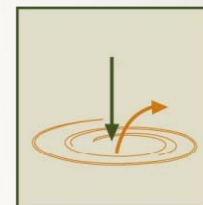


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# **Solid Waste Management Study Presentation: Waste Disposal Alternatives**

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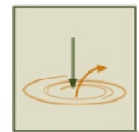
**Charleston County Government  
March 12, 2009**



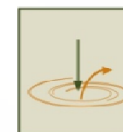
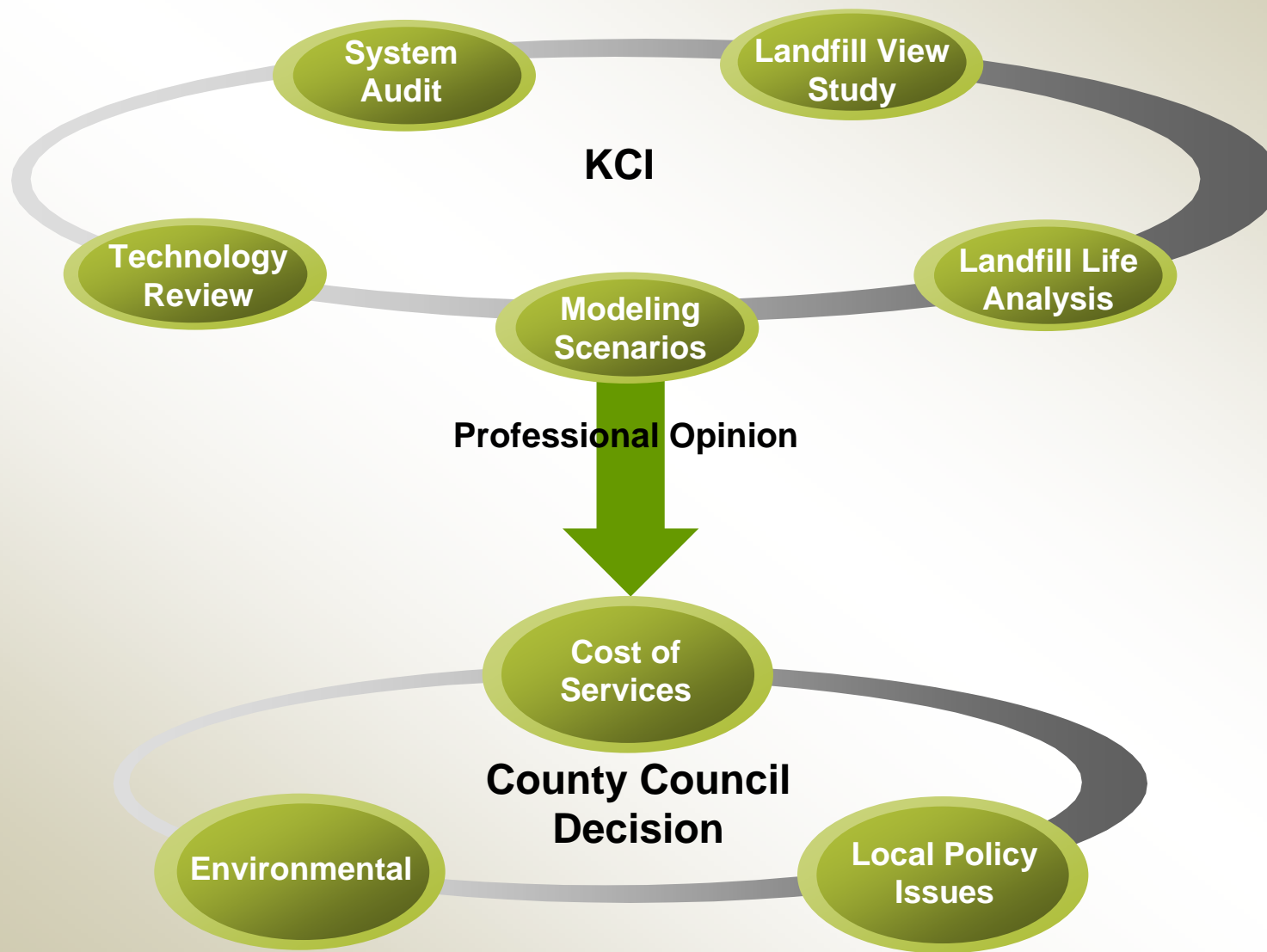
**kessler consulting inc.**  
innovative waste solutions

# Purpose of Presentation

- Provide Council with results of evaluation and recommendations to determine the future of solid waste disposal for Charleston County.
- Provide “a professional opinion whether viable options exist that reduce or divert the County’s waste enough to alleviate the **NEED** for incineration.”

