

The Fight to Overcoming Greenhouse Effect for Anti Global Climate Change, and the Current Situation of that Fight

Nguyen D*

Ho Chi Minh City University of Technology, Vietnam

Abstract

Greenhouse effects are caused by the release of CO₂ from industries, particularly from thermal power plants with fossil fuels. According to scientists, CO₂ emissions from thermal power plants account for nearly 50% of the global greenhouse effect, meaning that if we recover all CO₂ from thermal power plants, Looks like it will be fixed. In industry today, it is unreasonable if using Ethanolamine to recover CO₂, because the amine solution has many disadvantages, which is very expensive, resulting CO₂ is a dirty CO₂. The ethanolamine along with the adjuvants in the tower to form heat-resistant salts or to react with oxygen or other industrial dusts in the exhaust gas to consume a lot of solvent. Collection of CO₂ for anti-global climate change has not yet achieved the desired effect, according to us for four reasons:

1. This is the main reason, because we do not have the suitable industrial equipment and technologies.
2. Because we have not fully treated the industrial dust contained in the exhaust before the separation of CO₂.
3. Because we use amine solvents to collect CO₂.
4. The process of separating CO₂, preserving CO₂, transporting CO₂ as well as burying it to the bottom of the ocean is too costly and unreasonable.

Keywords: Greenhouse effect; CO₂ capture; Amine solvents fossil fuel; NaHCO₃ crystals; High-pressure metal bottle to containing liquid CO₂

Introduction

Because the effects of heat absorption of greenhouse gases like CO₂, CH₄, N₂O, O₃, fluoride organic compounds, the temperature of the Earth was up, beyond permissible limits, causing disaster for human, if we fail to promptly remedy the greenhouse effect, by treatment of greenhouse gases to a concentration needed to exist in Earth's atmosphere, the men standing in front of disaster. After nearly 20 years of research, we can assert that the greenhouse effect can be completely overcome. The main reason causing the greenhouse effect is due to industrial emissions containing CO₂, combustion products from thermal power plants, factories producing construction materials, use of fossil fuels such as coal, diesel, natural gas CH₄. Since this plant has caused over 70% of global greenhouse effect. Even the CO₂, causing the greenhouse effect, exit from power plants accounted for 82.3% of CO₂ were emitted from different sources, of which more than 40% escape from the thermal power plants using fossil fuels [1,2], means that is, if we handle the emissions from these industrial plants, the greenhouse effect as has been overcome. In 1930 the technology has been published for collecting CO₂ emissions from industrial exhaust gases by using solvent Mono-Ethanolamine [2]. Nearly half a century ago [3]. Authors have written a textbook to teach students, the separation of Gases such as CO₂, SO₂, NO₂, H₂S from gas mixtures, using chemical methods with M,D,T-Ethanolamine, or soda (Na₂CO₃) solution in water. That is the scientific basis for the separation of those gases above has long been known. Over the past 30 years the research process of separating these gases from the industrial exhaust gas was conducted in a very intense. For the purpose of industrial emissions processing with industrial-scale of the firm BASF in 2010, the authors [4] have conducted tests of industrial-scale separation of CO₂ from industrial emissions. CO₂ absorption tower using Ethanolamine solvent height of 40 m, collected ability CO₂ could yield up to 300 kg/h and CO₂ can be converted to 90%.

They hope in 2015, the emissions from power plant with coal as fuel will be treated appropriately, and followed a planned process emissions from power plants with lignite as fuel. The works of Japanese scientist's research scale R&D technology to separate CO₂ from emissions from power plants using an aqueous solution containing Ethanolamine or original zeolite sorbents are noteworthy [5]. When using the MEA, they were separated by 90% CO₂ with concentration of CO₂ in the emission is from 4-13%VL 600 Nm³/h scale. The authors used the absorption tower is 12.2m in height, and de-sorption tower 10.6m high; yield is 3tons of CO₂ collected CO₂/day. Norwegian firm conducted the project since 2005 emissions have been treated by post-combustion technology, which uses the MEA absorber [6], will race in 2014 to CO₂ separation to industrial scale, CO₂ collection costs about 25 Euro for 1 Ton CO₂, so the price was lower than 50% compared with current CO₂ collection price. According to the previous studies [7], is approximately 2020 technology to collect and store CO₂ could be commercialized. The method uses a solvent (M,D,T)-Ethanolamine containing water to separate CO₂ from industrial emissions have many drawbacks, and perhaps that is why more than 80 years, the man is no have the industrial solution feasible for the disposal of industrial waste gas emitted from the large power plant scale. In our opinion, the following are the disadvantages of ethylamine solvents, if it is using to remove carbon dioxide from industrial emissions:

