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An international collaborative network of advanced scientific thinking

NGO in Special Consultative status with the Economic and Social Council of the **United Nations** (ECOSOC)

February 16, 2016

For the attention of:

The Hon. Navdeep Singh Bains, P.C., B.A., M.B.A., C.M.A.
Minister of Innovation, Science and Economic Development
Ottawa, Ontario

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Dear Mr. Bains:

As President of the **Planetary Association for Clean Energy (PACE)**, I wish to bring to your attention several decades of independent scientific research and of peer review into advanced clean technology. The objective of such analysis was to determine efficiency, universality, sustainability, ethics and affordability. Our independent, collective data show that emerging technologies are maturing into valid options for improved transportation, heating and other human needs, and that their introduction will benefit the economy, the environment and also public well-being.

A Short Introduction about PACE

Recognized as a NGO in special consultative status with the United Nations, the **Planetary Association for Clean Energy (PACE)** Inc. is an independent international collaborative network of advanced scientific thinking. It was conceived by **Parliament's** first woman Speaker, Senator **Muriel M. Fergusson**, and co-founded by scientist Senator **Chesley W. Carter**, M.Sc. while chair of 2 Senate standing committees on Science and Health in the early 1970s. With his stewardship, the PACE network confirmed the phenomena of acid rain and of ozone layer depletion for Canadian policy decision-makers, resulting in international treaties. It also facilitated the world's 1st "blue-bin" recycling initiative, in Ottawa.

With the **National Research Council of Canada**, and the personal intercession of the Prime Minister, the Rt. Hon. **Pierre E. Trudeau**, by July 1976 PACE founders gave the highest priority to identifying and reviewing [advanced clean energy technologies](#) – not only how they perform but also why they do so. The founders included Dr. **Marcel Vogel**, chief scientist at **IBM** (developed memory systems for computers) and Dr. **Henry K. Puharich** (MD, physicist, micro-electronics for hearing aids and water-as-a fuel-on-demand, and advancement analyses for **Pentagon's** Joint Chiefs of Staff and Senator Carter and Prime Minister Trudeau on worldwide, lossless transmission of electrical energy).

Furtherance of this [long-term peer examination](#) was made under contract to the Division of Energy, **NRC of Canada** in 1985 and involved 330 individuals in the PACE worldwide network, published as ***The emerging energy science***. These findings were echoed and confirmed by a multi-agency multi-million dollar initiative by the US government that was to identify which technologies would be required by America for world leadership into the next century, 2000 onwards.

We, therefore, have significant technologies to recommend.

Some of technologies are already manufacturer prototypes, others are independently verified by third parties and ready to be manufactured. With proper participation, most recommended inventions could quite rapidly be brought onto the public domain. Furthermore, a number of approaches for environmental cleanup require little in the way of cost or material. UN agencies, including **UNITAR / IATAFI**, have confirmed some of our initial observations¹

The main challenge is opening the minds of people to see that these low-cost interventions are effective, and that expensive measures will not be needed in many cases - with substantial value for widespread application at savings for the common good. Some of the advanced clean technologies are of potential application in federal strategies as announced for Iraq, Lebanon, Jordan and Syria in helping successfully accomplish aid missions in the rapid on-site provision of power, water, sanitation and clean-up.

We can supply documentation, descriptions and other data - to the extent that proprietary information and intellectual property are protected – for your due diligence. We fully expect this information to enable uptake of these proposals into policy by this government for implementation during your present term in public office. In 2007, we received an inquiry to model the potential scope of worldwide benefits provided from implementation of clean energy science & technology. For global clean-up and surface revitalization alone, we forecast over a 10-15 years, an international demand of about US\$ 150 billion, with the creation of about 650,000 jobs. By way of comparison, to attain a similar goal with current technology, the cost would exceed US\$ 2 Trillion. Canada's portion of this clean energy implementation

