

CHAPTER 13. UTILITY IMPACT ANALYSIS

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CHAPTER 13. UTILITY IMPACT ANALYSIS

13.1 INTRODUCTION

DOE analyzed the effects of small electric motor standard levels on the electric utility industry using a variant of the DOE/Energy Information Administration (EIA)'s National Energy Modeling System (NEMS).^a NEMS is a public domain, multi-sectored, partial equilibrium model of the U.S. energy sector. Each year, DOE/EIA uses NEMS to produce a baseline energy forecast for the United States, the *Annual Energy Outlook (AEO)*. The *AEO* for 2009 (*AEO2009*) forecasts energy supply and demand through 2030.¹ DOE used a variant of this model, referred to here as NEMS-BT,^b to account for the impacts of small electric motor energy conservation standards on the baseline energy forecast. DOE's utility impact analysis consists of a comparison between model results for the *AEO2009* American Recovery and Reinvestment Act Case and for policy cases in which standards are in place, and applies the same basic set of assumptions as the *AEO2009*. For example, the operating characteristics (e.g., energy conversion efficiency, emissions rates) of future electricity generating plants are as specified in the *AEO2009* Reference Case, as are the prospects for natural gas supply.

The utility impact analysis reports the changes in installed capacity and generation that result for each trial standard level (TSL) by fuel type, as well as changes in residential electricity consumption. The *AEO2009* reference case corresponds to the American Recovery and Reinvestment Act (Stimulus) case.

13.2 ASSUMPTIONS

NEMS-BT has several advantages that have led to its adoption as the forecasting tool in the analysis of energy conservation standards. NEMS-BT uses a set of assumptions that are well known and fairly transparent, due to the exposure and scrutiny each *AEO* receives. In addition, the comprehensiveness of NEMS-BT permits the modeling of interactions among the various energy supply and demand sectors and the economy as a whole, producing a complete picture of the effects of energy conservation standards. Perhaps most importantly, NEMS-BT can be used to estimate marginal effects, which yield a better estimate of the actual impact of energy conservation standards than considering only average effects.

^a For more information on NEMS, refer to the U.S. Department of Energy, Energy Information Administration documentation. A useful summary is *National Energy Modeling System: An Overview 2003*, DOE/EIA-0581(2003), March, 2003.

^b DOE/EIA approves use of the name NEMS to describe only an official version of the model without any modification to code or data. Because this analysis entails some minor code modifications and the model is run under various policy scenarios that are variations on DOE/EIA assumptions, DOE refers to it by the name NEMS-BT (BT is DOE's Building Technologies Program, under whose aegis this work has been performed). NEMS-BT was previously called NEMS-BRS.

The utility impact analysis uses the assumptions of the *AEO2009* and treats polyphase and capacitor-start small electric motor energy conservation standards as variations in policy. The effect of the policy is calculated as the difference between the *AEO2009* Reference Case and each proposed standard case. Because the implementation of standards reduces total electricity demand by less than one percent in any given year, its effect cannot be detected directly in the simulations. Therefore, DOE modeled larger reductions in demand and interpolated results for the TSLs. DOE assumed the effects to be linear within the range of interpolation.

13.3 METHOD

DOE used the national energy savings developed in the national impact analysis (chapter 10) for each TSL as input to NEMS-BT. The magnitude of the energy decrement that would be required for NEMS-BT to produce stable results out of the range of numerical noise is larger than the highest efficiency standard under consideration. Therefore, DOE estimated results corresponding to each TSL using interpolation. DOE ran higher use reduction levels in NEMS-BT, representing multipliers of each TSL, and used these outputs to linearly interpolate the results to estimate actual changes in generation and capacity due to the standard.

Policy runs are executed by reducing electricity consumption in the NEMS-BT Residential Demand, Commercial Demand, and Industrial Demand Modules. The savings are divided evenly among the U.S. Census divisions. All fuels are considered simultaneously.

Although the current time horizon of NEMS-BT is 2030, other parts of the small electric motor energy conservation standards analysis extend to the year 2045. It is not feasible to extend the forecast period of NEMS-BT for the purposes of this analysis, nor does DOE/EIA have an approved method for extrapolation of many outputs beyond 2030. While it might seem reasonable to make simple linear extrapolations of results, in practice this is not advisable because outputs could be contradictory. For example, changes in the fuel mix implied by extrapolations of those outputs could be inconsistent with the extrapolation of marginal emissions factors. An analysis of various trends sufficiently detailed to guarantee consistency is beyond the scope of this work, and, in any case, would involve a great deal of uncertainty. Therefore, all extrapolations beyond 2030 are simple replications of year 2030 results. While these may seem unreasonable in some instances, in this way results are guaranteed to be consistent. As with the AEO Reference Case in general, the implicit assumption is that the regulatory environment does not deviate from the current known situation during the extrapolation period. Only changes that have been announced with date-certain introduction are included in NEMS-BT. To emphasize the extrapolated results wherever they appear, they are shaded in gray to distinguish them from actual NEMS-BT results.

