

The Ivanpah Solar Power Monstrosity: A Case Study in Government Non-Creative Destruction

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Topics To Be Addressed

- **The “fragile desert” and the physical monstrosity that is Ivanpah.**
- **Simple cost comparisons for Ivanpah.**
- **Net subsidies for Ivanpah.**
- **Environmental destruction engendered by Ivanpah.**
- **The amusing rationales for Ivanpah.**
- **Soviet agriculture and the performance of Ivanpah.**
- **The basic technological problem confronting unconventional electricity.**
- **The lessons of Ivanpah.**



Some Cost Comparisons Per mWh

- **Ivanpah (at planned output):** **\$180**
- **Other utility-scale solar:** **250**
- **Coal:** **90**
- **Gas combined cycle:** **60**
- **Nuclear:** **115**
- **Hydroelectric:** **70**
- **On-shore wind (EIA):** **60 (!)**

- **Backup costs for renewables (Zycher): ~370**

Direct Subsidies for Ivanpah

- **DoE \$1.6 billion loan guarantee, Section 1705 program.**
 - Credit subsidy cost paid by the taxpayers.
 - About \$12 million per year for 25 years.
- **30 percent investment tax credit in lieu of production tax credit of \$11 per mWh.**
 - So: No need to produce any power.
- **Accelerated depreciation (assumed 5-year life).**
- **Depreciation bonus of 50 percent in first year.**
- **We ignore: guaranteed market shares (RPS), etc.**

Federal Receipts Minus Subsidies: Energy for Electricity Generation (dollars per million btu)

	<u>Fees Paid</u>	<u>Subsidies Received</u>	<u>Net Fee Paid</u>
Ivanpah	0.88	285.00	(284.12)
Oil and Gas	1.23	0.19	1.04

Note: EIA “subsidies” for oil and gas are not “subsidies” properly defined.

Ivanpah: Unsightly Land Use

- **Ivanpah: 3471 acres of “fragile desert”.**
- **Nuclear plant: about 75-100 acres.**
- **Coal-fired 1600 MW plant: about 800 acres.**
- **Gas-fired 1000 MW plant: about 50 acres.**
- **Wind 1000 MW farm: 48,000-64,000 acres.**
- **Etc. This is unavoidable for reasons I will discuss in a few minutes.**

Ivanpah: Wildlife Destruction

- **Temperature of the focal field of the mirrors (“solar flux”): 800-1000° F.**
- **Insects attracted to glowing light of the solar towers, followed by birds.**
- **So: Many are burned (“streamers”).**
- **Observers: One streamer every two minutes.**
 - **The only dimension of renewable electricity that is reliable.**

Ivanpah: Subsidy Rationales (1)

- **Employment and wages: 2600 construction jobs over three years, 90 permanent jobs, \$650 million in wages over 30 years.**
 - Environmental left poo-pooed similar numbers for Keystone XL.
- **Great for those hired; but “jobs” are a cost for the economy writ large.**
- **These labor resources cannot be used elsewhere.**
 - Because subsidized, not the most productive uses.

Ivanpah: Subsidy Rationales (2)

- **State, local tax revenues: \$300 million over 30 years.**
 - Not clear whether this includes income taxes.
 - If so, we get a large double-counting problem.
- **Tax revenues are a transfer, not a social benefit.**
- **Taxes are not a gift: Ivanpah will consume public services, imposing costs upon the public sector.**
 - Police, fire protection, etc.
- **Proponents have not advertised those costs.**

Ivanpah: Subsidy Rationales (3)

- **“Over 30 years... 13.5 million tons of carbon emissions will have been avoided.”**
 - I love the “.5”.
- **Actually, this is false because of the cycling problem with the backup (gas, coal) units.**
- **Anyway: Global GHG emissions are about 38 billion tons annually.**
- **So: Advertised annual Ivanpah reduction (450,000 tons) is about 1 one-thousandth of 1 percent.**
 - **Temperature effect in 2100: Zero.**

Soviet Agriculture Lives

- **Promised output: 1 million mWh per year.**
- **Actual recent output: About 650,000 mWh.**
- **Spokesman: “...the sun didn’t shine as often as years of studies predicted...”**
- ***Pravda*: 70 years of bad harvests caused by 70 years of bad weather.**
- **Ivanpah and Chutzpah, 2014: Please, Treasury Dept., give us a \$539 million Section 1603 grant to pay off a third of our original Section 1705 \$1.6 billion loan already guaranteed by the DoE.**

The Basic Technical Problem

- At earth's surface, energy content of sunlight is about 150-400 watts per square meter.
 - Ivanpah probably about 500-550 watts/sq. meter.
- About 20-30 percent convertible to electricity.
 - Ivanpah claim: 28.72 percent.
- So, even in theory, a square meter of solar panels powers about 100 watt light bulb.
 - Energy content of sunlight and wind flows is unconcentrated.
- So massive land use is necessary: 173,500 Ivanpah heliostats, each about 15 square meters.
- That yields the official capacity of 392 MW.

Lessons of Ivanpah

- **Some truths are eternal: Government is the art of wealth redistribution, which means resource waste.**
- **Environmental advantages of unconventional (“clean”) energy are clear if we ignore the environmental problems caused by unconventional energy.**
 - **This applies to wind, solar, all of them.**
 - **Wildlife destruction, heavy metals, noise, flicker effects, increased emissions of conventional effluents and GHG.**
- **For four decades the arguments offered in support of uncompetitive energy have been faulty, without exception.**

Thank You!

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