

The End of the Oilfield*

*As we know it

When was the last time you swung by your coal dealer to stock up on heating fuel for the winter season? How often do you have to tell your kids to stay away from the coal pile because it makes their hands and clothes so hard to clean? Possibly for some of the oldest readers here, they may have memories of this, but for most of us, these are ideas from the past. Once upon a time, coal, was THE power source for modern human society. Coal engines directly powered literally everything from ships and railways to home heating furnaces, chemical plants for fertilizer and assembly lines for canned corn. Most industries and homes that were not directly coal powered were usually run on electricity created from burning coal. Coal was so valuable and critical a material that a shortage either temporary or national meant disaster since there were no practical alternatives. Plentiful coal meant health, wealth and world power, and a lack of it meant subjugation poverty and difficulty. With the sole and shrinking exception of China, coal today no longer holds a central place in the economy or security of any country. Indeed, it has not even been an important part of the economy of most wealthy nations for a generation now. Even in regions where the usage of coal is still growing such as India and Indonesia, it is growing slower than the economies of those places, and more slowly than the rate of increase of other energy sources

Access to coal was so critical that exceedingly dangerous and technologically advanced techniques were developed to create undersea coal mines, at excruciating cost in both lives and money as experience was gained in understanding the differences between conventional underground mining, and undersea underground mining.
http://www.maden.org.tr/resimler/ekler/2b15c75c0c389b4_ek.pdf (a technical paper reviewing some of the key challenges and difficulties in undersea coal mines) In 2017 the world's last undersea coal mine was closed. Even in China it's not worth trying to keep these sorts of endeavors operational.
<https://www.firstpost.com/world/china-will-shut-down-its-only-undersea-coal-mine-in-october-3476278.html> Worldwide, most of the techniques, technologies and people which were once involved in a variety of forms of coal mining are no longer employed. The idea of exploring for new coal producing regions or developing new recovery techniques is virtually unheard of, since more than enough extractable coal is already known of using already developed methods and the amount available is enough to supply any reasonable foreseeable future needs. The volume of coal produced is still large in absolute and relative terms, but it is cheap, abundant, and taken for granted that it will be available for use if and when it is desired. Coal mining companies are not politically or economically relevant entities in a large sense, and nations or regions do not make general policies or decisions with coal availability or pricing as a part of the decision process.

If you are wondering what this has to do with the oilfield, re-read the preceding two paragraphs and substitute the word oil and gas everywhere the word coal appears, and realize that oil and gas is currently at a tipping point between being the 'king' of the economy and being simply another source of energy with no particular political or economic importance. This is a hard thing to think about, particularly for those of us who have dedicated a substantial portion of our lives to this industry, but it is in the process of happening.

What does this mean for the future of the oilfield?

There will be an oilfield for a long time after it is no longer an economic, technological, or strategic lynchpin. However, it will not look like the old oilfield. I will not try to imagine that I can forecast them all, or know them all, but here are a few large ones that are already underway, and can be expected to accelerate:

- Permanent reserves reductions for previously booked reserves which are now found to be in excess of any utility and cannot reasonably be expected ever to be produced. This has already happened and will continue to take place.
<https://www.rystadenergy.com/newsevents/news/press-releases/rystad-energy-annual-review-of-world-oil-resources-recoverable-oil-loses-282-billion-barrels-as-covid-19-hastens-peak-oil/>
- Oil and Gas companies transition out of, or diversify away from oil and gas, as BP has already announced: There will certainly be more to come.
https://www.rigzone.com/news/wire/supermajor_era_ends_for_bp-05-aug-2020-162933-article/
- Consolidation of production techniques around a few highly successful and repeatable ones. Many methods which we are familiar with now will become obsolete, even if they are technically successful, because it simply won't be worth the while to maintain a critical mass of the network of expertise, personal and equipment required to employ them on a regular basis.
- End of large-scale exploration for oil and gas, because known locations are sufficient. In field/near field extensions will likely continue for a considerable period of time to take advantage of existing infrastructure and expertise to add cashflow cheaply, but with the need to continuously grow production and replace reserves gone, most **What does this mean for the future of the oilfield?**

The alternatives that will reduce or end the dominance of oil and gas are already here – they just aren't present everywhere and on demand the way oil and gas is, but that is in the process of changing in the following already present ways:

- Wind and solar power for electricity generation
- The development of a 'hydrogen economy' which will work as a wholesale replacement for natural gas, and some oil applications (if you don't believe me, read your JPT magazine) <https://pubs.spe.org/en/jpt/jpt-article-detail/?art=7367>
- Increasingly successful electric personal vehicles

As with other 'older' technologies, this does not mean that oil and gas will disappear suddenly. It will take place slowly on a piecemeal basis and will not be an overnight revolution. People still burn wood all the time. Propeller planes still sell in large numbers even though jets are better for large scale air travel. Horses are still around even though they are not required for transport. Books are still being sold even though they are in all technical respects replaceable with electronic media. However, in all these cases, the resources, technology, and techniques of the older methods are basically 'frozen in time' and reduced to a tiny level of importance compared to what they once were. This will happen to oil and gas as well, and ultimately, it will be a good thing. Change is inevitable, and as a society and as

people we should be happy that there are better alternatives out there to the ones we depend on right now. In the meantime, we will help keep the lights on.