Will uranium recovery last this time?

In my January 2017 Uranium Market Outlook, I said that the improving nuclear energy sentiment offered a prospective uranium market outlook for 2017. This optimism was based on a recovery of the U3O8 price from a low of $18.00/lb on November 20, 2016 to $24.50/lb on January 21, 2017 and the long-term price up from $30.00/lb on December 14, 2016 to $32.50/lb.

The recovery of the U3O8 price resulted in a strong recovery of the uranium equity markets, reflected in an unrivalled market performance of my 2016 shortlist of uranium investment recommendations, which achieved a gain of 30.5%. It was expected by uranium market watchers, including myself, that the recovery preluded the end of a 15-year bear market for uranium since the Fukushima disaster on March 11, 2011, but it did not. As a result, the spot price fell back to a $20.00/lb level.

This did not only cause a new blow to the equity markets, but consequently also threatened the existence of most uranium producers, as a result of continuing negative operational cash flows. Compensating long-term contracts dried up and urged producers had to curtail production.

The most illustrative example is Cameco, the Western world’s largest uranium producer, that it will suspend production from its McArthur River and Key Lake operations by the end of January 2018 for at least 10 months or the whole 2018. Earlier, Kazatomprom, the largest producer globally, announced that it will cut 10% of its production.

Most professional market watchers, in particular from Canadian investor houses have interpreted the decision of Cameco as an encouraging message for market conditions after 2018.

Although the price recovery in November from $20.15 to $25.50 or 26% compared to the price of $26.00 of February 8, the high of the year, looks very encouraging, it is important to see what effect this will have on the long-term price, which was $32.50 at that time.
Having declined by less than 10% since then, the big question is whether the gap between the spot price and long-term price will narrow or the long-term price will break the $33.00 level to justify a bullish sentiment.

In this respect, against the anticipated strong growth of the construction of nuclear reactors in emerging countries, led by China, Russia and India (see overview), it is hardly recognized that in conjunction with the strong growth of uranium demand in emerging countries, this will be tempered by tightened security and government regulations.

In China this results in a lower than originally anticipated construction of nuclear reactors in 2017.

Also in other countries construction of new reactors is expected to be lower than anticipated earlier, while in Japan this had led to significant delays in an envisaged restart of 24 of its reactors. France wants to bring back its 72% share in generating electricity to approximately 50%, resulting in the closing of up to 18 of its currently 58 operating nuclear reactors.

Also, the shift of the construction of nuclear reactors from traditional countries to emerging countries, is notable, and China and Russia not only developing their own competitive technically advanced and innovated models, but also having access to the discovery of national uranium deposits.

In conclusion, delays in the restart of nuclear reactors in Japan, together with lower than expected growth of reactor construction in China, and a decline of operating reactors in Europe (France and Germany), will have an ongoing negative impact on the growth rate of nuclear energy generating.

<table>
<thead>
<tr>
<th>Country</th>
<th>Reactors operable</th>
<th>Nuclear electricity generation 2016</th>
<th>Reactors under construction</th>
<th>Reactors planned</th>
<th>Uranium required 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TWh</td>
<td>% e</td>
<td>Mwe gross</td>
<td>Mwe gross</td>
</tr>
<tr>
<td>USA</td>
<td>99</td>
<td>805.3</td>
<td>19.7</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>France</td>
<td>58</td>
<td>384.0</td>
<td>72.3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>China</td>
<td>37</td>
<td>210.5</td>
<td>3.6</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Russia</td>
<td>35</td>
<td>179.7</td>
<td>17.1</td>
<td>7</td>
<td>26</td>
</tr>
<tr>
<td>India</td>
<td>22</td>
<td>35.0</td>
<td>3.4</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>South Korea</td>
<td>24</td>
<td>154.2</td>
<td>30.3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Canada</td>
<td>19</td>
<td>97.4</td>
<td>15.6</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>15</td>
<td>65.1</td>
<td>20.4</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>Ukraine</td>
<td>15</td>
<td>81.0</td>
<td>52.3</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Germany</td>
<td>8</td>
<td>80.1</td>
<td>13.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sweden</td>
<td>8</td>
<td>60.6</td>
<td>40.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Belgium</td>
<td>7</td>
<td>41.3</td>
<td>51.7</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Top 10 total</td>
<td>347</td>
<td>2,194.2</td>
<td>339.5</td>
<td>41</td>
<td>116</td>
</tr>
<tr>
<td>Japan</td>
<td>5</td>
<td>9.5</td>
<td>9.4</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>World total</td>
<td>447</td>
<td>2,490.0</td>
<td>10.6</td>
<td>58</td>
<td>160</td>
</tr>
<tr>
<td>Top 10 total in % World total</td>
<td>74</td>
<td>70</td>
<td>72</td>
<td>86</td>
<td></td>
</tr>
</tbody>
</table>

* The share of France may be reduced by one-third to 50% by 2025 to the benefit of renewable energy generating, phasing out approximately 18 nuclear reactors

** Japan has currently 42 reactors operable and potentially able to restart, and 24 of these are in the process of restart approvals. The first 2 restarted in August and October 2015 with 3 more since then
### Overview of world power reactors and envisaged future reactors

<table>
<thead>
<tr>
<th>Country</th>
<th>Nuclear electricity generation in 2016 (billion kWh)</th>
<th>Operable reactors</th>
<th>Planned 2017</th>
<th>Proposed 2021</th>
<th>Uranium required 2017 (in tonnes U)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>210.5</td>
<td>3.6</td>
<td>36</td>
<td>21</td>
<td>174</td>
</tr>
<tr>
<td>India</td>
<td>35.0</td>
<td>3.4</td>
<td>22</td>
<td>5</td>
<td>20</td>
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<tr>
<td>Russia</td>
<td>179.7</td>
<td>17.1</td>
<td>35</td>
<td>7</td>
<td>26</td>
</tr>
<tr>
<td>USA</td>
<td>805.3</td>
<td>19.7</td>
<td>99</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Japan</td>
<td>17.5</td>
<td>2.2</td>
<td>x</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>European Union + UK</td>
<td>773.8</td>
<td>NA</td>
<td>122</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>of which 70% applies to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>France</td>
<td>384.0</td>
<td>72.3</td>
<td>58</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>UK</td>
<td>65.1</td>
<td>20.4</td>
<td>15</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Germany</td>
<td>80.1</td>
<td>13.1</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Subtotal</td>
<td>2,004.3</td>
<td>314</td>
<td>41</td>
<td>112</td>
<td>271</td>
</tr>
<tr>
<td>World total</td>
<td>2,490.0</td>
<td>11.5e</td>
<td>447</td>
<td>59</td>
<td>164</td>
</tr>
<tr>
<td>China, India, Russia, USA and EU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>372</td>
</tr>
<tr>
<td>in % of world total</td>
<td>81</td>
<td>70</td>
<td>70</td>
<td>68</td>
<td>68</td>
</tr>
</tbody>
</table>

Source: WNA

### 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 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.

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.

