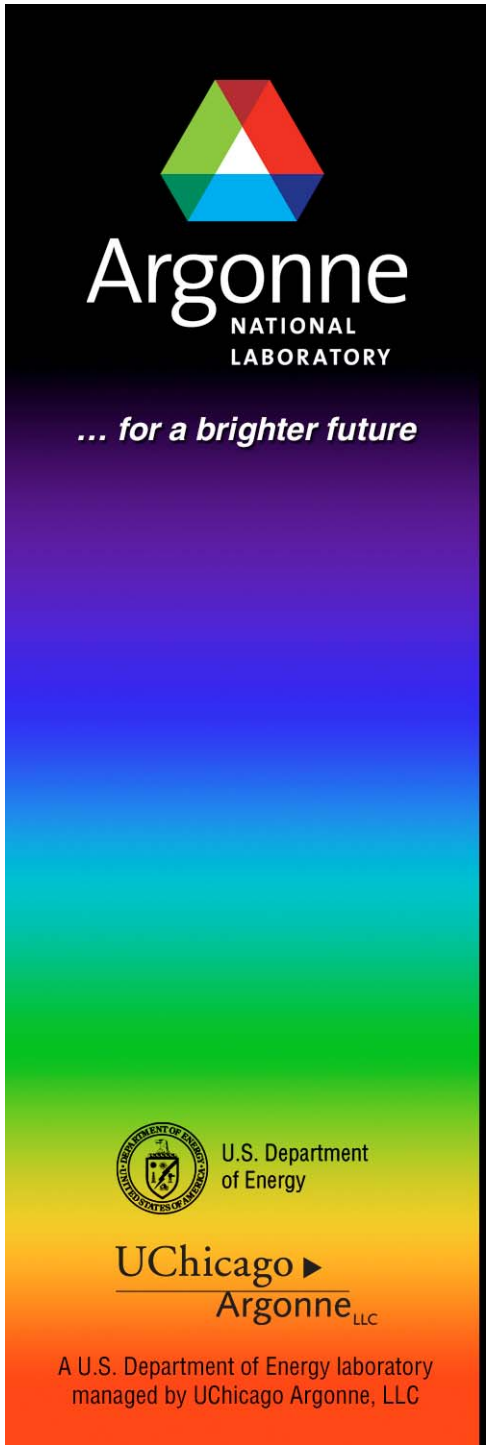

Introduction To GREET 1.7 Graphical User Interface

Amgad Elgowainy

Center for Transportation Research
Argonne National Laboratory

GREET User Workshop
June 25-26, 2007 at Argonne, IL

Outline

- 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

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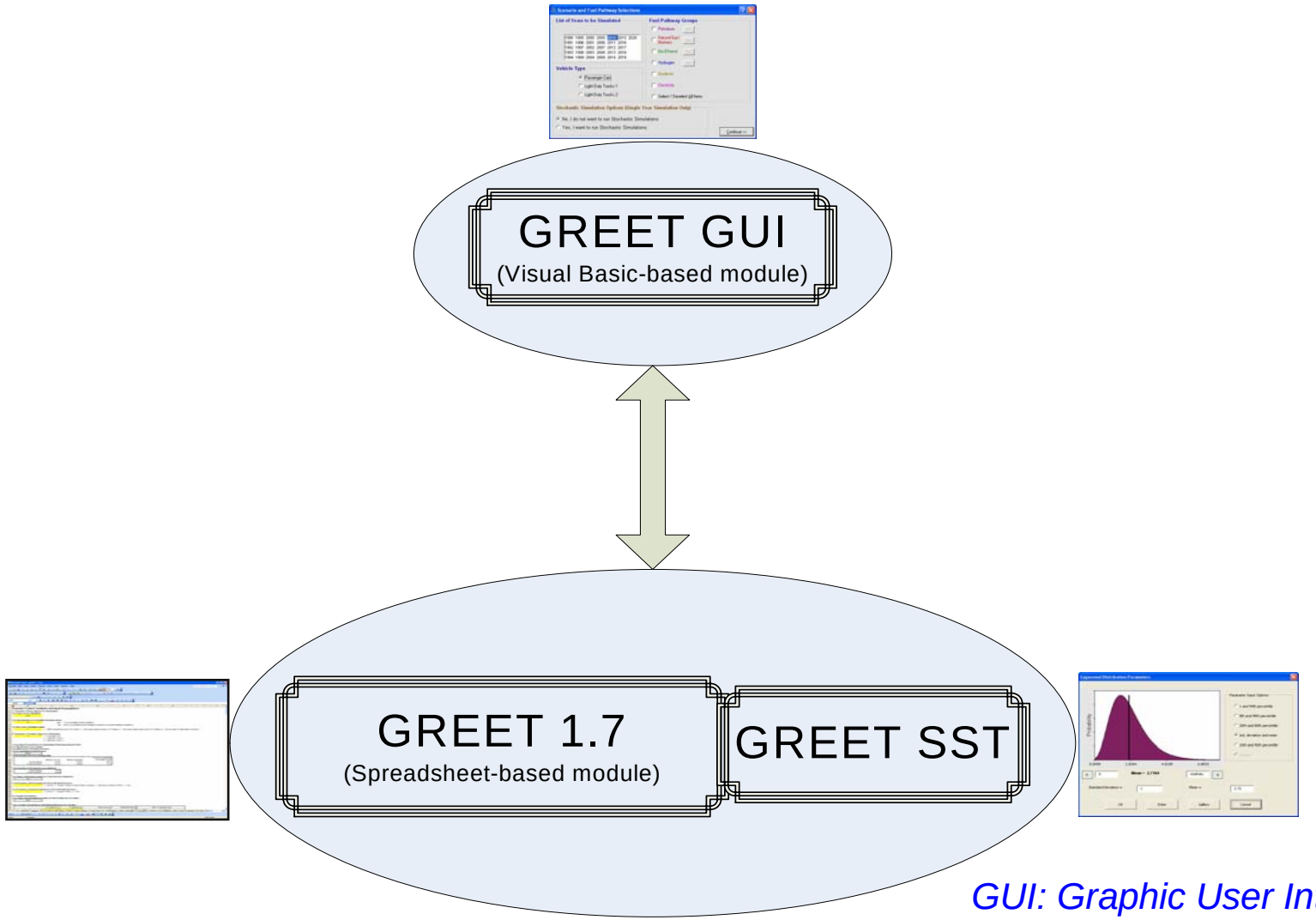
Purpose of GREET GUI

- 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 Software Package Includes 3 Modules



GUI: Graphic User Interface
SST: Stochastic Simulation Tool

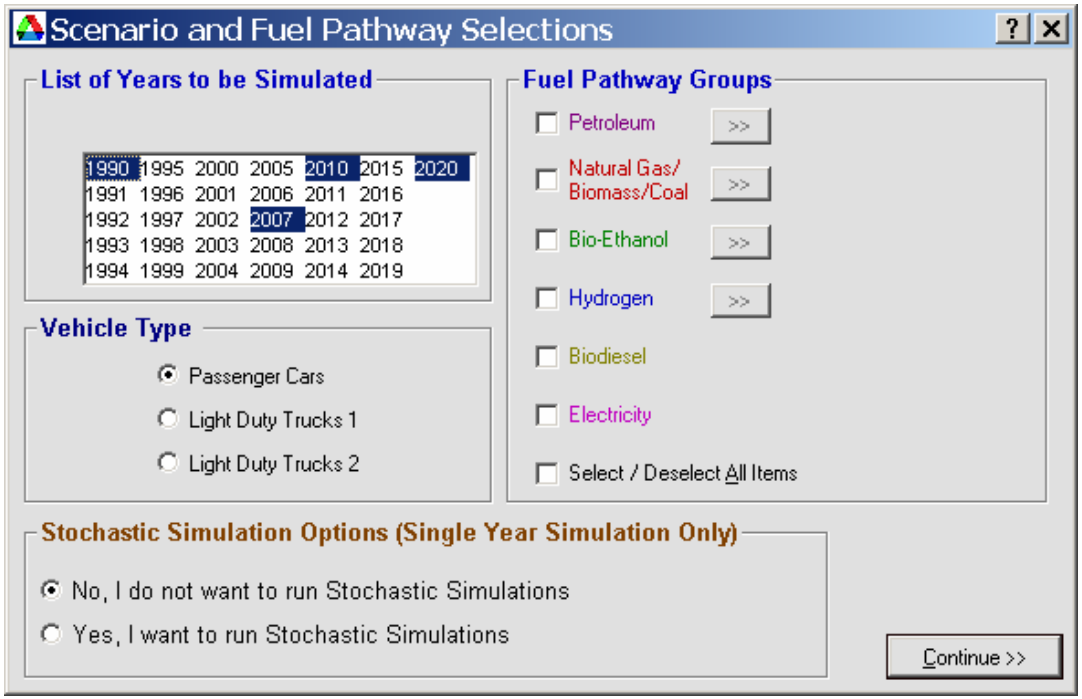
GREET GUI Logical Structure

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



0.069	
0.069	
5-year period	**LDGV: NOx**
1990	1.285
1995	0.656
2000	0.300
2005	0.141
2010	**0.069**
2015	0.069
2020	0.069

71.50%	
71.50%	
5-year period	**G.H2 Production Efficiency (Central, NA-NG, no export)**
1990	68.0%
1995	69.0%
2000	71.0%
2005	71.5%
2010	**71.5%**
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%
2010	**1.7%**	**20.6%**	**50.2%**	**17.7%**	**9.8%**
2015	2.5%	22.7%	48.6%	16.6%	9.6%
2020	1.9%	24.2%	49.2%	15.4%	9.3%

Simulation of Multiple Years in One Run

Microsoft Excel - Session2Out.xls

File Edit View Insert Format Tools Data Window Help

A3 Year: 1990

Vehicle Technologies, Passenger Cars: Well-to-Pump Energy Consumption and Emissions
(Btu or grams per mmBtu of Fuel Available at Fuel Station Pumps)

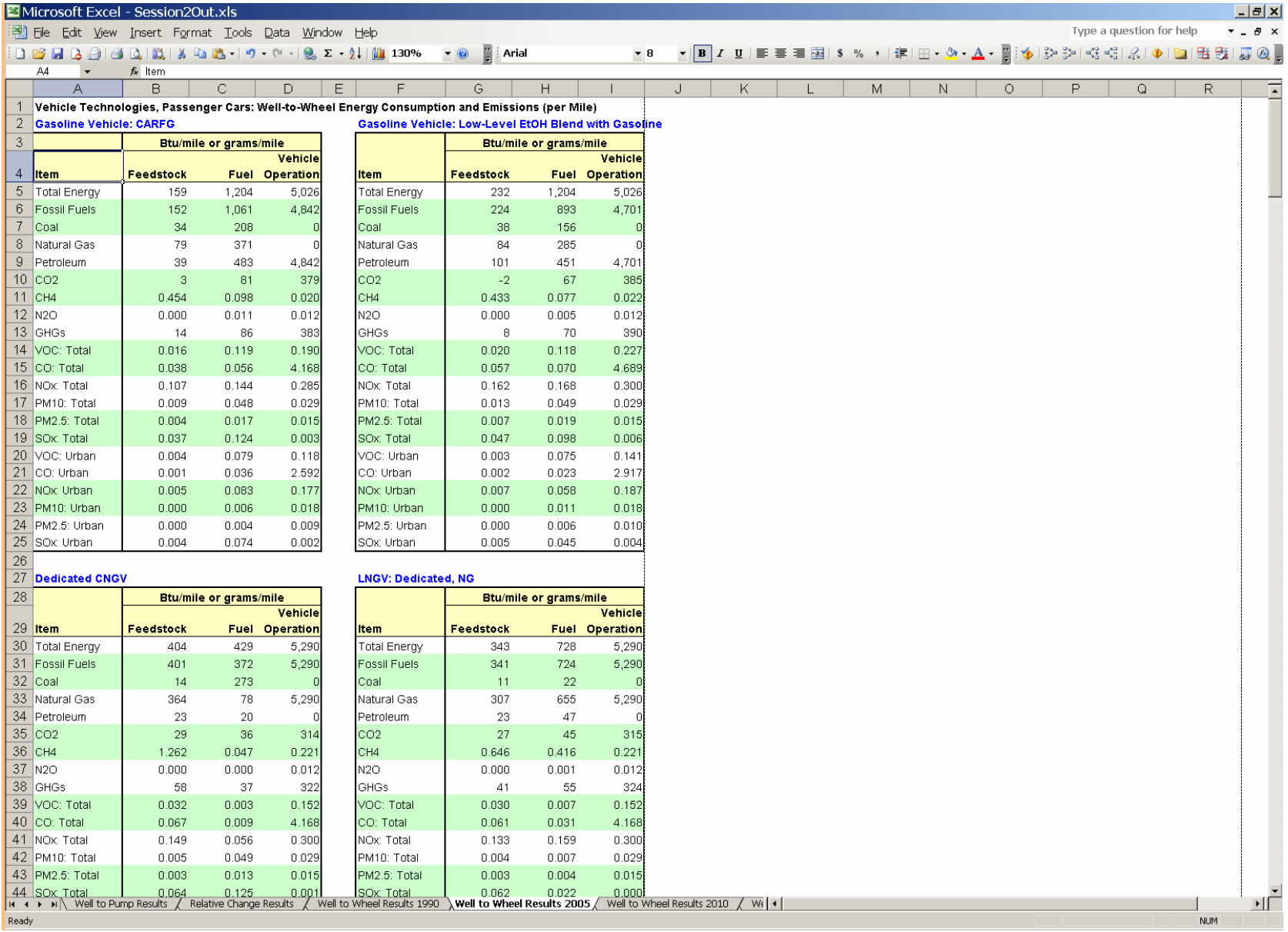
Year: 1990	CA RFG	Gasoline Vehicle: Low-Level EtOH Blend with Gasoline	Compressed Natural Gas	LNGV: Dedicated, NG	LPGV: Dedicated, Crude	Naphtha	FCV: MeOH, nNA NG	Dedi. MeOH Vehicle: M90, nNA NG	EtOH FFV: E85, Biomass	EtOH FCVs: H. Biomass	Grid-Connected SI HEV: Gasoline and Electricity	Grid-Connected SI HEV: Low-Level EtOH Blend with Gasoline and Electricity	Grid-Connected SI HEV: E90, Biomass and Electricity	Grid-Connected SI HEV: G.H2 and Electricity	CIDI Vehicle: DME, nNA NG	CIDI Vehicle: FT100, nNA NG	CIDI Vehicle: BD20
Total Energy	287,947	280,864	164,348	224,209	124,884	762,949	672,420	589,404	901,975	1,148,891	753,606	793,747	1,247,845	1,668,298	598,079	761,758	278,631
WTP Efficiency	77.6%	78.1%	85.9%	81.7%	88.9%	56.7%	59.8%	62.9%	52.6%	46.5%	57.0%	55.7%	44.5%	37.5%	62.6%	56.8%	78.2%
Fossil Fuels	257,928	217,456	152,304	222,706	122,131	762,152	671,260	587,698	224,103	226,745	730,794	731,224	736,083	1,607,683	596,935	760,960	272,244
Coal	61,347	39,046	59,017	7,532	22,734	4,131	6,055	12,440	21,071	13,925	452,847	451,685	438,543	624,444	5,938	4,133	44,223
Natural Gas	95,036	71,261	83,163	201,714	42,170	735,548	627,463	525,385	60,231	55,846	161,426	160,714	152,649	884,228	556,237	734,199	126,246
Petroleum	101,544	107,149	10,124	13,459	57,227	22,473	37,743	49,873	142,801	156,974	116,521	118,825	144,891	99,011	34,760	22,627	101,775
CO2	18,381	12,650	12,877	14,909	10,376	30,922	29,810	27,544	-37,476	-57,403	91,040	87,800	51,153	192,199	27,538	30,979	5,146
CH4	112.280	101.186	248.066	203.340	98.293	199.125	188.695	173.521	49.464	28.902	172.915	169.572	131.757	296.053	180.273	198.989	101.149
N2O	3.019	1.033	0.186	0.312	0.176	0.159	0.473	0.438	8.818	11.912	1.212	1.715	7.407	1.759	0.176	0.159	1.901
GHGs	21,856	15,283	18,638	19,678	12,689	35,549	34,290	31,665	-33,729	-53,213	95,376	92,208	56,375	199,529	31,737	35,603	8,035
VOC: Total	27.441	28.109	6.991	7.387	8.019	32.358	26.754	26.806	39.248	43.676	25.342	26.062	34.205	33.706	13.897	13.708	42.902
CO: Total	25.573	31.153	19.197	23.923	17.772	41.234	52.878	47.225	124.639	161.804	33.172	39.214	107.563	75.788	51.146	41.286	39.242
NOx: Total	64.807	76.134	50.871	70.914	52.696	98.244	141.575	127.038	217.271	273.379	206.191	215.312	318.499	348.698	121.876	98.848	86.389
PM10: Total	16.761	14.047	11.268	2.703	7.359	15.507	16.659	15.973	25.683	30.309	116.213	116.965	125.472	164.521	15.306	15.517	15.040
PM2.5: Total	6.140	6.092	3.426	1.576	3.105	14.619	15.350	13.470	16.104	20.084	32.076	32.723	40.043	58.956	13.996	14.623	7.221
SOx: Total	50.272	37.658	49.334	18.265	26.031	33.606	39.685	39.546	24.449	19.199	416.737	415.883	406.227	550.987	45.718	33.934	54.946
VOC: Urban	16.558	15.530	0.200	0.187	3.097	13.400	9.085	10.292	14.335	13.860	11.024	10.946	10.073	9.369	1.162	0.895	2.772
CO: Urban	8.281	5.606	0.650	0.807	3.390	0.550	0.997	1.897	2.654	1.481	6.952	6.762	4.604	9.239	0.969	0.538	4.189
NOx: Urban	20.414	14.518	3.599	4.217	8.918	2.720	5.508	7.277	8.218	5.713	38.397	37.990	33.384	49.242	5.004	2.711	11.546
PM10: Urban	1.691	3.095	0.134	0.112	1.620	0.104	0.197	0.764	1.203	0.452	3.303	3.181	1.798	7.180	0.182	0.104	2.168
PM2.5: Urban	1.166	1.575	0.081	0.087	0.835	0.068	0.133	0.415	0.630	0.254	1.743	1.681	0.990	6.488	0.127	0.068	1.111
SOx: Urban	19.798	13.635	6.816	1.172	8.543	1.353	2.112	4.364	6.093	3.094	77.380	76.893	71.378	91.487	2.292	1.381	11.861

