



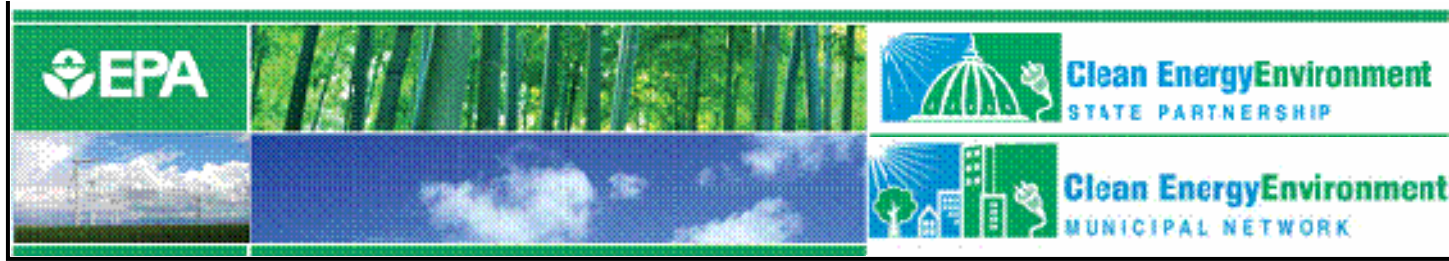
Greenhouse Gas Inventory 101

Session 3: State Inventory Tool (SIT) Training Session

You will hear music until the webcast begins.

Slides will be e-mailed to all participants.





Greenhouse Gas Inventory 101

Session 3: State Inventory Tool (SIT) Training Session

December 5, 2007

Andrea Denny, EPA & Lauren Pederson, ICF





Welcome and background

- Clean Energy Environment Programs
 - Promote cost-effective clean energy strategies that achieve environmental, energy, public health and economic benefits
 - Clean Energy Environment State Program
 - Clean Energy Environment Municipal Network
- www.epa.gov/cleanenergy/stateandlocal





Logistics

- Phone lines are muted to control background noise.
- Please use question/comment box to submit your questions, we will consolidate questions and ask them during the Q&A session at the end of the presentation.
- Please use color indicators to show if you are confused or need the presenter to slow down. We will keep an eye on this during the presentation.
- We will notify participants of where the recording will be online once it is available.
- Feedback after the training is welcomed, please email denny.andrea@epa.gov with questions or comments.





Session 3

- Audience:
 - Recommended for state officials as the tool is designed to incorporate state-level data.
- Goal:
 - This detailed training for the SIT modules includes implementation of state data to assess GHG emissions by source and sector.

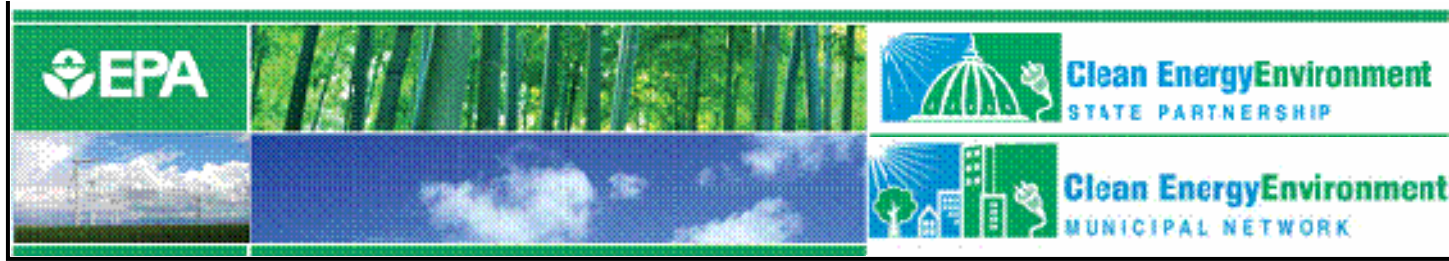




Outline

- Background
- Lessons Learned
- State Inventory Tool
- State Inventory Tool Demonstration
 - CO₂ from Fossil Fuel Combustion module
 - Natural Gas and Oil module
 - Synthesis module
- Projection Tool





