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Carbon Storage in Basalt Climate change and global warming have been the most prominent problems throughout the centuries since global temperatures are expected to increase by about 1-6 degrees by 2100. The major components to these drastic environmental changes are mainly due to greenhouse gas (GHG) emission. GHG levels have spiked due to industrial evolution and anthropogenic influences and activities. Stabilization of the GHG could reduce the anthropogenic impact to the climate system and lower the expected global temperature spike in the future by 1-3 degrees. For stabilization of the GHG, concentration in the atmosphere to be at a low level requires the reduction of emission into the atmosphere. Although this explanation was devised, some studies have shown the feasibility to stabilizing the GHG at a desired low level, which implies that few information are available on the strategies that could reduce the global temperature through stabilization of GHG. Earlier studies discussed the mitigation options to lower levels of concentration of GHG through emission reduction by carbon capture and storage (CCS) (Sally Orr 303).

After nearly four years, the US Department of Energy's (DOE) new-fangled Part 810 guidelines are finally in place. The need for grandfather endowment in the new regulation means that numerous corporations will need to be decisive—in the formula of written export submissions and/or written notifications—to uphold amenability with their expertise export obligations. This regulation was appraised in 1986, and the international civil industry market has expanded in recent times. The DOE faces numerous technological challenges to deal with such emission disputes in the United States. The department should plan accordingly the termini and undertakings that are largely accredited or subject to definite authorizations.

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Fossil fuels are the greatest contribution to the world's source of energy. Burning of fossil fuels is the major contributor to electricity, heating, and transportation. However, the burning fossil fuels emit carbon dioxide (CO₂), which is also the major contributor to the GHG that is affecting the planet. CO₂ makes up 79% of Canada's total emission (PWGSC, 2009). CCS is a mitigation approach in which its primary focus is reducing the CO₂ emission from the burning of fossil fuels. The CCS could significantly reduce the carbon footprint of fossil fuels ultimately leading to the reduction of greenhouse gases (GHG) that are emitted into the atmosphere affecting the ozone layer (Figure 1). CCS would reduce the CO₂ emission by 14-19%. The long term storage of the carbon dioxide and the cost of the storage pose a huge issue on many large fossil fuel burning companies, such as Alberta, Canada well-known energy company, and Shell Canada Ltd. (Shell Ltd., 2012). Their company was the first to launch a carbon capture project (Quest) on Canadian oil in early September 2012. Three basic approaches of CCS are available: post-combustion capture, pre-combustion capture, and oxyfuel (EPA 8). This paper will briefly discuss the three different methods of CCS.

There are only set amounts of areas in the world that can be used as a storage house for captured CO₂. Suitable basins for CO₂ storage contain thick abundant sediments, saline formidable rocks, and a cap-like (low porosity) cover rock in a simple structure background (IPCC, 2005). The effectiveness of storing away CO₂ depends on the physical and geochemical trapping mechanism. According to Gunter et al. (25), CO₂ injected into the ground (geological storage) would have a storage rate of more than 99%

over 1000 years in well geological reservoirs. The estimated storage time would be reasonable since earth's natural gas have been trapped underground for millions of years.

Geohazards are the main concern with CCS technology. Leakage is the primary problem with CCS especially those that are uncontrollable. Leakage by the 'cap' rock, the seal have significant problems in the storage time and capacity of the injected CO₂. With a leak in the cap, CO₂ are more prone to release into the atmosphere contradicting the purpose of CCS to avoid CO₂ emission into the atmosphere. In Alberta, there are about 400, 000 wells. Thousands of those wells experience some leakage, which could either eventually escape into the atmosphere or make its way into vital resources. The Canadian Department of Emissions should separate these activities into three overall classes: those that are exempted, "generally sanctioned," as well as those activities that are "specially authorized." The most perceptible change to these regulations is replacing a list of explicitly authorized emissions with those of largely authorized ones.

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