

The Economic Impacts of CCUS Tax Credits

Roger H. Bezdek, Ph.D., Management Information Services, Inc. (MISI)

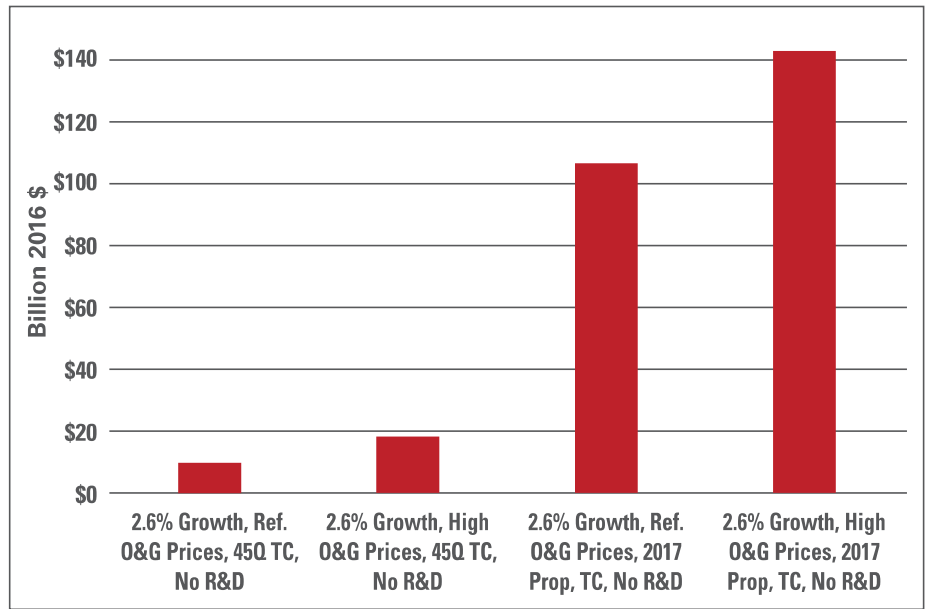
Carbon capture, utilization and sequestration (CCUS) may be a technology whose time has come and gone, and come back again. Analysts and policy-makers have belatedly realized that any ambitious decarbonization goals are simply not feasible without CCUS. Even advocates of the “Green New Deal” have (grudgingly) accepted the need for CCUS as a necessarily large part of the program.

Here we assess the likely economic impacts of the 45Q CCUS tax credits enacted in 2018 and compare these with the impacts of those proposed in 2017. The enacted 45Q tax credits (ETC) provided less incentives than those proposed in 2017 (PTC) – primarily because they contain “sunset” provisions requiring that facilities begin construction by Jan. 1, 2024 to be eligible for the tax credit. The salient question is thus: “How do the likely economic and job impacts of the 2018 enacted 45Q tax credits compare to those proposed in 2017?”