Background

- The State and Local Program began in 1990
 - Mission: to build capacity in the states
- Developed the *State Guidance* for estimating state GHG emissions
- Gave grants to states to develop GHG inventories
 - 42 states and Puerto Rico have developed inventories





Lessons Learned

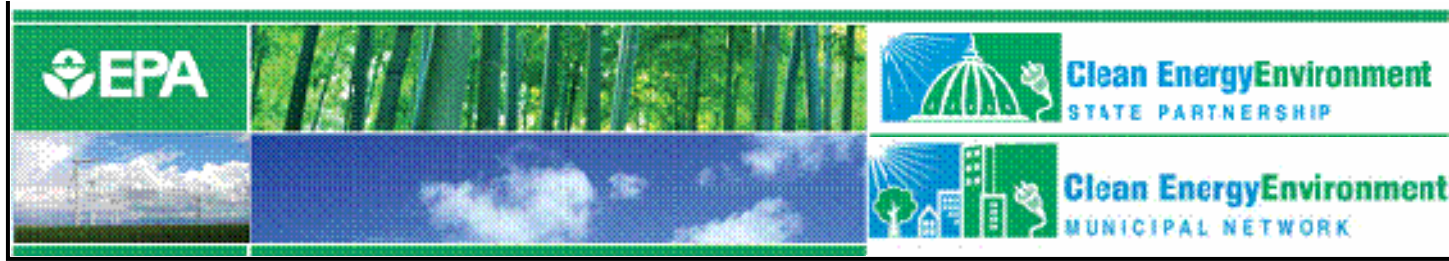
- Inventories are time-intensive
 - Collecting the data
 - Identifying the appropriate emission factors
 - Setting up the infrastructure to calculate emissions
- Inventories for a single year in the 1990s are insufficient for mitigation planning in 2007
- Emission trends are necessary for:
 - projecting emissions, identifying mitigation activities, setting targets, and creating action plans





Lessons Learned (continued)

- Updating methodology is difficult
 - Creation of User's Guide to update methodology and provide guidance for modules
- States need tools
 - To facilitate updates
 - To project emissions
 - To analyze trends
 - To provide a standardized methodology
 - To track progress from year to year
 - To gain perspective on major sources and sinks



State Inventory Tool Goals

- Leverage EPA's extensive inventory experience
 - Development of the National Inventory
 - Contributing to the IPCC Good Practice Guidance
- Provide default state activity data and emission factors, but allow customization
- Maximize transparency
- Provide estimates for the most recent year where data is available
- Enable sector experts to work simultaneously on different parts of the inventory
- Utilize a user-friendly interface





State Inventory Tool Design

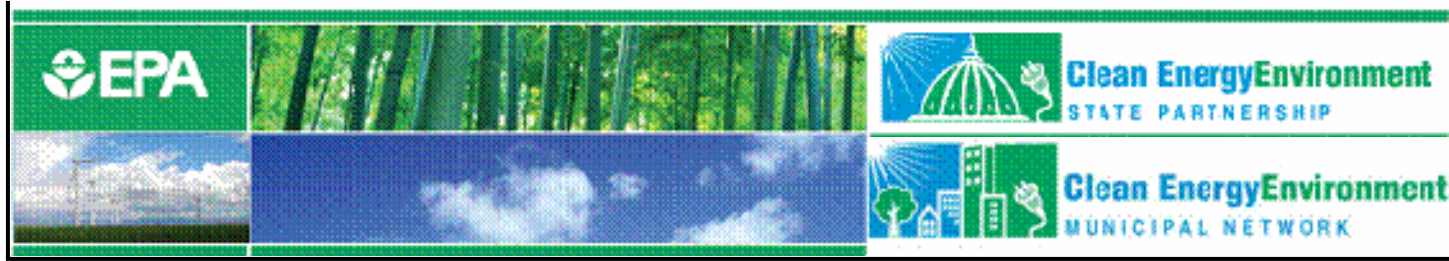
- Eleven Excel® modules comprise the State Inventory Tool
 - Ten modules cover the emission source categories
 - One Synthesis Module compiles data from the source modules into a complete inventory
- A companion Projection Tool



Sector Modules

- CO₂ from Fossil Fuel Combustion
- CH₄ and N₂O from Stationary Combustion
- CH₄ and N₂O from Mobile Combustion
- Natural Gas and Oil Systems
- Coal Mining
- Industrial Processes
- Agriculture
- Municipal Solid Waste
- Wastewater
- Land-Use Change and Forestry





Using the Tool

- Complete one module at a time or encourage sector experts to complete relevant modules
- When modules are complete, create export files
- Use Synthesis Module to create summary tables and graphs



Completing a Source Module...

