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# ***Introduction To GREET 1.8 Graphical User Interface***

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Argonne National Laboratory***

***GREET User Workshop,  
Sacramento, CA  
March 18, 2008***

# Outline

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- Purpose of GREET GUI
- Structure of GREET GUI
- Design and Operation of GREET GUI
- Outputs of GREET GUI
- Installation and Compatibility Issues with GREET GUI
- Help with GREET GUI

# Outline

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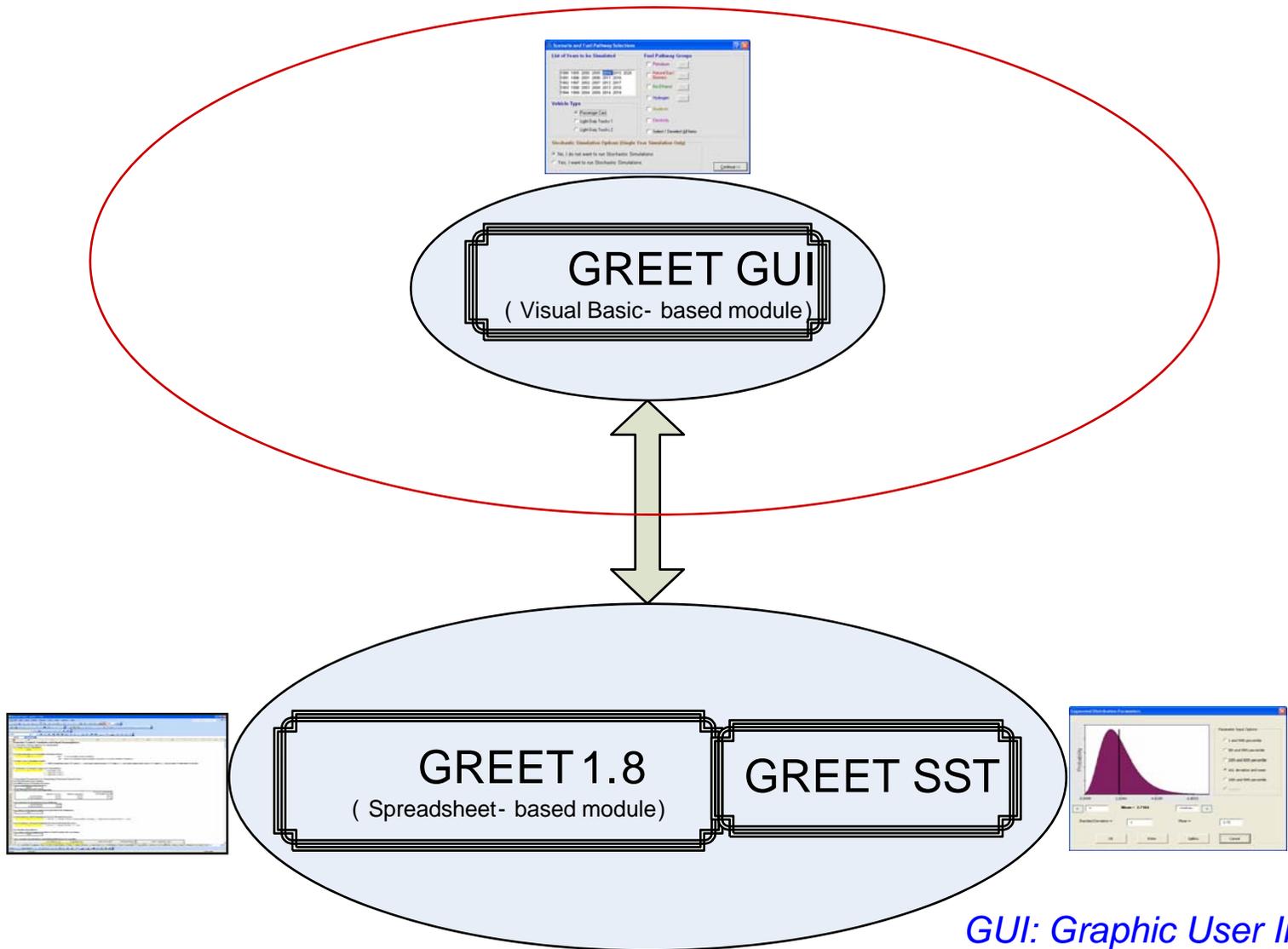
## *Purpose of GREET GUI*

- GREET model was originally developed in MS Excel
- Number of pathway options has grown significantly (more than 100 fuel production pathways and more than 75 vehicle/fuel system options)
- User may be interested in simulating a few of these options and in modifying only the key assumptions associated with these options.
- GREET GUI allows the user to simulate specific pathways of interest by prompting for inputs and presenting results only relevant to those pathways

# ***GREET GUI Development***

- Note that new options developed in GREET Excel are usually rolled into GREETGUI the next release.
- A new architecture is being considered to combine GREET Excel and GREETGUI into one package.

# ***GREET Software Package Includes 3 Modules***



*GUI: Graphic User Interface  
SST: Stochastic Simulation Tool*

## ***GREET GUI Logical Structure***

GREETGUI, developed using Microsoft® Visual Basic 6.0, works as follows:

1. **Receives** inputs from the user through option buttons, check boxes, and input text boxes
2. **Communicates** the inputs to an underlying Excel spreadsheet model (GREET)
3. **Runs** the GREET model in the background
4. **Displays** results in the form of tables in another Excel output file

# Simulation of Multiple Years in One Run

- GREET GUI offers a multiple-year simulation in one run

5-year period	LDGV: NOx
1990	1.285
1995	0.656
2000	0.300
2005	0.141
<b>2010</b>	<b>0.069</b>
2015	0.069
2020	0.069

5-year period	G.H2 Production Efficiency (Central, NA-NG, no export)
1990	68.0%
1995	69.0%
2000	71.0%
2005	71.5%
<b>2010</b>	<b>71.5%</b>
2015	72.0%
2020	73.0%

U.S. mix: Average					
	1.7%	20.6%	50.2%	17.7%	9.8%
5-year period	Residual Oil	Natural Gas	Coal	Nuclear	Others
1990	4.2%	12.3%	52.5%	19.0%	12.0%
1995	2.2%	14.8%	51.0%	20.1%	11.9%
2000	2.9%	15.8%	51.7%	19.8%	9.8%
2005	1.7%	18.4%	50.3%	19.4%	10.2%
<b>2010</b>	<b>1.7%</b>	<b>20.6%</b>	<b>50.2%</b>	<b>17.7%</b>	<b>9.8%</b>
2015	2.5%	22.7%	48.6%	16.6%	9.6%
2020	1.9%	24.2%	49.2%	15.4%	9.3%

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# Structure of GREET GUI

- **Three** main levels of interaction involved with any GREET GUI session:

## I. **Market Share** Specification

(e.g., % of ethanol produced from corn)

## II. **Technological Options** Selections and Inputs

(e.g., DMP and WMP for corn-ethanol production)

## III. **Key Assumptions** Review and Modification

(e.g., corn farming energy use)

## ***Structure of GREET GUI (Cont'd)***

### Note:

- **Key Assumptions** are 1<sup>st</sup> tier assumptions affecting WTW results at the upper level
- 2<sup>nd</sup> tier assumptions are not presented by GUI but can be modified in the underlying Excel model
- Examples of 1<sup>st</sup> tier assumptions are ethanol production energy use or electricity generation efficiency
- Examples of 2<sup>nd</sup> tier assumptions are the emission factors associated with process fuel combustion or vehicle technology

# Main Phases of Interaction in a Typical Session

**Ethanol Feedstock Shares**

GREET Default

Year	Corn %	Woody Biomass %	Herbaceous Biomass %	Corn Stover %	Forest Residue %
1990	100.0	0.0	0.0	0.0	0.0
1995	100.0	0.0	0.0	0.0	0.0
2000	100.0	0.0	0.0	0.0	0.0
2005	100.0	0.0	0.0	0.0	0.0
2007	100.0	0.0	0.0	0.0	0.0
2010	100.0	0.0	0.0	0.0	0.0
2015	100.0	0.0	0.0	0.0	0.0
2020	100.0	0.0	0.0	0.0	0.0

