

Julie MacArthur and Cathrine Dyer

# Transition Inequity

## gendered employment trends in New Zealand's energy industries

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### Abstract:

Energy industries are experiencing a period of rapid and sustained change as nations seek to meet climate policy targets. In Aotearoa New Zealand a gap in both information about and attention to the gendered dimensions of the proposed low-emissions transition has emerged. This silence has implications for the distributive impacts of any transition. We present data illustrating the sub-sector variation in women's employment, pay, tenure and executive representation in both the electricity and fossil fuel industries. Recommendations are presented for more sustained policy attention to how an energy transition, given current gendered employment trends, is unlikely to be inclusive or just.

**Keywords** just transition, Aotearoa New Zealand, gender policy, energy transition, occupational segregation

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Energy industries are in the midst of a period of rapid change, one crucial to meeting climate policy targets worldwide. Investment in new technologies and divestment of others are reshaping energy economies. Electrification, e-mobility, decentralisation and decarbonisation are transforming the industrial landscape. Energy activities are also incredibly diverse, spanning the extraction, transformation, processing, distribution and retailing of renewable and non-renewable sources of heat and power (MacArthur and Stephenson, forthcoming, 2022). A transition to low-carbon sources will be accompanied by significant employment-related effects along the energy supply chain, from those working on offshore oil rigs to petrol station attendants and solar panel installers. The International Renewable Energy Association estimates that the number of jobs in renewables globally could increase from 10.3 million in 2017 to nearly 29 million in 2050 (International Renewable Energy Association, 2019). Where and how these new jobs will be distributed is less certain.

As Aotearoa New Zealand looks towards new, more strategic investments that can provide low-carbon pathways as well as industrial innovation, a gap in both information about and attention to the gendered dimensions of a transition has emerged. In this article we highlight the significance of gender segregation in energy industries, the large gender gaps that exist in energy employment in sub-sectors and over time in New Zealand, and the implications of these silences and gaps for a just transition in Aotearoa.

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Policymakers in Aotearoa New Zealand have signalled in recent years an interest in ensuring that a low-carbon transition is also a just transition. Policy proposals often include references to low-carbon jobs, 'good' jobs, and equitable distribution of costs and benefits. In the 'Just transition to a low emissions economy: strategic discussion' Cabinet paper, for example, we find the following statement:

to achieve a successful *and* just transition, we also need to understand the nature of the transition pathways ahead and how the impacts might be distributed across regions, sectors or communities so that we can be informed and deliberate about how we manage impacts, and leverage opportunities, in an equitable and inclusive way. (Woods, 2018, para 10)

While attention is turning to specific regions, sectors and communities, intergenerational equity, and the crucial leadership of Māori as part of a 'tika transition' (Bargh, 2019), there is almost

no mention of gender equity or use of a gender analytical lens in recent New Zealand climate and energy policy. This is a significant and problematic gap which needs to be addressed urgently, as the current focus on 'shovel ready' jobs in heavily masculinised industries magnifies already existing equity challenges.

The fact remains that progress in gender equality that occurred in the 1970s has slowed or stalled in many countries since the 1990s (England, Levine and Mishel, 2020; World Bank, 2011). According to the

World Economic Forum's *Global Gender Gap Report 2021*, New Zealand ranks highly (fourth below Iceland, Finland and Norway).<sup>1</sup> However, the Covid-19 pandemic and subsequent industrial disruption point to a jobs future set to increase rather than shrink gender gaps (World Economic Forum, 2021, 2020). The magnitude of this change will depend on country-level characteristics such as industrial composition, labour force participation and occupational segregation. In Aotearoa New Zealand recent analysis shows that Covid-related unemployment was highly feminised, with two thirds of lay-offs significantly concentrated in industries with high participation of women: hospitality and tourism, service and care, all lower-paid, part-time and contract occupations (Stats NZ, 2020). A growing number of women have dropped out of the labour force completely.

### **Gendered employment gaps: significance and policy attention**

Energy is one of the most gender-segregated industries on the planet.

