

**SPEECH BY TUN DR MAHATHIR BIN MOHAMD
AT THE INTERNATIONAL R&D FORUM ON OIL, GAS AND
PETROCHEMICALS AT PUTRAJAYA ON TUESDAY, 26 MAY 2009**

“Leveraging Innovation for Sustainability”

1. Firstly I would like to thank the organizers for this invitation to talk on the subject of Leveraging Innovation for Sustainability. I hope I can do justice to this rather technical subject which is laced with some social and environmental sensitivities.
2. We are all talking about sustainability now. It would seem that we are now conscious that the way we live we will soon be unable to live. That is because we are fast destroying what sustains life on this planet.
3. It was fine when the population of the earth was less than a billion rather primitive and rather poor people. Their capacity to consume and to produce waste was quite limited. They were not numerous enough to use the natural resources of the world to the point of exhaustion and beyond regeneration.
4. But today we have more than six billion relatively rich people skilled in using the resources of the world in ways that can only speed up the exhaustion of these resources and outstrip the natural capacity for regeneration. Not only are the six billion people more skillful but each one has the capacity of a hundred or more primitive people in terms of their consumption of the resources in their environment.
5. We are particularly concerned today about the consumption of fossil fuel. In the early days of extracting petroleum from the bowels of the earth, we announce ourselves with huge flares from associated gas which we burnt from high towers over the oil fields. It was the natural way for getting rid of this by-product. We were not concerned about pollution or the heating of the atmosphere.
6. It was really quite harmless because we were not producing and consuming much oil at that time. Our wasteful burning of the gases then was not producing much heat or other harmful gases into the atmosphere either. We were therefore not concerned with pollution.
7. It took a long time for us to realise that the continuously bigger amounts of oil that we consume was affecting the environment in many ways. Not only were the associated gas flares heating and polluting the atmosphere but the huge number of motor vehicles and other combustion engines were also spewing out noxious gases into the air. Still we were not unduly worried.

8. It took the crazy environment NGO's to shock us out of our complacency. Since then the world has seriously tried to reduce pollution by various means.

9. With fossil fuels we had to improve the efficiency of combustion engines when the price of oil went up higher than we had ever experienced. This helped to reduce pollution as well. We improved the scrubbing of the polluting exhaust gases through better exhaust systems. As for the gas associated with the production of oil, ways were found for converting it into plastic materials. This started the petro-chemical industries which unfortunately resulted in the production of useful but non-biodegradable materials, which are another source of pollution.

10. But the increase in population and their increasing wealth created a craze for motor vehicles which lead to a new source of pollution from the combustion engines used in these vehicles. The resultant emissions polluted the air to unsustainable levels.

11. Developed countries then began to impose emission standards on motor vehicles. The standards were raised every year. With this the automotive industry began to seriously devise ways to reduce exhaust emissions. But still the number of motor vehicles being put on the roads negated the efforts at reducing pollution from exhaust gases.

12. Following this, heavy fines and charges were imposed to reduce the number of cars on the roads. In some countries cars with odd and even numbers were allowed to use the streets only every other day. Cars carrying less than full loads of passengers have to pay a fee to enter a specified urban area. Now in London, cars and other motor vehicles entering or operating within the city limits are charged very high fees. On the other hand, in order to encourage the usage of non-polluting electric and hybrid cars, exemptions were given these vehicles in the city.

13. This has stimulated the automotive industries to allocate funds for research into hybrid cars and electric cars. To date such cars carry a heavy price penalty of as much as 200%. This is due to the cost of the battery, which may be higher than the price of the car itself. They may be acceptable in rich countries but certainly not in poor countries. Even in the rich countries the automotive industries are asking the Government to subsidize the buyers.

14. The research into hybrid and electric cars by the automobile companies are still going on. It is their hope that the increasing demand would give them the volume to reduce their cost. They also expect to improve on the performance of the batteries with continued research. Although there are automobile companies which will be putting on the road electric cars and hybrid, their exorbitant price is not likely to result in their replacing the gasoline engines any time soon. So for a

long time reduction in pollution will have to depend on improving the efficiency of gasoline engine.

15. Another approach being tried by the auto manufacturers is to lower the weight of the cars. Greater use of aluminium might do this but the use of composites and carbon fibre holds greater promise. The advantage of aluminium is that it can be recycled but plastic cannot be easily disposed off. Burning plastic would give out noxious gasses like dioxin etc.

16. There is also a lot of research for alternative fuel. Vegetable oil like palm oil and jatropha oil are promising. But it seems clear that they cannot be produced in large enough quantities to replace petroleum. The acreage to be planted must be huge and must take up land now used for agriculture or forest lands which are equally precious. It is therefore unlikely that they will replace fossil fuel, though they may reduce the consumption slightly. Ethyl alcohol from sugar has been used but again the quantity is too small to reduce use of petroleum.

17. Hydrogen as a fuel sounds very attractive especially as the by-product of combustion would be water. In fact water would also be used to produce the hydrogen – and water is plentiful everywhere and is cheap. So far none of the hydrogen fuelled engines has really worked. Researches are still going on. If the hydrogen cannot at the moment be used as substitute for gasoline, it can be used for other purposes including for cutting steel in place of oxy-acetylene gas and for heating sea water for desalination.

