

Consequences of economic decisions on emissions

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OS/APS and
OS & SOS/AAPT

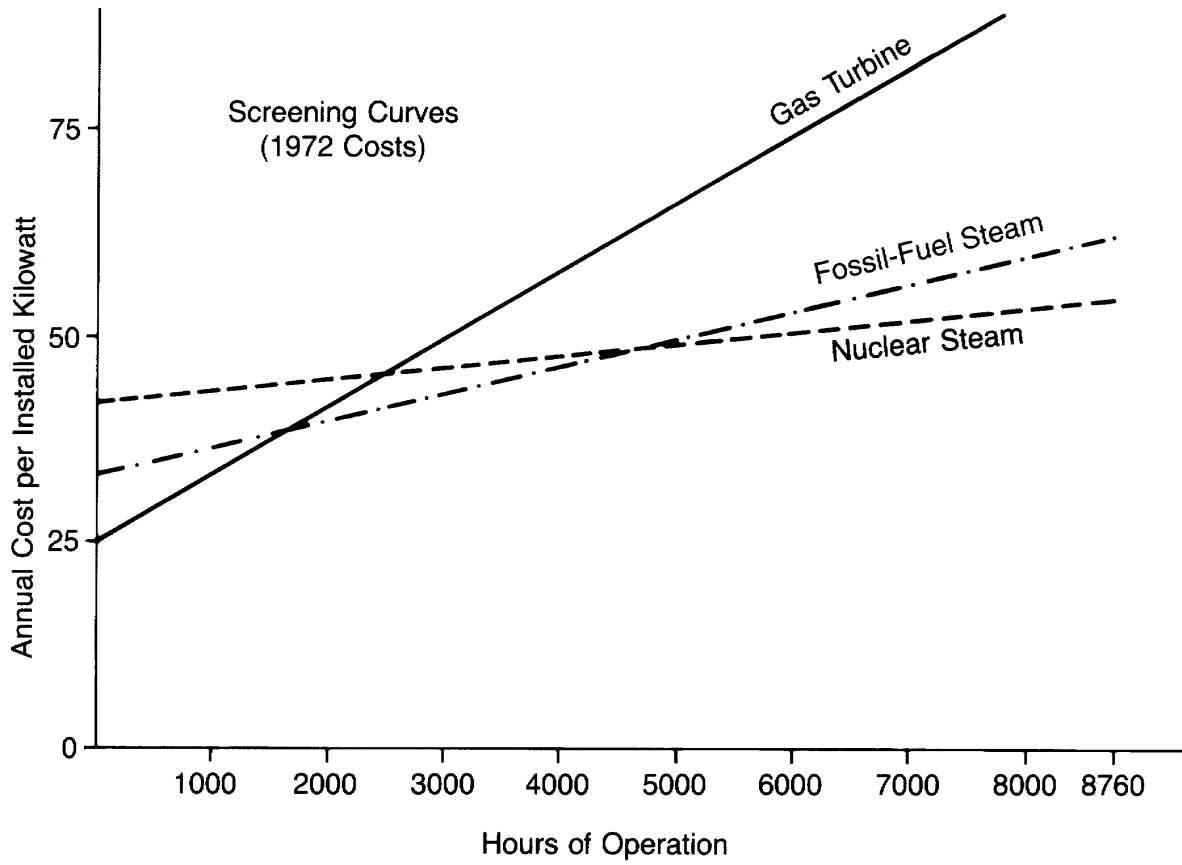
Utilities use screening curves to decide how to mix their generating units. In the last 30 years, substantial changes in these curves have been experienced. The implications for electricity production of these changes are examined.

What is a “screening curve”?

