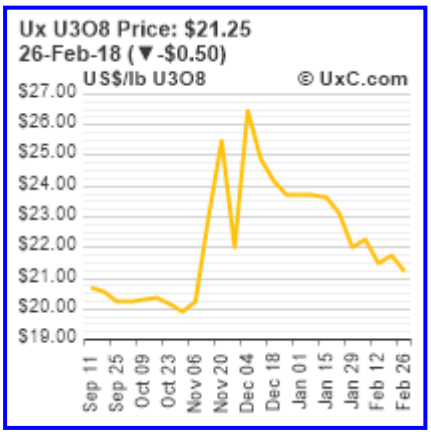
Uraniumletter INTERNATIONAL

the international independent information and advice bulletin for uranium resource investments

Quarter 1, 2018

Uranium Market Outlook

Marino G. Pieterse, publisher and editor



►Paris Agreement to limit global warming is a Fata Morgana

►Geographical strategic blocks determining the future of the uranium Market, which hurts Western uranium industry

In my December 2017 **Uranium Market Outlook** I already said that narrowing the gap between the spot- and long-term U3O8 price is needed to improve the ongoing uranium market sentiment.

OVERVIEW of U3O8 PRICES

	Spot		Long-term		Spot	Long-term
2018						
February 26	**21.25**		**30.00**	**Year-end 2016**	**20.25**	**30.00**
January 29	**22.00**		**30.00**	Year-end 2015	34.25	44.00
2017				**May 31, 2015 (year high)**	**39.50**	50.00
Year-end	23.75		30.67	Year-end 2014	35.50	49.00
December 4 (high)	**26.50**		31.00	**May 14, 2014 (year low)**	**28.25**	49.00
November 27	22.00		31.00	Year-end 2013	34.50	50.00
October 31	20.15		30.00	Year-end 2012	43.50	56.50
September 27	20.25		31.50	Year-end 2011	61.75	64.00
June 26	20.10		32.50			
May 29	19.25		32.50	Pre-Fukushima accident		
May 1	22.50		33.00	March 11, 2011	67.75	73.00
March 27	24.50		33.99			
February 28	22.25		32.50			
February 6	26.00		32.50			
January 31	24.50		32.50			
2016						
Year-end	20.25		30.00			
November 28	**18.00**	*	33.00			
October 31	18.75		35.50			
September 26	23.75		38.00			
June 27	27.00		40.50			
March 28	29.15		43.50			

* *spot price 12-* year low

Cameco having suspended production at its flagship McArthur River and Key Lake operations for 10 months, beginning February 2018, and Kazatomprom to cut uranium production by 20% over a period of 3 years, these measures failed to stimulate the U3O8 price, with the gap between spot price and long-term U3O8 price still at an unchanged level of about $ 6.

Since the Paris Agreement has entered into force on 4 November 2016, I have explained in my monthly published **Uranium Market Outlook** that the commitment of 173 countries to the Agreement is of symbolic importance.

The withdrawal of the U.S. was considered by the global clean energy community as a profound immorality in the fight against climate change, but not having accounted for America's share of clean energy, which combines renewables (wind- and solar energy) and nuclear energy, as the only large-scale CO2 emission free energy, is by far the highest in the world.

In 2016, the U.S. operable 99 reactors contributed 19.7% (805 TWh) to total electricity generation of 4,079 TWh net.
In addition, 266 TWh was generated from hydro, 226 TWh from wind and 117 TWh from other renewables, **adding up to 6,095 TWh from clean energy, equal to approximately 35% of total electricity generating**.

The overview below of world nuclear power reactors and uranium required in 2017 confirms the dominance of the U.S. on nuclear energy generation and as such the provider of clean energy, despite an only limited added share of renewables.

WORLD NUCLEAR POWER REACTORS & URANIUM REQUIREMENTS of the world's major nuclear energy generating countries *(as at January 1, 2018)*

Country	Reactors operable	% total electricity generation	Under construction	Planned *	Uranium required in tonnes 2017
USA	99	19.7	2	14	18,996
France	58	72.3	1	-	9,502
China	37	3.6	20	40	8,289
Russia	35	17.1	7	26	5,380
South Korea	24	30.3	3	2	4,730
India	22	3.4	6	19	843
Canada	19	15.6	-	2	1,592
Ukraine	15	52.3	-	2	1,944
United Kngdom	15	20.4	-	11	1,772
Germany	8	13.1	-	-	1,480
Japan x	5	2.2	-	-	662
Total	**337**		**39**	**116**	**55,190**
Total world	**447**	**c10.6**	**57**	**159**	**65,014**
Top 11 in % world total	**75**		**68**	**73**	**85**

