Just Transition Working Group

Meeting #11

November 9, 2021
11:00am -1:00 pm

NEW YORK STATE OF OPPORTUNITY. Department of Labor

NEW YORK STATE OF OPPORTUNITY. NYSERDA

NEW YORK STATE OF OPPORTUNITY. Climate Action Council

Just Transition Working Group (JTWG)

Meeting #11 Agenda

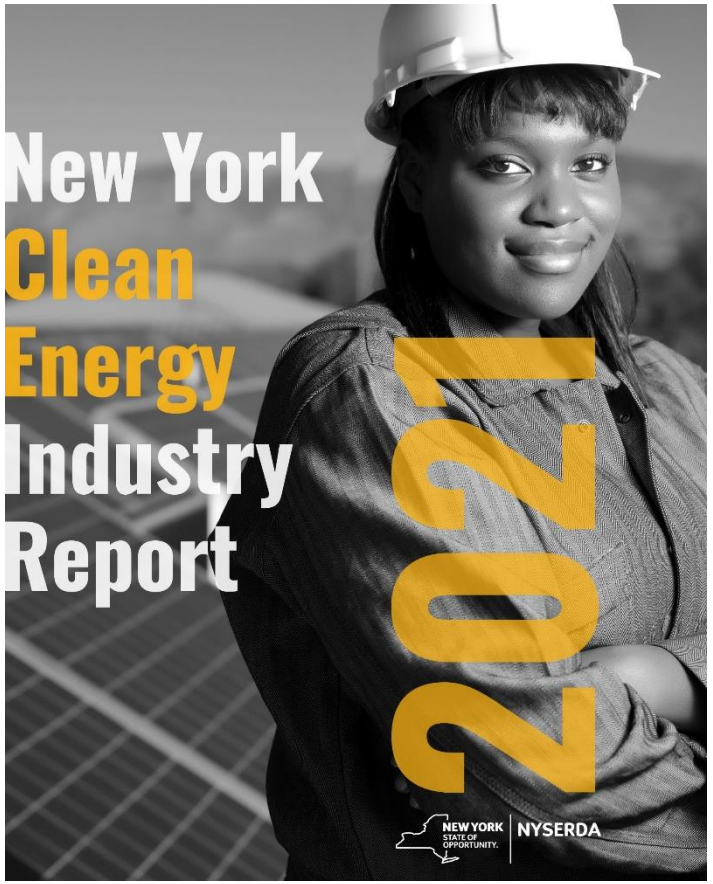
1. **Introduction / Roll Call**
2. **Member Updates**
3. **2021 Clean Energy Industry Report Highlights**
4. **JTWG Jobs Study Initial Employment Outputs**
5. **Q&A**
6. **Next Steps**

Member Updates

Recent highlights from Working Group Members

New York Clean Energy Industry Report 2021

Report Overview



The 5th edition of the annual New York Clean Energy Industry report:

> Measures, characterizes, and analyzes clean energy and traditional energy employment trends across technology sectors

> Highlights the impacts of COVID-19 on clean energy employment, by technology, sub-technology, and value chain

> Explores specific sectors, including:

- offshore wind
- clean and alternative transportation supply chain potential
- priority populations

Key Findings

157,686

clean energy jobs

[at end of 2020]

-4% net job loss [2019 - 2020], but clean energy employment remains **12% higher** than 2015 jobs baseline

> Job losses in NY's clean energy sector were **lower** than the national clean energy average (-9%) and other regional clean energy economies, like PA, MD, MA, and RI

> Clean energy sector was **more resilient** in NY compared to other industries, like accommodation, food service, and retail

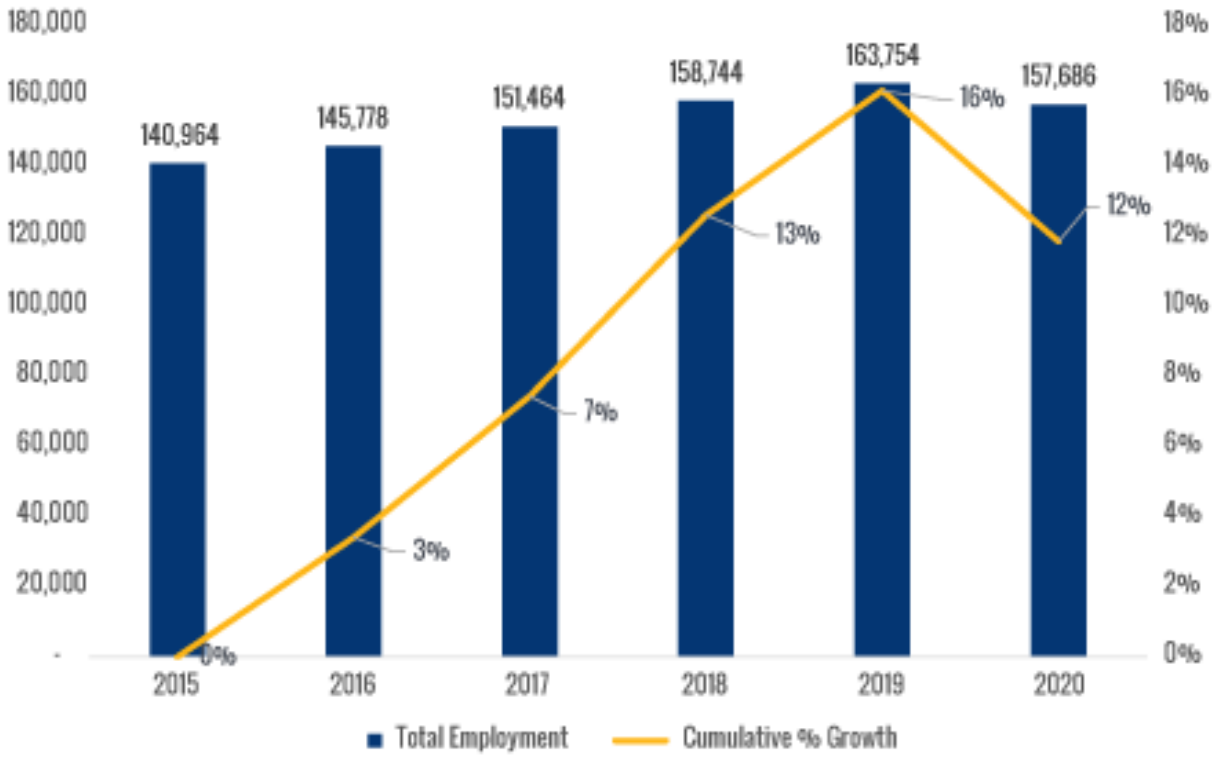
> Survey data from NY manufacturers indicate the State is **ripe for advanced electric vehicle supply chain growth**, but requires policy, capital, and talent/workforce support

> Based on occupational analyses, NY is positioned to capitalize on **offshore wind development**, but will likely require additional workforce development efforts and partnerships

> Clean energy firms recognize importance of **diversity, equity, and inclusion**, but have few formal policies/programs in place to foster it

Overall Clean Energy Employment

Annual Clean Energy Employment in New York (2015-2020)



> Clean energy jobs represented 2% of all employment within the State in 2020

> Continuous growth from 2016 through 2019 (+16%)

> Despite declines in 2019-2020, clean energy employment is still 12% higher than baseline jobs from 2015

COVID

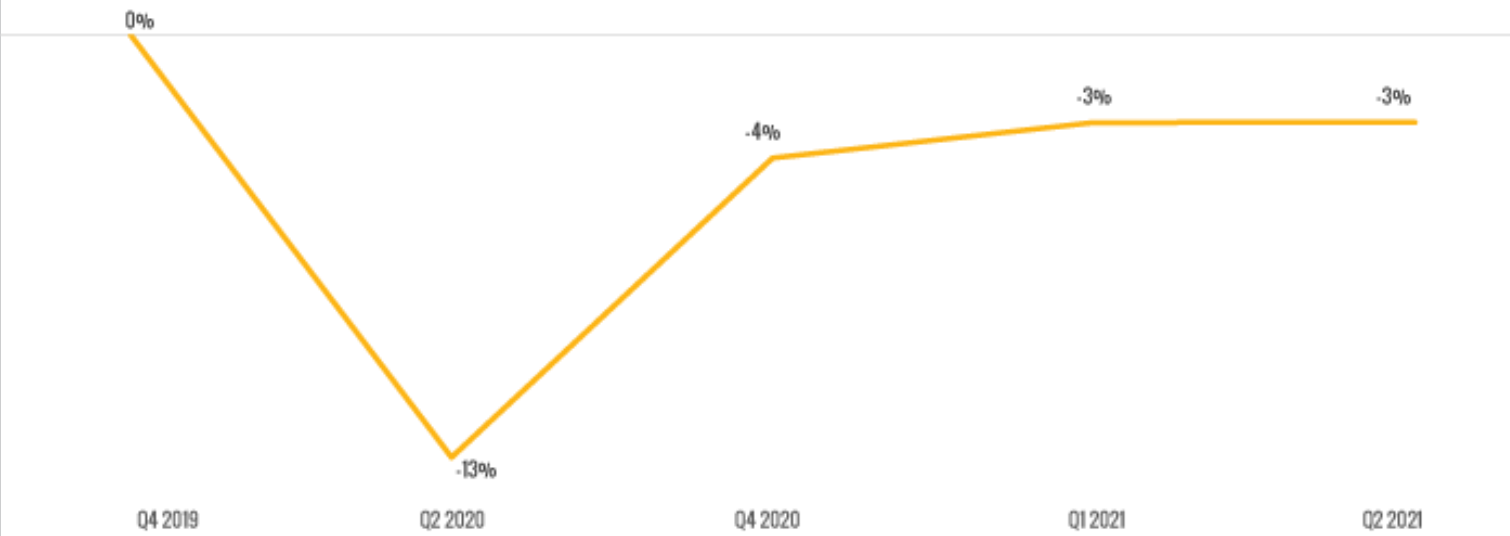
- Between Q4 2019 and Q4 2020, New York lost 6,068 clean energy jobs—almost 4% decline in 12 months
- Clean energy job losses accounted for less that 1% of total losses

COVID-19 Clean Energy Job Trends

> Most significant declines experienced during Q2 2020

> Recovery trajectory from Q2 2020 through Q2 2021 indicate resilience of clean energy economy

New York Clean Energy Industry
COVID-19 Recovery (Q4 2019 – Q2 2021)



Clean and Alternative Transportation
5% growth - 400 jobs

Grid Modernization and Energy Storage
1% growth - 23 jobs

Energy Efficiency hit hardest
5% decline or ~5,800 jobs

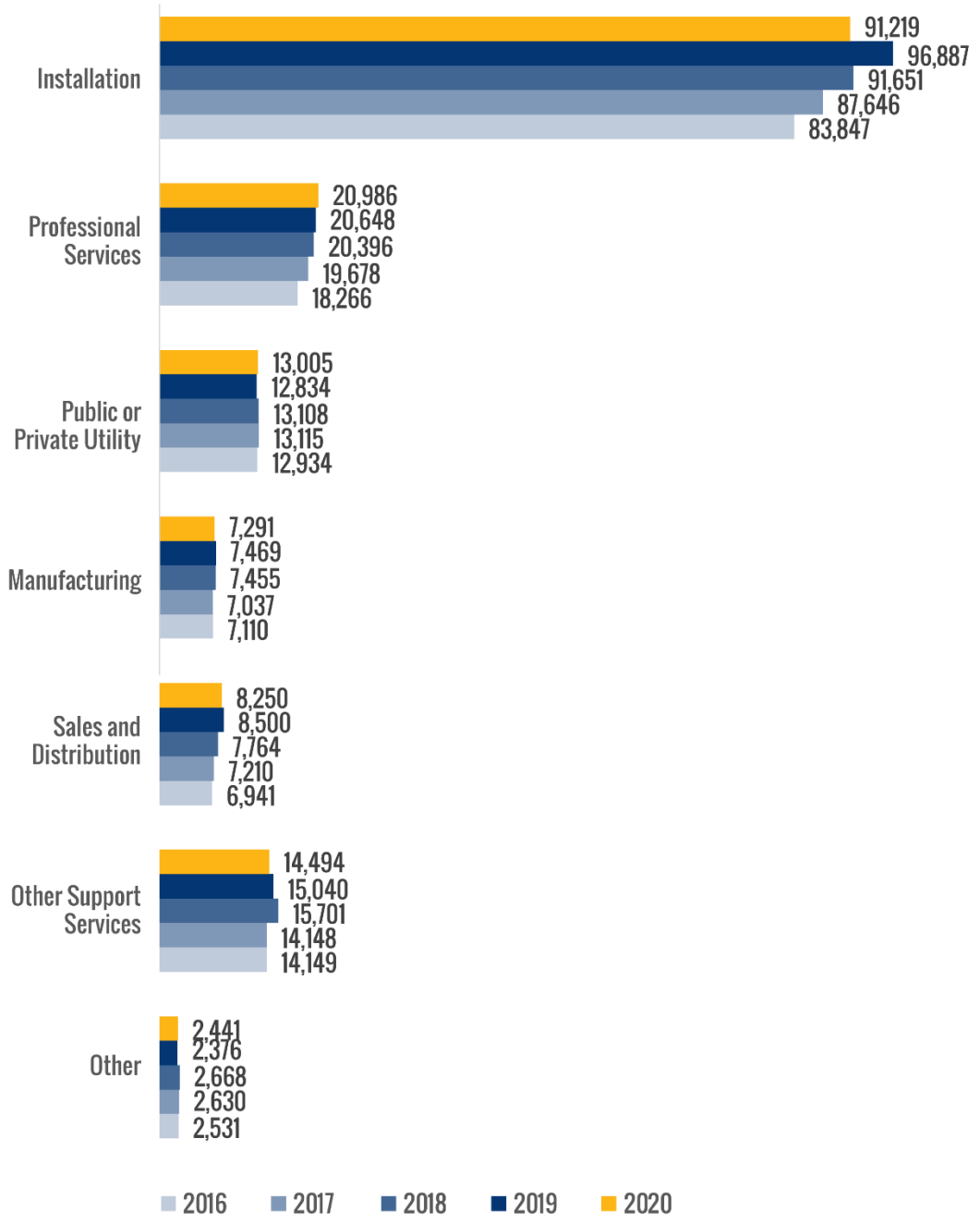
COVID-19 Clean Energy Job Trends

	Employment			Change (2019-2020)	
	2018	2019	2020	Number of Jobs	% Change
Energy Efficiency	123,292	126,739	120,961	-5,779	-5%
Renewable Electric Power Generation	22,023	23,491	22,855	-636	-3%
Clean and Alternative Transportation	8,624	8,579	8,976	397	5%
Renewable Fuels	2,654	2,656	2,582	-74	-3%
Grid Modernization and Energy Storage	2,151	2,289	2,312	23	1%

Clean Energy Employment by Value Chain [2016-2020]

Installation remains the largest value chain segment

These occupations had the greatest loss of jobs



COVID-19 Impacts by Value Chain

Installation occupations had the biggest drop in employment
6% decline - 5,700 jobs

> Though initially most heavily impacted by COVID-19 in mid-2020, the professional services sector had **net growth** from 2019 to 2020 of almost **340 jobs (+2%)**

