

Notes from the Oil Patch: Planning for a Worker-Focused Transition in the Oil and Gas Industry

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Abstract: The energy transition portends major disruption to livelihoods of oil and gas workers and communities dependent on the fossil fuel industry. Managing this transition smoothly will require coordinated policy planning, community and place-based incentives, and structural reforms and support structures that carefully map the skills of the worker to opportunities in the clean energy economy.

That the oil and gas industry (O&G) needs to transition to a low-carbon world within the next 30 years is a truth acknowledged by everyone but the most strident climate contrarians (1, 2). Public positions, early investments, and corporate strategies of major O&G companies suggest that a shift within the industry is underway (3, 4). Overall, the O&G sector, including support services, employs over 500,000 people directly in the U.S., and millions more in surrounding communities (5). The O&G industry is diverse – with employees from recent college graduates to 40-year industry veterans, from a management executive to a rig worker, from supporting boom town communities like Williston, ND to making significant contributions to state budgets like in New Mexico. In thinking about the energy transition, the needs of the recent college graduate, the rig worker, the boom-town community, and the O&G revenue dependent state are also equally diverse. In other words, managing this transition effectively needs comprehensive solutions for both the energy system and the people and communities that power it (6).

On the one hand, the technological needs of the transition are relatively clear. The International Energy Agency (IEA) in its net-zero by 2050 analysis notes that oil and gas use fall by 75% and 55%, respectively, by 2050 compared to 2020 (1). In the U.S., the net-zero America study estimated that oil and gas in primary energy declines between 56% and 100% across different emissions pathways (7). Addressing climate action will require policies such as bans on sales of internal combustion engine vehicles, electrification, carbon taxes, or clean energy mandates that will directly reduce fossil fuel consumption and shrink the traditional O&G industry.

On the other hand, the transition needs of people and communities are unclear. Often, the dominant public rhetoric goes little beyond an exhortation to O&G workers to shift to growing jobs in the solar and wind industry (8). While it is part of the solution, such policies are simplistic and betray a lack of experience and understanding of these communities and workers. Recent research on coal communities found that each lost coal mining job reduced county-level income by \$100,000, and that many who lost jobs did not relocate and remained unemployed (9). Compounding this is that few people in the corridors of power have ever been a rig worker or spent time in the oil patches of Pennsylvania or Texas or Colorado.

Here, we discuss a framework that will help policy makers and the broader public think about a managed transition in the O&G industry. Unlike prior work on this subject, we come to this issue from a '*field perspective*' – we have direct experience in the O&G industry, as a former drilling engineer and current field scientist. Our goal is to reflect the diversity of the needs of O&G workers and their communities in future transition planning. We first identify three critical elements that are necessary to ensure an equitable transition. Next, we discuss key challenges in this transition, looking at both the timing and scale of solutions necessary for an effective transition. Finally, we show how the jobs of the new energy economy could be carefully mapped onto the diversity of O&G workers such that no one gets left behind.

Key Elements of a Transition

An equitable transition for the O&G industry must incorporate three key elements – coordinated planning, community and place-based incentives, and long-term structural reform. These elements address two major failures in our approach to the demise of the coal industry – first, ensuring that people and communities don't fall through cracks in any transition plan, and second, providing robust long-term support for entire communities to make a successful transition (10).

A transition plan that is coordinated at the local, state, and federal levels and across agencies is necessary to address the complex and long-term dynamics of a major economic shift (11). Efforts at the state and local level to incentivize the creation of new clean energy industries would suffer if not backed by federal support for the transitioning communities. Furthermore, the timing and sequencing of support mechanisms to smoothen the transition for individual workers and communities is critical to ensure long-term success. Demand side policies to reduce demand for fossil fuels, for example, must be coupled with decentralized efforts to provide training, financial assistance, and a pathway to careers in the new energy economy. Importantly, training and career opportunities should also be aligned with the skills and experience of the O&G workforce.

Transition plans must include place-based incentives that align with the interests and values of the community. O&G communities in the US, and therefore their needs, are diverse – the gas fields of Appalachia are distributed across several small towns, the Bakken oil patch is centered around the boomtown of Williston, North Dakota, while the refineries and petrochemical facilities along the Gulf Coast support thousands of jobs. Instead of a top-down approach to the transition that is unlikely to represent the needs of all communities, we should incentivize a decentralized approach to planning. In this regard, the Appalachian Regional Commission serves as a good example on ways to empower communities to plan for change through a federal-state partnership (12). The federal government should support the creation of regional planning authorities who can engage with workers and the community to develop transition pathways. These planning authorities must also be empowered to advise and recommend policies to state legislatures, with the expectation that federal support will be available. This flips traditional approaches to

planning in a way that empowers communities. For example, instead of the federal government deciding the locations for hydrogen hubs, communities can decide if hydrogen production would be their future (13).

