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April 14, 2022

VIA ELECTRONIC FILING

Ms. A. Shonta Dunston, Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

RE: Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Reply Comments
Docket No. M-100, Sub 164

Dear Ms. Dunston:

Pursuant to Commission's February 1, 2022 *Order Allowing Comments Regarding Federal Funding for Utility Service of North Carolina,* I enclose for filing in this matter the Reply Comments of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC.

Thank you for your attention to this matter. If you have any questions, please let me know.

Sincerely,

Jack E. Jirak

Enclosure

cc: Parties of Record

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. M-100, SUB 164

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of Consideration of the Federal Funding Available Under the Infrastructure and Jobs Act	))))	**REPLY COMMENTS OF DUKE ENERGY CAROLINAS, LLC AND DUKE ENERGY PROGRESS, LLC**

NOW COME Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (collectively "Duke Energy" or the "Companies"), and pursuant to the North Carolina Utilities Commission's ("Commission") February 1, 2022 *Order Allowing Comments Regarding Federal Funding for Utility Service of North Carolina* ("Order"), hereby submit the following Reply Comments for the Commission's review.

REPLY COMMENTS

In Initial Comments, the Companies stated that potential funding opportunities under the Infrastructure Investment and Jobs Act ("IIJA" or the "Act")[1] could facilitate the energy transition in North Carolina as a result of the overlap between the Act and existing state policies, especially those aimed at reducing carbon emissions, increasing integration of renewable energy resources, increasing beneficial electrification, and ensuring the continued reliability, security, and modernization of the electric grid. However, the Companies noted that implementation of the Act was still in the early stages of development and, as a result, utilities would be better positioned to recommend specific actions for the Commission and North Carolina utilities after the agencies administering

[1] Text - H.R.3684 - 117th Congress (2021-2022): Infrastructure Investment and Jobs Act | Congress.gov | Library of Congress.

funds under the IIJA have established specific funding opportunities. Importantly, the Companies stated that while they continue to assess potential funding opportunities under the Act, they have not yet determined which funds they will seek to access in connection with their existing or planned programs given that such determinations require federal and state agency guidance and determinations that have not yet been developed.[2] However, the Companies' goal is to access funding under the Act that will have the most positive impact on their electric customers and the economic strength and competitiveness of the Carolinas. To that end, the Companies will identify opportunities to use IIJA-related funds to offset appropriate customer costs.

Intervenor parties have submitted comments in this docket recommending requirements for utilities that may be eligible for funds under the Act. While the Companies agree they should pursue eligible funds where appropriate, it is premature to impose requirements on utilities until all parties have had an opportunity to review and understand how specific funding opportunities under the IIJA can be incorporated into programs that may benefit the state. The Commission should also reject any recommendations that it order specific requirements for utilities that are not authorized under existing law. As noted, the Companies have recommended that the Commission convene a technical conference among interested parties to discuss the scope of the IIJA and its potential funding opportunities no earlier than the third quarter of 2022.

[2] Similarly, the initial comments of other North Carolina electric and natural gas utilities in this docket, including Dominion Energy North Carolina ("DENC"), Public Service Company of North Carolina ("PSNC"), and Piedmont Natural Gas Company, Inc. ("Piedmont") note that they do not yet have specific recommendations for action by the Commission. DENC and PSNC Initial Comments at 5; Piedmont Initial Comments at 9.

I. The Commission should defer ordering specific utility actions until funding opportunities under the IIJA have been clearly established.

The Companies are diligently reviewing the Act to understand where funding opportunities might exist and to prioritize potential IIJA funding programs that have the most viability and positive impact. However, the IIJA establishes only a framework for potential funding opportunities, and it explicitly empowers agencies and state and local governments to define specific programs under which they will award funds. The Companies expect that those entities will develop funding opportunities throughout 2022 and into 2023 in accordance with a process that has been historically employed when Congress has appropriated funds to federal agencies for state and federal infrastructure programs. Given that this process includes clearly defined milestones at which additional information about funding opportunities will become available, the Commission should decline to implement any specific processes or require utilities to take specific actions until those milestones have been reached.

Certain agencies have issued Requests for Information ("RFIs") regarding funding opportunities under the Act and the process for administering IIJA-related funds. The Companies have been very active in this process and, to date, have responded to various RFIs, including from (1) the Federal Highway Administration on the development of guidance for electric vehicle ("EV") charging infrastructure deployment; (2) the U.S. Department of Energy ("DOE") on the solicitation process and structure of a DOE Funding Opportunity Announcement ("FOA") to fund regional clean energy hydrogen hubs; and (3) the DOE on the solicitation process and structure of a DOE FOA to advance domestic manufacturing and recycling of clean hydrogen technologies. The Companies' responses to these RFIs are attached hereto and marked for identification as Attachments A, B, and

C, respectively. The Companies expect that agencies will review RFI responses and may publish FOAs with short turnaround times for applications. Commission awareness or support of the Companies' proposals may strengthen utility applications to the various IIJA fund administering agencies. Therefore, the Companies are committed to keeping the Commission apprised of developments in this process.

Several intervenor comments include recommendations that the Commission implement specific processes or require utilities to take certain actions regarding the IIJA at this time. The Commission should reject any such steps as premature and should defer considering them until more information about funding opportunities becomes available. For example, in its comments, ChargePoint, Inc. ("ChargePoint") discusses increasing utility staffing for the purposes of expanding existing EV charging programs. Initial Comments of ChargePoint at 4. The Companies, however, maintain that the better approach is to continue their commitment to work with the North Carolina Department of Transportation ("NC DOT") on the North Carolina Clean Transportation Plan pursuant to Governor Cooper's Executive Order 246 and to evaluate the need for additional workforce resources once a plan is developed and adopted.

The Carolina Industrial Group for Fair Utility Rates I, II, and III (collectively, "CIGFUR"), requests that the Commission require utilities to submit reports every six months describing their efforts to obtain funding as well as quarterly reports addressing their efforts to win a regional clean hydrogen hub. Initial Comments of CIGFUR I, II, & III at 6, 14. Similarly, the Companies maintain that such action is premature without more information regarding specific funding opportunities and, as such, the Commission should decline to mandate such a requirement. The Companies generally believe that reporting

requirements around utility efforts to pursue IIJA funding are unnecessary at this time. However, to the extent the Commission mandates any reporting, such reports should align with the funding opportunity timeline and should allow utilities an opportunity to present meaningful information about the opportunities they are pursuing and the manner in which those opportunities may provide benefits to the utility's customers and the state. Arbitrary reporting timelines are unlikely to result in a productive exchange of information.

II. The Commission should reject recommendations that it prematurely determine the prudency of utility actions related to the IIJA.

The Carolina Utility Customers Association, Inc. ("CUCA") recommends that the Companies be required to pause their existing Grid Improvement Plan in the event that IIJA funding opportunities may offset some of these costs. Initial Comments of CUCA at 9. The Commission should reject CUCA's recommendation. The Commission should not reexamine programs it has already reviewed and determined to be consistent with the public interest. The Commission previously approved the Grid Improvement Plan based on the Plan's relative costs and benefits at the time the Companies proposed the Plan.

Therefore, the Commission should reject CUCA's recommendation that any expenditure of funds that could have been defrayed by federal funding should be presumptively deemed imprudent. Initial Comments of CUCA at 4. The utilities' analysis of whether to pursue funding under the IIJA will include various considerations, some of which may not be based on public information. Also, pursuing funding is not a guarantee a utility will ultimately receive such funding; therefore, the Companies believe a prioritization of such opportunities is important. A presumptive determination of imprudence for IIJA-eligible programs would fail to incorporate these considerations and

would unfairly penalize utilities for submitting applications that were not ultimately selected by an IIJA fund administering entity.

III. Requirements for utilities that seek federal funds under the IIJA must be based in existing North Carolina law.

The Companies are hard at work preparing a Carbon Plan that will satisfy the requirements of HB 951 and will facilitate the energy transition. The Companies are currently engaged in a robust stakeholder process and are incorporating many parties' feedback into achieving carbon reductions at least cost. That pathway will include leveraging available federal funds where appropriate. However, some commenters have presented recommendations that, if accepted, would exceed the Companies' service and operations requirements under existing North Carolina law. Requirements imposed on utilities that may seek federal funding under the IIJA should be clearly established in existing law. Therefore, the Commission should reject all recommendations by parties that do not have a concrete statutory basis.

For example, ChargePoint recommends that the Commission direct utilities to propose alternatives to traditional demand-based rates for EV chargers. Initial Comments of ChargePoint at 9-13. In support of its recommendation, ChargePoint provides examples of other jurisdictions where utilities have proposed such alternatives for EV charging customers. *Id.* While the Companies acknowledge that the IIJA's amendments to the Public Utility Regulatory Policies Act of 1978 ("PURPA") require states to consider measures to promote increased electrification of transportation, the PURPA amendments do not authorize states to require utilities to fundamentally modify their existing rate designs for specific customers. The Companies are proactively reviewing ways in which they can promote the use of electric charging infrastructure within their service territories.

For instance, in Docket Nos. E-7, Sub 1266 and E-2, Sub 1291, the Companies have requested that the Commission approve an EV residential managed charging pilot program which will allow the Companies to gain increased knowledge of managed charging and ultimately offer a variety of new EV pricing options without the need for a costly second meter.[3] Therefore, other dockets are more appropriate to address these recommendations.

CIGFUR recommends that all IIJA funds be used for the direct benefit of the utilities' North Carolina ratepayers. Initial Comments of CIGFUR I, II, & III at 3. While the utilities should aim to propose programs and services that will provide benefits to customers, neither the IIJA nor existing state law authorizes the Commission to dictate the manner in which federal funds received under the Act must be used. Rate adjustment proceedings are those appropriate for addressing cost recovery from ratepayers. While the Commission may evaluate the prudency of costs incurred by utilities subject to its jurisdiction, CIGFUR does not identify the statutory basis for its implicit assertion that the Commission may order a specific use of funds obtained through a federal grant. That said, the Companies' goals are to continue providing safe, reliable, and cost-effective electric service to their customers while providing customer programs and services that will further the legislative objectives of the Act and existing state laws. Those objectives, which include reducing carbon emissions and expanding the integration of renewable energy technologies, will directly benefit North Carolina ratepayers.

IV. Conclusion

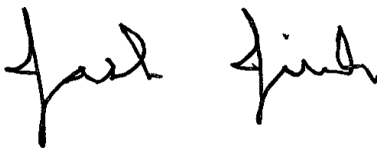
The Companies commend the Commission for its forward-thinking approach to soliciting information about the IIJA. Indeed, the Act is an expansive piece of legislation

[3] Duke Energy Carolinas, LLC's and Duke Energy Progress, LLC's Joint Application for Approval of Electric Vehicle Managed Charging Pilots, Docket Nos. E-7, Sub 1266 and E-2, 1291 (Feb. 11, 2022).

with a broad scope that has the potential for varying interpretations. The Companies agree that it is important for entities that are eligible for IIJA funds and stakeholders to provide input to the Commission on potential funding opportunities.

WHEREFORE, Duke Energy Carolinas, LLC and Duke Energy Progress, LLC respectfully request that the Commission consider the foregoing Reply Comments and grant any other relief the Commission deems reasonable and appropriate.

Respectfully submitted this 14th day of April, 2022.



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Counsel for Duke Energy Carolinas, LLC and Duke Energy Progress, LLC

January 28, 2022

VIA submission to www.regulations.gov; **Docket No. FHWA-2021-0022**

Subject: Duke Energy Comments on the Development of Guidance for Electric Vehicle Charging Infrastructure Deployment

Duke Energy Business Services LLC, on behalf of Duke Energy Carolinas, LLC, Duke Energy Florida, LLC, Duke Energy Indiana, LLC, Duke Energy Kentucky Inc., Duke Energy Ohio, Inc., Duke Energy Progress, LLC, Duke Energy One, Duke Energy Sustainable Solutions and eTransEnergy (collectively Duke Energy), appreciates the opportunity to provide these comments on the Federal Highway Administration's Request for Information on the Development of Guidance for Electric Vehicle Charging Infrastructure Deployment, published on November 29, 2021.[1]

As one of the largest electric and gas utilities in the U.S., Duke Energy embraces its responsibility to power the communities where our customers and employees live and work, as well as to address the need for carbon reduction in our generation fleet. Duke Energy serves 7.9 million customers in North Carolina, South Carolina, Florida, Indiana, Ohio and Kentucky, and collectively owns 51,000 megawatts of energy capacity.

Duke Energy is executing a clean energy transition across its territories to create a smarter, cleaner energy future for its customers and communities – with goals of at least a 50% carbon reduction by 2030 and net-zero carbon emissions by 2050. Achieving our goal of net-zero carbon emissions by 2050 includes supporting other sectors, such as transportation, in meeting their emissions reduction targets. To that end, we are leveraging our resources to not only electrify our own vehicle fleet, but to also deploy the electric vehicle infrastructure to help electrify America's roads.

Duke Energy appreciates the passage of the Bipartisan Infrastructure Law (BIL) and believes it is a powerful catalyst to modernize our nation's infrastructure needs while accelerating carbon emissions reductions. We believe the BIL will be instrumental in helping to expand the adoption of electric vehicles (EVs) that will be key to our net-zero carbon emissions future. Duke Energy will work with the communities we serve and will listen to and fully analyze stakeholder feedback to ensure that this transition to clean transportation is achieved in a manner that carefully considers the expectations and needs of our customers, communities and stakeholders.

Duke Energy commends the Federal Highway Administration (FHWA) for publishing this request for information to inform the guidance that the agency will be developing to implement the National Electric Vehicle Formula Program (EV Charging Program) and the Charging and Fueling Infrastructure Program established by the BIL. DOT's guidance will facilitate the establishment of a convenient, reliable public EV charging network, with a focus on ensuring equity, access and affordability. The effective implementation of these programs is critical to electrifying our transportation sector by providing important flexibility and funding to enable transit agencies, schools and other institutions to diversify their fleets and enable us to expand and adapt our electric grid to meet the demand from increased EV adoption. Based on our experience, we recognize that there is no one-size-fits-all approach to implementing needed infrastructure.

