WEST VIRGINIA'S ENERGY FUTURE

BUILT BACK BETTER

HOW THE AMERICAN JOBS PLAN WOULD CREATE JOBS IN WEST VIRGINIA AND ENABLE A PATHWAY TO EMISSION-FREE POWER IN THE MOUNTAIN STATE

WVULAW
Center for Energy and Sustainable Development

At the end of 2020, we published West Virginia's Energy Future, demonstrating that a major ramping up of renewable energy in West Virginia through 2035 would be cost-competitive and create economic opportunities for the state.

Now, we have updated our analysis to show the potential impact of President Biden's American Jobs Plan currently being considered by Congress.

Taking into account key provisions from the American Jobs Plan,[1] our modeling shows that building a Clean Innovation Pathway to 80 percent emission-free power in West Virginia would:

- Cost $855 million less through 2040 than our current trajectory for power resources.
- Cause a net increase in employment in West Virginia equivalent to 3,508 full-time jobs through 2040.[2]
- Grow total earnings for West Virginia residents by $172 million annually (on average from 2021-2040).
- Cause $20.9 billion of investment in new power plants in West Virginia, including 10,600 megawatts of solar, 5,300 megawatts of wind, and 4,984 megawatts of energy storage installations through 2040.
- Expand state GDP by $322 million annually (on average from 2021-2040).
- Achieve 79.4 percent emission-free electricity generation in 2030 and continue to increase thereafter.

If the American Jobs in Energy Manufacturing Act sponsored by Senator Joe Manchin is enacted as part of the American Jobs Plan,[3] our analysis shows that it would:

- Catalyze an additional $1.7 billion in manufacturing investments in West Virginia.
- Create 3,250-4,350 manufacturing jobs in West Virginia, plus 9,300-12,400 jobs created indirectly from the manufacturing investment — on top of the 3,508 jobs discussed above.
- Generate $610-810 million in additional annual labor income across all sectors in West Virginia, including $290-390 million in the state's manufacturing sector.

1 Our comparison of West Virginia energy scenarios specifically incorporates the American Jobs Plan's "path to achieving 100 percent carbon-free electricity by 2035" and the associated ten-year extension of clean energy tax incentives. For the details of the ten-year clean energy tax credit extension, we relied on the legislative proposal sponsored by Senator Ron Wyden (D-OR). S. 1298, 117th Cong. (2021).

2 These employment impacts are calculated on a net basis, taking into account all upstream and downstream effects from the proposed energy scenarios.

3 S. 622, 117th Cong. (2021).

Here is what a Clean Innovation Pathway achieving nearly 80 percent emission-free generation in 2030 would look like and how it would compare against the current trajectory for power resources in our state (referred to here as "Continued Coal Dependence"), assuming the clean energy tax credit proposal from the American Jobs Plan is enacted:

CLEAN INNOVATION PATHWAY	CONTINUED COAL DEPENDENCE
Solar, wind, battery storage, and limited natural gas power plants are installed throughout West Virginia.	West Virginia's electric utilities continue to depend overwhelmingly on coal-fired power plants in accordance with current plans.

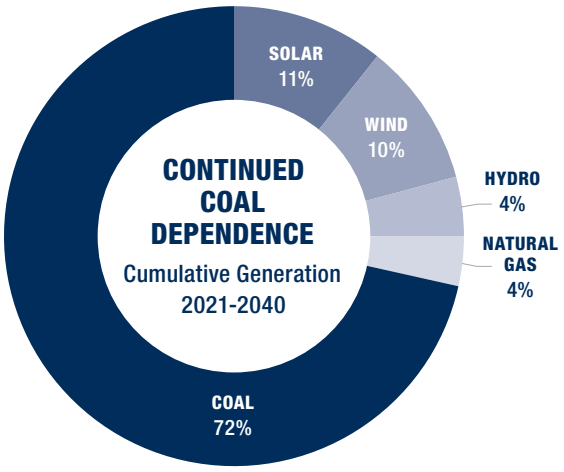
CLEAN INNOVATION PATHWAY	ECONOMIC ADVANTAGE
Net Jobs Impact	3,508 full-time jobs
Additional Manufacturing Jobs[4]	3,250-4,350 (on top of jobs shown above)
Increased Earnings	$172 million annually
Energy Cost Savings	$855 million through 2040[5]
New Power Plant Investments	$20.9 billion
State GDP Expansion	$322 million annually