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.

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 Fuging 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 GW under the country's 13th Five-year Plan (2016-2020), 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.**

**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. Clean 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.

With coal's share of primary energy in China down to 64.4% in 2015 from 72.5% in 2007, the action plan aim is 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.

**Uranium One** is the world's 4th largest uranium producer, with a globally diversified portfolio of assets located in Kazakhstan, the United States and Tanzania. In 2016, the Company produced 4,717 MT. **ROSATOM State Atomic Energy**, through its affiliates, is the major shareholder of Uranium One.

**Attributable production for 2016 was 12.7 million pounds U3O8**, compared to total attributable production of 12.5 million pounds during 2015.

Headline revenue was $ 314.6 million in 2016 compared to $ 324.7 million in 2015. **Attributable revenue was $ 405.7 million for 2016 based on sales of 13.5 million pounds U3O8 of produced material at an average realized sales price of US$ 27 per pound U3O8 sold.**

The total average cash cost per pound U3O8 sold of produced material decreased to US$ 9 per pound U3O8 during 2016, compared to $11 per pound during 2015.

**Gross profit was $ 41.9 million during 2016 compared to gross profit of $ 4.4 million in 2015.**

Gross profit, including the Company’s share of gross profit from equity accounted investees, totalled $ 132.5 million in 2016, a 35% decrease compared to $ 264.5 million in 2015, mainly due to a decrease of 22% in the average realized sale price, partly offset by an increase of 10% in sales volume.

**Net earnings for 2016 were $ 252.6 million**, compared to net earnings of $ 70.7 million for 2015. The adjusted net earnings for 2016 were $ 54.7 million after extension of a net gain received through business combination of $ 198.3 million, compared to an adjusted net earnings of $ 42.6 million for 2015.
In the first 9 months of 2017, Uranium One reported headline revenues of $196.1 million, compared to $238.6 million for the same period of 2016. Attributable revenues, including the revenues equity accounted inventories were $27.5 million, compared to $291.5 million for the same period of 2016.

Kazatomprom JSC NAC has been the world leader in the extraction of uranium since 2009, ensuring around 20% of the global market demand today, after having announced to cut production by 10% due to ongoing challenging market conditions. To save its position, the Company will replenish its resource base of uranium, optimize all types of costs, and implement the advanced technologies directed to increase the efficiency of extraction of uranium and decrease the cost value of finished goods on a regular basis.

In 2015, the strategy of development of Kazatomprom for 2015-2025 was updated. In 2016, the first year of transformation, the Company increased its net income to 108 billion KZT (US$ 326 million), which is more than two-and-a-half times higher as compared to 2015.

Kazatomprom, together with CGNPC of China, has started to implement a breakthrough high-technology project in the nuclear industry, i.e. construction of a fuel assembly producing plant. The new plant will annually produce 200 tons of nuclear fuel for Chinese NPP’s and will have a guaranteed sale market for the next 20 years.

In 2016 important agreement were signed with foreign parties:

- The Company signed with Cameco on restructuration of LLC JV “Inkai” and increase of the share of Kazatomprom in the Joint Venture from 40% to 60% in 2018.
- The agreement with CNPC of China on the purchase of Kazakhstani fuel pallets to Chinese nuclear power plants until 2024.
- An agreement with NAEC “Energoatom” of Ukraine on the supply of enriched uranium production to the Ukrainian NPPs.

Kazatomprom outsourced 20 non-core businesses with the aim of increasing the value of the Company.

In 2016, Kazatomprom produced 13,187 tons of uranium, representing a 24.2% share in the global market, 17.47 tons of beryllium and 121.8 tons of tantalum and 46.8 tons of niobium. Production volume of electrical power decreased 2.4% from 5,154 million kWh in 2015 to 5,032 kWh in 2016.

Income from products sale and vendor service increased 5.3% from 397 million KZT (US$ 1.19 million) in 2015 to 418.9 billion KZT (US$ 1.26 billion) in 2016. EBITDA increased 19.2% from 126.92 billion KZT to 151.27 billion KZT. Cost of sales increased 4.8% from 294.4 billion to 308.5 billion KZT ($ 932 million). Operating income amounted to 73.2 billion KZT ($ 220 million) compared to 73.6 billion KZT ($ 222 million) in 2015. Profit for the year tripled from 36.5 billion KZT ($ 110 million) to 111.6 billion KZT ($ 337 million).

Cash and cash equivalent at the end of the year amounted to 75.1 billion KZT ($ 227 million).

► Rare and rare-earth metals

The extraction of rare and rare-earth metals and the production of products based on them are also a priority activity of Kazatomprom. In 2016, the Company continued to implement its development strategy in this area, as well as an active cooperation with foreign partners.

The SARECO Joint Project (Kazatomprom 51% and Sumitomo of Japan 49%) in 2016 continued work on the preparation for the operation of the plant to create high-tech production of rare earth products.
The SARECO plant in Stepnogorsk is a unique complex of thermal and hydrometallurgical processing of various types of raw materials.

The plant is designed to produce 1.5 thousand tonnes of TEEO per year within an increase in production capacity to 3 thousand tonnes of TREO in 2016 and up to 5-6 thousand tonnes of TREO per year by 2018-2019. A consistent part of the produced products will be heavy rare-earths metals.

Kazatomprom’s assets increased 3% from 793.3 billion KZT in 2015 to 820.0 billion KZT in 2016 (US$ 2.48 billion), of which 360.1 billion KZT ($ 1.08 billion) current assets.

Shareholders’ equity increased 21% from 469.4 billion KZT in 2015 to 567.83 billion KZT (US$ 1.72 billion) in 2016.

The growth in Economic Added Value (EAV) amounted to 4 billion KZT from minus 10.3 billion KZT in 2015 to minus 6.4 billion KZT ($ 193 million) in 2016.

The growth was achieved due to the transformation program, the total effect of which in 2016 amounted to 16.2 billion KZT ($ 490 million) due to lower costs and introduction of category purchases.

