

PUCO EXHIBIT FILING

Date of Hearing: 9 / 9 / 2015

Case No. 14-1297-EL-550

PUCO Case Caption: In the Matter of the Application  
of Ohio Edison The Cleveland Electric Illuminating  
Company, and The Toledo Edison Company  
for Authority to Provide for a Standard Service  
Offer Pursuant to R.C. 4928.143 in the Form  
of an Electric Security Plan.

List of exhibits being filed: Volume VII  
Items 1-10

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Technician DMB Date Processed OCT 30 2015

Reporter's Signature: Karen Sue Gibson  
Date Submitted: 10/30/2015

BEFORE THE PUBLIC UTILITIES COMMISSION OF OHIO

- - -

In the Matter of the :  
Application of Ohio Edison:  
Company, The Cleveland :  
Electric Illuminating  
Company, and The Toledo :  
Edison Company for : Case No. 14-1297-EL-SSO  
Authority to Provide for :  
a Standard Service Offer :  
Pursuant to R.C. 4928.143 :  
in the Form of an Electric:  
Security Plan. :

- - -

PROCEEDINGS

before Mr. Gregory Price, Ms. Mandy Chiles, and  
Ms. Megan Addison, Attorney Examiners, at the Public  
Utilities Commission of Ohio, 180 East Broad Street,  
Room 11-A, Columbus, Ohio, called at 9:08 a.m. on  
Wednesday, September 9, 2015.

- - -

VOLUME VII

- - -

ARMSTRONG & OKEY, INC.  
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Columbus, Ohio 43215-5201  
(614) 224-9481 - (800) 223-9481  
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## **ICForecast: Executive Energy Outlook-Data Tables**

The ICForecast: Executive Energy Outlook now includes price projections for Reference, High and Low cases for all of the covered markets. The scenarios vary by the assumed natural gas supply offer perspective on the influence of fuel cost on the modeled prices for power, coal, emissions and renewables.

The annual average gas prices in the Reference Case are based on fundamentals-based analysis of natural gas and power markets using ICF's Gas Market Model (GMM) and Integrated Planning Model (IPM). The High (Gas Price) Case and Low (Gas Price) Case gas prices are based on confidence intervals around those Reference Case values derived from prior analysis. The High and Low cases are intended to represent a reasonable range of prices around the Reference Case, not the absolute boundaries of higher or lower gas prices.

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Minemouth Coal Prices-Reference Case (2012\$/short ton)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037		
<b>Dominick (2012\$/short ton)</b>																										
Northern Appalachia 3.6 lb SO2/MMBtu; 12,500 Btu/lb	\$54.6	\$54.8	\$55.0	\$55.2	\$55.4	\$55.6	\$55.7	\$55.8	\$56.1	\$56.3	\$56.4	\$56.5	\$56.6	\$56.7	\$56.8	\$56.9	\$57.0	\$57.1	\$57.2	\$57.3	\$57.4	\$57.5	\$57.6	\$57.7	\$57.8	\$57.9
Northern Appalachia 4.5 lb SO2/MMBtu; 12,500 Btu/lb	\$51.6	\$52.1	\$52.7	\$53.3	\$53.9	\$54.1	\$54.3	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4	\$54.4
Central Appalachia 1.1 lb SO2/MMBtu; 12,500 Btu/lb	\$63.9	\$65.0	\$66.0	\$66.2	\$66.3	\$66.5	\$66.8	\$66.8	\$66.9	\$67.0	\$67.1	\$67.2	\$67.3	\$67.4	\$67.5	\$67.6	\$67.7	\$67.8	\$67.9	\$68.0	\$68.1	\$68.2	\$68.3	\$68.4	\$68.5	\$68.6
Central Appalachia 1.6 lb SO2/MMBtu; 12,500 Btu/lb	\$60.9	\$61.8	\$62.7	\$62.8	\$62.9	\$63.1	\$63.4	\$63.6	\$63.7	\$63.8	\$63.9	\$64.0	\$64.1	\$64.2	\$64.3	\$64.4	\$64.5	\$64.6	\$64.7	\$64.8	\$64.9	\$65.0	\$65.1	\$65.2	\$65.3	\$65.4
Powder River Basin 0.8 lb SO2/MMBtu; 8,000 Btu/lb	\$12.3	\$13.1	\$14.0	\$14.4	\$14.7	\$14.8	\$14.9	\$15.0	\$15.1	\$15.3	\$15.3	\$15.4	\$15.5	\$15.5	\$15.7	\$15.7	\$15.8	\$15.9	\$16.0	\$16.1	\$16.2	\$16.3	\$16.4	\$16.5	\$16.6	\$16.7
Powder River Basin 0.8 lb SO2/MMBtu; 8,400 Btu/lb	\$9.9	\$10.3	\$10.7	\$11.0	\$11.4	\$11.5	\$11.6	\$11.7	\$11.8	\$11.9	\$12.0	\$12.1	\$12.2	\$12.2	\$12.3	\$12.4	\$12.4	\$12.5	\$12.6	\$12.7	\$12.8	\$12.9	\$13.0	\$13.1	\$13.2	\$13.3
Illinois Basin 4.5 lb SO2/MMBtu; 11,000 Btu/lb	\$38.3	\$39.0	\$39.8	\$40.4	\$40.9	\$41.0	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1	\$41.1
Illinois Basin 5.5 lb SO2/MMBtu; 11,000 Btu/lb	\$34.4	\$34.9	\$35.4	\$36.0	\$36.6	\$37.1	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7	\$37.7
Rockies 0.9 lb SO2/MMBtu; 11,700 Btu/lb	\$34.6	\$34.8	\$35.0	\$35.2	\$35.4	\$35.6	\$35.7	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8	\$35.8
<b>Argentine (2012\$/short ton)</b>																										
Australia Newcastle	\$66.0	\$68.1	\$70.2	\$72.3	\$74.5	\$74.5	\$74.6	\$74.7	\$74.8	\$74.8	\$74.8	\$74.9	\$74.9	\$74.9	\$75.0	\$75.0	\$75.1	\$75.1	\$75.1	\$75.1	\$75.1	\$75.1	\$75.2	\$75.2	\$75.2	\$75.3
South Africa Richards Bay	\$59.4	\$68.5	\$69.5	\$70.5	\$71.5	\$71.6	\$71.7	\$71.7	\$71.8	\$71.8	\$71.8	\$71.9	\$71.9	\$72.0	\$72.0	\$72.0	\$72.1	\$72.1	\$72.1	\$72.1	\$72.1	\$72.1	\$72.2	\$72.2	\$72.2	\$72.2
Columbia Puerto Bellair	\$58.7	\$59.8	\$60.8	\$61.8	\$62.8	\$62.9	\$62.9	\$62.9	\$63.0	\$63.0	\$63.0	\$63.0	\$63.0	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.2	\$63.2	\$63.2	\$63.2

