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Opportunities and Challenges in Biden's Plan for a Zero-Carbon Federal Government by 2050

President Biden signed an [executive order](#) (Order) on December 8, 2021, directing the federal government to use its scale and procurement power to slash its carbon emissions by 65% by 2030 and achieve net-zero emissions by 2050. Under this ambitious plan, federal operations would run on 100% carbon-free electricity by 2030. This increased demand is expected to add at least 10 gigawatts of locally supplied clean electricity to the grid by 2030 and spur the creation of new union jobs.

The Biden administration's plan outlines a number of initiatives and timelines to reduce emissions across federal operations, including transitioning federal infrastructure to zero-emission buildings powered by carbon-free electricity, procuring zero-emission vehicles, achieving net-zero emissions from federal procurement, and advancing equity and environmental justice. The Order also reestablished the [Office of the Federal Chief Sustainability Officer](#) within the White House Council on Environmental Quality (CEQ), which will oversee efforts to implement the Order as well as the accompanying and newly released [Federal Sustainability Plan](#). The Order states that the federal government should "lead by example in order to achieve a carbon pollution-free electricity sector by 2035 and net-zero emissions economy-wide by no later than 2050," policies that the Biden administration had [previously set](#). The Order also builds upon the Biden administration's [pledge to achieve 50-52% greenhouse gas reductions from 2005 levels by 2030](#).

This article provides an overview of the targets and actions set forth by the Order and highlights key opportunities and challenges arising from the Order.

Overview of the Executive Order

In addition to achieving net-zero emissions from overall federal operations by 2050 and reducing emissions by 65% by 2030, the Order directs the federal government to meet the following four primary targets:

- 100% carbon pollution-free electricity (CFE) by 2030, at least half of which will be locally supplied clean energy to meet 24/7 demand.
- 100% zero-emission vehicle (ZEV) acquisitions by 2035, including 100% zero-emission light-duty vehicle acquisitions by 2027.
- Net-zero emissions from federal procurement no later than 2050, including a "Buy Clean" policy to promote use of construction materials with lower embodied emissions.
- A net-zero emissions buildings portfolio by 2045, including a 50% emissions reduction by 2032.

By setting a 2035 target for an all-electric vehicle fleet and a 2045 target for net-zero emission buildings, the federal government will need to transform its portfolio of 300,000 buildings and fleet of 600,000 cars and trucks. And in setting a net-zero federal procurement goal, the federal government will leverage its annual purchasing power of \$650 billion in goods and services to make necessary infrastructure changes and increase the sustainability of federal supply chains. The Order also includes overarching goals of developing a climate-ready workforce and incorporating principles of equity and environmental justice into all its programs.

Key Areas of Opportunity

Locally Supplied, 24/7 Carbon-Free Electricity Procurement and Development

The targets announced in the Order offer a significant opportunity for energy market participants and developers of a wide range of carbon-free resources. According to U.S. Department of Energy (DOE) data, the federal government spent around \$4 billion on site-delivered electricity in the fiscal year 2020, 9% of which came from renewable resources.[1] The federal government buys most of its electricity via contracts issued by the U.S. General Services Administration (GSA) and the U.S. Defense Logistics Agency (DLA).

The Order sets a 2030 target for the federal government to achieve 100% CFE on a net annual basis, including half on a 24/7 basis. The Order defines 24/7 CFE as "carbon pollution-free electricity procured to match actual electricity consumption to an hourly basis and produced within the same regional grid where the energy is consumed." It focuses on "locally sourced" CFE resources, which suggests development of CFE resources in each regional market in which federal energy procurement occurs. CFE resources in the Order include marine energy, solar, wind, hydrokinetic, geothermal, hydroelectric, nuclear, renewably sourced hydrogen, and electrical energy generation from fossil resources to the extent there is active carbon capture and storage.

In addition, the Federal Sustainability Plan states that the federal government will seek to pilot and accelerate CFE sources such as green hydrogen and modular and advanced nuclear reactors. The federal government will work with utilities, developers, technology firms, financiers, and others to purchase CFE for its operations.