> Utilities also saw a slight **increase** from 2019 to 2020, of roughly **170 workers** or **1%**

	Employment by Value Chain (2020)	Employment Change (2019-2020)	
	Number of Jobs	Number of Jobs	% Change
Installation	91,219	-5,668	-6%
Professional Services	20,986	338	2%
Public or Private Utility	13,005	171	1%
Manufacturing	7,291	-178	-2%
Sales and Distribution	8,250	-250	-3%
Other Support Services	14,494	-546	-4%
Other	2,441	65	3%

Clean and Alternative Transportation Supply Chain

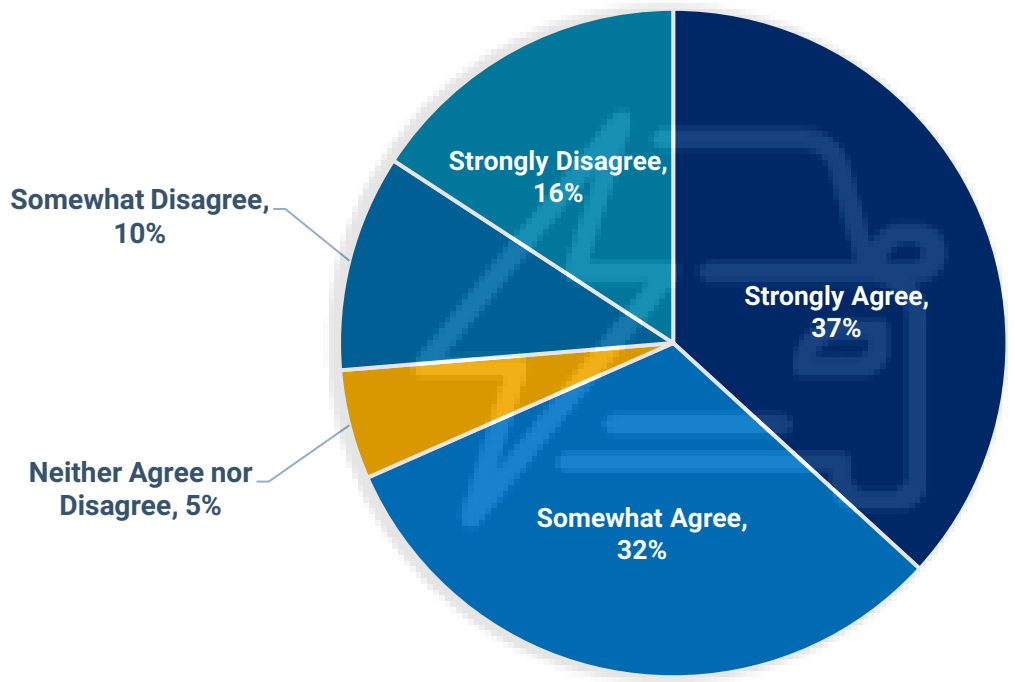
There is interest and potential capacity from NY manufacturers to enter the electric vehicle market

> 69% of surveyed manufacturers in New York agreed they are interested in the opportunity EVs present for their business

> 63% of companies indicated their current offering of goods/services could be used by the EV industry

> 42% of firms believe there is sufficient market demand to grow a profitable EV business

% of Firms That Agree They Are "Interested in the Opportunity Electric Vehicles Present for Their Business" (2020)



* Important to note small sample size for this survey (n=33) due to low concentration of manufacturing firms in New York, which account for about 2% of total business establishments in the State.

Clean and Alternative Transportation Supply Chain

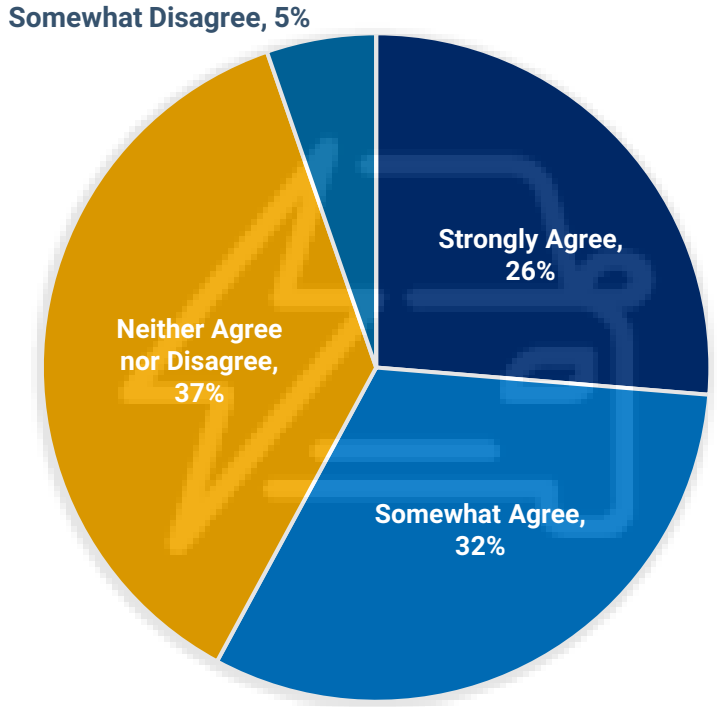
Policy, talent, and capital needs may inhibit NY manufacturers' expansion into electric vehicle markets

> 58% of surveyed manufacturers in New York agreed they would need to make significant capital investments to serve the EV industry

> 48% of companies reported policy challenges inhibiting growth of a profitable business in the EV industry

> 47% of firms believe their staff would need additional training to serve the EV industry

% of Firms That Agree They "Would Need to Make Significant Capital Investments to Serve Electric Vehicle Industry" (2020)



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Offshore Wind Occupations

OSW Occupations by Project Phase

Project Phase	Number of Occupations in each Category	Total Jobs in New York, 2020	Location Quotient (LQ)
Planning and Development	46	1.21 million	1.09
Manufacturing and Assembly	77	1.88 million	0.91
Construction and Installation	71	1.81 million	0.96
Operations and Maintenance (O&M)	62	1.60 million	0.94
Support Services	38	690,000	1.04

> New York has an above-average concentration of jobs required for both the planning and development and support service phases of OSW development

> Jobs in manufacturing, operations and maintenance, and construction are less concentrated in New York compared to the national average

Offshore Wind Occupations

New York has an above-average concentration of jobs required for both planning and development and support service phases of offshore wind development

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OSW Occupations by Project Phase

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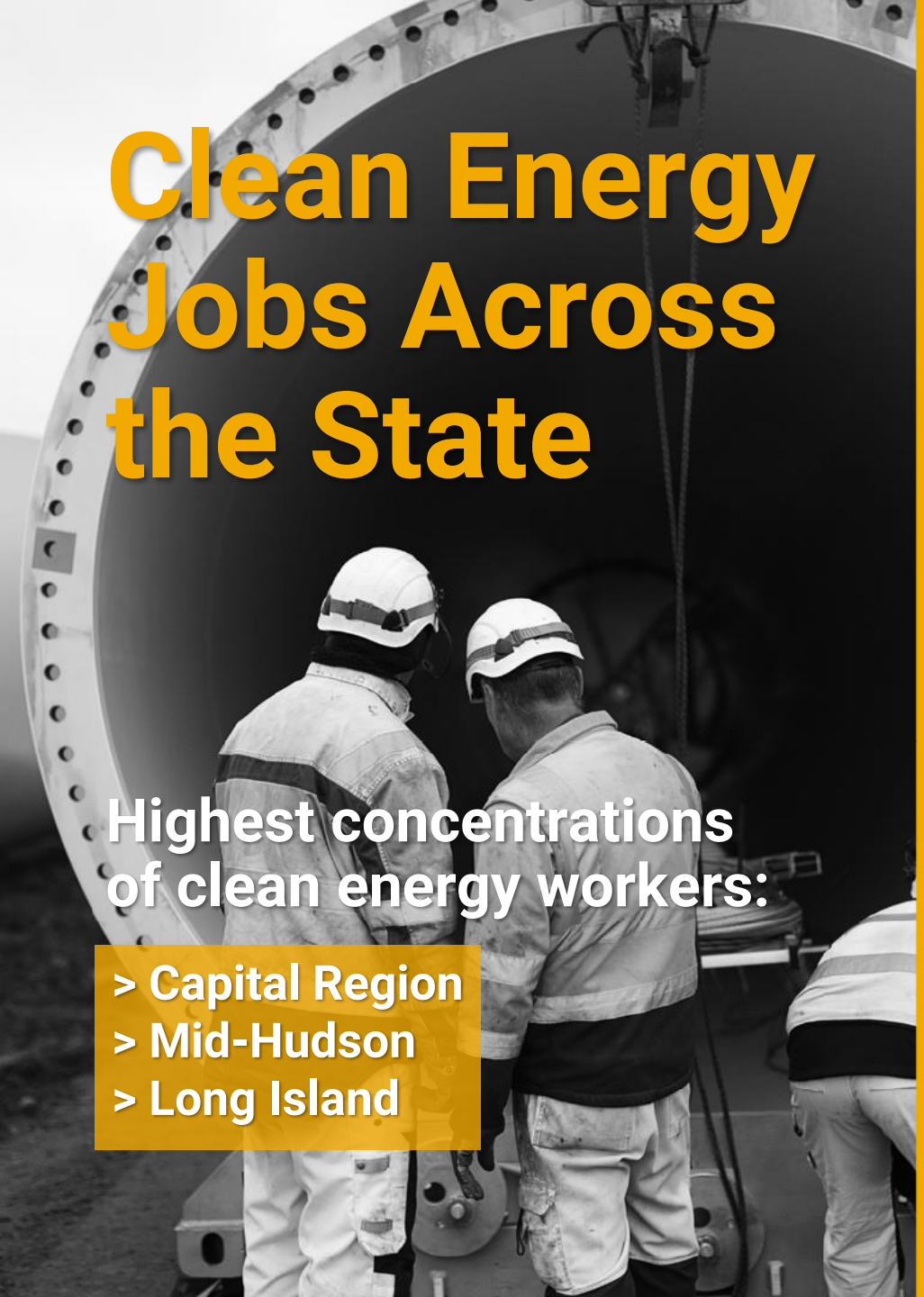
With the nation's most aggressive offshore wind development goals, New York can expect to see job growth in OSW-related occupations over the coming 5-10 years as OSW projects are developed and brought online

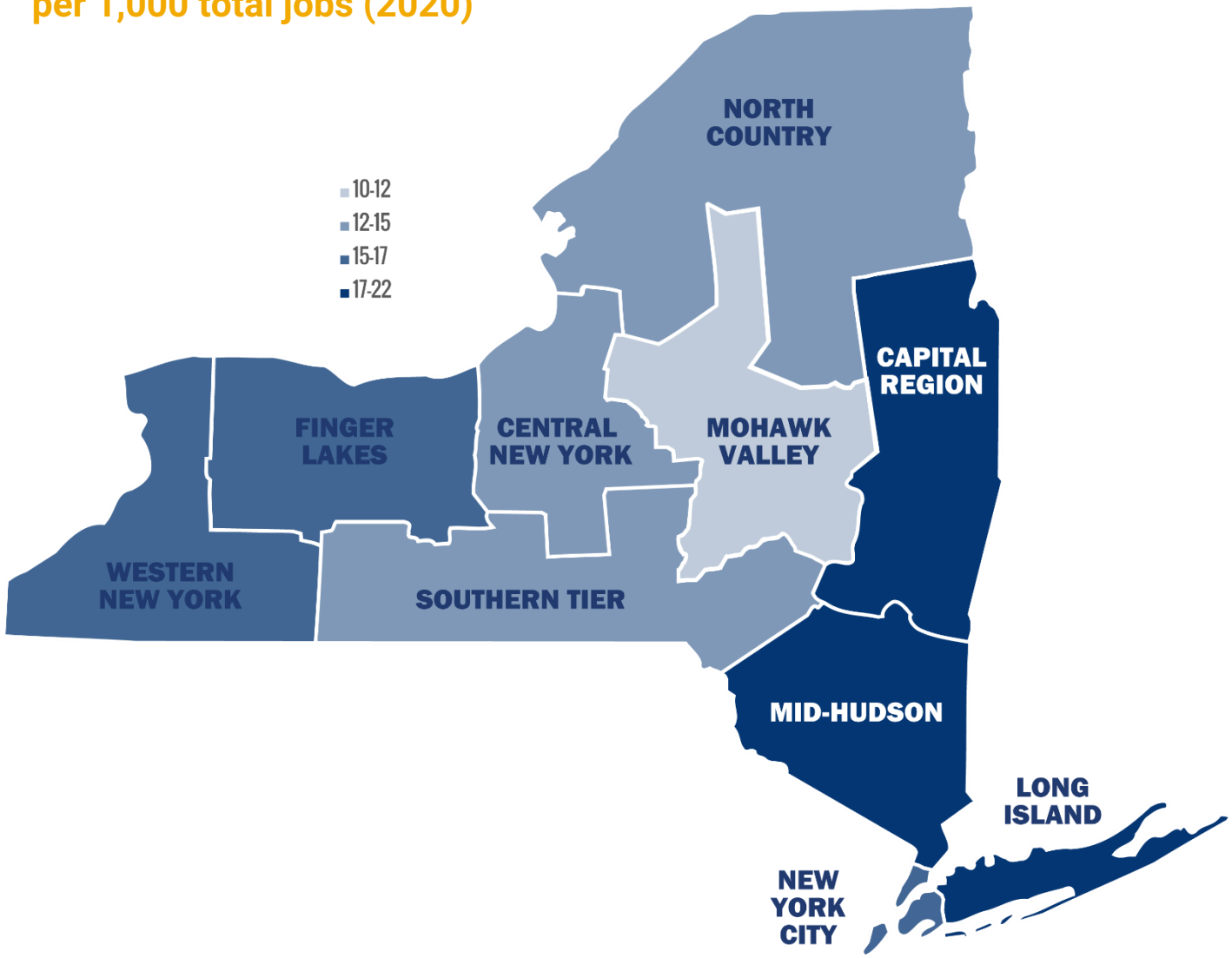
Clean Energy Jobs Across the State



Highest concentrations of clean energy workers:

> Capital Region
> Mid-Hudson
> Long Island

Clean Energy Employment by REDC, per 1,000 total jobs (2020)



Demographics

Diversity in the clean energy sector is largely unchanged compared to 2019

> In 2020, the renewable energy generation sector employed a slightly higher share of women and people of color than the State's clean energy industry as a whole

New York State and National Clean Energy Demographics (2020)

	NY CLEAN ENERGY INDUSTRY					
	Overall Clean Energy, 2019	Overall Clean Energy, 2020	Energy Efficiency, 2020	Renewable Electric Power Generation, 2020	NY Overall[43]	US Clean Energy[44]
Female	26%	25%	24%	29%	49%	27%
Male	74%	75%	76%	71%	51%	73%
White	72%	72%	73%	71%	71%	73%
Hispanic/ Latinx	15%	15%	14%	17%	16%	17%
Black	8%	8%	8%	9%	17%	8%
Asian	8%	6%	6%	9%	10%	8%
Native American	1%	1%	2%	1%	%	1%
Pacific Islander	1%	1%	1%	1%	<1%	1%