18. Various improvements have been made for power generating in order to reduce the use of fossil fuels. Of the petroleum products gas is the preferred fuel as it is clean. But gas supply is limited. Coal is highly polluting despite improvements in the design of the furnace and using coal only in powder form. The site for coal fired, power plants are difficult to find because of the ease with which coal dust is blown to surrounding areas. Besides coal can catch fire spontaneously.

19. The best choice for power generation is hydro-power. The flowing water to drive the turbines is hardly ever exhausted. Once built it can go on generating electricity almost indefinitely.

20. The initial cost is usually very high but once built it would cost little to run or to maintain. This means that the cost of hydro-electric power to the consumer is very low. In addition it is very clean as all that happens for electricity to be generated is for the water to flow through the turbines.

21. Everyone should welcome hydro-electric power. But some environmentalists are objecting to it because of the need to cut down forest trees or to inundate the forest under water. Some people may even have to be evacuated to make way for the lake that will form because of the dam raising the

water level. A decision has to be made as to whether a country wants clean energy or it wants the preservation of the forests.

22. Those living in temperate climate are more fortunate as snow melts almost throughout the year to sustain the flow of the rivers and fill the dams. In the tropics the water to drive the turbines is less constant as it depends on rain. There will be times when the reservoirs will run dry.

23. On the Danube the hydropower is generated by the flowing water of the river. As there is a constant drop in the level of the flowing water along the river, low dams would be enough to give a head for the water to drive the turbines. In the Danube numerous such dams have been built to tap the flow of the river water. Since the Danube is also used as a waterway for boats, locks were built alongside the dam so as to enable boats to be raised or lowered to the upper or lower levels without having to interfere with the dams and the power plant.

24. The Perak river in Malaysia has been studied for this kind of power generation but the drop and the flow is not sufficient for this purpose.

25. Nuclear power was once regarded as the most reliable for electric power generation. But once uranium or other radioactive substances is activated there seems to be no way of deactivating them. Nuclear waste will still emit harmful radiation almost forever. The nuclear waste can only be reprocessed but cannot be disposed off in any way. Besides an accident involving a nuclear power plant can result in radioactive material being spread far and wide by the wind – as happened with Chernobyl. Burying the plant under huge quantities of concrete has not stopped dangerous radiation from harming people who have to oversee the plant which has ceased to operate.

26. Another source of pollution is from aircraft engines. The growth of air travel has put tens of thousands of large jet-engine aircrafts in the air at any given time. Much work has been done to reduce emission of smoke and other gases from the engines but because of the continued growth of air travel, the pollution is still considerable.

27. Lately new renewable fuel from plants have been tried. This may reduce the use of fossil fuel but not necessarily the polluting gases.

28. The invention of the micro circuit has saved enormous amounts of power. Where before much electricity was needed for the radio valves, now only minute amounts of electricity is sufficient to turn the on / off keys in the micro-circuit. Yet the amount of information that can be obtained via these circuits is literally unlimited.

29. The problem of pollution is really the problem of the high and rapid growth of the population of the world. Open fires did not pollute the air when they were few in number and widely separated. But when the population is very big and

concentrated and they all decide to burn their rubbish at the same time then the pollution becomes very severe and will cause everyone's lungs to be filled with dust from the smokes. When the burning is frequent the health of the whole population would be affected. Haze was unknown in Malaysia in the first half of the last century. Today, because of open burning of rice stumps after harvest, we see haze caused by smoke in the air during the post-harvest season.

30. It is the same with other kinds of pollution. It is the concentration and the frequency due to the increases of population everywhere that makes pollution a problem for the world today.

31. Clearly we have been seeing a great deal of innovation in the way we try to achieve sustainability in our environment. Innovation in reducing the consumption of fuel oil in particular has been made by scientists and researchers. Other kinds of innovation have also been tried. As world population increases and more living space is required, there must be more innovation in order to make life on earth sustainable. This will involve greater expenditure on research to reduce fuel consumption through greater efficiency of combustion engines of all kinds, discovering or developing less polluting fuels such as hydrogen, gas and water, easier and less costly methods of breaking up water molecules into hydrogen and oxygen, conversion of waste and plants into methane and other flammable gases, finding ways of harnessing wave and wind power to generate electricity, more usage of sunlight and development of better solar panels etc. etc.

32. The scientists and researchers must look into ways of enhancing existing power generation as well as finding and developing new ways of generating power.

33. In the attempt to attain sustainability through innovation Governments have a big role to play. By raising standards of subsidising the usage of hybrids and electric cars, awarding carbon credits to poor countries, subsidizing and directly financing research and innovations leading to more efficient use of fossil and other fuels, building of hydro-electric power plants etc. etc, Government can promote innovations for greater sustainability.

34. At the same time the private sector must devote a large proportion of their profits to similar researches.

35. Awards must be given for innovative ideas which can contribute towards reducing polluting emission from combustion engines, towards reducing use of fuel, toward developing materials and compounds which can absorb pollutants in gasses etc.

36. Not least will be the role played by the people themselves. They must be educated on the danger posed by pollution to sustainability, to their own lives in

fact. They must be made conscious of the role they can play in the reduction of waste. They must be prepared to spend some money in order to make their environment capable of sustaining a healthy life, as for example using the more costly electric and hybrid cars. The people must remember that in caring for the environment they are caring for themselves.
