Chapter 7. Just Transition

As the State continues implementation of the Climate Act, which demands a transition away from traditional energy sources and industries, New York will ensure this is a just transition. A just transition is one that builds connections, creates opportunity, and ensures a good quality of life for New Yorkers from all different walks of life. The Just Transition Working Group (JTWG) was convened by the Climate Action Council (Council), as required by Environmental Conservation Law (ECL) § 75-0103(8). The Climate Act specifically requires the JTWG to advise the Council on various issues related to workforce development and opportunities, conduct a climate jobs study, advise on potential impacts of carbon leakage risk to New York industries and communities, identify sector specific impacts, and identify electric generating sites that may be closed as a result of a transition to a clean energy sector, including the issues and opportunities that are presented by reuse of those sites.[54] The materials developed by the JTWG are included in Appendices C, D, and E. The Climate Act requires that this Scoping Plan include recommendations to aid in the transition of the State workforce and rapidly emerging clean energy industry, which is discussed below.

In addition to the work New York is undertaking, new federal resources under the Inflation Reduction Act, the Infrastructure Investment and Jobs Act, and the CHIPS and Science Act provide promising opportunities to strengthen New York's clean energy workforce with enhanced avenues of support for a just transition. New and expanded federal tax credits integrating bonuses for prevailing wage and apprenticeship requirements assure that New York's expanded focus on applying these labor standards will be met with greater financial benefits for the State. Across all these areas and others that may emerge, New York should work to leverage federal tax credits, grants, and financing for infrastructure reuse wherever possible to deploy clean energy options that support the State's future energy mix and the State's current and future energy workforce and trades. To maximize federal support, the technology mix should remain flexible to include beneficial technologies incentivized by federal statute. In addition, federal resources should be prioritized to assist the State in making needed grid infrastructure investments, particularly in legacy/rust belt neighborhoods and other Disadvantaged Communities to supplement State and utility processes and investments. The importance of federal and other partnerships to achieve the requirements of the Climate Act is discussed further in *Chapter 22. Essential Elements*.

[54] ECL § 75-0103(8)(a)-(f).

A truly just transition means that the State must enact measures to ensure that any worker who loses their job as a result of climate change mitigation efforts be promptly reemployed with the same or better wages, benefits, and terms and conditions of employment, while maintaining their choice of collective bargaining representative. Further, jobs created as a result of the State's climate change mitigation efforts should be good, family-sustaining, union jobs, and accessible to all New Yorkers. This can be achieved by requiring robust labor standards and worker-focused procurement standards on clean energy, resilience, and other emissions reduction and adaptation projects, coupled with concerted efforts to drive increased workforce diversity and equity statewide through recruitment efforts, retention policies, and promotion opportunities. Finally, a just transition cannot permit privatization of public employment.

7.1 Just Transition Principles

The JTWG's just transition principles, shown in Table 2, were developed to serve as a guide for Advisory Panel recommendations with the acknowledgement that each principle may have different applicability depending on economic sector. The principles have been developed to support a fair and equitable movement from fossil fuel-based economies toward the achievement of the carbon neutral future envisioned by the Climate Act. The Climate Act presents economic development opportunities for the State and its communities. Accordingly, the principles were also defined with local, regional, and statewide job creation and workforce development in mind.

Table 2. Just Transition Principles

Category	Principle Language
Stakeholder-Engaged Transition Planning	Engage a diverse range of stakeholders via early, inclusive engagement in communities' transitions to local low-carbon economies, including New York's workforce and the State's Disadvantaged Communities.
Collaborative Planning for a Measured Transition Toward Long-Term Goals	Encourage collaborative State and community-based long-term planning, capacity-building, and robust social dialogue in order to ensure a gradual and supported transition.
Preservation of Culture and Tradition	Ensure that transition plans, policies, and programs reflect and respect local wisdoms, cultures, and traditions, including recognition of Indigenous sovereignty.
Realize Vibrant, Healthy Communities Through Repair of Structural Inequalities	Seek to lift up New Yorkers in the transition to a low-carbon economy by implementing transition policies and programs that promote cross-generational prosperity and gender and racial equity, in recognition of the disproportionate burden of environmental pollution and climate change on Disadvantaged Communities.
Equitable Access to High Quality, Family-Sustaining Jobs	Promote the creation of high-quality, family-sustaining jobs, including union jobs, and ensure that new jobs are created in transitioning and Disadvantaged Communities, connecting workers to employment opportunities through career services, skills training, and infrastructure investments.
Redevelopment of Industrial Communities	Promote diversified, strengthened economies in the transition to a low-carbon economy, examine opportunities for community-centered ownership structures, and promote industry recovery, retention, and growth for regions and sectors in transition.

Category	Principle Language
Development of Robust In-State Low-Carbon Energy and Manufacturing Supply Chain	Develop a robust in-State low-carbon supply chain, spanning full product life cycles, to increase focus on exporting low- and no-carbon products and to ensure that jobs in these emerging sectors become more accessible to the local workforce and to Disadvantaged Communities.
Climate Adaptation Planning and Investment for a Resilient Future	Integrate climate adaptation into transition planning, including through promotion of community resilience and investment in sustainable infrastructure.
Protection and Restoration of Natural and Working Lands Systems & Resources	Promote the restoration, conservation, and resiliency of the State's agricultural and natural systems, improving local food security and supply and fostering healthy ecosystems, particularly in Disadvantaged Communities through sustainable land and natural resource use.
Mutually-Affirming Targets for State Industrialization & Decarbonization	Implement decarbonization policies that simultaneously bolster industry retention and sustainable economic development and growth and ensure that economywide programs and policies address the social, environmental, and economic challenges of workers and communities in transition.

