

## Biomass and Biorefinery Systems R&D FY11 Primary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, cumulative (Bil bbl)	NEMS	ns	ns	0.77	N/A
		MARKAL	0.01	0.08	0.53	2.3
	Natural Gas Imports Reduction, cumulative (Tcf)	NEMS	ns	ns	0.09	N/A
		MARKAL	ns	ns	ns	ns
<b>Environmental Impacts</b>	CO <sub>2</sub> Emissions Reduction, cumulative (Mil mtCO <sub>2</sub> )	NEMS	ns	28	396	N/A
		MARKAL	2.4	26	238	1195
	SO <sub>2</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
	NO <sub>x</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
<b>Economic Impacts</b>	Primary Energy Savings, cumulative (quads)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Oil Savings, cumulative (Bil bbl)	NEMS	ns	ns	0.91	N/A
		MARKAL	0.02	0.09	0.62	2.9
	Consumer Savings, cumulative (Bil \$)	NEMS	ns	ns	58	N/A
		MARKAL	ns	ns	82	202
	Electric Power Industry Savings, cumulative (Bil \$)	NEMS	ns	ns	12	N/A
		MARKAL	ns	0.22	1.25	ns
	Household Energy Expenditures Reduction (\$/household/yr)	NEMS	ns	ns	80	N/A
		MARKAL	ns	ns	73.63	28.1
<p>- "Reductions" and "savings" are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).</p> <p>- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.</p> <p>- All cumulative metrics are based on results beginning in 2011.</p> <p>- All monetary metrics are in 2007\$.</p> <p>- Cumulative monetary metrics are in 2007\$ that are discounted to 2011 using a 3% discount rate.</p> <p>ns - Not significant    NA - Not yet available    N/A - Not applicable</p>						

## Biomass and Biorefinery Systems R&D FY11 Secondary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, annual (Mbpd)	NEMS	ns	ns	0.3	N/A
		MARKAL	ns	ns	0.2	0.3
	Natural Gas Imports Reduction, annual (Tcf)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	MPG Improvement (%)	NEMS	ns	1%	3%	N/A
		MARKAL	ns	ns	ns	ns
<b>Environmental Impacts</b>	CO2 Emissions Reduction, annual (Mil mtCO2/yr)	NEMS	ns	7.3	59	N/A
		MARKAL	ns	8.6	38	57
	CO2 Intensity Reduction of US Economy (Kg CO2/\$GDP)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	CO2 Intensity Reduction of US Power Sector (Kg CO2/kWh)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	CO2 Intensity Reduction of US Transportation Sector (Kg CO2/mile)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
<b>Economic Impacts</b>	Primary Energy Savings, annual (quads/yr)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Oil Savings, annual (Mbpd)	NEMS	ns	0.04	0.29	N/A
		MARKAL	0.01	0.06	0.24	0.38
	Consumer Savings, annual (Bil \$)	NEMS	ns	ns	16	N/A
		MARKAL	ns	0.1	27	11
	Electric Power Industry Savings, annual (Bil \$)	NEMS	ns	0.8	3.0	N/A
		MARKAL	ns	ns	ns	ns
	Energy Intensity of US Economy (energy/\$GDP)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
Net Energy System Cost Reduction, cumulative (Bil \$)	NEMS	N/A	N/A	N/A	N/A	
	MARKAL	0.9	7.6	48	157	

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- All cumulative metrics are based on results beginning in 2011.

- All monetary metrics are in 2007\$.

- Cumulative monetary metrics are in 2007\$ that are discounted to 2011 using a 3% discount rate.

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## Building Technologies FY11 Primary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, cumulative (Bil bbl)	NEMS	ns	0.09	0.26	N/A
		MARKAL	ns	ns	ns	ns
	Natural Gas Imports Reduction, cumulative (Tcf)	NEMS	ns	0.40	2.38	N/A
		MARKAL	ns	0.60	7.64	29.0
<b>Environmental Impacts</b>	CO <sub>2</sub> Emissions Reduction, cumulative (Mil mtCO <sub>2</sub> )	NEMS	ns	296	1481	N/A
		MARKAL	199	660	2174	7746
	SO <sub>2</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
	NO <sub>x</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
<b>Economic Impacts</b>	Primary Energy Savings, cumulative (quads)	NEMS	1.3	6.4	26	N/A
		MARKAL	ns	10.6	36	126
	Oil Savings, cumulative (Bil bbl)	NEMS	ns	0.1	0.5	N/A
		MARKAL	0.01	0.06	0.22	0.45
	Consumer Savings, cumulative (Bil \$)	NEMS	13	70	272	N/A
		MARKAL	52	158	422	1190
	Electric Power Industry Savings, cumulative (Bil \$)	NEMS	24	70	231	N/A
		MARKAL	20	66	188	597
	Household Energy Expenditures Reduction (\$/household/yr)	NEMS	30	90	180	N/A
		MARKAL	92	176	237	397

- "Reductions" and "savings" are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).

- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.

- All cumulative metrics are based on results beginning in 2011.

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## Building Technologies FY11 Secondary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, annual (Mbpd)	NEMS	ns	0.03	0.06	N/A
		MARKAL	ns	ns	ns	ns
	Natural Gas Imports Reduction, annual (Tcf)	NEMS	0.01	0.15	0.16	N/A
		MARKAL	ns	0.24	0.91	1.78
	MPG Improvement (%)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
<b>Environmental Impacts</b>	CO2 Emissions Reduction, annual (Mil mtCO2/yr)	NEMS	ns	76.2	155	N/A
		MARKAL	71	113	174	361
	CO2 Intensity Reduction of US Economy (Kg CO2/\$GDP)	NEMS	ns	ns	0.01	N/A
		MARKAL	0.01	0.01	0.01	0.01
	CO2 Intensity Reduction of US Power Sector (Kg CO2/kWh)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	CO2 Intensity Reduction of US Transportation Sector (Kg CO2/mile)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
<b>Economic Impacts</b>	Primary Energy Savings, annual (quads/yr)	NEMS	0.50	1.31	2.70	N/A
		MARKAL	ns	1.9	3.1	5.6
	Oil Savings, annual (Mbpd)	NEMS	ns	0.04	0.16	N/A
		MARKAL	0.01	0.04	0.09	0.02
	Consumer Savings, annual (Bil \$)	NEMS	6.8	21	42	N/A
		MARKAL	19	32	55	107
	Electric Power Industry Savings, annual (Bil \$)	NEMS	7.9	15	34	N/A
		MARKAL	8.4	13	24	59
	Energy Intensity of US Economy (energy/\$GDP)	NEMS	0.07	0.11	0.16	N/A
		MARKAL	ns	0.13	0.17	0.20
Net Energy System Cost Reduction, cumulative (Bil \$)	NEMS	N/A	N/A	N/A	N/A	
	MARKAL	47	178	570	1585	

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## Federal Energy Management Program FY11 Primary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, cumulative (Bil bbl)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Natural Gas Imports Reduction, cumulative (Tcf)	NEMS	ns	ns	0.11	N/A
		MARKAL	ns	0.18	1.00	2.32
<b>Environmental Impacts</b>	CO <sub>2</sub> Emissions Reduction, cumulative (Mil mtCO <sub>2</sub> )	NEMS	ns	29.9	91.5	N/A
		MARKAL	15	38	87	165
	SO <sub>2</sub> Allowance Price Reduction (\$/ton)	NEMS	NA	NA	NA	N/A
		MARKAL	N/A	N/A	N/A	N/A
	NO <sub>x</sub> Allowance Price Reduction (\$/ton)	NEMS	NA	NA	NA	N/A
		MARKAL	N/A	N/A	N/A	N/A
<b>Economic Impacts</b>	Primary Energy Savings, cumulative (quads)	NEMS	ns	ns	1.1	N/A
		MARKAL	ns	ns	0.7	2.7
	Oil Savings, cumulative (Bil bbl)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	0.01	0.01	ns
	Consumer Savings, cumulative (Bil \$)	NEMS	ns	7.4	23.2	N/A
		MARKAL	ns	ns	ns	ns
	Electric Power Industry Savings, cumulative (Bil \$)	NEMS	ns	3.3	9.1	N/A
		MARKAL	1.6	3.8	12.3	19.1
	Household Energy Expenditures Reduction (\$/household/yr)	NEMS	ns	ns	ns	N/A
		MARKAL	9.0	4.9	14.1	ns
<p>- "Reductions" and "savings" are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).</p> <p>- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.</p> <p>- All cumulative metrics are based on results beginning in 2011.</p> <p>- All monetary metrics are in 2007\$.</p> <p>- Cumulative monetary metrics are in 2007\$ that are discounted to 2011 using a 3% discount rate.</p> <p>ns - Not significant    NA - Not yet available    N/A - Not applicable</p>						

