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EXORCISING THE **RESOURCE CURSE**:

The Emerging Post-Carbon Alberta Powerhouse

The pandemic is just the latest in a wave of cataclysms that have shaken Alberta to its core. It is as if the province has been going through a lengthy exorcism. And the demon has a name: The resource curse, or the ‘paradox of plenty’, which tends to visit economies with abundant natural resources in the form of stunted growth of non-resource sectors, challenges with innovation, entrepreneurship and diversification, and challenges with social capital and cohesion.

The psychologist Elisabeth Kübler-Ross, who worked with terminally ill patients, famously came up with the “Five Stages of Grief”: Denial, anger, bargaining, depression and acceptance. Taking each

of these in turn, we’ve seen an early epoch of *denial* – denial of climate change, or our collective culpability in it (think of Ralph Klein’s dismissive knee-slapper about “dinosaur farts”). Then, *anger*, expressed for example in the vilification of celebrities (Neil Young, James Cameron, Leonardo DiCaprio). Then, *bargaining*, for example in the Notley-Trudeau attempt at a “grand bargain” (or, more cynically, the “we can have our cake and eat it too” scenario), also in the unprecedented scale of public pipeline and refinery subsidies, equity partnerships with Indigenous stakeholders and threats-as-bargaining chips lobbed at the rest of Confederation. The early phase of COVID then brought on the penultimate phase: *Depression*. Indeed, agonizingly so: Alberta currently has the highest rate of suicide among all provinces.¹⁴² We have 2 fewer Canadian energy giants (following EnCana’s decampment to Denver and the Husky-Cenovus merger). And a glum Premier Kenny told us to brace for levels of unemployment that would echo, if not eclipse, the Great Depression.

But now, Alberta is reaching the last phase: *Acceptance*. Perhaps best symbolized by the damning indictment of both the federal and provincial government’s inaction on climate change that came not from an environmental group, but from the industry itself – the now infamous February 23 Letter from the CEO of Teck.¹⁴³ The mining giant’s abandonment of a multi-billion dollar oilsands investment is due to insufficient investor interest

“We’ve shown the world things like this can happen, even in the smallest of communities.”

Blue Eyes Simpson, Vice-President, Fort Chipewyan Metis Association¹⁵²

“The future rewards those who press on. I don’t have time to feel sorry for myself. I don’t have time to complain. I’m going to press on.”

Barack Obama

tied, in turn, to Canada’s lack of a compelling or coherent climate strategy, leading to uncertainty for investors and an elevated risk of “stranded assets.” Indeed, as one economic analyst noted recently “we have switched our approach to emissions reductions so many times, federally and provincially, that long-term investors don’t know what to think.”¹⁴⁴

But now, the good news: Slowly and painfully, as acceptance sets in, there is a new imagined future emerging. More and more people are beginning to get excited about the 21st century possibilities in new industries, some far flung from oil and gas, and others perfectly suited to take advantage of Alberta’s unique *in situ* natural and human assets: The most plentiful wind and solar potential in Canada, decent geothermal potential, alongside sedimentary basins capable of sequestering vast amounts of carbon; a highly educated population schooled in required, or adjacent, STEM-fields necessary to take leadership in an energy transition; and a thriving civil society, a necessary corollary to a high-innovation economy. Despite the challenges of COVID and declining revenue, there remains no shortage of grit, tenacity and a sense of possibility among Albertans. Industry analysts Peter Tertzakian and Jackie Forrest of ARC Energy Research Institute are particularly bullish about hydrogen, geothermal, and carbon capture and storage.¹⁴⁵ Each of these are explored in this section.

Ironically, with sufficient political will and investment, Alberta innovation could prove to be pivotal in achieving a levelling off, or eventually even a reduction, of atmospheric greenhouse gases. As a recent report by the International Energy Agency pointed out, carbon capture “is the only group of technologies that contributes both to reducing emissions in key sectors directly and to removing CO₂ to balance emissions that cannot be avoided.” Alberta was an early a global leader in point-source carbon capture and storage (CCS), and UCalgary’s Containment and Monitoring Institute (CaMI), led by Dr. Don Lawton, is among the world’s leading CCS research projects. The \$1.2 billion Alberta Carbon Trunk Line System (ACTL) went online in June, 2020. Alongside Shell’s Quest project and Calgary-based Whitecap Resources’ Weyburn project, initially developed by Cenovus, these are three of the largest geologic sequestration sites in the world.



However, such projects, still very much in the proof-of-concept phase, require significant public subsidy, including tax credits, and their commercial potential in the short term remains tied to “tight” hydrocarbon production. But longer term, global carbon neutral and carbon negative markets suggest there is a much larger market in offsets and carbon trading, partially reliant, of course, on more robust carbon pricing schemes and/or more stringent clean energy standards. Currently, the United States remains - by far - the global leader in the development in particular of large-scale CCS facilities, with 25 facilities with commercial potential having been announced in just the past 3 years. Even during COVID, the CCS market has increased nearly 50%, and with Biden’s stated commitment to decarbonization, CCS will become a vital part of the mix of solutions, which Alberta could be well-positioned to help address. The re-deployment of Alberta oil and gas science and engineering knowledge, and employment should be a relatively straightforward shift. In fact, the employment potential in Alberta for CCS may well be massive. Predicted to be an \$800 billion global market by 2030, CCS is even expanding to non point-source, “direct air capture” (or DAC) technology (i.e. capturing carbon directly out of the atmosphere), which will be a critical biosphere-sustaining solution. This breakthrough technology was pioneered by former UCalgary Professor Dr. David Keith (now at Harvard). While many companies already claim carbon neutrality, and many others are moving to more robust net zero targets, Microsoft vows to be carbon negative by 2030, which requires heavy investment in DAC.