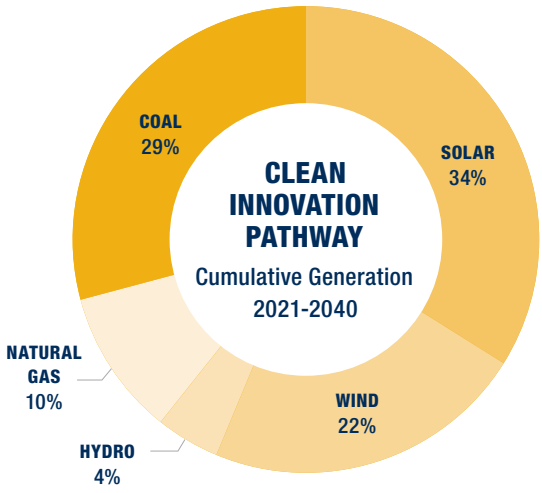
4 Assumes the American Jobs in Energy Manufacturing Act sponsored by Senator Manchin is enacted as part of the American Jobs Plan.

5 These energy cost savings do not even take into account incentive payments that might be provided to West Virginia's electric utilities for generating renewable energy under the Clean Electricity Payment Program currently being considered as part of Senate Democrat's budget reconciliation plan. The Clean Electricity Payment Program aims to achieve 80 percent emissions-free power nationwide by 2030 and rewards utilities with incentive payments for their progress. *See, e.g.,* Evergreen Action, *Everything You Need to Know About a Clean Electricity Standard* (July 21, 2021), available at: https://www.evergreenaction.com/blog/evergreen-explains-everything-you-need-to-know-about-a-clean-electricity-standard.

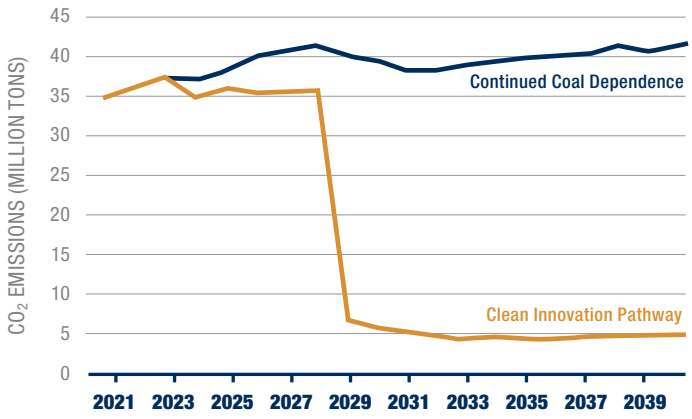
LEVERAGING ALL TECHNOLOGIES AT OUR DISPOSAL

Many business and policy leaders in our state emphasize the need to take advantage of all the energy resources that West Virginia has been blessed with. The Clean Innovation Pathway described above does exactly that by generating enough electricity from coal-fired plants to power all the homes in West Virginia for another 26 years, while simultaneously building new wind, solar, battery storage, and limited natural gas power plants that position West Virginia to compete well in the new energy economy.





ANNUAL CO_2 EMISSIONS — 2021-2040



INNOVATION, NOT ELIMINATION

In charting a pathway to an emission-free future in West Virginia, policy leaders have also emphasized the importance of innovating new solutions to the climate challenge as we transition away from polluting power sources. The Clean Innovation Pathway that we modeled borrows from this strategy.