## Federal Energy Management Program FY11 Secondary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
Energy Security	Oil Imports Reduction, annual (Mbpd)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Natural Gas Imports Reduction, annual (Tcf)	NEMS	NA	NA	NA	N/A
		MARKAL	ns	0.07	0.09	ns
	MPG Improvement (%)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
Environmental Impacts	CO2 Emissions Reduction, annual (Million mtCO2/yr)	NEMS	ns	3.9	8.5	N/A
		MARKAL	5.5	3.7	4.8	1.0
	CO2 Intensity Reduction of US Economy (Kg CO2/\$GDP)	NEMS	NA	NA	NA	N/A
		MARKAL	ns	ns	ns	ns
	CO2 Intensity Reduction of US Power Sector <sup>3</sup> (Kg CO2/kWh)	NEMS	NA	NA	NA	N/A
		MARKAL	ns	ns	ns	ns
	CO2 Intensity Reduction of US Transportation Sector (Kg CO2/mile)	NEMS	NA	NA	NA	N/A
		MARKAL	ns	ns	ns	ns
Economic Impacts	Primary Energy Savings, annual (quads/yr)	NEMS	ns	ns	0.09	N/A
		MARKAL	ns	0.06	0.10	0.05
	Oil Savings, annual (Mbpd)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Consumer Savings, annual (Bil \$)	NEMS	ns	1.5	1.9	N/A
		MARKAL	ns	ns	ns	ns
	Electric Power Industry Savings, annual (Bil \$)	NEMS	ns	0.64	0.92	N/A
		MARKAL	0.68	0.45	1.88	0.79
	Energy Intensity of US Economy (energy/\$GDP)	NEMS	NA	NA	NA	N/A
		MARKAL	ns	ns	ns	ns
Net Energy System Cost Reduction, cumulative (NPV, Bil \$)	NEMS	N/A	N/A	N/A	N/A	
	MARKAL	6.3	19.1	50.4	94.2	

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## Hydrogen and Fuel Cell Technologies FY11 Primary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, cumulative (Bil bbl)	NEMS	ns	ns	0.2	N/A
		MARKAL	ns	ns	ns	7.8
	Natural Gas Imports Reduction, cumulative (Tcf)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
<b>Environmental Impacts</b>	CO <sub>2</sub> Emissions Reduction, cumulative (mtCO <sub>2</sub> )	NEMS	ns	ns	148	N/A
		MARKAL	ns	ns	ns	2365
	SO <sub>2</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
	NO <sub>x</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
<b>Economic Impacts</b>	Primary Energy Savings, cumulative (quads)	NEMS	ns	ns	2.1	N/A
		MARKAL	ns	ns	ns	4.0
	Oil Savings, cumulative (Bil bbl)	NEMS	ns	ns	0.2	N/A
		MARKAL	ns	ns	ns	7.9
	Consumer Savings, cumulative (Bil \$)	NEMS	ns	ns	14.9	N/A
		MARKAL	ns	19	149	1612
	Electric Power Industry Savings, cumulative (Bil \$)	NEMS	ns	ns	7	N/A
		MARKAL	ns	ns	ns	ns
	Household Energy Expenditures Reduction (\$/household/yr)	NEMS	ns	ns	30	N/A
		MARKAL	ns	ns	ns	2551
<p>- “Reductions” and “savings” are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).</p> <p>- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.</p> <p>- All cumulative metrics are based on results beginning in 2011.</p> <p>- All monetary metrics are in 2007\$.</p> <p>- Cumulative monetary metrics are in 2007\$ that are discounted to 2011 using a 3% discount rate.</p> <p>ns - Not significant    NA - Not yet available    N/A - Not applicable</p>						

## Hydrogen and Fuel Cell Technologies FY11 Secondary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, annual (Mbpd)	NEMS	ns	ns	0.1	N/A
		MARKAL	ns	ns	ns	2.75
	Natural Gas Imports Reduction, annual (Tcf)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	MPG Improvement (%)	NEMS	ns	ns	2%	N/A
MARKAL		ns	ns	ns	127%	
<b>Environmental Impacts</b>	CO2 Emissions Reduction, annual (Mil mtCO2/yr)	NEMS	ns	ns	30.2	N/A
		MARKAL	ns	ns	ns	239
	CO2 Intensity Reduction of US Economy (Kg CO2/\$GDP)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	CO2 Intensity Reduction of US Power Sector <sup>3</sup> (Kg CO2/kWh)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	0.02
CO2 Intensity Reduction of US Transportation Sector <sup>4</sup> (Kg CO2/mile)	NEMS	ns	ns	ns	N/A	
	MARKAL	ns	ns	ns	0.09	
<b>Economic Impacts</b>	Primary Energy Savings, annual (quads/yr)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	1.0
	Oil Savings, annual (Mbpd)	NEMS	ns	ns	0.14	N/A
		MARKAL	ns	ns	0.04	3.04
	Consumer Savings, annual (Bil \$)	NEMS	ns	ns	4.3	N/A
		MARKAL	ns	ns	8.4	376
	Electric Power Industry Savings, annual (Bil \$)	NEMS	ns	ns	2.5	N/A
		MARKAL	ns	ns	ns	ns
	Energy Intensity of US Economy (energy/\$GDP)	NEMS	ns	ns	ns	N/A
MARKAL		ns	ns	ns	ns	
Net Energy System Cost Reduction, cumulative (Bil \$)	NEMS	N/A	N/A	N/A	N/A	
	MARKAL	ns	6	70	1405	

