

## CARBON NEGATIVE GOALS

(AIR DIAMONDS - NEW CURRENCY)

As from this competition: Global Challenges Prize text can be concluded, that primary goal of this competition is to find acceptable solution that can push progress of men kind forward, and solve the problem such as CO<sub>2</sub> emission, global and main negative processes concerning even existence not only of mankind but, but entire life on planet Earth. I must emphasize that with further increase of CO<sub>2</sub> in the air, the rate of dissolved CO<sub>2</sub> in oceans will also rise correspondent to that, and in one moment, can reach a critical fatal point when all living thing on earth will vanish or terminal stage for all living beings. According to model of Professor Daniel Rothman from MIT Lawrence University in Massachusetts, that can happen approximately about year 2100. So there will be no progress of men kind what so ever if we are not able to find the way to revert CO<sub>2</sub> emission, not just to stop carbon emission, but we must reverse that emission in favor to oxygen emission, on the viable way.

Only on that way we can be certain that great extinction of species won't happen, if we do that gigantic step, or millennium step forward, from carbon positive to carbon negative emission on every level, as individuals or as states, or as corporations... So what does Carbon negative mean? It mean simply to capture CO<sub>2</sub> from atmosphere then divide CO<sub>2</sub> molecule then release Oxygen, and retain and store Carbon, that is carbon negative processes, but it make sense to do that in only on viable way, by using only clean energy sources, like solar or wind energy, or hydropower as well. What is mechanism to consent global society to such deed, slim chances anybody will do volunteeringly... Enforcement to behave in that manner, or war intimidation to impose any attitude changes, on sovereign states, doesn't give us results, as we were witnessed, in our recent history, like wars in Iraq, Libya, or Syria... And what is characteristic for all of them, what are these wars are all about..? We can say that mainly that was wars over currencies, (petrodollar - wars) and less war for domination over oil and gas resources... The price on clean energy is today equal or even more acceptable then price of energy derived from coal power plant, or nuclear power plant, if the radioactive waste storage is taken in consideration. Not just price but it is well known fact that that wind and solar or hydro power are clean and not hazard to environment, so it is win-win solution for everyone, (unlike war). The proof for such claim is Saudi Arabia, the biggest oil exporter, are shifting it internal energy consumption from oil to solar power generation, the news about that are widespread on all media portals.

(<http://www.independent.co.uk/news/business/news/saudi-arabia-oil-revenue-production-solar-power-shift-electricity-energy-opec-a7488626.html>)

So war about energy sources like oil and gas, are a bit corny, the political and economic establishment or so-called elites must know better than medieval ways with dealing things... So we can say for sure, that most wars in our late history, was wars for currency domination! The Dollar is under attack as petrol-based not gold based currency, and now we have even new challenges for dollar such are Chinese golden based Yuan, or Russian ruble, in Euro-Asian free market association, which are confronting west economic domination. So we can say that war for world supreme currency, already taking a momentum. Let resume: Carbon dioxide as world biggest threat, then perpetual state of war is another big threat for mankind, then somebody would add overpopulated planet Earth as third threat in that line too... Or, is it so? That third claim is false, the Earth is not