We have extensive experience operating power infrastructure and ensuring that services are safe, reliable and well-maintained. In all the states we serve, we are working to expand EV charging infrastructure and are partnering with various organizations to promote clean transportation and

[1] 86 FR 67782

encourage EV adoption. Our initiatives include increasing access to EV charging, researching how residential EV charging affects the electric grid and helping companies transition from fuel-powered equipment to electric. Duke Energy is also a founding member of the National Electric Highway Coalition (NEHC), which was formed to enable long-distance EV travel for our customers by addressing charging gaps along major transportation corridors.

The BIL outlines key factors that must be considered in developing the guidance on the National Electric Vehicle Formula Program, on which the RFI requests input. The RFI also requested comments to inform the implementation of the Charging and Fueling Infrastructure Program. Below, we have provided comments on the following considerations:

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1. The distance between publicly available EV charging infrastructure

Ensuring the proper distance between publicly accessible charging stations and number of stations per site, especially along major transportation corridors, is critical to increasing EV penetration and relieving range anxiety for current and prospective drivers. However, in tandem with providing guidance on this key issue, the administration should focus on areas where charging infrastructure is currently lacking. These areas, or "charging deserts," must be addressed so that access to charging stations is equitable across the country.

Several studies have offered guidance on distance between publicly accessible charging stations. Duke Energy refers the administration to findings from the West Coast Clean Transit Corridor Initiative, led by HDR. Like others, HDR suggests a 50-mile interval between charging stations. This interval should be considered the maximum distance between publicly available charging stations where possible and will need to be decreased in densely populated urban areas. While these figures may be appropriate at the present time, the administration should continue to revisit these guidelines to accommodate the rapidly evolving EV and Electric Vehicle Supply Equipment (EVSE) market.

2. Connections to the electric grid, including electric distribution upgrades; vehicle-to-grid integration, including smart charge management or other protocols that can minimize impacts to the grid; alignment with electric distribution interconnection processes; and plans for the use of renewable energy sources to power charging and energy storage

Engaging the utility early is crucial to the electrification transition.

- As electric vehicle adoption ramps up across the U.S., the utility's early engagement will be paramount to ensure a smooth grid transition to support transportation electrification.
- Utilities, alongside the Department of Energy and Public Utilities Commissions, will play a critical role in enabling EVSE deployments via conceptualizing, planning and upgrading the system with necessary distribution upgrades, vehicle-to-grid (V2G) integration and more.
- With the most complete view and understanding of the transmission and distribution (T&D) system, the electric utility is best positioned to upgrade that system with the most efficient and cost-effective solutions. The EV charging build-out must consider the full extent of infrastructure costs, including supply infrastructure and service connections.
- It is critical that utilities are engaged early in the EV infrastructure deployment process to prevent delays, abate costs and mitigate the need for additional, incremental grid upgrades in the future. Guidance should require all eligible entities to conduct this early engagement.

Joint planning with the utility should be required to minimize costs and delays, and joint use should be a required consideration for implementation.

- Joint planning among electric utilities, charging equipment suppliers, local or state government, and site hosts for the integration of new EV chargers with existing distribution assets will enable optimization of additional charging infrastructure and grid upgrades for charging.
- The continuation of joint planning between the utility and others is critical to an efficient and effective electrification transition. The earlier the utility is engaged with joint planning partners, the better it can minimize costs and delays.
- For example, joint planning executed early in a town, city or state's transportation electrification plan enables the utility to better plan charging points and potentially leverage existing grid and city infrastructure such as the outdoor lighting network (via "Joint Use") based on traffic patterns while positioning assets for convenient operations and maintenance.

Electric utilities should be eligible entities for funding of EV charging infrastructure deployments.

- Electric utilities are integrating new technologies and clean energy generation sources in support of transportation electrification and grid resiliency.
- Integrating charging infrastructure and additional storage for the EV transition requires balancing the traffic on the grid and managing increased energy demand that extends beyond power lines and storage itself.
- Duke Energy is actively piloting several programs in multiple states in the Southeast and Midwest, addressing EV charging management on the grid, transit electrification and public charging expansion.
- With EV initiatives like Florida's Park & Plug, Duke Energy is demonstrating that it is one of the most efficient installers of utility-owned charging stations.
- The company is simultaneously researching and developing rate design strategies and accounting for projected EV-related grid investments.
- Duke Energy is actively exploring vehicle-to-grid bidirectional power flow and planning programs to understand the role of EVs as distributed energy resources for grid operators. In North Carolina, Duke Energy will offset the purchase of 15 electric school buses by districts across the state to gather operational data and explore the capabilities of vehicle-to-grid technology.
- Duke Energy also partnered with Cummins to provide a local Indiana school system with a DC fast charger and electric school bus with vehicle-to-grid capabilities. Duke Energy worked with Cummins and the school system to complete the grant application that enabled the purchase of the electric bus through funding from the Indiana Volkswagen Environmental Mitigation Trust. Duke Energy installed the charger in December 2021. Over a three-year period, Duke Energy is testing and researching the integrated V2G capabilities for use cases such as backup power, mobile storage, peak shifting and frequency regulation on the grid. As part of Duke Energy's exploration of this technology, the company has filed a request with the Indiana Utility Regulatory Commission to complete additional vehicle-to-grid projects and work with school buses so the company can study this technology further across its service territory.

Duke Energy is well-positioned to address our customers' electrification needs.

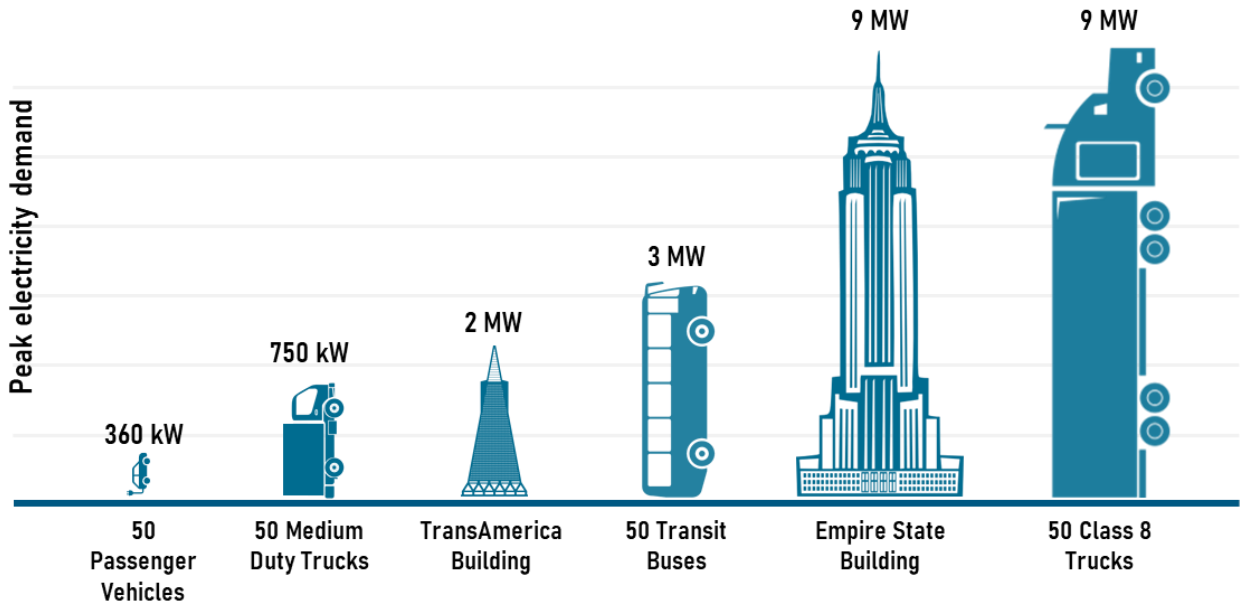
- As the electricity generation, transmission and distribution provider to approximately 30 million people, Duke Energy has developed a deep understanding of customer needs and behaviors in many localities.
- EV sales vary widely by state and region and are consistently most substantial in markets with favorable policies and engaged electric utilities. To serve this range of customers best, Duke Energy is executing programs in multiple states that address research and development, charging infrastructure deployment, rate design and consumer education needs.

- As an experienced operator of rate-regulated utilities, Duke Energy has a history of ensuring equitable access to the benefits of electric transportation. We are making investments to broaden the reach of electric transportation to all communities, closing gaps in low-income and rural communities, as well as storm evacuation routes along key corridors.

Utility programs incentivizing off-peak charging need support from local authorities.

- Electrification will create substantial new load across the grid. This will become most challenging in specific instances with tremendous new loads (e.g., concentrated EV fleets at automobile dealerships or freight businesses surrounding an airport) and will require substantial grid upgrades. Figure 1 shows the coincidental peak of charging fleets of light-duty, medium-duty and heavy-duty EVs in the absence of charging management to provide perspective on the potential grid impacts of electrification.
- To address these challenges, utilities should propose and retail rate regulators should approve incentivizing off-peak charging to shift load and take advantage of the off-peak energy, particularly at times when utilities' solar fleets are peaking, for example. This proactive solution should be planned comprehensively across multiple customers for greatest efficiency and long-term cost reduction.
- In addition, V2G has the potential to be a resource to offset some of this new load. Authorities should fund additional analysis of the technology to conclude its viability as a grid scale resource.

Figure 1. EV Fleet Requirements in Perspective | Potential Grid Impacts[2]



[2] Illustrative view of potential EV fleet impacts on the grid, showing coincidental electricity demand of charging fleets of different vehicle classes (in the absence of charge management solutions) relative to the peak demand of major U.S. buildings.

The Department of Transportation should work with utilities to ensure EV charging infrastructure meets needs of storm response.

- Electrification and the transition to EV will impact storm preparedness and response. As extreme weather events become more severe, it will be imperative to create charging infrastructure along major evacuation routes.
- In Florida, we have begun discussions with state and local officials on this important issue. Duke Energy's work across its territories relating to storm planning positions us to address evacuation routes and storm restoration with regard to EV charging infrastructure.
- Duke Energy and the state's Department of Transportation should collaborate on the deployment of charging infrastructure for storm response and proactively create safe evacuation processes for more widespread EV adoption.
- Funding should be allocated for evacuation route charging as part of the program guidance.

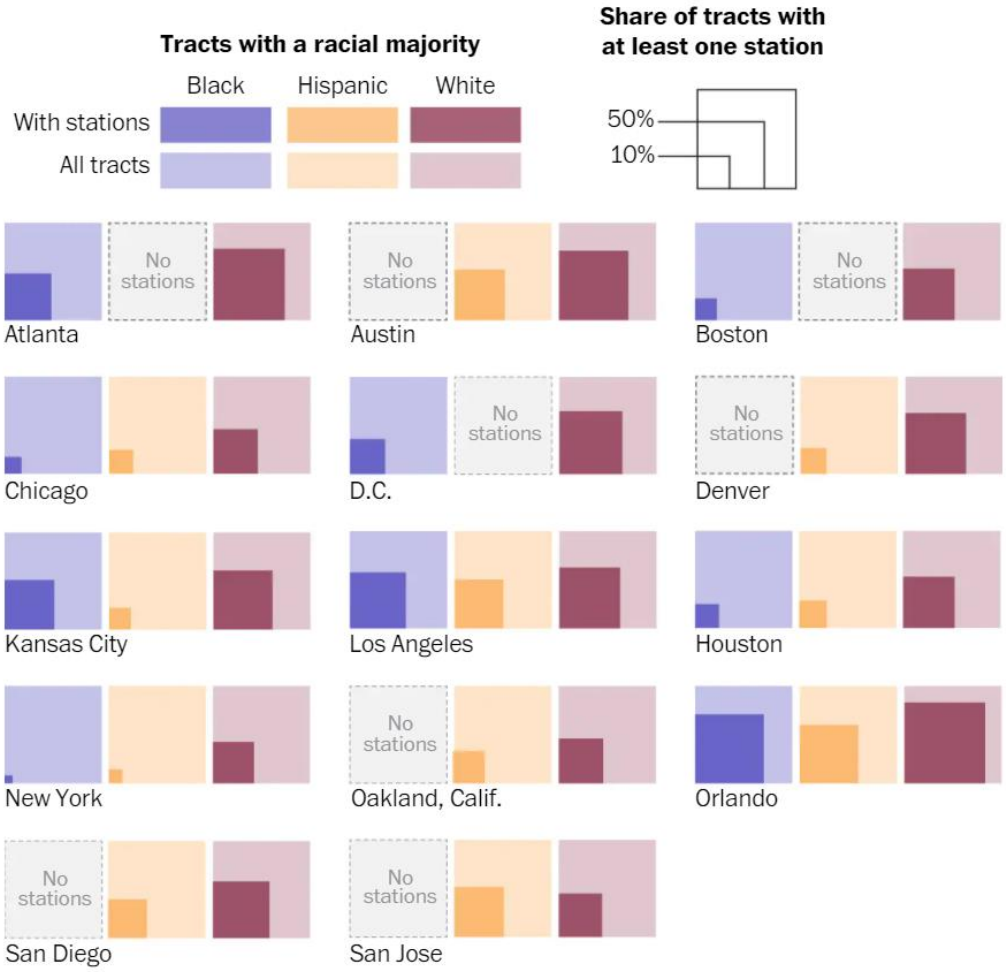
4. The need for publicly available EV charging infrastructure in rural corridors and underserved or disadvantaged communities

Regulated electric utilities are uniquely positioned to provide equitable access to EV charging.

- There are discernible gaps in public charging accessibility and corridor fast charging across the country, especially in rural areas, historically underserved communities and/or low-income communities. Addressing these gaps is critical to supporting the EV transition in an equitable way. A more complete charging network will lead to increased EV adoption, provide storm evacuation capabilities for EV drivers in extreme weather-prone areas and ensure that disadvantaged and rural communities are not left behind by EVs and their benefits.
- Reasonably, private investment follows the market where it is the strongest and profits are most plentiful. In the current EV market, that generally translates to greater investment in predominantly white, wealthy and more urban communities (see Figure 2). Without intervention, low-income, rural, and Black, Indigenous and People of Color (BIPOC) communities will be left behind in the electrification of transportation.
- As an operator of multiple rate-regulated utilities with obligation and right to serve, Duke Energy has the privilege of serving a wide range of customers from varied backgrounds, representing numerous communities, all as part of our regulatory imperative. This imperative positions Duke Energy and its regulated peer utilities to supplement the private sector in the EV transition.
- Furthermore, Duke Energy's depth, historical knowledge and range of engagement across customers and regions position the company well to invest in the electrification of underserved communities and support environmental justice through equitable access to benefits such as reduced emissions, low-cost mobility and quieter streets. Duke Energy has proudly published its own environmental justice principles that advance the fair treatment and ensure meaningful involvement of the communities we serve, regardless of race, color, national origin or income.[3]
- Through active, ongoing customer and stakeholder engagement on energy services and resources, we are working to bolster EV education and outreach to foster better understanding of the benefits across all customers.
- Duke Energy recommends allocating federal funding for EV outreach and education initiatives in alignment with the infrastructure investments, particularly to drive awareness of EV benefits and help close the gap for communities where exposure has been more limited.

