Appendix F: Additional Regional Detail for Economic Cost Estimates

This appendix presents figures with additional regional economic impacts related to the illustrative control strategies developed for the 15/35 and 14/35 standards. Rather than showing an East-West separation for the country, findings are given for all five regions in the EMPAX-CGE model. Figures F-1a, F-1b, F-2a and F-2b have additional detail on changes in energy markets, and Figures F-3a, F-3b, F-4a and F-4b give disaggregated regional results for the energy-intensive industries shown in Figures 7-4 and 7-5 of the RIA.

Under the 15/35 alternative, effects on energy production are quite limited. On average across all energy types, output, as measured in quantity (or unit) terms in Figures F-1a and F-1a, declines by approximately three one-hundredths of one percent (0.03%). Impacts on electricity generation are slightly higher at one-tenth of one percent, driven largely by modestly higher costs in the Northeast. For 14/35, the illustrative controls assume additional measures are taken by electric utilities. As shown in Figure F-2a, this leads to additional adjustments in electricity output, which in turn has spillover effects on coal consumption (90% of coal is used for electricity generation). Figures F-1b and F-2b, which show the changes in terms of industrial gross revenues (these combine any declines in output with any changes in production costs or prices), generally go the same direction as the quantity changes – with the exception of electricity, which has lower output quantities, but higher gross revenues because of changes in production costs and hence prices.

Figures F-3a and F-4a (output quantities) give the regional detail behind Figures 7-4a and 7-5a in the main text, and Figures F-3b and F-4b (revenues) have the same detail for Figures 7-4b and 7-5b. These show that, although the illustrative controls for these alternative standards may tend to redistribute production around the nation (and across states within model regions), the majority of the impacts are less than one tenth of one percent. The disaggregated regional results do indicate, however, that an industry such as cement could experience relatively larger effects than other industries, especially within specific regions. However, as mentioned in Chapter 7, States' SIP strategies may be designed to mitigate such outcomes.

As with the main findings in Chapter 7, it is important to note when examining such findings that these impacts and redistributions are directly related to the specific control options assumed in the illustrative 15/35 and 14/35 analyses, and that attainment could be met through alternative approaches. Thus, while EPA provides this analysis as guidance for States, it is expected that States will evaluate the best strategies for achieving compliance and may choose options that could significantly alter these regional effects. Therefore, SIPs will most likely be different than the strategies developed in this RIA and could be designed to alleviate any disproportionate impacts on sensitive industries.

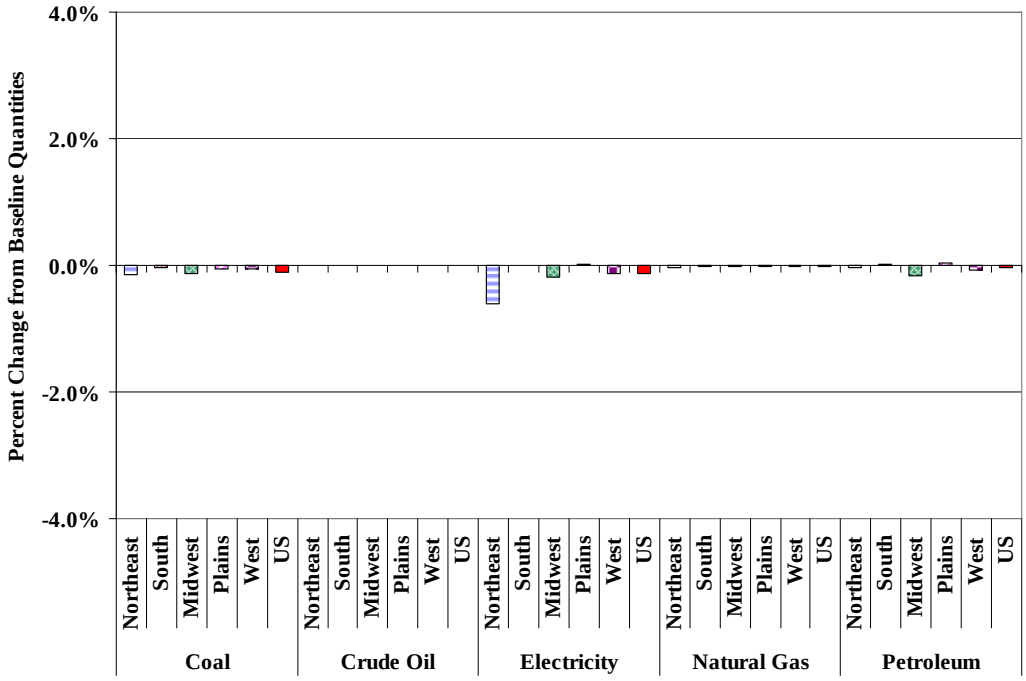

Figure F-1a. $PM_{2.5}$ NAAQS 15/35 Impacts on Regional Energy Output Quantities, 2020

