Federal Higher-Impact Carbon-Free Electricity Procurement

Meeting the Biden Administration goal of creating a 100% clean electricity grid by 2035 will require the rapid deployment of a diverse portfolio of carbon-free energy technologies. The federal government can accelerate achievement of that objective by adopting electricity procurement practices that deploy new clean energy resources, maximize carbon reduction, incentivize technology development, and better leverage federal leadership. This approach is "higher-impact carbon-free electricity procurement."

On January 27, 2021, the Biden Administration released a new "Executive Order on Tackling the Climate Crisis at Home and Abroad."[1] This order specifically includes a Section 205 on "Federal Clean Electricity and Vehicles Procurement Strategy." This section highlights "developing a comprehensive plan to create good jobs and stimulate clean energy industries by revitalizing the Federal Government's sustainability efforts" which should "aim to use, as appropriate and consistent with applicable law, all available procurement authorities to achieve or facilitate… (i) a carbon pollution-free electricity sector no later than 2035." In addition, Section 210 on "Clean Energy in Financial Management" directs the heads of agencies to "identify opportunities for Federal funding to spur innovation, commercialization, and deployment of clean energy technologies and infrastructure..." The recommendations contained in this memo for higher-impact carbon-free electricity procurement represent what our undersigned groups believe to be the strongest possible policy the Administration could implement to meet the mandates of the Executive Order.

Higher-impact electricity procurement focuses on decarbonizing electricity consumption in each hour and on each regional grid where electricity consumption occurs and securing a 24-7 clean energy supply. In contrast, traditional clean electricity procurement approaches have relied on purchasing electricity or environmental attributes from renewable projects located far away from consumption and whose generation does not coincide with the time at which electricity is consumed.[2] Higher-impact electricity procurement also aims to reduce reliance on fossil generation that supplies the grid when adequate variable renewable generation is not available and to create demand for energy storage and firm and dispatchable carbon-free resources. This approach emphasizes procuring carbon-free resources from the same region as demand to ensure that local grids progress in decarbonizing.

Higher-impact carbon-free federal electricity procurement aligns with President Biden's 2035 goal and effectuates his Climate Plan's tenet of "[u]sing the Federal government procurement system – which spends $500 billion every year – to drive towards 100% clean energy."[3] Adopting higher-impact carbon-free electricity procurement goals will demonstrate federal government leadership – and magnify the impact of leading private sector carbon-free energy buyers. The market signal that the federal government can send to the electricity marketplace for round-the-clock carbon-free electricity will drive

[1] "Executive Order on Tackling the Climate Crisis at Home and Abroad," (Jan. 27, 2021).

[2] There is a growing interest among corporate sustainability leaders in these higher-impact electricity procurement approaches. Google, for instance, is the first company to make a commitment to operate on 24/7 carbon-free electricity everywhere it operates. See: https://www.gstatic.com/gumdrop/sustainability/247-carbon-free-energy.pdf

[3] https://joebiden.com/climate-plan/#

deployment of new technologies and create American jobs needed to meet that demand with and for American business. By emphasizing locational aspects of procurement, the federal government can ensure that the economic and public health benefits associated with the deployment of clean energy are realized by all regions and communities.

What is higher-impact carbon-free electricity procurement?

There are four key features of a higher-impact, carbon-free electricity procurement approach that distinguish it from traditional renewable energy procurement approaches:

1. **Location:** The focus is on matching consumption with clean electricity purchased in each regional grid where the buyer is located.
2. **Time:** The ultimate goal is matching consumption at an hourly level.
3. **Eligible Technology:** In recognition of the need to decarbonize the electricity system cost-effectively and quickly, higher-impact carbon-free procurement uses an expansive definition of "carbon-free electricity" (and involves a broad portfolio of technologies that do not emit carbon dioxide when producing electricity, including wind, solar, hydro, geothermal, biomass, nuclear, hydrogen, and fossil with carbon capture and storage). Technologies to shift the time of production and consumption such as energy storage, demand response, and transmission also play an important role. The inclusion of a full range of carbon-free and enabling resources under procurement goals aligns with accelerating the decarbonization of the grid on a cost-effective basis.[4]
4. **Consumption-focused:** Higher-impact carbon-free procurement is about moving from goals defined by purchasing a certain amount of renewable generation independent of time and location toward goals that focus on the carbon-free content of the electricity that is consumed at each facility.

