**The *Restoration* as an immediate imperative: Using negative emissions to reduce the amount of CO2 to below 400 PPM in the global atmosphere.**

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**SUMMARY**: Building on the [previous MAHB article](https://mahb.stanford.edu/blog/blue-oceans-green-seas-1-solutions-part-ii/), “1% Solutions”, this article provides a cumulative “1PPM strategy” concerning the research, development and deployment (R&D2) of 15-20 Negative Emissions Technologies with the goal of collectively or sequentially lowering the CO2 in the global atmosphere to below 400 ppm as the immediate and urgent imperative of humanity. This strategy should be pursued simultaneously with vigorous carbon cuts to insure the *RESTORATION* of the global atmosphere to levels of pre-400 ppm of CO2 that insures life on the planet for the now threatened future.

***INTRODUCTION*: THE *RESTORATION***

This paper will present several operational methods of negative emission technologies (NETS) needed to reduce CO2 in the global atmosphere below 400 ppm within the immediate future, meaning the next 5-10 years. This must be done *simultaneously* with urgently needed carbon cuts, like those planned in the Paris Agreement, since no one strategy or method will accomplish this alone. In view of this, this article proposes a “1 PPM NET each” strategy in which scientists, policy makers and citizens initiate a variety of mitigation methods that each take at least 1 ppm or up to 1% of the total CO2 out of the global atmosphere. This strategic and diverse approach is called the Multiplex Operational Mitigation Methods (MOMMS) approach since the decisive emphasis is on ***actual operational research, design and immediate deployment (R&D2)*** of at least 15- 20 such methods as the immediate imperative of humanity.

Specifically, *with 15-20* *actual operational and effective methods of Negative Emissions Technologies (NETS), we could reduce CO2 in the Global Atmosphere to a level below 400 ppm permanently, making our survival more certain in a very problematic future due to climate change. We call this historic effort the Restoration and can still be done, especially if and when combined with the Earth Armistice which can raise the necessary funds immediately.[[1]](#footnote-0)* The decisive and desperate need is to employ what the great Gandhi called the mindset of “Experiments with Truth,” and **actually implement–despite the uncertainty factors– a series of 1 PPM solutions immediately**–such as reforestation, carbon farming, blue carbon, carbon sequestration and carbon cuts — or face alone the coming and unabated  inferno of climate change.

**BACKGROUND:**

In an earlier article,[[2]](#footnote-1) the Global Trust Project (GTP) argued that:

“We know we are running out of time to make a decisive difference before runaway climate change occurs.[[3]](#footnote-2)  This is why it is absolutely necessary at this late date for a Multiplex Operational Mitigation Methods*approach. The MOMMS approach* must animate discussion, experimentation and deployment of any means that promises to effectively cut, curtail or capture carbon in the global atmosphere. Developing 20 such methods, as an immediate imperative of governments, scientists and citizens, will get CO2 below 400 ppm, which still should be possible…. “This is admittedly a simplistic yet very tempting summation of the beckoning potential of carbon dioxide removal’s (CDR) potential.”

“This must be part of a much greater effort to go green. Even if, with the proper testing and long term deployment methods, we are successful by using MOMMs carbon sequestration in removing 1% of carbon from the global atmosphere, that would be a significant result and contribution to becoming a carbon free world.” Such NETS are also a job creator in a green economy.”