[3] Duke-Energy-Environmental-Justice-Principles.pdf

Figure 2. Cities with the Most Active and Publicly Available EV Charging Stations[4]



Note: Cities that did not have any majority-Black or majority-Hispanic tracts were excluded. Kansas City includes city areas in Kansas and Missouri.

Additive benefits exist for equitable access to EV charging in our communities.

- More complete charging corridors will help draw in EV-driving travelers to support the tourism economy of rural communities.
- Adequate highway corridor fast charging supports storm evacuation and storm response needs, a safety concern for EV drivers living in storm-prone areas. Duke Energy's territories include several coastal regions, making evacuation route charging a critical focus of our charging infrastructure deployment efforts.
- The investments needed to integrate EVs into the electric grid can be leveraged as a means of strengthening the reliability and resilience of the electric distribution grid. While EVs offer greenhouse gas and local pollution reductions, the associated circuit upgrades will provide resiliency and reduced outages for communities.

[4] Englund, Will. "Without Access to Charging Stations, Black and Hispanic Communities May Be Left behind in the Era of Electric Vehicles." The Washington Post, WP Company, 9 Dec. 2021, https://www.washingtonpost.com/business/2021/12/09/charging-deserts-evs/.

Duke Energy is leaning into charging infrastructure and is focused on serving all customers.

- In addition to its unique positioning and skill set to address EV infrastructure gaps, Duke Energy has a history of supporting underserved communities via EV programs and equitable access-related investment.
- For example, the Duke Energy Florida Park & Plug program installed over 10% of its allotted EV infrastructure in rural and underserved communities.
- Duke Energy's EV program also focuses on providing charging stations for multi-unit dwellings, so people living in apartment units can charge at home, which is a critically cited barrier for EV ownership. Publicly funded chargers should additionally target locations where home charging is unavailable due to lack of access to on-site parking, garages or driveways.
- Proposed EV programs are modeled after the company's outdoor lighting programs, where Duke Energy installs and maintains electric vehicle charging equipment for customers who in turn need to make no capital investment or take on risk of heavy maintenance or failure.
- Duke Energy has provided a foundational level of EV charging infrastructure in several service territories, and has scaled its proposed programs targeted to low- and moderate-income and rural communities to support initiatives such as the Executive Order No. 80 (EO 80) goal of 80,000 zero-emission vehicles (ZEV) on North Carolina roads by 2025 (Note: Recently announced EO 246 calls for an increase in registered zero-emission vehicles to at least 1,250,000 by 2030 and for 50% of sales of new vehicles in North Carolina to be zero-emission by 2030) and given particular attention to expanding fast charging to close the gaps in EV public charging networks. In North Carolina, Duke Energy plans to fill up to 25% of the anticipated 2025 Fast Charge infrastructure gap.
- These pilots will yield additional valuable information for the commission and Electric Transportation (ET) Stakeholders to review regarding how to efficiently foster equitable EV adoption in areas with customer groups in North Carolina that may be less served by the current EV market. Duke Energy continues to engage with the ET Stakeholders to monitor and discuss their programs' performance and effectiveness.
- Duke Energy's proposed North Carolina Make Ready program is a credit for the companies' customers that wish to install EV charging infrastructure. It encompasses, among other things, the need to ensure that the necessary new supporting electric infrastructure on a customer's premises is installed in a safe and reliable manner to protect both the customer's investment and the grid impacts resulting from this significant new load. Further, it provides for electrification of transportation for low- to moderate-income customers, which otherwise may be delayed through burdensome upfront costs to install EV chargers and make ready infrastructure.

Success of utility-led EV charging programs has accelerated EV adoption.

- The growth rate of light-duty passenger EV sales in North Carolina has been significant. As of December 2021, there were more than 30,000 EVs registered in North Carolina compared to almost zero a decade earlier. As stated in our commission filings, Duke Energy believes that more investment in EV charging infrastructure would accelerate EV adoption in the state, consistent with the intent of state policies and the developing EV market.
- In the Carolinas, since the companies filed their initial EV pilot application in 2019, the regional ET market has, unsurprisingly, continued to grow. As of January 2022, in Duke Energy's North Carolina and South Carolina service territories, approximately 8,730 EVs were registered in the first three quarters of 2021, compared with approximately 3,470 in the first three quarters of 2019, an increase of 152%, well exceeding the national average (Full Q4 2021 data is not available until February 2022).[5]

[5] Registration data sourced from DMV records and allocated to Duke Energy jurisdictions by county.

Given the possible benefits of increased EV adoption to all utility customers, utilities have been and are a natural choice to provide infrastructure that encourages and sustains EV market growth for all customer demographics.

- State utility commissions have recognized that electric utilities play a vital role in building out the infrastructure or providing the EVSE in the transition to electric transportation.
- According to the Edison Electric Institute (EEI), 60 electric companies had regulatory approval for ET filings as of January 2022. Forty-two states plus the District of Columbia had approved ET filings from electric companies. Electric company-approved ET filings represent a total investment of nearly $3 billion.

5. The long-term operation and maintenance of publicly available EV charging infrastructure to avoid stranded assets and protect the investment of public funds in that infrastructure

Duke Energy is keenly focused on deploying charging infrastructure to meet and anticipate growing needs while ensuring the deployed assets and investments are protected in this rapidly maturing technology market.

- Duke Energy's interest is to safely operate and maintain energy infrastructure for long periods of time, with high uptime and reasonable cost to customers. To that end, we have the staff and competencies to ensure that federally funded infrastructure is similarly maintained, avoiding stranded assets and wasted public funds, as well as ensure reliable, equitable and adequate access into the future. We must serve all and serve all the time. As these assets are connected to the grid, supplying electric power, the utility has a clear incentive to ensure ongoing operations and maintenance.
- To avoid stranding assets and to enable best use investment, a build-out approach requires system right-sizing while maintaining the ability to expand at low cost.
- The approach should also acknowledge that one set of features does not work for all. System right-configuring will be key to avoid costly upgrades.
- Duke Energy is also working to reduce downtime of charging infrastructure due to hardware or network failures through robust maintenance networks and agreements, allowing the explicit ability to deploy field resources effectively when stations cannot be reset remotely. It is also key for maintenance plans to include routine site checks and, for DC fast charging, preventive maintenance to avoid costly failures.
- Funds disbursement should come only with an associated maintenance plan that details provisions for preventive and reactive maintenance to include both in-warranty and post-warranty periods, communications response, ability to deploy to the site as necessary and a demonstration of hardware-software integration that is conducive to efficient and effective troubleshooting.
- To foster a level playing field, a common definition and/or calculation of uptime should be determined such that charging operators and hosts are able to objectively evaluate performance and obligations.
- Duke Energy has a strong track record of deploying new technology at scale and sharing what we learn in the process. As an example, for the past decade, Duke Energy's regulated utilities in the Carolinas and Florida have been building solar farms and buying solar energy in large quantities in response to federal and state regulations. As a result, the company has become a national leader in solar forecasting, integration and control of solar output vis-a-vis the bulk electric system, and solar PV safety and fire protection, to name a few competencies. Furthermore, we routinely share our experiences by speaking at technical conferences at FERC, in IEEE standards meetings where our engineers are on standards-setting committees and at numerous industry events.

Interoperability best serves the customer and protects the investment of public funds.

- Duke Energy supports the continued development of the competitive market for DC fast charging by leveraging multiple providers of the hardware and software, creating a transparent stakeholder-informed process around vendor selection that allows for alternative pricing by site hosts.
- As part of Duke Energy's EV infrastructure pilots and programs, the company is deploying smart charger units networked with cellular connections capable of remote operation. Ensuring interoperability between hardware and network management systems is an industry best practice to mitigate the risk of stranded assets. Interoperability allows for flexibility and choice while enabling future scalability and the ability to meet changing needs, so that owners can optimize the cost and risk of networked infrastructure investments.
- Decisions made today will have long-term consequences for the future. To that end, Duke Energy supports open standard and flexible charging systems to enable long-term sourcing and supply chain flexibility.
- Payment options for charging should be easy and non-discriminatory to improve utilization and adoption, but also allow owners to select technology that is reliable and leads to minimal maintenance. EV drivers are inconvenienced by fragmented networks that require maintaining multiple apps and payment methods.
- The lack of widely agreed upon standards for back-end communication networks can also hinder the ability to effectively integrate charging stations into the energy infrastructure, leverage the latest in grid-edge technologies and support all functionality needed in advanced charge management.
- To ensure a fully optimized EV infrastructure, network operators will need to have the ability to integrate charging stations into the power grid to enable additional energy-related services. Interoperable and open networks will allow data to be easily accessed, shared and collected to improve charging services and plan for infrastructure development.
- Program requirements should include, at a minimum, that publicly funded chargers regularly share data with utilities and localities.

States should work jointly with utilities on programs and program approvals to facilitate adoption and maintenance.

- Long-term maintenance and upgrades of EV charging systems must be accounted for. The DOT should work with the utility on programs and installations to ensure the longevity of the assets. Where utility infrastructure programs, including options paid via installment structures, are enabling for funding recipients, such programs should be considered eligible use of funds by recipients.
- The support and authority of public utilities commissions is critical to ongoing maintenance and operations, and states should encourage approvals of utility EVSE programs such as tariffed offerings, line extension allowances and make-ready programs.

6. Existing private, national, state, local, tribal and territorial government EV charging infrastructure programs and incentives

While BIL programs will bring tremendous opportunity and growth to our nation's EV charging infrastructure build-out, it will be critical for the administration to identify existing EVSE deployment efforts to avoid duplication of work as well as to prevent delays to fulfillment of work already underway. Specifically, state and local initiatives are underway across much of the country to address EV charging infrastructure deployment. States should ensure that the acquisition and use of federal funding is well-coordinated across entities. For example, many utilities have pilots or

larger-scale programs approved by their state public utility commission to build out EV customer and charging infrastructure programs. These typically take the form of 1) incentive-based programs (customer rebates, etc.); 2) make-ready programs (providing all the necessary infrastructure up to point of charger installation); and 3) utility-owned and -operated programs (utility-provided turnkey solutions). Utility programs are designed to bolster private investment in EV charging infrastructure, not compete with it. All these program structures should be eligible for a state to leverage in its EV charging plan to maximize the impact of federal funding.

We would also like to refer the administration to the Edison Electric Institute's (EEI) recently announced NEHC, which is made up of 50-plus electric companies that are committed to ensuring a foundational network of EV charging is available to drivers across their service territories to complete long-distance travel. As a founding member of the NEHC, Duke Energy will likely need to implement different programs to ensure the initiative is a success. As these programs will require approval by various state commissions, the administration should encourage, if not require, some level of coordination among the entities and states to be awarded funding. Effective collaboration and coordination will be key to delivering an optimal charging network that best utilizes the investment resources from utility customers.

7. Fostering enhanced, coordinated, public-private or private investment in EV charging infrastructure

Duke Energy is developing a framework for public-private partnership, which will be critical to the EV transition.

- eTransEnergy, a wholly owned subsidiary of Duke Energy, assists school districts, local transit authorities and private industry across the country to achieve their economic and sustainability goals as they transition their vehicle fleets to electric.
- For example, in 2021, eTransEnergy and Charlotte Area Transit System (CATS) commenced a public-private partnership to test the performance of battery electric bus (BEB) vehicles across the greater metropolitan Charlotte area.
- Together, the City of Charlotte and eTransEnergy submitted a grant application to the Federal Transit Administration (FTA) and was awarded a $3,723,712 Low or No (LoNo) Emissions Grant Award, which will fund six of the 18 buses.
- eTransEnergy is excited to have developed a blueprint for public-private partnership with CATS to first pilot and then move to full-scale transit fleet electrification. The company plans to use this framework with other transit authorities around the country to help them transition to clean energy transportation options.
- The eTransEnergy BEB pilot program with CATS supports the Strategic Energy Action Plan (SEAP), which strives to have city fleet and facilities be fueled by 100% zero-carbon sources by 2030 and sets a communitywide goal for Charlotte to become a low-carbon city by 2050.
- After completion of the pilot program, eTransEnergy will support the transition of CATS' entire bus fleet with a selected BEB manufacturer.

Public-private partnerships enable more cost-effective EV charging deployment where joint use can minimize costs.

- EV charging deployments should leverage existing electric utility infrastructure and right of way where possible to minimize redundancy, reduce costs and maximize the impact of federal investment. Outdoor lighting networks are an optimal joint use option for charging stations.

- Streetlights can host a variety of different attachments, such as 5G small cell devices and EV chargers. Because streetlights are already installed, they are an existing network of infrastructure capable of utilization by third parties and municipalities.
- Duke Energy's joint use business oversees the process by which third-party companies, such as major telecom providers, license the right to attach devices, cables, antennas and more on Duke Energy's distribution infrastructure.
- With over 5.2 million joint attachments, Duke Energy has a history of successful collaboration with cities, utilities, universities, various third parties and energy industry entities. The joint use team has forged meaningful partnerships with both service providers and cities to better understand and meet their unique needs.
- Duke Energy's approach to joint use minimizes redundancy, allowing service providers to save on infrastructure and communities to reduce street clutter via fewer structures.
- In partnership with local governments, utilities are well-positioned to meet unique customer needs and overcome various obstacles to charging infrastructure deployment such as easements.