According to the International Energy Agency, 'closing this gap is not only a moral and social imperative, but makes good sense for business, as studies show that diverse organisations perform better' (International Energy Agency, 2017, p.4). Despite higher levels of education and workplace participation, stubborn inequities persist in women's pay, advancement and representation. Vertical and horizontal gender segregation is also common and persistent, which has led to women's concentration in lower-paid health, educational and social service care work. This is the case even in the countries with strong social safety nets which lead in many gender equity measures (Nordic Council of Ministers, 2019).

Progress to desegregate occupations has slowed significantly from strides made in the 1970s and 80s. This segregation is particularly pronounced in 'jobs of the future' industries, such as engineering, data and artificial intelligence (AI) and product development (World Economic Forum, 2020). Women make up 48% of the paid workforce globally but just 22% in the oil and gas industries and 32% in renewables (International Renewable Energy Association, 2019). This imbalance is significant in terms of pay disparities between men and women in the economy, especially given that average salaries in energy industry jobs are relatively high (NZ\$98,000 in 2018). Moreover, women's employment in these industries is typically concentrated in lower-paid, non-technical, administrative and public relations positions (Pearl-Martinez, 2015).

This begs the question: how does New Zealand compare to this global picture? Very little information is publicly available on gender and energy sector employment in Aotearoa New Zealand, so we used customised labour force data<sup>2</sup> and company reports to assess the situation, finding large employment, pay, leadership and job-tenure gaps between different energy sub-sectors.

A number of international initiatives are now seeking to address energy sector gender gaps, including the International Energy Agency's gender diversity initiative, and the Clean Energy Ministerial led by Canada (International Energy Agency, 2017; Clean Energy Ministerial, 2021). The

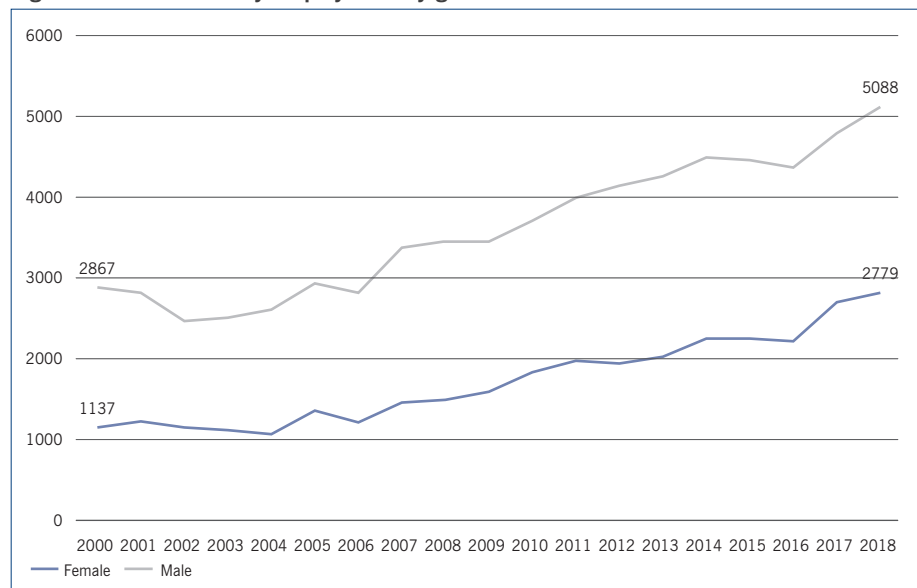
latter includes the goal of improving the gender data collection in energy industries for benchmarking, career development and mentorship, and awards and recognition, as well as dialogue. It has 14 current signatories, including the European Commission, Australia, the United States, Canada, the UK and Sweden (Clean Energy Ministerial, 2021). New Zealand is absent from the list, which is notable because in the past decade three of six (50%) of New Zealand’s energy ministers have been women, a rate that is higher than in many other countries.<sup>3</sup>