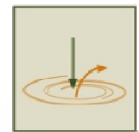


# The Purpose & Process...



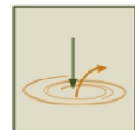
# Topics for Today

- Results of Kessler Consulting, Inc. (KCI) work
  - System audit
  - Landfill view study
  - Landfill life analysis
  - Technology review
  
- KCI's professional opinion regarding disposal options
  - Modeling scenarios
  - Recommendations



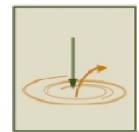
# Timeline

Jan 2008	<u>COUNCIL DECLINED MONTENAY WTE CONTRACT RENEWAL</u>
Oct 2008	<u>COUNCIL APPOINTED GREEN RIBBON COMMITTEE</u>
Nov 2008	<u>KESSLER CONSULTING (KCI) RETAINED</u>
Jan 2009	<u>FINANCE COMMITTEE UPDATE</u>
Mar 2009	<u>KCI PRESENTS PROFESSIONAL OPINION TO COUNCIL</u> <u>- COUNCIL ACTION ON DISPOSAL OPTIONS</u>
Apr 2009	<u>AT&amp;T BUILDING PURCHASE TRANSFER OPTION EXPIRES</u>
Jun 2009	<u>PHASE I OF GREEN FOR GREEN PLAN COMPLETED</u>
Sept 2009	<u>PHASE II OF GREEN FOR GREEN PLAN COMPLETED</u>
Dec 2009	<u>MONTENAY CONTRACT EXPIRES</u>



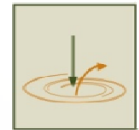
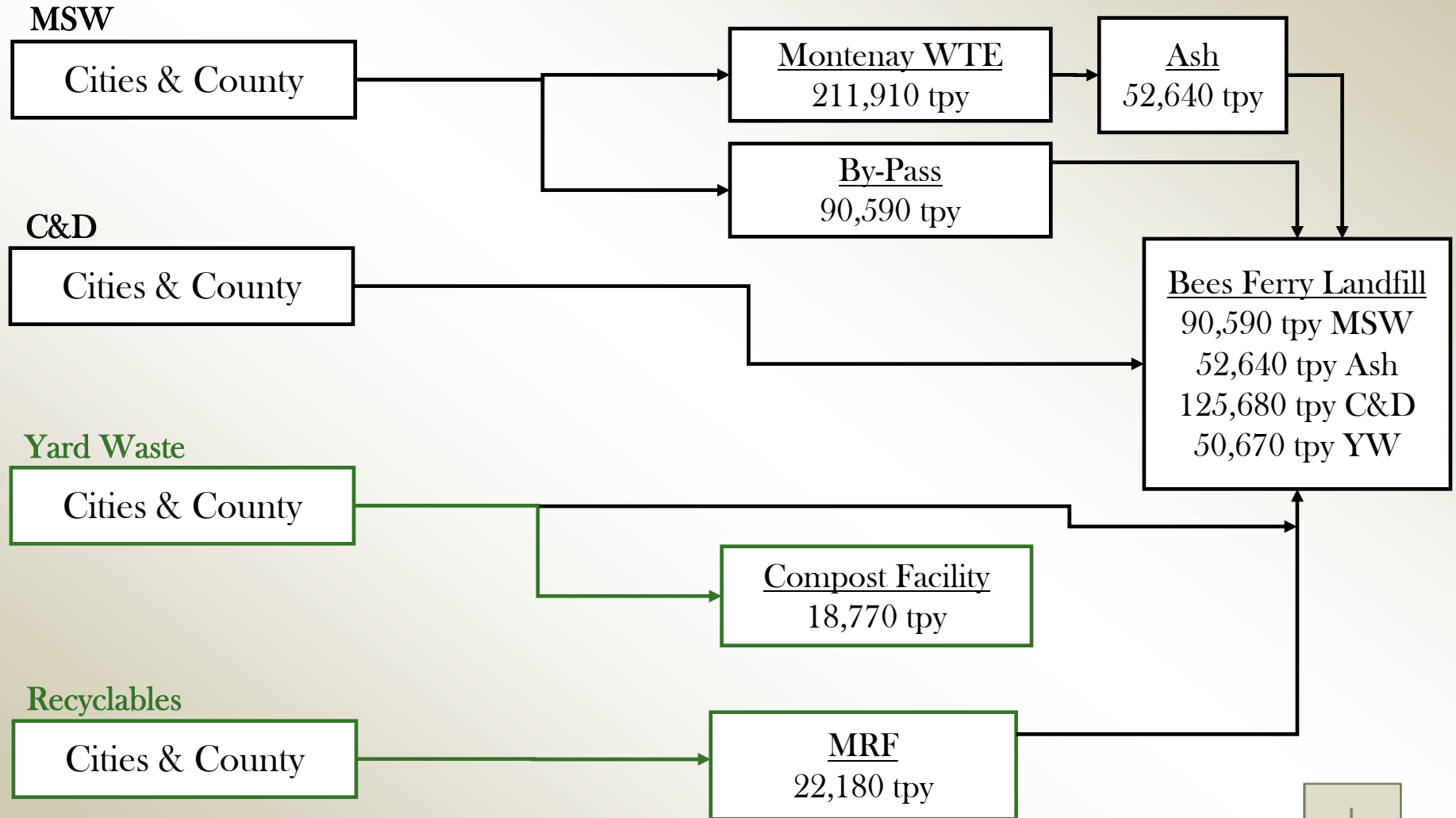
# Review of Work To Date