13.4 RESULTS

The utility impact analysis reports NEMS-BT forecasts for generation, installed capacity, and residential-sector consumption. Results for all TSLs are presented in five-year increments to year 2030. Beyond year 2030, an extrapolation to 2045 for each proposed TSL represents a simple replication of the year 2030 results.

The results from the *AEO2009* Reference Case are shown in Table 13.4.1.

A separate set of TSLs are modeled for each energy conservation standard product. Eight TSLs each are modeled for polyphase and for capacitor-start small electric motors. The reference case results for each TSL are presented in Tables 13.4.2 through 13.4.17. The results from polyphase SEM TSLs are presented in Tables 13.4.2 through 13.4.9 and the results from capacitor-start SEM TSLs are presented in Tables 13.4.10 through 13.4.17. Each table shows forecasts using interpolated results, as described in section 13.3 for total U.S. electricity generation and installed capacity.

The proposed polyphase SEM TSLs reduce electricity consumption compared to the *AEO2009* Reference Case. The electricity savings predicted by the NIA model range from 0.004 to 0.042 percent of total electricity consumption by year 2030.

The proposed capacitor-start SEM TSLs also reduce electricity consumption compared to the *AEO2009* Reference Case. The electricity savings predicted by the NIA model range from 0.10 to 0.22 percent of total electricity consumption by year 2030.

Table 13.4.1 AEO2009 Stimulus Reference (American Recovery and Reinvestment Act) Case Forecast

NEMS-BT Results: AEO2009 Reference						
	2005	2010	2015	2020	2025	2030
<i>Residential Sector Energy Consumption</i> ¹						
Electricity Sales (TWh) ²	1,359	1,403	1,407	1,477	1,571	1,661
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00
Other (Quads) ³	1.88	1.77	1.65	1.63	1.61	1.60
<i>Total U.S. Electric Generation</i> ⁴						
Coal (TWh)	2,014	2,022	2,138	2,198	2,203	2,305
Gas (TWh)	753	775	647	714	908	979
Petroleum (TWh)	123	56	47	49	49	50
Nuclear (TWh)	782	809	831	876	881	890
Renewables (TWh)	357	468	645	707	771	797
Total (TWh) ⁵	4,029	4,130	4,308	4,544	4,812	5,021
<i>Installed Generating Capacity</i> ⁶						
Coal (GW)	313.8	325.0	331.0	333.3	333.9	344.6
Other Fossil (GW) ⁷	438.9	470.5	443.2	451.8	499.4	542.4
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0
Renewables (GW)	99.5	133.5	171.1	176.1	182.3	188.3
Total (GW) ⁸	952.3	1,030.2	1,049.4	1,071.5	1,125.9	1,185.3
<i>Residential Fuel Prices</i> ⁹						
Electricity (¢/kWh)	10.00	9.77	10.55	11.08	11.24	11.79
Natural Gas (\$/GJ)	12.39	10.61	10.75	11.90	12.00	13.27
Petroleum Products (\$/GJ)	16.57	12.66	20.46	23.24	23.84	25.48
Natural Gas (\$/MBtu)	13.07	11.19	11.34	12.56	12.66	14.00
Petroleum Products (\$/MBtu)	17.48	13.36	21.59	24.52	25.15	26.88

¹Comparable to Table A2 of AEO2009: Energy Consumption, Residential

²Comparable to Table A8 of AEO2009: Electricity Sales by Sector

³Includes distillate fuel, commercial fuel, kerosene, LPG, motor gasoline, coal, and renewable energy

⁴Comparable to Table A8 of AEO2009: Electric Generators and Cogenerators

⁵Excludes "Other Gaseous Fuels" cogenerators and "Other" cogenerators

⁶Comparable to Table A9 of AEO2009: Electric Generators and Cogenerators Capability

⁷Includes "Other Gaseous Fuels" cogenerators

⁸Excludes Pumped Storage and Fuel Cells

⁹Comparable to Table A3 of AEO2009: Residential

Table 13.4.2 Polyphase Small Electric Motor Trial Standard Level 1 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case										
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation			
														2035	2040	2045	
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>										
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>										
Coal (TWh)	2,014	2,022	2,138	2,198	2,203	2,305	Coal (TWh)	0.00	0.00	-0.01	-0.04	-0.05	-0.06	-0.06	-0.06	-0.06	
Gas (TWh)	753	775	647	714	908	979	Gas (TWh)	0.00	0.02	0.05	-0.01	-0.06	-0.07	-0.07	-0.07	-0.07	
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (TWh)	357	468	645	707	771	797	Renewables (TWh)	0.00	-0.02	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	
Total (TWh)	4,029	4,130	4,308	4,544	4,812	5,021	Total (TWh)	0.00	0.00	-0.03	-0.13	-0.19	-0.20	-0.20	-0.20	-0.20	
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>										
Coal (GW)	313.8	325.0	331.0	333.3	333.9	344.6	Coal (GW)	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01	
Other Fossil (GW)	438.9	470.5	443.2	451.8	499.4	542.4	Other Fossil (GW)	0.00	0.00	0.00	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02	
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (GW)	99.5	133.5	171.1	176.1	182.3	188.3	Renewables (GW)	0.00	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	
Total (GW)	952.3	1,030.2	1,049.4	1,071.5	1,125.9	1,185.3	Total (GW)	0.00	-0.01	-0.03	-0.03	-0.04	-0.05	-0.05	-0.05	-0.05	