Women’s representation in policy leadership in New Zealand has yet to translate into attention to gender in its transition and Covid recovery policies. For example, our survey of recent policy documents, reports and strategies finds that the words ‘gender’, ‘women’ and ‘inclusive’ are almost wholly absent. These include the Climate Change Response (Zero Carbon) Amendment Act 2019, the Resource Management Amendment Act 2020, the New Zealand Energy Efficiency and Conservation Strategy 2017–2022 (Ministry of Business, Innovation and Employment, 2017), the Cabinet paper ‘Just transition to a low emissions economy: strategic discussion’ (Woods, 2018) and *Tapuae Roa and Taranaki 2050 Progress Update* (Ngā Kaiwhakarete o Taranaki, 2021) (the latter two produced in conjunction with the Ministry of Business, Innovation and Employment’s Just Transitions Unit). One exception can be found in the Climate Change Commission’s *Ināia Tonu Nei: a low emissions future for Aotearoa* report, where it mentions the male dominance in energy industries and negative effects of large-scale economic disruptions on women’s employment historically (Climate Change Commission, 2021).

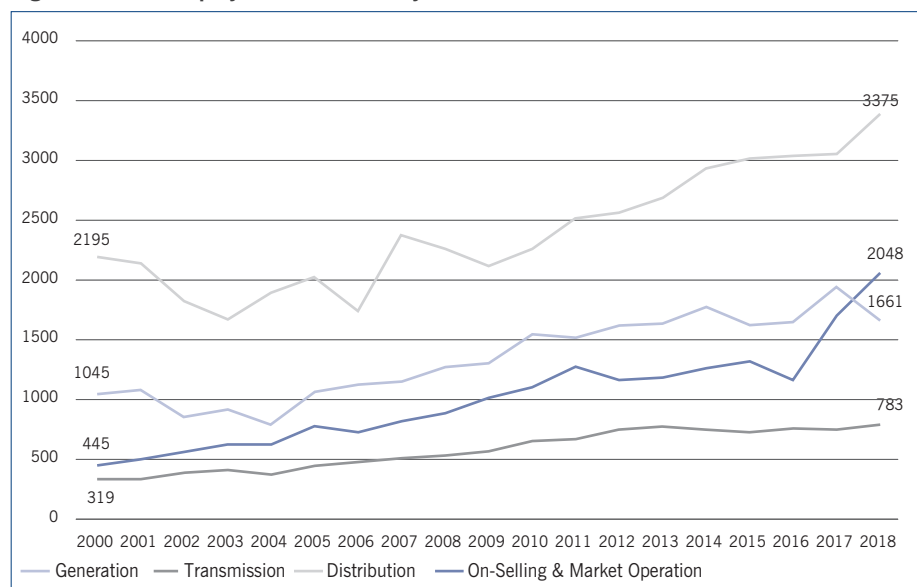
**Gender and energy sector employment in New Zealand**

The available public data on energy industries in New Zealand often combines electricity, water and waste utilities, obscuring large differences in specific areas of energy employment. We obtained the sub-industry data from Stats NZ LEED (linked employer–employee data) and the Household Labour Force Survey for

**Figure 1: Total electricity employment by gender – Tax Years 2000 – 2018**



**Figure 2: Total employment in electricity 2000–18**



men and women over time based on total employment, job tenure and new hires (accessions). This data was broken down by distinct activities in electricity supply (generation, transmission, distribution and onselling/market operation) and the mining and petroleum sectors (coal mining, oil and gas extraction, exploration and mining support services, petroleum and coal product manufacturing and fuel retailing). We examined whether international trends are replicated in Aotearoa New Zealand, and, if so, what implications this has for just transitions. This data extends to December 2018, so does not include the impacts of recent policy changes, such as the Zero Carbon Act, the ban on new offshore oil and

gas exploration, or other more recent developments.

Diversity is certainly not limited to women and gendered employment patterns, but statistics at the industry level on either ethnicity or gender non-binary people are not available at this time. Moving forward, collecting this data is vital, because an inclusive and resilient energy transition requires much broader change than the data below shows. Moreover, the energy industry’s gender problem extends far beyond employment and leadership to cultures of energy consumption, and to gendered issues of fuel and energy poverty beyond the scope of this piece (MacArthur and Stephenson, 2022).