7.2 Workforce Impacts and Opportunities

Achieving a just and equitable transition will generate numerous opportunities for New York's existing and emerging workforce. At the same time, where certain sectors and occupations face a risk of job displacement, the State must work to ensure that job losses are minimized and that any losses come with meaningful support and reemployment protections. The State must enact measures to ensure that any worker who loses their job as a result of climate change mitigation efforts be promptly reemployed with the same or better wages, benefits, and terms and conditions of employment, while maintaining their choice of collective bargaining representative. Workers who are reemployed must receive support necessary to succeed in their new roles, including comprehensive training on their new role, safety and health, and other matters. Since the Council's JTWG and seven multi-sector Advisory Panels were launched, representatives from public, private, academic, environmental, and community groups; labor unions; environmental justice communities; impacted industries; and renewable energy developers have met on several occasions to debate and analyze the impacts of transitioning to clean energy on the labor market. This Scoping Plan identifies the following recommendations to help ensure that New York's workforce is prepared for and stands to benefit from the State's transition to a clean economy.

Direct Displaced Worker Support

New York's transition toward a cleaner, greener power grid will create both opportunities for economic success as well as risks of disruption in communities that have historically relied on fossil fuel power plants. New opportunities and challenges will similarly be faced in other sectors of the economy, transitioning away from the use of fossil fuels and associated technologies, including buildings, transportation, and fuel distribution. As New York leaves fossil fuels behind, and transitions to cleaner

alternatives as infrastructure and appliances reach the end of their useful life, some power plants and other centers of conventional energy employment will inevitably close. To mitigate any economic impact and ensure that current and formerly employed fossil fuel workers benefit from the transition to clean energy, it is imperative to support displaced workers as much as possible and early on. This means establishing continuing education, Registered Apprenticeships, certifications, and licensing in trades and professions for current workers and supporting companies in transitioning their workforce to building operations and maintenance, design, construction, and other clean energy jobs. This also means creating a bridge to retirement for displaced workers nearing retirement age at the time of a plant or facility closing. The State should also provide and coordinate other discrete benefits for displaced workers facing a gap in employment or wishing to pursue an alternative path, including transitional unemployment benefits (including, but not limited to, supplemental payments), federal and state Continuation of Health Coverage insurance, and grants/credits for post-secondary education at two- and four-year programs at public institutions (such as through New York's existing full- and part-time Tuition Assistance Program for City University of New York [CUNY] and State University of New York [SUNY]). Support for these measures is envisioned to be provided in part from the proposed Office of Just Transition fund (discussed further below) working in concert with existing federal and state programs. Consideration should be given to businesses and jobs not only in installation, but also in manufacturing and the entire supply chain. Engagement with clean energy providers will be important to evaluating current and future workforce needs, aligning training with business demand, including by geographical area and, ultimately, developing a successful talent pipeline.

In cases when continued operation of a power plant or other facility/system is needed, even as it winds down, efforts should focus on retaining workers while retraining them for new, clean energy jobs. In other cases, when facility closures and system transitions are known ahead of time, training and supportive services should be implemented while individuals are still working to prepare workers for the transition to clean energy. Areas identified to support fossil fuel workers include securing wage support and setting aside a fund for on-the-job training, providing resume-writing support and career coaching, and hosting job fairs with relevant clean energy employers, while also leveraging opportunities at multi-commodity utilities, which will include all major New York utilities pursuant to newly authorized utility and community thermal energy network development, for gas utility workers and contractors. Where business interests of employers align, other decarbonization-related roles should also be leveraged, for instance, via the substantial growth forecasted for electricity transmission and distribution jobs, as well as through decarbonization and operation of the gas delivery system during its transition. Periodic surveys will also be a useful tool to identify workers' career status, future interests, timing needs, and other considerations.

Distinct strategies and responses must be developed for key existing traditional energy sectors, namely electric power generation, transmission, distribution, storage, fuels, and motor vehicles. In electric power generation, displaced power plant workers must be supported through retraining, retention, early retirement/pension support, and mutual aid/work agreements. For retention, this means paying particular attention to the continued employment of workers who learn during the transition period that their jobs will be eliminated in the future, using financial incentives to retain these workers in the interim and preserve sufficient workforce levels prior to facility closure, thereby enhancing reliability. One option would require a cost share by and other forms of support from plant owners, while focusing support on workers rather than plant executives. In the transmission, distribution, and storage sector, natural gas utility workers should be supported by Public Service Commission (PSC) rules to retrain for roles on the electric and/or thermal side of multi-commodity utilities (supported by cost recovery), with specific wage floors and protections. In the fuels industry, it will be important to address changes to business-models that allow employers to retrain and reorient their workforce for new roles, such as new amenities at gas stations and delivery of energy efficiency services at companies previously focused on delivery of home heating fuels. Finally, greater attention must be paid to addressing the shift in work for other sectors that are central to the transition to a low-carbon economy, such as automotive workers and service technicians as internal combustion engines are replaced with electric vehicles (EVs).

Ensuring Application of Labor Standards

To ensure a just transition, jobs created as a result of the State's climate change mitigation efforts should be good, family-sustaining, union jobs, and accessible to all New Yorkers. As such, the State should apply robust labor standards across all sectors and projects. During implementation, the application of any such labor standards by relevant public entities should take into consideration unique sector- and project-specific characteristics, so as to tailor the standards accordingly.

As discussed further below, these labor standards should include provisions related to prevailing rate requirements and compliance; project labor agreements for construction projects; labor peace agreements and employer neutrality agreements for operations and maintenance activity and other permanent positions; maintenance of all current state, county, and municipal licensing standards for all trades; and apprenticeship utilization. These standards should apply across the range of construction, operations, maintenance, and repair activities, as well as where incentives are provided to support new clean energy manufacturing facilities. As with existing clean energy contracts, violations or other lack of adherence to specific standards should result in incentives being clawed back and other remedies. These standards

should also apply to projects undertaken by any political subdivision of the state, including but not limited to Industrial Development Authorities and Local Development Corporations.