Source: EMPAX-CGE

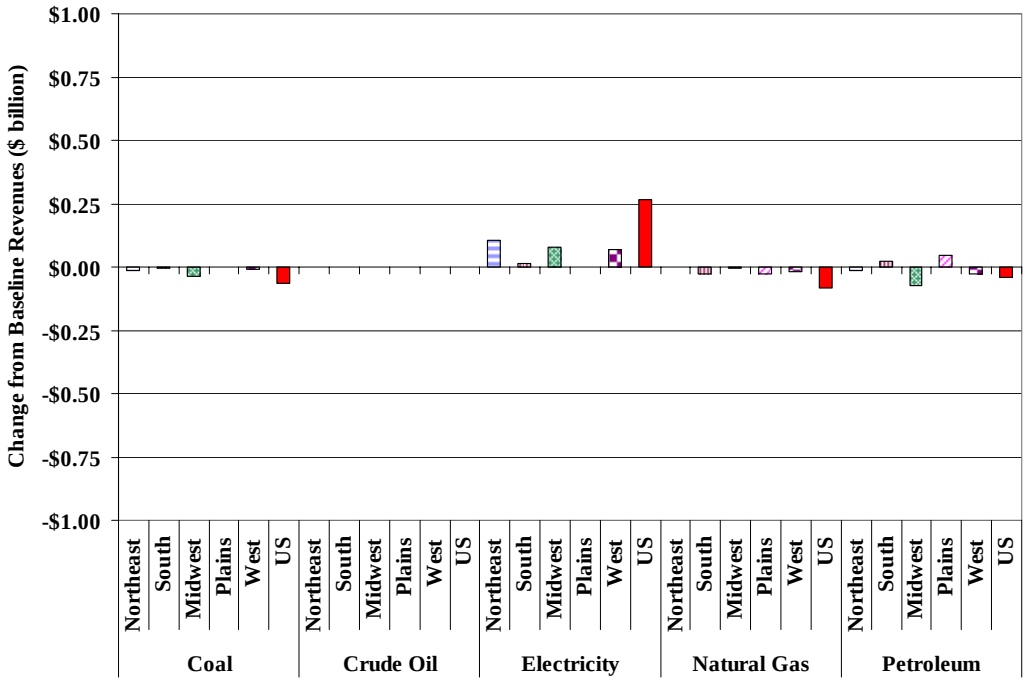

Figure F-1b. $PM_{2.5}$ NAAQS 15/35 Impacts on Regional Energy Output Revenues, 2020