*Corresponding author: Nguyen Dan, Ho Chi Minh City University of Technology, Vietnam, Tel: +84 898 450 821; E-mail: bamoidan@gmail.com

Received January 25, 2018; Accepted March 09, 2018; Published March 16, 2018

Citation: Nguyen D (2018) The Fight to Overcoming Greenhouse Effect for Anti Global Climate Change, and the Current Situation of that Fight. Environ Pollut Climate Change 2: 151. [10.4172/2573-458X.1000151](https://doi.org/10.4172/2573-458X.1000151)

Copyright: © 2018 Nguyen D. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

First weak-point

Ethanolamine compound quite expensive, if compared with some other cheap solvents are (NaOH) or soda (Na_2CO_3). Then we will see this quite clearly disadvantages. Also document NaOH or Na_2CO_3 can perform functional of amine on here [3].

Second weak-point

It's not just CO_2 , but other acidic oxides such as SO_2 , SO_3 , NO_x , H_2S , is also involved reversible complex reactions with ethanolamine. That is when we execute desorption reactions, in addition CO_2 , we also obtained other acid oxides, even acid H_2S . So CO_2 is obtained by this method is very dirty and harmful, if we want to use it for different purposes, such as food, or storing on the ocean bottom, then we have to clean up.

Thirst weak-point

It's the anion impurities in amine absorption tower easily join the side with amines, forming the heat stable salts [7], these salts will break down the activity of the adsorption tower making consumption a lot of solvent, and the regeneration solvent for reuse is complicated, making the technology investment rate for the CO_2 collection is too large [8,9].

Fourth weak-point

The ethanolamine easy participants oxidation reaction with oxygen present in exhaust gas mixture. On the other hand because dusts in the emissions are not thoroughly separated, should have different kinds of reactions with ethanolamine, Ethanolamine solvent activity will be fast to break down, as solvent-consuming. Because of the above disadvantages, CO_2 production costs are relatively high and the entire emission processing cycle, including CO_2 separation, CO_2 transport and storage of CO_2 into the ocean floor, or down deep in earth, the costs of CO_2 separation account for over 70% of total funding [10]. Perhaps because of the reasons above, Amine method found since 1930, there have been hundreds of plants used the Amine method to handle emissions [2], to CO_2 separation, but when referring to the handling emissions from large power plants, the amine method is can't appropriate, but must wait until 2015 are the answer [4]. There are many research projects, find another solution instead ethanolamine methods to process industrial waste gas, but the results still cannot solve the problem that we expect. Why so far, it has not been able to thoroughly treatment greenhouse gases escaping from the large thermal power plants using fossil fuels? According to [11], since the exhaust gas is too large. As today, no power plants with CO_2 - capture have been realized.

Because four reasons below and also the 4 weaknesses do we have so far not been able to do what we want.

The first reason-disadvantage: This is the fundamental reason: Because we do not have a suitable new generation of devices, as well as do not have the new appropriate technologies. In many technologies [11,12], use so much cyclone dust collectors, According to Bhawan [13], to recover 96.5% of dust in emission, each individual cyclone can only be used for emission sources with a Maxima capacity of approximately 500 m^3/h . That is the source of all want to handle 3.4 million m^3/h , emissions emitted from 1000 mW thermal power plant [10], we must use a lot of multi-cyclone, it contains 6800 individual cyclones. Clearly, with this classic types of equipment, surface of waste gas treatment plant will expand out, and will be much larger than the surface of that factory [14]. This will make construction cost increases can be many times, compared with investment funds for building of plants that, electricity prices will be higher to levels no to bear, not only 33-70% have warned [15,16]. We mentioned above devices, the issue is more important than

is a technology problem. In all of the typical technologies there are hope will be commercialized soon [2,11,12,16,17], people are not interested in collection thoroughly the dust from the emissions. According to Sam and Bioletti [18], emission line in the production technology of coke contains 6-20 g/m^3 . I believe in the industrial exhaust gases from power plants using fossil fuels, dust content is larger. From the data of Sam and Bioletti [18], we take the average dust content of 13 g/m^3 , then we will see a tremendous amount of dust is 44.2 tons/h, 382,000 tons/year, escape to the atmosphere, if we cannot recover it. We not only lost a valuable product, as the crushed material was very smooth, but also for environmental pollution, serious effects to human health. Such, only no-waste technologies will be satisfaction of us. But unfortunately, up to now, from the research and application technologies are escape many waste.