Delivered Coal Prices

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037		
<b>Region (2012\$/MWh)</b>																										
ERCOT Houston	\$2.23	\$2.23	\$2.28	\$2.27	\$2.30	\$2.31	\$2.32	\$2.33	\$2.34	\$2.34	\$2.34	\$2.34	\$2.34	\$2.34	\$2.35	\$2.35	\$2.35	\$2.35	\$2.35	\$2.35	\$2.35	\$2.35	\$2.36	\$2.36	\$2.36	\$2.36
PIW COMED	\$1.05	\$2.06	\$2.08	\$2.09	\$2.09	\$2.10	\$2.10	\$2.11	\$2.12	\$2.13	\$2.14	\$2.14	\$2.15	\$2.15	\$2.16	\$2.16	\$2.16	\$2.17	\$2.17	\$2.18	\$2.18	\$2.19	\$2.19	\$2.20	\$2.21	\$2.22
PIW West	\$1.70	\$2.72	\$2.74	\$2.75	\$2.77	\$2.79	\$2.81	\$2.82	\$2.83	\$2.84	\$2.84	\$2.84	\$2.85	\$2.85	\$2.86	\$2.86	\$2.86	\$2.86	\$2.86	\$2.86	\$2.86	\$2.85	\$2.85	\$2.84	\$2.84	\$2.84
US Total	\$2.36	\$2.37	\$2.37	\$2.40	\$2.42	\$2.43	\$2.45	\$2.45	\$2.46	\$2.47	\$2.47	\$2.48	\$2.48	\$2.48	\$2.49	\$2.49	\$2.49	\$2.50	\$2.50	\$2.50	\$2.50	\$2.51	\$2.51	\$2.52	\$2.52	



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Miner-mouth Coal Prices-High Case (2012\$/short ton)

