Supporting Attachments

Response to Request for Proposals for Long-Term Contracts for Offshore Wind Energy

VINEYARD OFFSHORE

PUBLIC

RESPONSE TO THE REQUEST FOR PROPOSALS FOR LONG-TERM CONTRACTS FOR OFFSHORE WIND ENERGY PROJECTS

Prepared for

The Narragansett Electric Company d/b/a Rhode Island Energy

March 27, 2024

Submitted by

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Attachment 1.1-1: [redacted]

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Attachment 1.1-2: [redacted]

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Attachment 7.4-1: Draft Fisheries Guidance Comment Letters

VINEYARD WIND

August 22, 2022

Submitted via regulations.gov

Office of Renewable Energy Programs
Bureau of Ocean Energy Management
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Sterling, Virginia 20166

RE: Comments on the Draft Guidance for Mitigating Impact to Commercial and Recreational Fisheries from Offshore Wind Energy Development (BOEM-2022-0033)

Vineyard Wind 1 LLC appreciates the opportunity to comment on the Draft Guidance for Mitigating Impact to Commercial and Recreational Fisheries from Offshore Wind Energy Development (the "Guidance") published by the Bureau of Ocean Energy Management (BOEM) on June 23, 2022. We welcome BOEM's efforts to develop a standard set of recommended practices to mitigate impacts to commercial and recreational fisheries. Vineyard Wind is a member of the American Clean Power Association's Fisheries Working Group (ACP FWG), and we have contributed to and echo comments submitted by the ACP FWG. Our supplemental comments focus on the guidance provided in Part E., Financial Compensation, and reflect the experience we have gained developing the fisheries compensatory mitigation program for Vineyard Wind 1. Vineyard Wind 1 is currently under construction and will be the nation's first utility-scale offshore wind project.

In accordance with our commitment to provide compensatory mitigation to fishermen, we have spent the better part of a year evaluating approaches to implementing a workable and transparent claims process over the 30-year life of the project. Our objective has been to develop a data-driven compensation approach that utilizes the best available data and consistent criteria, and we have done so in consultation with state agencies, the National Oceanic and Atmospheric Administration (NOAA), commercial fishermen, and others. At the outset, we would like to offer our full support for the General Approach and Management of Funds recommendations in the Guidance, and we believe that the offshore wind industry is aligned with fisheries stakeholders on these points. It is essential for fisheries compensation programs to be fair and equitable across fisheries and fishing communities. We also strongly favor the use of independent third parties to manage programs and disburse funds.

Our primary recommendation is that BOEM refrain from endorsing a particular model or methodology for a claims process. We have found that the claims-based/causation model detailed in the Guidance on page 10 is largely unworkable for both fishermen and offshore wind developers due to current data limitations, confidentiality concerns, and multiple confounding factors that make it challenging to tie individual fishing vessel revenue impacts to individual offshore wind projects.

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A primary disadvantage of a causation-based process is that it requires fishermen to demonstrate revenue impacts from an individual offshore wind project relative to a baseline (e.g., a fishing vessel earned $X from a project area prior to the construction and operation of the project and once constructed that project reduced the fishing vessel's earnings by $Y in a given year). Establishing baselines for individual fishing vessels, however, is difficult as most fishermen do not track or record vessel movements, catch data, landings, etc. at a fine enough scale to tie fishing activities or revenues to a specific project area or offshore export cable corridor area. While NOAA Fisheries tracks vessel information through a Permit History Identifier, confidentiality concerns limit access to these data. Fishermen can request access to their data, but it would be a significant lift for fishermen or any other party to process these data to establish a baseline for individual fishing vessels thus increasing the cost and administrative burden associated with these programs. Moreover, NOAA Fisheries data may need to be supplemented with state data (e.g., nearshore fisheries, lobster, Jonah crab) and other data sources or analyses to provide a complete picture.

A claims-based process would also require fishermen to demonstrate economic impacts to qualify for compensation. However, multiple confounding factors and recordkeeping burdens will frustrate efforts to establish causation between an offshore wind project and changes to a fishing vessel's earnings. Confounding factors include other offshore wind projects, climate change, seasonal variability, changes in fishing movements, and fluctuating seafood and commodity prices. Moreover, in assessing a claim for compensation, it is also difficult to determine the extent to which fishermen could recoup lost revenues from other fishing areas.

For these reasons, a claims-based/causation model is unlikely to be a workable model for most project-specific compensation programs in the near- to medium-term. It may be more workable at a regional level. In our view, rather than choosing one model as a minimum standard, we recommend that BOEM focus on outlining a set of principles or objectives that offshore wind developers should adhere to when developing compensatory mitigation programs.

As an example, the key objectives that have guided our efforts for the Vineyard Wind 1 fisheries compensatory mitigation program are as follows:

- create a fair, simple, and transparent program;
- limit the administrative burden for all parties;
- reduce the potential for gaming and fraud; and
- resolve uncertainties and data limitations in the fishermen's favor.

A principle or objective-based approach to compensation programs in the Guidance would set a more effective minimum standard for compensatory mitigation and allow offshore wind developers and other parties the flexibility they need to design and implement programs on a project-specific, regional, or another basis to address the potential economic impacts of offshore wind on fishermen.

Thank you for your consideration.

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August 22, 2022

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Re: Comments on the Draft Guidance for Mitigating Impact to Commercial and Recreational Fisheries from Offshore Wind Energy Development

Submitted via regulations.gov, Docket ID BOEM-2022-0033

The American Clean Power Association ("ACP") welcomes the opportunity to comment in response to the Bureau of Ocean Energy Management's ("BOEM") Draft Fisheries Mitigation Guidance Reducing or Avoiding Impacts of Offshore Wind Energy on Fisheries ("Guidance"). ACP is a national renewable energy trade association that unites the power of offshore wind, onshore wind, solar, storage, and transmission companies[1]. ACP has established a Fisheries Working Group ("FWG"), comprised of developers and leaseholders, to coordinate consensus and share best practices on the offshore wind industry's interaction with the environment, fishermen, fishing communities, and the fishing industry.

The ACP FWG continues to explore ways for the fishing and offshore wind industries to productively coexist and appreciates BOEM's efforts to create guidance that recognizes issues of common interest to both groups. ACP and its members in the offshore wind industry support the spirit of and process by which this draft mitigation was developed. It is clear that, in addition to the public meetings and comment periods for this process, BOEM has incorporated experiences and resources from other efforts which included extensive input by stakeholders, including the fishing and offshore wind industries. Similarly, the ACP FWG supports the recent efforts of the Special Initiative for Offshore Wind (SIOW) to coordinate with a group of nine Atlantic states (and growing) to explore a regional compensatory mitigation approach that provides consistency and transparency for the fishing industry, offshore wind developers, federal agencies, and the states themselves.

The ACP FWG appreciates BOEM's efforts to document common mitigation measures across East coast projects that can serve as industry standards for offshore wind development in other regions of the Outer Continental Shelf. The ACP FWG also appreciates BOEM's effort to incorporate evidence-based solutions to mitigating the effects of offshore wind on fisheries and fishing. To both points, while BOEM's efforts do provide transparency and predictability for developers and ocean users, ACP FWG recommends that BOEM consider which mitigation measures and standard continued to be applied on a project-by-project basis. Specific to compensation, the ACP FWG appreciates BOEM considering levels of compensation appropriate to phases of offshore wind development and BOEM's assessment of its legal authority to administer funds.

As BOEM finalizes its guidance, we urge the agency to bear in mind other key principles:

- Every offshore wind project is different, with location- and developer-specific design needs and commercial considerations, as well as a unique set of potentially affected fisheries. Unless dictated by bid conditions or lease stipulations, final decisions on mitigation measures should be made on a project-by-project basis in close consultation with agencies and developers.
- The final guidance must acknowledge the importance of balancing fisheries concerns against project economics and the needs of other ocean users. The ACP FWG urges BOEM to avoid using absolute words like "maximize" or "minimize" in its final guidance, and instead recommend "using commercially and technically feasible measures" to achieve its objectives.

The ACP FWG supports BOEM's recommendation that lessees engage with the commercial and recreational fishing industries, tribal communities, and others most impacted by their offshore wind development activities, prior to the onset of any project work. ACP and its members have echoed these sentiments and recommended this engagement to improve communication between ocean users and developers, to promote transparency, to inform the public, and to increase industry accountability. Developers routinely utilize such early engagement to help inform the public and receive valuable input from the WEA designation process to lease sales to early lease activities to the preparation of Construction and Operation Plans ("COPs") that must include proposed project-specific mitigations and resource monitoring plans. This kind of effective, transparent communication is vital to ensures the success of these projects, and more broadly the offshore wind industry.

The ACP FWG supports BOEM's own continued, direct engagement of the commercial and recreational fishing industries and communities at the earliest stages of the process. BOEM's engagement with these ocean users, as well partner federal and state agencies, to collect information and data to inform the initial designation of WEAs and eventually lease areas assists developers in understanding and mitigating impacts to fishing. We also look forward to continued

engagement with BOEM as the agency considers the input of the Atlantic states, collaborating federal agencies, and the industry as the agency moves toward finalizing this Guidance.

ACP and its members also support BOEM's use of the Council of Environmental Quality's (CEQ) definition of mitigation.[1] This framework is an appropriate and well-understood way to manage offshore wind project effects, particularly with respect to fisheries. The Draft BOEM Fisheries Mitigation Guidance provides robust recommendations on avoidance (1), minimization (2), and Compensation (5), but does not adequately address Rectification (3) and Reducing (4). ACP recommends that BOEM include further guidance to offshore wind developers focused on addressing Bullets 3 and 4 as it believes that this process will be most successful if all five aspects of the CEQ definition of "mitigation" are addressed given appropriate weight. The remainder of our comments are structured to comment on the specific sections of the Guidance.

Environmental Monitoring

The ACP FWG agrees that BOEM and other entities, including the Responsible Offshore Science Alliance (ROSA), have developed guidance documents that provide overarching principles to inform fisheries monitoring designs for the phases of offshore wind development. The proposed Guidance could serve to supplement these existing resources with BOEM's perspective on processes that could better inform developers of information needed in the construction phase. Specifically, it would be helpful if this Guidance could include information on timelines with respect to required studies as they relate to BOEM's definitions of phases of construction.

In addition, developers are required to conduct multiple studies that result in fish mortality.[2] The ACP FWG recommends BOEM consider adding to this guidance document language that indicates the acceptability of using regional studies for neighboring lease owners operating in similar habitat. This would significantly reduce fish mortality and environmental impact related to the studies themselves. Further, ACP FWG suggests that BOEM consider additional language regarding the use of innovative technologies (e.g., non-extractive techniques) to perform required studies.

Project Siting, Design, Navigation and Access

The ACP FWG proposes BOEM consider the following principles as it finalizes this guidance:

- Leases on the Atlantic OCS are not the same, and leaseholders may have different solutions to project siting, design, navigation, and access based on ocean users in and around specific lease areas.
- Conditions within the lease itself can vary, from ocean conditions to habitats to seafloor geology. Standard approaches may not be equally applicable across all leases. Any guidance by BOEM and consulting agencies should allow flexibility to account for

[1] 40 CFR 1508.1(s).

[2] The industry foresees potential challenges in receiving necessary federal permits to conduct these types of surveys, which is a barrier to hiring local fishermen to conduct the studies and to completing the required studies.

variability across leases and projects within leases and not unduly restrict adaptive approaches that developers will need to take in mitigating site- or activity-specific actions.

- Unless specifically mandated by a federal lease stipulation or state procurement requirement, BOEM should provide the flexibility for the lessee to work directly with the affected fishing communities to establish reasonable and practicable project siting and design solutions. Standard layouts may not be applicable across all lease areas within an OCS region.
- In several instances, BOEM uses the term maximize or minimize when referring to one industry over another. The ACP FWG recommends this guidance should include more balanced language when discussing coexistence of ocean uses.

We now turn to BOEM's specific project recommendations.

Recommended static cable design elements, pg. 5

> *All static cables should be buried to a minimum depth of 6 feet below the seabed where technically feasible. Technical feasibility constraints include seabed conditions that preclude burial, such as telecommunication cable crossings.*

The ACP FWG recommends that cable burial depths should be determined by the risk profiles of the seafloor and sediment conditions in the project footprint. The spatial extent of profiles can vary within a project footprint, lease area, and between leases across the extent of the Atlantic OCS. Profiles may also shift over time depending on oceanic conditions and other factors or uses in a particular area. For instance, anchoring risk from commercial/merchant shipping will set the required burial depth in/around entrances to ports, which may need to be different from a standard proposed depth. Further, there may be other ocean uses or users that require unique burial depths or techniques to avoid or mitigate interactions and this flexibility should be afforded to the developers to directly manage these instances with the affected stakeholders.

For the designed cable route, a burial assessment study is required. The burial assessment will need to detail the following: risks along the cable route suitable (lay and) burial method(s) and resulting trench profiles based upon the sediment conditions, and additional protection that may be required.[3] Rather than encouraging a standard depth, BOEM should encourage lessees to base cable burial depths on the outcomes provide in project-specific cable burial risk assessments, which consider all factors, conditions and other uses of the ocean that could impact the burial depths of offshore wind transmission cables. Specific to fishing activity, BOEM should allow developers flexibility to design cable protections respective of the type of fishing activity that may happen in and around their projects based on consultations with agencies and fishing community.

[3] Cable Burial Risk Assessment Methodology Guidance for the Preparation of Cable Burial Depth of Lowering Specification CTC835, February 2015, available at ttps://www.carbontrust.com/resources/cable-burial-risk-assessment-cbra-guidance-and-application-guid

Lessees should avoid installation techniques that raise the profile of the seabed, such as the ejection of large, previously buried rocks or boulders onto the surface. The ejection of this material may damage fishing gear.

Cable route survey activities help to identify areas of potential seabed obstructions that may interfere with the installations of cables. It is the intent of developers to route cables around obstructions, sensitive habitats, archaeological areas of significance etc., to the maximum possible extent. In the event that this is not possible, the Route Clearance/Pre-Lay Grapnel Run (an installation technique) (RC/PLGR) may dislodge debris in the seabed as this is the intent of this activity – to initially prepare the seabed for the burial of cables. It is possible that there could be disturbances associated with this activity, specifically the creation of a 'furrow' where the seabed is raised on either side. The ACP FWG recommend that BOEM consider which activities may result in disturbances that are unavoidable and not considered to be obstructions and exclude such in the final Guidance.

If needed, cable protection measures should reflect the pre-existing conditions at the site. This mitigation measure chiefly ensures that seafloor cable protection does not introduce new obstructions for mobile fishing gear. Thus, the cable protection measures should be trawl-friendly with tapered or sloped edges. If cable protection is necessary in "non-trawlable" habitat, such as rocky habitat, then the lessee should consider using materials that mirror the benthic environment.

The ACP FWG recommends that BOEM consider instances where there would be no additional need for protection (e.g., if an area is not trawl-friendly and/or no mobile fishing gear is used in the area).

Recommended Dynamic Cable Design Elements, pg. 5

Dynamic cables should be suspended at a depth that minimizes, to the extent practicable, the potential for interactions with fishing operations.

Where feasible, cables should share corridors and minimize the total cable footprint.

The ACP FWG encourages BOEM to recognize that the total cable footprint in a project – whether developed independently or in collaboration with another leaseholder(s) – will be the same where the cables are installed in a shared corridor or independent corridors. Project design and the dynamic cable corridor depth should consider the regional recreational and commercial fisheries activities (e.g., epipelagic and mesopelagic) to best mitigate impacts. The ACP FWG recommends that BOEM not mandate how a developer(s) install cables or how cable corridors should be designed. BOEM should consider the risks to mandating common corridors, such as the susceptibility of a single catastrophic event (i.e., a merchant vessel transitioning with an anchor deployed), impacting all infrastructure in the corridor itself.

Recommended Dynamic Cable Design Elements, pg. 5 - 6

The facility design should maximize access to fisheries, including by consideration of:

As noted above, project design must balance various technical, commercial, and ocean user considerations. The proposed language elevates one ocean user at the expense of other critical factors, including project viability. The ACP FWG recommends BOEM adopt the following wording:

The facility design should enable continued access to fisheries, including by consideration of:

The intent and purpose of several recommendations in this section is unclear. In some instances, it is difficult to determine which components or installation techniques BOEM is recommending (e.g., common cable corridors, regional transmission backbones, etc.). In other instances, BOEM's early siting work has already identified space-use conflicts and it is not clear what additional conflicts might remain. For some items, a clear definition of the objective or agency expectation of the developers would be helpful. The ACP FWG recommends BOEM further elaborate on these items:

Consolidation of infrastructure, where practicable, to reduce space-use conflicts.

It would be helpful if BOEM provided examples of this item. Developers are primarily focused on building necessary and efficient infrastructure. We recommend either eliminating this item or rephrasing it to recommend that developers consider the potential to consolidate infrastructure when creating its project layout.

Consideration of larger turbine sizes to reduce total project footprint and meet energy production commitments.

We are concerned that this recommendation turns the project design and engineering process on its head. While developers analyze and account for the likely benefits and costs of its wind turbine options within the permitting process, selection of wind turbine generators is a complex decision that primarily involves commercial and technical considerations, The phrasing of this item implies that reduction of the project footprint should be a driver of the developer's decision. We are also concerned that this provision could conflict with BOEM's mandate to consider prevention of waste of the wind resource under 43 U.S.C. 1337(p)(4)(C) by elevating project footprint over maximization of renewable energy generation on a lease. We recommend either eliminating this item or rephrasing to recommend that developers consider the effects of project footprint in selecting its turbines.