O&G is the energy backbone powering the US economy. A transition to a low-carbon world will therefore require significant structural reforms to de-link each major economic sector from the fortunes of the O&G industry. A key aspect of this structural transition is for the federal government to address impacts of this transition on state budgets. States differ widely on how they use revenue from O&G activity. While some states like New Mexico route most O&G revenue into State Permanent Funds with an annual pay out, other states like North Dakota use them to fund current expenditures (14). It would be unfair and impractical to ask states to commit to a transition away from fossil fuels and therefore a loss in revenue without a mechanism to prevent catastrophic budgetary shortfalls. Here, the federal government can set up a ‘*matching funds program*’ to encourage more states to move O&G revenues into permanent funds. Initially, the federal government can match up to 100% of any near-term budgetary shortfall. This approach is not costly – a recent analysis found that the O&G supply chain (excluding excise taxes on petroleum products) generated \$43 billion in total government revenue in 2020 (14). Over time, as the permanent fund grows and the annual payouts increase, the federal matching funds can wind down as the state economy restructures. This has two advantages: one, states would be more willing to plan for a transition knowing that their budgets would not be affected, and two, the sunset policy of the matching funds program ensures that the transition assistance would not pose a long-term fiscal challenge.

Transition Challenge Across Time and Scale

A worker-focused perspective on the solutions to the fossil fuel energy transition centers around a dual framework of policy timing and policy scale. Figure 1 shows the transition challenge within the O&G industry based on this dual framework, along with the roles for federal, state, and local governments. A successful transition requires both near-term and long-term policy solutions focused on O&G workers. Furthermore, the effectiveness of these solutions depends on the scale of implementation – from policies that focus on individual workers to policies that address state-level challenges.

Local and state governments could be powerful drivers of change. One example is the need for training for existing O&G workers in the new energy industry. This must happen against a background of high wages associated with a typical rig worker. Very few would forego that income to enroll in a transition program with little pay and uncertain job prospects. Here, a solution could be to develop online, asynchronous certificate programs in various new energy industry areas through public universities or national labs that O&G workers can choose to take while in their existing jobs. This could then be coupled to a jobs program in the new industries with a short-term apprenticeship period. Additionally, jobs programs should be focused on areas where the skills of the O&G workers – with competencies in mechanical and electrical work, manufacturing, safety systems, and heavy equipment operations can be matched with opportunities. Such programs need to be implemented at the state- and local-level, with federal support. Similarly, local- and state-governments can develop incentives for new energy industries suited to their community, encourage companies to hire O&G workers with the required certifications obtained through the training program, and empower regional planning authorities.

The federal government also has a significant role to play, particularly to complement state- and local policies to address transition needs. A key challenge for O&G workers to switch to new industries is the lack of an effective solution for transitional healthcare. Workers currently enjoy industry-provided healthcare benefits – to lose that as part of any transition is a major financial concern that should not be

ignored. In addition, the federal government can work to ensure that any restructuring in how states use O&G revenue does not result in cuts to state-level spending on critical services like education, healthcare, and public safety. In developing these policies across time and different levels of government, coordination and appropriate sequencing is important.

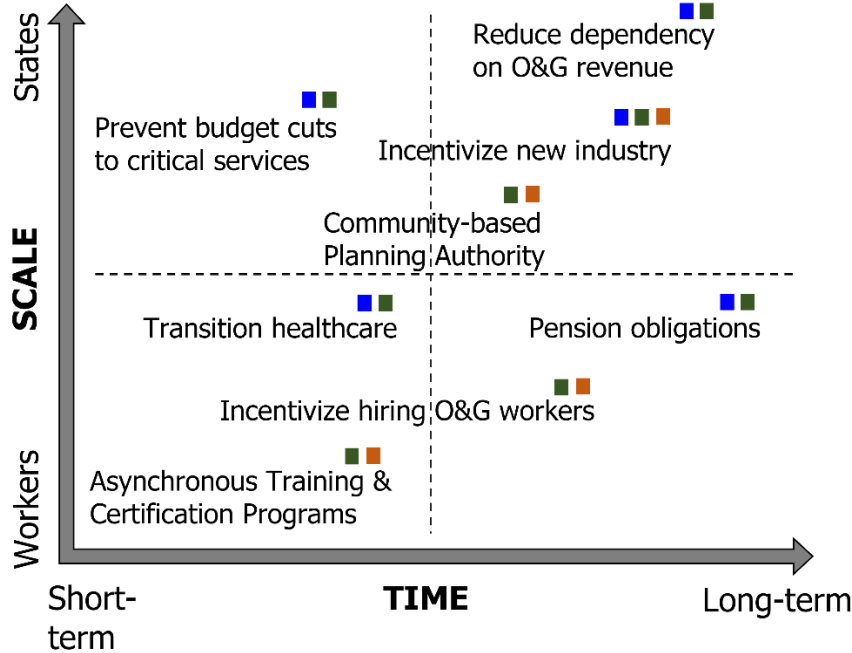


Figure 1. The transition challenge for the oil and gas industry based on a dual framework of time (x-axis) and scale of solution (y-axis). The roles for the federal government (blue), state governments (green), and local governments (orange) in solving specific challenges are shown as colored boxes.