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## Geothermal Technology FY11 Primary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, cumulative (Bil bbl)	NEMS	ns	ns	0.2	N/A
		MARKAL	0.0	0.0	0.0	0.0
	Natural Gas Imports Reduction, cumulative (Tcf)	NEMS	ns	ns	ns	N/A
		MARKAL	0.0	0.0	0.1	0.2
<b>Environmental Impacts</b>	CO <sub>2</sub> Emissions Reduction, cumulative (Mil mtCO <sub>2</sub> )	NEMS	ns	ns	77	N/A
		MARKAL	0	0	77	587
	SO <sub>2</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
	NO <sub>x</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
<b>Economic Impacts</b>	Primary Energy Savings, cumulative (quads)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Consumer Savings, cumulative (Bil \$)	NEMS	ns	ns	9	N/A
		MARKAL	ns	ns	16	26
	Electric Power Industry Savings, cumulative (Bil \$)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Household Energy Expenditures Reduction (\$/household/yr)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
<p>- “Reductions” and “savings” are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).</p> <p>- All cumulative metrics are based on results beginning in 2011.</p> <p>- All monetary metrics are in 2007\$.</p> <p>- Cumulative monetary metrics are in 2007\$ that are discounted to 2011 using a 3% discount rate.</p> <p>ns - Not significant    NA - Not yet available    N/A - Not applicable</p>						

## Geothermal Technology FY11 Secondary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, annual (Mbpd)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Natural Gas Imports Reduction, annual (Tcf)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	MPG Improvement (%)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	0%
<b>Environmental Impacts</b>	CO2 Emissions Reduction, annual (Mil mtCO2/yr)	NEMS	ns	ns	19	N/A
		MARKAL	ns	ns	11	26
	CO2 Intensity Reduction of US Economy (Kg CO2/\$GDP)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	0.00
	CO2 Intensity Reduction of US Power Sector (Kg CO2/kWh)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	CO2 Intensity Reduction of US Transportation Sector (Kg CO2/mile)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
<b>Economic Impacts</b>	Consumer Savings, annual (Bil \$)	NEMS	ns	ns	3.2	N/A
		MARKAL	ns	ns	ns	ns
	Primary Energy Savings, annual (quads/yr)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Electric Power Industry Savings, annual (Bil \$)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Energy Intensity of US Economy (energy/\$GDP)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Net Energy System Cost Reduction, cumulative (Bil \$)	NEMS	N/A	N/A	N/A	N/A
		MARKAL	ns	ns	0.53	7.24
<p>- “Reductions” and “savings” are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).</p> <p>- All cumulative metrics are based on results beginning in 2011.</p> <p>- All monetary metrics are in 2007\$.</p> <p>- Cumulative monetary metrics are in 2007\$ that are discounted to 2011 using a 3% discount rate.</p> <p>ns - Not significant    NA - Not yet available    N/A - Not applicable</p>						

## Industrial Technologies FY11 Primary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, cumulative (Bil bbl)	NEMS	ns	ns	0.20	N/A
		MARKAL	0.17	0.39	0.74	1.9
	Natural Gas Imports Reduction, cumulative (Tcf)	NEMS	0.03	0.45	2.2	N/A
		MARKAL	ns	0.66	4.38	13.8
<b>Environmental Impacts</b>	CO <sub>2</sub> Emissions Reduction, cumulative (Mil mtCO <sub>2</sub> )	NEMS	82	350	1504	N/A
		MARKAL	82	391	1934	5509
	SO <sub>2</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
	NO <sub>x</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
<b>Economic Impacts</b>	Primary Energy Savings, cumulative (quads)	NEMS	1.4	5.5	23	N/A
		MARKAL	1.5	6.2	28	85
	Oil Savings, cumulative (Bil bbl)	NEMS	0.01	0.06	0.50	N/A
		MARKAL	0.18	0.43	1.1	2.7
	Consumer Savings, cumulative (Bil \$)	NEMS	15	49	171	N/A
		MARKAL	23	64	275	654
	Electric Power Industry Savings, cumulative (Bil \$)	NEMS	11	32	95	N/A
		MARKAL	6	18	80	206
	Household Energy Expenditures Reduction (\$/household/yr)	NEMS	10	30	40	N/A
		MARKAL	ns	ns	ns	ns
<p>- “Reductions” and “savings” are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).</p> <p>- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.</p> <p>- All cumulative metrics are based on results beginning in 2011.</p> <p>- All monetary metrics are in 2007\$.</p> <p>- Cumulative monetary metrics are in 2007\$ that are discounted to 2011 using a 3% discount rate.</p> <p>ns - Not significant    NA - Not yet available    N/A - Not applicable</p>						