Commodity (2012\$/short ton)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	
Northern Appalachia 3.4 lb SO <sub>2</sub> /MMBtu; 12,500 Btu/lb	\$51.6	\$55.4	\$55.9	\$55.3	\$56.7	\$57.0	\$57.3	\$57.6	\$58.0	\$58.4	\$58.6	\$58.7	\$58.9	\$59.0	\$59.2	\$59.4	\$59.5	\$59.5	\$59.4	\$59.4	\$59.4	\$59.3	\$59.2	\$59.2	\$59.1
Northern Appalachia 4.5 lb SO <sub>2</sub> /MMBtu; 12,500 Btu/lb	\$51.6	\$52.2	\$52.9	\$53.6	\$54.2	\$54.3	\$54.4	\$54.4	\$54.4	\$54.4	\$54.5	\$54.6	\$54.7	\$54.8	\$54.9	\$55.0	\$55.1	\$55.1	\$55.0	\$55.0	\$55.0	\$54.9	\$54.8	\$54.7	\$54.6
Central Appalachia 1.1 lb SO <sub>2</sub> /MMBtu; 12,500 Btu/lb	\$60.9	\$65.1	\$61.9	\$63.3	\$66.7	\$68.8	\$67.1	\$67.8	\$68.0	\$68.0	\$67.9	\$68.0	\$68.1	\$68.2	\$68.3	\$68.5	\$68.6	\$68.6	\$68.6	\$68.6	\$68.6	\$68.6	\$68.6	\$68.6	\$68.6
Central Appalachia 1.6 lb SO <sub>2</sub> /MMBtu; 12,500 Btu/lb	\$12.3	\$13.1	\$14.0	\$14.6	\$15.2	\$15.3	\$15.4	\$15.4	\$15.6	\$15.7	\$15.8	\$15.9	\$16.1	\$16.2	\$16.3	\$16.4	\$16.5	\$16.5	\$16.6	\$16.6	\$16.6	\$16.6	\$16.6	\$16.6	\$16.6
Powder River Basin 0.8 lb SO <sub>2</sub> /MMBtu; 8,400 Btu/lb	\$9.9	\$10.3	\$10.7	\$11.2	\$11.8	\$11.9	\$12.1	\$12.2	\$12.3	\$12.4	\$12.5	\$12.6	\$12.7	\$12.8	\$12.8	\$12.9	\$13.0	\$13.0	\$13.0	\$13.0	\$13.0	\$13.0	\$13.0	\$13.0	\$12.8
Powder River Basin 4.5 lb SO <sub>2</sub> /MMBtu; 8,400 Btu/lb	\$38.3	\$39.0	\$39.8	\$41.1	\$42.4	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5	\$42.5
Illinois Basin 4.5 lb SO <sub>2</sub> /MMBtu; 11,000 Btu/lb	\$34.4	\$34.9	\$35.4	\$36.4	\$37.3	\$38.3	\$39.2	\$39.4	\$39.2	\$39.2	\$39.2	\$39.2	\$39.2	\$39.2	\$39.2	\$39.2	\$39.2	\$39.2	\$39.2	\$39.2	\$39.2	\$39.2	\$39.2	\$39.2	\$39.2
Recycles 0.9 lb SO <sub>2</sub> /MMBtu; 11,700 Btu/lb	\$36.2	\$36.6	\$37.0	\$37.6	\$38.1	\$38.6	\$39.1	\$39.4	\$39.4	\$39.4	\$40.1	\$40.1	\$40.1	\$40.1	\$40.1	\$40.1	\$40.1	\$40.1	\$40.1	\$40.1	\$40.1	\$40.1	\$40.1	\$40.1	\$40.1

International (2012\$/short ton)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	
Australia Newcastle	\$64.0	\$68.1	\$70.2	\$72.3	\$74.5	\$74.5	\$74.6	\$74.7	\$74.7	\$74.8	\$74.8	\$74.8	\$74.9	\$74.9	\$74.9	\$75.0	\$75.0	\$75.1	\$75.1	\$75.1	\$75.1	\$75.2	\$75.2	\$75.2	\$75.3
South Africa Richards Bay	\$67.4	\$68.5	\$69.5	\$70.5	\$71.5	\$71.6	\$71.7	\$71.7	\$71.8	\$71.8	\$71.8	\$71.9	\$71.9	\$72.0	\$72.0	\$72.0	\$72.1	\$72.3	\$72.3	\$72.3	\$72.7	\$73.0	\$73.0	\$73.4	\$73.7
Colombia Puerto Bahar	\$58.7	\$59.8	\$60.8	\$61.8	\$62.8	\$62.9	\$62.9	\$62.9	\$62.9	\$63.0	\$63.0	\$63.0	\$63.0	\$63.0	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.2	\$63.2	\$63.2	\$63.2	\$63.2

Delivered Coal Prices

Region (2012\$/short ton)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
ERCOT Houston	\$125	\$130	\$136	\$136	\$136	\$136	\$137	\$137	\$137	\$137	\$137	\$138	\$138	\$138	\$138	\$138	\$138	\$139	\$139	\$139	\$139	\$139	\$139	\$139
PIJM (OMEX)	\$2.07	\$2.09	\$2.12	\$2.12	\$2.12	\$2.13	\$2.14	\$2.14	\$2.15	\$2.16	\$2.17	\$2.18	\$2.18	\$2.18	\$2.18	\$2.19	\$2.19	\$2.20	\$2.21	\$2.21	\$2.22	\$2.23	\$2.24	\$2.25
PIJM West	\$2.71	\$2.73	\$2.76	\$2.77	\$2.79	\$2.82	\$2.84	\$2.85	\$2.86	\$2.86	\$2.87	\$2.87	\$2.87	\$2.87	\$2.87	\$2.88	\$2.88	\$2.88	\$2.88	\$2.88	\$2.88	\$2.89	\$2.89	\$2.89
US Total	\$2.39	\$2.43	\$2.47	\$2.49	\$2.51	\$2.53	\$2.54	\$2.55	\$2.55	\$2.55	\$2.57	\$2.57	\$2.58	\$2.58	\$2.58	\$2.58	\$2.59	\$2.59	\$2.59	\$2.59	\$2.60	\$2.60	\$2.60	\$2.61



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Minemouth Coal Prices-Low Case (2012\$/short ton)