* *Future reactors envisaged in specific plans and proposals and expected to be operating by 2030*

x In ***Japan***, *currently 42 reactors are operable and potentially able to restart, of which 5 reactors have restarted to date. A further 21 reactors are in the process of restart approval. With the country's 50+ main reactors having provided some 30% of electricity before the Fukushima nuclear accident, this was expected to increase to at least 40% by 2017 . The prospect now is for two-thirds (about 27%) of this from a depleted fleet.*

source : WNA

Geographical strategic blocks

	Uranium production 2016 (tonnes)	in %	Uranium required	Surplus (+) Deficit (-)
USSR				
Kazakhstan	24,575	40	0	24,575
Russia	3,004	5	5,380	-2,376
Uzbekistan	2,404	4	0	2,404
Ukraine	1,005	2	1,944	-939
	30,988	51	7,324	23,664
USA	1,125	2	18,996	-17,871
Canada	14,039	23	1,592	12,447
	15,164	25	20,588	-5,424
China	1,616	3	8,289	-6,673
Australia	6,315	10	0	6,315
	7,931	13	8,289	-358
Japan *	0	0	662 x	-662
South Korea	0	0	4730	-4,730
	0	0	5,392	-5,392
Niger	3,477	6	0	3,477
Namibia	3,315	5	0	3,315
	6,792	11	0	6,792

x *uranium required based on currently 5 operating nuclear reactors; 21 reactors are in process of restart*

Considering that globalization is creating a new economical world order, it is interesting to see which countries are supplying uranium, because this has a crucial impact on the uranium market.

Anticipating a strong growth of nuclear reactors under construction and of planned reactors, led by China, Russia and India, and these leading these three emerging countries accounting for 53% of reactors under construction and 58% of planned reactors, it is important to know from which countries the required uranium to feed the reactors will come.

From this perspective, I refer to my overview of geographical strategic blocks, which shows that Kazakhstan based at a production of 24,575 tonnes in 2016, is not only by far the world's biggest uranium supplier, but can easily fully feed growing demand from Russia, with no impact on the uranium price.

In addition, as part of the **USSR block**, Kazakhstan and Russia are also in the strategic position to trade uranium with other strategic blocks that are facing a deficit in supply.
Strategically, the USA could be supplied by Canada, and China by Australia.

No concrete insight exists for **Japan** where required uranium from the anticipated restarts of nuclear reactors probably can be fully met by existing reserves at the time of the Fukushima accident in March 2011 and having been stored.

In regard to **South Korea**, the deficit of 4,730 tonnes uranium can be provided by different international sources. Noteworthy is the growing anti-nuclear sentiment in the country, which may result in a significant reduction of the current share of approximately 30% of total electricity generating.

Europe has no own sources of uranium supply. First production is to come from Berkeley Energia's Salamanca mine in 2019. With a share of approximately 72% of total electricity generating, **France** is the biggest generator of nuclear energy in Europe.

In conclusion, with only Canada and Australia to be major geographically independent uranium suppliers to the open market, in Canada, only **Cameco** as the Western world's biggest supplier, plays an important role but its future growth potential limited due to not having been successful to discover new economically viable deposits since Cigar Lake in 1981 and having to announc suspension of production at its flagship McArthur River and Key Lake operations for 10 months, beginning February 2018.

It is striking to see that two new generation uranium companies **Fission Uranium** (Patterson Lake South in 2012) and **NexGen Energy** (Arrow discovery in 2014, followed by the Bow discovery in January 2015 and the Harpoon discovery in August 2016).

At January 1, 2018 **Cameco**'s ownership interest of 60% in the Inkai Joint Venture with Kazatomprom is adjusted from 60% to 40%, with Kazatomprom now holding the controlling 60% ownership, confirmed my currently negative view on the outlook for the Western uranium industry.

