The Long-Term Socioeconomic Impact of Coal Development in Alaska

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LAST MODIFIED: 23RD FEBRUARY 2023
CREATED: JAN. 19, 2018

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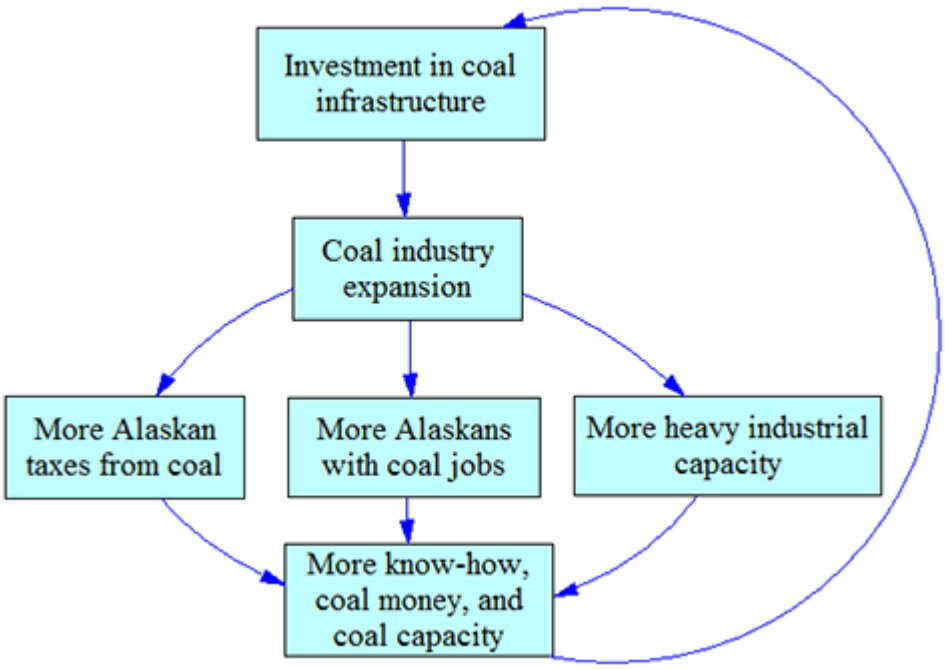
Building extensive coal infrastructure (http://en.wikipedia.org/wiki/Infrastructure) virtually ensures that a society will mine or burn larger amounts of coal in the future than it otherwise would, absent such infrastructure. This is due to the relatively low ongoing usage costs of such infrastructure, the expensive build-cost of that same infrastructure, the fact that other developments are foregone to build it (the "opportunity cost (http://www.investopedia.com/terms/o/opportunitycost.asp)"), and the establishment of a coal-dependent workforce and economy. This pattern may occur even if coal never becomes profitable enough to pay off the large build-costs of the infrastructure.

In Alaska, a large increase in coal infrastructure would consist of some combination of railroad expansions, coal power plants, export terminals, and coal mines themselves. These sorts of heavy-duty facilities are typically immobile or very difficult to move, and have a service life of decades or more.

For proponents of Alaska coal (/Issues/AlaskaCoal.html) development, investment in coal infrastructure will potentially create an economic driver that would convey benefits far into the future, creating a virtuous cycle. For opponents, it is the start of a vicious cycle.

Transformative Infrastructure

Dams, roads, bridges, harbors, mines, railroads, power plants, and electrical grids are all examples of transformative infrastructure, which “shapes” society.



SELF-REINFORCING INVESTMENT (/figures/coal-investment/) — Investment in the Alaska coal industry forms a potential self-reinforcing loop, provided coal sales can generate enough revenue to cover the operating expenses of mining coal and bringing it to market.

The classic example of this is a bridge: A person who can drive trucks over a canyon on a bridge possesses a tremendous advantage over a competitor who must negotiate the canyon walls and ford the river to deliver goods. Therefore, there is an extremely strong economic incentive to develop business models that take advantage of the bridge.