Coordination of turbine and substation array layouts between and among neighboring lease areas to allow safe fishing operations and transit through multiple projects. In instances where layout design cannot accommodate two common lines of orientation across adjacent leases, the lessee should consider incorporating a 1 nautical mile setback,

within which no surface structures may be constructed. See Navigation and Vessel Inspection Circular 10-194 for more details.

The ACP FWG agrees that the 1-nautucal mile spacing for the southern New England lease areas for the purposes of a unified layout was appropriate for that area. This layout was situational and collaboratively designed and agreed to by those leaseholders, with substantial ocean user input and supporting technical analysis, to accommodate mariner uses in the area. However, this specific action, driven in part as response to ocean user concerns and agencies' recommendations, should not signal support for that standard in other lease areas. The 1-nautical mile separation between turbines may not be required for safe fishing operations and/or navigations for independent lease areas or adjoining projects and/or lease areas across an OCS region. If there are adjacent lease areas with different layouts, a suitably sized buffer based on a NSRA could be considered. Other markings should also be considered to inform mariners that they are leaving one lease (orientation) and entering another.

Turbine locations should be sited to avoid known sensitive benthic features, such as natural and artificial reefs.

The ACP FWG recommends that BOEM recognize developers are using the results of site assessment and characterization surveys (geological and geophysical surveys) to achieve this mitigation. We recommend that BOEM take the opportunity to further clarify what defines 'sensitive' benthic habitats and 'artificial reefs. For artificial reefs, BOEM should clarify if this applies to designated reefs for fish or fishing or whether this terminology refers to something broader. BOEM should also recognize that there are designated, i.e., state-based reefing locations - and undesignated artificial reef areas (i.e., mariner-created bottom structure), and which should be avoided.

Facility planning should consider use of nature inclusive designs, where applicable, to maximize, maintain and/or provide additional available habitat for fish.

The ACP FWG recommends that BOEM further elaborate as to which fish species are meant to benefit from nature inclusive designs. The differences in species and their habitat utilizations varies significantly across seafloor types and even in the water column. Maximizing habitat for one species could inadvertently reduce habitat for another species. The ACP FWG suggests that BOEM consider revising this mitigation to allow for site-specific species considerations and whether habitat development is necessary or should be created based on species composition in a project area.

Navigation and Safety

Regarding navigation and safety, ACP agrees with BOEM on many of the recommendations and is currently considering or actively implementing nearly all of them as appropriate per project and other site-specific circumstances. The ACP FWG recommends BOEM consider the following:

Considering installation techniques and time windows that minimize disruption to fishing activities (e.g., simultaneous lay and burial, or conducting activity during the appropriate time of year).

ACP recognizes mitigation as a core principle to successful offshore wind development and members are incentivized to minimize disruptions to fishing activities. However, ACP opposes citing time windows with regard to fishing activities as a determining factor in when installation construction activities can occur.

As worded, the recommendation is aimed at reducing business interruption rather than enhancing safety. If that is indeed the case, then it seems more appropriate to include this as a mitigation recommendation in the Project Siting, Design, Navigation, and Access category.

Employing liaisons from the commercial fishing industry to provide safety and communication services during construction.

Developers are currently contracting commercial and recreational fishermen as fisheries liaisons upon survey and project vessels,and contracting their vessels as scout and safety vessels during survey and construction stages of projects. Representatives from the fishing industry are also contracted to provide further project updates, communications and aid in safety efforts.

Monitoring cable burial in real-time and report all potential hazard events to the USCG as soon as possible.

Developers conduct regular cable surveys, which are included in a project's Construction and Operation Plan (COP). Regular cable surveys are frequently conducted during early stages of the project (i.e., during the construction period), and become needed less frequently over time as the project is established.

There are several foreseeable situations that could be classified as hazardous which may occur over the lifecycle of a project. To set reasonable boundaries on reporting, ACP encourages BOEM to clarify 'potential hazard events' as related to cable burial.

Using digital information technology platforms (e.g., smartphone applications) to bring together survey and construction schedules and locations in addition to standard local notices to mariners via the USCG.

There is not one maritime software platform (app) that has been agreed upon by the entire industry, but efforts can be made to provide standard information across whichever mediums are used. For example, currently multiple developers in the Rhode Island and Massachusetts wind energy areas are supporting a software platform that will provide project locations, survey and construction vessels, and other project news on an app that will house multiple projects and developers. This

same software may or may not be used by other developers, and BOEM should not require the use of a specific software, but instead focus on what information is shared and the frequency.

> *Providing training opportunities for the commercial fishing industry to simulate safe navigation through a wind facility in various weather conditions and at various speeds.*

Currently, multiple developers are providing simulated experiences to commercial and recreational fishing interests. These efforts will continue as the offshore wind industry continues to develop because they have proven to be beneficial to demonstration attendees. These should not be continued if the intended audience and communities do not find them beneficial, likely by the time offshore wind projects are installed and commonly found in U.S. waters. In addition to these on-going activities, ACP encourages BOEM to work with the U.S. Coast Guard to develop a standard certification process verifying a mariner's completion of a navigation safety course.

In response to the guidance that lighting, marking, and AIS utilization should be as standardized as possible:

Developers of the Rhode Island and Massachusetts lease areas have established and have been working via a Joint Developer Marine Affairs Working group to discuss and coordinate efforts which include lighting and marking, uniform labeling, aids to navigation, NAV safety, etc. Prior to adopting these standards across all projects, a review amongst all maritime user groups should take place to reach standards for all WEAs.

Compensatory Mitigation

Climate change driven by carbon emissions is negatively impacting the health of commercial and recreational fisheries around the world. While offshore wind energy developed at scale can help reduce future carbon emissions, and thus lessen future stresses from climate change, we acknowledge that the development of offshore wind will result in small to moderate effects on other ocean users. Where efforts to avoid, minimize, and mitigate impacts to commercial and recreational fishing are not wholly successful, we support efforts to create a coast-wide fisheries compensation process for offshore wind development that provides predictability, certainty, and resolution of fishermen's' compensation claims. While we agree that BOEM does not have authority to establish or manage a federal compensatory mitigation program, we believe BOEM's final guidance can go much further in endorsing and incentivizing the creation of an independently administered third party fund that can effectively manage a compensation fund.

The BOEM Guidance goes a long way towards trying to provide greater predictability through a transparent, data driven process, though we provide several recommendations below based on member experience. While the offshore wind and commercial fishing industries agree on many

foundational concepts, like the use of third-party fund managers, there remains a difference of opinion regarding how to estimate revenue exposure during wind farm operations. We provide suggestions below on how to add greater rigor to those estimates, but the inherent uncertainty of how to calculate losses and how individual commercial fishers will respond and adjust fishing patterns in the future highlights why such mitigation funds should be credited against discounts on auction bids and current operations fee payments.

We also encourage BOEM to support the work the Special Initiative on Offshore Wind (SIOW) has been doing to bring Northeast and Mid-Atlantic states together with the commercial fishing and offshore wind industries to create a regional third-party fisheries compensation fund. As noted above, the ACP FWG has been coordinating with SIOW and believes its efforts are the right process to create a compensation mechanism that works for everyone.

Gear Loss

The ACP FWG believes that gear loss claims after the start of construction should be managed through its proposed regional, third party-managed compensatory mitigation program. ACP supports the recommendation in the draft guidance to follow minimum standards set forth in NOAA's Fisheries Contingency Fund ("FCF"). Though developers cannot model it entirely, as it is a legislatively created entity, the process has proved a workable solution to gear claims.

ACP requests that BOEM remove the following guidance language: "[a] lessee may elect to reimburse damage to fishing gear from marked and charted obstructions in order to limit interactions with lessee property." Reimbursements for interactions with known obstructions encourages unnecessary risks and goes against the first point raised in the "Safety Measures." It does not make sense for developers to reimburse gear loss related to interactions with known obstructions as doing so could invite unwanted risk. This language is also inconsistent with the administration of the FCF, which limits claimant recovery if the claimant is also at fault or was negligent (50 CFR 296.4(c)).

While we are not opposed in principle to recoverability of reasonable fees, a cap for such fees should be defined. We think fees under a gear loss program should not exceed 25%, as this will ensure most funds go to those with the claim. In addition, we suggest BOEM add language to the recommendation that allows for reasonable fees paid to an attorney, certified public accountant, or other consultant contingent to an award. As the draft guidance is currently written, it can be construed that developers should reimburse fees regardless of a claim's merits. The FCF does not consider damages and fees separately, as the FCF regulations state, "An award may also include compensation for reasonable fees paid by the claimant to an attorney, CPA, or other consultant for the preparation or prosecution of a claim." 50 CFR 296.8(d). We believe reimbursement of fees contingent to an award reflects the intent of the FCF and should be mirrored in the final guidance.

For gear loss claims made prior to the start of construction—e.g., during survey activities—ACP believes that it would be easier to maintain the status quo and have developers manage such claims individually. Most developers already have systems in place for these claims and can therefore continue to be responsive to fishermen's gear loss claims in a timely way.

Compensation for Lost Income

We generally agree that for the purposes of determining voluntary compensation during construction, such compensation, when appropriate, should be derived from the proportion of the project area that is rendered unavailable to fishing during active construction. Based on time of year restrictions for certain activities as well as construction logistics, it is unlikely that an exclusion zone would encompass the entire lease area for the full construction period, but rather would be located in proximity to the vessels conducting work. We agree with BOEM's draft guidance to the extent it is based on NOAA data. BOEM has also (presumably with input from NMFS) provided thoughtful methodologies to calculate exposure specific to distinct fisheries that may have data gaps.

For determining voluntary compensation reserve funds for commercial fishing during operations, BOEM's proposed percentage exposure estimates—which BOEM rightfully acknowledges are overestimates—should be grounded in more rigorous methodology. For example, BOEM provides no basis for why 100 percent revenue exposure is a reasonable basis for the first year after construction is completed. Similarly, more detail is needed to justify the recommended values for year 2 and beyond.

Instead of the proposed percentages in operations, ACP urges BOEM to look at economic impact analyses that can be used to inform the process and serve as examples, such as those conducted by the Woods Hole Oceanographic Institution on impacts to commercial landings during construction, operations, and decommissioning. While this analysis was prepared for one project, the methodology is useful for other projects and can serve as a more appropriate starting point. Based on that export report, operational impacts were estimated to be much lower than BOEM proposed. The analysis also provides some lease area specific factors, such as potential stock effects on bivalves may be smaller spatially than finfish but of slightly longer duration.

Categories of exposure	Percentage estimate
Stock effects	Lobster & crab reduced 10% for 1 year* Bivalves/mollusks reduced 10% for 4 years* 25% of finfish stocks leave area* (*annualized per year of construction)
Constrained access during operations	Landings reduced by 0-5% from baseline Calculated as present value of 5% of baseline using a 5% discount rate, which is the average of the rate usually applied in natural

	resource valuation (3%) and the rate usually applied by the US government for public investment and regulatory analyses (7%).
Inflation	<2% (based on historical average)

Source: Rhode Island Coastal Resource Management Council South Fork Wind Consistency Determination (2021, July 1) .http://www.crmc.ri.gov/windenergy/dwsouthfork/SFWF_FedConsistencyDecision_20210701.pdf, pg 204

ACP does not recommend the use of commercial growth multipliers beyond inflation. The chance of overestimation under BOEM's approach is heightened because BOEM suggests using all available data and extrapolating into the future, even though landings vary from year to year and have generally trended downward since 2008 across almost all lease areas. ACP does not think that growth factors beyond inflation are justified by the data because of the general (though not universal) downward trend in landings, which may be exacerbated by climate change.

The above critiques of the proposed percentages should not detract from the fact that ACP agrees that a universal formula could serve as a useful alternative to performing a detailed analysis for determining compensation amounts on a project-by-project basis. It would also promote consistency across the region. But because the formula would serve as the expectation for projections throughout the Northeast region, it becomes all the more important for BOEM to provide justification for these revenue exposure estimates. Again, we encourage BOEM to review and consider the WHOI analysis to refine the impact percentages. While a standardized, nationwide approach is preferred, we recognize that supplemental analyses may be warranted for other regions where BOEM is advancing offshore wind leasing, such as the Gulf of Mexico or West Coast, due to differing fishing methods, fisheries data, and technology type.

Strengthening Compensation Fund Through Use of Credits Against Auction Bids and/or Operating Fees

We concur with BOEM's assessment that it may not require lessees to make payments into a third-party compensation fund. However, we encourage BOEM to endorse what ACP believes to be the ideal solution to ensure the fund always has sufficient resources: funding the fund through lessee payments credited against auction bids and/or annual operating fee payments.

BOEM is on The Right Track With California Proposed Sale Notice

ACP believes BOEM is on the right track in seeking solutions to properly support and fund fisheries compensation. We were heartened by BOEM's proposal in the Proposed Sale Notice for California[4] that it has regulatory authority under OCSLA to implement bidding credits for contributions to mitigation funds benefiting ocean users such as the fishing industry. Whether it takes the form of what BOEM has termed a community benefits agreement, or, preferably, a transparent third-party regional mitigation fund, the proposed bidding credit is a worthwhile policy. If BOEM paired its final fishing mitigation guidance with a commitment to use its existing

[4] Proposed Sale: Pacific Wind Lease Sale 1 for Commercial Leasing for Wind Power on the Outer Continental Shelf in California, available at https://www.regulations.gov/document/BOEM-2022-0017-0001.

regulatory authority to incentivize compensatory fishing investments using bidding and operating fee credits, this would allow commercial and recreational fishermen to benefit from the promise of ocean wind to an extent that might not be possible if funding levels are solely based on projected impacts. Finally, funding through developer payments in exchange for BOEM credits would also make it easier for the third-party fund to beneficially repurpose unused funds, thereby avoiding the administrative and legal challenges involved in refunding developers if economic loss and gear loss claims fall short of BOEM's baseline estimates of revenue exposure.

Bidding Credits and Operating Fee Credits Work Well Together

As discussed further in ACP's January 7, 2022 letter and noted above, we believe BOEM has the authority today to implement mechanisms to incentives the funding of a compensatory mitigation program through both lease auction bidding credits and operating fee credits. The two funding mechanisms would work well in tandem to ensure that sufficient money is available to satisfy valid claims and provide forward-looking grants, when that money is most likely to be needed.

We assume that to the extent offshore wind development has adverse effects on fishing, such effects will not commence until the start of offshore construction. We also assume that the effects of construction of the first two commercial-scale offshore wind projects—Vineyard Wind 1 and South Fork Wind Farm—will be addressed through the funds created for those projects and not through ACP's proposed regional fund. Therefore, it is important that the regional compensatory mitigation program be in place and adequately funded by the time the next offshore wind projects commences offshore construction; this is likely to be 2024 based on current FAST-41 permitting dashboard timelines.

The next East Coast lease sale, in the Central Atlantic, is anticipated between Q2 and Q4 of 2023. A fisheries compensation bidding credit in this lease sale that comes from a portion of the initial lease auction proceeds would provide "seed money" into the regional compensatory mitigation program. Depending on the percentage bidding credit that BOEM decides to use, we believe lessee payments in exchange for such a credit could be more than sufficient to satisfy claims for the effects of early offshore construction.

We estimate that lessees would begin paying operating fees for post-Vineyard/South Fork projects starting in 2025, once the first of those projects is completed and begins commercial operations. At that point, lessees could begin making payments in return for credits against their regulatorily mandated 2% annual operating fees (which could be authorized through mutually agreed-to lease amendments at the time of COP approval) into the regional compensatory mitigation program. As more projects go online, the amount of operating fees owed by lessees to BOEM would increase—and so would operating fee credit payments into the compensation program. By combining both types of credits, the compensation program would be funded early enough to matter for potential

early fisheries effects of offshore wind construction and would also become sustainably funded in the long term.

BOEM Should Work to Develop The Funding Mechanism At The Same Time The Third-Party Fund Is Being Developed

While a funding mechanism would need to be established separately from this guidance, they are not separate exercises. We urge BOEM to work with ACP and other stakeholders to develop the funding mechanism at the same time it coordinates with states, fisheries, and the offshore wind industry to ensure that the fund is appropriately structured and administered. First, a fund requires appropriate reserves to serve the need, funds that can be created through the use of a bidding credit in the Central Atlantic lease sale. Working out the details of how the funding mechanism will operate will take time and thoughtful policy. That process should start now so that the fund can be established with a funding plan already in place. Second, establishing the funding mechanism early will create fairness and predictability during the process of determining how the funds will be managed and distributed. For example, the exposure estimates during operations will be the most contentious part of both BOEM's guidance—and by extension the establishment of a compensation mechanism.

Third, the early establishment of a funding mechanism will have the added benefit of providing comfort to the fishing industry that money will always be available to satisfy valid claims. The success of the fisheries compensatory mitigation program will hinge on buy-in from all parties, and the most important aspect of that buy-in is trust in the efficacy of the process.

Finally, we believe that early attention to the funding mechanism will provide everyone with clear insight into whether the money into the fund will meet the anticipated purposes of the fund—and will allow for policy choices that grant flexibility in the event that predictions for claims and grants do not match actual usage. To that end, and as discussed further in the next section, ACP believes that to the extent the fund ends up with excess money, it should be able to be used beneficially for fishing industries through a grant program.

The Proposed Funding Mechanism Would Facilitate Grants For Adaptive Gear and Coastal Communities

A further reason to have the fisheries compensatory mitigation program funded through payments credited from winning auction bids and operating fees is that it would likely result in surplus funds that could be used in forward-looking ways that benefit fishing industries. The ACP FWG's January 7, 2022 comments recommended that a third-party compensatory mitigation program could include:

- A fund to enhance fishermen's navigational safety through grants for radar and gear upgrades; and

- A coastal community fund that could provide grants to support those not eligible for direct compensation, such as dockside seafood processors.