- On the control worksheet: select the state, select the parameters of the inventory (where necessary), and fill in the emission factors (or utilize default parameters)
- On the calculation worksheet: enter activity data or select default data
- On the summary worksheet: view the summary of emissions
- On the control worksheet: export the summary data to a separate file





Control Worksheet

State Inventory Tool - CO₂ Emissions from Combustion of Fossil Fuel

File Edit Module Options Typ

State Inventory Tool - CO₂ Emissions from Combustion of Fossil Fuels

1. Choose a State: Colorado Consult EIIP Guidance

This is very important - it selects the correct default variables for your state. RESET ALL!

2. Fill In the Variables that are used throughout the module for:
Either Type in the value/percentage or Click the Default Box.

Combustion Efficiencies

Fuel	Default Efficiency	Efficiency Used	Use the Default? (Check for Yes)
Coal	100.0%	100.0%	<input checked="" type="checkbox"/>
Natural Gas	100.0%	100.0%	<input checked="" type="checkbox"/>
Petroleum	100.0%	100.0%	<input checked="" type="checkbox"/>
LPG	100.0%	100.0%	<input checked="" type="checkbox"/>

Clear/Select All Defaults

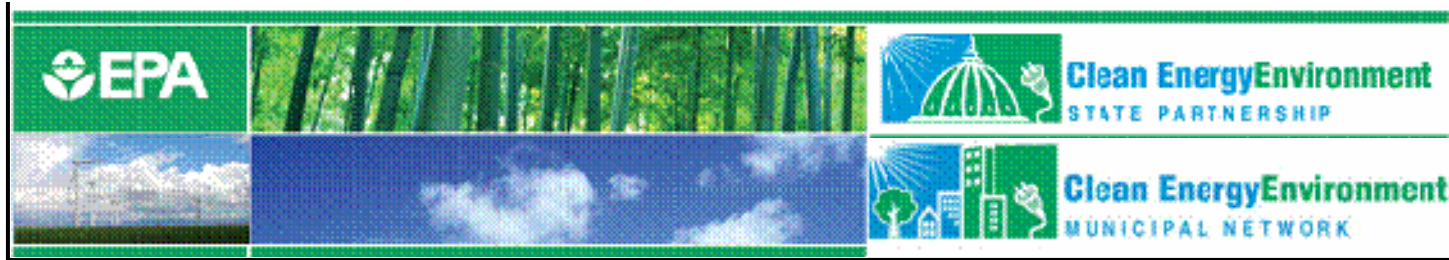
Carbon Contents (lbs Carbon/million Btu)

Fuel	Default Carbon Content	Carbon Content Used	Use the Default? (Check for Yes)
Asphalt and Road Oil	45.42	45.4	<input checked="" type="checkbox"/>
Aviation Gasoline	41.56	41.6	<input checked="" type="checkbox"/>
Distillate Fuel	43.94	43.9	<input checked="" type="checkbox"/>
Jet Fuel, Kerosene	variable by year	variable by year	<input checked="" type="checkbox"/>
Jet Fuel, Naphtha	43.50	43.5	<input checked="" type="checkbox"/>
Kerosene	43.44	43.4	<input checked="" type="checkbox"/>
LPG (industrial)	variable by year	variable by year	<input checked="" type="checkbox"/>
LPG (energy only)	variable by year	variable by year	<input checked="" type="checkbox"/>
Lubricants	44.58	44.6	<input checked="" type="checkbox"/>
Motor Gasoline	variable by year	variable by year	<input checked="" type="checkbox"/>
Residual Fuel	47.33	47.3	<input checked="" type="checkbox"/>
Misc. Petro Products	variable by year	variable by year	<input checked="" type="checkbox"/>
Feedstocks, Naphtha	39.96	40.0	<input checked="" type="checkbox"/>
Feedstocks, Other Oils	43.94	43.9	<input checked="" type="checkbox"/>
Pentanes Plus	40.18	40.2	<input checked="" type="checkbox"/>
Petroleum Coke	61.34	61.3	<input checked="" type="checkbox"/>
Still Gas	38.57	38.6	<input checked="" type="checkbox"/>
Special Naphthas	43.74	43.7	<input checked="" type="checkbox"/>
Unfinished Oils	variable by year	variable by year	<input checked="" type="checkbox"/>
Waxes	43.63	43.6	<input checked="" type="checkbox"/>
Residential Coal	variable by year	variable by year	<input checked="" type="checkbox"/>