Phase I

<< Back      Continue



**Biofuels and H2 Pathways Options -Base Year for Simulation (Closest t...)**

Ethanol   Electricity   Biodiesel   G.H2: Central   L.H2: Central   G.H2: Station   L.H2: Station

**Corn**      **Biomass**

**Corn Ethanol Options:**

Share of Ethanol Plant Type:

DMP: **85.0** %      WMP: 15.0 %

Share of Process Fuels:

DMP: NG: **80.0** %      Coal: 20.0 %

WMP: NG: **60.0** %      Coal: 40.0 %

Co-Products Credit Calc. Method:  
 Displacement  
 Market Value

Vehicle Tech: 100% Ethanol  
 FCV

**Vehicle Tech: High-Level Blend**

FFV SI engine  
 Dedi. SI engine  
 SIDI engine  
 GI HEV SI engine  
 GC HEV SI engine  
 Select All

**Vehicle Tech: Low-Level Blend (with Gasoline)**

SI engine  
 SIDI engine  
 GI HEV SI engine  
 GC HEV SI engine  
 Select All

**Vehicle Tech: Low-Level Blend (with Diesel)**

CIDI engine  
 GI HEV CIDI engine  
 GC HEV CIDI engine  
 Select All

Phase II

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**Fuel Production Assumptions -BaseYear: 2010**

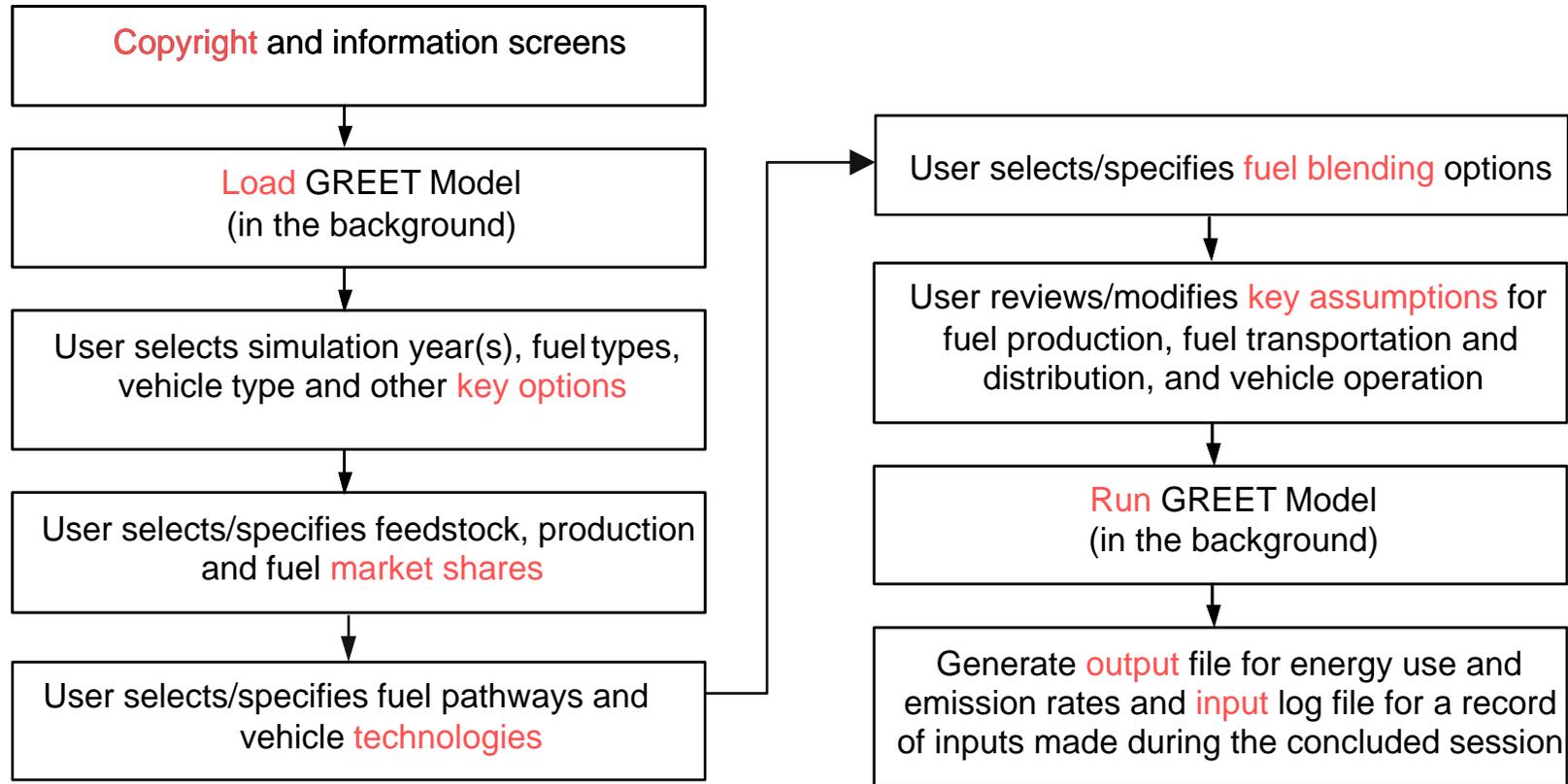
Petroleum   Natural Gas/Biomass   Ethanol   Electricity   Gaseous Hydrogen   Liquid Hydrogen

Items	Assumptions
CO2 Emissions from Landuse Change by Corn Farming (g/bushel)	195.0
Corn Farming Energy Use (Btu/bushel)	22,500
Ethanol Production Energy Use: Dry Mill (Btu/gallon)	36,000
Ethanol Production Energy Use: Wet Mill (Btu/gallon)	45,950

