About ERG

- Founded in 1984
- 300+ employees
- Public sector focus
- Services areas include:
  - Climate Change & Energy
  - Communications
  - Air Quality
  - Mobile Sources
  - Marine/Coastal Resources
  - Public Health
  - Water Quality
  - Environmental Assessment
  - Field Research & Measurement
  - Risk Assessment
  - Economic Analysis

Office Locations
CONNECT Our Future

- Regional planning project funded through a Sustainable Communities Planning Grant
- Managed by Centralina and Catawba Regional COGs
- Developing a “regional growth framework” for the 14-county, bi-state project region

“We can grow by chance or we can grow by choice”
Construction Activity and Emissions Assessment

1. Assess how much major construction is anticipated in the region
2. Estimate \textbf{black carbon} and other air emissions produced by diesel construction equipment
3. Identify strategies to minimize impacts on local air quality, our climate, and human health
4. Provide user-friendly tool that can help decision-makers prioritize mitigation strategies where potential impacts are greatest
What is Black Carbon?

- The solid, dark, light absorbing portion of fine particulate matter (PM$_{2.5}$)
- A major component of soot
- Produced by incomplete combustion of fossil fuels, biofuels, and biomass

Why Should You Care?

**Climate**
- BC is the second most powerful climate forcer after CO$_2$
- Disproportionate impact on short term global warming

**Public Health**
- As a component of PM$_{2.5}$, BC is linked to respiratory and cardiovascular illnesses and cancer
Assessment Approach

1. Selected several construction project types important to municipalities
2. Collected construction activity projections called surrogate data
3. Produced and used equipment population and activity profiles to estimate emissions
Construction Project Types

- Heavy highway
  - New construction
  - Maintenance
  - Bridgework
  - Widening lanes
  - Miscellaneous

- County/local roads

- Residential

- Utilities

- Landfills
Surrogate Data Sources

- Heavy highway → Transportation Improvement Plans
- Local roads → Municipal funding allocations
- Residential
- Utilities → Population growth estimates, local plans
- Landfills → Reed Construction Data
- Mecklenburg County, SC DHEC
### DCE Activity Profiles

#### Scenario Details

| Year | 2014 |

#### County Selection

- All
- Anson - NC
- Cabarrus - NC
- Cleveland - NC
- Gaston - NC
- Iredell - NC
- Lincoln - NC
- Mecklenburg - NC
- Rowan - NC
- Stanly - NC
- Union - NC
- Chester - SC
- Lancaster - SC
- Union - SC
- York - SC

Do Not Cite
## DCE Activity Profiles

### Construction Activity

<table>
<thead>
<tr>
<th>Construction Sector</th>
<th>Surrogate Value</th>
<th>Surrogate Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>Highway - New Construction</td>
<td>77.8</td>
<td>lane-miles</td>
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<tr>
<td>Highway - Bridgework</td>
<td>29.0</td>
<td>project value (m$)</td>
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<tr>
<td>Highway - Repair/Maintenance</td>
<td>62.8</td>
<td>lane-miles</td>
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<tr>
<td>Highway - Widening/Turn Lanes</td>
<td>1.8</td>
<td>lane-miles</td>
</tr>
<tr>
<td>Highway - Other</td>
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<td>project value (m$)</td>
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<tr>
<td>Utility</td>
<td>116</td>
<td>project value (m$)</td>
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<tr>
<td>Residential</td>
<td>8.5</td>
<td>single unit housing starts ('000s)</td>
</tr>
<tr>
<td>Landfills</td>
<td>3.5</td>
<td>million tons of waste/yr</td>
</tr>
<tr>
<td>City/County Roads - New Construction</td>
<td>5.5</td>
<td>lane-miles</td>
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<tr>
<td>City/County Roads - Other</td>
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</table>

### Optional Profile - Project-Specific

<table>
<thead>
<tr>
<th>Commercial</th>
<th>Thousand square feet</th>
</tr>
</thead>
</table>

Do Not Cite
### Scenario Summary

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>County/Counties</td>
<td>All</td>
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</table>

#### Base Case (Uncontrolled) Emissions

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>Total Emissions</th>
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</thead>
<tbody>
<tr>
<td>Black Carbon</td>
<td>tons/yr</td>
<td>71.1</td>
</tr>
<tr>
<td>PM$_{2.5}$</td>
<td>tons/yr</td>
<td>94.5</td>
</tr>
<tr>
<td>NOx</td>
<td>tons/yr</td>
<td>1,744.7</td>
</tr>
<tr>
<td>VOC</td>
<td>tons/yr</td>
<td>129.5</td>
</tr>
<tr>
<td>CO$_2$</td>
<td>tons/yr</td>
<td>243,812</td>
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</table>

#### Highway

<table>
<thead>
<tr>
<th></th>
<th>New Construction</th>
<th>Bridgework</th>
<th>Repair/Maint</th>
<th>Widen/ Turn Lanes</th>
<th>Other</th>
<th>Utility</th>
<th>Residential</th>
<th>Landfills</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Black Carbon</td>
<td>31.9</td>
<td>0.8</td>
<td>2.0</td>
<td>0.4</td>
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<td>42.6</td>
<td>1.1</td>
<td>2.7</td>
<td>0.5</td>
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<td>20.8</td>
<td>43.2</td>
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<td>58.5</td>
<td>1.5</td>
<td>3.4</td>
<td>0.9</td>
<td>1.4</td>
<td>10.5</td>
<td>110.3</td>
<td>6.1</td>
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<tr>
<td>CO$_2$</td>
<td>110,709</td>
<td>2,822</td>
<td>5,792</td>
<td>2,113</td>
<td>2,684</td>
<td>14,934</td>
<td>56,831</td>
<td>14,738</td>
<td>96,309</td>
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</table>

#### City/County Roads

<table>
<thead>
<tr>
<th></th>
<th>New Construction</th>
<th>Bridgework</th>
<th>Repair/Maint</th>
<th>Widen/ Turn Lanes</th>
<th>Other</th>
<th>Utility</th>
<th>Residential</th>
<th>Landfills</th>
<th>Total</th>
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<tbody>
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<td>3.0</td>
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<td>6.0</td>
<td>3.1</td>
<td>0.0</td>
<td>3.0</td>
<td>6.0</td>
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<tr>
<td>NOx</td>
<td>56.3</td>
<td>0.0</td>
<td>94.9</td>
<td>67.6</td>
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<td>56.3</td>
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<td>VOC</td>
<td>4.1</td>
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<td>4.1</td>
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<tr>
<td>CO$_2$</td>
<td>7,906</td>
<td>0.0</td>
<td>12,737</td>
<td>12,646</td>
<td>0.0</td>
<td>7,906</td>
<td>12,737</td>
<td>12,646</td>
<td>33,389</td>
</tr>
</tbody>
</table>
What Can We Do About It?

- Advance local policies that promote clean construction through
  - Voluntary, incentive-based options or recognition
    - E.g., contract evaluation criteria, public relations
  - Rules or requirements
    - E.g., contract specifications, site requirements

- Advocate for use of controls that mitigate emissions
  - Retrofit options are available to reduce emissions
  - In some cases, costs to retrofit/repower/replace equipment can be partially offset by external funding sources
Takeaways

- Final assessment results and DCE activity profiles will be available later this year.
- Profiles can be used to estimate emissions from a single project or modified to more closely represent a specific fleet.
- Keep in mind:
  - Users need to collect appropriate surrogates.
  - Emission control technologies change frequently.
  - Visit U.S. EPA and CARB verified lists.
Q&A

Any questions?

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