



Challenges in Reducing GHG Emissions in the Generation and Use of Electricity in Malaysia

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A talk on “Challenges in Reducing GHG Emissions in the Generation and Use of Electricity in Malaysia” was successfully organized by Electrical Engineering Technical Division at Wisma IEM on 10th September 2016. The speaker was Gurmit Singh, a renowned environmentalist who has founded and still chairing the Centre for Environment, Technology & Development, Malaysia (CETDEM).

The talk started with an introduction to greenhouse effect. Global warming is the cause of greenhouse effect and the largest contributor is burning of fossil fuel. Extreme weathers are regular occurrences. Atmospheric greenhouse gas (GHG) concentrations continue to rise. For instance, methane CH₄ has gone up from 715 ppb to 1813 ppb from pre-industrial to 2011. Concentration of CO₂ has risen from 280 ppm to 391 ppm within the same timeframe. Worldwide greenhouse gas from 1990 to 2010 in CO₂ emission has increased from 34,000 million metric tons of CO₂ equivalent in 1990 to 45,000 million metric tons of CO₂ equivalent in 2010. It is projected that by the year 2090, the developing countries will overtake developed countries in terms cumulative CO₂ emissions. Even before the year 1992, scientists have issued warning that greenhouse gas emissions had to be reduced 80% below 1990 levels by 2000. CO₂ equivalent in the greenhouse belt also had to be kept below 350 ppm concentration but these have already reached 400 ppm and are rising.

Climate change impacts include rise of temperature, precipitation changes and sea level rise which in turn cause issues with health as in breeding of mosquitos in new areas, agriculture as in shift of optimum location to grow crops, forests as in dying of trees due to temperature change, water resources and aquatic life as in death of coral reef, erosion of coastal areas, and disruption of species and natural areas.

Mr. Gurmit then talked on Framework Convention on Climate Change (UNFCCC). UNFCCC’s objectives are to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with climate to allow ecosystems to adapt naturally, to ensure food production is not threatened and to enable sustainable development.

Electrical generation using fossil fuels is a major generator of GHG emissions especially coal with an emission factor of 26.2 tC/TJ compared to gas with 15.3 tC/TJ. The energy sector amounted to 78% of

Malaysia's 2011 GHG emissions. According to Mr. Gurmit, lighting accounts for only 7% of total energy consumption whereas air-conditioners, water heaters and fridges are the significant energy guzzlers. Transportation is another huge contributor of GHG.

Renewable resources have much lower emissions. However thoughts have to be put into the disposal of decommissioned solar panels which have grown significantly in terms of installation volume. Nuclear power may be low in GHG but waste disposal poses an immense challenge. Mr. Gurmit proposed to explore the possibility of hybrid biomass and mini-hydro energy generation.

Losses and inefficient utilization of electricity translates into increased greenhouse gas emissions to generate the extra electricity. Huge amounts of electricity are wasted through excessive amounts of air-conditioning in hotels, offices, complexes and even houses as well as inefficient usage of electrical equipment such as fridges and heaters. Technological means such as employment of super critical turbines is a viable option. Replacement of old inefficient equipment at power stations and users end may also assist. Thorough audits at all levels will help as in GBI process for existing installation.

Malaysian engineers can help curb climate change by reducing the generation of GHG emissions at all levels of the electricity chain, teaming with other professionals to work out holistic solutions to threats of climate change. On the other hand, we must act at our personal level within our nation and globally in the face of the adversity and reality of climate change.



Mr. Gurmit delivering his talk