Table 13.4.3 Polyphase Small Electric Motor Trial Standard Level 2 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case										
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation			
														2035	2040	2045	
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>										
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	0.00	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02	
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>										
Coal (TWh)	2,014	2,022	2,138	2,198	2,203	2,305	Coal (TWh)	0.00	-0.01	-0.02	-0.08	-0.11	-0.12	-0.12	-0.12	-0.12	
Gas (TWh)	753	775	647	714	908	979	Gas (TWh)	0.00	0.05	0.10	-0.03	-0.13	-0.14	-0.14	-0.14	-0.14	
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (TWh)	357	468	645	707	771	797	Renewables (TWh)	0.00	-0.04	-0.15	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	
Total (TWh)	4,029	4,130	4,308	4,544	4,812	5,021	Total (TWh)	0.00	0.00	-0.07	-0.26	-0.38	-0.40	-0.40	-0.40	-0.40	
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>										
Coal (GW)	313.8	325.0	331.0	333.3	333.9	344.6	Coal (GW)	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	
Other Fossil (GW)	438.9	470.5	443.2	451.8	499.4	542.4	Other Fossil (GW)	0.00	0.00	-0.01	-0.02	-0.04	-0.04	-0.04	-0.04	-0.04	
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (GW)	99.5	133.5	171.1	176.1	182.3	188.3	Renewables (GW)	0.00	-0.01	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	
Total (GW)	952.3	1,030.2	1,049.3	1,071.4	1,125.8	1,185.2	Total (GW)	0.00	-0.01	-0.05	-0.06	-0.08	-0.09	-0.09	-0.09	-0.09	

Table 13.4.4 Polyphase Small Electric Motor Trial Standard Level 3 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case											
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation				
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>											
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	0.00	-0.02	-0.03	-0.03	-0.03	-0.03	-0.03	-0.04	
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>											
Coal (TWh)	2,014	2,022	2,138	2,198	2,203	2,305	Coal (TWh)	0.00	-0.01	-0.04	-0.15	-0.20	-0.22	-0.22	-0.22	-0.22	-0.22	
Gas (TWh)	753	775	647	714	908	979	Gas (TWh)	0.00	0.08	0.18	-0.05	-0.23	-0.25	-0.25	-0.25	-0.25	-0.25	
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (TWh)	357	468	645	707	771	797	Renewables (TWh)	0.00	-0.08	-0.26	-0.25	-0.25	-0.26	-0.26	-0.26	-0.26	-0.26	
Total (TWh)	4,029	4,130	4,308	4,544	4,811	5,020	Total (TWh)	0.00	0.00	-0.12	-0.46	-0.68	-0.73	-0.73	-0.73	-0.73	-0.73	
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>											
Coal (GW)	313.8	325.0	331.0	333.3	333.9	344.6	Coal (GW)	0.00	0.00	-0.01	-0.01	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02	
Other Fossil (GW)	438.9	470.5	443.2	451.8	499.3	542.3	Other Fossil (GW)	0.00	0.00	-0.02	-0.03	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (GW)	99.5	133.5	171.0	176.0	182.2	188.2	Renewables (GW)	0.00	-0.02	-0.07	-0.07	-0.06	-0.07	-0.07	-0.07	-0.07	-0.07	
Total (GW)	952.3	1,030.2	1,049.3	1,071.4	1,125.7	1,185.1	Total (GW)	0.00	-0.03	-0.10	-0.11	-0.15	-0.16	-0.16	-0.16	-0.16	-0.16	

Table 13.4.5 Polyphase Small Electric Motor Trial Standard Level 4 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case											
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation				
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>											
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	0.00	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04		
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>											
Coal (TWh)	2,014	2,022	2,138	2,198	2,203	2,305	Coal (TWh)	0.00	-0.01	-0.04	-0.17	-0.22	-0.25	-0.25	-0.25	-0.25	-0.25	
Gas (TWh)	753	775	647	714	908	979	Gas (TWh)	0.00	0.09	0.20	-0.06	-0.26	-0.28	-0.28	-0.28	-0.28	-0.28	
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (TWh)	357	468	645	707	771	797	Renewables (TWh)	0.00	-0.09	-0.30	-0.29	-0.29	-0.29	-0.29	-0.29	-0.29	-0.29	
Total (TWh)	4,029	4,130	4,308	4,543	4,811	5,020	Total (TWh)	0.00	0.00	-0.14	-0.52	-0.76	-0.82	-0.82	-0.82	-0.82	-0.82	
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>											
Coal (GW)	313.8	325.0	331.0	333.3	333.9	344.6	Coal (GW)	0.00	0.00	-0.01	-0.01	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02	
Other Fossil (GW)	438.9	470.5	443.2	451.8	499.3	542.3	Other Fossil (GW)	0.00	0.00	-0.02	-0.04	-0.09	-0.08	-0.08	-0.08	-0.08	-0.08	
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (GW)	99.5	133.5	171.0	176.0	182.2	188.2	Renewables (GW)	0.00	-0.03	-0.08	-0.08	-0.07	-0.08	-0.08	-0.08	-0.08	-0.08	
Total (GW)	952.3	1,030.2	1,049.3	1,071.4	1,125.7	1,185.1	Total (GW)	0.00	-0.03	-0.11	-0.13	-0.17	-0.19	-0.19	-0.19	-0.19	-0.19	