Analysis

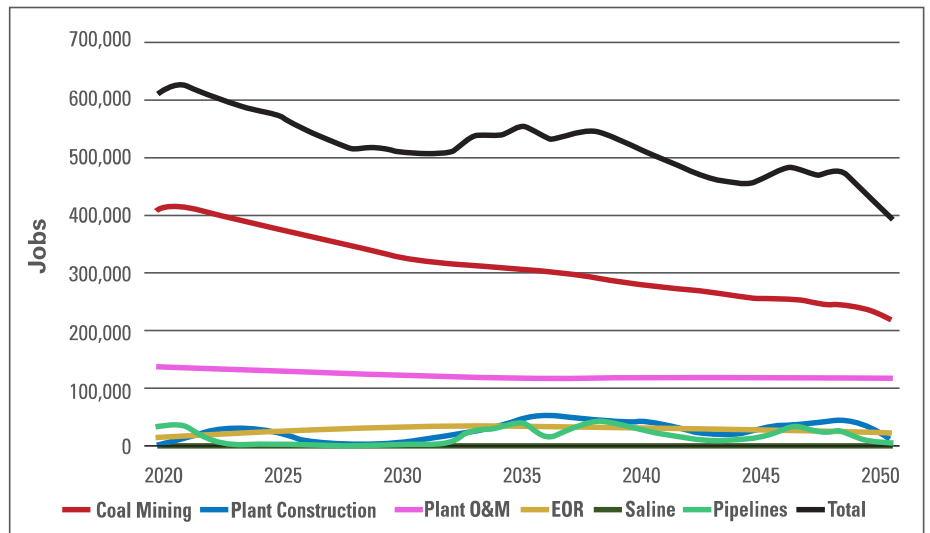
We estimated the impacts of CCUS, 2020-50 in the coal power sector using the “NETL CTUS-NEMS” version of EIA’s National Energy Modeling System (NEMS).¹ We estimated the impact on coal-related jobs under the Reference Case and 13 alternative scenarios.² Job estimates were developed for coal mining, coal power plant construction, coal power plant O&M, Enhanced Oil Recovery (EOR), saline sequestration and CO2

Figure 1: CCUS Tax Credit Costs, 2020 - 2050



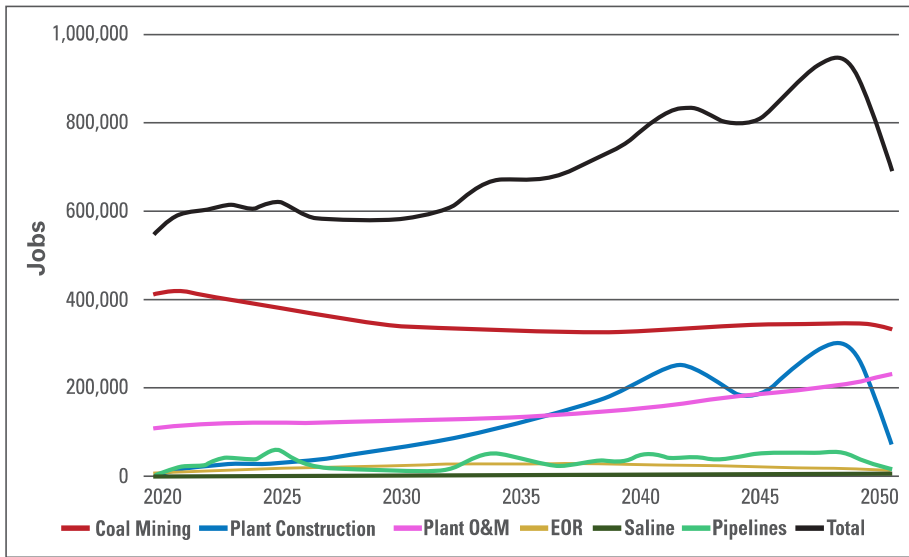
Source: MISI and NETL

Figure 2: Coal-Related Jobs Created Annually: 2.6% Growth, High O&G Prices, 45Q TC + R&D



