WASTE-TO-WHEELS
RNG AS A VEHICLE FUEL
A CASE STUDY

PRESENTED TO
Air & Waste Management Association
Environmental Focus 2012

OCTOBER 30, 2012
Katry Martin, Executive Director
St Landry Parish Solid Waste Disposal District
PRESENTATION OUTLINE

- BACKGROUND
- EVOLUTION (GCCS)
- PROJECT DRIVERS
- PROJECT BUDGET
- CONSTRUCTION & INSTALLATION
- ONGOING MONITORING
ST LANDRY PARISH SOLID WASTE DISPOSAL DISTRICT

- HOME TO ZYDECO CAJUN MUSIC
- LEGISLATIVE ACT 1980
- SERVES 90,000 RESIDENTS
- GOVERNS ALL WASTE ACTIVITIES
BACKGROUND

ST LANDRY PARISH
SANITARY LANDFILL

- TYPE II MSW PERMITTED 1986
- ACCEPTANCE RATE OF 400 TPD
- 3 MILLION TONS WASTE IN PLACE
- 300 scfm LANDFILL GAS
The EPA has promulgated regulations governing landfill emissions of non-methane organic compounds (NMOC) in March of 1996. The intent of the New Source Performance Standards (NSPS) and Emission Guidelines (EG) is to reduce emission of greenhouse gases (methane) and NMOCs. Applicability in both Rules depends on the NMOC emission rates (tons per year) calculated by the EPA Landfill Emissions Model.
Landfills that exceed the NMOC emissions limit are required to install a landfill gas (LFG) collection system to extract and combust LFG (e.g., in a flare, boiler, or engine generator). Operations, monitoring, record keeping, and reporting for the installed collection system must be in accordance with the requirements of the regulations.
Exemptions:

MSW landfills with design capacity lower than 2.5 million Mg or annual emissions less than 50 Mg (approximately 55 tons) non-methane organic compounds (NMOC)
- Reduction of one ton of GHG either by destruction or preventing the emission from occurring, measured in metric tons of carbon dioxide equivalent

- VCS credits or **Voluntary Carbon Units** (VCU) must be real, the abatement must have occurred, they must be additional by going beyond business-as-usual activities, be measurable, permanent, not temporarily displace emissions, the findings need to be independently verified and unique so they cannot be used more than once to offset emissions.
LFG CARBON PROJECT

OBJECTIVES

• PERMIT, DESIGN AND CONSTRUCT A GCCS IN ANTICIPATION OF GOING NSPS WITH SALE OF VOLUNTARY OFFSETS IN MIND

• OWN / OPERATE SYSTEM

• SUCCESSFULLY VERIFY REDUCTIONS AND MAXIMIZE THE SALE OF CARBON CREDITS

• DEVELOP BENEFICIAL USE FOR METHANE
GCCS EVOLUTION

GAS COLLECTION AND CONTROL SYSTEM

GROUNDBREAKING AND CONSTRUCTION WINTER OF 2008
GCCS EVOLUTION

GAS COLLECTION AND CONTROL SYSTEM

- COMMISSIONED IN JANUARY 2009
- TOTAL COST OF $750,000
- LA’S FIRST VOLUNTARY LANDFILL CARBON PROJECT
# Sale of Carbon Offsets

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 (Jan-Mar)</td>
<td>4,915</td>
<td>6,921</td>
<td>7,228</td>
<td>7,385</td>
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<tr>
<td>Q2 (Apr-Jun)</td>
<td>5,400</td>
<td>6,530</td>
<td>6,915</td>
<td>7,600</td>
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<td>Q3 (Jul-Sep)</td>
<td>6,400</td>
<td>6,998</td>
<td>6,885</td>
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<td>Q4 (Oct-Dec)</td>
<td>7,900</td>
<td>7,770</td>
<td>6,618</td>
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<tr>
<td><strong>Total CRT Volume Estimated</strong></td>
<td><strong>24,615</strong></td>
<td><strong>28,219</strong></td>
<td><strong>27,646</strong></td>
<td><strong>14,985</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>

|                  | 24,615 | 28,219 | 27,646 | 14,985 | 0    |

| CRT Transaction Price | $7.50  | $5.50  | $5.75  | $5.75  | $5.75 |
| CRT Transaction Volume | 20,000 | 13,451 | 14,143 | 14,985 | 0    |
| CRT Transaction Value  | $150,000.00 | $73,980.50 | $81,322.25 | $86,163.75 | $0.00 |

| CRT Transaction Price | $5.50  | $5.50  | $5.75  | $5.75  | $5.75 |
| CRT Transaction Volume | 4,615  | 14,768 | 13,503 | 0     | 0    |
| CRT Transaction Value  | $25,383 | $81,224 | $77,642 | $0    | $0   |

| Average Price per CRT Sold | $7.13  | $5.50  | $5.75  | $5.75  | $0.00 |
| Total CRTs Forward Sold    | 24,615 | 28,219 | 27,646 | 14,985 | 0    |

| Total Gross Estimated Revenue* | $175,383 | $155,205 | $158,965 | $86,164 | $0    |

**GROSS SALE OF CARBON OFFSETS TO DATE $575,717**
BENEFICIAL USE
PROJECT DRIVERS

- SUCCESS OF CARBON PROJECT
- STAFFED TO OPERATE THE SYSTEM
- AN UNDERSTANDING OF THE LFG COMPOSITION
- COMMISSION WAS ABLE TO MAINTAIN COMPLETE CONTROL OF THE PROJECT AND ITS BENEFITS
- AVAILABLE FEDERAL AND STATE FUNDING
PROJECT DRIVERS

