MINERALS COUNCIL OF AUSTRALIA

SUBMISSION TO THE JOINT STANDING COMMITTEE ON TREATIES ON THE AGREEMENT BETWEEN THE GOVERNMENT OF AUSTRALIA AND THE GOVERNMENT OF UKRAINE ON COOPERATION IN THE PEACEFUL USES OF NUCLEAR ENERGY

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INTRODUCTION

The Minerals Council of Australia (MCA) welcomes the opportunity to make this submission to the Joint Standing Committee on Treaties on the Agreement between the Government of Australia and the Government of Ukraine on Cooperation in the Peaceful Uses of Nuclear Energy (Australia-Ukraine Nuclear Cooperation Agreement).

The MCA is the peak industry organisation representing Australia's exploration, mining and minerals processing industry, nationally and internationally in their contribution to sustainable development and society. MCA member companies represent more than 85 per cent of Australia's annual minerals industry production and a higher share of minerals exports.

The MCA is committed to a uranium export policy that manages and actively reduces the risk of nuclear proliferation.

The MCA supports the export of Australian uranium to countries that agree to become parties to bilateral treaties which provide assurances that exported uranium and its derivatives cannot benefit the development of nuclear weapons or be used in other military programs.

The MCA considers the proposed Australia-Ukraine Nuclear Cooperation Agreement provides these assurances.

The opening of this market provides new commercial opportunities for Australia's uranium exploration, mining and export industries, which in turn provides broader economic advantages to Australia.

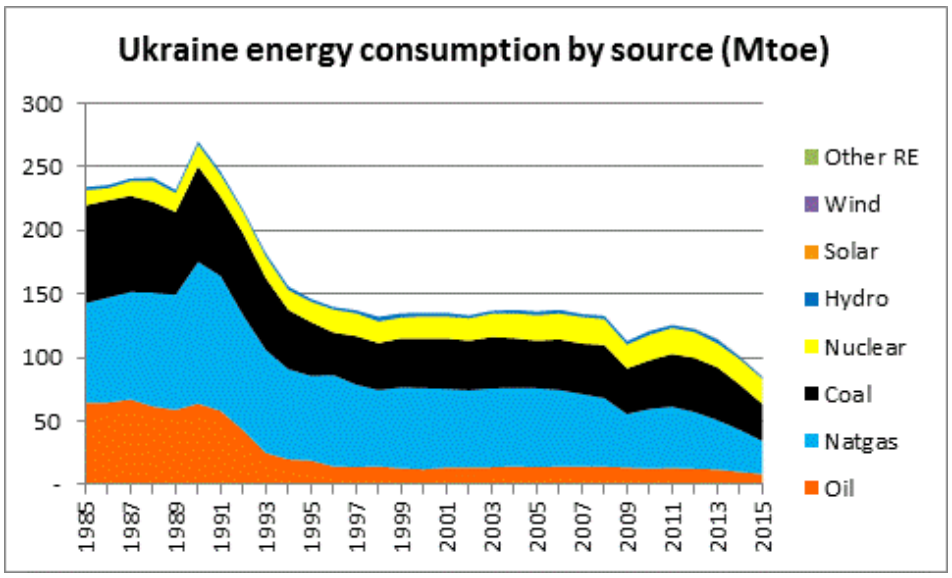
The MCA supports exports in accordance with the Australia-Ukraine Nuclear Cooperation Agreement for the following key reasons:

- Ukraine is today a large uranium-consuming, nuclear energy market and is projected to grow substiantially over the coming decades;
- Australia is a natural partner to help Ukraine meet its growing demand for uranium through its world class uranium industry and outstanding resource endowment;
- The Agreement meets the requirement to assure that exported uranium and its derivatives cannot benefit the development of nuclear weapons or be used in other military programs, and
- Australia can benefit economically through access to an additional market for its uranium which can generate jobs and export revenue.

ENERGY IN UKRAINE

Ukraine's energy use is heavily dependent natural gas, coal and nuclear energy. These three sources make up 88 per cent of Ukraine's total energy usage. Nuclear energy represents over 23 per cent of Ukraine's total energy usage, and around 43 per cent of Ukraine's electricity generation.

