# DCE Emissions Assessment Tool User's Guide

This User's Guide briefly describes how to open, use, and modify the DCE Emissions Assessment Tool. Additional information, surrogate data sources, and example calculations are available in the *Diesel/Black Carbon Technical Assessment and Feasibility Study* for CONNECT Our Future.

## I.     Opening the File and Checking the Security Settings

Completing this tool requires a 2003 or later version of Microsoft Excel. The Excel security level must be set at Medium or lower. In some cases, Microsoft Excel will ask you to adjust your security settings before opening the file. Instructions should appear on your screen if you need to change your security settings before running the tool. The instructions differ depending on what version of Excel you use (Excel 2003, 2007, or 2010). To change the security settings before using the file, follow the instructions below for the version of Excel you are using:

### Excel 2003
Setting Security Levels to Medium in Excel 2003
1. When using Excel 2003, on the menu bar, go to Tools → Macro → Security Level.
2. When the "Security" window opens, select the "Medium" level, and select OK.
3. Close Excel.

Running the file in Excel 2003
1. Save the file to your computer in a folder on your hard drive.
2. Go to that folder and double-click on the file to open the Tool
3. You will see a security-warning box appear. Select the "Enable Macros" button in the security-warning box.
4. The *Scenario Selection* worksheet for the file should then appear and you will be ready to begin working in the file.

### Excel 2007
Running the file in Excel 2007
1. Save the file to your computer in a folder on your hard drive.
2. Open the file and select the "Options…" button that appears after the Security Warning just below the menu bar. Detailed instructions are also provided on the screen itself.
3. In the "Microsoft Office Security Options" dialog box, choose "Enable this content" and select OK.
4. The *Scenario Selection* worksheet for the file should then appear and you will be ready to begin working in the file.

### Excel 2010
Running the file in Excel 2010
1. Save the file to your computer in a folder on your hard drive.
2. Open the file. Depending on your Office settings, you may receive an "Enable Editing" popup. If you do, simply select the "Enable Editing" button. This will allow you to enter data into the file. You may only receive this popup the very first time you open the file.
3. Depending on your Excel macro security settings, you may receive an "Enable Content" popup. If you do, simply select the "Enable Content" button. This will enable macros in the file you just opened.
4. The *Scenario Selection* worksheet for the file should then appear and you will be ready to beging working in the file.

# II.     Using the Tool

The workbook contains 18 worksheets, including the *Scenario Selection*, *Emissions*, *Controls*, *Surrogates*, and 14 sector-specific worksheets. When you have opened the file with the appropriate security settings, you will begin with the *Scenario Selection* worksheet.

## a.  Completing the Scenario Selection Worksheet

On the *Scenario Selection* worksheet, you will enter information about the scenario you would like to assess. There are three pieces of information you must select:

1.  Year
2.  County(ies)
3.  Construction sector(s)

### Year
Select the scenario year from the drop-down menu at the top of the screen. You may select any year from 2013 through 2018.



### County Selection
Check the box for each county you would like to include in your scenario. You may select just one or as many as all 14 counties (as appropriate) for the scenario.



### Construction Sectors Using Default Surrogate Values
Check the boxes for the construction sectors you would like to include in your scenario. You may select just one or as many as all 13 sectors (as appropriate) for the scenario. Once you check these boxes, the default Surrogate Value for the sector will be populated.

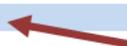**Construction Sectors with Default Surrogate Values**

## Construction Sectors Using Non-Default Surrogate Values

To input your own surrogate values to be used in the scenario, select "Yes" from the drop-down menu provided. Cells that you may edit will be highlighted in orange. You may now overwrite the default values (in the orange cells). The surrogate values must be numeric entries greater than or equal to 0.

**Construction Sectors with User-Input Surrogate Values**

| Do you want to input your own surrogate values below? | Yes | |
| --- | --- | --- |
| **Construction Sector** | **Surrogate Value** | **Surrogate Units** |
| ☑ Highway - New Construction | 77.8 | lane-miles |
| ☑ Highway - Bridgework | 29.0 | project value (m$) |
| ☑ Highway - Repair/Maintenance | 21.0 | project value (m$) |
| ☑ Highway - Widening/Turn Lanes | 1.8 | lane-miles |
| ☐ Highway - Other | 0.0 | project value (m$) |
| ☐ Utility | 0 | $M/yr |
| ☑ Residiential | 9.5 | single unit housing starts ('000s) |
| ☑ Landfills | 3.45 | million tons of waste/yr |
| ☑ City/County Roads - New Construction | 5.5 | lane-miles |
| ☑ City/County Roads - Bridgework | 0.0 | project value (m$) |
| ☐ City/County Roads - Repair/Maintenance | 0.0 | project value (m$) |
| ☑ City/County Roads - Widening/Turn Lanes | 10.6 | lane-miles |
| ☑ City/County Roads - Other | 0.0 | project value (m$) |

## Optional Profile – Project-specific

Check the box if you would like to include the Commercial sector in your scenario. The tool **does not** include default values for the commercial sector so, if selected, you must input a Surrogate Value in the orange cell. The surrogate value must be a numeric entry greater than or equal to 0.