We believe that such grants could enhance the ability of fishermen to continue to fish within offshore wind projects, thereby creating a virtuous cycle that would decrease the need for compensation for economic loss and freeing up more funds for further grants. The fund could even provide pilot grants for the adoption of innovative gear that would, in turn, mitigate impacts on biological resources such as protected species.

Conclusion

We thank BOEM for their continued effort on this important topic. As the ACP FWG continues to advance efforts that support the coexistence of offshore wind with fisheries, it is helpful to capture best practices already underway and outline future possibilities in an accessible, common platform that is usable and helpful to both the fishing and offshore wind industries. This effort provides this opportunity. The ACP FWG looks forward to continued engagements with BOEM and fishing industries on this important effort.

Sincerely,

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VINEYARD OFFSHORE

Attachment 9.1-1: Project Schedule

REDACTED

VINEYARD OFFSHORE

Attachment 14.1-1: Economic Benefits Analysis

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VINEYARD OFFSHORE

Attachment 14.2-1: Economic Development Agreements

REDACTED

Attachment 14.3-1: Market Benefits Report

REDACTED

VINEYARD OFFSHORE

Attachment 14.5-1: Economic Development Summary Sheet

REDACTED

Attachment 17.1-1: Project Labor Agreement Commitment Letters

REDACTED

Attachment 17.2-1: Vineyard Wind 1 Project Labor Agreement

REDACTED

Attachment 17.2-2: Vineyard Wind 1 Impact on Jobs and Economic Output Report

VINEYARD WIND

Vineyard Wind 1
Impact on Jobs and Economic Output

Annual Report 2

November 2023

Submitted to:

Massachusetts Department of
Energy Resources
100 Cambridge St. #1020
Boston, MA 02114

Prepared by:

UMass | Dartmouth

SPRINGLINE RESEARCH GROUP

PUBLIC

VINEYARD WIND

Vineyard Wind is currently building the nation's first utility-scale offshore wind energy project over 15 miles off the coast of Massachusetts. The project will generate clean, renewable, affordable energy for over 400,000 homes and businesses across the Commonwealth, while reducing carbon emissions by over 1.6 million tons per year.

The Vineyard Wind parent companies consists of funds managed by Copenhagen Infrastructure Partners (CIP), whose Senior Partners are pioneers with an unparalleled track record in the offshore wind industry, and Avangrid Renewables (AR), the third largest onshore wind developer in the US with operations in more than 20 states, a Lead Market Participant in the ISO-NE market and an affiliate of the Iberdrola Group, the world's largest wind developer with more than 15,000 MW of wind installed.

UMass | Dartmouth

The University of Massachusetts Dartmouth is a public research university in Dartmouth, Massachusetts. It is the southernmost campus of the University of Massachusetts system. Formerly Southeastern Massachusetts University, it was merged into the University of Massachusetts system in 1991. As a national research university, UMassD opens a world of exploration and discovery. Our students work with world-class faculty researchers and journey into real-world innovation and experiences.

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Contents

Executive Summary

Vineyard Wind's *Offshore Wind Development and Reporting Agreement* executed with the Massachusetts Department of Energy Resources (MA DOER) requires Vineyard Wind to deliver written annual progress reports that summarize the company's progress in achieving the goals set forth in Section 1 of the *Agreement*. Accordingly, this analysis utilizes job and expenditure data collected from 2017 through September 2023 to measure Vineyard Wind's progress in meeting the requirements outlined in the *Agreement.*

This is the second annual report. The Year 1 annual report focused on Development phase activities from 2017 to 2021 and a partial-year analysis on Construction phase activities. The report also measured the extent to which the reported results align with the job and economic output estimates conducted by UMass Dartmouth's Public Policy Center in 2017. Importantly, the Construction phase is not complete.

The 2017 estimates were designed to gauge the economic impact of the complete construction phase of the project including economically meaningful project activities that are expected in 2024. Given that project phases span reporting years, the data contained in this report document the impact of project related construction activities through September 2023 only.

The current Year 2 report is focused on Construction activities that occurred over a two-year period:

- **Year 1:** October 2021 to September 2022
- **Year 2:** October 2022 to September 2023

Employment Impacts

How are Jobs Defined in this Report?

The labor needs of offshore wind developments are concentrated in Construction activities, which by their very nature are project based and not permanent. The actual number of workers on the project includes both full-time and part-time workers who may be on the project for several years, one-year, or less. This makes estimating employment impacts somewhat less intuitive than in contexts where activities are ongoing and can be accurately defined as "permanent."

Consequently, economic impact assessments of construction and other temporary project-based activities are typically reported in terms of the number of years of full-time work required. To minimize misunderstanding and to provide the most complete and accurate reporting of job impacts possible, our analysis reports employment impact in two ways – the total number of workers employed on the project or headcount (whether part-time or full), and the number of job years of work associated with the project, with one job year equal to one worker working one full-time year on the project (i.e., FTE).

Union Jobs (Headcount) and Job Years

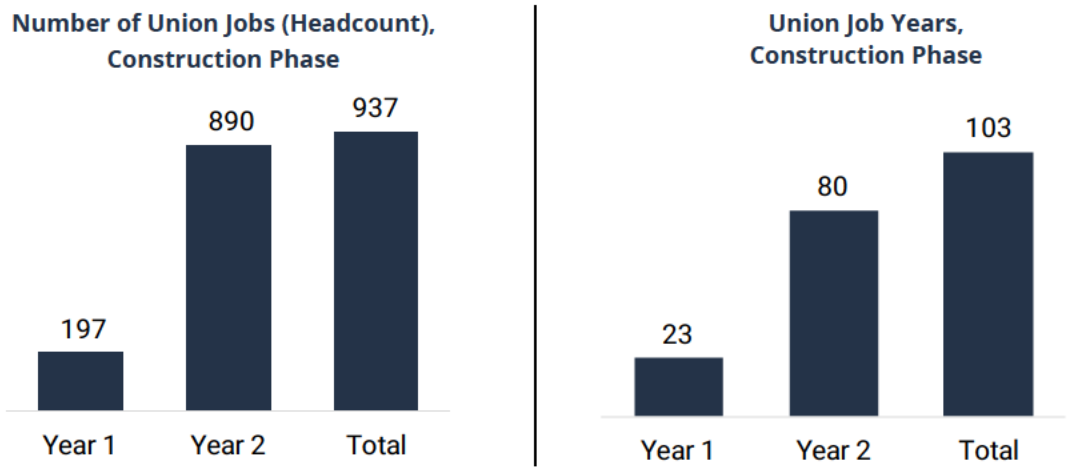
- **Jobs (Headcount):** To date, there have been 937 individual union workers employed during the Construction phase, with 197 workers in Year 1 and 890 workers in Year 2 (see Figure 1). Importantly, while some of the same employees may have worked in both Year 1 and Year 2, these jobs are only counted once in the total headcount (third bar in the chart) whether the union member worked in Year 1, Year 2, or both years. This means the total headcount over the two-year period is not the

sum of workers in Year 1 and Year 2.[1] To date, nearly 9 in 10 (88%) of union workers on the project are residents of SEMass.

- **Job Years:** As noted, the number of workers on the project includes both full-time and part-time workers who may be on the project for several years, one year, or less. In the first two years of the project there have been 103 total union job years during the Construction phase: 23 job years in Year 1 and 80 job years in Year 2 (see Figure 1).

  Notably, the job-year calculation does not include overtime hours. The number of overtime hours is significant, accounting for 19.4% of total hours worked over the two-year period. These hours are paid at time-and-a-half or double-time and consequently have a larger economic impact in comparison to regular hours. If overtime hours are included in the job year calculation, the number of job years increases to 25.8 in Year 1, 102.4 in Year 2, and 128.1 in total.

Figure 1. Number of Union Jobs (Headcount) and Job Years Over the Construction Period, by Year



Source: UMass Dartmouth from monthly contractor reports

Union Worker Diversity, Equity, and Inclusion Goals

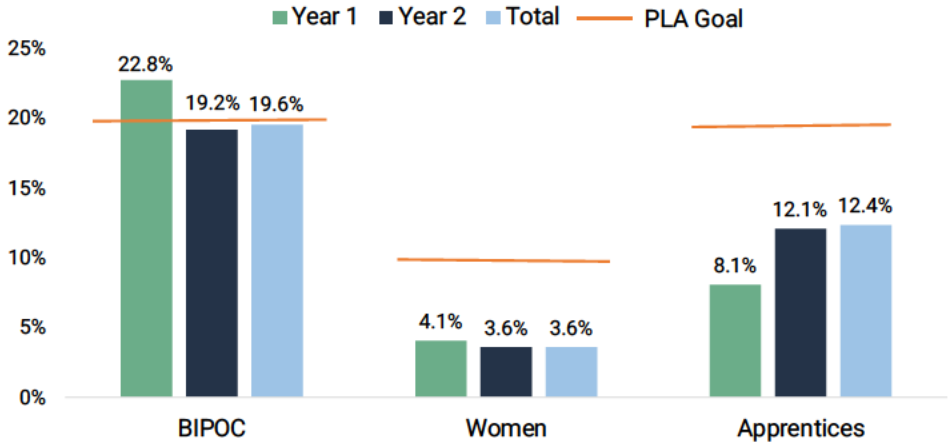
Vineyard Wind's Project Labor Agreements (PLA) with its union contractors stipulate several hiring goals related to Diversity, Equity, and inclusion (DEI) as well as the number of apprentices on the project:

1. Black, Indigenous, and People of Color (BIPOC): 20% of total union jobs (headcount)
2. Women: 10% of total union jobs (headcount)
3. Apprentice: 20% union workers (headcount)

[1] Data collection in the first two years of the project was undertaken in an environment where the project was ramping up very quickly, which resulted in incomplete reporting from some Tier 1 contractors, especially in Year 1 of the Construction phase. Consequently, the worker headcounts reported here should be considered conservative estimates.

Just under twenty percent (19.6%) of union workers on the Vineyard Wind 1 project meet the BIPOC criteria, while women comprise 3.6% of the union workforce on the project. Over twelve percent (12.4%) of workers were hired as apprentices (see Figure 2).[2]

Figure 2. Number of Union Workers Meeting PLA Goals

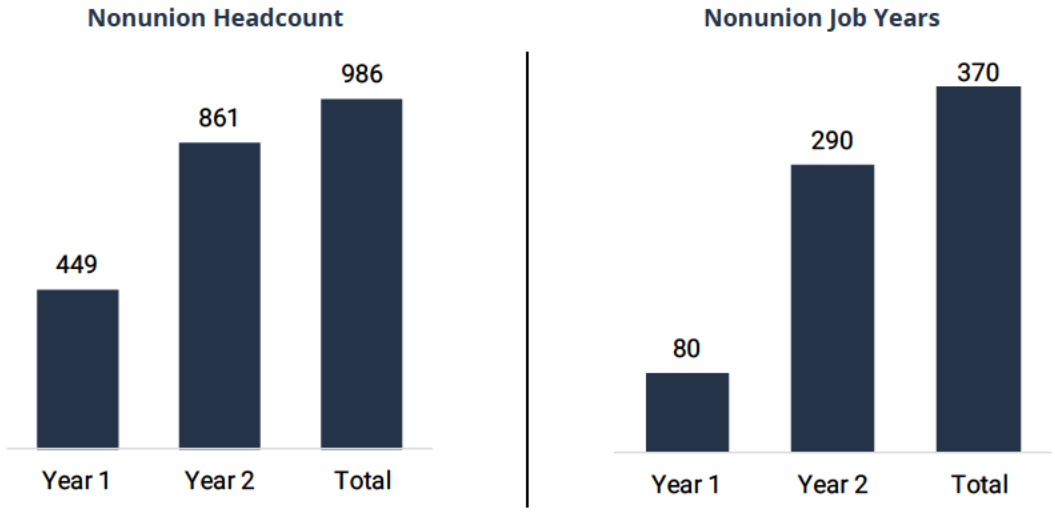


Source: UMass Dartmouth from monthly contractor reports

Nonunion Workforce, Headcount and Job Years

This section highlights the number of nonunion workers (headcount) and job years directly employed on the Vineyard Wind 1 project over the two-year Construction phase period. To date, there have been 986 unique nonunion workers employed during the Construction phase: 449 in Year 1 and 861 in Year 2 (see Figure 3). In terms of job years, as can be seen in Figure 3, there were 80 nonunion job years in Year 1, 290 in Year 2, and 370 over the two-year Construction phase.[3]

Figure 3. Nonunion Workforce, Headcount and Job Years



Source: UMass Dartmouth from monthly contractor reports

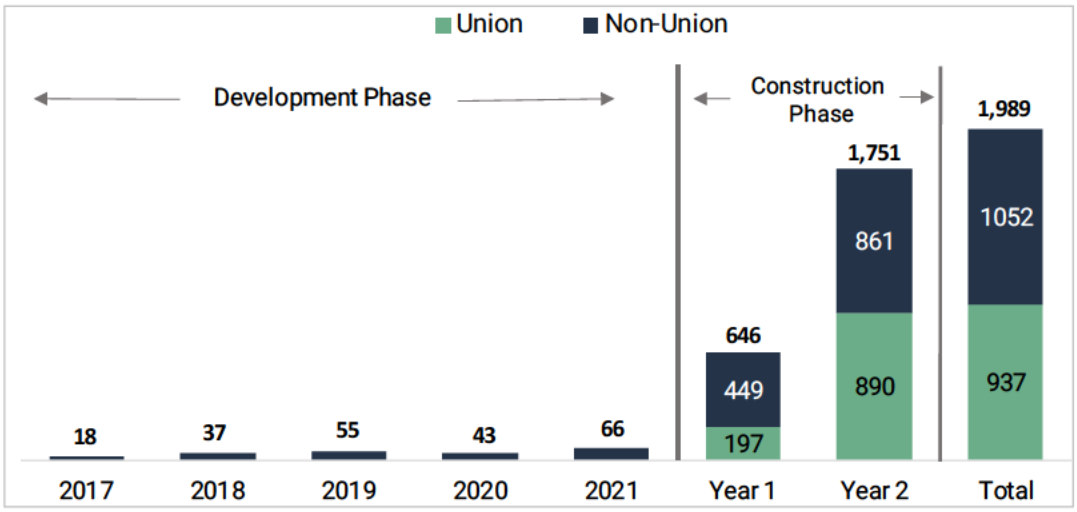
[2] BIPOC (Black, Indigenous, and people of color) is defined as any employee whose race is not White-alone.
[3] Similar to the union workforce reporting, the nonunion worker headcount is a conservative estimate due to incomplete reporting from some Tier 1 contractors..

Total Jobs and Job Years Over the Project Period (2017-2023)

Figure 4 presents the worker headcount since the Vineyard Wind 1 Development phase began in 2017.[4] A total of 1,989 workers have been employed on the project since 2017. This is a conservative estimate based on incomplete reporting from some contractors during the early phases of project work.[5]

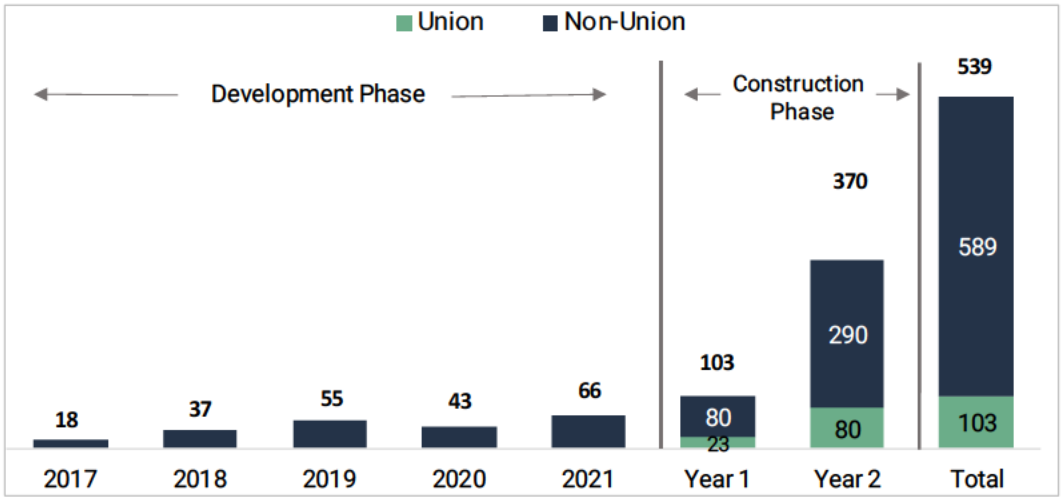
Figure 5 details the total number of job years by phase and year since development work on the project work began in 2017.

Figure 4. Jobs (Headcount), Development & Construction Phases



Source: Vineyard Wind Services Historical and Monthly Tracker Submissions

Figure 5. Job Years, Development & Construction Phases



Source: Vineyard Wind Services Historical and Monthly Tracker Submissions

[4] See the Year 1 Annual Report for more details on Development Phase employment.
[5] The total (last bar) represents the number of individual workers over the seven-year period, not the sum of the previous bars. That is, there have been 1,989 unique workers on the project since 2017. Some of these workers may have been employed on the project in multiple years.

Construction Phase Economic Impacts, Year 1 and Year 2

Table 1 displays the Construction Phase economic impacts[6] for Year 1 and Year 2 on the Commonwealth of Massachusetts. Much of the Construction phase activity in Year 1 was focused on onshore work in the Town of Barnstable. Marshalling and offshore construction activity has intensified throughout Year 2, with most of that work being staged from New Bedford.