8. Meeting current and anticipated market demands for EV charging infrastructure, including with regard to power levels and charging speed, and minimizing the time to charge current and anticipated vehicles

As discussed above, a build-out approach requires system right-sizing while maintaining the ability to expand at low cost. Not all charging infrastructure needs to be fast. To optimize this infrastructure investment, it is important to perform cost-benefit analysis and consider sizing and installing infrastructure for future scalability, not only for more chargers to be installed later, but also ensuring that any existing chargers can be upgraded. In considering location, use case and utilization, the approach should determine the tradeoff of investing in a smaller number of 350-kW units that many vehicles will not be able to use for the next three to five years versus delivering more 150-kW or 200-kW units. However, the utility is uniquely positioned to provide this scalability by providing the front-of-meter sizing and grid upgrades necessary at time of initial install for additional or faster chargers in future.

9. Any other factors, as determined by the Secretary. In connection with question 9, please describe any other factors that you suggest we consider in developing the EV Charging Program guidance. inform the implementation of the Charging and Fueling Infrastructure Program to provide discretionary grants for corridor and community charging

Electric utilities (including municipalities, member-owned, federal entities, state entities and investor-owned utilities) should be eligible for federal funding programs for use cases where commercial entities do not demonstrate affinity and/or to supplement regulated investment to seed the market.
Utilities are uniquely positioned to play a key role in the deployment of EV charging infrastructure. Not only do electric utilities like Duke Energy have decades of experience implementing large-scale capital projects, but they also fundamentally understand how to manage the ongoing operations and maintenance of assets that are in the field. Utilities are also used to planning and deploying infrastructure projects in areas of high growth, which has led to a practice of building scalable, future-ready infrastructure for customers. When utilities own or operate charging stations, the risk of charger abandonment decreases significantly. While commercial entities will be subject to the rise and fall of the market, utilities have prescribed regulated jurisdictions with customers and assets that, by law, cannot be abandoned. This burgeoning industry needs stability and certainty from a customer perspective, and utilities are uniquely positioned to provide that.

Utilities are also well-equipped to deploy assets across large geographies, including rural and historically underserved areas. Furthermore, they have demonstrated a proven ability to study and optimize the performance of charging infrastructure vis-a-vis ongoing EVSE deployments and other electrical infrastructure and operations, which will be an incredibly important practice moving forward. Ideally, federal funds would not supplant utility investment in infrastructure but instead complement planned investments, lowering the cost of deploying EV charging and creating EV programs for utility customers.

Open standards and interoperability are essential to reliable long-term operation of charging infrastructure and a positive customer experience.
The mass adoption of any industry or product hinges on a seamless, positive customer experience. To ensure success in its administration of federal funding, the FHWA should take a customer-centric approach to the deployment of EV charging infrastructure. Duke Energy leverages open standards and protocols and interoperability to support the long-term health of the electric system. Such systems and architecture can ensure that 1) the right information is shared across chargers and back-end networks (including a driver's credentials, the price of electricity at a given station and the status of a charger for maintenance purposes); 2) the station owner has flexibility in EVSE supply chain options; and 3) charging networks experience optimal levels of reliability.

We also support section 11129 of the Infrastructure Investment and Jobs Act (IIJA) on "Standards," requiring the use of federal funding "to use non-proprietary charging connectors that meet applicable industry safety standards" insomuch as publicly funded chargers or systems should not be exclusive to a particular brand of electric vehicle. However, it is notable that connector adapters may be a useful technological solution presuming other access controls are not limited to specific automakers.

10. Please provide examples of best practices relating to project development of EV charging infrastructure and hydrogen, propane and natural gas fueling infrastructure at the state, tribal and local levels

Duke Energy's utilities have deployed and continue to deploy EV charging infrastructure across their jurisdictions with a goal to create a foundational network that will complement and support similar infrastructure deployed by non-utilities. For example, in South Carolina, non-utilities are deploying infrastructure in city and town centers while Duke Energy is focusing on state and federal highway corridors within the state. We would also like to highlight Duke Energy Indiana, which has recently been awarded funds from the VW mitigation settlement that will be used to deploy fast-charging programs along highway corridors. In each of these efforts, Duke Energy relies on steadfast best practices that have been key to successful EVSE deployments. These best practices, highlighted below, again point to the valuable role utilities play in planning and deploying EV charging infrastructure.

Initiate a robust stakeholder engagement process that ensures early and frequent utility involvement.
Duke Energy understands that there are many parties that have a stake in a successful and robust EV charging infrastructure build-out. Whether Duke Energy is leading a specific project as an owner/operator or merely supporting a non-utility partner, success is built upon frequent, transparent communication. Duke Energy also understands that each entity comes to the table with its own list of priorities and subject matter expertise. Taking the time to obtain feedback from each stakeholder group while reacting to their ideas and concerns is critical to achieving the best result. In many cases, the utility partner is also uniquely positioned with the most discrete customer insights. Utilities understand their customers and communities and can advocate for them in

stakeholder settings. This expertise in approaching the stakeholder engagement process is why an engaged utility partner is critical to a project being deployed right, versus one that is deployed fast.

Planning a future-ready, scalable and a reliable system.
Utilities have long been responsible for ensuring a safe, reliable and resilient system for their customers. This practice is also expected of utilities from their state commissions. To satisfy these expectations while remaining in compliance with uptime mandates, utilities need to build and support an electric grid that satisfies present and future load requirements. Duke Energy prides itself on its ability to plan for a future that may look different than it does today. This means that before any steel is placed in the ground, utility experts are planning viable, long-term solutions by analyzing economic, environmental and political factors that may impact a given area. Through this robust process, utilities can build scalable, future-ready infrastructure that optimizes cost, time and materials. The approach to EVSE deployments should be looked at through the same lens. The administration should include a requirement for eligible entities that goes beyond building a foundational network that can accommodate today's usage. Entities should also conduct an analysis to determine a site's future needs. Deploying a solution that is "good enough" today without any future preparations will hinder a successful EV charging infrastructure build-out. Utilities can help inform this planning process but should be brought in as an early partner to do so.

Share data across stakeholder groups to promote successful outcomes.
Duke Energy has found that transparency, even after infrastructure is deployed, is key to ongoing success and continuous improvement. In our EV infrastructure deployment pilots, we share our data with external stakeholders. Availability of utilization data from charging networks is critical to optimize grid solutions for EV growth. This data enables the utility and stakeholder to understand EV charging behaviors to determine grid impacts and inform T&D planning, which allows entities to collaborate to better locate chargers, provide flexible rates, enable distributed energy resources and ultimately ensure the electric grid is ready for projected use.

11. **What topics do you suggest that we address in guidance on project development of EV charging infrastructure and hydrogen, propane and natural gas fueling infrastructure at the state, tribal and local levels to allow for the predictable deployment of that infrastructure?**

Engage with electric utilities early and often.
It will be critical for developers and site owners to engage with their utility early and often. Utilities are a valuable resource in promoting electric vehicles, ensuring managed charging and understanding the impact of the new load on the T&D grid and resource needs. If this early partnership is not initiated and maintained, utilities may inadvertently cause deployment delays due to potential infrastructure upgrade needs in some locations. When utilities are brought to the table early, they also bring a vast knowledge of customer and stakeholder outreach. The administration can drive EV deployment in strategic locations but also create opportunities for community engagement, stakeholder buy-in and perhaps even state regulator education. In all these areas, the utility is well-positioned to play a key role.

Consider guidance that addresses not only the five-year EV deployment horizon but also the 15- and 20-year horizons.
Creating a foundational network of EV charging infrastructure is no small task. While getting charging stations built and ready for customer use is a top priority, the administration and stakeholders should be mindful of how factors at a given site may change over time. For example, two chargers at a given site may suffice at present time, but changes to a geographic area (e.g., population density changes, fleet electrification transitions, new construction, etc.) or to the EVSE market may result in the need for more capacity or stations. The administration should require entities to conduct an analysis to determine a site's future needs. This planning, when properly shared with the utility, will ensure a cost-effective and timely approach for managing future electricity grid impacts.

Require coordination with state and local entities to ensure EVSE deployment alignment.
Given its goal to build a foundational EV charging infrastructure, the administration should focus on maximizing its investment by aligning with state and local entities on ongoing initiatives. Specifically, state and local initiatives are underway across much of the country to address EV charging infrastructure deployment. We again bring attention to initiatives like the National Electric Highway Coalition, which is made up of 50-plus electric companies that are committed to ensuring a foundational network of EV charging is available to drivers across their service territories to complete long-distance travel. Initiatives like this are spreading across the country and without collaboration there is a risk of duplicating work. To avoid this outcome, the administration should encourage, if not require, some level of coordination among the entities and states to be awarded funding. Effective collaboration and coordination will be key to delivering an optimal charging network that best utilizes the investment resources from utility customers.

Prioritize funding for entities with established and legitimate sustainability targets and the proven ability to deploy clean energy options at scale.
Transportation electrification is occurring in large part due to the need to decarbonize the transportation sector. To enhance this goal, companies across the world are adopting tangible, legitimate sustainability goals that include, among other things, plans to reduce their greenhouse gas (GHG) emissions. Entities that wish to reap the benefits of BIL funding opportunities should also have well-documented sustainability targets to exemplify their commitment to reducing GHG emissions. In addition, these entities should be able to provide renewable energy options to supply charging infrastructure. The administration should consider prioritizing the allocation of funding to these companies.

12. Please provide any suggestions to inform the administration of competitive grants under the Charging and Fueling Infrastructure Program for corridor and community charging.

Electric utilities, particularly those regulated by state entities, are uniquely situated to readily convert DOT funding into "steel-in-the-ground." Specifically, utilities have established the ability to focus on rural, low/moderate-income areas and underserved areas and all locations that may not be attractive or "economically pencil" for non-utility EV infrastructure providers. Furthermore, because of the role of state regulation in the electricity utility business, each funding opportunity with a state-regulated utility serves as a collaborative opportunity for DOT and the individual state regulatory body.

Thank you for the opportunity to comment. Please contact me if you have any questions. We look forward to working with you as you move forward with the implementation of these important programs.

Sincerely,

Venu G. Ghanta

Venu Ghanta
Vice President, Federal Regulatory Affairs
Duke Energy

550 S. Tryon St.
Charlotte, NC 28202

March 21, 2022

U.S. Department of Energy
Hydrogen Fuel Cell and Technology Office
Attention: Guidance on Hydrogen Demonstrations

Company Contacts:

[redacted]

Duke Energy respectfully submits the following comments in response to the Notice of Request for Information ("RFI") issued by the U.S. Department of Energy ("DOE") on Feb. 22, 2022, intending to obtain public input regarding the solicitation process and structure of a DOE Funding Opportunity Announcement (FOA) to fund regional clean hydrogen hubs, in accordance with the Infrastructure Investment and Jobs Act (IIJA).

Duke Energy (NYSE: DUK), a Fortune 150 company headquartered in Charlotte, N.C., is one of America's largest energy holding companies and employs 28,000 people. Its electric utilities serve 8.2 million customers in North Carolina, South Carolina, Florida, Indiana, Ohio and Kentucky, and collectively own 51,000 megawatts of energy capacity. Its natural gas unit serves 1.6 million customers in North Carolina, South Carolina, Tennessee, Ohio and Kentucky.

As described in Duke Energy's 2020 Climate Report[1] and in independent studies and reports, very low- or zero-emitting technologies that can be dispatched to meet energy demand over long durations will be needed to reach very deep carbon reductions in the electricity sector. At Duke Energy, we call these technologies zero-emitting load-following resources (ZELFRs or "zell-furs"). Commercialization of ZELFR technology – including development, demonstrations, and scaling-up – must occur on a very aggressive timeline to enable a timely, cost-effective transition to net-zero. Specifically, to meet our net-zero by 2050 goal, we project ZELFRs need to be commercially deployed at scale on our system by the mid-2030s; these technologies must be commercially available even faster to meet more aggressive targets. The illustrative net-zero analysis in our 2020 Climate Report indicates a need for 6 gigawatts (GW) of ZELFRs across our six-state electricity service area by 2040 and 13 GW by 2050.
Hydrogen production is a ZELFR technology with the potential to play an important role in the clean energy transition, including in the company's service territories in North Carolina, South

[1]Duke Energy, "Climate Change." Available at: https://www.duke-energy.com/our-company/environment/global-climate-change

Carolina, Florida, Indiana, Ohio and Kentucky. Duke Energy looks forward to working with our communities and stakeholders and building partnerships within each of our jurisdictions to move hydrogen technology and the hydrogen economy forward. Duke Energy is being intentional about the way we work with the communities we serve and will listen to and fully analyze stakeholder feedback to ensure that this transition to net-zero is achieved in a manner that carefully considers the expectations and needs of our customers, communities and stakeholders.

All of Duke Energy's jurisdictions are leading by example and we are actively engaging with policymakers and working groups, such as Kentucky's energy strategy, KYE3, not only of the potential for hydrogen but also for opportunities within the overall infrastructure law. Duke Energy is actively working within our jurisdictions to incorporate strategic hydrogen pathways into their clean infrastructures of the future.

The company is thoughtfully considering the role of hydrogen and other ZELFR technologies based on regionally available resources, such as renewable energy and carbon storage. Although these comments focus on the role of a green hydrogen hub in the Carolinas, we believe that blue hydrogen may play a larger role in the company's Midwest service territories, which are located closer to secure geologic storage.

"Hydrogen is not only versatile for the needs of an electric and gas company, but it has industrial uses BY a broad number of sectors that are also going after carbon reduction. As I consider the opportunity we have in this decade with supportive policy FROM the infrastructure bill and potentially tax credits as well, we can make real progress on technical feasibility and also on tackling cost competitiveness. So as we get to the 2030s [hydrogen] becomes a really valuable tool to reach net-zero." – Lynn Good, Chief Executive Officer, Duke Energy

The Role of a Green Hydrogen Hub in the Carolinas Region

The Carolinas region (North Carolina and South Carolina) offers both a unique and advantageous location for a national hydrogen hub, including the opportunity to co-locate supply and demand. The region has significant resources to power the growth of green hydrogen production and its supply chain. It is also home to a rapidly decarbonizing electricity sector with 10 GW of coal remaining to transition and more than 100 large, heavy industrial manufacturers who have stated energy and emissions reductions goals. North Carolina alone hosts 66 companies that have set a goal of being powered by 100% renewable energy.[2] From a production standpoint, the Carolinas host multiple zero-emitting resources, including solar and nuclear generation, that can enable green hydrogen production. Renewable energy will continue to grow, and Duke Energy has announced plans to relicense the company's 11 nuclear units in the Carolinas. In addition, the region is located on a key transportation corridor between the Gulf Coast and Northeast and presents opportunities in hard-to-decarbonize heavy transportation.