### Top 10 countries of world’s uranium production

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kazakhstan</td>
<td>24,575</td>
<td>40</td>
<td>23,800</td>
<td>23,127</td>
<td>22,451</td>
<td>17,803</td>
<td>33</td>
</tr>
<tr>
<td>Canada</td>
<td>14,039</td>
<td>23</td>
<td>13,325</td>
<td>9,134</td>
<td>9,331</td>
<td>9,783</td>
<td>18</td>
</tr>
<tr>
<td>Australia</td>
<td>6,315</td>
<td>10</td>
<td>5,672</td>
<td>5,001</td>
<td>6,350</td>
<td>5,900</td>
<td>11</td>
</tr>
<tr>
<td>Niger</td>
<td>3,477</td>
<td>6</td>
<td>4,116</td>
<td>4,057</td>
<td>4,518</td>
<td>4,198</td>
<td>8</td>
</tr>
<tr>
<td>Russia</td>
<td>3,004</td>
<td>5</td>
<td>3,055</td>
<td>2,990</td>
<td>3,135</td>
<td>3,582</td>
<td>7</td>
</tr>
<tr>
<td>Namibia</td>
<td>3,315</td>
<td>5</td>
<td>2,993</td>
<td>3,255</td>
<td>4,323</td>
<td>4,496</td>
<td>8</td>
</tr>
<tr>
<td>Uzbekistan (est)</td>
<td>2,404</td>
<td>4</td>
<td>2,385</td>
<td>2,400</td>
<td>2,400</td>
<td>2,400</td>
<td>4</td>
</tr>
<tr>
<td>China (est)</td>
<td>1,616</td>
<td>3</td>
<td>1,616</td>
<td>1,500</td>
<td>1,500</td>
<td>827</td>
<td>2</td>
</tr>
<tr>
<td>USA</td>
<td>1,125</td>
<td>2</td>
<td>1,256</td>
<td>1,919</td>
<td>1,792</td>
<td>1,660</td>
<td>3</td>
</tr>
<tr>
<td>Ukraine (est)</td>
<td>1,005</td>
<td>2</td>
<td>1,200</td>
<td>926</td>
<td>922</td>
<td>850</td>
<td>2</td>
</tr>
<tr>
<td><strong>Top-10 total</strong></td>
<td><strong>60,875</strong></td>
<td><strong>98</strong></td>
<td><strong>59,418</strong></td>
<td><strong>54,309</strong></td>
<td><strong>56,722</strong></td>
<td><strong>51,479</strong></td>
<td><strong>96</strong></td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td><strong>1,137</strong></td>
<td><strong>2</strong></td>
<td><strong>1,100</strong></td>
<td><strong>1,908</strong></td>
<td><strong>2,648</strong></td>
<td><strong>2,192</strong></td>
<td><strong>4</strong></td>
</tr>
<tr>
<td><strong>Total world production tu U</strong></td>
<td><strong>62,012</strong></td>
<td><strong>100</strong></td>
<td><strong>60,518</strong></td>
<td><strong>56,217</strong></td>
<td><strong>59,370</strong></td>
<td><strong>53,671</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*Source: WNA*
World’s largest uranium producers

<table>
<thead>
<tr>
<th></th>
<th>Production in tonnes U</th>
<th>in % of production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameco</td>
<td>13,500</td>
<td>25</td>
</tr>
<tr>
<td>Kazatomprom</td>
<td>13,187</td>
<td>24</td>
</tr>
<tr>
<td>Areva</td>
<td>11,186</td>
<td>21</td>
</tr>
<tr>
<td>Uranium One</td>
<td>4,717</td>
<td>9</td>
</tr>
<tr>
<td>Paladin Energy</td>
<td>4,460</td>
<td>8</td>
</tr>
<tr>
<td>BHP Billiton</td>
<td>2,460</td>
<td>5</td>
</tr>
<tr>
<td>Energy Resources of Australia</td>
<td>2,351</td>
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<tr>
<td>Heathgate Resources</td>
<td>1,615</td>
<td>3</td>
</tr>
<tr>
<td>Energy Fuels</td>
<td>460</td>
<td>1</td>
</tr>
<tr>
<td>Ur-Energy</td>
<td>234</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>54,170</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

* Olympic Dam, Australia’s largest producer of uranium as by-product copper (3,813 tonnes in 2016)

Cameco to suspend production from McArthur River and Key Lake operations confirms fall of Canada’s uranium industry

Cameco announced on November 8, 2017 that due to continued uranium price weakness, production from the McArthur River and Key Lake milling operations in the Athabasca Basin of northern Saskatchewan will be temporarily suspended by the end of January 2018. The duration of the suspension and temporary lay-off of about 845 workers is expected to last 10 months.

Cameco reported an adjusted quarterly loss of US$ 50 million, after selling 9.2 million pounds uranium. The Company indicated its US$ 32 per pound U3O8 price realization represents the lowest quarterly level reported in over 10 years.

Cameco expects its share of the costs to maintain both operations during the suspension to range between C$ 6.5 and C$ 7.5 million per month, However, some of the items affecting these costs won’t be known until the operations are actually shut down. More detailed will be provided in the Company’s Q4 results, which will be released in February 2018.

► Financial results: 9 months ended September 30, 2017

In the 9 months ended September 30, 2017, revenue decreased 13% to C$ 1.35 billion compared to C$ 1.54 billion in the same period of 2016. Gross profit declined 35% from C$ 307 million to C$ 199 million. Net earnings attributable to equity holders worsened from a profit of C$ 83 million to a loss of C$ 143 million; adjusted net earnings saw a loss of C$ 122 million against a profit of C$ 54 million in the same period of 2016. Cash provided by operations (after working capital changes) amounted to C$ 276 million (9 months 2016: C$ 57 million).

On February 1, 2017, Cameco announced that on January 31, 2017, TEPCO, alleging force majeure, confirmed that it would not withdraw a contract termination notice it provided to Cameco, with respect to a uranium supply agreement, which affects approximately 9.3 million pounds of uranium deliveries through 2028, worth approximately C$ 1.3 billion in revenue, including about C$ 126 million in 2017.
Cameco did not see a basis for terminating the agreement. In its management discussions and analysis, the Company’s financial outlook and other discussions relating to its contract portfolio excludes this agreement with TEPCO, which is under dispute.


Cameco had cash and cash equivalents of C$352 million as at September 30, 2017, of which C$276 million from operations, partly offset by capital expenditures of C$89 million, divided payments of C$119 million and interest payments of C$49 million. Net debt at September 2017 was C$1,142 million.