- **Indirect Impacts:** Vineyard Wind's direct payroll and non-payroll expenditures have supported an additional 213 indirect jobs in Massachusetts during the Construction phase to date. These jobs supported $20.1 million in labor income, contributed $25.7 million in added value to the Massachusetts economy, and supported $123.1 million in new economic output during the Construction phase.
- **Induced Impacts:** The direct and indirect impacts induced an additional 305 jobs in Massachusetts that supported $22.9 million in labor income. Construction phase activities also contributed over $37.9 million in added value to the Massachusetts economy and supported $60.2 million in new economic output.
- **Total Impacts:** In total, Construction phase economic activity to date has supported 991 jobs in Massachusetts, $113.3 million in labor income, $170.7 million in value added, and 424.0 million in economic output.

Table 1. Direct, Indirect, and Induced Impacts, Construction Phase

Massachusetts Impact				
Construction Phase				
Impact Type	**Job Years**	**Labor Income**	**Value Added**	**Output**
Direct Effect	473	$ 70,225,095	$ 107,071,768	$ 240,804,191
Indirect Effect	213	$ 20,148,702	$ 25,674,995	$ 123,056,476
Induced Effect	305	$ 22,921,309	$ 37,948,404	$ 60,158,973
Total Effect	991	$ 113,295,106	$ 170,695,167	$ 424,019,641

Source: UMass Dartmouth from Implan

Total Project Impacts to Date (Development and Construction Phases)

Table 2 aggregates the impact data for the Development and Construction phases.

- **Indirect Impacts:** Vineyard Wind's direct payroll and non-payroll expenditures have supported an additional 350 indirect Massachusetts jobs during the project period. The project supported $31.7 million in labor income, contributed $42.5 million in added value to the Massachusetts economy, and supported $150.9 million in new economic output.
- **Induced Impacts:** The direct and indirect impacts induced an additional 556 Massachusetts jobs that supported $39.7 million in labor income. The project also contributed over $66.2 million in

[6] See Section 3.2 for a more detailed explanation of the distinction between direct, indirect, and induced impacts.

added value to the Massachusetts economy and supported $105.1 million in new economic output.

- **Total Impacts:** In total, the project to date has supported 1,657 jobs, $172.6 million in labor income, $66.2 million in value added, and $590.7 million in economic output.

Table 2. Total Project Impact to Date, Development & Construction Phases

Total Massachusetts Impact				
Total Project Impacts to Date				
Impact Type	**Job Years**	**Labor Income**	**Value Added**	**Output**
Direct Effect	751	$ 101,282,461	$ 141,157,270	$ 334,707,436
Indirect Effect	350	$ 31,654,226	$ 42,457,233	$ 150,877,800
Induced Effect	556	$ 39,680,528	$ 66,185,843	$ 105,083,246
Total Effect	1,657	$ 172,617,215	$ 249,800,346	$ 590,668,482

Source: UMass Dartmouth from Implan

Comparisons to 2017 PPC Estimates

The Public Policy Center (PPC) at UMass Dartmouth conducted an analysis in 2017 that described the economic contributions to employment and economic output that the proposed 800 MW Vineyard Wind 1 project would have on the Commonwealth of Massachusetts and the regional economy of Southeastern Massachusetts.

In its 2017 analysis, PPC estimated that the 800 MW Vineyard Wind 1 project would support an estimated 3,180 direct job years across all phases over the project period under the Base scenario and 3,658 direct job years in the High scenario for Massachusetts. This total includes 126 job years in the Development phase and 974 job years in the Construction phase (Base scenario) (see Table 3).[7]

Table 3. PPC Estimated Direct Job Years, Development & Construction Phase, 2017

	Development Phase	Construction Phase	Total Job Years
Base Scenario	126	974	1,100
High Scenario	126	1,426	1,552

Source: UMass Dartmouth Public Policy Center, 2017

[7] The PPC developed a Base and High scenario that varied by the assumed level of state and regional supply chain expenditures.

Construction Phase, Comparison to PPC Estimates

Table 4 presents the total impacts of the project to date on the Massachusetts economy, Importantly, the Construction phase is not complete, thus the impacts are expected to be lower than the PPC estimates, which included estimates for the full Construction period.

Direct Job Impacts

- The direct number of Construction phase job years is 473. This compares to the 2017 estimate of 974 job years, a difference of 501 job years.

Indirect and Induced Job Impacts

- **Indirect Impacts:** The number of indirect job years supported to date is 213. This compares to the 2017 estimate of 346 jobs-years, a difference of 133 job years.[8]
- **Induced Impacts:** The direct and indirect impacts of Construction phase activities have induced an additional 305 job years. This compares to the 2017 estimate of 777 job years, a difference of 472.

Economic Output Impacts

- Economic output is higher than the PPC estimates. This is primarily due to the increased cost of the project compared to the assumptions made in 2017.

Table 4. Construction Phase, Massachusetts Impacts
PPC Estimate Versus Actual

Massachusetts Impact				
Construction Phase				
	Job Years		**Output**	
Impact Type	**PPC 2017**	**Actual**	**PPC 2017**	**Actual**
Direct Effect	974	473	$ 148,485,739	$240,804,191
Indirect Effect	346	213	$ 68,758,340	$123,056,476
Induced Effect	777	305	$ 135,739,944	$ 60,158,973
Total Effect	2,097	991	$ 352,984,023	$424,019,641

Source: Estimate; Dartmouth PPC, 2017 (Base scenario). Current; UMass Dartmouth

[8] IMPLAN does not report jobs as FTEs. Accordingly, the reported jobs for the indirect and induced impacts were converted to FTEs using IMPLAN conversion tables.

Project to Date, Comparison to PPC Estimates

Table 5 presents the total impacts of the project to date on the Massachusetts economy (Development and Construction phases).

Direct Employment Impacts

- The direct number of job years is 751. This compares to the 2017 estimate of 1,100 job years, a difference of 349 jobs years.

Indirect and Induced Employment Impacts

- **Indirect Impacts:** The number of indirect job years supported to date is 350. This compares to the 2017 estimate of 373 jobs-years, a difference of 23 job years.[9]
- **Induced Impacts:** The direct and indirect impacts of project activities to date have induced an additional 556 job years. This compares to the 2017 estimate of 898 job years, a difference of 342 job years.

Economic Output Impacts

- Economic output is higher than the PPC estimates, again primarily due to the increased cost of the project compared to assumptions made in 2017, particularly during the Development phase.

Table 5. Construction Phase, Massachusetts Impacts
PPC Estimate Versus Actual

Massachusetts Impact				
Total Project to Date				
	Job Years		**Output**	
Impact Type	**PPC 2017**	**Actual**	**PPC 2017**	**Actual**
Direct Effect	1,100	751	$ 186,907,554	$334,707,436
Indirect Effect	373	350	$ 77,197,265	$150,877,800
Induced Effect	898	556	$ 169,965,557	$105,083,246
Total Effect	2,371	1,657	$ 434,070,376	$590,668,482

Source: Estimate; Dartmouth PPC, 2017 (Base scenario). Current; UMass Dartmouth

[9] IMPLAN does not report jobs as FTEs. Accordingly, the reported jobs for the indirect and induced impacts were converted to FTEs using IMPLAN conversion tables.

1 Overview

Vineyard Wind is currently building the nation's first utility-scale offshore wind energy project fifteen miles south of Martha's Vineyard. The Vineyard Wind 1 (VW1) project will consist of an array of 62 wind turbines, spaced 1 nautical mile apart, that will generate 800 megawatts (MW) of electricity and power over 400,000 homes.

Vineyard Wind's *Offshore Wind Development and Reporting Agreement* executed with the Massachusetts Department of Energy Resources (MA DOER) requires Vineyard Wind to deliver written annual progress reports that summarize the company's progress in achieving the goals set forth in Section 1 of the *Agreement*. Accordingly, this analysis utilizes job and expenditure data collected from 2017 through September 2023 to measure Vineyard Wind's progress in meeting the following eight requirements outlined in the *Agreement*:

(a) the total number of employees on Vineyard Wind Services LLC's payroll, as well as the number who reside in the Commonwealth and in which counties

(b) the total number of workers employed by subcontractors and vendors for Vineyard Wind 1 LLC, as well as the number who reside in the Commonwealth

(c) an estimate of the direct, indirect, and induced employment and economic impacts to date in Massachusetts from the Project

(d) the extent to which the reported results align with the estimates of the project's contributions to employment and economic development contained in the project proposal *Request For Proposals For Long-Term Contracts For Offshore Wind Energy Projects*

(e) any relevant lessons learned that Massachusetts officials can use to improve economic outcomes for Massachusetts and inform future state procurement and programmatic efforts

(f) the impact of projects supported by the Resiliency and Affordability Fund, specifically focusing on revenue generation and the impacts on the communities in which such projects are located

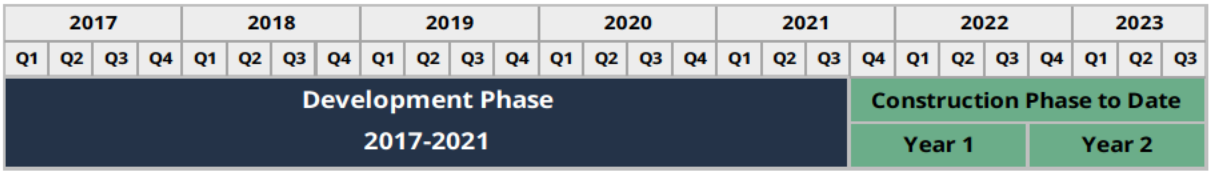
(g) how the community in Massachusetts party to a Host Community Agreement with Vineyard Wind has benefitted from the payments it received under such agreement

(h) the share of the Innovations in Marine Mammals Protection Fund spent in Massachusetts, which institutions received funding, and the projects supported

2 Project Phases and Dates Included In the Analysis

The Year 1annual monitoring report included job and expenditure estimates for the full Development phase (2017-2021). The Year 1 report also included estimates related to Construction phase jobs and expenditures from October 2021 through September 2021, although much of the construction-related activity up to that point had been focused on onshore work in the town of Barnstable. Marshalling and offshore construction began to ramp up in Q4 2022, with the bulk of the marshalling and offshore construction impacts beginning in Q2 2023. Accordingly, the current analysis includes two year-long construction periods: October 2021 through September 2022 and October 2022 through September 2023 (see Figure 6).

Figure 6. Project Phases Included in the Analysis



3 Data Collection and Methodology

3.1 Data Collection

Data collection to obtain job, expenditure, and other information from Vineyard Wind and its subcontractors began in earnest in October 2021, shortly following the project's financial close. Two primary data collection tools were developed and used to monitor relevant project activity:

1) An historical spreadsheet tracker to obtain Development-related job and expenditure data from 2017 to 2021. These data were the basis for the bulk of our first annual report.[10]

2) A monthly spreadsheet tracking template that Tier 1 contractors were required to submit monthly beginning in October 2021. These tracking templates were focused on Construction phase activities. Over 300 monthly reports were received from Tier1 contractors.

Development Phase Data Collection

From the outset, conversations with subcontractors made it clear that obtaining accurate historical data from all subcontractors would be difficult, particularly from smaller companies that were no longer working on the project. Consequently, Vineyard Wind and UMass Dartmouth focused their data collection efforts on obtaining detailed job and expenditure data from companies with contracts above $1 million (n=48), which represents 90.3% of the total contract value during the Development phase. These subcontractors were asked to provide their annual Massachusetts expenditures and counts of Massachusetts-based employees over the 2017-2021 period for activities that directly supported the Vineyard Wind 1 project. Thirty-five of the forty-nine subcontractors (69%) complied.

Construction Phase Data Collection

As noted, UMass Dartmouth and Vineyard Wind created a data collection spreadsheet that was completed monthly by the Tier 1 suppliers working on the project. The tracking sheet includes inputs for labor—both union and non-union—as well as nonpayroll expenditures by three geographic levels of analysis: the U.S., Massachusetts, and Southeastern Massachusetts. Subcontractor expenditures made by the Tier 1 suppliers, as well as various diversity, equity, and inclusion (DEI) data such as race, gender, tribal affiliation, and veteran status were also tracked. Tier 1 contractors also provided the same information for their larger Tier 2 contracts, while also providing the overall contract amounts for smaller Tier 2 and Tier 3 contractors.

[10] See https://www.vineyardwind.com/press-releases/2023/2/16/report-shows-vineyard-wind-far-exceeded-job-creation-and-economic-output-projections-during-development-and-early-construction-period

3.2 Economic Impact Methodology and Definitions[11]

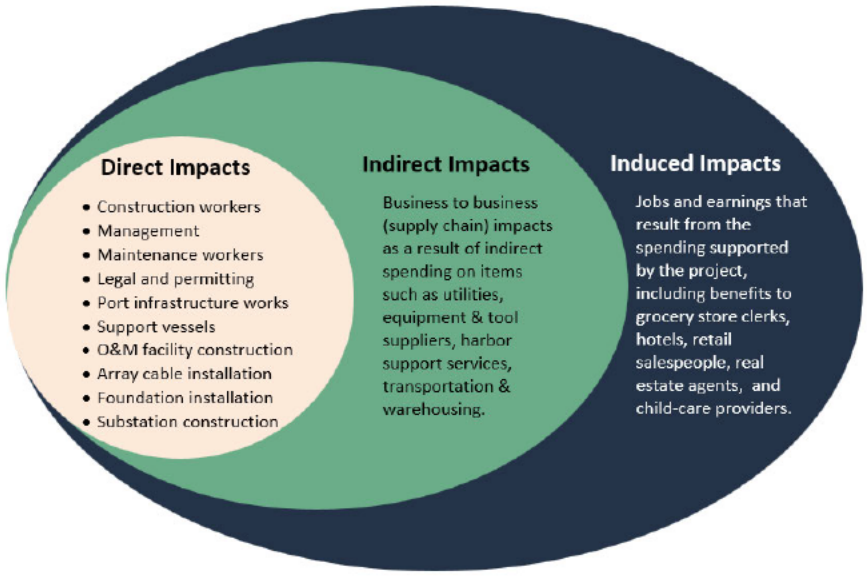
Economic impacts measure how spending associated with an industry circulates through and affects an economy. For example, employee wages and purchases made from suppliers circulate through the economy and support additional spending and job creation, that is, the original expenditures and job creation are multiplied. Measuring these ripple effects on the economy provides a fuller picture of the economic contributions an offshore wind farm's construction has on a particular region. These impacts are expressed as direct effects, indirect effects, and induced effects (see Figure 7).

- **Direct effects** result from expenditures associated with developing, constructing, and operating the wind farm, including money spent on salaries, supplies, and operating expenses. These are the data received directly from the contractors working on the project described in the previous section.

- **Indirect effects** result from the suppliers of the wind farm purchasing goods and services as a result of the direct spending on the project. Because these impacts measure interactions among businesses, they are often referred to as supply-chain impacts.[12] The indirect effects are specified using IMPLAN, which is an input-output database and model that traces a project's purchases of goods, services, and labor through an economic area.

- **Induced effects** result from the spending of employees directly involved in the development, construction, and operation of the wind farm, as well as the spending of employees of the wind farm's suppliers within the region (indirect effects). These induced effects are often referred to as consumption-driven impacts.

Figure 7. Examples of an Offshore Wind Project's Economic Effects



[11] More detail on the report's methodology can be found in Appendix A.
[12] Not including the initial round of spending, which is included in the direct effects.

3.3 Economic Impact Definitions

Economic impacts (i.e., direct, indirect, and induced) are presented in four categories: jobs, labor income, value added, and output.

Jobs

The labor needs of offshore wind developments are concentrated in Construction activities, which by their very nature are project based and not permanent. The actual number of workers on the project includes both full-time and part-time workers who may be on the project for several years, one-year, or less. For example, many of the union workers on the project work for only a month or less since individual construction workers frequently move from site-to-site and to other projects, and the number of workers on the project frequently changes based on the status of the construction project.

This makes estimating employment impacts somewhat less intuitive than in contexts where activities are ongoing and can be accurately defined as "permanent." Consequently, economic impact assessments of construction and other temporary project-based activities are typically reported in terms of the number of years of full-time work required. While less intuitive, this approach allows for more context sensitive and empirically accurate estimates of employment impacts. This is frequently misunderstood by some who reflexively and mistakenly assume construction projects last forever. To limit the chance of this misunderstanding and to provide the most complete and accurate reporting of job impacts possible, our analysis reports employment impacts in two ways – the number of workers employed on the project or headcount (whether part-time or full), and the number of job years of work associated with the project (FTE).

Labor Income

Labor Income is the sum of all payments made to employees, including wages, salaries, benefits, and payroll taxes, as well as payments received by self-employed individuals and unincorporated business owners across the defined economy.

Value Added

Value added is a measure of the contribution of a private industry or government sector to overall GDP. The components of value added consist of compensation of employees, taxes on production and imports less subsidies, and gross operating surplus.

Output

Output is the total value of a business's production and is the sum of the value of all goods and services produced by the business.