Figure 3: Electricity sector accessions (new hires) 2000–18

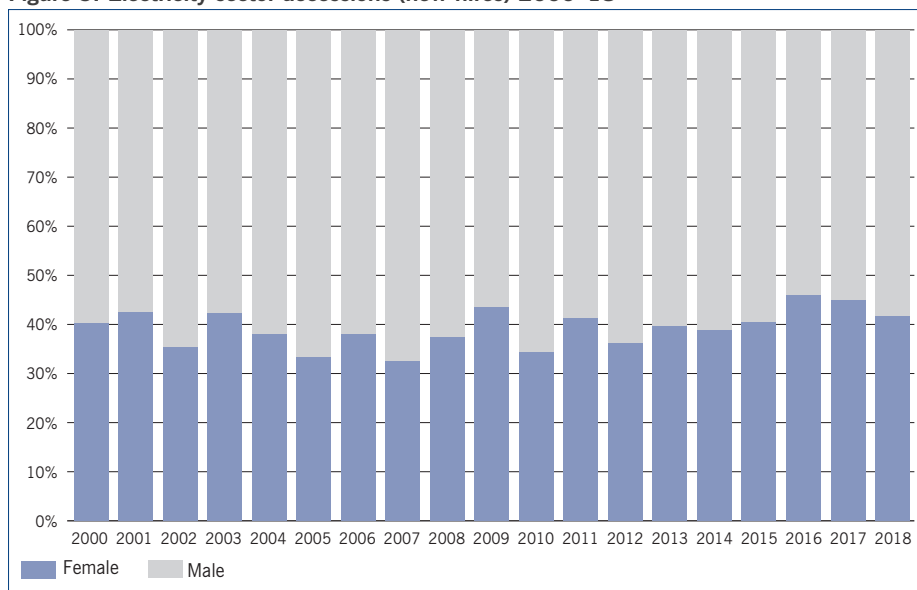
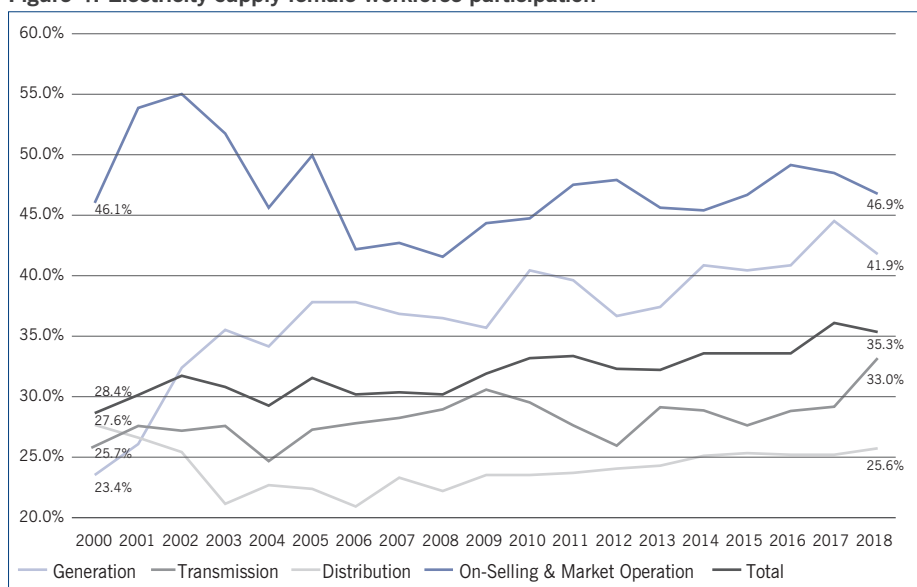


Figure 4: Electricity supply female workforce participation



**Electricity**

The electricity workforce in Aotearoa New Zealand is an area of long-term employment growth but is male-dominated, with nearly twice as many men as women in the sector (Figure 1).

Since 2000 employment has increased significantly in distribution companies, with a sharp increase since 2016 doubling the number of employees in electricity market operation and onselling (Figure 2). Employees in distribution companies make up the lion's share (43%) of employment, while in 2018 for the first time retailing and market operation employees became the second-largest proportion of the workforce.

One factor perpetuating the employment gender gap is the fact that the proportion of women hired in New

Zealand's electricity sector has not changed significantly in two decades – at 40% in 2000 and 42% in 2018 (Figure 3).

Large, albeit varied, pay gaps exist in electricity industries. In 2018 men in electricity generation and retailing made 74% and 73% more than their female counterparts respectively, with these gaps increasing almost 10% since 2010. The pay gap in distribution is lower at 37% and has been declining since 2000.

