

Table 1 Effects on Final Energy Prices

	Percent Change from Baseline				
	2020	2025	2030	2035	2040
Total Final Energy Price	-0.048	-0.112	3.088	3.093	3.119
Propane	-0.018	-0.043	0.824	0.827	0.836
Butane	-0.010	-0.028	0.176	0.158	0.146
LPG	-0.053	-0.112	2.409	2.406	2.423
Fuel Oil	-0.024	-0.059	0.842	0.825	0.818
Gasoline	-0.003	-0.007	0.020	0.020	0.021
Diesel	-0.002	-0.006	0.037	0.036	0.036
Electricity	-0.105	-0.241	7.121	7.140	7.206
Biomass	-0.195	-0.457	0.937	0.616	0.404

Table 2 Effects on Electricity Markets

	Percent Change from Baseline				
	2020	2025	2030	2035	2040
Electricity Production	0.079	0.186	-5.526	-5.545	-5.599
Thermal Generation	-0.018	-0.036	-36.144	-36.633	-37.097
Natural Gas	-0.039	-0.087	2.104	2.103	2.116
Renewable Energy Systems	0.206	0.477	0.873	1.234	1.504
Net Electricity Imports	-0.541	-1.130	34.174	34.256	34.551
Electricity Demand	0.065	0.151	-4.506	-4.522	-4.565
Electricity Demand by Households	0.048	0.117	-3.615	-3.628	-3.662
First Quintile (lowest income)	0.052	0.122	-3.644	-3.660	-3.696
Second Quintile	0.052	0.125	-3.853	-3.868	-3.904
Third Quintile	0.050	0.121	-3.780	-3.794	-3.829
Fourth Quintile	0.047	0.116	-3.627	-3.641	-3.675
Fifth Quintile (highest income)	0.042	0.105	-3.277	-3.287	-3.316
Electricity Demand by Firms	0.076	0.175	-5.221	-5.243	-5.296
ETS	0.071	0.165	-4.994	-5.015	-5.067
Non-ETS	0.108	0.244	-6.767	-6.786	-6.847
% Electricity in Final Energy Demand	0.039	0.086	-3.495	-3.532	-3.583

Table 3 Effects on Final Energy Demand

	Percent Change from Baseline				
	2020	2025	2030	2035	2040
Final Energy Demand	0.032	0.078	-2.064	-2.067	-2.084
Energy Demand by Households	0.020	0.055	-1.441	-1.437	-1.444
First Quintile (lowest income)	0.029	0.073	-1.840	-1.840	-1.854
Second Quintile	0.024	0.064	-1.535	-1.528	-1.534
Third Quintile	0.021	0.058	-1.442	-1.435	-1.440
Fourth Quintile	0.018	0.052	-1.380	-1.377	-1.384
Fifth Quintile (highest income)	0.014	0.042	-1.244	-1.243	-1.250
Energy Demand by Firms	0.046	0.109	-4.678	-4.711	-4.764
ETS	0.050	0.120	-5.799	-5.848	-5.917
Non-ETS	0.037	0.084	-2.032	-2.032	-2.046

Table 4 Effects on Carbon Dioxide Emissions

	Percent Change from Baseline				
	2020	2025	2030	2035	2040
Total CO₂ Emissions	-0.004	-0.009	-21.447	-21.737	-22.015
Households	-0.010	-0.016	0.348	0.350	0.355
Residential	-0.033	-0.068	1.652	1.652	1.665
Transportation	-0.003	-0.001	-0.029	-0.025	-0.022
Households	-0.010	-0.016	0.348	0.350	0.355
First Quintile (lowest income)	-0.007	-0.014	0.401	0.401	0.404
Second Quintile	-0.011	-0.020	0.485	0.487	0.493
Third Quintile	-0.012	-0.020	0.454	0.457	0.464
Fourth Quintile	-0.010	-0.016	0.343	0.345	0.350
Fifth Quintile (highest income)	-0.008	-0.010	0.188	0.192	0.197
Production Sectors	-0.002	-0.007	-28.690	-29.079	-29.452
ETS	-0.009	-0.019	-42.111	-42.684	-43.231
Non-ETS	0.011	0.018	-0.171	-0.169	-0.170

Table 5 Macroeconomic Effects

	Percent Change from Baseline				
	2020	2025	2030	2035	2040
GDP	0.008	0.014	-0.514	-0.543	-0.572
Private Consumption	-0.004	-0.001	-0.133	-0.138	-0.143
Investment	0.063	0.089	-0.094	-0.108	-0.123
Employment	0.007	0.010	-0.169	-0.182	-0.194
CPI	-0.003	-0.008	0.265	0.281	0.295
Foreign Debt	0.008	0.020	0.035	0.380	0.738
Trade Deficit	0.054	0.075	1.454	1.591	1.716
Exports	-0.011	-0.024	-0.778	-0.853	-0.921
Imports	0.003	-0.001	-0.254	-0.266	-0.276
Public Debt	-0.002	-0.010	-0.026	0.835	1.892
Public Expenditures	-0.003	-0.008	0.252	0.335	0.430
Tax Revenue	0.000	-0.001	-0.245	-0.242	-0.238

Table 6 Effects on Prices by Industry

	Percent Change from Baseline				
	2020	2025	2030	2035	2040
Petroleum Refining	-0.007	-0.016	0.200	0.197	0.198
Electricity Production	-0.107	-0.248	7.355	7.374	7.443
Biomass	-0.195	-0.457	0.937	0.616	0.404
Agriculture	0.002	0.004	0.140	0.161	0.181
Equipment Manufacturing	0.012	0.024	0.103	0.126	0.147
Construction	0.010	0.013	0.076	0.090	0.101
Transportation	0.001	0.001	0.100	0.114	0.128
Textiles	-0.006	-0.014	0.233	0.241	0.251
Wood, pulp and paper	0.011	0.023	0.364	0.400	0.432
Chemicals and pharmaceuticals	-0.005	-0.013	0.293	0.301	0.311
Rubber, plastic and ceramics	0.006	0.011	0.305	0.329	0.350
Primary metals	0.005	0.010	0.226	0.245	0.262
Other	0.001	0.000	0.053	0.072	0.088

Table 7 Effects on Output by Industry

	Percent Change from Baseline				
	2020	2025	2030	2035	2040
Economy-wide	0.008	0.014	-0.514	-0.543	-0.572
Petroleum Refining	0.005	0.012	-0.032	-0.028	-0.026
Electricity Production	0.079	0.186	-5.526	-5.545	-5.599
Biomass	0.128	0.308	0.831	1.095	1.281
Agriculture	-0.001	-0.003	-0.310	-0.343	-0.374
Equipment Manufacturing	-0.078	-0.179	-1.062	-1.262	-1.435
Construction	0.054	0.077	-0.103	-0.117	-0.132
Transportation	-0.001	-0.002	-0.270	-0.298	-0.326
Textiles	0.013	0.035	-0.662	-0.677	-0.699
Wood, pulp and paper	-0.028	-0.065	-1.286	-1.398	-1.499
Chemicals and pharmaceuticals	0.011	0.027	-0.881	-0.911	-0.944
Rubber, plastic and ceramics	-0.002	-0.013	-1.078	-1.155	-1.226
Primary metals	-0.022	-0.054	-1.261	-1.372	-1.473
Other	0.004	0.007	-0.127	-0.148	-0.167

Table 8 Effects on Employment by Industry

	Percent Change from Baseline				
	2020	2025	2030	2035	2040
Economy-wide	0.007	0.010	-0.169	-0.182	-0.194
Petroleum Refining	0.002	0.005	0.060	0.065	0.069
Electricity Production	0.037	0.088	-2.777	-2.782	-2.805
Biomass	0.050	0.124	1.208	1.343	1.445
Agriculture	0.001	0.001	-0.185	-0.199	-0.212
Equipment Manufacturing	-0.071	-0.166	-0.966	-1.149	-1.308
Construction	0.063	0.089	-0.026	-0.026	-0.029
Transportation	0.000	-0.001	-0.207	-0.224	-0.241
Textiles	0.010	0.028	-0.516	-0.521	-0.534
Wood, pulp and paper	-0.020	-0.049	-1.011	-1.096	-1.172
Chemicals and pharmaceuticals	0.009	0.021	-0.723	-0.742	-0.765
Rubber, plastic and ceramics	0.001	-0.009	-0.885	-0.948	-1.005
Primary metals	-0.019	-0.048	-1.130	-1.228	-1.317
Other	0.005	0.008	-0.080	-0.088	-0.095

Table 9 Effects on Exports by Industry

	Percent Change from Baseline				
	2020	2025	2030	2035	2040
Economy-wide	-0.011	-0.024	-0.778	-0.853	-0.921
Petroleum Refining	0.008	0.020	-0.078	-0.073	-0.071
Electricity Production	0.511	1.185	-28.874	-28.940	-29.162
Biomass					
Agriculture	-0.004	-0.007	-0.478	-0.536	-0.590
Equipment Manufacturing	-0.091	-0.208	-1.184	-1.411	-1.609
Construction	0.042	0.061	-0.194	-0.225	-0.253
Transportation	-0.002	-0.002	-0.389	-0.435	-0.478
Textiles	0.020	0.051	-0.939	-0.963	-0.998
Wood, pulp and paper	-0.041	-0.092	-1.715	-1.869	-2.008
Chemicals and pharmaceuticals	0.017	0.043	-1.228	-1.268	-1.313
Rubber, plastic and ceramics	-0.009	-0.026	-1.439	-1.543	-1.640
Primary metals	-0.028	-0.065	-1.529	-1.661	-1.782
Other	0.003	0.007	-0.191	-0.234	-0.272

Table 10 Effects on Labor Supply by Household

	Percent Change from Baseline				
	2020	2025	2030	2035	2040
Labor Supply	0.007	0.010	-0.169	-0.182	-0.194
First Quintile (lowest income)	0.003	0.005	-0.115	-0.120	-0.126
Second Quintile	0.005	0.008	-0.169	-0.180	-0.190
Third Quintile	0.007	0.010	-0.187	-0.200	-0.214
Fourth Quintile	0.007	0.011	-0.166	-0.179	-0.191
Fifth Quintile (highest income)	0.008	0.011	-0.169	-0.183	-0.197

Table 11 Effects on Consumer Prices by Household

	Percent Change from Baseline				
	2020	2025	2030	2035	2040
Consumer Prices	-0.003	-0.008	0.265	0.281	0.295
First Quintile (lowest income)	-0.005	-0.012	0.380	0.394	0.410
Second Quintile	-0.004	-0.011	0.322	0.336	0.351
Third Quintile	-0.003	-0.009	0.288	0.303	0.317
Fourth Quintile	-0.003	-0.007	0.252	0.267	0.282
Fifth Quintile (highest income)	-0.002	-0.005	0.210	0.226	0.241

Table 12 Equivalent Variation in Income by Household

	Percent Change from Baseline				
	2020	2025	2030	2035	2040
All Households	-0.004	-0.001	-0.133	-0.138	-0.143
First Quintile (lowest income)	0.002	0.009	-0.299	-0.308	-0.317
Second Quintile	-0.001	0.004	-0.189	-0.193	-0.198
Third Quintile	-0.003	0.000	-0.138	-0.142	-0.146
Fourth Quintile	-0.004	-0.002	-0.120	-0.125	-0.130
Fifth Quintile (highest income)	-0.006	-0.005	-0.071	-0.076	-0.081

Table 13 Long Run Energy and Environmental Effects (2040)

	Percent Change from Baseline				
	Current CF1	Energy Tax		Energy and Carbon Taxes	
		Current CF2	Early CF3	Current CF4	Early CF5
Electricity Price	7.21	7.20	7.15	7.19	7.13
Electricity Production	-5.60	-5.60	-5.56	-5.59	-5.55
Natural gas	2.12	2.12	2.10	2.11	2.09
Renewable energy	1.50	1.51	1.61	1.53	1.65
Net Electricity Imports	34.55	34.53	34.28	34.49	34.16
Energy Demand	-2.08	-2.08	-2.07	-2.08	-2.07
Electricity Share	-3.58	-3.58	-3.57	-3.58	-3.56
CO2 Emissions	-22.01	-22.02	-22.02	-22.02	-22.02

Figure 1 Long Run Energy and Environmental Effects (2040)

