

# Integrated solution to carbon emission, plastic rubbish, bushfires and wilderness reduction.

Jianlong Bai\*

Department of Tech, CSSC XD-gen, Zhenjiang, China

## Abstract

Carbon emission and plastic rubbish around the globe have been 2 urgent issues to be solved, so here discusses the viable solutions. Zero carbon emission will be fulfilled sooner with Carbon-free World Power Grid (CFWPG), that is to say, CFWPG will be the most suitable way to zero carbon emission. Furthermore, under CFWPG frame, industry will be upgraded into oxygen (O<sub>2</sub>) maker but not carbon dioxide (CO<sub>2</sub>) emitter any more, such as the metallurgy. 2 distinctive disposal ways of waste plastic are given: as insulation filling of power pipeline for CFWPG, demand a lot; upgrading rubbish incineration process with O<sub>2</sub> from O<sub>2</sub>-maker will gain much lower cost that everyone can accept. Other relevant discuss is provided in addition, mainly on water diversion. And an improved water diversion scheme is proposed under CFWPG: for reducing catastrophic bushfires; for reversing the reduction of wilderness. With the water diversion, deserts will become farms and homes of mankind.

**Keywords:** RCarbon Emission, CFWPG, O<sub>2</sub>-Maker.

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## Introduction

### *Beyond zero carbon emission*

**Background:** Carbon emission has been resulting in fierce climate problems: disappearing of polar regions, many ecologic circles, islands, tropical rain forests; extreme chilliness and torridity, more violent hurricane, more frequent flood and drought; catastrophic bushfires caused by durable drought with the hotter weather, like 4 months burning in Australia, "zombie" fires in Siberia and wildfires in California in 2020.

**Solutions: zero carbon emission way; essential industry changes into O<sub>2</sub> maker:** Carbon-free World Power Grid (CFWPG) has been proposed and designed in [1]. It will realize worldwide random energy collection and smart power transmission-supply, and remold the energy consumption pattern completely. It is more feasible to start with largish region power grids, like that of Euro-Africa or North America over 5 time zones. Largish region grid with adequate components listed in Figure 1 should basically fulfil zero carbon emission [1].

Converter-train as in [1] is the key technology to constitute DCT and IECS to gain a few dozen MV EHVDC to fulfil ultra-long distance even worldwide power delivery. The advantages of CFWPG, besides those listed in [1], should also contain:

- Providing 100% carbon-free energy in concept, more than 95% in fact
- Providing the precondition to upgrade industry modes. For example, under CFWPG, upgraded metallurgy industry will realize zero carbon emission, and become O<sub>2</sub> maker further, as that in Figure 1; factually, current process of metallurgy produces dioxin as well, but the upgraded will not
- Improving the global environment with usual temporary extra-surplus power CFWPG will be the most suitable way

to zero carbon emission, and more than that

### *Zero-emissions' rubbish incineration and a new recycle way of waste plastic around the globe*

**Background:** Plastic rubbish, shown as Figure 2, has almost polluted everywhere of land and ocean. Even in uncharted snowfield of the Arctic Circle, micro-plastics can be found. It has been incurring many problems in environment and ecology: many animals and birds died from in taking of plastic or were killed by discarded plastic-net. These happen in the ocean area especially. Living creatures including us human are being poisoned by micro-plastics.

### **Solutions: as insulation filling; upgrading rubbish incineration:**

- The new recycling: as insulation filling of power pipeline in Figure 1, is shown as A in Figure 3. Building CFWPG as discussed in section I needs thousands miles power pipeline; it demands a great deal of insulation materials. The massive waste plastic/rubber around the globe can be well recycled as the insulation filling. (The maximum diameter of pipeline will be more than 2 meters).
- Zero-emissions' rubbish incineration present rubbish incineration produces toxins mainly including cancer genic dioxin, but the post processing does/will result in much higher, even unacceptable cost. It is just why plastic rubbish amasses. A typical waste to energy incineration is show as C. in Figure 3. However, the upgraded metallurgy industry-O<sub>2</sub> maker will change the embarrassing status totally. Surplus O<sub>2</sub> will realize acceptable cost under no toxins' pollution, even without carbon emission at the same time. CO<sub>2</sub> will be easily separated and stored via separating can. The reference process is shown as