¹ **Beyond the remedial actions of conservation and environmental clean-up: The introduction of clean science and technology by governmental and societal agencies.** Submission. United Nations' World Commission on Environment and Development, Geneva, 1986. 4 p.
Una propuesta de tecnología escalar en materia de energía limpia. Proceedings. Jornadas Internacionales Multidisciplinarias Sobre Medio Ambiente y Contaminación por el Hombre. Universidad de Mendoza, Mendoza, Argentina, 1987. 10 p.
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Enhancing budgetary efficacy & outreach by promoting and applying clean energy science and technology. Submission: Pre-budget consultation to Hon. Catherine McKenna, Minister of Environment and Climate Change & F-P. Champagne, Parl. Sec'y, Minister of Finance, Ottawa. 2016. 2p.

opportunity could well exceed its proportion its 2% of the world's economy if your government determines that spearheading clean energy science and technology in appropriate policy: US\$ 3B, probably 32,500 to over 50,000 full-time jobs. Because most of the know-how would be "in-house": this estimate could then configure into US\$ 5 – 10B of the world's demand, and up to about 75,000 jobs. Similar types of new vistas are open for energy provision, for generation and deployment of clean on-site, on-demand, quality water (mostly from advanced atmospheric systems at costs and requirements well below current methods). So the potential of new development horizons and employment can accrue with each series of applications and good thorough planning.

In one suggestive, narrative scenario, such start-up would thoroughly confirm and assess, in terms of the community-involvement and deployment initiatives, the worldwide surface stress situation, optimize the various available alternative treatment protocols, assess their operational linkages to specific waste treatment strategies, design full-size remedial prototypes, conduct clean-up operations in a sampling of typical sites worldwide. During this period, testing and optimized protocol development would probably be conducted with the **City of Ottawa**, the Polish **Instytut Ekologii Terenów Uprzemysłowych**, Quebec's **Cité de la Biotechnologie de St Hyacinthe**, the Israeli **Ministry of Environment**, as well as others. Research and development co-operation would also be sought with a number of governmental, commercial, defence and academic institutions. In this scenario, such work with these parties would be only a continuation of existing relationships with the PACE network.

National Task Force scenario

One scenario involves, as first planned by several Senators after a national science policy review, a "**Futures Secretariat**" under the direct purview of the **Prime Minister's Office /Privy Council Office**. With the superimposition of the exercises with **National Research Council of Canada**, and international networking and consultation in our network, we consider the setting up of a "**National Task Force**". Its activities and nature as described below in two tables.²

NATIONAL TASK FORCE

Industry - R & D Laboratories / Centres of Excellence – Universities - Utilities

The steps of Technology Transfer for Clean Energy systems

• IDENTIFY

Scan Energy Systems which may serve national interests

• ASSESS COOPERATIVELY

*Determine scientific and technological **feasibility***

*Determine **economic desirability** on regional/national/international basis (e.g.: reduction of public & private debts)*

*Determine **environmental repercussions** on regional/national/international basis (including +/- factors)*

• COMMAND PROTOTYPES

***Test systems** within representative industry, R&D Laboratories, Universities, Utilities and custom-made fabricators*

• SIZE-UP

***Go ahead/abort** for each step & application level (climate, geography, bio-region, distribution, and infrastructure)*

Final evaluation** by additional considerations of **environmental, socio-cultural and human rights issues

*Weigh decisions against **ways & means** of various governments (balance of payments & intra-regional transfers)*

Verify industry training, tooling, timing, budgeting abilities

Verify universities and governmental structures ability to adjust

***Take procedural action:** taxation, regulatory mechanisms, standards that impede application*

² Adapted from earlier versions since our 1986 submission to the **United Nations' World Commission on Environment and Development**, Geneva

Earlier Energy Crises and the Federal Debt

A few decades ago, public debt soared noticeably as a result of oil-supply & pricing panic. Unable to accept alternatives to oil, and due to rejecting a major cost-saving proposal from PACE for electricity transmission without wires, the government was pressured into investing in nuclear plants. As no private-sector business wanted the extreme liabilities, building nuclear power stations entailed billions in public spending in unrecoverable costs and servicing debt. This resulted in radioactive waste buildup and conflicts over how and where to store it; nobody wants it in their backyard.

Often a toxic buildup has been left to worsen over time; the poor or minorities end up living beside the poisoned waterways and drinking contaminated water because those communities can't afford cleanup assumed to be very expensive. The old thinking has failed to bring affordable solutions. In particular, boil-water conditions on First Nations reserves have not been resolved. For this, a low-cost, on-site water generation (portable to community-level) approach from our network may be able to meet this need in a timely manner - without expensive, remote, treatment plants.

