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Toward a green revolution and civilization

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Billion tons of oil are burned every day to support our prosperity. At the same time millions of tons of carbon dioxide are released into the atmosphere, creating a greenhouse effect that will endure for at least for a century.

Our oil-addicted civilization keeps on extracting carbon that has been stored underground for millions of years, burning it and releasing it into the atmosphere to form heat-trapping gases.

The accumulation of heat-trapping gases might eventually become unbearable, creating disastrous climate change and intensifying sudden weather alterations, such as floods, thunderstorms, blizzards, and so on. Some epidemic disease might cross over from tropical to sub-tropical regions, and vice versa, due to climate change in both areas.

Taking a glance at the energy market, there are four primary energy resources: clean and renewable energy, such as hydropower and geothermal; less clean non-renewable sources, such as natural gas; unclean renewable sources, such as raw biomass and briquette; and unclean and non-renewable resources, such as coal and oil.

To calculate the National Energy Balance (NEB), the Energy and Mineral Resources Ministry divided energy into several categories: hydropower, geothermal, biomass, coal, briquette, natural gas, crude oil, fuel, liquefied petroleum gas (LPG), liquefied natural gas (LNG) and electricity.

On the demand side, the consumption of energy can be categorized into five sectors: industry, household, commercial, transportation and others.

It is worth mentioning that there is one sector that is required to convert energy from its original form (primary energy) into forms that are ready-to-consume.

The energy-transformation sector includes power plants for electricity generation, coal processing plants, LNG and LPG plants as well as refineries. According to the ministry's NEB matrix for 2009, the household sector was the biggest consumer of biomass and electricity (233.26 and 33.68 million barrels of oil equivalent (mboe), respectively).

The industry sector had the highest rate of natural gas and coal consumption at 89.10 and 82.59 mboe respectively, while the transportation sector was the highest consumer of fuel which amounts at approximately 226.45 mboe.

While the improvement of power generation to support energy demand for households and the industry sector is now in progress, it is not too late for us to start to improve our efficiency in the transportation sector. Several policies should be implemented to improve energy efficiency as well as to reduce greenhouse gas emission by reducing oil consumption.

Indonesia must transform its current transportation system, which heavily depends on road and highways, into an electrified railway system. Since the investment climate in the nation is at a high, now it is the time to start to restore our old railway infrastructure and to build new railroads followed by their electrification.

Electrified railway systems are eco-friendly, since they do not emit greenhouse gases. Of course, Indonesian cannot entirely dismantle its existing road transportation system. Yet, when appropriately implemented, a rail system would reduce the burden on the road transportation system. It also means reducing fuel consumption, which would further cut greenhouse gas emissions.

Along with electrification we should enhance railways from single to double tracks, which would enable trains to operate more frequently, efficiently and quickly.

Keep in mind that restructuring the land transportation system by diversifying it would require a restructuring of the country's energy policy, particularly the security of the nation's electricity supply.

While replacing coal-fueled power plants with natural-gas plants, renewable-fueled power plants, such as wind farms and solar-energy systems should be introduced to satisfy energy consumption needs from household sectors.

Biofuel is more environmental friendly compared to hydrocarbon fuels since it is extracted from plants that capture carbon dioxide from the atmosphere. Biofuel production "recycles" carbon dioxide from the atmosphere, in a way.

However, the first generation of biofuels, such as ethanol, extracted from sugar cane or corn or diesel fuel extracted from palm oil, has created a lot of controversy.

The plantations needed to produce biofuels would need a vast amount of arable land, which would compete with food-production plantations or even result in more environmental damage due to deforestation.

The second generation of biofuels is comprised of fuels extracted from plants that can survive in less-fertile earth, such as switchgrass, which can be cultivated in arid rural areas, such as Nusa Tenggara and the south coast of Java.

Until now, the Indonesian automotive industry has not yet introduced hybrid cars, powered by gasoline and batteries. Since the vehicles are not as yet mass produced, plug-in hybrid electric vehicles (PHEV) are very expensive for average households. To drive the demand for such vehicles in the market, governments need to provide incentives, such as, for example, lowering taxes for producers and for buyers.

Government use of PHEVs as official cars would be a very big incentive for producers and would facilitate mass production. PHEVs are not carbon free, but if they are combined with biofuel use, they will significantly reduce carbon emission.

The Stone Age ended not because people ran out of stone but because people invented a new technology that was much more efficient.

Oil might still rule the market for decades to come. We might not even be half way toward developing carbon-free technology, but we should take all possible measures to bring our oil addiction to an end.

Energy diversification will not only save our economy from the danger of oil price volatility; it will also save our planet and civilization.

The time to start is now.

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