**Option not Selected - Surrogate Value is 0**

| **Optional Profile - Project-Specific** | | |
| --- | --- | --- |
| ☐ Commercial | 0 | Thou |

**Option is Selected - User-Input Surrogate Value**

| **Optional Profile - Project-Specific** | | |
| --- | --- | --- |
| ☑ Commercial | 0 | Thou |

After completing your selections on the Scenario Selection worksheet, you may select other worksheets to view and/or input additional data.

## b. Reviewing the Emissions Worksheet

The *Emissions* worksheet is a **read-only** worksheet that displays the "base case," uncontrolled estimated emissions for the scenario you have created. Remember that values on this summary worksheet will change based on your scenario selection and any user-input values you have entered in the orange cells on other worksheets.

## c. Using the Controls Worksheet

The *Controls* worksheet provides the control strategy evaluation and displays the controlled emissions for biodiesel, compressed natural gas (CNG), diesel particulate filters (DPFs), diesel oxidation catalysts (DOCs), and accelerated retirement/rebuild. On this worksheet, you may change the inputs in the orange cells associated with each control strategy. These include:

- Biodiesel section: you may input a Blend percent and Penetration percent (see screenshot below).
- CNG section: you may input a Penetration percent.
- DPFs section: you may input a Penetration percent.
- DOCs section: you may input a Penetration percent.
- Accelerated Retirement/Rebuild section: you may input a Model Year cutoff (1995 – 2013) and Penetration percent (see screenshot below).

For each of the percent cells, the value entered must be greater than or equal to 0 and less than or equal to 100. The Model Year cutoff value must be a year between 1995 and 2013.

**Examples of Values in Orange Cells That May be Edited**

| Biodiesel | |
|---|---|
| Blend % | 25 |
| Penetration % | 50 |

| Accelerated Retirement/Rebuild | |
|---|---|

*Replacement with, or rebuild/repower to, Tier 4 assumed not available for 2013 calendar year*

| Model Year cutoff (1995-2013) | 2006 |
|---|---|

| Penetration % | 50 |
|---|---|

## d. Surrogates Worksheet

The *Surrogates* worksheet is a read-only worksheet that displays the surrogate values by sector, county, and year for the scenario you have created. Default values represent the activity surrogates collected by ERG and described in the *Diesel/Black Carbon Technical Assessment and Feasibility Study*.

### Sector-specific Worksheets

There are 14 sector-specific worksheets. Each worksheet corresponds with one of the construction sectors listed on the *Scenario Selection* worksheet. The table below lists the construction sector and corresponding worksheet name:

| Construction Sector | Worksheet Name |
|---|---|
| Highway – New Construction | Highway-New Construction |
| Highway – Bridgework | Highway-Bridgework |
| Highway – Repair/Maintenance | Highway-Repair_Maint |
| Highway – Widening/Turn Lanes | Highway-Widening |
| Highway – Other | Highway-Other |
| Utility | Utilities |
| Residential | Residential |

| Construction Sector | Worksheet Name |
|---|---|
| Landfills | Landfill |
| City/County Roads – New Construction | CityCntyRdsNew |
| City/County Roads – Bridgework | CityCntyRdsBridges |
| City/County Roads – Repair/Maintenance | CityCntyRdsRepMaint |
| City/County Roads – Widening/Turn Lanes | CityCntyRdsWidening |
| City/County Roads – Other | CityCntyRdsOther |
| *Optional Profile* | |
| Commercial | Commercial |

## *Sector Worksheets Using Default Equipment Allocations*

Each sector-specific worksheet provides default equipment counts for the particular construction sector and surrogate values (as selected on the Scenario Selection worksheet). Equipment counts are categorized by model year (e.g., 2014) and by type (e.g., Pavers). Default values for equipment counts are provided on the worksheet.