Increasingly, corrosion caused by acid rain, electron-stripping (material surface excitation from the wireless microwave technology, a roaring new phenomenon) is putting major infrastructure at massive risk. Potential instability of all tall buildings, bridge weakening, road, railway and pipeline degeneration and of many kinds of engineering installations are slowly being recognized. More rapid corrosion than previously seen puts severe pressure on budgets.

Either public money is expended preventively, and often, just upkeep of essential buildings, bridges and other structures, or it's spent on insurance payouts, healthcare costs and rebuilding, if the structures are allowed to collapse. PACE network is researching the new forms of corrosion and is exploring a system that may slow down corrosion and help restrain maintenance costs. Although successfully utilized, an anti-corrosion discovery is so far outside mainstream thinking that, again, it requires minds and political will open to new concepts. Meanwhile, monitoring structural safety and shoring up what can be saved until the solution is confirmed will be needed.

Contrary to assumptions, clean energy does not need to cost more. Since advanced clean technology does not sacrifice biological systems, it is compatible with sustainable agricultural production while supports general wellness.

Brighter Economic Prospects without Environmental Degradation & Corrosion

When Germany's leaders started to consider energy-paradigm transition, they found that clean energy would reduce those end-loaded costs which the oil, nuclear and chemical industries have handed down to us. Chair Prof. **Josef Gruber's Technical University of Hagen** econometric report for the federal government, and investigations by the **Chancellor's** office also noted significant saving for the national economy if pollution-caused corrosion and breakdown could be averted, not to mention discontinuing oil imports for which Germany had been dependent of foreign sources.

Hon. **Sheila Copps** had learned that it made economic sense for the country to have a clean environment. When she held the Environment portfolio under Prime Minister **Jean Chretien's** leadership, Ms Copps began working to convince the oil industry to clean up its act. Recently in a **CBC radio** interview, Albertan company spokespersons admitted that it was the extreme decline in oil prices that prompted their installing solar panels at oil rig sites. Thus they would still have something to sell, if the price dropped so low that they couldn't extract oil anymore and still make any profit.

A notable common denominator of advanced clean-energy technologies is that recently-invented materials have allowed devices to be built that were not possible in the past. Novel manufacturing processes designs can keep costs low and pricing competitive. Based on experience and demonstration projects undertaken so far, PACE can offer substantial savings both to the public purse and for businesses which build upon this emerging clean-energy paradigm. These clean technology inventions can greatly reduce the constant obligation of buying fuel, a cost formerly regarded as inevitable.

Opening the market to new clean technologies enables meeting & potentially exceeding greenhouse-gas reduction targets in both time and volume. Doing this in a way that helps poorer nations can also raise Canada's positive image.

If Canada provides a welcome mat to develop these new inventions and processes here, we can foresee the ability of all businesses to create large numbers of new jobs, more than replacing those lost when older products are discontinued.

In addition to newly-employed people having income to spend thus raising GDP, along with economic advancement of our country Canadians will enjoy improved quality of life. One of those improvements will be no longer inhaling exhaust from traditional combustion engines. Although catalytic converters did reduce visible smog, the noise of motors and blackened snow banks in winter remind urban dwellers that we are still breathing in by products of burning fuel. And thanks to that same mitigation technology which made exhaust less visible, we are now also inhaling nanoparticles of platinum, a metal not ideal for human respiratory health.

Advances in Process and Systems: examples confirmed by PACE scientific participants

1. Electrical Transmission cost savings

Traditional long-distance HV transmission lines cost at least \$1,000,000 per kilometre ³ even more than the dams or fuel-based generating stations. Over such distances, electricity loss occurs at a rate of about 30%, another cost that may be left off the books due to assuming this cannot ever be improved. A successful alternative which avoided that unseen cost was demonstrated over a century ago, in 1904, when the Tesla Magnifying Transmitter (**TMT**) sent electric power from Long Island to Los Angeles with a loss of only 2%.