Year: 2005	CA RFG	Gasoline Vehicle: Low-Level EtOH Blend with Gasoline	Compressed Natural Gas	LNGV: Dedicated, NG	LPGV: Dedicated, Crude	Naphtha	FCV: MeOH, nNA NG	Dedi. MeOH Vehicle: M90, nNA NG	EtOH FFV: E85, Biomass	EtOH FCVs: H. Biomass	Grid-Connected SI HEV: Gasoline and Electricity	Grid-Connected SI HEV: Low-Level EtOH Blend with Gasoline and Electricity	Grid-Connected SI HEV: E90, Biomass and Electricity	Grid-Connected SI HEV: G.H2 and Electricity	CIDI Vehicle: DME, nNA NG	CIDI Vehicle: FT100, nNA NG	CIDI Vehicle: BD20
Total Energy	271,349	285,581	157,530	202,503	123,328	720,608	610,953	540,185	902,345	1,147,532	687,773	727,633	1,178,554	1,524,052	563,567	719,449	267,008
WTP Efficiency	78.7%	77.8%	86.4%	83.2%	89.0%	58.1%	62.1%	64.9%	52.6%	46.6%	59.2%	57.9%	45.9%	39.6%	64.0%	58.2%	78.9%
Fossil Fuels	241,433	222,263	146,043	201,212	120,702	719,864	609,911	538,590	224,577	225,497	666,391	666,540	668,232	1,466,738	562,511	718,705	261,084
Coal	48,020	38,740	54,295	6,269	21,655	3,737	5,294	11,771	20,310	12,984	407,348	406,157	392,682	562,949	5,318	3,740	40,887
Natural Gas	89,528	73,596	83,587	181,854	42,268	693,950	567,318	476,757	60,956	55,931	156,174	155,357	146,115	827,270	522,760	692,633	122,568
Petroleum	103,885	109,927	8,161	13,089	56,779	22,177	37,300	50,063	143,311	156,583	102,869	105,027	129,435	76,519	34,433	22,332	97,629
CO2	16,701	12,911	12,221	13,532	10,208	29,226	26,061	24,537	-37,499	-57,539	84,573	81,315	44,460	180,178	25,423	29,279	4,210
CH4	109.705	101.628	247.461	200.851	98.230	194.386	181.786	167.971	49.509	28.789	166.781	163.413	125.308	281.602	176.420	194.254	99.844
N2O	2.162	1.040	0.183	0.281	0.175	0.156	0.457	0.426	8.819	11.912	1.188	1.691	7.378	1.707	0.174	0.156	1.727
GHGs	19,865	15,557	17,967	18,235	12,520	33,743	30,377	28,527	-33,750	-53,351	88,761	85,574	49,526	187,161	29,532	33,793	7,017
VOC: Total	27.019	27.467	6.712	6.967	7.744	31.831	25.897	26.060	34.538	37.349	24.574	25.031	30.201	32.178	13.419	13.181	38.338
CO: Total	18.797	25.375	14.282	17.386	14.150	33.346	41.613	37.258	102.584	133.277	29.260	34.250	90.698	64.702	44.448	33.407	26.411

Well to Pump Results | Relative Change Results | Well to Wheel Results 1990 | Well to Wheel Results 2005 | Well to Wheel Results 2010

Ready NUM

Simulation of Multiple Years in One Run


Microsoft Excel - Session2Out.xls

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Vehicle Technologies, Passenger Cars: Well-to-Wheel Energy Consumption and Emissions (per Mile)

Gasoline Vehicle: CARFG

Item	Btu/mile or grams/mile		
	Feedstock	Fuel	Vehicle Operation
Total Energy	159	1,204	5,026
Fossil Fuels	152	1,061	4,842
Coal	34	208	0
Natural Gas	79	371	0
Petroleum	39	483	4,842
CO2	3	81	379
CH4	0.454	0.098	0.020
N2O	0.000	0.011	0.012
GHGs	14	86	383
VOC: Total	0.016	0.119	0.190
CO: Total	0.038	0.056	4.168
NOx: Total	0.107	0.144	0.285
PM10: Total	0.009	0.048	0.029
PM2.5: Total	0.004	0.017	0.015
SOx: Total	0.037	0.124	0.003
VOC: Urban	0.004	0.079	0.118
CO: Urban	0.001	0.036	2.592
NOx: Urban	0.005	0.083	0.177
PM10: Urban	0.000	0.006	0.018
PM2.5: Urban	0.000	0.004	0.009
SOx: Urban	0.004	0.074	0.002

Gasoline Vehicle: Low-Level EtOH Blend with Gasoline

Item	Btu/mile or grams/mile		
	Feedstock	Fuel	Vehicle Operation
Total Energy	232	1,204	5,026
Fossil Fuels	224	893	4,701
Coal	38	156	0
Natural Gas	84	285	0
Petroleum	101	451	4,701
CO2	-2	67	385
CH4	0.433	0.077	0.022
N2O	0.000	0.005	0.012
GHGs	8	70	390
VOC: Total	0.020	0.118	0.227
CO: Total	0.057	0.070	4.689
NOx: Total	0.162	0.168	0.300
PM10: Total	0.013	0.049	0.029
PM2.5: Total	0.007	0.019	0.015
SOx: Total	0.047	0.098	0.006
VOC: Urban	0.003	0.075	0.141
CO: Urban	0.002	0.023	2.917
NOx: Urban	0.007	0.058	0.187
PM10: Urban	0.000	0.011	0.018
PM2.5: Urban	0.000	0.006	0.010
SOx: Urban	0.005	0.045	0.004

Dedicated CNGV

Item	Btu/mile or grams/mile		
	Feedstock	Fuel	Vehicle Operation
Total Energy	404	429	5,290
Fossil Fuels	401	372	5,290
Coal	14	273	0
Natural Gas	364	78	5,290
Petroleum	23	20	0
CO2	29	36	314
CH4	1.262	0.047	0.221
N2O	0.000	0.000	0.012
GHGs	58	37	322
VOC: Total	0.032	0.003	0.152
CO: Total	0.067	0.009	4.168
NOx: Total	0.149	0.056	0.300
PM10: Total	0.005	0.049	0.029
PM2.5: Total	0.003	0.013	0.015
SOx: Total	0.064	0.125	0.001

LNGV: Dedicated, NG

Item	Btu/mile or grams/mile		
	Feedstock	Fuel	Vehicle Operation
Total Energy	343	728	5,290
Fossil Fuels	341	724	5,290
Coal	11	22	0
Natural Gas	307	655	5,290
Petroleum	23	47	0
CO2	27	45	315
CH4	0.646	0.416	0.221
N2O	0.000	0.001	0.012
GHGs	41	55	324
VOC: Total	0.030	0.007	0.152
CO: Total	0.061	0.031	4.168
NOx: Total	0.133	0.159	0.300
PM10: Total	0.004	0.007	0.029
PM2.5: Total	0.003	0.004	0.015
SOx: Total	0.062	0.022	0.000

Well to Pump Results | Relative Change Results | Well to Wheel Results 1990 | Well to Wheel Results 2005 | Well to Wheel Results 2010

Ready

Outline

- Purpose of GREET GUI
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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

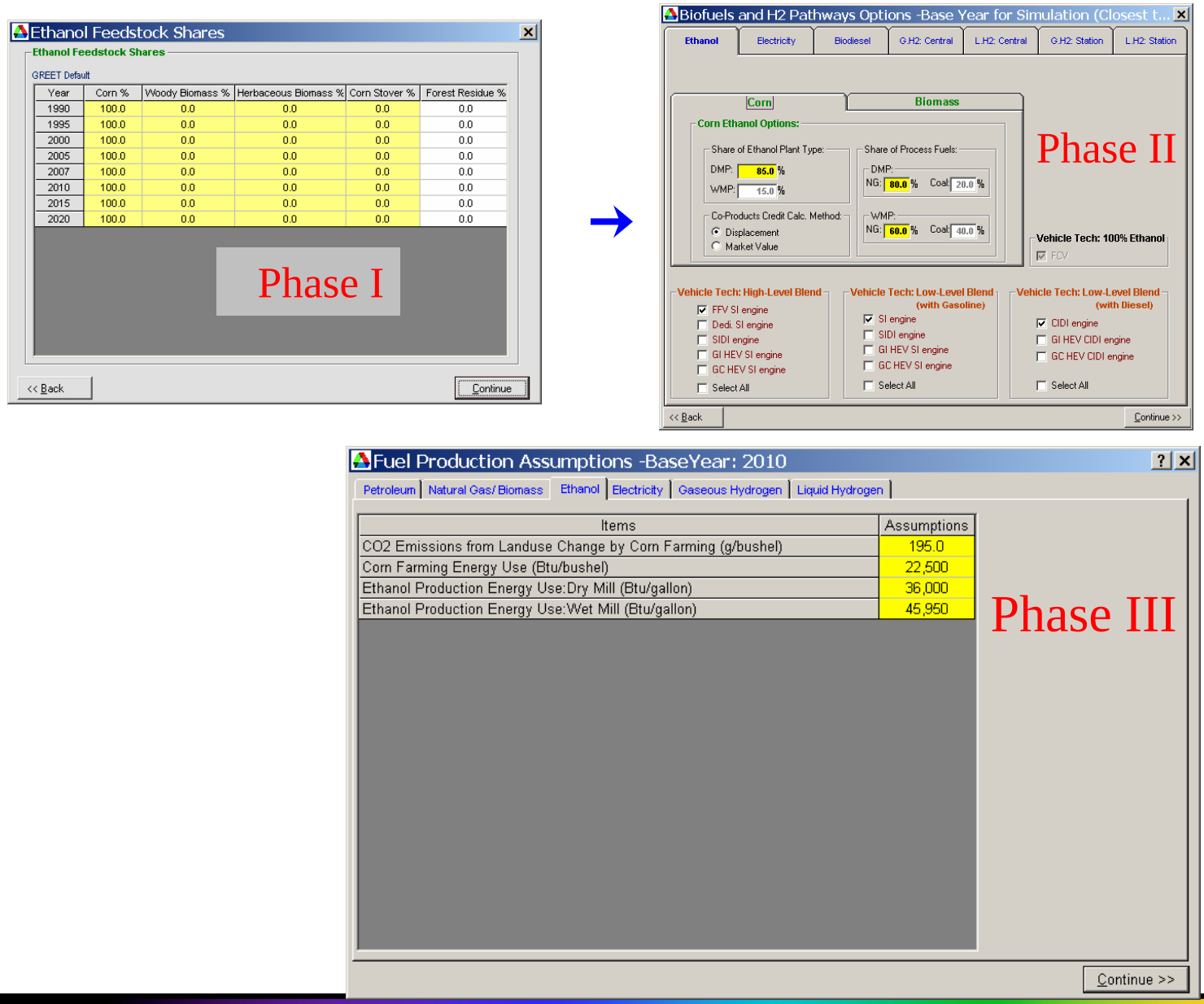
  (e.g., corn farming energy use)

Structure of GREET GUI (Cont'd)