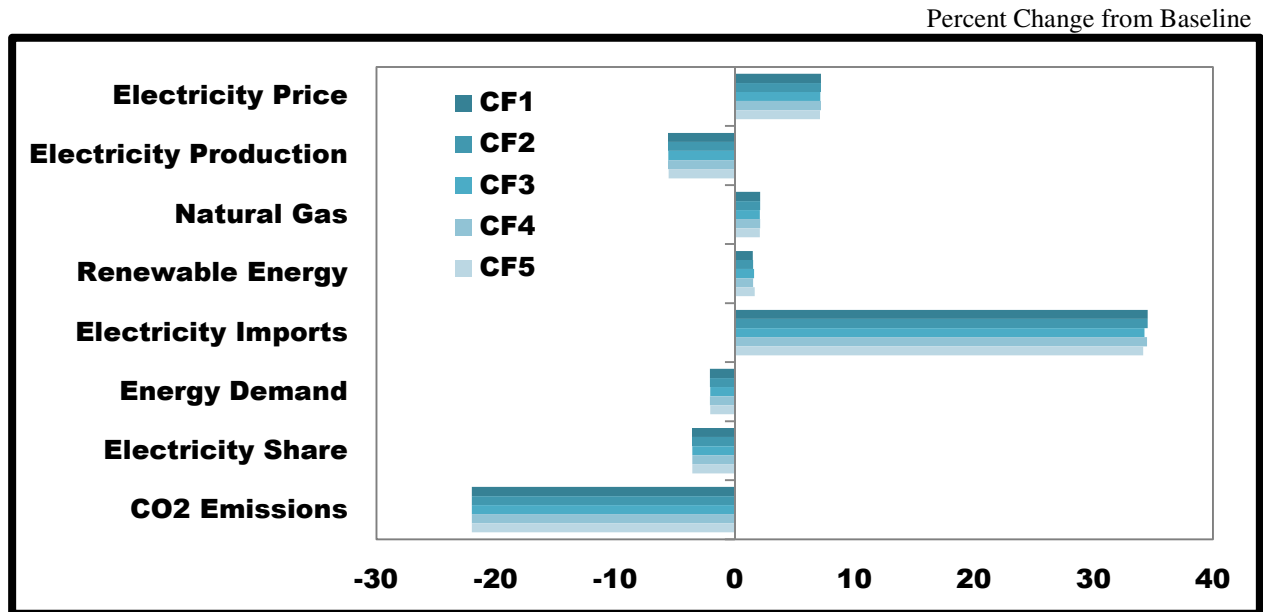


Table 14 Long Run Macroeconomic Effects (2040)

	Percent Change from Baseline				
	Current CF1	Energy Tax		Energy and Carbon Taxes	
		Current CF2	Early CF3	Current CF4	Early CF5
GDP	-0.57	-0.57	-0.58	-0.57	-0.59
Consumption	-0.14	-0.14	-0.14	-0.14	-0.15
Investment	-0.12	-0.12	-0.12	-0.13	-0.12
Employment	-0.19	-0.19	-0.20	-0.19	-0.20
Public Debt	1.89	1.86	2.98	1.82	4.22
Foreign Debt	0.74	0.73	1.16	0.75	1.66

Figure 2 Long Run Macroeconomic Effects (2040)

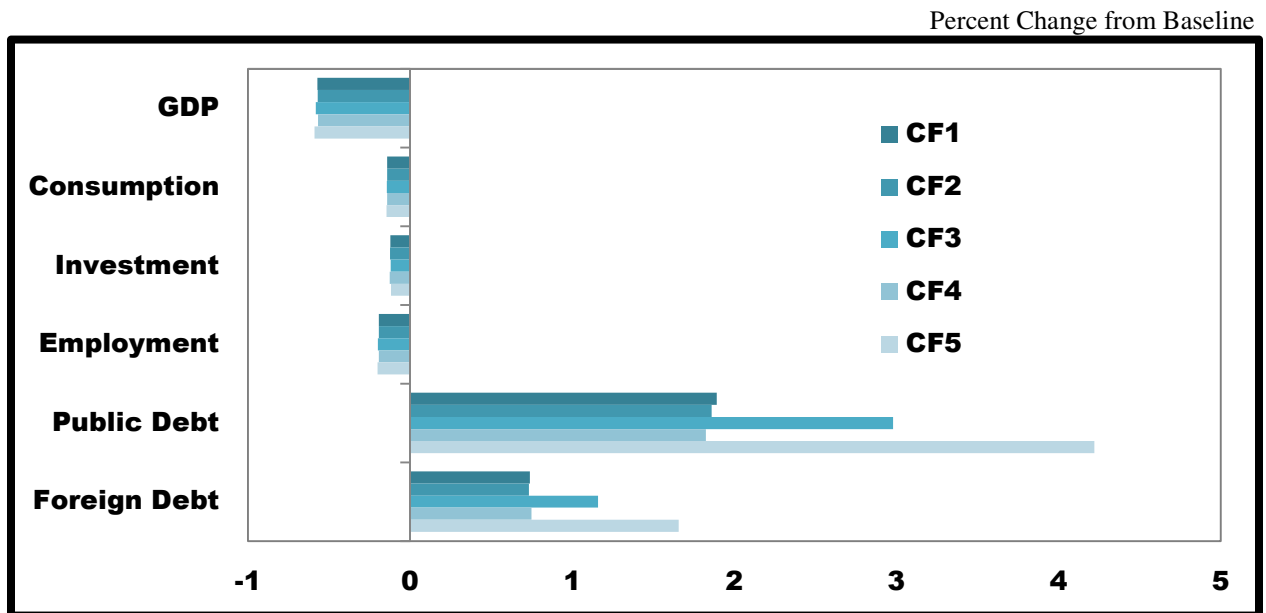


Table 15 Long Run Industry Output Effects (2040)

	Percent Change from Baseline				
	Current CF1	Energy Tax		Energy and Carbon Taxes	
		Current CF2	Early CF3	Current CF4	Early CF5
Total	-0.572	-0.571	-0.582	-0.569	-0.591
Petroleum Refining	-0.026	-0.030	-0.028	-0.036	-0.028
Electricity Production	-5.599	-5.595	-5.562	-5.589	-5.546
Biomass	1.281	1.286	1.349	1.297	1.380
Agriculture	-0.374	-0.372	-0.388	-0.369	-0.400
Equipment Manufacturing	-1.435	-1.432	-1.527	-1.427	-1.594
Construction	-0.132	-0.133	-0.132	-0.134	-0.130
Transportation	-0.326	-0.325	-0.339	-0.324	-0.351
Textiles	-0.699	-0.697	-0.707	-0.692	-0.718
Wood, pulp and paper	-1.499	-1.493	-1.541	-1.482	-1.575
Chemicals and pharmaceuticals	-0.944	-0.943	-0.957	-0.939	-0.970
Rubber, plastic and ceramics	-1.226	-1.224	-1.256	-1.221	-1.279
Primary metals	-1.473	-1.470	-1.520	-1.465	-1.558
Other	-0.167	-0.166	-0.176	-0.165	-0.183

Figure 3 Long Run Industry Output Effects (2040)

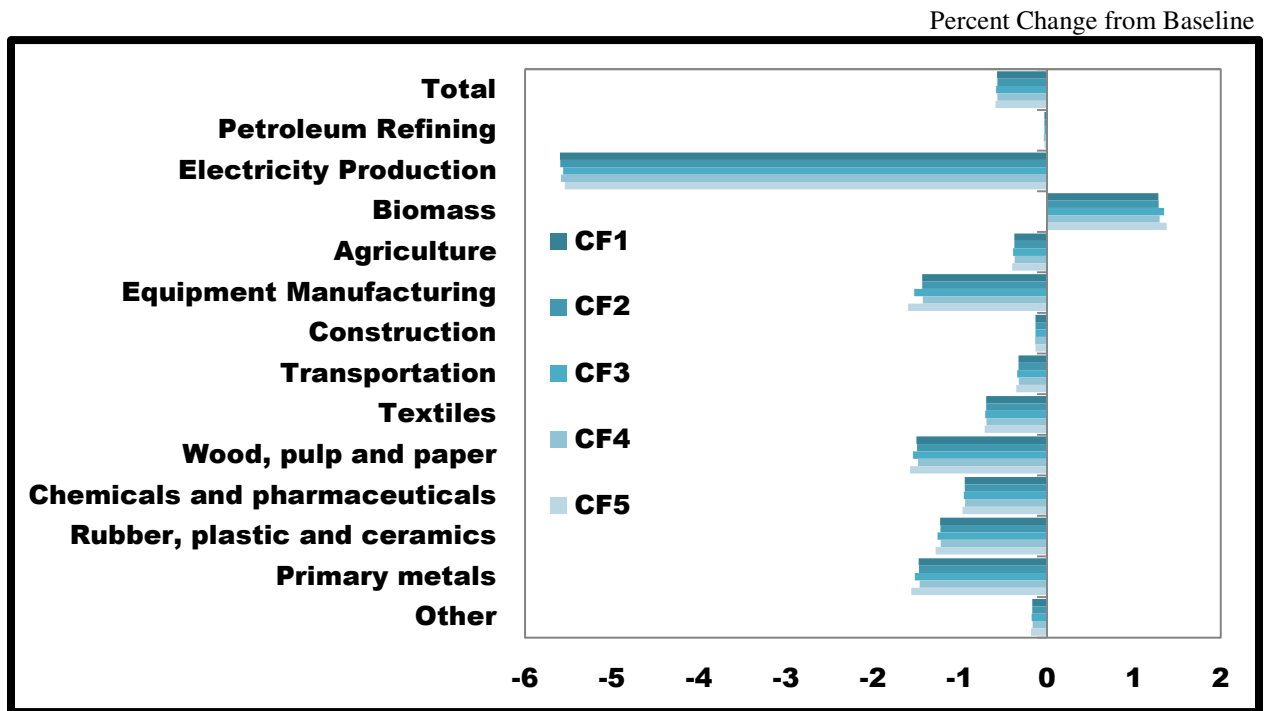


Table 16 Long Run Welfare Effects (2040)

	Percent Change from Baseline				
	Current CF1	Energy Tax		Energy and Carbon Taxes	
		Current CF2	Early CF3	Current CF4	Early CF5
All Households	-0.143	-0.142	-0.145	-0.141	-0.147
First Quintile (Lowest Income)	-0.317	-0.316	-0.319	-0.315	-0.321
Second Quintile	-0.198	-0.198	-0.199	-0.197	-0.200
Third Quintile	-0.146	-0.146	-0.147	-0.145	-0.148
Fourth Quintile	-0.130	-0.130	-0.133	-0.129	-0.135
Fifth Quintile (Highest Income)	-0.081	-0.081	-0.084	-0.080	-0.086

Figure 4 Long Run Welfare Effects (2040)

