

**Forum:** Environmental Committee

**Issue:** Towards prohibiting the operation of factories with unsustainable outputs of carbon dioxide

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**Position:** Deputy President

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## INTRODUCTION

In the 21<sup>st</sup> century the issue of keeping our world climactically intact has been of concern due to the mass industrialization that is occurring and has been occurring for the past hundred years. The mass industrilaization and vast appeal to mass production has led to the creation of many factories, and many large factories that emit a lot of Carbon Dioxide.

Carbon Dioxide is a greenhouse gas. Greenhouse gasses form a 'cloud' around the earth's atmosphere that reflects Infrared rays back onto the earth. The continued reflection of the rays onto earth leads the earth's crust to heat up. This process is known as the Greenhouse effect and one of the main reasons as to why our planet is heating up. The more Carbon Dioxide that is emitted the thicker the 'cloud' becomes meaning more Infrared Rays are reflected back onto the earth and the hotter the planet becomes.

The multifaceted aspect of this issue encompasses the collaboration of the private and government sector to work on legislation, and on taking better care of our planet. Factories are infamous for their lack of sustainability, which is an aspect that needs to thoroughly be discussed. Furthermore, the types of ways in which the factories emit carbon dioxide is also an important aspect, as there are more ways than one that carbon dioxide is expelled into the atmosphere. Factories are owned by corporations, and the corporations' job is to provide a profit for its owners and shareholders, which in turn means to minimize the costs and maximze the profits. Thus, using cheaper non-renewable sources of energy is more benficial for the corporation. This consequently leads to the facotires emitting a large amount of Carbon Dioxide due to the inflated costs of renewable energy.

The monetary concern of factories is major which is why innovation of sustainable outputs of carbon is essential as well as the marketization of such innovation to decrease prices and substitute unsustainable carbon outputs. The idea of renewable energy sources is key to fully understand in order to successfully tackle this issue. A multi-pronged approach is nessecary due to the nature of this issue. There are two type of innovation that need to be focues on, the first is: the correect disposal of Carbon Dioxide, and the second: the implementation and development of other—more green—energy sources.

## DEFINITION OF KEY-TERMS

### Carbon Dioxide

Carbon Dioxide (CO<sub>2</sub>) is a color-less gas, that is present in the earth atmosphere. It is a Greenhouse gas, and Carbon Dioxide in excess raises the temperature of the earth's crust.

### Factories

A structure or collection of structures that manufacture goods in large quantities.

### Renewable Energy

Renewable Energy or also known as sustainable energy is energy that is derived from sources of energy that can be renewed. Some may include: Solar Power (sun), Hydroelectric Power (water bodies), Wind Power (wind turbines), Geothermal Power (Hot springs), etc...

### Non-Renewable Energy

Non-Renewable Energy or also known as Natural Resources, are sources of energy that cannot be replenished after their use. Furthermore, there is a finite amount of said energy source on Earth. Some example may include: Oil, Coal, Gas, Uranium.

### Climate

The aggregation of weather factors that include: temperature, humidity, precipitation, winds, cloudiness, etc.

### Greenhouse Gasses

A gas that absorbs Infrared radiation in the atmosphere, and by doing so traps more heat in the atmosphere. Carbon Dioxide and Methane are both Greenhouse Gases.

### NDC or Nationally Determined Contributions:

NDCs are the bedrock of the Paris Climate Agreement and outline what nations will contribute within their capacity.

### Assembly Line Production

A line usually centered around a transportation belt which is divided in section and each section complete one small part of the manufacturing process. Each section is specialized to one step of the process, and by doing so less skilled workers are required. All the sections aggregated produce the final product.

### De-carbonization

The discontinued use of carbon emitting energy sources.