[2]North Carolina Sustainable Energy Association, "Celebrating Clean Energy Powered Businesses in North Carolina." Available at: https://energync.org/nclovesclean/re100/

Given this robust combination of potential suppliers and consumers, we expect there will be significant demand for enabling and supporting a hydrogen economy, especially one that integrates green hydrogen production and co-locates hydrogen consumption and supply.

To better understand the region's potential, Duke Energy collaborated with the Energy Futures Initiative (EFI) on a case study of a green hydrogen hub in the Carolinas as part of a larger EFI study on hydrogen market formation. The company participated alongside other stakeholders in a public workshop and invitation-only roundtable hosted by EFI on Oct. 28-29, 2021.[3] In addition, Duke Energy is an active member of the Southeast Hydrogen Energy Alliance (SHEA) – a nonprofit that is advancing the commercialization of hydrogen and fuel cell technologies that minimize environmental footprint. Participation in EFI and SHEA's workshops position Duke Energy to more effectively engage and collaborate with local communities and stakeholders, further enhancing potential support for a regional hydrogen hub.

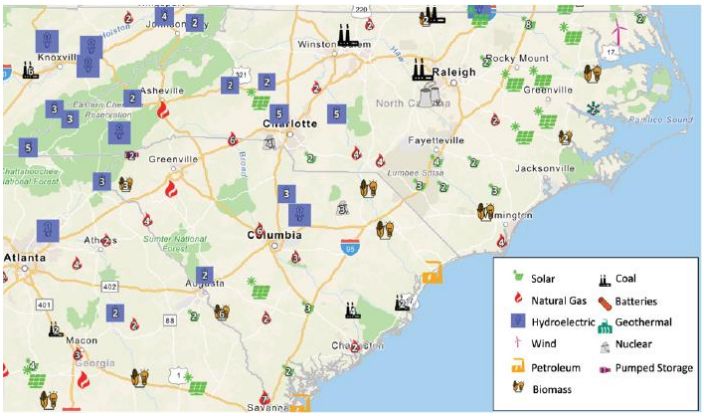


Figure 1: Existing Electricity Generation Facilities in North Carolina, South Carolina, and the Adjacent Regions of Surrounding States. Source: Energy Futures Initiative (EFI)

The following section highlights key attributes of a potential green hydrogen hub in the Carolinas region before turning to the company's response to specific questions in the request for information.

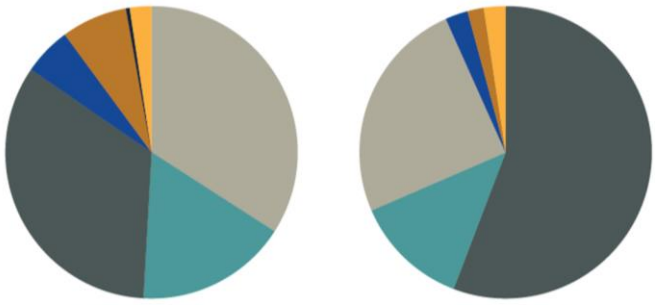
Resources & Production:

There are multiple pathways to producing zero carbon hydrogen in the Carolinas as compared to today's industrial hydrogen. This includes green hydrogen production from solar and wind as well as from nuclear. As of 2020, zero carbon generation accounts for approximately 47% of North Carolina and 60% of South Carolina electricity supply. A significant portion of this zero carbon generation is from nuclear power (Figure 3). As of Q4 2021, North Carolina is the No. 4 state, behind Texas, California, and Florida, when it comes to total solar capacity installed.[4] The amount of solar generation is projected to increase significantly in both Carolinas. Analyses from the National Renewable Energy Laboratory (NREL) corroborates the potential for offshore wind in the Carolinas, further boosting the penetration of renewable generation assets in the region.

[3]Energy Futures Initiative, "The Potential for Clean Hydrogen in the Carolinas," January 2022. Available at: https://static1.squarespace.com/static/58ec123cb3db2bd94e057628/t/61f99276ae97da4b1455fbc2/1643745915407/Carolinas-PostWorkshopReport.pdf

[4]Solar Energy Industries Association, "Solar State By State," Q4 2021. Available at: https://www.seia.org/states-map

Water availability is another critical factor for long-term green hydrogen market sustainability and another strong attribute of the Carolinas region. As demonstrated by the many river systems, large bodies of freshwater and existing hydro- and thermo-electricity generation facilities present in the Carolinas, the region is considered exceedingly water abundant. Electrolysis and regional hydrogen demand scenarios should incorporate regional water demand for electricity generation as well as allocation of upstream water consumption and process-level water consumption factors for hydrogen production.



NORTH CAROLINA		SOUTH CAROLINA
34.1%	NUCLEAR	55.8%
16.8%	COAL	12.7%
33.7%	GAS	24.8%
5.3%	HYDROELECTRIC	2.5%
7.3%	SOLAR	1.8%
0.4%	WIND	0.0%
2.4%	BIOMASS	2.4%

Figure 2: North Carolina and South Carolina Percent Net Electricity Generated 2020, respectively. Source: Energy Futures Initiative (EFI)

Distribution & Logistics:

The Carolinas region already serves as a critical transportation and logistics hub with the potential to integrate a green hydrogen economy. The region hosts large multimodal rail hubs that connect the largest rail system in the U.S. – the Norfolk Southern Railway. In the Carolinas, five international seaports are linked to railways, inland shipways, and interstate highways such as I-85 and I-95 (Figure 1). These transportation corridors are strategically situated to link other likely hydrogen markets along the Gulf Coast, Appalachia and the Northeast.

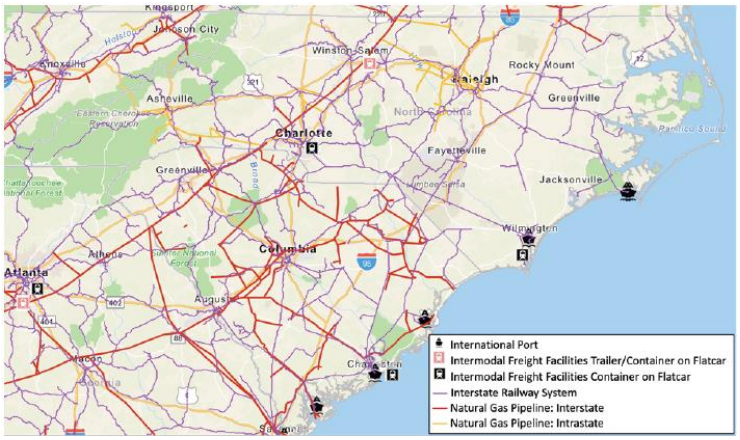


Figure 3: Existing Transportation Infrastructure in North Carolina, South Carolina, and the Adjacent Regions of Surrounding States. Source: Energy Futures Initiative (EFI)

Currently available technologies and evolving markets may lead to natural gas pipelines being retrofitted to facilitate blended volumes of hydrogen. The Carolinas have an expansive network of distribution pipelines which have a potential to transport hydrogen, first through natural gas-hydrogen blending. Also, given the Carolinas large solar and nuclear presence, this also presents the opportunity to locate electrolyzers to produce green hydrogen behind pipeline infrastructure. Especially when co-located with gas turbines, this could present significant economic synergies for customers and could reduce incremental pipeline needs.

The Carolinas do not have any geological natural gas production and interstate natural gas transmission capacity from production regions into the Carolinas is currently fully-subscribed.

This presents an opportunity for the states to increase their fuel security through displacing natural gas from the Gulf Coast with in-state fuel supply. Local production of green hydrogen can help transition existing and future natural gas generators to a carbon-free dispatchable resource. While natural gas transmission infrastructure is over-subscribed in the Carolinas, local production of green hydrogen can help transition away from the 10 gigawatts of remaining coal in North Carolina with a carbon-free dispatchable resource.

Hydrogen Storage:
Hydrogen has the potential to be a cost-effective, mid-to-long duration storage solution, that is not cycle-limited. As noted by SHEA's RFI submission, the Carolinas region does not have salt domes for hydrogen storage, so other storage methods would need to be considered for large storage capabilities. Regional operators of the Carolinas have liquefaction that are widely used for natural gas liquefaction. These facilities offer an opportunity to pivot toward hydrogen liquefaction operations. No means of natural geologic hydrogen storage exist in the Carolinas – a challenge faced by many other states across the nation. Despite these circumstances, the Carolinas region has the R&D capabilities and infrastructure required to address the hydrogen storage challenges the nation will face. Alternatives to subterranean storage are not only a market opportunity, but a research and commercialization necessity to improve both the costs of hydrogen and to expand operations at scale.

Savannah River National Laboratory, located in Aiken, S.C., is a leader in hydrogen storage research and is actively researching forms of lightweight, cost-effective, non-geologic hydrogen storage. Greenway Energy (GWE) of Aiken, South Carolina, an H2-Orange team collaborator, is evaluating both natural gas turbine and fuel cell technologies for a lower-cost and more efficient hydrogen energy storage alternative to battery systems for power plant applications, including fossil fuel plant energy storage systems (H2-Orange project is described below in R&D Capabilities). Commercialization of these hydrogen storage technologies would unlock hydrogen as a decarbonization tool and long-duration energy storage asset in similarly situated regions both nationally and globally. Pipelines – as described above – offer another means of hydrogen storage.

These regional efforts to advance hydrogen storage systems technology, including novel hydrogen storage materials, are in line with the DOE Hydrogen Fuel Technology Office's hydrogen storage targets, including those for onboard light- and heavy-duty vehicles, material-handling equipment, portable power applications and long-duration energy storage. Hydrogen energy storage enhances domestic economy and brings us closer to the Biden Administration's energy and climate targets, and ambitious goal of reducing the cost of hydrogen to $1 per 1 kilogram in one decade.

Local Consumption:
The electricity and transportation sectors, described in detail above, both have the potential to serve as significant consumers of green hydrogen produced locally to support deep decarbonization of the grid and reduce hard-to-abate emissions from heavy-duty transportation. Duke Energy's existing fleet of natural gas generators in the Carolinas are capable of co-firing hydrogen today. Most of the company's existing fleet can co-fire up to 30%hydrogen and the company's combustion turbines in Lincoln County, NC are capable of up to 50% today. Any

future natural gas generators will also be hydrogen capable; original equipment manufacturers are working to provide 100 percent hydrogen capability by 2030.

The advanced combustion turbine generator at Lincoln Combustion Turbine Station near Denver, NC will be fully operational in 2024 – supplying enough energy to power more than 300,000 homes in the Carolinas. This unit will be approximately 34% more efficient than existing combustion turbines at the Lincoln station and will be the most efficient combustion turbine in Duke Energy's fleet. This unit will give Duke Energy more flexibility – supporting the company's growing portfolio of solar generation, quickly starting to meet customer demand when the sun isn't shining and helping the company continue its plan to close older, less efficient coal-fired units.

Beyond these sectors, many additional consumers exist. For example, warehouses, logistics, and drayage facilities are increasingly using hydrogen as a fuel in vehicles such as forklifts and yard trucks. Many of these facilities are located along key transportation corridors such as I-85, co-located with air and inland ports. As noted above, the region is also home to more than 100 large, heavy industrial manufacturers who have stated energy and emissions reductions goals, including steel and fertilizer production facilities that are actively examining ways to incorporate hydrogen into their feedstock portfolio.

Local business and consumer confidence will increase with concise and structured road maps to integrate hydrogen into the renewable generation, industrial and transportation sectors – especially in the areas of chemicals, machinery, steel production, motor vehicles and parts, heavy-duty trucking, large seaports for maritime transportation, and aerospace (Figure 4).The Carolinas have significant population hubs, rural areas, military bases, universities, and other critical entities that could benefit from on-site hydrogen energy storage and uninterruptable power supply during a grid outage event. North Carolina and South Carolina each have eight military bases, 16 total between the two states, that contain every branch of the armed forces. North Carolina in particular hosts Fort Bragg – the largest military base in the world and home to more than 260,000 people. A local hydrogen hub would enable these 16 military installations to achieve goals for back-up critical facilities, islanding for up to 14 days, and allowing a more energy independent and distributed presence while also decarbonizing their

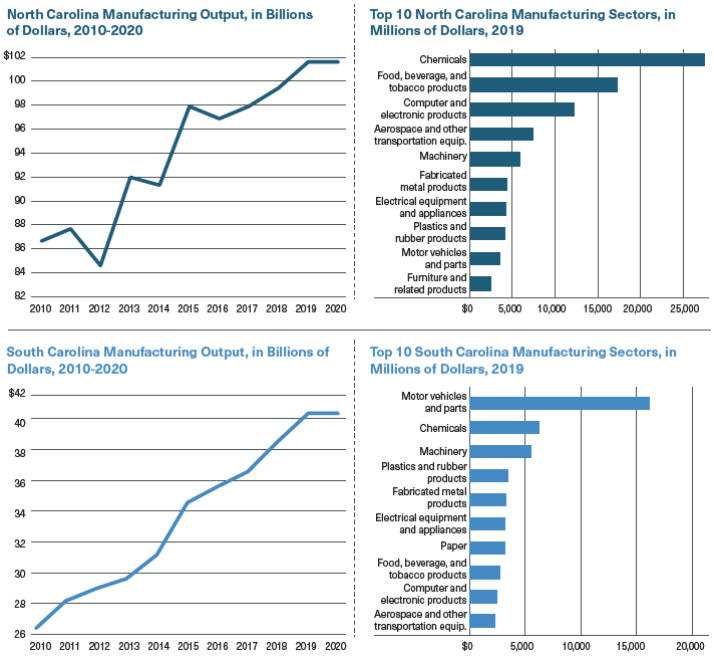


Figure 4: Manufacturing Statistics for North Carolina and South Carolina. Source: Energy Futures Initiative (EFI)

operations consistent with the administration's goals for both carbon-free electricity and military resilience.

Additionally, the Carolinas region is continually looking for energy solutions that aid in resiliency during severe weather events such as hurricanes and snow/ice storms. Hydrogen can provide emissions-free long-duration energy storage when the power grid is not available to other critical facilities as well, such as storm shelters, grocery stores, and hospitals.