over populated, or over the limit, it is nothing like that, only greed of very few people, less than one percent, is over every limit! Greed of one percentage of men kind which are daring to claim that their wealth is of a greater importance than humanity itself! So instead of shrinking their wealth, humanity is to be shrunk to the size that accommodate wealth of that one percent of mankind! If one percent of rich people has  $\frac{1}{2}$  of wealth of mankind, and all other 7.6 billion or 99% has another  $\frac{1}{2}$  of wealth than it is simple mathematic that shows us if those one percent would be willing to share their wealth than 3.7 billion people more has place to live on this planet Earth. If by any chance all man are to become equal in their wealth... And again somebody would say that Earth has not enough means to support us all, and how about oxygen, is there enough for all of us? How by any means, can you measure how much let say native people from Brazilian rain forest which live sustainable lives in harmony with nature, must leave planet Earth because they are breathing air, against urge of so called "civilized" people from developed countries to drive their cars which burn oxygen from air, or Lamborghinis, or to travel by airplane for vacation, and so on... What is to be sacrificed people or greed? How about the claim, that land can't provide enough for all of us? It is simple greed and rude selfish behavior to abuse land with intensive agricultural production where arable land is converting to desert, by the rate of 2300 square kilometers per year! Not because of noble goal to help poor and hungry people, just row pursuit for money and profit, by the rate that land can't endure such abuse. Now beside of that, we have 33% of mainland area on planet Earth are in fact deserts – one third! If, by any chance, that one third of land surface which is desert now become arable, would we be talking then of overpopulation of planet Earth, or all this labor power would be necessary to cultivate this mass land surfaces..? The planet Earth is not over populated, but its population is poor and unemployed, and without proper mechanization is unable to reverse deserts to green fields and forests, habitats for all living things. With one third more of green and forest on planet Earth we would be able to reverse CO<sub>2</sub> emission to O<sub>2</sub> emission, or to carbon negative. Converting deserts into a forest, and pastures is becoming more and more new world social movement, and maybe now few of brave people are occupied in such venture, but in future for sure it will be many more to join them, so it is essential to mention some of their most successful deeds.

Loess Plateau in China, (<https://www.youtube.com/watch?v=UAmal36XJDK>) the area size of Belgium, some time ago was desert, but now is converted into green fields and forests, showing to us that sustainable agriculture is the only way to cultivate land on proper way. Then to mention Allan Savory the famous environmentalist (<https://www.youtube.com/watch?v=vpTHi7O66pi&t=19s>) which is fighting against desertification, and reclaiming degraded land that was once desert, into pastures. He says that only with flock of sheep can make desert to blossom, and many more... Then to mention Yacouba Sawadogo the man that stop the desert in Sahel area, south of Sahara desert (<https://www.youtube.com/watch?v=dnw-PrPEtcl>). And not to forget: Tamera Solar village, which use Sun-pulse low differential Stirling motor propelled by Sun heat, to deliver energy enough for all village needs, which tribe is in harmony with nature (<https://www.youtube.com/watch?v=iSoXWt4hBpc&t=27s>). Those people alone, sometimes with their own bare hands are conquering deserts showing to us the way of progress, doing for all of us more than we can comprehend and realize in this moment... You can Google all of that and find more examples of recovering desert land. So with all of this on mind, I think it is clear now that question of how many inhabitants is on planet Earth is not what really matter, but what are they all doing really matters... If all of them are focused in to right direction, then we can accomplish a great deeds, but in order for that, think tanks, banks and governments must provide necessary means, and funding. So it is obvious that part of solution for so call "problem" of overpopulated

Earth is reclaiming desert land into green forests, pastures, and arable land, for all overpopulated people to work on, and live on it... On the other hand concerning our industrial needs, I am afraid, it won't be good enough, because all our Industry is tremendous Oxygen consumer... The most industrial developed countries are in fact biggest Oxygen consumers, dependent mostly on coal and oil for energy production. Is this necessary such colossal Oxygen consumption for our Industry – it is not. This is urging for change, and it must be very rapid change, if we want to survive! So the third biggest challenge for mankind is time frame to do these changes, not overpopulated Earth because we will need all of labor possible to do these changes, but the time frame in which obvious changes must be realized.

Let me one more time identify main problems in order to propose possible solutions... First and main problem for mankind is CO<sub>2</sub> emission, or carbon dioxide positive industry which is making energy by burning coal and oil. Second problem is perpetual state of wars, which distract mankind from focusing on the first problem. Third problem is time frame for necessary changes, in order for problem solving.

#### Solution:

Solution can be named: Diamonds from the Sky – New world money, real currency

How are currencies created? What determine value of Dollar or Euro? Are those money or currency? Some economist claim that those are fiat currencies, made from thin air... And what is the biggest financial nightmare then, or let us ask a simple question is it possible to establish the price of anything with unit of something which simply by somebody choice can worth nothing... Nothing is making sense with worthless paper money or better said with fiat currencies... Currency or Money question is now? We can laugh about it, but this is biggest financial obstacle in this time, international trading is almost impossible, financial stock crisis are eminent as we saw in past and it shall happen in future, insecurity in economy, is then transferred to next level, to war and destruction...