** Race categories will not sum to 100% because the individuals who selected "two or more races" are not featured in this table.*

Priority Populations - Employers

	Very Important	Important	Somewhat Important	Not Important	Don't Know/ Refused
Creating a work environment where everyone has equal access to	65%	28%	4%	0%	2%
Listening to and empowering our employees	63%	28%	2%	0%	7%
Ensuring equal opportunities for people of color	48%	33%	4%	9%	6%
Implementing policies and programs that promote a more diverse and inclusive workplace	33%	39%	11%	11%	6%
Placing a high priority on a diverse workplace	35%	30%	13%	15%	7%

** Percentages may not sum to 100% due to rounding.*

The majority of employers agree equal opportunity and diverse/ inclusive workplaces are important to company culture, innovation, and profitability

Priority Populations - Employers

	Yes	No	Don't know/ refused
A company policy to respond to incidents of discrimination	79%	9%	12%
Employee diversity training or diversity awareness events	39%	42%	19%
Strategies, policies, or programs to increase the number of female hires	33%	49%	18%
Strategies, policies, or programs to increase the number of ethnic and racial minorities	28%	53%	19%
Strategies, policies, or programs to increase the number of LGBTQ+ individuals	21%	56%	23%
Strategies, policies, or programs to increase the number of Veterans	19%	60%	21%

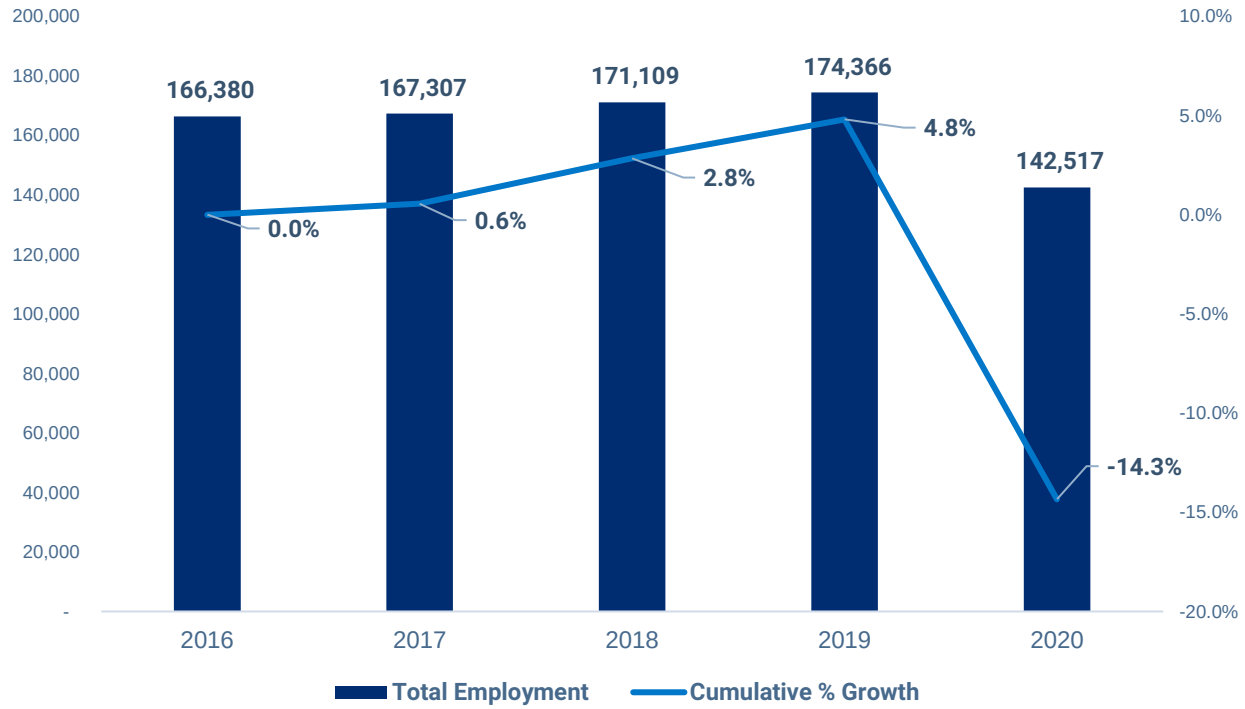
> Few clean energy companies reported having formal policies in place to recruit diverse populations

> Seven in ten firms reported they do not actively recruit the formerly incarcerated, homeless individuals, or individuals with disabilities

> Only 15% of employers indicated they have plans to implement diversity policies or programs in the future

Annual Traditional Energy Overview

Annual Traditional Energy Employment in New York (2016-2020)



> 2016 through 2019, the traditional energy sector in New York grew by 4%

> The sector was hard hit by the COVID-19 pandemic, declining by 14% between 2019 and 2020 alone

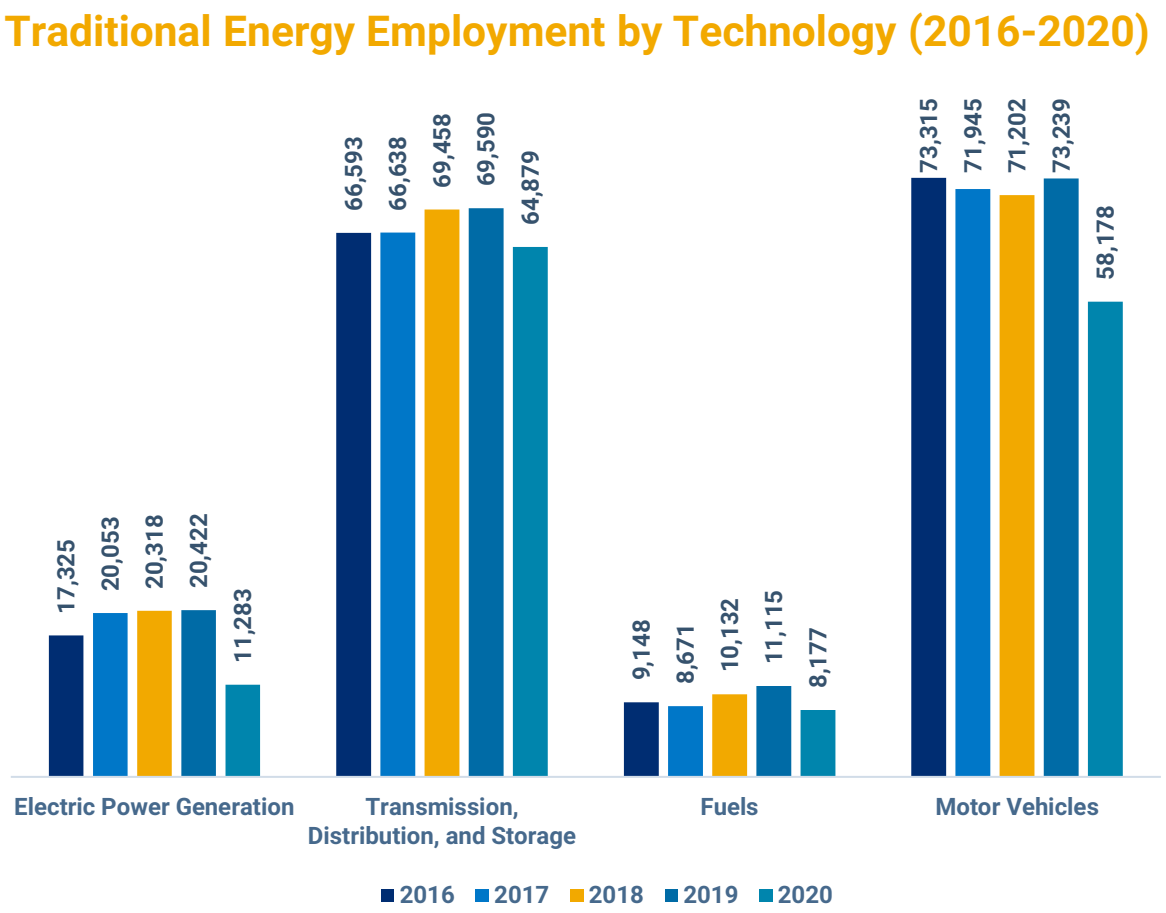
> As of Q4 2020, the traditional energy sector employed 141,928 total workers

- 10% lower compared to the 2016 baseline of employment

COVID

- The traditional energy sector declined by 18% or almost 32,000 jobs in 12 months

Traditional Energy Employment by Technology



> Employment in Transmission, Distribution, and Storage and Motor Vehicles technology sectors accounts for majority of traditional energy jobs

> All traditional energy sectors, except Motor Vehicles, experienced job growth 2016-2019

> Fuels sector 22% job growth

> Electric Power Generation 20% job growth

COVID

- During COVID-19 pandemic, all traditional energy sectors experienced job losses
  - Motor Vehicles and Fuels sectors hit the hardest, shedding ~15,000 and 3,000 workers in 12 months
  - Transmission, Distribution, and Storage firms saw a 7% decline 2019-2020, a loss of just over 4,700 workers
  - Electric Power Generation firms declined by 4% with a loss of more than 450 jobs

Additional Resources Available

nyserda.ny.gov/clean-energy-jobs

Jobs Study Initial Employment Outlook (IEO)

[bw] RESEARCH PARTNERSHIP

Presentation Overview

I. Jobs Study Background

II. Methodology Overview

III. Initial Employment Outputs

IV. Model Sensitivities (upcoming)

V. Workforce Analyses (upcoming)

VI. Next Steps

Jobs Study

Project Background

Jobs Study

Direction from Climate Act

<u>This study is meant to:</u>

- Measure "***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"

- Examine the "***projection of the inventory of jobs*** needed and the skills and training required to meet the demand of jobs to counter climate change" as well as the "***workforce disruption due to community transitions*** from a low carbon economy"

Jobs Study

Direction from Climate Act, (cont'd)

- "Advise the council on ***issues and opportunities for workforce development and training*** related to energy efficiency measures, renewable energy and other clean energy technologies, with specific focus on training and workforce opportunity for ***disadvantaged communities***, and segments of the population that may be underrepresented in the clean energy workforce such as veterans, women and formerly incarcerated persons"

Jobs Study

Project Objectives

Project Objectives & Order of Operations

1. Develop structure & framework of the employment impact model based on literature review (January – April)

2. Produce the employment model outputs by industry and occupation (May – November)

3. Examine the model sensitivities and workforce implications associated with model outputs & scenarios (November – December)

Jobs Study

Literature Review

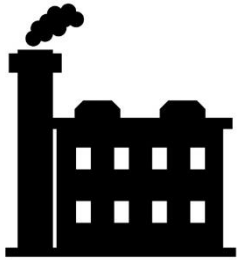
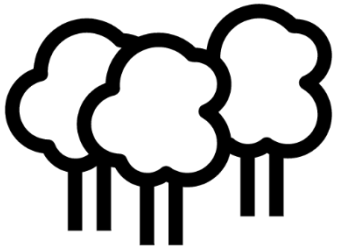
Primary Questions for the Literature Review

1. How are sectors, industries and occupational categories identified and defined? (Structure)

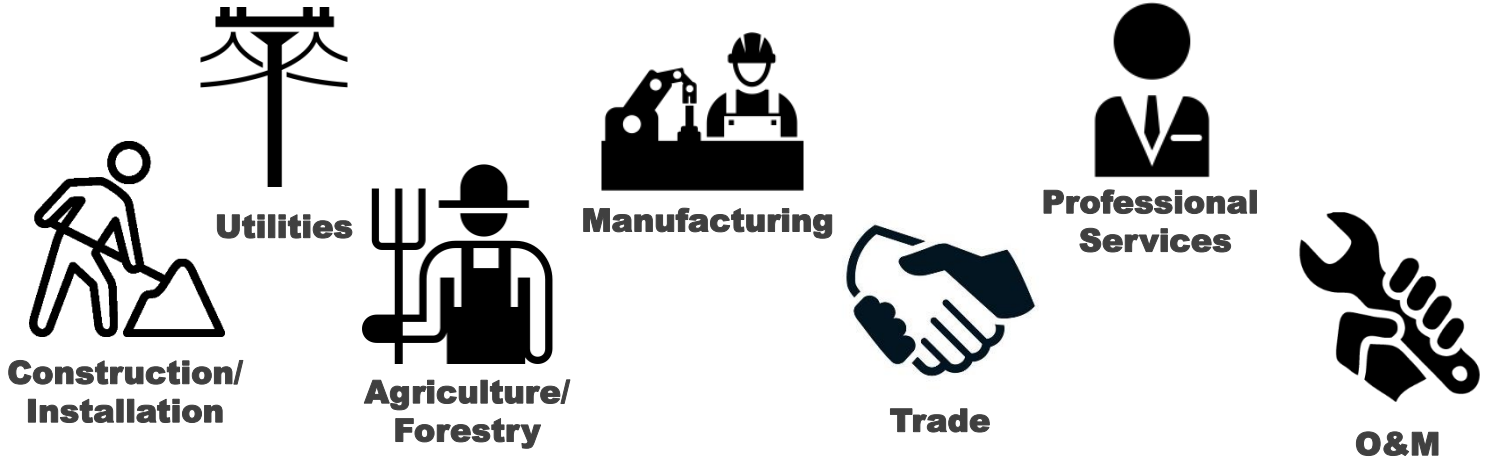
2. What are the methods for estimating current or future job impacts? (Methods)

3. What are the workforce implications of the comparable studies and what was learned from the literature review? (Scenarios & Recommendations)

1. Sectors are used typically used to evaluate employment impacts

Universal Sectors	 Energy/Electricity	 Buildings	 Transportation
Secondary Sectors	 Waste	 Industry (incl. Fuels)	 Working Lands
Other Sectors	 Water	 Option Creation	 District Heating	 Hydrogen

2. Occupational categories are much less consistent in their use.

Value Chain	
Work Setting	

3. Existing studies use for four primary methods for generating employment impacts.

General IMPLAN

- San Joaquin Valley: Cap-and-Trade
- UCLA: except Electricity
- 2035 The Report

Custom IMPLAN

- Putting CA on the High Road
- Zero-Carbon Action Plan

Proprietary Model

- IEc (LIFT)
- USCA (JEDI)
- Vermont (RFF models)
- Energy Policy Solutions (I/O based on DEEPER)
- San Joaquin Valley: Energy (JEDI)
- Advancing Equity (JEDI)
- UCLA: Electricity (JEDI)
- Net-Zero America (DEERS)

Investment Multipliers

- San Joaquin Valley: EE
- BBBF
- Cornell

Jobs Study

Additional Findings from the Literature Review

1. **Renewable energy generation** and **energy efficiency** projects were often cited as key opportunities for workforce development and providing **employment opportunities for disadvantaged communities**.

2. While previous research showed that **coal, oil, & natural gas extraction industries** had **higher wages and rates of unionization** than renewable energy industries, this is less relevant for New York given the nature of the industrial structure.

Jobs Study

Additional Findings from the Literature Review (cont'd)

3. The few studies that examined job quality under different low to no carbon transitioning scenarios emphasized the importance of ***income, retraining, and relocation support*** for transitioning workers to maintain and/or improve job quality.

