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Energy Market Impacts of Alternative Greenhouse Gas Intensity Reduction Goals

Table ES 1: Analysis Cases

Case Name	GHG Intensity Reduction Goal (percent per year)		Safety-valve Price (2004 dollars per metric ton CO_2 equivalent)		Other
	2010-2019	2020-2030	2010	2030	
Cap-Trade 1	2.4	2.8	$ 6.16	$ 9.86	Greenhouse gas cap-and-trade system with safety-valve.
Cap-Trade 2	2.6	3.0	$ 8.83	$14.13	
Cap-Trade 3	2.8	3.5	$22.09	$35.34	
Cap-Trade 4	3.0	4.0	$30.92	$49.47	
Cap-Trade 3 Low Other	2.8	3.5	$22.09	$35.34	Cap-Trade 3 with 50 percent reduction in "other" than energy-related CO_2 GHG abatement supply.
Cap-Trade 3 Low Safety	2.8	3.5	$ 8.83	$14.13	Cap-Trade 3 with lower assumed safety-valve price.
Cap-Trade 3 High Tech	2.8	3.5	$22.09	$35.34	Cap-Trade 3 with more optimistic technology assumptions.

Table ES 2a: Summary Results from the Reference and Program Cases in 2020

	2004	Reference	Cap-Trade 1	Cap-Trade 2	Cap-Trade 3	Cap-Trade 3 High Tech	Cap-Trade 3 Low Other	Cap-Trade 3 Low Safety	Cap-Trade 4
Emissions of greenhouse gases (million metric tons CO_2 equivalent)									
Covered Emissions Goal	NA	NA	6,964	6,808	6,635	6,635	6,635	6,635	6,467
Total covered emissions	6,159	7,571	7,121	7,014	6,635	6,536	6,711	6,986	6,396
Energy-related carbon dioxide	5,900	7,119	6,927	6,843	6,497	6,378	6,417	6,816	6,259
Other covered emissions	259	452	194	171	138	158	295	171	137
Non-covered emissions	963	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077
Total greenhouse gases	7,122	8,649	8,198	8,091	7,712	7,613	7,788	8,063	7,473
Permit price (2004 dollars per metric ton CO_2 equivalent)	NA	NA	7.8	11.1	21.9	13.2	25.4	11.1	23.7
Delivered energy prices, including permit costs (2004 dollars per physical unit, as indicated)									
Motor gasoline (per gallon)	1.90	2.08	2.14	2.17	2.26	2.15	2.28	2.17	2.27
Jet fuel (per gallon)	1.22	1.42	1.51	1.54	1.63	1.51	1.66	1.54	1.65
Distillate (per gallon)	1.74	1.93	2.03	2.07	2.18	2.05	2.21	2.07	2.19
Natural Gas (per thousand cubic feet), all users	7.74	7.14	7.57	7.74	8.21	7.73	8.41	7.68	8.20
Residential	10.72	10.48	10.90	11.08	11.57	11.10	11.79	11.03	11.54
Electric power	6.07	5.53	5.99	6.16	6.61	6.05	6.81	6.10	6.50
Coal (per short ton)	28.81	28.55	43.32	49.55	69.32	52.80	76.00	49.59	73.21
Electricity (cents per kwh)	7.57	7.25	7.68	7.89	8.34	7.71	8.51	7.88	8.33
Fossil energy consumption (quadrillion Btu)									
Petroleum	40.1	48.1	47.2	47.0	46.5	44.4	46.4	47.0	46.5
Natural Gas	23.1	27.7	27.4	27.3	26.9	25.8	27.0	27.4	26.2
Coal	22.5	27.6	26.5	25.7	22.6	23.4	21.8	25.4	20.5
Electric power sector generation (billion kilowatthours)									
Total	3,799	4,835	4,785	4,758	4,701	4,541	4,680	4,756	4,703
Petroleum	115	92	34	34	28	27	26	34	26
Natural Gas	619	968	1,032	1,022	1,005	1,003	1,026	1,027	909
Coal	1,954	2,435	2,353	2,281	1,990	2,065	1,919	2,256	1,801
Nuclear	789	871	871	885	926	892	923	906	945
Renewable	323	469	496	536	753	554	785	534	1,023
Real Gross Domestic Product (billion 2000 dollars)	10,756	17,541	17,528	17,522	17,500	17,543	17,493	17,527	17,503

Source: National Energy Modeling System runs AEO2006.D111905A, SALACAP.D012006a, SALACAP30.D012306a, SALACAP35.D012306a, SALACAP35HI.D012306A, SALACAP35LOTH.D012506A, SALACAP35S.D012306A and SALACAP40.D012006a.