Further, the State must enact measures to ensure job security for all workers displaced from their positions as a result of climate change mitigation efforts. This support should ensure the prompt reemployment of displaced workers with the same or better wages, benefits, and terms and conditions of employment, while maintaining their choice of collective bargaining representative. Finally, to ensure that the State's investment in climate change mitigation provides the greatest benefits to New Yorkers, Buy American provisions and preferences for New York-based manufacturing should be included in all relevant solicitations.

As New York continues to work toward the Climate Act mandates and the overall energy landscape changes, labor standards should be further applied and enhanced to promote family-sustaining wages and comprehensive benefits across all sectors and projects, as well as employer-led pre-apprenticeship and Registered Apprenticeship training, thereby supporting the development of pathways into good-paying union jobs. Project labor and community workforce agreements, prevailing rate requirements, neutrality, and labor peace agreements, as well as local and targeted hiring provisions, should be employed across all sectors and projects, particularly to incentivize the hiring of workers from Disadvantaged Communities, including environmental justice and New York's Opportunity Zones. Enacting fair pay provisions will be particularly important in ensuring that new, clean energy jobs pay as well as or better than former or existing jobs. Prevailing wage and project labor agreements, neutrality and labor peace agreements, as well as the use of Registered Apprenticeship programs, can help ensure that jobs turn into long-term careers for New York residents who live in the local communities hosting clean energy industries.

As new technologies and solutions emerge to help New York achieve the Climate Act, the State should ensure that appropriate labor standards are applied. This is true for applications like large-scale EV charging station installation work, green hydrogen infrastructure projects, utility and community thermal energy networks, and others. Expanding labor standard application to these emerging sectors will build on the foundation of labor standards already in place for sectors such as large-scale renewables and community solar.

Strengthening New York's application of labor standards should reflect and buttress new rules at the state and federal level for labor-related protections, most notably with respect to prevailing wage. At the federal level, as discussed further below, prevailing wage requirements and bonuses are included in

numerous provisions within the Infrastructure Investment and Jobs Act and the Inflation Reduction Act, such that New York's existing application of and familiarity with prevailing wage will only serve to enhance the benefits and savings New Yorkers realize from the federal government, via higher federal tax credit levels and greater project uptake. At the State level, new legislation in 2022 expanded the application of prevailing wage requirements to cover community solar installations above 1 megawatt (MW), also reflected in the State's main community solar program rules and approvals. These measures represent positive steps toward expanded labor standard coverage that should be replicated across sectors at appropriate junctures throughout the remaining work of Climate Act implementation, and again should apply across all construction, operations, maintenance, and repair activities.

Exploring Emerging Climate Act-Aligned Technology Opportunities

From a technology and resource standpoint, the particular mix of climate solutions that New York considers and pursues is highly relevant to the achievement of a just transition. For the state's energy workforce and specifically the energy and construction trades working on energy infrastructure, the breadth of climate solutions able to be explored and pursued ties directly to the occupations and skillsets that will see support and growth in the decades ahead. In the respective sector-specific chapters of this Scoping Plan, the technology types and resources available to deliver emissions reductions are covered in extensive detail. As a cross-cutting principle, however, where newly emerging technologies and resources arise that are aligned with the Climate Act and supportive of the occupations and skillsets of the State's energy trades, those resources should be prioritized – an 'all of the above clean energy' approach to emerging technology exploration and development.

Evaluation of these resources should occur on an ongoing basis to monitor trends in cost, availability, technology maturity, and other factors. In the last year alone, several relatively nascent resource types have seen considerable advancements and show strong promise in meeting these dual characteristics of alignment with the Climate Act and support for unionized energy labor and a just transition. These resources include community thermal energy networks, green hydrogen, enhanced geothermal, and advanced nuclear, among others. While generally not considered emerging technologies, biofuels such as renewable natural gas (RNG) have potential to serve as flexible and dispatchable resources, yet many are unproven at commercial scale. The evaluation should be consistent with the evaluation of alternative fuels as discussed in *Chapter 13. Electricity*. These resources are also relevant to a just transition given the alignment in skillsets of many existing workers and trades who may be involved in their future use, as discussed in other chapters such as *Chapter 18. Gas System Transition*. Notably (and as discussed further

below), many of these emerging resource types are poised to benefit substantially from newly available federal investments.

- **Community thermal energy networks:** In 2022, the State enacted the Utility Thermal Energy Network and Jobs Act, advancing a new initiative to develop regulatory structures and pilot/demonstrate utility thermal energy networks across the state's utility service territories. These thermal energy networks are rapidly emerging as a key strategy to scale up building decarbonization from a "building-by-building" to a "community-by-community" approach, and critically, they provide overlapping job needs with the skilled pipe trades workforce that has historically worked on gas pipelines. Specifically, advancing thermal energy networks will mean significant job opportunities across multiple trades, from trenching and drilling, pipeline and plumbing installation, and electrical work to heating, ventilation, and air conditioning (HVAC) and ductwork, construction and assembly, and ongoing maintenance and operations activities. As they are piloted, and gain benefit from federal tax credits for commercial geothermal installations and thermal energy storage systems, these thermal energy networks have the potential to help establish a major transition strategy for gas utilities and their workforces and contractor bases to shift to being clean thermal energy providers. In addition, many state campus facilities (State University of New York [SUNY], New York State Office of General Services [OGS], New York State Department of Corrections and Community Supervision, etc.) are ideal candidates for the installation of thermal energy networks, particularly at higher education institutions where demonstration projects can be paired with research and student learning opportunities.
- **Green hydrogen:** As described in several sectoral chapters of this Scoping Plan, green hydrogen, as defined in *Chapter 2. The Time is Now to Decarbonize Our Economy*, has seen notable advancements, offering new opportunities for the production and consumption of hydrogen in important strategic applications, including where electrification is difficult. Coming out of the Infrastructure Investment and Jobs Act, the U.S. Department of Energy has released the Funding Opportunity Announcement for the establishment of multiple Hydrogen Hubs across the country, with up to $1 billion in funding to ultimately be available to each winning hub. New York is leading a coalition of northeast states and partners to compete for one of these Hydrogen Hubs, with the intent of securing a Hub award and cementing a durable hydrogen ecosystem in the northeast. Furthermore, the federal Inflation Reduction Act includes brand new and substantial production and investment tax credit incentives for hydrogen, which will provide a significant boost to the economic competitiveness of hydrogen in the near future. Hydrogen offers strong workforce promise for numerous energy trades, including those working in construction and installation, operations and maintenance, distribution and storage, and other occupational roles.