Table 13.4.6 Polyphase Small Electric Motor Trial Standard Level 4b Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case									
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation		
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>									
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	-0.01	-0.03	-0.05	-0.06	-0.06	-0.06	-0.07
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>									
Coal (TWh)	2,014	2,022	2,138	2,198	2,203	2,305	Coal (TWh)	0.00	-0.02	-0.07	-0.28	-0.37	-0.41	-0.41	-0.41	-0.41
Gas (TWh)	753	775	647	714	908	979	Gas (TWh)	0.00	0.16	0.33	-0.10	-0.42	-0.47	-0.47	-0.47	-0.47
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewables (TWh)	357	468	645	707	771	797	Renewables (TWh)	0.00	-0.14	-0.49	-0.47	-0.47	-0.48	-0.48	-0.48	-0.48
Total (TWh)	4,029	4,130	4,308	4,543	4,811	5,020	Total (TWh)	0.00	0.00	-0.23	-0.85	-1.26	-1.35	-1.35	-1.35	-1.35
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>									
Coal (GW)	313.8	325.0	331.0	333.3	333.9	344.6	Coal (GW)	0.00	0.00	-0.02	-0.02	-0.02	-0.04	-0.04	-0.04	-0.04
Other Fossil (GW)	438.9	470.5	443.2	451.7	499.3	542.3	Other Fossil (GW)	0.00	0.00	-0.03	-0.06	-0.14	-0.14	-0.14	-0.14	-0.14
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewables (GW)	99.5	133.5	171.0	176.0	182.2	188.2	Renewables (GW)	0.00	-0.05	-0.14	-0.13	-0.12	-0.13	-0.13	-0.13	-0.13
Total (GW)	952.3	1,030.2	1,049.2	1,071.3	1,125.6	1,185.0	Total (GW)	0.00	-0.05	-0.18	-0.21	-0.28	-0.31	-0.31	-0.31	-0.31

Table 13.4.7 Polyphase Small Electric Motor Trial Standard Level 5 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case										
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation			
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>							2035	2040	2045	
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	-0.01	-0.04	-0.06	-0.07	-0.07	-0.08	-0.08	
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>										
Coal (TWh)	2,014	2,022	2,138	2,198	2,203	2,305	Coal (TWh)	0.00	-0.02	-0.08	-0.33	-0.44	-0.48	-0.48	-0.48	-0.48	
Gas (TWh)	753	775	647	714	907	978	Gas (TWh)	0.00	0.19	0.39	-0.12	-0.50	-0.56	-0.56	-0.56	-0.56	
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (TWh)	357	468	644	706	770	796	Renewables (TWh)	0.00	-0.17	-0.58	-0.56	-0.56	-0.57	-0.57	-0.57	-0.57	
Total (TWh)	4,029	4,130	4,308	4,543	4,810	5,019	Total (TWh)	0.00	0.00	-0.27	-1.02	-1.50	-1.61	-1.61	-1.61	-1.61	
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>										
Coal (GW)	313.8	325.0	331.0	333.3	333.9	344.6	Coal (GW)	0.00	0.00	-0.02	-0.02	-0.02	-0.05	-0.05	-0.05	-0.05	
Other Fossil (GW)	438.9	470.5	443.2	451.7	499.2	542.2	Other Fossil (GW)	0.00	0.00	-0.04	-0.07	-0.17	-0.17	-0.17	-0.17	-0.17	
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (GW)	99.5	133.4	170.9	175.9	182.2	188.2	Renewables (GW)	0.00	-0.05	-0.16	-0.16	-0.14	-0.15	-0.15	-0.15	-0.15	
Total (GW)	952.3	1,030.1	1,049.2	1,071.2	1,125.6	1,184.9	Total (GW)	0.00	-0.06	-0.22	-0.25	-0.33	-0.36	-0.36	-0.36	-0.36	