Significant differences in the share of female employees exist at the sub-sector level. The distribution sector has the highest share of overall employment in electricity (Figure 2), but the smallest proportion of women (25.6% – Figure 4), while onselling and market operation has the second-highest overall employment

(Figure 2) but the highest proportion of women (47% – Figure 4).

The data also showed that women are much more likely to stay less than two years in their electricity sector jobs, and men much more likely to stay eight years or more. These patterns have remained steady over the past decade. This gendered job tenure pattern is most pronounced in electricity generation and least pronounced in retail and onselling. Electricity generation is the sub-sector that has closed the job tenure gap most in the past 20 years, but this remains the largest gap. Electricity retailing jobs are for much shorter durations than those in other parts of the industry. The longest average tenure for both men and women is in power distribution, a part of the sector dominated by community and consumer trusts.

**Fossil fuels**

Overall employment is declining in fossil fuel-related industries – coal mining, oil and gas extraction, exploration and mining support services, petroleum and coal product manufacturing and fuel retailing – with fuel retailing making up the lion's share of the decline.

Fossil fuel industry employment also continues to be male dominated, though the gap overall has closed in more recent years. The proportion of women increased from 30% in 2000 to 38% in 2018, a larger shift than observed in electricity.

This narrowing in the gender gap for fossil fuels overall is largely due to the decline in the large fuel retailing sub-sector (Figure 5), which makes up nearly 70% of all fossil fuel-related employment in Aotearoa. The job losses in retailing (gas stations) came almost exclusively from male employees in the sub-sector. The number of women has held remarkably steady over the past 20 years, from 3,610 in 2000 to 3,695 in 2018 (Figure 7). This has led to almost gender employment parity in the fuel retailing sub-sector (from 33% in 2000 to 46% – Figure 7).

When fuel retailing is removed from the numbers, the gender balance looks much more like electricity, with the share of women largely unchanged in 20 years (from 20% to 22%). This also puts the share of women in line with international figures for fossil fuel industries

(International Renewable Energy Association, 2019).

Job tenure patterns in fossil fuel jobs are similar to those in electricity. Men working in fossil fuel industries are nearly twice as likely to stay in their jobs for eight years or more. The 2018 salary gaps in fossil fuels were higher than in electricity: highest in oil and gas extraction at 86% and lowest in fuel retailing at 25%.

### Executive positions and leadership

In addition to general employment trends presented above, a further data gap exists in reporting of gendered leadership positions in New Zealand energy industries (vertical stratification). We know that leadership diversity matters to decision making and performance based on extensive international literature on the causes and consequences of glass ceilings (World Economic Forum, 2021; International Energy Agency, 2017, Hunt, Layton and Prince, 2015; Adams and Funk, 2011). It is also important for career progression, and imbalances in senior leadership translate into overall pay gap differentials for the workforce overall.

In order to address this gap in New Zealand, we analysed published online data and annual company reports in both the electricity and fossil fuel sub-sectors.<sup>4</sup> We found that at the corporate leadership level (executive teams and boards), women are represented approximately the same proportions as in the New Zealand top 100 survey: 25% in both the electricity and fossil fuel industries, with the exception of electricity distribution at 15%. Differences emerge at the sub-sector level, though. Of 62 electricity sector companies with published board memberships, ten had no women. All of these were distribution companies. We found similar lack of representation in fossil fuel investment, coal mining and wholesale retail boards. Nineteen of the 62 electricity companies did not publish board or executive memberships online or in their annual reports, demonstrating a lack of attention to the importance of gender equity in leadership and the sector more broadly. In fossil fuel industries, women's share of board seats was highest in gas distribution at 44% and lowest in oil and gas extraction at 20%.