Top 10 countries of the world's uranium producers

	Production in tonnes U 2016	2016 in % world total	Production in tonnes U 2015	2014	2013	2010	2010 in % world total
Kazakhstan	24,575	40	23,800	23,127	22,451	17,803	33
Canada	14,039	23	13,325	9,134	9,331	9,783	18
Australia	6,315	10	5,672	5,001	6,350	5,900	11
Niger	3,477	6	4,116	4,057	4,518	4,198	8
Russia	3,004	5	3,055	2,990	3,135	3,562	7
Namibia	3,315	5	2,993	3,255	4,323	4,496	8
Uzbekistan (est)	2,404	4	2,385	2,400	2,400	2,400	4
China (est)	1,616	3	1,616	1,500	1,500	827	2
USA	1,125	2	1,256	1,919	1,792	1,660	3
Ukraine (est)	1,005	2	1,200	926	922	850	2
Top-10 total	**60,875**	**98**	**59,418**	**54,309**	**56,722**	**51,479**	**96**
Others	1,137	2	1,100	1,908	2,648	2,192	4
Total world production tU	**62,012**	**100**	**60,518**	**56,217**	**59,370**	**53,671**	**100**

source: WNA

►Paris Climate Agreement confirms essential contribution of nuclear energy to limit global warming

With 195 countries having adopted the first-ever universal climate agreement 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, due to enter into force in 2020, executing the plan is in conflict with 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 the Paris climate agreement 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, 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 it is good to learn that 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.

►Nuclear power in China

As of September 2017, **China** has 37 nuclear reactors with a capacity of 32.4GWe operating, compared to worldwide number of 447 reactors. The country has 20 reactors under construction. In addition, 40 reactors are planned, including some of the world's most advanced, to give an almost doubling of nuclear capacity to 58 GWe by 2020-21, then up to 120 to 150 GWe by 2030.

China's policy is to have a closed nuclear fuel cycle and to become largely self-sufficient in reactor design and construction, as well as other aspects of the fuel cycle, but is making full use of western technology dawn from France, Canada and Russia, while adapting and improving it.

The State Council's Energy Development Strategy Plan 2014-2020 said that China's efforts should be focused on promoting the use of large pressured water reactors (including the AP 1000 and CMP 1400 designs), high temperature gas-cooled reactors (HTSs) and fast reactors. It also said that research should be conducted to "improve the nuclear fuel cycle system, including reprocessing of used fuel".

In **China**'s 13th Five Year Plan from 2016, 6 to 8 nuclear reactors are to be approved each year. Non-fossil primary energy provision should reach 15% by 2020 and 20% by 2030 (from 9.8% in 2013). At that time China intends its peak of CO2 emissions to occur.

► Including environmental protection, vigorous development of nuclear power is required

Coal's share of primary energy in China was down to 64.4% in 2015 from 72.5% in 2007. The action plan aim was 62% in 2020. After 21.5 GWe of coal capacity was added in the first half of 2016, in September the NEA issued a notice halting all construction and approval for coal plants in 28 provinces until their overcapacity is reduced.

►European Union, profiling itself as a leader in promoting action on climate change but fails to act accordingly

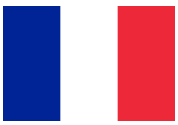
In March 2007, the European Council endorsed the European Commission's Strategic Energy Review and agreed on a unilateral cut of 20% in EU greenhouse gas emissions by 2020, relative to the 1990 levels. The Council also set a target of meeting 20% of EU energy needs from renewals by 2020, leaving individual 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 a 1990 baseline) which will require strong commitments from the 28 EU member states.

► Phasing out Germany's nuclear reactors in conflict with common EU energy policy



France

France has 58 nuclear power plants operated by Electricité de France (EDF) with a total capacity of 53.1 GWe.

The country derived 384 TWh or 73% of its electricity from nuclear energy, due to a long-standing policy based on energy security. This share may be reduced to 50% by 2025.

France is the world's largest net exporter of electricity due to its very low cost of generation and gains over € 3 billion per year from that.
The country has been very active in developing nuclear technology Reactors and especially fuel products and services have been a significant export. About 17% of France's electricity comes from recycled nuclear fuel.

Germany

Until the March 2011 Fukushima accident, Germany obtained 25% of its electricity from nuclear energy, about 14% from 8 reactors, while 43% of electricity comes from coal, the majority of that from lignite and there are no plans to phase this out.
The predominance of coal makes Germany Europe's biggest emitter. The 2016 increase in renewables generation was the smallest since 2009 of carbon dioxide.

A coalition government formed after the 1998 federal elections had the phasing out of nuclear energy as a featured of its policy. With a new government in 2009 the phasing out was cancelled, but them reintroduced in 2011 when 8 reactors shut down immediately.

Germany has some of the lowest wholesale electricity prices in Europe and some of the highest retail prices, due to its energy policies. Taxes and surcharges account for more than 50% of the domestic electricity price.

Germany's electricity production in 2016 was 648 TWh, with demand of 595 TWh and net export of 54 TWh. Of the total generation, lignite provided 150 TWh, hard coal 112 TWh, nuclear 85 TWh.

