

# Utility Screening curves; changes and their implications

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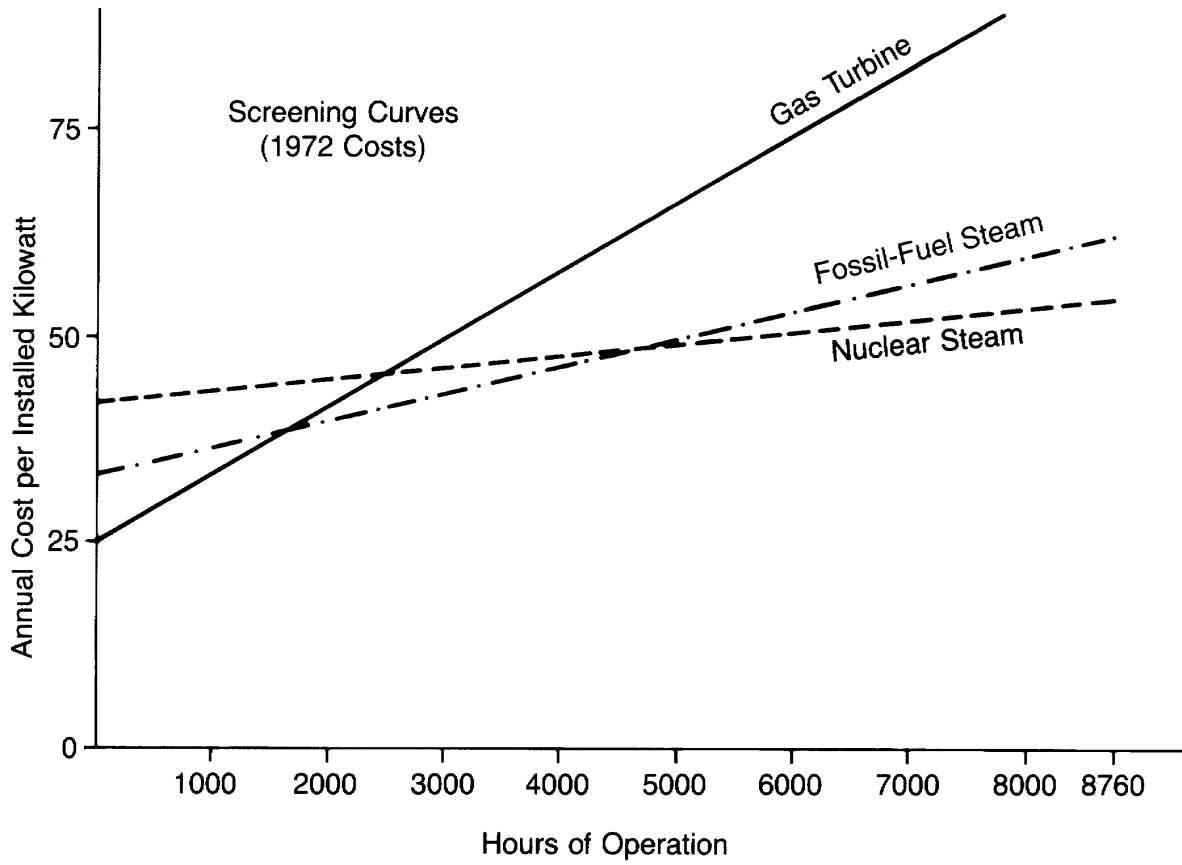
Utilities use screening curves to decide how to mix their generating units. In the last 30 years, substantial changes in these curves have been experienced. The implications for electricity production of these changes are examined.