Through 2040, the Clean Innovation Pathway constructs 20,884 megawatts of solar, wind, and battery storage power plants in West Virginia. Following tremendous innovations and cost declines over the past two decades, these technologies have the greatest potential today to make progress affordably and quickly toward a zero-emissions power sector while creating local jobs and investment.

In addition, the Clean Innovation Pathway builds natural gas power plants that take advantage of today's most affordable fossil fuel while maintaining flexibility to switch to zero-emission power generation when innovation within the fossil fuel industry catches up. Specifically, the combined cycle natural gas power plants built in the Clean Innovation Pathway will be poised to continue operation on a zero-emissions basis by switching to zero-emissions fuel (e.g., hydrogen), incorporating carbon capture and storage, or leveraging other new technologies. This could even be accomplished gradually by co-firing natural gas plants with a continually increasing blend of hydrogen.

The American Jobs Plan proposes 15 decarbonized hydrogen demonstration projects in the United States. If one or more of those projects were to be sited in West Virginia,[6] it would lay the groundwork for a switch to hydrogen-firing at our natural gas power plants.[7] Developing this 21st century energy technology in West Virginia would also open up possibilities for exporting zero-emission energy generation technologies and know-how from West Virginia to the rest of the world.

EXPLORING NEW OPPORTUNITIES FOR COAL

As emphasized in West Virginia's Energy Future, our miners and coal communities made an indispensable contribution to America's economic rise in the 19th and 20th centuries. It is critical that this contribution be honored by securing a strong future for coal communities in the new energy economy.

The American Jobs Plan includes multiple prongs aimed at developing and deploying carbon capture, utilization and storage (CCUS) technologies for fossil fuels. First, CCUS will be one of the technologies eligible for $15 billion in demonstration projects similar to those supported through the Pentagon's DARPA efforts. Second, the American Jobs Plan proposes building ten "pioneer facilities" for demonstrating CCUS retrofits at steel, cement, and chemical production facilities, like the cement production facility in Martinsburg, West Virginia. Third, the American Jobs Plan proposes expanding the tax credit that companies can receive for the capture and storage of carbon dioxide.

6 The positive economic impact of a potential hydrogen demonstration project was not modeled in our study.

7 To ensure that power plants contemplating a natural gas-to-hydrogen conversion can be financed and built, legislators should clarify that, under the American Jobs Plan's proposed 100%-by-2035 clean electricity standard, any such power plants may continue to operate beyond 2035 without penalty if they are converting to hydrogen-firing in accordance with a schedule established as part of a U.S. Department of Energy demonstration project.

The American Jobs Plan should additionally build upon efforts by our congressional delegation to create new opportunities for coal in the 21st century energy economy by spurring new coal-based products[8] and funding RD&D relating to the extraction of rare earth minerals (which are critical in the production of high-tech products) from coal and coal byproducts.[9]

THE AMERICAN JOBS PLAN SUPPORTS ADDITIONAL INVESTMENT IN COAL COMMUNITIES

As advocated for in West Virginia's Energy Future, the American Jobs Plan includes not only provisions aimed at developing new opportunities for the coal industry, but also provisions aimed at creating other jobs and local investment in coal communities.

Our modeling of energy scenarios for West Virginia only takes into account a sliver of the investments in our state that are proposed in the American Jobs Plan — specifically just the extension of tax credits for renewable energy and energy storage technologies.

