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Stopping of NOx Elimination is Easy Way to Reduce CO_2 and Protect Global Warming

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Abstract

The earth is warmed up by the burning of fossil fuel. If we can compensate the generation of CO_2 and heart by CO_2 assimilation, global warming can is protected. To promote CO_2 assimilation, supply of nutrient N and P is most important. NOx is produced when fossil is burned. NOx is critically important for plant growth. Many governments set up laws to eliminate NOx using ammonia. This elimination process is accelerating global warming. I wish to insist stopping NOx elimination and use of all produced NOx as it is. Stopping of NOx elimination is easy way to reduce CO_2 and protect global warming.

Keywords: NOx; Carbon dioxide; Carbon dioxide assimilation; Global warming; NOx elimination; Thunder

1. Introduction

The earth is warmed up by the heat and CO_2 evolved by the burning of fossil, Most (probably 95%) CO_2 evolved is fixed by plant by CO_2 assimilation. But burning of fossil is so much. CO_2 assimilation cannot follow. CO_2 concentration increasing. CO_2 concentration was kept constant from 0AD to 1700. In 0AD, 250 ppm, in 1700, 250 ppm, in 1750, 278 ppm, in 1986, 350 ppm, in 1990,357 ppm, in 2000, 372 ppm, in 2010, 390 ppm, in 2014, 387 ppm, in 2015, 397 ppm. But since industrial revolution started in 1750, CO_2 concentration increased. If we can compensate the generation of CO_2 and heart of burning with the absorption of CO_2 and heart by CO_2 assimilation, global warming will be protected [1-10]. NOx is produced when fossil is burned. NOx is essential compound for plant growth. Many governments hating NOx as pollution gas and set laws to elimination NOx. I wish to insist that NOx elimination should be stopped to increase CO_2 assimilation and protect global warming.

2. Promotion of CO_2 Assimilation

The plant is growing by absorbing CO_2, water and heart making carbohydrate and oxygen. This reaction is called CO_2 assimilation. Burning of fossil is reverse reaction of CO_2 assimilation. The earth is warmed up by burning of fossil. Increased CO_2 can be fixed by CO_2 assimilation. Burning heat can be compensated with heart absorption by CO_2 assimilation.

$$\mathbf{CO_2 + H_2O + 114\ kcal \xrightarrow{\text{Assimilation}} 1/6\ C_6H_{12}O_6 + O_2}$$

$$\mathbf{CO_2 + H_2O + 114\ kcal \xleftarrow[\text{Burning}]{} Fossil + O_2}$$

To promote CO_2 assimilation, the supply of nutrient nitrogen and phosphorous is essential. Many CO_2 assimilation studies [11-37] indicated that CO_2 assimilation is playing very important role for the regulation of climate and supply of nutrient N.P is important for the promotion of CO assimilation. NOx is a main nutrient nitrogen sources. Plants are growing by eating CO_2, water and nutrient N.P. NOx is a food of plant. Plant cannot grow without nutrient N.P. Nature look likes to set up system to make NOx to promote CO_2 assimilation to promote plant growth. Nature also looks like to make thunder to make NOx, [38-48] by following reaction.

$$\mathbf{N_2 + O_2 \longrightarrow 2\ NO - 43.2\ kcal}$$

NOx is a gift from nature. We should not eliminate NOx. We should use all NOx as it is for the promotion of CO_2 assimilation.

3. Stop NOx elimination to Promote CO_2 Assimilation

NOx eliminations are retarding CO_2 assimilation and are promoting global warming NOx is hated as pollution gas and not good for health. Many governments set up very strict laws to eliminate NOx in burned gas and forced to eliminate all NOx using ammonia.

$$\mathbf{4\ NO + 4\ NH_3 + O_2 \longrightarrow 4\ N_2 + 6\ H_2O}$$

To kill one promotor with other promotor is great loss of precious natural resource. Nutrient nitrogen and phosphorous in drainage is also hated as pollution elements and many governments set up very strict laws to eliminate all nutrient nitrogen and phosphorus and forced to eliminate these elements using much electricity. I wish to tell how much CO_2 assimilation was decreased and how much global warming was promoted by these NOx and P elimination policy.