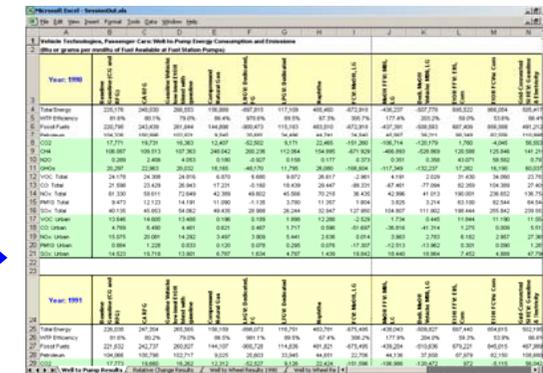
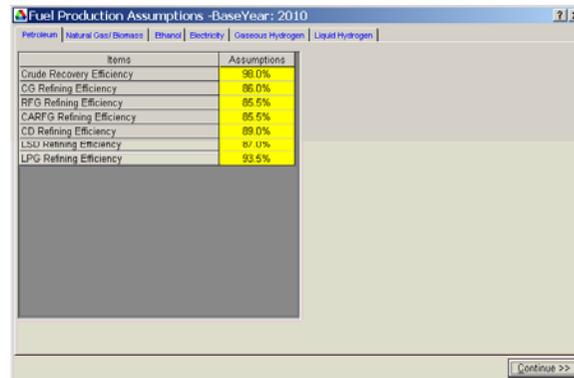
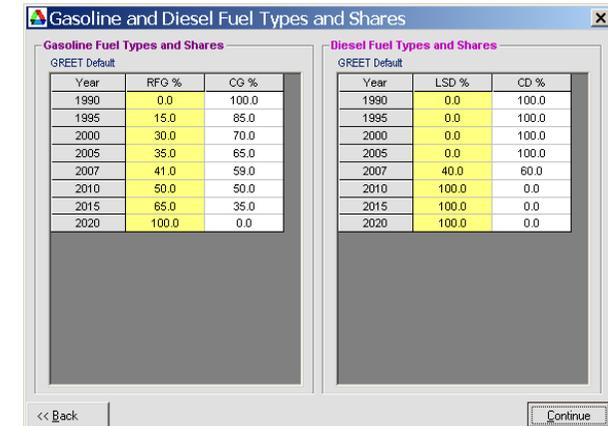
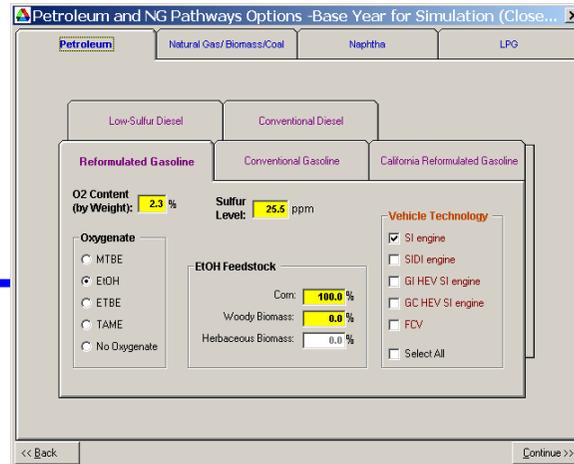
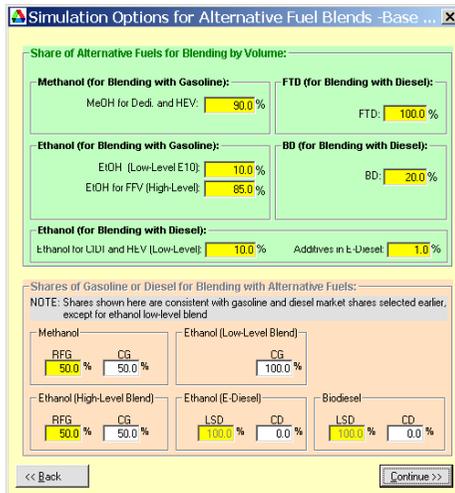
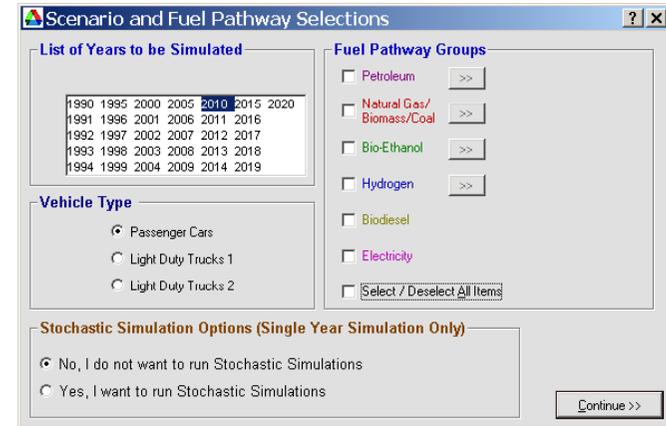
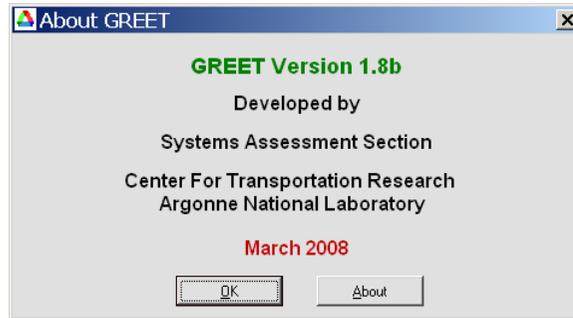
Phase III

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# Steps of a Typical GREET GUI Session



# Main Steps of a Typical GREET GUI Session

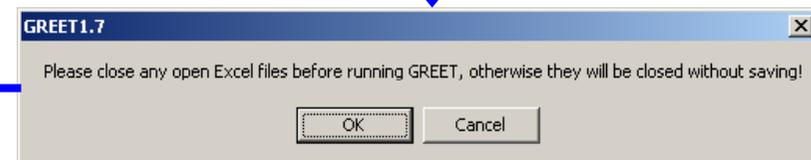
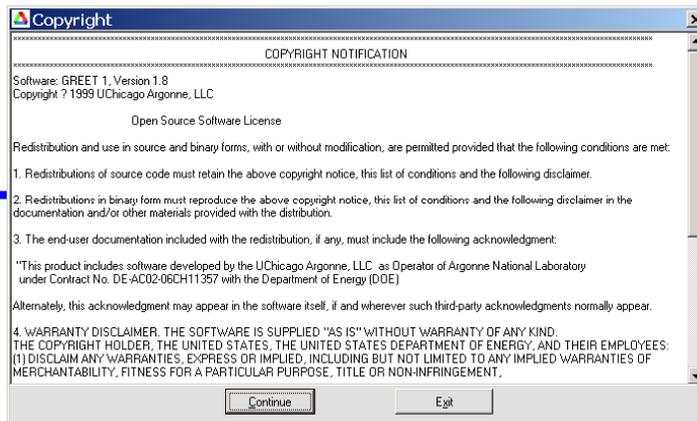
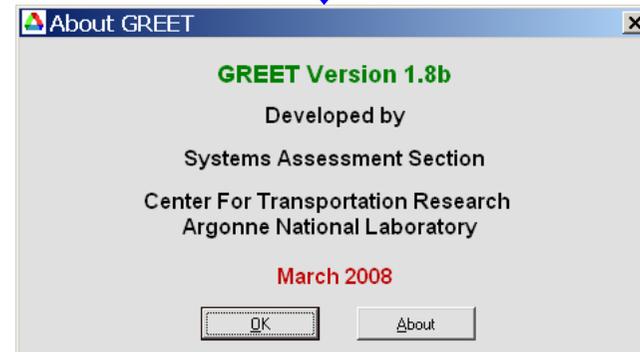
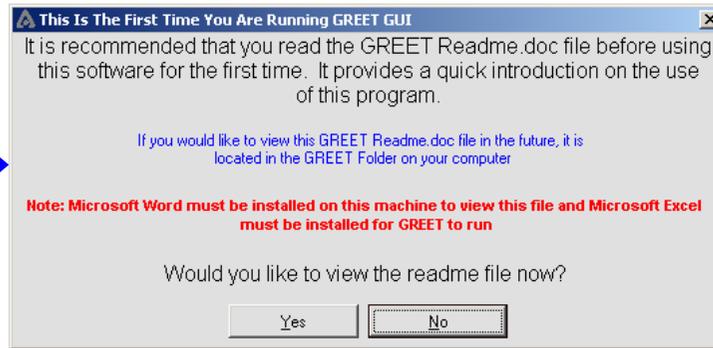