Source: EMPAX-CGE

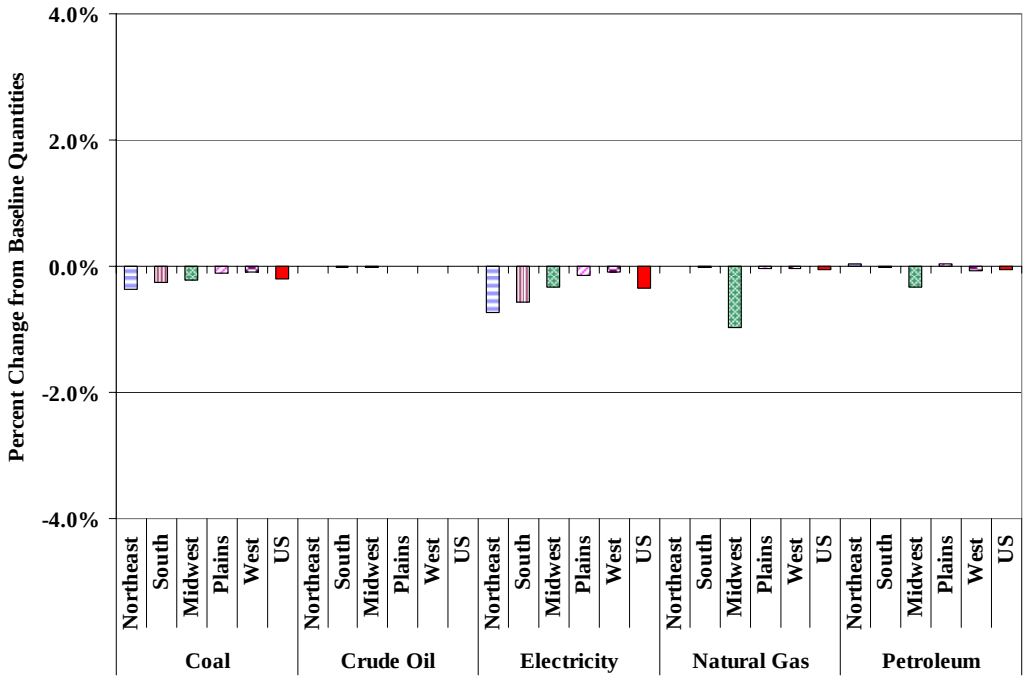

Figure F-2a. $PM_{2.5}$ NAAQS 14/35 Impacts on Regional Energy Output Quantities, 2020

Source: EMPAX-CGE

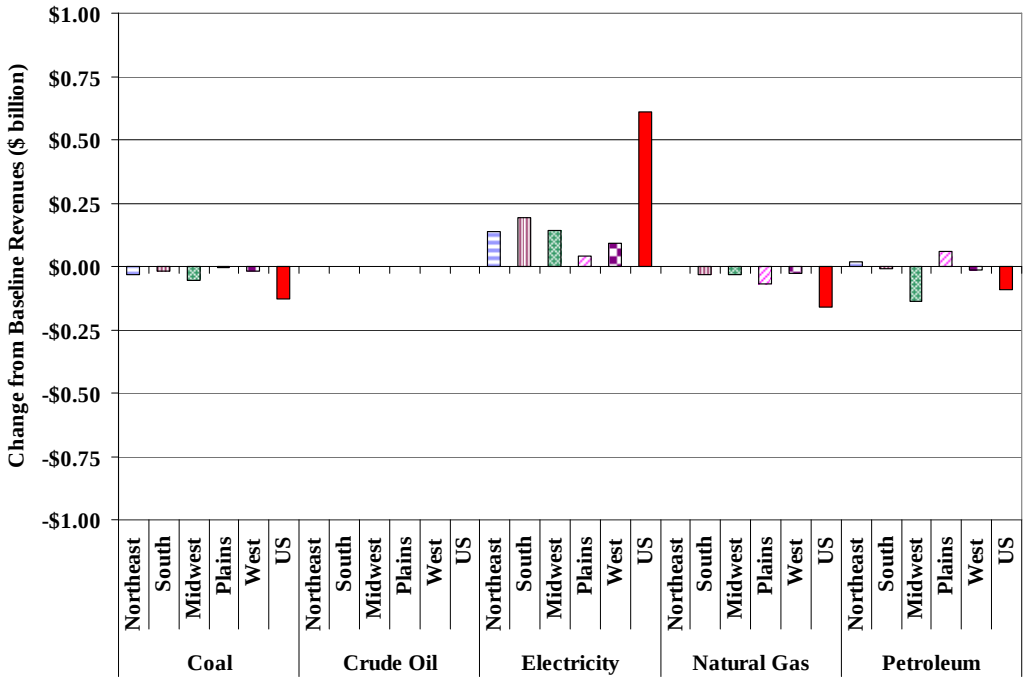

Figure F-2b. $PM_{2.5}$ NAAQS 14/35 Impacts on Regional Energy Output Revenues, 2020