Domestic (2012\$/short ton)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040		
Northern Appalachia 3.6 lb SO2/MMBtu; 12,500 Btu/lb	\$54.5	\$54.8	\$54.6	\$54.7	\$54.8	\$54.8	\$54.9	\$54.9	\$55.0	\$55.1	\$55.1	\$55.1	\$55.2	\$55.2	\$55.2	\$55.2	\$55.3	\$55.3	\$55.3	\$55.7	\$56.2	\$56.7	\$57.2	\$58.2	\$58.7	\$59.2	\$59.7	\$60.2	
Northern Appalachia 4.5 lb SO2/MMBtu; 12,500 Btu/lb	\$51.6	\$52.1	\$52.6	\$53.2	\$53.7	\$53.9	\$54.1	\$54.2	\$54.3	\$54.4	\$54.5	\$54.5	\$54.6	\$54.7	\$54.7	\$54.7	\$54.7	\$54.7	\$54.7	\$55.1	\$55.6	\$56.1	\$56.6	\$57.2	\$57.7	\$58.2	\$58.7	\$59.2	
Central Appalachia 1.1 lb SO2/MMBtu; 11,500 Btu/lb	\$63.9	\$63.8	\$63.7	\$63.6	\$63.5	\$63.4	\$63.3	\$63.2	\$63.1	\$63.0	\$62.9	\$62.8	\$62.7	\$62.6	\$62.5	\$62.4	\$62.3	\$62.2	\$62.1	\$62.0	\$61.9	\$61.8	\$61.7	\$61.6	\$61.5	\$61.4	\$61.3	\$61.2	\$61.1
Central Appalachia 1.6 lb SO2/MMBtu; 11,500 Btu/lb	\$60.9	\$61.8	\$62.7	\$63.6	\$64.5	\$65.4	\$66.3	\$67.2	\$68.1	\$69.0	\$69.9	\$70.8	\$71.7	\$72.6	\$73.5	\$74.4	\$75.3	\$76.2	\$77.1	\$78.0	\$78.9	\$79.8	\$80.7	\$81.6	\$82.5	\$83.4	\$84.3	\$85.2	\$86.1
Powder River Basin 0.8 lb SO2/MMBtu; 8,800 Btu/lb	\$12.3	\$13.1	\$14.0	\$14.2	\$14.4	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5	\$14.5
Powder River Basin 0.8 lb SO2/MMBtu; 8,400 Btu/lb	\$9.9	\$10.3	\$10.7	\$10.9	\$11.2	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3	\$11.3
Illinois Basin 4.5 lb SO2/MMBtu; 11,500 Btu/lb	\$38.3	\$39.0	\$39.8	\$40.1	\$40.3	\$40.4	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5	\$40.5
Illinois Basin 5.5 lb SO2/MMBtu; 11,000 Btu/lb	\$34.4	\$34.9	\$35.4	\$35.8	\$36.3	\$36.7	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1	\$37.1
Bituminous 0.3 lb SO2/MMBtu; 11,700 Btu/lb	\$33.7	\$34.0	\$34.3	\$34.6	\$34.9	\$35.2	\$35.6	\$36.1	\$36.7	\$37.2	\$37.7	\$38.2	\$38.7	\$39.2	\$39.7	\$40.2	\$40.7	\$41.2	\$41.7	\$42.2	\$42.7	\$43.2	\$43.7	\$44.2	\$44.7	\$45.2	\$45.7	\$46.2	\$46.7

Delivered Coal Prices

International (2012\$/short ton)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040		
Australia Newcastle	\$66.0	\$68.1	\$70.2	\$72.3	\$74.5	\$74.5	\$74.6	\$74.7	\$74.7	\$74.8	\$74.8	\$74.8	\$74.8	\$74.9	\$74.9	\$75.0	\$75.0	\$75.1	\$75.1	\$75.1	\$75.1	\$75.1	\$75.1	\$75.1	\$75.1	\$75.1	\$75.1	\$75.1	\$75.1
South Africa Richards Bay	\$67.4	\$68.5	\$69.5	\$70.5	\$71.5	\$71.6	\$71.7	\$71.7	\$71.8	\$71.8	\$71.9	\$71.9	\$71.9	\$72.0	\$72.0	\$72.0	\$72.0	\$72.1	\$72.1	\$72.1	\$72.1	\$72.1	\$72.1	\$72.1	\$72.1	\$72.1	\$72.1	\$72.1	\$72.1
Colombia Puerto Bolivar	\$58.7	\$59.8	\$60.8	\$61.8	\$62.8	\$62.9	\$62.9	\$62.9	\$62.9	\$63.0	\$63.0	\$63.0	\$63.0	\$63.0	\$63.0	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1	\$63.1