Second reason-disadvantage: Because we cannot handle nearly thoroughly industrial dust in industrial emissions before CO_2 separation. Currently in all technologies announced for handling industrial gases they are not set requirements thoroughly treated industrial dust in the exhaust stream, because people cannot do that with industrial equipment today, special handling coal dust escaping from the coal furnace, this dust would make solvent, used to separate CO_2 , is MDT Ethanolamine deterioration.

Third reason-disadvantage: Because we use solvent M,D,T-Ethanolamine for CO_2 separation from industrial emissions. Apart from the above solvent and one other cheap chemical compound with the implementation of CO_2 separation, which is soda ash (Na_2CO_3). Soda ash when dissolved in water can react with CO_2 to give us NaHCO_3 , which has poor solubility, so it is easily separated from the solution under NaHCO_3 crystals, these crystals are easily broken destroyed at temperatures above 70°C for soda and food clean CO_2 . This reaction is also known to people over 70 years [3]. CO_2 is a weak acid, soda is a weak base. CO_2 concentration in the emissions is not high; usually less than 15% VL, so the CO_2 reacts with the Na_2CO_3 will occur with very little performance, if without special measures. So, want to exercise with high performance response, we must have special solutions.

The fourth reason-disadvantage: The CO_2 separation, storage and transport as well as storing it to the deep ocean are too costly and unreasonable. According to Sam and Bioletti [18], the total cost to process 1ton of CO_2 , including the cost of separating CO_2 from industrial emissions as high-pressure liquid CO_2 , costs to CO_2 liquid high pressure pump through pipelines across the sea to where funeral CO_2 storage, pumping costs liquid CO_2 to the deep ocean is: A total of 40.7 to 72 USD/TCO₂. Partial separation of CO_2 from the exhaust gas in a clean state (no liquid) have accounted for over 70% of the total cost.

Conclusion

We do not currently implement effective global climate change mitigation for four reasons and the following four disadvantages:

1. We do not have the suitable equipment and technologies.
2. Because we have not fully treated the industrial dust in the industrial exhaust gas stream before CO_2 extraction.
3. Because we use amine solvents to collect CO_2 .
4. Because the process of collecting, preserving, transporting and burying CO_2 to the ocean floor is too costly and unreasonable.

References

1. Irving MM (1990) Greenhouse gases, climate change and energy. Ann Rev Energy 15: 513-550.

2. Rochelle GT (2009) Amin scrubbing for CO₂ capture. *Science* 325: 1652-1654.
3. Egorov AP (1964) *Obshaia khimicheskaia Technologia nheorganicheskix vishestv* Izd. Khimia Moscva.
4. RWE. AG-CO₂ scrubbing process overview.
5. Takahisa Y (2004) Japanese R&D on large-scale CO₂ capture in separations technology VI: New perspectives on very large-scale operations. ECI Symposium Series, Australia.
6. <http://bellona.org/about-ccs/how-ccs/capture>
7. http://www.idswater.com/water/us/eco_tec/petro_chemical/3566_0/s_supplier_3.html
8. National Energy Laboratory (2004) Regenerable sorbents for CO₂ capture from moderate and high temperature gas streams. Department of Energy.
9. Michael J (2009) Petroleum production engineering - CO₂ removal. pp: 1-3.
10. Ramkumar S, Wang W, Li S, Gumuluru S, Sun Z, et al. (2001) CO₂ Separation from flue gas by the carbonation/calcination of metal oxides. Ohio State University, USA
11. Shwetha R, Daniel P, Connell (2010) Calcium looping process for clean fossil fuel conversion: Patent application. *Ind Eng Chem Res* 49: 10200-10211.
12. Thomas ON, David AG, Raghubir P (2005) Dry regenerable carbonate sorbents for capture of Carbon dioxide from flue Gas. 4th Annual Conference on Carbon Capture & Sequestration, Virginia.
13. Bhawan P (2009) Central pollution control board. Comprehensive Industry Document on Vertical Cement Plants, pp: 2-4.
14. https://19january2017snapshot.epa.gov/climatechange/carbon-dioxide-capture-and-sequestration-overview_.html
15. Shrikar C, Amitabh G, Balazs hunek (2001) Advanced technology for the carbon capture of carbon dioxide from flue gases. First National Conference on Carbon Sequestration Washington, pp: 1-11.
16. Ya Liang (2003) Carbondioxide capture from flue gas using renegerable sodium-based somebts. *Energy Fuels* 18: 569-575.
17. Kovalev OC, Muslenov IP (1987) Absortion and CO₂ capture in the production of mineral fertilizers Moscow. Khimia.
18. Sam W, Bioletti R. Carbon dioxide separation technologies. Carbon and Energy Management, Alberta Research Council, Edmonton, Canada.