# What is a “screening curve”?

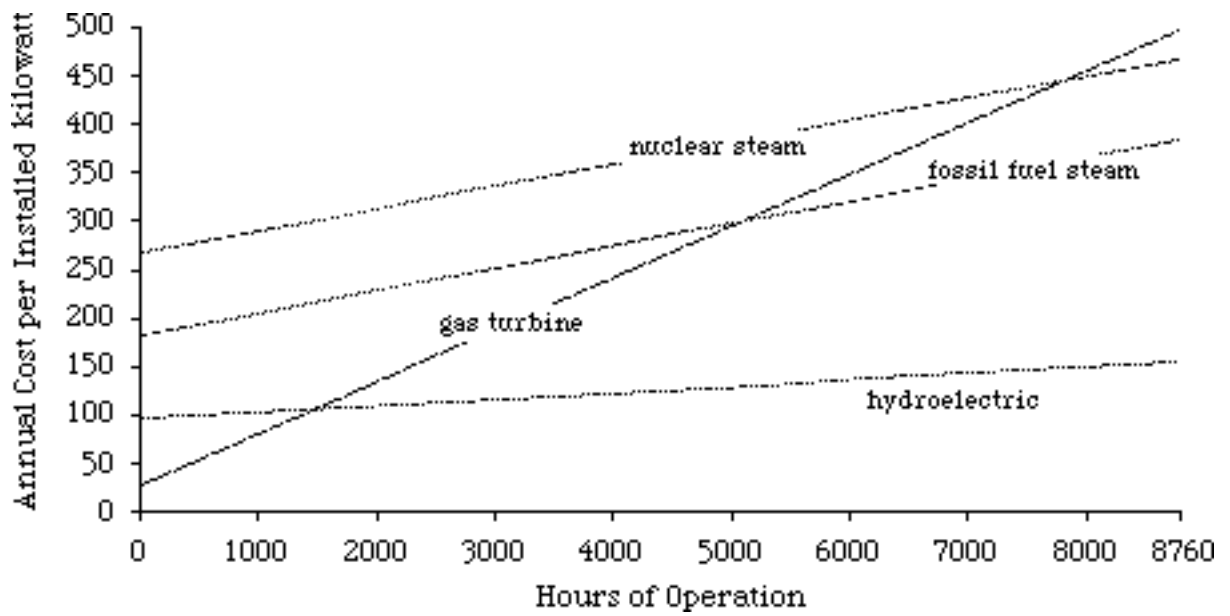
It is a graph that has the **time** (in hours) along the ordinate and the **total cost** (in dollars) along the abscissa.

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**.

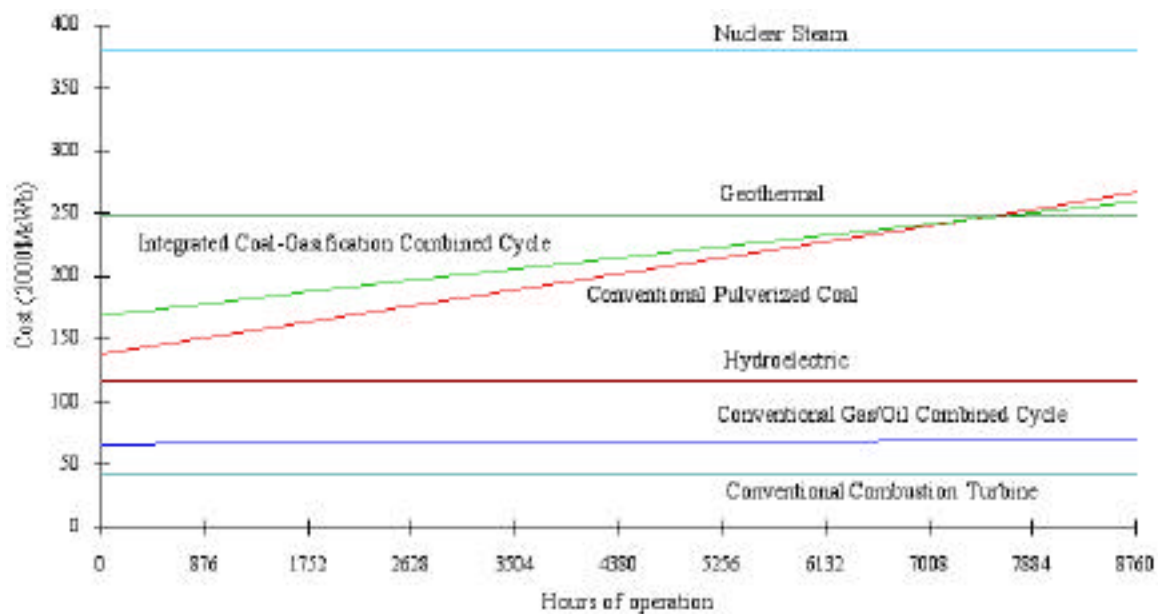
Example, ~ 30 years ago.



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 . . .

$\text{NO}_x$ , not overly large in most cases now

$\text{SO}_x$ , still lots, even with scrubbing (Ohio emits about one-third the national total for sulfur!)

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Acid rain

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

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

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mine fires . . . Centralia, PA

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

the United States

China

India

You are all  
correct!

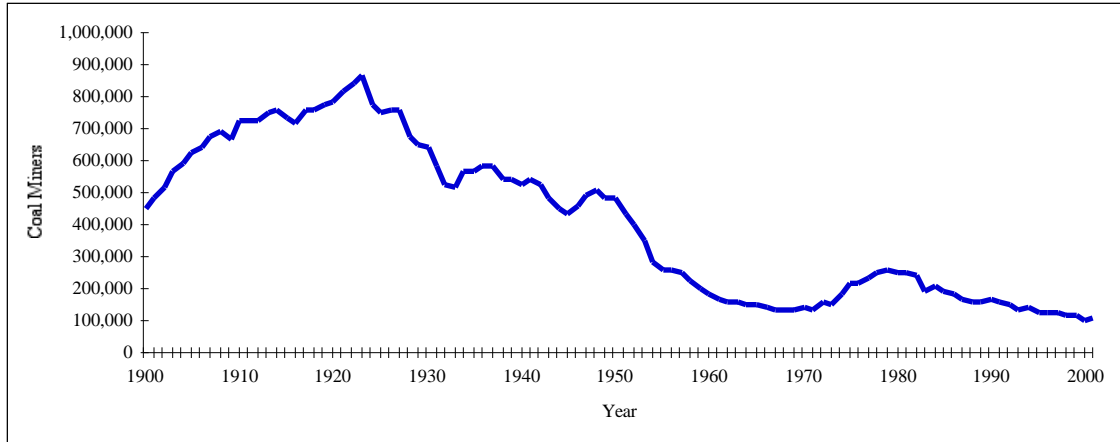
# “Mountaintopping” coal mining . . .