So, reducing CO2 in the global atmosphere is the immediate and imperative goal; once successful, the ultimate goal must be striving for a global atmosphere of 350 ppm, the level that our best scientists say is necessary to sustain human lie into the future.[[4]](#footnote-3)

**THE MOST PROMISING MOMMS: RESEARCH, DEVELOP AND DEPLOY NOW**

The most promising mitigation methods that we have identified are listed below with websites cited for further research and information. This list is by no means comprehensive but is meant to initiate the actual R&D2 for each of these by governments, institutions, foundations or individuals in the immediate future.[[5]](#footnote-4)

So, the MOMMS with the most potential to result in a RESTORATION of the Global Atmosphere, when *enacted together, in groups or even sequentially*, to levels below 400ppm of CO@ include:

1. THE DEPLOYED REGIONAL IRON HYPOTHESIS: This MOMM consists of country-specific shoreline sequestration methods using systematic buoy systems or farms, each buoyed loaded with titrated iron filtrate, to enrich and vastly extend already existing oceanic plankton streams. Many such plankton streams already seem to originate within the territorial waters of liminal states, such as Iceland, Norway, Angola, Costa Rica, Ecuador, Peru—where the trans Pacific plankton blooms seems to begin—or Argentina, where the globe spanning Antarctica plankton blooms seem to originate. [[6]](#footnote-5)
2. OLIVINE AND THE OCEANS: [Project Vesta,](https://projectvesta.org/green-paper/.) using olivine on beaches to capture CO2 in oceans and other rock weathering projects should be R&D2 immediately as well since olivine and other ultramafic minerals are plentiful, if not under your feet right now….
3. INDUSTRIAL CARBON CAPTURE AND STORAGE: [Carbon Capture and Storage](https://www.c2es.org/content/carbon-capture/). The Center for Climate and Energy Solutions claims that: Carbon capture, use, and storage technologies can capture more than 90 percent of carbon dioxide (CO2) emissions from power plants and industrial facilities.” We should try to find out very quickly if this is true and can be done. Also, a very promising project is taking CO2 out of the atmosphere and storing it *or turning into fuel.*  This latter project, pioneered by the Carbon Engineering Company, may well be the wave of the future, if it can be ramped up quickly….[[7]](#footnote-6)
4. CARBON FARMING: According to the Carbon Cycle Institute: “Land management is the second largest contributor to carbon dioxide emissions on planet earth. Agriculture is the ONE sector that has the ability to transform from a net emitter of CO2 to a net sequesterer of CO2 — there is no other human managed realm with this potential.” [[8]](#footnote-7)

The Carbon Cycle Institute goes on to state:” Recent studies demonstrate the efficacy of several carbon-beneficial agricultural practices in increasing soil carbon sequestration.  Compost use has been shown to increase the amount of carbon stored in both grassland and cropland soils and has important co-benefits, such as increased primary productivity and water-holding capacity.” [[9]](#footnote-8)

1. [BLUE CARBON](https://www.thebluecarboninitiative.org/): “The International Blue Carbon Initiative is a coordinated, global program focused on mitigating climate change through the conservation and restoration of coastal and marine ecosystems;” THIS IS AN excellent idea that needs to be developed and deployed, probably again using tax incentives to promote the RESTORATION of wetlands and coastal marine ecologies locally, and worldwide.
2. AFFORESTATION AND REFORESTATION: Afforestation refers to planting trees or high carbon capture plants—like Bamboo! –where no forests or plants existed before. Reforestation refers to restoring forests where they once were; while an extremely promising idea, the growing areas of drought and wildfires may make this problematic in certain parts of the world suffering from increasing declines in rainfall. For the promise and potential see [here](https://www.imperial.ac.uk/news/192448/plants-could-remove-years-carbon-dioxide/): So just plants trees!
3. DIRECT AIR CAPTURE (DAC): The idea is to directly suck carbon dioxide out of the air and store it underground. [[10]](#footnote-9) The advantage of this method is that such DAC units could theoretically be set up anywhere. The disadvantage is that the technologies are still at a start-up stage and need government support and tax incentives to develop quickly. Read more [here](https://e360.yale.edu/features/negative-emissions-is-it-feasible-to-remove-co2-from-the-air).
4. BIOCHAR: Quoting from the Carbon Brief webpage, Biochar is: “Biochar is the name given to charcoal that is added to soils rather than burned as a fuel. The charcoal is produced by [burning biomass](http://www.sciencedirect.com/science/article/pii/S1364032114005590), such as wood, crop wastes and manure, while cutting off the supply of oxygen. This process is known as pyrolysis.