Total product inventories decreased 13% from C$1,283 million at December 31, 2016 to C$1,119 million including NUKEM’s inventories of C$115 million. Inventories decreased as sales were higher than production and purchases in the first 9 months of the year and the average cost for uranium has decreased 8% to C$31.56 per pound compared to C$34.49 per pound at December 31, 2016.

As of September 30, 2017, Cameco held an inventory of 27.6 million pounds U3O8 equivalent to its uranium segment (excluding broken ore).

With uranium prices having fallen by more than 70% since the Fukushima accident on March 11, 2011 and remain on unsustainable levels, Cameco has been partially sheltered from the full impact of weak prices by its portfolio of long-term contracts, but these contracts are running out and it is necessary to position the Company today to generate cash flow if prices do not improve.

Cameco has committed sales volumes of 28 to 30 million pounds U3O8 in 2018. Using inventory to help meet contract commitments now allows the Company to draw down its inventory without suffering a loss by selling at low market prices, it also avoids the risk of holding excess inventory valued above market prices on its balance sheet of prices remain low.

The Company reported U3O8 inventory of 27.6 million pounds U3O8 at an average cost of C$31.50/lb (US$24.86/lb) and noted that its current contract book has average sales of 26 million pounds U3O8 per year over the next 5 years, with more being sold in the earlier years.

**United Nations** change report calls for World action on carbon emissions and leaves nuclear power as the only mature source

The report required the global share of low-carbon options for electricity supply – nuclear power, renewable, bio-energy and carbon capture and storage (CCS) from fossil fuels collectively to increase from its current levels of 30% to reach 80% by 2050, hence effective quadrupling them.

However, CCS is unproven and its economic practicality is simply a hope, bio-energy to replace fossil fuels raises questions of scale, wind and solar renewable are well-proven along with their intrinsic limitations leaving nuclear power as the only mature viable clean and cost-effective alternative for fossil fuels (oil, gas, coal) providing power and demand regardless of weather or time of day.

**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.

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 applies to emerging independent countries in Eastern Europe being almost totally dependent on fossil fuels and in particular coal.

Institute of Energy Economics Japan expects 19 nuclear plant units to be restarted by March 2018

In its Economic and Energy Outlook of Japan through 2017, the Institute of Energy Economics Japan (IEE) has considered the economic impact in fiscal years 2016 and 2017 (ending March 2017 and 2018, respectively) of various scenarios for the restart of reactors in Japan.

The organization estimates that if restarts take place according to the current schedule – “the reference scenario” – 7 reactors could restart by the end of fiscal year 2016 (ending March 2017). By the end of fiscal year 2017 (ending March 2018) 19 units could be restarted, generating some 119.8 TWh of electricity annually, compared with total nuclear output of 288.2 TWh in fiscal year 2010 (ending March 2012), the year prior to the accident at the Fukushima Daiichi plant on 11 March 2011.

Under this scenario, compared with fiscal year 2010, total spending on fossil fuel costs, feed-in-tariffs and grid stabilization costs, increased by about Japanese yen (JPY) 100/MWh, relative to the same period, energy-related carbon dioxide emissions to 1,094 million tonnes CO2.

Under the best “mix scenario” – which reflects the generation mix of the Ministry of Economics, Trade and Industry’s long-term energy supply and demand outlook – nuclear output reaches 195 TWh by the end of fiscal year 2017.
No material impact from Fukushima accident in March 2011 on future nuclear energy demand

<table>
<thead>
<tr>
<th>Country</th>
<th>Nuclear generating 2015 in % total consumption</th>
<th>Operable reactors</th>
<th>Under construction</th>
<th>Planned</th>
<th>Proposed</th>
<th>Uranium required 2016 in tonnes U</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>161.2</td>
<td>3.0</td>
<td>35</td>
<td>22</td>
<td>40</td>
<td>136</td>
</tr>
<tr>
<td>India</td>
<td>34.6</td>
<td>3.5</td>
<td>22</td>
<td>5</td>
<td>20</td>
<td>44</td>
</tr>
<tr>
<td>Russia</td>
<td>182.8</td>
<td>18.6</td>
<td>35</td>
<td>7</td>
<td>25</td>
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<tr>
<td>USA</td>
<td>798.0</td>
<td>19.5</td>
<td>99</td>
<td>4</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Japan</td>
<td>4.3</td>
<td>0.5</td>
<td>x</td>
<td>-</td>
<td>-</td>
<td>680</td>
</tr>
<tr>
<td>European Union</td>
<td>815.2</td>
<td>NA</td>
<td>128</td>
<td>4</td>
<td>12</td>
<td>16</td>
</tr>
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<td>of which 70% applies to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>France</td>
<td>419.0</td>
<td>76.3</td>
<td>58</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>UK</td>
<td>63.9</td>
<td>18.9</td>
<td>15</td>
<td>-</td>
<td>4</td>
<td>9</td>
</tr>
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<td>Germany</td>
<td>86.8</td>
<td>14.1</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Subtotal</td>
<td>1,991.8</td>
<td>319</td>
<td>42</td>
<td>102</td>
<td>236</td>
<td>51,540</td>
</tr>
<tr>
<td>World total</td>
<td>2,441.0</td>
<td>11.5e</td>
<td>447</td>
<td>60</td>
<td>164</td>
<td>347</td>
</tr>
<tr>
<td>China, India, Russia and EU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in % of world total</td>
<td>81</td>
<td>71</td>
<td>70</td>
<td>62</td>
<td>68</td>
<td>80</td>
</tr>
</tbody>
</table>

* before Fukushima accident 48 operable reactors; 3 reactors restarted; 24 reactors in the process of restart

(source: WNA)

► IEA says policy change is needed to raise nuclear capacity

The International Atomic Agency (IEA) says clear and consistent policy support is needed if nuclear power is to significantly expand its contribution to the global transition to clean energy sources.

Policies are required to address uncertainties in investing in new nuclear power plants and to avoid the premature closure of existing reactors, the Paris based agency says in its annual report, Energy Technology Perspective 2017.

The IEA’s main scenario – the 2 Degree Scenario (2DS), set by the Paris Climate Change Agreement – demonstrates the actions needed in the energy sector to limit the rise in global temperatures to no more than 2°C.

The IEA says the report "highlights that decisive policy actions and market signals will be needed to drive technological development and benefit from higher electrification around the world. Investments in stronger and smarter infrastructure, including transmission capacity, storage capacity and demand side management technologies are necessary to build an efficient, low-carbon, integrated, flexible and robust energy system."