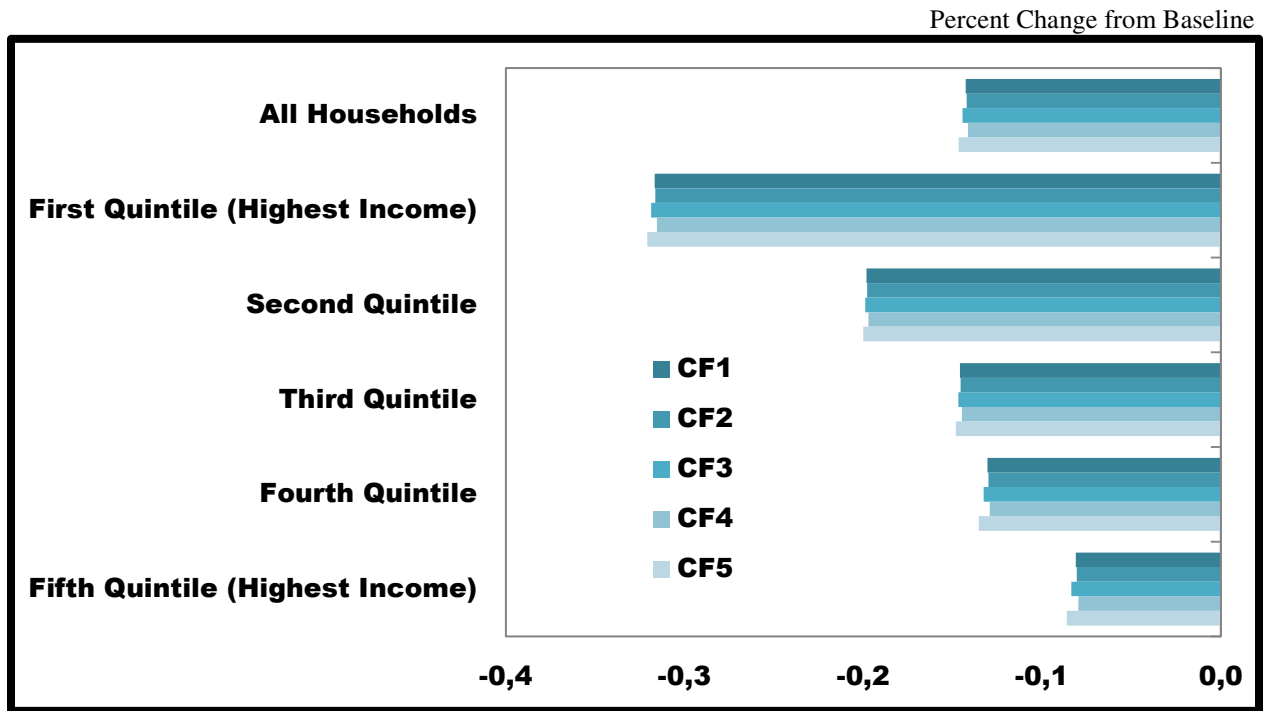


Figure 5 Electricity Price (Intertemporal) – Energy Tax

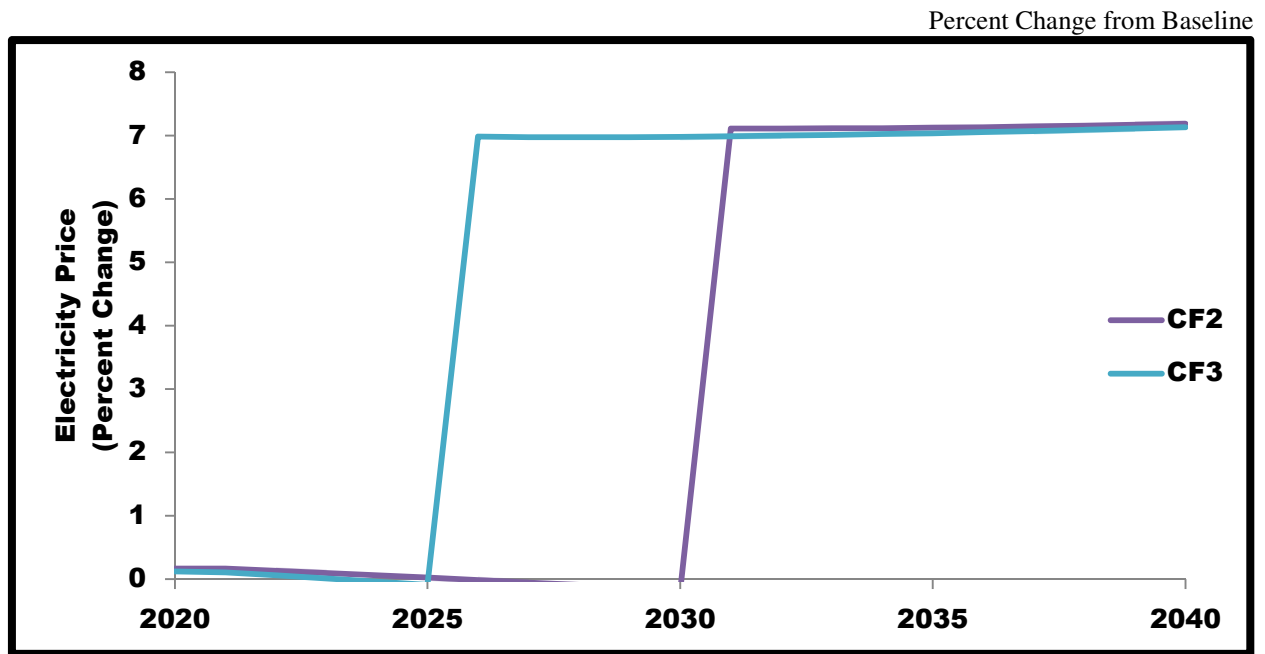


Figure 6 Electricity Price (Intertemporal) – Energy and Carbon Tax

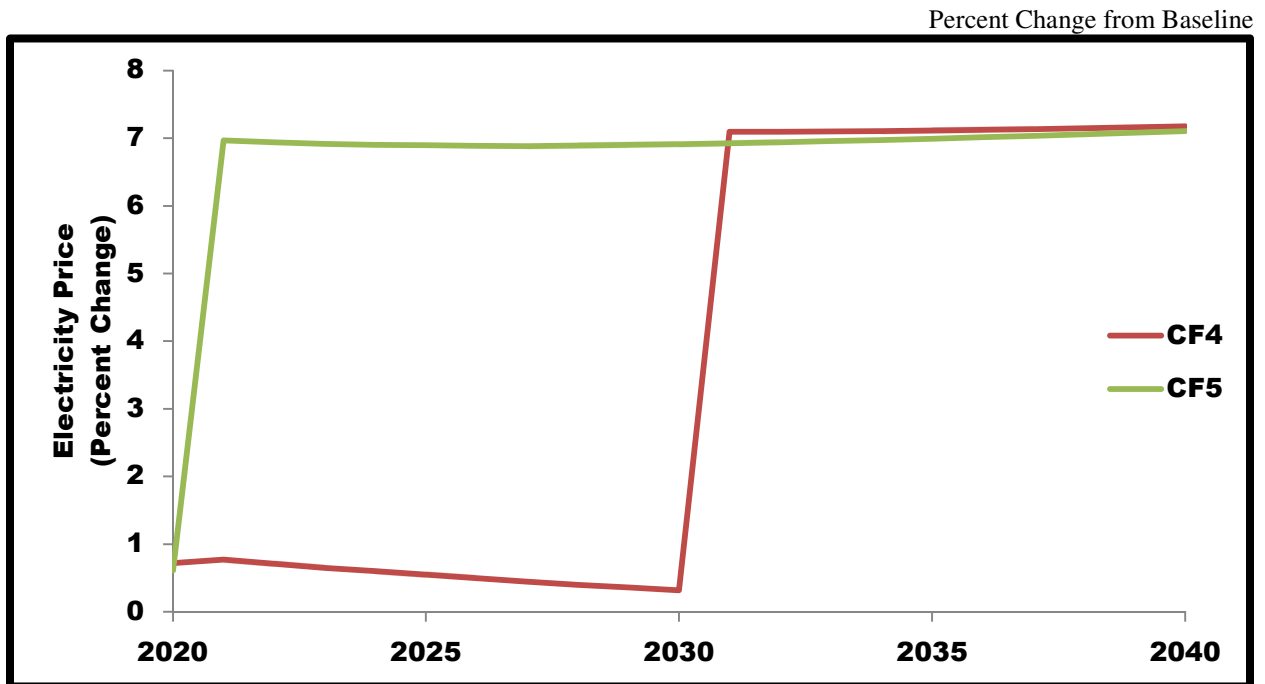


Figure 7 Environmental Effects (Intertemporal) – Energy Tax

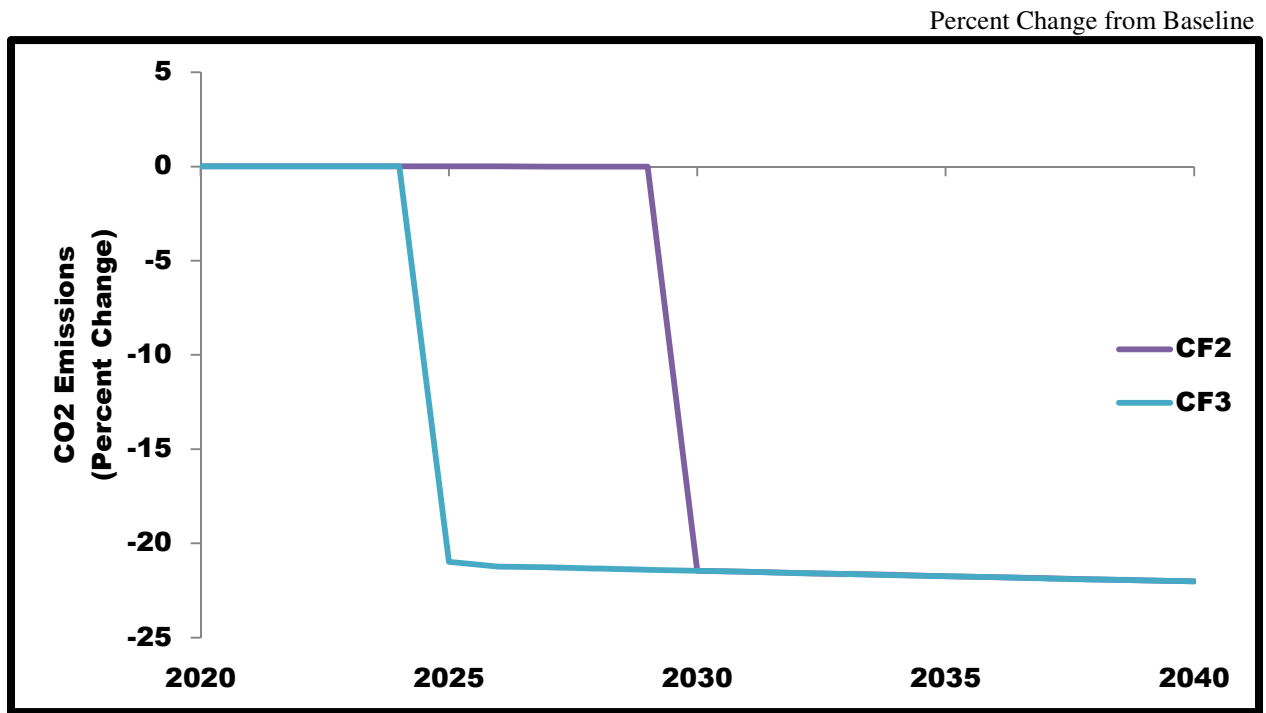


Figure 8 Environmental Effects (Intertemporal) –Energy and Carbon Tax

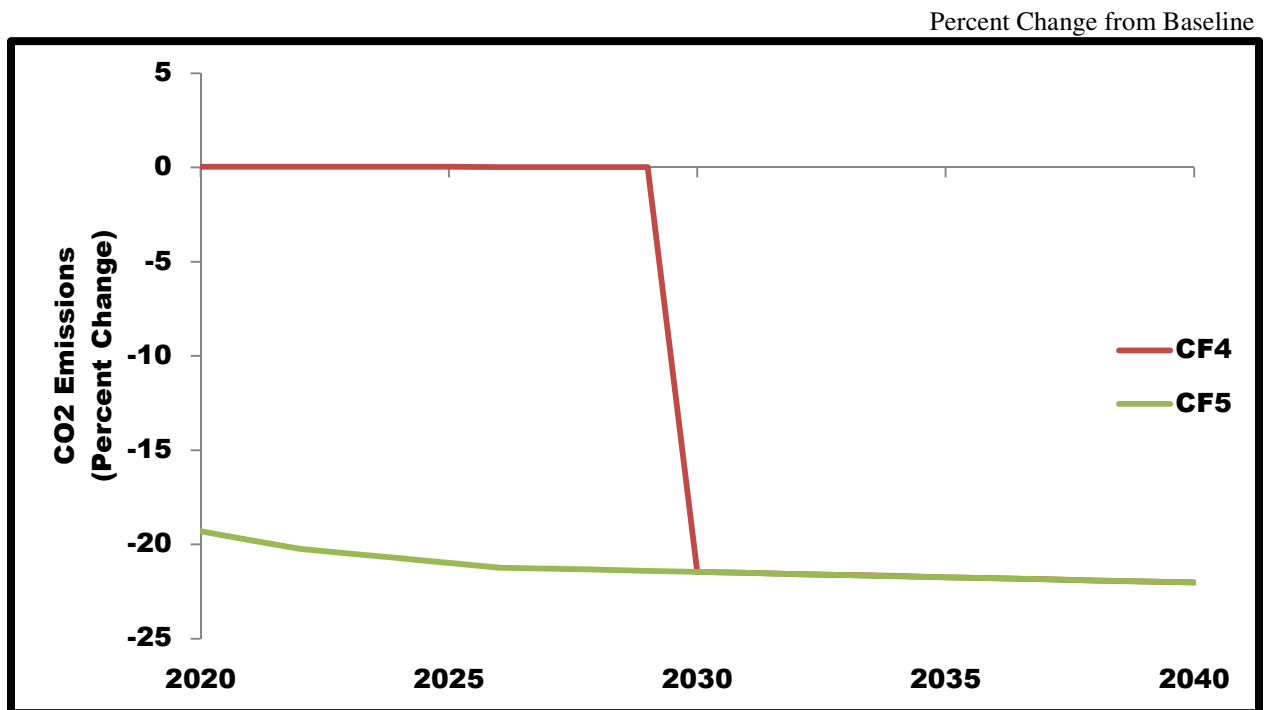


Figure 9 Macroeconomic GDP Effects (Intertemporal) – Energy Tax

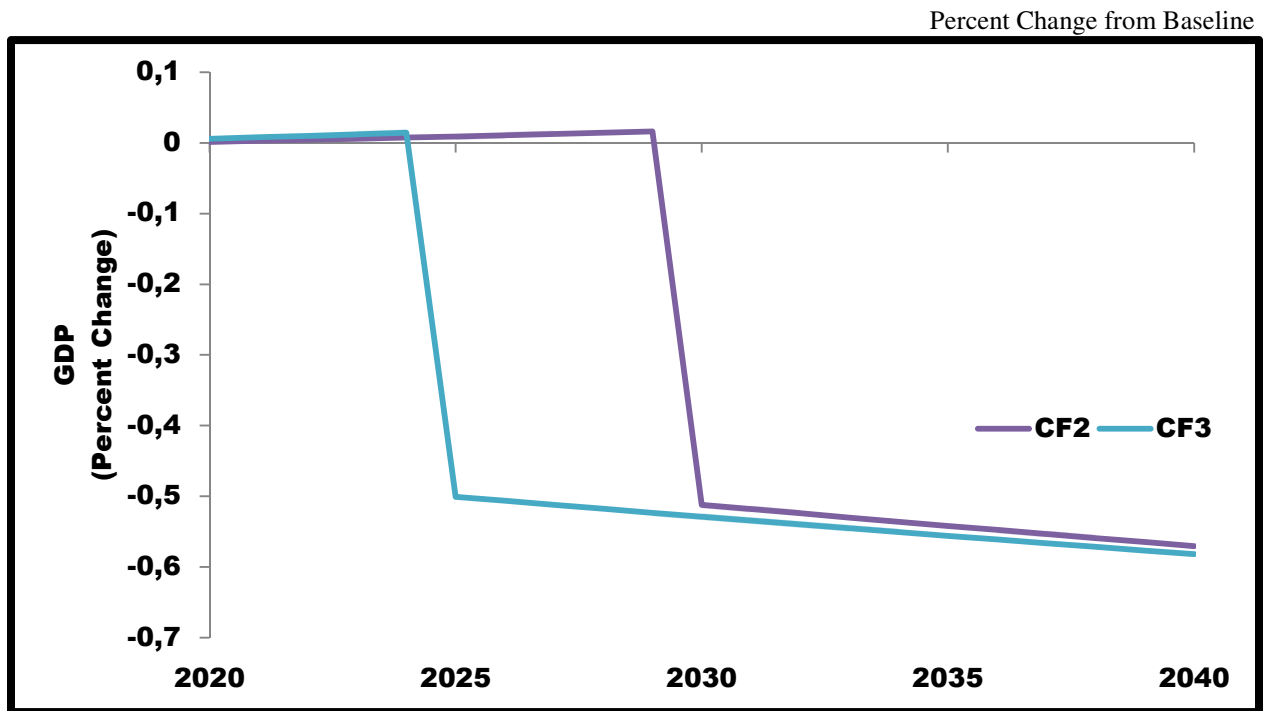