# Outline

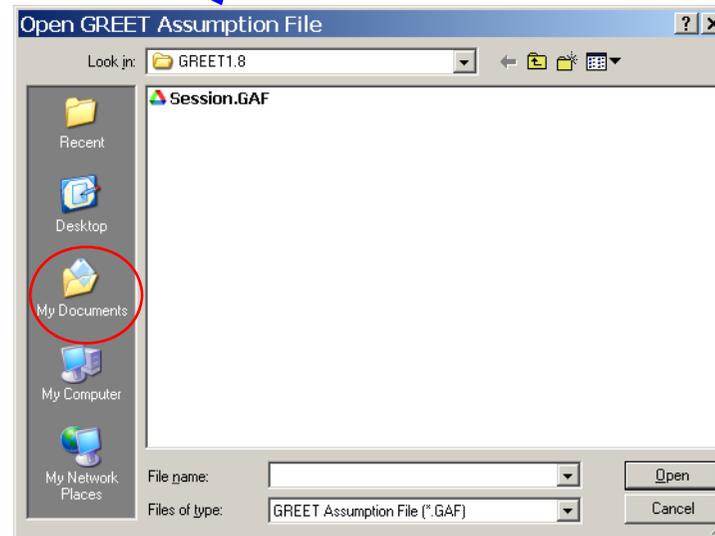
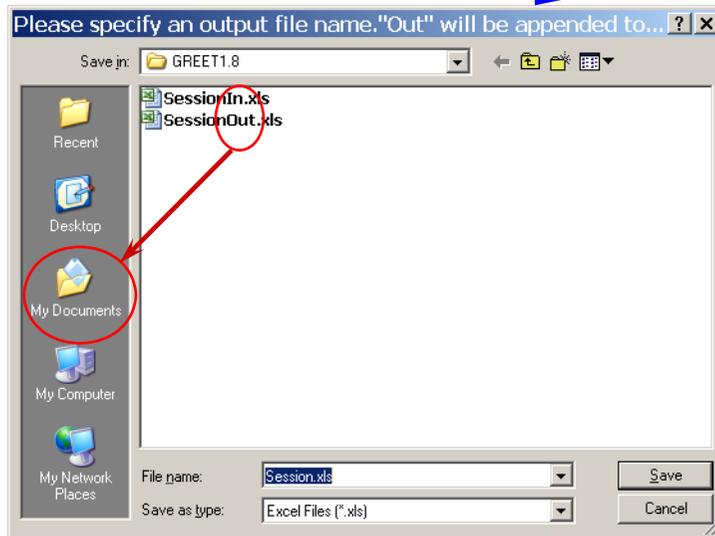
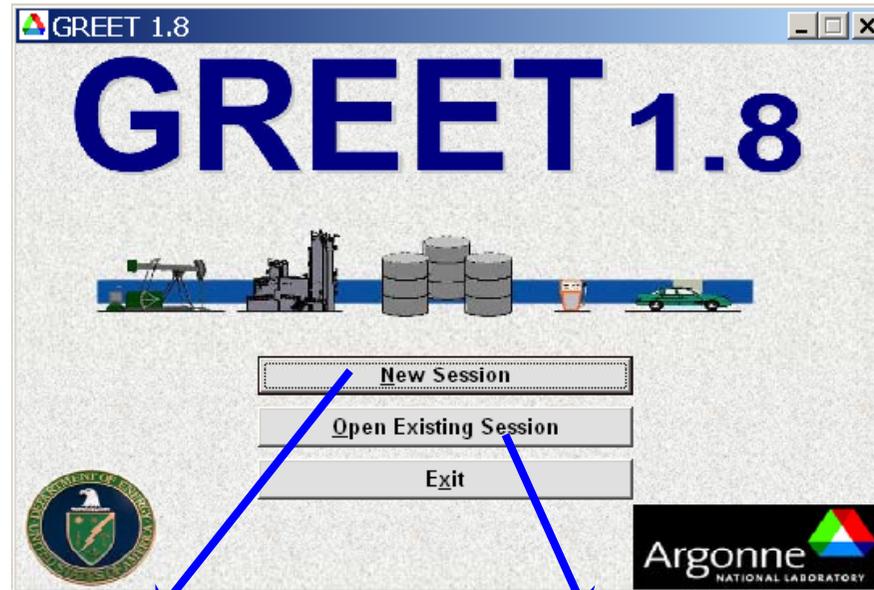
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# Starting GREET GUI...



# Beginning a GREET GUI Session: 1) Create a New Session, or 2) Open Existing Session



# Select the *Key* Scenario Options

- *Simulation Year(s)*
- *Vehicle Type*
- *Fuel Pathways*
- *Stochastic Simulation Option*

**Scenario and Fuel Pathway Selections**

**List of Years to be Simulated**

1990	1995	2000	2005	2010	2015	2020
1991	1996	2001	2006	2011	2016	
1992	1997	2002	2007	2012	2017	
1993	1998	2003	2008	2013	2018	
1994	1999	2004	2009	2014	2019	

**Vehicle Type**

- Passenger Cars
- Light Duty Trucks 1
- Light Duty Trucks 2

**Stochastic Simulation Options (Single Year Simulation Only)**

- No, I do not want to run Stochastic Simulations
- Yes, I want to run Stochastic Simulations

**Fuel Pathway Groups**

- Petroleum
- Natural Gas/Biomass/Coal
- Bio-Ethanol
- Hydrogen
- Biodiesel
- Electricity
- Select / Deselect All Items

**Petroleum Based Fuel Types - Year: ...**

**Petroleum Fuel Types**

- Gasoline
- Diesel
- CARFG
- LPG
- Crude Naptha
- Select All Items

**Ethanol Blend Level**

**Ethanol Blend Level**

- Low-Level Blend (5-15% by volume with gasoline or diesel)
- High-Level Blend (50-90% by Volume with gasoline)
- 100% Ethanol (for Fuel Cell Vehicles)
- Select All Items

**Continue >>**

# I. Market Shares of Fuel Production Options

- Gasoline types' market shares
- Diesel types' market shares
- GH2 production shares
- LH2 production shares
- LPG feedstock shares
- Ethanol feedstock shares

	GREET Default Market Shares	Linear Interpolation between Start Year and End Year Shares (User Specified)	User Specify All Market Shares
Reformulated/Conventional Gasoline Market Shares	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Low-Sulfur/Conventional Diesel Market Shares	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gas H2 Production: Central/Refueling Station Shares	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gas H2 Central Production Feedstock Shares	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gas H2 Station Production Feedstock Shares	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Liquid H2 Production: Central/Refueling Station Shares	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Liquid H2 Central Production Feedstock Shares	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Liquid H2 Station Production Feedstock Shares	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
LPG Production: NG/Crude Feedstock Shares	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ethanol Production: Corn/Biomass Feedstock Shares	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Default All     Interpolate All     User Specify All

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# An Example of Market Share Form

**Ethanol Feedstock Shares**

Ethanol Feedstock Shares

GREET Default

Year	Corn %	Woody Biomass %	Herbaceous Biomass %	Corn Stover %	Forest Residue %	Sugar Cane %
1990	100.0	0.0	0.0	0.0	0.0	0.0
1995	100.0	0.0	0.0	0.0	0.0	0.0
2000	100.0	0.0	0.0	0.0	0.0	0.0
2005	100.0	0.0	0.0	0.0	0.0	0.0
2007	100.0	0.0	0.0	0.0	0.0	0.0
2010	100.0	0.0	0.0	0.0	0.0	0.0
2015	100.0	0.0	0.0	0.0	0.0	0.0
2020	100.0	0.0	0.0	0.0	0.0	0.0

**Note: ALL Yellow fields in GREET GUI are INPUT fields**

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## II. Technological Options Selections and Inputs

### Example: Corn Ethanol Pathway

Biofuels and H2 Pathways Options -Base Year for Simulation (Closest t... X

**Ethanol** Electricity Biodiesel G.H2: Station L.H2: Station

**Corn**

**Corn Ethanol Options:**

Share of Ethanol Plant Type:

DMP:  %

WMP:  %

Share of Process Fuels:

DMP: \_\_\_\_\_

NG:  % Coal:  %

WMP: \_\_\_\_\_

NG:  % Coal:  %

Co-Products Credit Calc. Method:

Displacement

Market Value

**Vehicle Tech: 100% Ethanol**

FCV

**Vehicle Tech: High-Level Blend**

FFV SI engine

Dedi. SI engine

SIDI engine

GI HEV SI engine

GC HEV SI engine

Select All

**Vehicle Tech: Low-Level Blend (with Gasoline)**

SI engine

SIDI engine

GI HEV SI engine

GC HEV SI engine

Select All

**Vehicle Tech: Low-Level Blend (with Diesel)**

CIDI engine

GI HEV CIDI engine

GC HEV CIDI engine

Select All

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# Example: Electricity Generation Pathway

Biofuels and H2 Pathways Options - **Base Year** for Simulation (Closest t... X

Ethanol Electricity Biodiesel G.H2: Station L.H2: Station

**Marginal Generation Mix for Transportation Use:**

U.S. Mix     NE U.S. Mix  
 CA mix     User Defined    Change Default Generation Mix

**Average Generation Mix for Stationary Use:**

U.S. Mix     NE U.S. Mix  
 CA Mix     User Defined    Change Default Generation Mix

**Advanced Power Plants Technology Share:**

NG turbine combined-cycle technology share: **44.0** %  
 NG turbine simple-cycle technology share: **36.0** %  
 Advanced coal technology share: **0.0** %  
 Advanced biomass technology share: **0.0** %