Source: EMPAX-CGE

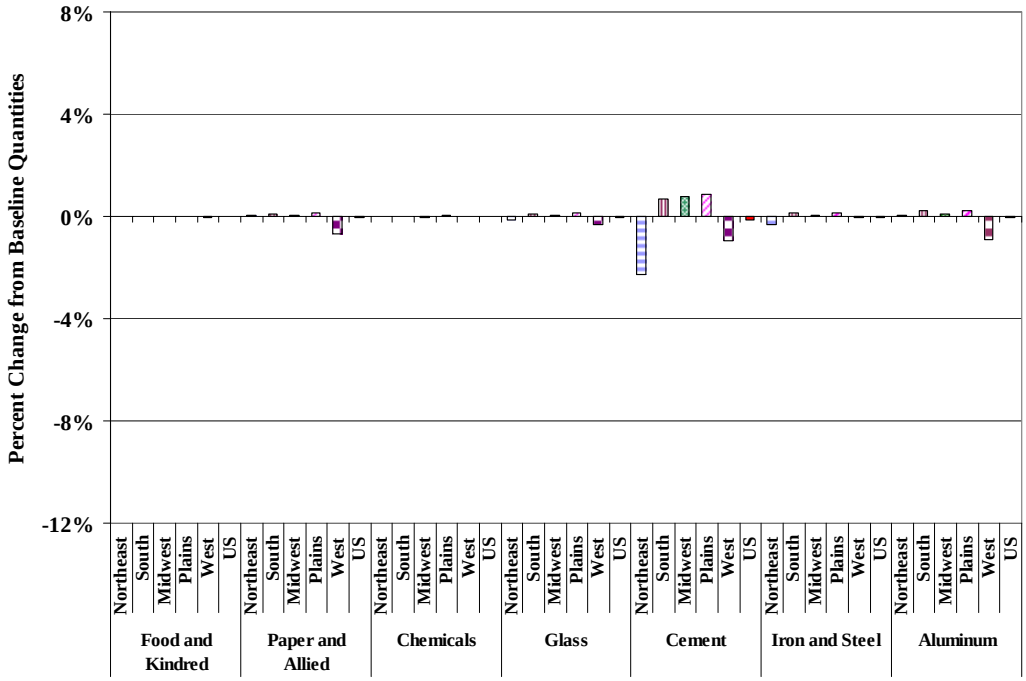

Figure F-3a. $PM_{2.5}$ NAAQS 15/35 Impacts on Regional Energy-Intensive Output Quantities, 2020

Source: EMPAX-CGE

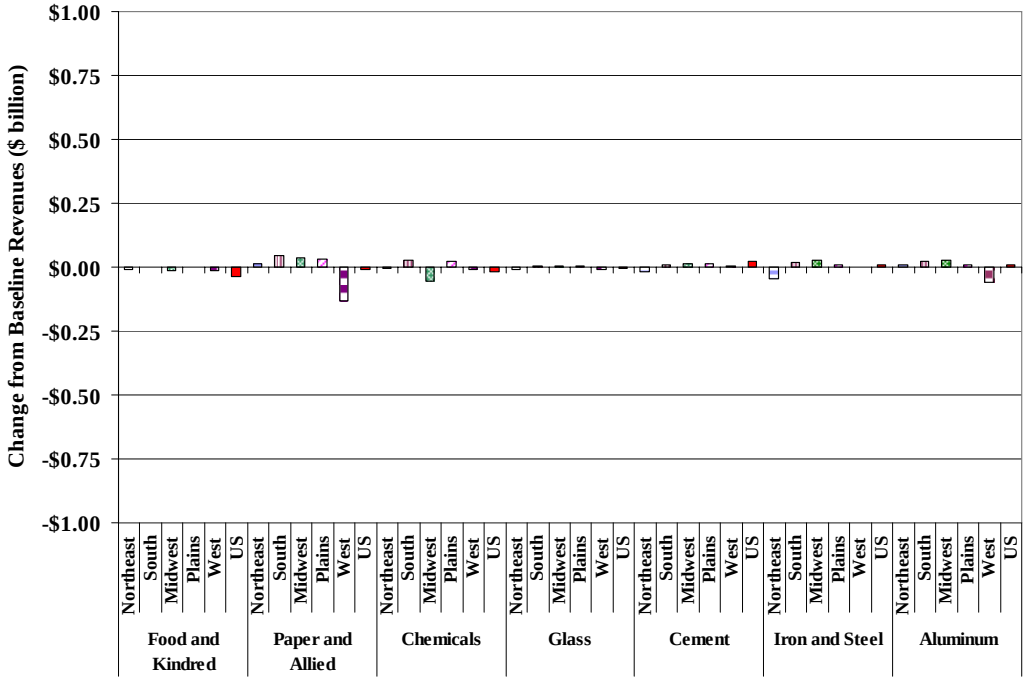

Figure F-3b. $PM_{2.5}$ NAAQS 15/35 Impacts on Regional Energy-Intensive Output Revenues, 2020

