



# HEAVY INDUSTRIAL CONSTRUCTION WORKFORCE OUTLOOK: 2019-2022

**Fall 2019**

*Issued: December 18, 2019*



# SECTOR INTELLIGENCE MODEL (SIM)



## WHAT

The Sector Intelligence Model (SIM) is a custom occupation specific labour demand forecasting tool



## HISTORY

- SIM for Heavy Industrial Construction, formerly OILMAP, is a collaboration between the government of Alberta and COAA that has been in place since January 2012.
- Based on micro-economic modelling updated twice a year: Spring (May) and Fall (November).
- Includes brownfield and greenfield projects that have been validated by individual companies.
- Forecasts for the ongoing and turnaround maintenance are based on historical data from the General Presidents' Maintenance Committee for Canada and the National Maintenance Council For Canada (New model being developed).



## BENEFITS

- Provides a better understanding of the heavy industrial construction and maintenance workforce demands in Alberta in order to understand current and future workforce needs
- Helps address challenges such as skill shortages, training, immigration

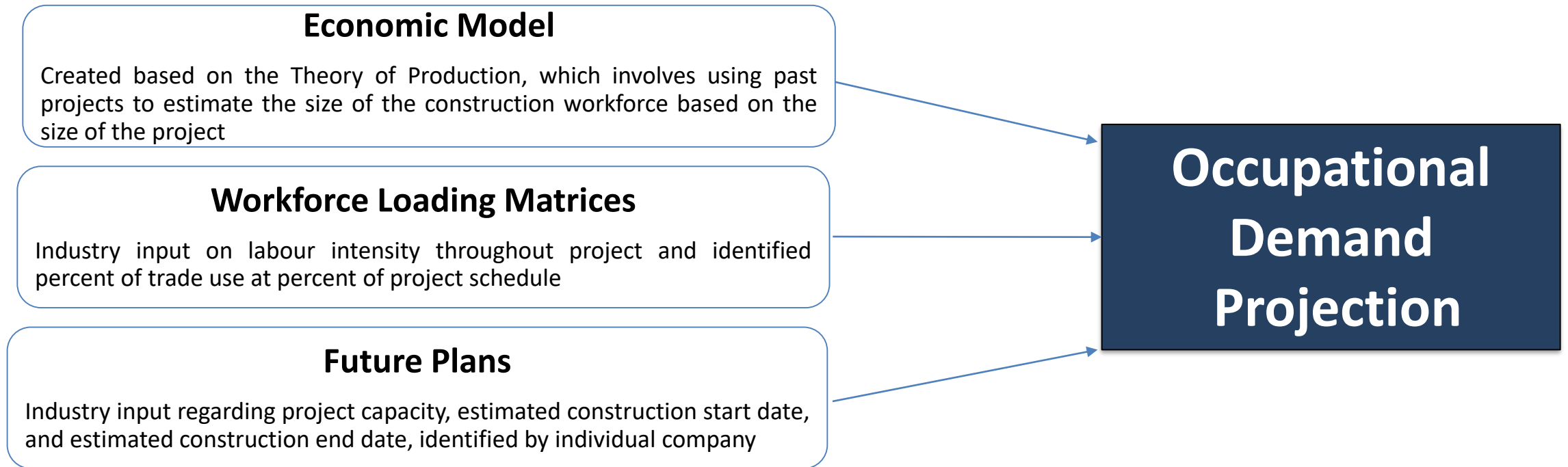


## INDUSTRY ENGAGEMENT

High survey participation is needed to obtain more data and build reliable workforce forecast

# SECTOR INTELLIGENCE MODEL (SIM) MODEL APPROACH

On-site and off-site construction workforce demand for 21 occupations are forecasted using 3 main inputs:



# METHODOLOGY

## 1. Calibration Factors based on past construction projects

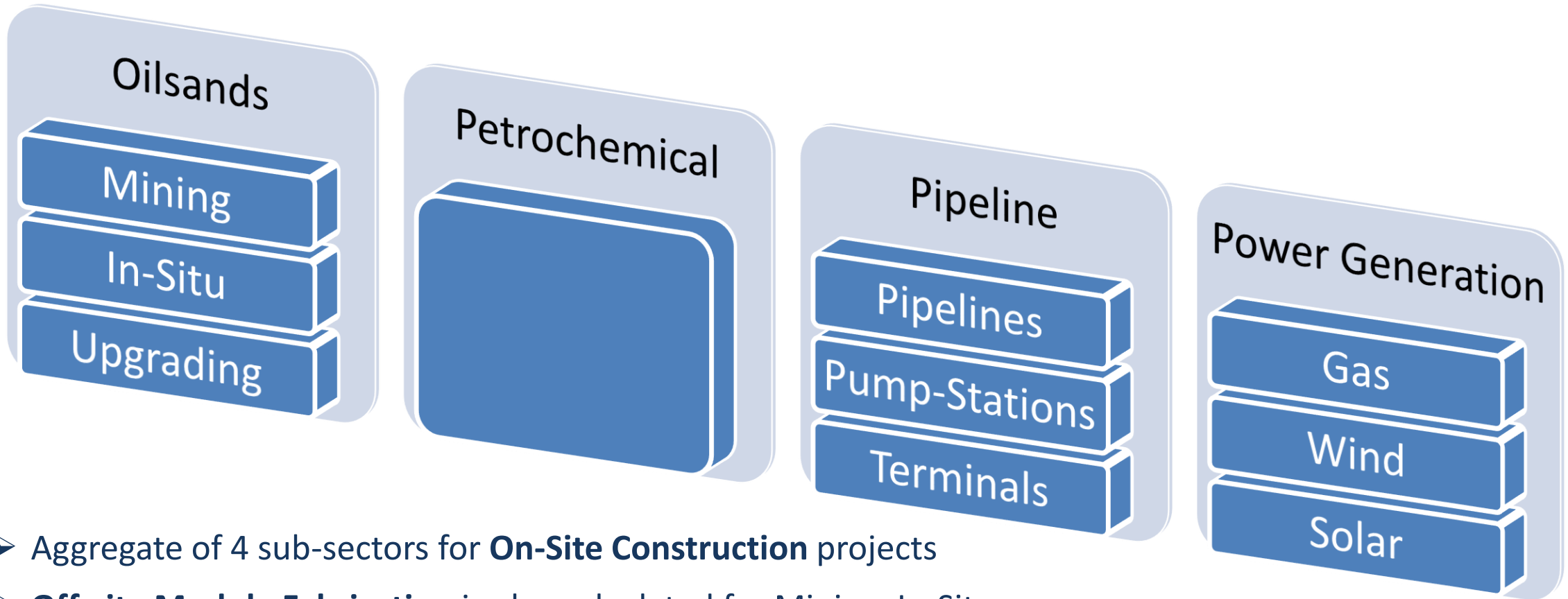
- Total Project Workforce Required (*Economic model*)
  - Type of Projects (e.g. oil sands, petrochemical, pipeline, power)
  - Size of Projects, measured by output capacity (e.g. Bpd, mlbs/day, MW)
- Workforce Breakdown (*Workforce loading matrices*)
  - By Trade
  - Trade use intensity as a percentage of total hours required for trade

## 2. Forecast of Current and Future Construction Demand

- Identify Future Projects
  - Type (e.g. oil sands, petrochemical, pipeline, power)
  - Size (e.g. Bpd, mlbs/day, MW)
  - Start/End Dates
  - Status (e.g. application for regulatory approval)
- Forecast = Sum of Month by Month Project Demands