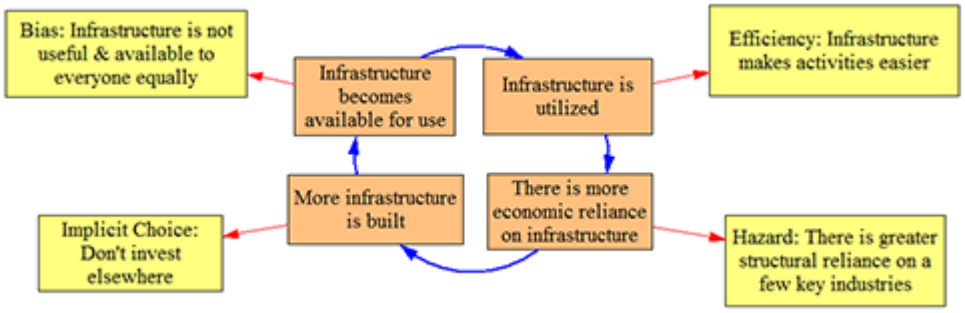
Much of the cost of large-scale infrastructure is incurred during construction, and subsequent operating costs are relatively small. Simultaneously, the economic leverage provided by such infrastructure is usually very strong, letting the user accomplish a given task many times more efficiently (and hence competitively). Gaining this economic leverage is the primary reason to build such infrastructure.

The choices for building and locating these developments may initially be determined by geography, demographics, and cost, but once they are in place, they strongly influence future choices.

Traditionally, mobile equipment such as large haul trucks (http://en.wikipedia.org/wiki/Haul_trucks) and dragline buckets (http://en.wikipedia.org/wiki/Dragline_excavator) is not considered infrastructure. In this article, we loosely group this very heavy equipment together with traditional infrastructure (facilities and immobile physical objects) because it can behave in a similar economic fashion, with respect to Alaska coal (/Issues/AlaskaCoal.html).

Sunk Costs, Opportunity Costs, and Subsidies

Money invested in an infrastructure project is typically gone and cannot be recovered. Economically, it is known as a sunk cost (http://en.wikipedia.org/wiki/Sunk_costs). When confronted with expensive sunk cost, like large infrastructure, the best action is usually to use infrastructure to one's best economic ability in the present, or abandon it if that present use fails to generate enough revenue to cover one's immediate operating costs. It is immaterial whether the initial build-cost of the infrastructure is recovered, because it is a sunk cost. The money is "gone" and cannot be reclaimed, except perhaps by sale of the infrastructure, which often only brings pennies on the dollar.



INFRASTRUCTURE DEVELOPMENT CIRCUIT (/figures/coal-infracycle/) — This idealized cycle highlights the self-reinforcing circuit common in developing infrastructure (the circular flow at center) and one key implication at each point (the satellite boxes).

Sunk Costs Example:

An "Unprofitable" Railroad Spur

If a $100 million Alaska Railroad spur were built and only generated $5 million a year in greater wealth for society as a whole, it might never pay back its build-cost. (This is true even after 20 years of operation, because of the Time-Value of Money (http://www.investopedia.com/articles/03/082703.asp)).

However, it would still not be logical to abandon the railroad spur. The cost of building the spur is a sunk cost, and cannot be recovered. Tearing up the tracks and recycling them would probably only return pennies on the dollar.

Therefore, the “unprofitable” railroad spur would likely continue to operate, and it would still benefit those few companies who can make money from it. Society as a whole would have spent its resources in an unprofitable way.

In contrast, if the rail spur generates $15 million per year net value for society, and rapidly pays back its built cost, it may be regarded as a financially wise investment.

Once we begin to incorporate lost industrial opportunities, ecological services, aesthetics, social mobility gains from good transportation, and other indirect values, the question becomes much more complicated. We must ask what opportunities we gained and lost by building the rail spur.

If a rail spur generates $15 million in revenues to society per year, but the same money invested in tax reform, business incentives, and upgrades to the electrical grid would result in a savings of $20 million per year, then the railroad spur is comparatively a bad investment.