Source: EMPAX-CGE

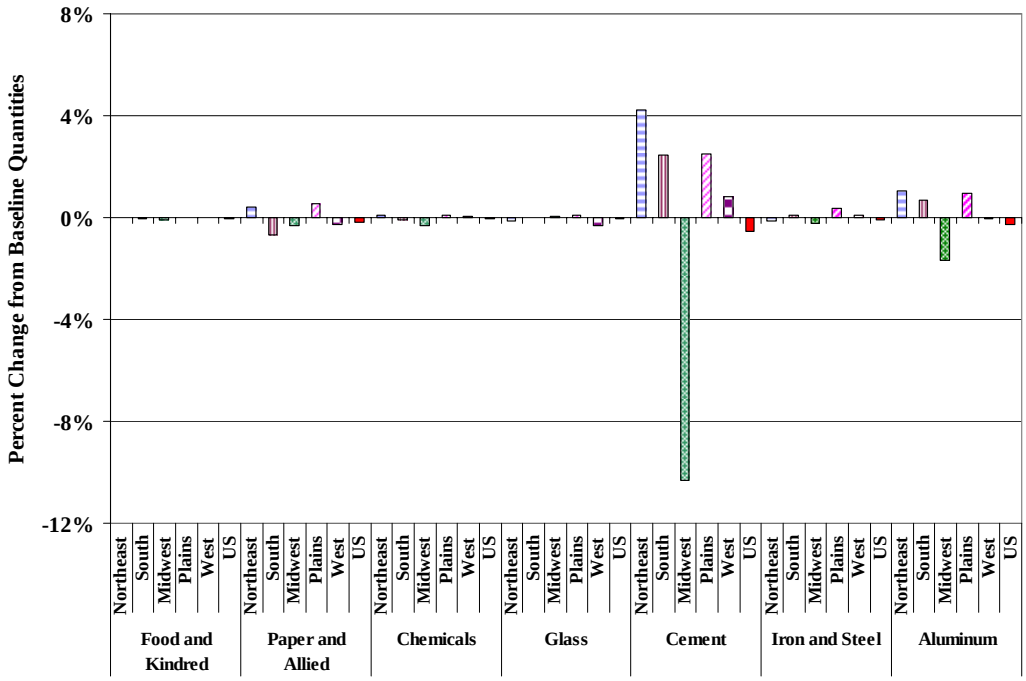

Figure F-4a. $PM_{2.5}$ NAAQS 14/35 Impacts on Regional Energy-Intensive Output Quantities, 2020

Source: EMPAX-CGE

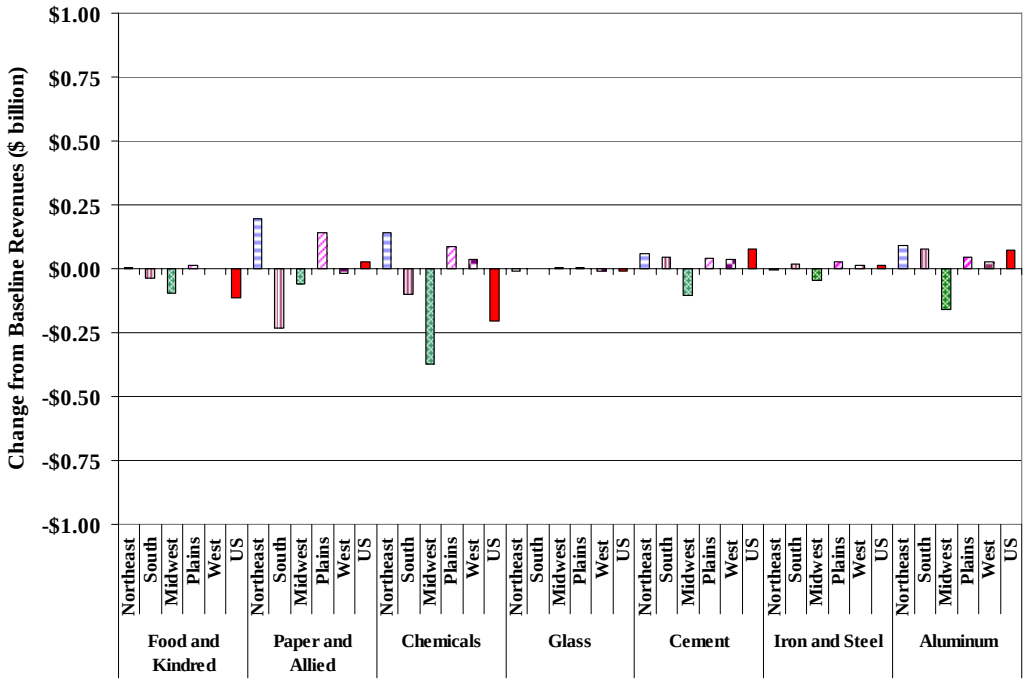

Figure F-4b. $PM_{2.5}$ NAAQS 14/35 Impacts on Regional Energy-Intensive Output Revenues, 2020

Source: EMPAX-CGE