DRAFT

Jobs Study

Methodology Overview

Jobs Study

Sectors and Sub-sectors

Primary Sectors

I. **Energy Supply**
   1. **Electricity (11 sub-sectors)**
   2. **Fuels (5 sub-sectors)**

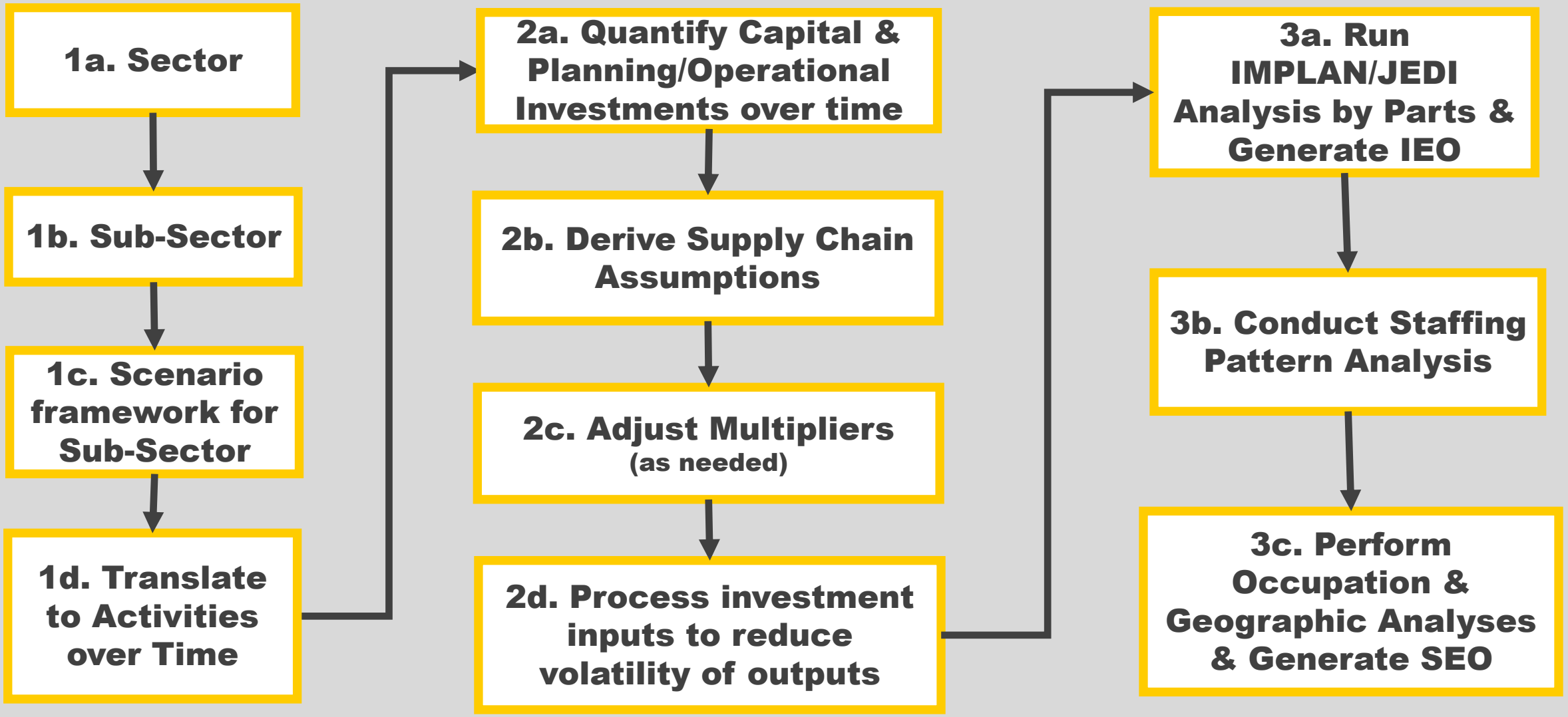
II. **Energy Demand**
   1. **Buildings (6 sub-sectors)**
   2. **Transportation (5 sub-sectors)**

Methodology Overview

Working Lands Study

Parallel Research from the US Climate Alliance

Modeling Framework Overview



Methodology Overview

Process for Generating Initial Employment Outputs (IEO)

Determine unit inputs

From CAC Integration Analysis data – i.e. device stocks and sales, MW electric capacity, fuel demand, etc.

↓

Determine unit and total Investment

Initial input from CAC Integration Analysis data where provided, additional investments may be assumed from secondary sources.

↓

Split Investment into industry category by technical costs data

Segment overall investments into industries based on activity using secondary data sources – i.e. installation of efficiency measures, manufacturing of EV batteries, etc.

↓

Apply multipliers & Levelize Inputs

Input processed investments into IMPLAN industry multipliers based on above cost allocation and levelize inputs to reduce inter-annual variation (as needed)

↓

Report

Jobs created through additions (per 5 years) with 2019 as base employment in general industry categories (Construction, Profession & Business Services, Manufacturing, Other Supply Chain, & Induced Employment)

Methodology Overview

Summary of Input Output Models, IMPLAN, & JEDI

- IMPLAN & JEDI are Input-Output (I/O) models, that illustrate the interdependent relationships between different sectors of a national and regional economy.
- Investments or activities in a given sector are used as inputs into the model, to estimate the ripple or multiplier effect on business, household, and government expenditures and industry employment.
- IMPLAN is not an energy-specific industry analysis, but instead is focused on the overall employment impacts that would be felt across a given economic region, in this case the State of New York.

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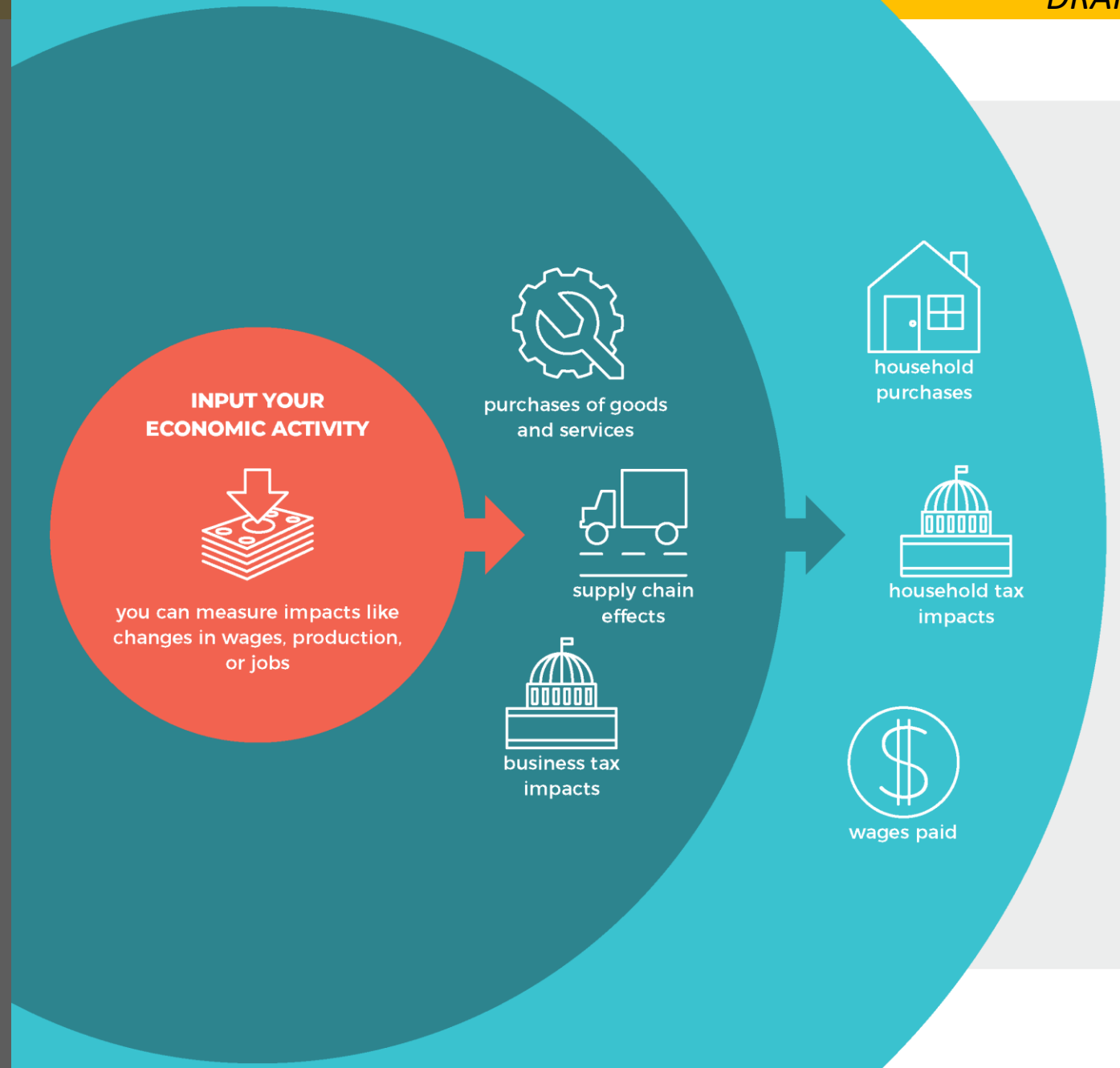
Methodology Overview

Summary of Input Output Models, IMPLAN, & JEDI



WHAT IT SHOWS YOU

DIRECT EFFECTS

These are the initial changes that result from your economic activity. The IMPLAN model will display how the region will economically respond to these initial changes.

INDIRECT EFFECTS

These are the impact of local industries buying goods and services from other local industries as a result of your influence in the economy.

INDUCED EFFECTS

The response by your economy to an initial change that occurs through spending of income received by wage earners.

IMPLAN

Methodology Overview

Summary of Input Output Models, IMPLAN, & JEDI

- JEDI (Jobs and Economic Development Impact) models are the National Renewable Energy Laboratory's (NREL) tools to estimate the local economic impacts of the construction and operation of power generation and biofuel plants. NREL provides JEDI models for various energy sub-sectors, including Onshore and Offshore Wind, Solar, and Biofuels.

- JEDI helps estimate job creation by running user input of project location, facility size, and year of construction, in combination with the built-in model defaults and economic multipliers.

- Buildings sector data was calibrated by an analysis of data on New York State's building electrification activities.

Methodology Overview

Initial Employment Outputs (IEO)

For 2019, 2025, 2030, 2035, 2040, 2045, & 2050

1. Investment Stream by sub-sector
2. Overall annual employment by sub-sector
3. For electricity, the energy that will be generated within each sub-sector
4. Annual employment by general industry (construction, professional & business services, manufacturing, other, & induced) for each sub-sector

Methodology Overview

Secondary Employment Outputs (SEO)

For 2019 & 2030

1. Employment by specific industry (for example construction, is split into four more specific industries, residential, non-residential, structural, and contractors)

2. Employment by occupational category

3. Employment by geographic region within NYS (5 Regions within NYS)

4. Employment by prevailing wage / sustainable wages

IEO to Prevailing Wages

IMPLAN Industry Employment Outputs

NAICS Industry Employment (IMPLAN-NAICS crosswalk)

SOC Occupational Employment (BLS OEWS staffing patterns)

Estimate prevailing (sustainable) wages in New York for 2030

Account for inflation, cost of living, and changes in wages

Employment Categorized proportionally into:

Tier 1 - Above prevailing wage

Tier 2 - At prevailing wage

Tier 3 - Below prevailing wage

Methodology Overview

Overview of CAC Integration Analysis Scenarios

Scenario Overview

> Previous scenarios
- *Reference Case*
  - *Currently implemented policies*
- *Scenario 1: Advisory Panel Recommendations*
  - *Aggregate impacts of recommendations from Advisory Panels*

> Scenarios that meet or exceed GHG emission limits, achieve carbon neutrality by midcentury
- Foundational themes across **all** mitigation scenarios based on findings from Advisory Panels and supporting analysis
  - Zero emission power sector by 2040
  - Enhancement and expansion of transit & vehicle miles traveled reduction
  - More rapid and widespread end-use electrification & efficiency
  - Higher methane mitigation in agriculture and waste
  - End-use electric load flexibility reflective of high customer engagement and advanced techs
- **Scenario 2: Strategic Use of Low-Carbon Fuels**
  - Includes the use of bioenergy derived from biogenic waste, agriculture & forest residues, and limited purpose grown biomass, as well as green hydrogen, for difficult to electrify applications
- **Scenario 3: Accelerated Transition Away from Combustion**
  - Low-to-no bioenergy and hydrogen combustion; Accelerated electrification of buildings and transportation
- **Scenario 4: Beyond 85% Reduction**
  - Accelerated electrification + limited low-carbon fuels; Additional VMT reductions; Additional innovation in methane abatement; Avoids direct air capture of CO_2

Methodology Overview

Summary of CAC Integration Analysis Scenarios

<u>Both Scenarios</u>

- Made considerable investments in Solar and Wind energy.
- Continued investments in transmission, distribution, and storage capacity.
- Invested in charging and hydrogen fueling stations.
- Made considerable investments in commercial and residential buildings.

<u>Scenario 2</u> - Strategic Use of Low Carbon Fuels (S2:LCF)

- Considerable investments in low carbon fuels (including liquid biofuels)

<u>Scenario 3</u> - Accelerate Transition Away from Combustion (S3:AT)

- Greater early investments in grid and electrification

Jobs Study

IEO for Primary Sectors

Jobs Study

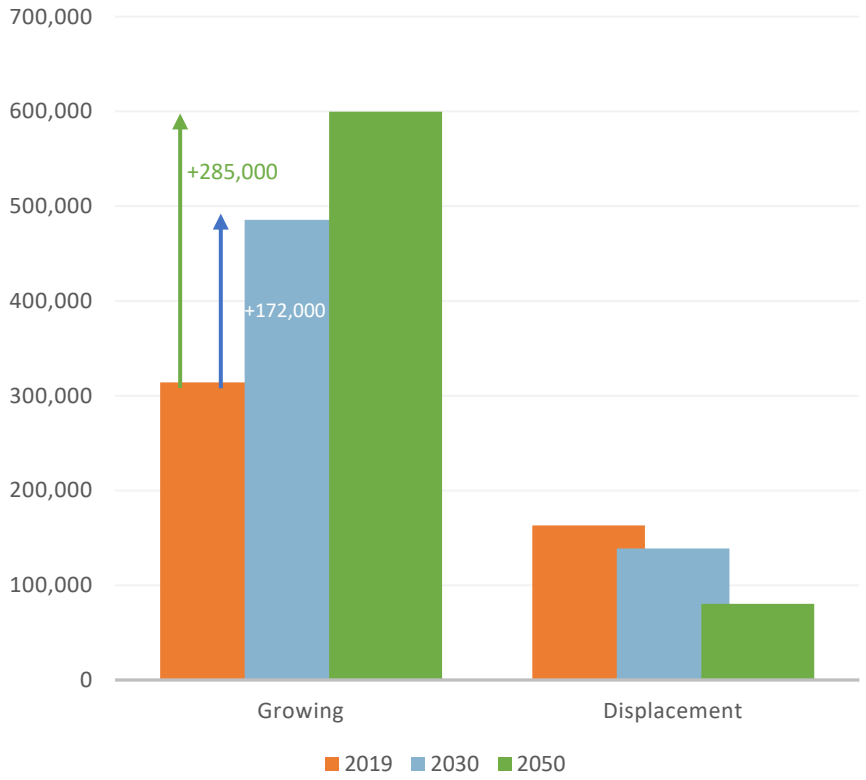
Key Employment Findings: Overall

Growth Sub-Sector

Scoping Plan scenario investments spur hundreds of thousands of new jobs in coming decades

Employment in growth sub-sectors increases by at least **172,000 jobs by 2030**, a 55 percent increase in the workforce from 2019 to 2030.