**Sector Worksheet with Default Values**

| *Equipment Population - New Highway Construction* | | | Year | 2014 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

**Do you want to input your own equipment population values?** No

**Equipment Counts**

| Model Year | Pavers | Rollers | Scrapers | Other Paving | Surfacing | Excavators | Graders | Wheeled Loaders | Backhoes | Dozers | Cranes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2014 | 0.06 | 0.70 | 0.39 | 0.18 | 0.03 | 1.34 | 1.12 | 1.04 | 0.32 | 1.07 | 0.27 |
| 2013 | 0.06 | 0.68 | 0.38 | 0.17 | 0.03 | 1.28 | 1.07 | 0.99 | 0.31 | 1.03 | 0.26 |
| 2012 | 0.06 | 0.66 | 0.36 | 0.16 | 0.03 | 1.21 | 1.00 | 0.95 | 0.31 | 0.99 | 0.25 |
| 2011 | 0.06 | 0.64 | 0.35 | 0.16 | 0.03 | 1.13 | 0.92 | 0.89 | 0.30 | 0.94 | 0.23 |
| 2010 | 0.06 | 0.62 | 0.33 | 0.15 | 0.03 | 1.02 | 0.68 | 0.83 | 0.29 | 0.88 | 0.22 |
| 2009 | 0.05 | 0.60 | 0.32 | 0.14 | 0.03 | 0.66 | 0.59 | 0.70 | 0.28 | 0.73 | 0.21 |
| 2008 | 0.05 | 0.57 | 0.30 | 0.14 | 0.03 | 0.57 | 0.51 | 0.50 | 0.28 | 0.64 | 0.16 |
| 2007 | 0.05 | 0.55 | 0.28 | 0.13 | 0.02 | 0.49 | 0.30 | 0.45 | 0.27 | 0.59 | 0.14 |
| 2006 | 0.04 | 0.52 | 0.26 | 0.11 | 0.02 | 0.42 | 0.22 | 0.40 | 0.26 | 0.53 | 0.13 |
| 2005 | 0.03 | 0.49 | 0.18 | 0.07 | 0.02 | 0.29 | 0.18 | 0.35 | 0.26 | 0.47 | 0.11 |
| 2004 | 0.03 | 0.46 | 0.15 | 0.06 | 0.01 | 0.25 | 0.14 | 0.24 | 0.25 | 0.33 | 0.10 |
| 2003 | 0.03 | 0.33 | 0.13 | 0.05 | 0.01 | 0.23 | 0.07 | 0.22 | 0.24 | 0.29 | 0.08 |
| 2002 | 0.02 | 0.26 | 0.12 | 0.05 | 0.01 | 0.19 | 0.05 | 0.19 | 0.23 | 0.26 | 0.06 |
| 2001 | 0.02 | 0.23 | 0.07 | 0.04 | 0.01 | 0.10 | 0.03 | 0.17 | 0.23 | 0.23 | 0.05 |
| 2000 | 0.02 | 0.21 | 0.05 | 0.04 | 0.01 | 0.07 | 0.02 | 0.14 | 0.22 | 0.13 | 0.05 |
| 1999 | 0.02 | 0.19 | 0.04 | 0.03 | 0.01 | 0.06 | 0.01 | 0.07 | 0.21 | 0.09 | 0.04 |
| 1998 | 0.02 | 0.18 | 0.03 | 0.02 | 0.01 | 0.04 | 0.01 | 0.06 | 0.20 | 0.07 | 0.04 |
| 1997 | 0.01 | 0.16 | 0.02 | 0.01 | 0.01 | 0.03 | 0.01 | 0.04 | 0.20 | 0.06 | 0.02 |
| 1996 | 0.01 | 0.15 | 0.02 | 0.01 | 0.01 | 0.03 | 0.01 | 0.03 | 0.19 | 0.04 | 0.02 |
| 1995 | 0.01 | 0.13 | 0.01 | 0.01 | 0.01 | 0.02 | 0.00 | 0.03 | 0.18 | 0.03 | 0.01 |
| pre-1995 | 0.04 | 0.54 | 0.03 | 0.05 | 0.03 | 0.05 | 0.00 | 0.09 | 1.32 | 0.10 | 0.05 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total** | **0.74** | **8.87** | **3.81** | **1.78** | **0.40** | **9.51** | **6.94** | **8.38** | **6.34** | **9.48** | **2.49** |

## Sector Worksheets Using Non-Default Equipment Allocations

To input your own equipment counts for use in the scenario, select "Yes" in the drop-down menu provided near the top of the screen. Cells that you may edit will be highlighted in orange. You may now overwrite the default values (in the orange cells). The surrogate values must be numeric entries greater than or equal to 0.