Figure 10 Macroeconomic GDP Effects (Intertemporal) –Energy and Carbon Tax

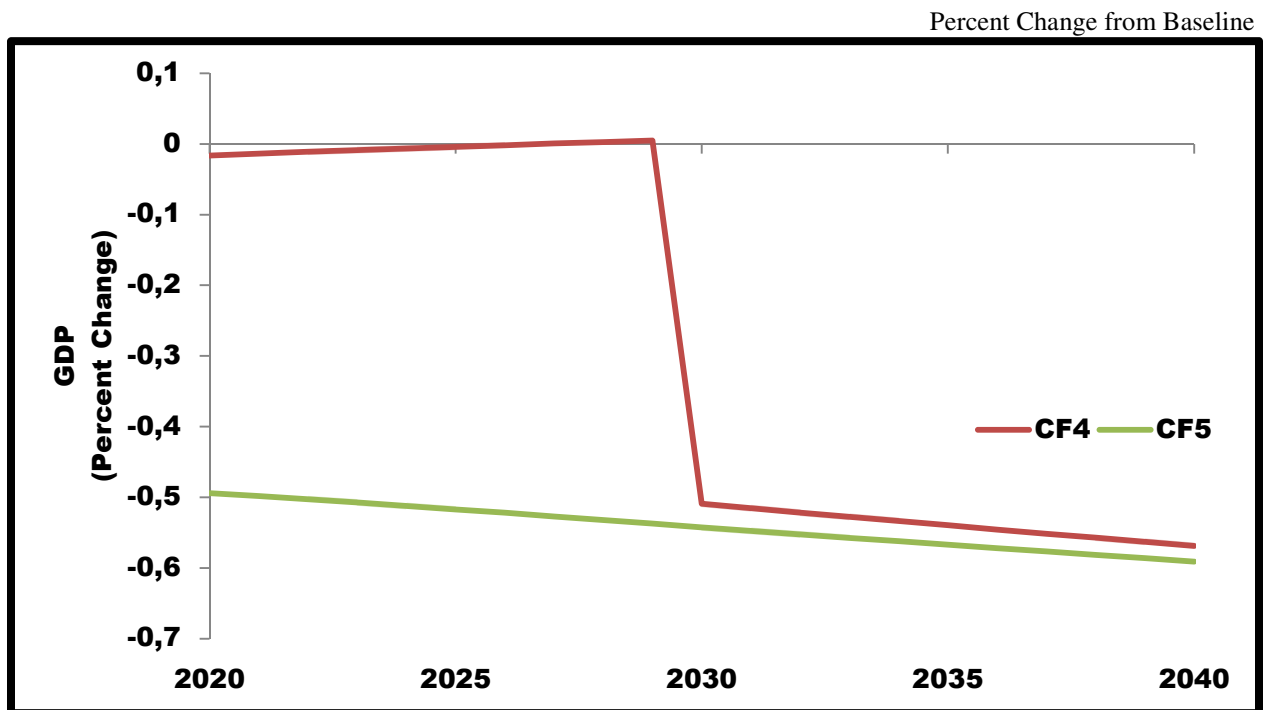


Figure 11 Macroeconomic Employment Effects (Intertemporal) –Energy Tax

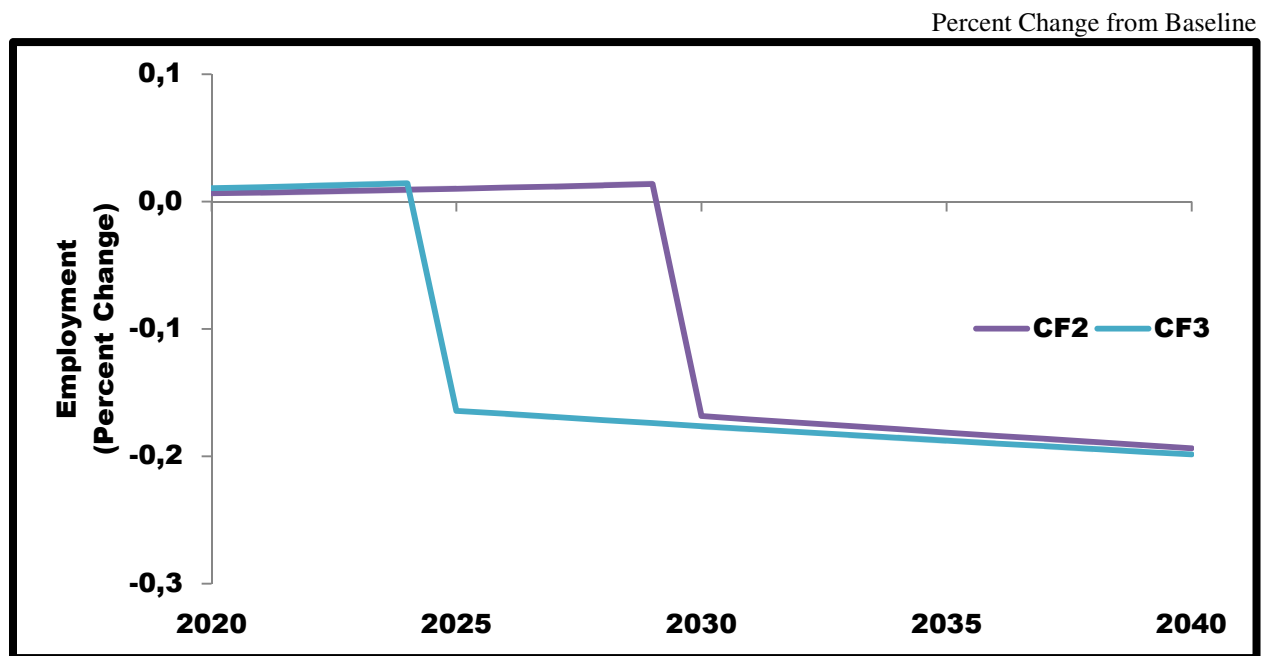


Figure 12 Macroeconomic Employment Effects (Intertemporal) –Energy and Carbon Tax

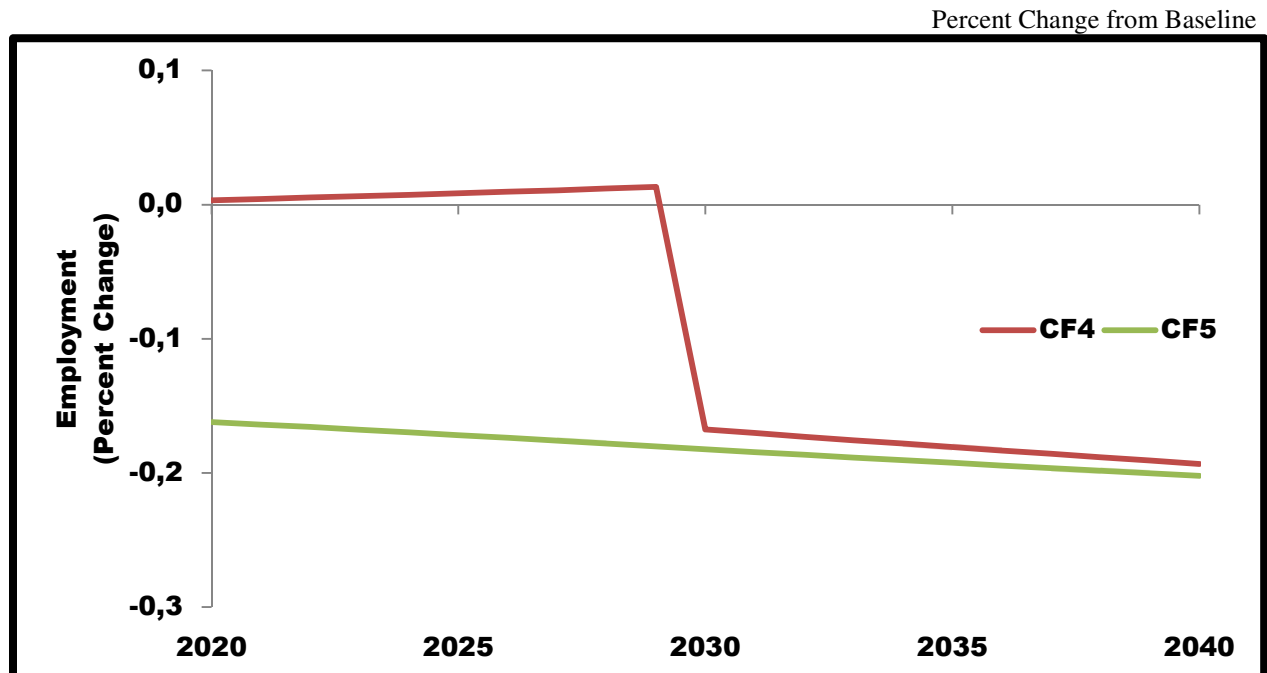


Figure 13 Macroeconomic Public Debt Effects (Intertemporal) –Energy Tax

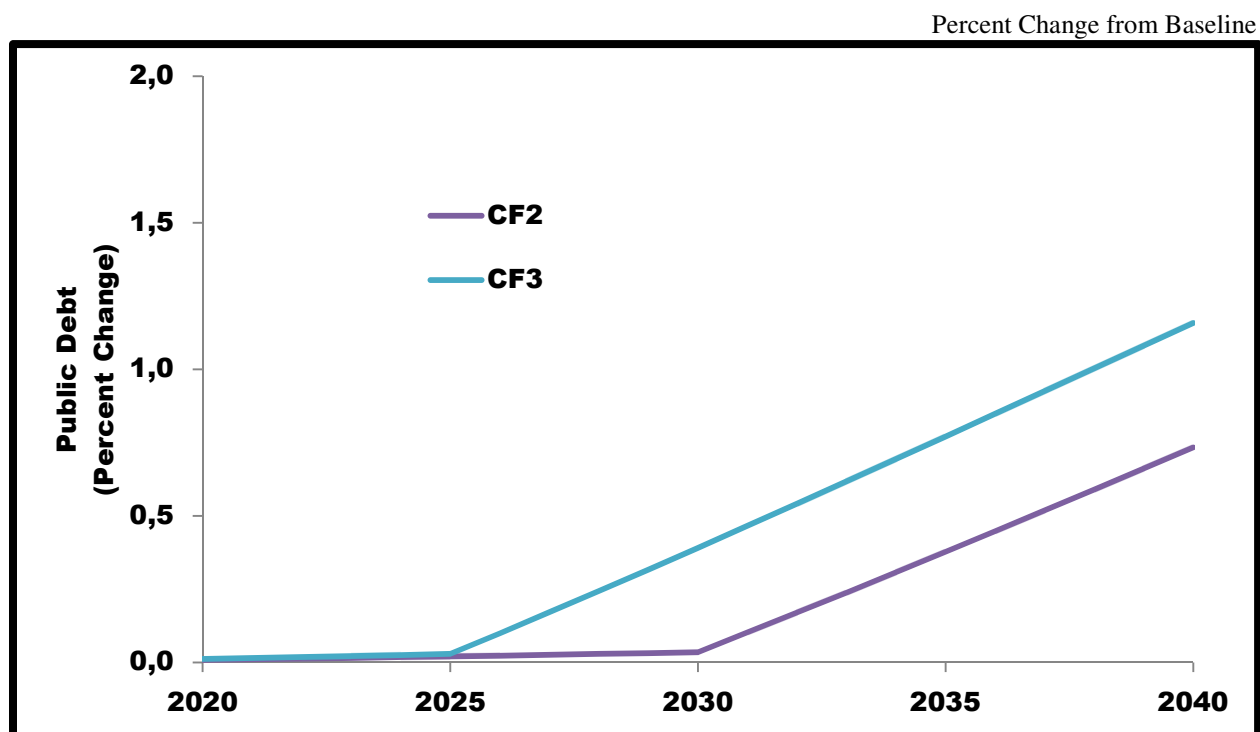


Figure 14 Macroeconomic Public Debt Effects (Intertemporal) –Energy and Carbon Tax