Figure A: Ukraine energy consumption (BP Statistical Review of World Energy 2016 data)[1]



Ukraine's primary energy supply is driven by the country's uranium and substantial coal resources. Gas and oil is mostly imported from Russia. Following the breakdown of the Soviet Union in 1991, the Ukraine economy collapsed and electricity consumption declined dramatically. The reduced electricity production was mostly from coal and gas plants.

In 2012, an International Energy Agency (IEA) review found that Ukraine faced 'unprecedented energy sector challenges' and that the country has 'the unique opportunity to undertake an energy revolution to modernise its energy sector, reform its energy markets, create employment and drive economic growth, which over the 1990s and 2000s, did not enjoy the same priority'.[2]

The IEA review notes that 'Energy policy in Ukraine is showing signs of a shift to foster the further development of domestic resources and to strengthen the energy market framework to European Union levels'.

The IEA offered a suite of recommendations to the Government of Ukraine including that it move towards a low carbon future. In addition, the IEA stated that the Ukraine should 'maintain a nuclear electricity capability'.

In April 2015, Ukraine launched a new energy strategy and a draft energy white paper outlining the country's long-term energy development priorities and how these will be achieved.[3]

The paper envisaged:

- Full-scale integration of Ukraine's energy sector into the European energy market;
- A resilient supply of energy built by reducing dependence on energy imports from monopolistic sources; and
- Technological upgrade of the energy sector.

[1] BP, *Statistical Review of World Energy Data*, June 2016
[2] IEA, *Ukraine 2012*,Energy Policies Beyond IEA Countries
[3] Energy Strategy of Ukraine through 2035, *White Book of Ukrainian energy policy*, Kyiv 2014

The paper stated that 'Ukraine is committed to using nuclear power to meet the needs of its national economy, seeing its stable operation as the necessary condition to ensure an adequate level of energy security and sustainable development of the country'.

In addition, the paper noted the importance of international cooperation with the world's leading companies; particularly with respect to nuclear fuel sources:

> The diversification of the routes and sources of energy supplies and of energy technology suppliers to the energy market of Ukraine have to become the priority of the country's energy policy. Ukraine's participation in the implementation of infrastructure projects carried out jointly with the EU that would improve the stability of energy supply to Ukrainian market and its energy security should be ensured as soon as possible. The enhancement of technical capacities and the development of organizational and institutional framework for cross-border energy trade with the EU countries will provide not only for the diversification of sources and routes of electricity, natural gas, oil and oil products supplies, but also for the technological integration of Ukraine into the European energy market. Expanding the use of nuclear fuel and technologies in cooperation with the world's leading companies will help reduce the critical dependence of the country's nuclear-powered complex on Russian nuclear technology.

NUCLEAR POWER IN UKRAINE

Nuclear energy commenced in Ukraine with the commissioning of the Chernobyl plant in 1977. Despite the accident in 1986, nuclear energy has continued to be a mainstay of power generation in the country, and has remained relatively stable following the break-up of the Soviet Union.[4]

Ukraine's 15 nuclear reactors across four sites are operated by state-owned NNEGC Energoatom. Two new reactors were added in 2005, replacing the closure of the remaining Chernobyl reactors. Today, Ukraine has the seventh largest nuclear reactor fleet in the world. All are Russian-built reactors. None of the current reactors are of the RBMK type built at Chernobyl.

Interruptions in natural gas supply from Russia in early 2006 highlighted the need for energy security and the role of nuclear power.

Ukraine's energy strategy is to maintain nuclear power generation at around 50 per cent of the country's electricity supply.

> The forecast of the further development of the nuclear energy sector for the period up to 2035 is based on the fact that the share of nuclear power generation in the electricity output will remain at about 50 per cent. It provides for life extension of the existing units and construction of the two units at the Khmelnitsky NPP site in the period up to 2025. The construction of new nuclear power units will be subject to the achievement of the operating nuclear power plants capacity factor of 80 per cent, if the capacity output of electric power lines and electricity exports are at the appropriate level.[5]

The report goes on to say that further priorities will be the production of its own nuclear fuel (except for uranium enrichment stage), commercial development of the manufacturing technologies necessary for zirconium products, the building infrastructure for spent fuel and radioactive waste management, and the enhancement of energy security via the diversification of nuclear fuel and technology.