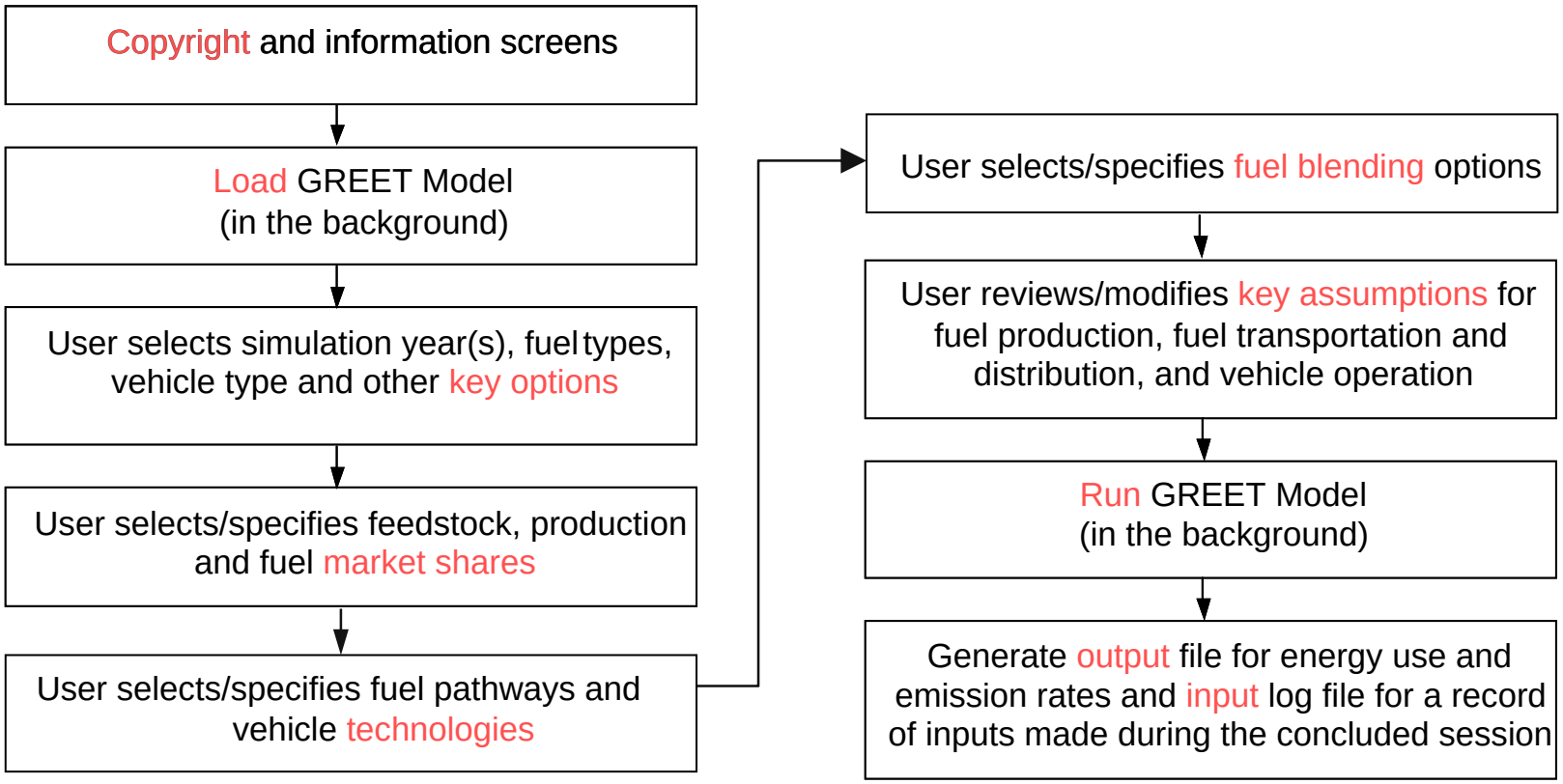
Note:

- Key Assumptions are 1st tier assumptions affecting WTW results at the upper level
- 2nd tier assumptions are not presented in GUI but can be modified in the underlying Excel model
- Example of 1st tier assumptions is the Hydrogen production efficiency via Natural Gas SMR
- Example of 2nd tier assumptions is the emission factors associated with process fuel combustion

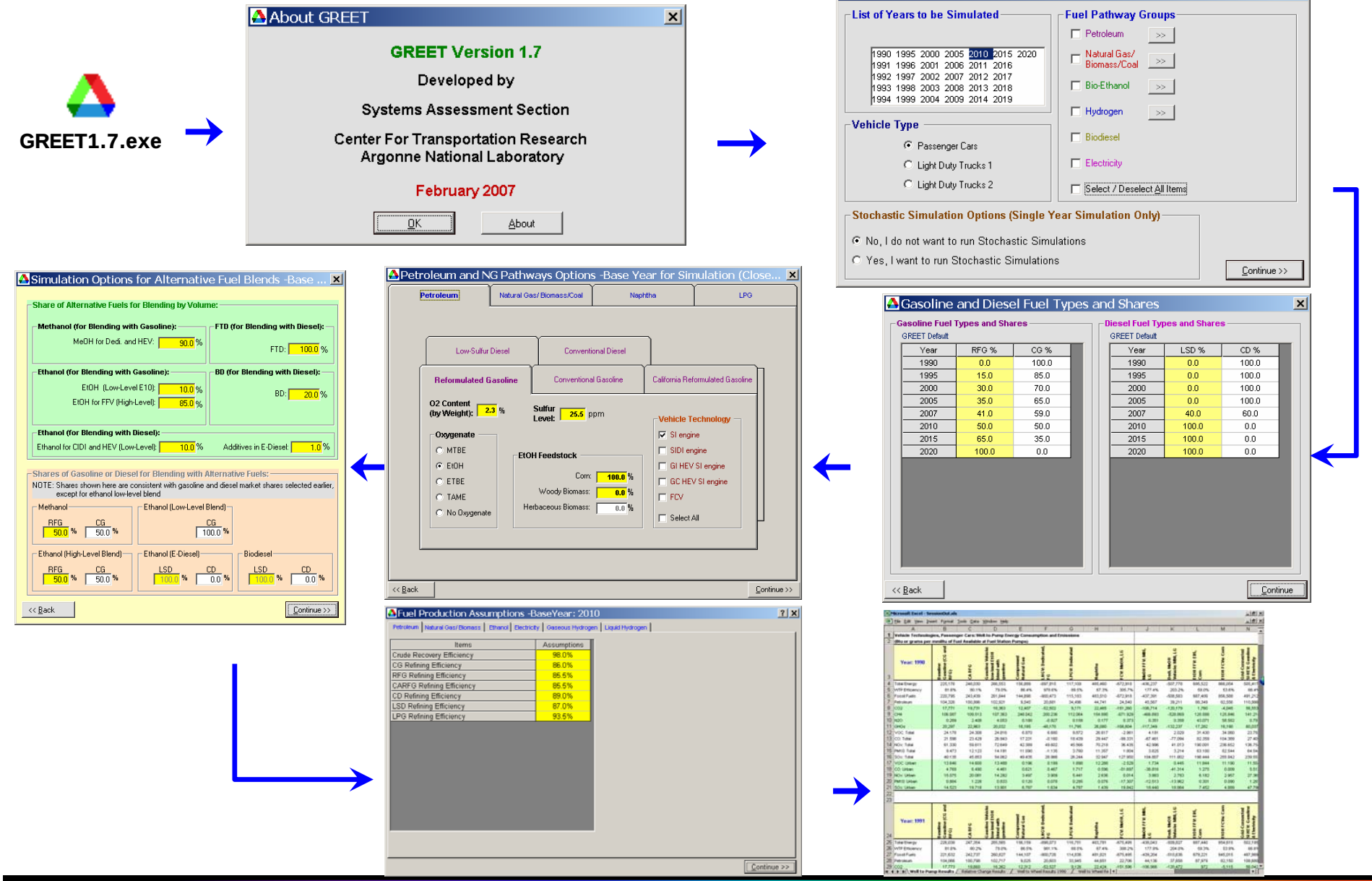
Main Phases of a Typical GREET GUI Session



Steps of a Typical GREET GUI Session



Main Steps of a Typical GREET GUI Session



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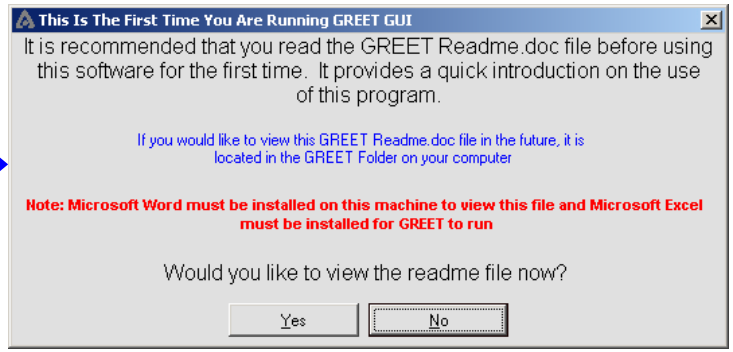
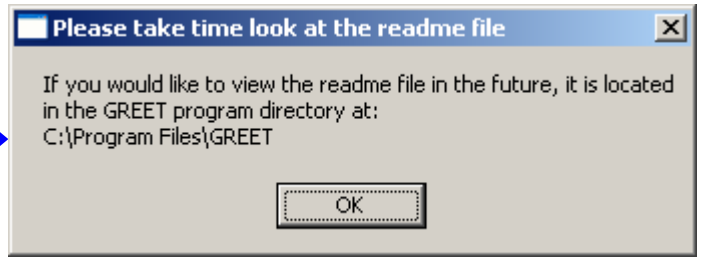
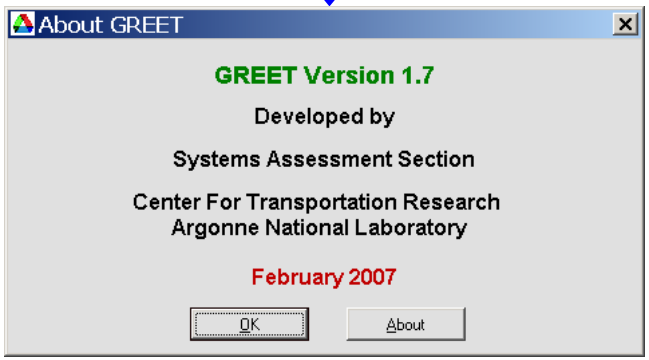
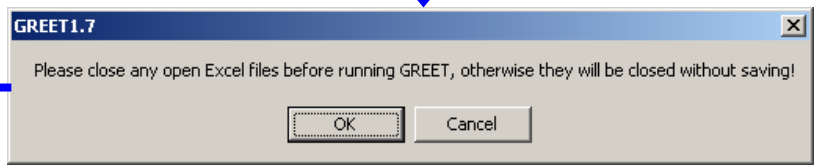
Starting GREET GUI…

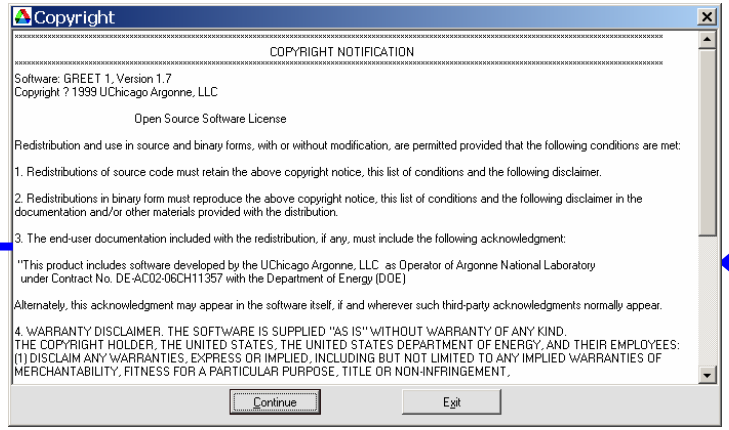
GREET1.7.exe



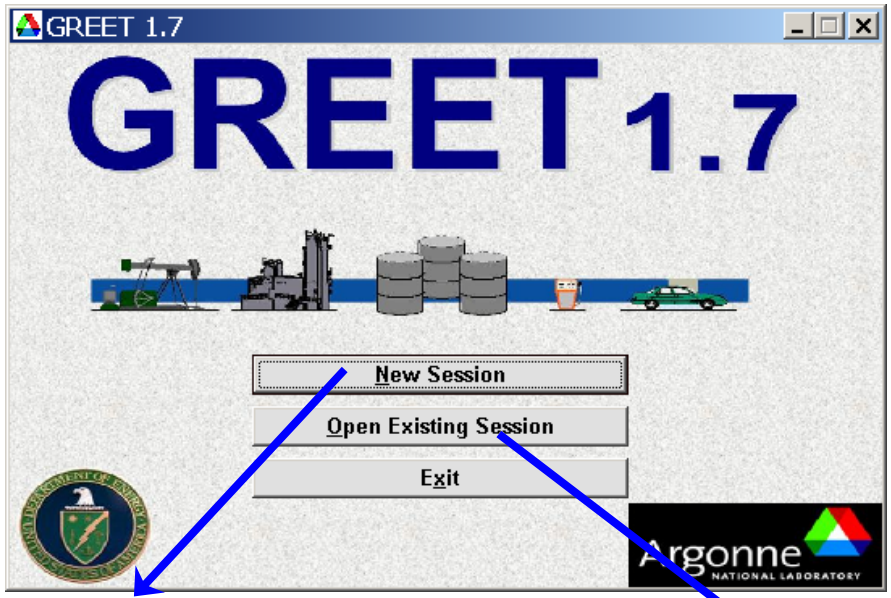


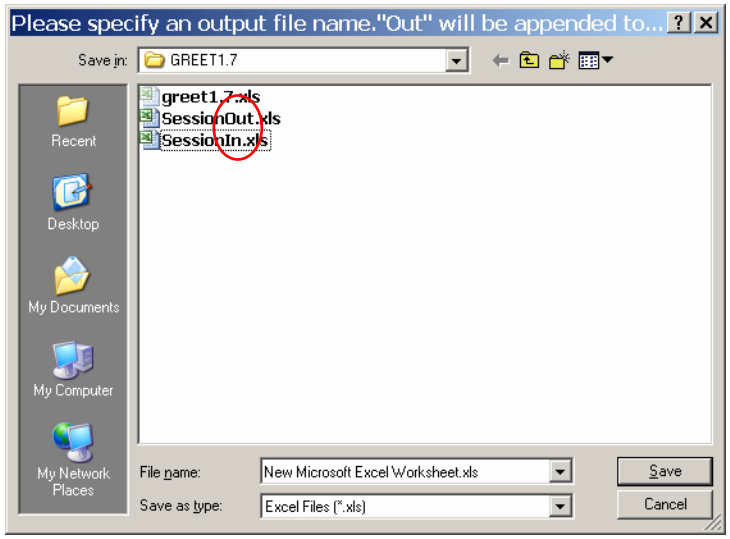


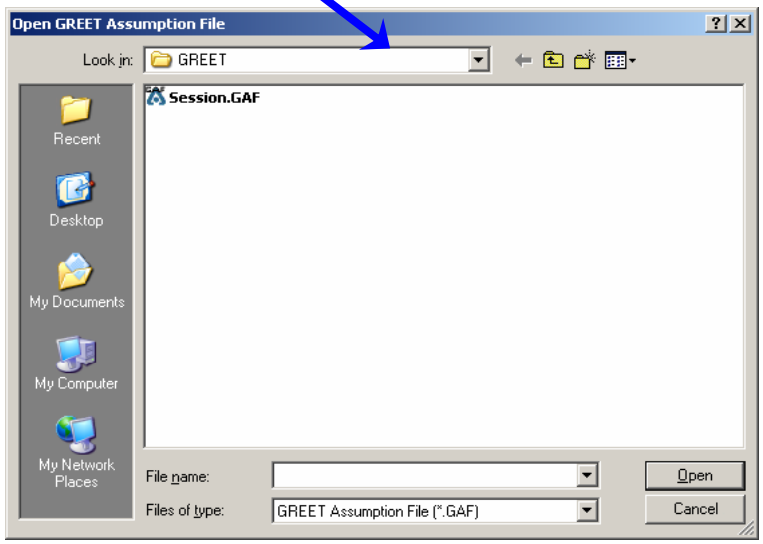




Beginning a GREET GUI Session: 1)Create a New Session, or 2) Open Existing Session