In the 1986 – 87, through the intercession of PACE led by **West Virginia University's** Departments of Electrical and of Mechanical & Aerospace Engineering (with the world's largest independent research organization, **Battelle Institute** of Columbus, Ohio) ⁴ made to the Government of Canada the offer of a 2 -3 year test project to send 100 Megawatts -- a minimum commercial quantity - from ANY location in Canada (even NWT/Yukon) to their facilities in Morgantown. The consortium expected wireless transcontinental transmission to cost only US\$ 4.59 million dollars, i.e., less than the same as 1 kilometer of high-tension wiring and its supporting structures. For this lossless-transmission proof-of-concept project, no government money was to be involved. The **Gamma Institute**, **McGill University** and **Université de Montréal** reviewed and publicly endorsed the concept from both economic and environmental analyses. Other behind-the-scene sponsors for the day-long Ottawa panel review were the Board of Directors of **IBM**, Armonk and West Virginia Governor **Rockefeller**. A Montreal philanthropist was ready to pay the costs for the test project, which included building the transmitter and receiver. Mrs. **Mila Mulroney** and Hon. **Marcel Massé** asked for examination of the matter, so experts at **National Research Council** offered to complete a similar the same project for only \$300,000, using data from research at the **CN Tower** in Toronto. However, without giving any justification (or perhaps just unable to believe it could be done), officials rejected the free offer. Note that the US consortium observed in their lab physics analysis that the rate of power processed (rate of energy conversion) versus energy developed with the Tesla system has a power efficiency orders of magnitude superior of anything available today!

In 2001, a proposed Russian ⁵ update design for a near-lossless Europe-Asia "**SWEPS**" grid would connect 3 or more major solar power plants of equal capacity – located in Spain, Far Eastern region of Russia and in Astrakhan near the Caspian Sea. Its computer simulation model suggests that solar power could be generated 24 hours per day for 6 months annually, without the need of electric accumulators or night-time back-up electricity generation. During the winter months, electricity from solar power plants could be transmitted from Africa, India and Australia. Cost for Eurasian coverage: about US\$ 20 to 100 million (instead of billions of capital expenditure for current conventional technology).

2. Production of stand-alone electric energy

Enough electric power for typical Canadian dwellings -- from 15 to 20 kWh -- can be produced in-situ with advanced, light-weight, nearly maintenance-free, small-sized units which have already been invented. These include: ultra-efficient printed photovoltaic system (identified by the **Texas A&M University**, **Argonne Laboratory** and the **CIA** as the most efficient solar power generator, over 95% efficient, at about 2 cents/kWh); Motionless Energy Generator (MEG); advanced-materials frictionless wind turbines, and more. An end-user would make a one-time outlay, ranging from less than \$2,000 to \$5,000 (depending on which system is chosen) and be service for 10 – 20 years. Over that time and on

³ Three-phase AC 1,2MV - 10 GW - 1,000km extra-high-voltage power transmission lines cost US\$1,300,000/km, and the entire transmission system including transformer substations and electrical equipment costs \$5,100,000/km to install, as per Mogillis, - **Hydro Quebec**, IREQ -Varennes. 1991.

⁴ **Distribution of electrical power by means of terrestrial cavity resonator modes**. West Virginia University, December 5, 1986

⁵ **All-Russian Research Institute for Electrification of Agriculture** (before restructuring of pro-petroleum energy policy in Russian Federation).

top of financial savings due to not needing to buy fuel, there would be the peace-of-mind supply stability, even extreme weather, natural disasters, and other disruptions. On a vaster scale, such power availability would not disable bank machines, communications, food supply and, ultimately, national security.

3. Ultra efficient Propulsion technology for vehicles, transit, wheelchairs, aircraft, drones

Several PACE scientists consulted for this summary recommend adopting the **Thornson Drive**, a Canadian technology. Cost may be possibly less than \$1,000 per truck / bus engine. With an efficiency providing three times more power than a jet turbine engine, the propulsion system is remarkably noiseless, requiring very little input power, with excellent manoeuvrability and capability for lift. The system could find exceptional opportunities for carriers for the disadvantaged, for effortless all-terrain transport during natural disasters such as earthquakes, remote regions, including meltdowns of permafrost, etc. According to **NASA** analyses, 'star-light' energy would be enough to direct *Thornson-Drive*-fitted spacecraft in outer space.