The Energy Strategy of Ukraine report forecast nuclear power generating capacity rising from 13.8 GW in 2013, to 18.0 GW in 2035. In that period, nuclear power generation will rise from 83.2 TWh to 126 TWh, or close to half of the projected 276 TWh total electricity generation.[6]

According to the World Nuclear Association (WNA), Ukraine has 14 GW of planned or proposed reactors reflecting both expansion and replacement of scheduled closures. In July 2014, the Government affirmed the priority of nuclear power, and said that a western-designed reactor might be built in South Ukraine, which had sea access for large equipment.[7]

[4] World Nuclear Association, *Nuclear power in Ukraine*, 26 September 2016
[5] Energy Strategy of Ukraine through 2035, op cit
[6] Ibid
[7] World Nuclear Association, op cit

URANIUM INDUSTRY DEVELOPMENT IN AUSTRALIA

Uranium for electricity generation is one of Australia's most important and strategic energy and export assets.

Australia has the reserves and the capability to take advantage of both the expected growth in demand for uranium and the expected increase in uranium prices. Australia has about one third of the world's economically recoverable resources of uranium.

Uranium already comprises over 16.5 per cent of Australia's primary energy exports (2592 PJ in 2014-15) in thermal terms[8]. With more economically recoverable uranium than any other country, Australia has the potential to become a more significant provider of energy to a world already reliant on nuclear power to supply 11 per cent of its electricity.

The Australian uranium industry employs about 3,000 people directly and indirectly, mostly in remote areas of Australia where there are not abundant employment opportunities.[9] There is significant potential for expanding this employment contribution long-term, both from expansion of present mines and the establishment of new ones. There are a substantial number of companies looking to explore for and develop uranium projects in Australia.

In 2014-15, the export of 8,417 tonnes of uranium oxide concentrate was valued at $926 million.[10] The Office of the Chief Economist forecasts that Australian uranium exports will grow to 9,250 tonnes worth $1.073 billion by 2018-19.[11]

Growing global demand for uranium will play an increasingly significant role in Australia's economic and export future.

The Australia-Ukraine Nuclear Cooperation Agreement will open up a new and growing market for Australian uranium leading to more jobs, economic growth and export revenue.

Australia's current share of global production is around 11 per cent. However, its share of global resources is approximately 30 per cent.[12]

The difference between Australia's current share of global production, and share of global resource endowment, provides a real opportunity for expansion; generating jobs, export revenue and economic growth. This Agreement is a positive step towards realising that potential.

[8] Office of the Chief Economist, *2016 Australian Energy Update*, Australian Government
[9] Prof Sinclair Davidson and Dr Ashton de Silva, *Realising Australia's uranium potential*, Minerals Council of Australia, Oct 2015
[10] Australian Safeguards and Non-Proliferation Office (ASNO), *Annual Report 2015-16*, Australian Government
[11] Office of the Chief Economist, *Resources and Energy Quarterly, March Quarter 2016*, Australian Government
[12] World Nuclear Association, Supply of Uranium, Updated July 2016

UKRAINE URANIUM DEMAND AND AUSTRALIAN POTENTIAL SUPPLY

Ukraine has modest uranium resources – 222,700 tU according to the International Atomic Energy Agency (IAEA) Red Book 2014 – 59,600 tU of these recoverable at under US$80/kgU.[13] Mine production has been around 900 tU per annum over recent years.[14] This is equivalent to about 30 per cent of Ukraine's requirements.

The Vostochny Gorn-Obogatitel'niy Kombinat (VostGOK) has a plan to increase production by further developing the Novokonstantinovskoye mine. Novokonstantinovskoye is claimed to be the largest uranium deposit in Europe.

It is unclear how much domestic uranium Ukraine will be able to produce to meet its needs. Currently, domestic production is 70 per cent short of requirements.

The IAEA Red Book forecasts that Ukraine's annual reactor-related uranium requirements will expand by between 94 per cent (low case) and 114 per cent (high case), from around 2500 tonnes U in 2012-2013, to around 5,000 tonnes U in 2035.