## **BACKGROUND INFORMATION**

### History of Factories

The true birthplace of the industrial revolution was in the latter 18<sup>th</sup> Century England. From strongly agricultural, and rural areas where close to everything was fabricated by hand, to the world of mass producing in massive factories requiring a very minimal amount of hand work; this, was the work of the industrial revolution. The introduction of steam power fueled by coal, was the energy that pioneered throughout the revolution. The evolution of steam power generated great demand for coal. The power steam power of coal was used for transportation but also in newly founded factories. However, when coal is burnt and there is an output of steam, that steam is mostly made up of Carbon Dioxide.

John Lombe is accredited to have produced the first factory during the industrial revolution. Known as Lombe's Mill, the factory was a silk throwing mill in 1718 England. The factory was powered by steam power, and it was an essential process to fabricate the silk. The steam would then be released into the atmosphere. The mass utilization of this manufacturing technique would then be transported to the United States.

It was 1790 when the first factory was built in the United States, by Samuel Slater in Pawtucket Rhode Island. This factory was a catalyst for all others. However, a major discovery in the United States happened in 1804 in Philadelphia. A man by the name of Oliver Evans created and developed a high pressure steam engine with a great fluidity of usage. A couple years after this discovery the implementation of that engine was nationwide and was in many different sectors including but not limited to: ships, textile factories, printing presses.

Another great invention in the scope of factories and their efficiency is the invention of one Henry Ford. He was the pioneer and inventor of the assembly line

production system in 1913. This system was comprised of section among a single assembly line, and each section would only work on one component. For example, if one wanted to build a chair, there would be a separate section for each leg, the base, and so and so forth for each part of the chair. This more efficient system of production meant that more reasources were required and part of those reasources were energy and that energy derived from coal, which then would combust into Carbon Dioxide steam.

In the 21<sup>st</sup> century at the dawn of true automation, factories have been trying to automate as much as they can. The automation is wanted due to its cheaper cost as it would replace a human being with responsibilities, it would also not need to rest and therefore could work longer hours. Nevertheless, through the perspective of the enviornmen the needed machines require more energy to produce, and more reasources to produce objects with. The automation of factories is something that is not going to slow down and the mitigation of the energy consumed needs to be solved promptly.

### Current Carbon Footprint

Years past the industrial revolution and the first few factories, we have an estimated: 10 million factories around the world, according to SCMO a leading Global Logistics Consulting firm. The vast industrialization of world brought about all of these factories that to this day have a rather significant carbon footprint. In 2019 according to the IEA (International Energy Agency) the world emitted 22.0 Gt of Carbon Dioxide (33,300,000,000,000 Kg). The IEA they state that: “Global Carbon Dioxide emissions from coal use declined by almost 200 million tonnes (Mt), or 1.3%, from 2018 levels, offsetting increases in emissions from oil and natural gas. Advanced economies saw their emissions decline by over 370 Mt (or 3.2%), with the power sector responsible for 85% of the drop.”

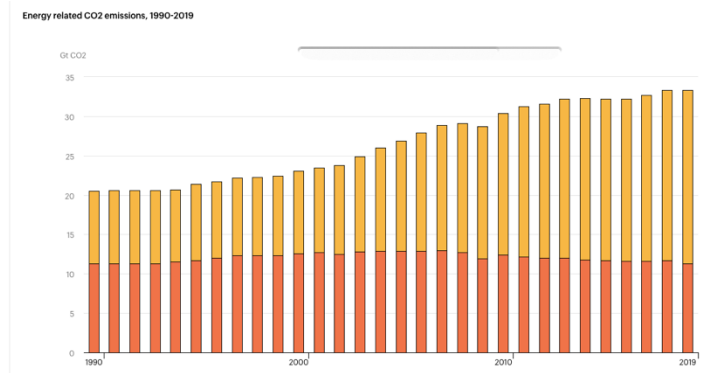


FIGURE 1

### Current Situation of Sustainable Energy

Sustainable Energy is the future, and that is beyond any shadow of doubt. The need to develop more sustainable energy sources that won't damage the environment like non-renewable energy sources do, and the propagation of that factor is imperative

to develop. Nevertheless, innovation isn't free, and comes at a great monetary cost, and with paramount risk. The recent formation of this sector in the energy industry renders it a risky business environment that is filled with costs and low guarantee for success. The high cost in producing such energy leads to the high cost in implement such energy.

