

# **Acrion Technologies, Inc.**

Renewable Fuels and CO<sub>2</sub>



Award



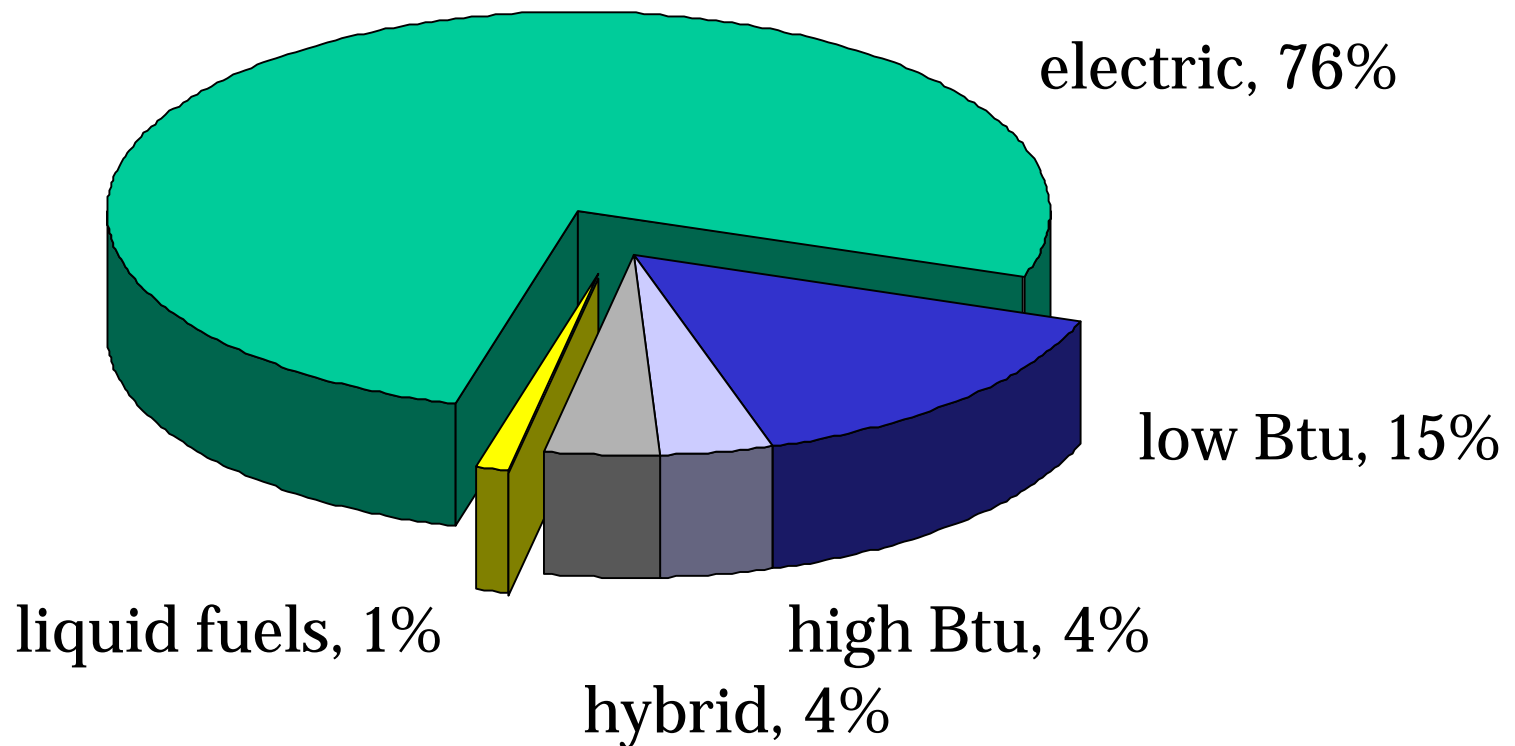
Winner



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## LFG Utilization

204 sites





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CO<sub>2</sub> Wash™

Enabling Technology

OPPORTUNITY  
FEEDSTOCK

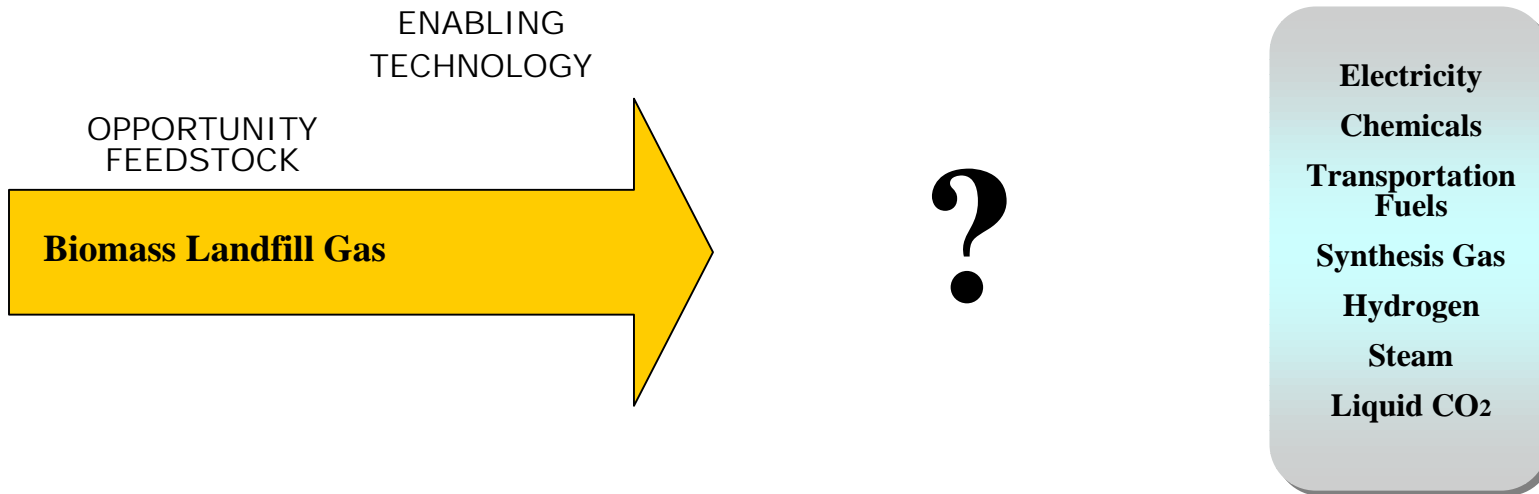
**Biomass Landfill Gas**



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**CO<sub>2</sub> Wash™  
Enabling Technology**