Employment grows in these sub-sectors by at least **285,000 jobs through 2050**.

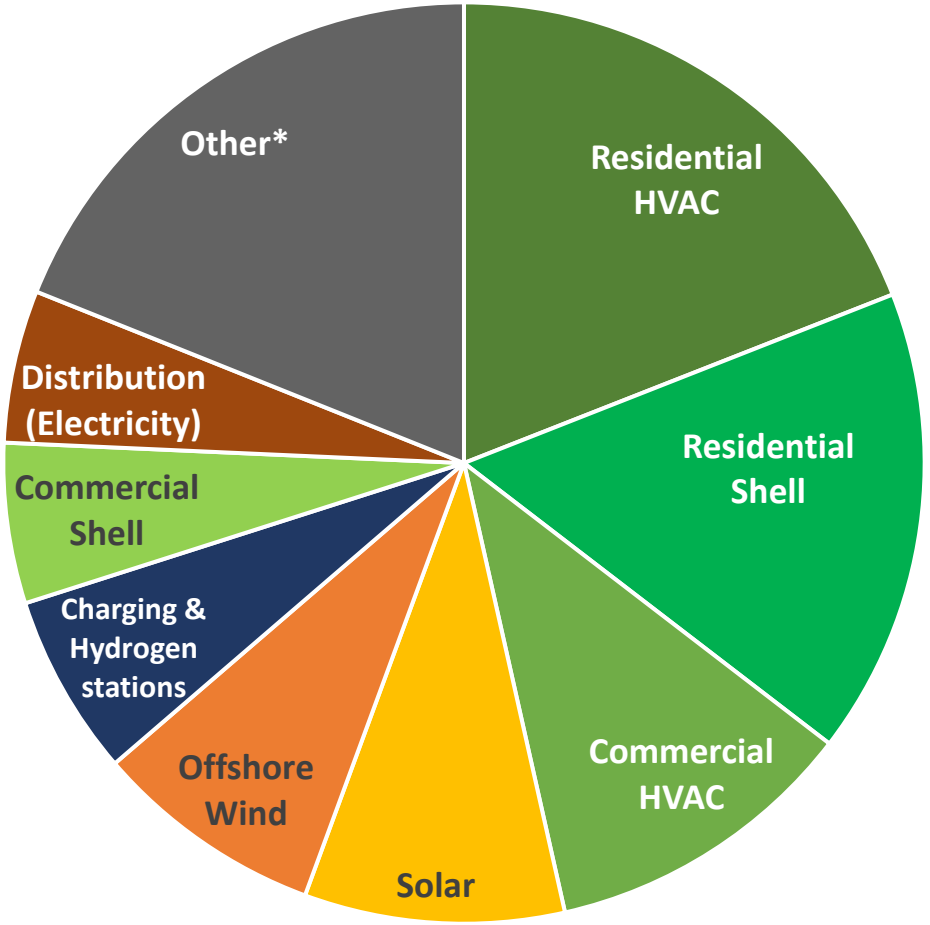


- Clean energy jobs, in their comparable sub-sectors, are expected to **grow at more than twice the rate** of annual growth from 2021 through 2030 as they experienced between 2016 through 2020, in the state of New York.
- By 2050, growth sub-sectors, in the state of New York will reach **nearly 600,000 jobs.**

Jobs Study

Key Employment Findings: S2: LCF Scenario

Sub-Sectoral Breakdown of 172,000 jobs Added by 2030



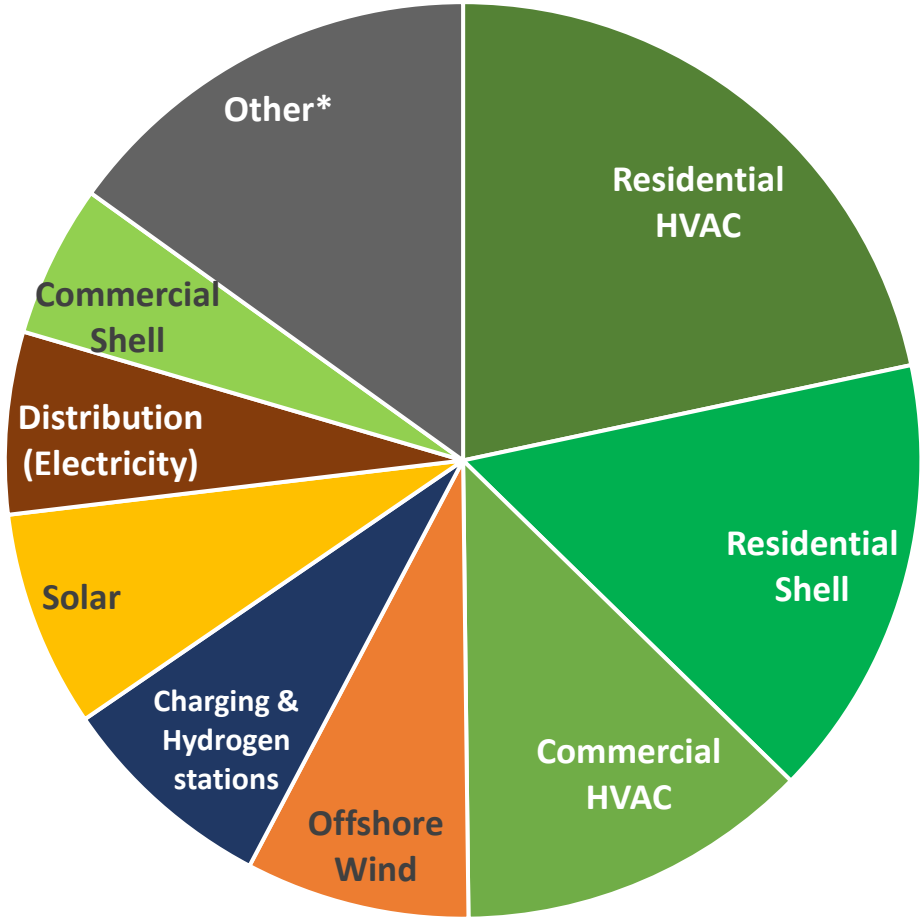
- **Over half of the new jobs, in the growth sub-sectors, from 2019 to 2030, will be found in the buildings sub-sectors (shaded green)**
- **The next largest growth sub-sectors are solar and offshore wind electricity generation, and electric vehicle charging and hydrogen fueling stations**

* Includes Transmission, Storage, Other Generation, Bioenergy, Residential Other, Hydrogen, Onshore Wind, & Vehicle Manufacturing

Jobs Study

Key Employment Findings: S3: AT Scenario

Sub-Sectoral Breakdown of 180,000 jobs Added by 2030



- **With higher levels of investment in 2030, the buildings sector shows even more growth in the third scenario (S3:AT), compared to the second (S2:LCF)**
- **Offshore wind is one of the fastest growing sub-sectors, increasing from less than 1,000 jobs to almost 15,000 by 2030**

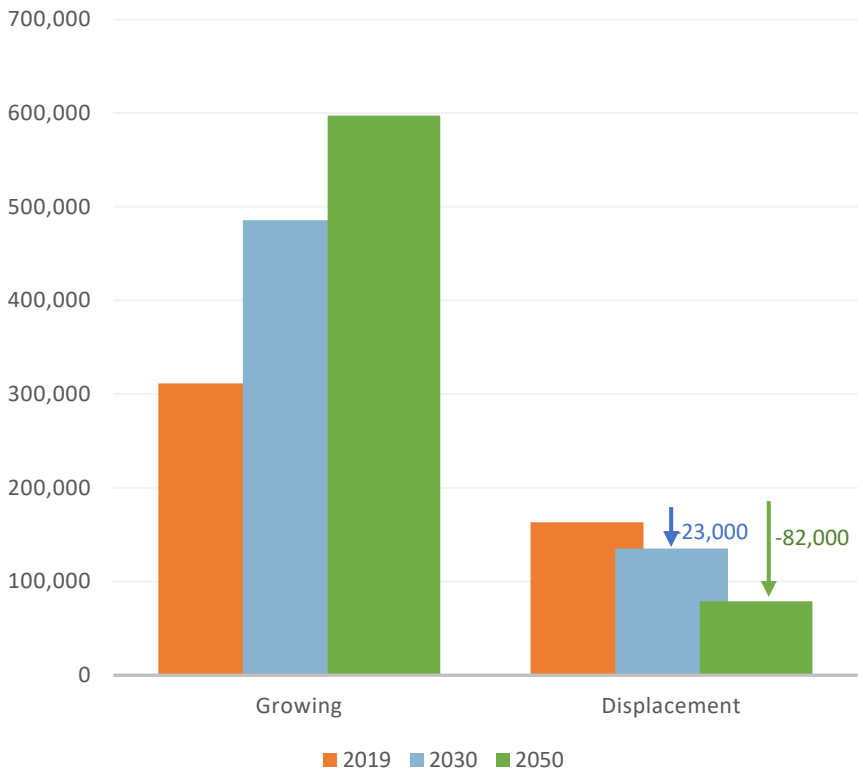
* Includes Transmission, Storage, Residential Other, Bioenergy, Onshore Wind, Hydrogen, Other Generation, Wholesale Trade, and Vehicle Manufacturing

Jobs Study

Key Employment Findings: Overall

Displaced Sub-Sectors

For every job displaced, 7 jobs are added by 2030 under the Scoping Plan scenarios

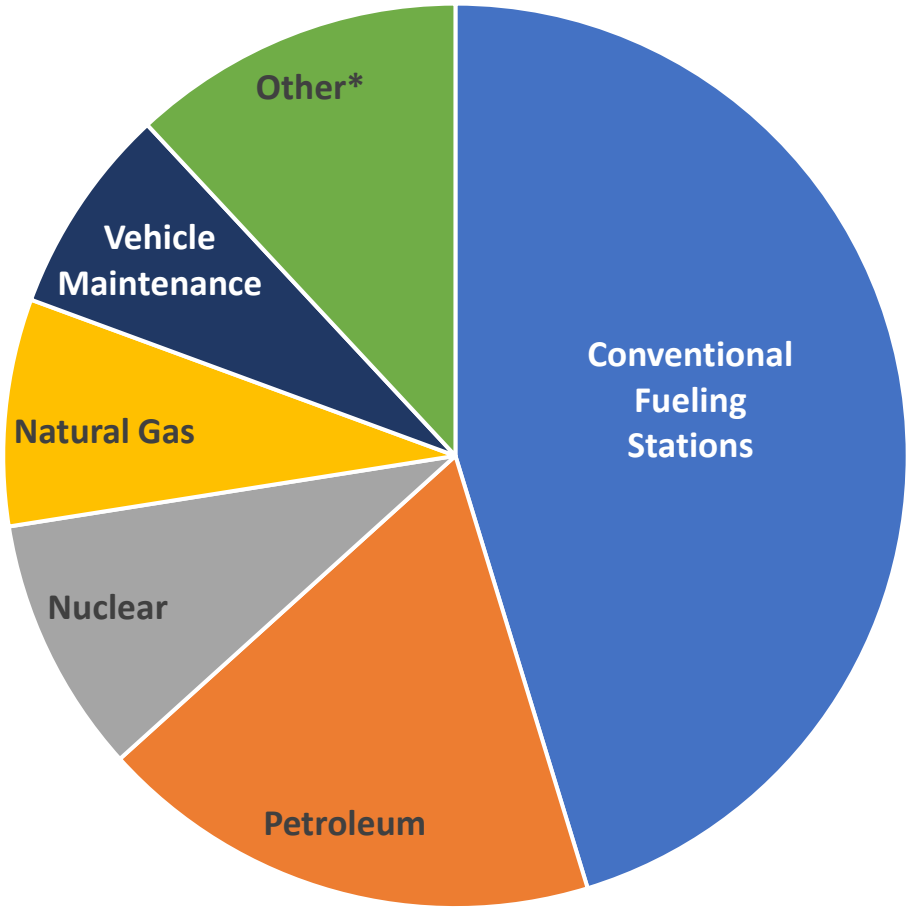


- Employment in the displaced sub-sectors **decreases by at least 23,000 jobs by 2030**, a 14 percent decrease in the workforce from 2019 to 2030.
- Employment **declines in these sub-sectors by at least 82,000 jobs through 2050**.
- In the displaced sub-sectors, from 2019 to 2030, one worker may be lost for every seven current workers, which **could be offset by retiring workers coupled with job transitions**

Jobs Study

Key Employment Findings: S2: LCF Scenario

Sub-Sectoral Breakdown of 23,000 jobs Displaced by 2030



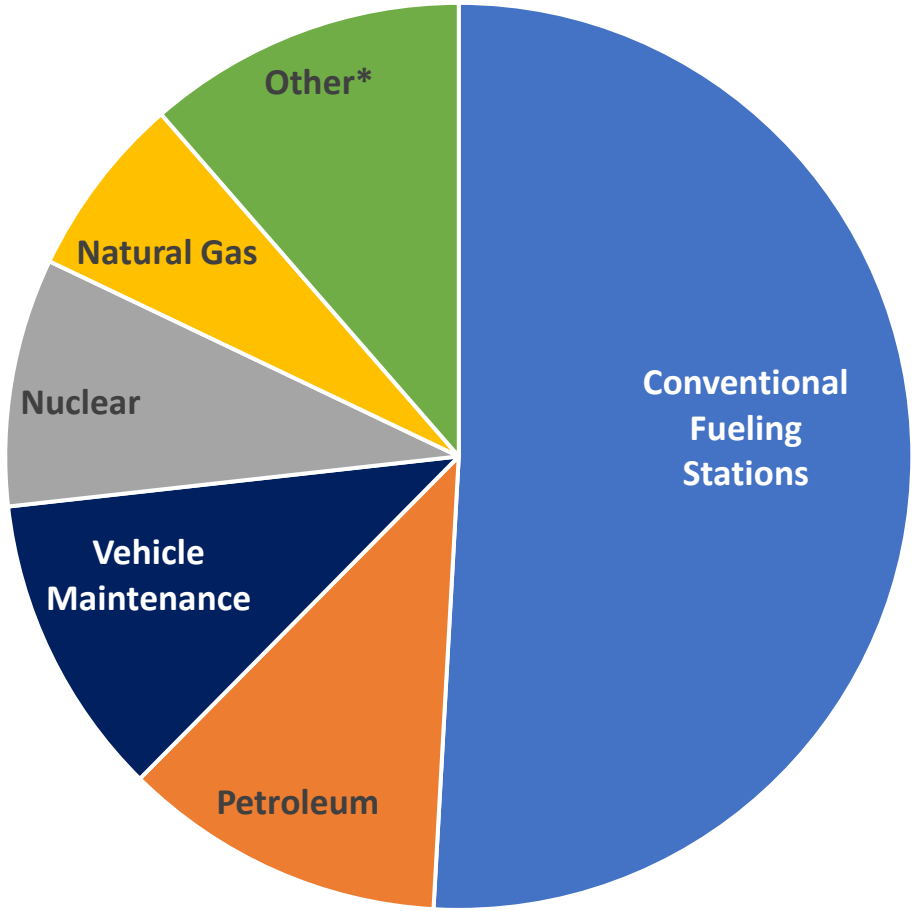
- **About half of the displaced jobs from 2019 to 2030 are found in conventional fueling stations (gas stations)**
- **Conventional fuel industries (Petroleum & Natural Gas) represent about one-quarter of the displaced employment**

* Includes Natural Gas Generation, Natural Gas Distribution, and Other Fossil Generation

Jobs Study

Key Employment Findings: S3: AT Scenario

Sub-Sectoral Breakdown of 24,000 jobs Displaced by 2030



- **Displaced employment from Conventional Fueling Stations represents just over half of all displaced jobs in the third scenario (S3:AT)**

* Includes Natural Gas Generation, Natural Gas Distribution, and Other Fossil Generation

Jobs Study

Key Employment Findings:

Electricity Sector

Employment in the 'Electricity Sector', specifically in the Solar, Offshore Wind, Onshore Wind, Other Generation, Distribution, Transmission, and Storage sub-sectors will grow to at least 212,000 by 2040, an 87 percent increase from the 2019 workforce, and 98,000 jobs added. These growing electricity sub-sectors will also experience employment increases to at least 165,000 total jobs by 2030, a 46 percent increase (52,000 jobs added) from the 2019 workforce.