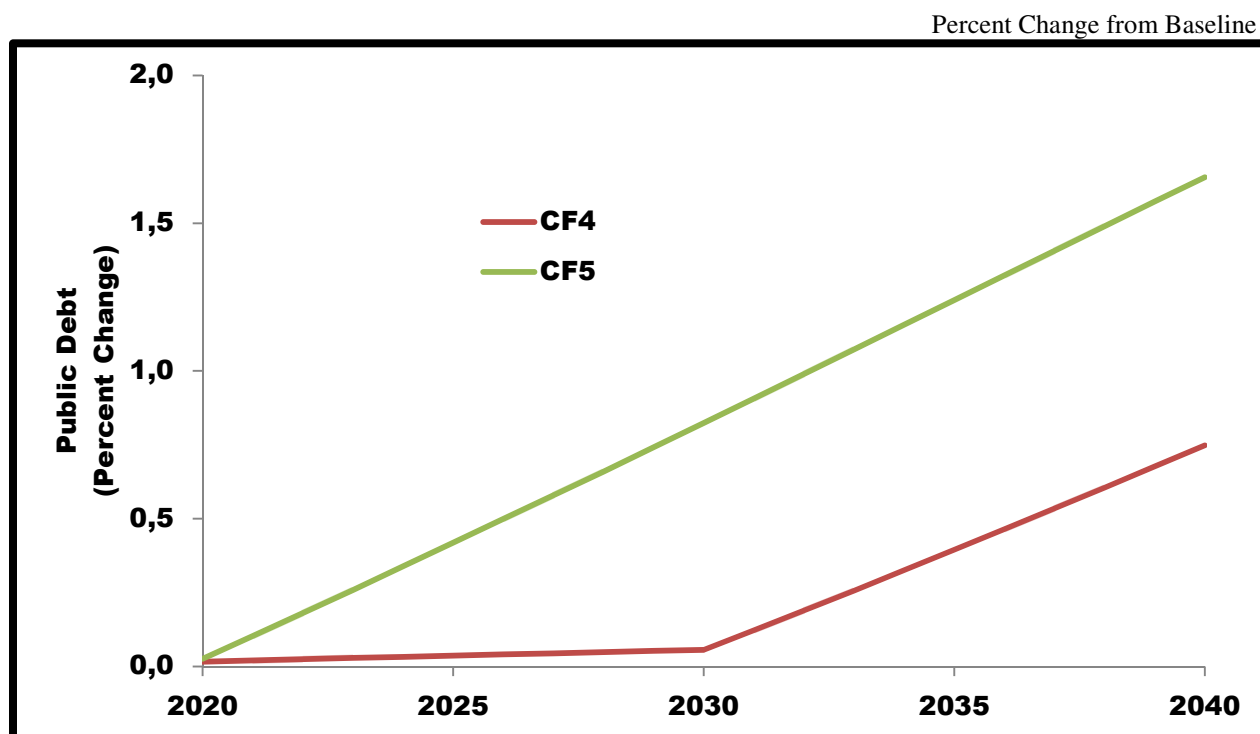


Figure 15 Macroeconomic Foreign Debt Effects (Intertemporal) –Energy Tax

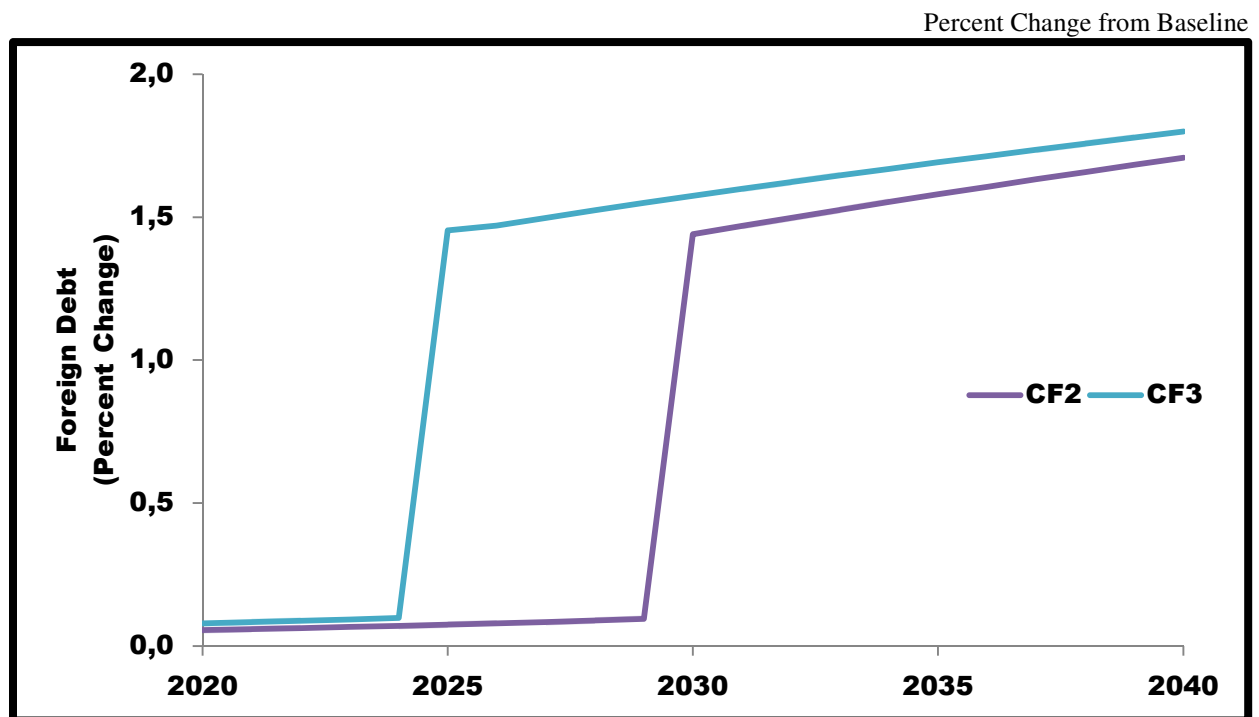


Figure 16 Macroeconomic Foreign Debt Effects (Intertemporal) –Energy and Carbon Tax

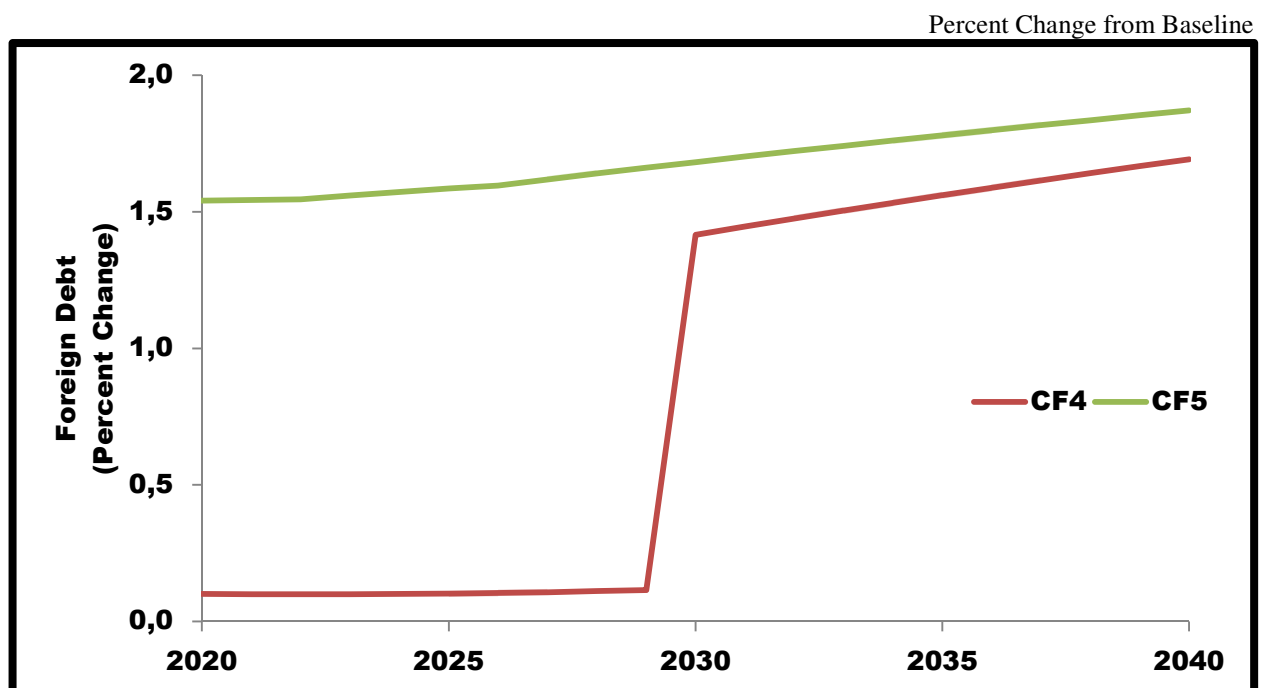


Figure 17 Welfare Effects (Intertemporal) –Energy Tax

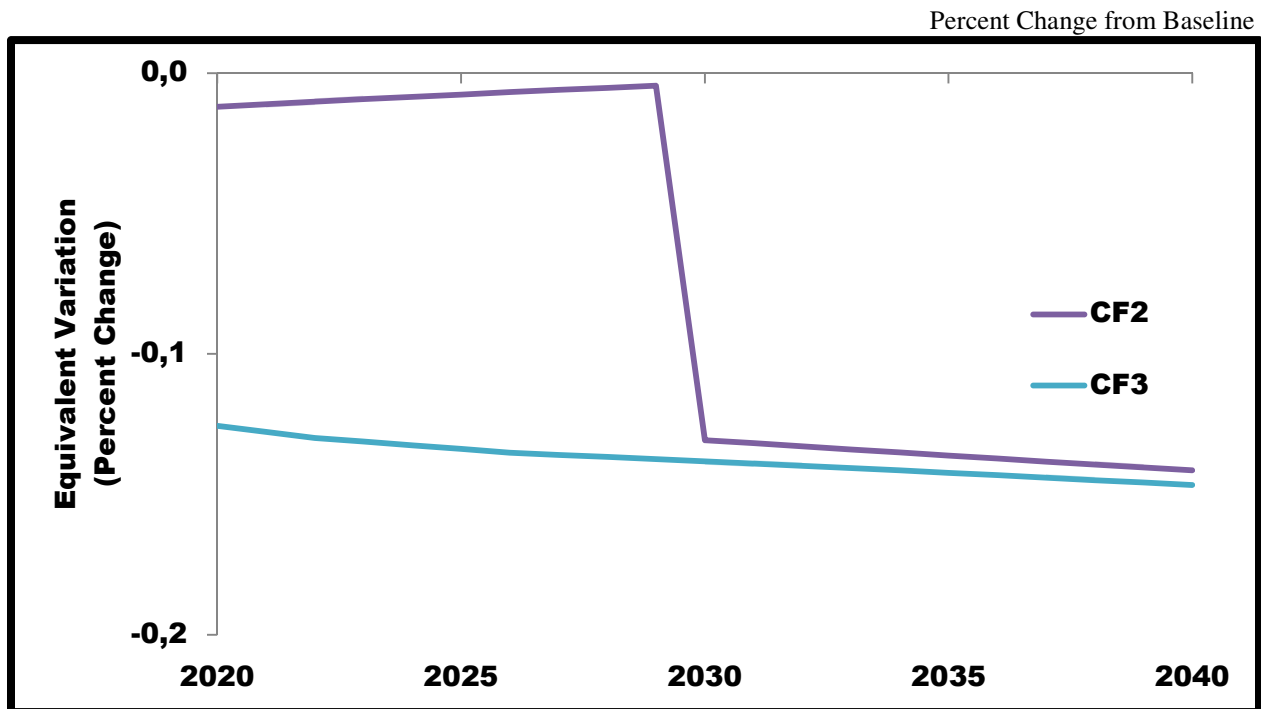


Figure 18 Welfare Effects (Intertemporal) –Energy and Carbon Tax

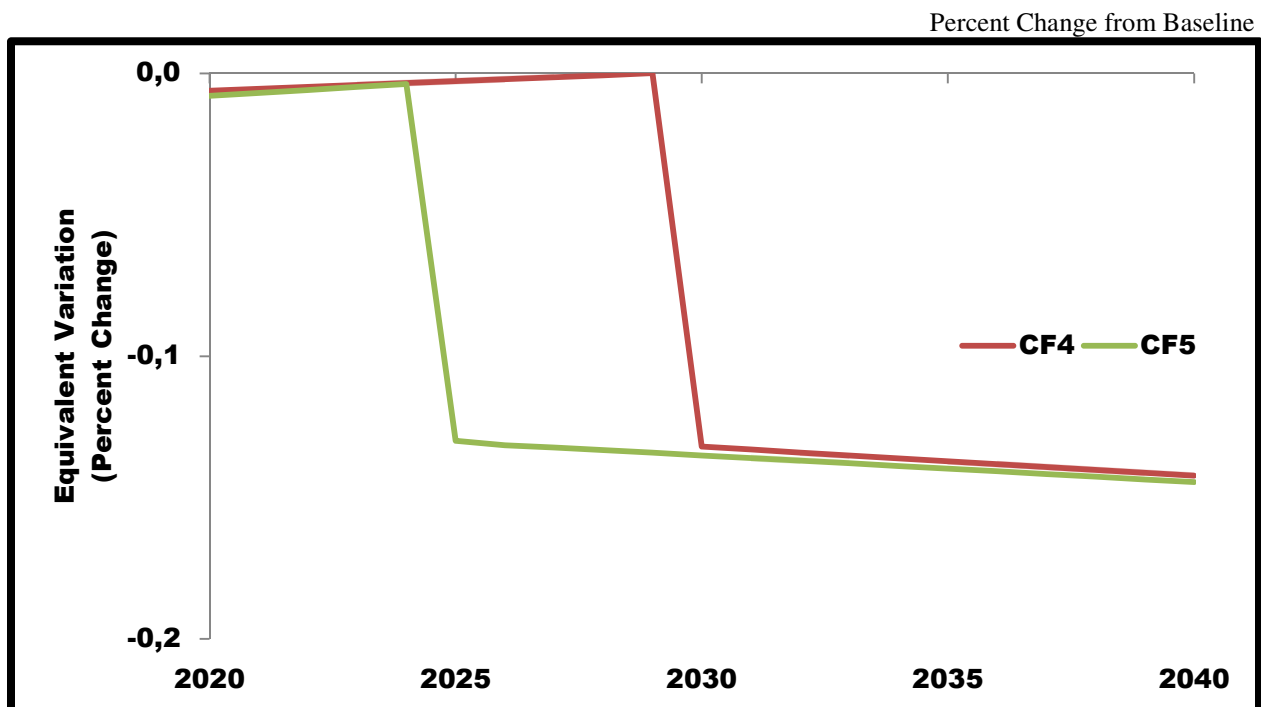


Table 17 Effects on Electricity Prices (Intertemporal)