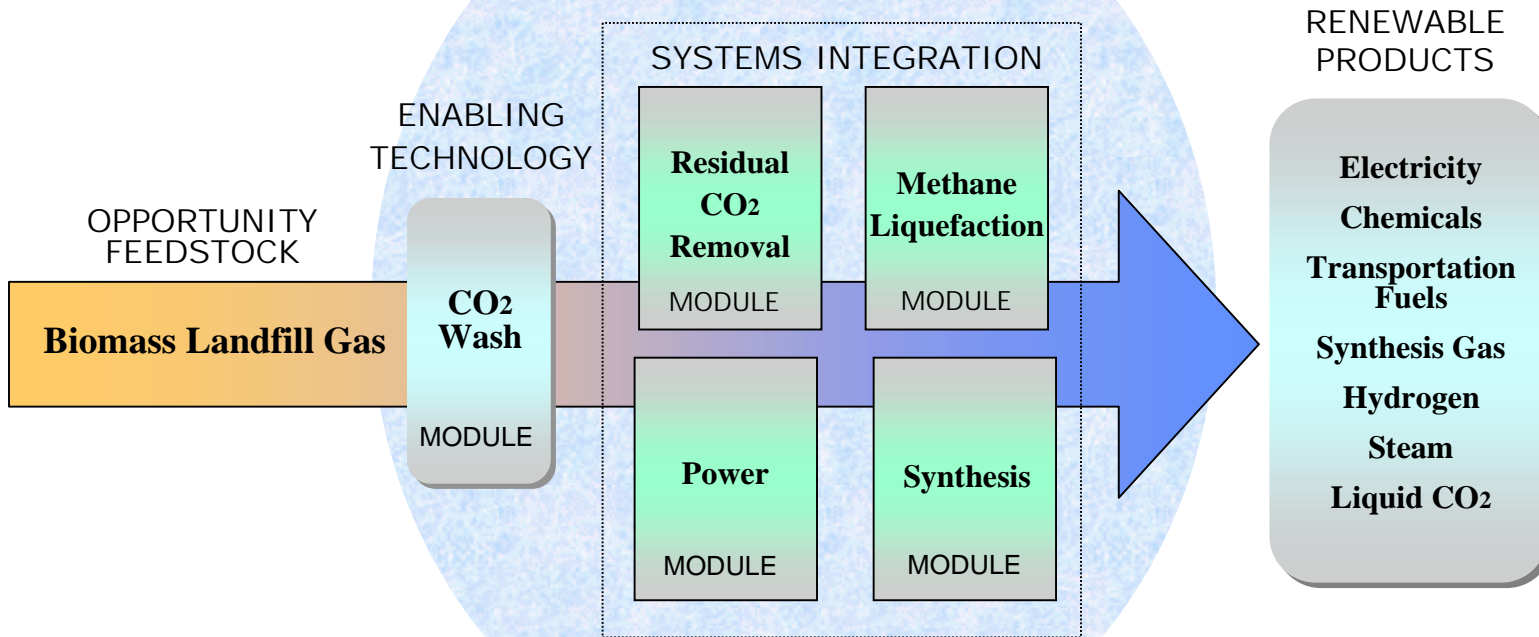




# Acron Technologies