Jobs Study

Key Employment Findings:

Electricity Sector (cont'd)

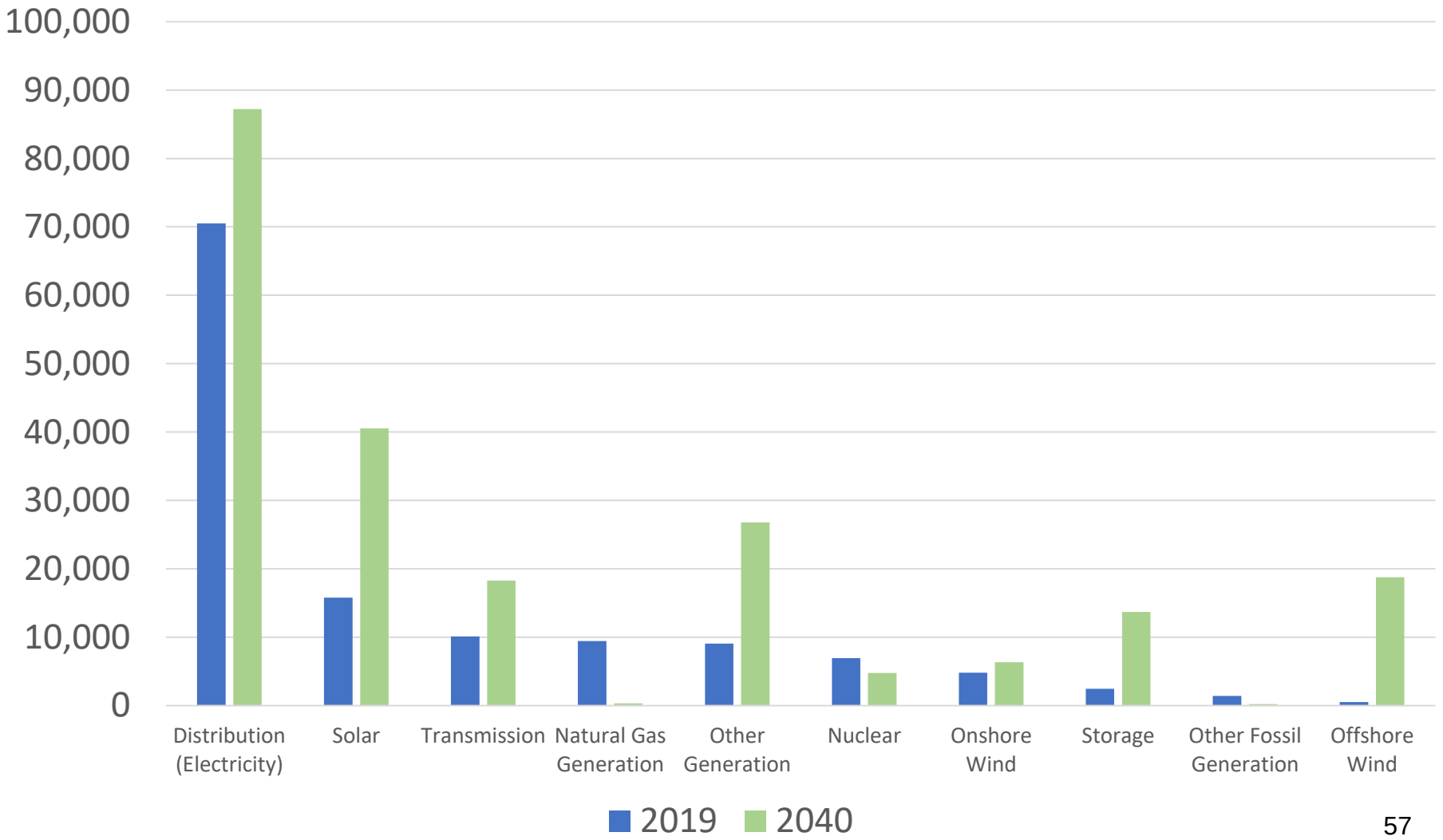
Employment in the 'Electricity Sector', specifically in the Natural Gas Generation, Other Fossil Generation, and Nuclear sub-sectors falls to 5,000 by 2040, a 70 percent decline compared to the 2019 workforce. Jobs continue to decline in these sub-sectors through 2050, reaching approximately 3,000 in the final year of the analysis.

On net, overall employment in the Electricity Sector grows to at least 217,000 by 2040, a 66 percent increase from the 2019 workforce, and 86,000 jobs added.

Jobs Study

Electricity Sector Jobs Changes: S2: LCF Scenario

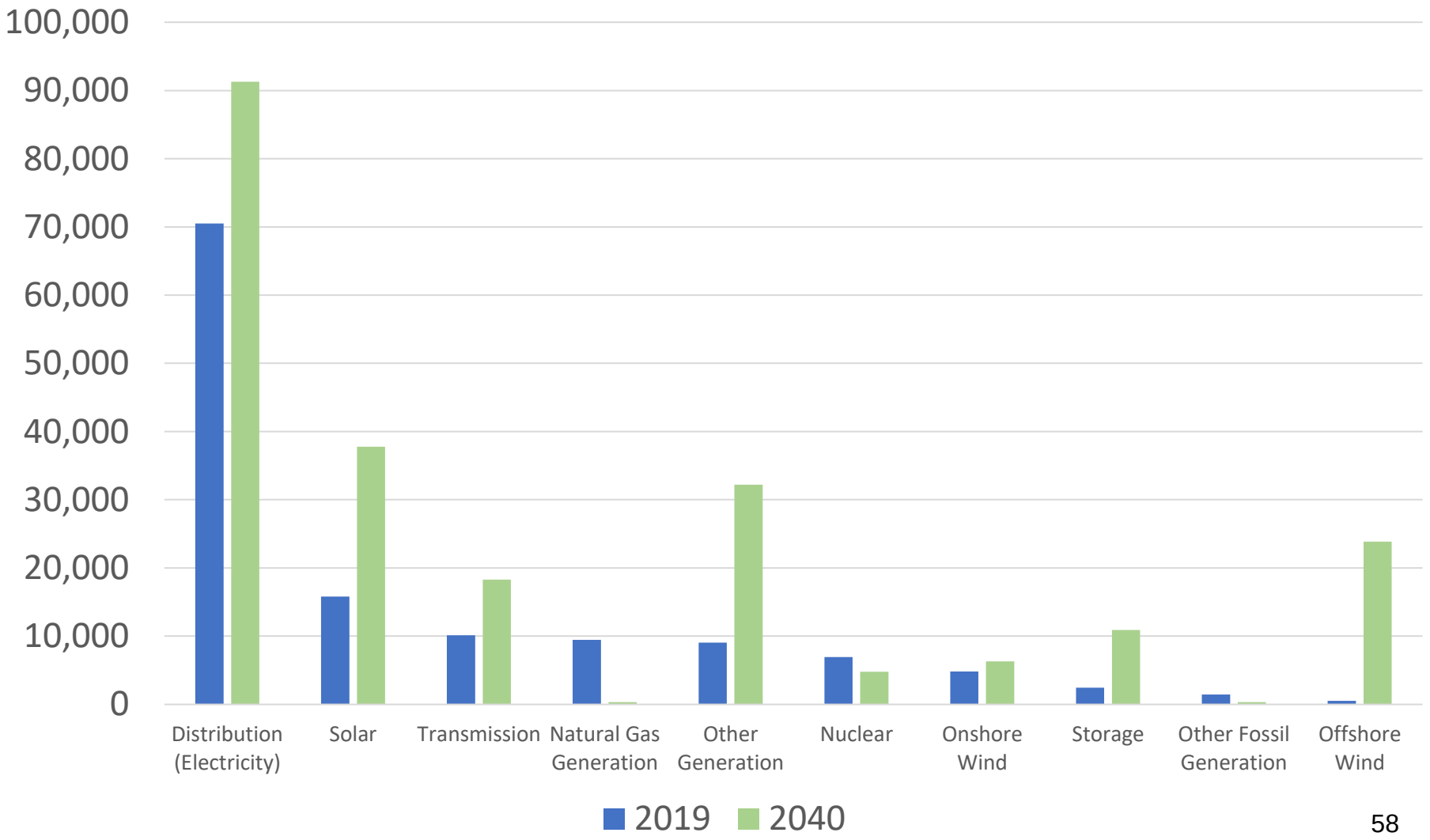
Distribution (Electricity) and Solar sub-sectors, the two largest sub-sectors in electricity in 2019, will see considerable growth through 2040, Offshore Wind, the smallest in 2019, will grow the most proportionally through 2040.



Jobs Study

Electricity Sector Jobs Changes: S3: AT Scenario

In the third scenario (S3:AT), employment growth increases more in Offshore Wind and Other Generation compared to the second scenario (S2:LCF)



Jobs Study

Key Employment Findings:

Fuels Sector

Employment in the 'Fuels Sector', specifically in the Hydrogen and Bioenergy sub-sectors will grow to as much as 11,000 by 2040, a four-fold increase from the 2019 workforce, and 8,000 jobs added. These growing Fuels sub-sectors will also experience employment increases to as much as 8,200 total jobs by 2030, over double (5,000 jobs added) the 2019 workforce.

Jobs Study

Key Employment Findings:

Fuels Sector (cont'd)

Employment in the 'Fuels Sector', specifically, in the Natural Gas, Natural Gas Distribution, and Petroleum sub-sectors falls to as much as 7,500 by 2040, a 69 percent decline compared to the 2019 workforce. Jobs continue to decline in these sub-sectors through 2050, reaching about 1,000 in the final year of the analysis.

On net, overall employment in the Fuels Sector declines to as low as 23,000 by 2030, a 16 percent decrease from the 2019 workforce, and 4,300 jobs lost. Total jobs in the Fuels Sector continue to decline through 2050, reaching just over 6,000.

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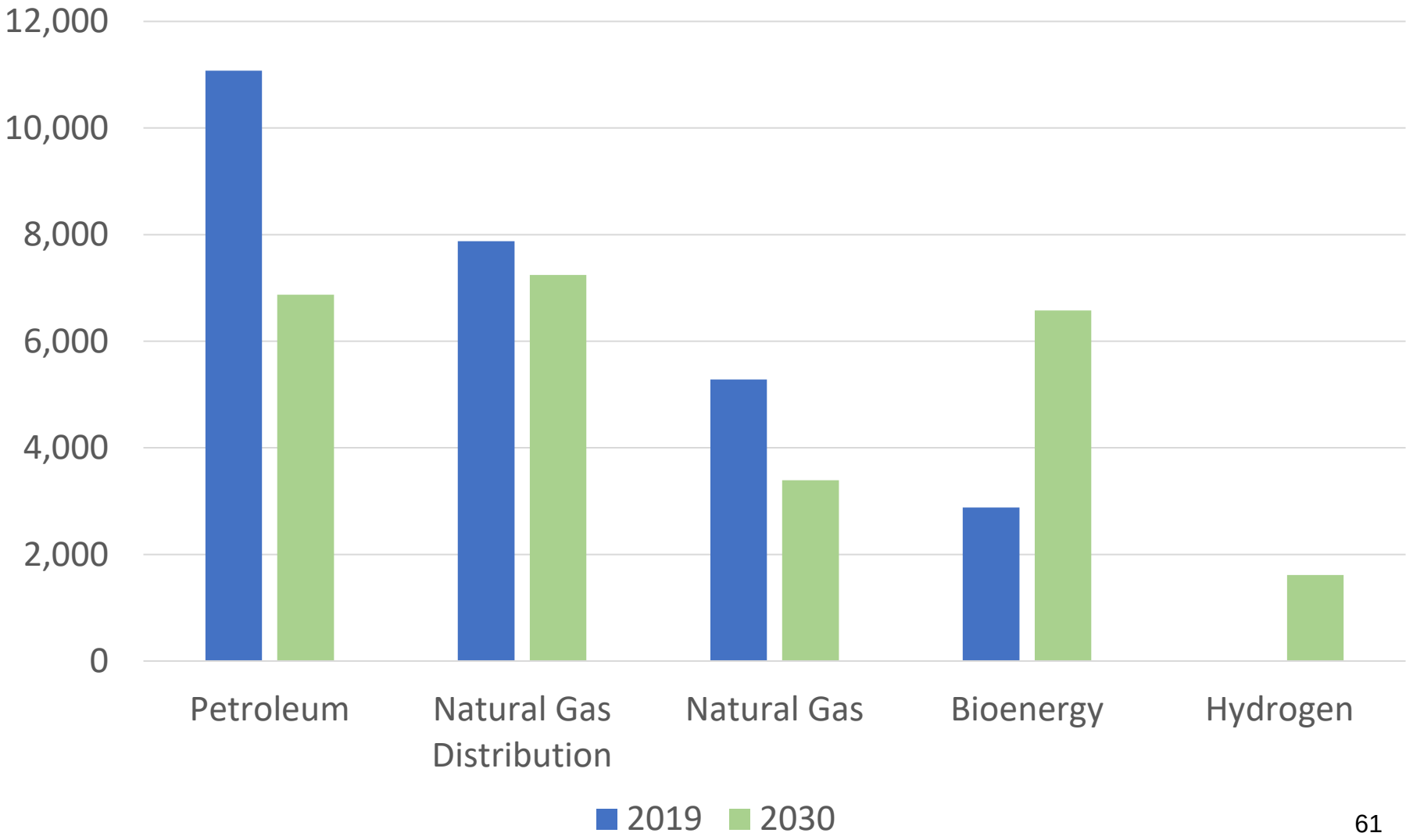
Jobs Study