Figure 5: Employment in fossil fuel sub-sectors 2000–18

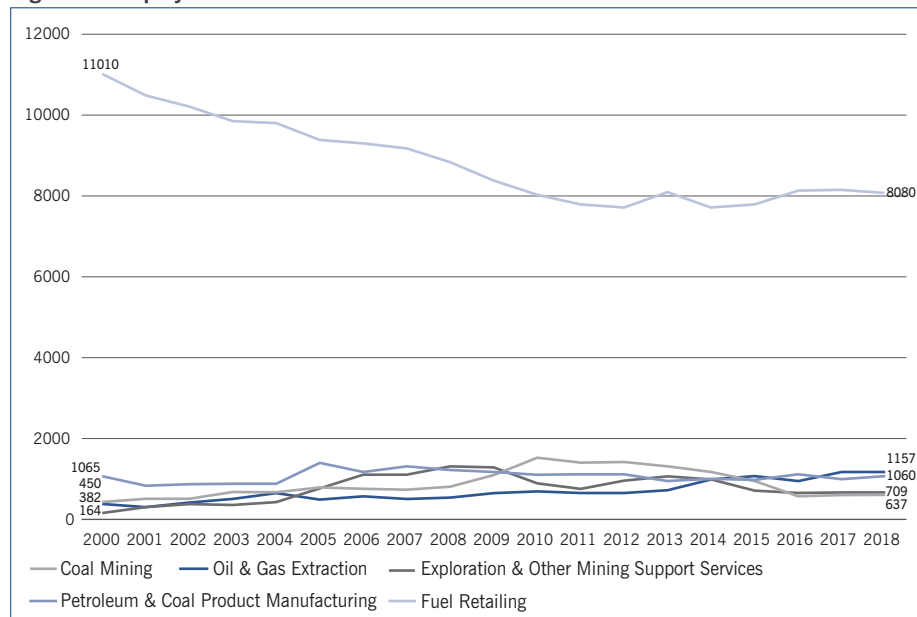


Figure 6: Employment – fossil fuels

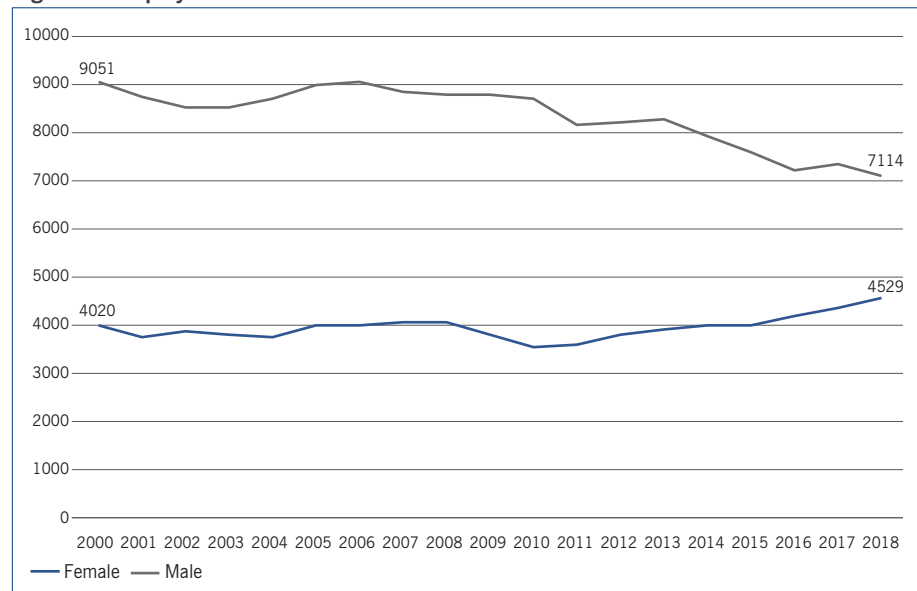
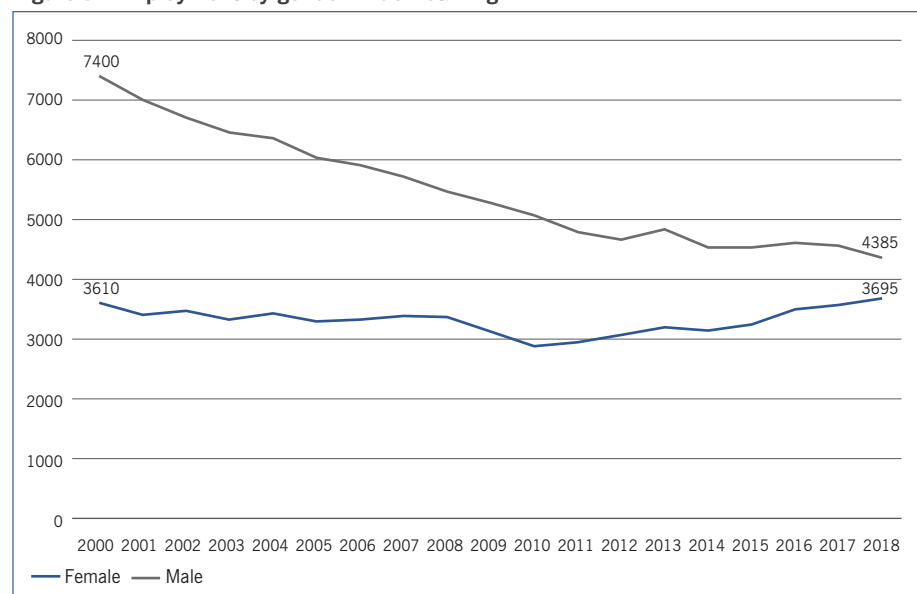