Projects already under development will contribute to the production goal of more than 10 gigawatts of new clean electricity by 2030. The U.S. Department of Defense (DOD)'s Edwards Air Force Base in Southern California will add 520 megawatts of CFE to the grid by completing one of the country's largest photovoltaic array projects in 2022. The DOD's Pacific Missile Range Facility in Hawaii will also complete construction of the nation's largest 100% clean energy microgrid in 2022, composed of a 14 MW solar facility paired with a 70 MWh battery energy storage system, which will make the facility self-sufficient for all its electricity needs in the event of a loss of transmission feed from the utility grid.

Getting to the goal of 100% CFE by 2030 will present a vast challenge. In 2020, renewable energy resources made up around 20% of utility-scale electric power generation on the U.S. power grid.[2] To meet the 2030 target, the federal government will need to rapidly scale its procurement of CFE, as well as incentivize new transmission build-out, which is costly and time-consuming. However, the \$1.2 trillion Infrastructure Investment and Jobs Act, which President Biden signed into law on November 15, and the proposed \$1.75 trillion Build Back Better Act (H.R. 5376) each set aside historic investments in clean energy infrastructure to do just that. We analyzed these investments in a prior update available [here](#).

Zero-Emission Vehicles and Charging Infrastructure

The Order also presents significant opportunities for the electric vehicle and charging infrastructure industries. The Order calls on the federal government to acquire an all-electric light-duty vehicle fleet by 2027 and an all-electric fleet—including all medium- and heavy-duty vehicles—by 2035. The Order states that the federal government will work with American vehicle, battery, and charging equipment manufacturers and installers to transform its fleet into the largest zero-emission vehicle fleet in the nation.

To do so, the federal government will need to replace most of the roughly 600,000 vehicles it currently owns, as only approximately 2,000 vehicles in the fleet are ZEVs.[3] It will also need to scale its charging infrastructure,

including electric vehicle (EV) supply equipment and hydrogen stations. Currently, there are only approximately 700 charging stations at federal buildings and facilities across the country.[4] In addition, ensuring a secure EV battery supply chain will require enhancements to raw materials procurement and processing as well as battery manufacturing and recycling.

Some existing efforts by agencies in this area include the U.S. Department of Interior's (DOI) transition of its U.S. Park Police fleets to 100% ZEVs in its District of Columbia, New York City, and San Francisco locations, with plans to reach a 100% ZEVs by 2025. In 2022, the U.S. Department of Homeland Security will begin field testing the Ford Mustang Mach-E ZEV for use in its law enforcement fleet, which currently consists of over 30,000 vehicles. In addition, the Biden administration had previously pushed to electrify the U.S. Postal Service's 231,000 vehicles, which make up the largest component of the federal fleet.[5] The Build Back Better bill currently earmarks \$2.6 billion to be available until September 30, 2031, for the Postal Service to acquire electric vehicles and \$3.4 billion to purchase related infrastructure, such as charging stations.[6]

Net-Zero Emissions From Federal Procurement and "Buy Clean" Initiative

Supercharging the breadth of its impact, the Order outlines a path to achieve net-zero emissions from federal procurement by 2050 and notably establishes a "Buy Clean" initiative for low-carbon materials to increase the sustainability of federal supply chains. The federal government is the world's largest buyer of goods and services, having awarded over \$650 billion in contracts in 2020. Thus, the new "Buy Clean" initiative is expected to advance the market for lower-carbon materials and place a renewed emphasis on cradle-to-grave emissions tracking and reductions.

The plan requires major federal suppliers to publicly disclose greenhouse gas emissions and climate risks and set science-based targets to reduce emissions. In addition, they will be required to disclose climate risks and vulnerabilities that may affect their future economic stability. In 2022, GSA will require contractors to disclose the embodied carbon of building materials for new building and major modernization contracts.

The Order's "Buy Clean" initiative incorporates life-cycle emission considerations in building projects, aiming to reduce emissions from construction materials like concrete and steel, which emit large amounts of global greenhouse gas emissions during the manufacturing and production processes. The policy promotes the purchase of construction materials with lower embodied emissions, taking into account emissions resulting from the mining, harvesting, processing, manufacturing, transportation, and installation of materials. The policy also prioritizes the purchase of sustainable products and instructs agencies to avoid the procurement of products containing perfluoroalkyl and polyfluoroalkyl substances (PFAS). Finally, the Order establishes a federal "Buy Clean" Task Force to drive strategy and implementation of these policies.