I was born in 1930 at small town Kojima, Kurashiki, Japan. This town is located at sea beach in Setoinland sea, Japan. The bottom of the sea was filled with sea weed. This is clear from my swimming experience at swimming shore. There is swimming beach at small village, named Hikiami （beach seine). When swimming at tide is down, leg touched sea weed and stone fish. Sea shore was filled with dried sea weed especially that cast ashore. The sea was filled with plankton and fish, Bream (tai), Eel (unagi) Sea eel (anago), Octopas, Sardin(iwashi), Shrimps, Ikanago. Five hundred thousand tone fish was produced. The sea was filled with fishing boat. Fish was very low price than meat. Main protein source of Japanese was fish before 1945.

But since NOx, nutrient N, P elimination policy and elimination law was established at around 1980. Concentration of N, P of sea water decreased. Concentration of nitrogen in the rain dropped to zero. No weed, no plankton grow at Setoinland sea . Hundred thousand fisherman lost job. Most fish shops were closed. We cannot buy fish produced at Setoinland sea.

This indicate that CO_2. assimilation by plankton was lost by the NOx and nutrient N,P elimination policy. This district is smallest rain fall district in Japan and famous as NaCl salt manufacturing industry at this district no thunder happen and no NOx is supplied [9]. Setoinland sea is surrounded by Shikoku and Chugoku and exchange of sea water with wide pacific ocean is limited by narrow Naruto channel which is famous for vortex. Therefore NOx elimination policy blocked the supply of NP almost completely.

Area of Setoinland sea is 47000 km^2 4.7 million times wider than 1 hectare. If we can do the assimilation with the same efficiency as rice field, by giving sufficient N and P supply as before 1980 by stopping NOx elimination and N,P elimination. $1.47t \times 47 \times 10^5 = 69 \times 10^6$ t of CO_2 is absorbable and $114 \times 47 \times 10^6 = 5.3 \times 10^{12}$ kcal heat is absorbable. And 47×10^6 t of fish can be produced as before 1980. Global warming can be protected as such amount.

In 2015 fossil 1.4×10^{10} t was burned and CO_2 4.4×10^{10} t, 2.5×10^{15} kcal and NOx 2.4×10^9 t are produced in the world. As C/N ratio [49, 50] of plant is around 5/1-50/1(average 25/1). Plant is growing by eating CO_2 and nutrient N by the ratio of C/ N 5/1 - 50/1(average 25/1). One N can fix 5- 50 (average 25) CO_2. Plankton is composed with chlorophyl, ($C_{34}H_{12}ClFeN_4O_4$) C/ N=34/4, Nucleic acid ($C_{17}H_{16}N_8O_{10}$) C/N=17/8 and protein $C_6H_{11}NO$ C/N=6/1. We estimate that plankton is composed with protein 5 ,chlorophyl 1 ,and nucleic acid 1.Then plankton grow by eating CO_2, nutrient N and P by the ratio of C/N/P = 56/15/1 . This ratio indicates that much nutrient N and P are necessary for the growth of plankton. If we use these all NOx 2.4×10^9 t, we can fix CO_2 5×10^{10} t ($25 \times 2.4 \times 10^9$ t). This amount is almost same as 4.4×10^{10} t (CO_2 produced in 2015). We can protect global warming by promotion of CO_2 assimilation by using NOx.

4. CO_2, NOx and Heat Balance in the World

Fossil fuel 1.4×10^{10} tone was burned at whole world in 2015 and about 4.4×10^{10} t one CO_2 and 7.4×10^{15} kcal and 2.8×10^7 tone NOx is produced. And also 8.6×10^6 tone NOx is produced by thunder [9]. Then total 3.7×10^7 tone NOx is produced in the world. To eliminate NOx 3.7×10^7 tone, equimolar ammonia 1.26×10^7 ton is necessary. To make ammonia 1.26×10^7 tone, 2.2×10^6 tone hydrogen gas is necessary. To make 2.2×10^6 tone hydrogen, butane 7.2×10^6 tone is necessary. As the result, 2.1×10^7 tone CO_2 is released. If NOx elimination is stopped, 2.1×10^7 tone CO_2 release can be saved. And 9.25×10^8 tone CO_2 can be fixed.