Figure 7: Employment by gender – fuel retailing



### Implications for just transitions

Policymakers and those interested in energy transitions in Aotearoa New Zealand will need to understand where the challenges and opportunities are in order to bridge the gap that has persisted for decades now and make the energy sector a more inclusive one. The sub-sector employment data presented here provides insights for future research and for policymakers. There is tremendous potential in energy transition policies to create new employment, bring in innovative and diverse actors and

food retail elements of the business. These are some of the least skilled and lowest paid jobs in the energy sector, so it is significant that they also have the highest share of female employees.

Large differences in job tenure exist between men and women in some sub-sectors (power generation, petroleum and coal manufacturing, exploration and mining support), and far less so in others (electricity retailing and onselling, fuel retailing). To plug job tenure gaps we need to find out much more about why women

and beyond that investigate the norms and practices that result in particular imbalances.

The sub-sector data also shows that the largest sub-sector in electricity (distribution) and largest in fossil fuels (retailing) have far-reaching, albeit opposite, effects on the overall gender composition of the energy sector. The overall sector figures, showing little change, mask large shifts in employment, job tenure and gender composition in sub-sectors. Emphasis is often placed on increasing the training and participation of women in STEM, but increasing technical training for women is just one piece of a much broader challenge of systemic change. Once women are employed, why don't they stay? What kinds of employees and skills are necessary in order to transform how our societies produce and consume energy? Why are non-technical yet highly skilled positions paid relatively poorly?

The negative gender impacts of conventional infrastructure policy and gender-blind transitions policy can also be attributed to a range of factors which include: the impact of care work on employment; persistent stereotypes about women's capacities and competencies; low pay in feminised professions; and discrimination against women in masculinised ones (World Economic Forum, 2021; International Renewable Energy Association, 2019). Various networks of women in energy industries have developed in recent years, attempting to raise the profile of the lack of diversity and its implications for the sector, as well as provide mentoring and strategic support. This push for diversity has been met with resistance from some quarters, based on sexist assumptions about women's 'natural' inclinations and capabilities (see comments section in Greaves, 2019).

### Conclusion

Energy systems globally are in the midst of significant restructuring, in response to pressures to decarbonise, decentralise, diversify and decolonise (Newell, 2021). It is essential that recovery and transition policies are gender positive rather than regressive (World Economic Forum, 2021, p.6). In order to achieve this, occupational

Where investments are directed to or diverted from, who makes decisions, and how and why they do so all have significant and differentiated impacts on those who experience this world as male, compared to those who experience it as female.

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expand the benefits of job growth. But there is also growing concern that current policies will merely magnify the stark underrepresentation of women (Baruah, 2017). Women in both the electricity and fossil fuel industries are significantly underrepresented, and, importantly, the share of women being hired for new roles has remained largely unchanged in more than two decades. Large pay gaps persist, consistent with the international literature demonstrating that women are stalled and in some areas reversing their share of 'jobs of the future'.