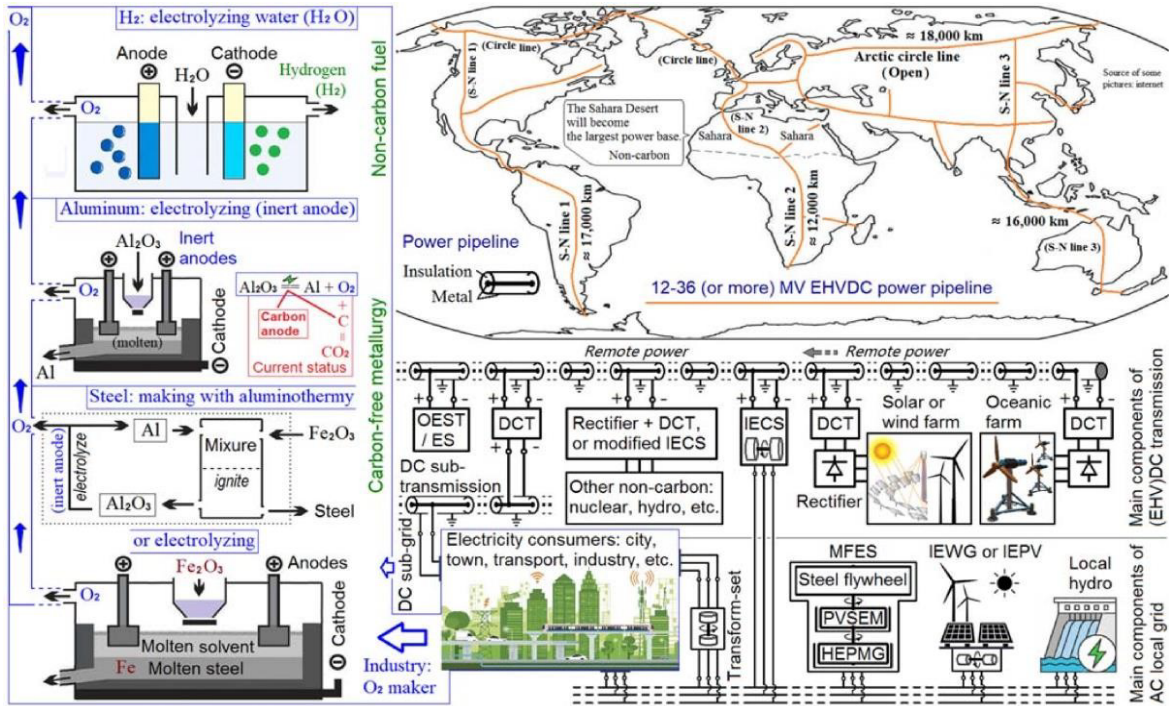


Figure 1: O<sub>2</sub> maker in art extension of CFWPG configuration. (DCT-DC Transformer, also called DC convert-station; IECS-Inertia Endowed Convert Station. EHVDC-Extremely High Voltage DC; 1 MV = 10<sup>3</sup> kV = 10<sup>6</sup> V; ES-Energy Storage; OEST-Online Energy Storage Train; MFES-Multi-function Energy Storage [2], PVSEM-Pure Variable Speed Electric Machine [2], HEPMG-Hybrid Excitation Permanent Magnet Generator; IEWG-Inertia-endowed Wind Generation, IEPV-Inertia-endowed Photovoltaic generation; Transform-set, such as that of 11 kV / 440 V 60 Hz; key technologies/devices: DCT & IECS [1].



Figure 2: Glances of plastic rubbish.