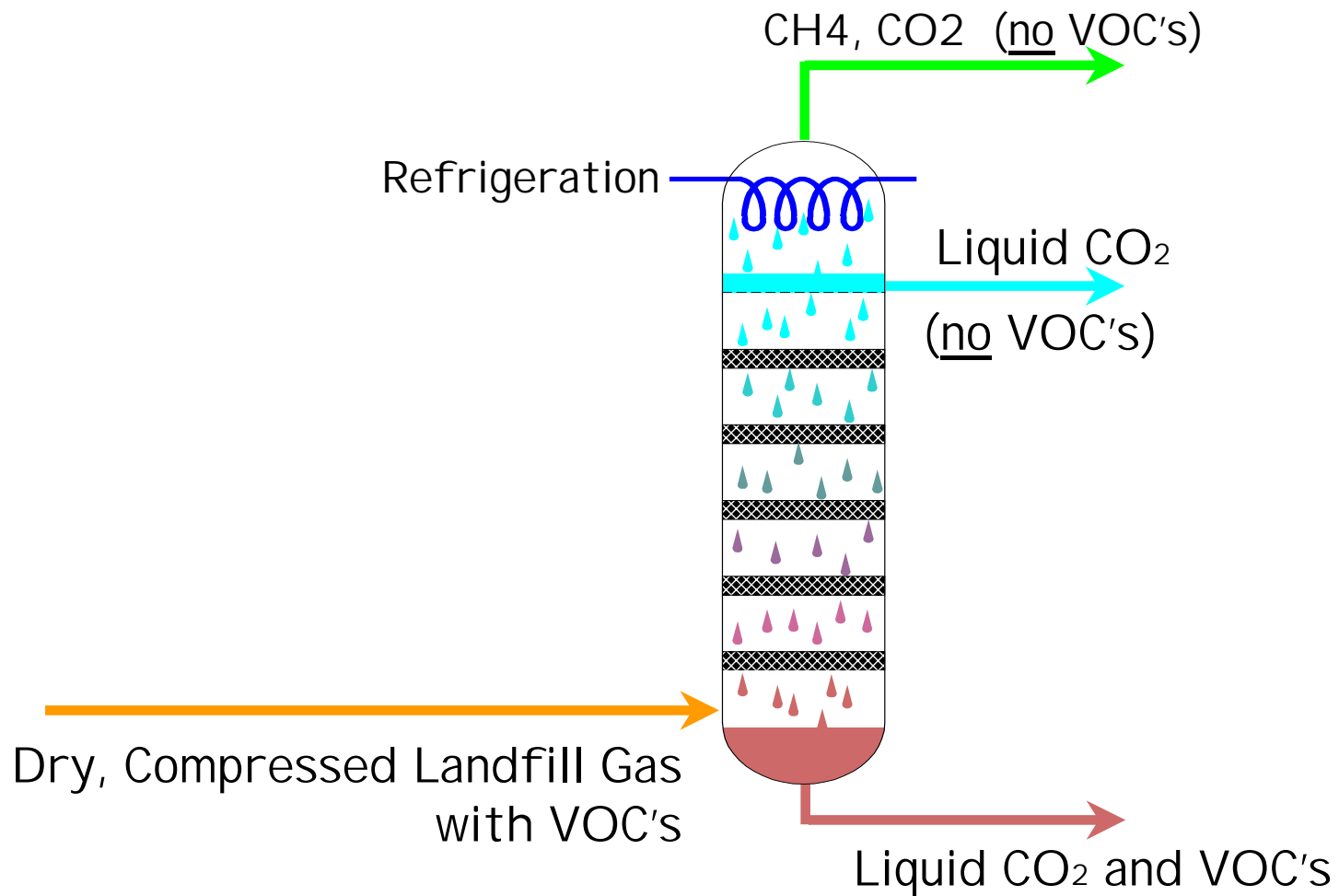
## CO<sub>2</sub> Wash™ Enabling Technology