The various and diverse types of renewable energy sources, that would fundamentally help factories are solar and wind energy. Solar energy would be materialized in the form of solar panels that can be placed on the roof of factories, or in neighbouring fields, however, the price of solar price incredibly high and also isn't the most reliable as the sun is needed to shine, and that isn't a certainty in many places around the world. Wind power would be in the form of wind turbines, but those require a lot of space and land which would mean extra costs in buying said land. Also, the need for wind is crucial and like the solar energy the source isn't incredibly reliable.

### Direct and Indirect Emission

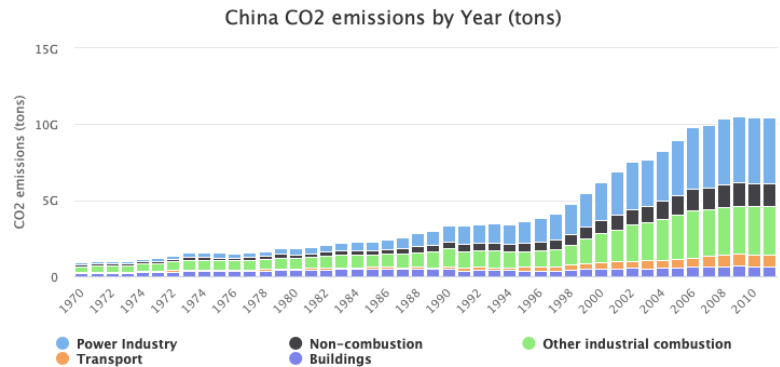
As iterated many times, a factory produces objects, and by doing so consumes energy typically that energy is expelled as Carbon Dioxide. However, when producing an object there are two main ways that the factory produces Carbon Dioxide; Direct Emissions and Indirect Emissions. Direct carbon emissions are emissions that are created by the creation of such objects. An example is the usage of energy to create the fire and heat needed to melt plastic, in a toy factory. On the other hand indirect emissions are emissions that are created by using energy to sustain the factory. That entails the lights of the factory, areas for workers in factories. Also, energy that is associated with the factory but is burned and emitted off-site. That can be transport of the goods, and sometimes even the goods themselves. Factories use a large amount of energy to routinely run, and that is a crucial aspect of the issue, how is it possible to diminish the carbon footprint of factories from both perspectives as well as how can one compliment the other.

## **MAJOR COUNTRIES AND ORGANIZATIONS INVOLVED**

### China

China is notoriously known for being the epicenter of factories and largest manufacturer in the world. In 2018, China held 28.4% of the world manufacturing output, making it the world leader in manufacturing output.

Manufacturing output is the amount of ‘things’ produced and valued at a dollar figure. In 2016 China emitted 10,432,751,400 tons of fossil Carbon Dioxide, as you can see in the figure. That was 29.18% of the world emissions and was a -0.28% descent from the year prior.



**FIGURE 2**

China plays a major role in the pollution of our earth. The mere fact that China is the most populated country in the world, combined with the large amount of factories, is why it is crucial to collaborate with the nation of China. In the past few years the Chinese government has been focribly exchanging coal energy to natural gas in households to diminish the carbon footprint of its nation. This idea could be adapted into factories.

### United States of America

The USA is also a strong polluter, and manufacturing powerhouse. Second to China, the USA, held 16.6% of the worlds manufacturing output in 2018. In 2016, the USA emitted 5,011,686,600 tons of Carbon Dioxide, which was decrease of 2.01%, cumulating to 14.4% of the world emissions. Nearly ¼ of the United States Carbon Dioxide emissions are from the industry sector (factories), and that is an incredibly high number that promptly needs to be reduced. Furthermore, with the current Political stage in the USA, the leader of the executive branch of government is trying to bring more manufacturing towards America and reduce imports. This factor is important to keep in mind as the emissions by the United States could very well increase in the coming years.