## 3. Reasonableness Review by Industry Practitioners

# Heavy Industrial Construction Sub-Sectors

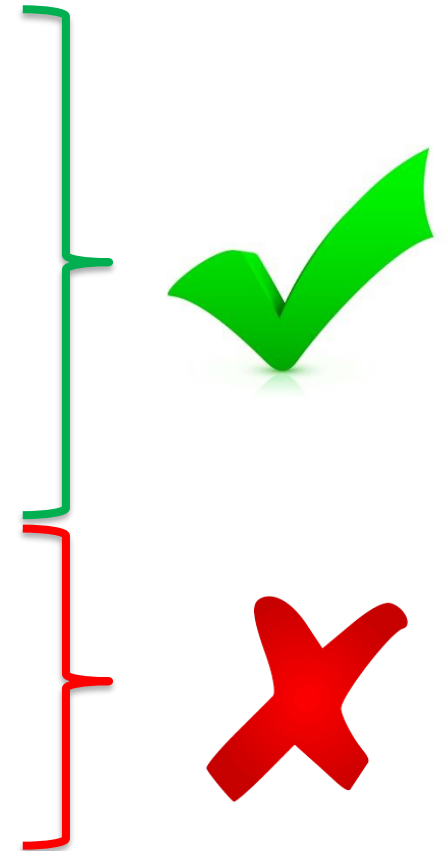


- Aggregate of 4 sub-sectors for **On-Site Construction** projects
- **Off-site Module Fabrication** is also calculated for Mining, In-Situ, Up-grading and Petrochemical projects
- Natural Gas Processing projects are counted, but they are not yet included in the workforce projection

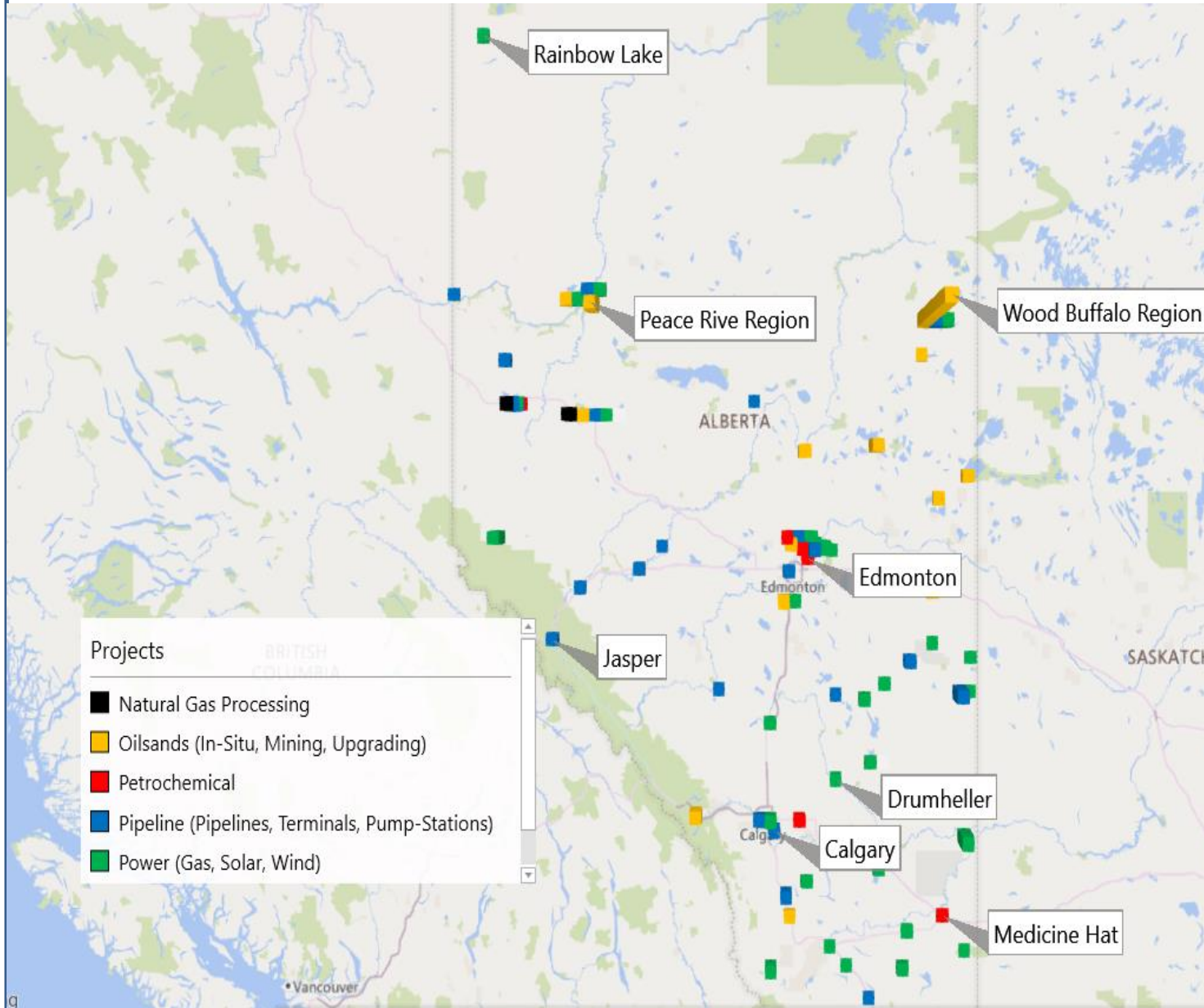
# Project Status for the Model

Seven status categories are identified and used to determine whether or not a project is included in the model:

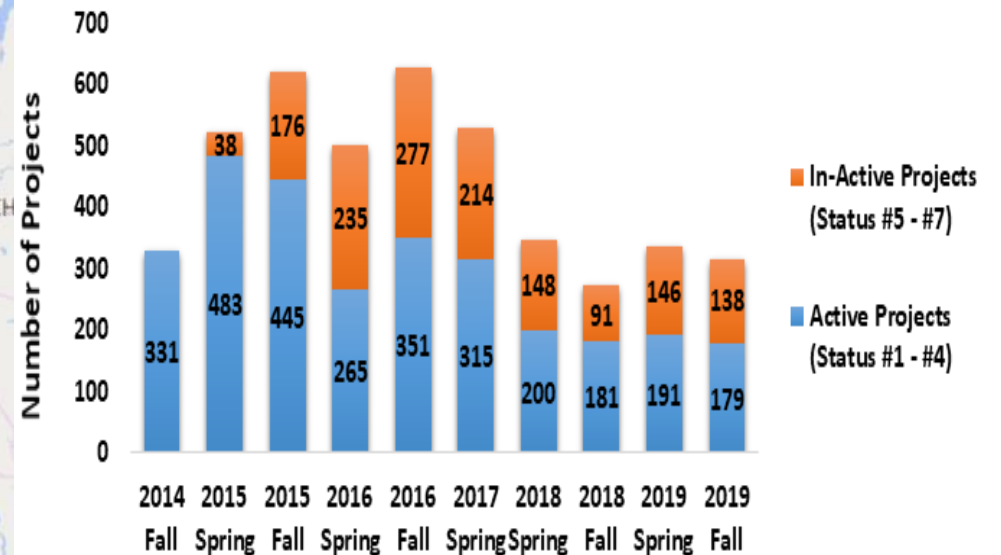
1. **Planning Stage** - Project has been submitted for Regulatory Approval – may or may not have a start date yet (TBD)
2. **Received Regulatory Approval** – Project has received regulatory approval and plans to proceed with start/end date (not included if start/end dates have not been identified).
3. **Construction** - Construction is in progress with start/end date identified
4. **Postponed** - Project is delayed but has an anticipated start and end date.
5. **On-Hold** - Project delayed with no start and end date
6. **Cancelled** – Project has been removed from a companies capital plans
7. **Completed** – Construction is finished with no construction staff remaining, ready to start production



# Fall 2019 Outlook



- In total, 60 companies were contacted from September to October 2019
- The response rate was 90%, compared to 87% in Spring 2019
- The total number of reported projects in the fall was 311, compared to 337 during Spring 2019



