◆ Renewable Energy Power Purchase Agreement (PPA) between Sexton and APS Signed
  - ◆ 90% Availability for 10 days
  - ◆ 68% of maximum capacity averaged over two years
  - ◆ Serious penalties for missing production targets

6/10/03

Jul 29, 08

# Project Time Line

- ◆ Foundation Investigation for proposed facility location submitted to APS
  - ◆ Plant and Substation to be built over waste

6/10/03

Sep 18, 08

# Project Time Line

- ◆ APS Interconnections Development group requests indemnification regarding environmental issues associated with Substation site

6/10/03

Sep 25, 08

# Project Time Line

- ◆ APS Interconnections Development group finalizes the Interconnect Agreement
  - ◆ Performance Bond for Substation an issue

6/10/03

Apr 27, 09

# Project Time Line

- ◆ Approved plan set submitted to the City of Glendale Building Department
  - ◆ Civil/Structural
  - ◆ Electrical
  - ◆ Mechanical
  - ◆ 89 total drawings

6/10/03

Jun 15, 09

# Project Time Line

- ◆ Title V Permit and Authority to Construct received
  - ◆ Critical Path Item
  - ◆ APS Not Happy with delay of start of construction

6/10/03

Jun 15, 09

# Project Time Line

- ◆ Building Permits issued by the City of Glendale
  - ◆ Building, Electrical, Plumbing/Mechanical,
  - ◆ Fire, Backflow/CC-Domestic, & ROW Water

6/10/03

Jun 30, 09

# Project Time Line

## ◆ Construction Begins!



6/10/03

Jun 30, 09

# Project Time Line

- ◆ Gas to Energy Plant became operational



6/10/03

Dec 16, 09

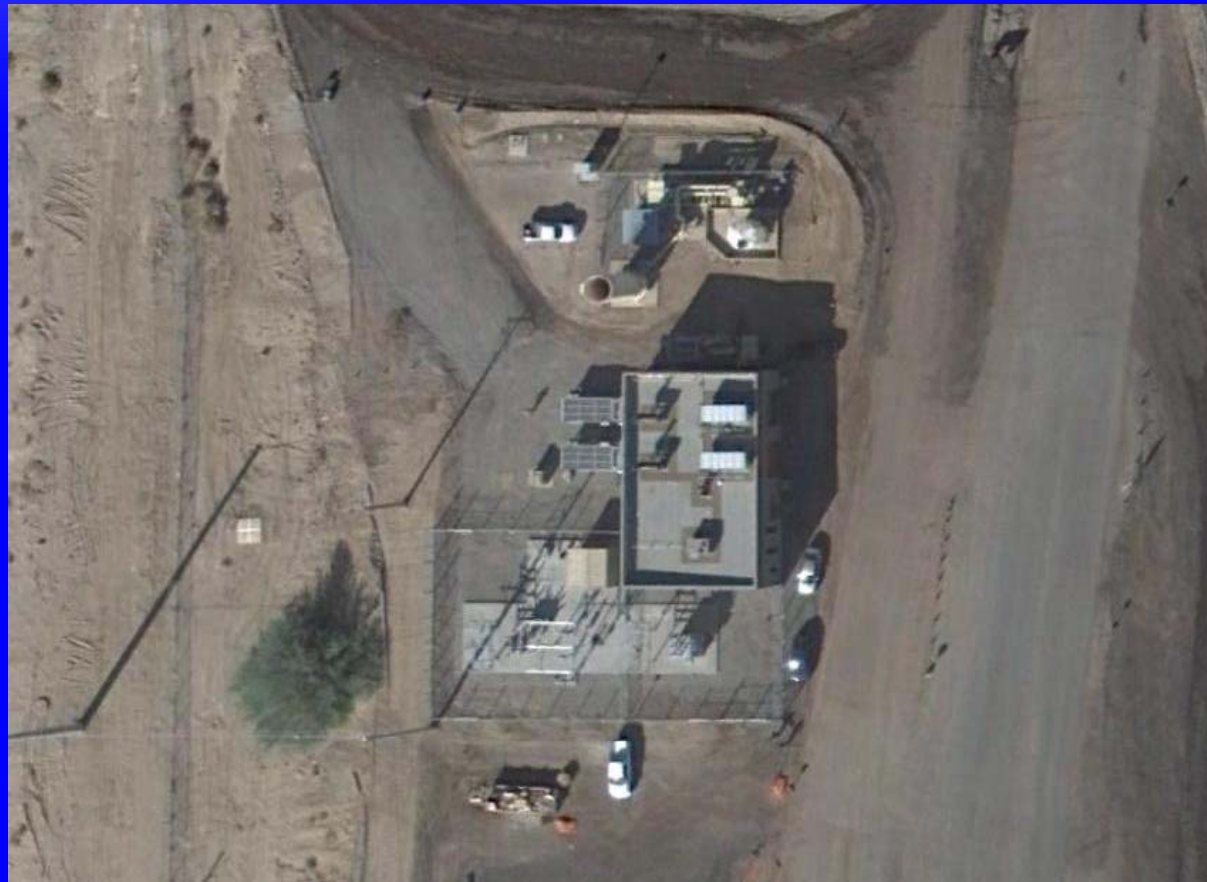
# Project Time Line

- ◆ Plant Commercial Operation Certificate from APS
  - ◆ 10-Day Operations at 90% capacity



# Project Time Line

- ◆ Certificate of Occupancy issued by the City of Glendale
  - ◆ As-Built Drawings and Finished Floor Elevation Req'd



6/10/03

Feb 25, 10

# Project Time Line

## ◆ Questions

Departments	Services A-Z	City Officials	Residents	Visitors	Businesses	Online Services	Home
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**GLENDALE**

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### Renewable Energy Plant at the Glendale Landfill Powers up, celebrates with Lunch at Landfill

Did you ever wonder what happens to your trash when you throw it away? Traditionally, trash goes into the landfill and then immediately begins to decompose. But then what happens? Well, now it has a purpose. Construction of a landfill-gas-to-energy facility at the Glendale Landfill was completed in December, and now we're turning decomposed trash into electricity.



As the trash decomposes, it turns into methane gas. Using landfill gas as a renewable energy source has many benefits. Landfill gas is less expensive than other renewable resources, yet is just as reliable. Furthermore, converting landfill gas to energy helps the environment and community. By using landfill gas, Glendale will be helping to improve local air quality and reduce the risk of global climate change.

This renewable energy project, a public-private partnership, is now generating power for approximately 750 homes in the West Valley.

This project began back in 2003, when the city's gas rights were sold to an engineering firm. Eventually it evolved to include Sexton Energy and APS, a partnership which paired the right combination of technical expertise and the capabilities to incorporate it into a public power grid. The facility opened with a ribbon-cutting ceremony and Lunch at the Landfill event on January 30.

"It is great to be the leader in providing green energy from a municipal landfill, as we are the only city in the Valley offering this type of energy project," said Stuart Kent, field operations director. "We have been operating this landfill since 1973, and anticipate continuing for another 40 years. As a result, this renewable energy opportunity will reach thousands of homes throughout the years."

June 10, 2003

2003

2004

2005

Nov-Dec

05

Apr 07

May 15, 07

July 15, 07

Jul 07 to

Jul 08

Oct 07

Nov 15, 07

Dec 11, 07

Jul 29, 08

Sep 18, 08

Sep 25, 08

Apr 27, 09

Jun 15, 09

Jun 30, 09

Dec 16, 09

Jan 13, 09

Feb 25, 09