## Industrial Technologies FY11 Secondary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, annual (Mbpd)	NEMS	ns	0.03	ns	N/A
		MARKAL	0.12	0.12	0.11	0.13
	Natural Gas Imports Reduction, annual (Tcf)	NEMS	ns	0.13	0.12	N/A
		MARKAL	ns	0.26	0.33	0.5
	MPG Improvement (%)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
<b>Environmental Impacts</b>	CO2 Emissions Reduction, annual (Mil mtCO2/yr)	NEMS	23	70	147	N/A
		MARKAL	29	94	166	198
	CO2 Intensity Reduction of US Economy (Kg CO2/\$GDP)	NEMS	ns	ns	0.01	N/A
		MARKAL	ns	0.01	0.01	0.01
	CO2 Intensity Reduction of US Power Sector <sup>3</sup> (Kg CO2/kWh)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	CO2 Intensity Reduction of US Transportation Sector (Kg CO2/mile)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
<b>Economic Impacts</b>	Primary Energy Savings, annual (quads/yr)	NEMS	ns	1.04	2.2	N/A
		MARKAL	0.48	1.38	2.6	3.1
	Oil Savings, annual (Mbpd)	NEMS	0.01	0.04	0.2	N/A
		MARKAL	0.13	0.14	0.19	0.22
	Consumer Savings, annual (Bil \$)	NEMS	3.2	12	21	N/A
		MARKAL	8.3	11	48	39
	Electric Power Industry Savings, annual (Bil \$)	NEMS	3.8	6.6	13	N/A
		MARKAL	ns	3.5	14	18
	Energy Intensity of US Economy (energy/\$GDP)	NEMS	0.04	0.08	0.1	N/A
		MARKAL	ns	ns	0.1	0.1
Net Energy System Cost Reduction, cumulative (Bil \$)	NEMS	N/A	N/A	N/A	N/A	
	MARKAL	22	65	214	519	

- "Reductions" and "savings" are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).

- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.

- All cumulative metrics are based on results beginning in 2011.

- All monetary metrics are in 2007\$.

- Cumulative monetary metrics are in 2007\$ that are discounted to 2011 using a 3% discount rate.

ns - Not significant    NA - Not yet available    N/A - Not applicable

## Solar Energy FY11 Primary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, cumulative (Bil bbl)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	0.01	0.04	0.10
	Natural Gas Imports Reduction, cumulative (Tcf)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	0.58	3.18	17.7
<b>Environmental Impacts</b>	CO <sub>2</sub> Emissions Reduction, cumulative (Mil mtCO <sub>2</sub> )	NEMS	ns	ns	84	N/A
		MARKAL	9.3	22	40	2440
	SO <sub>2</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
	NO <sub>x</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
<b>Economic Impacts</b>	Primary Energy Savings, cumulative (quads)	NEMS	0.01	0.07	0.31	N/A
		MARKAL	ns	na	ns	9.47
	Oil Savings, cumulative (Bil bbl)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	0.10
	Consumer Savings, cumulative (Bil \$)	NEMS	ns	ns	24	N/A
		MARKAL	5.3	9.0	25	172
	Electric Power Industry Savings, cumulative (Bil \$)	NEMS	3.2	11	43	N/A
		MARKAL	na	ns	ns	42
	Household Energy Expenditures Reduction (\$/household/yr)	NEMS	ns	ns	30	N/A
		MARKAL	na	ns	14	63
<p>- “Reductions” and “savings” are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).</p> <p>- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.</p> <p>- All cumulative metrics are based on results beginning in 2011.</p> <p>- All monetary metrics are in 2007\$.</p> <p>- Cumulative monetary metrics are in 2007\$ that are discounted to 2011 using a 3% discount rate.</p> <p>ns - Not significant    NA - Not yet available    N/A - Not applicable</p>						