# Highlights

- The trades with the highest demand across all years include boilermakers, pipefitters, labourers, carpenters, electricians and construction managers & supervisors
- The Fall 2019 projection suggests a decline in workforce demand compared to the 2018 and 2019 spring forecasts
  - The decline is largely driven by reduced capital spending in the oil sands due to a constrained growth outlook which has led to an increase of projects being put on hold or cancelled.
  - The peak demand is predicted to reach just over 36 000 workers in May 2021.
  - Another peak in labour demand expected in May 2022 may coincide with part of the peak demand of the LNG Canada project in British Columbia (LNG peak is expected to be between 2022 and 2024).
- Labour demand dropped in 2019 primarily due to 2 large projects that were completed last year. There will be a slow upswing in 2020 as demand from other projects increases
- There will be a drop in labour demand in the beginning of 2021 due to work on large petrochemical and refinery projects beginning to wind down
- A significant number of projects in construction have been identified to be in the Natural Gas Processing sub-sector (7 projects) , however, currently there is no model to calculate labour demand and these projects are not included in the labour forecast.
- Maintenance is a stabilizing influence on construction trades since existing facilities are getting older and new facilities are coming into production.
  - The model currently forecasts maintenance schedules based on current and historic capacity data. There may be some discrepancy with actual requirements as companies evaluate maintenance plans going forward and may not follow their traditional schedules.
  - Companies reported an anticipated significant increase in demand in 2020 and 2021 which will result in labor shortages



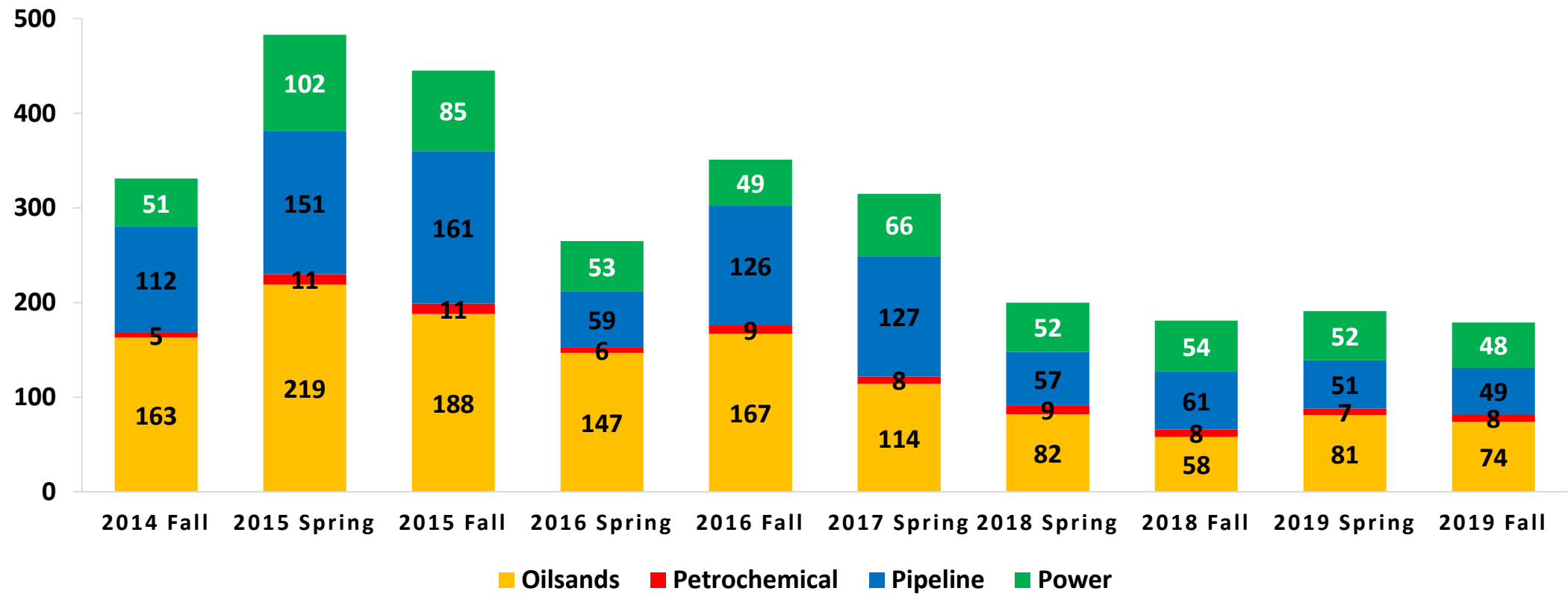
# Total Project Count

	OilSands	Petrochemical	Pipelines	Power	Natural Gas Processing	Others	TOTAL
1. Planning Stage	45	3	18	19	3	0	92
2. Received Regulatory Approval	8	1	6	15	1	1	32
3. Construction in progress	8	4	25	8	7	1	53
4. Postponed	1	0	0	2	1	0	4
5. On-Hold	43	1	10	15	0	0	69
6. Cancelled	2	1	21	18	0	2	45
7. Completed	1	0	12	2	5	1	22
<b>TOTAL</b>	<b>108</b>	<b>10</b>	<b>92</b>	<b>79</b>	<b>17</b>	<b>5</b>	<b>311</b>

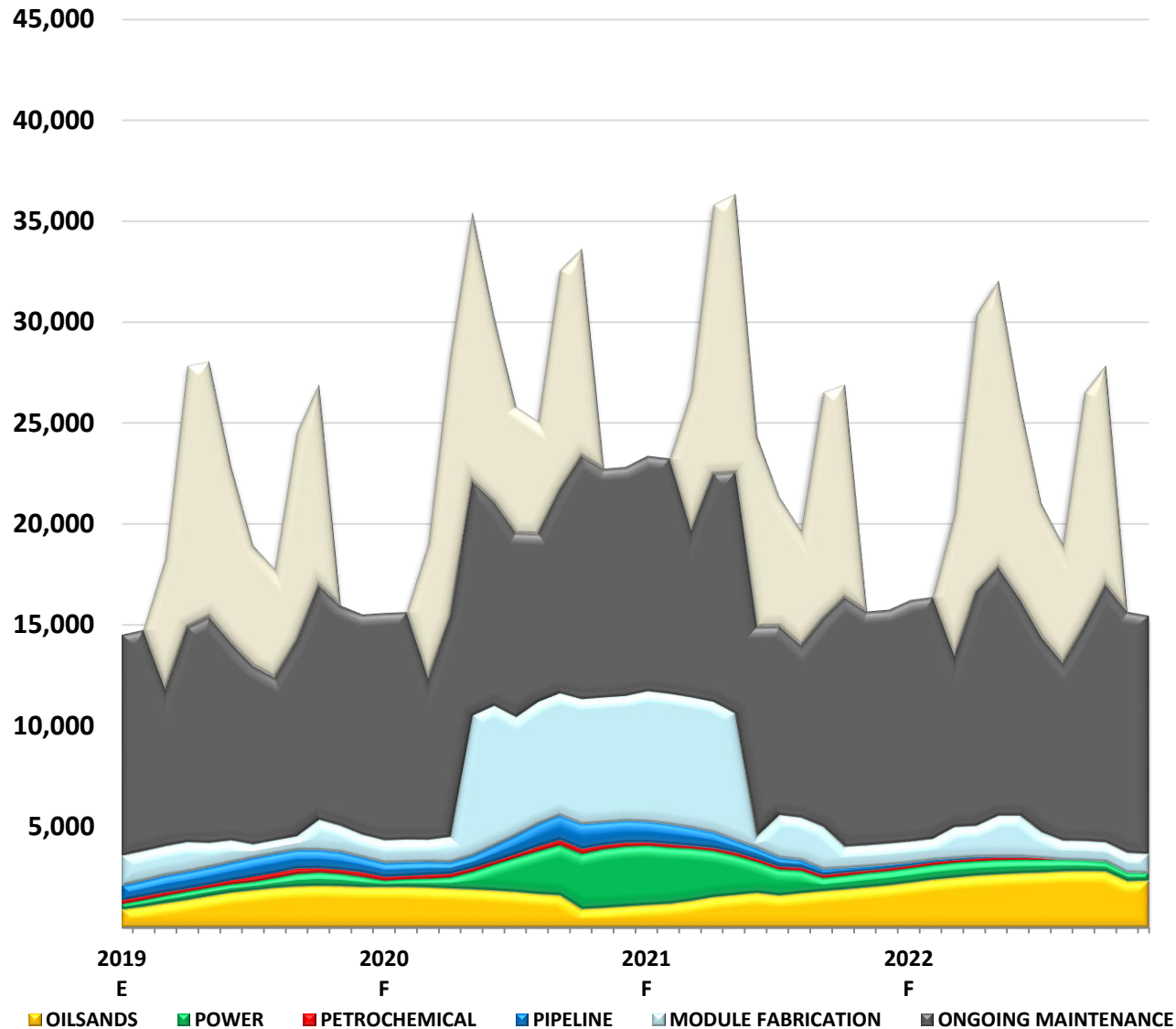
- Most projects currently under construction are pipeline projects (also includes terminals and pump-stations)
- Seven Natural Gas Processing projects were counted, but they are not yet included in the workforce projection