Table 13.4.8 Polyphase Small Electric Motor Trial Standard Level 6 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case										
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation			
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>							2035	2040	2045	
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	-0.01	-0.04	-0.07	-0.07	-0.08	-0.08	-0.09	
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>										
Coal (TWh)	2,014	2,022	2,138	2,198	2,203	2,304	Coal (TWh)	0.00	-0.02	-0.09	-0.35	-0.46	-0.51	-0.51	-0.51	-0.51	
Gas (TWh)	753	775	647	714	907	978	Gas (TWh)	0.00	0.20	0.42	-0.13	-0.54	-0.59	-0.59	-0.59	-0.59	
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	-0.05	-0.06	-0.11	-0.11	-0.11	-0.11	
Renewables (TWh)	357	468	644	706	770	796	Renewables (TWh)	0.00	-0.18	-0.62	-0.60	-0.60	-0.61	-0.61	-0.61	-0.61	
Total (TWh)	4,029	4,130	4,308	4,543	4,810	5,019	Total (TWh)	0.00	-0.01	-0.29	-1.13	-1.65	-1.82	-1.82	-1.82	-1.82	
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>										
Coal (GW)	313.8	325.0	331.0	333.3	333.9	344.5	Coal (GW)	0.00	0.00	-0.02	-0.02	-0.02	-0.05	-0.05	-0.05	-0.05	
Other Fossil (GW)	438.9	470.5	443.2	451.7	499.2	542.2	Other Fossil (GW)	0.00	0.00	-0.04	-0.08	-0.18	-0.18	-0.18	-0.18	-0.18	
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (GW)	99.5	133.4	170.9	175.9	182.1	188.1	Renewables (GW)	0.00	-0.06	-0.17	-0.17	-0.15	-0.16	-0.16	-0.16	-0.16	
Total (GW)	952.3	1,030.1	1,049.2	1,071.2	1,125.5	1,184.9	Total (GW)	0.00	-0.06	-0.23	-0.27	-0.36	-0.39	-0.39	-0.39	-0.39	

Table 13.4.9 Polyphase Small Electric Motor Trial Standard Level 7 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case									
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation		
														2035	2040	2045
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>									
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	-0.01	-0.05	-0.07	-0.08	-0.08	-0.09	-0.09
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>									
Coal (TWh)	2,014	2,022	2,138	2,198	2,202	2,304	Coal (TWh)	0.00	-0.02	-0.10	-0.39	-0.51	-0.56	-0.56	-0.56	-0.56
Gas (TWh)	753	775	647	714	907	978	Gas (TWh)	0.00	0.22	0.46	-0.14	-0.58	-0.65	-0.65	-0.65	-0.65
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	-0.05	-0.06	-0.12	-0.12	-0.12	-0.12
Renewables (TWh)	357	468	644	706	770	796	Renewables (TWh)	0.00	-0.20	-0.68	-0.65	-0.65	-0.66	-0.66	-0.66	-0.66
Total (TWh)	4,029	4,130	4,308	4,543	4,810	5,019	Total (TWh)	0.00	-0.01	-0.31	-1.23	-1.80	-1.98	-1.98	-1.98	-1.98
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>									
Coal (GW)	313.8	325.0	331.0	333.3	333.9	344.5	Coal (GW)	0.00	0.00	-0.02	-0.03	-0.02	-0.06	-0.06	-0.06	-0.06
Other Fossil (GW)	438.9	470.5	443.2	451.7	499.2	542.2	Other Fossil (GW)	0.00	0.00	-0.04	-0.08	-0.20	-0.19	-0.19	-0.19	-0.19
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewables (GW)	99.5	133.4	170.9	175.9	182.1	188.1	Renewables (GW)	0.00	-0.06	-0.19	-0.18	-0.17	-0.17	-0.17	-0.17	-0.17
Total (GW)	952.3	1,030.1	1,049.1	1,071.2	1,125.5	1,184.9	Total (GW)	0.00	-0.07	-0.25	-0.29	-0.39	-0.42	-0.42	-0.42	-0.42

Table 13.4.10 Capacitor-Start Small Electric Motor Trial Standard Level 1 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case											
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation				
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>											
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	-0.03	-0.18	-0.23	-0.25	-0.27	-0.28	-0.30		
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>											
Coal (TWh)	2,014	2,022	2,138	2,197	2,202	2,303	Coal (TWh)	0.00	-0.07	-0.33	-1.29	-1.46	-1.56	-1.56	-1.56	-1.56		
Gas (TWh)	753	776	648	713	906	977	Gas (TWh)	0.00	0.65	1.25	-0.68	-1.65	-1.86	-1.86	-1.86	-1.86		
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	-0.01	0.01	0.00	0.00	0.00	0.00		
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Renewables (TWh)	357	467	643	705	769	795	Renewables (TWh)	0.00	-0.58	-1.96	-1.86	-1.93	-1.92	-1.92	-1.92	-1.92		
Total (TWh)	4,029	4,130	4,307	4,540	4,807	5,016	Total (TWh)	0.00	0.00	-1.03	-3.83	-5.04	-5.34	-5.34	-5.34	-5.34		
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>											
Coal (GW)	313.8	325.0	330.9	333.2	333.8	344.4	Coal (GW)	0.00	0.00	-0.07	-0.07	-0.07	-0.15	-0.15	-0.15	-0.15		
Other Fossil (GW)	438.9	470.5	443.1	451.6	498.9	541.9	Other Fossil (GW)	0.00	-0.01	-0.12	-0.23	-0.54	-0.55	-0.55	-0.55	-0.55		
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Renewables (GW)	99.5	133.3	170.6	175.6	181.8	187.8	Renewables (GW)	0.00	-0.18	-0.55	-0.53	-0.49	-0.50	-0.50	-0.50	-0.50		
Total (GW)	952.3	1,030.0	1,048.7	1,070.7	1,124.8	1,184.1	Total (GW)	0.00	-0.20	-0.73	-0.82	-1.10	-1.21	-1.21	-1.21	-1.21		

