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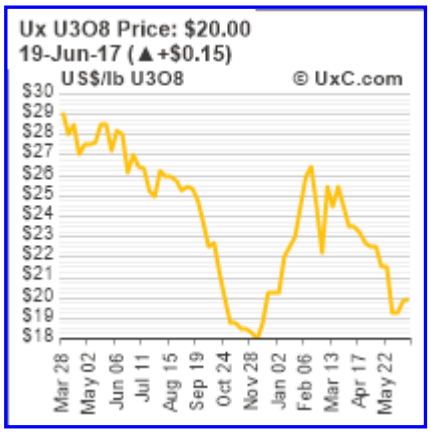
Uranium Market Outlook

Marino G. Pieterse, publisher and editor



►Ongoing bad market sentiment should not interrupt a pro-active advanced development strategy

Optimism about a recovery of the U3O8 spot price, after production has been curtailed by major uranium producers Cameco and Kazatomprom, has appeared to be premature since a recovery from a November 28, 2016 low of $ 18.00/lb to an interim high of $ 26.50/lb on February 6, 2017, was followed by a new correction to a current level of $ 20.00, This feeds growing scepticism on a full recovery of U3O8 prices within the next few years to a pre-Fukushima level of $ 65-70/lb.

Consequently, with economically viable feasibility studies calculated at a 100% plus price level compared with today's U3O8 prices, the Net Present Value of advanced development projects does not show a fair value and this should be adjusted accordingly.

OVERVIEW of U3O8 PRICES

	Spot		Long-term		Spot	Long-term
2017						
June 19	20.00		32.50	**Year-end 2016**	**20.25**	**30.00**
May 29	19.25		32.50	Year-end 2015	34.25	44.00
May 1	22.50		33.00	**May 31, 2015 (year high)**	**39.50**	50.00
March 27	24.50		33.99	Year-end 2014	35.50	49.00
February 28	22.25		32.50	**May 14, 2014 (year low)**	**28.25**	49.00
February 6 (high)	**26.00**		32.50	Year-end 2013	34.50	50.00
January 31	24.50		32.50	Year-end 2012	43.50	56.50
January 9	22.00		30.00	Year-end 2011	61.75	64.00
2016						
December 26	20.25		30.00	Pre-Fukushima accident		
December 14	18.75		30.00	March 11, 2011	67.75	73.00
November 28	**18.00**	*	33.00			
October 31	18.75		35.50			
September 26	23.75		38.00			
August 29	25.25		38.00			
July 25	25.00		40.50			
June 27	27.00		40.50			
June 20	26.15		41.00			
May 30	27.25		41.00			
April 25	27.50		43.50			
March 28	29.15		43.50			
February 29	33.50		44.00			
January 31	34.75		44.00			

** spot price 12- year low*

I already referred earlier to the negative operating cash flow of Cameco, as the world's largest and Canada's only uranium producer, as well as the original four US-focused producers including Uranium Energy, Energy Fuels, Ur-Energy and Peninsula Energy. Of these companies Uranium Energy had to stop production in 2016 and was not able to derive income from long-term delivery contracts like the other three companies.

The consequence is that current uranium producers depending on their respective cash costs require an U3O8 sale price of at least $ 40-50/lb by next year to limit operational losses and keep access to additional funding. This will further dilute the market valuation of the Western producers, which also include ERA, focused on Australia (68.4% owned by Rio Tinto Group) and Paladin Energy (75% of its Langer Heinrich mine optioned to National Nuclear Corporation (CNNC) of China).

The same situation affects the valuation of the flagship properties of advanced development companies, in which respect it has to be noted that most of these companies had postponed their activities instead of further advancing their projects to shorten the period of production under better market circumstances.

Paris Climate Agreement confirms essential contribution of nuclear energy as the only large-scale source to limit global warming

On 4 November 2016, the Paris Climate Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) entered into force, dealing with greenhouse gas emissions mitigation, adaptation and financing starting in the year 2020.
The aim of the convention is holding the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognising that this would significantly reduce the risks and impacts of climate change.

The contribution that each individual country should make in order to achieve the worldwide goal are determined by all countries individually and called "nationally determined contributions (NDCS).
The contribution should be reported every 5 years and are to be registered by the UNFCCC Secretariat.
Countries can corporate and pool their nationally determined contributions.

With 195 countries having adopted the first-ever universal climate agreement on 12 December 2015 and entered into force on 4 November 2016, which sets out a global action plan to put the world on track to avoid dangerous climate changes by limiting global warming to 1.5C, executing the plan is jeopardized by a variety of national directives in many countries to cut CO2 emission through the transmission of electricity generating from fossil fuels to renewable energy and also recognizing the essential contribution of nuclear energy as the only large-scale alternative to replace fossil fuels.