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# CO<sub>2</sub> Wash Process

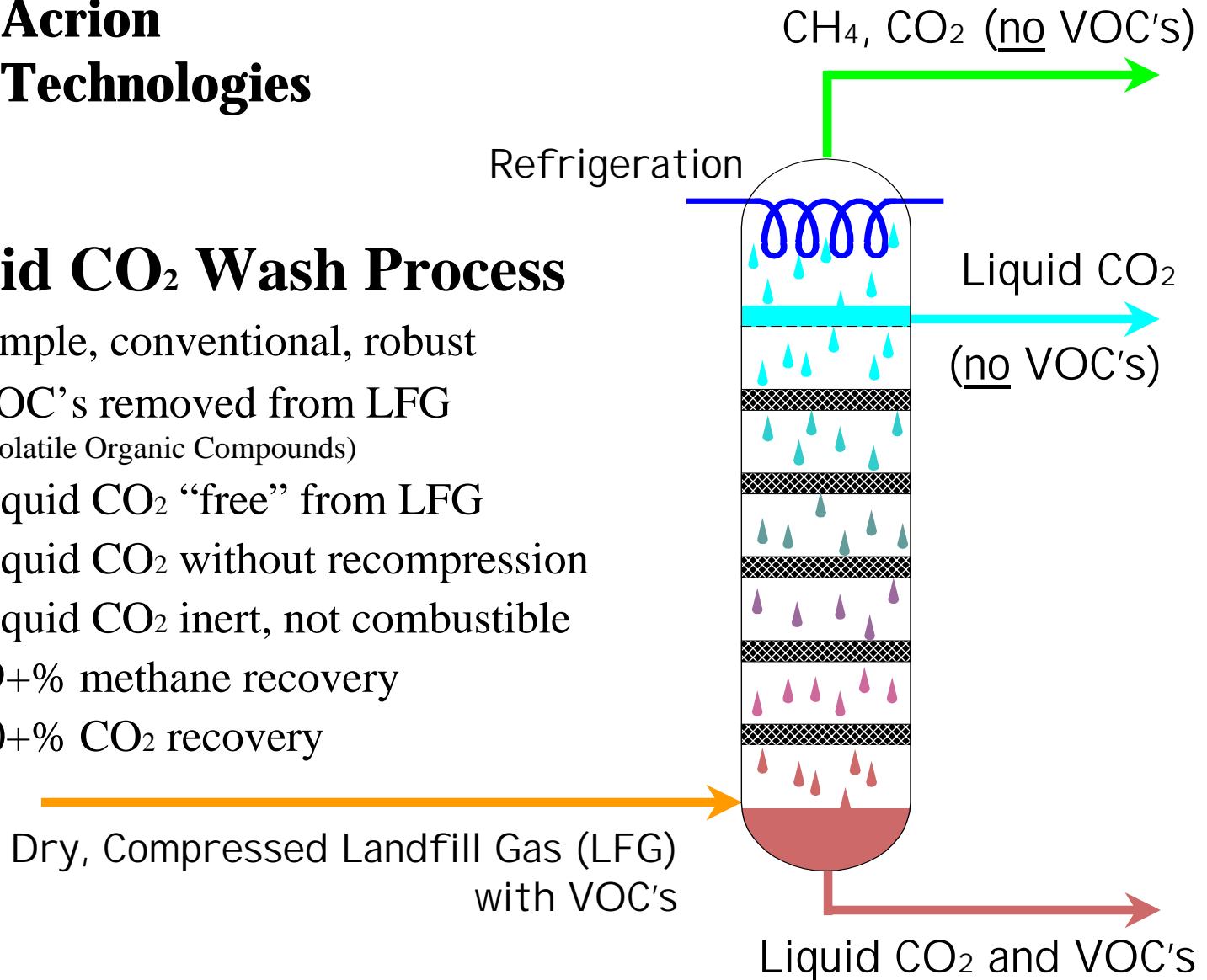




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## Liquid CO<sub>2</sub> Wash Process

