

Editorial

Case for a Global Project on Green Drying Technologies

The roller-coaster ride we saw recently for oil price indicates clearly the high degree of risk involved in nearly total dependence of both the industrialized and emerging nations of the world on fossil fuels. The rising concern over climate change caused by greenhouse gas emissions due to human activities is another reason for looking seriously at renewable resources to drive our energy needs. Unfortunately, there is a direct correlation between energy consumption and quality of life. **Since fossil resources are limited and not widely distributed around the globe, it is obvious that sooner or later all societies must rely heavily on sustainable energy sources and also limit greenhouse gas emissions to mitigate disastrous climate change.** We must reduce the size of our massive carbon footprint without adversely affecting the quality of life for mankind. The cost of fossil fuels will head in due time. It is good to be prepared than sorry.

Drying is notoriously energy-intensive even if well designed and optimized. Of course, we must try to develop new and efficient drying technologies. However, currently we all tend to use fossil fuels to supply heat for dryers. So, there is a thermodynamic limit to thermal efficiency and hence carbon footprint of even the best designed and operated dryers. As fuel costs rise, which they inevitably will do in time, it will be necessary to resort to at least partial use of renewable resources including biomass. Currently, most dryers are not designed for “green” operation.

I would like to propose a global idea for a cooperative multi-nation, multi-university and industry project that examines Green Drying Technologies as a high priority. Such a project would examine the potential for design of dryers based on simultaneous use of solar energy using conventional as well as concentrating solar collectors, photovoltaics for electric power, wind turbines to provide electricity or air flow, thermal energy storage units to continue drying in the absence of solar radiation, etc. A systems approach is needed to arrive at a cost-effective optimized solution in the form of user-friendly software that can be applied in any part of the globe. Different research groups located in various parts of the world will provide to such a global project their expertise to identify and model the best solar collector, energy storage device, wind turbine combination, for example. In fact, a very large number of variants can be examined in such a scenario, e.g., a solar thermal system utilizing a solar pond, water tank, pebble bed, phase change material, etc. Indeed, quite possibly, a combination of different storage concepts may prove to be the optimal design for a specific application at a specific geographical location. Finally, one must also examine the cost-effectiveness of such a system in the local context.

It is easy to see that what I propose here is a massive R&D project. It will be difficult to handle it at one location in a reasonable period of time, hence my proposal for a Global Project. The outcome should be freely available to all countries regardless of their contribution to the project. By providing such green technologies to the developing world we would indeed be making an enormous contribution not only to raising the quality of life in poorer regions of the globe but also helping reduce environmental impact due to use of fossil fuels or wood, which causes deforestation.

I look forward to hearing what our readership thinks about such an idea. In a flat world with almost free cyberspace connectivity, such a project is feasible although definitely very challenging as well. Funding of such a “mega” project in the era of the “nano” will be a challenge. Global cooperation in the absence of sustained and adequate funding is a massive challenge by itself. What we are seeking is some sort of “academic charitable” organization and support from governments, industry and businesses around the world for common good.

Please drop an e-mail to me at mpeasm@nus.edu.sg with your ideas and suggestions on this theme.

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