Infrastructure that supports enterprise and pays itself back becomes a very valuable asset, whereas infrastructure that is more valuable than the industries it supports becomes extremely difficult to sell. Industries which are “unprofitable” for societies as a whole (industries that do not pay back the infrastructure cost and/or impose large external costs on society) but which use large infrastructure build-outs can become deeply entrenched as a result of the advantages the infrastructure confers. Such industries can continue to operate as long as their revenues offset their immediate operating expenses. In this way, large infrastructure build-outs can shape long-term economic directions, for good or ill.

Coal development in Alaska incurs large sunk costs, since major infrastructure must be built to mine and transport coal in a relatively remote environment. Since the only current transportation method for Alaska coal is the Alaska Railroad, a subsidized government-owned enterprise, then the issues of subsidies (http://en.wikipedia.org/wiki/Subsidy) and politics come strongly into play. Public resources used to support coal could be put to other uses, so opportunity costs (http://www.investopedia.com/terms/o/opportunitycost.asp) are an important factor in assessing the merits of coal subsidies.

Whether a subsidy consists of healthcare for war veterans or tax breaks for software firms, economists view all subsidies as basically similar: They take “value” in the form of money or benefits from society as a whole and give them to the few selected beneficiaries. For instance, if $100 million in public funds are used to construct an Alaskan railroad spur for which the primary beneficiary is a coal mine, the coal industry is the beneficiary of a subsidy.

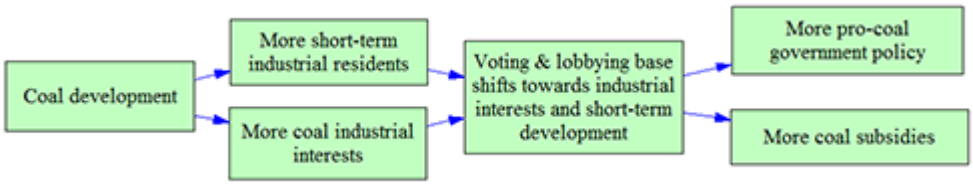
Subsidies are not “bad” or “good,” but they do have a shaping influence on the economy. The argument for subsidies is often that they alter the economy in such a way as to produce greater benefits for all, and that without a subsidy, the producer would not be properly compensated for the social good their activity creates. For instance, proponents argue that domestic oil and coal development subsidies help the U.S. secure energy security (and therefore better avoid foreign wars), and social welfare programs are cited as helping the disadvantaged become healthier and more productive members of society.

In the case of the Alaska Railroad railroad spur example, an argument for subsidies is that the railroad will generate widespread economic activity worth more than $100 million to society. This might occur in the form of direct and indirect jobs, commerce, and opportunities the railroad and associated coal mines create. The railroad may only ever capture back a fraction of that value in user fees, yet subsidizing may be a net gain for society because of all the spin-off benefits it produces.

Generally speaking, economists agree that careful economic investigation should be conducted before creating any subsidies, whether they be tax breaks for large mining corporations or grants for small non-profit organizations. Investigation ideally separates out both the wishful speculation of subsidy proponents (usually including those private parties who would reap the economic benefits) and opponents (usually including those bystanders who would bear the immediate external costs).

Self-Reinforcing Economies

Large economic commitments can alter whole economies in ways that are socially as well as physically self-reinforcing. The Alaska coal industry currently plays a small part in the Alaska economy and on the world stage. If Alaska turned coal into a major portion of its economy, then coal revenues would become increasingly important in state taxes, politics, and general economic welfare. More Alaskan jobs would likely become coal jobs, and more families would rely on a coal future. More mines would be built, more export terminals, and more coal transportation infrastructure, likely in the form of Alaska Railroad trains and tracks. The result would be greater economic reliance on coal, by both individual Alaskans and the state.



COAL-RELATED POLICY DRIVING (/figures/coal-voterchain/) — This sub-dynamic in the coal investment loop (top figure) depicts the driving effect that development of a particular economic sector can have, particularly in states like Alaska with relatively small voter bases.

Once the initial cost and effort have been incurred of moving equipment to an area and developing the skills, relationships, and regulatory framework necessary to support a particular kind of activity, it typically becomes easier and less expensive to engage further in that activity.

This type of economic momentum, as much as the availability of natural resources and financial capital (i.e., money), can foster the growth of industrial districts, from Silicon Valley to Hollywood to Appalachian coal country.