- **Enhanced geothermal:** Enhanced geothermal systems (EGS) create human-made geothermal reservoirs in locations where naturally favorable amounts of permeability and/or water are lacking. EGS reservoirs are created by first drilling wells and then pumping water to create permeability, thereby providing the three principal elements necessary for water to be circulated continuously and be used for electricity production or direct use. New York will be able to benefit from progress made at a national level, including through the U.S. Department of Energy's Enhanced Geothermal earth shot, a department-wide effort to dramatically reduce the cost of EGS by 90%, to $45 per megawatt hour by 2035. From a labor and workforce perspective, EGS provides the opportunity to learn from the tools and expertise of the oil and gas sector and to easily pivot oil and gas workers to this new geothermal application. This resource would provide opportunities for existing in-State workers and allow for the attraction of new workers from across state lines. These and other learnings from the active research and demonstration activity underway at the Cornell University Borehole Observatory should inform future EGS activity across the state.[55]
- **Advanced nuclear:** Advanced nuclear technologies are another emerging resource that could contribute to New York's achievement of 100% zero-emissions electricity by 2040 and help realize a just transition for the state's energy trades. Advanced small modular reactors (SMR) encompass a variety of sizes, technology options, capabilities, and deployment scenarios, from tens up to hundreds of megawatts and with potential use for power generation, process heat, desalination, or other industrial uses. According to the U.S. Department of Energy, advanced SMRs offer many advantages, such as relatively small physical footprints, reduced capital investment, ability to be sited in locations not possible for larger nuclear plants, and provisions for incremental power additions, along with offering distinct safeguards, security, and nonproliferation advantages. However, key issues pertaining to waste management and storage will still need to be addressed and resolved for advanced nuclear to see adoption at scale, and the State must rigorously scrutinize these and other challenges as part of any future evaluations of advanced nuclear. Nonetheless, with considerable new federal tax credit incentives, along with vital research and development funding from the federal CHIPS and Science Act and other bills, the prospects of economically competitive advanced nuclear have grown substantially. And, in many of the same ways that New York's existing upstate nuclear fleet strongly supports a variety

[55] Cornell University. "Earth Source Heat: Creating carbon neutral, deep geothermal heating systems." Earth Source Heat. https://earthsourceheat.cornell.edu/.

of energy trades, advanced nuclear offers the potential for a zero-emission power plant setting that current power plant workers could transition into readily.

These promising resources and other emerging technologies supporting Climate Act requirements and goals and a just transition should take on special consideration in future planning, policies, and programs, such as current and future proceedings to define and achieve 100% zero-emissions electricity by 2040, to undertake utility gas system planning, and beyond.

Targeted Financial Support for Businesses and Related Entities

To build a diverse, equitable, and inclusive clean energy economy, businesses must be supported with targeted financial support to ensure access to contracting and procurement opportunities in the transition away from fossil fuels. Funding must provide for supported on-the-job, recruitment, training, hiring, and job retention for businesses in Disadvantaged Communities, minority- and women-owned businesses (MWBEs), service-disabled veteran-owned businesses (SDVOBs), employee-owned businesses, cooperatives, design and installation firms, community-based organizations, start-ups, and unions, as well as pre-apprenticeship and apprenticeship programs. Government support for MWBEs and SDVOBs should include support on bonding, insurance programs, and access to public financing to support the business and the payroll for prevailing wages and apprenticeships. Concurrently, manufacturing of clean energy components and equipment must be promoted locally to stimulate the economy and increase job growth, with an emphasis on revitalizing legacy/rust belt cities and Disadvantaged Communities. Government support must target efforts both specific to clean energy technologies and to affected regions. The focus must be on creating stable, well-paid jobs as opposed to takeover by out-of-state workers in the gig-economy. Entrepreneurship training and small business start-up support could further increase small business creation and ownership in climate adaptation and resilience products and services, particularly by MWBEs and SDVOBs. In general, eligibility for such targeted financial support should include strong preference for entities with unionized workforces or labor peace agreements.