In other words, it will not be possible to change the current mix of energy sources of major industrial countries, applying both to the United States and Europe, in particular Germany, and emerging countries, led by China, India and Russia, with most of these countries heavily dependent on coal energy as the dirtiest energy provider.

In this respect, it is noteworthy that the Kyoto Protocol in 2009, which targets a 20% cut in CO2 emission by 2020, did not result in any improvement to date and the situation actually worsened due to the rise of worldwide industrial output, with the United States and China the biggest climate contaminators.

On the side line of the Paris Agreement nuclear energy remains an essential component in the action plan, thereby recognizing that in the Western world the share of nuclear energy is approximately 30% of total world consumption and approximately 11% worldwide.
With China and India representing only 2.6% and 3.5% respectively, these countries have ambitious plans to multiply the share of nuclear energy in total energy consumption. In addition, a growing number of emerging countries have planned construction of nuclear plants to diversify their pallet of energy providers.

In this respect, it is noteworthy in memory of Tsjernobil in 1996 due to human failure and strengthened by the Fukushima disaster in March 2011, these two disasters have fed out-dated views on the safety and environmental impact of nuclear reactors, thereby not recognizing that today's third generation of nuclear reactors meets the highest possible safety requirements and also the disposal of nuclear waste fully secured under governmental supervision.

European Union, profiles itself as a leader in promoting action on climate change but does not act accordingly

Already in March 2007, the European Council endorsed the European Commission's Strategic Energy Review and agreed on a unilateral cut of 20% in EU greenhouse gas emissions by 2020, relative to the 1990 levels. The Council also set a target of meeting 20% of EU energy needs from renewals by 2020, leaving individual countries to decide their own policies in such a way as to allow nuclear power as part of their energy mix to be taken into consideration in allocating individual country targets for renewables.

The Council noted the European Commission's assessment of the contribution of nuclear energy in meeting the growing concerns about safety of energy supply and CO2-emitting energy source.
The 2008 policy was set "20-20-20" – 20% reduction in CO2 emissions, 20% of electricity from renewable and 20% improvement in energy efficiency by 2020.

The European Commission's 2030 Policy Framework for Climate and Energy in January 2014 moved away from major reliance on renewables to achieve emission reduction targets and allows scope for nuclear power to play a larger role. The board is focused on CO2 emission reduction only, not the means of achieving that, and allows more consideration for cost-effectiveness.

The centrepiece is a binding 40% reduction in domestic greenhouse gas emissions by 2030 (compared with the Kyoto Protocol in 1990 baseline). This will require strong commitments from the 27 EU member states, after Brexit.

Overview of world power reactors and envisaged future reactors

May 1, 2017	Nuclear electricty generating in 2016 (billion kWh)	in % total consumption	Operable reactors	Under construction	Planned	Proposed	Uranium required 2017 (in tonnes U)
Country							
China	**210.5**	**3.6**	**36**	**21**	**41**	**174**	**7,757**
India	**35.0**	**3.4**	**22**	**5**	**20**	**44**	**1,091**
Russia	**179.7**	**17.1**	**35**	**7**	**26**	**22**	**7,767**
USA	**805.3**	**19.7**	**99**	**4**	**16**	**19**	**17,847**
Japan	*7.5*	*2.2*	***3***	-	-	-	*2,517*
x *before Fukushima accident 42 operable reactors; 4 reactors restarted; 23 reactors in the process of restart*							
European Union	**773.8**	**NA**	**122**	**4**	**9**	**12**	**17,266**
of which 70% applies to:							
France	*384.0*	*72.3*	*58*	*1*	-	*1*	*9,216*
UK (before Brexit)	*65.1*	*20.4*	*15*	-	*4*	*9*	*1,480*
Germany	*80.1*	*13.1*	*8*	-	-	-	*865*
Subtotal	**2,004.3**		**314**	**41**	**112**	**271**	**51,728**
World total	**2,490.0**	**11.5e**	**447**	**59**	**164**	**372**	**67,867**
China, India, Russia, USA and EU in % of world total	**81**		**70**	**70**	**68**	**73**	**76**
source: WNA							

US leadership on climate change not affected by withdrawal from Paris Climate Agreement

The **United States** is the world's largest producer of nuclear energy, accounting for more than 30% of worldwide nuclear generation of electricity. The country's 100 nuclear reactors produced 805 billion kWh in 2016, 19.7% of total electricity output.