### India

As the third largest emitter of Greenhouse Gasses India plays a major role in the manufacturing scene around the world. India's reported amount of factories is 237,684 as of March 2018. The large amount of factories in India is due to the cheap labor in said country. The cheap labor attracts corporations to build factories and commission a great amount of product to create, with disregard to the environment. As a nation in 2016 India emitted 2,533,638,100 tons of Carbon Dioxide, which is a 5% increase from 2017. That accounts for 7% of the global Carbon Dioxide emissions.

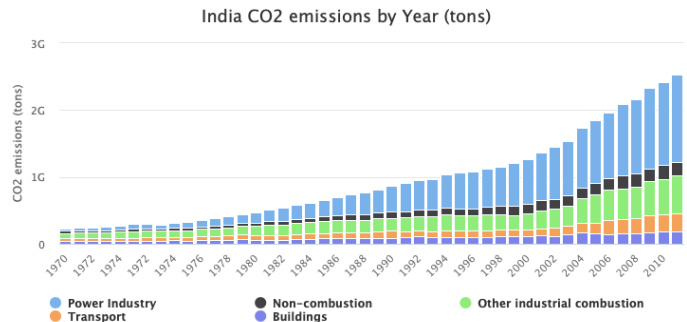


FIGURE 3

51.7% of India's carbon emissions derive from the power industry, and those emissions are comprised of all the energy required to maintain factories. In India the situation is more complicated than in the United States, China, and other more developed nations. It is important to keep in mind that the monetary availability India has towards renewable energy is a lot more limited than the United States and China, therefore, the innovation required to utilize sustainable energy is behind.

### International Energy Agency

The International Energy Agency can be summarized in statement that happens to be their mission statement: "The IEA works with governments and industry to shape a secure and sustainable energy future for all." The IEA funnels a stream of communication between governments and helps with the innovation of new sustainable energy resources, that can be implement in a variety of ways, including industry, and factories. Founded in 1974 the IEA initial purpose was to coordinate and respond to major disruptions in the oil supply chains. Now, the focus shifted, to ensuring a global impact on the energy sector in promoting more sustainable energy resources. The work of the IEA helps nations with data analysis to better understand how to implement such energy sources in their industries.

### European Union

The EU and EU nations are amid some of he leading economis in the world in terms of combatting excessive Greenhouse Gasses Emissions. From 1990-2018 the EU cut their Greenhouse Gas emissions by a staggering 23% and has pledged to cut by 40% in 2030. The European Commision formulated the European Green Deal towards the end of 2019, and that deal is a guildine of ways in which the EU will reach its pledge

by 2030, as well as aiming at the de-carbonization of the EU by 2050, lastly it is also coherent with the Paris Agreement of 2016.

## TIMELINE OF EVENTS

DATE	DESCRIPTION OF EVENT
1760	The start of the First Industrial Revolution.
1790	First large-scale factory in the United States.
December 1, 1913	Henry Ford creates, and implements the world first assembly line factory.
June 5, 1972	United Nations Environment Program (UNEP) founded. First UN organization to deal with solely environmental and climatic issues.
February 23, 1979	First World Climate Change Conference. Largely a scientific conference comprised of mainly scientists instead of legislators.
May 9, 1992	The founding of the United Nations Framework Convention on Climate Change.
November 4, 2016	The Paris Agreement entered into force, which dictates strategies for long-term mitigation of carbon emissions.
June 1, 2017	President Donald Trump states the the United States won't take part in the Paris Climate Agreement.



## RELEVANT UN RESOLUTIONS, TREATIES AND EVENTS

### United Nations Framework Convention on Climate Change

Firstly, the convention identified and summarized the problem. They realized that the situation was vastly different from 1992 (when the UNFCCC took effect), and that there is a new a large amount of data available. The convention then went on to set a goal that would be comprised of stabilizing greenhouse gasses. The goal is summarized as: “at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system.” This lead to the UNFCCC to pave the way for developed nations to lead all nations through times of scientific uncertainty. This by proxy means challenging funds towards developing countries. The convention goes on to stating that it’s important to continue to ‘keep tabs’ on the current situation and actions taken in order to combat it. The relevance of this convention is based upon the emission of greenhouse gasses (including Carbon Dioxide), as factories play a major role in the summative emissions.