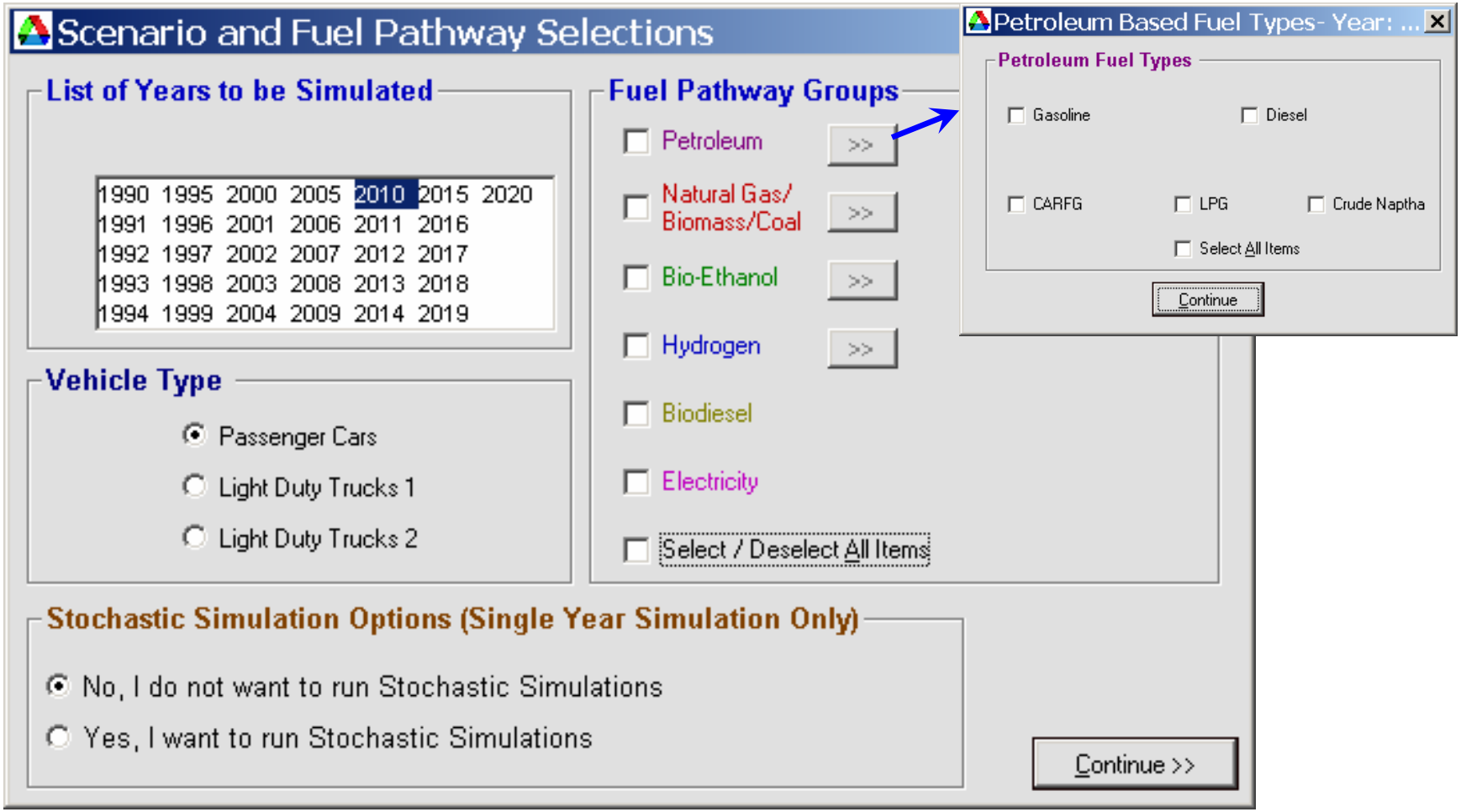






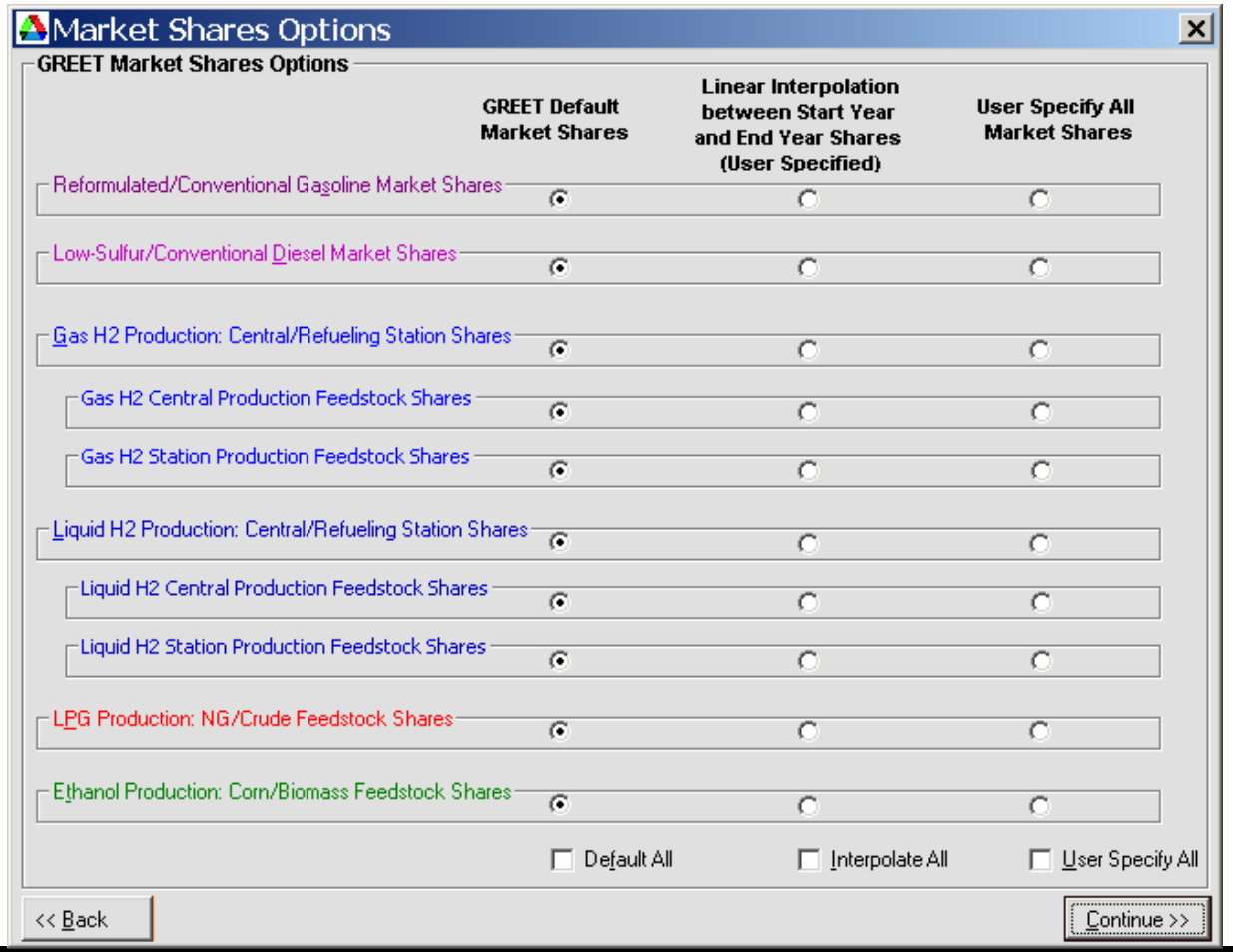
Select the Key Scenario Options

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

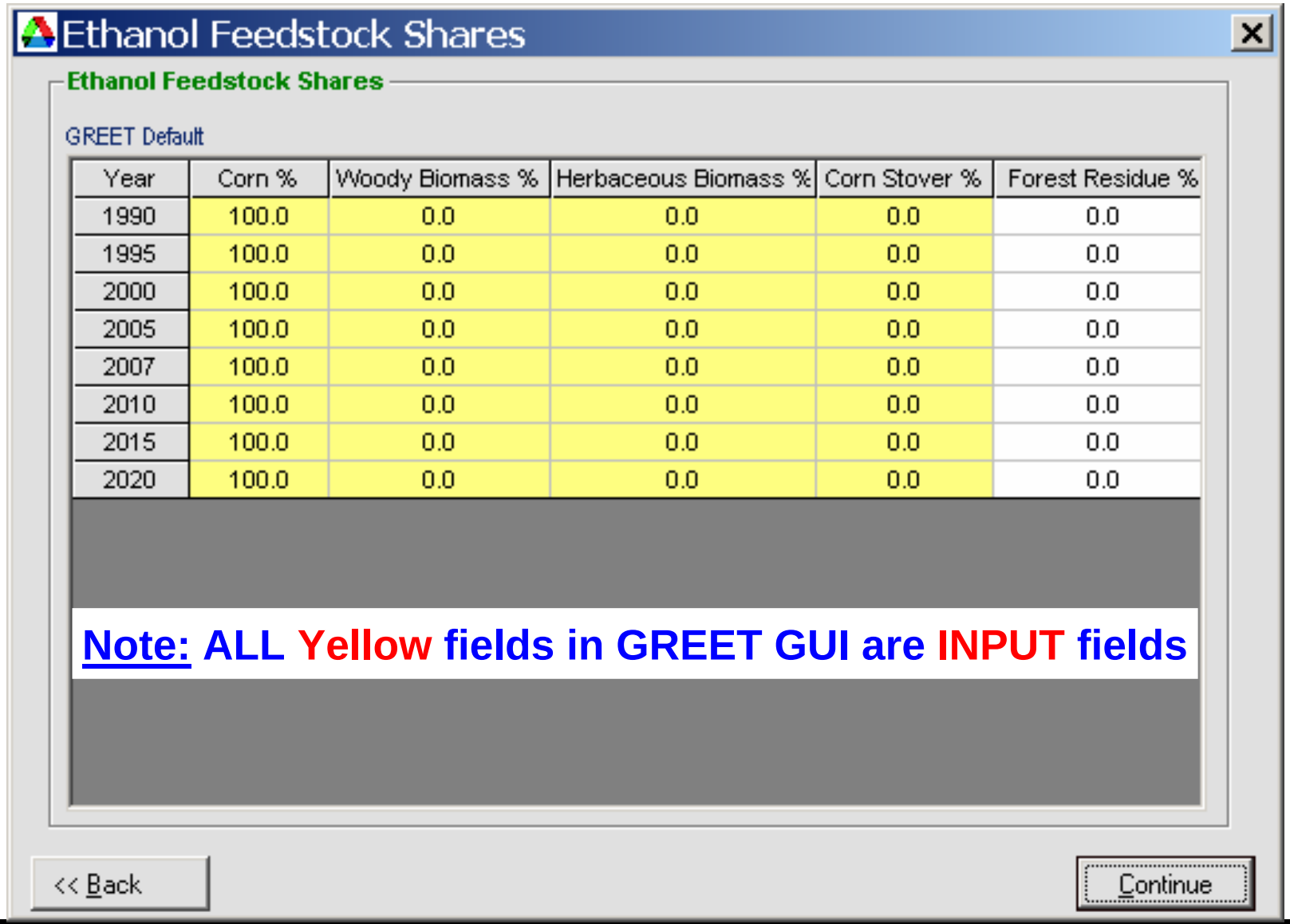


I. Market Shares of Fuel Production Options

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

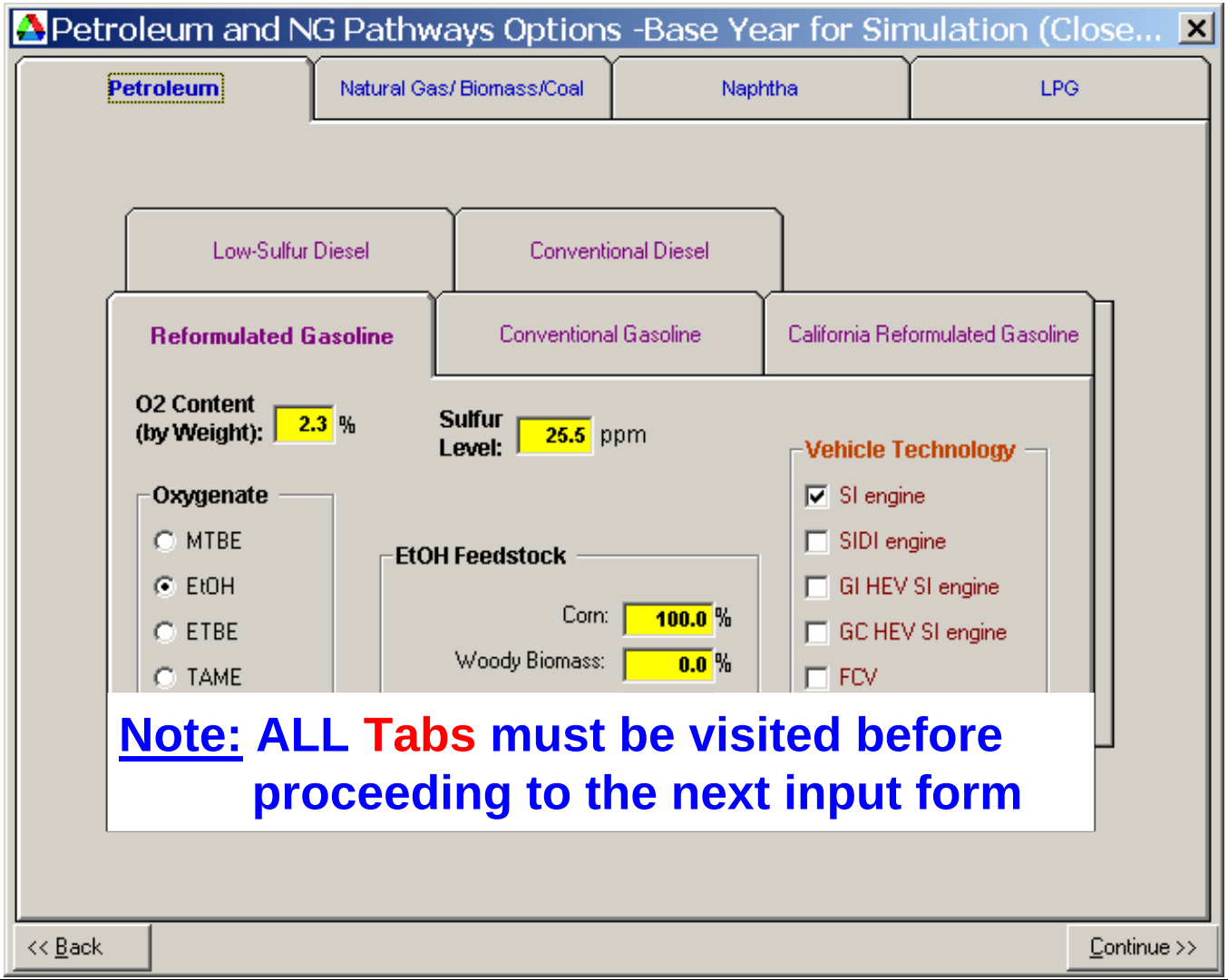


An Example of Market Share Form



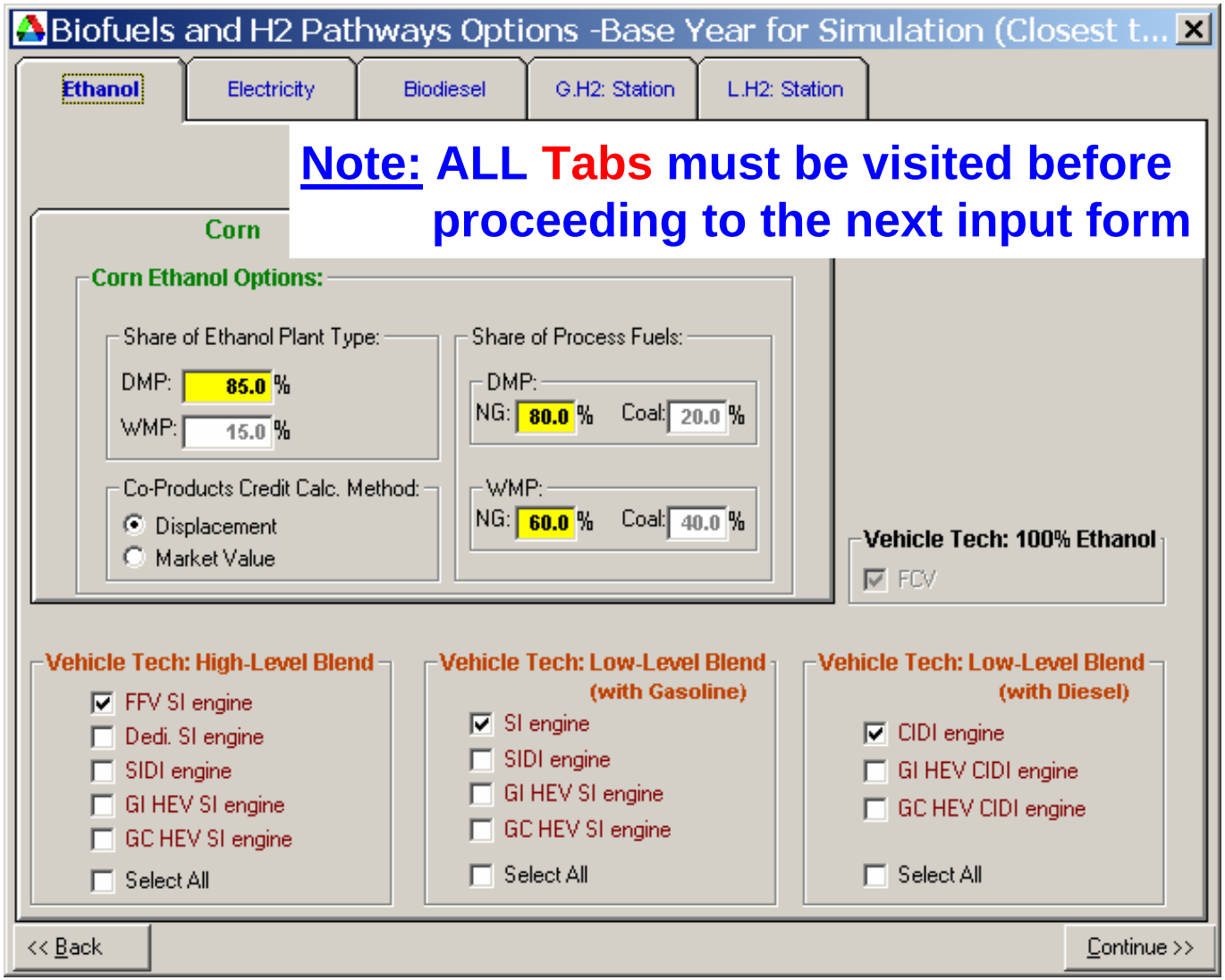
II. Technological Options Selections and Inputs

1) Petroleum and NG Pathways Form



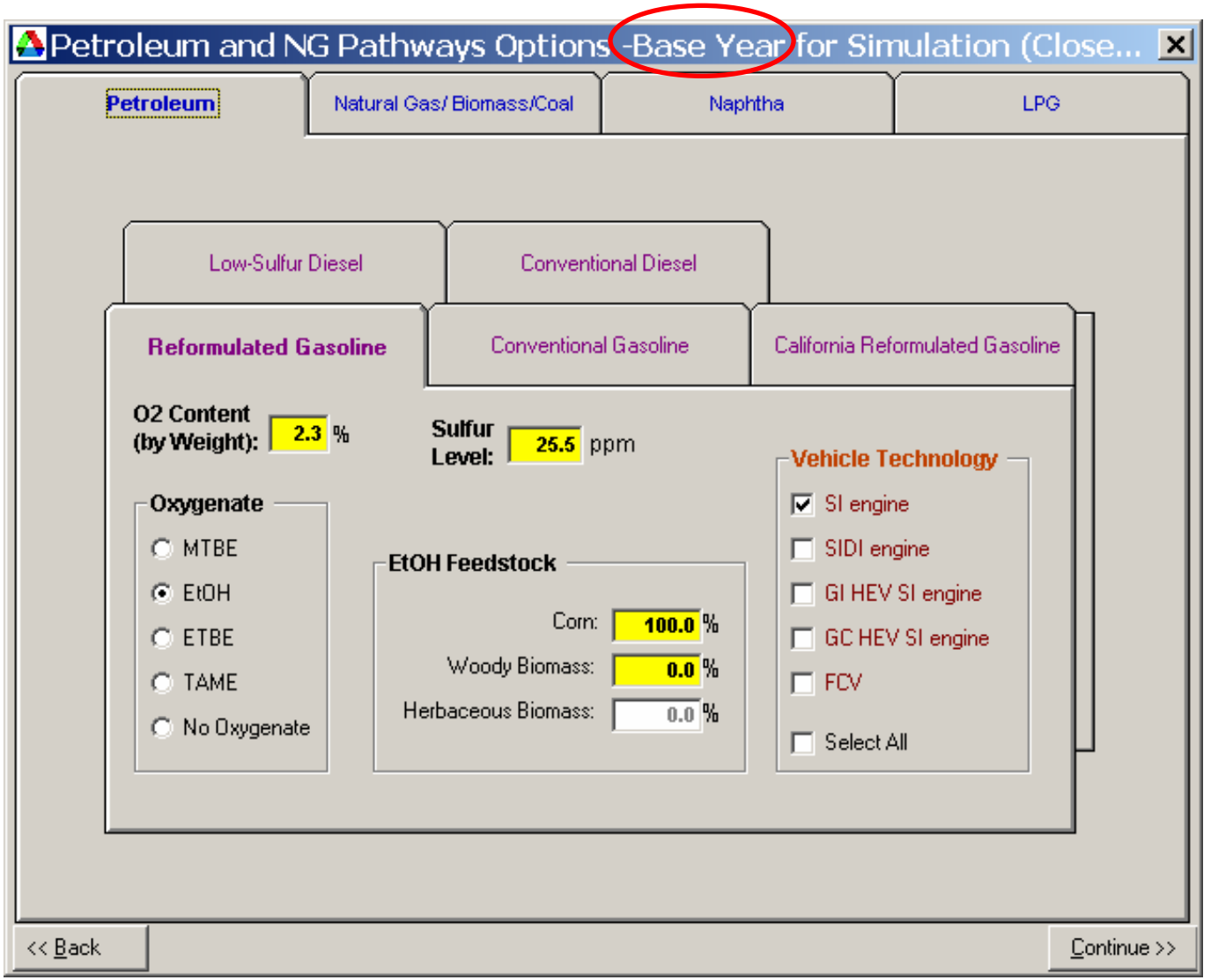
