

## UC Office of the President Sustainability Best Practices Case Study

**University: UCLA**

**Topic: Renewable Energy: Landfill Gas for Fuel**

### **Project Summary:**

The UCLA 43 MW cogeneration facility makes a unique contribution to the abatement of atmospheric pollution in the Los Angeles basin through its use of refuse derived gas as fuel.

Located three miles from campus, the Mountaingate Landfill produces low BTU content gas which must be disposed of safely. Without the cogeneration facility, this gas would have otherwise been flared at the landfill site, increasing the air emissions in the area by as much as 870 MMBTU of landfill gas daily (or 36 tons of smog-forming pollutants annually) into the atmosphere. At the cogeneration plant, this waste product is being blended with natural gas before it is delivered to the combustion gas turbine generators (CTG) to generate electricity for the campus. The emissions from the CTG is then processed through the plant's Best Available Control Technology (BACT) emission control system which brings it down to a mere 10ppm CO and to 6ppm NOx. As a result, the landfill gas produces less emissions than it would were it flared and at the same time reduces the amount of natural gas fuel consumed by the cogeneration plant. A win-win situation is also achieved between UCLA and SCS Renewable Energy, operators of the landfill site. UCLA obtains the fuel at a net discount to the price of natural gas while SCS obtains a positive cash flow from its waste gas disposal operation. Thus by using landfill gas as a renewable energy source for UCLA, several environmental and financial benefits are derived.

The Department of Energy, in order to stimulate the use of renewable sources and in particular the conversion of waste products into energy, provides economic incentives for producing electricity from refuse derived gas. DOE's Renewable Energy Production Incentive Program has assisted in defraying the additional cost incurred to compress and blend landfill gas with natural gas to make it a useful fuel source.

UCLA now powers, heats and cools campus buildings with a combination of 83% volume (with 91% BTU content) natural gas and 17% volume (with 9% BTU content) landfill gas. Approximately 300 million cubic feet of landfill gas (methane) is consumed annually.

### ***Project Goals***

- Reduce area emissions
- Recycle waste product into useful energy source
- Reduce overall fuel cost
- DOE incentives for electricity production from refuse derived gas

## ***Potential Strategies***

To achieve greater benefits, there are several key points that should be considered:

- Constant communication/coordination with regulatory agencies such as Southern California Air Quality Management District (SCAMD) to determine what submittal and conditions are required to obtain the necessary permits.
- Secure right-of-way agreements to install new pipelines from the landfill site to the power plant.
- Quality and supply of the landfill gas will deplete over time. Perform initial and annual detailed feasibility studies to assess the continued viability of the project.
- Conduct a health risk assessment for the use of the natural /landfill blended gas for fuel source.
- Explore several purchasing strategies to minimize your operational and financial risks in the event of outages or constrained supply of landfill gas; e.g. performance based energy contracting, long-term or short-term fixed price contracting, spot market purchasing capabilities, etc.
- Conduct a detailed gas analysis to search for hazardous impurities and develop a process to control siloxanes in the gas, reducing the likelihood that fouling of the emissions control system catalysts would occur.
- Plan to purchase auxiliary support equipment: BACT emission control system, a Selective Catalytic Reduction (SCR) system to regulate NOx emissions, gas compressor, and a standby CO catalyst in the event that the emission control system become damaged.
- Take advantage of governmentally supported programs (i.e. DOE) that offer long term cash incentives or tax breaks to help offset the added costs of blending and compressing landfill gas which typically has a lower BTU content than that of natural gas.

## ***Contact Persons***

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