Jobs in the New Energy Economy

Jobs in the new energy economy can be classified into five categories that map onto O&G worker profiles: O&G sunset, O&G adjacent, New Energy, Remediation, and Skill Adjacent. In Table 1, we show how these new energy economy jobs could be mapped onto the diversity of O&G workers.

Transition Jobs	O&G Sunset	O&G Adjacent	New Energy	Remediation	Skills Adjacent
Role	Maintain long-term production needs to meet demand for the next 20 – 30 years	Low-carbon industries with significant skill transfer capacity	Low-carbon industry with significant career growth prospects	Restoration of land and water resources as legacy industry winds down	Infrastructure development for energy transition with significant skills overlap with O&G
Worker Profile	Late-career O&G workers	Mid-career O&G workers	Early-career O&G workers, recent college graduates	Late-career O&G workers	Early to mid-career workers
Example Industry	O&G production, transportation	Geothermal, carbon capture & storage,	Solar, wind, efficiency, electrification	Abandoned & orphaned wells,	Construction, manufacturing,

		hydrogen, offshore wind		land reclamation, pipeline stripping	infrastructure building
Challenge	Pension obligations, community support	Incentivizing O&G to invest, lateral transfer within O&G, job growth	Training needs, healthcare, career advancement	Significant labor requirements, lower pay, disparate nature of work	Addressing transient and temporary nature of infrastructure jobs

Table 1. Matching worker profiles in the O&G industry with new economy jobs as part of the energy transition. A successful transition needs policies that are tailored to address the varied challenges faced by O&G workers.

O&G sunset jobs are jobs necessary to maintain long-term O&G production and transportation to meet demand over the next 20 – 30 years. These jobs are suited to industry veterans who are more likely to retire than to train for jobs in a new industry. Maintaining a skilled workforce in the O&G sunset industry will be critical for safety and environmental protection as well. Falling standards in health and safety for existing infrastructure during the transition could have harmful negative effects on workers and communities where fossil fuel infrastructure is currently located. Prioritizing these jobs for late-career workers ensures that their pension obligations will continue to be met by the industry.

The O&G adjacent jobs are jobs that are ideally suited for the O&G industry to invest in and deploy at scale. These are low-carbon industries that have overlapping skill sets with traditional O&G industry such as geothermal energy, carbon capture and sequestration, hydrogen, and offshore wind. These new industries would benefit from workers with experience in the O&G sector and best suit mid-career O&G workers. O&G companies should be encouraged to invest in these new industries and train existing O&G workers through lateral transfers within the company.

New energy jobs are jobs that traditionally form the core of the energy transition – solar, wind, energy efficiency, electrification, and clean manufacturing. Given the explosive growth seen in some of these industries, these jobs are best suited for early-career O&G workers who are looking to build a career in the energy sector. It also provides the best opportunities for the increasing number of college engineering graduates given the needed scale of deployment of new energy technologies.

Remediation jobs are jobs that addresses restoration of land and water resources as the industry shifts to less extractive systems. Recent progress in this area through the bipartisan infrastructure legislation that allocated funds for plugging abandoned and orphaned wells is an encouraging sign (15). As the energy transition accelerates over the next two decades, labor needs for remediation activities will significantly increase, providing a path for late-career O&G workers and conservation-minded students to get involved. However, the nature of this job – temporary, relatively low pay, and geographically dispersed needs – will make it challenging to hire and retain workers to restore millions of acres of land and plug abandoned wells (16, 17).

Finally, skills adjacent jobs are jobs in manufacturing and infrastructure development that make use of the skills of O&G workers such as heavy equipment specialist, crane operator or truck driver. The skills in these jobs are readily transferable to the significant infrastructure needs of the new energy economy as well as adaptation-related improvements. While workers across all age groups can participate in this skill transfer, policies must address the transient and temporary nature of infrastructure jobs.

The energy transition is an enormous technical, political, and social challenge. A key part of ensuring that the transition is successful is to ensure that all stakeholders, especially industry workers and communities, enjoy its benefits. That cannot happen with a technocratic approach to planning. The needs of O&G workers and fossil fuel dependent communities are varied and require place-based solutions that incorporate community input, take advantage of local resource availability, and have long-term access to resources and support from the federal government. The justified anger at the O&G industry for misleading people on the science of global warming or blocking climate action at every possible turn should not extend to the vast majority of workers that make up this industry (18, 19). O&G workers and their communities have sacrificed to keep the lights on and the cars running for over a century. It is in our collective interest to ensure that policies that accelerate the energy transition do not leave these workers behind.

Competing Interests

One of the authors (T.L.) is the CEO of Fervo Energy, a geothermal energy start-up.

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