**Nuclear Plants for Electricity Generation:**

LWR Plants Tech. Shares		HTGR Plants Tech. Shares	
Gas Diffusion	<b>25.0</b> %	Gas Diffusion	<b>25.0</b> %
Centrifuge	<b>75.0</b> %	Centrifuge	<b>75.0</b> %

**Marginal Electric Generation Mix...**

**U.S. Mix**

Residual Oil:	<b>2.7</b> %
Natural Gas:	<b>18.9</b> %
Coal:	<b>50.7</b> %
Nuclear Power:	<b>18.7</b> %
Biomass:	<b>1.3</b> %
Others:	<b>7.7</b> %

OK

U.S. Mix     NGCC Electricity  
 Biomass IGCC Electricity

**Biomass Power Plant Feedstock Share:**

Woody Biomass **100.0** %  
 Herbaceous Biomass **0.0** %

**Vehicle Tech.**

Electric Vehicle

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## The Logic to Determine the *Base Year*

- If the user selects more than one simulation year, GREET GUI will select a specific simulation year as its “**base year**”, for which default estimates are presented to the user.
- Specifically, GREETGUI selects the simulation year closest to **2010** as its “**base**” year because key assumptions, especially those with distribution functions, are made for year 2010.
- If the user modifies technology estimates for the base year, GREET GUI will make proportionate adjustments to the corresponding estimates of all **subsequent** simulation years.
- **For example**, if the share of coal-generated electricity in the U.S. average mix is **modified** from 50.2% to 51% for the year 2010, GREETGUI will adjust the coal-generated electricity share estimates for all simulation years subsequent to 2010 by the same percentage, which is +1.6% in this case.

# Blending Options:

## Alternative Fuel Blends

Simulation Options for Alternative Fuel Blends -Base ...

**Share of Alternative Fuels for Blending by Volume:**

<b>Methanol (for Blending with Gasoline):</b> MeOH for Dedi. and HEV: 90.0 %	<b>FTD (for Blending with Diesel):</b> FTD: 100.0 %
<b>Ethanol (for Blending with Gasoline):</b> EtOH (Low-Level E10): 10.0 % EtOH for FFV (High-Level): 85.0 % EtOH for Dedi. and HEV (High-Level): 90.0 %	<b>BD (for Blending with Diesel):</b> BD: 20.0 %
<b>Ethanol (for Blending with Diesel):</b> Ethanol for CIDI and HEV (Low-Level): 10.0 %      Additives in E-Diesel: 1.0 %	

**Shares of Gasoline or Diesel for Blending with Alternative Fuels:**

NOTE: Shares shown here are consistent with gasoline and diesel market shares selected earlier, except for ethanol low-level blend

<b>Methanol</b> RFG: 50.0 %      CG: 50.0 %	<b>Ethanol (Low-Level Blend)</b> CG: 100.0 %	
<b>Ethanol (High-Level Blend)</b> RFG: 50.0 %      CG: 50.0 %	<b>Ethanol (E-Diesel)</b> LSD: 100.0 %      CD: 0.0 %	<b>Biodiesel</b> LSD: 100.0 %      CD: 0.0 %

**Share of VMT for GC HEVs by Power Source:**

Grid Electricity: 33.0 %
On-Board ICE: 67.0 %

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# Proceed to the Next Parametric Assumptions Forms

- Selecting **“Use GREET default assumptions”** allows the user to view the GREET default assumptions in the subsequent screens, but not to modify or change them.
- Selecting **“Revise Base Year assumptions which adjust the assumptions of all years”** allows the user to revise the base year’s default assumptions and automatically adjusts all other years’ assumptions by the same percentage change made to the base year’s assumptions.
- Selecting **“Revise Base Year assumptions which adjust the assumptions of future years”** allows the user to revise the base year’s assumptions and automatically adjusts future years’ assumptions by the same percentage change made to the base year’s assumptions.

Parametric Assumptions Options for Base Year: 2010

Simulation Options using 2010 as Base Year for Parametric Assumptions

Use GREET default assumptions estimates

Revise Base Year assumptions which adjust the assumptions of all years

Revise Base Year assumptions which adjust the assumptions of future years

View parametric assumptions for specific years (select from list)

NOTE: Pressing SHIFT and clicking the mouse extends the selection from the previously selected item to the current item. Pressing CTRL and clicking the mouse selects or deselects an item in the list

1990  
1995  
2000  
2005  
2007  
2010  
2015  
2020

Proceed >>

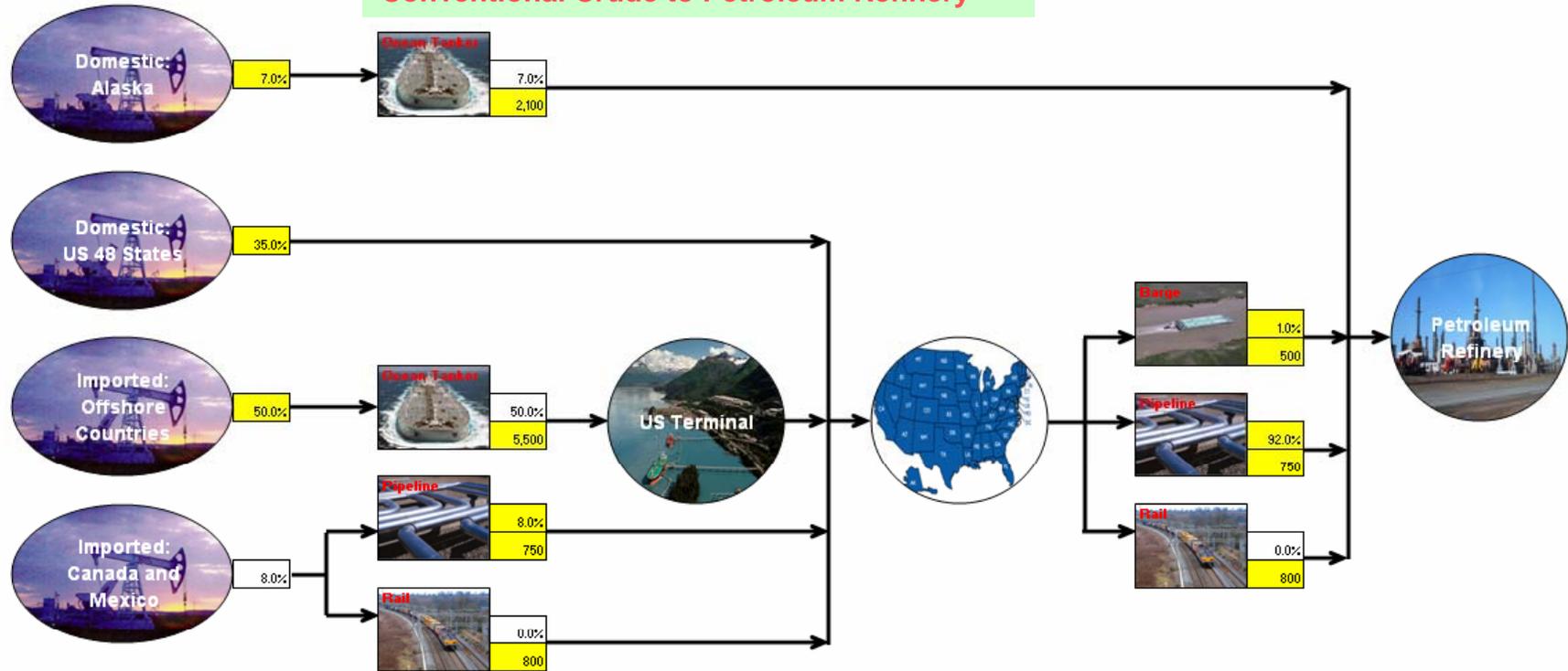
### III. Key Parametric Assumptions Inputs