Clear/Select All Defaults

Control Residential Commercial Transportation Electric Power Bunker Fuels Industrial Summary-MMTCO₂E Summary





Calculation Worksheet

State Inventory Tool - CO₂ Emissions from Combustion of Fossil Fuel

File Edit Module Options Type a question for help

3. Residential Consumption and CO₂ Emissions in Colorado

CO₂ emissions from fossil fuel combustion in the residential sector are calculated by multiplying energy consumption (in the residential sector) by carbon content coefficients for each fuel. These quantities are then multiplied by fuel-specific percentages of carbon oxidized during combustion ("combustion efficiency"). The resulting fuel emission values, in pounds of carbon, are then converted to short tons of carbon and million metric tons of carbon equivalent (MMTCE), then to million metric tons of carbon dioxide equivalent (MMTCO₂E), and summed. For further detail on this method, refer to the CO₂-FFC Chapter in the User's Guide.

According to the methods developed by the International Panel on Climate Change, CO₂ emissions from the combustion of biogenic sources (e.g., fuel wood) are not counted in greenhouse gas inventories, provided that those sources are harvested on a sustainable basis. The carbon in wood fuel was originally removed from the atmosphere by photosynthesis, and under natural conditions, it would cycle back to the atmosphere eventually as CO₂ due to degradation processes. For processes with CO₂ emissions, if the emissions are from biogenic materials and the materials are grown on a sustainable basis, then those emissions are considered to close the loop in the natural carbon cycle.

Go to the Control Sheet

Check All Boxes

Clear All Data

1

3 Residential Sector 1990 Default Consumption Data?

Fuel Type	Consumption (Billion Btu)	Emission Factor (lbs C/Million Btu)	Combustion Efficiency (%)	Emissions (short tons carbon)	Emissions (MMTCE)	Emissions (MMTCO ₂ E)
Coal	248	57.93	100.0%	7,180	0.007	0.024
Distillate Fuel	160	43.94	100.0%	3,519	0.003	0.012
Kerosene	127	43.44	100.0%	2,759	0.003	0.009
LPG	6,150	37.96	100.0%	116,725	0.106	0.388
Natural Gas	92,191	31.87	100.0%	1,469,161	1.333	4.887
Other					0.000	0.000

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3 Residential Sector 1991 Default Consumption Data?

Fuel Type	Consumption (Billion Btu)	Emission Factor (lbs C/Million Btu)	Combustion Efficiency (%)	Emissions (short tons carbon)	Emissions (MMTCE)	Emissions (MMTCO ₂ E)
Coal	251	57.93	100.0%	7,269	0.007	0.024
Distillate Fuel	127	43.94	100.0%	2,780	0.003	0.009
Kerosene	136	43.44	100.0%	2,963	0.003	0.010
LPG	6,865	37.95	100.0%	130,251	0.118	0.433
Natural Gas	100,304	31.87	100.0%	1,598,462	1.450	5.317
Other					0.000	0.000