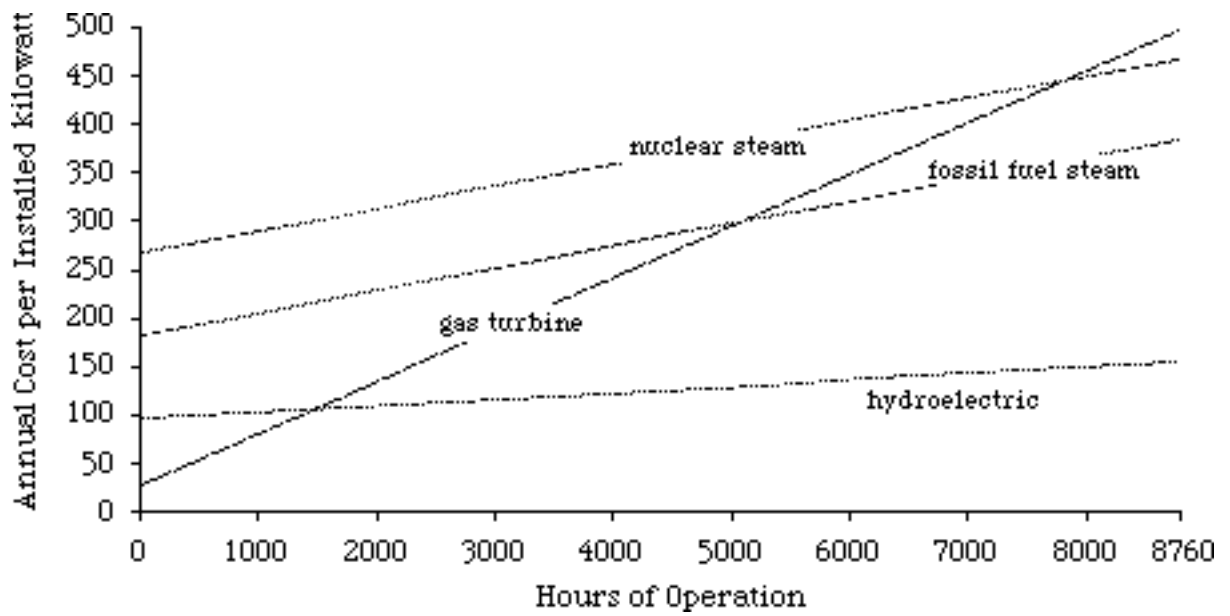
It is a graph that has the **time** (in hours) along the ordinate and the **total cost** (in dollars) along the abscissa.

Total cost has two parts—
capital expense (total capital expense, including interest, amortized over some period, say, 30 years), and
operating expense per hour, made up of
O&M costs and
fuel costs.

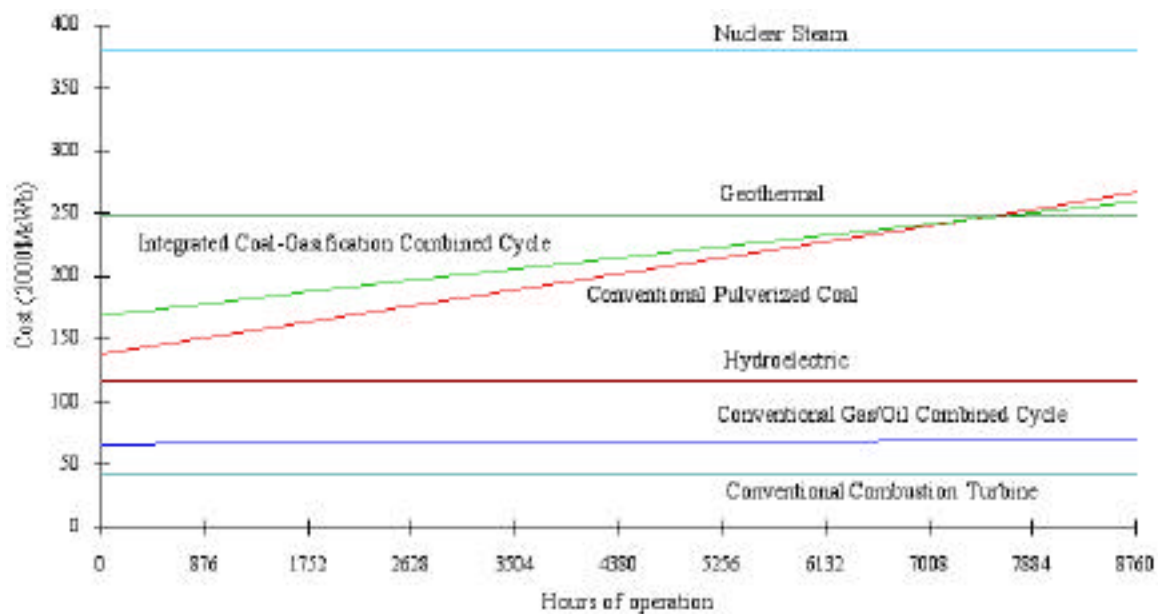
Example, ~ 30 years ago.



Example, ~ 10 years ago.



Today . . .



What happened?

Several things . . .

