Zero-Emissions Academy OneEarth

Ver. 1.0

Released: Jan. 10/2024

Manifesto

To solve climate crisis, we motive people to realize zero-emissions of green-house gases (GHGs) through our education, which emphasizes the following important core concepts and measures. There is no need to understand all the details described here, if you are not familiar with zero-emissions; these are provided to designate our educational guidelines, as there is a widespread confusion about how to tackle climate crisis.

Climate Change: Global warming is an essentially irreversible phenomenon [1] and once CO_2 is emitted, its influence continues for hundreds of years [2]. In particular, climate scientists are warning that a temperature rise of 1.5 ^{o}C from the preindustrial period (~1850) is a critical point (tipping point) at which earth's climate system starts to show a catastrophic irreversible change [3]. The temperature has risen by 1.1 ^{o}C already [4] and all the GHG emissions need to be reduced toward zero at all costs in a limited time scale of a few decades.

Electricity: 100% clean-energy supply, realized by various renewable energy sources (solar energy, wind turbine, etc.), is the cheapest and safest way with lesser uncertainty and risk. To achieve stable electricity supply with time-varying clean energy sources, we emphasize the importance of intercontinental (intergovernmental) electricity grid, together with energy storage by batteries and H_2-gas generation. In ZEA, nuclear plants are not considered as a reliable and stable energy source, as this plant is not cost effective and quite vulnerable to natural disaster, war/conflict, and cyber terrorism. Moreover, the problems of radioactive nuclear waste and its application to nuclear weapon fabrication make nuclear plants quite unattractive for electricity generation, particularly in developing countries. We also do not support carbon capture and storage (CCS) facilities, proposed for fossil fuel industries, as CCS is unlikely to contribute to a meaningful CO_2 reduction because of their very high cost [5] and other risk factors [6]. Furthermore, for direct capturing of CO_2 from air (direct air capture: DAC), we take a position that DAC has not yet proved cost-competitive and there is a high risk to rely on this method too much, as this technology may resonate with human nature of procrastination, delaying the adoption of important measures that should be implemented now.

Policy: To win elections, politicians tend to promise investments in new unproved technologies [7], while avoiding introducing restrictive measures for voters for suppressing GHG emissions. Unfortunately, our current lifestyle is deeply connected to GHG emissions and it is vital to introduce restrictive measures against each individual to cut GHG emissions. We propose that such GHG regulatory measures should be combined with economic benefits for individual who tried to suppress GHG emissions. History tells us that democracy tends to prioritize short-term results with less pain, whereas climate change is a crisis in a long run; thus, we need to introduce an international regulatory framework which considers long-term results by taking inequalities between the poor and rich people as well as between the rich and poor nations into account. Such an international measure should be implemented with strict monitoring of nation's GHG emissions by satellites. For policies, we strongly encourage voters in each nation to understand the technological aspects of zero-emissions world, so that voters can judge the validity of technological policy plans proposed by policy makers.

Economy: We prioritize suppression of climate change over economic growth, as the consequence of irreversible climate change is enormous with damage costs far exceeding losses caused by poor economy. We need to notice that healthy economy in the current world is not consistent with stable and comfortable zero-emissions world at this stage. In the current situation where a rapid world population growth leads to the substantial increase in energy demand, higher economic growth may even be detrimental in the view of climate change. On the other hand, in realizing zero-emissions world, economic rationality plays a central role; we have to introduce economic/political measures that rationalize clean energy and low-carbon products (i.e., products with lower carbon footprints). At this stage, fossil-fuel-driven industries are earning notable profits without paying damages caused by climate change [8]. Such "free ride" must be prevented by introducing proper measures validated based on international protocols. As an economical method, we explain our proposal of "complete worldwide emissions trading", applied for not only industry but also individual, to limit the total amount of GHGs emitted globally.

Food & Agriculture: GHG emissions from food/agriculture are as high as 34% of the total emission [9], which is comparable to the vast GHG emissions in the energy/heat sector. A major challenge in food & agriculture is the urgency to increase food production by 50% in 2050, to address rapid world population growth (30% increase from 2022) [10], while prohibiting farmland expansion to protect forests. Among various measures, the curtailment of beef consumption is one of the most cost-effective methods, which does not require any technology. In the view of nutrition, beef is a non-essential and luxurious food, which supplies only 1% of human calorie intake (or 4% of human protein) [10]. To reduce GHG emissions in the food sector, climate policies need to compete with our pleasing sensation of eating GHG-intensive foods. In other words, to cope with "human desire", strong economic and political measures must be introduced by considering food carbon footprints.

Zero-Emissions Lifestyle: We already have zero-emissions lifestyles, such as zero-emission house (ZEH) and zero-emission vehicles (or electric vehicle: EV), which are key components in zero-emissions world. Suppression of total energy usage by ZEH and LED light, for example, is a quite cost-effective method and should be made mandatory, as this always provides benefits to households. For transports, riding bicycles, public and shared transports by electric or H_2-fuel bus/vehicle are vital. Although EVs are important, GHGs are emitted during their production; therefore, EV-car-sharing society is preferable. In our daily life, we need to purchase products with low carbon footprints. For this purpose, the carbon footprints of all commercial products should be clarified and visualized by tracing technologies. This will motivate people to buy low-carbon products, so that the total carbon footprints of each person should become less than a GHG budget allocated to each person.

Goal of ZEA: The ongoing climate crisis is essentially caused by the lack of climate education. To stop climate change, ZEA realizes zero-emissions world through our free online education programs.

References

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