Every new turbine Duke Energy is procuring will be hydrogen capable. In addition, one of Duke Energy's pilot projects has an initial goal of co-firing hydrogen in gas plants at a 30% rate by 2024 and a midterm goal of 100% hydrogen by 2030 – a hydrogen hub in the Carolinas is the first step to achieving this 100% target.

R&D Capabilities:
The Carolinas host world-class tier 1 and historically Black colleges and universities as well as other research institutions with capabilities to support national, economywide applications of clean hydrogen. Existing hydrogen-focused R&D efforts focus on a variety of end uses, production from several pathways, utilization of renewable resources and establishing a transportation ecosystem. The Savannah River National Laboratory (SRNL) has extensive experience with hydrogen R&D and hosts the Hydrogen Storage Engineering Center of Excellence. SRNL contains the largest collection of hydrogen experts in the nation and is applying its hydrogen gas handling expertise to various application projects through the DOE and Fuel Cell Technology Office.

Duke Energy is actively engaged with clean hydrogen research, development and demonstration efforts across our industry and service territories, including through partnerships with local entities like Clemson University in South Carolina. Our H2-Orange project in South Carolina is co-sponsored by Clemson University, Siemens Energy, Duke Energy and received initial funding from DOE's Office of Fossil Energy and Carbon Management. This cross-industry coordination project intends to use hydrogen for energy storage and to produce energy for Duke Energy's combined heat and power plant at Clemson University while also leveraging Clemon's academic research to advance hydrogen technologies. This initiative is also examining the effects of blending hydrogen with natural gas in existing gas turbine applications.
In order to augment scalability, research collaborations and demonstrations should be commercially focused. The National Labs are well equipped to research cost implications related to the DOE's goal of $1/kgH2 and how electrolyzer manufacturing, transport, and storage influence this based cost. Hydrogen hubs should focus on incorporating local research partnerships that will advance related technologies through their maturation.

Community and Education:
The Carolinas region is home to a diverse and growing population. The region's transition away from higher-emitting generation sources, including coal, offers an opportunity to engage communities on the potential for hydrogen and other advanced clean energy technologies and to implement a thoughtful approach to equity and a just transition.

Nationally and regionally, awareness of diverse hydrogen use cases is limited and trust in the value it provides to the environment, climate change and industry applications isn't widely

established yet. As a result, sharing knowledge amongst research efforts, community education and building a cohesive hydrogen coalition are paramount to success of potential hubs and an eventual national clean hydrogen economy. Dedicating resources, and a shared risk across stakeholders, from “bottom-up” industry ambition and “top-down” policy direction, is necessary to fully realize the regulatory and economic environment that would enable the hydrogen market. The development of low-cost hydrogen and the infrastructure required to establish its economy depends on co-locating large-scale clean hydrogen production with multiple end-use applications. In addition to near-term federal investment, long-term policy support is integral for hydrogen market growth, both regionally and nationwide.

With the many highly accredited colleges and universities across the Carolinas region, there could be meaningful opportunities for partnership through student learning, research and demonstrations. In addition, Duke Energy already has established partnerships with 13 community colleges in the Carolinas for skilled training and hiring programs and 19 across the Duke Energy service territory.

Conclusion:
The Infrastructure Investment and Jobs Act (IIJA) requires at least one hub to demonstrate hydrogen production from renewable energy and nuclear power and at least one to demonstrate use cases in the electric power, industrial, residential, commercial, and mobility sectors. In addition, the IIJA dedicates funding for hydrogen demonstration projects on storage techniques, integration with power systems and large electrolysis facilities. The Carolinas region is uniquely positioned to meet each of these requirements as part of an integrated system.

The Carolinas offer various applications that enable local hydrogen market integration, and a hydrogen hub in this region would facilitate the creation of a necessary marketplace and the ability to transport hydrogen from hub to market. These regional facets enable a connective infrastructure and stronger hydrogen network of both clean hydrogen producers and consumers. Coordinating these use cases is critical to scaling the hydrogen market.

Duke Energy appreciates the opportunity to respond to this RFI to inform the scope and priorities of DOE’s initiatives to advance clean, affordable hydrogen in the United States. Hydrogen is a promising technology that may be able to help Duke Energy more quickly achieve decarbonization goals, and the company looks forward to continued dialogue with DOE on this important opportunity.

The RFI requests input on four categorized areas. Below, we have provided comments and considerations on each of the four areas requested in the RFI.

Category 1: Regional Clean Hydrogen Hub Provisions and Requirements

- What should qualify as “close proximity” in the context of hub requirements? **(1a)**
- What existing facilities and infrastructure, including pipelines and storage facilities, could be most easily leveraged by the H2Hubs? **(1b)**
- What types of new “connective infrastructure” will be needed by the H2Hubs (e.g., pipelines, storage, etc.)? **(1c)**

- What supportive activities would make the hydrogen hubs successful and sustainable (e.g., workforce development, community-based organization engagement, domestic manufacturing, labor standards, etc.)? **(1d)**
- Given the level of funding, and with the ultimate goal of developing a national clean hydrogen network, would four (4) large H2Hubs that each produce more than a certain amount of hydrogen (e.g., more than 1,000 tonnes/day, see question 3 to specify amount) or six to 10 H2Hubs of varying size be more effective? **(2c)**
- What policies, infrastructure, or other considerations could be put in place to enable the H2Hubs to develop into a national clean hydrogen network in the future? **(2d)**
- How should the H2Hubs be asked to measure progress toward the administration's goal of transforming the economy by 2050 to achieve net-zero emissions goals? Please be as specific as possible. **(2e)**
- Should DOE prioritize the repurposing of historic fossil infrastructure in the regional hub(s) focused on production from fossil fuels and if so, over what time frame? If yes, should DOE incentivize an eventual transition from fossil fuels to another fuel source? What conditions should DOE place on the carbon intensity of the fossil fuels (with CCS) used in this hub other than what is already specified in the BIL? **(3d)**
- Should H2Hub funding be made available to upgrade or develop new dedicated clean electric or heat generating energy resources (e.g., renewables or other clean generation sources) needed to produce clean hydrogen? **(3f)**
- The climate value of displacement may vary across end uses. How should the climate benefit of different hydrogen end uses be considered? **(4c)**
- A region could be defined as anything from a city, a state, multiple states, tribal communities, or a geographic area. Should DOE define the regions or allow applicants to define them within their proposal? If a definition is preferred, explain how regions should be defined for the purposes of this FOA and provide the rationale. **(5a)**
- In addition to sufficient energy and feedstock/water resources, what other regional factors should be considered when identifying and selecting regional hubs (e.g., economic considerations, policy considerations, environmental and energy justice considerations, geology, workforce availability and skills, current industrial and other relevant infrastructure and storage available/repurposed/reused, industry partners, minority-serving institutions[MSIs], minority-owned businesses, regional specific resources, security of supply, climate risk, etc.)? **(5b)**

Hydrogen Production Standards and Regional Infrastructure (Categories 1.1 a-d & 1.2 c-e)

Hydrogen hubs must be strategically located based off both local resources and power generation capabilities. With that in mind, supporting 6-10 hydrogen hubs, of varying size with at least four being large hubs, is aligned with the administration's goal of developing a national clean hydrogen network. At least half of these hubs should be green hydrogen hubs that are considered by regions that incorporate a large percentage of clean energy resources into their generation mix – such as nuclear, solar, wind and biomass.

Existing power generation, pipeline, manufacturing, and transportation infrastructure should be incorporated to minimize greenfield impacts of hub development. However, DOE should prioritize funding hubs that unlock clean hydrogen as a decarbonization pathway nationally. This should include funding for hubs to overcome regional gaps in existing infrastructure, such as for

regions that lack salt domes for hydrogen storage and for green hydrogen hubs in regions that lack local carbon storage capability.

Successful hydrogen hubs should articulate a clear vision for how they will support a regional and national clean energy economy that includes the opportunities they create for workforce development and domestic manufacturing. This starts with education and community-based engagement. Consideration should also be given to the strategic location of hydrogen hubs on key transportation and pipeline corridors that could ultimately support a national network and hydrogen economy.

Feedstock, End Use and Geographic Diversities (Categories 1.3 d, f; 1.4 c & 1.5 a-b)
For the purpose of this RFI, regional hydrogen hubs should use clean energy resources that are both abundant in that region and provide the means to fulfill multiple end-use applications. Hydrogen hub funding should be made available to upgrade or develop new dedicated low to no-carbon electric energy resources, such as renewables and other clean generation sources such as nuclear, to produce green hydrogen. Due to end users requiring different hydrogen purities, hydrogen hub funding should inform blended and pure pipeline transportation standards.

Involving communities in the local economy is important and a hydrogen market may provide an opportunity to repurpose workforces, potentially mirroring the repurposing of existing assets. A hydrogen hub may allow such facilities to remain operational while reducing and eventually eliminating the respective emissions profile. We have further addressed the important issues pertaining to equity, environmental justice and just transition in our responses to Category 3 below.

CATEGORY 2: SOLICITATION PROCESS, FOA STRUCTURE AND IMPLEMENTATION STRATEGY

- What are the key review criteria (e.g., technical merit, workplan, market transformation plan, team and resources, financial, regional economic benefits, environmental justice, DEI) that DOE should use to evaluate and select the H2Hubs as well as evaluate readiness to move from Phase 1 to Phase 2? **(2.9)**
- Does offering multiple launches roughly a year apart, as shown above in Figure 2, help facilitate expanding the hydrogen hub concept to more regions? **(2.10)**
- What specific activities should be conducted in Phase 1 vs. Phase 2? Should Phase 2 be further broken into multiple sub-phases, and if so, what should be included in each sub-phase? **(2.11)**
- How much time will be needed to complete the Phase 1 activities? Have some regional teams already completed analysis and design activities? **(2.12)**
- Are the proposed funding levels for Phase 1 and Phase 2 appropriate/adequate? **(2.13)** How much funding should DOE allocate for adding new technologies, capabilities/end uses, or partners to the existing hubs (i.e., Launches 3 and 4)? **(2.14)**

Applicable Funding Mechanism for H2 Hubs Projects (Categories 2.9 – 2.14)

Multiple hydrogen hub launches roughly a year apart will help facilitate the community and local network engagement to support the successful development of hubs and expand the hub concept to more regions. After each successful hydrogen hub launch and subsequent validation for its role in our nation's net-zero future, additional private support is likely to follow, further instilling trust in partners and consumers. As such, a phased approach strategy of hub planning, followed by hub construction and deployment, will allow for further analyses and cost share evaluations that bolster the decarbonization potential and long-term sustainability of each hub in the proposed regions. Review criteria should include key ingredients for a successful hub, including:

- Clean hydrogen production, consumption, and transportation/storage components aligned to regional resources and decarbonization pathways.
    - For example, hubs incorporating green hydrogen should demonstrate strong existing and future renewable and nuclear energy growth and abundant water availability for electrolysis while hubs incorporating blue hydrogen should demonstrate carbon storage availability.
- Established partnerships with universities, national labs and other research institutions and clear articulation of how hub demonstrations will collaborate with R&D partners to contribute to technology advancement and achievement of $1/kg by 2030.
- Diversity of production and consumption use cases within a clearly articulated region with physical connectivity and potential to scale, including access to future national and international hydrogen markets.
    - DOE should allow regions to define themselves and prioritize regions with strong potential for growth and connectivity to adjacent hubs.
- Ability to support the supply chain for a regional and national hydrogen economy, including manufacturing capability and workforce development.
- Clear plan and commitment to equity and just transition principles, including non-greenhouse gas environmental factors associated with hydrogen production, consumption, and its supply chain.
- Participating companies and organizations with public commitments to clean energy and decarbonization.
- Alignment with state policy, including energy, environmental and economic development goals.
- Ability to support multiple regional objectives, including decarbonization, resiliency, equity and just transition.

Category 3: Equity, Environmental and Energy Justice (EEEJ) Priorities

- What strategies, policies, and practices can H2Hubs deploy to support EEEJ goals (e.g., Justice40)? How should these be measured and evaluated for the H2Hubs? **(3.27)**
- What EEEJ concerns or priorities are most relevant for the H2Hubs? **(3.28)**
- What measures should H2Hub project developers take to ensure that harm to communities with environmental justice concerns, including local pollution, are mitigated? **(3.29)**

- How can H2Hubs ensure community-based stakeholders/organizations are engaged and included in the planning, decision-making, and implementation processes (e.g., including community-based organizations on the project team)? **(3.30)**
- How can DOE support meaningful and sustained engagement with H2Hub relevant disadvantaged communities? **(3.31)**

Societal Impact Considerations (Categories 3.27 – 3.31)

"At Duke Energy, we believe environmental justice is a business imperative, fundamental to our operations and a pillar of meaningful stakeholder engagement."
– Katherine Neebe, Chief Sustainability Officer, Duke Energy

The energy industry is in the midst of a massive transformation. As one of the largest utilities in the U.S., how we provide affordable, reliable, and increasingly cleaner energy for our customers and communities, while at the same time considering our societal impact, has never been more important than it is today. At Duke Energy, we believe equity and environmental justice are business imperatives, fundamental to our operations and a pillar of meaningful stakeholder engagement and we have taken significant steps forward to internalize our environmental justice principles.[5]

A few examples include:

- Improving the quality and rigor of our screening process by incorporating the latest U.S. Environmental Protection Agency screening tools and industry best practices as well as accounting for environmental justice inputs as we plan projects.
- Working with our community relations managers to help identify disadvantaged communities early in project development to engage in more meaningful and authentic stakeholder engagement.
- Improving the way we communicate environmental justice analysis to government agencies, policymakers and community members. This will help ensure we are identifying the most critical community concerns earlier in the process and working toward constructive solutions.
- Hydrogen hubs can provide a wide range of impactful practices and strategies to address equity, environmental justice and energy justice throughout communities in addition to the reduction of carbon and impacts. Value added considerations include education and research, workforce development, supply chain, economic development to name a few.

The DOE can better support meaningful and sustained engagement with the hydrogen hub by including funding eligibility to pay for both stakeholder and community engagement in Phase 1, and sustained engagement as part of Phase 2 and other subsequent phases. This funding is integral to providing the necessary resources that facilitate these engagement initiatives, to building and sustaining support for hub investments and to the development of sustainable clean hydrogen markets.