Table 13.4.11 Capacitor-Start Small Electric Motor Trial Standard Level 2 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case											
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation				
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>											
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	-0.03	-0.18	-0.24	-0.25	-0.27	-0.29	-0.31		
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>											
Coal (TWh)	2,014	2,022	2,138	2,197	2,202	2,303	Coal (TWh)	0.00	-0.07	-0.33	-1.30	-1.47	-1.58	-1.58	-1.58	-1.58		
Gas (TWh)	753	776	648	713	906	977	Gas (TWh)	0.00	0.65	1.27	-0.69	-1.67	-1.87	-1.87	-1.87	-1.87		
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	-0.01	0.01	0.00	0.00	0.00	0.00		
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Renewables (TWh)	357	467	643	705	769	795	Renewables (TWh)	0.00	-0.59	-1.98	-1.88	-1.95	-1.93	-1.93	-1.93	-1.93		
Total (TWh)	4,029	4,130	4,307	4,540	4,807	5,016	Total (TWh)	0.00	0.00	-1.04	-3.87	-5.09	-5.39	-5.39	-5.39	-5.39		
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>											
Coal (GW)	313.8	325.0	330.9	333.2	333.8	344.4	Coal (GW)	0.00	0.00	-0.07	-0.07	-0.07	-0.16	-0.16	-0.16	-0.16		
Other Fossil (GW)	438.9	470.5	443.1	451.6	498.9	541.8	Other Fossil (GW)	0.00	-0.01	-0.12	-0.23	-0.55	-0.55	-0.55	-0.55	-0.55		
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Renewables (GW)	99.5	133.3	170.5	175.6	181.8	187.8	Renewables (GW)	0.00	-0.19	-0.55	-0.53	-0.50	-0.51	-0.51	-0.51	-0.51		
Total (GW)	952.3	1,030.0	1,048.7	1,070.7	1,124.8	1,184.1	Total (GW)	0.00	-0.20	-0.74	-0.83	-1.11	-1.22	-1.22	-1.22	-1.22		

Table 13.4.12 Capacitor-Start Small Electric Motor Trial Standard Level 3 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case									
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation		
														2035	2040	2045
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>									
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	-0.03	-0.20	-0.27	-0.29	-0.30	-0.32	-0.35
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>									
Coal (TWh)	2,014	2,022	2,138	2,197	2,201	2,303	Coal (TWh)	0.00	-0.07	-0.37	-1.47	-1.67	-1.78	-1.78	-1.78	-1.78
Gas (TWh)	753	776	648	713	906	977	Gas (TWh)	0.00	0.74	1.43	-0.78	-1.89	-2.12	-2.12	-2.12	-2.12
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	-0.01	0.01	0.00	0.00	0.00	0.00
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewables (TWh)	357	467	643	705	769	795	Renewables (TWh)	0.00	-0.66	-2.24	-2.12	-2.20	-2.18	-2.18	-2.18	-2.18
Total (TWh)	4,029	4,130	4,307	4,540	4,806	5,015	Total (TWh)	0.00	0.00	-1.18	-4.37	-5.75	-6.09	-6.09	-6.09	-6.09
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>									
Coal (GW)	313.8	325.0	330.9	333.2	333.8	344.4	Coal (GW)	0.00	0.00	-0.08	-0.08	-0.07	-0.18	-0.18	-0.18	-0.18
Other Fossil (GW)	438.9	470.5	443.1	451.5	498.8	541.8	Other Fossil (GW)	0.00	-0.01	-0.13	-0.26	-0.62	-0.63	-0.63	-0.63	-0.63
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewables (GW)	99.5	133.3	170.5	175.5	181.7	187.7	Renewables (GW)	0.00	-0.21	-0.62	-0.60	-0.56	-0.58	-0.58	-0.58	-0.58
Total (GW)	952.3	1,030.0	1,048.6	1,070.6	1,124.6	1,183.9	Total (GW)	0.00	-0.22	-0.83	-0.94	-1.25	-1.38	-1.38	-1.38	-1.38

Table 13.4.13 Capacitor-Start Small Electric Motor Trial Standard Level 4 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case									
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation		
														2035	2040	2045
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>									
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	-0.04	-0.22	-0.30	-0.32	-0.34	-0.36	-0.39
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>									
Coal (TWh)	2,014	2,022	2,138	2,196	2,201	2,303	Coal (TWh)	0.00	-0.08	-0.42	-1.65	-1.87	-2.00	-2.00	-2.00	-2.00
Gas (TWh)	753	776	649	713	906	977	Gas (TWh)	0.00	0.83	1.61	-0.87	-2.12	-2.38	-2.38	-2.38	-2.38
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	-0.01	0.01	0.00	0.00	0.00	0.00
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewables (TWh)	357	467	642	705	769	795	Renewables (TWh)	0.00	-0.75	-2.51	-2.38	-2.47	-2.45	-2.45	-2.45	-2.45
Total (TWh)	4,029	4,130	4,307	4,539	4,806	5,014	Total (TWh)	0.00	0.00	-1.32	-4.91	-6.45	-6.83	-6.83	-6.83	-6.83
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>									
Coal (GW)	313.8	325.0	330.9	333.2	333.8	344.4	Coal (GW)	0.00	0.00	-0.09	-0.09	-0.08	-0.20	-0.20	-0.20	-0.20
Other Fossil (GW)	438.9	470.5	443.1	451.5	498.7	541.7	Other Fossil (GW)	0.00	-0.02	-0.15	-0.29	-0.69	-0.70	-0.70	-0.70	-0.70
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewables (GW)	99.5	133.3	170.4	175.4	181.7	187.7	Renewables (GW)	0.00	-0.24	-0.70	-0.67	-0.63	-0.65	-0.65	-0.65	-0.65
Total (GW)	952.3	1,029.9	1,048.5	1,070.4	1,124.5	1,183.8	Total (GW)	0.00	-0.25	-0.94	-1.06	-1.41	-1.54	-1.54	-1.54	-1.54