# Active Projects

- Project statuses 1-4
- Five year comparison
- Oilsands projects are the majority



# TOTAL HEAVY INDUSTRIAL CONSTRUCTION WORKFORCE REQUIREMENT TO 2022 – BY SECTOR

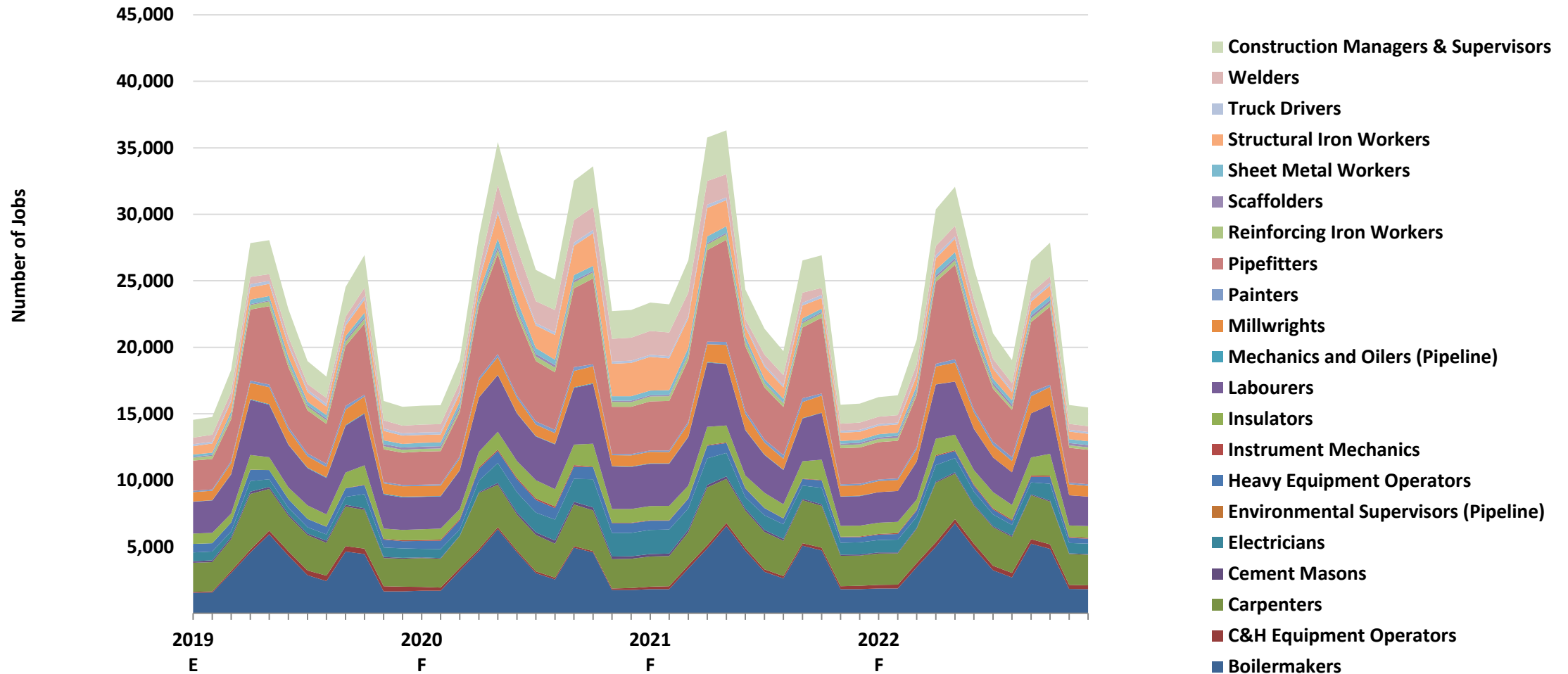


- Decline in workforce demand compared to the 2018 and 2019 spring forecasts
- Peak employment expected to reach just over 36 000 in May 2021
- May 2022 potential labour shortages- peak in demand coincides with part of the peak demand of the LNG Canada project
- The total numbers include ongoing and turnaround projections from the spring outlook

Note: Number of jobs = number full time jobs (50 hours/week)

Source: Alberta Labour, Fall 2019

# TOTAL HEAVY INDUSTRIAL CONSTRUCTION WORKFORCE REQUIREMENT TO 2022 – BY OCCUPATION



- **Highest demand:**boilermakers, pipefitters, labourers, carpenters, electricians and construction managers & supervisors
- As the model does not incorporate labour supply, the actual tightness of specific trades may not align.

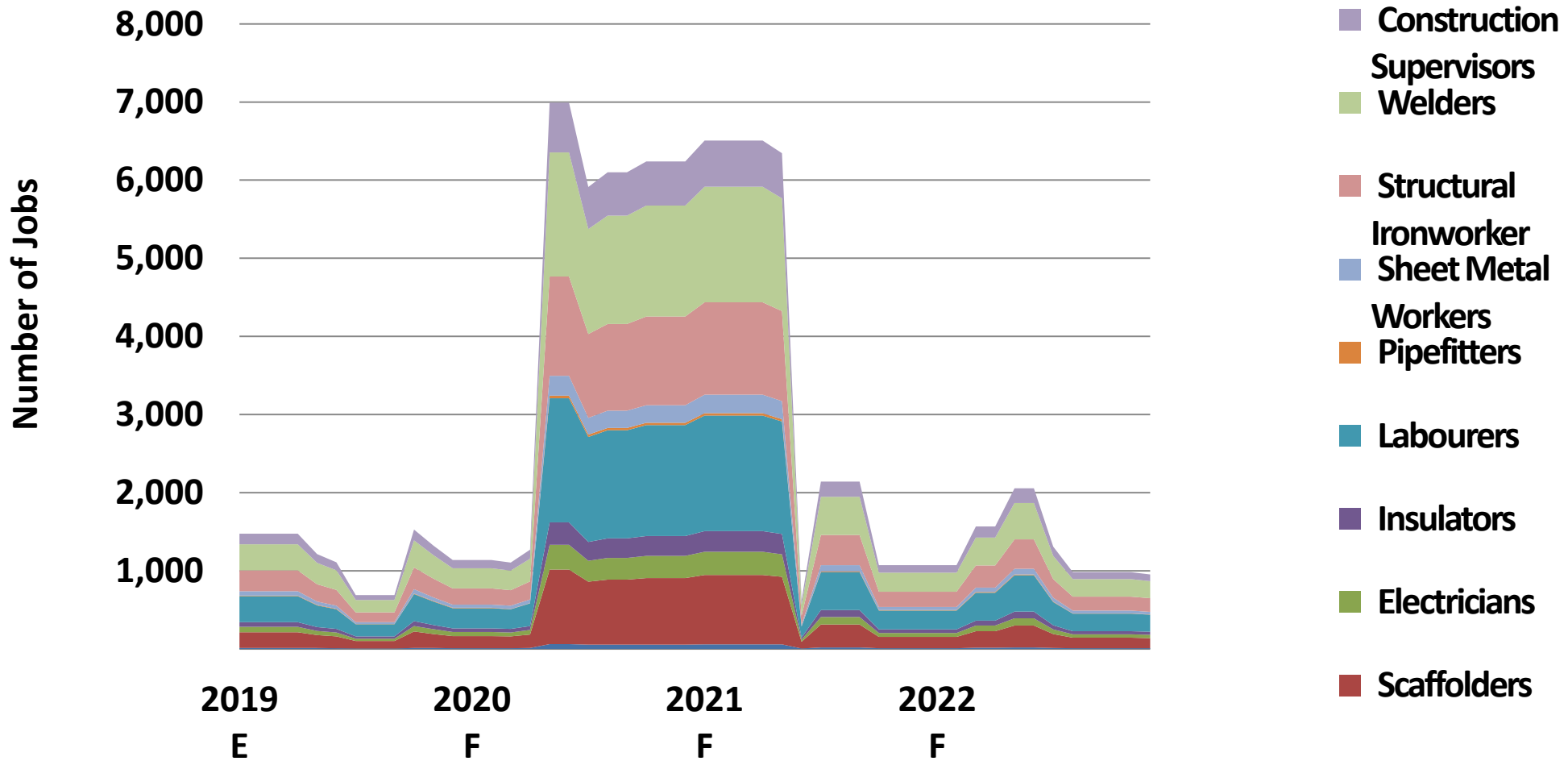
# TOTAL HEAVY INDUSTRIAL CONSTRUCTION WORKFORCE REQUIREMENT TO 2022 – BY OCCUPATION (FALL)