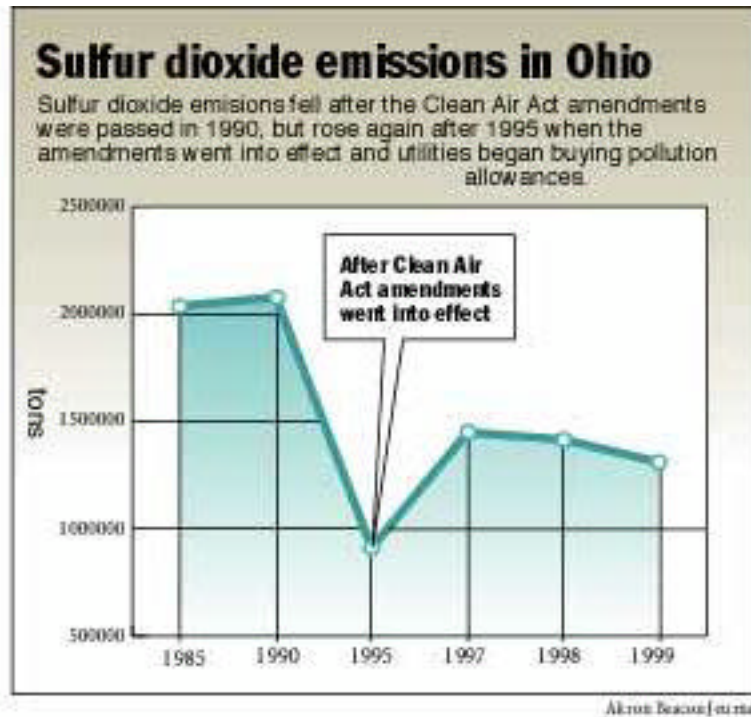
- Jet turbines make good electric turbines
- Modularity rules
- Scrubbing much less expensive than expected with combined cycle operations

What could affect this?

True costing of emissions . . .

NO_x , not overly large in most cases now

SO_x , still lots, even with scrubbing (Ohio emits about one-third the national total for sulfur!)



Acid rain



The Gen. J.M. Gavin plant is Ohio's largest coal-fired plant. (Bob DeMay)

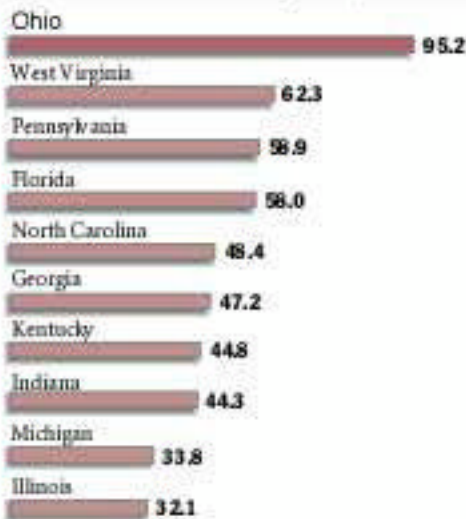
blue cloud (sulfuric acid) from Gavin power plant & the story of Cheshire, Ohio



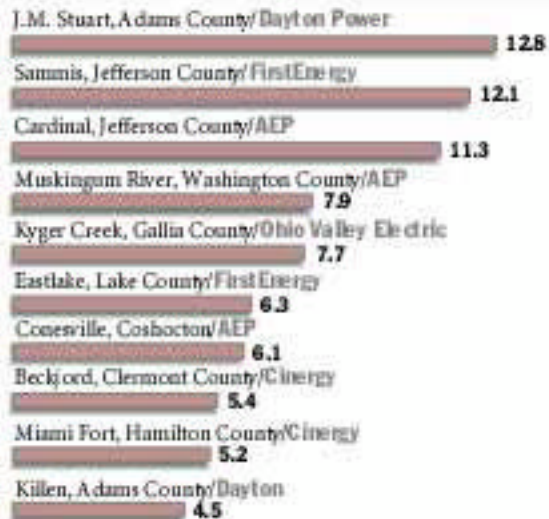
Toxic inventory

Ohio and its coal-burning utilities released the largest amount of toxic chemicals into the air in 1998, according to the federal Toxic Release Inventory. The major pollutants were hydrochloric acid, sulfuric acid, ammonia and heavy metals, all derived from burning coal. The TRI, mandated under 1986 right-to-know legislation, was topped by chemical companies, steel makers and manufacturers, until power plants were added in 1998 for the first time. The list contains 600 toxic chemicals. The report includes how much of each chemical was released and where it went, without indicating the rate or concentration.