- Simple, conventional, robust
- VOC's removed from LFG  
(Volatile Organic Compounds)
- Liquid CO<sub>2</sub> "free" from LFG
- Liquid CO<sub>2</sub> without recompression
- Liquid CO<sub>2</sub> inert, not combustible
- 99+% methane recovery
- 80+% CO<sub>2</sub> recovery





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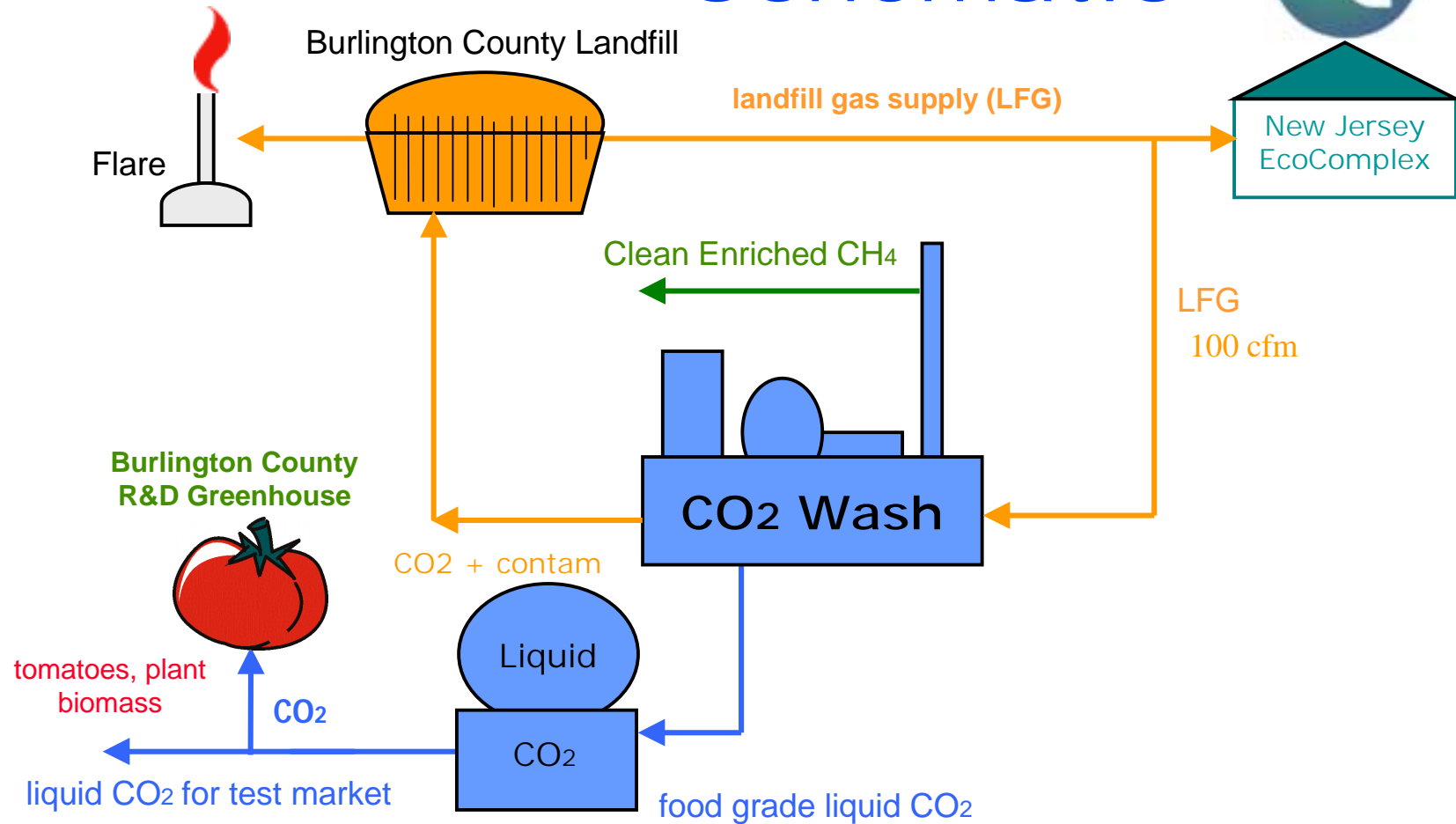
## New Jersey EcoComplex





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# PDU Schematic





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## CO<sub>2</sub> Wash Aux Equipment





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# CO<sub>2</sub> Wash Skid





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## Quality Products!!

- **Methane Product: < 100 ppb VOC**
- **Siloxanes: ND at 5 ppb**
- **Liquid CO<sub>2</sub>: > 0.9999**



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ppm Siloxane - so what?