Occupation	2019		2020		2021		2022	
	Min	Max	Min	Max	Min	Max	Min	Max
Boilermakers	1540	5930	1680	6310	1800	6550	1800	6750
C&H Equipment Operators	60	410	90	290	170	250	260	340
Carpenters/Scaffolder	2140	4370	2250	4420	2330	4460	2430	4670
Cement Masons	60	160	40	230	80	180	50	90
Electricians	450	1060	450	2110	840	1990	770	1250
Heavy Equipment Operators	550	840	580	980	400	940	310	680
Instrument Mechanics	0	60	30	120	10	40	50	100
Insulators	670	1440	720	1710	810	1510	770	1630
Labourers	2380	4150	2420	4500	2210	4820	2230	4080
Mechanics and Oilers (Pipeline)	20	50	10	40	10	30	0	10
Millwrights	700	1270	770	1330	780	1410	810	1420
Painters	100	260	100	270	110	280	110	300
Pipefitters	2270	5880	2480	7520	2710	7680	2570	7100
Reinforcing Iron Workers	210	350	210	450	230	420	180	320
Sheet Metal Workers	160	370	280	610	200	510	220	490
Structural Iron Workers	610	970	590	2500	620	2520	560	990
Truck Drivers	140	260	170	260	140	260	120	240
Welders	420	650	590	1910	430	1780	440	790
Construction Managers & Supervisors	1320	2550	1420	3220	1420	3300	1400	2910
<b>Total</b>	<b>13800</b>	<b>31030</b>	<b>14880</b>	<b>38780</b>	<b>15300</b>	<b>38930</b>	<b>15080</b>	<b>34160</b>

*Note: Numbers rounded off to the nearest ten.*

# MODULARIZATION WORKFORCE REQUIREMENT TO 2022 – BY OCCUPATION

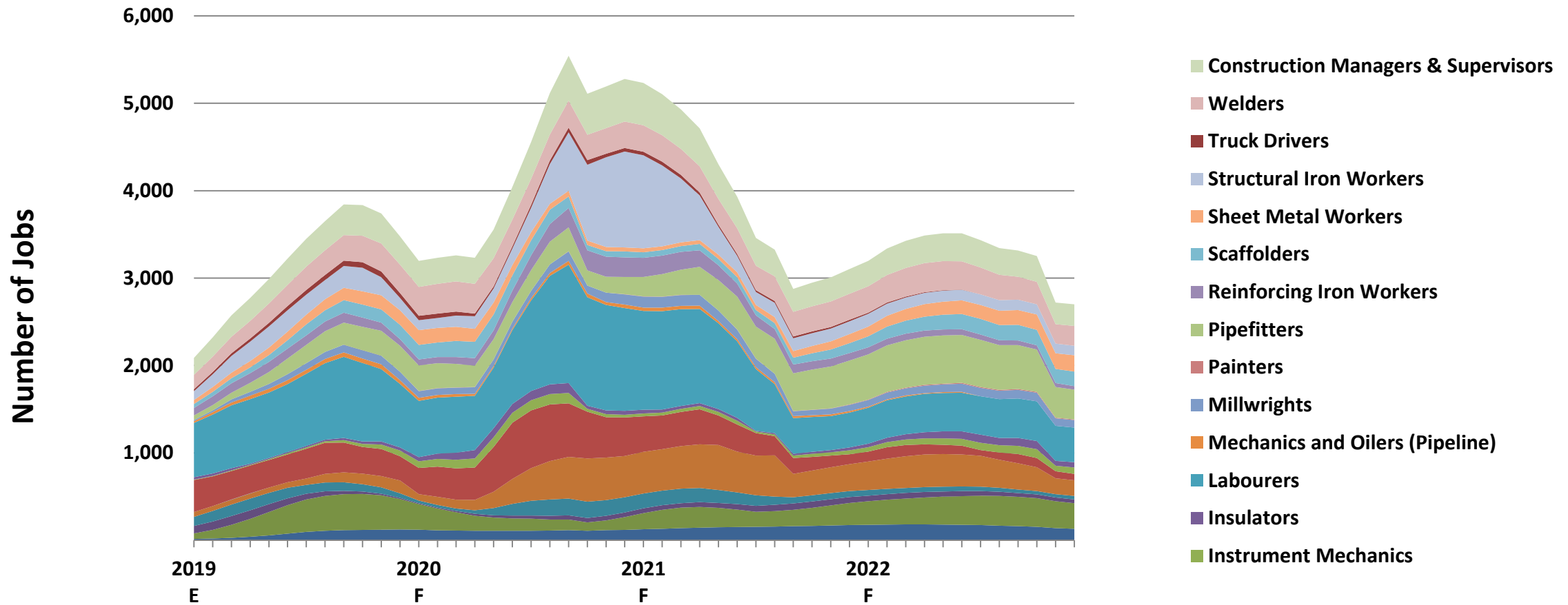
Note: Module Fabrication includes Insitu, Mining, Upgrading, Petrochemical