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Natural Gas Prices - Reference Case (2012\$/MMBtu)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037		
Henry Hub	\$3.96	\$4.11	\$4.25	\$4.43	\$4.61	\$4.66	\$4.71	\$4.76	\$4.81	\$4.86	\$4.90	\$4.94	\$4.97	\$5.01	\$5.05	\$5.09	\$5.12	\$5.22	\$5.31	\$5.41	\$5.51	\$5.60	\$5.70	\$5.79	\$5.79	
AECO	\$3.68	\$3.73	\$3.78	\$3.96	\$4.13	\$4.20	\$4.27	\$4.34	\$4.41	\$4.43	\$4.52	\$4.57	\$4.62	\$4.67	\$4.71	\$4.76	\$4.81	\$4.90	\$4.98	\$5.07	\$5.16	\$5.25	\$5.34	\$5.43	\$5.43	\$5.43
Chicago	\$5.32	\$4.89	\$4.46	\$4.60	\$4.73	\$4.78	\$4.82	\$4.87	\$4.91	\$4.96	\$4.99	\$5.03	\$5.07	\$5.11	\$5.15	\$5.18	\$5.22	\$5.31	\$5.39	\$5.48	\$5.57	\$5.65	\$5.74	\$5.83	\$5.83	\$5.83
NYC	\$7.84	\$6.58	\$5.32	\$5.50	\$5.68	\$5.69	\$5.71	\$5.73	\$5.75	\$5.77	\$5.79	\$5.81	\$5.83	\$5.84	\$5.86	\$5.88	\$5.90	\$6.01	\$6.11	\$6.22	\$6.33	\$6.44	\$6.55	\$6.65	\$6.65	\$6.65
Dawn	\$6.78	\$5.62	\$4.97	\$5.09	\$5.21	\$5.27	\$5.34	\$5.41	\$5.48	\$5.55	\$5.60	\$5.64	\$5.69	\$5.73	\$5.78	\$5.82	\$5.87	\$5.96	\$6.06	\$6.15	\$6.25	\$6.34	\$6.43	\$6.53	\$6.53	\$6.53
SOCCal Border	\$4.07	\$4.13	\$4.19	\$4.35	\$4.51	\$4.56	\$4.60	\$4.65	\$4.69	\$4.74	\$4.77	\$4.81	\$4.84	\$4.88	\$4.91	\$4.95	\$4.98	\$5.07	\$5.15	\$5.24	\$5.32	\$5.41	\$5.50	\$5.58	\$5.58	\$5.58



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**Natural Gas Prices - High Case (2012\$/MMBtu)**

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Henny Hub	\$3.97	\$4.44	\$4.92	\$5.21	\$5.49	\$5.56	\$5.62	\$5.68	\$5.74	\$5.80	\$5.82	\$5.85	\$5.87	\$5.90	\$5.92	\$5.94	\$5.97	\$6.06	\$6.14	\$6.23	\$6.32	\$6.41	\$6.49	\$6.58
AECO	\$3.69	\$4.08	\$4.46	\$4.75	\$5.04	\$5.12	\$5.19	\$5.27	\$5.35	\$5.43	\$5.46	\$5.50	\$5.53	\$5.56	\$5.60	\$5.63	\$5.66	\$5.74	\$5.83	\$5.91	\$6.00	\$6.07	\$6.15	\$6.23
Chicago	\$5.34	\$5.23	\$5.13	\$5.38	\$5.63	\$5.68	\$5.74	\$5.79	\$5.85	\$5.90	\$5.92	\$5.95	\$5.97	\$6.00	\$6.02	\$6.04	\$6.07	\$6.15	\$6.23	\$6.30	\$6.38	\$6.46	\$6.54	\$6.62
NYC	\$7.86	\$6.94	\$6.02	\$6.31	\$6.61	\$6.64	\$6.67	\$6.69	\$6.72	\$6.75	\$6.75	\$6.76	\$6.76	\$6.76	\$6.77	\$6.77	\$6.77	\$6.87	\$6.97	\$7.07	\$7.17	\$7.27	\$7.37	\$7.47
Dawn	\$6.29	\$5.97	\$5.66	\$5.89	\$6.13	\$6.20	\$6.28	\$6.36	\$6.44	\$6.52	\$6.55	\$6.58	\$6.62	\$6.65	\$6.68	\$6.71	\$6.74	\$6.83	\$6.91	\$7.00	\$7.08	\$7.17	\$7.25	\$7.34
SOCall Border	\$4.08	\$4.47	\$4.85	\$5.13	\$5.40	\$5.46	\$5.51	\$5.57	\$5.63	\$5.68	\$5.70	\$5.75	\$5.75	\$5.77	\$5.79	\$5.81	\$5.83	\$5.91	\$5.99	\$6.07	\$6.14	\$6.22	\$6.30	\$6.38