II. Technological Options Selections and Inputs

2) Biofuels and Hydrogen Production Pathways Form



Examples of Pathway Simulation Options Form:

1) Reformulated Gasoline



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.

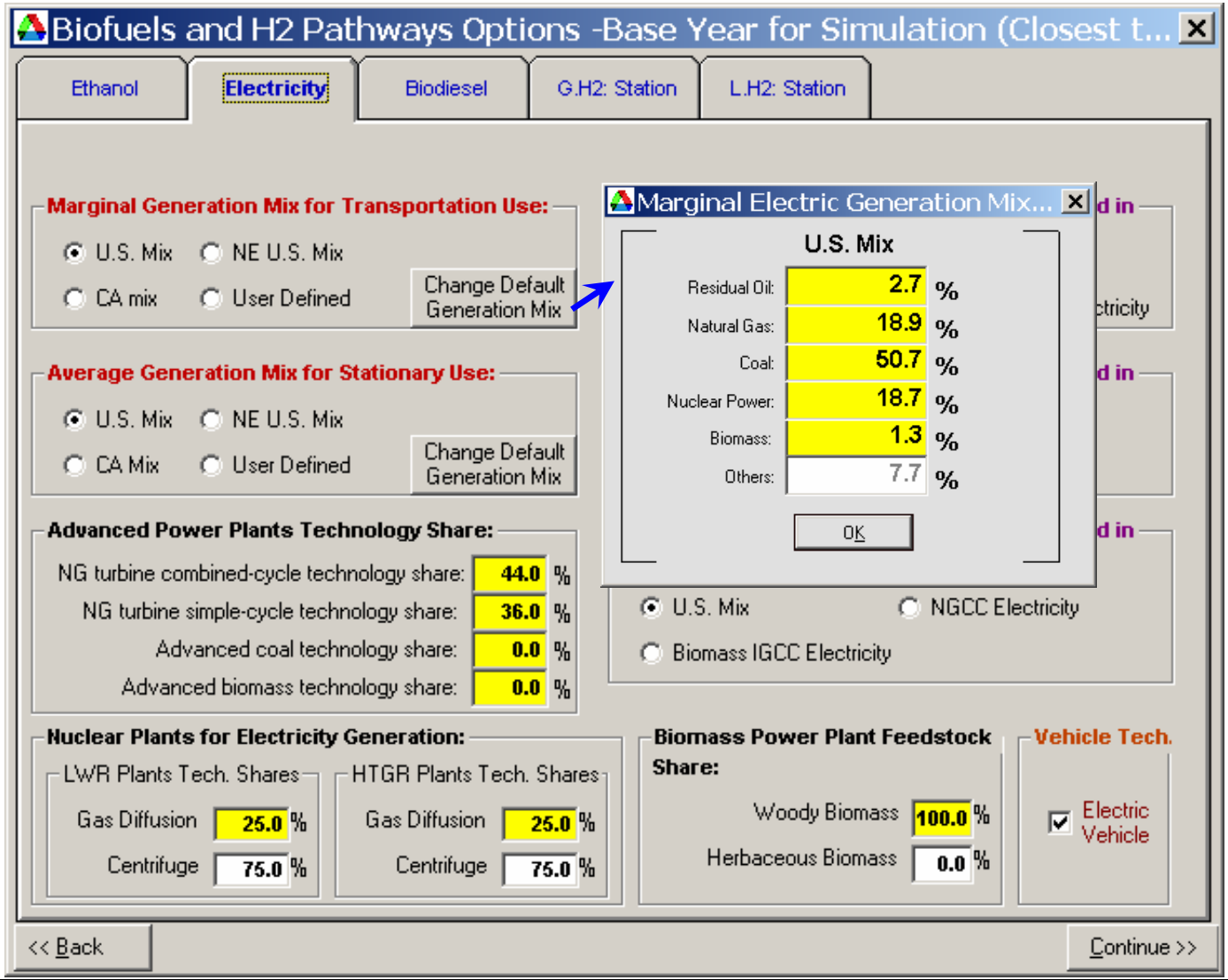
- Specifically, GREETGUI selects the simulation year closest to 2010 as its "base" year because key assumptions, especially those with distribution functions, are made for year 2010.

- 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.

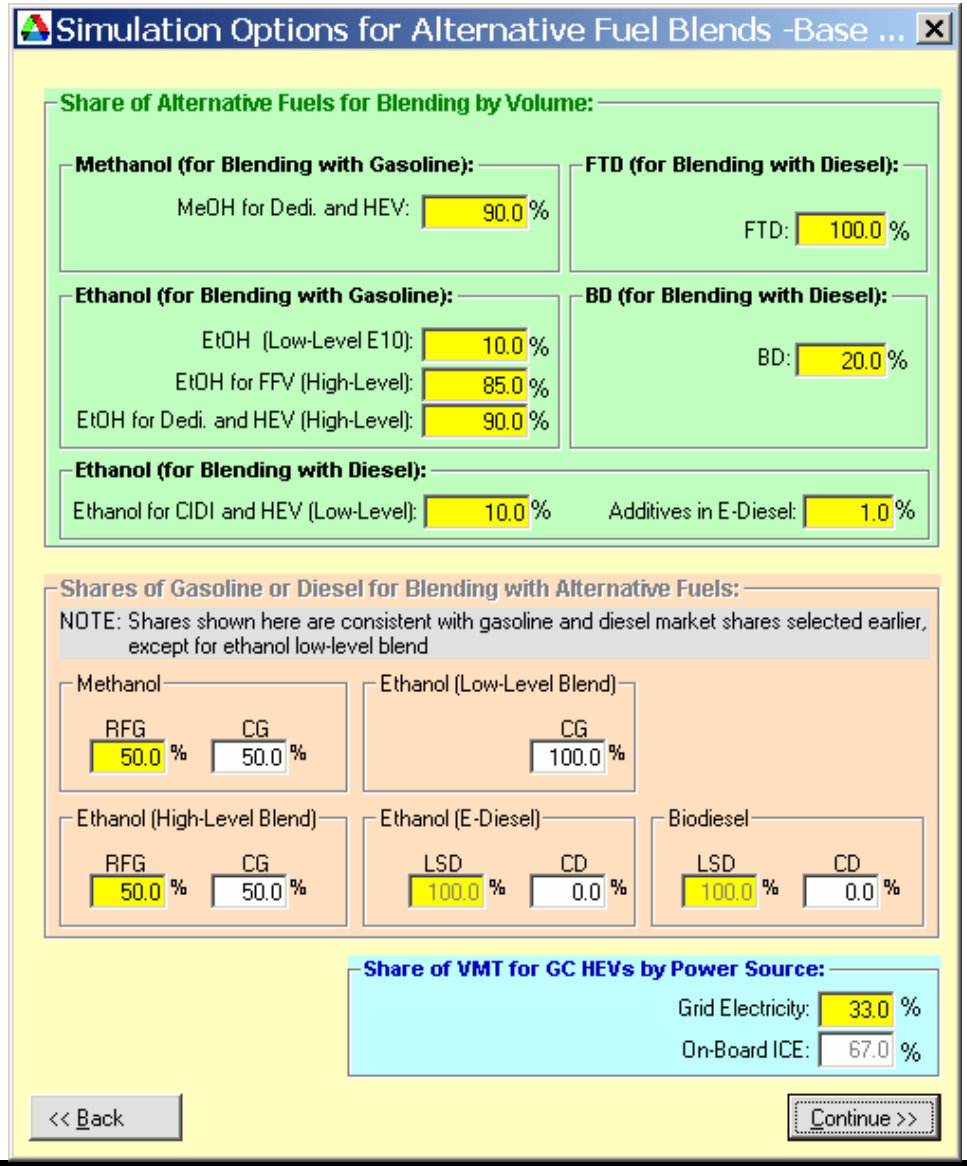
Examples of Pathway Simulation Options Form:

2) Electricity



Examples of Pathway Simulation Options Form:

3) Alternative Fuel Blends

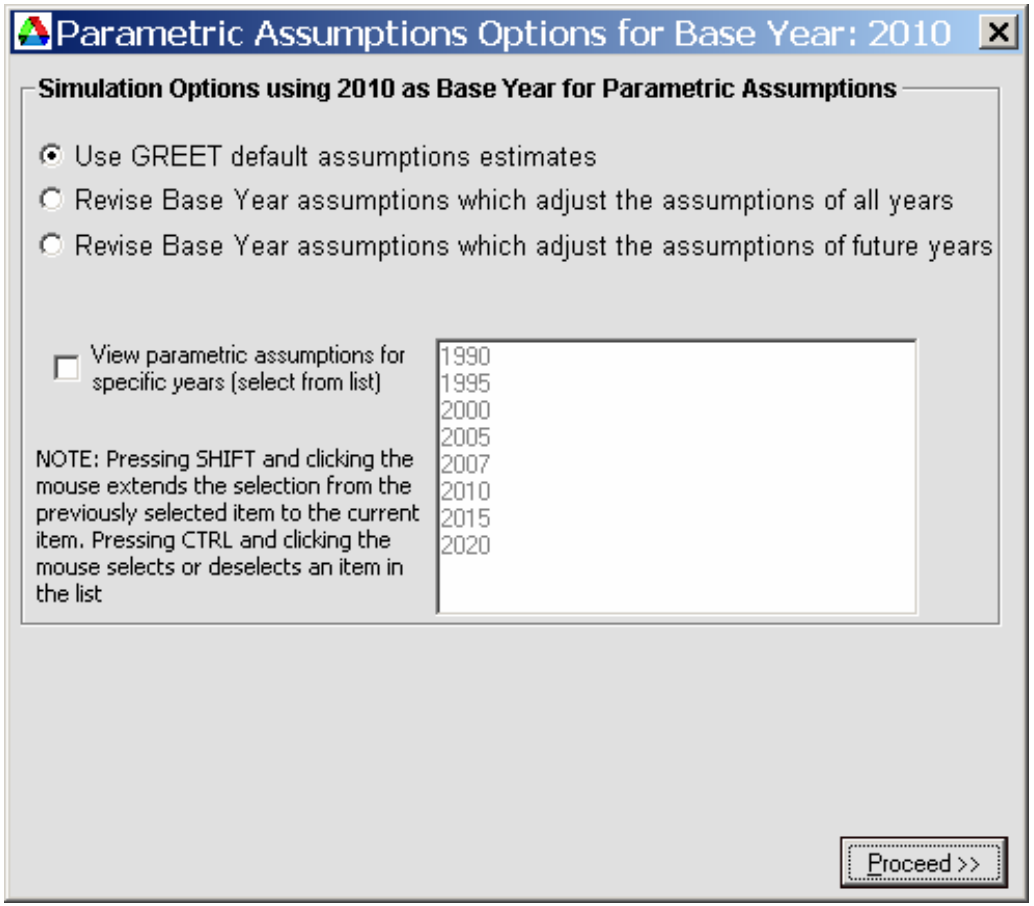


Proceed to the Next Parametric Assumptions Forms

- 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.

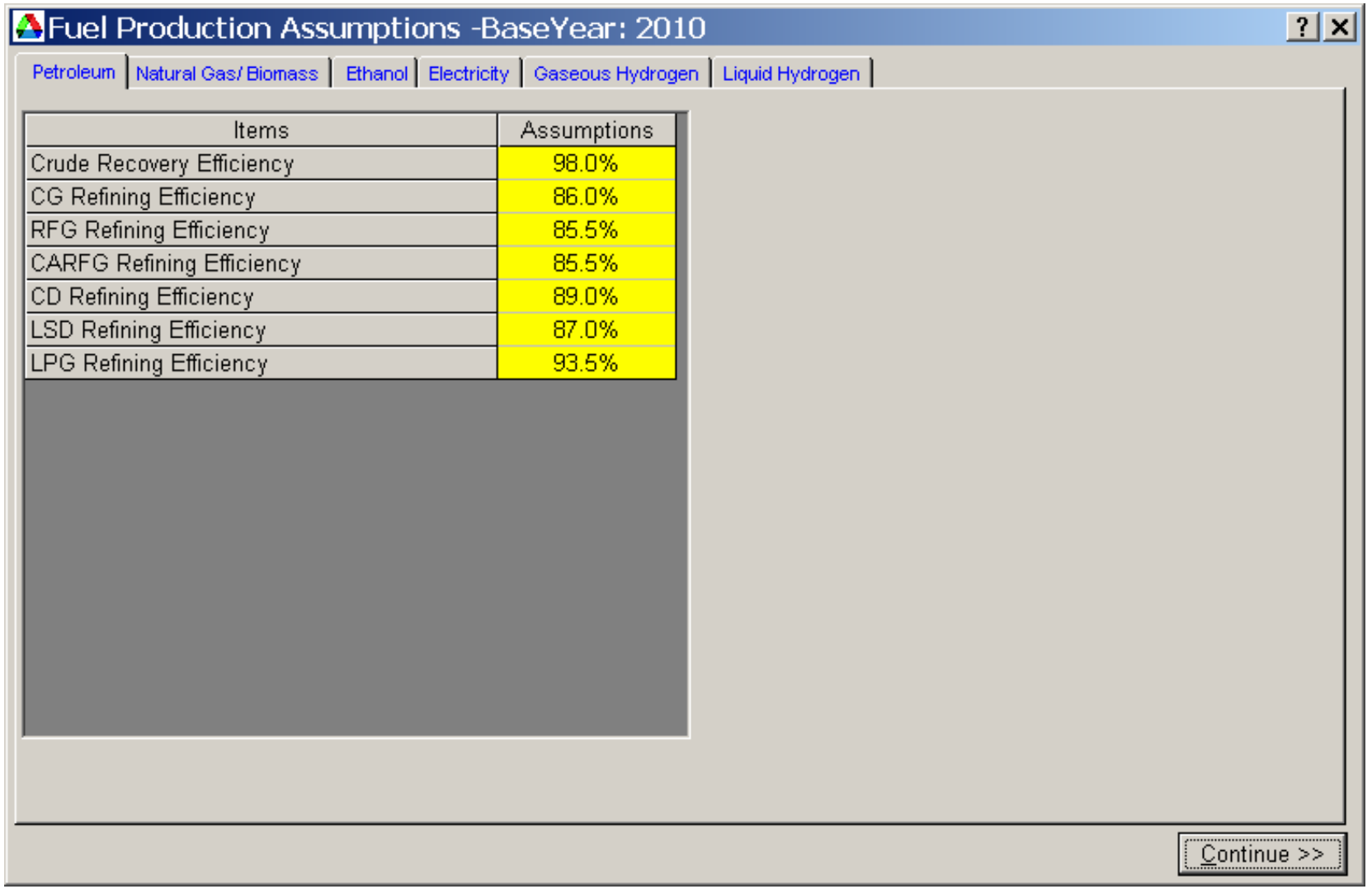
- Selecting ***"Revise Base Year assumptions which adjust the assumptions of all years"*** allows the user to revise the base year's default assumptions and automatically adjusts all other years' assumptions by the same percentage change made to the base year's assumptions.

- 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.



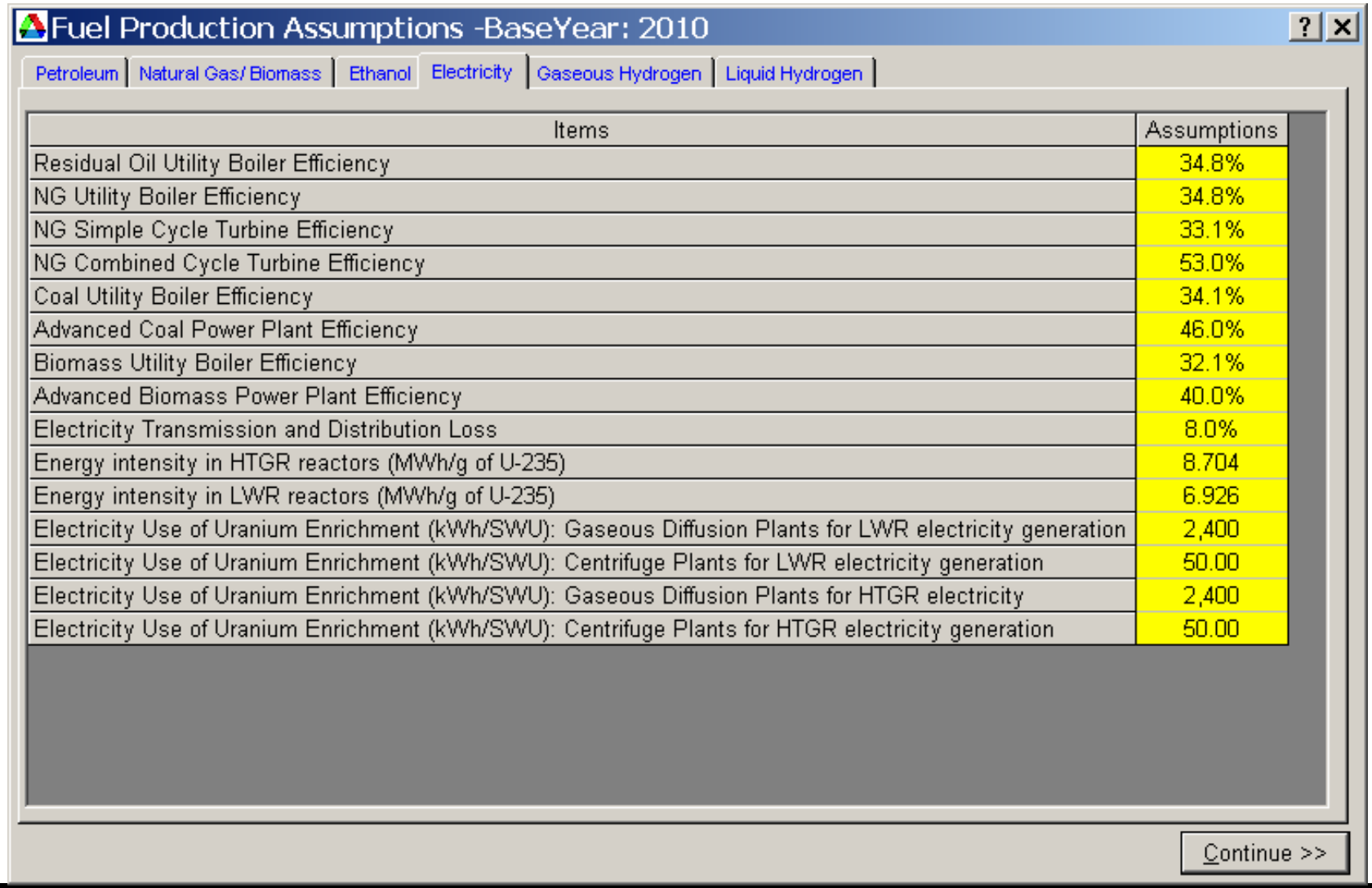
III. Examples of Parametric Assumptions Forms:

1) Petroleum



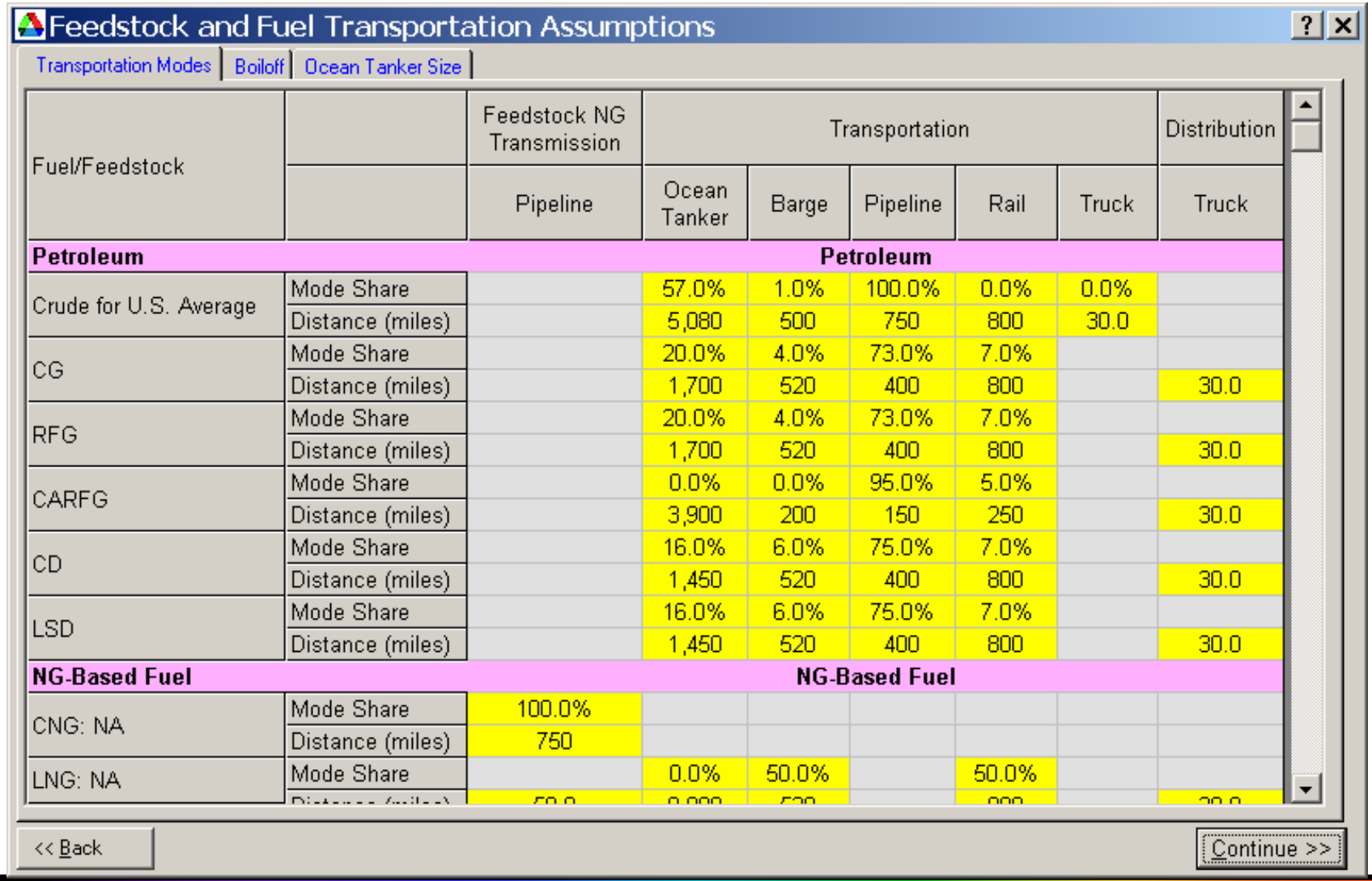
Examples of Parametric Assumptions Forms:

2) Electricity



Examples of Parametric Assumptions Forms:

3) Transportation Modes and Distances



Feedstock and Fuel Transportation Assumptions

Transportation Modes | Boiloff | Ocean Tanker Size

Fuel/Feedstock		Feedstock NG Transmission	Transportation					Distribution
		Pipeline	Ocean Tanker	Barge	Pipeline	Rail	Truck	Truck
Petroleum					**Petroleum**			
Crude for U.S. Average	Mode Share		57.0%	1.0%	100.0%	0.0%	0.0%	
	Distance (miles)		5,080	500	750	800	30.0	
CG	Mode Share		20.0%	4.0%	73.0%	7.0%		
	Distance (miles)		1,700	520	400	800		30.0
RFG	Mode Share		20.0%	4.0%	73.0%	7.0%		
	Distance (miles)		1,700	520	400	800		30.0
CARFG	Mode Share		0.0%	0.0%	95.0%	5.0%		
	Distance (miles)		3,900	200	150	250		30.0
CD	Mode Share		16.0%	6.0%	75.0%	7.0%		
	Distance (miles)		1,450	520	400	800		30.0
LSD	Mode Share		16.0%	6.0%	75.0%	7.0%		
	Distance (miles)		1,450	520	400	800		30.0
NG-Based Fuel					**NG-Based Fuel**			
CNG: NA	Mode Share	100.0%						
	Distance (miles)	750						
LNG: NA	Mode Share		0.0%	50.0%		50.0%		

<< Back | Continue >>

Examples of Parametric Assumptions Forms:

4) 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
Exhuast VOC	0.122	0.088
Evaporative VOC	0.058	0.000
CO	3.745	0.539
NOx	0.141	0.141
Exhuast PM10	0.0081	0.009
Brake and Tire Wear PM10	0.0205	0.0205
Exhuast 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

<< Back

Continue >>

Examples of Parametric Assumptions Forms:

5) Vehicle Operations –Alternative-Fueled and Advanced Vehicles

Vehicle Operation Assumptions -Base Year: 2010

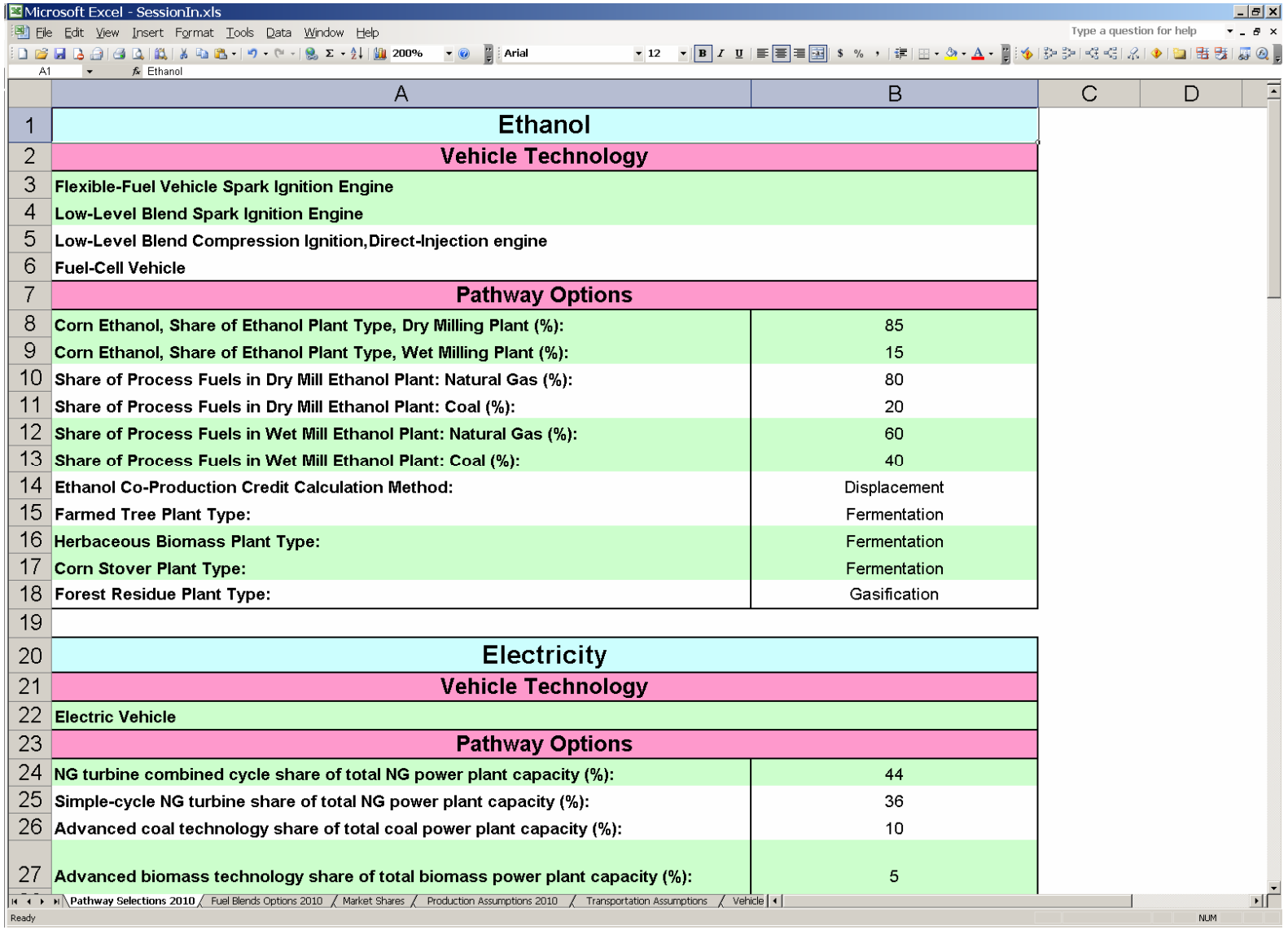
Baseline Vehicles (Model Year 2005) | Alternative-Fueled and Advanced Vehicles (Model Year 2005)

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 Vehicl EtOH FF
Gasoline Equivalent MPG	124.0%	95.0%	95.0%	100.0%	107.0%	100.0%	100.0%
Exhuast 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%
NOx		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Exhuast 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%
Exhuast 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%

<< Back | Continue >>

Generate Output and Input Log Files



Microsoft Excel - SessionIn.xls

File Edit View Insert Format Tools Data Window Help

A1: Ethanol

	A	B	C	D
1	**Ethanol**			
2	**Vehicle Technology**			
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	**Pathway Options**			
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		
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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	**Electricity**			
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22	Electric Vehicle			
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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 NUM

Outline

- 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

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

A4 fx Total Energy

	A	B	C	D	E	F	G	H	I	J	
28	Year: 2005	Baseline CG and RFG	CA RFG	Gasoline Vehicle: Low-Level EtOH Blend with Gasoline	Compressed Natural Gas	LNGV: Dedicated, NG	LPGV: Dedicated	Naphtha	FCV: MeOH, nNA NG	Dedi. MeOH Vehicle: M90, nNA 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	1,1
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	3
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 - Session20out.xls

File Edit View Insert Format Tools Data Window Help

130% Arial 8

A4 Item

Vehicle Technologies, Passenger Cars: Well-to-Wheel Energy Consumption and Emissions (per Mile)

Gasoline Vehicle: CARFG

Item	Btu/mile or grams/mile		
	Feedstock	Fuel	Vehicle Operation
Total Energy	159	1,204	5,026
Fossil Fuels	152	1,061	4,842
Coal	34	208	0
Natural Gas	79	371	0
Petroleum	39	483	4,842
CO2	3	81	379
CH4	0.454	0.098	0.020
N2O	0.000	0.011	0.012
GHGs	14	86	383
VOC: Total	0.016	0.119	0.190
CO: Total	0.038	0.056	4.168
NOx: Total	0.107	0.144	0.285
PM10: Total	0.009	0.048	0.029
PM2.5: Total	0.004	0.017	0.015
SOx: Total	0.037	0.124	0.003
VOC: Urban	0.004	0.079	0.118
CO: Urban	0.001	0.036	2.592
NOx: Urban	0.005	0.083	0.177
PM10: Urban	0.000	0.006	0.018
PM2.5: Urban	0.000	0.004	0.009
SOx: Urban	0.004	0.074	0.002

Gasoline Vehicle: Low-Level EtOH Blend with Gasoline

Item	Btu/mile or grams/mile		
	Feedstock	Fuel	Vehicle Operation
Total Energy	232	1,204	5,026
Fossil Fuels	224	893	4,701
Coal	38	156	0
Natural Gas	84	285	0
Petroleum	101	451	4,701
CO2	-2	67	385
CH4	0.433	0.077	0.022
N2O	0.000	0.005	0.012
GHGs	8	70	390
VOC: Total	0.020	0.118	0.227
CO: Total	0.057	0.070	4.689
NOx: Total	0.162	0.168	0.300
PM10: Total	0.013	0.049	0.029
PM2.5: Total	0.007	0.019	0.015
SOx: Total	0.047	0.098	0.006
VOC: Urban	0.003	0.075	0.141
CO: Urban	0.002	0.023	2.917
NOx: Urban	0.007	0.058	0.187
PM10: Urban	0.000	0.011	0.018
PM2.5: Urban	0.000	0.006	0.010
SOx: Urban	0.005	0.045	0.004

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

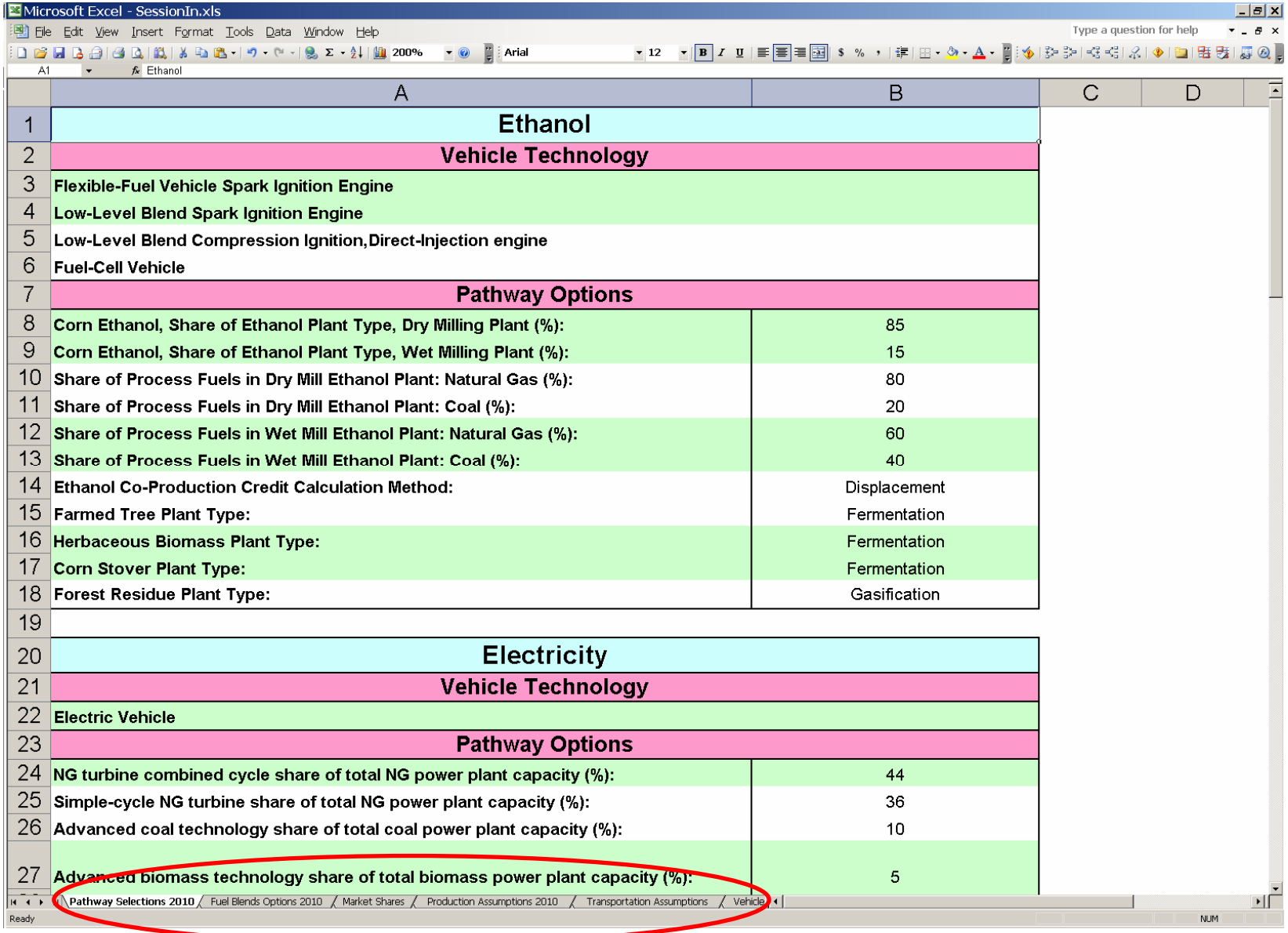
Microsoft Excel - SessionOut.xls

File Edit View Insert Format Tools Data Window Help

A4 | Total Energy

	A	B	C	D	E	F	G	H	I	J	K
26											
27	Year: 2005	GV: CARFG	GV: Low-Level EtOH Blend with Gasoline	Dedicated CNGV	LNGV: Dedicated, NG	LPGV: Dedicated	Dedi. MeOH Vehicle: M90, nNA NG	EtOH FFV: E85, Com	G.H2 ICE Vehicle	L.H2 ICE Vehicle	CIDI Vehicle: Conventional and
28	Total Energy	1.9%	4.8%	-2.3%	1.4%	-10.5%	15.7%	72.9%	39.3%	134.0%	-24
29	Fossil Fuels	-1.1%	-2.1%	-1.0%	3.8%	-8.5%	18.2%	-26.7%	40.1%	124.2%	-22
30	Coal	9.7%	19.3%	30.6%	-84.9%	-74.3%	-73.7%	299.2%	232.2%	1922.7%	-42
31	Natural Gas	10.2%	22.2%	1299.0%	1425.9%	726.9%	1385.4%	340.8%	1794.8%	2077.7%	-41
32	Petroleum	-2.4%	-4.8%	-99.2%	-98.7%	-60.7%	-80.1%	-67.2%	-98.5%	-93.4%	-20
33	CO2	-1.9%	-2.1%	-20.3%	-18.5%	-18.4%	-3.3%	-25.8%	16.4%	117.4%	-21
34	CH4	0.9%	-0.9%	170.2%	126.7%	5.7%	42.6%	5.1%	223.2%	335.7%	-26
35	N2O	32.1%	74.2%	-24.8%	-21.9%	-25.9%	-15.2%	1079.4%	-15.8%	21.6%	-25
36	GHGs	-1.5%	-1.2%	-15.3%	-14.7%	-17.9%	-2.3%	-13.5%	21.6%	122.2%	-21
37	VOC: Total	-10.4%	0.9%	-48.3%	-47.9%	-37.8%	-6.7%	10.8%	-20.2%	-8.2%	-67
38	CO: Total	-19.7%	-9.6%	-20.0%	-19.7%	-20.0%	-8.3%	-6.3%	1.6%	3.7%	-83
39	NOx: Total	-8.1%	5.0%	-13.3%	1.5%	-13.2%	38.7%	80.6%	27.2%	154.4%	-19
40	PM10: Total	-6.5%	15.6%	-8.8%	-55.1%	-48.8%	11.6%	237.9%	145.1%	848.2%	40
41	PM2.5: Total	-11.3%	11.9%	-21.0%	-44.3%	-40.9%	93.1%	184.0%	185.5%	614.6%	122
42	SOx: Total	-0.4%	12.4%	15.7%	-48.6%	-30.8%	4.7%	197.2%	149.9%	1152.0%	-13
43	VOC: Urban	-8.5%	-0.2%	-56.4%	-56.4%	-46.3%	-16.8%	-6.1%	-31.3%	-29.8%	-69
44	CO: Urban	-19.5%	-10.0%	-20.5%	-20.5%	-20.4%	-10.5%	-10.3%	0.8%	1.5%	-83
45	NOx: Urban	4.2%	-0.9%	-21.1%	-19.6%	-18.3%	-14.5%	-9.3%	11.8%	61.1%	-9
46	PM10: Urban	-19.8%	-2.2%	-37.6%	-38.1%	-31.3%	-30.7%	-24.7%	105.8%	129.3%	114
47	PM2.5: Urban	-16.5%	-2.3%	-39.6%	-39.6%	-32.9%	-31.9%	-25.7%	220.9%	246.5%	205
48	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