## Solar Energy FY11 Secondary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, annual (Mbpd)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	na	ns	0.01
	Natural Gas Imports Reduction, annual (Tcf)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	0.23	0.28	1.44
	MPG Improvement (%)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
<b>Environmental Impacts</b>	CO2 Emissions Reduction, annual (Mil mtCO2/yr)	NEMS	ns	ns	17.7	N/A
		MARKAL	3.33	1.81	0.53	239.36
	CO2 Intensity Reduction of US Economy (Kg CO2/\$GDP)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	0.01
	CO2 Intensity Reduction of US Power Sector (Kg CO2/kWh)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	0.03
	CO2 Intensity Reduction of US Transportation Sector (Kg CO2/mile)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
<b>Economic Impacts</b>	Primary Energy Savings, annual (quads/yr)	NEMS	ns	0.03	0.12	N/A
		MARKAL	ns	na	ns	1.51
	Oil Savings, annual (Mbpd)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	0.03
	Consumer Savings, annual (Bil \$)	NEMS	ns	ns	3.1	N/A
		MARKAL	1.9	0.2	5.5	54
	Electric Power Industry Savings, annual (Bil \$)	NEMS	1.6	2.2	9.0	N/A
		MARKAL	na	ns	2.25	23
	Energy Intensity of US Economy (energy/\$GDP)	NEMS	0.01	0.01	0.02	N/A
		MARKAL	ns	ns	ns	0.05
Net Energy System Cost Reduction, cumulative (Bil \$)	NEMS	N/A	N/A	N/A	N/A	
	MARKAL	4.16	9.1	18.4	54.7	

- "Reductions" and "savings" are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).

- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.

- All cumulative metrics are based on results beginning in 2011.

- All monetary metrics are in 2007\$.

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ns - Not significant    NA - Not yet available    N/A - Not applicable

## Vehicle Technologies FY11 Primary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, cumulative (Bil bbl)	NEMS	ns	0.39	3.27	N/A
		MARKAL	0.06	0.29	2.46	20
	Natural Gas Imports Reduction, cumulative (Tcf)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	0.33	1.8	5.41
<b>Environmental Impacts</b>	CO <sub>2</sub> Emissions Reduction, cumulative (Mil mtCO <sub>2</sub> )	NEMS	ns	159	1381	N/A
		MARKAL	22.78	183	1402	8846
	SO <sub>2</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
	NO <sub>x</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
<b>Economic Impacts</b>	Primary Energy Savings, cumulative (quads)	NEMS	ns	2.3	18	N/A
		MARKAL	0.03	0.36	8.2	98
	Oil Savings, cumulative (Bil bbl)	NEMS	0.03	0.42	3.7	N/A
		MARKAL	0.08	0.37	3.2	22
	Consumer Savings, cumulative (Bil \$)	NEMS	ns	44	427	N/A
		MARKAL	ns	ns	307	2127
	Electric Power Industry Savings, cumulative (Bil \$)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Household Energy Expenditures Reduction (\$/household/yr)	NEMS	ns	ns	340	N/A
		MARKAL	ns	88	494	1585

- "Reductions" and "savings" are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).

- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.

- All cumulative metrics are based on results beginning in 2011.

- All monetary metrics are in 2007\$.

- Cumulative monetary metrics are in 2007\$ that are discounted to 2011 using a 3% discount rate.

ns - Not significant    NA - Not yet available    N/A - Not applicable

## Vehicle Technologies FY11 Secondary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, annual (Mbpd)	NEMS	ns	0.3	1.1	N/A
		MARKAL	0.1	0.2	1.1	2.9
	Natural Gas Imports Reduction, annual (Tcf)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	0.1	0.2	0.2
	MPG Improvement (%)	NEMS	ns	2.3%	12%	N/A
		MARKAL	0.9%	0.9%	6.0%	43%
<b>Environmental Impacts</b>	CO2 Emissions Reduction, annual (Mil mtCO2/yr)	NEMS	ns	47	188	N/A
		MARKAL	8	56	240	498
	CO2 Intensity Reduction of US Economy (Kg CO2/\$GDP)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	0.01	0.02
	CO2 Intensity Reduction of US Power Sector (Kg CO2/kWh)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
CO2 Intensity Reduction of US Transportation Sector (Kg CO2/mile)	NEMS	ns	0.02	0.04	N/A	
	MARKAL	ns	0.01	0.05	0.10	
<b>Economic Impacts</b>	Primary Energy Savings, annual (quads/yr)	NEMS	0.11	0.7	2.5	N/A
		MARKAL	0.01	0.1	1.7	7.5
	Oil Savings, annual (Mbpd)	NEMS	0.06	0.3	1.3	N/A
		MARKAL	0.08	0.2	1.6	3.4
	Consumer Savings, annual (Bil \$)	NEMS	ns	19	83	N/A
		MARKAL	ns	ns	118	358
	Electric Power Industry Savings, annual (Bil \$)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	1.38	7.0
	Energy Intensity of US Economy (energy/\$GDP)	NEMS	0.01	0.04	0.12	N/A
		MARKAL	ns	0.01	0.09	0.27
Net Energy System Cost Reduction, cumulative (Bil \$)	NEMS	N/A	N/A	N/A	N/A	
	MARKAL	0.4	26	291	1602	