Percent Change from Baseline

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040
CF1	-0.11	-0.13	-0.15	-0.18	-0.21	-0.24	-0.27	-0.31	-0.35	-0.39	7.12	7.21
CF2	0.17	0.13	0.10	0.06	0.03	-0.01	-0.05	-0.09	-0.13	-0.17	7.11	7.20
CF3	0.11	0.06	0.01	-0.04	-0.09	6.99	6.97	6.97	6.98	6.98	6.99	7.15
CF4	0.77	0.71	0.65	0.60	0.55	0.50	0.45	0.40	0.36	0.32	7.10	7.19
CF5	6.97	6.94	6.91	6.90	6.89	6.89	6.88	6.89	6.90	6.91	6.93	7.13

Table 18 Cumulative Effects on CO2 Emissions

2015=100

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040
CF1	-0.01	-0.02	-0.02	-0.03	-0.03	-0.04	-0.05	-0.06	-0.08	-0.09	-20.32	-233.55
CF2	0.07	0.08	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.10	-20.13	-233.38
CF3	0.07	0.07	0.08	0.08	0.08	-19.20	-38.67	-58.33	-78.18	-98.22	-118.45	-331.73
CF4	0.26	0.30	0.33	0.37	0.40	0.43	0.45	0.48	0.50	0.53	-19.71	-232.98
CF5	-18.12	-36.64	-55.36	-74.26	-93.36	-112.64	-132.11	-151.78	-171.63	-191.68	-211.92	-425.22

Table 19 Cumulative Effects on GDP

2015=100

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040
CF1	0.01	0.02	0.03	0.04	0.05	0.07	0.08	0.10	0.12	0.14	-0.41	-6.41
CF2	0.00	0.00	0.01	0.02	0.02	0.03	0.04	0.06	0.07	0.09	-0.45	-6.44
CF3	0.01	0.01	0.02	0.04	0.05	-0.46	-0.99	-1.52	-2.06	-2.62	-3.18	-9.32
CF4	-0.02	-0.03	-0.04	-0.05	-0.06	-0.06	-0.06	-0.06	-0.06	-0.05	-0.60	-6.56
CF5	-0.50	-1.01	-1.52	-2.04	-2.56	-3.10	-3.64	-4.18	-4.74	-5.31	-5.88	-12.14

Table 20 Cumulative Effects on Employment

2015=100

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040
CF1	0.04	0.05	0.05	0.06	0.07	0.08	0.10	0.11	0.12	0.14	-0.05	-2.11
CF2	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.12	0.13	-0.05	-2.11
CF3	0.05	0.07	0.08	0.09	0.11	-0.07	-0.24	-0.42	-0.61	-0.79	-0.99	-3.12
CF4	0.02	0.02	0.03	0.03	0.04	0.05	0.06	0.07	0.08	0.10	-0.08	-2.14
CF5	-0.11	-0.28	-0.45	-0.62	-0.80	-0.98	-1.17	-1.35	-1.54	-1.74	-1.94	-4.12

Table 21 Cumulative Effects on Public Debt

2015=100

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040
CF1	0.00	0.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.04	-0.06	-0.07	-0.09	6.99
CF2	-0.01	-0.01	-0.02	-0.03	-0.05	-0.06	-0.08	-0.11	-0.13	-0.16	-0.20	6.68
CF3	-0.01	-0.01	-0.03	-0.04	-0.06	-0.08	0.02	0.22	0.55	1.01	1.59	15.69
CF4	-0.01	-0.02	-0.04	-0.06	-0.08	-0.10	-0.14	-0.17	-0.21	-0.26	-0.31	6.34
CF5	-0.01	0.09	0.30	0.63	1.08	1.65	2.36	3.20	4.17	5.29	6.56	28.68

Table 22 Cumulative Effects on Foreign Debt

2015=100

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040
CF1	0.01	0.02	0.03	0.05	0.07	0.09	0.12	0.15	0.18	0.22	0.26	6.44
CF2	0.01	0.02	0.03	0.05	0.07	0.09	0.12	0.15	0.19	0.23	0.27	6.40
CF3	0.01	0.03	0.05	0.07	0.10	0.13	0.25	0.45	0.75	1.14	1.63	13.44
CF4	0.02	0.04	0.06	0.10	0.13	0.17	0.22	0.27	0.33	0.40	0.47	6.84
CF5	0.03	0.14	0.33	0.61	0.99	1.46	2.04	2.72	3.52	4.43	5.47	24.04

Table 23 Cumulative Effects on Welfare

2015=100

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040
CF1	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.18	-1.75
CF2	-0.04	-0.05	-0.05	-0.06	-0.06	-0.06	-0.07	-0.07	-0.07	-0.07	-0.21	-1.77
CF3	-0.06	-0.07	-0.07	-0.08	-0.08	-0.22	-0.36	-0.50	-0.64	-0.79	-0.93	-2.52
CF4	-0.07	-0.08	-0.09	-0.10	-0.11	-0.12	-0.12	-0.13	-0.14	-0.14	-0.28	-1.83
CF5	-0.22	-0.35	-0.49	-0.63	-0.76	-0.91	-1.05	-1.19	-1.34	-1.49	-1.64	-3.26

Table 24 Long Run Welfare Effects (Annualized)

	Percent Change from Baseline				
	Current CF1	Energy Tax		Energy and Carbon Taxes	
		Current CF2	Early CF3	Current CF4	Early CF5
All Households	-0.075	-0.076	-0.099	-0.077	-0.121
First Quintile (Lowest Income)	-0.159	-0.161	-0.212	-0.167	-0.263
Second Quintile	-0.102	-0.103	-0.135	-0.107	-0.166
Third Quintile	-0.077	-0.078	-0.101	-0.080	-0.124
Fourth Quintile	-0.069	-0.069	-0.091	-0.071	-0.111
Fifth Quintile (Highest Income)	-0.044	-0.044	-0.058	-0.044	-0.071

Figure 19 Long Run Welfare Effects (Annualized)

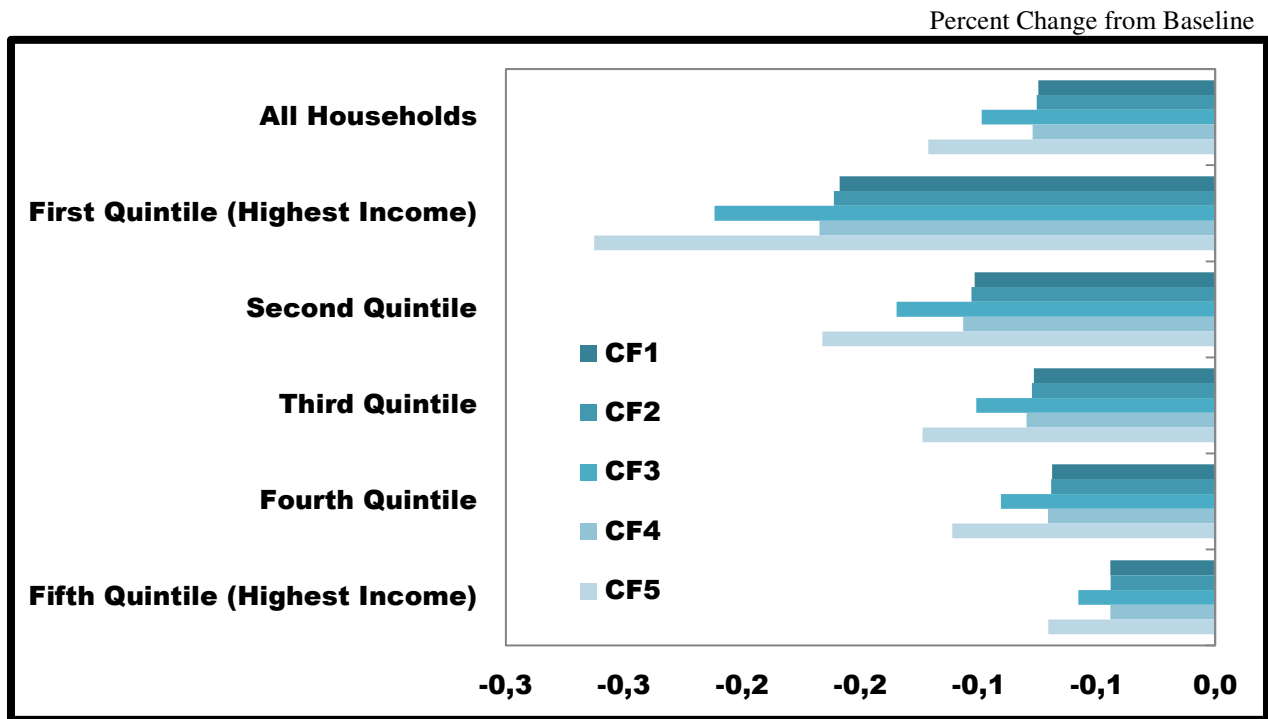


Table 25 Comparative Results: Cumulative Effects by 2040

Effects of CF1 = 100.0

	Current CF1	Energy Tax		Energy and Carbon Taxes	
		Current CF2	Early CF3	Current CF4	Early CF5
CO2	100.0	100.0	142.0	99.8	182.0
GDP	100.0	100.5	145.4	103.9	189.4
Employment	100.0	100.0	147.9	101.4	195.3
Public Debt	100.0	95.6	224.5	90.7	410.3
Foreign Debt	100.0	99.4	208.7	106.2	373.3
Equivalent Variation	100.0	101.1	144.0	104.5	186.5

Figure

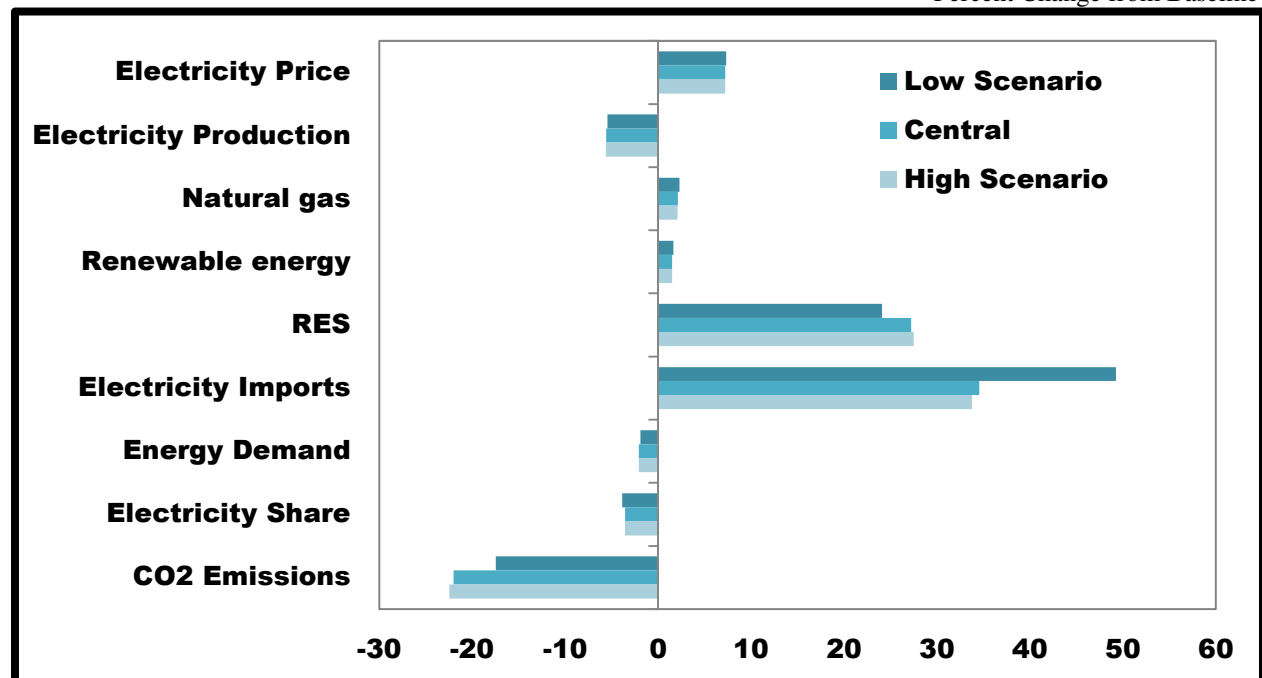
**Table 26 Sensitivity Analysis: Coal and Carbon Prices
Long Run Energy and Environmental Effects (2040)**