### UNEP Emissions Gap Report 2019

The UNEP Emissions Gap Report outline where current greenhouse gas emissions versus where they need to be and provides solution on how to close said gap. The 2019 version of report aims to focus on the transition from non-renewable energy resources to renewable energy resources, especially in the power, transport, and buildings sectors. The main focus for the issue at hand is the power sector, as factories require large amounts of power to function (indirect emission), and that power in it of itself greatly pollutes the atmosphere. The main point stressed in the Report—similar to the UNFCCC—is the cooperation of developed nations and developing nations. They also stress to nations to try and incorporate renewable energy sources better and make them more widespread for their people.

## PREVIOUS ATTEMPTS TO SOLVE THE ISSUE

The mitigation of greenhouse gasses, more specifically Carbon Dioxide has been an issue that is saturated in solutions. The most notable attempt at solving the issue of reducing the carbon footprint of factories is the Paris Agreement. The Paris agreements focal point is to fortify the worldwide reaction to the danger of rising emissions of greenhouse gasses. Furthermore, the agreement intends to fortify the capacity of nations to manage the effects of rising carbon emissions.

To arrive at these ambitious objectives, influx of cash, and assisting innovation, will be supporting activity by developing nations and the most helpless nations, in accordance with their own national goals. The Agreement likewise accommodates improved straightforwardness of activity and backing through an increasingly transparent framework. The agreement also requires all nations to follow through with their NDCs (Nationally Determined Contributions), plus a periodical report on the emission status of their nation. In addition, the agreement demands a global stock take every five years to convene and analyze the situation and progress towards achieving the collective goal.

## POSSIBLE SOLUTIONS

First and Foremost, there is the legislative point of view to undertake. There are certain legislative steps that can be taken to lower the carbon footprint of factories. As previously discussed the price incentive of non-renewable energy is a major contribution towards its popularity. Imposing regulations and taxes on non-renewable energy could be a solution as to have corporations re-evaluate the type of energy they are using. In addition, implementing new law that to construct a factory the corporation building the factory has to adhere to certain climate regulatory standards. Furthermore, imposing regulations and regulating the amount of carbon a factory is emitting. This regulation denotes to a number and after that number is surpassed by a factory they would have to pay reparations to the government, and that money would be re-invested into the development of renewable energy.

The collaboration of the private sector and the government sector also is an ample solution. Governments can work in collaboration with already existing companies to fund research and developments on new methods of utilizing renewable energy. The influx of cash into these businesses would greatly speed up the creation of certain technologies which would be easily implemented into factories. This allocation of fund would also try to absorb some of the costs for the business developing this technology hence, lowering the overall cost making it also more incentivizing for factories to use renewable energy.

Governments can also provide incentives for factories to adapt renewable sources of energy, and those incentives can be created through tax breaks. These tax breaks would lead to corporations to understand—not only the climactic benefits of renewable energy—but also the economic gain of renewable energy. This strategy has already been tried around the world with the implementation of electric cars. In nations like Sweden, for cars that have zero emissions the highest bonus they offer is around 6.700 USD.

In addition, it is crucial to inform the public of what could occur if carbon emission from factories are not placed under control. The raising awareness can be perputed through many different mediums. One could be education through the younger generations, which could be direct schooling by teachers, or could be seminars created for students. Another medium can be ad campaigns through social media. In our society social media is heavily used and the vast and diverse target audience on social media can be used to propagate aforementioned information. Also, direct communication with large multinational corportations could serve to raise awareness. There are a platitude of mediums in which awareness can be spread and it is crucial to do so.

Nevertheless, it is important to keep in mind that each nation has a different view on the topic and the way the topic should be tackled. The notion of government intervention in the private sector is something that is under a lot of debate as well as regulations businesses.

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Figure 3:

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