- "Reductions" and "savings" are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received)

- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.

- All cumulative metrics are based on results beginning in 2011.

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ns - Not significant    NA - Not yet available    N/A - Not applicable

## Wind Energy FY11 Primary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, cumulative (Bil bbl)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Natural Gas Imports Reduction, cumulative (Tcf)	NEMS	0.1	0.5	1.0	N/A
		MARKAL	ns	0.5	2.6	8.3
<b>Environmental Impacts</b>	CO <sub>2</sub> Emissions Reduction, cumulative (Mil mtCO <sub>2</sub> )	NEMS	101	241	476	N/A
		MARKAL	25	47	134	3208
	SO <sub>2</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
	NO <sub>x</sub> Allowance Price Reduction (\$/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
<b>Economic Impacts</b>	Primary Energy Savings, cumulative (quads)	NEMS	0.7	1.7	2.9	N/A
		MARKAL	ns	ns	ns	11
	Oil Savings, cumulative (Bil bbl)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	0.01
	Consumer Savings, cumulative (Bil \$)	NEMS	14	31	58	N/A
		MARKAL	ns	ns	14	55
	Electric Power Industry Savings, cumulative (Bil \$)	NEMS	ns	ns	ns	N/A
		MARKAL	9.2	15.5	31.3	0.69
Household Energy Expenditures Reduction (\$/household/yr)	NEMS	ns	ns	ns	N/A	
	MARKAL	ns	ns	ns	ns	
<p>- “Reductions” and “savings” are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).</p> <p>- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.</p> <p>- All cumulative metrics are based on results beginning in 2011.</p> <p>- All monetary metrics are in 2007\$.</p> <p>- Cumulative monetary metrics are in 2007\$ that are discounted to 2011 using a 3% discount rate.</p> <p>ns - Not significant    NA - Not yet available    N/A - Not applicable</p>						

## Wind Energy FY11 Secondary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, annual (Mbpd)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Natural Gas Imports Reduction, annual (Tcf)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	0.19	0.23	0.31
	MPG Improvement (%)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
<b>Environmental Impacts</b>	CO2 Emissions Reduction, annual (Mil mtCO2/yr)	NEMS	37	20	36	N/A
		MARKAL	8.8	0.27	34	251
	CO2 Intensity Reduction of US Economy (Kg CO2/\$GDP)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	0.01
	CO2 Intensity Reduction of US Power Sector <sup>3</sup> (Kg CO2/kWh)	NEMS	ns	0.01	0.01	N/A
		MARKAL	ns	ns	ns	0.04
CO2 Intensity Reduction of US Transportation Sector <sup>4</sup> (Kg CO2/mile)	NEMS	ns	ns	ns	N/A	
	MARKAL	ns	ns	ns	ns	
<b>Economic Impacts</b>	Primary Energy Savings, annual (quads/yr)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	1.3
	Oil Savings, annual (Mbpd)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	Consumer Savings, annual (Bil \$)	NEMS	2.1	4.7	3.5	N/A
		MARKAL	ns	ns	15	5.2
	Electric Power Industry Savings, annual (Bil \$)	NEMS	ns	ns	2.79	N/A
		MARKAL	ns	ns	ns	ns
	Energy Intensity of US Economy (energy/\$GDP)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	0.05
Net Energy System Cost Reduction, cumulative (Bil \$)	NEMS	N/A	N/A	N/A	N/A	
	MARKAL	6.3	16	34	84	

- "Reductions" and "savings" are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received)

- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.

- All cumulative metrics are based on results beginning in 2011.

- All monetary metrics are in 2007\$.