In 2016, total US electricity generation was 4,079 TWh (billion kWh) net, of which 1,380 TWh (34%) of it from gas, 1,240 TWh (31%) from coal-fired plant, 805 TWh (19.7%) from nuclear, 266 TWh (6.6%) from hydro, 226 TWh (5.5%) from wind and 117 TWh (3.2%) from other renewables.

Annual electricity demand is projected to increase to 5,000 TWh in 2030.

Following a 30-year period in which few new reactors were built, it is expected that 4 more new units will come online by 2021, these resulting from 16 licence applications made since mid-2007 to build 24 new reactors. Government policy changes since the late 1990s have helped pave the way for significant growth in nuclear capacity.

President Trump's decision to withdraw from the Paris Climate Agreement on climate change has been branded as an infamous inhumane decision in the fight of slowing the effects of climate change through cutting down on greenhouse gas emissions. Withdrawal from the agreement does not change the position of the US as world leader in the development of global clean energy, however, thereby to be recognised that clean energy not only comprises renewable energy but also nuclear energy as the only large-scale CO2 emission free electricity generator.

In this respect, it is absurd to watch that China, once an obstructive force in the United Nations climate talks, as the world's largest CO2 emitter with 73% of its electricity generated from coal, has set itself up as the global new leader to combat air pollution and has signed an agreement with the state of California to cooperate on clean emission trading and other climate-positive effects.

Consequently, nuclear energy and renewable energy in the US adds up to 1,414 TWh from clean energy or 35% of total electricity generating.

While by far most industrial countries have signed the Paris Climate Agreement, these countries are either in a position comparable to the US that a significant share of total clean energy generation as already available through nuclear energy generation or are obligated to make a full transition right from the beginning, which in practice is unrealistic. This in particular applies to emerging independent countries in Eastern Europe being almost totally dependent on fossil fuels and in particular coal.

With Germany having made a decision to fully phase out nuclear to address the Energiewende to new energy, not avoiding to remain heavily dependent on coal and the import of nuclear energy from France, the conclusion can only be that bureaucratic Europe will not be capable to meet the CO2 emission free targets set by the Paris Climate Agreement.

In the **European Union** and in the United Kingdom, there are 128 nuclear reactors operating of which 58 reactors in France, representing 48% of the total EU operating reactors are the more illustrative example that politically left mining approach against nuclear energy as the only large-scale source of emission free electricity generating, is dated by not recognizing the technical and innovative evolution in the nuclear industry.

This is underlined by the introduction of a second and third generation of nuclear reactors, which have satisfied ultimate safety and environmental requirements, and is not only being fully recognized by the United States and major emerging countries, led by China, but also in Japan. Despite the Fukushima disaster in March 2011, Japan has planned to restart 28 of its nuclear reactors, which offer a mature viable clean and cost-effective alternative for fossil fuels, and have a positive impact on securing economic growth.

In this respect, it has to be noted that the EU follows a controversial energy policy by allowing its member countries to follow independent strategies, as demonstrated by conflicting energy policies of France and Germany, and the UK in favor of nuclear energy, against Italy abandoning nuclear energy.

The established nuclear trade body of the EU, **Foratom**, that works on a revised version of Illustrative Program for Nuclear Energy, known as **PINC**, recommends to the EU to facilitate nuclear development projects by providing a stable regulatory and investment frame work given the importance of nuclear power for achieving its climate action goals as set by the **Paris Climate Agreement**.

European Union: 128 nuclear reactors operating in 14 countries

	Number of reactors	in percentage of total electricity generating
France	58	76.3
UK	15	18.9
Sweden	9	34.3
Germany	8	14.1
Spain	7	20.3
Belgium	7	37.5
Czech Republic	6	32.5
Finland	4	33.7
Hungary	4	52.7
Slovakia	4	55.9
Romania	2	17.3
Bulgaria	2	31.3
Slovania	1	38.0
the Netherlands	1	3.7
	128	

No nuclear reactors operating in 14 EU countries
Italy
Portugal
Poland
Ireland
Croatia
Austria
Denmark
Luxembourg
Greece
Estonia
Latvia
Lithiania
Malta
Cyprus

Expecting at least 14 EU member states to follow the PINC program, which is in accordance with the current number of 14 countries operating nuclear reactors, but considering the Brexit, Germany phasing out its reactors, and France lowering its number of plants, the table below shows that the EU would be almost fully dependent on increasing nuclear energy capacity in Eastern European countries that besides geopolitical turmoil in some of these countries are economically not in a position to carry out a successful transmission from fossil fuels to nuclear energy and renewables.

