


# Q&A



## Another New Age of an Old Industry *Decarbonization and Carbon Capture insights*

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### 5 Top Leadership Lessons from 2020 per this [Forbes article](#)

1. Maintain an inventor mindset
2. Time is finite- so be more authentic, unapologetic and fearless
3. Be more human again
4. Accept that a virtual presence is invaluable
5. Put yourself in other people's shoes

### Management Article

*of the Month:*

### Virtual Holiday Party Ideas

#### What are some of the more promising tools/technologies that could help the Petroleum industry to reduce its carbon footprint?

My company, Cenovus Energy, focuses on production from the Canadian oil sands and conventional fields in western Canada, so I'll focus my response on ways our industry may reduce the carbon intensity of its operations. Opportunities that have been identified are at various stages of development and may include additional operational optimization of production, incorporating cogeneration capacity into future operations, more extensive deployment of solvent technology, advancement of the methane emissions reduction initiatives and additional operational efficiencies, including the use of data analytics. I can expand on two examples:

1. Reducing greenhouse gas (GHG) emissions intensity by making the crude oil recovery process more energy efficient or by reducing waste energy. An example would be solvent technology, which involves injecting a naturally occurring hydrocarbon like butane or propane into the oil sands reservoir to help produce the oil. You can read more about Cenovus's approach to solvents [here](#).

2. Capturing and sequestering carbon, for example through Carbon Capture Storage (CCS). CCS is a proven technology but not cost efficient without government support such as in the form of tax credits, which is available in the U.S. but not currently in Canada. The industry continues to explore ways to lower the cost of CCS and develop new promising methods. In [this linked paper](#), I have described a few examples of these novel approaches, e.g. L-oxidation, Photo-electro-synthesis, biomass preservation, etc. While these approaches could potentially result in significant cost reductions to CCS, they are all currently still in the early stages of research and development.

#### How do these technologies work and what do they cost?

The cost of implementing GHG reduction technologies varies and estimates depend on whether a technology is still in the R&D phase or already commercial, whether it's being applied to new projects or retrofitted in existing operations.

There are numerous public studies and reports and varying estimates on the cost for GHG reduction technologies. As an example, the cost of CCS projects typically depends on the source of emissions and geographical location; you can [click here](#) for more information from the Global CCS Institute or [click here](#) for information from Elsevier.

#### What are the differences in carbon emissions between oil, gas, coal and approx. for renewables?

Among fossil fuels, on purely a unit energy basis, natural gas is the least carbon intensive and coal, the most. Renewables such as wind, solar, hydro, or geothermal, etc. can offer lower carbon intensity than gas. The Energy Information Agency has more information about the energy intensity of various energy forms which you can [click here](#) to read.