- Held 4 Green Ribbon Committee meetings
- Met with service providers and municipalities
- Reviewed County solid waste operations (tons, revenue, & expenses)
- Conducted landfill view study and analyzed impact of height reduction
- Technology review
- Conducted assessment of potential diversion and disposal options



# FY2008 Waste Flow

System  
Audit



# FY2008 Solid Waste Cost

System  
Audit

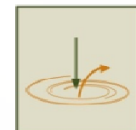
	Net Cost/Ton	Net Annual Cost <sup>(1)</sup>
Incineration	\$46	\$9,779,920
MSW Landfill	\$23	\$2,430,280
C&D Landfill <sup>(2)</sup>	\$18	\$3,134,360
MRF	(\$53)	(\$1,166,520)
Compost Facility	\$48	\$908,750
Collection Programs <sup>(3)</sup>	\$82	\$4,121,750
Administration	\$9	\$3,722,720
Other Programs & Debt Service	\$2	\$1,028,840
<b>Total</b>	<b>\$56</b>	<b>\$23,960,100</b>

Notes:

(1) \$40.21 million Total Cost - \$16.25 million Revenue = \$23.96 million Net Annual Cost

(2) Does not include commercial C&D tip fees

(3) Includes drop sites, convenience centers, and curbside



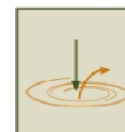
# Solid Waste User Fee

System  
Audit

- User fees are collected from residential and commercial customers

	Fee	Amount Collected	Percent
Residential Single Family	\$99	\$11,807,220	46%
Residential Multi-family	\$70	\$2,354,340	9%
Commercial & Other Accounts	Various	\$11,728,120	45%
<b>Total</b>		<b>\$25,889,680</b>	<b>100%</b>

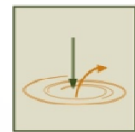
- User fees pay for solid waste operations and long-term debt service and maintain cash reserve



# Activities and Results

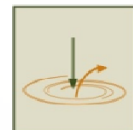
## Landfill View Study

- Bees Ferry MSW Landfill is permitted for maximum height of 172 ft elevation
- Locations in the surrounding community with greatest potential for view of the landfill were identified and evaluated
- At permitted heights, Bees Ferry is not visible from existing development
- Additional screening is not necessary at this time