Table ES 2b: Summary Results from the Reference and Program Cases in 2030

	2004	Reference	Cap-Trade 1	Cap-Trade 2	Cap-Trade 3	Cap-Trade 3 High Tech	Cap-Trade 3 Low Other	Cap-Trade 3 Low Safety	Cap-Trade 4
Emissions of greenhouse gases (million metric tons CO_2 equivalent)									
Covered Emissions Goal	NA	NA	6,907	6,615	6,123	6,123	6,123	6,123	5,665
Total covered emissions	6,159	8,742	7,878	7,568	6,752	6,594	6,950	7,440	5,971
Energy-related carbon dioxide	5,900	8,114	7,604	7,333	6,546	6,384	6,534	7,204	5,790
Other covered emissions	259	627	274	235	206	210	416	235	181
Non-covered emissions	963	1,189	1,189	1,189	1,189	1,189	1,189	1,189	1,189
Total greenhouse gases	7,122	9,930	9,067	8,757	7,941	7,783	8,139	8,629	7,160
Permit price (2004 dollars per metric ton CO_2 equivalent)	NA	NA	9.9	14.1	35.3	29.8	35.3	14.1	49.5
Delivered energy prices, including permit costs (2004 dollars per physical unit, as indicated)									
Motor gasoline (per gallon)	1.90	2.19	2.27	2.31	2.48	2.43	2.48	2.31	2.60
Jet fuel (per gallon)	1.22	1.56	1.66	1.69	1.90	1.83	1.89	1.69	2.03
Distillate (per gallon)	1.74	2.06	2.21	2.25	2.47	2.48	2.47	2.26	2.62
Natural Gas (per thousand cubic feet), all users	7.74	8.22	8.77	9.04	10.00	9.63	10.04	8.94	10.70
Residential	10.72	11.67	12.25	12.53	13.52	13.24	13.58	12.41	14.24
Electric power	6.07	6.41	7.01	7.31	8.24	7.92	8.26	7.16	8.89
Coal (per short ton)	28.81	30.30	47.71	54.18	93.88	83.17	93.94	53.69	122.94
Electricity (cents per kwh)	7.57	7.51	8.18	8.48	9.40	8.85	9.44	8.38	9.74
Fossil energy consumption (quadrillion Btu)									
Petroleum	40.1	53.6	52.3	52.0	50.9	47.5	50.8	52.0	50.3
Natural Gas	23.1	27.7	27.7	27.8	27.0	26.4	27.2	27.5	26.7
Coal	22.5	34.5	30.0	27.2	20.1	20.9	20.0	26.0	13.6
Electric power sector generation (billion kilowatthours)									
Total	3,799	5,503	5,461	5,421	5,272	5,043	5,265	5,425	5,211
Petroleum	115	101	35	35	27	25	25	33	22
Natural Gas	619	822	942	956	870	1,052	892	906	851
Coal	1,954	3,205	2,792	2,437	1,766	1,849	1,760	2,293	1,178
Nuclear	789	871	1,020	1,166	1,418	1,288	1,393	1,460	1,762
Renewable	323	504	672	827	1,191	829	1,195	734	1,398
Real Gross Domestic Product (billion 2000 dollars)	10,756	23,112	23,085	23,077	23,042	23,045	23,045	23,075	22,984

Source: National Energy Modeling System runs AEO2006.D111905A, SALACAP.D012006a, SALACAP30.D012306a, SALACAP35.D012306a, SALACAP35HI.D012306A, SALACAP35LOTH.D012506A, SALACAP35S.D012306A and SALACAP40.D012006a.