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[5]Duke Energy Environmental Justice Principles. Available at: https://www.dukeenergy.com/_/media/PDFs/Unindexed/Duke-Energy-Environmental-Justice-Principles.pdf?_ga=2.227363224.462669767.1643492249-1360442054.1589833581

CATEGORY 4: MARKET ADOPTION AND SUSTAINABILITY OF THE HUBS

- What mechanisms (e.g., tax/other incentives, offtake structures, prizes, competitions, alternative ownership structures for hydrogen production bundling demand, contracts for difference, etc.) would be valuable to incentivize market-based supply and demand? **(4.32)**
- What role/actions can DOE take to support reliable supply and demand for potential hydrogen producers and customers? **(4.33)**
- If DOE asks for a market analysis as part of the application process, what should the analysis include so that DOE can be confident that a proposed project will be successful? **(4.34)**
- What can DOE provide/do that would be helpful to a project to facilitate its collaborations with potential financing partners? **(4.35)**
- How can DOE support the H2Hubs in working together to increase competitiveness and scale? **(4.36)**
- Which regional and site-specific metrics should DOE track to estimate the impact of hydrogen production on regional water availability? **(4.37)**
- Other than greenhouse gas emissions, what sustainability metrics should DOE include in evaluating the hubs (e.g., impact on regional water resources, availability of decarbonized electricity production resources, climate risk impacts on the resilience of the H2Hubs)? **(4.38)**
- The goal is for the H2Hubs to be sustainable beyond the BIL funding (i.e., without additional government funding). To what extent will the H2Hubs be capable of demonstrating a path to economic viability after the BIL funded phases and how should the FOA and project (once awarded) be structured to ensure this outcome? **(4.39)**

Mechanisms Valuable to Incentivize Market Supply & Demand (Categories 4.32 – 4.36)

To facilitate market sustainability of hubs, DOE should encourage the development of hubs that incorporate efforts to connect facilities that already use hydrogen, existing infrastructure that can accommodate hydrogen consumption (such as natural gas power plants and pipeline infrastructure) and future applications for hydrogen consumption (such as heavy-duty transport). Connecting facilities that already use hydrogen to new forms of hydrogen production will increase the proportion of clean hydrogen to match existing and future demand. Marginal costs per unit of hydrogen will decrease as more operations come online with cheaper production methods. This will attract more demand for hydrogen utilization in pathways that are well established and garner new interest from industries looking for both cheaper and cleaner feedstock. This aligns with moving away from methane to further reach decarbonization goals.

Due to the current lack of cost competitiveness of hydrogen, especially in new applications, there poses financial risk to a simultaneous build out of both supply and demand. Regulated utilities are required to meet least cost requirements for delivering reliable energy to customers, while complying with other relevant policies such as emissions limitations and advanced technologies require policy support to compete in organized energy markets. As a result, various incentives and cost defrayment options are critical while new technologies move up the learning curve and down the cost curve to create sustainable markets. Funding (grants for cost share) is one critical tool for buying down these costs for customers and enabling utilities to help technologies move up the learning curve and achieve cost competitiveness. Other policies are

also critical to support his ecosystem. For example, a clean hydrogen production tax credit (PTC) has the potential to further enable a broad hydrogen market. This tax credit should recognize the value of multiple green hydrogen energy production inputs including renewables and nuclear, including both direct and grid connected production. Additionally, green tariffs, like those for current renewables and RNG offerings, would be a valuable consideration for hydrogen to incentivize market-based supply and demand and could also support the administration's goals for federal clean energy procurement.

Regional and Site-Specific Metrics (Categories 4.37 – 4.38)

Various regional and site-specific water consumption impact analyses should be incorporated to estimate the impact of hydrogen production on water availability. AWARE-US characterization factors (AWARE: Available Water REmaining; Characterization factors: CFs) express remaining freshwater resources from 0.1 to 100 – with the higher and lower values indicating water stress and water abundance, respectively.

$$\text{AWARE-US } CF_i = \frac{\text{US average available water remaining}}{\text{Available water remaining in region } i}$$

Available water remaining = freshwater supply – demand
= (Natural runoff) - (Human water consumption + Environmental water requirement)

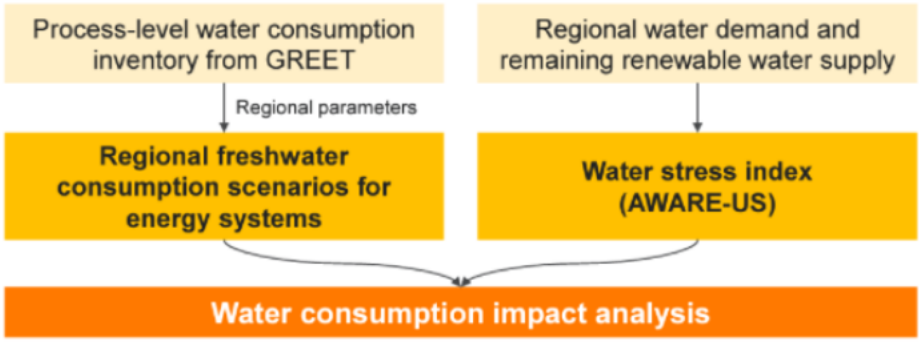
Source: Argonne National Laboratory

AWARE-US CF is a midpoint indicator that can quantify impact of adjusted water consumption as a water scarcity footprint.

$$\underset{\text{(gal US eq.)}}{[\text{Water scarcity footprint}]} = \underset{\text{(gal)}}{[\text{Water consumption}]} \times [\text{AWARE-US CF}]$$

Source: Argonne National Laboratory

Additionally, the GREET (Greenhouse Gases, Regulated Emissions and Energy use in Transportation) modeling approach can integrate water consumption metrics into regional life cycle impacts. GREET accounts for freshwater consumption along the supply chain of feedstock source and fuel production.



Source: Argonne National Laboratory

Demonstrating a Path to Economic Viability (Categories 4.39)

DOE should ensure that the proposed project structure and phased approach includes a requirement to adequately describe how a hydrogen hub will reduce the cost of the demonstrated path to economic viability and ensuring its feasible for commercial implementation. More discussion is required to model and evaluate the DOE's goal of $1/kgH2 and how to better estimate the potential cost of hydrogen produced from hubs. Anticipated costs will likely need to be reduced considerably to meet the DOE's goal of $1/kg. These challenges indicate the importance of having an expedited response and strong, proven project structures.

In a hydrogen hub, Duke Energy is looking to begin with no-regrets investments and building an approach to check and adjust as we scale to both minimize risk and maximize benefit. The commercial assessment identifies potential end users in both the industrial and commercial sectors such as transportation. This proposed small, but highly scalable demonstration has the potential for a wide reach of benefits by expanding across the Duke Energy jurisdictions in future iterations. These aspects of demonstration, in addition to the ones mentioned prior, will ensure the proposed hydrogen hub will be sustainable beyond government funding.

U.S. Department of Energy
Hydrogen Fuel Cell and Technology Office &
Office of Energy Efficiency & Renewable Energy
Attention: Guidance on Hydrogen Demonstrations

Company Contacts:

[redacted]

[redacted]

Duke Energy respectfully submits the following comments in response to the Notice of Request for Information ("RFI") issued by the U.S. Department of Energy ("DOE") on Feb. 15th, 2022, intending to obtain public input regarding the solicitation process and structure of a DOE Funding Opportunity Announcement (FOA) to advance domestic manufacturing and recycling of clean hydrogen technologies, in accordance with the Infrastructure Investment and Jobs Act (IIJA).

Duke Energy (NYSE: DUK), a Fortune 150 company headquartered in Charlotte, N.C., is one of America's largest energy holding companies and employs 28,000 people. Its electric utilities serve 8.2 million customers in North Carolina, South Carolina, Florida, Indiana, Ohio and Kentucky, and collectively own 51,000 megawatts of energy capacity. Its natural gas unit serves 1.6 million customers in North Carolina, South Carolina, Tennessee, Ohio and Kentucky.

As described in Duke Energy's 2020 Climate Report[1] and in independent studies and reports, very low- or zero-emitting technologies that can be dispatched to meet energy demand over long durations will be needed to reach very deep carbon reductions in the electricity sector. At Duke Energy, we call these technologies zero-emitting load-following resources (ZELFRs or "zell-furs"). Commercialization of ZELFR technology – including development, demonstrations, and scaling-up – must occur on a very aggressive timeline to enable a timely, cost-effective transition to net-zero. Specifically, to meet our net-zero by 2050 goal, we project ZELFRs need to be commercially deployed at scale on our system by the mid-2030s; these technologies must be commercially available even faster to meet more aggressive targets. The illustrative net-zero analysis in our 2020 Climate Report indicates a need for 6 gigawatts (GW) of ZELFRs across our six-state electricity service area by 2040 and 13 GW by 2050.

Clean hydrogen fueled generation is a ZELFR technology with the potential to play an important role in the clean energy transition, including in the company's service territories in North Carolina, South Carolina, Florida, Indiana, Ohio and Kentucky. Duke Energy looks forward to working with our communities and stakeholders and building partnerships within each of our jurisdictions to move hydrogen technology and the hydrogen economy forward. Duke Energy is

[1]Duke Energy, "Climate Change." Available at: https://www.duke-energy.com/our-company/environment/global-climate-change

being intentional about the way we work with the communities we serve and will listen to and fully analyze stakeholder feedback to ensure that this transition to net-zero is achieved in a manner that carefully considers the expectations and needs of our customers, communities and stakeholders.

The company is thoughtfully considering the role of hydrogen and other ZELFR technologies based on regionally available resources, such as renewable energy and carbon storage.

"Hydrogen is not only versatile for the needs of an electric and gas company, but it has industrial uses by a broad number of sectors that are also going after carbon reduction. As I consider the opportunity we have in this decade with supportive policy from the infrastructure bill and potentially tax credits as well, we can make real progress on technical feasibility and also on tackling cost competitiveness. So as we get to the 2030s [hydrogen] becomes a really valuable tool to reach net-zero." – Lynn Good, Chief Executive Officer, Duke Energy

Duke Energy appreciates the opportunity to respond to this RFI to inform the scope and priorities of DOE's initiatives to advance clean, affordable hydrogen in the United States. Hydrogen is a promising technology that may be able to help Duke Energy more quickly achieve decarbonization goals, and the company looks forward to continued dialogue with DOE on this important opportunity.

The RFI requests input on three parts. Below, we have provided comments and considerations on these areas requested in the RFI.

Part 1: Clean Hydrogen Manufacturing and Recycling

Clean Hydrogen Equipment Manufacturing & Domestic Supply Chains
Duke Energy is evaluating clean hydrogen options and is supportive of strengthening our domestic supply chain and the ability of existing energy infrastructure to support a clean hydrogen economy. We encourage the DOE to take steps to enhance our domestic supply chain for materials and components to increase efficiency and cost-effectiveness in the manufacturing process inclusive workforce training programs that provide opportunities to disadvantaged and rural communities.

As DOE has described, the potential market for hydrogen in the contiguous United States is more than 100 million metric tons per year for applications in power, industrial and transportation sectors. This market size requires U.S. electrolyzer capacity to increase from 0.17 gigawatts (GW) today to 1,000 GW in 2050.[2] To facilitate this level of growth of electrolytic hydrogen and fuel cell markets, risks that must be addressed include:

- Immature technologies that are cost-inhibitive for electrolysis and hydrogen utilization
- Insufficient clean electricity generation capacity
- Necessary upgrades and enhancements on existing infrastructure to support a domestic hydrogen economy
- Availability of key raw materials that enable hydrogen technologies
- Equitable distribution of the environmental and economic benefits of clean hydrogen

[2] U. S. Department of Energy, " Water Electrolyzers and Fuel Cells Supply Chain Deep Dive Assessment," https://www.energy.gov/eere/fuelcells/water-electrolyzers-and-fuel-cells-supply-chain-deep-dive-assessment

While sufficient U.S. manufacturing capacity exists to meet current demand for PEM electrolyzers and fuel cells, this capacity will not be sufficient to meet growing demands. The DOE should bolster the domestic supply chain of materials and material supplies that enable electrolysis, with a focus on polymer electrolyte and solid oxide technologies. Reliance on imports of key materials should be addressed through a two-pronged approach: strengthening the domestic supply chain of these materials and evaluating promising technologies that utilize alternative materials, especially those that eliminate iridium content in PEM electrolyzers.

To meet demand, the U.S. is 100% reliant on imports of graphite and iridium, and approximately 75%-80% reliant on foreign sources of platinum and cobalt. Potential long-term implications of foreign source materials and supply chain risk should be considered with materials such as copper, nickel and titanium sponge. Enhancing the domestic materials supply chain will provide greater resilience and increase competitiveness through cost reductions and expanding commercialization of electrolytic manufacturing components and clean hydrogen production.

Developing and managing bulk hydrogen storage and utilizing natural gas infrastructure for transport and storage will ease adoption of hydrogen into the current energy mix, smoothing the transition from fossil fuels to decarbonized fuel sources. Supporting efforts in hydrogen component recycling and manufacturing capacity will further enable the hydrogen market in the United States, as well as provide a more sustainable, long-term approach to a hydrogen economy.

Workforce development is also critical to support a future hydrogen economy and presents an opportunity to lead on issues of equity, environmental justice and a just transition. While the U.S. has a limited pool of trained workers with expertise in hydrogen and fuel cell technologies, R&D and academic programs are already well-established and can promote the necessary education required to establish a more skilled hydrogen workforce. Hydrogen can provide opportunities for workers displaced from fossil fuel industries and other declining resource-dependent industries, and a well-supported hydrogen economy is in line with the federal Justice40 Initiative to deliver at least 40% of the overall benefits from federal investments in climate and clean energy to disadvantaged communities.

Environmental Impacts and Identifying Nonhazardous Alternative Materials
Duke Energy supports the DOE's goals of facilitating a sustainable, clean future that utilizes domestic supply chains and local workers as much as possible. In support of those goals, we recommend DOE consider supporting research and development of technologies that will enable hydrogen to be an even cleaner alternative throughout the entire hydrogen supply chain.