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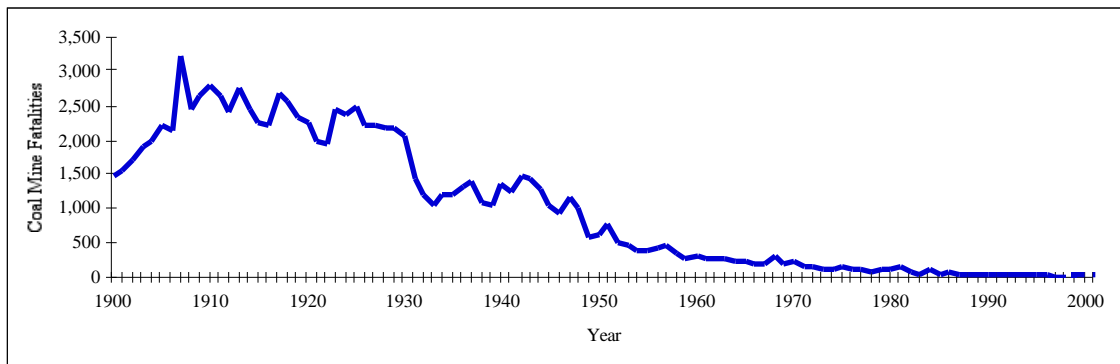
Robert M. Bays, regional manager of Arch Coal Inc., inspects the moonscape of Hobet 21 mine near Madison, W. Va.

And miners who die:

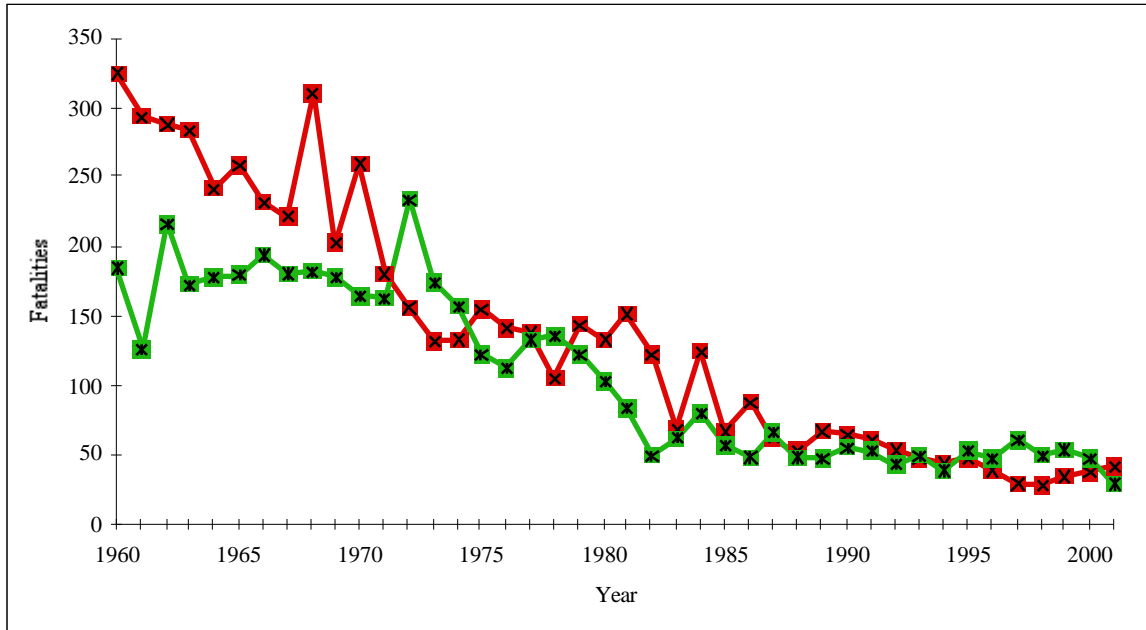
Total coal miner numbers, 1900-2001:



Coal miners who died, 1900-2001:



Blowup of 1960-2001 data on **coal miner** deaths compared to deaths for **all other forms of mining**.



Ratio of coal miner *per capita* deaths to those in other forms of mining, averages about two.