United States dominates global energy markets

Most of the uranium loaded into US nuclear power reactors is imported. During 2016, owners and operators of US nuclear power reactors purchased 50.6 million pounds of uranium.

About 11% of the uranium delivered to US reactors in 2016 was produced in the United States and 89% came from other countries. Nearly half of these purchases originated from 2 countries, Canada 925%) and Kazakhstan (24%), providing 17 million pounds and 11 million pounds of uranium respectively, followed by Australia (20%) and Russia (14%).

► Fossil fuels remain to have most influence on Trump's energy policy

On December 18, 2017, President Trump unveiled his National Security Strategy (NSS), which unveiled organizing principals to guide U.S. foreign policy and has been welcomed by foreign policy experts as a large balanced strategy that could service the Trump administration well if enacted.

Although the energy part of the report is provocatively titled "Embracing Energy Dominance", a closer reach reveals a reasonable vision of energy policy grounded in a self-consistent case for why economic strength and energy security underpin national security.

The NSS energy strategy aims to support allies and partners, encouraging North American energy cooperation, and tempers the definition of energy dominance suggested elsewhere, asserting that such dominance arises from America's central position in the global energy system as a leading self-sufficiency producer, leading consumer and innovator.

For example, the strategy calls for reducing regulatory barriers to energy production by putting more than 10 million acres of land in Alaska on the auction block for oil and gas companies.
Alaska is not the only place were Trump's plan to drill has met with tough market realties. The Administration has taken steps to open millions of acres to oil drilling across the county and off the coast of the U.S. from using the tax reform bill as a vehicle to open drilling in the Arctic National Wildlife Refuge to considering most of the waters of the U.S. coasts for oil exploration. But analysts and key industry players say it remains uncertain how much of it will actually be developed to produce oil and gas.

With oil prices having remained too low until recently to poor billions into exploring vast new areas offshore, in the Arctic and Alaska, would be a risky investment for drilling, the recent rise of Brent-oil price to a 3-year high of $ 70 is more than helpful to bring the U.S., the world's largest oil producer, in a position to stress the country's "Energy dominance" to the rest of the world.

No matter the market conditions, Trump's presidency has largely been a win for America's oil and gas industry. Regulations have been cut back, oil companies could soon have unprecedented access to land long out of their reach and perhaps most significantly, at least in the short term, oil companies by and large received a massive tax cut. Trump's Environmental Protection Agency initially entertained a plan from oil reforms to upend regulations requiring them to blend ethanol into their gasoline – then rejected it after a backlash from the ethanol industry.

Trump and others in his administration have criticized renewable energy as expensive and dependent on government support.
But the White House has not sought the repeal tax breaks expected to provide $ 12.3 billion to the renewable energy firms by 2020, which other Republicans continue to support.

Fossil-fuel firms clearly have more influence on policy under Trump and easier access to decision makers. Their policy victories include rollbacks of regulation limiting emissions of carbon, methanol and other pollutants; the opening of Alaska's Arctic National Wildlife Refuge to drilling; and the lifting of a coal-mining moratorium on federal lands.

Over the last decade France has exported up to 70 TWh net each year and Electricité de France (EDF) expects net exports to continue at 55-70 TWh/yr, principally to Italy, the UK, Switzerland, Belgium, Spain and Germany.

► Call for US government to revitalize its nuclear industry

The **US government** should hold a "structured conversation with the country's nuclear industry" on ways to restore and develop the sector, according to an assay from Mark Hibbs, senior fellow of the Carnegie Endowment for International Peace's nuclear programs.

Thereby, he is not only referring to America's nuclear power plant construction industry staggering or even in decline, but also to pressure from loss of know-how and high costs. US nuclear power plant vendors are now challenged by Chinese and Russian exporters, whose governments' view nuclear energy in strategic, not commercial terms.

Through strategic penetration, with both China and Russia having signed memorandums of understanding and other bilateral agreements with potential customer countries, these agreements will provide these two countries Access to strategic decision making in these countries concerning technology, energy and foreign policy for decades to come.

During the last 20 years, while China and Russia built dozens of reactors at home, leading Western vendors virtually stopped constructing new units.

Hibbs warns the USA could "lose its leadership in international nuclear governance" in the face of a future shift towards newcomers and away from established nuclear technology-owning countries and recommends that the Trump administration should discuss with the US nuclear industry what steps the government should take "to enhance US nuclear exports and encourage a level international playing field for ongoing nuclear equipment, material and technology, especially to risk-bearing destinations.