Two areas of focus should include:

PFAS-free Membrane Technologies:
When considering membranes for use in both electrolyzers and fuel cells, the DOE should consider the sources of membrane materials and associated manufacturing protocols. In particular, research should continue on membrane technologies that do not contain polyfluoroalkyl substances (PFAs) or chemicals that hydrolyze in the presence of water to form hexafluoropropylene oxide dimer acid (HFPO-DA).

Low NOx Burners:
There is substantial interest in the industry pursuing hydrogen as a replacement fuel for natural gas. Although promising, hydrogen as a utility fuel is still in the early stages from

both a production and generation standpoint and requires additional research, development, and commercial scale demonstration support.

Turbine manufacturers have proven successful with hydrogen/natural gas co-firing of up to 30% hydrogen by volume without significant gas turbine modifications in many of the combined-cycle and combustion turbine plants currently in operation, dependent on gas turbine type. However, to move to 100% hydrogen-fueled turbines, significant improvements in turbine technologies are required. In particular, the development of dry low-emission combustors that fire 100% hydrogen as a base fuel, as well as a startup and shutdown fuel, while maintaining or reducing NOx and CO emissions is critical.

Manufacturing, Reusability and Recyclability of Clean Hydrogen Technologies

While recycling hydrogen components at end of life (EOL) is important to reduce the waste that could go to disposal facilities, DOE should emphasize establishing continuous product life cycles through the Circular Economy (CE). The CE is a concept where materials are kept in constant use as resources with an increased consideration of the materials at design state and how such materials will be recovered, recycled or reused when they reach the end of their current life cycle. Similar to the U.S. Environmental Protection Agency's Sustainable Materials Management (SMM), a CE provides a systematic approach to using and reusing materials more productively over their entire life cycle(s).

When considering hydrogen and related technologies, such as electrolyzers, fuel cells and storage tanks, components should be fabricated in the most productive way with an emphasis on using fewer materials when proven designs allow. Such efforts will assure we are best positioned to mitigate potential supply chain constraints, thus having sufficient resources to meet today's needs and the nation's needs of the future. As clean hydrogen technology deployments continue to increase and become a greater part of our renewables generation mix, investments in supply chain and capturing EOL value of related hydrogen components will enable a more direct path to greater sustainability and further expedite market penetration and adoption of technology.

In addition to supply chain and manufacturing life cycles, CE and SMM approaches seek to reduce toxic chemicals and environmental impacts through the entire material and component life cycle(s). These points are integral when considering initiatives such as the Clean Hydrogen Electrolysis Program, the Clean Hydrogen Manufacturing Initiative, and the Clean Hydrogen Technology Recycling RD&D Program for the five-year period encompassing fiscal years (FYs) 2022 through 2026. Duke Energy will continue to support policies that encourage domestic manufacturing as the company expands its clean hydrogen initiatives.

Part 2: Clean Hydrogen Electrolysis Program

Demonstration Projects that Could Enable DOE Goals

Utilities have a strong role to play in hosting demonstration projects that enable the progression of clean hydrogen technologies and their integration with the nation's renewable energy mix. Funding opportunities should prioritize utility level partnerships to effectively scale clean hydrogen and transformation of utility fleets.

This should include a focus on efforts to demonstrate integrated systems capable of supporting 100% hydrogen-fired turbines, including production of hydrogen from electrolysis powered by renewables and/or nuclear, hydrogen storage and end use as a dispatchable zero-carbon

generation source. Duke Energy's existing fleet of natural gas generators are capable of co-firing hydrogen today. Most of the company's existing fleet can co-fire up to 30% hydrogen, and the company's newest combustion turbine in Lincoln County, NC for instance is capable of up to 50% today.

In one example, Duke Energy's combined heat and power plant on Clemson's campus in South Carolina has laid down the groundwork for a potential demonstration / test bed project. The project – called H2Orange – received phase I funding from DOE's Office of Fossil Energy and Carbon Management and includes a techno-economic analysis of hydrogen production using electrolysis, storage and co-firing with natural gas.[3] The small, scalable size (15 MW) of the combustion turbine at this site offers an attractive opportunity to demonstrate and test hydrogen co-firing because relatively smaller quantities of hydrogen are needed to reach higher blends. This cross-industry coordination project intends to use hydrogen for energy storage and to produce energy for Duke Energy's combined heat and power plant at Clemson University, leveraging Clemson's academic research to advance demonstration projects of clean hydrogen technologies.

Hydrogen Storage

Hydrogen has the potential to be a cost-effective, mid-to-long duration storage solution, that is not cycle-limited. As noted in Duke Energy's hydrogen hub RFI submission, the Southeastern U.S. does not have salt domes for hydrogen storage, so other storage methods would need to be considered for large storage capabilities. Regional operators of the Carolinas and Florida specifically have liquefaction that are widely used for natural gas liquefaction. These facilities offer an opportunity to pivot toward hydrogen liquefaction operations. No means of natural geologic hydrogen storage exist in many states across the nation. Despite these circumstances, the Southeastern region has the R&D capabilities and infrastructure required to address the hydrogen storage challenges the nation will face. Alternatives to subterranean storage are not only a market opportunity, but a research and commercialization necessity to improve both the costs of hydrogen and to expand operations at scale.

Savannah River National Laboratory, a leader in hydrogen storage research, is actively researching forms of lightweight, cost-effective, non-geologic hydrogen storage. Greenway Energy (GWE), an H2-Orange team collaborator, is evaluating both natural gas turbine and fuel cell technologies for a lower-cost and more efficient hydrogen energy storage alternative to battery systems for power plant applications, including fossil fuel plant energy storage systems projects. Commercialization of these hydrogen storage technologies would unlock hydrogen as a decarbonization tool and long-duration energy storage asset in similarly situated regions both nationally and globally. Existing natural gas pipeline infrastructure offer another potential means of hydrogen storage.

These regional capabilities to advance hydrogen storage systems technology, including novel hydrogen storage materials, have the potential to act as a test bed for the greater United States, enabling these technologies to be utilized in other regions across the U.S. These efforts are in line with the DOE Hydrogen Fuel Technology Office's hydrogen storage targets, including those for onboard light- and heavy-duty vehicles, material-handling equipment, portable power applications and long-duration energy storage. Hydrogen energy storage enhances domestic

[3] DOE National Energy Technology Laboratory, "Clemson Hydrogen Combined Heat and Power Storage System." Available at: https://netl.doe.gov/sites/default/files/netl-file/21AES_Koeppe.pdf

economy and brings us closer to the Biden Administration's energy and climate targets, and ambitious goal of reducing the cost of hydrogen to $1 per 1 kilogram in one decade.

Environmental Justice, Diversity, Equity & Inclusion

"At Duke Energy, we believe environmental justice is a business imperative, fundamental to our operations and a pillar of meaningful stakeholder engagement."
– Katherine Neebe, Chief Sustainability Officer, Duke Energy

The energy industry is in the midst of a massive transformation. As one of the largest utilities in the U.S., how we provide affordable, reliable, and increasingly cleaner energy for our customers and communities, while at the same time considering our societal impact, has never been more important than it is today. At Duke Energy, we believe equity and environmental justice are business imperatives, fundamental to our operations and a pillar of meaningful stakeholder engagement and we have taken significant steps forward to internalize our environmental justice principles that guide our work.[4]

Environmental Justice
We recognize and understand the importance of the impact of our work on communities as well as the importance of early engagement. We believe in being transparent on what we are trying to accomplish, seeking feedback and input, and adjusting and aligning where possible to bring about the best outcomes for the communities we serve. Through our talks with subject matter experts in the environmental justice field, we have learned there is an opportunity to create access to opportunities like jobs and economic development to help communities benefit from the clean energy transition. Our communities care about these issues and want to be included in the discussion.

Internally, our teams are purposeful in asking critical questions about projects and their associated impacts. We're building a process that includes early development, analysis and assessment. In fact, we've taken significant steps forward to internalize our environmental justice principles and are mindful that our principles may evolve as we continue to engage stakeholders on environmental justice concerns.

A few examples include:

- Improving the quality and rigor of our screening process by incorporating the latest U.S. Environmental Protection Agency screening tools and industry best practices as well as accounting for environmental justice inputs as we plan projects.
- Working with our community relations managers to help identify disadvantaged communities early in project development to engage in more meaningful and authentic stakeholder engagement.
- Improving the way we communicate environmental justice analysis to government agencies, policymakers, and community members. This will help ensure we are identifying the most critical community concerns earlier in the process and working toward constructive solutions.

[4]Duke Energy, "Duke Energy Environmental Justice Principles." Available at: https://www.duke-energy.com/_/media/PDFs/Unindexed/Duke-Energy-Environmental-Justice-Principles.pdf

Just Transition

Duke Energy is focused on building a more flexible workforce to execute our clean energy transition. Our customers and our local communities all benefit from us retaining and refocusing our workforce, and we have a proven record of successfully placing employees impacted by plant retirements in other positions with the company. As we navigate the largest planned coal retirement in the industry, we are being intentional in how we approach a fair, equitable and just transition for our employees, customers and communities. We are building from our past work, as we have already learned a great deal in previous coal retirements where we've meaningfully addressed impacts to workers and communities.

In 2021, we conducted a benchmarking exercise to determine best practices guided by groups who are experts in this space. We are also leaning in to better understand what the needs are across a diverse set of stakeholders including local governments and nonprofits. The results of the benchmarking and this important dialogue will inform our next steps in developing our long-term strategy. Duke Energy, our customers and our local communities all benefit from us retaining and refocusing our workforce, and we have a proven record of successfully placing employees impacted by plant retirements in other positions with the company.

For example, in April 2021, we initiated a multiskilled training pilot program for 500 coal plant employees in North Carolina. The program includes around 100 hours of traditional classroom, computer-based and on-the-job training. This additional training provides employees with the skills needed to generate reliable power and maintain cleaner technologies for our customers during our clean energy transition. As we retire our coal fleet, we will continue to serve those communities. Our employees have deep roots in the communities where they live and work, often making financial contributions and volunteering their time and talent to advance the mission of local organizations.

Duke Energy is determined to meet the energy needs of customers today and into the future, and we are meeting with community leaders to gain their valuable input on coal plant retirement plans and its potential impact on their communities. Our intention is to create solutions that work for our customers, communities and employees. These will continue to be important conversations as we – along with our stakeholders – strive for a cleaner energy future for all.

Diverse Workforce

At Duke energy, we believe that diversity is not just a metric. A diverse workforce and leadership team benefits our customers, communities and company as a whole, and the culture, accountability and support for diversity and inclusion (D&I) starts at the top with our leadership team. Duke Energy works hard to provide a culture that ensures employees feel welcomed, respected, heard and valued – and able to bring the best version of themselves to work every day. An empowered diverse workforce and inclusive workplace makes us a stronger company and provides a competitive advantage for connecting with the ever-changing needs of our customers and communities.

Duke Energy is committed to fostering an inclusive workplace and improving diversity within its talent pipeline. We believe a diversity of thought, backgrounds, cultures and more is vital to overcoming new challenges and addressing complex issues as part of our Path to Net-Zero.

According to the Human Rights Campaign Foundation, Duke Energy is one of the Best Places to work for LGBTQ+ Equality for the fifth straight year.[5]

In addition, strengthening our relationships and recruiting strategy at HBCUs has been a priority for the company's talent acquisition team since 2018, when Duke Energy was the first utility to sign the HBCU Partnership Challenge. Congress created the challenge to increase engagement between corporations and HBCUs. Since 2020, Duke Energy Foundation has donated more than $5M to promote a diverse energy workforce. More recently, in February 2022 we announced we are funding 15 nuclear engineering students in South Carolina State University's nuclear engineering program – the only four-year nuclear engineering degree offered by a historically Black college and university (HBCU).[6]

Since the company was founded more than a century ago, Duke Energy has made respect for our employees' and communities' rights a fundamental belief inherent in the way we operate. To amplify this belief, the company adopted a Human Rights Policy in April 2019 that outlines policies and practices that ensure an ongoing commitment to, and respect for, human rights. Duke Energy respects international human rights principles, including those identified in the United Nations. Duke Energy prohibits the use of forced labor, child labor and any form of human trafficking.

Adherence to and respect for human rights is more than a verbal commitment at Duke Energy. It's an ongoing process of learning, evaluating and improving how we operate. Duke Energy will conduct periodic human rights assessments to determine whether its processes and systems used to identify and investigate any alleged violations are appropriate and will publicly report on its human rights-related commitments in the annual Sustainability Report.

Investment in clean hydrogen technologies offers an opportunity to integrate impactful practices and strategies to address equity, environmental justice and a just transition in addition to reducing greenhouse gas emissions. Value added considerations include education and research, workforce development, supply chain, and economic development to name a few. The DOE can better support meaningful and sustained engagement with efforts in clean hydrogen manufacturing, recycling and electrolysis by enabling project developers to include community engagement, workforce development and similar efforts as an eligible use of funds.

Summary

Again, Duke Energy appreciates the opportunity to provide input on DOE's efforts to advance domestic manufacturing and recycling of clean hydrogen technologies, in accordance with the Infrastructure Investment and Jobs Act (IIJA). These initiatives are critical to facilitate advances in clean hydrogen technologies and domestic supply chains that will enable the development of sustainable clean hydrogen markets. The company is actively engaged with clean hydrogen research, development and demonstration efforts across our industry and service territories and welcomes the opportunity to further partner with DOE to advance clean hydrogen as a decarbonization solution.

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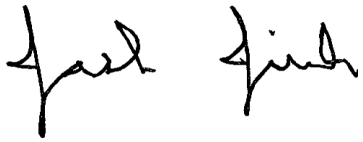
[5] Duke Energy, "Duke Energy earns perfect score for LGBTQ practices and policies." Available at: https://news.duke-energy.com/releases/releases-20220203

[6] Duke Energy, "How scholarships support a diverse pipeline of nuclear engineers." Available at: https://illumination.duke-energy.com/articles/how-scholarships-support-a-diverse-pipeline-of-nuclear-engineers

CERTIFICATE OF SERVICE

I certify that a copy of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Reply Comments, in Docket No. M-100, Sub 164, has been served by electronic mail, hand delivery or by depositing a copy in the United States mail, postage prepaid to parties of record.

This the 14th day of April, 2022.



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