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Importance of Tax Credits and Role They Can Play (Without CEPP) in Cutting Power Sector Emissions

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1. WHAT WILL HAPPEN WITHOUT CLEAN ENERGY TAX CREDITS?

Without clean energy tax credits, the U.S. will not meet its goal of 80 percent clean electricity by 2030, which is crucial to a stable climate future. In 2020, renewable energy provided 21 percent of U.S. electricity, while 42 percent was classified more broadly as carbon-free (e.g., inclusive of nuclear). Under a business-as-usual scenario in which no new policies are enacted, the U.S. Energy Information Administration (EIA) projects renewable energy will reach only 42 percent, and carbon-free energy only 51 percent, by 2030–far below the goal of 80 percent by 2030. Other models reach a similar conclusion: with no new policies, the University of California, Berkeley's 2030 Report projects the grid will only be 45 percent clean by 2030, while modeling using Energy Innovation's Energy Policy Simulator forecasts a 49 percent clean grid in 2030.

Although a handful of utilities have pledged to add 3 to 4 percent clean electricity per year to their portfolios over the coming decade, they are the rare exception and not the rule. Furthermore, their commitments are voluntary and therefore not enforceable. While renewables are often the lowest-cost option and are proven at scale, significant barriers remain to faster adoption without policy support. This is particularly true when utilities and their shareholders have substantial investments in fossil fuel infrastructure that would be stranded as a result of a faster clean energy transition. Clean energy tax credits improve the business case for new renewables, while undermining the economics of existing fossil, resulting in more rapid renewables deployment.

2. HOW HAVE TAX CREDITS AFFECTED CLEAN ENERGY DEPLOYMENT IN THE PAST?

Over the past decade, federal and state tax credits helped transition the private wind and solar industry from niche, demonstration-stage projects into mature, cost-competitive resources in U.S. energy markets. Tax credits' effectiveness can be deduced from looking at the differences in the amount of wind and solar generators deployed in the years before and after the tax credits have lapsed through the 2000s and 2010s.

For example, Congress extended the production tax credit (PTC) for wind in 2009 for a three-year period (2010 through 2012); developers built a record amount of wind in 2012 before the tax credits were due to expire. In 2013, wind development tanked to almost zero when the credits lapsed. Importantly, Congress's one-year extension of the tax credit on January 2, 2013 was not enough to generate high levels of deployment that year, as development had already stalled in anticipation of credits lapsing. This highlights the impact of providing market certainty through stable policies that provide longer-term extensions.

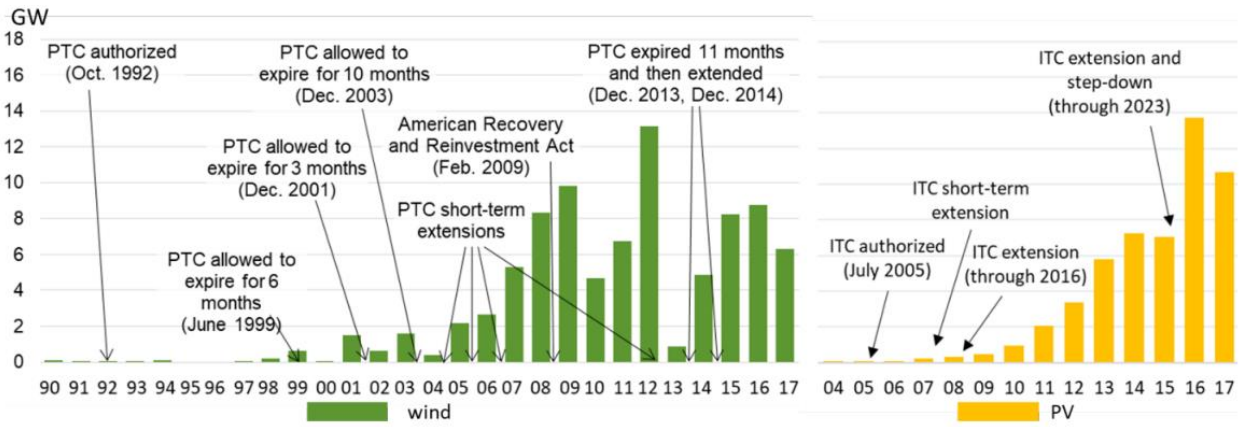

Figure 1. History of the PTC with historic annual wind capacity additions and history of the ITC with historic annual PV capacity additions in the United States. PTC figure adapted from Mai et al. (2016).

Source: National Renewable Energy Laboratory, 2019.

3. WILL COMPETITION ALONE DRIVE CLEAN ENERGY DEPLOYMENT?

Competition alone will drive clean energy deployment, but not nearly enough to meet President Biden's goal of 80 percent clean electricity by 2030 and 100 percent by 2035, in line with what is needed to avert the worst effects of the climate crisis. Business as usual scenarios without any new policy considerations do not reach the goal of 80 percent clean energy by 2030, with the EIA predicting that clean energy will only reach 51 percent penetration by 2030.