Most significant obstacle to promote CO_2 assimilation is laws of governments. Many governments set up very strict laws to eliminate NOx in burned gas and forced to eliminate all NOx and forced to eliminate NOx using ammonia. Without elimination of these laws, protection of global warming is impossible. These laws should be eliminated if governments think that protection of global warming is most important subject. Also NOx concentration limitation rule about the exhaust gas of car should be loosened. By loosening the NOx elimination rule, fuel efficiency will be increased 20% and 0.4×10^{10} tone CO_2 emission will be saved and 0.2×10^{10} tone CO_2 fixing can be expected.

5. CO_2, NOx and Heat Balance in Japan

Fossil fuel 3.8×10^8 tone was burned at Japan in 2015 and about 1.2×10^9 tone CO_2 and 2.0×10^{13} kcal were produced and 2×10^6 tone NOx is produced. In Japan, 2.8×10^8 hector wood is present. 13.7 tone CO_2 is fixed at 1 hector wood in one year. $2.8 \times 10^8 \times 13.7=3.8 \times 10^9$ tone CO_2 can be fixed at wood. In Japan, 4.5×10^7 hector cultivated land is present. 14.7 tone CO_2 is fixed at 1 hector in one year. $4.5 \times 10^7 \times 14.7 = 6.3 \times 10^8$ tone CO_2 can be fixed in one year at cultivated land. Therefore $3.8 \times 10^9 + 6.3 \times 10^8 = 4.4 \times 10^9$ tone CO_2 is fixed at land. This is far from production of CO_2. Therefore we must promote CO_2 assimilation by the supply of nutrient N, P at sea.

In Japan, 2×10^6 tone NOx is produced. If we use this 2×10^6 tone NOx for CO_2 assimilation, we can fix CO_2 50×10^6 tone ($25 \times 2 \times 10^6$). In Japan, 0.64 million tone butane is used for the elimination of NOx. If we stop the elimination procedure, we can save the production of 1.76 millions tone CO_2. In Japan about 60 million tone fossil is used for the generation of electricity for purification of drainage. If we stop the elimination of nutrient N,P of drainage, we can save the release of 150 million tone CO_2, total $50 \times 10^6 +1.76 \times 10^6 +0.64 \times 10^6 =52.4 \times 10^6$ tone CO_2. This method is not enough. $1.2 \times 10^9 – 52.4 \times 10^6 = 1.148 \times 10^9$ CO_2 is still remaining. This CO_2 must be fixed at sea.

The promotion of CO_2 assimilation by increase of nutrient N and P at sea is essential. At Setoinland sea, if we provide sufficient nutrient N,P. $1.47 \times 47 \times 10^5 = 69 \times 10^6$ t CO_2 can be fixed and $114 \times 47 \times 10^6 = 5.3 \times 10^{10}$ kcal heat will be absorbed. If we extend sea area to all Japan, we can fix 30 times more CO_2 2.0×10^9 tone.

6. Amount of CO_2 Emission and Fixable CO_2 and CO_2 Increase of 10 Countries

Most emitted CO_2 is fixed by CO_2 assimilation, CO_2 increase is calculated based by CO_2 emission minus fixable CO_2. CO_2 increase of 10 countries is shown at Table 1. 14 K tone CO_2 can be fixed at 1 km^2 wood and 14 k tone CO_2 is fixed at 1 km^2 cultivated land. Then we can calculate fixable CO_2 by area Km^2 multiply 14 k tone.