- **Burlington County LFG**
- **2.65 ppm Siloxane**
- **2,000 scfm Engine Fuel**
- **2 kg Sand (SiO<sub>2</sub>) / day**



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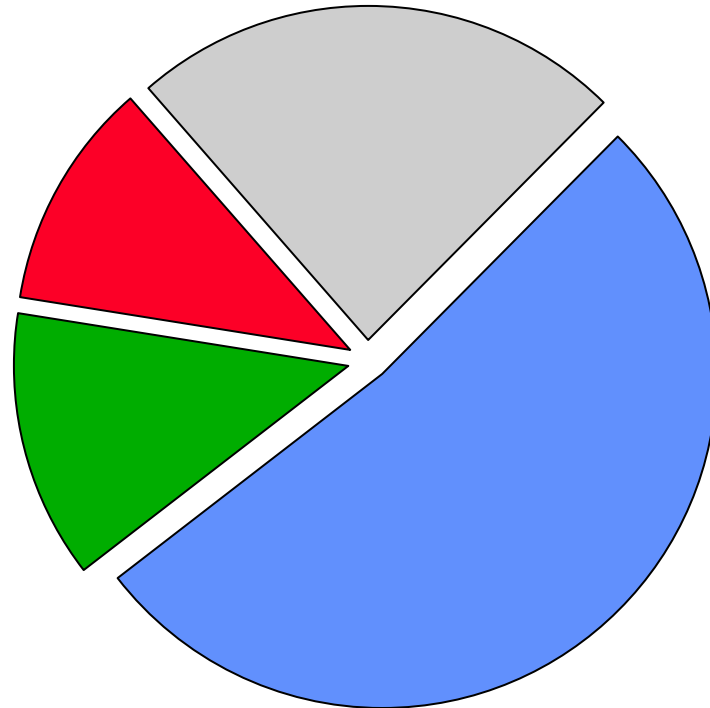
## These Aren't Bank Deposits





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## Liquid Carbon Dioxide



- Food Processing
- Beverages
- Water Treatment
- Other



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## Sparkling LFG





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## Landfill Snow (dry ice, $-109^{\circ}\text{F}$ )





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Refined to LNG







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## 2004 at NJ EcoComplex

- **Make LM from LFG**
- **Fuel Two Mack Refuse Trucks**
- **Operate Trucks 500 Hours Each**
- **Engine Inspection / Diagnosis**
- **DOE / Burlington County / Mack  
Rutgers NJ EcoComplex / Acrion  
Chart / Air Products / WMI**



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## Ballpark Estimates (7th inning)

<b>LFG, scfm</b>	<b>2,224</b>	<b>1,112</b>	<b>556</b>
<b>MMBtu/day</b>	<b>1,729</b>	<b>865</b>	<b>432</b>
<b>LM, gpd</b>	<b>20,000</b>	<b>10,000</b>	<b>5,000</b>
<b>LCO<sub>2</sub>, tpd</b>	<b>80</b>	<b>40</b>	<b>20</b>
<b>LM, ¢/gal (5 yr cap charge)</b>	<b>53</b>	<b>66</b>	<b>85</b>
<b>Diesel Equ, ¢/gal (untaxed)</b>	<b>90</b>	<b>112</b>	<b>145</b>



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## LFG Alternative Fuels

### Physical Change:

compress to **CNG** ( $\text{CH}_4$ , 3600 psi)

liquefy to **LNG** ( $\text{CH}_4$ ,  $-259^\circ\text{F}$ )

### Chemical Change:

reform to **Hydrogen** ( $\text{H}_2$ )

react to **Methanol** ( $\text{CH}_3\text{OH}$ )

**Bio Diesel** (methyl ester)

**Hydrogen** ( $\text{H}_2$ )

react to **Dimethyl Ether** ( $\text{CH}_3\text{OCH}_3$ )



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## Acknowledgement

- ✓ **US DOE NETL / SBIR Program**
- ✓ **US DOE Brookhaven National Lab**
- ✓ **New Jersey EcoComplex / Rutgers U**
- ✓ **Burlington County, NJ**
- ✓ **Mack Trucks, Allentown, PA**



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**Directions:**

- a) New Jersey**
- b) I-295**
- c) Exit 52A / 1/4 mile**

**Please Visit,**

**NJ EcoComplex**

**[www.acrion.com](http://www.acrion.com)**

**Thanks for Listening!**