Figure B: Ukraine annual reactor-related uranium requirements (IAEA Red Book)[15]

tonnes U	2012	2013	2015	2020	2025	2030	2035
	Actual	Actual	Forecast	Forecast	Forecast	Forecast	Forecast
Low case	2480	2480	2480	3020	3020	3600	4800
High case			3230	3600	3660	4800	5300

Along with Ukraine's inability to meet even its current requirements, Ukraine's interest in nuclear cooperation with Australia clearly signals that the potential for imported uranium and nuclear fuel remains substantial in the future.

An estimate of achievable volumes can be made by assuming that Ukraine will import half of its future requirements, and that Australia will supply between 10 per cent (Australia's current share of global uranium production) and 30 per cent (Australia's approximate share of global uranium resources).

With these assumptions, Australia could be exporting between 340 tU and 795 tU per annum to Ukraine by 2035. This volume represents between three and nine per cent of Australia's 2015-16 production.

Using the current market long term price of uranium as a conservative estimate of value, this would be worth US$20-65 million per annum.

In terms of employment, Australia's uranium industry currently creates around 3,000 direct and indirect jobs. A three to nine per cent volume expansion potentially generates up to almost 300 additional jobs.

[13] Joint Report by the Organisation for Economic Development (OECD) and the IAEA, *Uranium 2014: Resources, Production and Demand*, 2014
[14] World Nuclear Association, op cit
[15] Joint Report by the Organisation for Economic Development (OECD) and the IAEA, op cit

ENVIRONMENTAL BENEFITS OF URANIUM MINING AND NUCLEAR POWER DEVELOPMENT

Globally, the IEA's World Energy Outlook suggests that nuclear power generation will grow between 60 per cent on current policies and 152 per cent if additional climate management policies designed to keep atmospheric CO_2 within 450ppm are globally adopted between 2013 and 2040.[16]

The IPCC Synthesis report released on 1 November 2014 reinforces the need for energy systems to develop all low carbon energy sources. In modelling various scenarios, it concludes that the world's energy system needs:

> more rapid improvements in energy efficiency and a tripling to nearly a quadrupling of the share of zero- and low-carbon energy supply from renewable energy, nuclear energy and fossil energy with carbon dioxide capture and storage (CCS), or bioenergy with CCS (BECCS) by the year 2050.[17]

It also warns that limiting any low carbon technology options has dramatic negative effects.

The Australia-Ukraine Nuclear Cooperation Agreement will provide access to uranium for nuclear fuel for Ukraine and thereby give it security of uranium supply for its civilian nuclear power fleet. Furthermore, the expansion of Ukraine's civilian nuclear power is consistent with the IPCC's scenario calling for low carbon energy development.

[16] IEA, *World Energy outlook 2015*
[17] IPCC *Fifth Assessment Synthesis Report*, 1 November 2014

AUSTRALIA-UKRAINE COOPERATION AGREEMENT ARRANGEMENTS FOR SUPPLYING AUSTRALIAN URANIUM TO UKRAINE

The following table summarises Australia's uranium export policy[18] and how the Australia-Ukraine Nuclear Cooperation Agreement intersects with the policy.

Australia's policy	Agreement arrangements
Australian uranium may only be exported for peaceful non-explosive purposes under Australia's network of bilateral safeguards Agreements, which provide for:	Articles I(f), I(i), II(1) and X
• coverage by IAEA safeguards	Article XI(3)
• fallback safeguards in the event that IAEA safeguards no longer apply for any reason	Article XI
• prior Australian consent for any transfer of Australian-Obligated Nuclear Material (AONM) to a third party, for any enrichment beyond 20 per cent of uranium-235 and for reprocessing of AONM	Articles VII and IX
• physical security requirements	Article VI
Australia retains the right to be selective as to the countries with which it is prepared to conclude safeguards arrangements.	The Agreement does not affect, influence or impact Australia's rights to make agreements with any other countries.
Non-nuclear weapon state customer countries must at a minimum be a party to the Non-Proliferation Treaty (NPT) and have concluded a full scope safeguards Agreement with the IAEA.	Ukraine acceded to the NPT in 1994 as a non-nuclear state and signed a comprehensive safeguards agreement with the IAEA in 1995.
Nuclear weapon state customer countries must provide an assurance that AONM will not be diverted to non-peaceful or explosive uses and accept coverage of AONM by IAEA safeguards.	Article X, XI
Commercial contracts for the export of Australian uranium should include a clause noting that the contract is subject to the relevant bilateral safeguards arrangement.	Not applicable to Treaties
The Australian Government has further tightened Australia's export policy by making an Additional Protocol with the IAEA (providing for strengthened safeguards) a pre-condition for the supply of Australian obligated uranium to all states.	Ukraine signed an additional protocol with the IAEA in 2000.