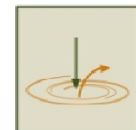
# View Points Evaluated

Landfill View Study



# View Projections

## Landfill View Study

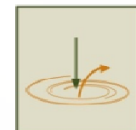


# Impact of Reducing Height

Landfill Life  
Analysis

Reducing permitted height of MSW unit from 172 ft.:

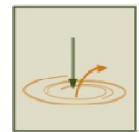
	<b>152' Elev.</b>	<b>132' Elev.</b>
Life Reduced	2 years	5 years
Lost Capacity	754,800 tons	1,692,000 tons
Cost Impact	\$10,844,420	\$24,309,440



# Work Activities

Technology  
Review

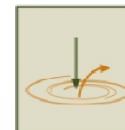
- Identified and reviewed national & international technologies
- Conducted literature review
- Assessed vendor information
- Evaluated the status of technologies:
  - Materials handled; pilot vs. commercial scale; design capacity; economics



# Technology Definitions

## Technology Review

- *Gasification* – high-temperature conversion of solid materials into a gaseous fuel (syngas) and ash residue
- *Plasma Arc Gasification* – a gasification technology that employs an electrical arc
- *Pyrolysis* – high-temperature conversion of solid materials into liquid or gaseous fuel and carbon by-product
- *Refuse Derived Fuel* – processing of heterogeneous material into a uniform fuel for combustion
- *Anaerobic Digestion* – biological conversion of biodegradable material into a gaseous fuel (biogas) and compost

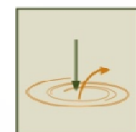


# Findings: Waste Treatment

## Technology Review

Waste Treatment Technologies	Material Handled	Commercial-scale Operations in North America?	Meets County MSW Management Needs?
<b>Gasification</b>	Biomass* MSW	Biomass - Yes MSW - No (R&D)	No
<b>Plasma Arc Gasification</b>	Biomass MSW	Biomass - Yes MSW - No (R&D)	No
<b>Pyrolysis</b>	Biomass MSW	Biomass - Yes MSW - No (R&D)	No
<b>Refuse Derived Fuel</b>	MSW	Yes (combined with combustion)	Yes

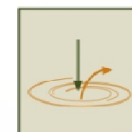
\* Biomass - uniform organic materials such as wood waste, organic industrial waste, biosolids, manure, etc.



# Findings: Material Recovery

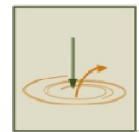
Technology Review

Material Recovery Technologies	Material Handled	Commercial-scale Operations in North America?	Meets County MSW Management Needs?
<b>40% Residential &amp; Commercial Recycling</b>	Paper, Plastic, Metal & Glass	Yes	Yes
<b>Organic Waste Composting</b>	Organic Material from MSW	Yes	Yes
<b>Mixed Waste Processing</b>	MSW	Yes	Yes
<b>MSW Compost</b>	MSW	Yes	Yes
<b>Anaerobic Digestion</b>	Organic Material from MSW	Yes	Yes



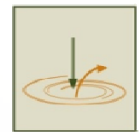
# Findings

- System Audit:
  - County has financially-sound integrated waste management system
  - Opportunities exist to optimize current operations
- Landfill View Study:
  - Bees Ferry not visible from existing development at permitted height
- Landfill Life Analysis – Height Reduction Impact:
  - MSW: up to 5 years & \$24.3 million lost
- County should utilize full permit capacity of Bees Ferry