➤ Model assumes all modules will be built in Alberta

# CONSTRUCTION WORKFORCE REQUIREMENT TO 2022 – BY OCCUPATION

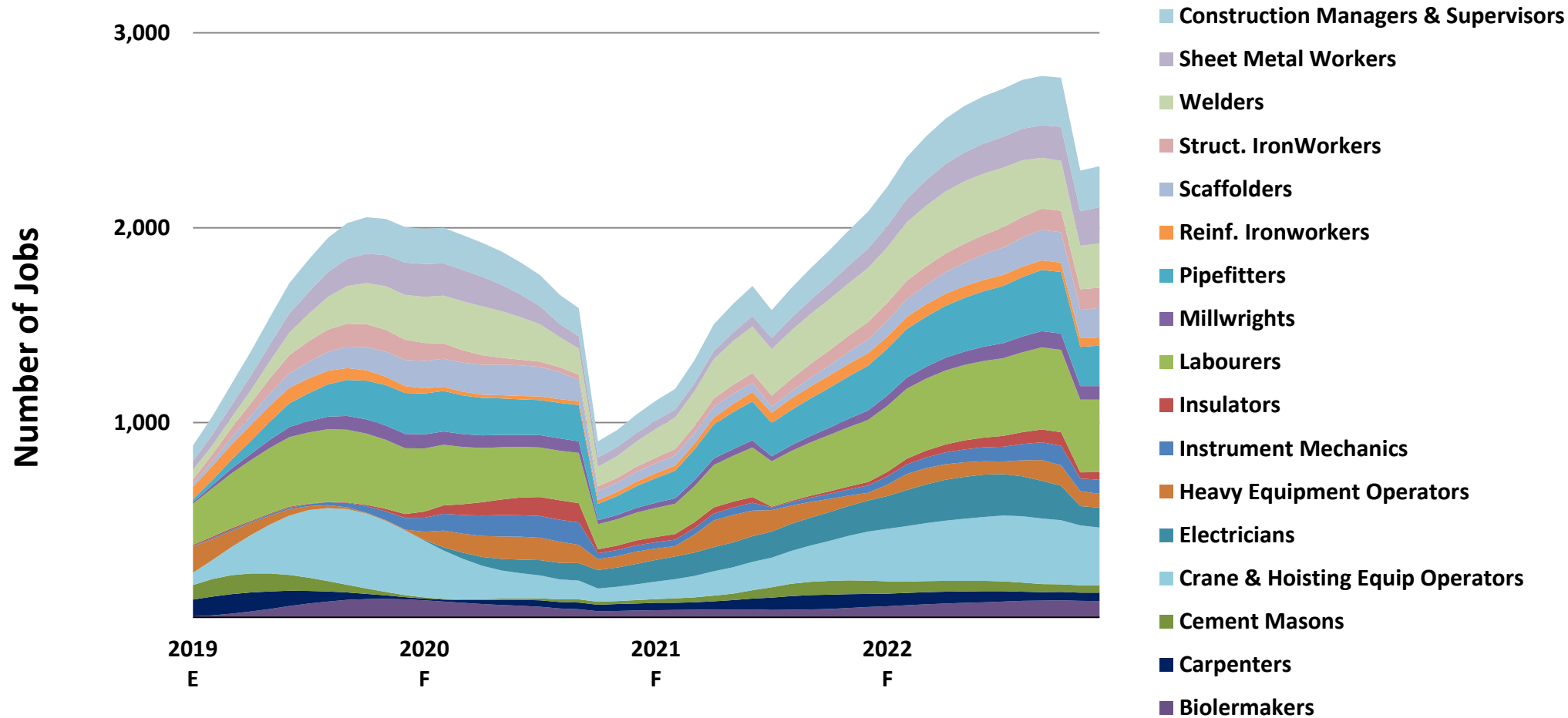
Note: Construction includes Oilsands, Petrochemical, Power, Pipelines



➤ A number of projects ending in 2022 will result in peak construction demand between September 2020 and April 2021

# OILSANDS WORKFORCE REQUIREMENT TO 2022 – BY OCCUPATION

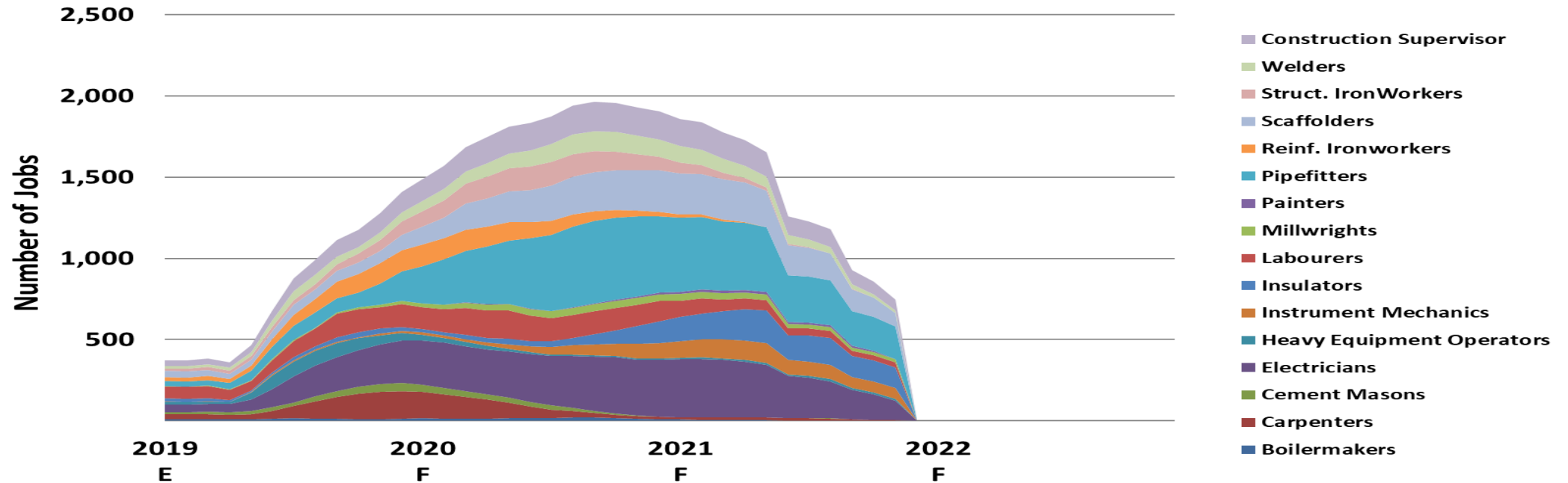
*Note: Oilsands includes Insitu, Mining, Upgrading*



➤ The sharp drop at the end of 2020 is due to the completion of a number of pipeline, pumpstation and terminal projects.