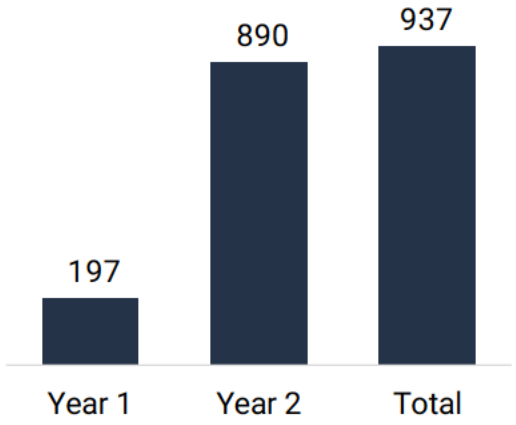
4 Construction Phase Workforce

4.1 Union Workforce – Headcount

This section highlights the number of union workers (headcount) and direct construction phase employment on the Vineyard Wind 1 project through September 2023. To date, there have been 937 unique workers employed during the Construction phase. Figure 8 presents union workers by the year in which they worked. Importantly, while some of the same workers may have worked in both Year 1 and Year 2, these jobs are only counted once in the total headcount (third bar in the chart) regardless if the union member worked in Year 1, Year 2, or both years. That is, the total headcount over the two-year period is not the sum of workers in Year 1 and Year 2.

Notably, data collection in the first two years of the project was undertaken in an environment where the project was ramping up very quickly, which resulted in incomplete reporting from some Tier 1 contractors, especially in Year 1 of the Construction phase. Consequently, the worker headcounts reported here should be considered conservative estimates.

Figure 8. Number of Union Jobs (Headcount) Over the Construction Period, by Year



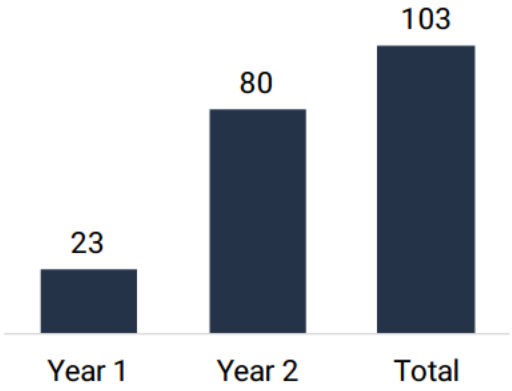
Source: UMass Dartmouth from monthly contractor reports

4.2 Union Job Years

In the first two years of the project there have been 103 total union job years during the Construction phase: 23 job years in Year 1 and 80 job years in Year 2 (see Figure 9).

As noted, the number of workers on the project includes both full-time and part-time workers who may be on the project for several years, one-year, or less. The seasonality of construction employment can also have a significant impact on the number of workers since construction work is heavily dependent on weather conditions. Construction both onshore and offshore is also governed by a series of commitments and regulations to protect communities and sensitive species which limit the times when construction can occur. This shrinks the construction season and leaves the project vulnerable to unexpected delays which can alter the timing of project employment.

Figure 9. Job Years
Over the Construction Period, by Year



Source: UMass Dartmouth from monthly contractor reports

The job year calculation also does not include overtime hours. The number of overtime hours is significant, accounting for:

- 10.4% of total hours worked in Year 1
- 21.7% of total hours worked in Year 2
- 19.4% of total hours worked over the two-year period

In fact, overtime hours accounted for 20% or greater of the total hours worked since February 2023. If overtime hours are included in the job year calculation, the number of job years increases to 25.8 in Year 1, 102.4 in Year 2, and 128.1 in total. Overtime hours are paid at time-and-a-half or double-time and consequently have a larger economic impact in comparison to regular hours.

Notably, a significant amount of overtime is expected to continue due to the intermittency of the working season combined with weather conditions that often dictate the project schedule. While these factors will not affect the number of workers on the job to a great degree, they will have an oversized impact on the economic impacts of the project since more overtime hours will be required.

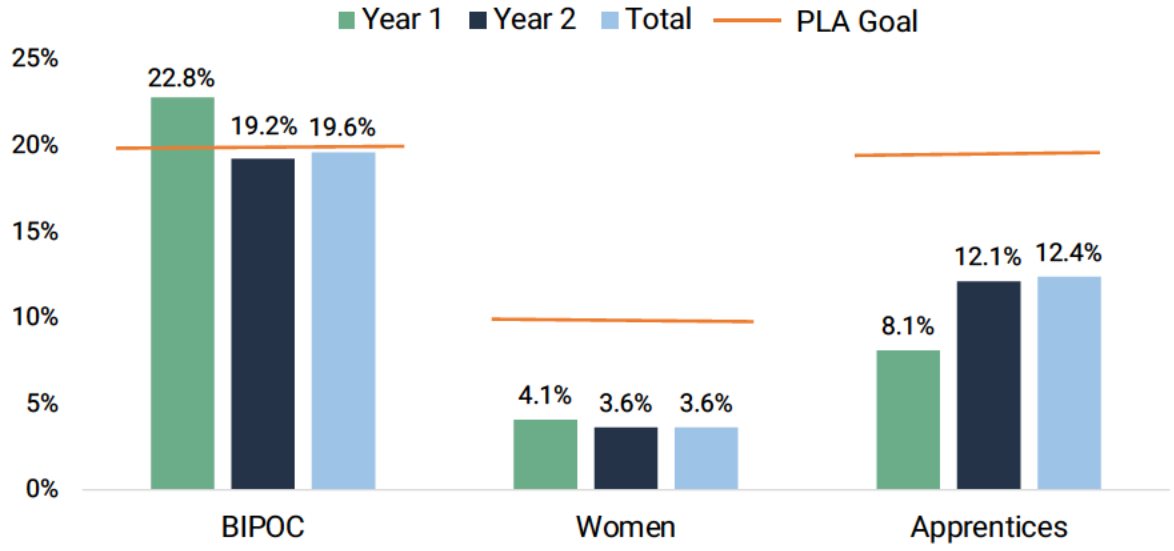
4.3 Diversity, Equity, and Inclusion Goals

Vineyard Wind's Project Labor Agreement (PLA) with its union contractors stipulate several hiring goals related to Diversity, Equity, and inclusion (DEI) as well as the number of apprentices on the project:

4. Black, Indigenous, and People of Color (BIPOC): 20% of total union jobs (headcount)
5. Women: 10% of total union jobs (headcount)
6. Apprentice: 1 in 5 union workers (headcount)

Just under twenty percent (19.6%) of union workers on the Vineyard Wind 1 project meet the BIPOC criteria, while women comprise only 3.6% of the union workforce on the project and 12.4% of workers were hired as apprentices (see Figure 10).[13]

Figure 10. Number of Union Workers Meeting PLA Goals



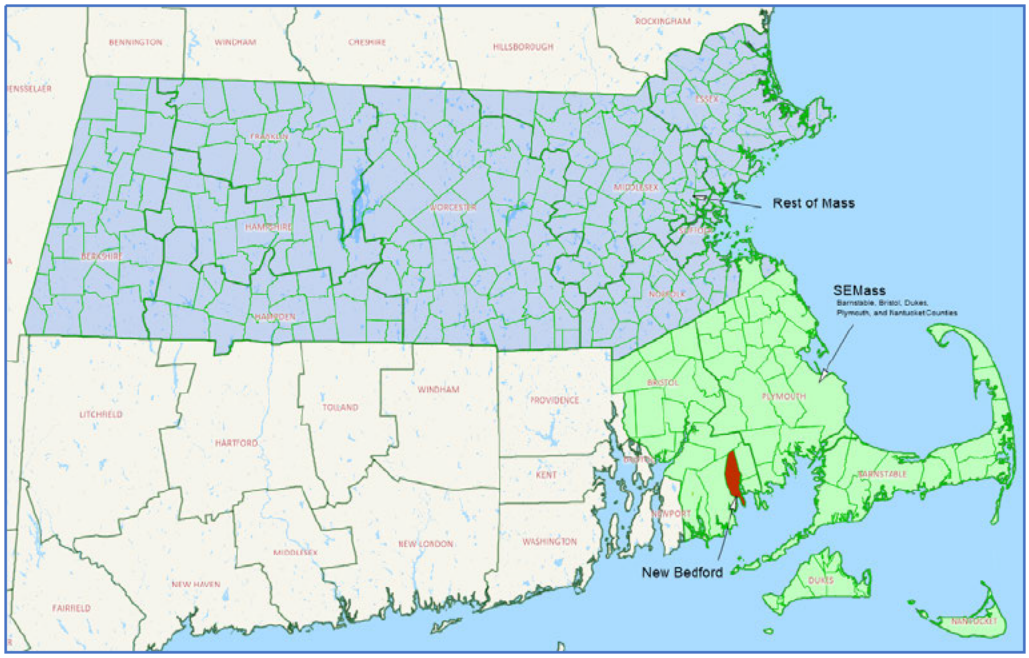
Source: UMass Dartmouth from monthly contractor reports

[13] BIPOC (Black, Indigenous, and people of color) is defined as any employee whose race is not White-alone.

4.4 Union Workers by Region

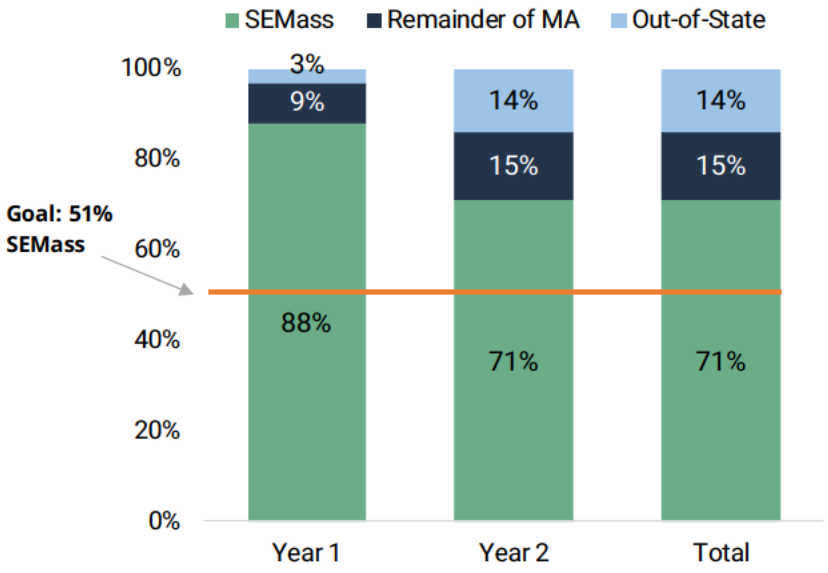
Workers' current residential ZIP Code was included in the monthly tracker template, which were then categorized into four regions: New Bedford, Southeastern Massachusetts (SEMass), remainder of Massachusetts, and out-of-state. SEMass is defined as including the counties of Barnstable, Bristol, Dukes, Nantucket, and Plymouth (see Figure 11).

Figure 11. Region Definitions



Vineyard Wind's set a goal of having 51% of workers on the project residing in Southeastern Massachusetts (SEMass). Over the two-year Construction phase to date, 88% of union workers were residents of SEMass (see Figure 12). In economic impact analysis, employment is determined by the location of the job rather than the individual's place of residence. Therefore, even if a worker is brought in from outside the region, they are still considered as "local" employment for the duration of their work. Thus, local employment in this report includes all employees on the job site, including workers who relocated to SEMass to work on the project. About 92 workers relocated to SEMass for the project. While counted as locals in economic impact terms, these workers obviously spend their income differently than longer-term residents. Accordingly, some modifications were made to the impact model to account for these relocated workers. See Appendix A for more detail.

Figure 12. Union Employee Place of Residence[14]



Source: UMass Dartmouth from monthly contractor reports

Nearly half of union workers reside in Plymouth County (46.0% of total Massachusetts-based workers) or are Cape Cod residents (3.4% of total Massachusetts-based workers), while 18.2% were Bristol County residents (see Table 6).

Table 6. Union Workers by Massachusetts County

County	Number	Percent
Barnstable	70	3.3%
Bristol	385	18.2%
Dukes	2	0.1%
Essex	14	0.7%
Hampden	3	0.1%
Middlesex	166	7.8%
Norfolk	272	12.8%
Plymouth	973	46.0%
Suffolk	156	7.4%
Worcester	76	3.6%

Source: UMass Dartmouth from monthly contractor reports

Counties highlighted in green are in SEMass

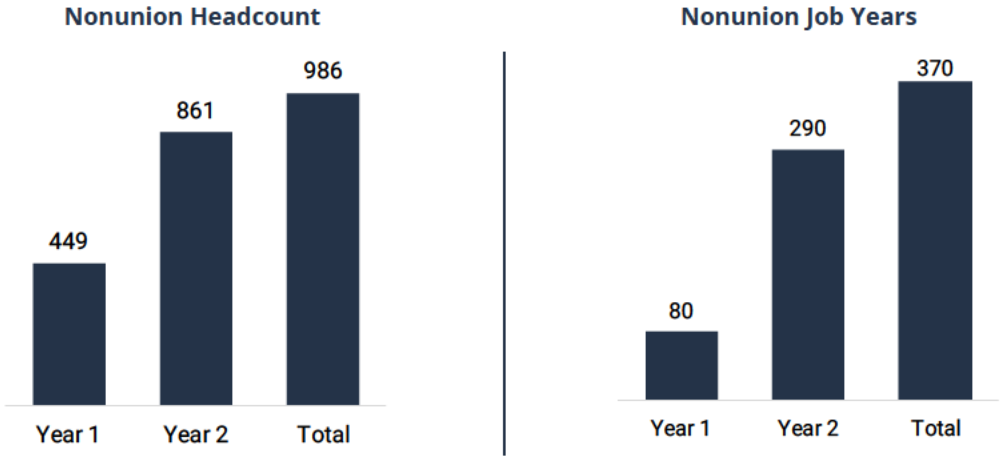
[14] While some of the same workers may have worked in both Year 1 and Year 2, these jobs are only counted once in the total headcount (third bar in the chart) regardless if the union member worked in Year 1, Year 2, or both years.

4.5 Nonunion Workforce – Headcount and Job Years

This section highlights the number of nonunion workers (headcount) and job years directly employed on the Vineyard Wind 1 project over the two-year Construction phase period. To date, there have been 986 individual workers employed during the Construction phase: 449 in Year 1 and 861 in Year 2 (see Figure 13).

Figure 13 also presents the number of job years, with 80 job years in Year 1, 290 in Year 2, and 370 in total over the two-year Construction phase. Similar to the union worker headcount, while some of the same workers may have worked in both Year 1 and Year 2, these jobs are only counted once in the total headcount (third bar in the chart) regardless if the employee worked in Year 1, Year 2, or both years.

Figure 13. Nonunion Workforce, Headcount and Job Years

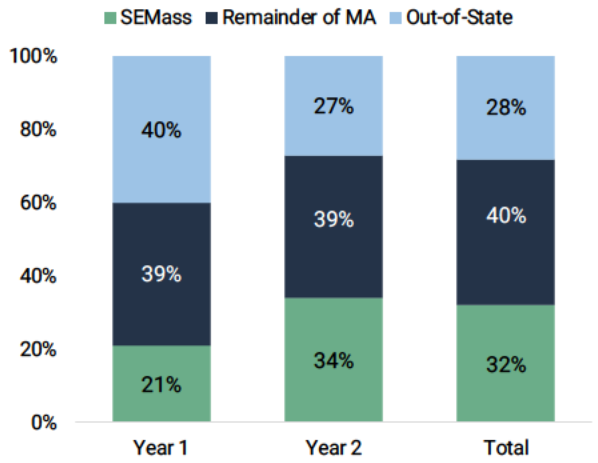


Source: UMass Dartmouth from monthly contractor reports

4.6 Nonunion Worker Residence

Thirty-two percent (32%) of nonunion workers over the Construction phase were residents of SEMass (see Figure 14). Forty percent (40%) reside in other areas of Massachusetts, while 28% reside out-of-state.

Figure 14. Nonunion Employee Place of Residence



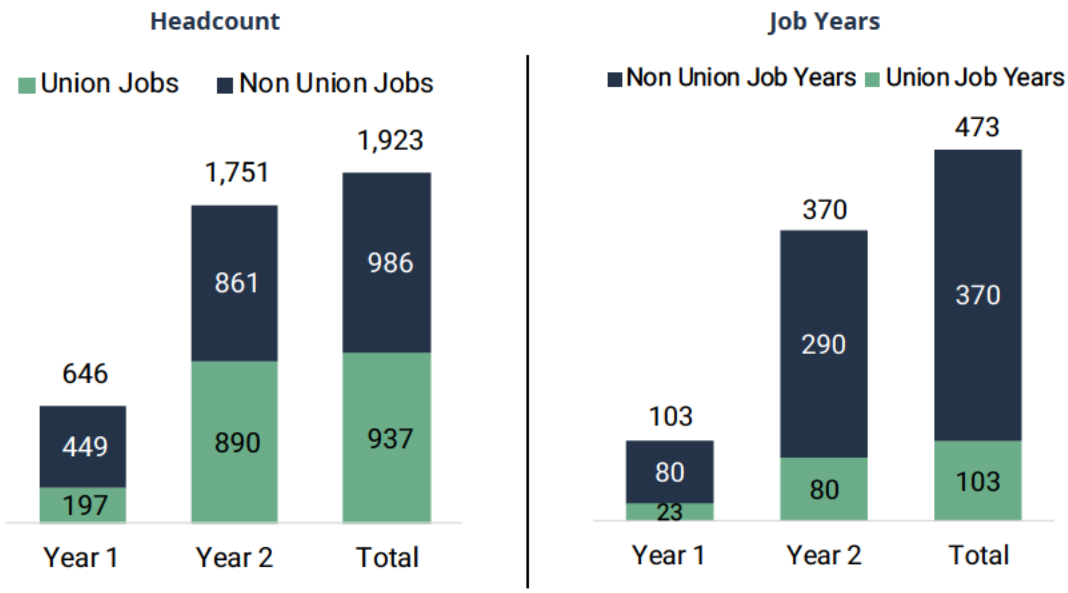
Source: UMass Dartmouth from monthly contractor reports

4.7 Total Union and Nonunion Employment, Headcount and Job Years

Total Jobs (Headcount)

Figure 15 displays the number (headcount) of reported union and non-union jobs (headcount) and job years. The total number of workers during the Construction phase rose significantly from 646 in year 1 to 1,751 in Year 2, for a total of 1,923 individual workers on the project. The number of job years also increased considerably from Year 1 (103) to Year 2 (370), for a total of 473 job years over the two-year construction phase.