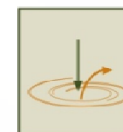
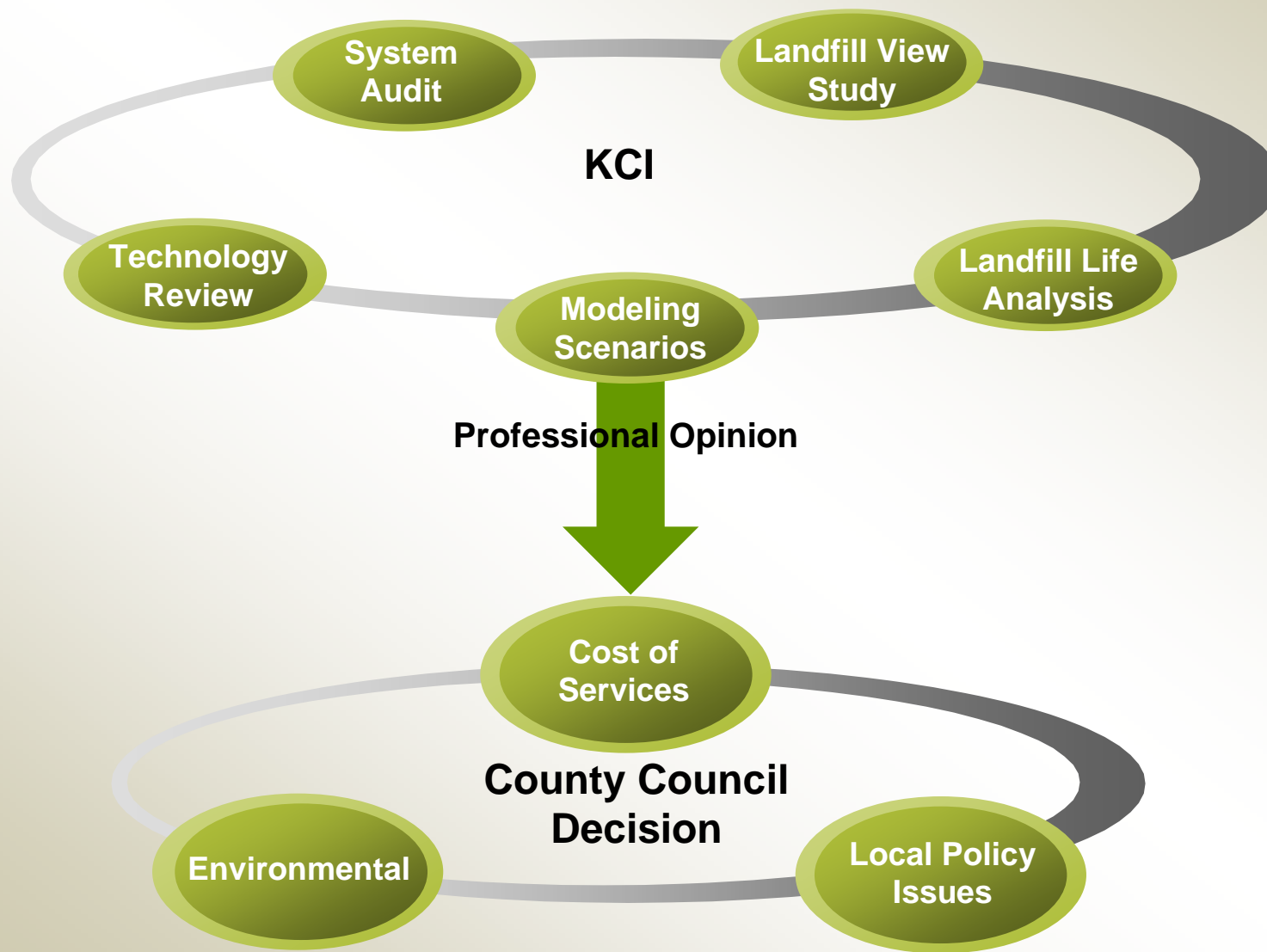


# Findings

- Technology Review:
  - The County has several viable recycling & composting options to significantly increase waste diversion
  - At this time, no MSW treatment technologies are operating at a scale comparable to Charleston County (except RDF)
  - Continue to monitor and review new technologies
- The County has sufficient, proven disposal options to meet long-term needs:
  - Waste-to-Energy
  - Landfill (Bees Ferry)
  - Out-of-County Transfer
  - 17 South is a potential option



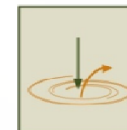
# The Purpose & Process...