Competition is far from completely open in the U.S., with high barriers for new technologies like wind, solar, and storage. Competitive market rules are outdated, and affordable transmission access for new resources is hard to come by (though the Build Back Better Act and Bipartisan Infrastructure Deal address this). Coal and gas are still largely spared from having to pay their pollution's costs to human life. Monopoly power also creates barriers to competition, and more than half of American consumers are served by monopoly utilities. Regulatory persistence is required to get a clear picture of the economics of alternatives and put pressure on uneconomic fossil fuels. Furthermore, renewables present a different reliability challenge for utilities compared to a mostly fuel-based system and switching to unfamiliar technology is perceived as an untenable risk, even where renewable penetration is relatively low. These are solvable problems, but a clean energy tax credit alone cannot address them.

Still, clean energy tax credits will effectively overcome much of this inertia. Renewables are the cheapest source of *new* power, which explains why no new coal plants are proposed in the U.S. But new renewables are more expensive than operating most of the *existing* gas fleet, and some of the existing coal fleet. Renewables are more likely to outcompete existing fossil fuels when the costs of new renewables falls below the operating costs of fossil plants, something that tax credits can achieve, particularly as proposed in the Build Back Better Act. In addition, as renewable penetrations increase, the cost of renewable energy must fall to allow for storage and transmission investments to reliably and cost-effectively replace fossil.

Turning tax credits into grants will also address monopoly resistance to renewables. Under tax credits, tax normalization and accounting rules allow independent third parties to more effectively and rapidly monetize tax

benefits, lowering renewable project costs when compared to regulated monopolies; this reduces utilities' ability to cost-effectively build and own these assets relative to independent power producers. Cash grants would level this playing field, encouraging monopoly utility support for renewable energy.

4. HOW CAN CLEAN ENERGY TAX CREDITS BE DESIGNED TO MAXIMIZE EMISSIONS REDUCTIONS?

Six design principles can maximize the emissions impact of clean energy tax credits:

1. **Duration:** Extending tax credits over a long time horizon (through at least 2030) provides business certainty and gives developers time to plan projects that take several years to site, permit, and build;
2. **Magnitude:** Tax credits offered at their full, original value (e.g., a 30 percent investment tax credit and a 2.5 cents/kWh production tax credit) is key to maximizing their impact on emissions;
3. **Flexibility:** Allowing any clean energy technology to opt for either the PTC or the Investment Tax Credit is technology neutral and allows developers to pick the incentive that minimizes their cost;
4. **Justice:** Ensure tax credits can benefit low-income consumers, for example by making tax credits refundable for rooftop-scale solar and storage projects;
5. **Form:** Converting tax credits to "direct pay" cash grants removes barriers to and inefficiencies associated with capturing their value and improves the monopoly utility business case for renewables; and
6. **Scope:** Expanding the tax credits to allow certain classes of existing clean energy resources to qualify (e.g., to keep struggling nuclear power plants from early retirement) maximizes the emissions reduction potential of the policy.

5. WHAT DO STUDIES SAY ABOUT THE EFFECTIVENESS OF CLEAN ENERGY TAX CREDITS OVER THE NEXT DECADE?

Studies agree that tax credits for zero-carbon power will significantly increase the share of clean electricity in the U.S. The level of clean electricity depends heavily on the duration, magnitude, flexibility, form, and scope of the tax credits. Four studies of the tax credits similar to those in the Build Back Better Act (by the Union of Concerned Scientists, Rhodium Group, Energy Innovation, and Resources for the Future) show that these provisions would likely increase the U.S. clean electricity share from 40 percent today to 57 to 69 percent by 2030, reducing power sector emissions 60 to 73 percent below 2005 levels by 2030. However, these outcomes do fall short of President Biden's 80 percent clean electricity goal for 2030, highlighting the need for additional measures.

- Union of Concerned Scientists find the Clean Energy for America (CEA) Act would grow carbon-free generation to 62 percent by 2035.
- Rhodium Group modeling finds tax credits drive 57 to 68 percent clean electricity by 2030.
- Energy Innovation modeling of the tax credit provisions in the Build Back Better Act finds they could bring the U.S. to 61 to 69 percent clean electricity by 2030.
- Resources for the Future finds the CEA Act would drive clean energy to represent 69 percent of generation by 2030.

These studies suggest that while tax credit extensions alone would not get the U.S. to 80 percent clean by 2030, they would still contribute to substantial reductions of carbon emissions, as well as local pollutants. Maximizing the

effectiveness of tax support also depends on state and regional policies, particularly oversight from state utility regulators and regional wholesale market operators. To provide the best chance of reaching the upper end of the studies' clean energy deployment projections, Congress should apply all five principles when extending clean energy tax credits and consider complementary policies to strengthen state ambition on clean electricity.

6. WHY SHOULD THESE INCENTIVES BE OFFERED AS CASH GRANTS RATHER THAN TAX CREDITS?

The federal investment and production tax credits should be converted to "direct pay" cash grants for three main reasons.