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Natural Gas Prices - Low Case (2012\$/MMBtu)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044		
Henry Hub	\$3.96	\$4.01	\$4.06	\$4.14	\$4.21	\$4.24	\$4.27	\$4.30	\$4.33	\$4.36	\$4.41	\$4.47	\$4.53	\$4.58	\$4.64	\$4.70	\$4.75	\$4.83	\$4.91	\$4.99	\$5.06	\$5.14	\$5.22	\$5.30	\$5.38	\$5.46	\$5.54	\$5.62	\$5.70	\$5.78	\$5.86	\$5.94	
AECO	\$3.68	\$3.63	\$3.58	\$3.65	\$3.73	\$3.77	\$3.82	\$3.87	\$3.91	\$3.96	\$4.03	\$4.09	\$4.16	\$4.23	\$4.30	\$4.36	\$4.43	\$4.50	\$4.57	\$4.64	\$4.71	\$4.78	\$4.85	\$4.92	\$4.99	\$5.06	\$5.13	\$5.20	\$5.27	\$5.34	\$5.41	\$5.48	\$5.55
Chicago	\$5.32	\$4.79	\$4.26	\$4.30	\$4.34	\$4.36	\$4.38	\$4.40	\$4.43	\$4.45	\$4.51	\$4.56	\$4.62	\$4.68	\$4.73	\$4.79	\$4.85	\$4.92	\$4.99	\$5.05	\$5.12	\$5.19	\$5.26	\$5.33	\$5.40	\$5.47	\$5.54	\$5.61	\$5.68	\$5.75	\$5.82	\$5.89	\$5.96
NYC	\$7.84	\$6.47	\$5.11	\$5.18	\$5.26	\$5.25	\$5.25	\$5.25	\$5.25	\$5.24	\$5.28	\$5.32	\$5.36	\$5.40	\$5.43	\$5.47	\$5.51	\$5.56	\$5.60	\$5.69	\$5.78	\$5.87	\$5.96	\$6.05	\$6.14	\$6.23	\$6.32	\$6.41	\$6.50	\$6.59	\$6.68	\$6.77	\$6.86
Dawn	\$6.28	\$5.52	\$4.77	\$4.78	\$4.80	\$4.84	\$4.89	\$4.94	\$4.98	\$5.03	\$5.09	\$5.16	\$5.22	\$5.29	\$5.35	\$5.42	\$5.48	\$5.56	\$5.64	\$5.71	\$5.79	\$5.86	\$5.94	\$6.01	\$6.08	\$6.15	\$6.22	\$6.29	\$6.36	\$6.43	\$6.50	\$6.57	\$6.64
SOGB Border	\$4.07	\$4.03	\$4.00	\$4.06	\$4.12	\$4.14	\$4.16	\$4.18	\$4.21	\$4.23	\$4.28	\$4.34	\$4.39	\$4.45	\$4.50	\$4.55	\$4.61	\$4.68	\$4.74	\$4.81	\$4.88	\$4.95	\$5.01	\$5.08	\$5.14	\$5.20	\$5.26	\$5.32	\$5.38	\$5.44	\$5.50	\$5.56	\$5.62



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**On-Peak Power Prices-Reference Case (2012\$/MWh)**

(2012\$/MWh)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Southern California <sup>1</sup>	\$49.3	\$50.2	\$51.1	\$52.6	\$54.0	\$55.8	\$57.6	\$58.4	\$59.3	\$60.1	\$60.4	\$60.6	\$60.8	\$61.0	\$61.2	\$61.5	\$61.7	\$63.1	\$64.5	\$65.9	\$67.4	\$68.9	\$70.4	\$72.0
Houston <sup>1</sup>	\$37.6	\$39.1	\$40.6	\$42.0	\$43.4	\$45.1	\$46.8	\$47.8	\$48.7	\$49.7	\$50.8	\$52.0	\$53.1	\$54.3	\$55.5	\$56.7	\$58.0	\$59.9	\$62.0	\$64.1	\$66.2	\$68.5	\$70.8	\$73.2
Mass Hub <sup>2</sup>	\$65.5	\$61.1	\$56.8	\$59.5	\$62.3	\$64.0	\$65.7	\$64.4	\$63.2	\$62.0	\$62.6	\$63.2	\$63.8	\$64.3	\$64.9	\$65.5	\$66.2	\$68.2	\$70.3	\$72.5	\$74.7	\$77.1	\$79.4	\$81.9
NYC <sup>2</sup>	\$75.5	\$70.7	\$65.9	\$67.9	\$69.8	\$71.3	\$72.7	\$73.3	\$73.9	\$74.5	\$75.5	\$76.5	\$77.5	\$78.5	\$79.6	\$80.7	\$81.7	\$83.9	\$86.0	\$88.3	\$90.6	\$92.9	\$95.3	\$97.8
PJM Western Hub <sup>2</sup>	\$51.1	\$50.3	\$49.5	\$49.3	\$49.1	\$50.5	\$51.8	\$52.3	\$52.9	\$53.4	\$54.2	\$55.1	\$56.0	\$56.8	\$57.7	\$58.7	\$59.6	\$61.6	\$63.8	\$66.0	\$68.2	\$70.6	\$73.0	\$75.6
PJM COMED <sup>2</sup>	\$41.9	\$43.2	\$44.5	\$46.0	\$47.5	\$48.6	\$49.8	\$51.1	\$52.4	\$53.8	\$55.2	\$56.6	\$58.1	\$59.6	\$61.2	\$62.8	\$64.5	\$66.7	\$69.0	\$71.4	\$73.9	\$76.5	\$79.1	\$81.9