Current government policies are not enough to achieve long-term global climate goals, the IEA says. Of the 26 technologies it assessed, only three "remain 'on track' to meet climate objectives". Substantial progress has been made in technology areas that have received clear policy support.

"Policies to support energy technology innovation at all stages, from research to full deployment, will be critical to reap [the] energy security, environmental and economic benefits of energy system transformations," the IEA says.
The report notes that 10 GWe of new nuclear generating capacity was added in 2016 - the highest level since 1990. Construction of a further 3.2 GWe of capacity was started last year. This is down from 8.8 GWe in 2015, and average 8.5 GWe over the past decade. However, the IEA says annual capacity additions of 20 GWe are needed to meet the 2DS targets. It warns that the premature closure of operational reactors remains a "major threat" to meeting those targets. Up to 50 GWe could be lost by 2025, it suggests.

"Without action to address these reductions due to non-technical factors, the capacity will more likely be 70 GWe to 90 GWe short of the 2025 2DS target, unless annual grid connections double compared with the 2016 rate."

The agency recommends governments "provide clear and consistent policy support for existing and new capacity that includes nuclear power in clean energy incentive schemes and that encourages its development in addition to other clean forms of energy."

► 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 Ika-ta 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.
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.

► European Union nuclear trade body calls for 100 new reactors by 2050

The nuclear trade body for the EU, Foratom, has stated the target after submitting a position paper for the European Commission, which expects at least 14 EU Member States to be operating nuclear power plants (NPPs) in 2050. A revised version of the Illustrative Program for Nuclear Energy, known as PINC, is intended to be published by the end of this year.

When built, new NPPs have many advantages in the electricity market:

- Designed to operate for a long time (60 to even 80 years, subject to national safety regulator’s approval)
  Relatively low fuel and other operating costs can be centrally and flexibly attached and
- Provide predictable output

While the financial crisis, the Fukushima accident and the tensions in Ukraine have all had impact on the energy sector as a whole, as well as on the nuclear sector, nevertheless, global interest in nuclear power is growing and there are currently more nuclear power plants under construction around the world than there have ever been. These total 67 reactors, led by China (26), Russia (9) and India (6).

Nuclear energy by the Intergovernmental Panel on Climate Change confirmed as “an effective greenhouse gas mitigation option to be underlined in the PINC” contributes to all three objectives of U energy policy. These are security of supply, decarburization of the electricity sector and competitive power prices.

The European Commission acknowledges in its Policy Framework for Climate and Energy in the period from 2020 to 2030, published in January 2014, that nuclear energy contributes to a competitive, secure and sustainable energy system in the European Union, according to Foratom with the EC to be asked to apply a technology neutral approach which will facilitate investment in all low-carbon technologies including nuclear, and provide a stable regulatory and investment framework.

The EU should facilitate nuclear development projects by providing a stable regulatory and investment framework given the importance of nuclear power for achieving the EU’s climate action goals. Confidence needs to be built among equity investors in nuclear power projects to maintain Europe’s leadership role in nuclear technology and innovation, according to Foratom.

Expected to have high competitive and sustainability advantages, advanced nuclear reactor technology, including Generation IV, should be provided with adequate funding for development and demonstration at EU level, taking into account the EU potential in terms of human and financial resources, according to Foratom.
European energy targets are out of reach

With Western Europe for approximately 30% dependent on the import of Russian gas, the energy targets of the EU with the primary focus on renewable, in conjunction with Germany having phased out nuclear energy, are not realistic and as such not achievable.

This view is emphasized by the European Council having set a target of meeting 20% of EU energy needs from renewals by 2020, individual countries have been left the decision on 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.

In this respect, it is striking to see that major European countries have totally different views on the energy mix to follow.

While France with a share of 76% represents by far the highest share of nuclear energy, which it intends to bring back to 50% to the full benefit of renewable energy, Germany has decided to fully phase out nuclear power. After already having shut of its originally 17 old plants, nuclear’s share in total electricity generation is currently around 14% of total electricity.

More than half of Germany’s electricity is generated from coal which is subsident by some € 2.5 billion (US$ 3.3 billion) each year (no subsidies), while the combined subsidies from wind and solar plants total some € 5 billion per year.

The decision to shut all its nuclear plants will cause dramatic economic and environmental consequences. Despite the massive investment in renewable energy, this will create an extra 300 million tons of CO2, by 2020 due to increased use of fossil fuels. That will virtually cancel out the 335 million tons of CO2 savings required under the terms of the European Commission’s 2011 Energy Efficiency Directive.

Nuclear phase out in Germany in conflict with EU energy strategy

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**

<table>
<thead>
<tr>
<th>Country</th>
<th>Number</th>
<th>in percentage of total electricity generating</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>58</td>
<td>76.3</td>
</tr>
<tr>
<td>UK</td>
<td>15</td>
<td>18.9</td>
</tr>
<tr>
<td>Sweden</td>
<td>9</td>
<td>34.3</td>
</tr>
<tr>
<td>Germany</td>
<td>8</td>
<td>14.1</td>
</tr>
<tr>
<td>Spain</td>
<td>7</td>
<td>20.3</td>
</tr>
<tr>
<td>Belgium</td>
<td>7</td>
<td>37.5</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>6</td>
<td>32.5</td>
</tr>
<tr>
<td>Finland</td>
<td>4</td>
<td>33.7</td>
</tr>
<tr>
<td>Hungary</td>
<td>4</td>
<td>52.7</td>
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<tr>
<td>Slovakia</td>
<td>4</td>
<td>55.9</td>
</tr>
<tr>
<td>Romania</td>
<td>2</td>
<td>17.3</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>2</td>
<td>31.3</td>
</tr>
<tr>
<td>Slovenia</td>
<td>1</td>
<td>38.0</td>
</tr>
<tr>
<td>the Netherlands</td>
<td>1</td>
<td>3.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>128</strong></td>
<td></td>
</tr>
</tbody>
</table>

**No nuclear reactors operating in 14 EU countries**

- Italy
- Portugal
- Poland
- Ireland
- Croatia
- Austria
- Denmark
- Luxembourg
- Greece
- Estonia
- Latvia
- Lithuania
- 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.

Having a combined 33 reactors under construction and 87 reactors planned, these 3 countries require annual uranium demand to grow by 14,000 tonnes in the next 5 years.
**Germany: Energiewende will affect future consumer prices and competitiveness of industry**

In September 2011, a study from KfW Banken Gruppe said that about € 25 billion per year will be required to meet the government’s Energiewende nuclear phase-out goals. It puts the total investment at approximately € 250 billion by 2020. This includes up to € 10 billion on fossil fuel plants, € 144 billion on renewable plants and as much as € 29 billion on 3,600 km of high-voltage transmission lines.