Fuels Sector Jobs Changes: S2: LCF Scenario

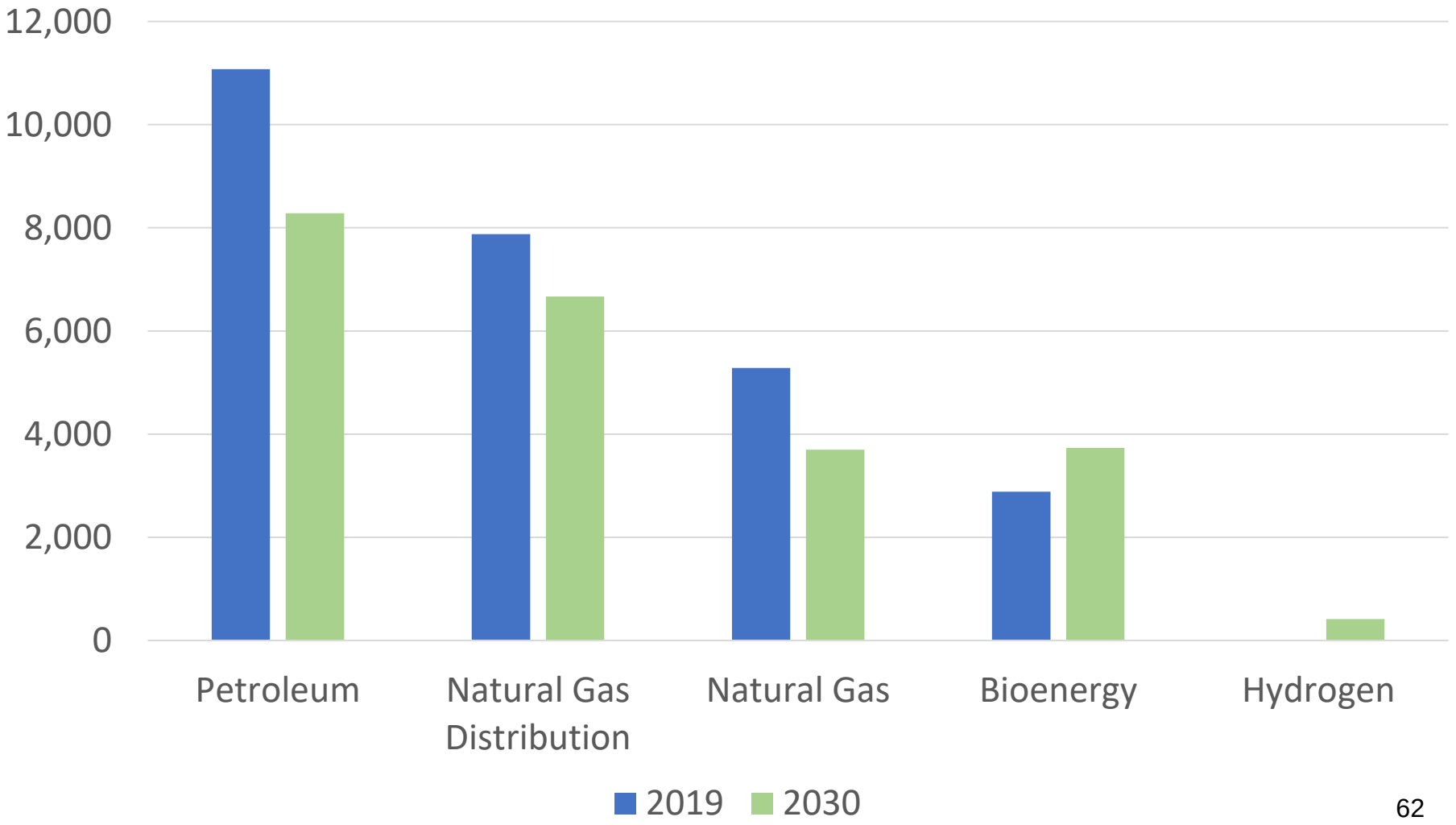
Displaced employment in the Petroleum and Natural Gas sub-sectors are largely offset by increased employment in Bioenergy and Hydrogen.



Jobs Study

Fuels Sector Jobs Changes: S3: AT Scenario

In the third scenario (S3:AT), the increased employment in Bioenergy and Hydrogen is considerably less than the second scenario (S2:LCF).



Jobs Study

Key Employment Findings:

Buildings Sector

Employment in the 'Buildings Sector' will grow to over 226,700 by 2030, a 79 percent increase from the 2019 workforce, and over 100,000 jobs added.

On net, overall employment in the Buildings Sector grows to approximately 272,000 by 2040, more than doubling the 2019 workforce by adding almost 146,000 new jobs. Total jobs in the Buildings Sector continue to increase through 2050, reaching about 304,000.

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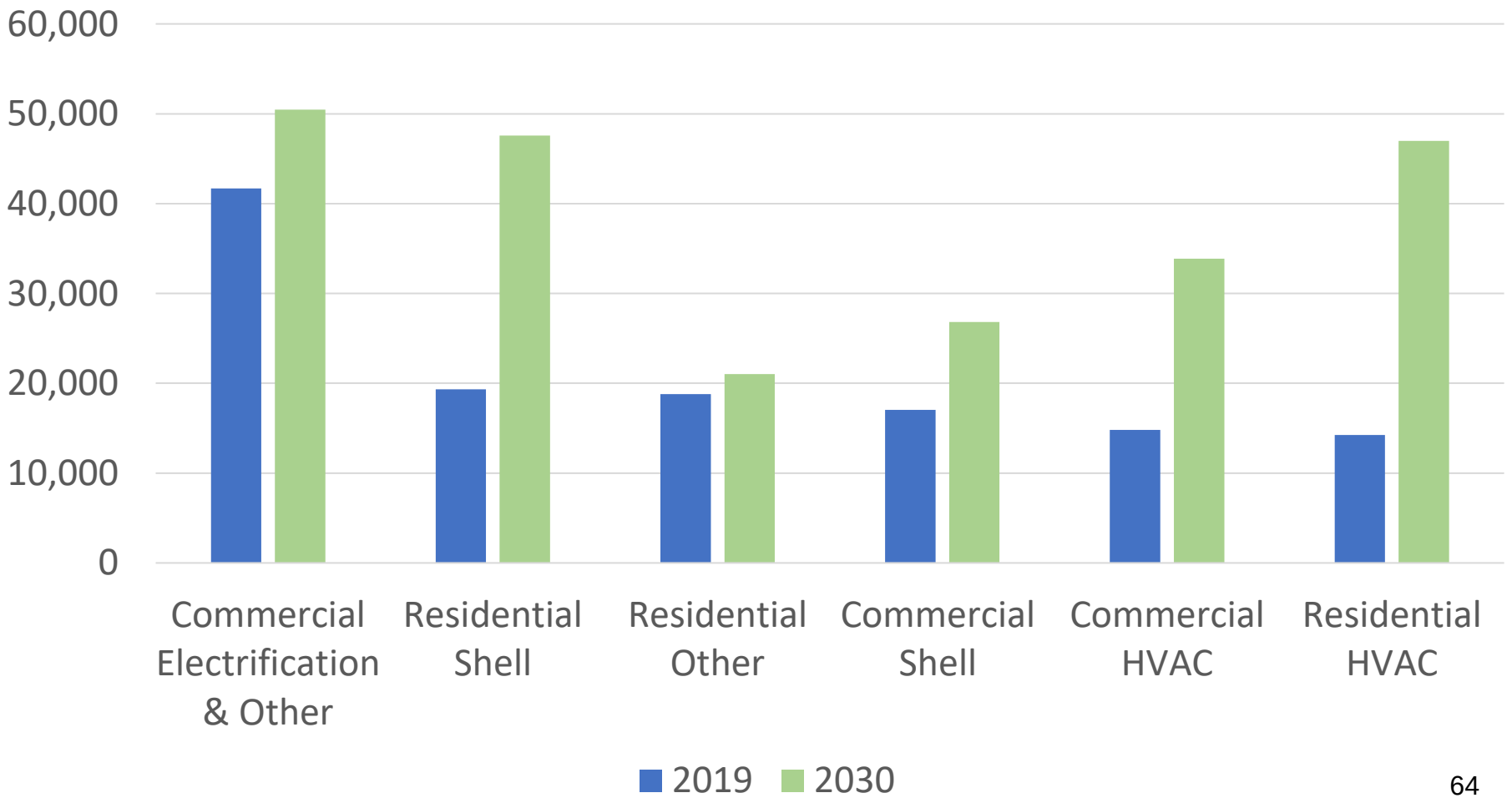
Jobs Study

Buildings Sector Jobs Changes: S2: LCF Scenario

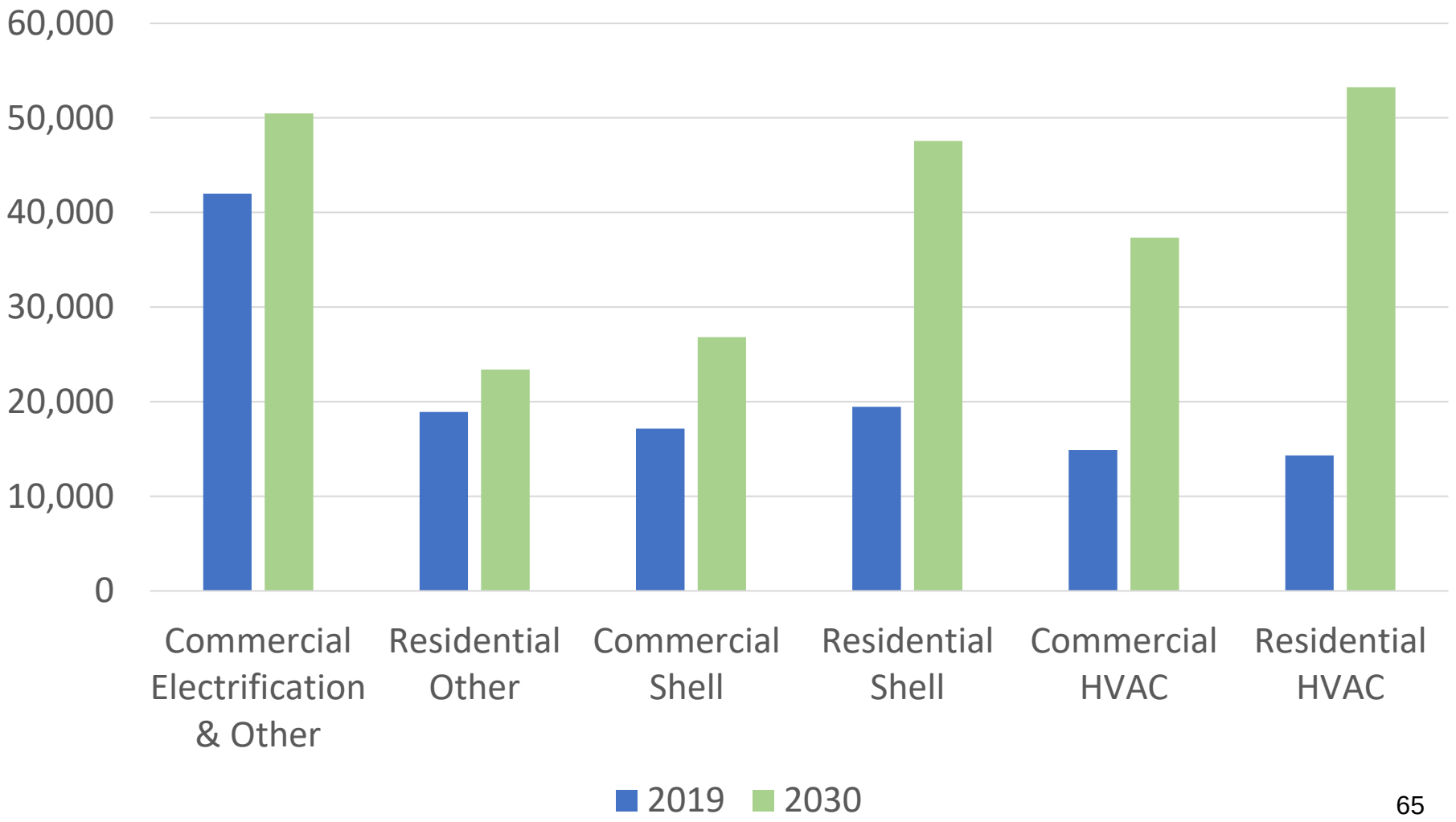
Employment in each of the Buildings sub-sectors increases from 2019 to 2030, with the largest increases found in Residential Shell, Commercial HVAC, and Residential HVAC.



Jobs Study

Buildings Sector Jobs Changes: S3: AT Scenario

Due to accelerated investments, the third scenario (S3:AT) sees even larger employment increases in the Buildings sub-sectors compared to the second scenario (S2:LCF).



Jobs Study

Key Employment Findings:

Transportation Sector

Employment in the 'Transportation Sector', specifically in the Vehicle Manufacturing, Wholesale Trade Parts, and Charging and Hydrogen Fuel Stations sub-sectors will grow to over 93,000 by 2040, a 31 percent increase from the 2019 workforce, and over 22,000 jobs added.

Jobs Study

Key Employment Findings:

Transportation Sector (cont'd)

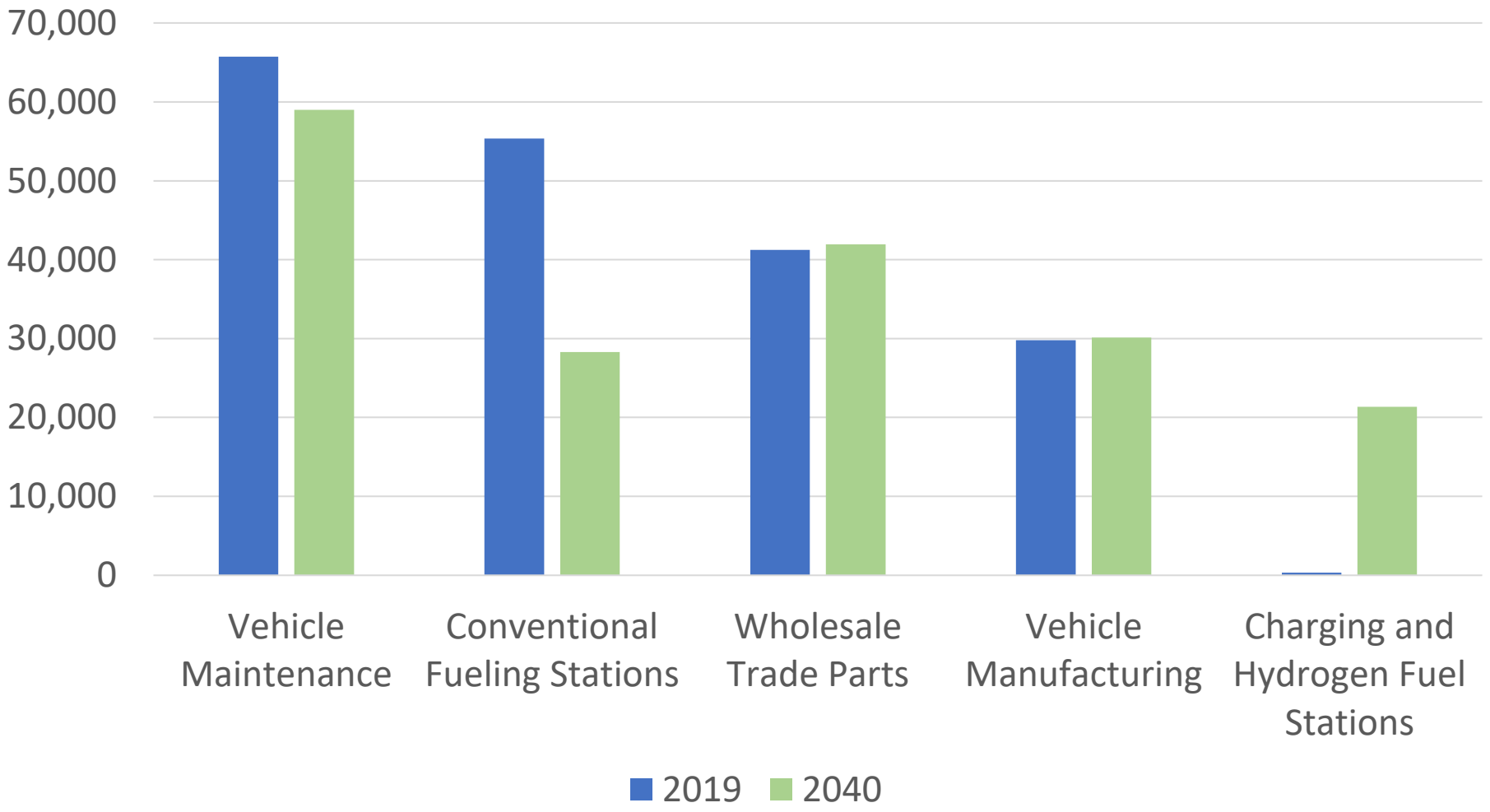
Employment in the 'Transportation Sector', specifically in the Conventional Fueling Stations and Vehicle Maintenance sub-sectors falls slightly below 85,000 by 2040, a 30 percent decline compared to the 2019 workforce. Jobs continue to decline in these sub-sectors through 2050, reaching about 75,000 in the final year of the analysis.