Table 13.4.14 Capacitor-Start Small Electric Motor Trial Standard Level 5 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case										
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation			
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>										
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	-0.04	-0.23	-0.30	-0.32	-0.34	-0.37	-0.39	
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>										
Coal (TWh)	2,014	2,022	2,138	2,196	2,201	2,303	Coal (TWh)	0.00	-0.08	-0.42	-1.66	-1.88	-2.01	-2.01	-2.01	-2.01	
Gas (TWh)	753	776	649	713	906	977	Gas (TWh)	0.00	0.83	1.62	-0.88	-2.13	-2.39	-2.39	-2.39	-2.39	
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	-0.01	0.01	0.00	0.00	0.00	0.00	
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (TWh)	357	467	642	705	769	795	Renewables (TWh)	0.00	-0.75	-2.53	-2.39	-2.49	-2.47	-2.47	-2.47	-2.47	
Total (TWh)	4,029	4,130	4,307	4,539	4,806	5,014	Total (TWh)	0.00	0.00	-1.33	-4.94	-6.49	-6.87	-6.87	-6.87	-6.87	
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>										
Coal (GW)	313.8	325.0	330.9	333.2	333.8	344.4	Coal (GW)	0.00	0.00	-0.09	-0.09	-0.08	-0.20	-0.20	-0.20	-0.20	
Other Fossil (GW)	438.9	470.5	443.0	451.5	498.7	541.7	Other Fossil (GW)	0.00	-0.02	-0.15	-0.30	-0.70	-0.71	-0.71	-0.71	-0.71	
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (GW)	99.5	133.3	170.4	175.4	181.7	187.7	Renewables (GW)	0.00	-0.24	-0.70	-0.68	-0.63	-0.65	-0.65	-0.65	-0.65	
Total (GW)	952.3	1,029.9	1,048.5	1,070.4	1,124.5	1,183.7	Total (GW)	0.00	-0.25	-0.94	-1.06	-1.41	-1.55	-1.55	-1.55	-1.55	

Table 13.4.15 Capacitor-Start Small Electric Motor Trial Standard Level 6 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case										
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation			
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>										
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	-0.04	-0.25	-0.33	-0.35	-0.38	-0.40	-0.43	
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>										
Coal (TWh)	2,014	2,022	2,138	2,196	2,201	2,303	Coal (TWh)	0.00	-0.09	-0.46	-1.81	-2.06	-2.20	-2.20	-2.20	-2.20	
Gas (TWh)	753	776	649	713	906	976	Gas (TWh)	0.00	0.91	1.77	-0.96	-2.33	-2.61	-2.61	-2.61	-2.61	
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	-0.01	0.01	0.00	0.00	0.00	0.00	
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (TWh)	357	467	642	704	768	794	Renewables (TWh)	0.00	-0.82	-2.76	-2.61	-2.72	-2.70	-2.70	-2.70	-2.70	
Total (TWh)	4,029	4,130	4,307	4,539	4,805	5,013	Total (TWh)	0.00	0.00	-1.46	-5.40	-7.09	-7.51	-7.51	-7.51	-7.51	
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>										
Coal (GW)	313.8	325.0	330.9	333.2	333.8	344.4	Coal (GW)	0.00	0.00	-0.10	-0.10	-0.09	-0.22	-0.22	-0.22	-0.22	
Other Fossil (GW)	438.9	470.5	443.0	451.5	498.6	541.6	Other Fossil (GW)	0.00	-0.02	-0.16	-0.32	-0.76	-0.77	-0.77	-0.77	-0.77	
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (GW)	99.5	133.2	170.3	175.4	181.6	187.6	Renewables (GW)	0.00	-0.26	-0.77	-0.74	-0.69	-0.71	-0.71	-0.71	-0.71	
Total (GW)	952.3	1,029.9	1,048.4	1,070.3	1,124.4	1,183.6	Total (GW)	0.00	-0.28	-1.03	-1.16	-1.55	-1.70	-1.70	-1.70	-1.70	