The Top Ten states for air emissions from power plants:
(figures are in millions of pounds)



The Top Ten sources of air toxics in Ohio are all coal-burning power plants:
(figures are in millions of pounds)



SOURCE: U.S. Environmental Protection Agency

carbon dioxide emissions, ~ \$15/t
removal, sequestration cost



mine fires . . . Centralia, PA



There are about **3,000** coal mine fires currently burning in what country?

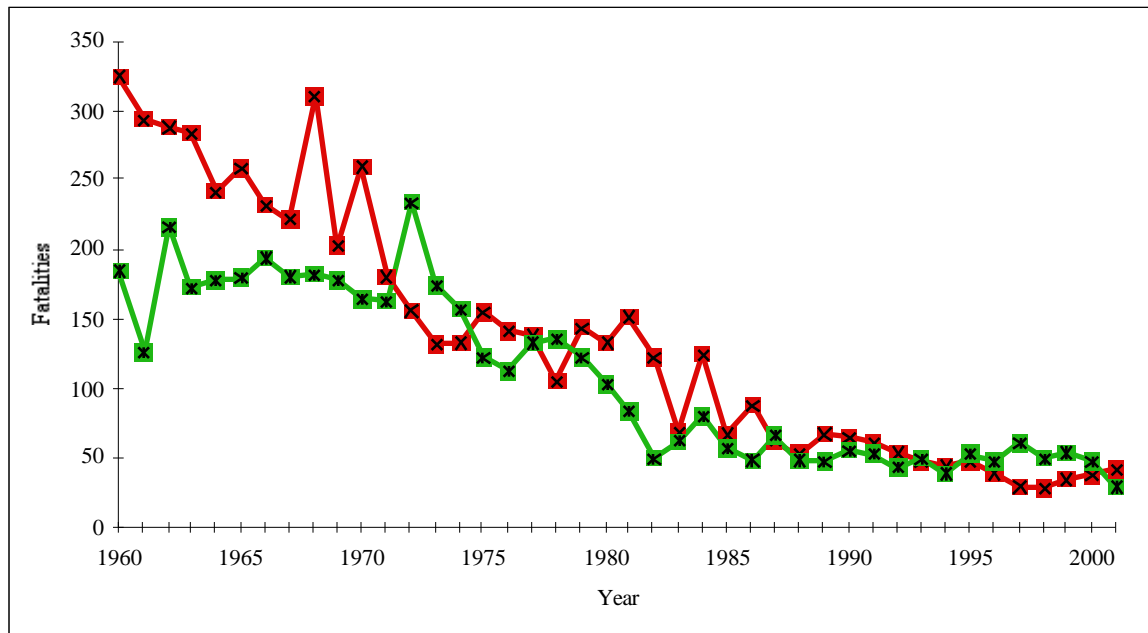
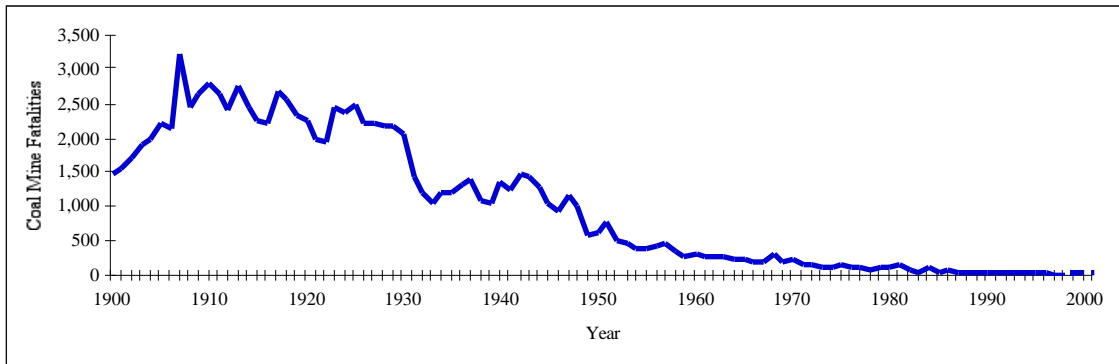
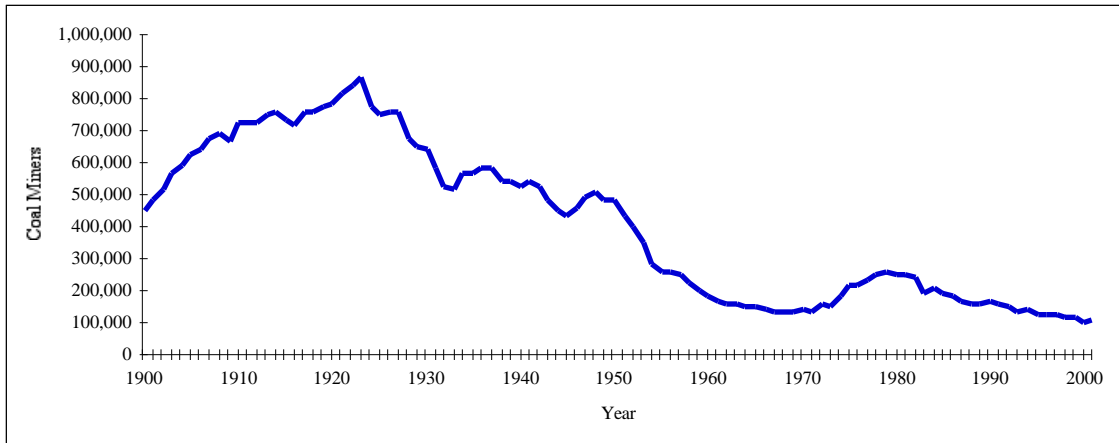
- the United States
- China
- India