Can we make real money from thin air, instead of fiat currencies, or to be more precise from CO<sub>2</sub> in thin air, or let say diamonds from the Sky..? If preconditioned that energy for such processes must be obtained from clean sources like wind and solar, than that process would be for sure carbon negative, right, but is it possible..? Imagine that benefit, in one hand solving CO<sub>2</sub> crisis and in another currencies crisis with same solution. Are they, artificial diamonds from carbon dioxide in the sky, money of the future..? Well first let remind that all diamonds has value, natural diamonds as well as artificial diamonds, only natural has bigger value of artificial. Artificial or man made diamonds business is in the progress, and those diamonds are becoming more and more popular right now, as jewelry for all people, regardless of nationality, or religion or gender, or for industrial purposes. Diamonds, natural or man made will always have their own market, and in recent times, technology is progressed so far, that clearness of such diamonds are almost as natural one and difference can be determined only with special optical equipment. All artificial diamonds are now scarce commodity, clear artificial diamonds as well as gemstones or colored artificial diamonds, has economic value exactly like gold or silver has... The ingredient from which artificial diamonds are made are carbon material, like graphite, in some special devices, but is it possible to be made from CO<sub>2</sub> obtained from air, and by doing so to use only clean energy sources? Simple answer is yes, and it is only make sense if by doing so only clean energy sources are used like solar and wind energy,

then we are certain of doing an carbon negative process of elimination carbon from atmosphere. What would that process look like? Process of extracting diamonds from air, can be divided in 5 phases.

**Phase 1** – Liquefying the air with Stirling engine using electricity from clean sources like wind and solar. Liquefied air can be used for energy conservation in cryogenic containers. After dust is removed from air with filter, air is cooled until it reaches  $-200^{\circ}\text{C}$  at this temperature air is liquid. Achieving this low temperatures is in order to store energy in cryogenic containers, and when is needed back, we can reverse Stirling engine cycle to produce energy from liquid air. While energy is stored in form of liquid air, fraction distillation can be performed.

**Phase 2** – Fractional distillation of liquid air as follows:

- Water vapor condenses, and can be removed using absorbent filters
- $\text{CO}_2$  freezes at  $-79^{\circ}\text{C}$ , and can be removed. After removing frozen  $\text{CO}_2$  pressure should rise in order to conserve  $\text{CO}_2$  in liquid form.
- Oxygen liquefies at  $-183^{\circ}\text{C}$ , and can be used as cooling liquid, and after that can be released in to the atmosphere or used for other purposes, like energy storing.
- Nitrogen liquefies at  $-196^{\circ}\text{C}$ , and can be used as cooling liquid and after that can be released in to the atmosphere or used for other purposes like energy storing.

**Phase 3** – Splitting liquid  $\text{CO}_2$  molecule in two stages, in first stage to Carbon-monoxide and Oxygen, and in second stage on pure Carbon and Oxygen, using electromagnets, microwaves and electric current. Oxygen can be released to the atmosphere while Carbon is retained. All energy for this process should be obtained from wind or solar.

**Phase 4** – Filling pressure containers with retained Carbon, while lowering temperature and rising pressure, until pressure container is filled, and hatch is sealed. All energy for pressure pump and cooling should be obtained from wind or solar.

**Phase 5** – Diamond growth. In order to achieve diamond growth in pressure container seed must be planted, or thin slice of diamond should be putted inside of container. Around this thin slice, new artificial diamond will grow because carbon will bond in same manner like slice of diamond putted inside. After pressure and temperature normalization, we could pull out new diamond from pressure container. The result from this five phases, is that the new money is born from renewable energy and  $\text{CO}_2$  from the sky! The value of this new currency is without any doubt, good as gold, or gold exchange standard. Even more it is good as survival of mankind and all life on planet Earth, because for the first time we will have means to balance exact ratio of  $\text{CO}_2$  versus  $\text{O}_2$  in our atmosphere.

