

Second Midterm Exam

Each part of each question (a, b, c, etc.) is worth 5 points. Make sure to allot your time accordingly. Total of 30 points, -1 for messiness, -2 for extreme messiness.

1. *CoalNaturalGas*. There are two electricity plants, one called AG which uses coal and one called WG which uses natural gas.

Both plants face the same demand curve, which has elasticity of infinity and a price of \$90 per MWh (megawatt-hour).

AG has an upward-sloping marginal cost curve of $MC(Q) = 10 + 0.1Q$.

WG has an upward-sloping marginal cost curve of $MC(Q) = 25 + 0.1Q$.

Both firms behave as perfect competitors.

- (a) What are the supply curves of AG and WG?
- (b) Draw two supply-and-demand diagrams for the two plants.
- (c) Explain in words why the demand curve $|\epsilon| = \infty$.
- (d) WG produces about \$25 in external costs per MWh due to carbon dioxide (global warming) emissions. Find its social supply curve and its socially optimal amount of production.
- (e) AG produces \$50 in external costs per MWh due to carbon dioxide (global warming) emissions. Show graphically whether AG's socially optimal production is larger or smaller than WG's.
- (f) Suppose the government levied a tax of \$50 per MWh on *all* electricity production. Would this be socially optimal for

these two plants? Would it create deadweight loss? Illustrate your answer on your two diagrams.

(g) Who are the CEOs of AG and WG? (0 points)

When you are finished, please keep the exam sheet and hand in your blue book. Thanks.

Happy Thanksgiving!