The Australia-Ukraine Nuclear Cooperation Agreement can credibly assure that Australian uranium will be used for intended peaceful purposes only; especially power generation.

The Agreement will complement other such agreements covering 47 countries.

[18] Department of Foreign Affairs and Trade, *Australia's uranium export policy*, Australian Government, viewed 20 Oct 2016

UKRAINE'S PROLIFERATION RECORD AND NUCLEAR REGULATION

Proliferation

After the break-up of the Soviet Union, Ukraine inherited the third largest nuclear weapons stockpile in the world after Russia and the United States. It negotiated to repatriate nuclear warheads and missiles to Russia in return for nuclear fuel supplies. It became nuclear-weapon free in 1996.[19]

In implementing full nuclear disarmament, Ukraine is one of a few countries to have had nuclear weapons and to have de-weaponised.

Regulation

In 1996, the former nuclear operating entity Goskomatom established a new corporate nuclear utility, National Nuclear Energy Generating Company (NNEGC) Energoatom. By law, NNEGC Energoatom is responsible for the safety of all Ukrainian nuclear plants. Its main task is construction of new power capacities and life extension for the existing plants, procurement of new fuel and transportation of used fuel, establishment of the national infrastructure for management of irradiated fuel, ensuring physical security of nuclear power facilities, and professional training and development of personnel. Energoatom's initial priorities were to increase safety, increase load factors to 83-85 per cent, and extend the working lives of the reactors by 10-15 years.

Goskomatom was replaced by two Departments within the Fuel & Energy Ministry: a Department for Nuclear Energy, responsible for civil nuclear power plants operation, and a Department for Atomic Industry, responsible for the development of nuclear fuel cycle.

The regulator, the State Nuclear Regulatory Inspectorate of Ukraine (SNRI or SNRC), is an independent authority today. Until 2001, it was under the Ministry of Environment Protection & Nuclear Safety.

In March 2015, SNRI was accepted as a full member of the Western European Nuclear Regulators' Association (WENRA).

The 1995 law on Nuclear Energy Use and Radiation Safety establishes the legal basis of the industry and included a provision for the operating plant to have full legal responsibility for the consequences of any accident. The 1995 law on Radioactive Waste Management complements this, and the consequent state program was approved in 2002.[20]

In August 2015, World Nuclear News reported that the completion of the nuclear safety upgrade program underway would be delayed to from 2017 to 2020. The upgrade program takes into account IAEA recommendations and has been reviewed by Ukraine's nuclear regulator with assistance from the European Commission to ensure internationally acceptable safety levels. [21]

[19] Nuclear Threat Initiative, *Ukraine*, updated November 2014
[20] World Nuclear Association, op cit
[21] World Nuclear News, *Ukraine aims to complete safety upgrade program by 2020*, 7 August 2015

CONCLUSION

MCA commends the Australia-Uranium Nuclear Cooperation Agreement to the Committee on the basis that:

- The Australia-Ukraine Nuclear Cooperation Agreement will continue to support Ukraine's continued economic growth;
- Australia, with its large uranium endowment, and some of the 'world's leading companies' in uranium mining, is a natural partner to support this growth in demand with responsible and sustainable uranium exploration, development and mining;
- The Agreement meets the requirement to assure that exported uranium and its derivatives cannot benefit the development of nuclear weapons or be used in other military programs; and
- Australia stands to potentially generate sustainable additional employment and export revenue with the successful implementation of this Agreement.

The MCA appreciates the opportunity to provide these comments. Should you require any further explanation of the issues raised in this submission, please do not hesitate to contact me on Daniel.zavattiero@minerals.org.au or 03 8614 1813.