Bolstering Training Curriculum and Programs

New training curricula, trained trainers, and comprehensive training programs will be critical to this economywide transition. These programs must be developed with a focus on Disadvantaged Communities and be designed to meet employer hiring needs. The New York State Energy Research and Development Authority (NYSERDA) Climate Justice Fellowship is one example of a program that funds fellows from Disadvantaged Communities to advance climate justice and clean energy in their respective communities. Programs that target individuals with barriers to employment must include support for wrap-around

services and leverage other state and local programs that can provide more comprehensive support with case managers shadowing and mentoring trainees through hiring and while on the job. Additional efforts should target career awareness, education outreach, and clean energy training at traditional education channels such as P-12 schools, Pathways in Technology Early College High Schools, Boards of Cooperative Education Services, labor unions, community colleges, and four-year colleges and universities, with a strong focus on integrating new, emerging technologies across these efforts. Some of the most successful education outreach programs feature ambassador programs, mentoring, job shadowing, science fairs, career days, guest speakers, and work site visits to generate excitement around clean energy and expose students to different career pathways early on. General science, technology, engineering, and mathematics programming should be expanded to include clean energy content leading to industry-recognized certificates, advanced training, internships, pre-apprenticeship programs, Registered Apprenticeship, and job placement. Within community and four-year colleges and universities, the State should support the development of decarbonization curricula by qualified subject matter experts and training entities for the fields of engineering, architecture, construction, and related programs. New curricula should be shared across SUNY and CUNY campuses. Collaborations with professional organizations, unions, and for-profit training groups can further be beneficial in developing training programs that advance worker rights, climate justice, and GHG mitigation efforts and scaling them statewide.

To directly enhance the benefits of new training curricula and programming for underserved communities and other priority populations, energy code education and training should be brought to frontline contractors. This can be achieved by working with local contractor networks to bring energy code training – including new building or installation practices – to their sites, workplaces, or events; continuing support for younger New Yorkers (ages 16 to 24) as well as older workers in green building and technology training and apprenticeships; and designing and funding training to be accessible in terms of mode or channel, time and resource commitment, language, and educational level (e.g., increased online trainings, abbreviated guidelines, translation, staff resources for live training or support). Collaboration on new training curricula between NYSERDA, New York State Department of Labor (DOL), and existing apprenticeship programs to support clean, green, and zero-emission technologies should also supplement what can be achieved through local contractor networks. Such curricula can also be informed by other labor management-sponsored training programs that exist for operations, maintenance, and supply chain jobs. Finally, pre-apprenticeship programs with direct entry status can be a resource for recruitment of local workforce with a direct pathway into union apprenticeship programs.

Expanded Comprehensive Career Pathway Programs

The State must develop comprehensive programs to develop career pathways into clean energy for both existing and future workers. Existing workers include workers from transitioning fossil fuel, clean energy industries, manufacturers, community-based organizations, MWBEs, SDVOBs, as well as State/public workers. Existing workers must be given access to technical skill development (upskilling) based on the most current, nationally recognized curricula and state-of-the-art labs and training equipment. This includes training on energy efficiency, building electrification, and healthy homes/buildings in coordination with adjacent industries that work in homes. Working with unions will be crucial to incorporating renewable energy and decarbonization training into existing and new Registered Apprenticeship programs. Additionally, workers must be provided with opportunities for career advancement, including management and leadership training. Future workers are new entrants (primarily entry-level) to clean energy, often young adults (ages 16 to 24) with high school degrees whose success depends on workforce development programs such as Youth Build and Job Corps, pre-apprenticeships, internships, and jobs with clean energy employers. Career awareness and supportive services are key to ensuring job placement and retention, particularly for members of Disadvantaged Communities and other underrepresented segments of the population (such as women, single parents, and formerly incarcerated individuals). Technical skills should further be complemented by professional skills, such as communication, leadership development, and workplace etiquette to ensure long-term success. Climate Justice Job Corps Fellowships for both entry-level and transitioning workers, as well as employer-sponsored on-the-job and Registered Apprenticeship programs, can serve as a meaningful pipeline to good-paying clean energy careers.

Community Engagement, Stakeholder Input, Market Assessments

Finally, it is imperative to continue stakeholder engagement to identify and assess industry skills gaps, employee demand, as well as curriculum and training needs. Open dialogue among relevant stakeholders will be key to sharing needs and best practices, support industry opportunity awareness, and enhance recruitment efforts for new, transitioning, and existing workers. Particular attention must be placed on unions, unionized workforces, and other fossil fuel workers to understand and leverage transferrable skills with complementary training in both energy and non-energy roles. In addition, the needs of people in frontline communities, indigenous community members, formerly incarcerated New Yorkers, women in nontraditional trades, new immigrants, and people transitioning from unemployment must be prioritized. Strategies must be in place to reach underrepresented communities and to include them in the development of clean energy policies, strategies, and solutions, ensuring their voices are not only heard but also drive the successful achievement of New York's clean energy future. These strategies include

campaigns to build public awareness of climate change effects and solutions, including co-benefits of actions to mitigate and adapt to climate change through public calls for ideas and projects to advance Climate Act requirements in Disadvantaged Communities. Finally, all such strategies for community engagement and stakeholder awareness should be accompanied by robust Specific, Measurable, Achievable, Relevant, Time-bound (SMART) targets.

The State should build on the 2021 JTWG Jobs Study and recurring New York Clean Energy Industry Reports to develop market assessments that can help understand emerging sectors and technologies, surrounding workforce needs and opportunities, and how to ensure job prospects are equitably realized amongst new, transitioning, and existing workers, with careful attention to those from Disadvantaged Communities. This should include ongoing tracking of employment trends along with prospective analysis to identify existing and potential workforce development assets and the additional market needs to support growth across the clean energy economy. In the near term, such studies should focus on critical existing decarbonization activities needed to rapidly accelerate within this decade, such as building efficiency and electrification and offshore wind, but should also be planned for nascent technologies including thermal energy networks, green hydrogen production and use, geothermal, and advanced nuclear, as well as for more established alternative fuels such as RNG and biofuels. Direct engagement with Registered Apprenticeship programs is vital to understand existing skills and various career pathways and properly develop curricula and training requirements to assist both new workers and existing workers. This direct engagement will supplement contractor-/employer-based workforce development initiatives and engagement.