On net, overall employment in the Transportation Sector declines to approximately 192,000 by 2030, a 2 percent decrease from the 2019 workforce, and 4,000 jobs lost. Total jobs in the Transportation Sector continue to decline through 2050, reaching about 177,000.

Jobs Study

Transportation Sector Jobs Changes: S2: LCF Scenario

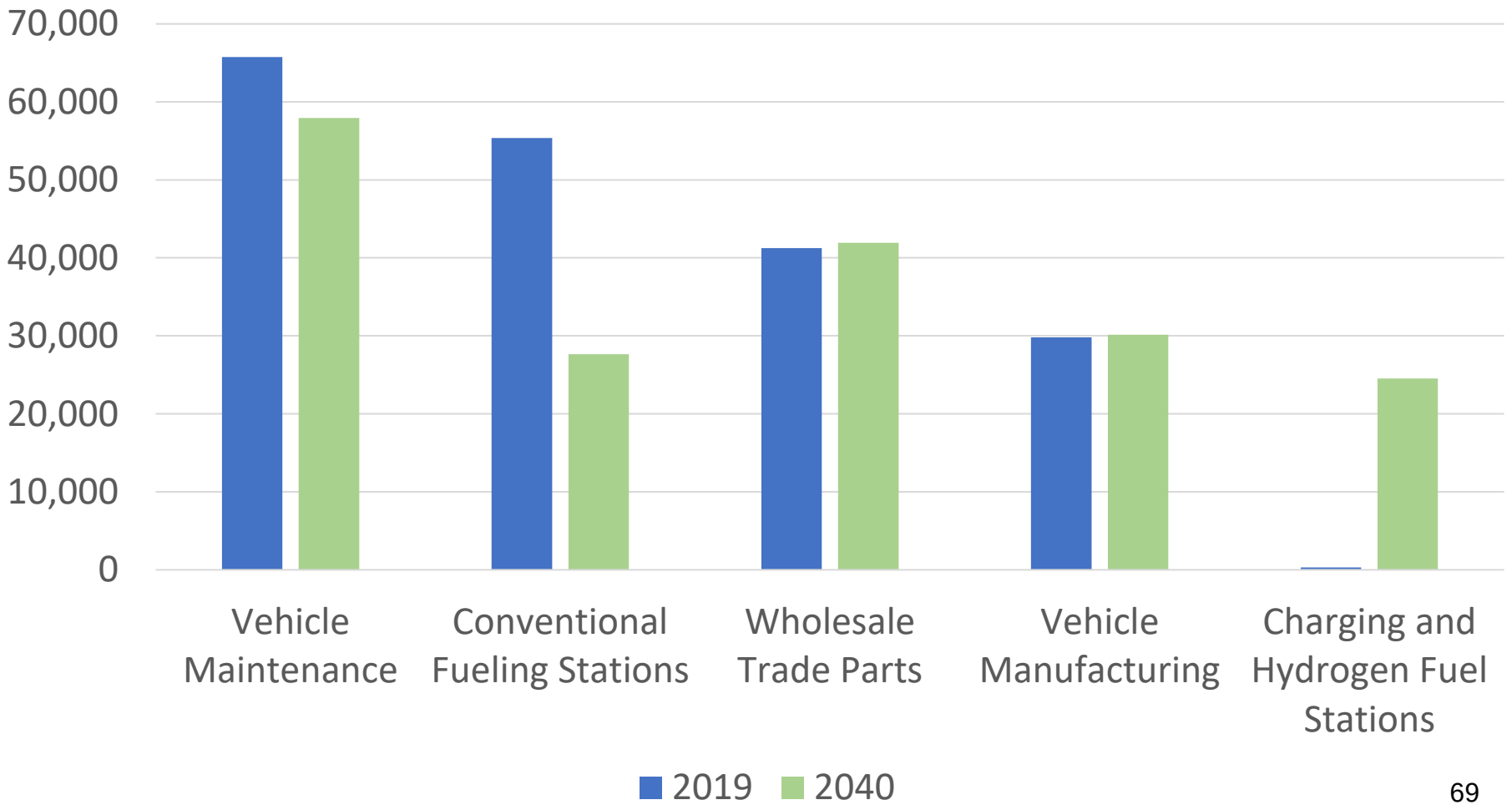
In this scenario, displaced employment in Conventional Fueling Stations and Vehicle Maintenance are somewhat offset by an increase in employment Charging and Hydrogen Fuel Stations.



Jobs Study

Transportation Sector Jobs Changes: S3: AT Scenario

The third scenario (S3:AT) is largely the same as the second scenario (S2: LCF), though does realize slightly greater employment in Charging and Hydrogen Fuel Stations due to accelerated investments in this infrastructure.



Jobs Study

Key Employment Findings:

Overall

Investments spur hundreds of thousands of new jobs in coming decades

Employment in growth sub-sectors increases by at least 172,000 jobs by 2030, a 55 percent increase in the workforce from 2019 to 2030. Employment continues to grow in these sub-sectors by at least 286,000 jobs through 2050.

For every job displaced, 7 jobs are added by 2030

Employment in the displaced sub-sectors decreases by at least 23,000 jobs by 2030, a 14 percent decrease in the workforce from 2019 to 2030. Employment declines in these sub-sectors by at least 82,000 jobs through 2050. Additional analysis will explore how job displacement could be offset by retiring workers coupled with job transitions.

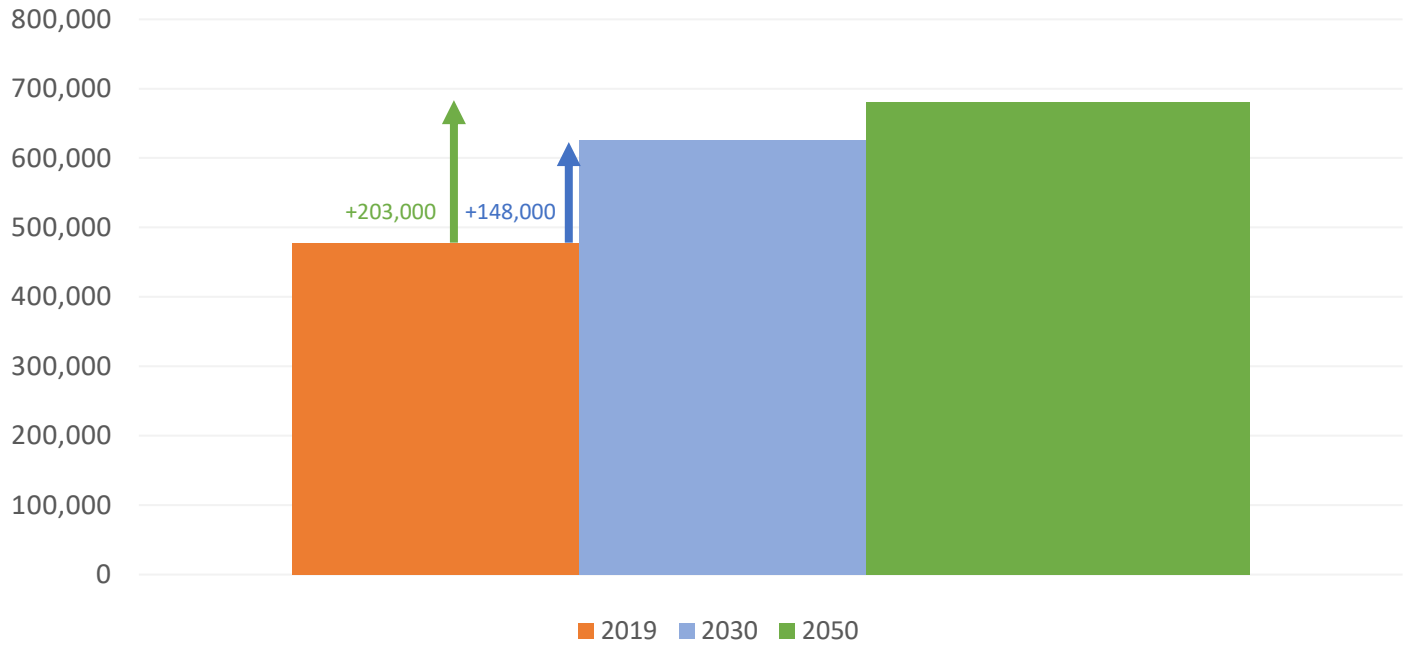
Jobs Study

Key Employment Findings:

Overall

All four sectors, electricity, fuels, buildings, and transportation, will grow faster, annually, from 2021 through 2030, then clean energy grew, annually, from 2016 to 2020, in the State of New York.

On net, overall employment in the four sectors grows by at least 148,000 jobs by 2030, a 31 percent increase from the 2019 workforce. Employment continues to grow in the four sectors by at least 203,000 jobs through 2050.



Jobs Study

Model Sensitivities (upcoming)

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Model Sensitivities

1. Develop an analysis that examines if ***in-state manufacturing*** increased in the relevant sub-sectors, how would it impact employment and the economy.

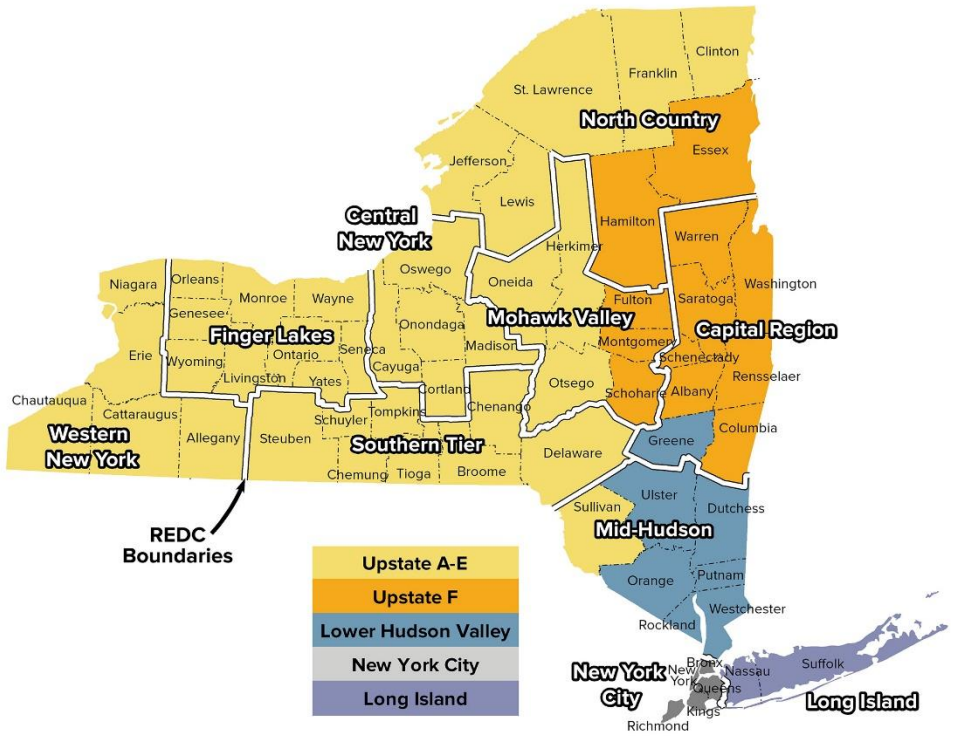
2. Describe the key assumptions that were done for ***gas station closings***, and how changes to those assumptions would impact the model outcomes.

Jobs Study

Workforce Analyses (upcoming)

Jobs Study

Workforce Analyses



1. Describe impact on **employment and the economic landscape** for NY & 5 Regions from CAC Integration Analysis.
2. Provide a qualitative assessment of how those in **declining industries and occupations can transition to growing or emerging industries** and what those transitions could look like.
3. Evaluate how the model findings impact **prevailing wages** and complete a secondary analysis that examines how a prevailing wage policy could impact these findings. This analysis would essentially evaluate the cost impact of a policy that increases wages to at least a prevailing / sustainable wage.

Jobs Study

Workforce Analyses

4. Describe how employment opportunities for underserved populations could be impacted under each scenario.
5. Examine how occupational pathways could change the demand for skills, certificates, education, experience, apprentice able standards, and other workforce requirements based on industry and occupational employment changes.

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Next Steps

Jobs Study

Next Steps for November

1. Present draft IEO at the next CAC Meeting (November 30)
2. Produce Secondary Employment Outputs (SEO)
3. Complete the model sensitivities
4. Complete the workforce analyses

Jobs Study

Next Steps for December

1. Present the findings of the initial draft of the 2021 *Jobs Study* Analysis (12/3)
2. Gather input on the research findings and the presentation
3. Produce the 2021 JTWG *Jobs Study* Report

Questions & Discussion

Next Steps

- **Just Transition Working Group will convene again on Friday, 12/3, 2-4p**
  - **Agenda to focus on:**
    - **Jobs Study**
      - **Secondary Employment Outputs (SEO)**
      - **Sensitivity Analysis**
      - **Workforce Implications & Discussion**
    - **JTWG Next Steps**
- **Climate Action Council**
  - **Next Meeting on 11/30**
    - **Jobs Study will be reported out at this meeting**
  - **Stay up to date with meetings and materials on the www.climate.ny.gov website**

Thank you for attending!