Why does this approach lead to greater decarbonization impact and other benefits?

The federal government is the largest purchaser of electricity in the world. In 2019, the federal government consumed approximately 53.8 million megawatt hours (MWh) of electricity, of which 4.6 million MWh (or 8.6%) were counted as renewable resources.[5] To date, federal clean electricity procurement has largely focused on setting and effectuating renewable energy *purchasing* goals.[6] These goals are predominantly met by purchasing renewable energy along with Renewable Energy Certificates (RECs), which represent the renewable attributes of the electricity, or by acquiring RECs apart from (also known as "unbundled" from) the underlying generation. These purchases are made to meet targets

[4] Jenkins et al. (2018) - https://doi.org/10.1016/j.joule.2018.11.013

[5] U.S. Department of Energy, Energy Efficiency & Renewable Energy, Comprehensive Annual Energy Data and Sustainability Performance FY 2019, available at: https://ctsedwweb.ee.doe.gov/Annual/Report/FederalAgencyUseRenewableElectricAsPercentageOfElectricityUse.aspx (last accessed Dec. 10, 2020).

[6] Currently, federal agencies are subject to a statutory obligation, from section 203 of the Energy Policy Act of 2005 (EPAct 2005), to ensure that at least 7.5 of the electricity they consume comes from renewable resources. 42 U.S.C. sec. 15852.

based on annual electricity consumption irrespective of location. The current approach of purchasing renewable electricity/RECs merely to match a certain share of annual consumption creates an incentive to purchase from the regions or technologies that provide the cheapest renewable MWh, rather than focusing on decarbonizing electricity supply in the locations and hours where the buyer actually consumes electricity.[7] While this traditional clean electricity procurement approach has led to gigawatts (GW) of new wind and solar capacity, this renewable electricity is not necessarily generated in regions or at times of day where it has the greatest impact on carbon reduction.

To decarbonize the nation's electricity system fully and cost-effectively, firm carbon-free energy technologies and advanced energy storage systems are needed to deliver clean electricity during gaps in production from solar and wind. Today's commercialized battery storage technologies can shift wind and solar generation a few hours at a time within a day. New long-duration energy storage technologies, once fully demonstrated and commercialized, could store electricity over multiple days, weeks, and months when the seasonal patterns of solar and wind cause output to be less than electric loads. Firm carbon-free generation could similarly supply clean energy during periods when solar and wind are insufficient. Yet, the traditional clean electricity procurement approach, which is focused on matching annual rather than hourly consumption, provides weak incentives for investment in advanced storage or firm carbon-free technologies because it allows demand to be satisfied through continued reliance on generation from wind- or solar-rich regions without regard to the location of the consumer or time of year it is consumed.

With higher-impact carbon-free electricity procurement, the federal government will create demand for in-region development of resources to match its electricity consumption and reduce demand for carbon emitting generation. The carbon reductions achievable through this type of procurement are substantial compared to traditional procurement approaches. For example, the following table[8] shows the electric system carbon emissions associated with a representative corporate office customer with a 1 MW annual average electric load in the ERCOT region of Texas. The analysis assumes the customer procures the equivalent of its annual electricity requirement from one of four supply portfolios: 1) the regional electric grid, 2) solar in the ERCOT region, 3) wind in the ERCOT region, or 4) a diverse portfolio including wind, solar, battery capacity and firm carbon-free generation. The analysis shows that solar and wind alone reduce carbon emissions by 57% to 64% respectively, but a diverse portfolio could reduce emissions by 97%, essentially the customer's entire carbon footprint. The results for this customer in Texas are consistent with that seen for other regions and customers: in all cases, solar and wind alone reduced carbon emissions by roughly 60% while a diverse portfolio virtually eliminated carbon emissions.

[7] Thus, a solar farm in California can be used to offset the electricity consumption of a data center in Alabama, even though the carbon reduction impact of the former may be much less than the carbon emitted via consumption on the grid in Alabama.