In addition to the "Buy Clean" initiative, the Biden administration's existing "Buy American" policies point to significant growth opportunities in the manufacturing and mining industries that support production of goods and materials necessary to meet the "Buy Clean" goals domestically, including electric vehicles, battery storage, solar panels, and similar items.[7]

Net-Zero Emissions Buildings

The Order also provides opportunities for innovators developing energy efficient building materials and practices, as well as carbon capture and storage systems. The Order sets a target for net-zero emissions buildings by 2045, including a 50% reduction in building emissions by 2032. "Net-zero emissions" is defined as "reducing greenhouse gas emissions to as close to zero as possible" by increasing energy and water efficiency, reducing waste and pollution, and removing carbon emissions through means such as natural carbon sinks, carbon capture and storage, and direct air capture. Currently, only 3,000 buildings of the federal government's approximately 300,000 building stock fit this description.[8]

The Order directs agencies to pursue building electrification strategies in conjunction with carbon-pollution free energy use, deep-energy retrofits, whole-building commission, energy and water conservation measures, and space reduction and consolidation for new construction. It requires modernization projects greater than 25,000 gross square feet to be net-zero emissions by 2030 and calls for agencies to implement CEQ's [Guiding Principles for Sustainable Federal Buildings](#) and to issue building performance standards within six months of the Order's publication.

Existing agency actions in this area include the U.S. Department of Transportation's (DOT) Volpe Transportation Center project, targeted to be completed in 2023, that consolidates six buildings into a single low-emissions building with rooftop solar photovoltaic (PV) panels, ZEV charging stations for the federal fleet and employee vehicles, green and cool roof technologies, rainwater reclamation and reuse system, and a climate-resilient above-grade data center. In addition, in 2022, the DOT will have completed the majority of its energy infrastructure improvements at an Internal Revenue Service (IRS) center outside of New York City through an energy savings performance contract worth \$30.9 million.

Looking Ahead

While the Order presents significant opportunities for the investment and development of renewable power, meeting these targets will present various challenges. The federal government is far from its net-zero emissions targets, with renewable energy, ZEVs, and net-zero emission buildings making up a small share of the government's portfolio in each respective sector.

There is also a lack of specificity around certain targets. For instance, it is unclear whether 100% CFE requires the United States to become a participant in the offset markets. In addition, while the plan instructs the federal government to incorporate environmental justice into agency sustainability plans, it is unclear how agencies will accomplish this in light of the tension that can exist between accelerating the pace of carbon-free resource development and addressing environmental justice concerns. The Justice40 Initiative^[9] directs 40% of overall benefits from relevant federal investments to disadvantaged communities and tracks performance toward that goal, but to meet these vast clean energy targets, agencies will need to integrate the consideration of impacts and benefits of these projects and program investments throughout the planning and implementation processes.

Nonetheless, the order presents a strategic vision for federal agencies to implement ambitious zero-carbon targets and a massive opportunity for many sectors touching the energy industry.

Endnotes

[1] U.S. Department of Energy, [Comprehensive Annual Energy Data and Sustainability Performance](#) (last accessed Dec. 13, 2021); [Renewable Electricity](#) (last accessed Dec. 14, 2021). The federal government-wide performance data available on the Office of the Federal Chief Sustainability Officer website currently covers data on renewable electricity purchases, not the broader category of CFE purchases.

[2] U.S. Energy Information Administration, [Electricity in the United States](#) (last updated March 18, 2021).

[3] U.S. General Services Administration, [Federal Fleet Report](#), May 27, 2021.

[4] Office of Los Angeles Mayor Eric Garcetti, *L.A.'s Green New Deal: Sustainable City Plan* (2019).

[5] [Executive Order on Tackling the Climate Crisis at Home and Abroad](#), January 27, 2021.

[6] Section 80003, *Build Back Better Act: Rules Committee Print*, November 3, 2021 (last accessed Dec. 13, 2021).

[7] [Executive Order on Ensuring the Future Is Made in All of America by All of America's Workers](#), issued Jan. 25, 2021 (last visited Dec. 14, 2021).

[8] Office of the Federal Chief Sustainability Officer. (n.d.). [Federal Government-Wide Performance Data](#).

[9] White House, [The Path to Achieving Justice40](#), July 20, 2021 (last accessed Dec. 14, 2021).

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