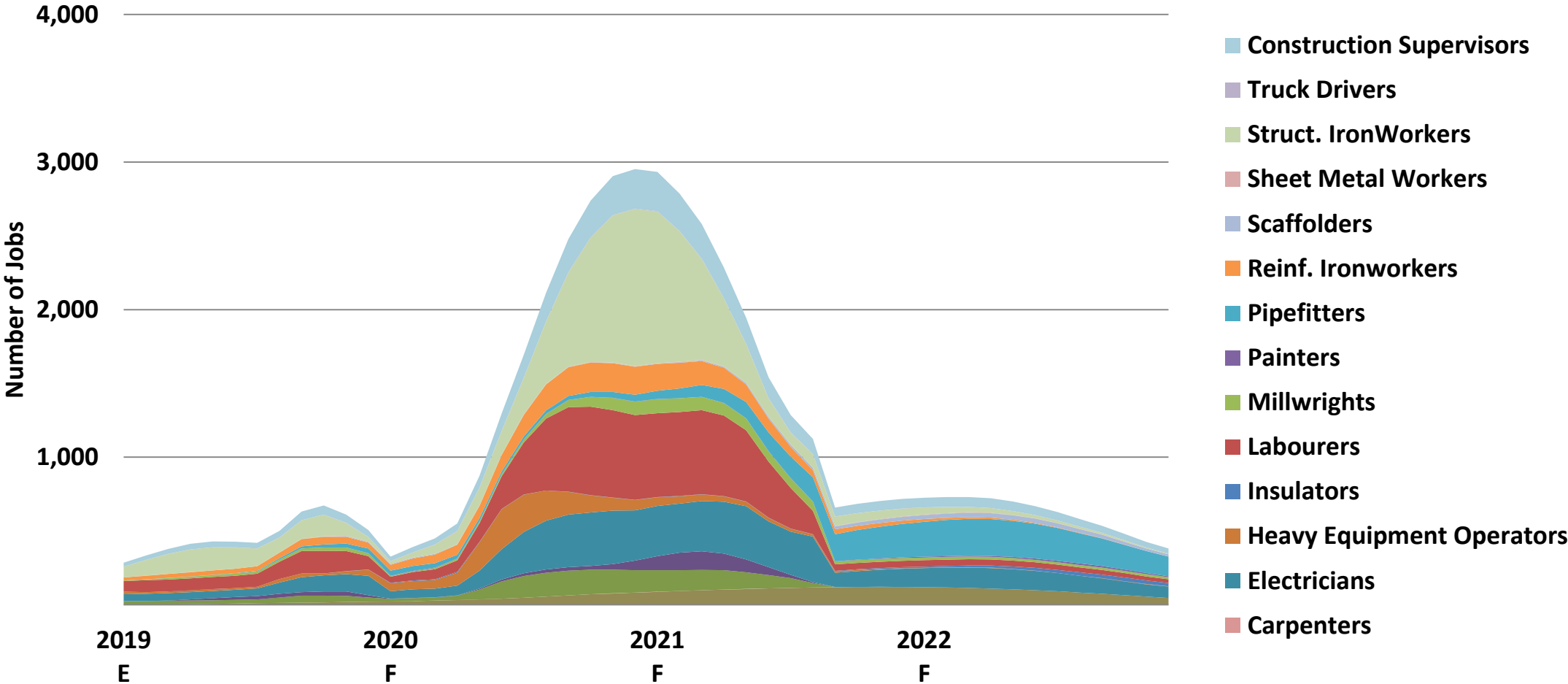


# PETROCHEMICAL WORKFORCE REQUIREMENT TO 2022 – BY OCCUPATION



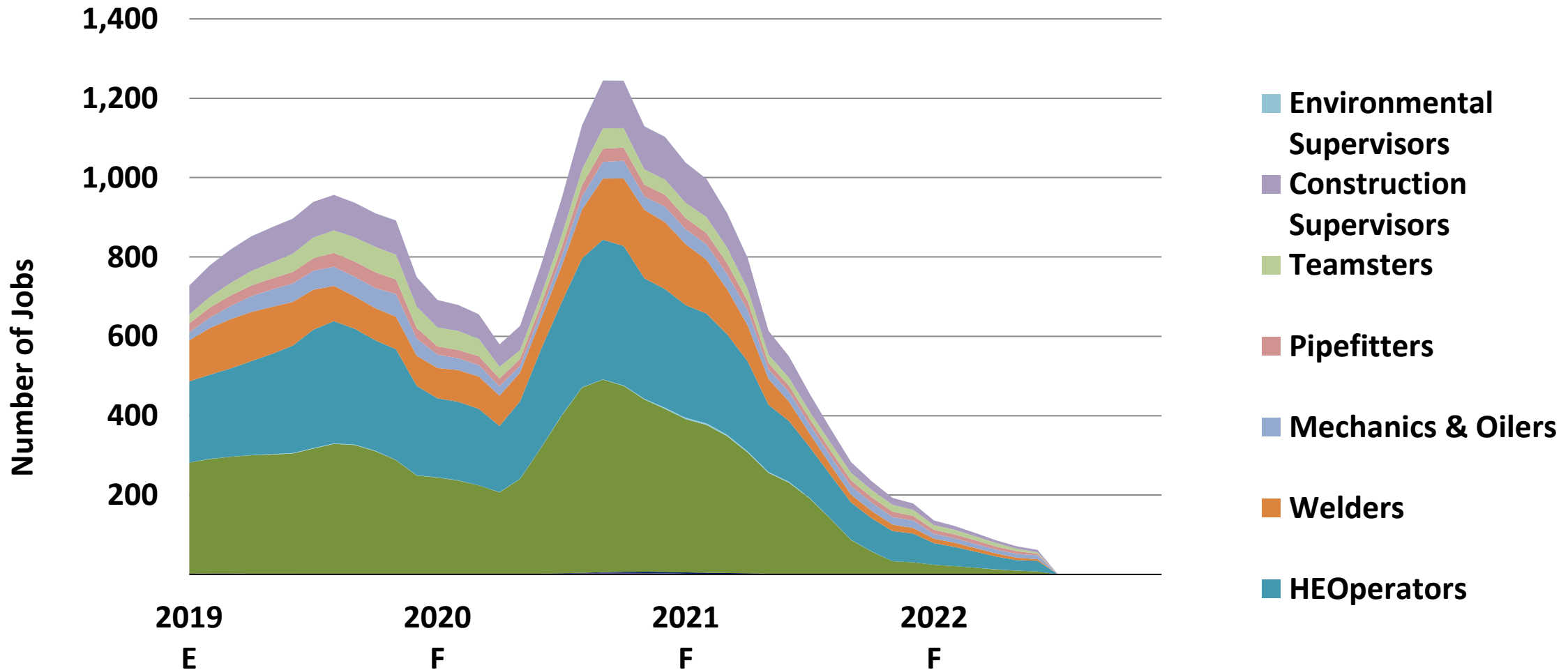
# POWER WORKFORCE REQUIREMENT TO 2022 – BY OCCUPATION

Note: Power includes Natural Gas, Wind Power, Solar Power



# PIPELINE WORKFORCE REQUIREMENT TO 2022 – BY OCCUPATION

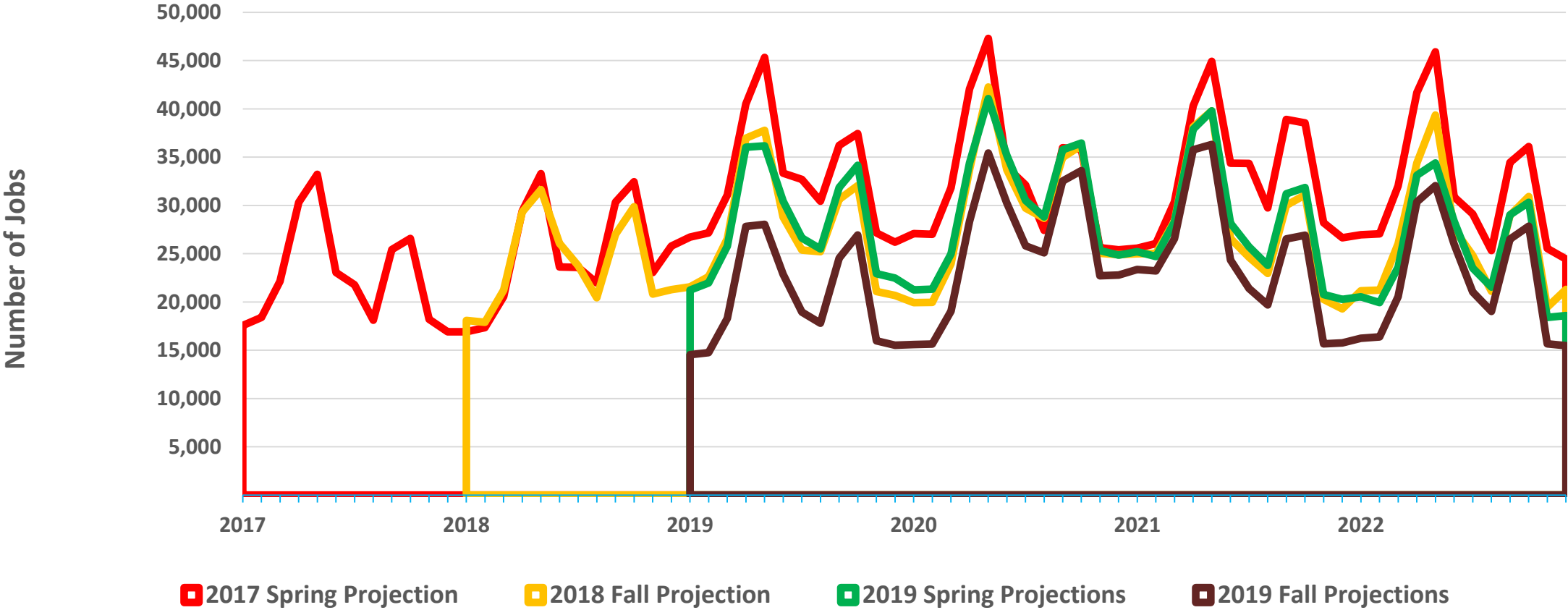
Note: Pipeline includes Pipelines, Pump Stations, Terminals



- A number of pipeline projects will be completed in 2020 (19 including pump stations and terminals)
- The Trans mountain pipeline is not included in this forecast