Such assessments should also evaluate the labor impacts of the gas system transition including jobs and occupations that will be needed to support leak detection and repair, the decommissioning of systems, transitioning customers to thermal energy networks, and more. Analysis for new clean energy technologies should incorporate skills transferability to evaluate which existing jobs can be readily transitioned to support clean energy deployment. In addition, future analysis should collect and examine the anticipated total cost of wage and benefit packages for jobs that are created. Finally, workforce analysis should consider the timeline of transition, including special attention to the pace of potential displacement relative to creation of replacement job opportunities.

General Considerations

As New York and the world at large adapts to a new reality in the wake of the COVID-19 pandemic, workforce development and training initiatives will also be required to adjust. Flexibility and resilience

are two important characteristics of successful workforce training models, enabling online and in-person training with courses offered in multiple languages and at different times to accommodate various health, safety, and learning needs. The most effective workforce development efforts further combine robust diversity, equity, and inclusion initiatives; generous wrap-around services; and relevant safety training (such as the Occupational Safety and Health Administration and EPA) as applicable. To the extent possible, training entities should leverage State, federal, or other funding to cover training and education costs and, thereby, eliminate barriers for both employers and individuals. Collaboration among relevant State entities, such as NYSERDA, CUNY, SUNY, New York Power Authority (NYPA), Empire State Development (ESD), DOL, and an Office of Just Transition (see below) will be critical in ensuring an "all government approach" to designing, implementing, and resourcing the above-referenced workforce development and training efforts. Finally, since the path to a carbon neutral economy requires new skills and expertise and likely new job titles, and since agencies already have hiring needs that do not align perfectly with existing civil service titles, the Department of Civil Service should also be directly involved in collaboration and engagement.

Office of Just Transition and Worker Support and Community Assurance Fund

Taking this information into consideration, New York has a need for a state apparatus to guide the ongoing programmatic and policy work needed to implement the measures described above. That apparatus should take the form of a newly created, dedicated state office charged with realizing a just transition and resourced with an accompanying fund, which would be overseen and administered by the office in consultation with DOL and NYSERDA, to provide support for workers, communities, and other transitional priorities. The Office of Just Transition will help coordinate all funding and financial incentives for workforce development, community support, existing worker support, and new worker support related to the Climate Act transition.

In recent years, other U.S. states contending with power plant closures and other energy transition impacts have begun to establish similar offices and funds dedicated to the achievement of a just transition for affected workers and communities.[56] While this activity has generally been concentrated in states with vertically integrated utility markets and specifically those facing impending coal plant closures, several of the states advancing these frameworks share with New York both ambitious climate laws and

[56] Takemura, Alison. October 3, 2022. "The best policies to help coal towns weather the switch to renewables." *Canary Media.* Accessed at https://www.canarymedia.com/articles/just-transition/the-best-policies-to-help-coal-towns-weather-the-switch-to-renewables.

membership in the U.S. Climate Alliance, most notably, Colorado, Illinois, and New Mexico. While New York's circumstances differ in important ways compared with these states, there is merit in New York advancing a similar framework of a dedicated office and fund to guide and centralize the implementation of a just transition as the state works to realize the goals of the Climate Act. As New York establishes an office of just transition and an accompanying fund to support workers, communities, and other related transition priorities, it can draw upon the experience of these sister states and fellow U.S. Climate Alliance members.

The office could be an independent entity, housed within an existing agency, administered jointly by multiple agencies, or reside as an office within the Governor's Office (for similar example, see the Office of Language Access). Housing the office within the Governor's Office could be the most effective way to give it the prominence and importance it will need to be influential in working across the full breadth of state government.

As the mission and programmatic priorities of the office and fund are built out, there are three main areas to focus on in the near- to medium-term: host community support, existing worker support, and new worker support.

- **Host community support:** New York should enact legislation to expand and extend the Electric Generation Facility Cessation Mitigation Program and transfer administration of the program to this proposed Office of Just Transition. The program was created to provide funding assistance to support counties, towns, cities, villages, school districts and special districts that experience a reduction in real property taxes and/or payments in lieu of taxes stemming from the closure of an electric generation facility. Currently, ESD administers the program in consultation with NYSERDA and New York State Department of Public Service (DPS). As of April 2021, New York has authorized a total of $140 million for the program largely through Regional Greenhouse Gas Initiative (RGGI) and the Clean Energy Fund. The program is currently scheduled to close to new applicants on July 1, 2025. It is likely that more funding will be needed to address future eligible closures, based on tax data compiled by the JTWG (see the power plant inventory in Appendix D: Power Generation Sites Identified by the JTWG). The program should be extended beyond 2025 and increased with new funding in order to help meet future needs beyond currently available budgets. A portion of new funding should also be available to provide energy transition and economic development planning grants for communities, building on and aligning with existing resources available – and ensuring that the office can help with continued support for communities already navigating the energy transition, including localities previously hosting coal

power plants. Finally, through this category, the Office would also seek to provide funding and other measures to support community-led visions for just transition transformations at a local and neighborhood level across the State.

- **Existing worker support:** The Office of Just Transition should provide support to existing energy workers facing known or potential displacement from their current positions/occupations, through mechanisms described above. Significant new funding should supplement existing support programs already available through state agencies and authorities. This funding should provide, among other efforts, wage and benefit bridge funding for retirees and re-trainees facing a decline in their compensation and benefits. The office should also create incentives for retention of workers at a plant or facility that is closing but requires continued operations in the interim. For the roughly 150,000 traditional energy workers currently employed in the state, funding should help provide resources for a meaningful portion of workers facing known or potential displacement, especially after factoring in natural rates of retirement as well as sectors/occupations not expected to face displacement (e.g., electricity transmission and distribution employment). To ensure that displaced workers are promptly and successfully reemployed, the Office of Just Transition would work with DOL to actively track all displaced workers, conduct skills assessments for each such worker, and facilitate training that will equip them to succeed in their new placement – among other measures to ensure such workers are prioritized for filling newly created clean energy positions. In addition, as mentioned above, the office's programming in this category would also be intended to provide and coordinate additional benefits for displaced workers, including transitional unemployment benefits (including, but not limited to, supplemental payments), federal and state Continuation of Health Coverage insurance, and grants/credits for post-secondary education at two- and four-year programs at public institutions.
- **New worker support:** Another key portion of the office's work and funding should be set aside to support new workers seeking entry into emerging clean energy occupations. This support can take the form of a number of mechanisms as outlined above, including for apprenticeships, pre-apprenticeships, and other forms of early-career training, and it should be focused on expanding access to clean energy jobs in underserved and historically marginalized communities. Given the scale of new clean energy workers that will be needed to fill the 2030 jobs forecast and beyond – more than 200,000 new jobs – it is expected that significant new funding will be needed to provide this new worker support, which is typically more costly on a dollar-per-capita basis than retraining/upskilling support for existing workers.