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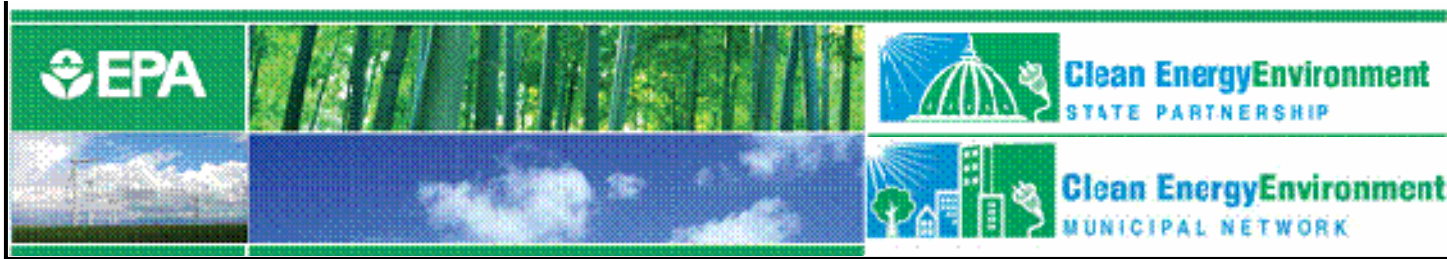
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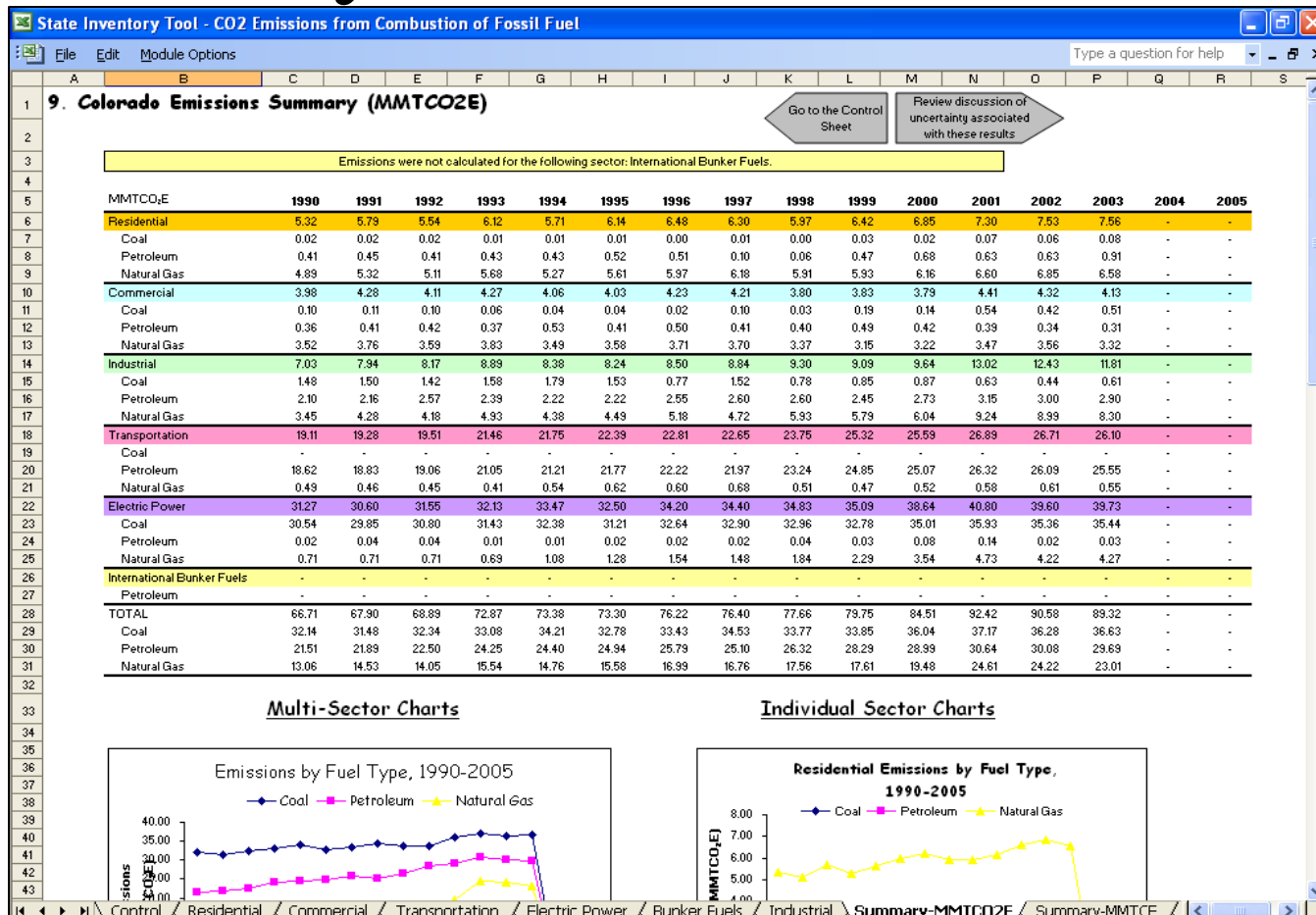
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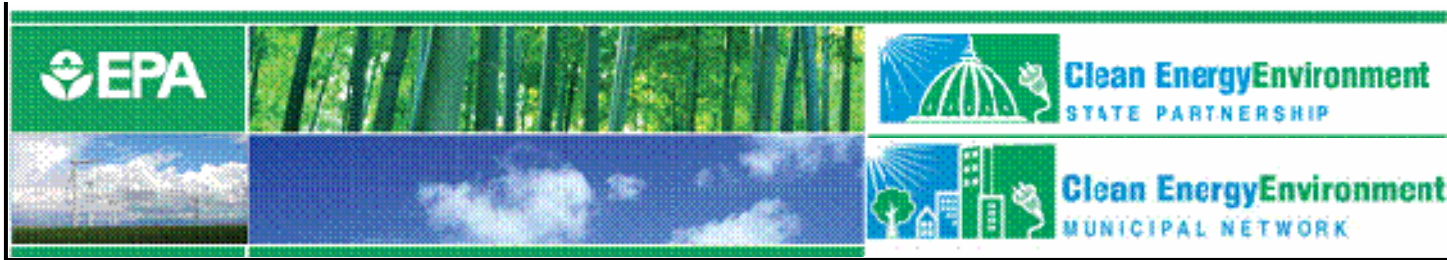
Control Residential Commercial Transportation Electric Power Bunker Fuels Industrial Summary-MMTCO₂E Summary-MMTCE