Another interesting petroleum-adjacent industry that has huge potential for Alberta is hydrogen. Global demand for hydrogen is projected to increase at least tenfold in the coming decades, with a \$2.5 trillion industry potentially meeting a quarter of the world's energy demand by 2050.¹⁴⁶ Over 25 countries already have a hydrogen strategy, with Canada in the process of developing one. Alberta has the start of a strategy, but at 3 pages embedded within the natural gas strategy, it will need fleshing out.¹⁴⁷ Like fossil fuels, though much safer, hydrogen's portability enables a wide range of uses, including heavy industrial uses, from shipping to aerospace to rail to steel smelting. Currently, 95% of the world's hydrogen is produced from fossil fuels, so the key will be moving to so-called "blue" (zero net carbon) and "green" (hydrogen from renewables) production. The trick will be to simultaneously expand hydrogen supply and demand. The Canada Energy Systems Analysis Research (or CESAR) lab, led by Dr. David Layzell at UCalgary, is doing some cutting-edge research on hydrogen in the heavy trucking industry, which is where Burnaby-based Ballard Power Systems could be poised to make a comeback. It is also worth considering that Central Canadian opposition to a national energy corridor would likely evaporate if it the payload was hydrogen.

Geothermal energy is poised to be a significant part of the worldwide energy mix in 2021. The exciting news for Alberta is that the engineering know-how required to bring geothermal to the forefront of world energy solutions comes largely from the oil and gas sector (horizontal drilling and fracturing substrata, for example). As one energy writer put it recently, "there's no realistic way geothermal can promise to absorb all the jobs currently being lost in oil and gas. Nonetheless, geothermal offers oil and gas something it badly needs: a port in a storm. It's a growing clean energy industry that needs a smart workforce trained in exploration and drilling"¹⁴⁸ The coming decade will see more investment in geothermal than the four previous decades

combined. Saskatoon-based company DEEP Earth Energy Production, female-led no less, just announced a "geothermal gusher" using directional drilling technology.¹⁴⁹ The well will provide energy sufficient to power 3,000 homes. In fact, geothermal's potential is so tantalizing as both a flexible and inexhaustible resource, the potential long-term for Alberta companies who are early innovators is hard to overstate.

Oil giants Shell, BP and Total are all moving heavily into renewables, with BP pledging to cut its oil and gas production by 40% while shifting about one third (so far) of its new investments in low-carbon energy.¹⁵⁰ But, notwithstanding Suncor's heavy investment in cogeneration, in general, Canadian companies are not pursuing renewables with nearly the same vigour. Some large companies are distancing themselves from the more rabid industry associations that work to undermine climate and renewables policies. Shell left the American Fuel and Petrochemical Manufacturers over its lobbying work undermining climate action policy. Total and Teck have both left the Canadian Association of Petroleum Producers (CAPP) due to their "misalignment" with CAPP's stance on climate change.¹⁵¹ Andrew Grant, the head of Oil, Gas and Mining at Carbon Tracker, a London-based think tank that researches the impact of climate change on financial markets summarizes the shifting sands well:

"I think it's become very clear that the world is different now these are not normal times, and that's especially true for large oil and gas companies like BP. Case in point: on August 4, the date that BP announced it was fundamentally altering its business strategy to adapt to the challenges posed by climate change, its shares rose by about 7% – on a day when the broader index of energy producers saw much more modest gains. If that doesn't tell you a story about how the math has changed, nothing will."¹⁵⁷

New wind and solar projects are coming online faster than predicted, particularly as the cost of solar plummets. The Taber solar plant will generate 500 megawatts of power, as will the Travers Project in Vulcan County (which will utilize a whopping 1.5 million photovoltaic panels). The solar project in off-grid, diesel-reliant Fort Chipewyan will provide up to 25% of the community's energy needs.¹⁵³ In fact, Alberta could well lead Canada in wind and solar development by 2025.¹⁵⁴ Worldwide solar use has jumped 20-fold in the last decade alone, providing 724 Gigawatts (or 3% of the world's energy) in 2019.¹⁵⁵ Over the same period, wind increased 3-fold, from 346 to 1,430 Gigawatts. Renewables are already lower cost in most of the world's markets, compared to fossil fuels, and the International Energy Agency in its *World Outlook 2020* declares solar to be the "cheapest electricity source in history", revising its 2018 forecasts for solar, which assumed cost levels 20-50% higher than the technology has proven to be.¹⁵⁶ By the end of 2020, total investments in renewables will exceed investments in fossil fuels for the first time ever, according to the International Renewable Energy Agency (IRENA). A revolution in battery storage will be a huge part of a renewable energy future, so it is also encouraging to see TD Asset Management's Greystone Infrastructure Fund investing in the country's largest battery storage development in Alberta. At least ten other major battery projects are underway in Alberta.

Canadian initiatives that bring industry, government and civil society together to work on future scenario planning, and shared innovation strategies will be important investments in the next few years. The Energy Futures Lab and Transitions Accelerator are two such initiatives, supported through philanthropic, industry government partners, the latter with seven foundations among the mix of funders.