Table 13.4.16 Capacitor-Start Small Electric Motor Trial Standard Level 7 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case										
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation			
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>										
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	-0.05	-0.27	-0.36	-0.39	-0.41	-0.44	-0.47	
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>										
Coal (TWh)	2,014	2,022	2,137	2,196	2,201	2,303	Coal (TWh)	0.00	-0.10	-0.51	-1.98	-2.25	-2.41	-2.41	-2.41	-2.41	
Gas (TWh)	753	776	649	713	905	976	Gas (TWh)	0.00	0.99	1.93	-1.05	-2.55	-2.86	-2.86	-2.86	-2.86	
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	-0.01	0.01	0.00	0.00	0.00	0.00	
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (TWh)	357	467	642	704	768	794	Renewables (TWh)	0.00	-0.90	-3.02	-2.86	-2.97	-2.95	-2.95	-2.95	-2.95	
Total (TWh)	4,029	4,130	4,306	4,538	4,804	5,013	Total (TWh)	0.00	0.00	-1.59	-5.90	-7.76	-8.22	-8.22	-8.22	-8.22	
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>										
Coal (GW)	313.8	325.0	330.9	333.2	333.8	344.4	Coal (GW)	0.00	0.00	-0.11	-0.11	-0.10	-0.24	-0.24	-0.24	-0.24	
Other Fossil (GW)	438.9	470.5	443.0	451.4	498.6	541.6	Other Fossil (GW)	0.00	-0.02	-0.18	-0.35	-0.83	-0.84	-0.84	-0.84	-0.84	
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (GW)	99.5	133.2	170.3	175.3	181.5	187.5	Renewables (GW)	0.00	-0.28	-0.84	-0.81	-0.76	-0.78	-0.78	-0.78	-0.78	
Total (GW)	952.3	1,029.9	1,048.3	1,070.2	1,124.2	1,183.4	Total (GW)	0.00	-0.30	-1.13	-1.27	-1.69	-1.86	-1.86	-1.86	-1.86	

Table 13.4.17 Capacitor-Start Small Electric Motor Trial Standard Level 8 Forecast

NEMS-BT Results:							Difference from AEO2009 LBNL Stimulus Reference Case										
	2005	2010	2015	2020	2025	2030		2005	2010	2015	2020	2025	2030	Extrapolation			
<i>Residential Sector Energy Consumption</i>							<i>Residential Sector Energy Consumption</i>										
Electricity Sales (TWh)	1,359	1,403	1,407	1,477	1,571	1,661	Electricity Sales (TWh)	0.00	0.00	-0.05	-0.31	-0.41	-0.44	-0.47	-0.50	-0.54	
Natural Gas (EJ)	5.23	5.34	5.21	5.26	5.32	5.28	Natural Gas (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (EJ)	1.98	1.87	1.74	1.72	1.70	1.69	Other (EJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Natural Gas (Quads)	4.96	5.06	4.94	4.99	5.04	5.00	Natural Gas (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Other (Quads)	1.88	1.77	1.65	1.63	1.61	1.60	Other (Quads)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
<i>Total U.S. Electric Generation</i>							<i>Total U.S. Electric Generation</i>										
Coal (TWh)	2,014	2,022	2,137	2,196	2,200	2,302	Coal (TWh)	0.00	-0.12	-0.58	-2.28	-2.59	-2.77	-2.77	-2.77	-2.77	
Gas (TWh)	753	776	649	713	905	976	Gas (TWh)	0.00	1.15	2.22	-1.21	-2.93	-3.29	-3.29	-3.29	-3.29	
Petroleum (TWh)	123	56	47	49	49	50	Petroleum (TWh)	0.00	0.00	0.00	-0.02	0.01	0.00	0.00	0.00	0.00	
Nuclear (TWh)	782	809	831	876	881	890	Nuclear (TWh)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (TWh)	357	467	642	704	768	794	Renewables (TWh)	0.00	-1.03	-3.48	-3.29	-3.42	-3.40	-3.40	-3.40	-3.40	
Total (TWh)	4,029	4,130	4,306	4,537	4,803	5,012	Total (TWh)	0.00	0.00	-1.83	-6.80	-8.93	-9.46	-9.46	-9.46	-9.46	
<i>Installed Generating Capacity</i>							<i>Installed Generating Capacity</i>										
Coal (GW)	313.8	325.0	330.9	333.2	333.8	344.3	Coal (GW)	0.00	0.00	-0.12	-0.12	-0.12	-0.27	-0.27	-0.27	-0.27	
Other Fossil (GW)	438.9	470.5	443.0	451.4	498.4	541.4	Other Fossil (GW)	0.00	-0.02	-0.21	-0.41	-0.96	-0.97	-0.97	-0.97	-0.97	
Nuclear (GW)	100.1	101.2	104.1	110.3	110.3	110.0	Nuclear (GW)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Renewables (GW)	99.5	133.2	170.1	175.2	181.4	187.4	Renewables (GW)	0.00	-0.33	-0.97	-0.93	-0.87	-0.89	-0.89	-0.89	-0.89	
Total (GW)	952.3	1,029.9	1,048.1	1,070.0	1,124.0	1,183.2	Total (GW)	0.00	-0.35	-1.30	-1.46	-1.95	-2.14	-2.14	-2.14	-2.14	

REFERENCES

1. Energy Information Administration, *Annual Energy Outlook 2009 with Projections to 2030*, 2009. Washington, DC. Report No. DOE/EIA-0383(2009).
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