And just to expand the phase 5 – or Diamond growth, to much more allotropic forms of Carbon, which has even greater value of artificial Diamonds, like Graphene on Nanocarbons, or Carbon nanotubes, M-carbon, Q-carbon, T-carbon and other allotropic forms of Carbon, which has potential to become money value as well. If we can extract all of those allotropic forms of Carbon from thin air, and doing so only by using clean energy of wind and solar, then for sure this new value can be represented as MONEY value, in same sense as gold exchange standard, not just artificial diamonds. Let add the fact that most of this allotropic forms of Carbon, are in fact very scarce, and difficult to manufacture for scientist today, and even now they represent huge value of possessing even small

quantities of this new Carbon materials. The application of those Carbon allotropies is versatile and big, and in modern technology is from Medicine to Space technology, batteries, capacitors, etc. So artificial diamonds and some other Carbon allotropies, has good marketing value already, which can be used to represent all other values, much better than Gold and Silver or even to mention, fiat currencies... Other good thing that would emerge from that pursuit of diamond currencies are jobs in wind and solar industry, plenty of jobs, and positive feeling that progress of mankind is now working hand in hand with nature. But even then, we would have only so few carbon negative process, despite all other industry producing vast amount of CO<sub>2</sub> it want make much of a difference, unless we cut that CO<sub>2</sub> emission wherever is not needed, like for example in transportation sector. Internal combustion engines and jet engines must be eliminated unless they are using hydrogen fuel, or hydrogen fuel cell, derived from wind and solar energy to split water molecule and release hydrogen atom. We must keep in mind the time frame for all changes to be accomplished, only few carbon negative process, what we will have in the begging, and very slow initial change of CO<sub>2</sub>, is not fast enough, for the time frame that we have, or time frame in which mankind must revert CO<sub>2</sub> level to satisfying and safe level. Carbon dioxide reduction on every level should be introduced through taxes, and incentives. All what is CO<sub>2</sub> – positive must be taxed, and that money to be use for incentives for all that is CO<sub>2</sub> – negative, or neutral. It must be made a list of CO<sub>2</sub> – positive processes or behaviors which are to be taxed, and to be applied for all of us, from individuals to institutions, factories, all the way up to the countries. It meters, what heating system we have in our home, in our schools, in institutions, factories and so on, with respect only to social differences, and poverty. The price of wood and coal for heating must go dramatically high! Especially for wood, because forests are only one carbon negative “engine” that keep us alive. On the other hand price of all kinds of solar panels, of insulation, of new eco friendly materials should considerably be lowered and subsidized, and free of taxes. For the poor people, systems for solar heating, must be free of charge. Even now, price of evacuated tubes for solar heating is considerable affordable for vast population, but with incentives, it can be even lowered more, reaching almost the annually price of coal heating. In the future only solar heating will be coast effective.

Argumentation demonstrating how the model meets the assessment criteria -

Argumentative demonstration how sky diamond can save the world

The world crises of today global society, is lack of means to express true value. Our monetary system can't represent value of life itself, only can represent value of commodities where animals are treated as commodities too, and forest has value when it is cut for timber, and then observed as commodity as well. Base value for all our commodities, our possession, land, houses factories, etc. is gold, and with gold we can trade and exchange our possessing between each other. That's the way things should be functioning in real economy, in today economy however, with fiat currencies made of “tin air”, not gold reserves to back up instead back up with oil, we have even more distorted value system, so it is more difficult to figure out, what is really happening. Suppose that we even manage to figure out somehow the best economic and political system, with best institutions, justice, police and everything else, but without knowing what are our most common real values, in practice or in real life we did not do nothing, we even won't be able to recognize if it

is good or bad what we have done. The value system is what us keeping apart from primitive deed, and when it is in jeopardy than conflicts are inevitable. We won't be able to solve any problem in the future, or what so ever, until this basic question is answered, what really are our real values, as living beings and humans. Our biggest civilisation values and life values can't be represented with fiat currencies, or even with gold...