# Key Assumptions

## Modeling Scenarios

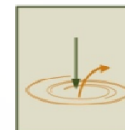
- Population: 1.7% growth
- Per capita waste generation: 1.8% growth
- Financial: 3% inflation
- Density of waste in landfill: 1200 lbs/cy MSW
- 40% recycling phased in over 5 years
- Capital investment for transfer station & landfill modification/improvement
- Initial cost per ton for key operations:
  - Incineration = \$40/ton
  - MSW Landfill = \$23/ton, \$20/ton (no incinerator)
  - Transfer & Haul = \$15/ton
  - Out of County Landfill = \$19/ton



# Modeling Scenarios

Modeling  
Scenarios

- Major Considerations:
  1. Greening Charleston County
  2. Incineration vs. No Incineration
  3. Bees Ferry & future disposal options
  
- Four Scenarios:
  1. Incineration & current recycling
  2. Incineration & 40% recycling
  3. No Incineration & current recycling
  4. No Incineration & 40% recycling

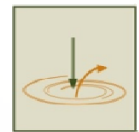


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# Greening Charleston County: Reaching 40% Recycling

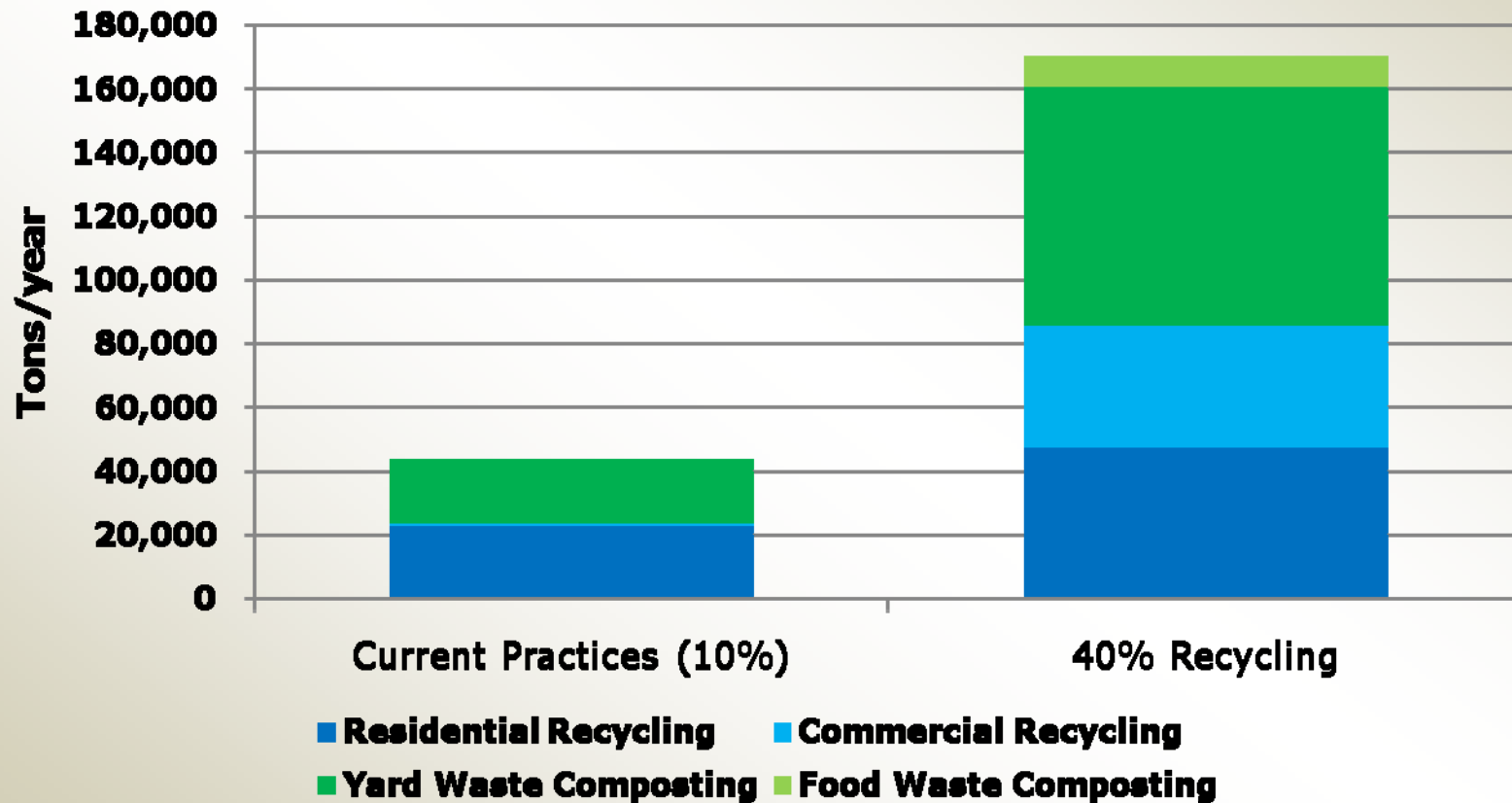
Modeling  
Scenarios

- County has established infrastructure to increase waste diversion
- Residential recycling: increase participation & capture rate
- Commercial recycling: existing user fee structure offers strong incentive for waste reduction & recycling
- Composting: facility expansion & optimization to handle all materials diverted
- Initiate countywide system to maximize C&D debris diversion

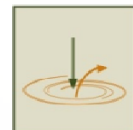


# Greening Charleston County: Reaching 40% Recycling

Modeling  
Scenarios



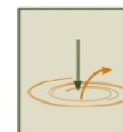
Note: Based on 2010 projected waste generation



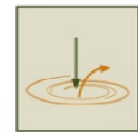
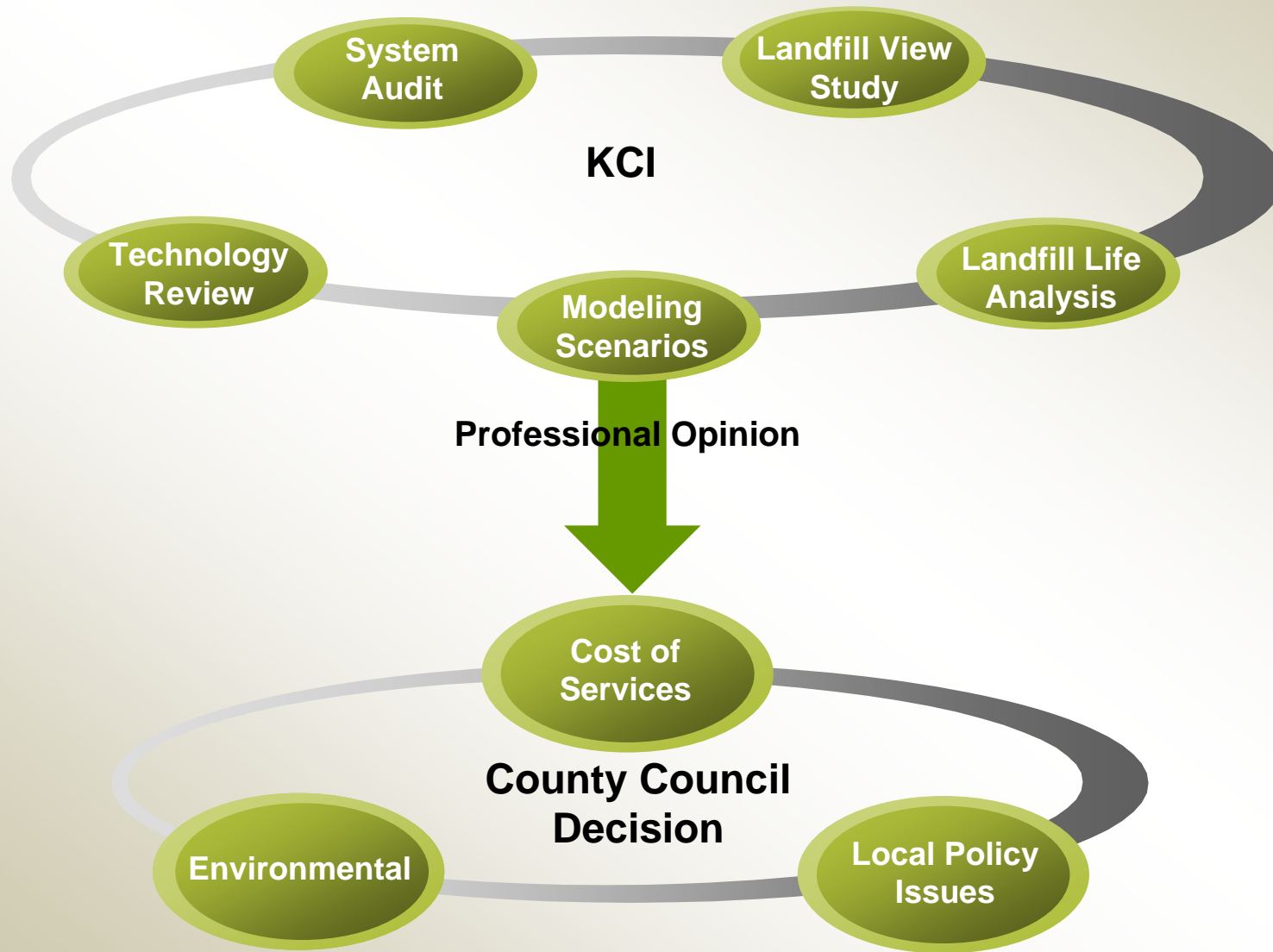
# Scenario Assessment