First, *cash grants are a more efficient use of government funds*. Under today's system, the use of the tax code forces most developers–who don't have enough tax liability to leverage the full subsidy–to finance their projects with a supplemental investor's tax liability. In practice, this means project developers must assign the rights to claim the tax credits to another party in exchange for a cash investment. But this cash has a cost–tax equity must be repaid with significant interest, often in excess of 10 percent of annual returns. As a result, this tax equity financing arrangement only allows project developers to realize two-thirds of the full value of these tax benefits, wasting taxpayer money in the process. It also introduces red tape in the form of finding the right counterparty, drafting and reviewing complicated contracts, and coordinating throughout the development process. All these barriers hit small developers harder and create barriers to innovation and new market players.

Second, *cash grants would raise the success rate of renewable energy projects*. Under today's system, developers may delay or shelve projects that depend on realizing tax credit value if they can't find an intermediary with a sufficient tax appetite. This situation may arise in recessions, when large financial institutions have less tax liability and interest due to less economic activity, forcing renewable developers to compete for limited opportunities to enter into tax equity financing arrangements. Additionally, a growing clean energy industry becomes more likely to hit tax equity constraints. With a cash grant system, developers could still see these projects through to completion.

Third, cash grants would remove barriers to renewable energy deployment in regions served by monopoly utilities. Under today's system, tax normalization and accounting rules require investor-owned utilities to monetize the investment tax credit benefit to ratepayers over the lifetime of the asset; this reduces utilities' ability to cost-effectively build and own these assets relative to independent power producers. As monopoly utilities' incentive structure rewards infrastructure ownership, they gravitate toward building new (or reinvesting in) fossil power plants rather than renewable energy assets, as independent power producers are more likely to outbid them on the latter. Cash grants would level this playing field, encouraging monopoly utility support for renewable energy.

APPENDIX: SUMMARIES OF RELEVANT PROPOSALS' EFFECT ON POWER SECTOR

The Growing Renewable Energy and Efficiency Now (GREEN) Act (House proposal)

The GREEN Act would extend the existing production tax credit (PTC) for renewable energy sources at full value through 2031, followed by a phase down. The PTC would provide a tax credit of up to 2.5 cents per kWh of renewable energy generated. In order to qualify for the full credit, a facility must meet prevailing wage, qualified apprenticeship, and domestic content requirements. Other facilities would qualify for a lower base credit rate of 0.5 cents/kWh. For most facilities, including municipal solid waste, qualified hydropower, marine energy, and geothermal, the PTC would be extended through the end of 2031, with a phase down to 80 percent of the applicable rate in 2032 and 60 percent in 2033. For wind and solar energy, the PTC is restored to its full value through 2031, and then faces a similar phase down in 2032 and 2033.

The GREEN Act would also extend the existing investment tax credit (ITC), which allows taxpayers to claim a credit for up to 30 percent in qualifying renewable energy property. A lower base credit rate of 6 percent would be allowable for facilities that do not meet the jobs requirements. These rates phase down after 2031, with the bonus rate at 26 percent in 2032 and 22 percent in 2033 while the base rate drops to 5.2 percent and 4.4 percent respectively. For solar, the ITC is extended at the 30 percent/6 percent bonus/base rate and remains at 10 percent/2 percent after the 2032 to 2033 phasedown. This ITC is also expanded to include new technology, such as energy storage, linear generators, microgrid controllers, dynamic glass, and biogas property. Another provision of the ITC provides an additional 10 percent credit for solar facilities that provide capacity in low-income communities.

The Clean Energy For America (CEA) Act (Senate proposal)

The CEA Act would streamline several separate clean electricity tax credits into one technology-neutral, emissions-based incentive. The taxpayer would be able to choose between a production tax credit (PTC) or investment tax credit (ITC) for any power facility with zero, or net-negative, carbon emissions. The PTC would provide a credit of 2.5 cents per KWh of electricity produced and sold in the 10 years after a qualifying facility starts operating. The ITC would provide a tax credit of 30 percent of the investment in a facility during the year that facility starts operating, and would also be available for qualifying grid improvements such as energy storage and transmission. These tax credits can be distributed as direct funds.

These credits will be in place until the Department of Energy and Environmental Protection Agency certify that the emissions of the entire electric power sector are 75 percent below 2021 levels, at which point they will phase out over a five-year period. This bill also requires projects above residential size to comply with prevailing wage and qualified apprenticeship requirements.

Nuclear Tax Credit Proposal

The Zero-Emission Nuclear Power Production Credit Act of 2021 would make existing merchant nuclear power owners/operators eligible for the same 1.5 cent/kilowatt hour credit ($15/megawatt hour) proposed for wind operators. Current tax law provides a production tax credit for eligible nuclear power facilities only during the first eight years of operations. There is no tax credit for older nuclear power plants, many of which are retiring before the end of their useful life due to a drop in energy prices. The proposed credit would phase out if market revenues reach 2.5 cents/kilowatt hour ($25/megawatt hour), if Greenhouse Gas Emissions (GHG) drop 50 percent from 2020 levels, or after 10 years.