Finally, when the Office of Just Transition is working with any State or municipal employees, any efforts to support workers will need to be consistent with New York State Civil Service Law and in cooperation with any applicable collective bargaining representatives.

7.3 Measures to Minimize the Carbon Leakage Risk and Minimize Anti-Competitiveness Impacts

In its transition to a net zero emission economy, the State must also consider the issue of GHG emissions "leakage." The Climate Act defines leakage as, "a reduction in emissions of greenhouse gases within the state that is offset by an increase in emissions of greenhouse gases outside of the state."[57] The concept of leakage is important given the fact that climate change is a global problem, whereas the State's policy authority is confined to activities within its borders. New policies that increase the cost of energy, reduce the reliability of energy, or increase the cost of emitting GHGs could cause businesses to shift their production outside of New York State, or avoid the State altogether, and instead invest in out-of-state locations with lower energy costs and/or less stringent environmental and GHG emission reduction policies. Mitigating leakage risk is of interest to the State for both climate and economic reasons, which is further demonstrated by the Climate Act requirements related to mitigating anti-competitive impacts and for the emission reduction regulations ultimately adopted by New York State Department of Environmental Conservation (DEC) to incorporate measures to minimize emissions leakage. Throughout any future potential policies and programs, the State should consider and enact measures to minimize the risk of energy-intensive and trade-exposed (EITE) industries moving out-of-state as a result of emissions reduction actions, including as discussed in *Chapter 14. Industry* and *Chapter 17. Economywide Strategies*.

As the State implements this Scoping Plan, it will need to carefully monitor the potential for unintended emissions and economic leakage. The following are potential measures to mitigate this risk. A more detailed analysis can be found in Appendix C.

- **Recognize early action:** The State should credit emitters for early investments to reduce their GHG emissions. The absence of early action credit could discourage short-term emission reductions by firms as they await the onset of a new system and the establishment of their baseline.

[57] ECL § 75-0101(12).

- **Set industry-specific benchmarks:** If assigning emission reduction targets to individual emitters, the State should apply benchmarks for the emissions intensity of their production, taking into account current technology and types of emissions and adjusting them over time to reduce the risk of leakage caused by the imposition of infeasible reduction requirements.
- **Utilize market forces:** The State should consider measures to financially incentivize emission reductions while also providing emitters with compliance methods intended to mitigate leakage, thereby increasing the cost-effectiveness of reducing emissions, such as through a cap-and-invest program.
- **Minimize business impacts on industry:** Consistent with the approaches to mitigate anti-competitive impacts put forward in Appendix E, the State should give careful consideration to EITE industries when establishing economywide emissions reduction policies. Such policies should avoid placing outsized compliance burdens on these industries, look to identify measures to mitigate compliance costs, and consider opportunities for allowing alternative compliance measures.
- **Buy American and Buy New York:** Requirements and preferences for the content of manufactured goods can limit leakage by incentivizing the procurement of components manufactured consistent with more stringent environmental regulations. Buy American and Buy New York policies can furthermore prioritize in-State companies that support local hiring and bring high-road green jobs to New York.

7.4 Power Plant Retirement and Site Reuse

On the road to achieving the power sector goals within the Climate Act – namely, the 70x30 and 100x40 mandates – the existing power sector will undergo significant evolutions and transformations, leading to uncertain outcomes for conventional power plants (primarily fossil fuel) and their workers and host communities. These impacts were contemplated by the Climate Act as something New York would have to proactively plan around. Specifically, the Climate Act tasked the JTWG with two discrete deliverables, which they considered with the leadership of a Power Plants Subgroup formed specifically to tackle these power plant topics. These two tasks are identifying generation facilities that "may be closed as a result of a transition to a clean energy sector" and identifying issues and opportunities presented by the reuse of those sites.

The JTWG and Power Plants Subgroup set about to tackle these two tasks with a robust, data-driven approach rooted in real-world case-studies and the "facts on the ground" as much as possible, while acknowledging that future scenarios would not be known and fixed. These full work-products are made

available in Appendix D, with the results making clear that power plant reuse is an area where there are both challenges as well as promises of opportunity moving forward.

7.5 Jobs Study

In accordance with the Climate Act, the JTWG also provided oversight to a Jobs Study, serving to forecast clean energy job growth tied to the State's decarbonization goals, with the following specific objectives:[58]

- The number of jobs created to counter climate change, which shall include but not be limited to the energy sector, building sector, transportation sector, and working lands sector
- The projection of the inventory of jobs needed and the skills and training required to meet the demand of jobs to counter climate change
- Workforce disruption due to community transitions to a low-carbon economy

The Jobs Study team leveraged its modeling framework and analysis to better understand and characterize job requirements and how those requirements can be constructed into workforce training and development pathways, including for priority populations and Disadvantaged Communities.