Summary Worksheet





Exporting Data

State Inventory Tool - CO2 Emissions from Combustion of Fossil Fuel

	Default	Storage Factor	Used	Use the Default? (Check for Yes)
49 Fuel				
50 Asphalt and Road Oil	100%		100%	<input checked="" type="checkbox"/>
51 Distillate Fuel	50%		50%	<input checked="" type="checkbox"/>
52 LPG	variable by year		variable by year	<input checked="" type="checkbox"/>
53 Lubricants	9%		9%	<input checked="" type="checkbox"/>
54 Residual Fuel	50%		50%	<input checked="" type="checkbox"/>
55 Feedstocks, Naphtha	variable by year		variable by year	<input checked="" type="checkbox"/>
56 Feedstocks, Other Oils	variable by year		variable by year	<input checked="" type="checkbox"/>
57 Misc. Petro Products	0%		0%	<input checked="" type="checkbox"/>
58 Pentanes Plus	variable by year		variable by year	<input checked="" type="checkbox"/>
59 Petroleum Coke	50%		50%	<input checked="" type="checkbox"/>
60 Still Gas	80%		80%	<input checked="" type="checkbox"/>
61 Special Naphthas	0%		0%	<input checked="" type="checkbox"/>
62 Waxes	58%		58%	<input checked="" type="checkbox"/>
63 Industrial Coking Coal				
64 Natural Gas				