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ns - Not significant    NA - Not yet available    N/A - Not applicable

## Weatherization and Intergovernmental Activities FY11 Primary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, cumulative (Bil bbl)	NEMS	ns	0.07	0.38	N/A
		MARKAL	ns	ns	0.05	0.18
	Natural Gas Imports Reduction, cumulative (Tcf)	NEMS	0.05	0.18	0.41	N/A
		MARKAL	ns	0.66	3.58	8.38
<b>Environmental Impacts</b>	CO <sub>2</sub> Emissions Reduction, cumulative (Mil mtCO <sub>2</sub> )	NEMS	63	160	427	N/A
		MARKAL	71	204	516	899
	SO <sub>2</sub> Allowance Price Reduction (\$/ton)	NEMS	N/A	N/A	N/A	N/A
		MARKAL	N/A	N/A	N/A	N/A
	NO <sub>x</sub> Allowance Price Reduction (\$/ton)	NEMS	N/A	N/A	N/A	N/A
		MARKAL	N/A	N/A	N/A	N/A
<b>Economic Impacts</b>	Primary Energy Savings, cumulative (quads)	NEMS	0.9	2.3	5.3	N/A
		MARKAL	ns	1.1	5.9	14.3
	Oil Savings, cumulative (Bil bbl)	NEMS	0	0.08	0.41	N/A
		MARKAL	0.01	0.04	0.13	0.28
	Consumer Savings, cumulative (Bil \$)	NEMS	13.8	40	109	N/A
		MARKAL	30	70	163	347
	Electric Power Industry Savings, cumulative (Bil \$)	NEMS	6.1	15	34	N/A
		MARKAL	10	24	57	104
	Household Energy Expenditures Reduction (\$/household/yr)	NEMS	20	20	20	N/A
		MARKAL	5.2	1.9	10	ns
<p>- “Reductions” and “savings” are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).</p> <p>- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.</p> <p>- All cumulative metrics are based on results beginning in 2011.</p> <p>- All monetary metrics are in 2007\$.</p> <p>- Cumulative monetary metrics are in 2007\$ that are discounted to 2011 using a 3% discount rate.</p> <p>ns - Not significant    NA - Not yet available    N/A - Not applicable</p>						

## Weatherization and Intergovernmental Activities FY11 Secondary Metrics

	Metric	Model	Year			
			2015	2020	2030	2050
<b>Energy Security</b>	Oil Imports Reduction, annual (Mbpd)	NEMS	ns	ns	0.10	N/A
		MARKAL	ns	ns	ns	0.01
	Natural Gas Imports Reduction, annual (Tcf)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	0.26	0.32	ns
	MPG Improvement (%)	NEMS	ns	ns	ns	N/A
MARKAL		ns	ns	ns	ns	
<b>Environmental Impacts</b>	CO2 Emissions Reduction, annual (Mil mtCO2/yr)	NEMS	20.3	21.1	39.7	N/A
		MARKAL	25.5	27.3	19.4	15.6
	CO2 Intensity Reduction of US Economy (Kg CO2/\$GDP)	NEMS	N/A	N/A	N/A	N/A
		MARKAL	ns	ns	ns	ns
	CO2 Intensity Reduction of US Power Sector (Kg CO2/kWh)	NEMS	N/A	N/A	N/A	N/A
		MARKAL	ns	ns	ns	ns
CO2 Intensity Reduction of US Transportation Sector (Kg CO2/mile)	NEMS	N/A	N/A	N/A	N/A	
	MARKAL	ns	ns	ns	ns	
<b>Economic Impacts</b>	Primary Energy Savings, annual (quads/yr)	NEMS	0.29	0.30	0.42	N/A
		MARKAL	ns	0.43	0.58	0.1
	Oil Savings, annual (Mbpd)	NEMS	ns	ns	0.13	N/A
		MARKAL	0.02	ns	0.02	ns
	Consumer Savings, annual (Bil \$)	NEMS	5.3	8.0	9.0	N/A
		MARKAL	11	9.2	18	19
	Electric Power Industry Savings, annual (Bil \$)	NEMS	2.2	3.0	3.5	N/A
		MARKAL	3.5	3.7	5.9	5.5
	Energy Intensity of US Economy (energy/\$GDP)	NEMS	N/A	N/A	N/A	N/A
		MARKAL	ns	0.03	0.03	0.01
Net Energy System Cost Reduction, cumulative (Bil \$)	NEMS	N/A	N/A	N/A	N/A	
	MARKAL	39	110	273	494	

- "Reductions" and "savings" are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).

- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.

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- All monetary metrics are in 2007\$.

- Cumulative monetary metrics are in 2007\$ that are discounted to 2011 using a 3% discount rate.

ns - Not significant    NA - Not yet available    N/A - Not applicable