The number of jobs in electricity and renewables in Aotearoa New Zealand is increasing while employment in fossil fuel industries is decreasing. The decreases have been particularly pronounced in fuel retailing from gas stations between 2000 and 2012, where women's employment has remained steady but men's has decreased. This is likely due to a range of changes in gas stations, from automation of pumps to an expansion of the convenience store and

are leaving their jobs so much earlier than men. International evidence suggests that these differences are due to a range of factors, which include hostile work cultures, lack of family-supportive leave and re-entry policies, workplace harassment and discrimination, lack of representation in STEM training, and lack of representation and role models in leadership positions (International Energy Agency, 2017; International Renewable Energy Association, 2019).

The lack of reporting from some energy companies on gender composition points to the importance of gender auditing exercises directed at the national level, as we saw with the United Kingdom's mandatory gender pay gap reporting in 2018 (Government Equalities Office, 2019). This exercise allows for in-depth data collection, and comparisons between industries not just of overall employment but of specific discrepancies in pay and in job rank. It forces firms to, at a minimum, take stock of their employment practices,

segregation needs to be addressed, as does reskilling, bias training and sustained policy attention to the scarring effect that inadequate care support has on women's employment prospects and trajectories. Transition pathways in Aotearoa New Zealand that fund 'shovel ready' projects and incumbent industries without strong social and industrial policy changes are likely to have regressive impacts on women.

This research has revealed the extent to which women in both the electricity and fossil fuel industries are currently underrepresented, and, importantly, that the share of women hired for new roles has remained largely unchanged in more than two decades. New Zealand's energy industries are both racially and gender segregated, and the sub-sectors where gaps are largest are also where change has been most resisted. This analysis opens up opportunities for change. Local electricity distribution companies are one important area for focus, as we move towards an electrified future with more distributed generation. Women's share of jobs in them has been consistently low and these jobs are also where the longest job tenures can be found. The largest job losses to date (in fossil fuel retailing) have equity implications as well as gender ones, as fuel retailing is the sub-sector where Māori

employees are most represented, average pay is lowest, and job losses were heavily masculinised. This leaves women nearly at parity (in total job numbers), but the sheer size of this sector inflates the overall gendered employment breakdown, highlighting the importance of both sub-sector and demographic data.

Infrastructure policy is gender policy, whether this is explicit in the design or not. Where investments are directed to or diverted from, who makes decisions, and how and why they do so all have significant and differentiated impacts on those who experience this world as male, compared to those who experience it as female. For example, women benefit disproportionately from energy efficiency and public housing investments, since they are overrepresented in low-income cohorts and use of public housing services. Energy policy, and just transitions policies more broadly, require an informed gender lens if we are going to navigate the intersecting challenges of climate transitions and post-Covid reconstruction. Far more work in New Zealand is required in the near term. Mandatory gender reporting and auditing exercises at a national level would help plug data gaps. A gendered employment lens needs to be added to infrastructural and climate transition policies in Aotearoa New

Zealand. This would include increased attention to reskilling, family-support policies, the climate benefits of investment in feminised care industries (childcare, health and education), and existing hostile work cultures. Proactive planning and implementation is required so that the gendered effects of this policy gap can be addressed before they grow even larger. Ticking the 'no gender implications' box may save time in the short term, but will have longstanding impacts on how just and effective low-carbon transitions will ultimately be.

- 1 The pay gap sits at 71.9% in 2021 and the income gap 63.7% (World Economic Forum, 2021, p.33). The majority of these gaps remain unexplained by educational attainment, and the gaps increase as an employee moves up the wage distribution (Pacheco, Li and Cochrane, 2017).
- 2 We obtained the sub-industry data from Statistics New Zealand for men and women over time based on total employment, job tenure and new hires. This data was broken down by distinct activities in electricity supply (generation, transmission, distribution and onselling/market operation) and also the mining and petroleum sectors (coal mining, oil and gas extraction, exploration and mining support services, petroleum and coal product manufacturing, and fuel retailing).
- 3 No women have headed the transport portfolio in the past decade, while one of four environment ministers since 2010 have been women.
- 4 See also MacArthur and Dumo, 2018 for an earlier version of this work.

#### Acknowledgements

The authors would like to thank Claudia Gonnelli for her research assistance for this article.

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