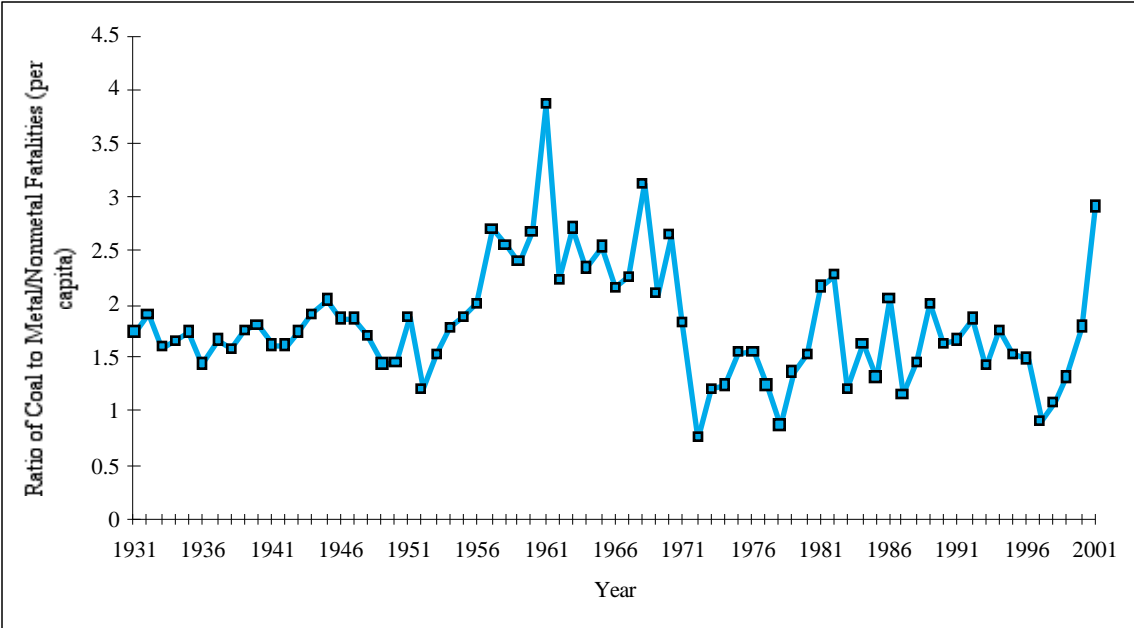
“Mountaintopping” coal mining . . .



Robert M. Bays, regional manager of Arch Coal Inc., inspects the moonscape of Hobet 21 mine near Madison, W. Va.

And miners who die:





Questions to be considered:

Should **economic** decisions on the fuel/generator be the decisive ones?

What is the role of **emissions control** of ordinary pollutants on type of generator used?

What should be done about **CO₂ production**?

Is **health and safety** of workers and the public a legitimate factor in deciding on what fuel/generating facility type to use?