3. through 8. Complete Individual Sheets

Complete the Residential Sheet

9. Review the Summary Information

Go to the MMTCO₂E Summary Sheet

Go to the MMTCE Summary Sheet

10. Export the results for use in the Synthesis Tool.

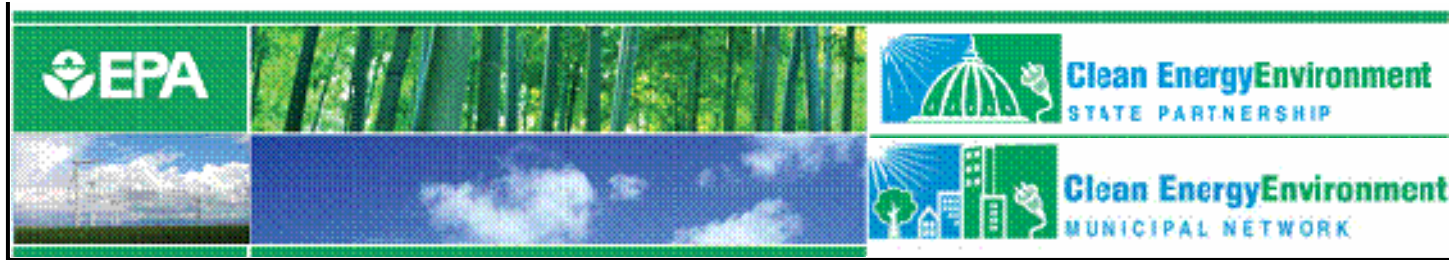
Export Data

State Inventory Tools

This process will generate the output file necessary for completing an inventory of greenhouse gas emissions from all sectors. Before exporting the data from this tool, please be sure that you have completed all the steps above and confirm the results on the summary sheet. If you make any changes to the data in this tool, please update the export file by running this step again.

Control / Residential / Commercial / Transportation / Electric Power / Bunker Fuels / Industrial / Summary-MMTCO₂E / Summary-MMTCE





Exporting Data (cont. 1)

State Inventory Tool - CO2 Emissions from Combustion of Fossil Fuel

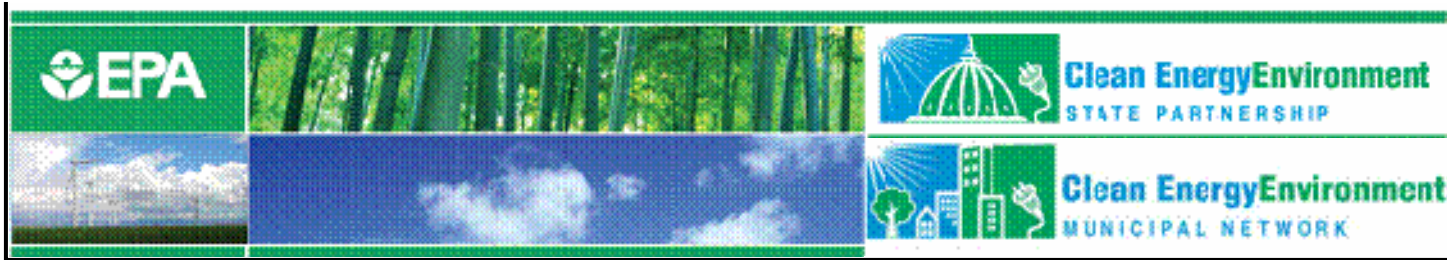
	Default	Storage Factor	Used	Use the Default? (Check for Yes)
49 Fuel	Storage Factor			
50 Asphalt and Road Oil	100%		100%	<input checked="" type="checkbox"/>
51 Distillate Fuel	50%		50%	<input checked="" type="checkbox"/>
52 LPG	variable by year		variable by year	<input checked="" type="checkbox"/>
53 Lubricants	9%		9%	<input checked="" type="checkbox"/>
54 Residual Fuel	50%		50%	<input checked="" type="checkbox"/>
55 Feedstocks, Naphtha	variable by year		variable by year	<input checked="" type="checkbox"/>
56 Feedstocks, Other Oils				
57 Misc. Petro Products				
58 Pentanes Plus				
59 Petroleum Coke				
60 Still Gas				
61 Special Naphthas				
62 Waxes				
63 Industrial Coking Coal				
64 Natural Gas				

3. through 8. Complete Individual...
 67 Complete the Residential Sheet
 68
 69
 70
 82
 83 9. Review the Summary Information
 84
 85 Go to the MMTCO₂E Summary Sheet
 86
 87
 88
 90 10. Export the results for use in the Synthesis tool.
 91
 92 Export Data
 93
 94
 95
 96

Save Summary Output File As...
 Save in: SUMMARY FILES
 CO2FFC_Summary
 Wastewater_Summary
 Stationary_Summary
 Waste_Summary
 Gas and Oil_Summary
 Mobile Combustion_Summary
 Forest Management_Summary
 IP_Summary
 Coal_Summary
 Agriculture_Summary
 File name: CO2FFC_Summary
 Save as type: Excel Files

Control / Residential / Commercial / Transportation / Electric Power / Bunker Fuels / Industrial / Summary-MMTCO₂E / Summary-MMTCE