➢ ACCESS TO FLEET VEHICLES

➢ LONG TERM TAXPAYER SAVINGS IN THE FORM OF LOWER FUEL PRICES

➢ LONG TERM ENVIRONMENTAL BENEFITS

➢ HISTORICALLY HIGH GASOLINE PRICES ($3.76)
ENVIRONMENTAL IMPACT

- RNG slashes carbon emissions to near zero: RNG’s carbon footprint, measured over the “life cycle” of the fuel’s production, transport and use, is the lowest of any vehicle fuel that is commercially available today according to research by the California Air Resources Board.¹¹

![Graph showing Direct Greenhouse Gas Emissions (gCO2e/MJ): Diesel and Alternative Fuels.](Derived from C.A. Resources Board LCFS, 2009.)
PROJECT FUNDING

REVENUES

- EmPOWER LA-TRANS $500,000
- EFFICIENCY & ALTERNATIVE FUELS PROGRAM
- STATE RENEWABLE ENERGY $250,000
- TAX CREDITS
- LOCAL RESOURCES $250,000
- $1,000,000
PROJECT FUNDING

EXPENDITURES

- FUELING STATION (TREATMENT, COMPRESSION, DISPENSING) $640,000
- SITE WORK, GCCS MODIFICATIONS (ENGINEERING DESIGN, PROCUREMENT) $160,000
- VEHICLE CONVERSIONS (15 PASSENGER CARS AND TRUCKS) $200,000 $1,000,000
COST RECOVERY

ASSUMPTIONS

- 15 VEHICLES WOULD CONSUME 20,000 GGE/YR REPRESENTING 1/3 OF PRODUCTION CAPACITY
- SYSTEM OPERATING COST WOULD NOT EXCEED $1/GGE
- SUCCESSFULLY MONETIZE THE RIN @ $.50/GGE

REVENUE BALANCE

- GASOLINE PURCHASE OFFSET/YR $70,000
- ENVIRONMENTAL INCENTIVES $10,000
- LESS ANNUAL OPERATING COST $20,000

$60,000/YR TO RETIRE CAPITAL
CONSTRUCTION INSTALLATION

SITE WORK BEGAN IN OCTOBER 2011
CONSTRUCTION INSTALLATION

EQUIPMENT ARRIVED
FEBRUARY 2012
CONSTRUCTION
INSTALLATION

INSTALLATION
MARCH 2012
CONSTRUCTION INSTALLATION

INTERCONNECTION COMPLETED LATE MARCH 2012
CONSTRUCTION
INSTALLATION

PLANT COMPLETION APRIL 2012
CONVERSIONS

15 VEHICLES
1 PASSENGER VAN
5 SEDANS
9 FLEET PU TRUCKS
COMMISSIONING

ONLINE APRIL 2012
GOING FORWARD

- MONITOR CONSUMPTION
- TRACK OPERATING COST
- WORK TO EXPAND FLEET
<table>
<thead>
<tr>
<th>MONTH</th>
<th>SHERIFF DEPT</th>
<th>SHERIFF DEPT LITTER ABATEMENT</th>
<th>SOLID WASTE</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Total Gallons</td>
<td>Price Per Gallon</td>
<td>Total Value</td>
<td>Total Gallons</td>
</tr>
<tr>
<td>JANUARY</td>
<td>0</td>
<td>$0.00</td>
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<td>0</td>
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<tr>
<td>FEBRUARY</td>
<td>0</td>
<td>$0.00</td>
<td>$0</td>
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</tr>
<tr>
<td>MARCH</td>
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<td>0</td>
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<tr>
<td>APRIL</td>
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<td>$0.00</td>
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<tr>
<td>MAY</td>
<td>560</td>
<td>$3.76</td>
<td>$2,105</td>
<td>40</td>
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<tr>
<td>JUNE</td>
<td>949</td>
<td>$3.63</td>
<td>$3,444</td>
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<tr>
<td>JULY</td>
<td>1,232</td>
<td>$3.36</td>
<td>$4,140</td>
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</tr>
<tr>
<td>AUGUST</td>
<td>783</td>
<td>$3.58</td>
<td>$2,803</td>
<td>63</td>
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<tr>
<td>SEPTEMBER</td>
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<tr>
<td>OCTOBER</td>
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<tr>
<td>NOVEMBER</td>
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<td>DECEMBER</td>
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<tr>
<td>GAL</td>
<td>3,524</td>
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<td>224</td>
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<tr>
<td>VALUE</td>
<td>$12,493</td>
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<td>$788</td>
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LANDFILL GAS TO VEHICLE FUEL PROJECT SAVINGS WILL BE REALIZED BY ALL TAXPAYERS OF ST LANDRY PARISH NOT JUST THE SOLID WASTE DISTRICT AS WE CONTINUE TO BE GOOD STEWARDS OF THE ENVIRONMENT.

SYSTEM IS DESIGNED TO CONDITION FUEL FOR AS MANY AS 50 VEHICLES AND ENOUGH LANDFILL GAS IS COLLECTED FOR AS MANY AS 500 VEHICLES.

IT WAS NECESSARY TO IDENTIFY VEHICLES THAT WOULD FREQUENT THE AREA IN ORDER TO HAVE PRACTICAL ACCESS TO THE BIOGAS STATION.
Using biogas for transportation was an obvious choice in this application as other uses were not economically viable.

In 2009, the district pioneered the first landfill carbon project in the state of Louisiana.

In 2012, the district pioneered the first biogas to transportation fuel project in the state and one of only a few in the country.
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VECHICLE CONVERSIONS
THANK YOU

Merci

WWW.SLPSOLIDWASTE.ORG