[8] Results from a forthcoming paper by the Columbia University Center on Global Energy Policy.

Representative Corporate Office Building in Texas (ERCOT) with a 1 MW Annual Average Load		
Supply Portfolio	Carbon Emissions from the Regional Electric Grid	
	Tons of CO2 / Year	Percent Reduction
100% Regional Electric Grid	4,419	0%
100% Solar	1,921	57%
100% Wind	1,601	64%
Diverse Carbon-Free Portfolio	146	97%

Higher-impact carbon-free electricity procurement spurs greater demand for the full suite of technologies and tools ultimately needed to fully decarbonize the grid, including both variable and firm carbon-free technologies, advanced energy storage, and the use of advanced demand management to better align load with periods of abundant carbon-free generation. And while supply costs will inevitably vary by technology, region of the country, and other factors, innovative procurement could readily lead to carbon-free supplies at a cost per ton of carbon abatement well below the social cost of carbon. Along with continued deployment of energy efficiency, this full-suite pathway can lead to a fully decarbonized electric grid with less risk, lower costs, and at an accelerated pace.

There are additional benefits beyond accelerating the reduction in emissions from federal electricity use:

- Federal procurement can drive deployment of new clean energy resources. It can serve as a catalyst for investment, unlocking capital and creating tens of thousands of new American jobs across the clean energy sector, as well as associated U.S. manufacturing supply chains.
- Federal offtake can help innovative carbon-free energy technologies get financed and built. By signing contracts to purchase electricity from new projects, the federal government can accelerate the commercialization of advanced carbon-free energy technologies, spurring "learning by doing" cost reductions that enable widespread deployment and additional carbon dioxide emissions reductions for everyone. These technologies will also be important for maintaining system reliability as the electricity system approaches very high (90%+) levels of carbon-free electricity supply.
- Federal action now can leverage even more reductions by the private sector. Federal leadership in procurement will encourage other larger energy buyers to follow the example and accelerate their own move towards higher-impact electricity procurement approaches. And the embrace of higher-impact approaches to procurement by such a large buyer will encourage development of accounting tools necessary to unlock this approach for smaller buyers.

How the federal government would implement higher-impact carbon-free procurement.

To procure or produce electricity, the federal government uses utility contracts, power purchase agreements (PPAs), General Services Administration (GSA) area-wide agreements, energy savings performance contracts (ESPCs), enhanced use leases (EULs), and privatization agreements. The Department of Defense also has additional contracting authorities, independent of the rest of the federal government.

The President has authority to direct, through Executive Order, agencies to use these tools in service of a particular electricity procurement approach. For example, in 2015, President Obama issued Executive Order 13693, which directed agencies to purchase "clean energy" including, among other things, wind, solar, hydro, small modular nuclear, and generation with carbon capture and sequestration—in an amount representing a certain minimum percentage of total building energy use. President Trump revoked those requirements in 2018.

What next steps do our organizations recommend?

In line with the January 27th Executive Order and the effort underway to develop a comprehensive plan to revitalize the Federal Government's sustainability efforts, President Biden's team should develop a strategy that maximizes the power of federal carbon-free electricity procurement and sets targets for federal facilities to procure round-the-clock clean energy. This can be done through implementation guidance or additional Executive Orders, as appropriate. The strategy should:

- Direct agencies to use all available procurement tools to achieve 100% carbon-free electricity consumption from federal facilities on an hourly basis as soon as possible;
- Establish a process for the adoption of interim targets and guidance on implementation methodologies;
- Permit phased-in implementation with gradually increasing stringency, including related to recognizing existing carbon-free resources in the regional grid mix; location and time-based electric generation, emissions, and electricity use data limitations; and exemption of facilities with relatively little electricity demand located in poorly-connected regions;
- Use accounting and tracking mechanisms that ensure the economic and public health benefits of clean energy deployment are realized equitably by all regions and communities across the country;
- Acknowledge, and where possible mitigate, risk and cost of procurements from new technology deployments;
- Hold federal agencies accountable for meeting the targets and reporting progress on an annual basis.

Signed:

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