These costs come for the account of German tax payers.

Taken these costs into account, which will have a negative impact on future end consumer prices and having a material impact on the competitiveness of the German industry in Europe, in particular compared to France, I expect the Energiewende to face a growing resistance in the next few years.

Also to be considered is the dependence on supply from Russian gas and intended shale gas drilling in Germany, having been shelved for the next seven years.

**Switzerland** has 5 nuclear reactors generating 23 TWh nuclear power equivalent to 34% of Swiss total electricity generating production, with hydro supplying 59%. A lot of electricity is imported from France, Austria and Germany. While there are no current plans to build more nuclear plants, $ 12 billion investment in hydro projects is reported.

In November 2016 a referendum brought by the Green party proposed that nuclear plants to be closed after a maximum of 45 years in operation. This would have meant three of the five reactors closing in 2017 and the other two in 2024 and 2029. The outcome of the referendum failed by about 54 : 46, with voters expressing confidence in both operations and the safety authority, despite a major anti-nuclear campaign.

**United Kingdom**

In 2015, 338 TWh of electricity was produced in the UK. This comprised of 100 TWh (29.5%) from gas, 26 TWh (23%) from coal, 70 TWh (29%) from nuclear, 2 TWh from oil, and 85 TWh 25% from renewables of which: 40 TWh (12%) from wind, 7.5TWh from solar, 9 TWh from hydro and pumped storage, 29 TWh from bio-fuels and 4 TWh from wastes.

Net electricity imports – mostly nuclear were 21 TWh from France, 8.0 TWh from the Netherlands and 0.9 TWh net was exported to Ireland.

North Sea oil has been a major energy and revenue source for the UK, but the resources are now depleted. The decommissioning cost is about £ 30 billion with the government liable for 60% of this.

France’s EDF, 85% owned by the French government, successfully bid for government-owned British Energy, completing the £ 12 billion acquisition in January 2009. EDF Energy, plans to build to EPR nuclear reactors at Hinkley Point C in Somerset, linked to some extent with its plans to build two more at Sizewell in Suffolk. The company applied for consent to construct and operate the first two (3,260 MWe) at Hinkley Point in October 2011.

By mid-September 2010 EDF Energy had led £ 50 million in contracts for site works at Hinkley Point, and by February 2013 pre-development costs there had reached almost £ 1 billion. In March 2013 environmental permits were granted for the plant operation, and planning permission was received.

In October 2013, the government announced that initial agreement had been reached with EDF Group on the key terms of a proposed £ 16 billion investment contract for the Hinkley Point C nuclear power stake. In October 2014, the European Commission decided that revised UK plans to support the construction and operation of the project were in line with the European Union State and rules.
In October 2015, a strategic investment agreement was signed committing China General Nuclear Corporation (CGN) to take 33.5% of the Hinkley Point C Project and EDF initially being responsible for 66.5%, with a view to selling this down to near 50%.

In November 2015, Wintime and China General Nuclear (“CGN”) signed a framework agreement to form a partnership aimed at developing nuclear power and other clean energy project worldwide. The two companies will additionally develop two AP 1000 units at Lufeng in China’s Guangdong Province.

Late in July 2016, EDF made its decision to proceed with the project, with full construction to begin in mid-2019. After seven weeks of uncertainty, the government gave approval after reaching an agreement with EDF, signed at the end of September, which means that the government will be able to prevent the sale of EDF’s controlling stake prior to completion or construction.

On January 3, 2017, it was announced that shareholders of China coal miner Wintime Energy have approved its proposed investment in Hinkley Point C (“HPC”) – EDF and China General Nuclear’s project to build two European Pressurised Water Reactors (EPR’s) in Somerset.

Wintime Energy (Wing Tai Energy in China) announced its plan to invest up to 3 billion Yuan ($ 440 million) in HPC through a wholly-owned subsidiary of New Energy, Huayuan New Energy on December 13, 2016.

The USA accounts for more than 30% of worldwide nuclear power generation of electricity

The USA is the world’s largest producer of nuclear power, accounting for 33% of worldwide nuclear generation of electricity. The country’s 100 nuclear reactors produced 798 billion kWh in 2015, accounting for 19.5% of its total electricity generated. At the end of 2016 there are now 99 nuclear power reactors operable generating 99,535 GWnet and 4 under construction.

Following a 30-year period in which few new reactors were built, it is expected that 6 new units may come on line by 2020, 4 of these resulting from 16 licence applications made since mid-2007 to build 24 new reactors. However, lower gas prices since 2009 have put the economic viability of some existing reactors and proposed projects in doubt.

Government policy changed since the late 1990s have helped pave the way for significant growth in nuclear capacity. Government and industry are working closely on expedited approval for construction and new plant design. The industry invests about $ 7.5 billion per year in maintenance and upgrades of the plants.

By February 2016, the Nuclear Regulatory Commission (NRC) reviewed the operating licences of 83 reactors (79 still operating), over 80% of the US total and about 30 were actually in their 40-60 year age bracket.

The NRC is considering licence renewal applications for 11 further units, with ore applications expected.

The NRC is now preparing to consider extending operating licences beyond 60 to 80 years, with the Subsequent Licence Renewal (SLR) programme.

Despite a near halt in new construction of more than 30 years after the Three Mile Island, Pennsylvania accident in 1979, US reliance on nuclear power has grown. In 1980, nuclear power produced 251 billion kWh accounting for 13% of the country’s electricity generation. In 2008, that output had risen to 890 billion kWh and nearly 20% of total generated electricity.

Most of the increase came from the 47 reactors all approved for construction before 1977, that came online in the late 1970s and 1980s, more than doubling the US nuclear generation capacity. The US nuclear industry has also received remarkable growth in power plant utilisation through improvement refuelling, maintenance and safety systems of existing plants.

In 2015, the US electricity generating was 4,094 kWh (billion kWh) net, 1,582 TWh (39%) of it from coal-fired plant, 1,138 TWh (29%) from gas, 797 TWh (19.5%) nuclear, 259 TWh (6%) from hydro and 279 TWh (7%) from other renewables. In 2015, 727.5 TWh (19.3%) was generated from nuclear energy.
Coal is projected to retain the largest share of the electricity generation mix to 2035, though by 2020 about 29 GWe of coal-fired capacity is expected to be retired due to environmental constraints and low efficiency coupled with a continued drop in the fuel price of gas related to coal.