The American Jobs Plan contains many other provisions that would generate investment in West Virginia's energy industry and coal communities — several of which are now also included in Senator Manchin's Energy Infrastructure Act[10] — such as:

PROGRAM	TOTAL 10-YEAR FUNDING PROPOSAL[11]
Economic Development in Appalachia	$994 million
Reclamation of Abandoned Mines and Wells	$16 billion
Brownfield Site Remediation	$5 billion
Clean Energy and Sustainability Accelerator	$27 billion
Hydrogen and Carbon Capture Demonstration Projects	$9.3 billion
ARPA-Climate Demonstration Projects	$15 billion
CO_2 Sequestration Tax Credits	$6 billion
Weatherization of Houses and Buildings	$17.5 billion
Manufacturing Extension Partnership	$7 billion
Regional Innovation Hubs	$10 billion
Broadband Infrastructure	$100 billion

8 *See* Creating Opportunities And Leveraging Technologies for Coal Carbon Act (COAL TeCC Act), S. 3047, H.R. 5704, 116th Cong. (2019-2020).
9 *See* Rare Earth Element Advanced Coal Technologies Act (REEACT), S. 1052, 116th Cong. (2019).
10 S. 2377, 117th Cong. (2021).
11 *Budget of the U.S. Gov't FY 2022*, White House Office of Mgmt. and Budget (2021), available at https://www.whitehouse.gov/wp-content/uploads/2021/05/budget_fy22.pdf.

AMERICAN JOBS IN ENERGY MANUFACTURING ACT

As highlighted above, the American Jobs in Energy Manufacturing Act sponsored by Senator Manchin represents an estimated $1.7 billion investment in energy-related manufacturing in West Virginia's coal communities, including $1.2 billion in private investment and $520 million in tax credits. Importantly, these manufacturing investments would be steered directly to coal power plant and coal mining communities, resulting in the creation of an estimated 3,250-4,350 full-time manufacturing jobs in West Virginia, plus 9,300-12,400 indirect, non-manufacturing jobs in West Virginia.

The American Jobs in Energy Manufacturing Act represents just one example of the additional job creation impacts that the American Jobs Plan could have in West Virginia's energy economy and coal communities — above and beyond the positive employment and earnings impacts flowing from the energy resource mix changes that we modeled.

BUILDING A WEST VIRGINIA ENERGY ECONOMY FOR THE FUTURE

Last year, in West Virginia's Energy Future, we demonstrated that West Virginia's electric utilities can dramatically ramp up renewable energy in a cost-effective manner. We also stated that this ramp-up should be complemented with a federal reinvestment in coal communities and West Virginia's new energy economy. The American Jobs Plan, as well as Senator Manchin's Energy Infrastructure Act and American Jobs in Energy Manufacturing Act, represent exactly the type of federal reinvestment that would honor the historic contributions of our coal communities and secure a robust role for West Virginia in the energy economy of the future.

As shown in this update, the American Jobs Plan would enable a Clean Innovation Pathway in West Virginia that achieves 80 percent emission-free power, reduces energy costs, creates jobs, and grows our economy.

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GridLab

WVU LAW
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The Center for Energy and Sustainable Development is an energy and environmental public policy and research organization at the West Virginia University College of Law. The Center focuses on strengthening opportunities for West Virginia and its residents in the context of nationwide trends to reduce carbon emissions and pursue sustainable energy policies.

GridLAB

GridLab is an innovative non-profit that provides technical grid expertise to enhance policy decision-making and to ensure a rapid transition to a reliable, cost effective, and low carbon future.

Synapse
Energy Economics, Inc.

Synapse Energy Economics is a small, independent research and consulting firm specializing in energy, economic, and environmental topics. Since its inception in 1996, Synapse has grown to become a leader in providing rigorous analysis of the electric power sector for public interest and governmental clients. Synapse's expertise includes environmental economics, resource planning, electricity dispatch and economic modeling, energy efficiency, renewable energy, energy storage, transportation and building sector electrification, transmission and distribution, rate design and cost allocation, risk management, benefit-cost analysis, environmental compliance, climate science, and both regulated and competitive electricity and natural gas markets.

Downstream Strategies
Ideas that sustain.

Downstream Strategies is an environmental and economic development consulting firm located in West Virginia. We are considered the go-to source for objective, data-based analyses, plans, and actions that strengthen economies, sustain healthy environments, and build resilient communities.