Modeling  
Scenarios

Scenario	Bees Ferry Landfill Life Expectancy	20-Year Disposal Cost	Annual Cost
1. Incineration & Current Recycling	20 years	\$309 million	\$15.5 million
2. Incineration & 40% Recycling	25 years	\$263 million	\$13.2 million
3. No Incineration & Current Recycling	12 years	\$283 million	\$14.2 million
4. No Incineration & 40% Recycling	14 years	\$224 million	\$11.2 million



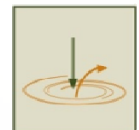
# The Purpose & Process...



# Green Ribbon Committee

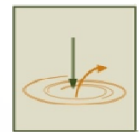
Local Policy  
Issues

- **Recommendation**



# KCI Professional Opinion

...Professional opinion whether viable Solid Waste Management methodologies, systems, or practices exist, including but not limited to increased recycling, that will likely reduce or divert the County's solid waste stream enough to alleviate the need for incineration in Charleston County.

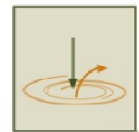


# Recommendations

Professional  
Opinion

## ■ If incineration:

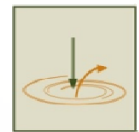
- ❑ Maximize recycling & composting
- ❑ State-of-the-art pollution equipment
- ❑ Mercury elimination program
- ❑ Upfront mixed waste processing at incinerator
- ❑ Re-initiate negotiations
- ❑ Assistance for impacted community



# Recommendations

Professional  
Opinion

- **If no incineration:**
  - ❑ Maximize recycling
  - ❑ Optimize current operations
  - ❑ Ramp up operations at Bees Ferry
  - ❑ Have several years to select future disposal site
  - ❑ Continue to track emerging technologies



# Professional Opinion

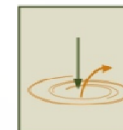
Professional  
Opinion

Cost of  
Service

Scenario	Bees Ferry Landfill Life Expectancy	20-Year Disposal Cost	Annual Cost
1. Incineration & Current Recycling	20 years	\$309 million	\$15.5 million
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Environmental

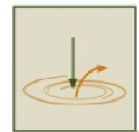
Local Policy  
Issues



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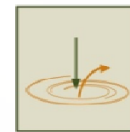
# Decide Direction for Solid Waste Programs

- Based on decision:
  - If incineration, re-initiate negotiations
  - If no incineration, ramp up landfill operations and continue to track emerging technologies
- In either case, implement programs and policies to meet 40% recycling goal



# KCI Next Steps

- Continue to work with Green Ribbon Committee
- Complete Phase 1 Report (June) based on Council Decision
- Initiate Phase 2 work:
  - Analysis of comprehensive waste reduction & recycling options
  - Analysis of municipal impacts & transfer options
  - Prepare Green for Green Plan
  - Prepare Revised Solid Waste Management Plan



# Discussion