That is why I am suggesting new currency, made from carbon extracted from CO<sub>2</sub> from atmosphere, to represent our biggest value that we have on this planet Earth, and that is life. Produced only on sustainable way, basically from energy of the Sun, or as common phrase is on wind and solar, this carbon based currency, captured from sky can restore our value system.

DIAMONDS FROM THE SKY, can connect whole humanity to achieve this mission, and save the life on planet Earth, because everyone will recognise this true value, represented in diamonds from sky, and will embrace them as most precious thing, like life itself. Artificial diamond based currencies, derived from air, or some other valuable carbon allotropies, can be game changer not just for all life on planet, but for economy as well. At last all of us will have true value in our pockets, to trade with, and to represent all other values, and with relief that more sky diamonds you posses, environment is safer... It won't be easy thing to accomplish, end knowing that those goals will be hard to achieve, it certainly won't be as easy as push on button, and lot of investment's and effort, sweat and tears ought to be made, and the question will rise, is it worth it..? Let step away for a little bit, and look and compare with gold prospecting and digging, when tons of dirt should be removed, and whole landscape devastated just for tiny amount of gold, without certainty that you are digging on right place... For sure, making artificial diamonds from air is more comfortable job, and of course more certain job even knowing the fact that CO<sub>2</sub> are less than one percent present in the atmosphere. Then when we add the fact than natural sources of energy like wind and solar, are impermanent, so in time of abundance of wind and solar energy and low demand for electric power, it would be god for all not to stall with energy production but just redirect it for diamond production, that it is far more logical move, and I will explain why. For sure that we need some kind of energy storage, and while energy in form in liquid air is stored we can subtract CO<sub>2</sub> divide it and make something useful from carbon, for example diamonds or other carbon allotropies, while O<sub>2</sub> is released back in to the atmosphere.

While in the same time it is also cheapest and high efficient way for storing energy, in the form of liquid air on -200°C, and in form of phase change material for storing +200°C (sun-amp batteries for example), then we have temperature difference of 400°C that can give as efficiency of  $\eta = 400/473 = 84\%$  that is very high efficiency and can be achieved with the use of Stirling engine. Combining high efficiency with the new vacuum thermo isolating materials VIP (Vacuum Insulation Panels) and APM (Advanced Porous Materials such as aerogel and silica based materials) for containers that can store thermal energy for long period of time, it becomes obvious that heat (and cold) storage, with use of Stirling engine is the most economic and efficient way for energy storage. In the mean time we can purify liquid air by subtracting CO<sub>2</sub>, and after subtraction purify air can pass through Sterling engine and create useful energy (in the time of demands for electricity), and then can be realised back in to the atmosphere. While on the other hand captured CO<sub>2</sub> is splitted and than carbon is retained for production of carbon allotropies (diamonds, carbon nanotubes or other) and O<sub>2</sub> is realised back in to the atmosphere. That is new carbon negative process, and with use of renewable energy can become leading process for cleaning the atmosphere from CO<sub>2</sub>.

That is all of argumentation for making diamonds from tin air... How crazy does it seems, but it might actually work. That was all folks, wish me good luck...

ABSTRACT

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(AIR DIAMONDS - NEW CURRENCY)