#### Production Assumptions (Example: Electricity)

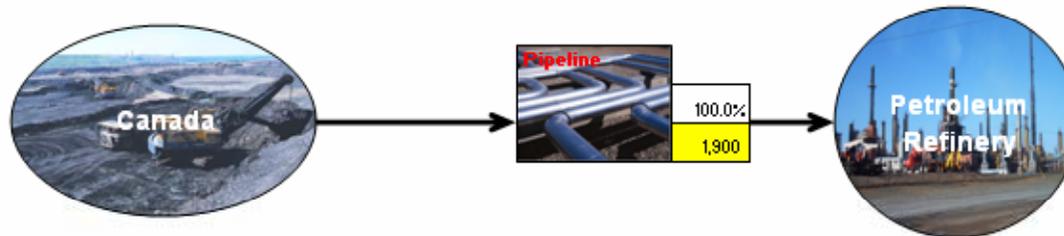
Items	Assumptions
Residual Oil Utility Boiler Efficiency	34.8%
NG Utility Boiler Efficiency	34.8%
NG Simple Cycle Turbine Efficiency	33.1%
NG Combined Cycle Turbine Efficiency	53.0%
Coal Utility Boiler Efficiency	34.1%
Advanced Coal Power Plant Efficiency	46.0%
Biomass Utility Boiler Efficiency	32.1%
Advanced Biomass Power Plant Efficiency	40.0%
Electricity Transmission and Distribution Loss	8.0%
Energy intensity in HTGR reactors (MWh/g of U-235)	8.704
Energy intensity in LWR reactors (MWh/g of U-235)	6.926
Electricity Use of Uranium Enrichment (kWh/SWU): Gaseous Diffusion Plants for LWR electricity generation	2,400
Electricity Use of Uranium Enrichment (kWh/SWU): Centrifuge Plants for LWR electricity generation	50.00
Electricity Use of Uranium Enrichment (kWh/SWU): Gaseous Diffusion Plants for HTGR electricity generation	2,400
Electricity Use of Uranium Enrichment (kWh/SWU): Centrifuge Plants for HTGR electricity generation	50.00

# Transportation Modes and Distances

## Conventional Crude to Petroleum Refinery



## Canadian Oil Sands to Petroleum Refinery



# Vehicles' Technology Assumptions:

## Vehicle Operations –Baseline Vehicles

Vehicle Operation Assumptions -Base Year: 2010

Baseline Vehicles (Model Year 2005) | Alternative-Fueled and Advanced Vehicles (Model Year 2005)

**Fuel Economy (MPG) and Emission Rates (g/mile) of Baseline Vehicles: Passenger Cars**

Items	SI Vehicle: CG and RFG	CIDI Vehicle: CD and LSD
Gasoline Equivalent MPG	24.80	30.75
Exhaust VOC	0.122	0.088
Evaporative VOC	0.058	0.000
CO	3.745	0.539
NOx	0.141	0.141
Exhaust PM10	0.0081	0.009
Brake and Tire Wear PM10	0.0205	0.0205
Exhaust PM2.5	0.0075	0.0084
Brake and Tire Wear PM2.5	0.0073	0.0073
CH4	0.0146	0.0026
N2O	0.012	0.012

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# Vehicles' Technology Assumptions:

## Vehicle Operations –Alternative-Fueled and Advanced Vehicles

Vehicle Operation Assumptions -Base Year: 2010

Baseline Vehicles (Model Year 2005) | Alternative-Fueled and Advanced Vehicles (Model Year 2005)

**MPG and Emission Ratios for Alternative-Fueled and Advanced Vehicles RELATIVE TO Baseline Vehicles: Passenger Cars**

Items	CIDI Vehicle: CD and LSD	SI Vehicle: Dedicated CNGV	SI Vehicle: Dedicated LNGV	SI Vehicle: Dedicated LPGV	SI Vehicle: Dedi. MeOH Vehicle	SI Vehicle: EtOH Low-Level	SI Vehicle: EtOH FF
Gasoline Equivalent MPG	124.0%	95.0%	95.0%	100.0%	107.0%	100.0%	100.0%
Exhaust VOC		90.0%	90.0%	90.0%	100.0%	100.0%	100.0%
Evaporative VOC		50.0%	50.0%	80.0%	85.0%	100.0%	85.0%
CO		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
NO <sub>x</sub>		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Exhaust PM10		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Brake and Tire Wear PM10		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Exhaust PM2.5		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Brake and Tire Wear PM2.5		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

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# *Output Files of GREET GUI*

- Results Output File
  - Well-to-Pump (WTP) Energy Use and Emissions
  - Well-to-Wheels (WTW) Energy Use and Emissions
- Input Log File (recording inputs for the simulated pathways)

# Output Files of GREET GUI- WTP Results

Microsoft Excel - SessionOut.xls

File Edit View Insert Format Tools Data Window Help

100% Arial

A4 Total Energy

	A	B	C	D	E	F	G	H	I	J	
28	Year: 2005	Baseline CG and RFG	CA RFG	Gasoline Vehicles: Low-Level ETOH Blend with Gasoline	Compressed Natural Gas	LNG: Dedicated, NG	LPG: Dedicated	Naphtha	FCV: MeOH, nMA NG	Dedi. MeOH Vehicle: nMA NG	ETOH FFV: E85,
29	Total Energy	247,706	271,348	307,296	157,530	202,503	116,548	720,608	610,953	544,514	1,15
30	WTP Efficiency	80.1%	78.7%	76.5%	86.4%	83.2%	89.6%	58.1%	62.1%	64.7%	
31	Fossil Fuels	233,161	241,433	257,456	146,043	201,212	114,973	719,864	609,911	541,031	62
32	Coal	43,756	48,014	52,221	54,295	6,269	11,234	3,737	5,294	12,314	17
33	Natural Gas	81,529	89,878	99,644	83,587	181,854	74,142	693,950	567,318	478,522	35
34	Petroleum	107,877	103,540	105,591	8,161	13,089	29,598	22,177	37,300	50,195	9
35	CO2	17,600	16,681	15,738	12,221	13,532	8,936	29,226	26,061	24,595	.
36	CH4	108.365	109.705	107.350	247.461	200.851	114.803	194.386	181.786	168.364	1
37	N2O	1.052	2.162	3.615	0.183	0.281	0.156	0.156	0.457	0.564	
38	GHGs	20,404	19,844	19,277	17,967	18,235	11,622	33,743	30,377	28,634	
39	VOC: Total	27.060	27.019	27.684	6.712	6.967	10.256	31.831	25.897	26.109	
40	CO: Total	18.925	18.797	21.286	14.282	17.386	14.872	33.346	41.613	37.464	
41	NOx: Total	56.359	49.979	62.146	38.835	55.151	41.004	84.187	120.162	108.495	1
42	PM10: Total	12.462	11.366	15.315	10.299	2.245	3.515	15.526	16.312	15.606	
43	PM2.5: Total	4.940	4.113	5.898	3.089	1.311	1.655	14.727	15.148	13.282	
44	SOx: Total	31.394	31.983	35.539	35.620	15.952	22.603	32.142	37.435	36.327	
45	VOC: Urban	15.600	16.517	15.496	0.193	0.176	1.878	13.398	9.077	10.269	
46	CO: Urban	5.135	7.382	4.895	0.620	0.660	1.481	0.547	0.988	1.746	
47	NOx: Urban	13.507	17.538	13.026	2.630	3.332	4.179	2.541	5.024	6.574	
48	PM10: Urban	2.411	1.267	2.278	0.123	0.095	0.510	0.093	0.178	0.586	
49	PM2.5: Urban	1.391	0.894	1.316	0.076	0.076	0.301	0.064	0.126	0.357	
50	SOx: Urban	10.478	15.565	10.233	4.421	0.787	2.982	1.128	1.748	3.343	
51											