“A recent study found that biochar has the potential to sequester up to 4.8bn tonnes of CO2e per year. It has “fewer disadvantages than many negative emissions technologies,” the paper says, with limited need for additional land and water.” [[11]](#footnote-10)

1. THE MORATORIUM: **Cutting the carbon footprint of individuals from developed nations by 50% in the next one to two years.**  The idea of this strategy is to use a variety of approaches during the Restoration period, such as tax incentives for homeowners to plant up to fifty percent of their property or more with trees, stop eating red meat, advocate a “2 for 2” population policy that suggests parents have only two kids (why be outnumbered?!), end reckless maritime pollution in shipping, cut out all but essential jet travel, and no new coal power plants for the duration of the RESTORATION, etc. (Forthcoming by Maheesha Mudannayake et al,)[[12]](#footnote-11)

**CONCLUSION: Now or Never? We shall soon find out……**

*” Pour ce qui est de l’avenir, il ne s’agit pas de le prévoir, mais de le rendre possible. “*  
 **– Antoine de Saint Exupéry**, *Citadelle*

"As for the future, it is not a question of predicting it, but of making it possible…..”

It’s stunning how little R&D2 has been done to actually make operational many, if not all of the MOMMs outlined in this article. So, with all due respect, the time for rhetoric or debate is over in view of the overwhelming scientific evidence presented by the IPCC and other scientific groups concerning the increasing danger of intensifying climate change. So, this article has proposed a RESTORATION of the global atmosphere by employing a variety of MOMMs to achieve levels of under 400 ppm as the immediate imperative of humanity.

1. See: https://mahb.stanford.edu/library-item/earth-armistice-updated/ [↑](#footnote-ref-0)
2. See MAHB Project, Stanford University at: <https://mahb.stanford.edu/blog/blue-oceans-green-seas-1-solutions-part-ii/>. Also see Global Trust website at: [https://atmosphereasaglobaltrust.com](https://duckduckgo.com/l/?kh=-1&uddg=https%3A%2F%2Fatmosphereasaglobaltrust.com%2F) [↑](#footnote-ref-1)
3. https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/ [↑](#footnote-ref-2)
4. Hansen, J., Sato, M., Kharecha, P., Beerling, D., Berner, R., Masson-Delmotte, V., ... & Zachos, J. C. (2008). Target atmospheric CO2: Where should humanity aim?. *arXiv preprint arXiv:0804.1126*. [↑](#footnote-ref-3)
5. McLaren, D. (2012). A comparative global assessment of potential negative emissions technologies. *Process Safety and Environmental Protection*, *90*(6), 489-500. (Lists 30 NETS) [↑](#footnote-ref-4)
6. See supra, note 1. [↑](#footnote-ref-5)
7. See: Keith, D. W., Holmes, G., Angelo, D. S., & Heidel, K. (2018). A Process for Capturing CO2 from the Atmosphere. *Joule*, *2*(8), 1573-1594. [↑](#footnote-ref-6)
8. See: <https://www.carboncycle.org/carbon-farming/> [↑](#footnote-ref-7)
9. Ibid. [↑](#footnote-ref-8)
10. Ibid.,Andrei., see Akshat Rathi, Supra, note 4. [↑](#footnote-ref-9)
11. Carbon Brief is an excellent source and the research group at Imperial College, London is an impressive group. See: supra, note, 4 or: https://www.carbonbrief.org/explainer-10-ways-negative-emissions-could-slow-climate-change [↑](#footnote-ref-10)
12. See Supra, Note 1.Also: <https://qz.com/1416481/the-ultimate-guide-to-negative-emission-technologies/> and: https://www.carbonbrief.org/explainer-10-ways-negative-emissions-could-slow-climate-change [↑](#footnote-ref-11)