Exporting Data (cont. 2)

State Inventory Tool - CO2 Emissions from Combustion of Fossil Fuel

Fuel	Default	Storage Factor		Use the Default? (Check for Yes)
	Storage Factor	Used	Used	
Asphalt and Road Oil	100%	100%	100%	<input checked="" type="checkbox"/>
Distillate Fuel	50%	50%	50%	<input checked="" type="checkbox"/>
LPG	variable by year	variable by year	variable by year	<input checked="" type="checkbox"/>
Lubricants	9%	9%	9%	<input checked="" type="checkbox"/>
Residual Fuel	50%	50%	50%	<input checked="" type="checkbox"/>
Feedstocks, Naphtha	variable by year	variable by year	variable by year	<input checked="" type="checkbox"/>
Feedstocks, Other Oils	variable by year	variable by year	variable by year	<input checked="" type="checkbox"/>
Misc. Petro Products	0%	0%	0%	<input checked="" type="checkbox"/>
Pentanes Plus	variable by year	variable by year	variable by year	<input checked="" type="checkbox"/>
Petroleum Coke	50%	50%	50%	<input checked="" type="checkbox"/>
Still Gas	80%	80%	80%	<input checked="" type="checkbox"/>
Special Naphthas	0%	0%	0%	<input checked="" type="checkbox"/>
Waxes	58%	58%	58%	<input checked="" type="checkbox"/>
Industrial Coking Coal	10%	10%	10%	<input checked="" type="checkbox"/>
Natural Gas	variable by year			<input checked="" type="checkbox"/>

3. through 8. Complete Individual Sector Worksheets

9. Review the Summary Information

10. Export the results for use in the Synthesis Tool.

Export Data

State Inventory Tool

The summary data were successfully exported!

OK

Control / Residential / Commercial / Transportation / Electric Power / Bunker Fuels / Industrial / Summary-MMTCO2E / Summary-MMTCE





Tool Demonstration: State Inventory Tools





Q&A for the State Inventory Tool Modules





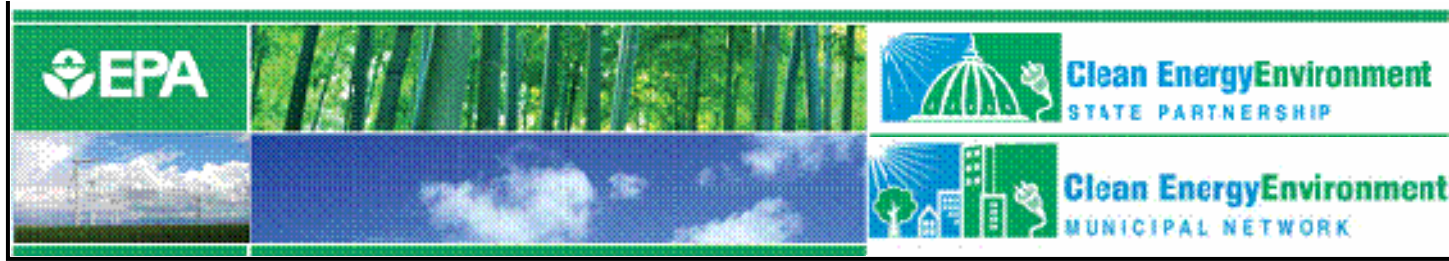
Projection Tool Overview

- Project emissions by gas and by sector through 2020
- Import historic emissions from SIT modules (if applicable)
- Project future emissions
 1. Based on historical data
 2. Forecasting using projected activity data



Projection Example: CO₂FFC

- Projections based on EIA's regional energy consumption data to 2020
- State specific estimates calculated using historic percentage of energy consumption in the region



Tool Demonstration: Projection Tool





Q&A for the Projection Tool





Additional resources

- Energy CO₂ Emissions by State
http://epa.gov/climatechange/emissions/state_energyco2inv.html
- State Greenhouse Gas Inventories
http://epa.gov/climatechange/emissions/state_ghginventories.html
- Inventory of U.S. Greenhouse Gas Emissions and Sinks
<http://www.epa.gov/climatechange/emissions/usinventoryreport.html>





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