Summary of Jobs Study Findings

The Climate Act tasked the JTWG with conducting a study of the jobs needed to counter climate change, with explicit direction to focus on the buildings, fuels, electricity, transportation, and natural working lands sectors. A competitive process was established to select a team of leading consultants in the field of clean energy workforce to undertake this new analysis to accompany and complement the integration analysis work.

The Jobs Study team, which consisted of BW Research, NYSERDA, DOL, and members of other State agencies including DEC, ESD, New York State Department of State (DOS), NYPA, and Long Island Power Authority (LIPA), conducted and supported a rigorous literature review to derive the analytical framework and methodology deployed to this analysis. Further, the Jobs Study team qualified and calibrated its analytical model by benchmarking its outputs against other modeling frameworks that have been previously validated. The Jobs Study focuses its analysis on a baseline year of 2019 and provides data outputs in five-year increments through 2050 (i.e., 2019, 2025, 2030, 2035, 2040, 2045, and 2050).

[58] ECL § 75-0103(8)(g).

The Jobs Study findings have been updated to align with the "2022 vintage" of the integration analysis described in *Chapter 9. Analysis of the Plan*.

Grounded by projected investments in the State's clean energy economy, the Jobs Study focuses on the opportunity to create jobs associated with New York's decarbonization pathways. Currently, the Jobs Study does not provide additional sensitivity analysis nor does it articulate the potential for low-carbon, export-oriented economic development. Nonetheless, that opportunity represents a potentially significant additional upside in an emerging global marketplace much greater in size than New York. The Jobs Study modeling framework comprised energy supply and energy demand represented by four primary sectors (electricity and fuels for energy supply, and buildings and transportation for energy demand). Further, a total of 28 subsectors were included in the modeling framework and analyses.

The following key highlights from the Jobs Study are presented as evidence of the significant growth anticipated over the next 30 years:

- Across 21 subsectors, total employment increases by over 60% from 2019 to 2030, adding at least 211,000 new jobs in the state of New York. Just seven subsectors experienced displacement of 22,000 jobs, or 14%, in this time period. Overall employment in the four primary sectors increases by at least 189,000 jobs from 2019 to 2030, or a 38% increase in the workforce. The number of jobs added from growing subsectors outnumbered jobs lost in displaced subsectors by a ratio of approximately 10 to one.
- Overall employment in the four primary sectors from 2019 through 2050 increases by at least 269,000 jobs, or a 54% increase in the workforce.
- The buildings sector accounted for well over half of all jobs added in growing subsectors from 2019 to 2030, with the most sizeable increases in added jobs found in the residential HVAC and residential shell subsectors. This finding indicates the need to expand the residential and commercial building workforce training considerably before 2030 to meet the expected need.
- Conventional fueling stations (gas stations) account for over one-third to almost one-half of all displaced jobs in the primary sectors from 2019 to 2030, as more drivers shift to lower-cost charging of EVs. This finding indicates that traditional fueling stations will likely need to adapt beyond providing gasoline for cars to avoid diminishing opportunities for revenue and employment.
- In the electricity sector, more mature subsectors like transmission, distribution, and solar will see strong growth between 2019 and 2040, while more nascent subsectors like offshore wind, storage, and hydrogen are expected to experience exponential growth. This finding indicates that parts of

the growing electricity sector will be able to build upon their current established workforce, while other parts of this sector will almost need to start from the beginning because they have little, if any, existing workforce foundations.

The Jobs Study also provides an estimate of how jobs will change from 2019 to 2030, by industry, occupation, wages, and geography across the state of New York, under both modeled scenarios, in the four primary sectors. All the major industry categories for the Jobs Study, which include construction, professional services, manufacturing, and other supply chains, saw a net increase of employment in the four primary sectors.

The largest net employment increases were found in the construction and manufacturing industries. In the growth subsectors, over three-quarters of total added jobs will be found in the construction industry. In the displaced subsectors, over four out of five industry jobs lost will be found in the other supply chain industries, which include transportation and warehousing, utilities, wholesale, and retail industries.

Additional key findings from the 2021 Jobs Study include the following:

- Geographically, the net job increases from 2019 to 2030 are found in every corner of the State, with each of New York's five regions seeing an increase of between 10,000 and 48,000 net new jobs. This finding indicates that each of the regions should prioritize workforce development efforts and training to supply a well-prepared labor force for these growing positions. While not a direct finding from the Jobs Study, the Council observes that as energy activities increasingly shift from predominantly supply-oriented to demand-side oriented (buildings, transportation, distribution, etc.), this creates the opportunity to drive significant overall job creation as well as company ownership in the communities where energy use is most concentrated, including in urban areas.
- Occupationally, the largest job increases from 2019 to 2030 will be found in installation and repair occupations. They are expected to account for almost two-thirds of added jobs in the growth subsectors. This finding indicates that additional research should be done to understand the education and training resources that lead into these positions and the different career paths that can be found in this category of occupations.
- Though there is clear growth in job opportunities at all parts of the income spectrum, the wage profile of jobs in the four sectors – energy, building, transportation, and working lands – shows

the largest increase from 2019 to 2030 in middle wage positions ($28 to $37 an hour),[59] while high wage (>$37 an hour) and low wage positions (<$28 an hour) grow at slower rates. This finding goes against national and statewide trends that have seen middle wage positions decline over the last 50 years.

[59] Boehm, Michael. February 8, 2014. "Job polarization and the decline of middle-class workers' wages." Vox EU. https://voxeu.org/article/job-polarisation-and-decline-middle-class-workers-wages and Chicago Metropolitan Agency for Planning. May 25, 2018. Technology, Tastes, and Demographic Shifts Contribute to Job Polarization in the U.S. Accessed at https://www.cmap.illinois.gov/updates/all/-/asset_publisher/UIMfSLnFfMB6/content/technology-tastes-and-demographic-shifts-contribute-to-job-polarization-in-the-u-s-.