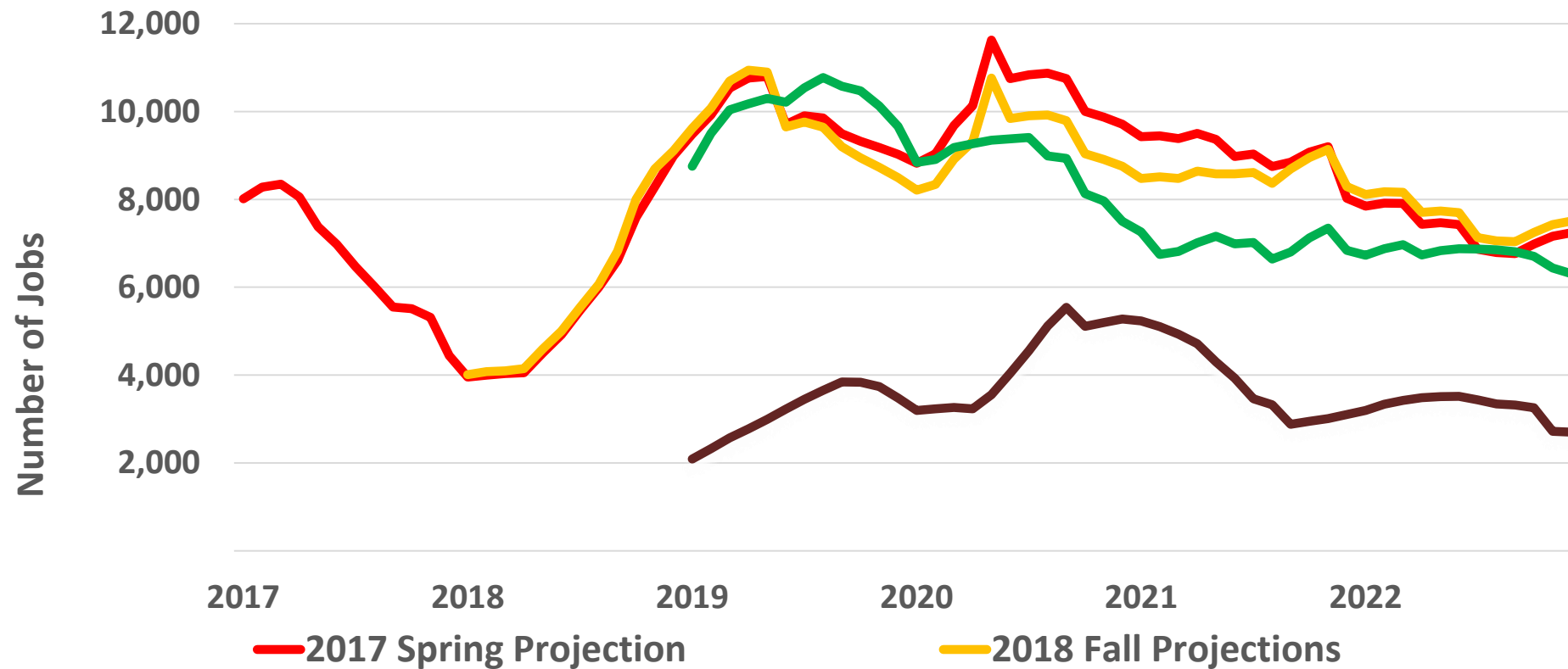
# HEAVY INDUSTRIAL CONSTRUCTION WORKFORCE REQUIREMENT TO 2022

## – TOTAL



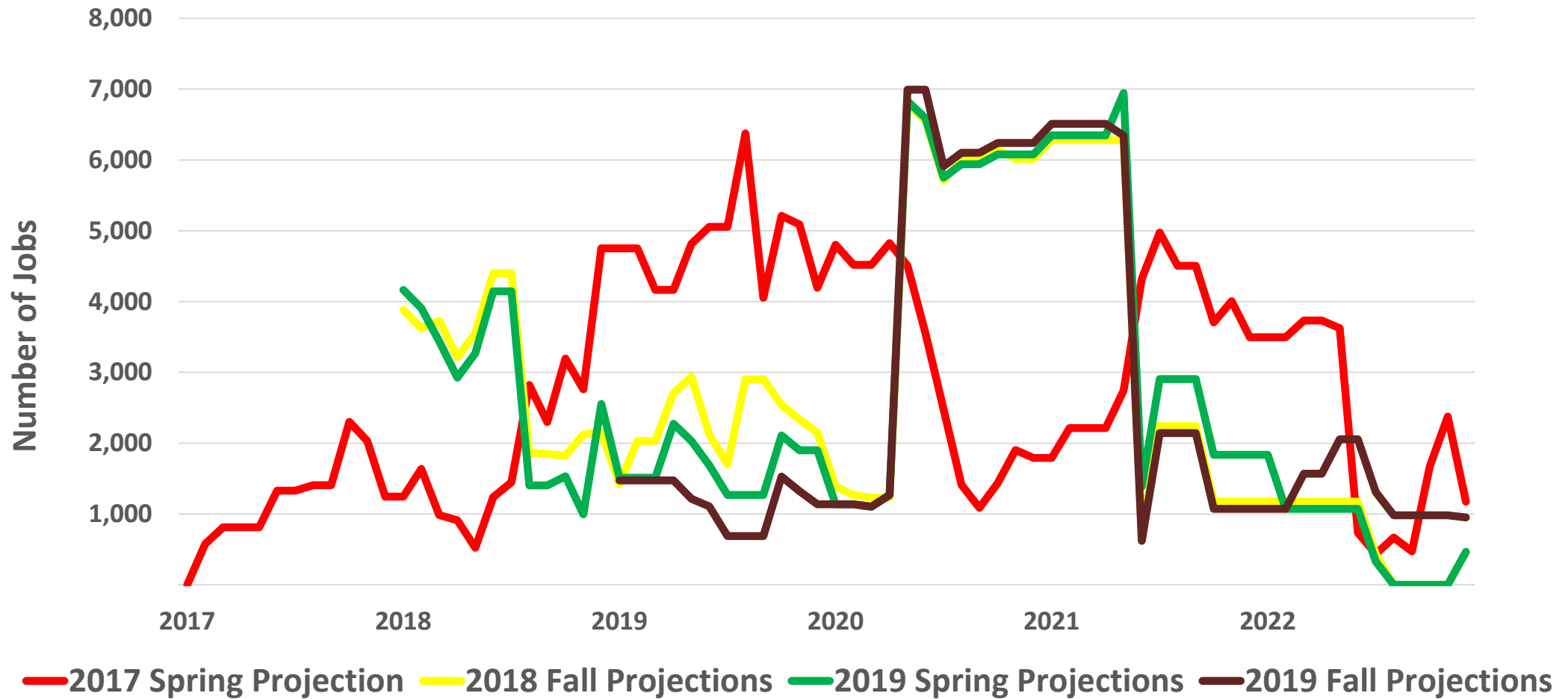
- 2019 Fall projection relatively lower than previous forecasts
- Fewer projects going ahead, more on-hold or cancelled due to the economic climate

# HEAVY INDUSTRIAL CONSTRUCTION WORKFORCE REQUIREMENT TO 2022 – ON-SITE CONSTRUCTION



- There was a significant drop in labour demand due to a number of projects being cancelled or put on-hold

# HEAVY INDUSTRIAL CONSTRUCTION WORKFORCE REQUIREMENT TO 2022 – OFF-SITE MODULE CONSTRUCTION



Note: The model assumes that all module fabrication is completed in Alberta

Source: Alberta Labour 2019

# NEXT FORECAST UPDATE

- The next forecast will be completed in Spring 2020.
- Data gathering will take place from February to March with the target to complete the forecast by May 2020.
- The Government of Alberta has established an on-line data collection tool for this survey to streamline the process and create an easier, more efficient and secure environment
- For all employers that have registered, GOA will be sending an email requesting companies review their projects and submit.
- Companies that have not registered will be contacted by a GoA representative.