Percent Change from Baseline

	Low Scenario	CF1	High Scenario
Electricity Price	7.30	7.21	7.19
Electricity Production	-5.47	-5.60	-5.62
Natural gas	2.30	2.12	2.08
Renewable energy	1.64	1.50	1.48
Percent Renewable (RES %)	24.08	27.21	27.50
Net Electricity Imports	49.24	34.55	33.75
Energy Demand	-1.92	-2.08	-2.10
Electricity Share	-3.87	-3.58	-3.55
CO2 Emissions	-17.48	-22.01	-22.48

**Figure 20 Sensitivity Analysis: Coal and Carbon Prices
Long Run Energy and Environmental Effects (2040)**

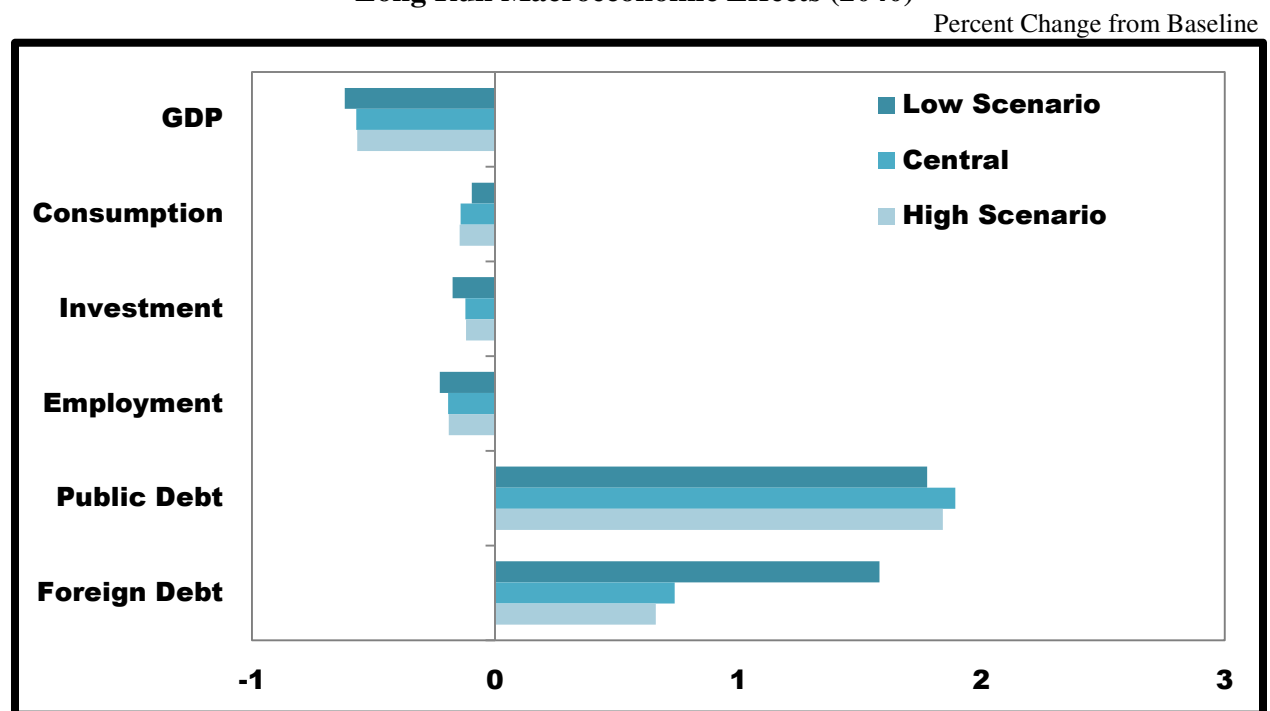
Percent Change from Baseline



**Table 27 Sensitivity Analysis: Coal and Carbon Prices
Long Run Macroeconomic Effects (2040)**

	Percent Change from Baseline		
	Low Scenario	CF1	High Scenario
GDP	-0.62	-0.57	-0.57
Consumption	-0.10	-0.14	-0.15
Investment	-0.18	-0.12	-0.12
Employment	-0.23	-0.19	-0.19
Public Debt	1.78	1.89	1.84
Foreign Debt	1.58	0.74	0.66

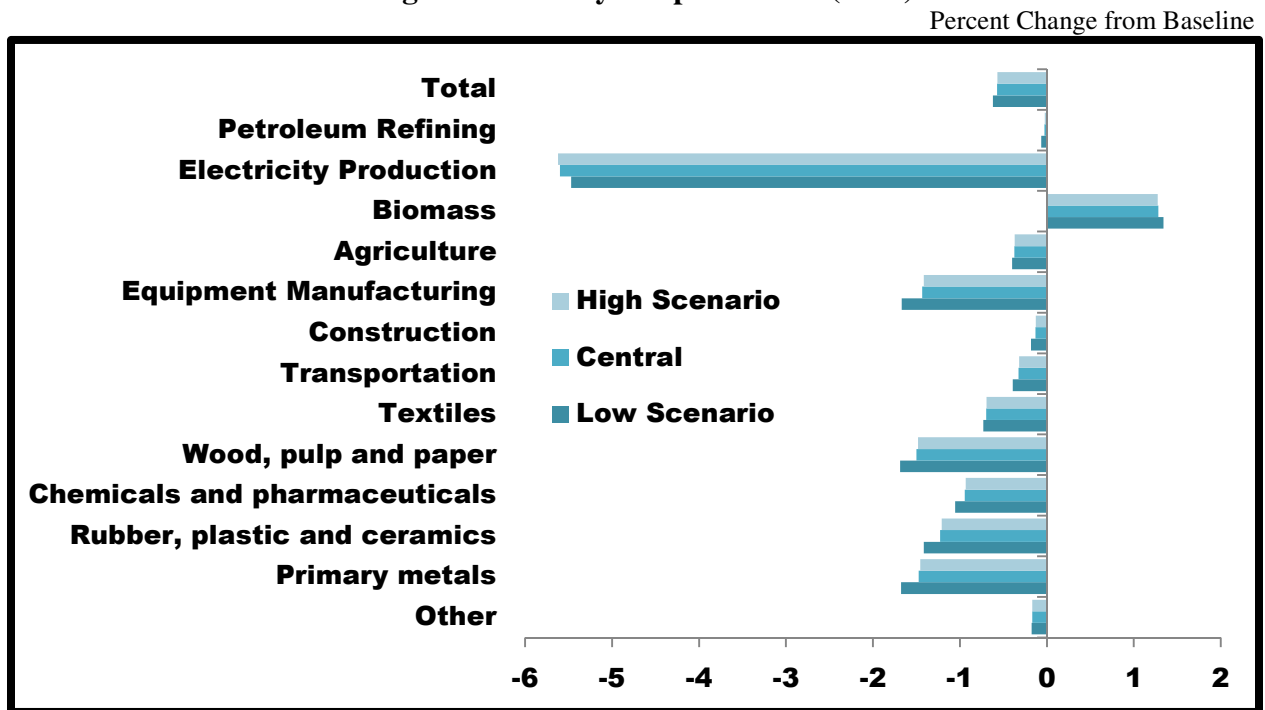
**Figure 21 Sensitivity Analysis: Coal and Carbon Prices
Long Run Macroeconomic Effects (2040)**



**Table 28 Sensitivity Analysis: Coal and Carbon Prices
Long Run Industry Output Effects (2040)**

	Percent Change from Baseline		
	Low Scenario	CF1	High Scenario
Total	-0.619	-0.572	-0.568
Petroleum Refining	-0.065	-0.026	-0.024
Electricity Production	-5.470	-5.599	-5.620
Biomass	1.343	1.281	1.275
Agriculture	-0.400	-0.374	-0.372
Equipment Manufacturing	-1.669	-1.435	-1.415
Construction	-0.181	-0.132	-0.129
Transportation	-0.393	-0.326	-0.320
Textiles	-0.730	-0.699	-0.696
Wood, pulp and paper	-1.689	-1.499	-1.482
Chemicals and pharmaceuticals	-1.055	-0.944	-0.935
Rubber, plastic and ceramics	-1.415	-1.226	-1.210
Primary metals	-1.676	-1.473	-1.455
Other	-0.175	-0.167	-0.166

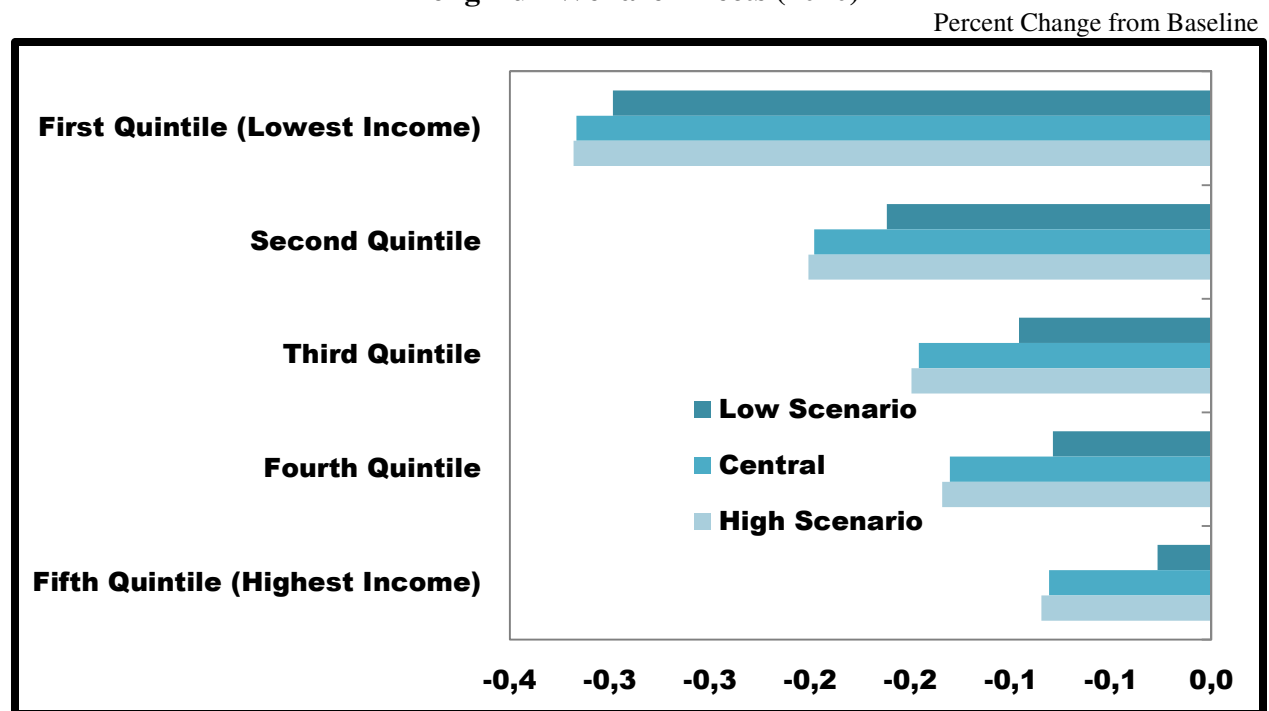
**Figure 22 Sensitivity Analysis: Coal and Carbon Prices
Long Run Industry Output Effects (2040)**



**Table 29 Sensitivity Analysis: Coal and Carbon Prices
Long Run Welfare Effects (2040)**

	Percent Change from Baseline		
	Low Scenario	CF1	High Scenario
All Households	-0.097	-0.143	-0.150
First Quintile (Lowest Income)	-0.299	-0.317	-0.318
Second Quintile	-0.162	-0.198	-0.201
Third Quintile	-0.096	-0.146	-0.150
Fourth Quintile	-0.079	-0.130	-0.134
Fifth Quintile (Highest Income)	-0.027	-0.081	-0.085