Figure 15. Total Jobs, Headcount and Job Years[15]



Source: UMass Dartmouth from monthly contractor reports

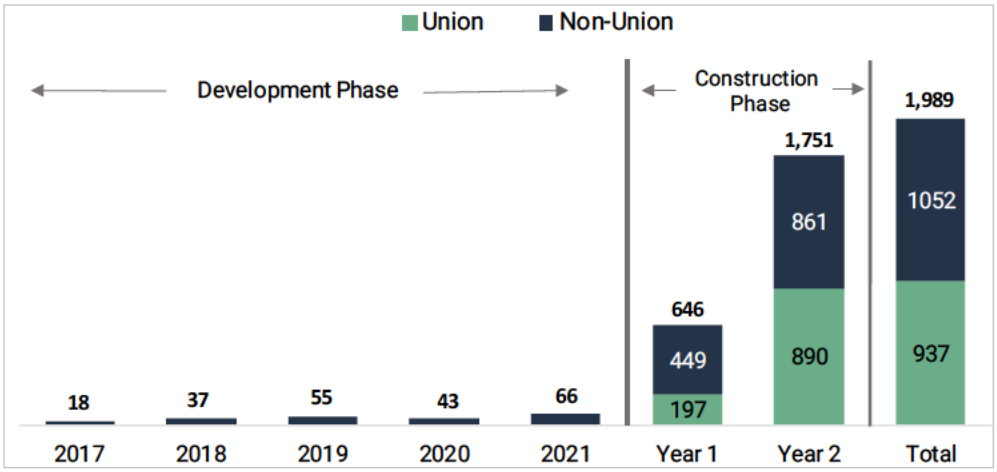
[15] As noted, while some of the same workers may have worked in both Year 1 and Year 2, these jobs are only counted once in the total headcount (third bar in the chart) whether the union member worked in Year 1, Year 2, or both years.

5 Development and Construction Phase Employment

5.1 Union and Nonunion Headcount and Job Years

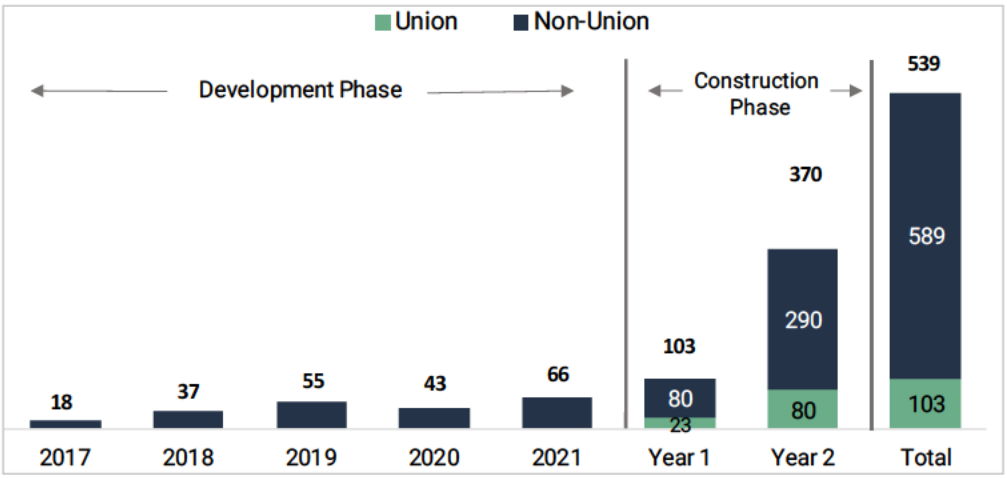
Figure 15 presents the worker headcount since the Vineyard Wind 1 Development phase began in 2017.[16] A total of 1,989 workers have been employed on the project since 2017. This is a conservative estimate based on incomplete reporting from some contractors during the early phases of project work.[17] Figure 17 details the total number of job years by phase and year since development work on the project work began in 2017.

Figure 16. Jobs (Headcount), Development & Construction Phases



Source: Vineyard Wind Services Historical and Monthly Tracker Submissions

Figure 17. Job Years, Development & Construction Phases



Source: Vineyard Wind Services Historical and Monthly Tracker Submissions

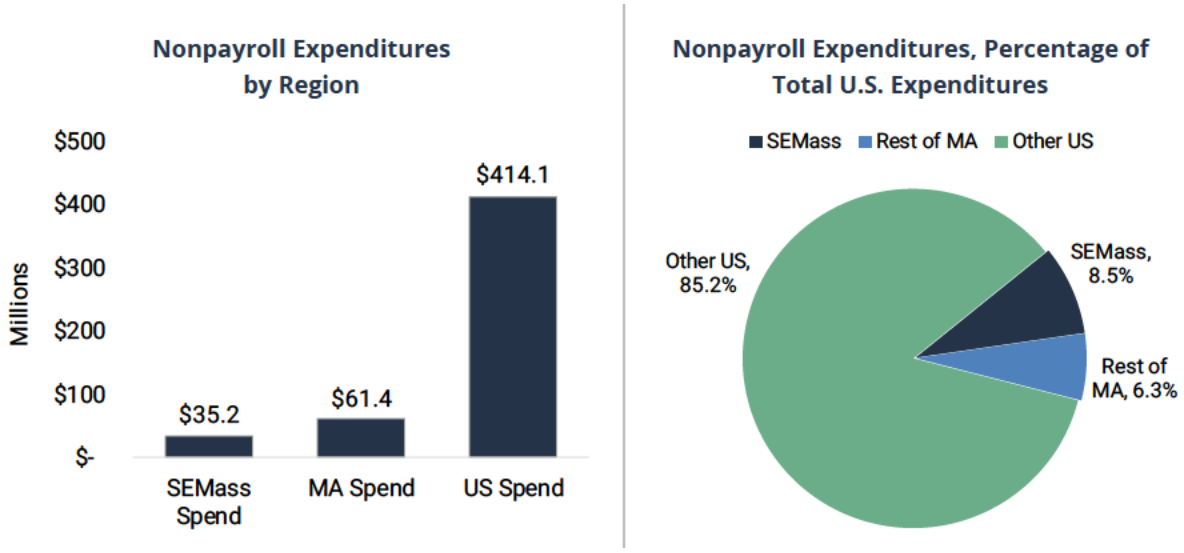
[16] See the Year 1 Annual Report for more details on Development Phase employment.
[17] The total (last bar) represents the number of individual workers over the seven-year period, not the sum of the previous bars. That is, there have been 1,989 unique workers on the project since 2017. Some of these workers may have been employed on the project in multiple years.

6 Direct Expenditures

6.1 Nonpayroll Expenditures

Vineyard Wind's contractors made a total of $35.2 million in nonpayroll expenditures to SEMass businesses during the Construction phase and $61.4 million in Massachusetts as a whole. Massachusetts expenditures accounted for 14.8% of total US expenditures (8.5% in SEMass and 6.3% in other areas of the state) over this period (see Figure 18).

Figure 18. Nonpayroll Expenditures by Region, Construction Phase



Source: UMass Dartmouth from monthly contractor reports. Includes Tier 1 contractor reported spend from monthly reports and Tier 2 and Tier 3 contractor spend estimated from Implan based on subcontractor amounts from Tier 1 reports

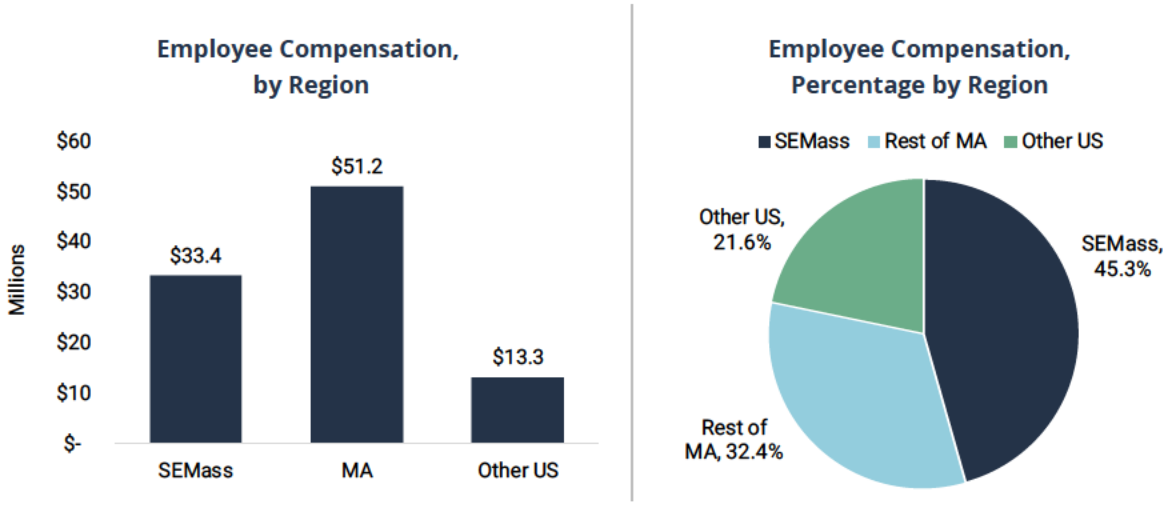
6.2 Payroll Expenditures

Massachusetts residents working on the project received a total of $51.2 million in employee compensation over the two-year Construction period. More than $33.4 million of this amount was earned by SEMass residents.[18] SEMass accounted for 45.3% of total employee compensation over the two-year period. The remaining portion of Massachusetts workers accounted for 32.4% of employee compensation and workers outside the state accounted for 21.6% (see Figure 19).[19]

[18] The state total includes SEMass.

[19] Employee compensation includes wages and benefits. Employee compensation was estimated by utilizing actual wage and benefit data detailed in each union's prevailing wage schedule. Employee compensation for nonunion workers was estimated utilizing Massachusetts occupational wage data from Lightcast and the Bureau of Labor Statistics. All union workers are considered local on the project and therefore all employee compensation for union workers is included in the Massachusetts total. Conversely, nonunion employee compensation includes compensation for Massachusetts-based workers only. Employees without a ZIP Code were categorized as out-of-state.

Figure 19. Union and Nonunion Employee Compensation by Region, Construction Phase

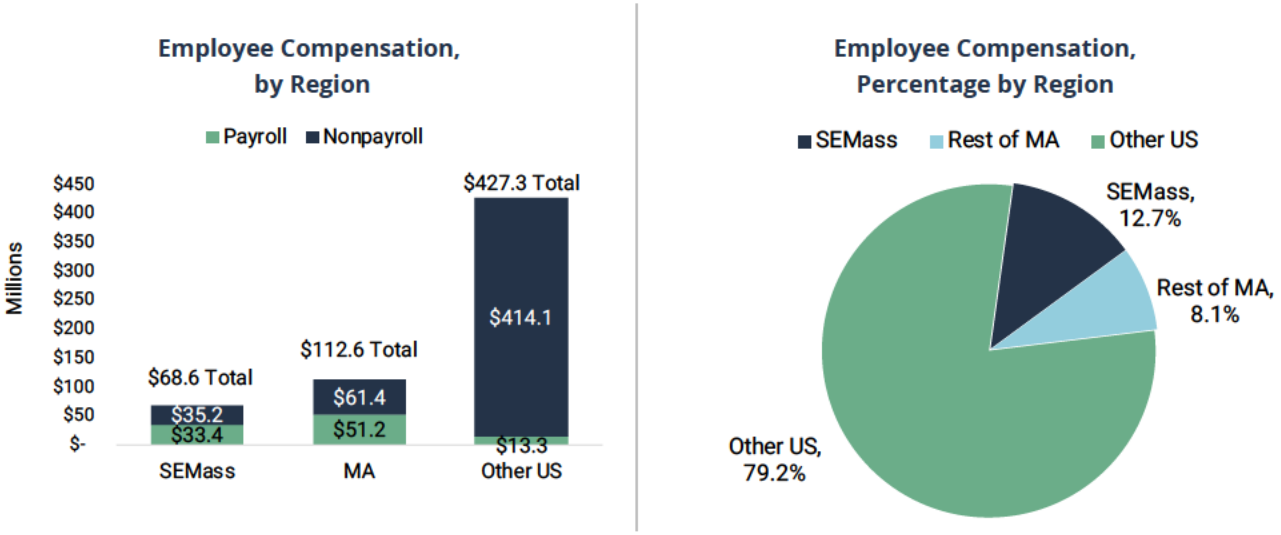


Source: UMass Dartmouth from monthly contractor reports, Emsi, and prevailing wage data by union

6.3 Total Payroll and Nonpayroll Expenditures

Total payroll and nonpayroll expenditures in Massachusetts were $112.6 million. In all, Massachusetts accounted for 20.8% of total U.S. expenditures over the two-year period (12.7% in SEMass and 8.1% in other areas of the state) (see Figure 20).

Figure 20. Total Payroll and Nonpayroll Expenditures by Region, Construction Phase



Source: UMass Dartmouth from monthly contractor reports

7 Economic Impacts on the Massachusetts Economy

This section expands on the direct impacts by examining the broader economic impact of the project activities in the Development and Construction phases.

7.1 Development Phase Impacts, 2017-2021

The data in Table 7 revisit the results of our first annual report, which focused primarily on the Development phase. Results from the year-one analysis included:

- **Indirect Impacts:** Vineyard Wind's direct payroll and non-payroll expenditures supported an additional 137 indirect jobs during the Development phase. These jobs supported $11.5 million in labor income, contributed $16.8 million in added value to the Massachusetts economy, and supported $27.9 million in new economic output during the Development phase.
- **Induced Impacts:** The direct and indirect impacts induced an additional 251 jobs that supported $16.8 million in labor income. Development phase activities also contributed over $28.2 million in added value to the Massachusetts economy and supported $44.9 million in new economic output.
- **Total Impacts:** In total, Development phase economic activity supported 666 jobs, $59.3 million in labor income, $79.1 million in value added, and $166.6 million in economic output.

Table 7. Direct, Indirect, and Induced Impacts, Development Phase

Massachusetts Impact				
Development Phase (2017 - 2021)				
Impact Type	**Job Years**	**Labor Income**	**Value Added**	**Output**
Direct Effect	278	$ 31,057,366	$ 34,085,502	$ 93,903,244
Indirect Effect	137	$ 11,505,524	$ 16,782,238	$ 27,821,324
Induced Effect	251	$ 16,759,219	$ 28,237,439	$ 44,924,273
Total Effect	666	$ 59,322,109	$ 79,105,179	$ 166,648,841

Source: UMass Dartmouth from Implan

7.2 Construction Phase Impacts

Table 8 presents the impacts of Construction phase activities to date. Note that much of the Construction phase activity in Year 1 was focused on onshore work in the Town of Barnstable. Marshalling and offshore construction activity has intensified throughout Year 2, with most of that work being staged from New Bedford.[20]

- **Indirect Impacts:** Vineyard Wind's direct payroll and non-payroll expenditures have supported an additional 213 indirect jobs during the Construction phase to date. These jobs supported $20.1 million in labor income, contributed $25.7 million in added value to the Massachusetts economy, and supported $123.1 million in new economic output during the Construction phase.
- **Induced Impacts:** The direct and indirect impacts induced an additional 305 jobs that supported $22.9 million in labor income. Construction phase activities also contributed over $37.9 million in added value to the Massachusetts economy and supported $60.2 million in new economic output.
- **Total Impacts:** In total, Construction phase economic activity to date has supported 991 jobs, $113.3 million in labor income, $170.7 million in value added, and 424.0 million in economic output.

Table 8. Direct, Indirect, and Induced Impacts, Construction Phase

Massachusetts Impact				
Construction Phase				
Impact Type	**Job Years**	**Labor Income**	**Value Added**	**Output**
Direct Effect	473	$ 70,225,095	$ 107,071,768	$ 240,804,191
Indirect Effect	213	$ 20,148,702	$ 25,674,995	$ 123,056,476
Induced Effect	305	$ 22,921,309	$ 37,948,404	$ 60,158,973
Total Effect	991	$ 113,295,106	$ 170,695,167	$ 424,019,641

Source: UMass Dartmouth from Implan

[20] The job impacts are presented in job years, not number of jobs (headcount). As noted earlier, the total number of Construction phase individual workers (headcount) on the project to date is 1,927 workers.

7.3 Total Project Impact to Date

Table 9 aggregates the data in the previous two tables to present the total impacts of the Vineyard Wind 1 project through September 2023.

- **Indirect Impacts:** The project's direct payroll and non-payroll expenditures have supported an additional 350 indirect jobs during the project period. The project supported $31.7 million in labor income, contributed $42.5 million in added value to the Massachusetts economy, and supported $150.9 million in new economic output.
- **Induced Impacts:** The direct and indirect impacts induced an additional 556 jobs that supported $39.7 million in labor income. The project also contributed over $66.2 million in added value to the Massachusetts economy and supported $105.1 million in new economic output.
- **Total Impacts:** In total, the project to date has supported 1,657 jobs, $172.6 million in labor income, $66.2 million in value added, and $590.7 million in economic output.