# Output Files of GREET GUI- WTW Results

Microsoft Excel - Session2Out.xls

File Edit View Insert Format Tools Data Window Help

130% Arial 8

A4 Item

	A	B	C	D	E	F	G	H	I
1	<b>Vehicle Technologies, Passenger Cars: Well-to-Wheel Energy Consumption and Emissions (per Mile)</b>								
2	<b>Gasoline Vehicle: CARFG</b>				<b>Gasoline Vehicle: Low-Level EtOH Blend with Gasoline</b>				
3		<b>Btu/mile or grams/mile</b>				<b>Btu/mile or grams/mile</b>			
4	<b>Item</b>	<b>Feedstock</b>	<b>Fuel</b>	<b>Vehicle Operation</b>	<b>Item</b>	<b>Feedstock</b>	<b>Fuel</b>	<b>Vehicle Operation</b>	
5	Total Energy	159	1,204	5,026	Total Energy	232	1,204	5,026	
6	Fossil Fuels	152	1,061	4,842	Fossil Fuels	224	893	4,701	
7	Coal	34	208	0	Coal	38	156	0	
8	Natural Gas	79	371	0	Natural Gas	84	285	0	
9	Petroleum	39	483	4,842	Petroleum	101	451	4,701	
10	CO2	3	81	379	CO2	-2	67	385	
11	CH4	0.454	0.098	0.020	CH4	0.433	0.077	0.022	
12	N2O	0.000	0.011	0.012	N2O	0.000	0.005	0.012	
13	GHGs	14	86	383	GHGs	8	70	390	
14	VOC: Total	0.016	0.119	0.190	VOC: Total	0.020	0.118	0.227	
15	CO: Total	0.038	0.056	4.168	CO: Total	0.057	0.070	4.689	
16	NOx: Total	0.107	0.144	0.285	NOx: Total	0.162	0.168	0.300	
17	PM10: Total	0.009	0.048	0.029	PM10: Total	0.013	0.049	0.029	
18	PM2.5: Total	0.004	0.017	0.015	PM2.5: Total	0.007	0.019	0.015	
19	SOx: Total	0.037	0.124	0.003	SOx: Total	0.047	0.098	0.006	
20	VOC: Urban	0.004	0.079	0.110	VOC: Urban	0.003	0.075	0.141	
21	CO: Urban	0.001	0.036	2.592	CO: Urban	0.002	0.023	2.917	
22	NOx: Urban	0.005	0.083	0.177	NOx: Urban	0.007	0.058	0.187	
23	PM10: Urban	0.000	0.006	0.018	PM10: Urban	0.000	0.011	0.018	
24	PM2.5: Urban	0.000	0.004	0.009	PM2.5: Urban	0.000	0.006	0.010	
25	SOx: Urban	0.004	0.074	0.002	SOx: Urban	0.005	0.045	0.004	
26									

# Output Files of GREET GUI- WTW Relative Change Results (Compared to Conventional Gasoline Baseline Vehicles)

Microsoft Excel - SessionOut.xls

File Edit View Insert Format Tools Data Window Help

A4 Total Energy

Year: 2005	GV: CARFG	GV: Low-Level EtOH Blend with Gasoline	Dedicated CNGV	LNGV: Dedicated, NG	LPGV: Dedicated	Dedi. MeOH Vehicle: M80, nMA NG	EtOH FFV: E85, Com	G-H2 ICE Vehicle	L-H2 ICE Vehicle	CIDI Vehicle: Conventional and
Total Energy	1.9%	4.8%	-2.3%	1.4%	-10.5%	15.7%	72.9%	39.3%	134.0%	-24
Fossil Fuels	-1.1%	-2.1%	-1.0%	3.8%	-8.5%	18.2%	-26.7%	40.1%	124.2%	-22
Coal	9.7%	19.3%	30.6%	-84.9%	-74.3%	-73.7%	299.2%	232.2%	1922.7%	-42
Natural Gas	10.2%	22.2%	1299.0%	1425.9%	726.9%	1385.4%	340.8%	1794.8%	2077.7%	-41
Petroleum	-2.4%	-4.8%	-99.2%	-98.7%	-60.7%	-80.1%	-67.2%	-98.5%	-93.4%	-20
CO2	-1.9%	-2.1%	-20.3%	-18.5%	-18.4%	-3.3%	-25.8%	16.4%	117.4%	-21
CH4	0.9%	-0.9%	170.2%	126.7%	5.7%	42.6%	5.1%	223.2%	335.7%	-26
N2O	32.1%	74.2%	-24.8%	-21.9%	-25.9%	-15.2%	1079.4%	-15.8%	21.6%	-25
GHGs	-1.5%	-1.2%	-15.3%	-14.7%	-17.9%	-2.3%	-13.5%	21.6%	122.2%	-21
VOC: Total	-10.4%	0.9%	-48.3%	-47.9%	-37.8%	-6.7%	10.8%	-20.2%	-8.2%	-67
CO: Total	-19.7%	-9.6%	-20.0%	-19.7%	-20.0%	-8.3%	-6.3%	1.6%	3.7%	-83
NOx: Total	-8.1%	5.0%	-13.3%	1.5%	-13.2%	38.7%	80.6%	27.2%	154.4%	-15
PM10: Total	-6.5%	15.6%	-8.8%	-55.1%	-48.8%	11.6%	237.9%	145.1%	848.2%	40
PM2.5: Total	-11.3%	11.9%	-21.0%	-44.3%	-40.9%	93.1%	184.0%	185.5%	614.6%	122
SOx: Total	-0.4%	12.4%	15.7%	-48.6%	-30.8%	4.7%	197.2%	149.9%	1152.0%	-13
VOC: Urban	-8.5%	-0.2%	-56.4%	-56.4%	-46.3%	-16.8%	-6.1%	-31.3%	-29.8%	-69
CO: Urban	-19.5%	-10.0%	-20.5%	-20.5%	-20.4%	-10.5%	-10.3%	0.8%	1.5%	-83
NOx: Urban	4.2%	-0.9%	-21.1%	-19.6%	-18.3%	-14.5%	-9.3%	11.8%	61.1%	-9
PM10: Urban	-19.8%	-2.2%	-37.6%	-38.1%	-31.3%	-30.7%	-24.7%	105.8%	129.3%	114
PM2.5: Urban	-16.5%	-2.3%	-39.6%	-39.6%	-32.9%	-31.9%	-25.7%	220.9%	246.5%	205
SOx: Urban	41.3%	-2.6%	-57.1%	-92.6%	-73.5%	-71.1%	-22.7%	3.7%	506.3%	4

# Output Files of GREET GUI- Inputs Log File

Microsoft Excel - SessionIn.xls

File Edit View Insert Format Tools Data Window Help

Type a question for help

200%

Arial

	A	B	C	D
1	<b>Ethanol</b>			
2	<b>Vehicle Technology</b>			
3	Flexible-Fuel Vehicle Spark Ignition Engine			
4	Low-Level Blend Spark Ignition Engine			
5	Low-Level Blend Compression Ignition, Direct-Injection engine			
6	Fuel-Cell Vehicle			
7	<b>Pathway Options</b>			
8	Corn Ethanol, Share of Ethanol Plant Type, Dry Milling Plant (%):	85		
9	Corn Ethanol, Share of Ethanol Plant Type, Wet Milling Plant (%):	15		
10	Share of Process Fuels in Dry Mill Ethanol Plant: Natural Gas (%):	80		
11	Share of Process Fuels in Dry Mill Ethanol Plant: Coal (%):	20		
12	Share of Process Fuels in Wet Mill Ethanol Plant: Natural Gas (%):	60		
13	Share of Process Fuels in Wet Mill Ethanol Plant: Coal (%):	40		
14	Ethanol Co-Production Credit Calculation Method:	Displacement		
15	Farmed Tree Plant Type:	Fermentation		
16	Herbaceous Biomass Plant Type:	Fermentation		
17	Corn Stover Plant Type:	Fermentation		
18	Forest Residue Plant Type:	Gasification		
19				
20	<b>Electricity</b>			
21	<b>Vehicle Technology</b>			
22	Electric Vehicle			
23	<b>Pathway Options</b>			
24	NG turbine combined cycle share of total NG power plant capacity (%):	44		
25	Simple-cycle NG turbine share of total NG power plant capacity (%):	36		
26	Advanced coal technology share of total coal power plant capacity (%):	10		
27	Advanced biomass technology share of total biomass power plant capacity (%):	5		

Pathway Selections 2010 / Fuel Blends Options 2010 / Market Shares / Production Assumptions 2010 / Transportation Assumptions / Vehicle