4. Water as a fuel

Hydroxy gas, Brown's Gas, HHO, other names apply to this well-demonstrated resource. PACE co-founder **Andrija Puharich** drove several times his 3-bedroom motor home/lab, between Mexico to Canada, with a few litres of as-available water as its fuel source - no gasoline. In his design, pressing the gas pedal with a micro-electronic resonating system that creates the de-composed water gas on-demand, without storage. The **US Navy** wanted his phonon technology for noiseless subs, and **Rolls Royce** for their advanced turbines.

- In Australia, Prof **Yull Brown** demonstrated to NSW parliamentarians (and recorded in **Hansard**) a 4WD drive 1000 kilometres drive on 1 litre of tap water. Such systems are easy to retrofit in current engines.
- In the 1990s, **NASA** technology transfer regime offered to the US car industry to test such technology before some congressmen diverted the allotted budget. According to recently-declassified U.S. government documents, Brown's Gas was deemed to be the key energy, water generation and life-support system for self-sustaining lunar colonies as early as the late 1970s.
- In Germany, a favoured application was intended for neighbourhood central heating system for massive cost run-downs and greater reliability as well as efficiency in both a national econometric study and in a high-level federal department policy review.
- In Korea the Brown's Gas technology is favoured for large saunas, industrial scale BBQs, and incineration (both small scale as for hospital wastes or large scale regional municipality facilities) and has been awarded presidential prizes for excellence. A recently released study by a federal science centre has demonstrated remarkable improvement in fuel efficiency with the technology for engines.
- People's Republic of China has an interesting application, which it licences internationally, for on-demand desalination of seawater in mega vessels, saving space for cargo in lieu of tanks and ballast. It has been reported that several thousand post-graduates have been trained in the Brown's Gas technology for dozens of industrial applications.
- In Quebec, an innovation exercise Shawinigan within **Hydro Québec** considered this system as an energy storage modality when hydroelectric production is otherwise underutilized during summer for conversion into electricity during the lower electricity production winter phase when surface water freezes
- In Alberta, the **Alberta Research Council** reported exceptional thermal efficiency with the technology, almost at nuclear energy levels, with proprietary protocols. BTU efficiencies significantly exceed petroleum products. The technology could allow on-site reduction of bituminous oil sands, probably without surface disturbance and extraction of specific fuels-on-demand: a great bonus for environmental, climate-change and capital recovery.

The technology is exceptionally favoured for **magneto hydrodynamics (MHD)** for direct conversion to electricity, where it could be installed in refurbished aging nuclear reactors, with all the infrastructure for delivery intact, offering massive

reduction in budgeting as well as more power delivery – all with the bonus of atmosphere-neutrality that would very rapidly exceed climate-change targets.

5. Ultra-rapid on-site nuclear waste decontamination:

Protocols for about 10 methods of rapidly-reducing radioactivity to near-background levels are now well understood.^{6,7} A few years ago, **AECL Chalk River Reactor** engineer **Mark Porringa** successfully demonstrated several and reported on such protocols to Canadian and United States decision-makers. Concerted will for environmental protection may prod through-put. Efforts are continuing to enable implementation in several countries with radioactivity issues. Exceptional results have been obtained with “natural radioactivity materials” tests of NORM-contaminated petroleum fittings, water filtration equipments, fertilizer residues, etc. in drastically reducing their “half-life” emissions from billions of years to several hours in a British Columbia permit facility

Neutralizing radioactivity at near-zero cost will permit recycling of existing structures and infrastructure, and avoidance of long-term burdens for both public and private sectors. By achieving ultra-rapid, on-site decontamination from the Fukushima disaster, a Japanese consortium of academe/industry/government expects to enhance and accelerate return to civil society back to pre-disaster quality.

6: Waste water / waste ponds clean-up:

A “*pro bono*” concept demonstration conducted by PACE network in Poland enabled cleanup of WWII Soviet-military occupation sites where toxic chemical sludge had accumulated to a depth of as much as 7 meters. The successful protocols “tweak” Nature’s to catalyse restorative processes. For a few tens of thousands of dollars per site -- mostly spent on logistics of bringing equipment from Canada to Poland -- these toxic ponds became swimming-quality lakes within days to weeks. The Canadian embassy in Warsaw, as well as local/regional governments made big PR with the spectacular results. In contrast, the **European Union**’s conventional approach would cost over 5 million Euros per pond, with full or partial recovery not expected for at least a few years.