Table 9. Direct, Indirect, and Induced Impacts, Total Project Impacts to Date

Total Massachusetts Impact				
Total Project Impacts to Date				
Impact Type	**Job Years**	**Labor Income**	**Value Added**	**Output**
Direct Effect	751	$ 101,282,461	$ 141,157,270	$ 334,707,436
Indirect Effect	350	$ 31,654,226	$ 42,457,233	$ 150,877,800
Induced Effect	556	$ 39,680,528	$ 66,185,843	$ 105,083,246
Total Effect	1,657	$ 172,617,215	$ 249,800,346	$ 590,668,482

Source: UMass Dartmouth from Implan

8 Comparison to UMass Dartmouth Public Policy Center 2017 Estimates

The Public Policy Center (PPC) at UMass Dartmouth conducted an analysis in 2017 that described the economic contributions to employment and economic output that the proposed 800 MW Vineyard Wind 1 project would have on the Commonwealth of Massachusetts and the regional economy of Southeastern Massachusetts. The analysis was undertaken in response to inquiries contained in the *Request for Proposals for Long-Term Contracts for Offshore Wind Energy Projects (RFP)* issued by the state's four electric distribution companies in coordination with the Massachusetts Department of Energy Resources (DOER).

In its 2017 analysis, PPC estimated that the 800 MW Vineyard Wind 1 project would support an estimated 3,180 direct job years across all phases over the project period under the Base scenario and 3,658 direct job years in the High scenario for Massachusetts. This total includes 126 job years in the Development phase and 974 job years in the Construction phase (Base scenario) (see Table 10).[21]

Table 10. PPC Estimated Direct Job Years, Development & Construction Phase, 2017

	Development Phase	Construction Phase	Total Job Years
Base Scenario	126	974	1,100
High Scenario	126	1,426	1,552

Source: UMass Dartmouth Public Policy Center, 2017

This section compares the extent to which the results reported here compare with the estimates of the project's contributions to employment and economic development contained in the 2017 UMass Dartmouth analysis and included as part of Vineyard Wind's proposal submission to DOER.

8.1 Development Phase

As noted in last year's annual report, the expected impacts are larger in 2022 than expected in 2017 on every dimension of the economic impact of the project to date (see Table 11 and Figure 21). The larger impact is primarily due to the two-year federal permitting delay and expanded project envelope that extended the Development phase beyond the initial expectation. The economic impact of future projects may be closer to initial estimations as project development becomes more streamlined and predictable.

Direct Employment Impacts

- The direct number of Development phase job years is 278. This compares to the 2017 estimate of 126 job years, a difference of 152 jobs.
- In all, the total job impact of Development phase activities is 666. This compares to the 2017 estimate of 274 jobs, a difference of 392 jobs.

[21] The PPC developed a Base and High scenario that varied by the assumed level of state and regional supply chain expenditures.

Indirect and Induced Employment Impacts

- **Indirect Impacts:** Vineyard Wind's direct payroll and non-payroll expenditures supported an additional 137 indirect job years during the Development phase. This compares to the 2017 estimate of 27 jobs, a difference of 110 jobs.[22]
- **Induced Impacts:** The direct and indirect impacts of the proposed project induced an estimated additional 251 jobs during the Development phase. This compares to the 2017 estimate of 121 jobs, a difference of 130 jobs.

Economic Output Impacts

- Economic output values are also much higher than the 2017 estimates. For example, total economic output (direct + indirect + induced) is estimated to be $166.6 million, which compared to $81.1 million in the 2017 estimate, a difference of $85.5 million.

Table 11. Development Phase
Massachusetts Impacts, PPC Estimate Versus Actual

Massachusetts Impact				
Development Phase				
	Job Years		Output	
Impact Type	PPC 2017	Actual	PPC 2017	Actual
Direct Effect	126	278	$ 38,421,815	$ 93,903,244
Indirect Effect	27	137	$ 8,438,925	$ 27,821,324
Induced Effect	121	251	$ 34,225,613	$ 44,924,273
Total Effect	274	666	$ 81,086,353	$166,648,841

Source: Estimate; Dartmouth PPC, 2017 (Base scenario). Current; UMass Dartmouth

Figure 21. Development Phase, Total Massachusetts Economic Impacts
UMass Dartmouth Estimate Versus Actual

Source: Estimate; UMass Dartmouth Public Policy Center (2017). Current; UMass Dartmouth and Vineyard Wind

[22] IMPLAN does not report jobs as FTEs. Accordingly, the reported jobs for the indirect and induced impacts were converted to FTEs using IMPLAN conversion tables.

8.2 Construction Phase

The 2017 estimates were designed to gauge the economic impact of the complete construction phase of the project, including economically meaningful project activities that are expected in 2024. What follows documents the impact of project related construction activities through September 2023 only.[23] Accordingly, comparisons to 2017 should be interpreted with caution and understood as a progress report rather than a true "apples to apples" comparison.

Direct Employment Impacts

- The direct number of Construction phase job years is 473. This compares to the 2017 estimate of 974 job years, a difference of 501 jobs years.

Indirect and Induced Employment Impacts

- **Indirect Impacts:** The number of indirect job years supported to date is 213. This compares to the 2017 estimate of 346 jobs-years, a difference of 133 job years.[24]
- **Induced Impacts:** The direct and indirect impacts of Construction phase activities have induced an additional 305 job years. This compares to the 2017 estimate of 777 job years, a difference of 472.

Economic Output Impacts

- Economic output to date is significantly higher than the PPC estimates. This reflects the impact of inflation and project costs, both of which have been much higher than could have been foreseen in 2017.

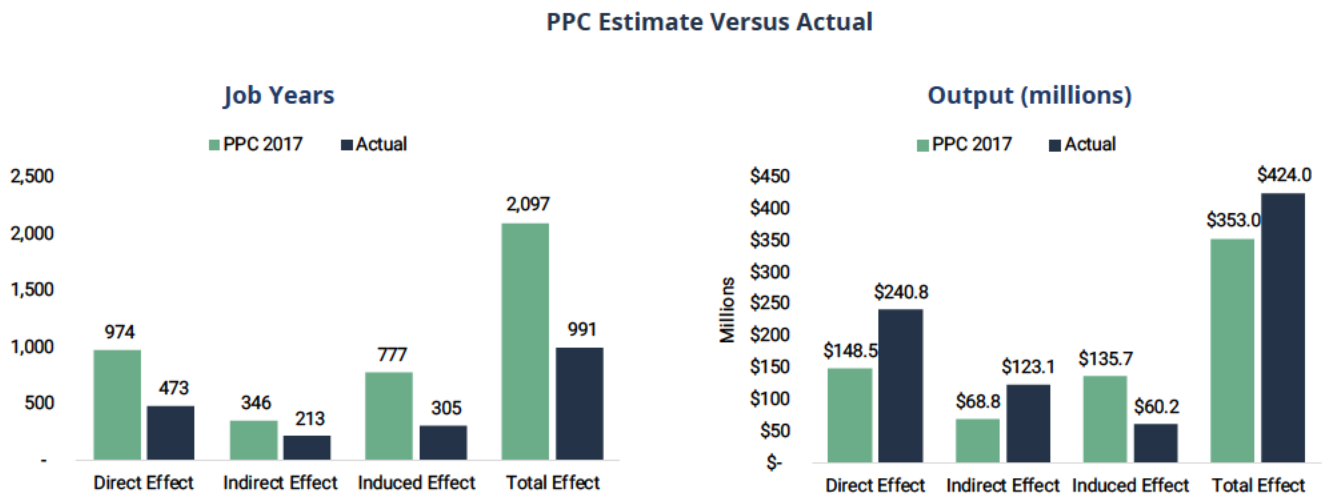
Table 12. Construction Phase, Massachusetts Impacts
PPC Estimate Versus Actual

Massachusetts Impact				
Construction Phase				
	Job Years		**Output**	
Impact Type	**PPC 2017**	**Actual**	**PPC 2017**	**Actual**
Direct Effect	974	473	$ 148,485,739	$240,804,191
Indirect Effect	346	213	$ 68,758,340	$123,056,476
Induced Effect	777	305	$ 135,739,944	$ 60,158,973
Total Effect	2,097	991	$ 352,984,023	$424,019,641

Source: Estimate; Dartmouth PPC, 2017 (Base scenario). Current; UMass Dartmouth

Figure 22. Construction Phase Massachusetts Impacts

[23] Note again that the job impacts are presented in job years, not number of jobs (headcount).
[24] IMPLAN does not report jobs as FTEs. Accordingly, the reported jobs for the indirect and induced impacts were converted to FTEs using IMPLAN conversion tables.



Source: Estimate; Dartmouth PPC, 2017 (Base scenario). Current; UMass Dartmouth

8.3 Total Impact of the Project to Date

Table 13 and Figure 23 present project outcomes through September 2023 and should be understood as a progress report. Construction activity will continue in 2024 and the full impact of the Construction phase will not be known before that phase is complete.

Direct Employment Impacts

- The direct number of job years is 751. This compares to the 2017 estimate of 1,100 job years, a difference of 349 jobs years.

Indirect and Induced Employment Impacts

- **Indirect Impacts:** The number of indirect job years supported to date is 350. This compares to the 2017 estimate of 373 jobs-years, a difference of 23 job years.[25]
- **Induced Impacts:** The direct and indirect impacts of project activities to date have induced an additional 556 job years. This compares to the 2017 estimate of 898 job years, a difference of 342 job years.

Economic Output Impacts

- Economic output is higher than the PPC estimates. Again, this is primarily due to the increased cost of the project compared to assumptions made in 2017, particularly during the Development phase.

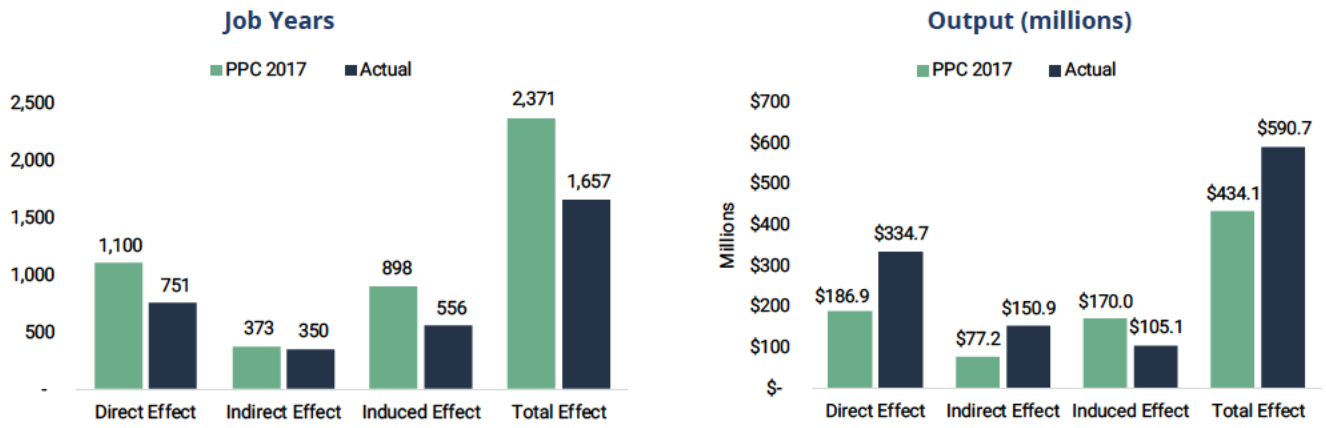
[25] An FTE assumes 2080 hours of work in a year. IMPLAN does not report jobs as FTEs. Accordingly, the reported jobs for the indirect and induced impacts were converted to FTEs using IMPLAN conversion tables.

Table 13. Construction Phase, Massachusetts Impacts
PPC Estimate Versus Actual

Massachusetts Impact				
Total Project to Date				
	Job Years		**Output**	
Impact Type	**PPC 2017**	**Actual**	**PPC 2017**	**Actual**
Direct Effect	1,100	751	$ 186,907,554	$334,707,436
Indirect Effect	373	350	$ 77,197,265	$150,877,800
Induced Effect	898	556	$ 169,965,557	$105,083,246
Total Effect	2,371	1,657	$ 434,070,376	$590,668,482

Source: Estimate; Dartmouth PPC, 2017 (Base scenario). Current; UMass Dartmouth

Figure 23. Construction Phase Massachusetts Impacts
PPC Estimate Versus Actual



Source: Estimate; Dartmouth PPC, 2017 (Base scenario). Current; UMass Dartmouth

9 Lessons Learned to Date and Research Related Recommendations

This section highlights several relevant lessons learned while conducting this research that Massachusetts officials can use to support efforts to improve economic outcomes for Massachusetts and inform future state procurement and related programmatic efforts.

Over the course of the past two years there have been two durable lessons that we have learned that improve our understanding of the statewide and regional impact of the Vineyard Wind 1 project. Both can be classified as unintended consequences of otherwise positive conditions.

9.1 Consequences of the Project Labor Agreement

The Construction work is being performed under a Project Labor Agreement (PLA) with much of the construction labor provided by local unions. A PLA specifies the wages, overtime wages, and fringe benefits to be paid on a project and is usually higher than the prevailing wage required on public projects. While the PLA has resulted in hundreds of local union workers performing work on the project with wages that meet or exceed prevailing wage, it also narrows the number of contractors that are eligible to execute contracts on the construction portion of the project to those that employ union labor.

In a recent report prepared for Vineyard Wind and the Massachusetts Clean Energy Center (MassCEC) Greentree Consulting LLC (Greentree) identified several lessons learned through the VW1 "Meet the Buyer" initiative.[26] The initiative was designed to connect local companies to key project partners and make them aware of competitive opportunities to directly benefit as subcontractors or suppliers. They identified several issues that make it difficult to make these connections. As they described it:

> *Open lists of union hall members are not easily available or accessible without membership, therefore making it difficult to quickly identify local unionized suppliers. Another challenge is to identify minority companies. Greentree did make use of the MA Certified SBA Directory, but this directory does not include any union affiliation. Nor does this list include any industry classifications, to filter the suppliers relative to offshore wind supply chain. Not impossible, but it does require more targeted research and outreach to further filter and identify union and minority suppliers.*

Greentree also noted that "buyers" (tier one contractors on the project) commented that they met several qualified suppliers, but they were not union, which would be problematic to work on Vineyard Wind 1. To the extent that a given region or community does not have a ready supply of available union construction firms, a PLA limits available contractors to the available pool of union firms. This is not an uncommon challenge in regions that do not have many large construction projects. As the industry moves forward, understanding whether PLAs will be common industry practice will allow local companies to determine whether becoming a union employer will provide better business opportunities in this sector.

Moving forward, the available supply chain directories should include information about whether a local company is signatory to unions and therefore eligible to work under a PLA.

[26] Vineyard Wind Meet-The-Buyer Initiative, Overview And Lessons Learned. Greentree Consulting, LLC.

9.2 Recruiting a Local and Diverse Workforce In a Very Tight Labor Market Is Difficult

The Vineyard Wind 1 project is being developed during a period where the state and nation are at or near record lows in unemployment. In an otherwise extremely tight regional labor market, the competition for labor in the construction and building trades sector has been particularly intense.
it is very difficult to persuade workers to pursue a new career and complete specialized training and certification in an environment where jobs paying competitive wages with no such requirements are readily available.

Additionally, small delays in the project can have cascading effects on whether local workers in the training pipeline end up working on the Vineyard Wind 1 or one of the many other traditional shoreside projects that require workers with their skills and that allow them to start work and begin earning a wage immediately. A delay as short as a week (due to weather or one of the many reasons an offshore project may face a short-term delay) can mean that the workforce who intended to perform the job seeks work elsewhere and then is unavailable to go offshore when the project is ready. Due to the relatively small workforce that has the full offshore capabilities and limited industry-specific training capacity, it is very difficult to train backup workers with short notice.

Going forward, future projects should be able to learn from these lessons and benefit from the larger supply of work-ready workers in the region who are now working in construction and building trades sector, even if not currently employed supporting offshore wind. If ongoing workforce development efforts are successful, this means that the local impact of future projects can be expected to be larger.

10 Resiliency and Affordability Fund

Vineyard Wind has established the Resiliency and Affordability Program (RAP) in Partnerships with Citizens Energy Corporation and Vineyard Power Development Fund, Inc.[27] Vineyard Wind will contribute $15 million in total funding to the RAP with the funding to be used by the program partners to support the development of distributed battery energy storage and solar projects in local host communities as well as to provide credits directly to low-income ratepayers' electric utility bills. The RAP is focused on supporting projects and delivering benefits to low-income ratepayers in New Bedford, Martha's Vineyard, Nantucket, Barnstable, and Somerset as well as to the Mashpee Wampanoag Tribe and Wampanoag Tribe of Gay Head (Aquinnah).

The RAP is in its second year and, although no resiliency projects have been funded, Citizens Energy continues to enroll low-income ratepayers from cities/towns in the CE Geographic Region into the low-income community solar program, Joe-4-Sun (J4S). J4S leverages the Massachusetts SMART program to operate low-income community shared solar projects that generate solar bill credits that are used to lower electricity bills for low-income households. Regular J4S customers receive a 50% discount on bill credits (by far the highest discount offered in the SMART program), while the VW RAP program offers eligible and enrolled customers a 100% discount on the bill credits.

At the time of reporting, 191 RAP participants were enrolled in the J4S program, a 133% increase over last year, with another 171 in the process of being enrolled, a 99% increase vs last year. Overall, this represents a year-over-year increase of 194 RAP participants. Based on the program, each household is expected to

[27] Vineyard Power Development Fund, Inc. is an affiliate entity of Vineyard Power Cooperative, Vineyard Wind's community benefits partner on Martha's Vineyard.

receive about $600 in electricity bill savings. Given the program's current capacity and remaining availability to subscribers, Citizens was able to link customers' bill savings to their household electricity consumption, providing greater benefit to RAP participants who need it most. Over the past twelve months, the participants have received about $190,000 in electricity bill savings, with half of that, $95,000, provided by the RAP funds, an average of $778 per household over that timeframe. This is not a direct calculation as the # of participants has been increasing each month, but it is an average savings per RAP participant.