Ready

# Outline

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- Purpose of GREET GUI
- Structure of GREET GUI
- Design and Operation of GREET GUI
- Outputs of GREET GUI
- Installation and Compatibility Issues of GREET GUI
- Help with GREET GUI

# Installing GREET

- To download the latest GREET version:
  - Go to <http://www.transportation.anl.gov/software/GREET/index.html>

Address <http://www.transportation.anl.gov/software/GREET/> Go

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• Sample Results

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• Training  
• Technical Papers  
• Presentations  
• Demonstration Videos  
• Newsletter Articles and Useful Links

**The Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) Model**

GREET 1.8b - March 17, 2008 ([download](#))

**What's New in GREET1.8b?**

- New fuel production pathways
  - Brazilian sugarcane ethanol
  - Corn to butanol
  - Soybeans to renewable diesel via hydrogenation
  - Coal/biomass co-feeding for FT diesel production
  - Various corn ethanol plant types with different process fuels
- Enhancements of existing pathways
  - Inclusion of three methods in dealing with co-products for soybean-based biodiesel
  - Compression energy efficiencies for NG and H2 are calculated with the first law of thermodynamics
  - Tube trailer delivery option for gaseous H2 to refueling stations
  - Revision of petroleum refining energy efficiencies

**Related Items**

**Contact**

[greet@anl.gov](mailto:greet@anl.gov)

# Installing GREET

## GREET Documentation

- Operating Manual for GREET: Version 1.7 ([1.6 MB pdf](#))
- User Manual for Stochastic Simulations ([1.1 MB pdf](#))

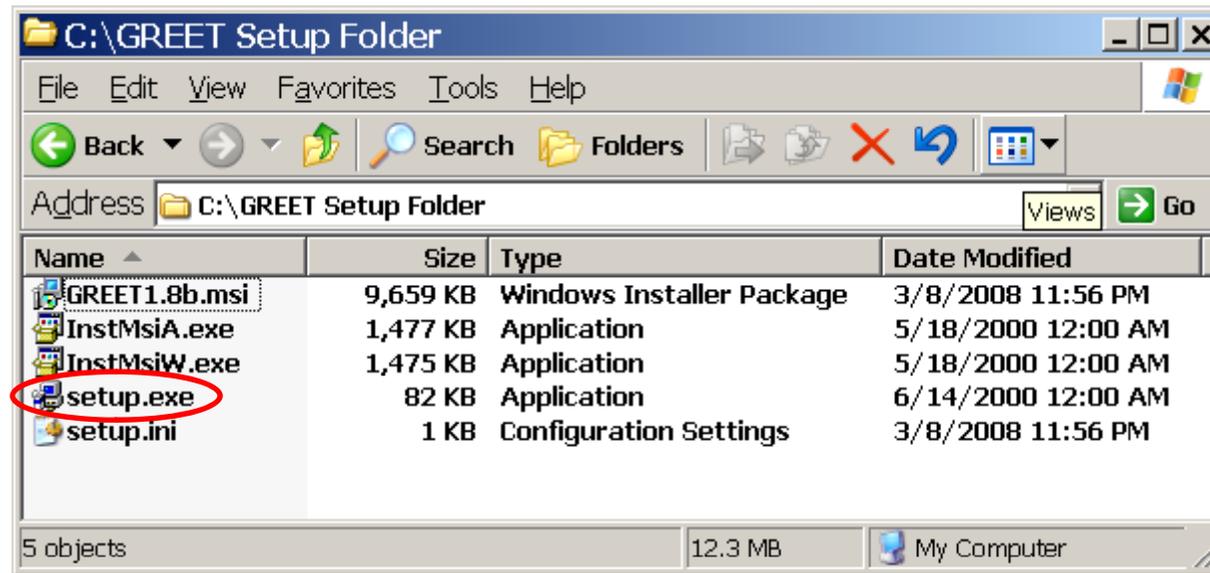
## Installation Instructions

If you wish to run GREET 1.8b version in MS Excel, you can find it in the GREET folder on your PC (C:\Program Files\GREET1.8) which is the default specified by the GREETGUI installation program.

1. **Before installation**, make sure that a Microsoft Office XP Web Component 10 is installed on your computer:
  - a. Go to Windows website (below) to download the file "owc10.exe": <http://www.microsoft.com/downloads/details.aspx?FamilyID=982b0359-0a86-4fb2-a7ee-5f3a499519dd&displaylang=en>.
  - b. When the download is complete, double-click on the file icon and follow the on-screen installation instructions.
2. **Before installation**, make sure that a Microsoft Data Access Component version 2.5 or higher is installed on your computer:
  - a. In Windows, go to *Start, Find, Files or Folders*, and search for "mdac\_typ.exe."
  - b. If you find the file, right-click on it and view its properties by clicking the Version tab.
  - c. If the version is earlier than 2.5 OR if you can't find this file, then [click here to save the "mdac.zip"](#) file to your hard drive.
  - d. When the download is complete, unzip the file by double-clicking on it in the folder where you saved it. Then double-click on the file icon and follow the on-screen installation instructions.
3. **To download GREET:**
  - a. Click here and save the file [GREET1-8b.zip](#) to your hard drive.
  - b. When the download is complete, unzip the file by double clicking on it in the folder where you saved it.
  - c. When the file is unzipped, double click on the executable file "setup.exe" and follow the onscreen instructions.
  - d. Note that some versions of Windows operating systems may not permit the installation program to update some of the system files. In such case, click OK to continue and the installation will still be successful.
  - e. Also note that for compatibility with Windows Vista, the GREET1.8b version generates the output files in a special folder named "GREET1.8" under the "MY Documents" folder.
4. **To uninstall GREET:**
  - a. Click on the Start button, go to *Settings*, click on *Control Panel*.
  - b. Double-click on "*Add/Remove Programs*."
  - c. Scroll down to "GREETGUI" on the list of installed programs.
  - d. Click "Add/Remove" and follow the onscreen instructions.

# Installing GREET GUI

- To install GREET GUI:
  - Double-click the “**setup.exe**” application file in the GREET GUI installation package.



- Follow the on-screen instructions.
- If prompted to do so, restart the computer to allow the installation process to fully complete.
- The installation program creates a shortcut to the GREETGUI program on the desktop.



# Before Running GREET

## ■ Review Installation Instructions

### Installation Instructions

If you wish to run GREET 1.8b version in MS Excel, you can find it in the GREET folder on your PC (C:\Program Files\GREET1.8) which is the default specified by the GREETGUI installation program.

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# Compatibility of GREET GUI

- **Operating Systems:**
  - Windows XP
  - Windows Vista
  - NOT compatible with MAC OS
  
- **MS OFFICE EXCEL Versions:**
  - EXCEL 2000
  - EXCEL XP
  - EXCEL 2003
  - EXCEL 2007

# Outline

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# *Help with GREET GUI*

- Sources of Help:

1. User Guide

2. Publications

# Help with GREET GUI- User Guide and Publications

- Download User Guide from the GREET web site:

<http://www.transportation.anl.gov/software/GREET/index.html>

The screenshot shows a web browser window with the address bar displaying <http://www.transportation.anl.gov/software/GREET/>. The page header features the Argonne National Laboratory logo and the text "Transportation Technology R&D Center". A navigation menu includes "About Us", "Research", "Facilities", and "Staff". A sidebar on the left lists "AirCred" (Online Version, Users Manual, Updates) and "GREET" (Copyright, Publications, Download V2.8a, Download V1.8b, Sample Results). The "Publications" link under GREET is circled in red. The main content area has "GREET Documentation" circled in red, with links to "Operating Manual for GREET: Version 1.7 (1.6 MB pdf)" and "User Manual for Stochastic Simulations (1.1 MB pdf)". Below this is the "Installation Instructions" section, which includes a paragraph and a numbered list of steps for installation and downloading GREET.

Address <http://www.transportation.anl.gov/software/GREET/>

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Transportation Technology R&D Center

**GREET Documentation**

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- User Manual for Stochastic Simulations ([1.1 MB pdf](#))

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***THANK YOU!***