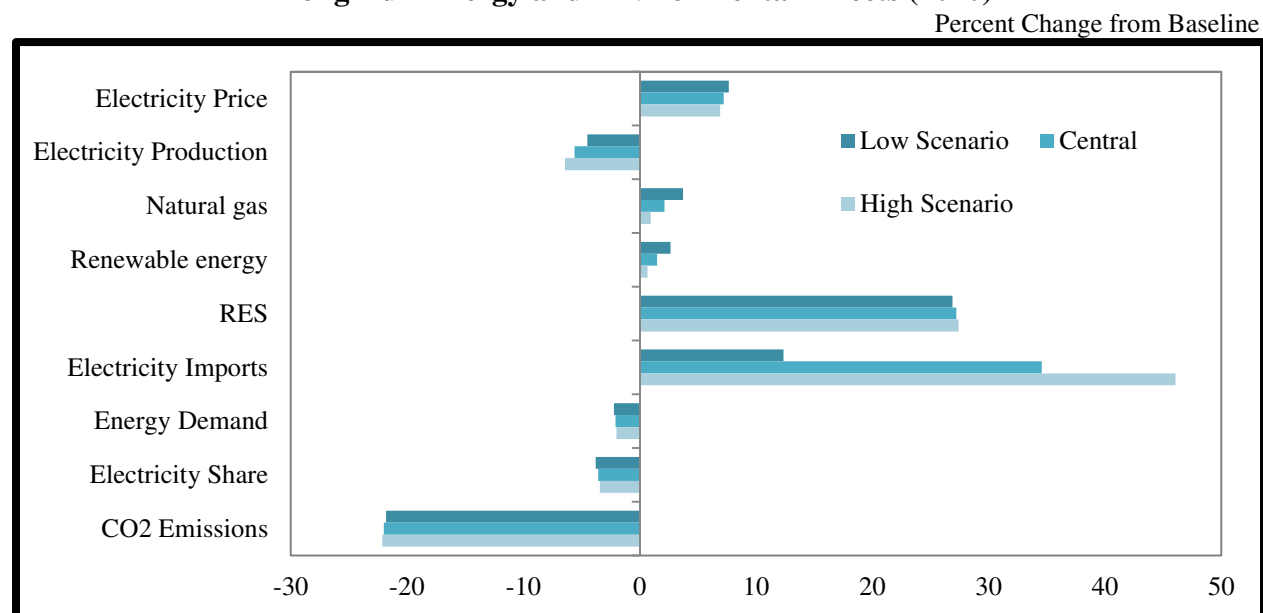
**Figure 23 Sensitivity Analysis: Coal and Carbon Prices
Long Run Welfare Effects (2040)**



**Table 30 Sensitivity Analysis: Elasticity of Substitution of Electricity Imports
Long Run Energy and Environmental Effects (2040)**

	Percent Change from Baseline		
	Low Scenario	CF1	High Scenario
Electricity Price	7.65	7.21	6.90
Electricity Production	-4.50	-5.60	-6.43
Natural gas	3.71	2.12	0.95
Renewable energy	2.64	1.50	0.66
Percent Renewable (RES %)	26.89	27.21	27.41
Net Electricity Imports	12.35	34.55	46.07
Energy Demand	-2.21	-2.08	-2.00
Electricity Share	-3.79	-3.58	-3.44
CO2 Emissions	-21.82	-22.01	-22.15

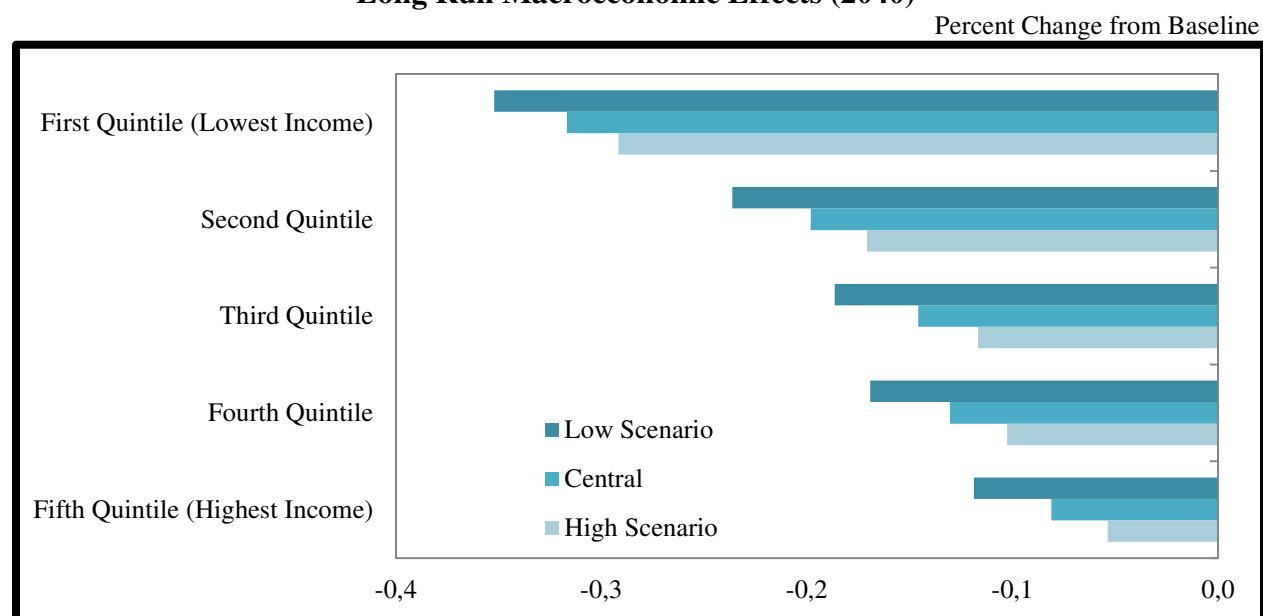
**Figure 24 Sensitivity Analysis: Elasticity of Substitution of Electricity Imports
Long Run Energy and Environmental Effects (2040)**



**Table 31 Sensitivity Analysis: Elasticity of Substitution of Electricity Imports
Long Run Macroeconomic Effects (2040)**

	Percent Change from Baseline		
	Low Scenario	CF1	High Scenario
GDP	-0.53	-0.57	-0.60
Consumption	-0.18	-0.14	-0.12
Investment	-0.01	-0.12	-0.20
Employment	-0.18	-0.19	-0.21
Public Debt	1.83	1.89	1.94
Foreign Debt	0.63	0.74	0.82

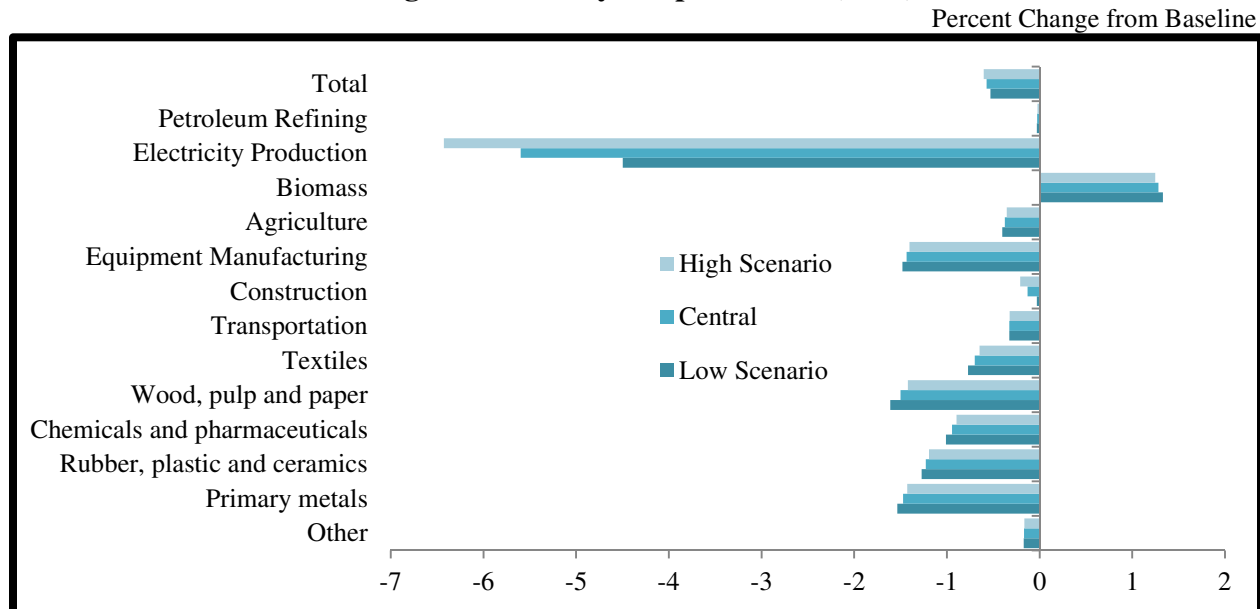
**Figure 25 Sensitivity Analysis: Elasticity of Substitution of Electricity Imports
Long Run Macroeconomic Effects (2040)**



**Table 32 Sensitivity Analysis: Elasticity of Substitution of Electricity Imports
Long Run Industry Output Effects (2040)**

	Percent Change from Baseline		
	Low Scenario	CF1	High Scenario
Total	-0.531	-0.572	-0.603
Petroleum Refining	-0.031	-0.026	-0.022
Electricity Production	-4.496	-5.599	-6.426
Biomass	1.331	1.281	1.247
Agriculture	-0.404	-0.374	-0.353
Equipment Manufacturing	-1.480	-1.435	-1.405
Construction	-0.029	-0.132	-0.208
Transportation	-0.328	-0.326	-0.325
Textiles	-0.773	-0.699	-0.647
Wood, pulp and paper	-1.610	-1.499	-1.422
Chemicals and pharmaceuticals	-1.012	-0.944	-0.898
Rubber, plastic and ceramics	-1.274	-1.226	-1.195
Primary metals	-1.536	-1.473	-1.429
Other	-0.170	-0.167	-0.165

**Figure 26 Sensitivity Analysis: Elasticity of Substitution of Electricity Imports
Long Run Industry Output Effects (2040)**



**Table 33 Sensitivity Analysis: Elasticity of Substitution of Electricity Imports
Long Run Welfare Effects (2040)**

	Percent Change from Baseline		
	Low Scenario	CF1	High Scenario
All Households	-0.18	-0.14	-0.12
First Quintile (Lowest Income)	-0.352	-0.317	-0.292
Second Quintile	-0.236	-0.198	-0.171
Third Quintile	-0.186	-0.146	-0.117
Fourth Quintile	-0.169	-0.130	-0.103
Fifth Quintile (Highest Income)	-0.119	-0.081	-0.054

**Figure 27 Sensitivity Analysis: Elasticity of Substitution of Electricity Imports
Long Run Welfare Effects (2040)**

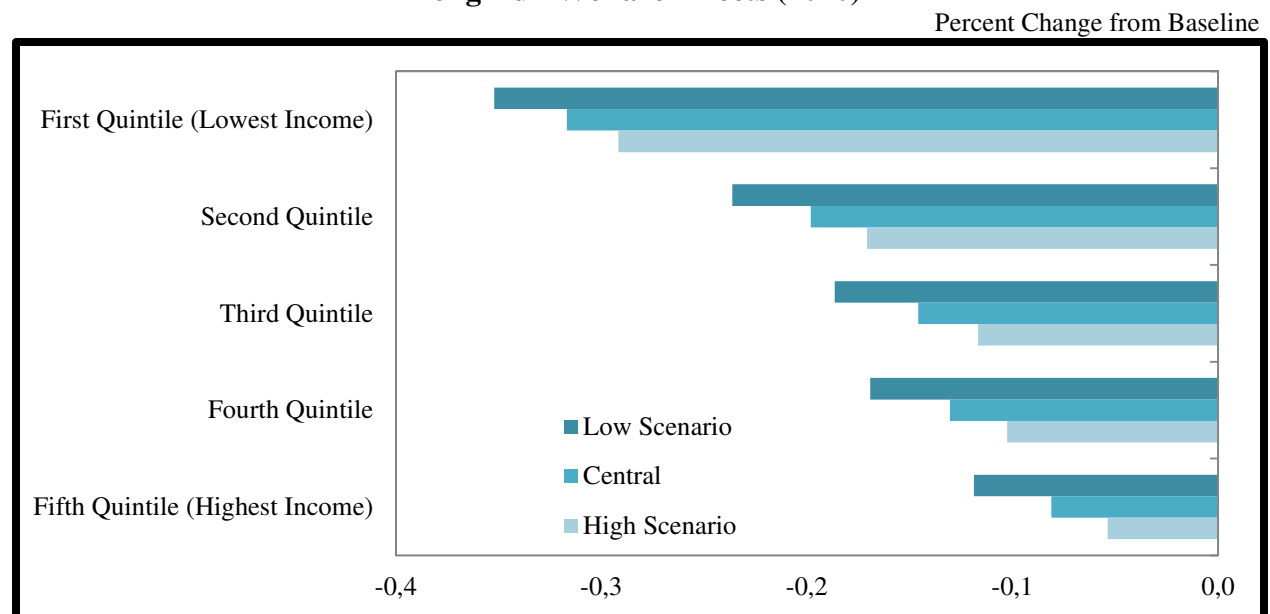


Table 34 Comparison Table of Long Run Effects (2040)

Percent Change from Baseline				
	Forced Closures	CO2 Taxation (Pereira & Pereira, 2017)		VAT on Electricity (Pereira & Pereira, 2018)
		Without Recycling	With Recycling	
CO2 Emissions	-22.0%	-24.3%	-25.1%	-0.1%
GDP	-0.57%	-4.3%	0.2%	-0.2%
Employment	-0.19%	-2.10%	0.9%	-0.16%
Equivalent Variations	-0.32% to -0.08	-3.3% to -1.8%	0.5% to -0.8%	-0.61% to -0.14%