Expected strong future growth of nuclear demand is not anymore determined by the US and EU, but by China, Russia and India. Nuclear electricity generating in 2016 in the US was almost five times higher than in China and more than doubled combined nuclear electricity generating from the three emerging countries combined. It was 4% higher than in the EU, dominated by France, representing a share of approximately 50% of total EU nuclear energy generating.

While the United States is anticipated to consolidate a 19%-20% share of nuclear in total electricity generating, in Western Europe nuclear energy generating will come under pressure which will be politically offset by the construction of nuclear reactors in Eastern European countries.

In 2016, the US and European Union required 17,847 tonnes uranium and 17,266 tonnes uranium, respectively, compared with a combined uranium requirement of 16,615 tonnes uranium for China, India and Russia.
Based on these three countries having a combined 33 reactors under construction and 87 reactors having planned, this requires annual uranium demand to grow by 14,000 tonnes in the next five years.

► Worldwide nuclear capacity continued to grow in 2016; WNA targets nuclear energy to provide up to 25% of total electricity in 2050

Global nuclear generating capacity increased slightly in 2016 to 291.6 GWe net, up from 382.2 GWe at the end of 2015. Ten new nuclear power reactors with a combined generating capacity of 9,479 MWe came online in 2016. Five of these were in **China**, one in **South Korea**, one in **India**, one in **Pakistan**, one in **Russia** and one in the **United States**.
China started construction of the 1,080 MWe Tianwan 6 and the 1,150 MWe Fangchenggang 4 during 2016. In addition, China General Nuclear also started construction of a 60 MWe floating nuclear power plant project.
Construction was also started last year at unit 3 of **Pakistan**'s Karachi nuclear plant, where work on unit 2 began in 2015.

Three power reactors with a combined capacity of 1,402 MWe were officially shut down in 2016. These were Ikata 1 in **Japan**, Fort Calhoun in the **US** ad unit 3 of **Russia**'s Novovoronezh plant.

At the end of 2016 there were 447 reactors operable around the world totaling 391.4 GWe net, and 60 under construction (64.5 GWe gross). This compares with 439 reactors in operation at the end of 2015, with a total 382.6 GWe.

The World Nuclear Association ("WNA") has developed its own vision for the future of electricity, referred to as Harmony. This is based on the International Energy Agency's 2-degree scenario which aims to avoid the most damaging consequences of climate change and required a significant increase in nuclear energy. The Harmony goal envisages a diverse mix of low-carbon generating technologies deployed in such a manner that the benefits of each are maximized while the negative impacts are minimized.

WNA's goal for nuclear is to provide 25% of total electricity generating in 2050 is based on the nuclear industry capable of adding 50 GWe of capacity in 2015-2020, 125 GWe in 2020-2025 and 825 GWe in 2025-2050.

China to complete 5 nuclear reactors in 2017 and double nuclear power generation to about 58 GWe by 2020

According to **China**'s the 13th Five-year plan for power production announced by the National Energy Administration (NEA) in November 2016, by 2020 coal capacity will be limited to 1,100 GWe by cancelling and postponing about 150 GWe of projects.
Gas in 2020 is projected at 110 GWe, hydro 340 GWe, and wind 210 GWe.

Nuclear 58 GWe was reiterated for 2020. Clean energy 770 GWe will then produce 15% of electricity

BP's most recent Energy Outlook 2035 projects that **China** in that year will become the world's largest energy importer, overtaking Europe, as import dependency rises from 15% to 23%. China's energy production rises by 47% while consumption grows by 60%.
China's fossil fuel output continues to rise with increases in natural gas (+200%) and coal (+19%), more than offsetting declines in oil (-3%).

China's CO2 emissions increase by 37% and by 2035 will account for 30% of world total with per capita emission surpassing the ECD by 2035.

China will complete construction of 5 nuclear reactors and start construction of 8 more in 2017, according to plans released by the county's National Energy Administration (NEA). Planning for a further 8 reactors will also be processed this year.

In its Energy Work Guidance Opinion for 2017, the NEA said construction will be completed of the Sanmen 1 and Haiyang 1 **AP 1000 units**, the Taishan 1 **EPR** and the Fuqing 4 and Yangjiang 4 **CPR-1000 units**.
The Administration plans to start construction of 8 units during this year, but did not name them or state the type of reactors they will feature.
Preparatory work is also to be carried out this year on a further 8 units. These include units 3 and 4 of Sanmen, Ningde units 5 and 6, and 2 units each at new plants at Zhangzhou in Fujian province and Huizhou in Guangdong province.

Together with other projects, these will add 9,86 GWe of nuclear generating capacity.
The NEA also said China will promote the export of its nuclear power technology.

China's operating nuclear generating capacity will double to at least 58 GWe over the next 5 years under the country's 13th Five-year Plan, then up to 150-250 GWe by 2030, and much more by 2050.