► Energy Fuels and Ur-Energy jointly file a petition with the U.S. Commerce Department to investigate effects of uranium imports on U.S. national energy

Just before publication of my January 2018 **Market Outlook,** thereby in particular referring to the specific attention I paid to the impact of geopolitical strategic blocks on nuclear energy generation and the price-making of the uranium market, **Energy Fuels** and **Ur-Energy**, the two main U.S. uranium producers, together supplying more than half of all U.S. Uranium in 2017, announced that on January 16 they jointly submitted a Petition to the U.S. Commerce Department ("DOC") for Relief under Section 232 of the Trade Expansion Act of 1962 (as amended) from imports of uranium products that threaten National Security, and the President to use his authority to adjust imports to ensure a long-term viability of the U.S. uranium mining industry.

Imports of uranium from state-owned and state-subsidized enterprises in Russia, Kazakhstan and Uzbekistan now fulfil nearly 40% of U.S. demand, while domestic production fulfils less than 5%.

Increasing levels of nuclear fuel expected to be imported from Russia and China in the coming years, which will compete directly with U.S. uranium production.

In 2017, U.S. uranium production fell to near historic lows due in large part to uranium and nuclear fuel imported from state-subsidized foreign entities; 2018 domestic production is likely to be even lower.

Already in my October 2017 **Market Outlook**, I included a call for the U.S. government in an assay from Mark Hibbs, senior fellow of the Carnegie Endorsement for International Peace nuclear program (see above).

It would speak for itself when **Energy Fuels** and **Ur-Energy**, both headquartered in Denver, Colorado, would lend weight to their action by amalgamating their operations.

MARKET VALUATION OF THE WORLD'S LISTED URANIUM PRODUCERS

(in US$ million)

Country focus	Company Name		March 1 2018	Year-end 2017	Change in %	Year-end 2016	Year-end 2015	Year-end 2014	Year-end 2013	Year-end 2012	Year-end 2011	Year-end 2010	Change % 2017 / 2010
United States	Uranium Energy	*1)*	**203**	276	-26	132	105	160	179	218	253	421	-34
	Energy Fuels	*2)*	**112**	133	-16	109	134	121	111	123	167	158	-16
	Ur-Energy	*3)*	**98**	99	-1	76	138	110	170	101	96	303	-67
	Peninsula Energy	*4)*	**81**	81	0	75	85	113	60	122	122	158	-49

1) ISR production commencement 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; premium of 37%; including takeover of Uranerz completed on June 19, 2015

3) ISR production commenced 1n August 2013

4) first ISR production commenced in December 2015

MARKET VALUATION of worldwide listed exploration/development companies valued at >US$ 20 million

Company Name	Share price Year-end 2017	Share price Year-end 2016	Change in % 2017/2016	Market valuation 2017
Canada (6):				
NexGen Energy	3.21	2.33	38	860
Denison Mines	0.69	0.70	-1	305
Fission Uranium	0.775	0.64	21	297
UEX	0.345	0.245	41	89
Skyharbour Resources	0.52	0.33	58	22
Iso Energy	0.59	0.90	-	22
Australia (3):				
Toro Energy	0.04	0.04	0	63
Vimy Resources	0.16	0.25	-36	45
Boss Resources	0.05	0.06	-17	42
US (1):				
Laramide Resources	0.47	0.29	62	43
Europe (1):				
Berkeley Energia	1.02	0.90	13	202
Africa (4):				
GoviEx Uranium	0.27	0.15	80	70
Deep Yellow	0.32	0.40	-20	48
Bannerman Resources	0.06	0.03	100	40
A-Cap Resources	0.05	0.08	-38	34
Sout America (1):				
Plateau Uranium	0.80	0.25	220	41

	Number of companies	Combined market valuation	in %
Canada	6	1,595	71
Australia	3	151	7
US	1	43	2
Europe	1	202	9
Africa	4	192	9
South Am	1	41	2
Total	16	2,224	100

Uraniumletter International ● a publication by **M**etal **C**ommodities **I**nvestment **P**latform, the Netherlands ● Marino G. Pieterse, Publisher and Editor ● Information and investment comments are independently and thoroughly researched and believed correct. No guaranty of absolute accuracy can be given however. ● Investment decisions are fully made for own risk ● tel.: +31-251-828247 ● Chamber of Commerce 58330445 ● www.metalcommodities-ip.com ● e-mail: marino.pieterse@metalcommodities-ip.com