Given that nuclear plants generate nearly 20% of the US’s electricity overall and 63% of its carbon-free electricity, even a modest increase in electricity demand would require 13.2 GWe of new nuclear capacity by 2025 in addition to the 5 nuclear pans currently under construction in order to maintain this share.

If today’s nuclear plants retire after 60 years of operation 22 GWe of new nuclear capacity would be needed by 2030, and 55 GWe by 2035 to maintain a 20% nuclear share.

► 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 assy 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.

It is noteworthy that while US nuclear power plants in 2016 produced 3.4 million pounds of U3O8, representing only 6% of the total 56.5 million pounds demand of total nuclear utilities.

As a result, with nuclear energy representing more than 60% of emission-free electricity, this underpins the importance of protecting the strong position of nuclear energy in the total electricity generating mix of the US, and the support of the national uranium industry to increase its share in national supply.

From this perspective it is striking to see that the Obama-government did not have an open eye for the problems of the nuclear industry that has suffered the last few years from the collapse of the uranium price, and being responsible for negative operational cash flows and long-term delivery contracts coming under water.

As a result, market valuations of the 4 listed US producers collapsed to six-year lows (see overview).

To prevent funding from foreign investors, in particular from Asia, which would affect national uranium supply as is currently the case in Canada (strategic joint ventures entered into by NexGen Energy and Fission Uranium), it is of strategic importance that the Trump-government supports the country’s uranium industry.

This can be effectuated by a national uranium fund buying uranium in the open market to compensate for the longer than anticipated restarts of Japanese reactors, which is mainly responsible for the short-term oversupply.
Considering that commercial operation has been resumed at only 3 nuclear reactors of Japan’s 48 operational nuclear reactors that were gradually taken offline following the March 2011 accident at Fukushima Daiichi, it is not a question of if but when the uranium piece will recover to the economically viable pre-Fukushima level of $65 – 70/lb.

To facilitate achieving this level again, with nuclear energy to be recognized as the only large-scale emission-free energy source, the Trump-government should follow a comparable protecting policy as for the oil and gas industry by building uranium stock through the open market to secure future supply rather than to remain dependent on foreign supply.

With Donald Trump having reversed the signature of the US under the Paris Climate Agreement, the resignation is related to his “America first” policy to protect the gas and oil industry, which accounts for approximately 67% of electricity generation, and in addition a share of 19.5% from hydro and only 7% from other renewables.

These figures demonstrate that also in case the USA not having withdrawn from the Paris Climate Agreement, their signature is of symbolic nature only, like it is for China, which remains for more than 50% dependable from coal supply in the next 10 years.

### MARKET VALUATION OF LISTED US URANIUM PRODUCERS

<table>
<thead>
<tr>
<th>Trade symbol</th>
<th>Share price</th>
<th>Change in %</th>
<th>12 months</th>
<th>Change in % compared to Market capitalization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25 Nov.</td>
<td>year-end</td>
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<td>L</td>
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<tr>
<td></td>
<td>2017</td>
<td>2016</td>
<td></td>
<td></td>
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<tr>
<td>Uranium Energy</td>
<td>AMEX UEC</td>
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<td>Energy Fuels 1</td>
<td>NYSE MKT UUUU</td>
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<td>1.64</td>
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<td>NYSE MKT URG</td>
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<tr>
<td>Peninsula Energy 2</td>
<td>NYSE PENMF</td>
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<td>0.38</td>
<td>-34.21</td>
</tr>
</tbody>
</table>

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; including takeover of Uranerz completed on June 19, 2015.
3) ISR production commenced in August 2013
4) ISR production commenced in December 2015

**Uranium Energy**'s ("UEC") fully-licenced Hobson Processing Facility is central to all of its projects in South Texas, including the permitted Goliad ISR Project and the development-stage Burke Hollow ISR Project.

In Wyoming **UEC** controls the permitted Reno Creek ISR Project. Additionally, **UEC** controls a pipeline of advanced-stage projects in Arizona, Colorado, New Mexico and Paraguay.

On August 10, 2017, **UEC** announced that it had completed its acquisition of the fully Reno Creek ISR Project located in the Powder River Basin, Wyoming. Reno Creek hosts an NI 43-101 Measured and Indicated Resource of 27.47 million tons grading 0.041% U3O8 yielding 21.98 million pounds U3O8 at a grade thickness (GT) cut-off of 0.20.

A Pre-Feasibility Study ("PFS") on Reno Creek completed in 2014 demonstrated strong economics with low capital and operating costs consistent with ISR projects in Wyoming. Proceeding with development of the Project allows to process up to 2 million pounds U3O8 from five resource units. Cumulative project expenditures to date at Reno Creek total approximately $60 million, including completion of more than 10,000 drill holes. A new and optimized PFS is in progress and will be completed by **UEC**.
On November 2, 2017, UEC announced that the company has entered into a definitive Purchase Agreement with Uranerz Energy, a wholly-owned subsidiary of Energy Fuels to acquire 100% of its advanced-stage North Reno Creek Project located immediately adjacent to and within UEC’s existing Reno Creek Project permitting boundary in the Powder River Basin, Wyoming. The transaction creates a new partnership with private equity firm Pacific Road Resources Funds, who now own approximately 9.5% of UEC’s common shares.

On November 27, 2017, UEC announced that it had completed an updated NI 43-101 resource estimate for its Burke Hollow Project following completion of a recent 132-hole drill campaign. The updated report, including the data from 707 drill holes, demonstrates an Inferred resource increase from 5.12 million pounds U3O8 to 7.09 million pounds U3O8 and a cut-off grade of 0.02% U3O8, at a weighted average grade of 0.088% U3O8 contained within 4.06 million tons.

On November 13, 2017, Energy Fuels announced that it has entered into an agreement to acquire all of the issued and outstanding shares of Excalibur Industries. Excalibur holds royalties on the Company’s Nichols Ranch ISR Project in Wyoming, as well as royalties on several operating, standby and advanced-stage ISR projects in Wyoming owned and operated by Power Resources, a wholly-owned subsidiary of Cameco. The transaction will occur by way of a merger of Excalibur and Energy Fuels’ wholly-owned subsidiary ERF Utah.

Through the transaction, Energy Fuels is acquiring a 6-8% sliding scale gross proceeds producing royalty on the Company’s Nichols Ranch, Hank and Doughstick properties. The royalty also applies to pay the royalty on future production from these projects.