Humanity is confronted with hard choices for the years to come. Environmental disturbances, caused by industrial production, propelled only by profit goals, where greed is ultimate value, abuse and neglect nature to that extent that life on Earth is in jeopardy so seriously, that is in the fact on edge of mass extinction. According to model of Professor Daniel Rothman from MIT Lawrence University in Massachusetts, that can happen approximately about year 2100, when the level of CO<sub>2</sub> dissolved in oceans will reach this terminal stage. So we can identify CO<sub>2</sub> as first and biggest problem for humanity to deal with, second problem then even more separate us from solving the first one is problem of perpetuate state of wars, not just over energy sources but over something more delicate than coal and oil, war over currency supremacy. The third problem to deal with, beside CO<sub>2</sub> emission as first one, and perpetuate state of war as second, is time frame to solve those problems. Although some reach and reckless people would claim that third problem of mankind is overpopulation of planet Earth, which drain Earth's resources to the point that can't hold on any longer and support so vast overcrowded mankind... Or is it so? Or is it in fact that because of simple greed of one percent of enormously rich people, which in fact lead us to position where we are now, that want us to believe that we are some kind of Earth's overweight, something that should be disposed of, instead of their lifestyle conveniences and toys... Now it is very simple to determine that, if 1% percent of mankind has ½ of all wealth on planet Earth and the other 99% or 7.6 billion people has the other half, that is so obvious that 3.7 billion people more can thrive and survive on our planet. We have 1/3 of earth land surface turn in to a desert, but still it is somehow better to leave those deserts, and depopulate planet..? How can an intelligent human being, mismatch problem with solution..? We need those human beings to solve the problem of desertification, and to overturn those deserts in to the forest and green fields, we need that manpower... There are great examples of turning desert in to green, like Loess Plateau in China, and many, many more. To resume what is third problem of mankind, overpopulation or timeframe? For sure it is timeframe to solve those two problems. So problems are as follows: 1. - CO<sub>2</sub> emission, 2. – Perpetuate state of wars, 3. – time frame to solve those problems. There are many more problems than this three, but if we solve this three we may have chance to solve all others...

Solving first problem in time frame for less than one half of century is quite a challenge, and in order to revert CO<sub>2</sub> emission with only natural ways like let the trees do it things, like converting deserts to forests and green fields, even if we reduce CO<sub>2</sub> emission from industry substantially, I am afraid that might not be enough...

We need more Carbon negative processes in order to reverse CO<sub>2</sub> emission. Carbon negative process meaning that, CO<sub>2</sub> from atmosphere is captured, O<sub>2</sub> is released and C (Carbon) retained and stored. Storing might be like putting Carbon in ground as charcoal, or as compost, (even from human and animal waste or feces), or like combining brine management with carbon capture, the brine is concentrated salt water after desalination processes to produce fresh water. Combining

brine and CO<sub>2</sub> in to sodium bicarbonate, a product which is used in medicine and cooking, among other applications. Or some other ways to capture CO<sub>2</sub> like: Capturing Carbon Dioxide with Saltwater Hydroponics – author: Vikram S. Balasubramania. Then to mention NASA compiles list of best plants to clean indoor air, with common indoor plant, which are great CO<sub>2</sub> absorbent. NASA plan to launch some of them in to the space, but here in Earth we can fill our offices, buildings, and our homes, with indoor plants. Indoor plants can be grown in aquaponic, or hydroponic systems to the extent that all indoor space without indoor plants should be taxed... In fact all carbon negative processes should be subsidized, and all carbon positive processes should be taxed, and that should be general rule that governs modern society. Ecology taxes like carbon emission taxes, wastewater taxes, should increase for all pollutants in our industry and transportation, or individuals that pollutes. And on other hand eco-friendly incentives should be introduced for carbon negative processes!

One more carbon negative processes can become main stream in removing CO<sub>2</sub> from atmosphere, not know till now and it is feasible solution, is to produce artificial diamonds and other carbon allotropes which have market value, from a thin air, or from sky actually. And to achieve this on wind and solar energy, on ecological acceptable way, otherwise make no sense. That way produced diamonds, than should be accepted as international currency, like one universal value. So with one strike we can solve two problems, CO<sub>2</sub> emission and to stop wars for international currencies or because of Petro-dollar. Instead of Petro dollar, let there be Diamond- Dollar, and/or Diamond - Ruble, and/or Diamond Yuan, no matter how it is called it is still Diamond based currency... Diamonds and other allotropes of carbon, which has value, may be considered. The strength between country currencies should be determined in correlation to carbon emission, on bases that carbon negative countries should has stronger currencies than carbon positive. For example carbon negative countries should tax, or custom, the goods from carbon positive countries. That might stop deforestation of Brazil for example. To determine whether one country is carbon negative or positive, it should count the ratio between, in one hand: all their green fields and forest (type and height) plus carbon negative industry, versus, human population plus carbon positive industry and deserts, on the other hand...

In hope that all mankind will recognise this effort to create future for all living thing on this planet, and start to act in right direction with pray that God will be on our side. Good luck for as all!

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