**Energy Abundance and Energy Problems**

Helmut Burkhardt, Toronto, Ontario, Canada, 2015-05-02

In a scientific perspective there is no shortage of energy resources on Planet Earth. The clean solar power delivered to the Earth’s surface is 10 000 time more than the power humankind is presently derives from oil, coal, and nuclear resources together. In another perspective, the total power used by humankind today is equivalent to the solar power received by a square of only a 260 km x 260 km.

The technology to utilize this vast solar energy resource is available today and is improving rapidly. There are two technical options to cope with the intermittency of solar power: an integrated global electricity grid, and large scale energy storage. High voltage direct current transmission makes large area integration feasible. Molten salts, batteries, flywheels, hydrogen or in synthesized liquid or gaseous fuels are some of the technical energy storage options.

The economic hurdles for a transition to renewable energy are largely due to the resistance of the established energy industry whose financially strong lobby also contributes to the lack of political will for a transition. By contrast, climate change and other environmental concerns are driving forces for a speedy transition to a clean and more efficient world energy system.

A 2007 round table of over 30 energy and climate change experts has issued the ‘Wasan Action Framework on Climate Change and Energy’. In addition to listing the root causes of the problems the Roundtable’s unanimously adopted resolution states:

“WE PROPOSE A GLOBAL SOLUTION FRAMEWORK: We must begin immediately to

**a) curb overconsumption** and give priority to efficiency, conservation and the avoidance of waste

**b) promote lower birthrates** by empowerment of women through educational, economic and social measures, including access to birth control information and services

**c) focus globally and locally on developing low-impact renewable energy infrastructure and technologies** (e.g., small-scale biomass, geothermal, hydro, ocean energy, solar, wind) to their full potential, so as to avoid large-scale biofuel usage and nuclear energy

**d) reduce carbon emissions** by creating a just and universal framework through the implementation of appropriate incentives, government regulation, legislation and taxation

**e) preserve forests**, especially tropical rainforests.”

The full text of the Wasan Action Framework is available on the Internet at: <http://www.pugwashgroup.ca/events/documents/2008/2008.01.04-wasan-action-framework.pdf>   
The scientific reasons for avoiding land-based biofuel use can be found at:   
<http://www.pugwashgroup.ca/index.php/climate-change/97-physical-limits-to-large-scale-global-biomass-generation>

\*This note summarizes a PowerPoint Presentation scheduled for the World Federation of Scientific Workers Meeting in Barcelona, Spain, May 12-16, 2015