<sup>1</sup>Peak reflects Monday through Saturday 7:00 AM to 11:00 PM

<sup>2</sup>Peak reflects Monday through Sunday, 7:00 AM to 11:00 PM

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On-Peak Power Prices-High Case (2012\$/MWh)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	
Southern California <sup>1</sup>	\$49.4	\$52.9	\$56.3	\$58.6	\$60.8	\$62.7	\$64.7	\$66.3	\$68.0	\$69.7	\$71.8	\$73.9	\$76.1	\$78.3	\$80.6	\$82.9	\$85.3	\$87.4	\$89.1	\$90.9	\$92.7	\$94.6	\$96.5	\$98.5	\$90.5
Houston <sup>1</sup>	\$37.8	\$41.7	\$45.7	\$48.4	\$51.1	\$53.2	\$55.4	\$56.0	\$56.5	\$57.1	\$58.0	\$59.7	\$61.5	\$63.9	\$66.6	\$69.6	\$72.0	\$74.3	\$76.7	\$79.1	\$81.6	\$84.2	\$86.9	\$89.7	\$91.0
Mass-Hub <sup>2</sup>	\$65.5	\$63.8	\$62.0	\$65.7	\$69.3	\$71.2	\$73.1	\$71.1	\$69.2	\$67.3	\$67.9	\$68.6	\$69.3	\$69.9	\$70.6	\$71.3	\$72.0	\$74.3	\$74.3	\$76.7	\$79.1	\$81.6	\$84.2	\$86.9	\$88.7
NYC <sup>2</sup>	\$75.5	\$73.2	\$70.9	\$73.5	\$76.2	\$78.1	\$80.1	\$80.4	\$80.7	\$80.9	\$81.9	\$82.9	\$83.9	\$84.9	\$85.9	\$86.9	\$87.9	\$90.2	\$90.2	\$92.6	\$95.0	\$97.5	\$100.1	\$102.7	\$105.4
PJM Western Hub <sup>2</sup>	\$51.2	\$52.4	\$53.6	\$55.0	\$56.4	\$58.1	\$59.8	\$59.6	\$59.4	\$59.1	\$60.0	\$61.0	\$61.9	\$62.9	\$63.8	\$64.8	\$65.8	\$68.1	\$68.1	\$70.5	\$73.0	\$75.5	\$78.2	\$80.9	\$82.8
PJM COMED <sup>2</sup>	\$42.0	\$45.0	\$48.0	\$50.2	\$52.4	\$54.0	\$55.7	\$56.6	\$57.5	\$58.4	\$59.6	\$60.9	\$62.2	\$63.5	\$64.9	\$66.2	\$67.7	\$70.2	\$70.2	\$72.9	\$75.7	\$78.6	\$81.6	\$84.7	\$87.9

<sup>1</sup>Peak reflects Monday through Saturday 7:00 AM to 11:00 PM

<sup>2</sup>Peak reflects Monday through Sunday, 7:00 AM to 11:00 PM

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**On-Peak Power Prices-Low Case (2012\$/MWh)**

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Southern California <sup>1</sup>	\$49.2	\$49.5	\$48.9	\$50.6	\$51.4	\$52.4	\$53.4	\$54.2	\$55.0	\$55.8	\$56.1	\$56.4	\$56.6	\$56.9	\$57.2	\$57.4	\$57.7	\$58.9	\$60.2	\$61.4	\$62.7	\$64.1	\$65.4	\$66.8
Houston <sup>2</sup>	\$37.4	\$38.3	\$39.1	\$39.6	\$40.0	\$41.0	\$41.9	\$43.5	\$45.2	\$46.9	\$47.9	\$48.9	\$50.0	\$51.0	\$52.1	\$53.2	\$54.3	\$56.0	\$57.7	\$59.4	\$61.2	\$63.1	\$65.0	\$66.9
Midwest Hub <sup>3</sup>	\$65.5	\$60.3	\$55.2	\$57.4	\$59.6	\$61.3	\$63.0	\$61.8	\$60.6	\$59.5	\$60.0	\$60.5	\$61.1	\$61.6	\$62.1	\$62.6	\$63.2	\$64.9	\$66.6	\$68.3	\$70.1	\$72.0	\$73.9	\$75.8
NYC <sup>1</sup>	\$75.5	\$70.1	\$64.7	\$66.1	\$67.5	\$68.6	\$69.7	\$70.3	\$71.0	\$71.7	\$72.6	\$73.5	\$74.4	\$75.4	\$76.3	\$77.3	\$78.3	\$80.1	\$81.9	\$83.7	\$85.6	\$87.6	\$89.6	\$91.6
PJM Western Hub <sup>2</sup>	\$51.0	\$49.7	\$48.4	\$47.7	\$46.9	\$48.0	\$49.1	\$49.6	\$50.0	\$50.5	\$51.3	\$52.1	\$52.9	\$53.7	\$54.6	\$55.5	\$56.3	\$58.1	\$60.0	\$61.9	\$63.9	\$65.9	\$68.0	\$70.2
PJM COMED <sup>3</sup>	\$41.9	\$42.6	\$43.4	\$44.3	\$45.2	\$46.0	\$46.9	\$48.5	\$50.2	\$51.9	\$53.5	\$55.1	\$56.8	\$58.6	\$60.3	\$62.2	\$64.1	\$65.6	\$67.2	\$68.8	\$70.5	\$72.2	\$74.0	\$75.7