	A	B	C	D
1	**Ethanol**			
2	**Vehicle Technology**			
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	**Pathway Options**			
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		
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Pathway Selections 2010 | Fuel Blends Options 2010 | Market Shares | Production Assumptions 2010 | Transportation Assumptions | Vehicle

Ready NUM

Output Files of GREET GUI- Inputs Log File (Cont'd)

Gas H2 Station Production Feedstock Shares

Year	NG %	Electrolysis %	Ethanol %	Methanol %
1990	100.0%	0.0%	0.0%	0.0%
2005	100.0%	0.0%	0.0%	0.0%
2007	100.0%	0.0%	0.0%	0.0%
2010	100.0%	0.0%	0.0%	0.0%
2020	100.0%	0.0%	0.0%	0.0%

Liquid H2 Production: Central/Refueling Station Shares

Year	Central Production %	Station Production %
1990	0.0%	100.0%
2005	0.0%	100.0%
2007	0.0%	100.0%
2010	0.0%	100.0%
2020	0.0%	100.0%

Liquid H2 Station Production Feedstock Shares

Year	NG %	Electrolysis %	Ethanol %	Methanol %
1990	100.0%	0.0%	0.0%	0.0%
2005	100.0%	0.0%	0.0%	0.0%
2007	100.0%	0.0%	0.0%	0.0%
2010	100.0%	0.0%	0.0%	0.0%
2020	100.0%	0.0%	0.0%	0.0%

LPG Production: NG/Crude Feedstock Shares

Year	NG %	Crude %
1990	50.0%	50.0%

Pathway Selections 2010 | Fuel Blends Options 2010 | Market Shares | Production Assumptions 2010 | Transportation Assumptions

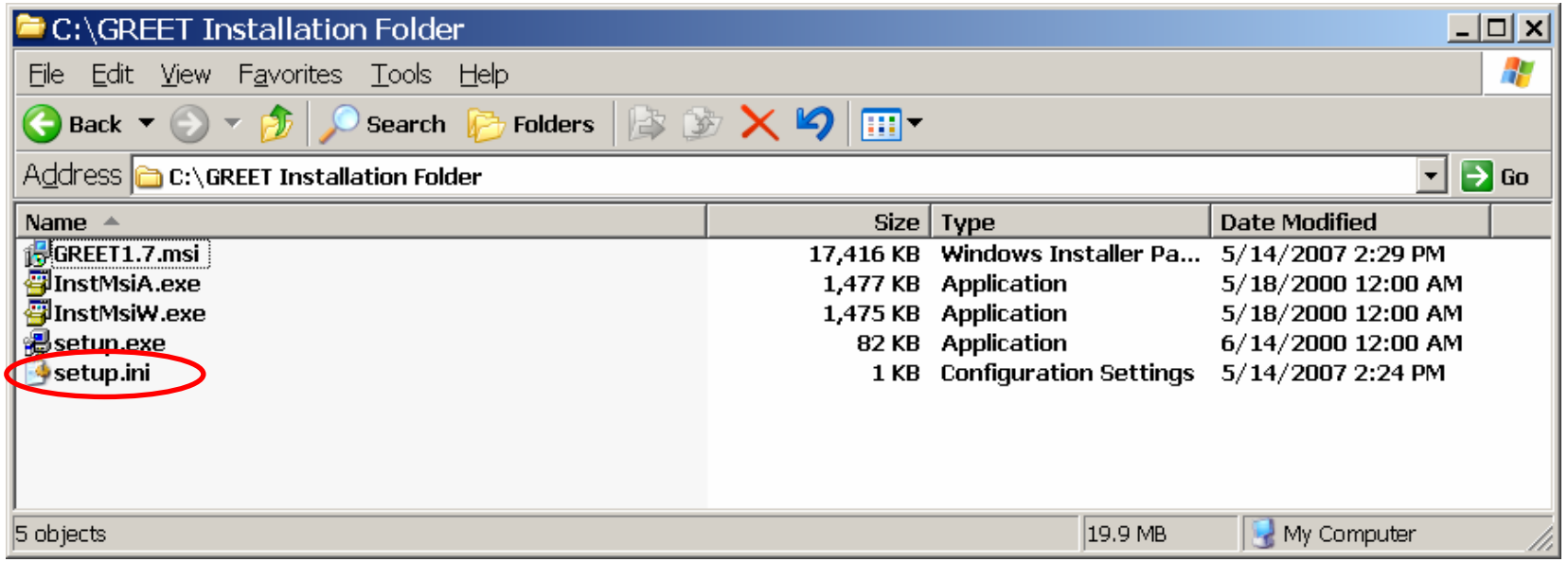
Ready

Outline

- 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 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.

GREET1.7.lnk

Compatibility of GREET GUI

- Operating Systems:
  - Windows ME
  - Windows NT 4.0
  - Windows 2000
  - Windows XP
  - NOT compatible with MAC OS

- MS OFFICE EXCEL Versions:
  - EXCEL 2000
  - EXCEL XP
  - EXCEL 2003

System Requirements to Run GREET GUI

- PC running the following software:
  - Microsoft® Windows NT, Windows Millennium Edition (ME), Windows 2000, or Windows XP
  - Microsoft® Excel 2000 or higher
  - Adobe® Acrobat Reader (to view the User Guide)

- Hardware Requirements:
  - 166 MHz processor or higher speed
  - 128 MB RAM (256 MB Recommended)
  - 30 MB free hard drive space (100 MB Recommended)

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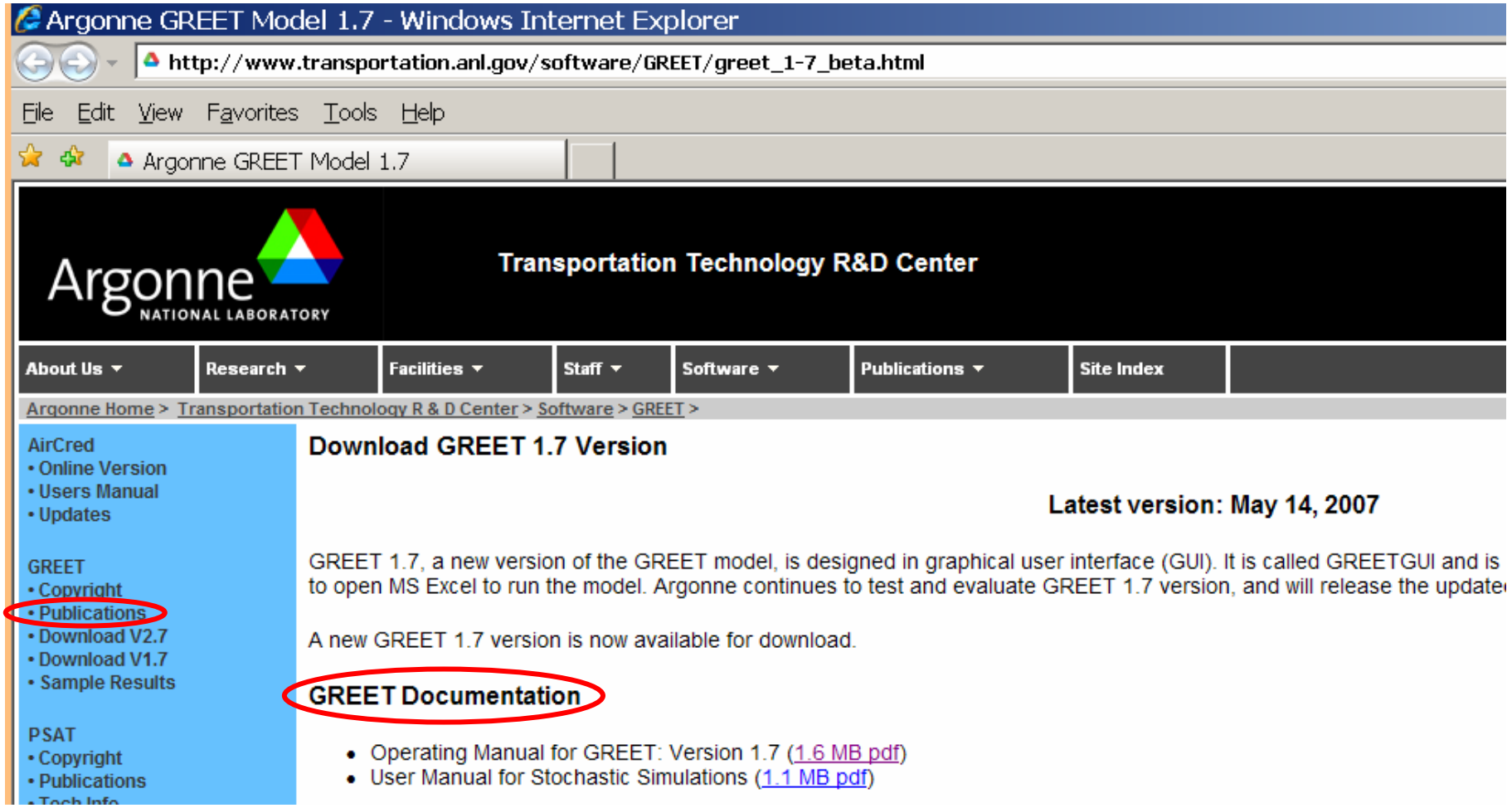
Help with GREET GUI

- Sources of Help:
  1. User Guide
  2. Publications
  3. Screen Tooltips

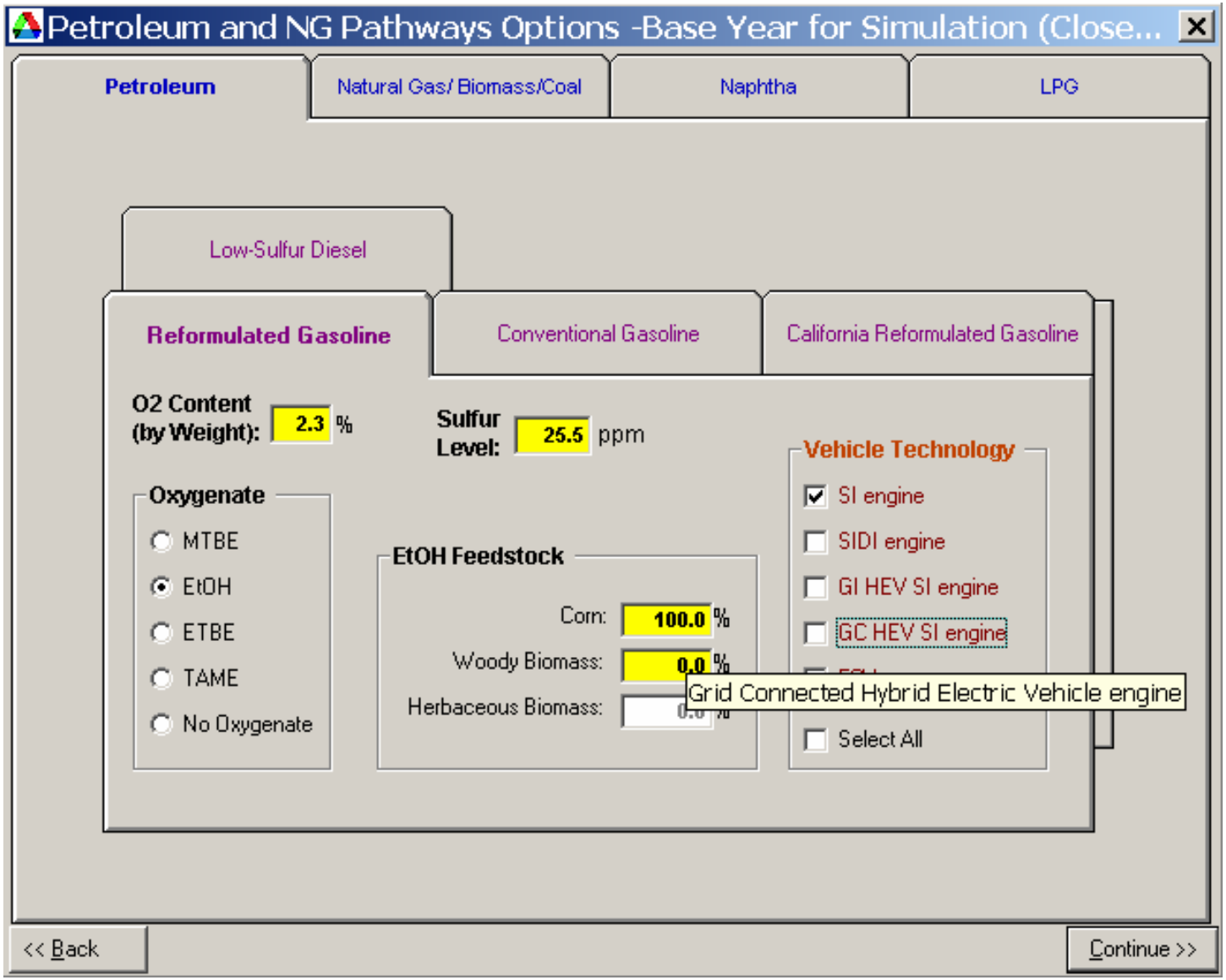
Help with GREET GUI- User Guide and Publications

- Download User Guide from the GREET web site:

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



Help with GREET GUI- Screen Tooltips



THANK YOU!