Energy Fuels expects to produce approximately 140,000 to 160,000 pounds U3O8 from the Nichols Ranch Project.

Further, there are 4 additional fully-permitted well fields at Nichols Ranch and 14 fully permitted well fields at the Company’s Jane Dough Project, of which Doughstick represents a portion, that are expected to be developed as an extension of Nichols Ranch in the future. Energy Fuels’ Hank Project is fully-permitted for 8 well fields that are expected to be developed as satellite operations to Nichols Ranch in the future.
According to a February 2015 technical report, the Nichols Ranch, Jane Dough and Hank projects contain 3.4 million tons of Measured and Indicated Mineral Resources with an average grade of 0.115% U3O8, containing 7.9 million pounds of uranium, along with 0.6 million tons of Inferred Mineral Resources with an average grade of 0.10% U3O8, containing 1.1 million pounds of uranium.

Through the transaction, Energy Fuels is also acquiring the 4% gross proceeds production royalty on Cameco’s North Butte/Browns Range Project, the Ruby Ranch Project, and the Greasewood Property. North Butte is a fully permitted and operational project that has been operated by Cameco as a satellite to their Smith Ranch-Highland ISR Project since 2013. Cameco ceased well field development at North Butte in 2016. However, as uranium prices rise, North Butte should be expected to resume production in the future.

According to Cameco’s 2016 Annual Report, the North Butte/Browns Range Project contains 6,499 million tons of Measured and Indicated Mineral Resources with an average grade of 0.07% U3O8 containing approximately 10.1 million pounds of uranium. Of these resources, 365 million tons are Proven Mineral Reserves with an average grade of 0.08% U3O8 containing 0.7 million pounds of uranium. The Project also contains significant quantities of Inferred Mineral Resources.

Energy Fuels expects to hold the royalty on the Cameco properties and receive royalty payments from future production from those properties.

As consideration, Energy Fuels will deliver to current shareholders of Excalibur common shares of the Company having a total value of US$ 3.5 million.

Ur-Energy is operating the Lost Creek in-situ uranium facility in southwest-central Wyoming. The Company has produced, packaged and shipped more than 2 million pounds of U3O8 from Lost Creek since the commencement of operations. Applications are under review by various agencies to incorporate the Company’s LC East Project area into the Lost Creek permits.

In the 9 months of 2017 Ur-Energy produced 197.4 thousand pounds U3O8 and sold 261,000 pounds U3O8 and purchased 519,000 pounds U3O8 for total sales of 780,000 pounds U3O8 at an average price of $ 49.09/lb, sold for revenues of US$ 38.3 million.

Continuing guidance for 2017

Ur-Energy does not currently anticipate any sales in Q4, as the Company has completed its contracted deliveries for the year. The Q4 production target for Lost Creek is between 65,000 and 75,000 pounds U3O8 dried and drummed. The production rate may be adjusted based on operational matters and other indicators in the market.
For the 9 months ended September 30, 2017, Ur-
Energy’s contract sales from U3O8 produced at Lost
Creek totalled 261,000 pounds U3O8.
The Company also sold 519,000 purchased pounds
U3O8. In total 780,000 pounds U3O8 at an average
price of $ 49.09 were sold for revenues of US$ 38.3
million.

Year-to-year production is on track to the projected
level of 250,000 to 300,000 pounds U3O8 for 2017.

Peninsula Energy

On October 26, 2017, Peninsula Energy announced project initiative commences at its Lance Projects in Wyo-
ming. Laboratory testing indicates that using an alternative mining solution could transform the Lance Projects
operating performance and cost profile to be much closer to global industry leading ISR projects. Multiple labora-
tory tests confirm positive results using a lower pH solution chemistry on Lance core samples.

Average product solution uranium grades of 295 mg/L U3O8 obtained from laboratory tests, after over 10 times
higher than average actual alkaline operations solution grades of 22 mg/L U3O8.

Peninsula has held positive initial discoveries with the relevant regulatory body and the Company is commencing
a licence and permit amendment process. The Company’s current portfolio provides a consistent revenue stream
throughout the transformation time line.

The transition of a low pH recovery system could not only positively reform Peninsula’s key asset in the United
States during the currently challenging uranium market conditions, but could also ultimately position the Company
to rapidly grow when uranium markets improve.

All 1st quartile uranium operations globally are ISR utilising a low pH lixiviant.

► Q1 fiscal year 2018 projects operating performance

Production derived from operations at the Lance Projects during the quarter ended September 30, 2017 was ap-
proximately 34,500 pounds U3O8 with approximately 42,500 pounds U3O8 dried and drummed in the quarter.
Sales during the quarter totalled 132,934 pounds U3O8 (92,934 pounds from Lance, 40,000 pounds from market
purchases) at an average price of US$ 50 per pound U3O8 for cash receipts of US$ 6.6 million.
These production results represent consistent improvement over recent quarters but still remain below internal target levels. All previously reported production improvement initiatives are continuing and production from the Company’s 9 commissioned header houses using alkaline lixiviant will form the basis of on-going operations over the near-term.

**Peninsula** is also bringing a 10th header house into readiness in mid-2018 to increase operating flexibility.

### Production profile over the next 24 months

Changing from alkaline ISR solution to a low PH ISR solution is not expected to require substantial changes to the current processing plant and/or other infrastructure. Unit operating costs using a low pH leach solution are expected to be considerably lower than what they would be under an alkaline solution.

In parallel to the permit amendment process, operations at the Lance Projects will continue as they are, with production from the currently active operating areas. No further alkaline leach permit beyond those for Header House 10. Ongoing uranium sales will generate revenue sufficient to allow time to complete access, licencing amendments and transition to an alternative leach solution regime.

To ensure that future Lance-sources product delivery commitments continue to be met and to further reduce future risks, **Peninsula** has opened discussions with an existing customer regarding possible contract variations to allow additional flexibility and possible adjustments of its product delivery schedules.

On October 17, 2017, **Peninsula** announced that it has decided to exit and sell its interests in the **Karoo Projects** in South Africa to focus its future capital expenditures on the operating **Lance Projects** in Wyoming. The Company intends to complete a disinvestment of its 74% interest in the Karoo Projects through an active process during the remainder of the 2017 calendar year. **Peninsula** may opt to retain some level of exposure to the Karoo Project albeit at a significantly reduced level to that which it currently holds.

The recently completed internal pre-feasibility study now provides a more comprehensive suite of project data for potential acquirers to review.