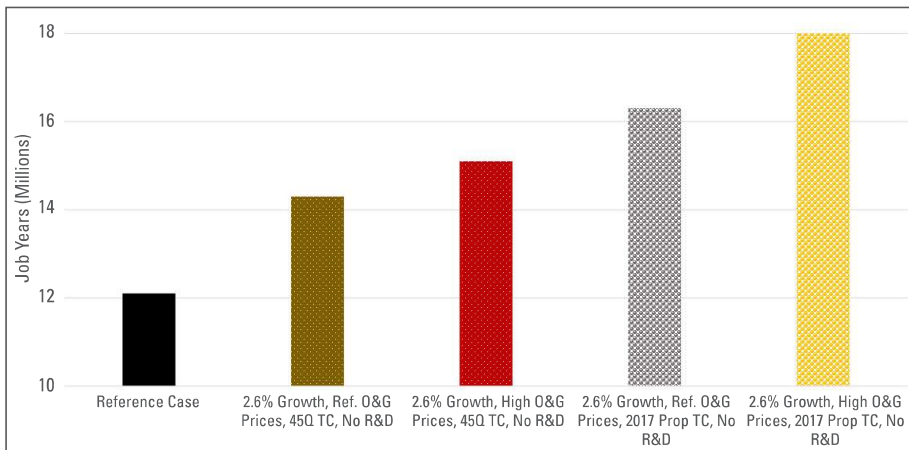
Source: MISI and NETL

Figure 3: Coal-Related Jobs Created Annually:
2.6% Growth, High O&G Prices, 2017 Prop. TC + R&D



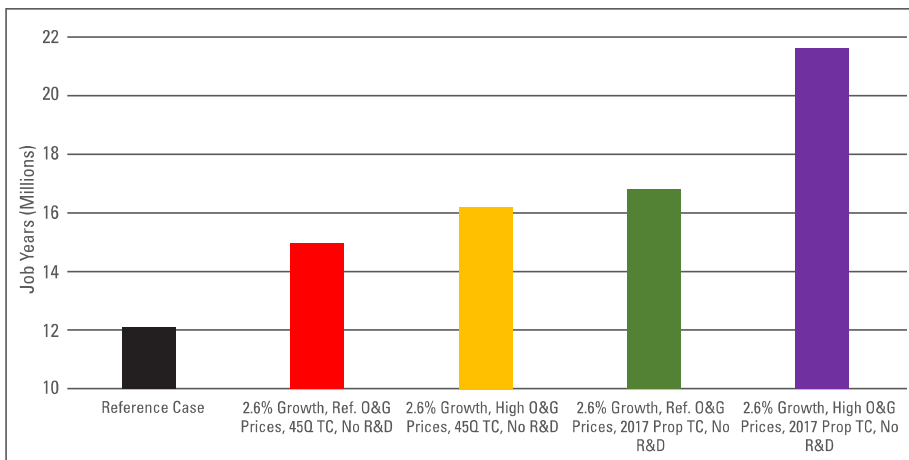
Source: MISI and NETL

Figure 4: Cumulative Job Years Created
by Tax Credits without DOE R&D, 2020 - 2050



Source: MISI and NETL

Figure 5: Cumulative Coal-Related Job Years Created, 2020 - 2050



Source: MISI and NETL

pipelines. Employment metrics were calculated using multipliers applied to the deployment levels of CCUS technologies. These multipliers are based on economic analyses of the direct and indirect impacts of investment in capital projects.

The employment concept used is a full-time equivalent (FTE) job in the U.S.³ Total jobs were estimated:

- Direct jobs are those created in the specific activity or process.
- Indirect jobs are those created throughout the required inter-industry supply chain and in supporting activities.
- Total jobs are the sum of all of the jobs created.

We simulated the economic and job impacts of the scenarios involving assumptions about economic growth, technologies, tax credits and R&D. Here we focus on several subsets of the scenarios to assess the differential impacts of the proposed and the enacted CCUS tax credits:

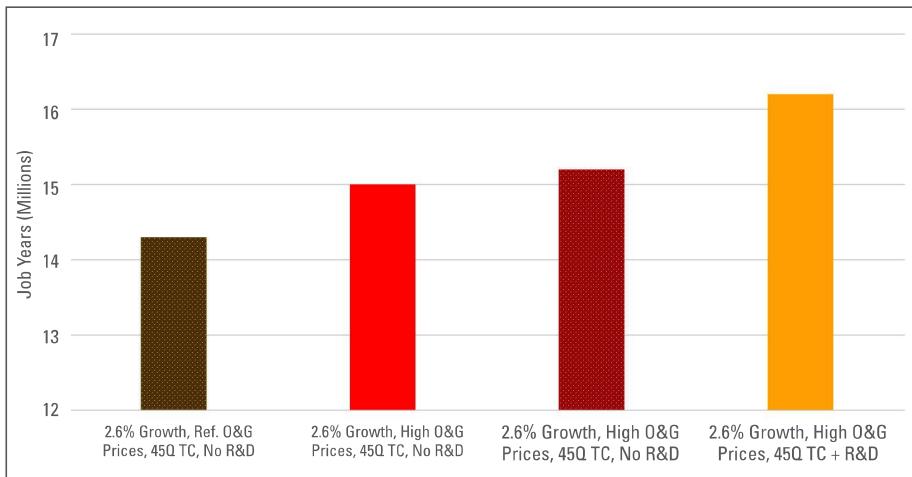
- The AEO 2017 “No Clean Power Plan” Reference Case.
- 2.6 percent annual U.S. GDP growth, high oil and gas prices, and ETC – with and without the DOE CCUS R&D program.⁴
- 2.6 percent annual U.S. GDP growth, high oil and gas prices, and PTC – with and without the DOE R&D program.

Figure 1 illustrates a major finding: The 45Q sunset provisions make a huge difference in tax credit costs. Specifically, the tax expenditures of the ETC will likely be \$10 billion to \$20 billion, whereas the tax expenditures of the PTC will likely be \$100 billion to \$140 billion.

Figures 2 and 3 show the annual job creation of each of the tax credits combined with the DOE CCUS R&D program. They illustrate that: (i) the PTC with the R&D program creates substantially more jobs each year than does the ETC with R&D program; (ii) the PTC creates substantially more jobs in 2050 than in 2020, which is not true for the ETC.

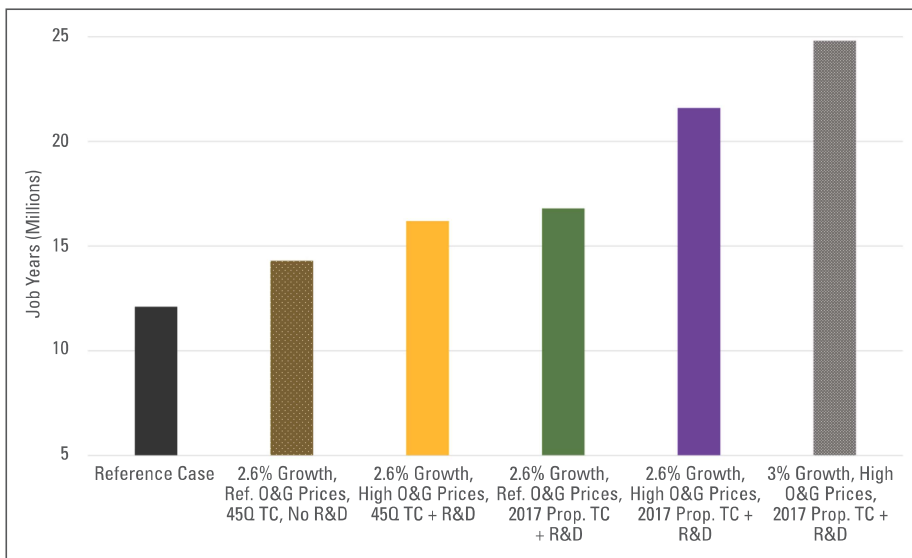


Figure 6: Cumulative Coal-Related Job Years Created, 2020 - 2050



Source: MISI and NETL.

Figure 7: Cumulative Coal-Related Job Years Created, 2020 - 2050



Source: MISI and NETL.

Figure 4 shows that without the R&D program, the ETC will create 14 million to 15 million jobs, whereas the PTC will create 16 million to 18 million jobs. Thus, the 45Q sunset provisions could result in four million fewer jobs.

Figure 5 shows that combining CCUS tax credits with the R&D program creates the most jobs – potentially 10 million more jobs than under the Reference Case.