**Sector Worksheet with User-Input Values**

| Equipment Population - New Highway Construction | | | | Year | 2014 | | | | | | |

| Do you want to input your own equipment population values? | Yes ▾ | | | | | | | | | | |

**Equipment Counts**

| Model Year | Pavers | Rollers | Scrapers | Other Paving | Surfacing | Excavators | Graders | Wheeled Loaders | Backhoes | Dozers | Cranes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2014 | 0.06 | 0.70 | 0.39 | 0.18 | 0.03 | 1.34 | 1.12 | 1.04 | 0.32 | 1.07 | 0.27 |
| 2013 | 0.06 | 0.68 | 0.38 | 0.17 | 0.03 | 1.28 | 1.07 | 0.99 | 0.31 | 1.03 | 0.26 |
| 2012 | 0.06 | 0.66 | 0.36 | 0.16 | 0.03 | 1.21 | 1.00 | 0.95 | 0.31 | 0.99 | 0.25 |
| 2011 | 0.06 | 0.64 | 0.35 | 0.16 | 0.03 | 1.13 | 0.92 | 0.89 | 0.30 | 0.94 | 0.23 |
| 2010 | 0.06 | 0.62 | 0.33 | 0.15 | 0.03 | 1.02 | 0.68 | 0.83 | 0.29 | 0.88 | 0.22 |
| 2009 | 0.05 | 0.60 | 0.32 | 0.14 | 0.03 | 0.66 | 0.59 | 0.70 | 0.28 | 0.73 | 0.21 |
| 2008 | 0.05 | 0.57 | 0.30 | 0.14 | 0.03 | 0.57 | 0.51 | 0.50 | 0.28 | 0.64 | 0.16 |
| 2007 | 0.05 | 0.55 | 0.28 | 0.13 | 0.02 | 0.49 | 0.30 | 0.45 | 0.27 | 0.59 | 0.14 |
| 2006 | 0.04 | 0.52 | 0.26 | 0.11 | 0.02 | 0.42 | 0.22 | 0.40 | 0.26 | 0.53 | 0.13 |
| 2005 | 0.03 | 0.49 | 0.18 | 0.07 | 0.02 | 0.29 | 0.18 | 0.35 | 0.26 | 0.47 | 0.11 |
| 2004 | 0.03 | 0.46 | 0.15 | 0.06 | 0.01 | 0.25 | 0.14 | 0.24 | 0.25 | 0.33 | 0.10 |
| 2003 | 0.03 | 0.33 | 0.13 | 0.05 | 0.01 | 0.23 | 0.07 | 0.22 | 0.24 | 0.29 | 0.08 |
| 2002 | 0.02 | 0.26 | 0.12 | 0.05 | 0.01 | 0.19 | 0.05 | 0.19 | 0.23 | 0.26 | 0.06 |
| 2001 | 0.02 | 0.23 | 0.07 | 0.04 | 0.01 | 0.10 | 0.03 | 0.17 | 0.23 | 0.23 | 0.05 |
| 2000 | 0.02 | 0.21 | 0.05 | 0.04 | 0.01 | 0.07 | 0.02 | 0.14 | 0.22 | 0.13 | 0.05 |
| 1999 | 0.02 | 0.19 | 0.04 | 0.03 | 0.01 | 0.06 | 0.01 | 0.07 | 0.21 | 0.09 | 0.04 |
| 1998 | 0.02 | 0.18 | 0.03 | 0.02 | 0.01 | 0.04 | 0.01 | 0.06 | 0.20 | 0.07 | 0.04 |
| 1997 | 0.01 | 0.16 | 0.02 | 0.01 | 0.01 | 0.03 | 0.01 | 0.04 | 0.20 | 0.06 | 0.02 |
| 1996 | 0.01 | 0.15 | 0.02 | 0.01 | 0.01 | 0.03 | 0.01 | 0.03 | 0.19 | 0.04 | 0.02 |
| 1995 | 0.01 | 0.13 | 0.01 | 0.01 | 0.01 | 0.02 | 0.00 | 0.03 | 0.18 | 0.03 | 0.01 |
| pre-1995 | 0.04 | 0.54 | 0.03 | 0.05 | 0.03 | 0.05 | 0.00 | 0.09 | 1.32 | 0.10 | 0.05 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total** | 0.74 | 8.87 | 3.81 | 1.78 | 0.40 | 9.51 | 6.94 | 8.38 | 6.34 | 9.48 | 2.49 |

Return to the *Emissions* worksheet or other worksheets to view changes in calculated values based on any inputs you have changed in orange cells.

# III.    Acknowledgements