It should be noted that as RAP participant enrollment continues to increase, the total $-value of bill credits allocated to each household will be adjusted to accommodate the number of enrollees while staying within the allowable budget. However, the basic construct will remain – that is, the RAP will pay for the customer's remaining 50% share of the bill credits. Based on the current enrollment, the households enrolled in the program should collectively experience annual electricity bill savings of $217,200, with half of the savings supported RAP funds.

Table 12. Joe-4-Sun Program Participation

Community	# Participants	# In Process of Enrolling	Total
Barnstable	26	36	62
Martha's Vineyard	14	11	25
Nantucket *	0	0	0
New Bedford	87	65	152
Somerset	26	24	50
Tribes**	38	35	73
Total	191	171	362

* Nantucket is not currently eligible for J4S program due to no Citizens solar projects in Nantucket territory
** Tribes includes Mashpee Wampanoag Tribe and Aquinnah Tribe of Gay Head

11 Host Community Agreements

Vineyard Wind entered into a Host Community Agreement (HCA) with the Town of Barnstable in October 2018. The HCA requires Vineyard Wind to make annual payments to the Town of at least $1.534 million each year in combined property taxes and Host Community Payments (HCP). The agreement guarantees a total HCP of $16 million, plus an additional $60,000 (adjusted for inflation annually), for each year the project is in operation beyond 25 years. To date, Vineyard Wind has made payments under the HCA of $640,000 in 2022 (Q2) $1.49 million in 2023 (Q2).

Apart from these payments, the HCA provided an opportunity for detailed review and consultation by the Town of Vineyard Wind's specifications for its new substation, including funding for the town to retain an external consultant. It also ensured close and ongoing communication and coordination between Vineyard Wind and town staff. Beyond the HCA, Barnstable and Vineyard Wind collaborated on the Town's sewer expansion effort by co-locating sewer infrastructure along the cable route, with Vineyard Wind assuming road reconstruction costs, which saved the town millions in project costs and minimized the need for future road construction, and helping to address the local environmental impact of wastewater and nitrogen loading that degrades the town's bays, estuaries, and ponds. The HCA also provided $80,000 in funding for reconstruction of the bath and restroom facilities at Covell's Beach. Future annual reports will more fully capture the impacts of the HCA collaboration.

12 Accelerator Fund

In its 83C bid into Massachusetts in 2017, Vineyard Wind committed $15 million to an Accelerator Fund, broken into three initiatives: 1) Windward Workforce ($2 million) for initiatives that will build a skilled offshore wind workforce centered in southeastern Massachusetts; 2) Industry Accelerator Fund ($10 million) to attract additional investment in infrastructure and supply chain development; and, 3) Marine Mammals Innovation Fund ($3 million) to advance technologies that will allow for greater expansion of offshore wind, while continuing to protect marine mammals. The funds were deposited into a joint trust account at financial close of the project, comanaged with the Massachusetts Clean Energy Center (MassCEC) under the Offshore Wind Accelerator Program Agreement, executed on September 29, 2021.

At time of this report, over $14 million of the total $15 million dollars has been committed to initiatives in coordination with Mass CEC. Some of the major projects funded include the below (this is not a comprehensive list of all initiatives):

12.1 Windward Workforce Fund

Building Pathways South (BPS)

The goal of this initiative is to support and advance a pre-apprenticeship program that allows Massachusetts residents to obtain the requisite qualifications to be considered for union apprenticeship opportunities in offshore wind. The primary goal of BPS is to expand access to recruit and train local and traditionally underserved populations in Massachusetts, including South Coast residents, Mashpee and Aquinnah Wampanoag tribal members, BIPOC, and women in support of efforts to diversify the unionized offshore wind workforce in the Commonwealth.

BPS is a pre-apprenticeship program that prepares low-income men and women for careers in the building trades with a goal of increasing job-site diversity. The Building Pathways model is nationally recognized for addressing training and inclusivity in the industry and providing the critical link between diverse communities and access to family-sustaining careers that empower individuals and strengthen our communities. Through apprenticeship preparedness training, outreach to young adults, and advocacy, BPS's pre-apprenticeship program addresses the need to recruit top talent into the industry while opening career pathways to women, BIOPC, individuals with disabilities, and transitioning veterans.

Turbine Installation Training Initiative

Per the Project Labor Agreement, the work associated with offshore turbine installation includes multiple unions who are required to have additional specialized technical and Health and Safety trainings in order to perform the work. Considering this work scope is the most unique, requiring a technical skillset that cuts across several traditional union jurisdictions, the PLA established a working group comprised of the turbine supplier (General Electric), Vineyard Wind, and the relevant unions to ensure communication, coordination and financial support for identifying, recruiting and training individuals to be prepared for this work. To date, the funds have supported the Offshore Suitability Experience program at Massachusetts Maritime Academy to introduce workers to life and work offshore, and Helicopter Underwater Escape Training (HUET) offered at Survival Systems USA in Groton, CT (the only available training institution in the Northeast US).

12.2 Industry Accelerator Fund

Thayer Mahan Bubble Curtain

MassCEC and Vineyard Wind 1 funded Thayer Mahan to (a) establish the necessary equipment and operational capabilities to provide "big bubble curtain" marine noise mitigation services to offshore wind projects in southern New England and (b) deploy a secondary big bubble curtain system in a pilot demonstration campaign during the monopile foundation installation of the Vineyard Wind 1 project to mitigate underwater noise during offshore wind pile driving activity during the construction of Vineyard Wind 1 and subsequent offshore wind projects.

Business Network for Offshore Wind (BNOW) Industry Education and Training Courses

These courses support and advance offshore wind supply chain education opportunities to diverse Massachusetts vendors and contractors to increase awareness about supply chain opportunities in the offshore wind sector. This education initiative will utilize three of BNOW's existing courses: Offshore Wind 101, Offshore Wind Ready, and Foundation 2 Blade.[28]

New Bedford's Fishing Community

Through Vineyard Wind's efforts under the Accelerator Fund, twenty-three New Bedford fishing boats are now qualified to work in OSW. As of this report, financial support of the fishing fleet includes $16,842 in inspections, $86,793 in safety equipment, and $130,056 in training/ certifications/merchant mariner credentials. These funds were provided to ensure fishing vessels and fishermen have the necessary credentials and equipment to be eligible to work on the Vineyard Wind 1 project and future offshore wind projects. Once the fishermen are licensed, they are much more marketable for workboats, tug, and other maritime professions, offering career flexibility and optionality as the offshore wind industry grows.

12.3 Marine Mammal Innovation Fund

Charles River Analytics Thermal Imaging

Vineyard Wind is allocating approximately $1,000,000 from the Wind and Whales Fund to the Charles River Analytics (CRA). These funds will be used to test a thermal imaging whale detection system that may offer improved detection for vessel strike avoidance mitigation for marine mammals. This system will be deployed by CRA before and during Vineyard Wind 1 to (1) compare the performance of a thermal imaging system to that of trained professional protected species observers; (2) conduct a feasibility trial for remote, near real-time verification during Vineyard Wind 1's operations phase to reduce the need for offshore personnel, (3) evaluate the impact of vessel speed on marine mammal detection performance, and (4) compare camera configurations for optimal marine mammal detection.

Thayer Mahan Transit Passive Acoustic Monitoring

Vineyard Wind, in collaboration with the MassCEC, is funding Thayer to provide a real-time passive acoustic monitoring (PAM) and data transmission system with remote alert capabilities that can be deployed at varying locations in advance of transiting vessels during the construction of the Vineyard Wind 1 project. Through this joint initiative, Vineyard Wind and MassCEC seek to progress the technology readiness level of real-time PAM technologies as a mitigation tool for vessel strike avoidance and provide better

28 More information can be found at BNOW's website: https://oceantic.org/education-and-training/.

protections for North Atlantic Right Whales (NARW) in the New England region. A second objective is to acoustically record and localize NARW and other mysticete vocalizations to enhance the general understanding of the species' distribution and potentially, abundance.

Wind and Whales Fund

Vineyard Wind is allocating approximately $1,000,000 from the Wind and Whales Fund to Charles River Analytics. These funds will be used to test a thermal imaging whale detection system that may offer improved detection for vessel strike avoidance mitigation for marine mammals. This system will be deployed by CRA before and during Vineyard Wind 1 to (1) compare the performance of a thermal imaging system to that of trained professional protected species observers; (2) conduct a feasibility trial for remote, near real-time verification during Vineyard Wind 1's operations phase to reduce the need for offshore personnel, (3) evaluate the impact of vessel speed on marine mammal detection performance, and (4) compare camera configurations for optimal marine mammal detection.

13 Sponsorships and Donations

Vineyard Wind provides sponsorships and donations throughout the year to various local organizations. Specifically in the past year, Vineyard Wind made $490,110 in sponsorships and donations to local organizations in the areas of education, fisheries, environment, and workforce. Examples of organizations and events supported include Juneteenth activities on Marthas Vineyard, the New Bedford Historic Society, the Cape Cod Climate Change Collaborative, Marthas Vineyard Museum, Cape Verdean Veterans Hall, New Bedford Whaling Museum, Seamen's Bethel, AHA! Night, and Leadership Southcoast.

APPENDIX A: METHODOLOGY

Data Collection

Data collection to obtain job, expenditure, and other information from Vineyard Wind and its subcontractors began in earnest in October 2021, shortly following the project's financial close. Two primary data collection tools were developed and used to monitor relevant project activity:

1) An historical spreadsheet tracker to obtain Development-related job and expenditure data from 2017 to 2021. These data were the basis for the bulk of our first annual report.

2) A monthly spreadsheet tracking template that Tier 1 contractors were required to submit monthly beginning in October 2021. These tracking templates were focused on Construction phase activities. Over 300 monthly reports were received from Tier1 contractors.

Development Phase

From the outset, conversations with subcontractors made it clear that obtaining accurate historical data from all subcontractors would be difficult, particularly from smaller companies that were no longer working on the project. Consequently, Vineyard Wind and UMass Dartmouth focused their efforts on obtaining detailed job and expenditure data from companies with contracts above $1 million (n=48), which represents 90.3% of the total contract value during the Development phase. These subcontractors were asked to provide their annual Massachusetts expenditures and counts of Massachusetts-based employees over the 2017-2021 period for activities that directly supported the Vineyard Wind 1 project. Thirty-five of the forty-nine subcontractors (69%) complied.

Construction Phase

UMass Dartmouth and Vineyard Wind created a data collection spreadsheet that was completed monthly by the Tier 1 suppliers working on the project. The tracking sheet includes inputs for labor—both union and non-union—as well as nonpayroll expenditures by three geographic levels of analysis: the U.S., Massachusetts, and Southeastern Massachusetts. Subcontractor expenditures made by the Tier 1 suppliers, as well as various diversity, equity, and inclusion (DEI) data such as race, gender, tribal affiliation, and veteran status were also tracked. Tier 1 contractors also provided the same information for their larger Tier 2 contracts, while also providing the overall contract amounts for smaller Tier 2 and Tier 3 contractors.

The following tables present the data architecture of the monthly reports.

1. Company Overview
Company Name
Primary business headquarters
Local business headquarters
Inclusion plan (Y/N)
Massachusetts SDO category:
None
Minority-Owned Business (MBE)
Women-Owned Business (WBE)
Portuguese-Owned Business (PBE)

Veteran-Owned Business (VBE)
Service-Disabled Veteran-Owned Business (SDVOBE)
Lesbian, Gay, Bisexual and Transgender-Owned Business (LGBTBE)
Disability-Owned Business (DOBE)
Other

2. Employee Data
Employee position/title
Employee current ZIP Code.
Number of monthly regular hours and OT hours for union employees
Number of weekly hours for nonunion employees
Race:
White (non-Hispanic)
Hispanic
Black or African American
American Indian
Alaska Native
Asian
Native Hawaiian or Other Pacific Islander
Two or More Races
Some Other Race
Gender:
Woman
Man
Non-binary/non-conforming
Other
Apprentice for union employees(Y/N)
Tribal status (Y/N)
Veteran status (Y/N)

3. Expenditures
Package:
Multi Package
Array cables
Construction Management
Export cable, Offshore
Foundations/ESP T&I
OPEX
OPEX Prep
Project Management/Development
Onshore Works
WTG

Expenditure categories (list populated depending on package) in SEMass, MA, US
Accommodations
Administrative and Support Services
Cable installation/Civil Works
Civil Works
Environmental, Health, Safety Monitoring
Equipment
Fabrication
Facilities/Office/Lease
Food
Insurance and Warranties
IT setup
Manufacturing/Fabrication
Materials/Supplies
New Bedford harbor operations during installation
Outreach & Governmental relation
Port Agreement
Port infrastructure works
Property Tax
Specialist Services
Surveying
Surveys
Trainings and Certifications
Travel/Airfare
Vessels
Vessels/Inspections

4. Company's US-Based Subcontractors
Subcontractor name and address
Approximate contract value
Less than $10,000
$10,000 - $50,000
$50,001 - $100,000
$100,001 - $250,000
$250,001 - $500,000
$500,001 - $1,000,000
$1,000,001 - $1.5 million
$1,500,001 - $2 million
Over $2 million
Signatory to PLA/LOA? (Y/N)

Implan Model

The economic impacts of the proposed project are specified using IMPLAN, which is an input-output database and model that traces a project's purchases of goods, services, and labor through an economic area. We constructed an input-output model for the state of Massachusetts. Model outputs are reported in 2023 dollars. The latest available IMPLAN dataset is for 2021.

Direct Inputs to the Impact Model

Employee Compensation[29]

Union employee compensation was estimated by utilizing actual wage and benefit data detailed in each union's prevailing wage schedule. Employee compensation for nonunion workers was estimated utilizing Massachusetts occupational wage data from Lightcast and the Bureau of Labor Statistics. These data served as the primary inputs to the IMPLAN model as labor income. All union workers are considered local on the project and therefore all employee compensation for union workers is included in the Massachusetts total. Conversely, nonunion employee compensation includes compensation for Massachusetts-based workers only. Employees without a ZIP Code were categorized as out-of-state.

Nonpayroll Expenditures

Nonpayroll expenditures were obtained from the Tier 1 contractor monthly reports, which as noted in the previous tables, included the expenditure category, the amount, and where the expenditure was made (i.e., SEMass, MA, Other US).

It is not possible to estimate the economic impact of the Vineyard Wind 1 project's operations and capital expenditures simply by changing the output of an aggregated offshore wind industry in the econometric model because a mature offshore wind industry does not exist in the U.S. However, because expenditures were reported by category, we were able to utilize a more precise method for estimating the project's economic impacts. Instead we utilized a bottom-up approach that specified a change in output for the Implan code that represents construction of new power structures. We instead specified a long list of changes in the output of each industry that is a beneficiary of the project's purchases, which allows IMPLAN to apply the appropriate regional purchase coefficient to each industry.

The table below lists the IMPLAN industry codes used in this analysis. More than 650 individual expenditures were mapped to 26 IMPLAN sectors for each scenario examined (see table below). As noted above, the model includes only those expenditures that occurred in Massachusetts.

Table 14. IMPLAN Sectors Used to Construct the Construction Phase Model for Massachusetts

Implan Code	Implan Description
28	Stone mining and quarrying
35	Drilling oil and gas wells
52	Construction of new power and communication structures
55	Construction of new commercial structures, including farm structures
216	Iron, steel pipe and tube manufacturing from purchased steel
329	Power, distribution, and specialty transformer manufacturing

[29] Employee compensation includes wages and benefits.

360	Ship building and repairing
393	Wholesale - Professional and commercial equipment and supplies
395	Wholesale - Machinery, equipment, and supplies
396	Wholesale - Other durable goods merchant wholesalers
416	Water transportation
422	Warehousing and storage
439	Nondepository credit intermediation and related activities
444	Insurance carriers, except direct life
447	Other real estate
453	Commercial and industrial machinery and equipment rental and leasing
457	Architectural, engineering, and related services
460	Computer systems design services
463	Environmental and other technical consulting services
464	Scientific research and development services
468	Marketing research and all other miscellaneous professional, scientific, and technical services
472	Employment services
476	Services to buildings
477	Landscape and horticultural services
478	Other support services
479	Waste management and remediation services

Who is Considered Local?

In economic impact analysis, employment is determined by the location of the job rather than the individual's place of residence. Therefore, even if a worker is brought in from outside the region, they are still considered as "local" employment for the duration of their work. Thus, local employment in this report includes all union employees on the job site, including workers who relocated to SEMass to work on the project. About 92 workers relocated to SEMass for the project.

Workers from outside the area spend their income differently than local residents. Consequently, we adjusted the labor income values for these workers in the IMPLAN model. However, relocated workers have impacts on the local economy because they do spend a portion of their earnings in the region. To account for this spending, we utilized per diem spending rates from the U.S. General Services Administration.

Project Years and Multiple Models

IMPLAN is an annual model and employment estimates provided by IMPLAN represent annualized employment values. However, payroll and nonpayroll expenditures will occur over multiple years. In order to account for the phases of the project and Vineyard Wind's proposed timeline, several input-output models were constructed for the Development and Construction phases depending on the year in which the expenditures were made. The results of these individual yearly models were then aggregated to produce the final impact tables.

Attachment 18.1-1: Form PPA Redlines

REDACTED