WORLD FEDERATION OF ENGINEERING ORGANIZATIONS
A member of the Scientific and Technological Major Group of the United Nations

Technological Communities Comment on NGLS Policy Brief #2 Recommendations on Energy

1. Background and Introduction:

WFEO, the STC Major Group member representing *the* Technological Communities, welcomes the invitation from the UN General Assembly Open Working Group on Sustainable Development Goals (OWG on SDGs) to offer comment.

A number of errors in the Policy Brief #2 produced by the UN-NGLS (United Nations Non-Governmental Liaison Service) for the UN General Assembly Open Working Group on Sustainable Development Goals (OWG on SDGs) have been identified. The Technological Communities wish to ensure that our colleagues at the United Nations have accurate and complete information about nuclear science and technology for their discussions on sustainable development.

The conclusions and recommendations in the NGLS Policy Brief related to nuclear energy lack important engineering and technological facts which we are providing in the following sections. We also consider that a number the conclusions and recommendations to be ungrounded, and not based on science or on factual evidence.

We do however welcome the NGLS suggestion for five objectives for Energy Policy. We would also draw attention to widely accepted need to balance; the environmental impact, the economics, with security of supply when developing and implementing energy policy. We also recognize that the application of nuclear energy has to sit within the menu of available sources for energy supply.

2. Energy supply and demand.

As UN Secretary General Ban Ki-Moon said in his vision for Sustainable Energy for All, "all energy sources and technologies have roles to play in achieving universal access in an economically, socially and environmentally sustainable fashion"[1]. The use of all feasible energy resources will be required in order to meet the world's huge growth of energy demand, and this not only will include technologies for energy efficiency and conservation, and advanced renewables, but also for cleaner, less carbon-intensive fossil fuel energy techniques, as well as safe and secure nuclear energy systems. Nuclear is a key contributor to a diversified energy strategy. Nuclear plays an important role in base load power production in areas of large populations and access to a power grid.

3. Nuclear energy can benefit the climate.

Net GHG emissions from nuclear electricity only result from the construction of the plant (embedded energy).[2]. The Intergovernmental Panel on Climate Change (IPCC) estimates that nuclear power has the greatest and the lowest cost for GHG reduction

[1] *Alexander Bychkov,* http://www.iaea.org/OurWork/ST/NE/Main/IAEA-NEWS/articles/2013-12-09-DDG.html
[2] *Climate Change and Nuclear Power,* International Atomic Energy Agency, 2012

potential in power generation[3]. Prominent climate scientists acknowledge the need for nuclear power as a way to address the problems of climate change. Climate modeling shows that only the lowest carbon emitting technologies have a good chance of delivering manageable climate outcomes.

4. Ability to compete with cost-effective energy sources.

Nuclear energy is an affordable, viable electricity solution with environmental advantages over fossil fuel.[4]. There are currently 14 countries building nuclear power plants. However, even where countries are increasing their nuclear electricity production, the pace at which the overall demand for electricity is increasing leads to the appearance of a reduced and declining role for nuclear power[5].

5. Nuclear power economic features.

Enabling effective financing is important for all energy sources. Subsidies exist in some form (e.g. tax credits, loan guarantees, consumer costs limitation) for most sources of energy production including fossil fuels. In fact, an analysis of energy subsidies in the US in 2010 identified that electricity produced from renewables received the majority of subsidy funding. In terms of dollars per kilowatt hour, subsidies for wind, solar and geothermal each significantly exceeded those for nuclear[6]. The economics of nuclear power electricity will clearly be a driving factor for the future of nuclear but there are no hidden costs: the costs for waste management as well as security costs are included upfront in the cost per kilowatt hour, including the waste fees that are based on known quantities and safe methods for management of radioactive waste.

6. Nuclear energy safety aspects.

Nuclear power is as safe, or safer, than any other form of energy. For example, in the U.S., there have been no deaths from radiation and no radiation-related health effects linked to the operation of nuclear power plants[7]. For both emerging and mature nuclear programs, safety remains a priority throughout the nuclear energy community. New inherent passive safety features have been introduced in the design of modern nuclear power plants, well before Fukushima, and professionals in the field continue to design improvements. Passive safety relies on natural physical processes like gravity and convection.

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[3] INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (PACHAURI, R.K., REISINGER, A. Eds.), IPCC, Geneva (2007) *http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm*

[4] *Average Operating Efficiency by Source of Electricity* Infographic, US Energy Information Administration

[5] World Energy Outlook 2012

[6] *Direct Federal Financial Interventions and Subsidies in Energy in Fiscal Year 2010,* U.S. Energy Information Administration, July 2011 (http://www.eia.gov/analysis/requests/subsidy/pdf/subsidy.pdf)

[7] Alan Waltar, PhD, *America the Powerless*, Cogito Books, Madison, Wisconsin, 1995 p 54

7. Management of radioactive waste.

Safe solutions for the management of waste produced from nuclear power exist. The record of the civilian nuclear power industry in safely isolating both low-level and high-level nuclear waste has been excellent. Used fuel is currently being safely stored. The U.S. National Academy of Sciences and Scientific Advisory Panels in every major country support geological disposal of such wastes as the preferred safe method for their ultimate disposal.

8. Small modular nuclear reactors.

The concept of small modular reactors (SMRs) enables universal energy access and ensures clean, safe, and locally appropriate energy generation. The potential use of SMRs is not in lieu of but rather to complement other generation types and provide base load energy[8]. This reactor-type offers benefits to areas where lack of transmission capacity requires stepwise development to provide reliable electricity access[9]. In contrast to most (large) nuclear power plants operating today, small modular reactors offer a greater range of power options for meeting local energy needs in conjunction with other available resources[10]. As local demand increases, the modular SMRs allow for incremental addition of capacity.

9. Conclusion / Summary

The Technological Communities support the use of nuclear energy to meet growing demand in the world and endorse programs to expand the peaceful use of nuclear energy while minimizing the safety and proliferation concerns. There is no scientific or technical basis to preclude nuclear from fulfilling an essential role in providing sustainable energy for all.

[8] http://energy.gov/ne/nuclear-reactor-technologies/small-modular-nuclear-reactors
[9] http://www.nei.org/Master-Document-Folder/Backgrounders/Policy-Briefs/Small-Reactor-Development-Advances-Energy,-Environmental Benefits in New Markets
[10] http://csis.org/publication/why-utilities-want-small-modular-reactors