Figure 6 illustrates the incremental benefits of adding the R&D program to the ETC: Creation of an additional two million jobs.

Figure 7 summarizes the findings. It shows that (i) combining tax credits with R&D creates three million to 10 million more jobs than the Reference Case; (ii) a 3-percent growth scenario combined with tax credits and R&D creates nearly 25 million jobs – more than twice as many as under the Reference Case – 13 million more jobs.

Findings and Conclusions

Adding CCUS tax credits to DOE R&D creates three million to six million additional job-years. Further, adding CCUS tax credits to DOE R&D generates an additional \$2.5 trillion in benefits, including:

- Five billion to six billion tons of coal.
- \$200 to \$300 billion in coal revenues.
- \$600 to \$1,700 billion in new coal plant investments.
- More than four billion barrels of EOR.
- More than \$400 billion EOR revenues.
- \$30 billion to \$90 billion in pipeline expenditures.

In the scenarios using Reference Case oil and gas prices, the economic impacts are reduced somewhat – for example, by about one million job-years over the forecast period, depending on the other assumptions made. However, we found that the CCUS tax credits (PTC and ETC) and the DOE R&D program each had much greater economic and job impacts than the oil and gas price assumptions.

◀◀ **Analysts and policy-makers have belatedly realized that any ambitious decarbonization goals are simply not feasible without CCUS. Even advocates of the “Green New Deal” have (grudgingly) accepted the need for CCUS as a necessarily large part of the program.**

Our major conclusions are:

1. The PTC will create substantially more jobs, both in total and in every year from 2020 to 2050, than the ETC, and the number of additional cumulative jobs created could total seven million.
2. Both the ETC and the PTC will create substantially more jobs every year than the Reference case – potentially almost twice as many cumulative jobs.
3. The ETC’s sunset provisions greatly decrease costs, but also the economic and job benefits created compared to those of the PTC.
4. The marginal job impacts of the DOE R&D program are substantial and could total more than three million additional jobs.
5. The DOE R&D program will create a large number of jobs irrespective of the specific CCUS tax credit

program: From three million to 9.4 million more jobs.

6. To maximize job creation, both tax credits and DOE R&D need to be implemented. This will stimulate economic growth and will, in turn, create even more jobs.
7. The administration’s goal of achieving 3 percent GDP growth could create an additional three million coal-generated jobs, for a total of nearly 25 million total cumulative jobs.

Acknowledgment: The U.S. Department of Energy provided funding for the analysis of these data. However, the paper does not necessarily reflect administration policy.

Roger Bezdek, Ph.D., is the founder and president of Management Information Services, Inc., a Washington DC-based economic, energy and environmental research firm.

REFERENCES

1. NETL CTUS-NEMS is an integrated model of the U.S. energy system linked to a macroeconomic model.
2. See Management Information Services, Inc., “Analyzing the Economic and Job Impacts of the DOE R&D Program and CCS Tax Credits,” prepared for the National Energy Technology Laboratory, DOE contract DE-FE 0025912, 2018; Management Information Services, Inc., “Analyzing and Estimating the Economic and Job Benefits of U.S. Coal,” prepared for the U.S. Department of Energy, 2017.
3. An FTE job is defined as 2,080 hours worked in a year’s time, and adjusts for part-time and seasonal employment and for labor turnover.
4. High oil and gas prices are a result of EIA’s “Low oil and gas resource and technology” case. To simulate DOE’s R&D, input parameters related to the cost and performance of CCUS technologies are adjusted to reflect successful completion of research goals. The “without the DOE R&D program” case assumes no DOE CCUS R&D program, 2020-2050. In this case, there are only minimal technological improvements and cost reductions in CCUS over this period.

AMERICAN COAL COUNCIL’S ONLINE PUBLICATIONS HUB!

Access featured articles in American Coal, American Coal E-Newsletters, ACC’s Buyers’ Guide and Much More!



ACC
American Coal Council

WWW.ACCLIVE.COM