<sup>1</sup>Peak reflects Monday through Saturday 7:00 AM to 11:00 PM

<sup>2</sup>Peak reflects Monday through Sunday, 7:00 AM to 11:00 PM

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Renewable Energy Certificate (REC) Prices-Reference Case (2012\$/MWh)

Renewable Energy Certificates	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	
California Delivered (10 Yr PPA)	\$28.6	\$25.5	\$23.3	\$22.0	\$20.2	\$18.1	\$15.5	\$12.5	\$9.6	\$7.1	\$4.7	\$3.1	\$2.2	\$1.6	\$1.3	\$1.1	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0
PIIM (5 Yr PPA)	\$18.7	\$21.1	\$22.5	\$22.8	\$23.1	\$23.2	\$23.3	\$23.4	\$23.2	\$22.8	\$22.0	\$21.2	\$20.4	\$18.7	\$16.3	\$13.4	\$10.2	\$6.7	\$4.4	\$2.9	\$2.0	\$1.4	\$1.1	\$1.0	\$1.0
New England (10 Yr PPA)	\$40.5	\$39.1	\$39.3	\$41.1	\$42.9	\$44.7	\$46.5	\$48.3	\$49.7	\$50.6	\$51.1	\$51.1	\$50.7	\$49.9	\$48.5	\$46.6	\$44.2	\$41.2	\$38.4	\$36.0	\$33.7	\$31.6	\$29.8	\$28.3	\$28.3



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Renewable Energy Certificate (REC) Prices-High Case (2012\$/MWh)

Renewable Energy Certificate	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050				
California Deliverer (10 Yr PPA)	\$19.5	\$15.2	\$12.8	\$11.5	\$10.0	\$8.2	\$6.7	\$5.5	\$4.5	\$3.5	\$2.7	\$2.1	\$1.6	\$1.3	\$1.2	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0		
PAW (5 Yr PPA)	\$18.8	\$18.5	\$19.7	\$20.3	\$20.8	\$21.2	\$21.4	\$21.1	\$21.1	\$20.5	\$19.5	\$18.6	\$17.7	\$16.1	\$14.0	\$11.6	\$8.9	\$6.0	\$4.0	\$2.7	\$1.9	\$1.4	\$1.1	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	
New England (10 Yr PPA)	\$37.2	\$35.2	\$35.1	\$36.7	\$38.3	\$39.9	\$41.5	\$43.1	\$44.3	\$45.0	\$45.2	\$45.0	\$44.4	\$43.3	\$41.5	\$39.5	\$37.2	\$34.3	\$31.9	\$29.8	\$28.0	\$26.7	\$25.6	\$24.9	\$24.9	\$24.9	\$24.9	\$24.9	\$24.9	\$24.9	\$24.9	\$24.9	\$24.9	\$24.9	\$24.9	\$24.9	\$24.9	\$24.9	\$24.9	\$24.9	\$24.9



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Renewable Energy Certificate (REC) Prices - Low Case (2012\$/MWh)

Renewable Energy Certificate	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	
California Delivered (10 Yr PPA)	\$51.2	\$48.5	\$46.5	\$45.2	\$43.6	\$41.8	\$39.1	\$36.2	\$33.7	\$31.7	\$29.3	\$27.3	\$25.3	\$23.3	\$21.3	\$19.3	\$17.0	\$15.0	\$13.0	\$11.0	\$10.0	\$10.0	\$10.0	\$10.0	\$10.0
PNM (5 Yr PPA)	\$19.7	\$22.4	\$24.1	\$24.5	\$24.8	\$25.0	\$25.2	\$25.4	\$25.4	\$25.4	\$25.4	\$25.4	\$25.4	\$25.4	\$25.4	\$25.4	\$25.4	\$25.4	\$25.4	\$25.4	\$25.4	\$25.4	\$25.4	\$25.4	\$25.4
New England (10 Yr PPA)	\$42.2	\$41.1	\$41.5	\$43.4	\$45.3	\$47.2	\$49.1	\$51.0	\$52.5	\$53.6	\$54.3	\$54.5	\$54.3	\$53.7	\$52.6	\$50.9	\$48.5	\$46.6	\$44.8	\$43.1	\$40.1	\$37.5	\$35.0	\$32.7	\$30.6



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**Emission Allowance Prices (2012\$/short ton)**

NOTE: The CAIR regional prices shown below do not vary by case (Base/Low/High). State-specific prices post 2018, discussed in note (2) below, may vary by price.

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
National CO <sub>2</sub> (t/kt)	\$2	\$3	\$2	\$2	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1
CAIR SO <sub>2</sub>	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40
CAIR Regional NO <sub>x</sub>	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40
CAIR Regional NO <sub>x</sub>	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40

(1) The \$40/short ton value for the NO<sub>x</sub> programs reflects the total cost of NO<sub>x</sub> compliance for the year for affected sources, including in states subject to both ozone and annual limits. States will not pay for the sum of both programs in the ozone season (May-September).

(2) Beginning in 2018, the CAIR annual price cap for NO<sub>x</sub> will be \$40/short ton. In response to 2018, the CAIR annual price cap for SO<sub>2</sub> will be \$40/short ton. CAIR prices are also specific to the state. For more information, please contact the Outlook authors.