Yet in **Sydney, Nova Scotia**, when the same procedure was proposed for toxic ponds, there was rejection; likewise, more recently, for the well-publicized **Montréal** wastewater efflux into the Saint Lawrence River. Apparently experts-in-charge assume that only brute-force methods are effective against an unruly Nature. They tend to ignore the evidence for familiarity & current funding formula, for lack of the kind of political will expressed by Polish municipal & regional officials.

In Sydney, over a decade, vast amounts of cement and aggregate were poured into the tar ponds — and equally vast amounts of money. The expected cost was \$400 million: \$280 million federal, and \$120-million provincial funds. Solidified matter stopped movement of toxins but did not neutralize them. As containment erodes, the same compounds will start to leak out again. We might well wonder what will be possible to be done at that future time. So was that expensive, hard-measures method the best use of public money? If the Canadian people had been informed about the alternative proposal which had a track record of success in Poland, they might well have wanted their government to test that low-cost, Nature-friendly approach. We should also question the waste of all those construction supplies. Concrete of course requires beach sand, a finite resource which is being taken from sites around the world. (Though desert sand exists in abundance, it cannot be used for concrete.)

More recently, an Ontario municipal authority actively embraced new thinking. In autumn of 2015, prompted by urging from organic farmers in that area, the **Town of Hawkesbury**, Ontario began applying the PACE system for its treatment. That town should soon realize budget savings alongside promoting sustainable local & organic food production. That is the kind of integrative thinking needed to deal with many sites in rural and northern Canada where water-treatment plants really cannot be constructed.

⁶ **Advanced transmutation process and its application for the decontamination of radioactive nuclear wastes** Proceedings of Congress 2000, **University of Alberta** Edmonton, May 29-30, 2000

⁷ **Submission regarding Bill C-27 An Act respecting the long-term management of nuclear fuel waste:** Standing Senate Committee on Energy, the Environment and Natural Resources. May 23, 2002

PACE Request to meet the Minister, provide a briefing to members of Parliament

PACE stands ready to provide your Ministry with more details of the advances as researched by our interdisciplinary network over several decades. If such innovative solutions are included in your plans for a future diversified Canadian energy 'mix' less vulnerable to wide-area shutdown, we foresee significant budget savings as well as health in Canadian employment and businesses able to benefit from these opportunities. Toward this end, we request:

- 1) A meeting with you and your staff as soon as can be arranged concerning the realistic potentials for applying clean-energy technology into the Canadian national socio-economic mainstream.
- 2) An active role by your ministry, in coordination with the Minister of Environment and Climate Change, as well as the Minister of Energy, to schedule a Briefing to be given by PACE members. We propose giving a presentation to Parliamentary committees responsible for technological innovations, science, and climate change. Also the areas of resources and finance are intertwined with the issue of applied sciences emerging into the economy with new inventions.

Our presenters can describe in more detail the peer-reviewed documentation for the new inventions and approaches, such as those mentioned above, and outline expected costing for their implementation.

Please advise us of a date for our proposed briefing as soon as this is known, so that our associates can schedule their availability, and assemble briefing documents to be submitted to the appropriate clerk for translation and distribution to attendees. Holding this briefing in a Parliamentary Committee room will facilitate ease of access by all office-holders.

We urge that this presentation be made open not only to Parliamentary Committee members directly concerned with technology, innovation and the environment, but also to all interested MPs from any party in the House of Commons, and interested Senate members.

We indeed hope that the Right Honourable **Justin Trudeau**'s election promise of funding for clean energy technologies will be expressed in federal leadership at the level of R&D funding for breakthrough inventions. Attention from Cabinet ministers, it is to be hoped, will energize investors to participate in the emerging clean paradigm. This will improve access to the marketplace for new devices of the types we have investigated and found to be valid.

We look forward to receiving an invitation to a meeting with you concerning these discoveries.

Thank you for taking action to improve Canada's future economic and environmental outlook.

We thank you also for your response.

Yours sincerely,

Dr Andrew Michrowski
President