Seven countries listed at the table look like able to fix emitted CO_2 by CO_2 assimilation because area is wide enough. Japan, United Kingdom and Italy cannot fix CO_2 at his country because, areas are narrow. Japan emitted 1.2×10^9 k tone CO_2 in 2015. Japan has area 3.8×10^5. Fixable CO_2 is 3.3×10^8 k tones. Japan increasing 9×10^8 k tone CO_2. Japan, United Kingdom and Italy are increasing CO_2. These 3 countries are surrounded by sea. These countries must decrease CO_2 by Plankton CO_2 assimilation at sea. Total CO_2 emission of the world is 3.6×10^{10} kt. We must decrease CO_2 emission by the promotion of plankton CO_2 assimilation by using NOx given by nature.

Country	CO_2 Emission kt	Area km2	Fixable CO_2 kt	CO_2 Increase kt
World	3.6×10^{10}	-	-	-
China	1.0×10^{10}	1.0×10^{7}	1×10^{10}	0
United State	5.1×10^{9}	9.5×10^{6}	9.5×10^{9}	0
India	2.4×10^{9}	3.2×10^{6}	3.2×10^{9}	0
Russia	1.7×10^{9}	3.2×10^{6}	3.2×10^{9}	0
Japan	1.2×10^{9}	3.8×10^{5}	3.3×10^{8}	9×10^{8}
Germany	7.8×10^{8}	3.5×10^{5}	3.5×10^{8}	0
Canada	5.5×10^{8}	1.0×10^{8}	1×10^{10}	0
United Kingdom	4.0×10^{8}	2.4×10^{4}	2.4×10^{8}	1.6×10^{8}
Italy	3.6×10^{8}	2.0×10^{5}	3.0×10^{8}	0.3×10^{8}
France	3.3×10^{8}	6.4×10^{5}	8.4×10^{8}	0

Table 1: CO_2 Increase of 10 countries.

7. Plankton CO_2 assimilation

70% of CO_2 assimilation is said to be carried out at sea. Plankton grow infinitively where nutrient N,P are enough. Annual CO_2 fix by ocean plankton is 2×10^{10} tones. And 1.1×10^{14} kcal is absorbed. When we look at world map of green, ferrous map (plankton map) obtained from satellite [22, 23], and fish production map. Plankton dense district is same as many fish producing district. North Pacific ocean, north Atlantic ocean and west ocean of North America. At these place, counter current of deep sea water (rich in nutrient N,P) with sallow sea water (poor in N,P). And N,P concentration of is very high at the surface of sea. Then plankton growth and CO_2 assimilation is very high and fish production become very high. If we stop the elimination of NOx and the drainage purification, then we can increase the concentration of N,P at sea, and we can increase the plankton CO_2 assimilation and fish production and we can protect global warming.

8. 10 Advantages of Stopping of NOx Elimination

1. Increase of CO_2 fixing, heat absorption. If NOx elimination is stopped, 9.25×10^{8} tone CO_2 can be fixed.
2. Decrease of fuel consumption. By loosening the NOx elimination rule, fuel efficiency increase 20% and 0.4×10^{10} tone CO_2 emission can be saved and 0.2×10^{10} tone CO_2 fixing can be expected.
3. Decrease of CO_2 generation. By stopping the use of ammonia, 2.1×10^{7} tone CO_2 release can be saved.
4. Decrease of fossil consumption. By stopping the use of ammonia, 1×10^{7} tone fossil can be saved.
5. Cost down of electricity price. Japan does NOx elimination completely. Electricity price of Japan is two times higher than China and Korea. Japan cannot compete with manufacturing industry which needs much electricity. Preparation of solar cell made by silicone is carried out at China.
6. Improvement of economy. When electricity price decrease, production industry activates. We need not move factory to other country which electricity price is low.
7. Increase of wood, timber promotion. Tree grows quickly when NOx is supplied.
8. Increase of crops. Crop heaviest increase when NOx is supplied. Fertilizer can be diminished when NOx is supplied.

9. Increase of fish, clam (kaki, asari), and sea weed (nori) production.
10. Promotion of anti-aging life. Long life record of Japanese comes from the habit to eat fish [51-57] by stopping NOx elimination, fish production increase and health can be kept for long life.

9. Conclusion

Stop the NOx elimination is easy way to reduce CO_2 and to protect global warming.

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