

# SOUTH WAKE LANDFILL ENERGY OPTIONS

### SOLAR ENERGY FACILITY

- 50 acres of soil capped landfill
- Ground mounted fixed panel PV system
- Desired application for moderate slopes with minimal settlement



### BIOFUELS

- Biofuels can be produced from a variety of feedstocks including:
  - crops grown on site
  - yard waste
  - organic fraction of municipal waste



### LANDFILL GAS-TO-ENERGY

- ~6,000 scfm of landfill gas at buildout will generate 16 MW of power
- County under contract with INGENCO to build and operate



### SOLAR ENERGY FACILITY

- 80-acre south facing slope
- Thin film PV laminate adhered to exposed geomembrane
- Potential replacement for regulatory cap
- Desired application for steep slopes subject to settlement



## SOLAR

### Technology Options

- Photovoltaic Systems are most common and include rigid panels and thin film laminates.
- Concentrated Solar Power Systems are used in high intensity solar regions and include linear, dish, and tower systems.

### Opportunities

- Current available open space – 50 acres (8 MW capacity). Space available after landfill closure - 130 acres (22 MW capacity)
- North Carolina Renewable Portfolio Standard became law in 2007 and requires 12.5% of electricity by 2021 from renewables. Current values for solar Renewable Energy Credits are: Duke \$30/MWh and Progress \$180/MWh.
- Net Metering provides retail rate for solar power up to 1 MW.
- NC Corporate Tax Credit available through December 31, 2015 is equal to 35 percent of solar energy expenditures or a maximum of \$2.5M.
- IRS Business Energy Investment Tax Credit (ITC) available through December 31, 2016 is equal to 30 percent of solar energy property expenditures.

## LANDFILL GAS

### Technology Options

- Options for beneficial use of landfill gas include: direct use in boilers, production of high btu gas for vehicle fuel or sale to gas company and electrical power generation.

### Technology Selected

- Electrical power generation was determined to be the most viable option. The County has contracted with INGENCO to produce power using repurposed diesel engines to operate electrical generators.

### Opportunities

- Landfill gas is available in abundant quantities from the closed Feltonville Landfill and the active South Wake Landfill.
- At peak gas generation in ~2030. The facility will be capable of producing power at a rate of 16 MW.

## WIND

### Technology

- Horizontal Axis Wind Turbines are the most common technology for large scale wind projects.

### Conclusion

- Large scale wind power is not feasible at the facility.

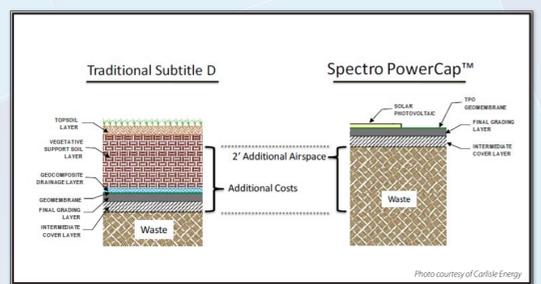
## BIOFUELS

### Technology Options

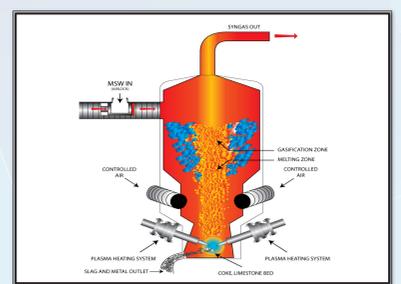
- Commercially viable technologies include: anaerobic digestion/fermentation, gasification, hydrolysis and other chemical conversion processes.

### Opportunities

- Organic wastes comprise a significant portion of municipal solid waste and include constituents such as food waste, yard waste, fats/oil/grease, wood waste, paper and plastics.
- These wastes can be source separated and diverted from landfills to produce a variety of biofuels including: ethanol, biodiesel, gasoline, and jet fuel.



Comparison of exposed geomembrane cap with thin film PV to traditional regulatory cap



Gasification of organic waste produces a syn gas that can be converted to biofuels



Landfill gas direct use facility supplies fuel to a nearby food processing facility



Ethanol facilities typically use grain but can also be produced using organic waste as the feedstock. The first organic waste-to-ethanol facility in the US is under construction in St. Lucie County, FL.