The grid system run by the State Grid Corporation of China (SGCC) invested CNY 500 billion ($ 75.5 billion) to extend the UHV grid to 40,000 kilometres and in 2015 it planned to spend CNY 420 billion, 24% up on 2014.

The 13th Five-Year Plan from 2016 includes spending $ 368 billion on smart grids, UHV grids and distribution.
By 2020, the capacity of the UHV network is expected to be some 300 GW, which will function as the backbone of the whole system, connecting 6 regional clusters.

Overview of major listed global uranium companies

		Trade symbol		Share price		Change	12 months		Shares	Market capitalization	
				June 15	year-end	in %	H	L	issued	million	
U.S.				2017	2016		C$	C$	million	local	US$
Producers:				US$	US$		US$	US$		US$	
Uranium Energy	1)	AMEX	UEC	1.360	1.120	21	1.920	0.760	138.4	188.2	188.2
Energy Fuels	2)	NYSE MKT	UUUU	1.550	1.640	-5	2.870	1.290	70.2	108.8	108.8
Ur-Energy	3)	NYSE MKT	URG	0.590	0.530	11	0.910	0.406	145.9	86.1	86.1
Peninsula Energy	4)	NYSE	PENMF	0.260	0.380	-32	0.580	0.240	229.6	59.7	59.7
Canada				C$	C$		C$	C$		C$	
Cameco	5)	TSX	CCO	12.130	14.040	-14	17.650	9.880	395.8	4,801.1	3648.8
Australia				A$	A$		A$	A$		A$	
Energy Resources of Australia	6)	ASX	ERA	0.500	0.440	14	0.770	0.330	517.7	258.9	196.7
Namibia				A$	A$		A$	A$		A$	
Paladin Energy	7)	ASX	PDN	0.050	0.090	-44	0.250	0.050	1,713.0	85.7	65.1

1) ISR production commenced in November 2010; no production since 2014
2) Acquired in May 2012 all of Denison Mines' US uranium assets in exchange for 425.44 million shares valued at Cdn$ 81 million; including takeover of Uranerz completed on June 19, 2015
3) ISR production commenced in August 2013
4) First ISR production commenced in December 2015
5) Also uranium production in US and 40% interest in China in Inkai Joint Venture (60% Kazatomprom)
6) 68.4% owned by Rio Tinto Group
7) 75% of Langer Heinrich Mine optioned to CNNC of China.

World's Top-10 listed uranium exploration/development companies focused on traditional countries

	Trade symbol		Share price 15/6/2017	Country focus	Market valuation US$ million	local
NexGen Energy	TSX.V	NXE	C$ 2.89	Canada	674	886.9
Denison Mines	TSX	DML	C$ 0.56	Canada	238	313.1
Fission Uranium	TSX	FCU	C$ 0.58	Canada	214	281.1
UEX	TSX	UEX	C$ 0.20	Canada	47	62.3
Toro Energy	ASX	TOE	A$ 0.03	Australia	46	60.2
Boss Resources	ASX	BOE	A$ 0.05	Australia	38	49.5
Vimy Resources	ASX	VMY	A$ 0.15	Australia	36	47.5
Laramide Resources	TSX	LAM	C$ 0.32	Australia/USA	28	36.8
Western Uranium	OTC	WSTRF	US$ 1.01	USA	20	19.8
Kivalliq Energy	TSX.V	KIV	C$ 0.10	Canada	18	23.5
Total market capitalization					**1,359**	

World's Top-10 listed uranium exploration/development companies focused on emerging countries

	Trade symbol		Share price 15/6/2017	Country focus	Market valuation US$ million	local
Berkeley Energia	ASX	BKY	A$ 0.78	Spain	149	196
GoviEx	TSX.V	GXU	C$ 0.19	Niger/other African countries	45	59.5
Uranium Resources	NASDAQ	URRE	US$ 1.49	Turkey/USA	37	36.8
Deep Yellow	ASX	DYL	A$ 0.28	Namibia	34	44.2
A-Cap Resources	ASX	ACB	A$ 0.05	Botswana	32	41.9
Bannerman Resources	ASX	BMN	A$ 0.03	Namibia	19	25.5
Plateau Uranium	TSX.V	PLU	C$ 0.43	Peru	19	24.8
Aura Energy	ASX	AEE	A$ 0.02	Mauretania	14	18.2
Forsys Metals	OTC	FSY	C$ 0.13	Sweden/Namibia	14	18.2
Blue Sky Uranium	TSX.V	BSK	C$ 0.18	Argentina	7	9.0
Total market capitalization					**370**	