B in Figure 3. Rubbish incineration will popularize with upgraded method. With surplus O<sub>2</sub>, most of rubbish components-plastic, resin, rubber, metal, silicon, etc. will gain complete combustion and result in high temperature, then avoid the condition engendering dioxin. Besides, high temperature will melt residue (including waste glass fiber). Or in other words, waste plastic and rubber will be as fuel for generating electricity

with carefreeness of toxin on account of low-priced O<sub>2</sub>, and make Waste-Energy- Incineration gain profit.

**To avoid unexpected carbon emission and improve environment under CFWPG**

**Background:** The climate problems from carbon emission will continue several decades at least, though zero carbon emission

will probably come soon. One of typical cases is Wild Fires 2020 in California that caused by abnormal climate and the original drought feature in geography (Figure 4).

Wilderness reduction is also a prominent problem in environmental protection. The records of remaining wilderness are: 66% in 1937; 64% in 1954; 62% in 1960; 55% in 1978; 46% in 1997; 35% in 2020 [3].

Usually, smog will happen when heat is gained from burning of wood or coal within a wide range and frequently emerges in developing countries in recent years. The well-known case is Great Smog of 1952 in London.

**Solutions:** Suggestions to avoid catastrophic bushfires, Suggestions to avoid catastrophic bushfires

- To decrease the tall-tree density in forest (alternate with tall-low strips)
- The massive stored CO<sub>2</sub> from upgraded rubbish incineration, cement production, and so on will help a lot.

As an environment-friendly fire-extinguishing material, the stored CO<sub>2</sub> will benefit the bushfire extinguishing

- Water is the key, anyway. So, here, under CFWPG, an improved water diversion scheme is given as Figure 5. Temporary superabundant power that often emerges in CFWPG will benefit water diversion; in return, hydro storage of trans-upland diversion as that in Figure 5 is just what CFWPG need (for power provide-demand balance). That is to say, CFWPG and water diversion will benefit each other. And almost every drought place on the globe will gain the necessary or sufficient water

**How to recover the wilderness:** Water diversions under CFWPG will reverse the wilderness reduction. Deserts will become new farms (of energy, cultivation, breeding...) and homes of mankind, for wilderness recovery.

**Eliminating smog:** CFWPG providing sufficient low-priced power will make carbon consumption become a luxury in the future. The potential smog will disappear when burning is not a widely heating means in modern society anymore.

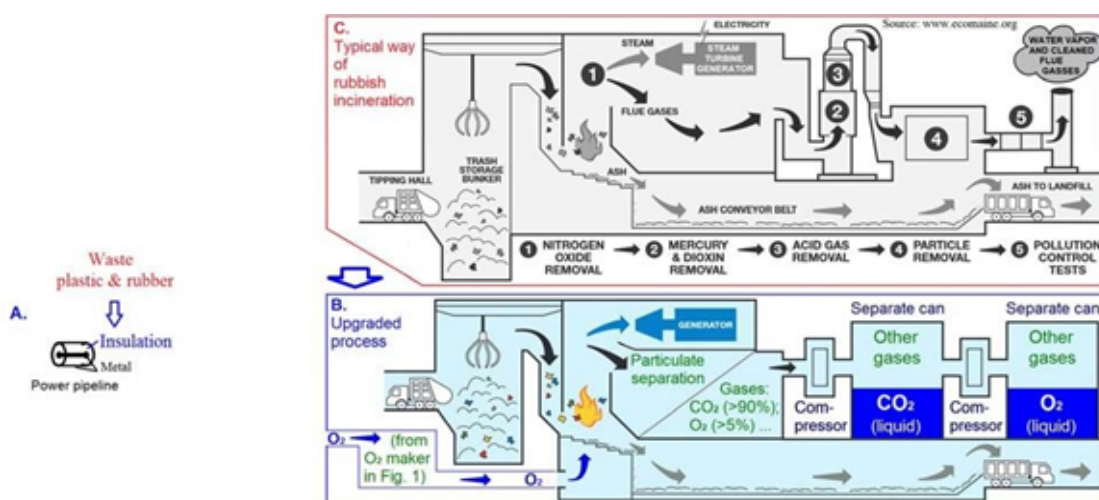


Figure 3: a) The new recycling way; b) Zero-emissions' Waste-Energy-Incineration; c) A typical disposal process of rubbish presently.

