

20210802 CARB Webinar

Who am I?

- Dave Hassan, P.Eng., Alberta, Canada. Currently offering consulting services: [Energy Innovation Consulting | Western Canada | Tir Nua Consulting Ltd.](#)
- Over 40 years of oil, gas and energy system experience
- Proud of the Canadian oil and gas industry and its accomplishments but also recognize that we need additional sources of clean energy. I convinced a former employer to invest in General Fusion. GF recently announced a partnership with UKAEA to build its Fusion Demonstration Plant in the UK, at the Culham Campus.
- Relevant experience to the discussion
 - 5 years in various leadership roles on the Weyburn CO₂-EOR project (2.5mmT/yr). At the time, one of the largest such projects. It was extensively monitored and risk-assessed by both academic and third-party industry experts through the International Energy Agency and concluded that “There is a 95% probability that 98.7% to 99.5% of the initial CO₂-in-place will remain stored in the geosphere for 5000 years”.
 - 5 years leading Cenovus Environmental Opportunity Fund Ltd. investing in technologies to produce clean energy, reduce the impacts of oil and gas production and improve energy efficiency. General Fusion was one of these investments.
 - Assisted Enhance Energy Ltd. establish its measurement, monitoring and verification (MMV) program for a CO₂-EOR project to ensure CO₂ containment and serialize CO₂ storage credits (~1mmT/yr).

My comments:

- Thanks for the opportunity to attend. The workshop was thought provoking and reminded me of some experiences and thoughts that I'd like to share.
- I'm not looking for answers to these questions. They are rhetorical for CARB consideration.
- How much extra energy is needed for the various CCS/CO₂ abatement technologies under consideration? I remember that initial studies for Boundary Dam showed about 1/3 of the power plant output would be required for carbon capture. It's an important consideration. For CA, this should be considered both in absolute terms and as a percent of the current power supply. Given the push to electrify transport, what's the cumulative impact on the grid? How will the demand be met? What will it cost? How will the added costs of moving to net zero impact the disadvantaged communities that the EJAC members refer to?
- I once saw a video by Professor Dieter Helm [Home - Dieter Helm](#). I can't seem to find it now, but he frequently speaks of a carbon consumption footprint as a better way of accounting for CO₂ production vs. a carbon production footprint. If we shut down our local industries and “offshore” production of those commodities and goods to countries with lower environmental, social and governance standards than our own, what real good have we done other than killing local jobs, inflating prices and increasing global CO₂ emissions?
- I tend to agree with some of the points made by Professor Jacobson. We must always consider the opportunity cost of using some resource vs. how it might be better used elsewhere. For example, there have been a number of studies published that show how inefficient it is to use renewable power to produce hydrogen for transport fuel vs. just using it to recharge e-car

batteries yet we continue to pursue the option (maybe it makes sense for long haul truckers). This should always be considered!

- My thoughts re some of the EJAC committee comments:
 - I understand the concerns and the frustrations. I've personally dealt with three different types of "publics" during energy project developments although none of them were "fence line" communities to something as big, or emissions producing, as a refinery.
 1. Agricultural community with no oil and gas development. Many of the concerns were due to the unknown nature of the development to them. Listening and explaining, especially putting things in context helped. Some tried to game the surface rights compensation system to extract more cash for facilities located on their land.
 2. Agricultural community with existing oil and gas development. No issues due to their familiarity with existing. Many were glad to see ongoing development (CO₂-EOR) to extend the life of the fields due to the local economic benefits.
 3. Remote, largely First Nations community with little existing oil and gas development. While some opposed, and there were conflicts at times, the majority welcomed the economic opportunity in a community that had very little opportunity otherwise. Giving people meaningful work gives them a sense of self-respect and pride and raises their standard of living.
 - While considering past reparations for negative impacts, please don't forget the positive impacts that developments have had or can have on these disadvantaged communities much as my number 3 above. While I don't have the experience to speak directly regarding the California experience, fossils fuels have had a profoundly positive impact on standards of living, life expectancy and the environment (imagine how bad the environment would be if we had continued to burn trees for fuel or harvest whales for oil as examples). Yes, there are exceptions that need to be addressed but don't let the bad outweigh the good.

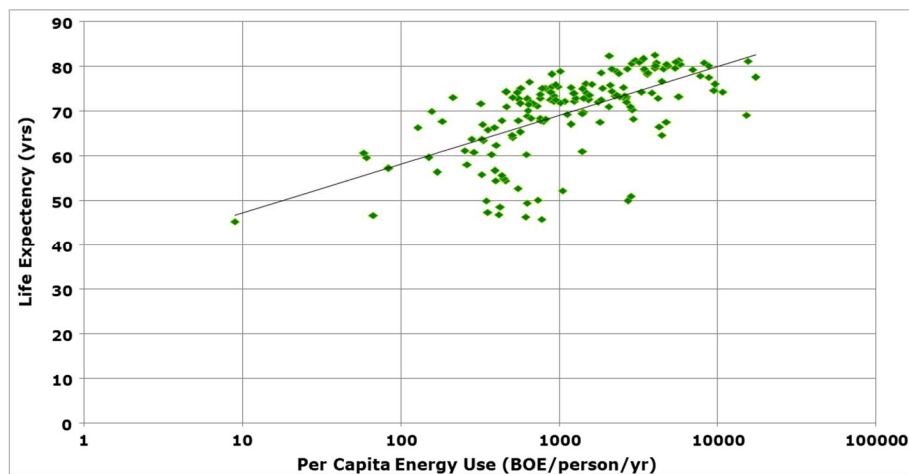


Figure 1- Data Source- World Bank, 2007



*Figure 2- NASA/Goddard Space Flight Center
Scientific Visualization Studio,*

~230 kg boe per capita for Haiti (left) and ~840 kg boe per capita for Dominican Republic (right) (World Bank 2010 data).