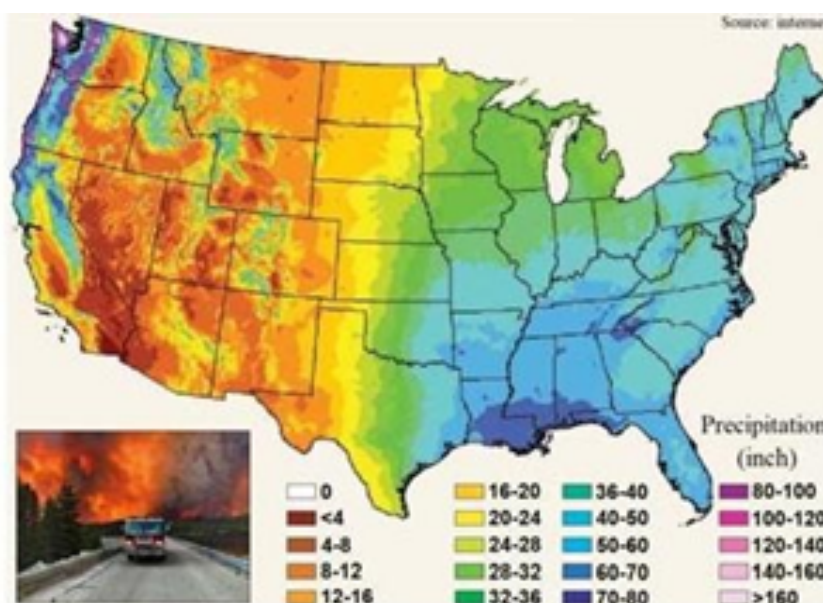
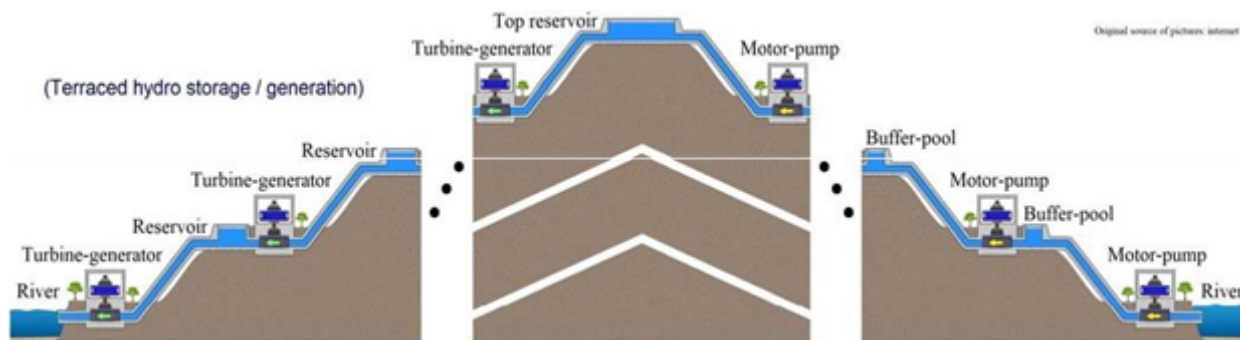


Figure 4: Wild fires 2020 in California and the typical precipitation



**Figure 5:** Trans-upland water diversion with pumped hydro storage in CFWPG.

## References

1. Bai J. Zero carbon emission based on carbon-free world power grid. *Foundamentals renew energy appl.* 2021.
2. Bai J. Multi-function energy storage system for smart grid. *IEEE Green Energy and Smart Systems Conference (IGESSC).* 2019:1-4.
3. Alastair Fothergill, Keith Scholey, Colin Butfield (Producer),

Steven Price (Composer). David Frederick Attenborough, "A life on our planet". 2020. Netflix

## \*Correspondence to:

Jianlong Bai  
Dep. Tech, CSSC XD-gen Zhenjiang,  
China  
E-mail: [baijianlong@aliyun.com](mailto:baijianlong@aliyun.com)